

## NOTICE TO BIDDERS

Sealed bids addressed to the City of Bellmead will be received at the Bellmead City Hall Council Chambers; 3015 Bellmead Drive; Bellmead, Texas 76705 until 2:00 PM on Tuesday, December 17, 2024 for the construction of the Water System SCADA Improvements in the City of Bellmead, Texas. The bids shall be labeled:

Water System SCADA Improvements  
Bellmead, Texas

Bids must be submitted on the Bid Form provided and must be accompanied by a cashier's check, certified check or acceptable bidder's bond payable without recourse to the City of Bellmead, Texas in an amount not less than five (5) percent of the bid submitted as a guarantee that the bidder will enter into a contract and execute a Performance Bond and a Payment Bond within fifteen (15) days after the notification of the award of the contract.

The bids will be publicly opened and read aloud in the Council Chambers at Bellmead City Hall; 3015 Bellmead Drive; Bellmead, Texas; 76705 at 2:00 PM on Tuesday, December 17, 2024. The City Council will officially review the bids and award the contract as soon thereafter as practical. The City of Bellmead reserves the right to accept or reject any and all bids, as the best interest of the City may require, and to waive any informality in bids received.

Plans, specifications and bidding documents may be secured beginning Monday, November 25, 2024 at Kasberg, Patrick & Associates, LP; (254) 773-3731; 19 North Main Street; Temple, Texas 76501 for a non-refundable cost of \$50.00 per set (11"x17") printed (or no charge for PDF download). Checks shall be made payable to Kasberg, Patrick & Associates, LP.

A Non-Mandatory Pre-Bid Conference will be held in the Bellmead City Hall located at 3015 Bellmead Drive, Bellmead, Texas 76705 at 9:00 AM on Wednesday, December 4, 2024. Although this is not a mandatory Pre-Bid Conference, it is highly recommended that all bidders attend, as there will be an opportunity for site visits immediately following the Pre-Bid Conference.

Technical questions and inquiries should be directed to Joe Kotrla, P.E., [jkotrla@mccreary-engr.com](mailto:jkotrla@mccreary-engr.com), until 12:00 p.m. on Tuesday, December 10, 2024. The Engineer and/or Owner shall not be bound by any references obtained by the Bidders unless an addendum is produced and released.

Waco Tribune-Herald & City of Bellmead Website

CITY OF BELLMEAD, TEXAS

November 21, 2024

December 3, 2024

Karen Evans, CPA – Assistant City Manager

# CITY OF BELLMEAD, TEXAS

## CONSTRUCTION PLANS FOR WATER SYSTEM SCADA IMPROVEMENTS



2024

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### City Council

James Cleveland	Mayor
Bryan Winget	Mayor Pro-Tem
Karen Coleman	Council Member
Travis Gibson	Council Member
Tommy Bainbridge	Council Member
Gary Moore	Council Member

### City Staff

Yousry Zakhary	City Manager
Craig Rice	Director of Public Works



Prepared By  
**KASBERG, PATRICK & ASSOCIATES, LP**  
CONSULTING ENGINEERS  
TEMPLE, TEXAS 76501  
KPA Firm Registration Number F-510



*GINGER R. Tolbert*

11/25/2024  
DATE

**A. BIDDER/CONTRACTOR ELIGIBILITY**

1. A NON-MANDATORY PRE-BID CONFERENCE WILL BE HELD PRIOR TO BID OPENING FOR THE PROJECT.

**B. GENERAL NOTES**

- 1. ALL CONSTRUCTION FOR THIS PROJECT SHALL GENERALLY CONFORM TO THE REQUIREMENTS OF THE TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES (2014 EDITION) UNLESS EXCEPTED OR NOTED ON THESE PLANS.
- 2. ALL BARRICADES, SIGNS AND TRAFFIC CONTROL FOR THIS PROJECT SHALL CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS.
- 3. THE BIDDERS FOR THIS PROJECT SHALL FAMILIARIZE THEMSELVES WITH ALL REQUIREMENTS OF WORKING IN STATE AND CITY OF BELLMEAD RIGHTS-OF-WAY AND EASEMENTS. THE BIDDERS SHALL FAMILIARIZE THEMSELVES WITH ALL INSURANCE REQUIREMENTS FOR SAID WORK AND SHALL INCLUDE IN THEIR BIDS, INSURANCE COSTS AND INSURANCE PREMIUMS THAT PROVIDE FOR THE STATE OF TEXAS, THE CITY OF BELLMEAD, AND THE ENGINEER AS ADDITIONAL INSURED UNDER THE CONTRACTOR'S POLICIES.
- 4. THE CONTRACTOR SHALL IF REQUIRED PROVIDE THE CITY OF BELLMEAD WITH A BARRICADE, SIGNING AND TRAFFIC PLAN WHICH WILL INCLUDE HOW TRAFFIC WILL BE HANDLED DURING CONSTRUCTION. THE BARRICADES, SIGNS AND LIGHTS SHALL CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS. THE PLAN SHALL BE PREPARED BY A TEXAS REGISTERED PROFESSIONAL ENGINEER. STANDARD TRAFFIC CONTROL PLANS HAVE BEEN PROVIDED. SHOULD THE CONTRACTOR CHOOSE TO DEVIATE AND DEVELOP THEIR OWN TRAFFIC CONTROL IT SHALL BE DESIGNED BY A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS.
- 5. CONTRACTOR SHALL NOTIFY THE CITY OF BELLMEAD A MINIMUM OF THREE (3) WORKING DAYS (MONDAY-FRIDAY) IN ADVANCE OF CONSTRUCTION STARTUP, FOLLOWED BY A LETTER OF CONFIRMATION. CONTRACTOR SHALL ALSO GIVE A MINIMUM OF THREE (3) WORKING DAYS (MONDAY-FRIDAY) NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS OR PERSONS IN CHARGE OR PRIVATE AND PUBLIC UTILITIES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK. THE FOLLOWING ARE TELEPHONE NUMBERS OF THE ENTITIES MOST LIKELY TO BE AFFECTED:
  - TEXAS ONE CALL 1-800-545-6005
  - TEXAS EXCAVATION SAFETY SYSTEM 1-800-344-9377
  - TXU ELECTRIC DELIVERY 1-512-244-5691
  - ATMOS ENERGY 1-866-332-8667
  - CITY OF BELLMEAD, TEXAS 1-254-799-2436
  - CABLEVISION 1-254-778-9441
  - CENTROVISION 1-254-773-1163
  - SBC 1-254-954-4102 OR 1-800-669-8344
  - AT&T 1-800-252-1133
- 6. LOCATION OF EXISTING UTILITIES SHOWN ON THE PLANS WAS COMPILED FROM RECORD INFORMATION. NO WARRANTY IS IMPLIED AS TO THE ACTUAL LOCATION OF EXISTING UTILITIES. CONTRACTOR TO FIELD VERIFY LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION BY POT-HOLING. CONTRACTOR SHALL CALL THE CITY OF BELLMEAD AT (254) 799-2436. IF THERE ARE ANY CONFLICTS BETWEEN PROPOSED AND EXISTING UTILITIES, OR IF THE EXISTING UTILITIES ARE IN ANY WAY DIFFERENT FROM WHAT IS SHOWN ON THE DRAWINGS, THEN IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE CITY OR OTHER AFFECTED UTILITY BEFORE PROCEEDING WITH ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESOLVING ALL CONFLICTS AT HIS EXPENSE. THE OWNER WILL CONSIDER ANY CONFLICTS AT SAID LOCATIONS ON A CASE BY CASE BASIS IN ORDER TO DETERMINE IF THE CONTRACTOR SHOULD BE REIMBURSED FOR HIS EXPENSE IN SOLVING SAID CONFLICT.
- 7. CONTRACTOR SHALL MAKE ALL DUE PRECAUTIONS TO PROTECT EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF THESE CONSTRUCTION OPERATIONS ARE TO BE REPAIRED IMMEDIATELY BY THE CONTRACTOR TO AT LEAST THE PREEXISTING CONDITION AT NO ADDITIONAL COST TO THE OWNER.
- 8. CONTRACTOR SHALL COORDINATE INTERRUPTIONS OF ALL UTILITIES AND SERVICES WITH ALL APPLICABLE UTILITY COMPANY OR COMPANIES. ALL WORK TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY COMPANY OR AGENCY INVOLVED.
- 9. WHEN UNLOCATED OR INCORRECTLY LOCATED UNDERGROUND PIPING OR A BREAK IN A LINE OR OTHER UTILITIES AND SERVICES ARE ENCOUNTERED DURING SITE WORK OPERATIONS, THE CONTRACTOR SHALL NOTIFY THE APPLICABLE UTILITY COMPANY IMMEDIATELY TO OBTAIN PROCEDURE DIRECTIONS. CONTRACTOR TO COOPERATE WITH THE APPLICABLE UTILITY COMPANY IN MAINTAINING ACTIVE SERVICES IN OPERATION.
- 10. THE CONTRACTOR SHALL CONTACT THE CITY OF BELLMEAD AT (254) 799-2436 FOR EXISTING UTILITY LOCATIONS PRIOR TO ANY EXCAVATION. IN ADVANCE OF CONSTRUCTION, THE CONTRACTOR IS TO VERIFY THE LOCATIONS OF ALL UTILITIES TO BE EXTENDED, TIED TO OR ALTERED, OR SUBJECT TO DAMAGE/INCONVENIENCE BY THE CONSTRUCTION OPERATIONS. THE CITY OF BELLMEAD WATER AND WASTEWATER MAINTENANCE RESPONSIBILITY ENDS AT RIGHT-OF-WAY/EASEMENT LINES.
- 11. CONTRACTOR SHALL STRIP 6 INCHES OF TOPSOIL FROM ALL AREAS SUBJECT TO GRADE MODIFICATIONS. REMOVE ANY AREA OF WEAK SOIL.
- 12. WITHIN CITY OF BELLMEAD RIGHT-OF-WAY, RESIDENTIAL DRIVEWAYS ARE TO HAVE A 10% MAXIMUM GRADE. NON RESIDENTIAL DRIVEWAYS ARE TO HAVE A 3% MAXIMUM GRADE FOR THE FIRST THIRTY (30) FEET OFF THE EDGE OF PAVEMENT.
- 13. THE CONTRACTOR SHALL PROTECT ALL EXISTING FENCES. IN THE EVENT THAT A FENCE MUST BE REMOVED, THE CONTRACTOR SHALL REPLACE SAID FENCE OR PORTION THEREOF WITH THE SAME TYPE OF FENCING TO A QUALITY OF EQUAL OR BETTER THAN THE ORIGINAL FENCE. THIS WILL NOT BE A SEPARATE PAY ITEM, UNLESS SPECIFICALLY NOTED ON THE CONSTRUCTION DRAWINGS.
- 14. THE CONTRACTOR SHALL MAKE AN EXAMINATION OF THE PROJECT SITE AND COMPLETELY FAMILIARIZE HIMSELF WITH THE NATURE AND EXTENT OF THE WORK TO BE ACCOMPLISHED. NO EXTRA COMPENSATION WILL BE ALLOWED FOR ANY WORK MADE NECESSARY BY UNUSUAL CONDITIONS OR OBSTACLES ENCOUNTERED DURING THE PROGRESS OF THE WORK, WHICH CONDITIONS OR OBSTACLES ARE READILY APPARENT UPON A VISIT TO THE SITE. IF THERE ARE ANY QUESTIONS OF THIS REGARD OR IF THERE ARE ANY DISCREPANCIES BETWEEN THE PLANS AND ACTUAL SITE CONDITIONS THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO THE SUBMISSION OF BIDS.
- 15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF HIS MATERIALS AND EQUIPMENT FROM THEFT, VANDALISM, ANIMALS, FIRE, ETC., WHILE SAID MATERIALS AND EQUIPMENT ARE ON THE PROJECT WHETHER STORED OR INSTALLED IN PLACE, UNTIL THE PROJECT HAS BEEN ACCEPTED BY THE CITY OF BELLMEAD.
- 16. UPON COMPLETION OF THE PROJECT, THE SITE(S) AS DEFINED HEREIN, SHALL BE CLEANED OF ALL DEBRIS AND LEFT IN A NEAT AND PRESENTABLE CONDITION.
- 17. IN THOSE CASES WHERE FIXED FEATURES REQUIRE, THE DESIGN SLOPES INDICATED HEREIN AND ON THE

- CROSS SECTIONS MAY BE MODIFIED IN THE FIELD AS DETERMINED BY THE ENGINEER IF EXISTING CONDITIONS SO REQUIRE.
- 18. THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT ALL ADJOINING PAVEMENT SECTIONS SHALL BE PROTECTED DURING ALL PHASES OF CONSTRUCTION AND ANY DAMAGES INCURRED DUE TO CONTRACTOR'S OPERATION SHALL BE REPAIRED AND/OR REPLACED AT THE CONTRACTOR'S EXPENSE.
- 19. WHERE EXISTING PAVEMENT ADJOINS NEW PAVEMENT, THE EXISTING PAVEMENT SHALL BE SAWED TO A NEAT TRANSVERSE LINE TO PERMIT ADEQUATE JOINING.
- 20. AT TIMES REQUESTED BY THE CONTRACTOR, THE CITY OF BELLMEAD STREET DEPARTMENT FORCES WILL REMOVE AND/OR RELOCATE EXISTING TRAFFIC SIGNS. FIVE WORKING DAYS NOTICE WILL BE REQUIRED.
- 21. ACCESS TO OFFICES, BUSINESSES AND DRIVEWAYS ALONG THE PROJECT MUST RECEIVE PRIORITY BY THE CONTRACTOR. ACCESS SHALL BE MAINTAINED AT ALL TIMES.
- 22. EXISTING PAVING, BUILDINGS AND OTHER ITEMS SHOWN ON THE PLANS ARE NOT SPECIFICALLY RELATED TO THE WORK OF THE CONTRACTOR AND IS FOR INFORMATION ONLY, UNLESS OTHERWISE NOTED.
- 23. THE PROCUREMENT AND TRANSPORTATION OF WATER REQUIRED FOR INCLUSION IN THE PROJECT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- 24. ALL UTILITY TECHNICAL SPECIFICATIONS FOR THE CITY OF BELLMEAD SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS LISTED BELOW AND AMENDMENTS INCLUDED HEREIN. THE TECHNICAL SPECIFICATIONS FROM "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" (BLUE BOOK) BY THE NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS:

NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS  
REGIONAL INFORMATION CENTER  
P.O. BOX 5888 ARLINGTON, TEXAS 76005-5888

WILL BE USED ON THE PROJECT. COPIES MAY BE PURCHASED FROM THE ABOVE ADDRESS OR REVIEWED AT THE CITY ENGINEERS OFFICE. RESPONSIBILITY FOR UPDATING THESE COPIES WILL BE THE CONTRACTORS RESPONSIBILITY.

**C. CONSTRUCTION LAYOUT/PROJECT COORDINATION**

- 1. CONTRACTOR SHALL LOCATE, PROTECT AND MAINTAIN BENCHMARKS, MONUMENTS AND CONTROL POINTS. RE-ESTABLISHMENT OF DISTURBED OR DESTROYED ITEMS SHALL BE ACCOMPLISHED BY A TEXAS REGISTERED PROFESSIONAL LAND SURVEYOR AT NO COST TO THE OWNER.
- 2. PRE-CONSTRUCTION CONFERENCE
  - A. PRIOR TO BEGINNING WORK ON THE PROJECT AND SOON AFTER THE AWARD OF THE CONTRACT, A CONFERENCE WILL BE HELD AMONG THE REPRESENTATIVES OF THE CITY OF BELLMEAD, THE ENGINEER, THE CONTRACTOR AND ANY SUBCONTRACTOR THAT WILL BE INVOLVED IN THE WORK. AT THAT TIME THE CONTRACTOR SHALL SUBMIT CHARTS OR BRIEFS, OUTLINING THE MANNER OF EXECUTION OF THE WORK THAT IS INTENDED IN ORDER TO COMPLETE THE SPECIFIED WORK WITHIN THE ALLOTTED TIME. THIS CONFERENCE WILL MORE COMPLETELY ESTABLISH THE SEQUENCE OF WORK TO BE FOLLOWED AND ESTABLISH THE ESTIMATED PROGRESS SCHEDULE FOR COMPLETION OF THE VARIOUS TASKS. WHEN APPLICABLE, THE PRE-CONSTRUCTION CONFERENCE WILL BE HELD ONLY AFTER INSTALLATION OF THE EROSION AND SEDIMENTATION CONTROLS. THIS CONFERENCE SHOULD TAKE PLACE ON THE SITE TO DEMONSTRATE COMPETENCE WITH THE EROSION AND SEDIMENTATION CONTROL PLAN AND WATER POLLUTION ABATEMENT PLAN.
  - B. IN ADDITION, AT THIS CONFERENCE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING THE ENGINEER WITH ALL OF THE FOLLOWING, AS SPECIFIED HEREIN OR AS DIRECTED BY THE ENGINEER:
    - a. SAMPLES OF ALL MATERIALS TO BE USED ON THE PROJECT WITH IDENTIFICATION AS TO PRODUCT NAME; NAME, LOCATION, PHONE NUMBER (INCLUDING AREA CODE) AND MAILING ADDRESS OF PRODUCT SOURCE AND MANUFACTURER, IF DIFFERENT FROM SOURCE; CONTENT OF PRODUCT; AMOUNT OF EACH INGREDIENT IN THE PRODUCT, AND MANUFACTURER'S DIRECTIONS AS TO USE AND APPLICATION OF THE PRODUCT, IF APPLICABLE.
    - b. MANUFACTURER'S LITERATURE OF ALL MATERIALS AND EQUIPMENT INSTALLED ON THE PROJECT.
- 3. THE PLANS FOR THIS PROJECT SHOW PROPOSED ELEVATIONS, SLOPES AND DIMENSIONS THAT ARE INTENDED FOR ACTUAL PLACEMENT. HOWEVER, THERE MAY BE SOME INSTANCES WHERE EXISTING CONDITIONS MAKE IT IMPRACTICAL TO ACHIEVE THE IDEAL. IN THOSE INSTANCES, THE ENGINEER WILL ASSIST THE CONTRACTOR IN MAKING PROPER FIELD CHANGES TO BETTER ACCOUNT FOR FIELD CONDITIONS.
- 4. THE CONTRACTOR FOR THE PROJECT WILL MARK THE LIMITS OF CONSTRUCTION AND RIGHT-OF-WAY PRIOR TO COMMENCEMENT OF THE PROJECT. PRIVATE PROPERTY SHALL BE OFF LIMITS UNLESS WRITTEN PERMISSION IS GIVEN TO THE CONTRACTOR BY THE OWNER. THE CITY OF BELLMEAD WILL NOT BE RESPONSIBLE FOR ANY CONTRACTOR OPERATIONS OFF OF THE PROJECT SITE.

**D. STORM WATER NOTES**

- 1. STORM WATER AND DRAIN LINES SHALL BE AS FOLLOWS.
  - A. ALL PIPES 18-INCHES OR GREATER IN DIAMETER SHALL BE C-76 CLASS III REINFORCED CONCRETE PIPE, UNLESS OTHERWISE NOTED.
  - B. ALL PIPE JOINTS SHALL BE WRAPPED AND SECURED AROUND EACH JOINT WITH AN 18-INCH WIDE STRIP OF MARFI-140-N OR APPROVED EQUIVALENT.
- 2. DO NOT EXCEED MANUFACTURER'S RECOMMENDATION FOR CURVATURE OF LINES AND/OR DEFLECTION OF PIPE JOINTS. INSTALL JOINTS OR FITTINGS AS REQUIRED. CONTRACTOR SHALL NOT USE BEND OR WYES.
- 3. THROUGHOUT THE CONSTRUCTION, AND THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR IS TO ASSURE THAT DRAINAGE OF STORM WATER RUNOFF IS NOT BLOCKED.
- 4. PRIOR TO FINAL ACCEPTANCE, ALL NEW STORM SEWER STRUCTURES AND STORM SEWER PIPE SHALL BE CLEANED OUT BY THE CONTRACTOR. THIS WORK WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED AS SUBSIDIARY TO THE VARIOUS BID ITEMS.

**E. SITE GRADING/CONNECTION NOTES**

- 1. CONTRACTOR SHALL CONTROL DUST CAUSED BY THE WORK AND COMPLY WITH POLLUTION CONTROL REGULATIONS OF GOVERNING AUTHORITIES. THIS SHALL BE SUBSIDIARY TO THE PROJECT.
- 2. CONTRACTOR SHALL REMOVE BUILT UP MATERIAL ON ADJACENT PUBLIC ROADWAYS RESULTING FROM HIS WORK. CLEANING TO BE AT LEAST ONCE A DAY. THIS SHALL BE SUBSIDIARY TO THE PROJECT.
- 3. CONTRACTOR SHALL NOT STOCKPILE MATERIAL WITHIN THE 100 YEAR FLOOD PLAIN.

- 4. THIS PROJECT IS A UNIT PRICE PROJECT AND PAYMENTS SHALL BE MADE AT THE UNIT PRICE AND QUANTITY FOR ITEMS CONSTRUCTED AND/OR INSTALLED.
- 5. THE SUCCESSFUL CONTRACTOR SHALL DEVELOP A PROJECT SCHEDULE FOR THE PROJECT IN PRIMAVERA, MICROSOFT OFFICE, EXCEL, OR OTHER SOFTWARE THAT ILLUSTRATES THE TASKS TO COMPLETE THE PROJECT WITH A CRITICAL PATH. THE SCHEDULE SHALL BE MAINTAINED THROUGHOUT THE PROJECT AND THE CONTRACTOR SHALL BE PREPARED TO REVIEW AND DISCUSS THE SCHEDULE AT THE CONSTRUCTION PROGRESS MEETINGS. CONSTRUCTION PROGRESS MEETINGS WILL BE HELD AT A MINIMUM OF ONCE PER MONTH AND THE CITY RESERVES THE RIGHT TO HAVE CONSTRUCTION PROGRESS MEETINGS AS REGULARLY AS THEY DEEM NECESSARY. THIS SHALL BE SUBSIDIARY TO THE PROJECT.
- 6. ALL HYDRO MULCH ON THIS PROJECT SHALL BE INSTALLED UTILIZING HIGH PERFORMANCE - FLEXIBLE GROWTH MEDIUM. THE SPECIFICATION FOR HIGH PERFORMANCE - FLEXIBLE GROWTH MEDIUM IS INCLUDED IN THE SPECIFICATIONS AND CONTRACT DOCUMENT BOOK FOR THIS PROJECT. ALL ELEMENTS OF THE SPECIFICATION SHALL BE PERFORMED AND INCLUDED IN THE PROJECT. ALL BID ITEMS FOR FURNISHING AND INSTALLING HYDRO-MULCH SHALL INCLUDE HIGH PERFORMANCE - FLEXIBLE GROWTH MEDIUM, WATER TO ESTABLISH AND MAINTAIN GRASS AND FINAL MOWING PRIOR TO ACCEPTANCE.
- 7. ALL STORAGE AREAS FOR MATERIALS AND EQUIPMENT OR OTHER AREAS DISTURBED BY THE CONTRACTOR IN THE CONSTRUCTION OF THIS PROJECT THAT ARE OUTSIDE OF THE AREA TO REMAIN NON-VEGETATED SHALL BE RE-VEGETATED AT NO EXPENSE TO THE CITY.
- 8. THE CONTRACTOR SHALL NOTIFY AFFECTED PROPERTY OWNERS A MINIMUM OF 1 WEEK PRIOR TO THE START OF CONSTRUCTION IN AND AROUND THEIR RESPECTIVE PROPERTIES.
- 9. INCLUDED WITH THE DESIGN PACKAGE ARE THE DESIGN AUTOCAD FILES THAT INCLUDES EXISTING SURFACE AND PROPOSED SURFACE. USE OF THE AUTOCAD FILE IS AT THE RISK OF THE BIDDERS. NO WARRANTY IS ISSUED BY THE DESIGN ENGINEER OR THE CITY FOR USE OF THIS FILE.
- 10. ALL STORAGE AREAS FOR MATERIALS AND EQUIPMENT OR OTHER AREAS DISTURBED BY THE CONTRACTOR IN THE CONSTRUCTION OF THIS PROJECT THAT ARE OUTSIDE OF THE AREA TO REMAIN NON-VEGETATED SHALL BE RE-VEGETATED AT NO EXPENSE TO THE CITY.
- 11. ALL WATER VALVES, WATER METERS, MANHOLES, HAND HOLES, PULL BOXES, JUNCTION BOXES, ETC. THAT ARE IN THE AREA OF CONSTRUCTION SHALL BE ADJUSTED TO THE FINAL GRADE OF INFRASTRUCTURE. THIS SHALL BE SUBSIDIARY TO THE PROJECT.
- 12. ALL WATER SERVICES SHALL BE HDPE AS SHOWN IN THE DETAILS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ALL WATER METERS AND INSTALLING ALL ITEMS AND APPARATUS REQUIRED BY THE CITY OF BELLMEAD AND OTHER REGULATORY AGENCIES FOR WATER SERVICE INSTALLATIONS.
- 13. ALL ASPHALT PAVING SHALL RECEIVE PRIME COAT AND TACK COAT AS APPROPRIATE. THIS SHALL BE SUBSIDIARY TO THE RESPECTIVE ASPHALT BID ITEMS.
- 14. THERE MAY BE INSTANCES IN WHICH FIELD ADJUSTMENTS OR CHANGES WILL BE REQUIRED FOR CONSTRUCTION OF THIS PROJECT. IN THOSE INSTANCES, THE CONTRACTOR SHALL WORK WITH THE ENGINEER TO MAKE FIELD ADJUSTMENTS IN ORDER TO SUCCESSFULLY COMPLETE THE PROJECT. THESE ADJUSTMENTS WILL BE PAID UTILIZING EXISTING BID PRICES AT THE UNIT PRICE BID AND QUANTITY INSTALLED. IN THE EVENT THERE IS NOT A BID ITEM FOR A CONSTRUCTION TASK, A CHANGE ORDER WILL BE ISSUED.
- 15. CURB INLETS THAT EXTEND INTO THE SIDEWALKS SHALL BE INCORPORATED AND MEET ALL ADA STANDARDS. THIS SHALL BE SUBSIDIARY TO THE PROJECT.
- 16. ALL STORM WATER JUNCTION BOXES AND INLETS SHALL INCLUDE MANHOLES AND SHALL BE SUBSIDIARY TO THE APPROPRIATE BID ITEM FOR JUNCTION BOXES AND INLETS.
- 17. THE BID ITEM "FURNISH & INSTALL COMPACTED FILL, COMPLETE FOR" IN A QUANTITY OF CUBIC YARDS IS BASED ON THE AUTOCAD MODEL WHICH HAS BEEN PROVIDED THE QUANTITY IS IN COMPACTED CUBIC YARDS AND ALL BIDDERS SHALL APPLY THEIR CONVERSION FROM LOOSE TRUCK CUBIC YARDS TO THE BID ITEMS FOR COMPACTED CUBIC YARDS. THIS BID ITEM AND THE BID ITEM "UNCLASSIFIED EXCAVATION" SHALL BE PLAN QUANTITY ITEMS AND SHALL BE PAID THE QUANTITY SHOWN ON THE BID SCHEDULE UNLESS THERE IS A SIGNIFICANT CHANGE TO THE GRADING PLAN FOR THE PROJECT.
- 18. ALL DEWATERING FOR CONSTRUCTION SHALL BE SUBSIDIARY TO THE PROJECT.
- 19. THE SUCCESSFUL CONTRACTOR SHALL PERFORM MOWING OF THE VEGETATION ONCE GRASS HAS REACHED A HEIGHT OF 3 INCHES AND A FINAL MOWING OF THE PROJECT PRIOR TO ACCEPTANCE. THIS SHALL BE SUBSIDIARY TO THE PROJECT.
- 20. CONTRACTOR SHALL MOW OR SHRED RIGHT-OF-WAY AND EASEMENTS PRIOR TO RELEASING THE PROJECT TO THE CITY OF BELLMEAD. THIS WILL BE SUBSIDIARY TO THE PROJECT AND WILL NOT HAVE A SPECIAL PAY ITEM.
- 21. REQUIRED FILL EMBANKMENT OUTSIDE OF THE ROADWAY SHALL BE PLACED AND COMPACTED PER TECHNICAL SPECIFICATIONS OR MAXIMUM 6 INCH LOOSE LIFTS AND COMPACTED TO MINIMUM 95% STANDARD PROCTOR DENSITY AT OPTIMUM MOISTURE TO +2%. IF NOT OTHERWISE SPECIFIED.
- 22. ANY EXISTING PAVEMENT, CURBS, AND/OR SIDEWALK DAMAGED OR REMOVED BY THE CONTRACTOR THAT ARE NOT A PART OF THIS CONTRACT ARE TO BE REPAIRED BY THE CONTRACTOR TO AT LEAST THE PREEXISTING CONDITION AT HIS EXPENSE BEFORE ACCEPTANCE OF THE WORK.
- 23. MAKE CONNECTION BETWEEN NEW AND EXISTING ASPHALT STREETS BY REMOVING EXISTING STREET FROM THE END OF EXISTING PAVEMENT UNTIL FULL DEPTH BASE AND HMAC ARE ENCOUNTERED AND HMAC APPEARS TO BE IN SOUND CONDITION. PROVIDE EXPANSION JOINTS AND DOWELS WHERE CONNECTING EXISTING CURB TO NEW CONSTRUCTION.
- 24. AT INTERSECTIONS WHICH HAVE VALLEY DRAINAGE THE CROWN OF THE INTERSECTING STREETS TO CULMINATE IN A DISTANCE OF 40 FEET FROM THE INTERSECTING CURB LINE, UNLESS OTHERWISE NOTED OR DIRECTED BY THE ENGINEER.
- 25. UNLESS OCCURRING AT AN EXPANSION JOINT, MAKE CONNECTION BETWEEN NEW AND EXISTING SIDEWALK BY EXPOSING AND CLEANING A ONE FOOT LENGTH OF WELDED WIRE REINFORCEMENT AND LAPPING NEW REINFORCEMENT ONTO THIS LENGTH.
- 26. STREETS SHALL BE CUT AND/OR FILLED TO SUBGRADE PRIOR TO UTILITY CONSTRUCTION.

**F. TESTING AND SUBMITTALS**

- 1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING MATERIAL SAMPLES AS WELL AS ANY MANUFACTURERS LITERATURE OF MATERIALS USED ON THIS PROJECT AS REQUIRED BY THE ENGINEER. ANY COSTS ASSOCIATED WITH ANY SAMPLING AND TESTING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THESE COSTS SHALL BE CONSIDERED AS INCIDENTAL AND THE CONTRACTOR WILL NOT BE ENTITLED TO ANY ADDITIONAL COMPENSATION.
- 2. CONTRACTOR SHALL COORDINATE ALL MATERIALS TESTING WITH THE CITY OF BELLMEAD CONSTRUCTION REPRESENTATIVE AND THE CITY TESTING COMPANY, INCLUDING SOIL DENSITY TESTS AND RELATED SOILS

ANALYSIS. TESTS TO BE ACCOMPLISHED BY AN INDEPENDENT LABORATORY UNDER CONTRACT WITH THE CITY OF BELLMEAD, AT THE FREQUENCY, TIME AND LOCATION AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS. A COPY OF THE TEST RESULTS TO BE FORWARDED TO THE CITY OF BELLMEAD, THE OWNERS REPRESENTATIVE, AND THE CONTRACTOR. TESTS WHICH SHOW UNSATISFACTORY RESULTS ARE TO BE REPEATED AT THE EXPENSE OF THE CONTRACTOR SUBSEQUENT TO THE CONTRACTOR'S REMEDIAL ACTIVITIES.

- 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR AND PAY FOR ALL CHARGES OF TESTING LABORATORIES FOR SERVICES IN CONNECTION WITH INITIAL TESTS MADE ON ALL IMPORTED MATERIALS TO THE PROJECT SITES INCLUDING BUT NOT LIMITED TO EMBEDMENT MATERIALS, FILL MATERIAL, BACKFILL MATERIAL, SELECT MATERIAL, CRUSHED LIMESTONE BASE, SUBBASE, CONCRETE, STEEL, WOOD FORMS, LIQUID ASPHALT, AGGREGATE, WATER, CEMENT, CURING COMPOUND, GUARD RAIL, HOT MIX, ETC.
- 4. THE TESTS FOR WHICH THE CONTRACTOR WILL TYPICALLY BE RESPONSIBLE ARE ATTERBERG LIMITS, SIEVE ANALYSIS, PLASTICITY INDICES, MIX DESIGN, CALIFORNIA BEARING RATIOS, TRIAXIAL TESTING, PROCTORS (MOISTURE DENSITY CURVES) AND ALL TESTS REQUIRED BY THE SPECIFICATIONS THAT PROVE THE MATERIAL BROUGHT TO THE PROJECT SITES MEETS OR EXCEEDS THE SPECIFICATIONS AND CONTRACT DOCUMENTS. THE CITY OF BELLMEAD WILL PAY ALL THE CHARGES OF TESTING LABORATORIES FOR SERVICES IN CONNECTION WITH IN PLACE FIELD DENSITIES, CONCRETE CYLINDERS TESTING, HMAc DENSITY TESTS AND ANY IN PLACE TEST REQUIRED FOR QUALITY ASSURANCE. RETESTING AFTER FAILURE OF INPLACE TESTS SHALL BE AT THE EXPENSE OF THE CONTRACTOR.

**G. CONCRETE FOR CONSTRUCTION**

- 1. THE CONCRETE FOR ALL VALLEY GUTTERS, RADIUS UNITS, DRIVEWAYS, BOX CULVERTS, APRONS, 1. HEADWALLS, AND WING WALLS SHALL BE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 P.S.I., A MINIMUM 7-DAY FLEXURAL STRENGTH OF 510 P.S.I., A MAXIMUM WATER TO CEMENT RATIO OF 6.0 GALLONS PER SACK AND BE A MINIMUM (6) SIX SACKS PER CUBIC YARD OF CONCRETE SHALL BE REQUIRED UNLESS OTHERWISE SPECIFIED IN PLANS. ALL OTHER CONCRETE SHALL BE AS SPECIFIED ON THE PLANS.
- 2. TYPE 2 MEMBRANE CURING COMPOUND (WHITE PIGMENTED) SHALL BE USED FOR THIS PROJECT.
- 3. ALL CONCRETE SHALL BE CURED IN ACCORDANCE WITH THE REQUIREMENTS OF TxDOT ITEM 526 "MEMBRANE CURING".
- 4. CONCRETE RIP RAP SHALL BE 4-INCHES IN THICKNESS, CLASS "A" CONCRETE WITH #4 BARS 16" ON CENTER EACH WAY. FINISHED CONCRETE SHALL RECEIVE A BROOM FINISH AND BE SPRAYED WITH TYPE 2 MEMBRANE CURING COMPOUND. THE RIP RAP SHALL BE PLACED WITH A 24-INCH DEPTH BY 6-INCH WIDE TOE DITCH AT THE BOTTOM OF SLOPE EDGE AND WITH AN 18-INCH DEPTH BY 6-INCH WIDE TOE DITCH AT THE TOP OF SLOPE EDGE AND ALONG THE EDGE OF THE SLOPE, UNLESS OTHERWISE NOTED ON THE PLANS.
- 5. ALL EXPANSION JOINT MATERIAL FOR DRIVEWAY AND SIDEWALK INSTALLATIONS SHALL BE GRADE 1 5. REDWOOD (1/2" x 3 1/2" DIMENSION) OR 3/4" ASPHALT IMPREGNATED FIBERBOARD. SNAP-CAP, VOID CAP OR OTHER APPROVED MATERIAL TO ACHIEVE A CLEAN, STRAIGHT EXPANSION JOINT SHALL BE USED. THE EXPANSION JOINT SHALL BE SEALED WITH A TxDOT APPROVED MATERIAL MEETING THE REQUIREMENT OF DMS-6310.
- 6. ALL REINFORCING STEEL FOR CONCRETE SHALL MEET ASTM A 615, GRADE 60.
- 7. PRE-CAST INLETS, JUNCTION BOXES, MANHOLES AND BOX CULVERTS ARE ALLOWABLE ON THIS PROJECT. HOWEVER, ALL SUPPLIER SUBMITTALS WILL BE REQUIRED AND THE OWNER RESERVES THE RIGHT TO CHANGE ELEVATIONS AND SLOPES OF, TO AND FROM EACH PROPOSED STRUCTURE AT ANY TIME.

**H. JOB SITE SAFETY NOTES**

- 1. ALL CONSTRUCTION OPERATIONS FOR THIS PROJECT SHALL BE ACCOMPLISHED IN ACCORDANCE WITH APPLICABLE REGULATIONS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA). COPIES OF THE OSHA STANDARDS MAY BE PURCHASED FROM THE U.S. GOVERNMENT PRINTING OFFICE, INFORMATION AND RELATED REFERENCE MATERIALS MAY BE OBTAINED FROM OSHA: 903 SAN JACINTO; AUSTIN, TEXAS.
- 2. THESE PLANS, PREPARED BY KASBERG, PATRICK & ASSOCIATES, LP, DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONTRACTOR OR HIS EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF KASBERG, PATRICK & ASSOCIATES, LP, REGISTERED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THE WORK.
- 3. THE CONTRACTOR SHALL PROVIDE A TRENCH SAFETY PLAN SIGNED AND SEALED BY LICENSED ENGINEER IN THE STATE OF TEXAS TO THE CITY OF BELLMEAD FOR RECORD PURPOSES, AS REQUIRED BY THE LAWS OF THE STATE OF TEXAS. IMPLEMENTATION OF THE SUBMITTED TRENCH SAFETY PLAN SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- 4. THE CONTRACTOR SHALL BE RESPONSIBLE AND LIABLE FOR ALL JOB SITE SAFETY, FOR MANAGEMENT OF JOB SITE PERSONNEL, FOR SUPERVISION OF THE USE OF JOB SITE EQUIPMENT AND FOR DIRECTION OF ALL CONSTRUCTION PROCEDURES, METHODS AND ELEMENTS REQUIRED TO COMPLETE THE CONSTRUCTION OF THE PROPOSED IMPROVEMENTS.
- 5. BLASTING IS NOT PERMITTED ON THIS PROJECT.
- 6. IN ADDITION TO OTHER SAFETY REQUIREMENTS, ALL TRUCKS USED FOR HAULING MATERIAL AND/OR EQUIPMENT TO AND/OR FROM THIS PROJECT SHALL BE EQUIPPED WITH AN AUDIBLE BACKUP WARNING DEVICE THAT IS IN GOOD OPERATING CONDITION.
- 7. ADVISORY SPEED LIMIT SIGNS SHALL BE PLACED AS DIRECTED BY THE CITY OF BELLMEAD AND THE TEXAS DEPARTMENT OF TRANSPORTATION. THE LOCATION AND SPEED WILL BE DETERMINED BY THOSE TWO ENTITIES IN ORDER TO FIT PROJECT CONDITIONS.
- 8. PROTECTION OF VEHICULAR AND PEDESTRIAN TRAFFIC IS OF THE UTMOST IMPORTANCE FOR THE PROJECT. THE TRAFFIC CONTROL AND SEQUENCE OF CONSTRUCTION PLAN SHALL ADDRESS ALL ANTICIPATED SITUATIONS IN THIS REGARD WITH SUFFICIENT DETAIL. THE CONTRACTORS PLAN WILL BE REVIEWED BY LOCAL TxDOT OFFICIALS AND THE CITY OF BELLMEAD.

**I. ENVIRONMENTAL NOTES**

- 1. CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND MAINTAINING SANITARY FACILITIES ON THIS PROJECT FOR EMPLOYEES.
- 2. CONTRACTOR SHALL NOT PLACE ASPHALT PRODUCTS ON THE GROUND WITHIN 48 HOURS OF FORECASTED RAIN.
- 3. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS REGARDING EXCESS AND WASTE MATERIAL, INCLUDING METHODS OF HANDLING AND DISPOSAL.
- 4. CONTRACTOR SHALL MAINTAIN ACCESS TO PUBLIC AND PRIVATE FACILITIES DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES TO BE COORDINATED WITH THE CITY OF BELLMEAD. THIS SHALL BE SOLE RESPONSIBILITY OF THE CONTRACTOR.

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NO.	DATE	REVISION	BY
©2024 Kasberg, Patrick & Associates, LP			
KPA Firm Registration Number F-510		Plot Date: Nov 25, 2024 - 2:11pm	
		Plotted By: JCHANDLER	

PROJECT NO.	22-107
DRAWN BY	Jared A. Chandler
DESIGNED BY	Ginger R. Tolbert, P.E.
APPROVED BY	<i>Ginger R. Tolbert</i>
DATE	11-25-2024



**KASBERG, PATRICK & ASSOCIATES, LP**  
CONSULTING ENGINEERS  
TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
WATER SYSTEM SCADA IMPROVEMENTS  
**GENERAL**  
**GENERAL NOTES**

SHEET NO. **G-01**  
OF **02**

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- CONTRACTOR SHALL LOCATE MATERIAL STORAGE AREAS AWAY FROM STORM WATER CONVEYANCE SYSTEMS. CONTRACTOR TO PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS AND OTHER POTENTIALLY TOXIC MATERIALS.
- NO OPEN BURNING IS ALLOWED WITHIN THE BELLMEAD CITY LIMITS. BURNING IS ALLOWED IN BELL COUNTY BY AIR CURTAIN DESTRUCTORS METHOD AND PRIOR WRITTEN APPROVAL FROM APPLICABLE GOVERNMENT AGENCIES AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR CAN HAUL CLEARED VEGETATION TO AN ACCEPTABLE OFF-SITE LOCATION WITH WRITTEN APPROVAL BY THE OWNER'S REPRESENTATIVE. PRIOR TO CONSTRUCTION THE CONTRACTOR MUST DESIGNATE TO THE CITY OF BELLMEAD REPRESENTATIVE WHICH METHOD WILL BE USED FOR DISPOSAL OF CLEARED VEGETATION.
- FUEL STORAGE IS NOT ALLOWED ON THIS PROJECT.
- CONTRACTOR SHALL ADVISE OWNER IMMEDIATELY, VERBALLY AND IN WRITING, OF ANY FUEL OR TOXIC MATERIAL SPILLS ONTO THE PROJECT CONSTRUCTION AREA AND THE ACTIONS TO BE TAKEN TO REMEDY THE PROBLEM.
- CONTRACTOR IS RESPONSIBLE FOR DISPOSING OF HIS FUELS, MATERIALS AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER.
- CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE ENVIRONMENTAL LAWS.
- IN THE EVENT THAT SITE GRADING AND/OR EXCAVATION REVEALS WHAT MIGHT BE HAZARDOUS MATERIALS, ALL CONSTRUCTION OPERATIONS SHALL CEASE. THE CITY OF BELLMEAD FIRE DEPARTMENT, FIRE CHIEF AND CITY ENGINEER SHALL BE CALLED TO THE SITE TO EVALUATE THE SITUATION. IF REQUIRED, THE CITY OF BELLMEAD WILL AUTHORIZE THE HAZARDOUS MATERIALS RESPONSE COMPANY WHICH IS UNDER CONTRACT WITH THE CITY OF BELLMEAD TO BEGIN REMEDIATION OF THE SITUATION. AT THAT SAME TIME, THE CITY OF BELLMEAD WILL DETERMINE WHAT CONSTRUCTION ACTIVITIES MAY CONTINUE THAT WOULD NOT ENDANGER CONSTRUCTION WORKERS OR CITIZENS.
- CONTRACTOR SHALL COPY THE CITY OF BELLMEAD AND THE ENGINEER ON SWPPP, NOI, AND NOT.

**J. PROJECT DOCUMENTATION**

- ALL BOUNDARY AND TOPOGRAPHIC SURVEY SERVICES FOR THIS PROJECT WERE PROVIDED BY ALL COUNTY SURVEYING, INC. OF BELLMEAD, TEXAS.

**K. SIDEWALK/ADA**

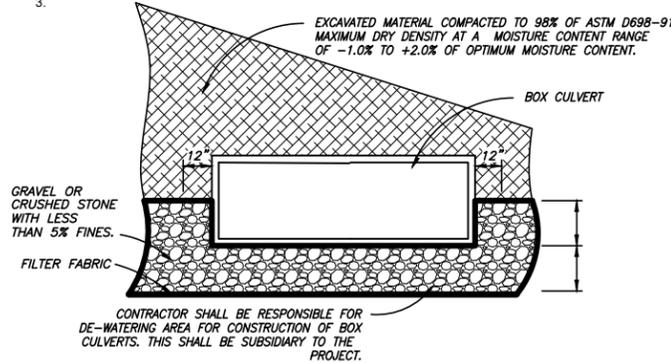
- THE SIDEWALK SHALL COMPLY WITH SECTION 403 OF THE TEXAS ACCESSIBILITY STANDARDS.
- THE RUNNING SLOPE OF THE PROPOSED SIDEWALK SHALL NOT BE STEEPER THAN 1:20 (5%)
- THE CROSS SLOPE OF THE SIDEWALK SHALL NOT BE STEEPER THAN 1:48 (2%)
- THE MAXIMUM ALLOWABLE VERTICAL CHANGE IS 1/4" INCH.

**L. PAVEMENT STRUCTURE SPECIFICATIONS / NOTES**

- THE DETAIL FOR THE PAVEMENT STRUCTURE FOR THIS PROJECT IS SHOWN ON OTHER PLAN SHEETS.
- SINCE SOME VARIATION WAS FOUND IN SUBSURFACE CONDITIONS AT BORING LOCATIONS, ALL PARTIES INVOLVED SHOULD BE AWARE THAT EVEN MORE VARIATION MAY BE ENCOUNTERED BETWEEN BORING LOCATIONS. STATEMENTS IN THE GEOTECHNICAL REPORT FOR THE PROJECT AS TO SUBSURFACE OVER GIVEN AREAS ARE INTENDED ONLY AS ESTIMATIONS BASED ON DATA OBTAINED AT SPECIFIC BORING LOCATIONS.

**M. REINFORCED CONCRETE BOX CULVERTS**

- DEWATERING SHALL BE REQUIRED AS NEEDED FOR CONSTRUCTION AND BE SUBSIDIARY TO THE BOX CULVERT PAY ITEM(S).
- THE FOLLOWING DETAIL SHALL GOVERN WITH RESPECT TO EMBEDMENT AND BACKFILL FOR REINFORCED CONCRETE BOX CULVERTS:
- 



**REINFORCED CONCRETE BOX CULVERT  
TYPICAL BEDDING AND BACKFILL  
NOT TO SCALE**

**N. STORMWATER POLLUTION PREVENTION PLAN (SW3P)**

- CONTRACTOR SHALL PREPARE A STORMWATER POLLUTION PREVENTION PLAN (SW3P) FOR THE PROJECT. THE ENGINEER HAS INCORPORATED IN THESE CONSTRUCTION DRAWINGS SOME MINIMUM STORM WATER CONTROLS THAT SHOULD BE INCLUDED INTO THE CONTRACTOR'S PLANS.
- CONTRACTOR SHALL SUBMIT THE SW3P TO THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ), THE ENGINEER AND THE CITY OF BELLMEAD, COMPLETE THE NOTICE OF INTENT (NOI) AND FORWARD THE NOTICE OF TERMINATION (NOT) WHEN THE PROJECT IS COMPLETED AND ACCEPTED BY THE CITY OF BELLMEAD, TEXAS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING, MAINTAINING, REPORTING AND

INSPECTION OF THE WATER POLLUTION ABATEMENT PLAN AND INSTALLED CONTROLS.

- AFTER PERMANENT EROSION CONTROL HAS BEEN ESTABLISHED THE CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION CONTROL DEVICES. THIS SHALL BE SUBSIDIARY TO THE EROSION CONTROL PAY ITEMS.

**O. BID SCHEDULE NOTES**

- THE BID SCHEDULE CONTAINS A BID ITEM FOR PAYMENT TO THE CONTRACTOR FOR PROVIDING RECORD DRAWINGS (AS-BUILTS) FOR THIS PROJECT. FINAL PAYMENT FOR THE PROJECT WILL NOT BE RELEASED BY THE CITY OF BELLMEAD UNTIL THE RECORD DRAWINGS ARE DELIVERED TO THE ENGINEER IN AN ACCEPTABLE, LEGIBLE CONDITION.

**P. WATERLINE**

- ALL TESTING SHALL BE IN COMPLIANCE WITH CURRENT TCEQ REGULATIONS, AND TECHNICAL SPECIFICATIONS.
- ALL WATER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH CURRENT TCEQ REGULATIONS, CHAPTER 290.
- ALL FIRE HYDRANTS TO BE CITY OF BELLMEAD STANDARD FIRE HYDRANT TYPE B, UNLESS OTHERWISE NOTED.
- PIPE MATERIAL FOR 3" AND SMALLER WATER LINES SHALL BE DR-21 PVC, CLASS 200. PIPE MATERIAL FOR 4-INCH TO 12-INCH WATER LINES SHALL BE PVC, AWWA C900, CLASS 150, DR-18 OR CLASS 250 DUCTILE IRON PIPE. PIPE MATERIAL FOR 14-INCH AND LARGER WATER LINES SHALL BE PVC, AWWA C905, CLASS 150, DR-18 OR CLASS 250 DUCTILE IRON PIPE.
- PRIOR TO CONSTRUCTION, CONTRACTOR SHALL SUBMIT A PLAN FOR TIE-INS AND FLUSHING FOR APPROVAL BY OWNER. SCHEDULE SHALL BE CONFIRMED WITH THE CITY 48 HOURS PRIOR TO ACTIVITY.

**Q. WASTEWATER LINE**

- ALL WASTEWATER PIPE SHALL BE SDR 26 WITH PIPE STIFFNESS OF 115 PSI, UNLESS OTHERWISE NOTED OR SPECIFIED.
- ALL WASTEWATER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH CURRENT TCEQ REGULATIONS, CHAPTER 217.
- ALL TESTING SHALL BE IN COMPLIANCE WITH CURRENT TCEG REGULATIONS AND TECHNICAL SPECIFICATIONS.

**R. UTILITY ABANDONMENT**

- IF UTILITIES ARE TO BE ABANDONED, CONTRACTOR SHALL LOCATE UTILITIES, CUT AND CAP AT REMOVAL LIMITS AND PLACE AND COMPACT LOW PI SELECT FILL MATERIAL.
- CONTRACTOR SHALL CUT AND CAP EXISTING SERVICE CONNECTIONS TO BE RELOCATED SO THAT NO PIPE REMAINING IN THE GROUND IS "OPEN". METER BOXES AND METERS SHALL BE PRESENTED TO THE CITY OF BELLMEAD FOR SALVAGE.
- VALVES TO BE ABANDONED IN PLACE SHALL HAVE VALVE RISER AND VALVE BOX REMOVED AND SURFACE RESTORED PER EMBEDMENT DETAIL FOR ROADWAY OR OUT OF ROADWAY CONDITIONS.
- FIRE HYDRANTS SHALL BE REMOVED AT FITTING PRIOR TO HYDRANT. CONTRACTOR SHALL PRESENT FIRE HYDRANT TO THE CITY OF BELLMEAD FOR SALVAGE.
- ABANDONMENT OF EXISTING MANHOLES SHALL CONSIST OF:
  - REMOVING AND PROPERLY DISPOSING OF ALL DEBRIS WITHIN THE MANHOLE. CONTRACTOR SHALL NOT ALLOW DEBRIS TO WASH DOWNSTREAM.
  - REMOVE AND DISPOSE OF GRADE RINGS, CONE SECTION AND CONCRETE STRUCTURE TO A POINT 3 FEET BELOW THE FINISHED GRADE.
  - PLACE FLOWABLE FILL TO A POINT 3 FEET BELOW THE FINISHED SURFACE FOR INSTALLATION IN NATURAL GROUND OR TO THE LIMITS OF PROPOSED ASPHALT ROADWAY.

**S. EARTHWORK**

- SITE PREPARATION** - CONSTRUCTION AREAS SHALL BE STRIPPED OF ALL VEGETATION, ASPHALT AND UNDERLYING BASE MATERIAL, LOOSE SOILS, TOP SOILS, AND OTHER UNSUITABLE MATERIAL CURRENTLY PRESENT AT THE SITE. THIS SHALL BE INCLUDED IN THE BID ITEM FOR PREPARATION OF RIGHT-OF-WAY. ONCE FINAL SUBGRADE ELEVATIONS HAVE BEEN ACHIEVED, THE EXPOSED SUBGRADE SHALL BE CAREFULLY PROOFROLLED WITH A MINIMUM 25-TON PNEUMATIC TIRE ROLLER (AS PER TXDOT ITEM 216) TO DETECT WEAK ZONES IN THE SUBGRADE. WEAK AREAS DETECTED DURING PROOFROLLING, AS WELL AS ZONES CONTAINING DEBRIS OR ORGANICS AND VOIDS RESULTING FROM REMOVAL OF VEGETATION, ROOTS, ETC. SHALL BE REMOVED AND REPLACED WITH GENERAL FILL AS DESCRIBED BELOW. PROPER SITE DRAINAGE SHALL BE MAINTAINED DURING CONSTRUCTION SO THAT PONDING OF SURFACE RUNOFF DOES NOT OCCUR AND CAUSES CONSTRUCTION DELAYS AND/OR INHIBIT SITE ACCESS.
- FILL COMPACTION REQUIREMENTS** - SUBSEQUENT TO PROOFROLLING, AND JUST PRIOR TO PLACEMENT OF FILL, THE EXPOSED SUBGRADE WITHIN THE CONSTRUCTION AREAS SHALL BE EVALUATED FOR MOISTURE AND DENSITY. IF THE MOISTURE AND/OR DENSITY REQUIREMENTS DO NOT MEET THE CRITERIA DESCRIBED BELOW, THE SUBGRADE SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 6 INCHES, MOISTURE ADJUSTED AND COMPACTED TO AT LEAST 98 PERCENT OF THE TEX-114-E MAXIMUM DRY DENSITY (OR TEX-113-E AS APPROPRIATE).

FILL TYPE <sup>1</sup>	TXDOT OR USCS CLASSIFICATION	ACCEPTABLE LOCATION FOR PLACEMENT <sup>2</sup>
FLEXIBLE BASE <sup>3a</sup>	ITEM 247, TYPE A GRADE 2 OR BETTER	PAVEMENT BASE
TYPE C EARTHEN ROCK EMBANKMENT FILL <sup>3b</sup>	ITEM 132, TYPE C (6 ≤ PI ≤ 20)	WITHIN ROADWAY LIMITS, INCLUDING EMBANKMENTS
GENERAL FILL <sup>4</sup>	ON-SITE EXCAVATED SOIL	WITHIN ROADWAY LIMITS, INCLUDING EMBANKMENTS

- PRIOR TO ANY FILLING OPERATIONS, SAMPLES OF PROPOSED BORROW AND/OR ON-SITE MATERIALS SHALL BE OBTAINED FOR LABORATORY TESTING. THE TESTS WILL PROVIDE A BASIS FOR EVALUATION OF FILL COMPACTION BY IN-PLACE DENSITY TESTING. A QUALIFIED SOIL TECHNICIAN SHALL PERFORM SUFFICIENT IN-PLACE DENSITY TESTS DURING THE FILLING OPERATIONS TO EVALUATE THAT PROPER LEVELS OF COMPACTION, INCLUDING DRY UNIT WEIGHT AND MOISTURE CONTENT, ARE BEING ATTAINED.

- ALL FILL SHALL BE PLACED IN MAXIMUM LOOSE LIFT THICKNESSES OF 8 INCHES WITH COMPACTED LIFT THICKNESSES OF NO MORE THAN 6 INCHES. ALL LIFTS SHALL BE TESTED FOR DENSITY AND MOISTURE CONTROL, AS WELL AS PROOFROLLING. ALL FILL MUST BE FREE OF VEGETATION, ORGANIC MATTER, AND FOREIGN DEBRIS. IF COBBLES OR BOULDERS EXIST THAT ARE LARGER THAN THE MAXIMUM AGGREGATE SIZE TABULATED ABOVE, THEY MUST BE BROKEN DOWN OR PULVERIZED INTO SMALLER ROCK SIZES MEETING THE ABOVE REQUIREMENTS PRIOR TO BEING PLACED OR SPREAD OUT WITHIN PROPOSED CONSTRUCTION AREAS.
- IMPORTED FLEXIBLE BASE AND TYPE C EMBANKMENT FILL SHALL MEET THE REQUIREMENTS OF THE TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) 2004 STANDARD SPECIFICATIONS MENTIONED ABOVE. TYPE C EMBANKMENT FILL SHALL NOT INCLUDE ANY ROCKS LARGER THAN 4 INCHES, PRIOR TO SPREADING AND COMPACTION.
- THE USE OF IMPORTED "CRUSHER FINES" TO MEET THE TYPE C EMBANKMENT FILL SPECIFICATIONS IS PROHIBITED DUE TO THEIR SUSCEPTIBILITY TO POOR SUPPORT CHARACTERISTICS UPON EXPOSURE TO EXCESSIVE MOISTURE I WET WEATHER.
- EXCAVATED ON-SITE SOILS, IF FREE OF ORGANICS, DEBRIS, AND ROCKS LARGER THAN 4 INCHES, MAY BE CONSIDERED FOR USE AS FILL IN GENERAL AREAS.

FILL TYPE	PERCENT COMPACTION	MOISTURE CONTENT
FLEXIBLE BASE	100% TEX-113-E	-3 TO +3 OPTIMUM
TYPE C EARTHEN OR ROCK EMBANKMENT FILL	ALL FILL LESS THAN 5 FEET : ≥95 PERCENT OF THE TEX-113-E OR TEX-114-E (DEPENDING UPON SOIL TYPE) FOR FILLS GRATER THAN 5 FEET IN DEPTH: ≥100 PERCENT OF THE TEX-113-E OR TEX-114-E (DEPENDING UPON SOIL TYPE)	-3 TO +3 OPTIMUM
GENERAL FILL (ON-SITE STRATUM I SOILS)	ALL FILL LESS THAN 5 FEET : ≥95 PERCENT OF THE TEX-113-E OR TEX-114-E (DEPENDING UPON SOIL TYPE)	0 TO +4 OPTIMUM
GENERAL FILL (ON-SITE STRATUM III SOILS)	FOR FILLS GRATER THAN 5 FEET IN DEPTH: 100 PERCENT OF THE TEX-113-E OR TEX-114-E (DEPENDING UPON SOIL TYPE)	-3 TO +3 OPTIMUM

**T. PAVEMENT COMPONENTS**

- HOT MIX ASPHALTIC CONCRETE (HMAC)** - THE ASPHALTIC CONCRETE SHALL BE PLANT MIXED, HOT LAID TYPE C (COARSE-GRADED SURFACE COURSE) AND TYPE B (FINE-GRADED BASE COURSE) MEETING THE MASTER SPECIFICATION REQUIREMENTS IN TXDOT ITEM 340. THE MIX SHALL BE DESIGNED FOR A STABILITY OF AT LEAST 35 IN ACCORDANCE WITH TEX-208-F AND SHALL BE COMPACTED TO BETWEEN 91 AND 96 PERCENT OF THE MAXIMUM THEORETICAL DENSITY. WHEN TESTED IN ACCORDANCE WITH TEX-207-F AND TEX-227-F. IN ACCORDANCE WITH TXDOT ITEM 340, COMPACTED LIFT THICKNESSES SHALL BE BETWEEN 2.5 AND 5 INCHES FOR TYPE B HMAC AND 2 AND 4 INCHES FOR TYPE C HMAC.
- CRUSHED LIMESTONE BASE (CLB)** - BASE MATERIAL SHALL BE COMPOSED OF CRUSHED LIMESTONE MEETING THE REQUIREMENTS OF TXDOT ITEM 247, TYPE A, GRADE 2 OR BETTER. THE CLB SHALL BE COMPACTED TO A MINIMUM OF 100 PERCENT OF THE TEX-113-E MAXIMUM DRY DENSITY AT -3 TO +3 PERCENT OF OPTIMUM MOISTURE CONTENT. EACH LIFT OF CLB SHALL BE THOROUGHLY PROOFROLLED JUST PRIOR TO PLACEMENT OF SUBSEQUENT LIFTS AND/OR ASPHALT.
- LIME-TREATED SUBGRADE (LTS)** - IF LIME-TREATED SUBGRADE IS UTILIZED, THE SUBGRADE SHALL BE TREATED WITH LIME MEETING THE REQUIREMENTS OF TXDOT ITEM 260. LIME TREATMENT MAY BE ACCOMPLISHED BY THE SLURRY PLACEMENT PROCESS. THE LIME SHALL INITIALLY BE BLENDED WITH A MIXING DEVICE SUCH AS A PULVERMIXER, SUFFICIENT WATER ADDED, AND ALLOWED TO CURE FOR AT LEAST 48 HOURS. AFTER CURING, MIXING SHALL CONTINUE UNTIL THE GRADATION REQUIREMENTS OF TXDOT ITEM 260.4 ARE MET. THE MIXTURE SHALL THEN BE MOISTURE ADJUSTED AND COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY TEX-114-E. PLACEMENT OF THE LIME-TREATED SUBGRADE SHALL EXTEND AT LEAST 24 INCHES BEHIND CURBS. AN OPTIMUM PERCENTAGE OF LIME OF AT LEAST 7 PERCENT BY DRY SOIL WEIGHT SHALL BE UTILIZED.
- MOISTURE CONDITIONED SUBGRADE** - IF LIME-TREATED SUBGRADE IS NOT UTILIZED, THE SOIL SUBGRADE SHALL BE SCARIFIED TO A DEPTH OF 6 INCHES, MOISTURE, CONDITIONED, AND RECOMPACTED TO AT LEAST 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY TEX-114-E. ON-SITE SOILS SHALL BE MOISTURE CONDITIONED AND COMPACTED AS DETAILED IN SECTION 4.1.1 -COMPACTION REQUIREMENTS. CARE SHALL BE TAKEN SUCH THAT THE SUBGRADE DOES NOT DRY OUT OR BECOME SATURATED PRIOR TO PAVEMENT CONSTRUCTION. THE PAVEMENT SUBGRADE SHALL BE THOROUGHLY PROOFROLLED WITH A RUBBER-TIRED VEHICLE (FULLY-LOADED WATER OR DUMP TRUCK) IMMEDIATELY PRIOR PLACEMENT OF BASE MATERIAL. PARTICULAR ATTENTION SHALL BE PAID TO AREAS ALONG CURBS, ABOVE UTILITY TRENCHES, AND ADJACENT TO LANDSCAPE ISLANDS, MANHOLES, AND STORM DRAIN INLETS. PLACEMENT OF THE MOISTURE CONDITIONED SUBGRADE SHALL EXTEND AT LEAST 24 INCHES BEHIND CURBS.

ON MOST PROJECTS, ROUGH SITE GRADING IS ACCOMPLISHED RELATIVELY EARLY IN THE CONSTRUCTION PHASE. FILLS ARE PLACED AND COMPACTED IN A UNIFORM MANNER. HOWEVER, AS CONSTRUCTION PROCEEDS, EXCAVATIONS ARE MADE INTO THESE AREAS; DRY WEATHER MAY DESICCATE SOME AREAS; RAINFALL AND SURFACE WATER SATURATES SOME AREAS; HEAVY TRAFFIC FROM CONCRETE AND OTHER DELIVERY VEHICLES DISTURBS THE SUBGRADE; AND MANY SURFACE IRREGULARITIES ARE FILLED IN WITH LOOSE SOILS TO TEMPORARILY IMPROVE SUBGRADE CONDITIONS. AS A RESULT, THE PAVEMENT SUBGRADE SHALL BE CAREFULLY EVALUATED AS THE TIME FOR PAVEMENT CONSTRUCTION APPROACHES. THIS IS PARTICULARLY IMPORTANT IN AND AROUND UTILITY TRENCH CUTS, MANHOLES, AND STORM DRAIN INLETS, AS WELL AS ANY LANDSCAPED AND IRRIGATED AREAS. ALL PAVEMENT AREAS SHALL BE MOISTURE CONDITIONED AND PROPERLY COMPACTED TO THE RECOMMENDATIONS IN THESE NOTES PRIOR TO PAVING. THOROUGH PROOFROLLING OF PAVEMENT AREAS USING A FULLY-LOADED WATER TRUCK OR DUMP TRUCK (RUBBER-WHEELED VEHICLE THAT CAN IMPART POINT WHEEL LOADS) SHALL BE PERFORMED NO MORE THAN 36 HOURS PRIOR TO SURFACE PAVING. ANY PROBLEMATIC AREAS SHALL BE REWORKED AND COMPACTED AT THAT TIME. PROOFROLLING SHALL BE RE-PERFORMED IF THE SUBGRADE AND/OR BASE IS EXPOSED TO RAINFALL PRIOR TO SUBSEQUENT CONSTRUCTION ACTIVITIES (I.E., BASE OR ASPHALT PLACEMENT).

**U. ESTABLISHMENT OF VEGETATION**

THE ESTABLISHMENT OF VEGETATION IS A CRITICAL ELEMENT OF THIS PROJECT AND AN ELEMENT OF THE PAVING DESIGN. WITHIN SEVEN CALENDAR DAYS OF PLACING THE CURB AND GUTTER THE CONTRACTOR SHALL BACKFILL THE SLOPES TO THE CURBS AS SHOWN ON THE CROSS SECTIONS, HYDROMULCH THE SLOPES AND WATER TO THE VEGETATION GROWTH AND WATER TO SUSTAIN THE GROWTH. WATERING SHALL OCCUR DAILY TO MAINTAIN MOISTURE CONDITION AND BE ACCOMPLISHED WITH EQUIPMENT WITH SPRAYING CAPABILITIES. CONTRACTOR SHALL MONITOR SOIL CONDITIONS AFTER RAIN TO DETERMINE IF WATERING IS REQUIRED TO MAINTAIN SOIL MOISTURE CONDITION.

**V. ONE COURSE SURFACE TREATMENT**

THE ONE COURSE SURFACE TREATMENT, WILL BE APPLIED TO THE CRUSHED LIMESTONE BASE MATERIAL WITHIN SEVEN CALENDAR DAYS OF PASSING MOISTURE AND DENSITY. THE APPLICATION WILL BE FROM EDGE TO EDGE OF THE CRUSHED LIMESTONE BASE MATERIAL. THE SURFACE TREATMENT WILL CONSIST OF 0.40 - 0.44 GALLONS PER SQUARE YARD OF CRS-2P (WARM WEATHER) OR CRS-1P (COOL WEATHER) AND TYPE A #3 NON-LIGHTWEIGHT AGGREGATE. THE ONE COURSE SURFACE TREATMENT SHALL MEET THE REQUIREMENTS OF TXDOT ITEM 316. THIS WILL BE BID BY THE SQUARE YARD.

**W. IRRIGATION EQUIPMENT AND SPRINKLER HEADS**

- REMOVAL AND RECONNECTION OF IRRIGATION EQUIPMENT AND SPRINKLER HEADS AS SET OUT IN THE APPRAISAL REPORT OF THE PROPERTY. IRRIGATION EQUIPMENT AND SPRINKLER HEADS ARE LOCATED ON PART OF THE PROPERTY TO BE CONVEYED BY DONOR TO THE CITY. THE CITY WILL COORDINATE WITH DONOR PRIOR TO COMMENCEMENT OF ANY OPERATIONS ON THE PROPERTY THAT MAY AFFECT THE IRRIGATION EQUIPMENT AND SPRINKLER HEADS. THE CITY, AT ITS SOLE COST AND EXPENSE, WILL REMOVE ANY IRRIGATION EQUIPMENT AND SPRINKLER HEADS ON THE CONVEYED PROPERTY AND WILL, TO THE SOLE SATISFACTION OF DONOR, RECONNECT THE REMAINING IRRIGATION EQUIPMENT AND SPRINKLER HEADS ON THE DONOR PROPERTY THAT WAS NOT CONVEYED TO THE CITY IN A MANNER THAT WILL ALLOW THE IRRIGATION EQUIPMENT AND SPRINKLER HEADS TO CONTINUE TO FUNCTION AS INTENDED.
- IRRIGATION EQUIPMENT AND SPRINKLER HEADS ARE LOCATED ON THE MCLANE COMPANY PROPERTY HAS BEEN CONVEYED TO THE CITY. THE CONTRACTOR SHALL COORDINATE WITH MCLANE COMPANY PRIOR TO COMMENCEMENT OF ANY OPERATIONS ON THE PROPERTY THAT MAY AFFECT THE IRRIGATION EQUIPMENT AND SPRINKLER HEADS. THE CONTRACTOR, AT ITS SOLE COST AND EXPENSE, WILL REMOVE ANY IRRIGATION EQUIPMENT AND SPRINKLER HEADS ON THE MCLANE PROPERTY AND WILL, TO THE SOLE SATISFACTION OF MCLANE COMPANY, RECONNECT THE REMAINING IRRIGATION EQUIPMENT AND SPRINKLER HEADS ON THE MCLANE COMPANY PROPERTY THAT WAS NOT CONVEYED TO THE CITY IN A MANNER THAT WILL ALLOW THE IRRIGATION EQUIPMENT AND SPRINKLER HEADS TO CONTINUE TO FUNCTION AS INTENDED. (THIS SHALL BE SUBSIDIARY TO THE PROJECT)

**X. GRADING AND DRAINAGE**

THE PERFORMANCE OF THE PROPOSED PAVEMENTS WILL NOT ONLY BE DEPENDENT UPON THE QUALITY OF CONSTRUCTION, BUT ALSO UPON THE STABILITY OF THE MOISTURE CONTENT OF THE NEAR-SURFACE SUBGRADE. THEREFORE, PROPER SITE DRAINAGE SHOULD BE DEVELOPED DURING CONSTRUCTION SO THAT PONDING OF SURFACE WATER ON THE ROADWAY SURFACES AND ALONG THE ROADWAY PERIMETERS DOES NOT OCCUR.

**Y. WATER AND ESTABLISHMENT OF VEGETATION ALONG PAVEMENT EDGES**

IN-SITU STRATUM 1 FAT CLAY SOILS WILL SERVE AS PAVEMENT SUBGRADE IN MANY AREAS AND MAY BE USED AS FILL IN AREAS ALONG THE ROADWAY, DEPENDING UPON THEIR PI AND ROCK SIZES AS TABULATED IN FILL MATERIAL TYPES.

ALTHOUGH METHODS CAN BE UNDERTAKEN TO REDUCE THE POSSIBILITY OF CRACKING IN THE PAVEMENT, CRACKING MAY STILL OCCUR. MOST PAVEMENT CRACKING OVER EXPANSIVE CLAY SOILS BEGINS LONGITUDINALLY WITHIN A FEW FEET ROUGHLY PARALLEL TO THE PAVEMENT EDGES AND THEN PROGRESSES INWARD. THIS IS DUE TO AN EDGE DRYING OR WETTING PROCESS IN WHICH THE SOILS ADJACENT TO THE PAVEMENT SUBGRADE EITHER WICK MOISTURE AWAY FROM THE SUBGRADE OR PROVIDE EXCESS MOISTURE INTO THE SUBGRADE. EITHER PROCESS TYPICALLY LEADS TO SUBGRADE SHRINKING OR SWELLING, WHICH THEN RESULTS IN CRACKS PROPAGATING UPWARD THROUGH THE SUBGRADE, BASE, AND INTO THE SURFICIAL ASPHALT.

THE PRIMARY GOAL WHEN ATTEMPTING TO REDUCE THE POTENTIAL FOR EDGE CRACKING IS TO MAINTAIN RELATIVELY CONSISTENT MOISTURE LEVELS IN THE SUBGRADE AND THE ADJACENT SOILS THROUGHOUT THE ENTIRE CONSTRUCTION PROCESS. THE ESTABLISHMENT OF VEGETATION IS A CRITICAL ELEMENT OF THIS PROJECT AND OF THE PAVEMENT DESIGN. WITHIN SEVEN (7) CALENDAR DAYS OF PLACING THE CURB AND GUTTER, THE CONTRACTOR SHALL BACKFILL THE SLOPES, REVEGETATE THE AREA AND WATER TO ESTABLISH AND SUSTAIN THE GROWTH OF THE VEGETATION. WATERING SHALL OCCUR DAILY TO MAINTAIN MOISTURE CONDITION AND SHALL BE ACCOMPLISHED WITH EQUIPMENT WITH SPRAYING CAPABILITIES. THE CONTRACTOR SHALL MONITOR MOISTURE CONDITION AFTER RAIN EVENTS TO DETERMINE IF WATERING IS REQUIRED TO MAINTAIN MOISTURE CONDITION. PAYMENT FOR THESE REQUIREMENTS SHALL BE INCLUDED IN THIS BID ITEM FOR FURNISHING AND INSTALLING HYDROMULCH WITH FLEXIBLE GROWTH MEDIUM.

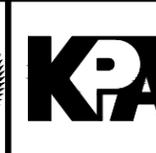
**Z. RAIN/WEATHER DAYS**

THIS PROJECT IS A CALENDAR DAY PROJECT AND WILL ALLOW SUBMITTAL OF WEATHER DAYS. THE CITY OF BELLMEAD REQUIRES THAT THE AVERAGE RAIN DAYS IN A MONTH BE EXCEEDED BEFORE ANY WEATHER DAYS ARE ADDED TO THE PROJECT. A WEATHER DAY SHALL BE CONSIDERED ANY DAY WITH ANY AMOUNT OF PRECIPITATION. IN ORDER TO SUBMIT FOR ADDITIONAL DAYS FOR WEATHER, THE CONTRACTOR SHALL TRACK THE PRECIPITATION ON THE PROJECT SITE AND SUBMIT THE DAYS OF PRECIPITATION MONTHLY AND INCLUDE THE AVERAGE PRECIPITATION DAYS FOR THAT MONTH AS SHOWN IN THE TABLE BELOW. ONLY DAYS IN EXCESS OF THE AVERAGE PRECIPITATION FOR THE MONTH WILL BE ALLOWED FOR ADDITIONAL DAYS DUE TO WEATHER. AVERAGE RAIN DAYS SHALL BE AS FOLLOWS:

AVERAGE RAIN DAYS	
JANUARY -	7 DAYS
FEBRUARY -	7 DAYS
MARCH -	7 DAYS
APRIL -	7 DAYS
MAY -	8 DAYS
JUNE -	6 DAYS
JULY -	6 DAYS
AUGUST -	5 DAYS
SEPTEMBER -	7 DAYS
OCTOBER -	7 DAYS
NOVEMBER -	7 DAYS
DECEMBER -	7 DAYS

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Plot Date: Nov 25, 2024 - 2:11pm		Plotted By: JCHANDLER	

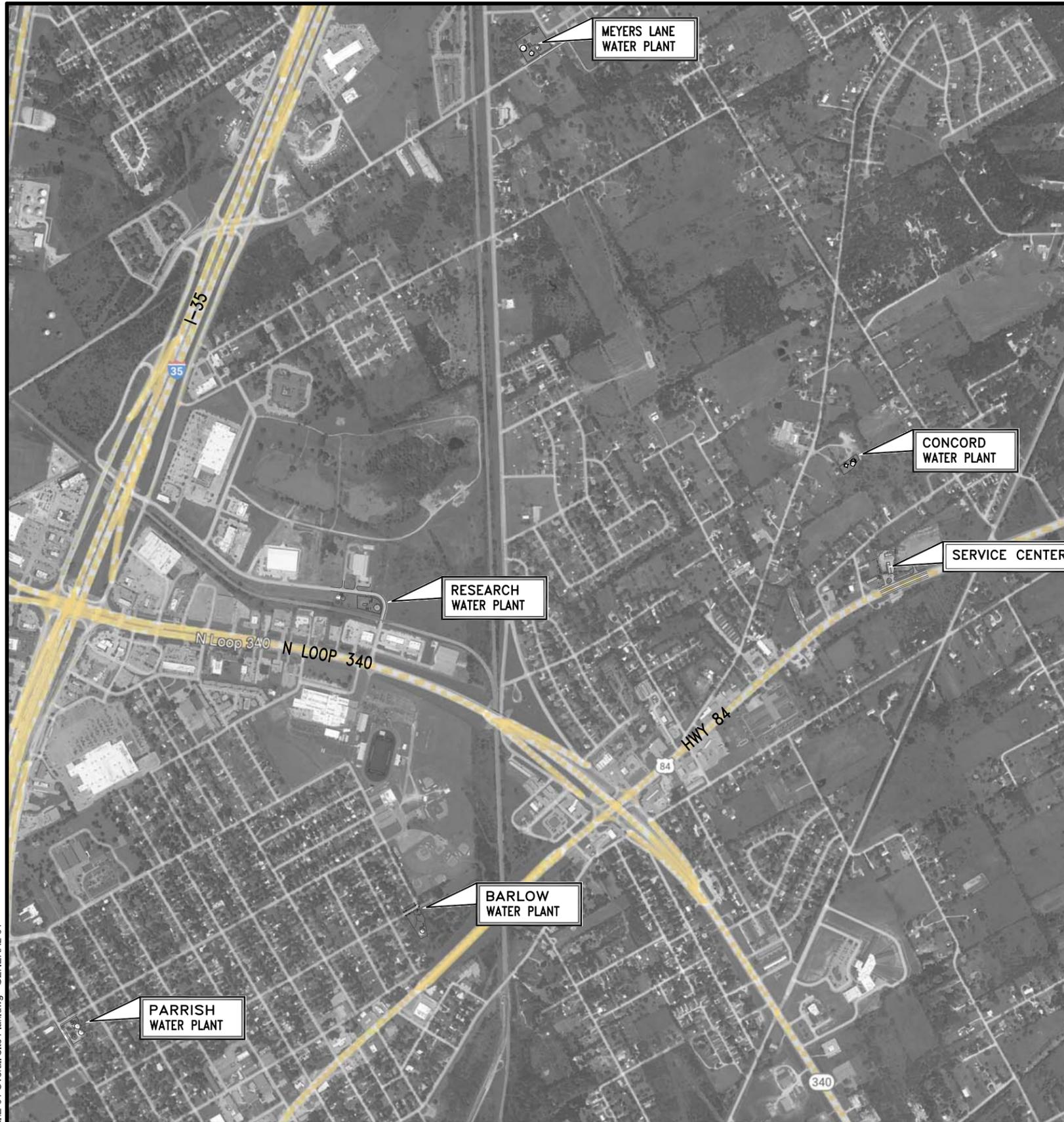
PROJECT NO.	22-107
DRAWN BY	Jared A. Chandler
DESIGNED BY	Ginger R. Tolbert, P.E.
APPROVED BY	<i>Ginger R. Tolbert</i>
DATE	11-25-2024



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TEMPLE, TEXAS 76501

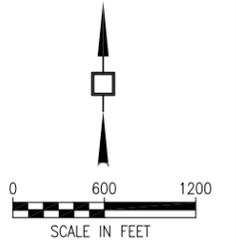
**CITY OF BELLMEAD, TEXAS**  
WATER SYSTEM SCADA IMPROVEMENTS  
GENERAL  
GENERAL NOTES

SHEET NO. **G-02**  
OF **02**



**SHEET INDEX:**

- E-01 LOCATION MAP-BELMEAD SCADA
- E-02 SCADA DIAGRAM-EXISTING
- E-03 SCADA DIAGRAM-MODIFIED
- E-04 ELECTRICAL-PARRISH SITE PLAN-EXISTING
- E-05 ELECTRICAL-PARRISH SITE PLAN-MODIFIED
- E-06 ELECTRICAL PLAN-PARRISH WATER PLANT
- E-07 PARRISH WATER PLANT ONE LINE DIAGRAMS
- E-08 PARRISH WATER PLANT ELECTRICAL CONTROL SCHEMATICS I
- E-09 PARRISH WATER PLANT ELECTRICAL CONTROL SCHEMATICS II
- E-10 PARRISH WATER PLANT ELECTRICAL CONTROL SCHEMATICS III
- E-11 PARRISH WATER PLANT I/O SCHEDULES
- E-12 ELECTRICAL-BARLOW SITE PLAN
- E-13 BARLOW WATER PLANT ONE LINE DIAGRAM
- E-14 BARLOW WATER PLANT I/O SCHEDULES
- E-15 ELECTRICAL-CONCORD SITE PLAN
- E-16 CONCORD WATER PLANT ONE LINE DIAGRAM
- E-17 CONCORD WATER PLANT I/O SCHEDULES
- E-18 ELECTRICAL-MEYERS SITE PLAN
- E-19 MEYERS SITE PLAN ONE LINE DIAGRAM
- E-20 MEYERS LANE WATER PLANT I/O SCHEDULES
- E-21 ELECTRICAL-RESEARCH SITE PLAN
- E-22 RESEARCH WATER PLANT ONE LINE DIAGRAM
- E-23 RESEARCH WATER PLANT I/O SCHEDULES
- E-24 ELECTRICAL-SERVICE CENTER SITE PLAN
- E-25 ELECTRICAL DETAILS SHEET I
- E-26 ELECTRICAL DETAILS SHEET II
- E-27 ELECTRICAL DETAILS SHEET III
- E-28 ELECTRICAL DETAILS SHEET IV



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Plot Date: Nov 25, 2024 - 11:34am  
Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



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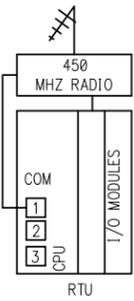
**CITY OF BELMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

LOCATION MAP  
 BELMEAD SCADA

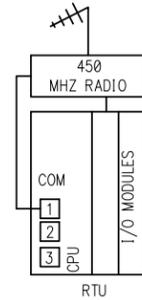
SHEET NO. **E-01**  
 OF **28**

**SCADA ABBREVIATIONS**

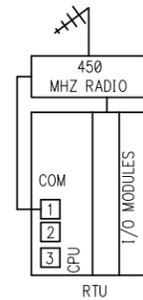
- COM - COMMUNICATIONS PORT
- DCPS - DC POWER SUPPLY
- FEP - FRONT END PROCESSOR
- RTU - REMOTE TERMINAL UNIT
- UPS - UNINTERRUPTABLE POWER SUPPLY
- Y - VERTICALLY POLARIZED OMNI
- BPS - BAND PASS FILTER



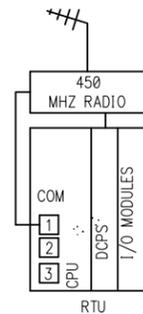
**04 MEYERS LANE WATER PLANT**



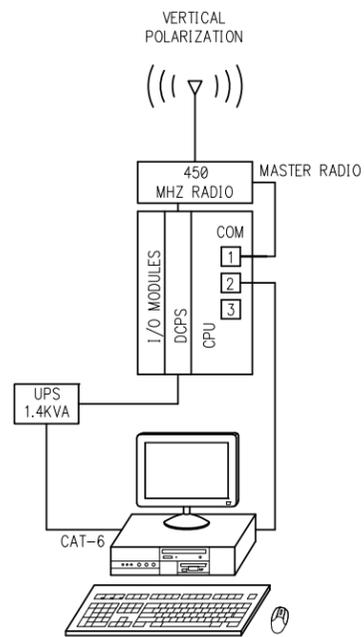
**03 CONCORD WATER PLANT**



**05 RESEARCH WATER PLANT**



**02 BARLOW WATER PLANT**



**01 PARRISH WATER PLANT (REPEATER)**

**SITE TOWER & ANTENNA SCHEDULE**

SITE NAME	COORDINATES		ELEVATIONS		COMMENTS
	LATITUDE	LONGITUDE	SITE AMSL'	ANTENNA HT.'	
PARRISH WATER PLANT	31°35'34.42"N	97°06'23.69"W	433'	40'	
BARLOW WATER PLANT	31°35'44.42"N	97°05'44.44"W	433'	20'	
CONCORD WATER PLANT	31°36'29.29"N	97°04'55.30"W	469'	20'	
MEYERS LANE WATER PLANT	31°37'09.87"N	97°05'31.43"W	479'	20'	
RESEARCH WATER PLANT	31°36'15.76"N	97°05'49.60"W	446'	20'	

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Plot Date: Nov 25, 2024 - 11:34am  
Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



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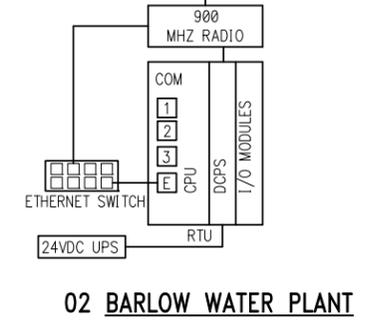
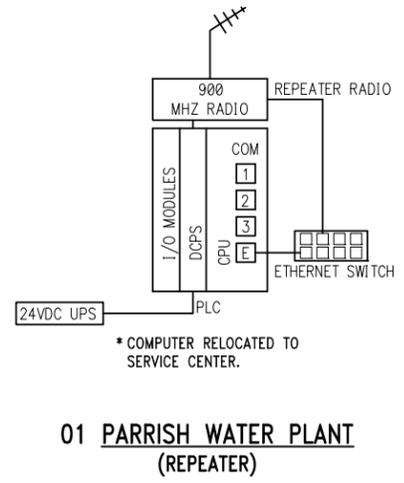
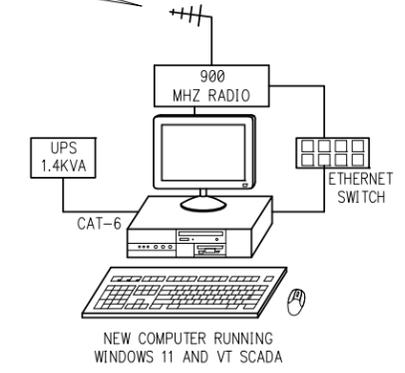
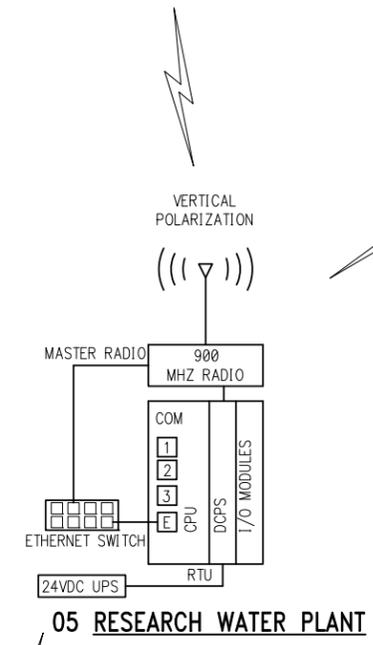
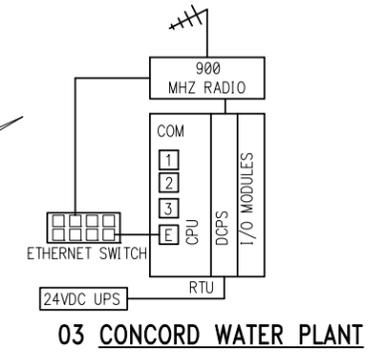
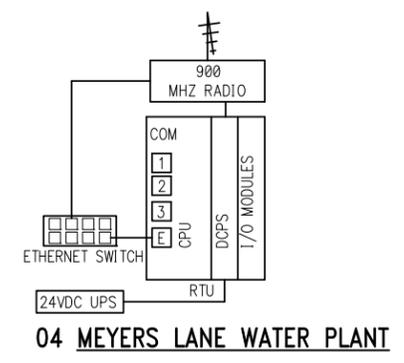
**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS  
 SCADA DIAGRAM - EXISTING

SHEET NO. **E-02**  
 OF **28**

**SCADA ABBREVIATIONS**

- COM - COMMUNICATIONS PORT
- DCPS - DC POWER SUPPLY
- FEP - FRONT END PROCESSOR
- RTU - REMOTE TERMINAL UNIT
- UPS - UNINTERRUPTABLE POWER SUPPLY
- ∇ - VERTICALLY POLARIZED OMNI
- BPS - BAND PASS FILTER

NOTES:  
1. ALL EQUIPMENT ON THIS SHEET IS NEW.



**SITE TOWER & ANTENNA SCHEDULE**

SITE NAME	COORDINATES		ELEVATIONS		COMMENTS
	LATITUDE	LONGITUDE	SITE AMSL'	ANTENNA HT.'	
PARRISH WATER PLANT	31°35'34.42"N	97°06'23.69"W	433'	30'	ON SIDE OF ELEVATED TANK
BARLOW WATER PLANT	31°35'44.42"N	97°05'44.44"W	433'	20'	NEW TOWER
CONCORD WATER PLANT	31°36'29.29"N	97°04'55.30"W	469'	20'	NEW TOWER
MEYERS LANE WATER PLANT	31°37'09.87"N	97°05'31.43"W	479'	20'	NEW TOWER
RESEARCH WATER PLANT	31°36'15.76"N	97°05'49.60"W	446'	30'	NEW TOWER
SERVICE CENTER	31°18'15.70"N	97°04'51.20"W	446'	20'	NEW TOWER

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Plot Date: Nov 25, 2024 - 11:33am  
Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338

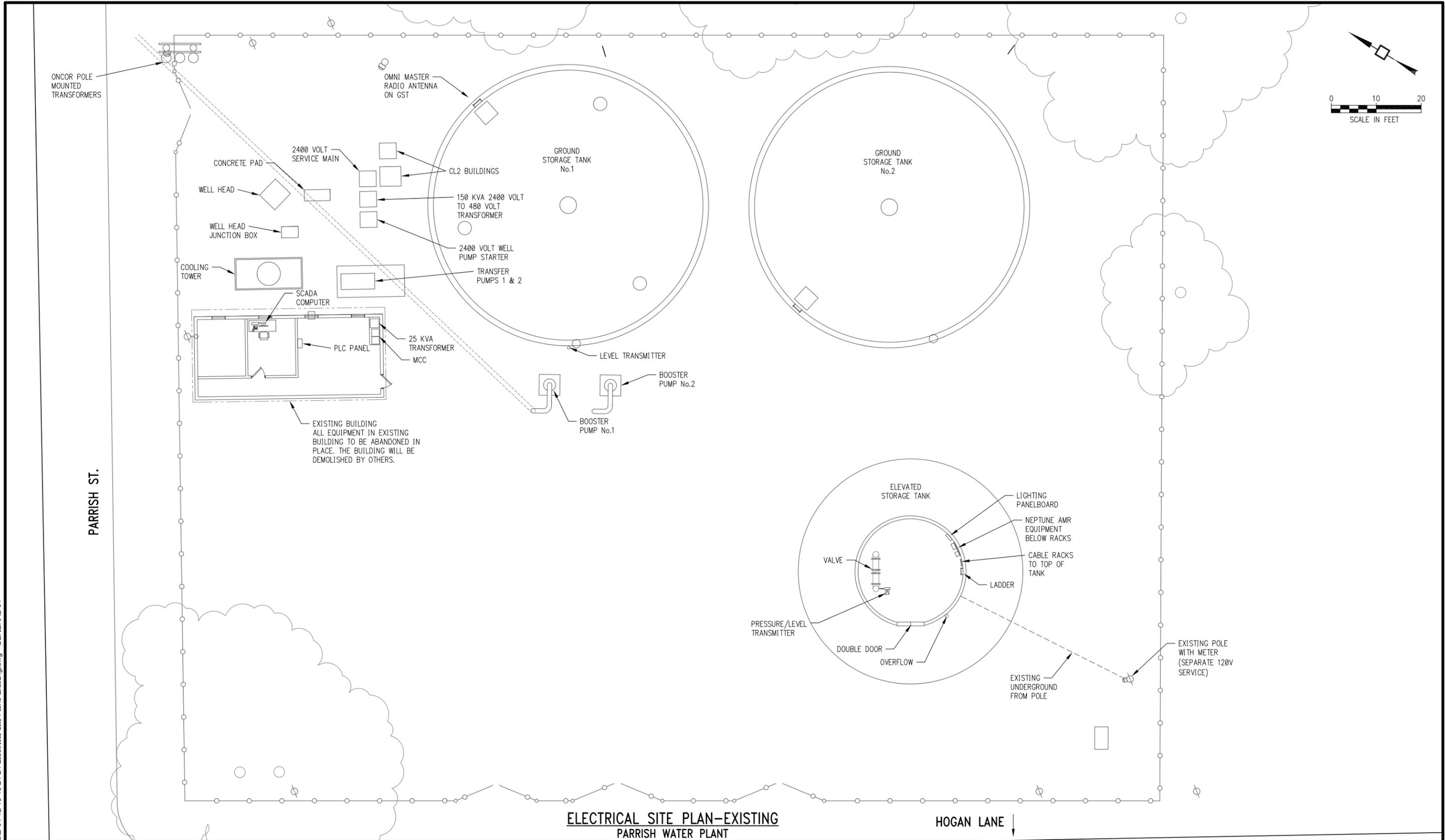


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 TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS  
 SCADA DIAGRAM - MODIFIED

SHEET NO. **E-03**  
 OF **28**

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**ELECTRICAL SITE PLAN-EXISTING**  
PARRISH WATER PLANT

NO.	DATE	REVISION	BY

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Plot Date: Nov 25, 2024 - 11:32am  
Plotted By: REBRA

PROJECT NO.	22-107
DRAWN BY	Richard Brady
DESIGNED BY	Joseph J. Kotrla, P.E.
APPROVED BY	<i>Joseph Kotrla</i>
DATE	NOVEMBER 25, 2024
FIRM No.	F-338



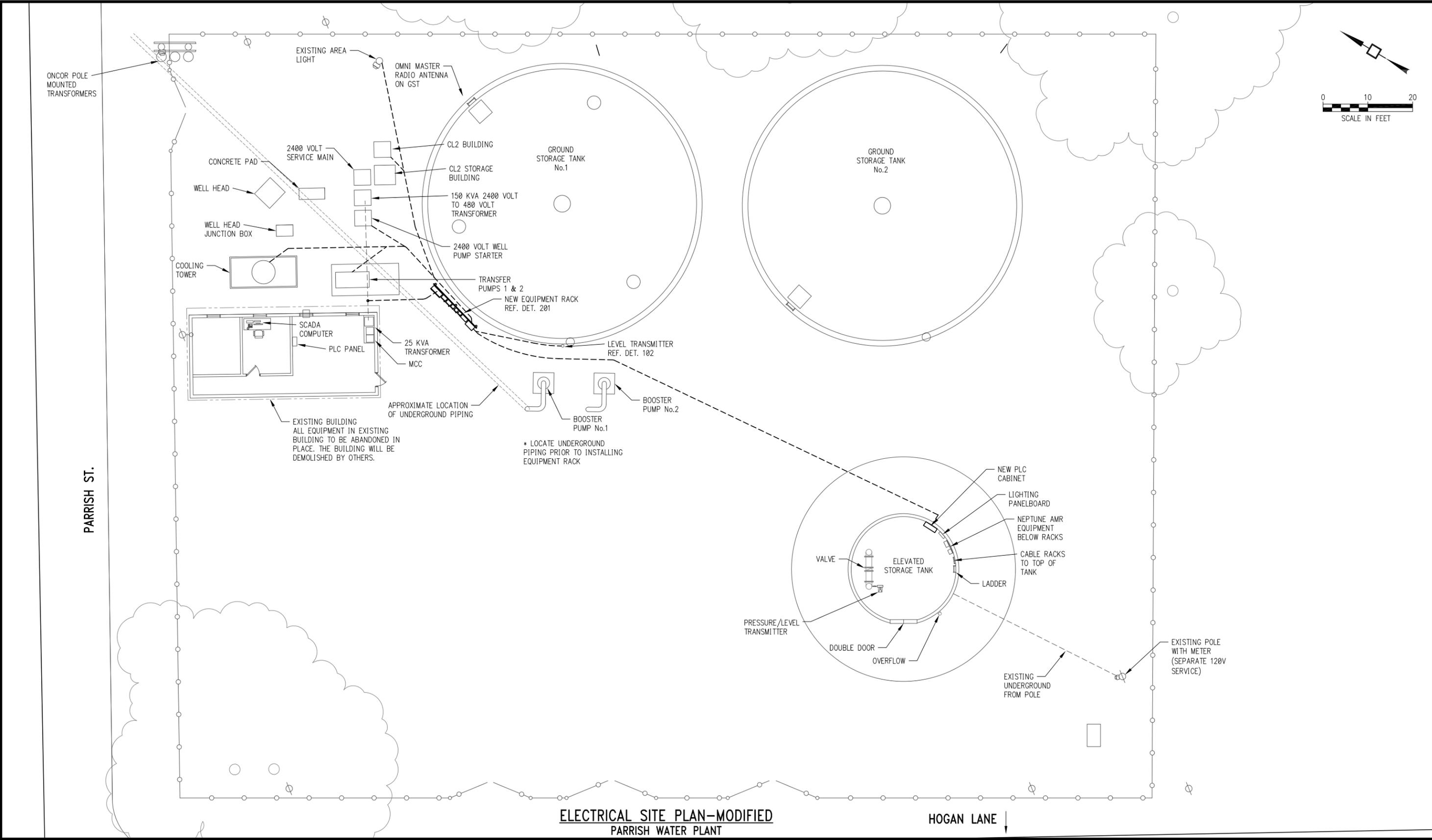
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**CITY OF BELLMEAD, TEXAS**  
WATER SYSTEM SCADA IMPROVEMENTS

**ELECTRICAL**  
PARRISH SITE PLAN - EXISTING

SHEET NO. **E-04**  
OF **28**

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**ELECTRICAL SITE PLAN-MODIFIED**  
PARRISH WATER PLANT

NO.	DATE	REVISION	BY

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Plot Date: Nov 25, 2024 - 12:54pm  
Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338

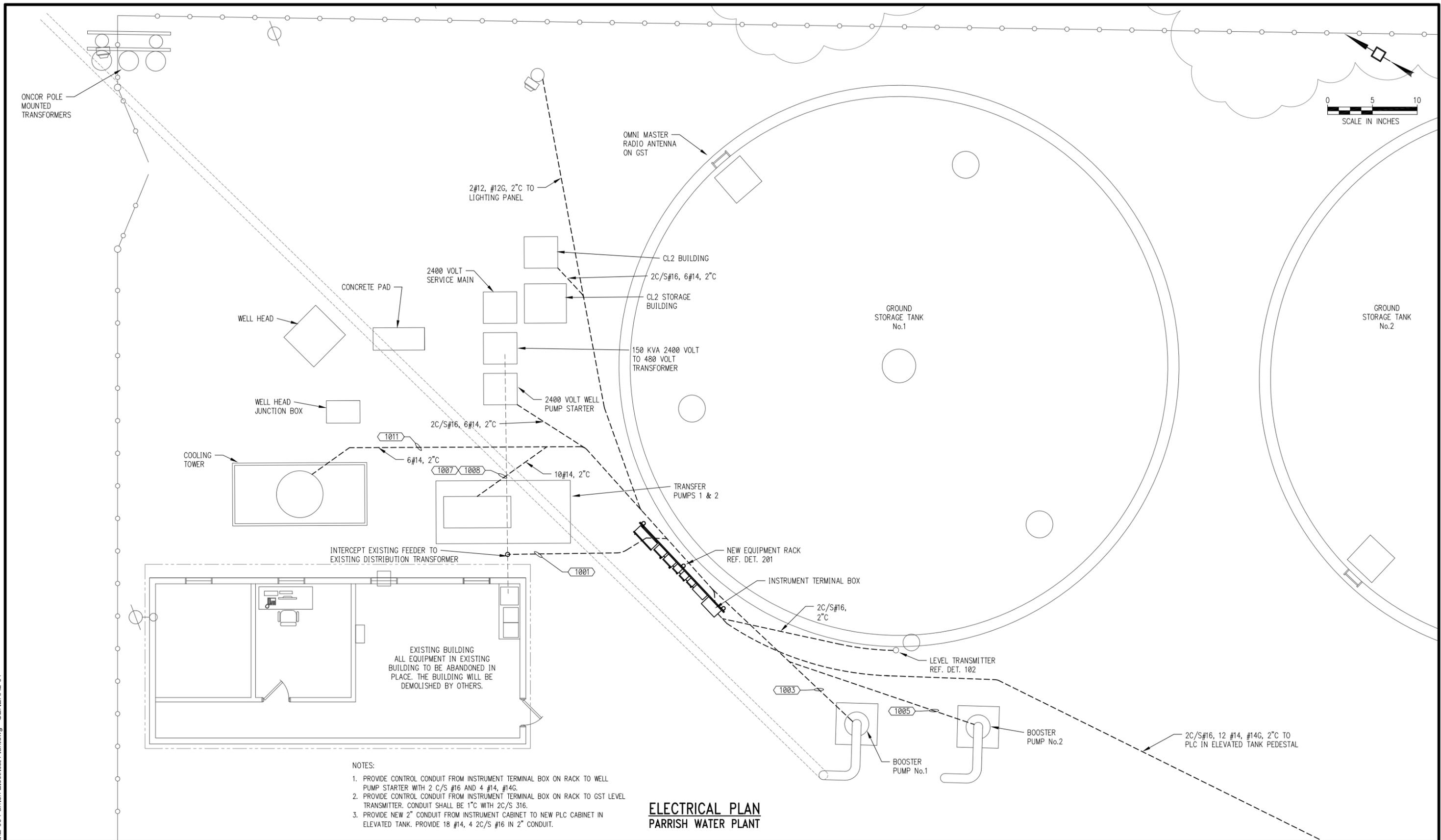


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**CONSULTING ENGINEERS**  
 TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

**ELECTRICAL**  
 PARRISH SITE PLAN - MODIFIED

SHEET NO. **E-05**  
 OF **28**



- NOTES:
1. PROVIDE CONTROL CONDUIT FROM INSTRUMENT TERMINAL BOX ON RACK TO WELL PUMP STARTER WITH 2 C/S #16 AND 4 #14, #14G.
  2. PROVIDE CONTROL CONDUIT FROM INSTRUMENT TERMINAL BOX ON RACK TO GST LEVEL TRANSMITTER. CONDUIT SHALL BE 1" WITH 2C/S 316.
  3. PROVIDE NEW 2" CONDUIT FROM INSTRUMENT CABINET TO NEW PLC CABINET IN ELEVATED TANK. PROVIDE 18 #14, 4 2C/S #16 IN 2" CONDUIT.

**ELECTRICAL PLAN  
PARRISH WATER PLANT**

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Plot Date: Nov 25, 2024 - 1:13pm  
Plotted By: REBRA

PROJECT NO. 22-107

DRAWN BY Richard Brady

DESIGNED BY Joseph J. Kotrla, P.E.

APPROVED BY *Joseph J. Kotrla*

DATE NOVEMBER 25, 2024 FIRM No. F-338



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TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
WATER SYSTEM SCADA IMPROVEMENTS

**ELECTRICAL PLAN  
PARRISH WATER PLANT**

**460 VOLT MOTOR DATA**

BOOSTER PUMP No.1		BOOSTER PUMP No.2		TRANSFER PUMP No.1		TRANSFER PUMP No.2		COOLING TOWER FAN	
HP	40	HP	40	HP	15	HP	15	HP	7.5
RPM	1,785	RPM	1,785	RPM	1,770	RPM	1,770	RPM	1,760
FLA	49.0	FLA	49.0	FLA	18.2	FLA	18.2	FLA	11.8
CODE	G	CODE	G	CODE	J	CODE	J	CODE	H
S.F.	1.15	S.F.	1.15	S.F.	1.15	S.F.	1.15	S.F.	1.15

**PANEL SCHEDULE -- PARRISH**

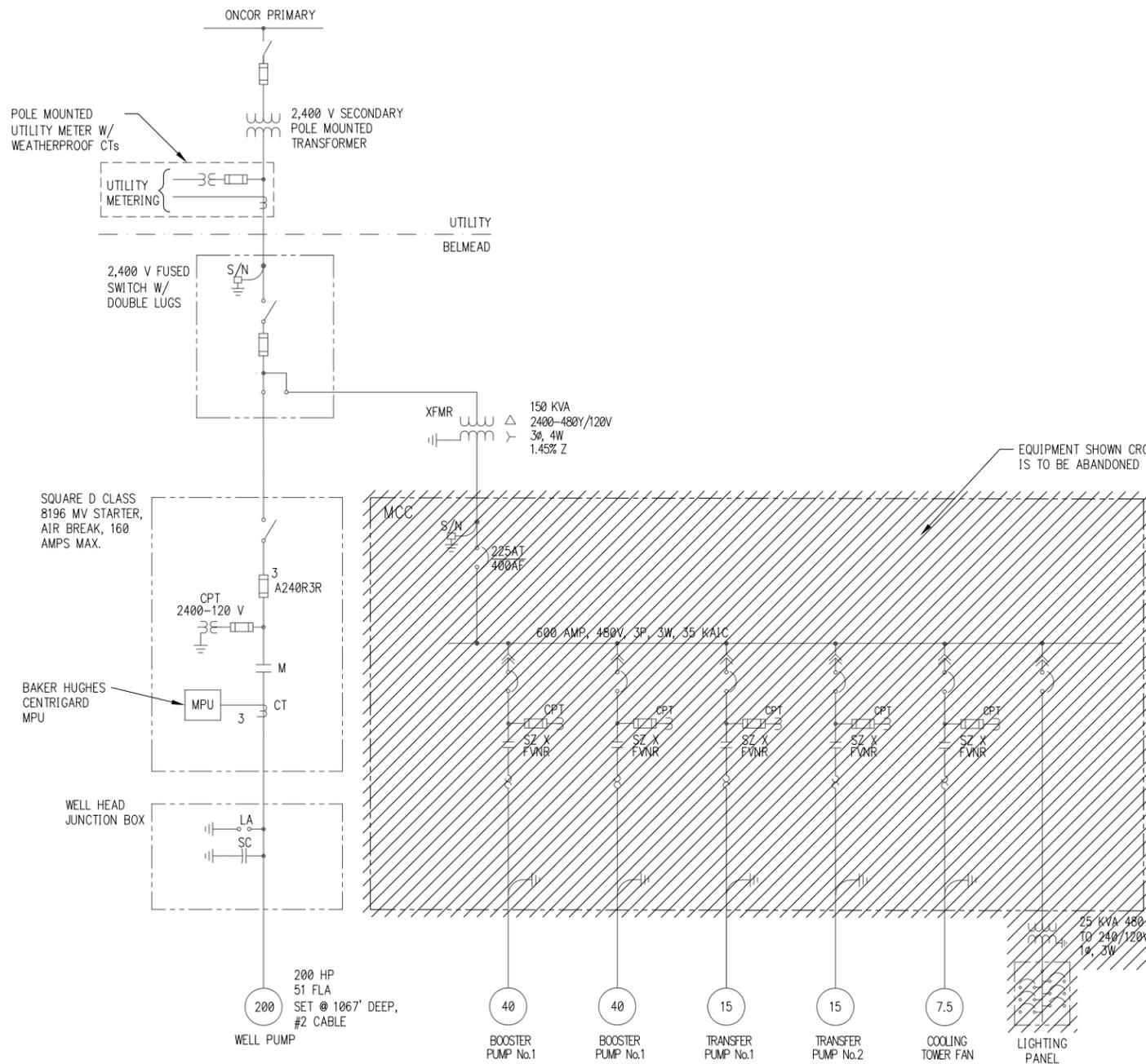
DESIGNATION: L  
 LOCATION: ELECTRIC ROOM  
 FED FROM: DP1

VOLTS: 208Y/120V 3Ø 4 WIRE  
 BUS RATING: 100 AMP  
 MAIN CIRCUIT BREAKER: 100 A  
 S.C. RATING: 10k.A.I.C.

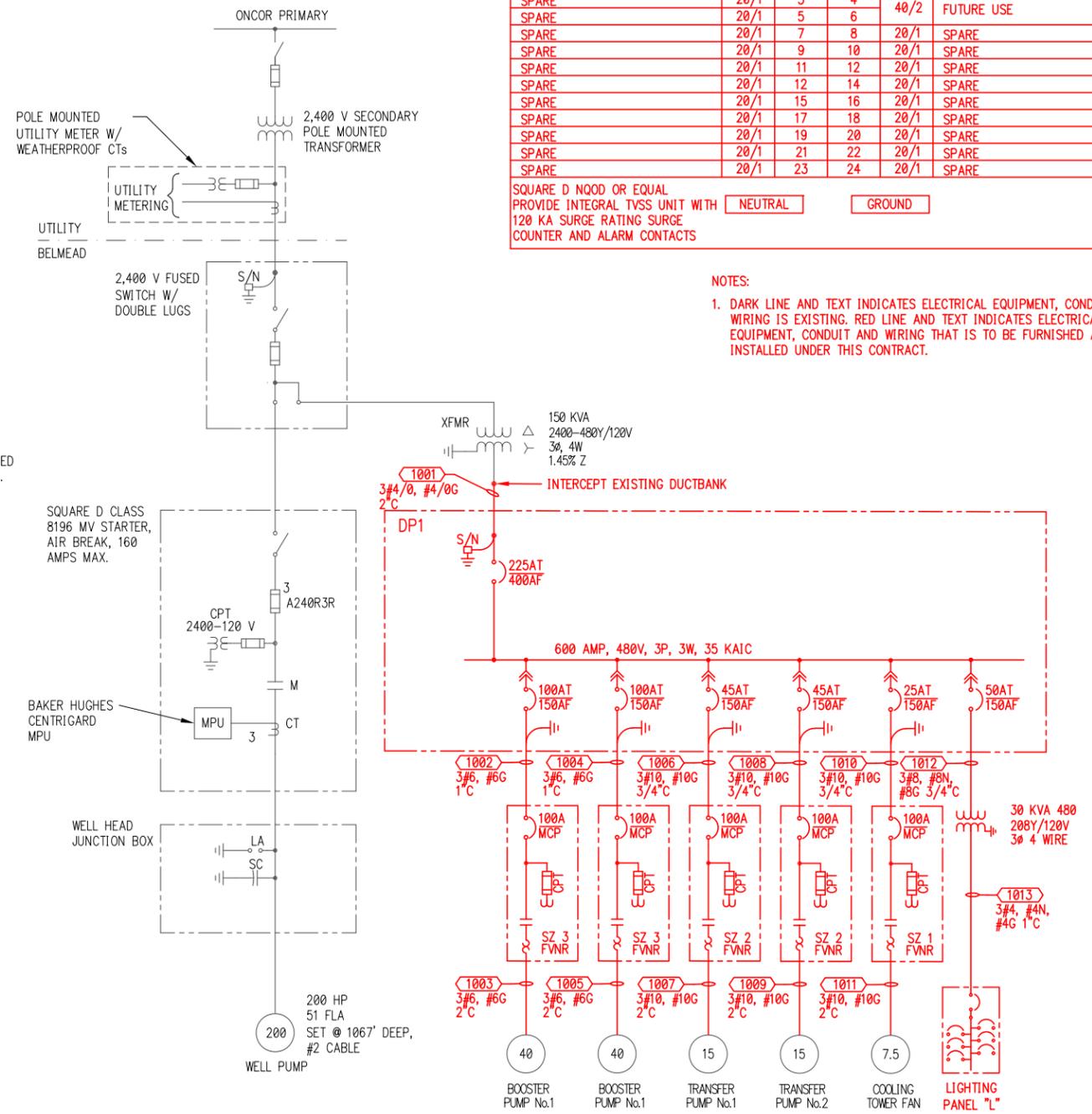
CIRCUIT DESCRIPTION	CKT BKR	CKT #	CKT #	CKT BKR	CIRCUIT DESCRIPTION
RECEPTACLE ON RACK	20/1	1	2	20/1	AREA LIGHTS
SPARE	20/1	3	4	40/2	FUTURE USE
SPARE	20/1	5	6	20/1	SPARE
SPARE	20/1	7	8	20/1	SPARE
SPARE	20/1	9	10	20/1	SPARE
SPARE	20/1	11	12	20/1	SPARE
SPARE	20/1	12	14	20/1	SPARE
SPARE	20/1	15	16	20/1	SPARE
SPARE	20/1	17	18	20/1	SPARE
SPARE	20/1	19	20	20/1	SPARE
SPARE	20/1	21	22	20/1	SPARE
SPARE	20/1	23	24	20/1	SPARE

SQUARE D NOOD OR EQUAL  
 PROVIDE INTEGRAL TVSS UNIT WITH NEUTRAL GROUND  
 120 KA SURGE RATING SURGE  
 COUNTER AND ALARM CONTACTS

- NOTES:  
 1. DARK LINE AND TEXT INDICATES ELECTRICAL EQUIPMENT, CONDUIT AND WIRING IS EXISTING. RED LINE AND TEXT INDICATES ELECTRICAL EQUIPMENT, CONDUIT AND WIRING THAT IS TO BE FURNISHED AND INSTALLED UNDER THIS CONTRACT.



**ONE LINE DIAGRAM -- EXISTING  
 PARRISH WATER PLANT**



**ONE LINE DIAGRAM -- MODIFIED  
 PARRISH WATER PLANT**

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NO.	DATE	REVISION	BY

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph J. Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338

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 Plot Date: Nov 25, 2024 - 12:57pm  
 Plotted By: REBRA



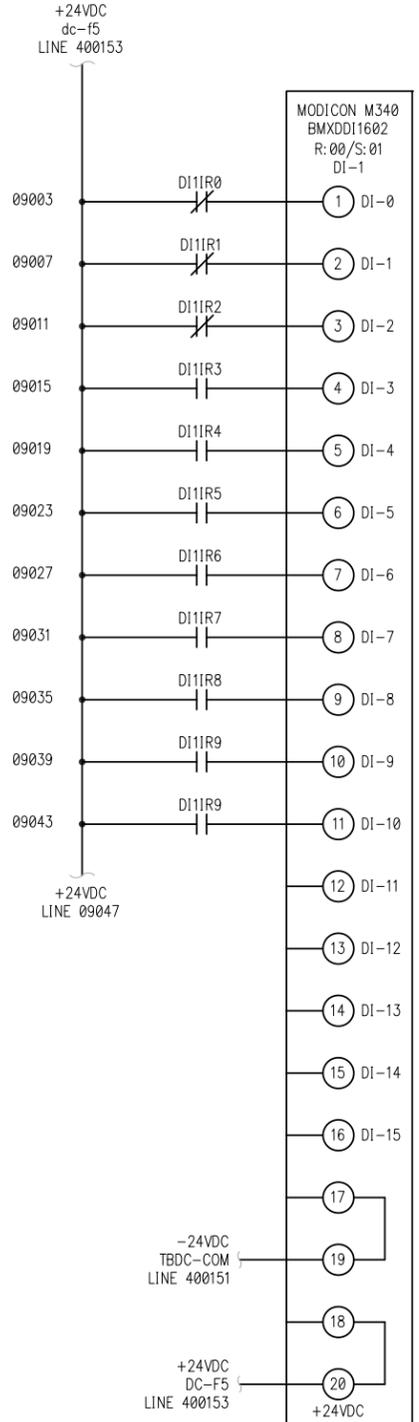
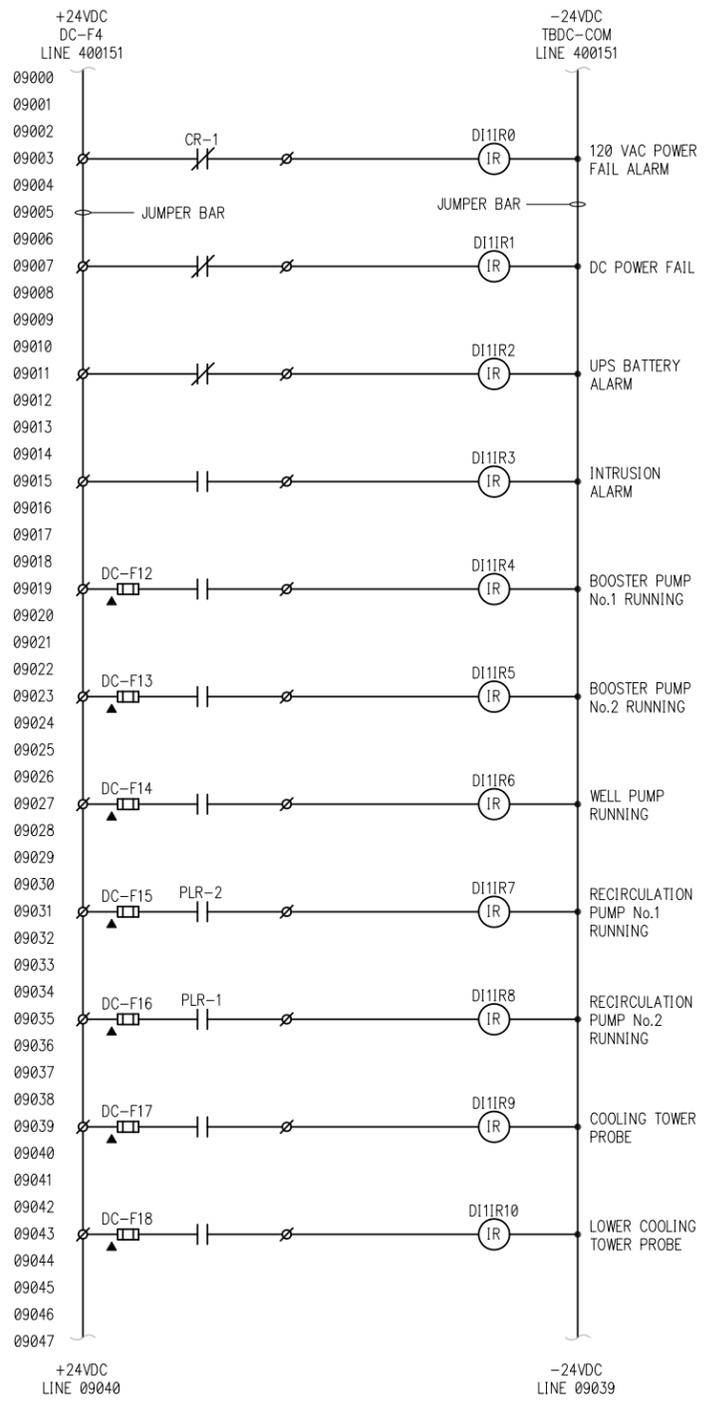
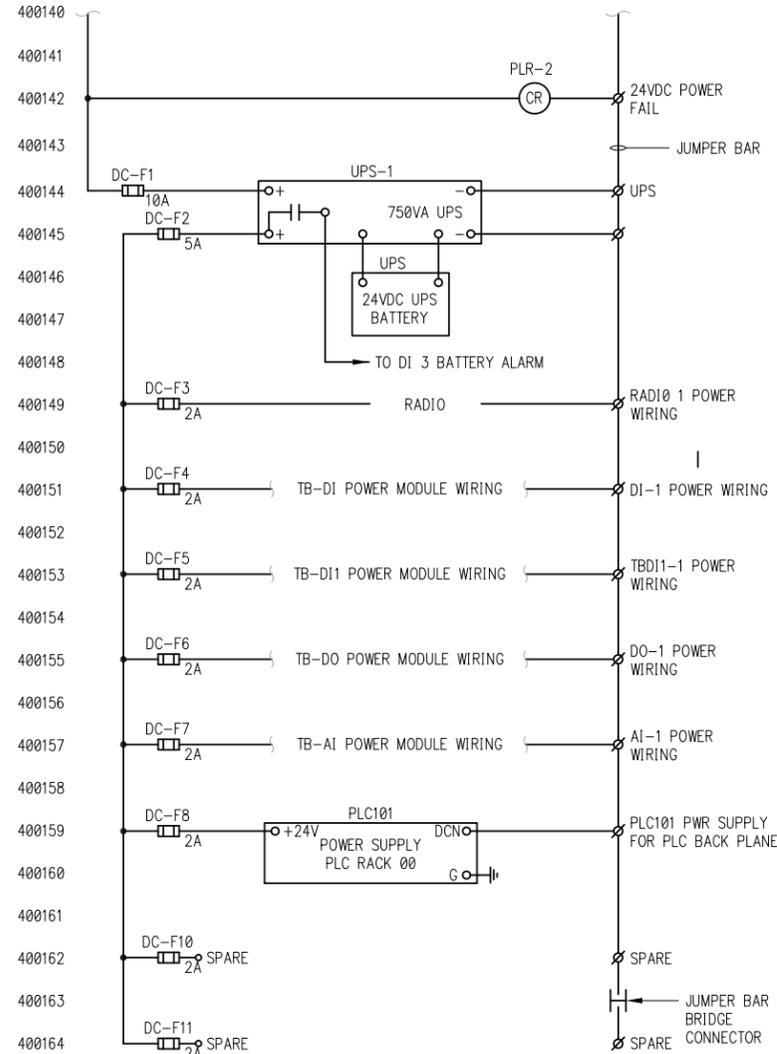
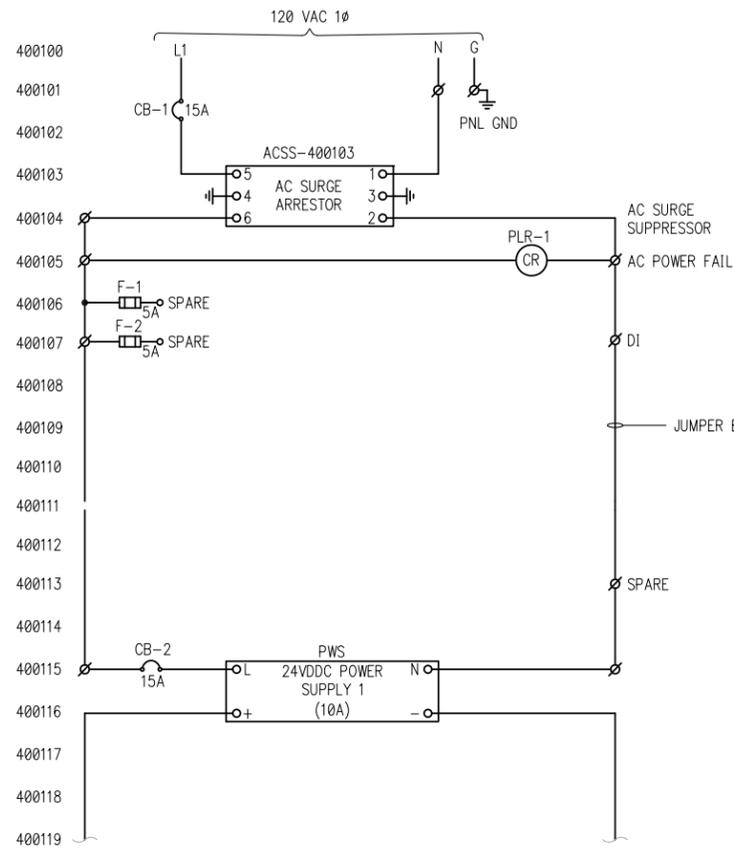
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 TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

PARRISH WATER PLANT  
 ONE LINE DIAGRAMS

SHEET NO. **E-07**

OF **28**



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Plot Date: Nov 25, 2024 - 11:27am  
Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Wood*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338

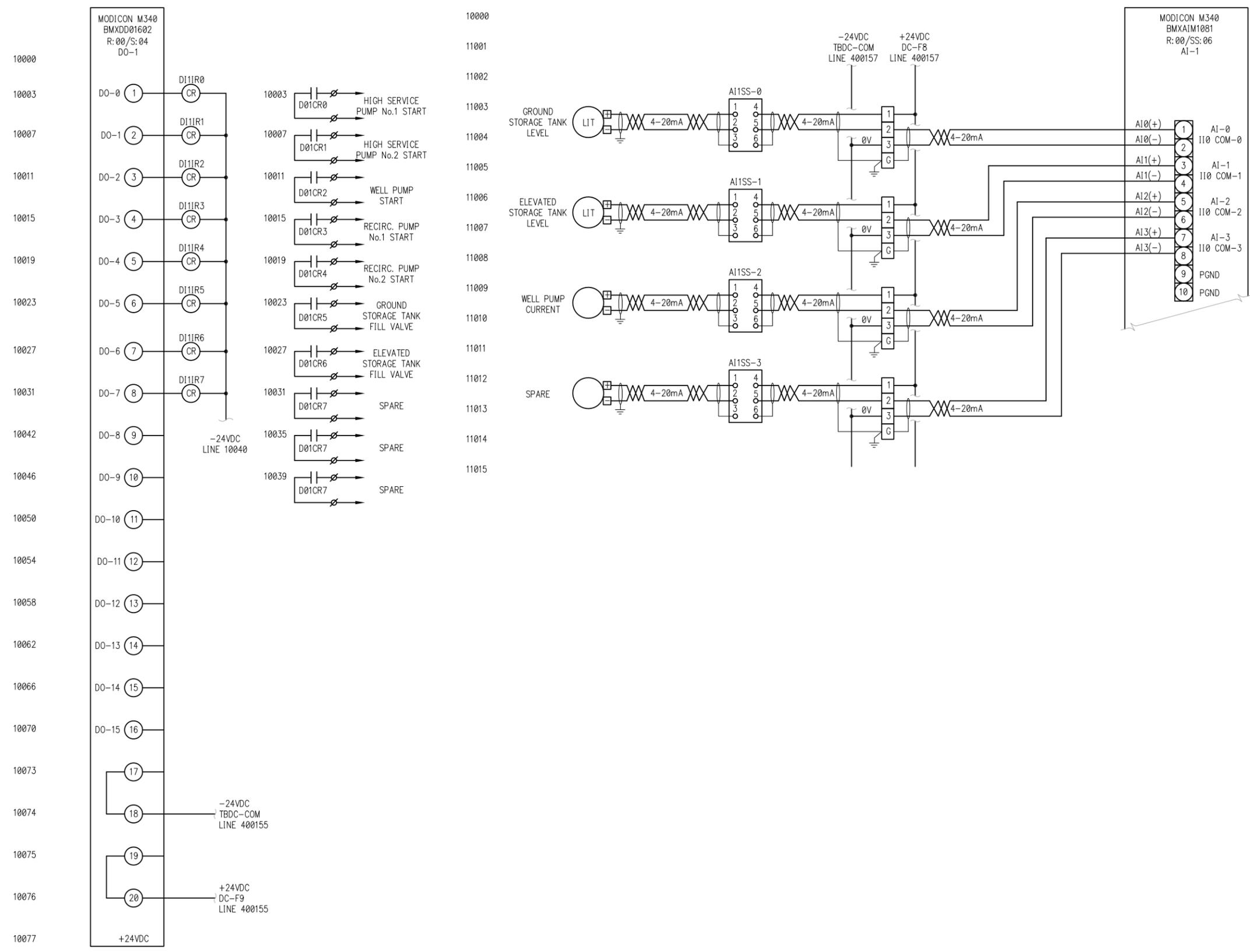


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**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

PARRISH WATER PLANT  
 ELECTRICAL CONTROL SCHEMATICS I

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Plot Date: Nov 25, 2024 - 11:28am  
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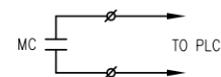
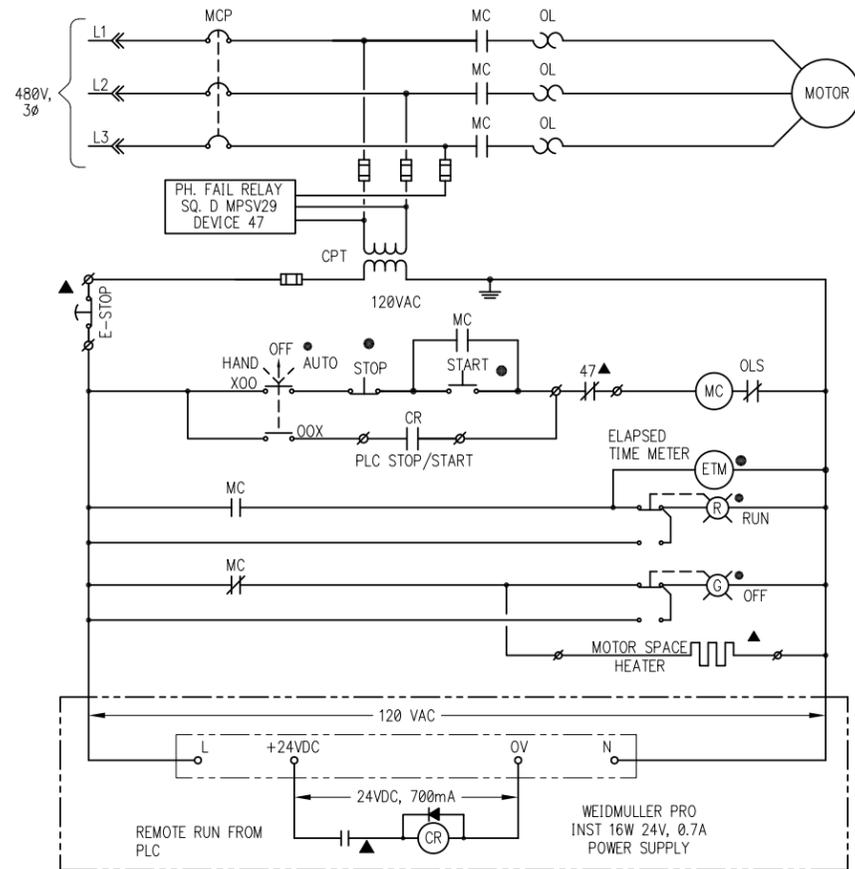
PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Wood*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



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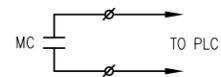
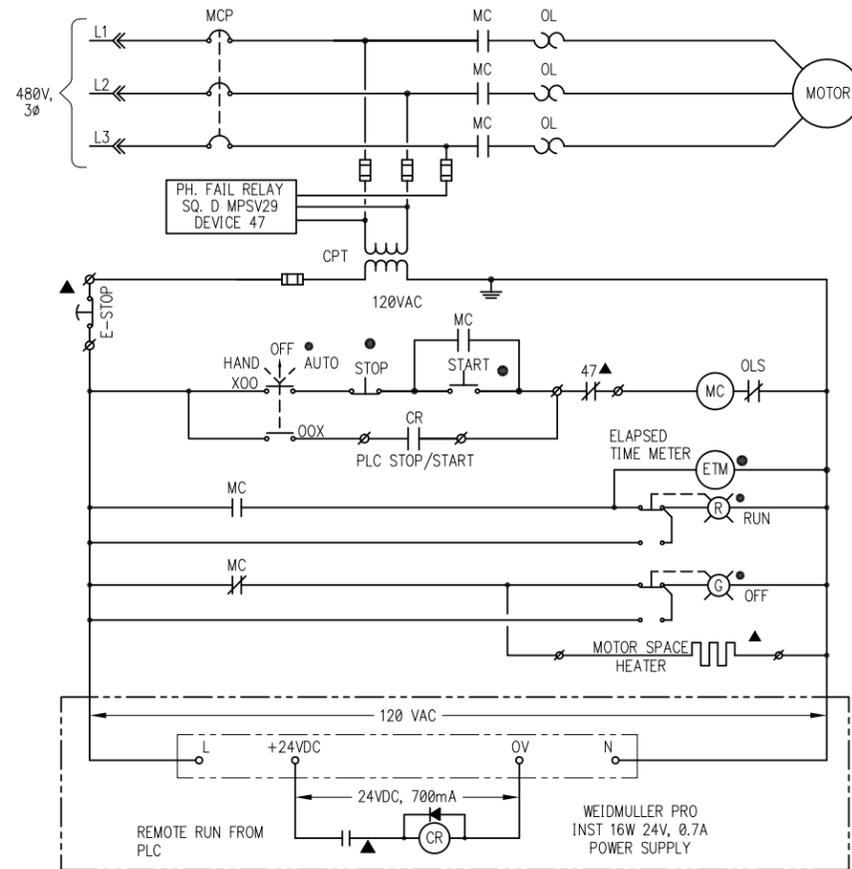
**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

PARRISH WATER PLANT  
 ELECTRICAL CONTROL SCHEMATICS II



NOTES:  
1. TYPICAL FOR COOLING FAN AND RECIRCULATION PUMPS

**301 CONTROL SCHEMATIC - HEAT EXCHANGER**



NOTES:  
1. TYPICAL FOR BOTH BOOSTER PUMPS.

**302 CONTROL SCHEMATIC - BOOSTER PUMPS**

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Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Wood*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



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**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS  
 PARRISH WATER PLANT  
 ELECTRICAL CONTROL SCHEMATICS III

SHEET NO. **E-10**  
 OF **28**

**PLC I/O POINTS – PARRISH WATER PLANT**

POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
<b>DIGITAL INPUT ADDITIONS</b>					
0	SITE POWER	DI	STATUS		POWER STATUS
1	DC POWER FAIL	DI	ALARM	24VDC UPS	
2	UPS BATTERY ALARM	DI	ALARM	UPS-1	
3	INTRUSION ALARM	DI	ALARM	MICROSWITCH	
4	BOOSTER PUMP No.1 RUNNING	DI	STATUS	STARTER	RUN STATUS
5	BOOSTER PUMP No.2 RUNNING	DI	STATUS	STARTER	RUN STATUS
6	WELL PUMP RUNNING	DI	STATUS	STARTER	RUN STATUS
7	TRANSFER PUMP No.1 RUNNING	DI	STATUS	STARTER	RUN STATUS
8	TRANSFER PUMP No.2 RUNNING	DI	STATUS	STARTER	RUN STATUS
9	COOLING TOWER PROBE	DI	STATUS		
10	LOWER COOLING TOWER PROBE	DI	STATUS		
11	SPARE	DI			
12	SPARE	DI			
13	SPARE	DI			
<b>DIGITAL OUTPUT ADDITIONS</b>					
0	BOOSTER PUMP No.1 START	DO	CONTROL	STARTER	RUN COMMAND
1	BOOSTER PUMP No.2 START	DO	CONTROL	STARTER	RUN COMMAND
2	WELL PUMP START	DO	CONTROL	STARTER	RUN COMMAND
3	TRANSFER PUMP No.1 START	DO	CONTROL	STARTER	RUN COMMAND
4	TRANSFER PUMP No.2 START	DO	CONTROL	STARTER	RUN COMMAND
5	GROUND STORAGE TANK FILL VALVE	DO	CONTROL	MOV	
6	ELEVATED STORAGE TANK FILL VALVE	DO	CONTROL	MOV	
7	SPARE	DO			
8	SPARE	DO			
9	SPARE	DO			
<b>ANALOG INPUT ADDITIONS</b>					
0	GROUND STORAGE TANK LEVEL	AI	LEVEL	LEVEL TRANSMITTER	
1	ELEVATED STORAGE TANK LEVEL	AI	LEVEL	LEVEL TRANSMITTER	
2	WELL PUMP CURRENT	AI	CURRENT	CT IN STARTER	
3	SPARE	AI			
4	SPARE	AI			
5	SPARE	AI			

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Plot Date: Nov 25, 2024 - 11:35am  
Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph J. Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338

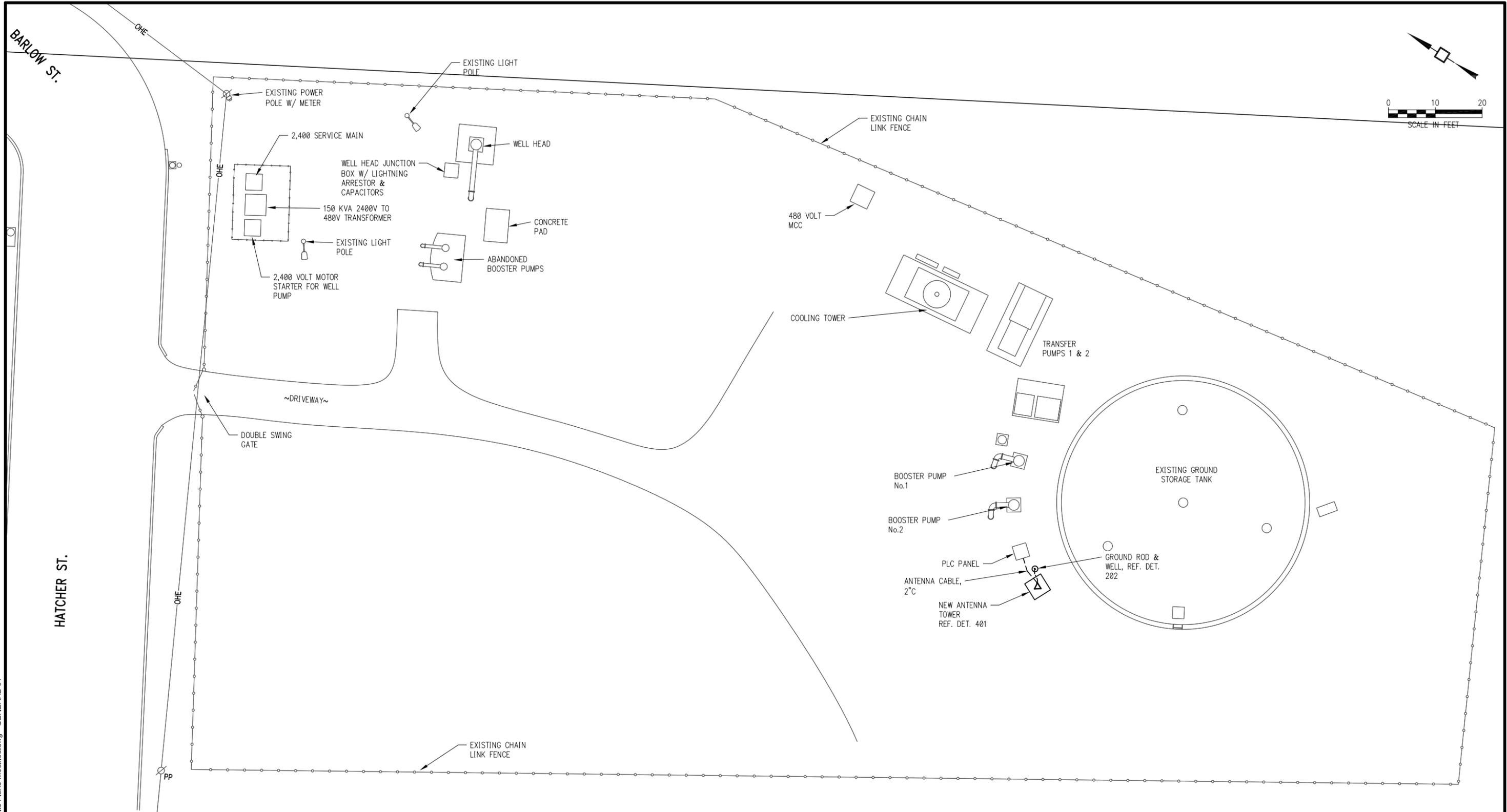


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 WATER SYSTEM SCADA IMPROVEMENTS

PARRISH WATER PLANT  
 I/O SCHEDULES

SHEET NO. **E-11**  
 OF **28**



**ELECTRICAL SITE PLAN**  
**BARLOW WATER PLANT**

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Plot Date: Nov 25, 2024 - 11:30am  
 Plotted By: REBRA

PROJECT NO. 22-107

DRAWN BY Richard Brady

DESIGNED BY Joseph J. Kotrla, P.E.

APPROVED BY *Joseph Kotrla*

DATE NOVEMBER 25, 2024 FIRM No. F-338



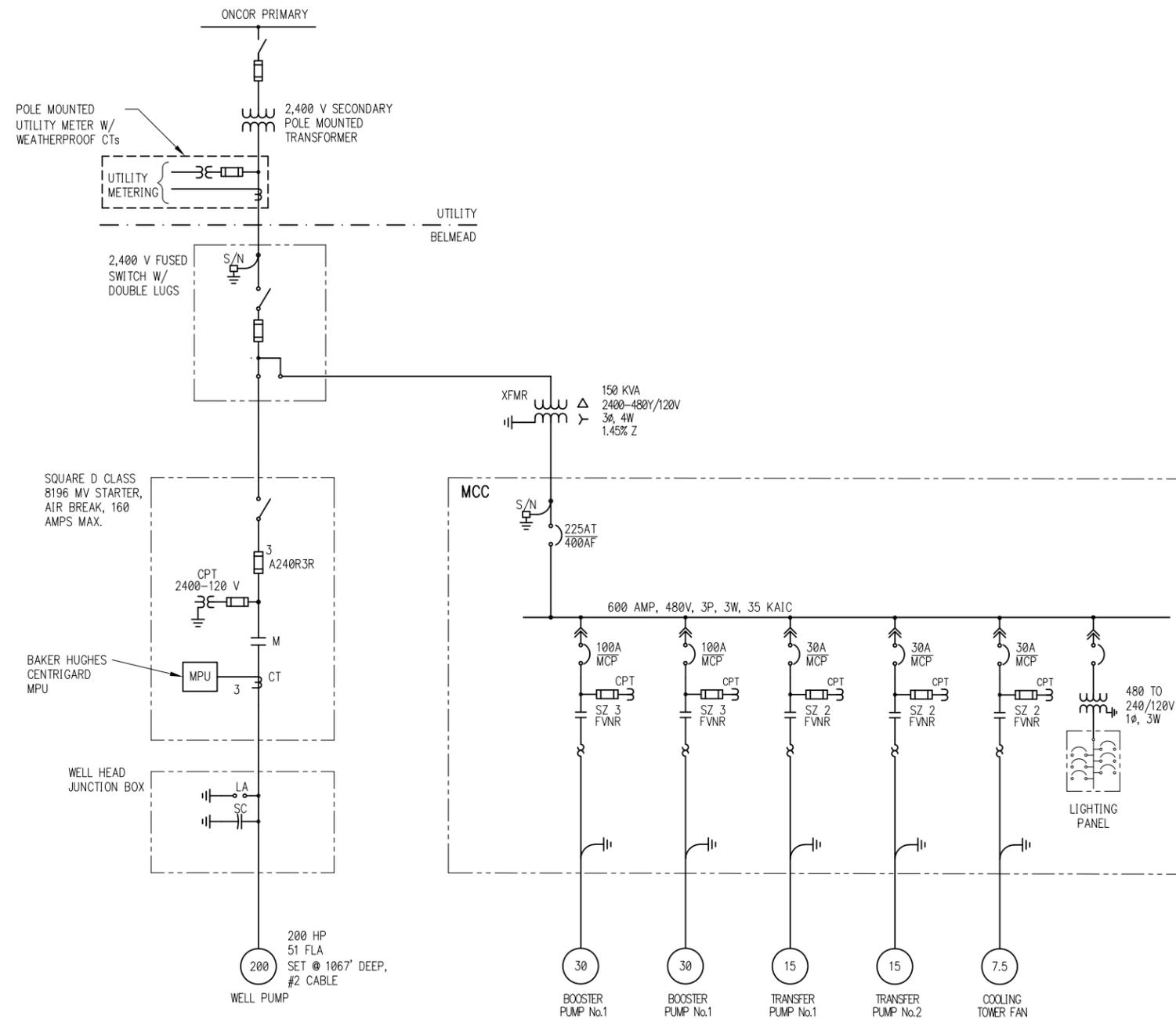
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**CONSULTING ENGINEERS**  
 TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

**ELECTRICAL**  
**BARLOW SITE PLAN**

NOTES:  
 1. ALL THE EQUIPMENT SHOWN ON THE ONE LINE DIAGRAM IS EXISTING. THE ONE LINE DIAGRAM IS SHOWN FOR REFERENCE IN REGARD TO PLC INPUTS AND OUTPUTS.



460 VOLT MOTOR DATA									
BOOSTER PUMP No.1		BOOSTER PUMP No.2		TRANSFER PUMP No.1		TRANSFER PUMP No.2		COOLING TOWER FAN	
HP	30	HP	30	HP	15	HP	7.5	HP	7.5
RPM	1,770	RPM	1,770	RPM		RPM		RPM	1,760
FLA	34.7	FLA	34.7	FLA		FLA		FLA	11.8
CODE	G	CODE	G	CODE		CODE		CODE	H
S.F.	1.15	S.F.	1.15	S.F.		S.F.		S.F.	1.15

**ONE LINE DIAGRAM**

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Plot Date: Nov 25, 2024 - 1:07pm  
 Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph J. Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



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**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

BARLOW WATER PLANT  
 ONE LINE DIAGRAM

SHEET NO. **E-13**  
 OF **28**

NOTES:

1. ALL PLC CABINET WIRING AND DEVICE REQUIREMENTS SHALL BE SIMILAR TO THE PLC SCHEMATIC SHOWN FOR PARRISH WATER PLANT PLC. CHANGE THE I/O TAGGING TO THAT SHOWN ON THE SCHEDULE FOR EACH SPECIFIC WATER PLANT SITE. PROVIDE SHOP DRAWINGS FOR EACH INDIVIDUAL PLC CABINET.

PLC I/O POINTS – BARLOW WATER PLANT					
POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
<b>DIGITAL INPUT ADDITIONS</b>					
0	SITE POWER	DI	STATUS		POWER STATUS
1	DC POWER FAIL	DI	ALARM	24VDC UPS	
2	UPS BATTERY ALARM	DI	ALARM	UPS-1	
3	INTRUSION ALARM	DI	ALARM	MICROSWITCH	
4	BOOSTER PUMP No.1 RUNNING	DI	STATUS	STARTER	RUN STATUS
5	BOOSTER PUMP No.2 RUNNING	DI	STATUS	STARTER	RUN STATUS
6	WELL PUMP RUNNING	DI	STATUS	STARTER	RUN STATUS
7	TRANSFER PUMP No.1 RUNNING	DI	STATUS	STARTER	RUN STATUS
8	TRANSFER PUMP No.2 RUNNING	DI	STATUS	STARTER	RUN STATUS
9	COOLING TOWER PROBE	DI	STATUS		
10	LOWER COOLING TOWER PROBE	DI	STATUS		
11	SPARE	DI			
12	SPARE	DI			
13	SPARE	DI			
<b>DIGITAL OUTPUT ADDITIONS</b>					
0	BOOSTER PUMP No.1 START	DO	CONTROL	STARTER	RUN COMMAND
1	BOOSTER PUMP No.2 START	DO	CONTROL	STARTER	RUN COMMAND
2	WELL PUMP START	DO	CONTROL	STARTER	RUN COMMAND
3	TRANSFER PUMP No.1 START	DO	CONTROL	STARTER	RUN COMMAND
4	TRANSFER PUMP No.2 START	DO	CONTROL	STARTER	RUN COMMAND
5	GROUND STORAGE TANK FILL VALVE	DO	CONTROL	MOV	
6	ELEVATED STORAGE TANK FILL VALVE	DO	CONTROL	MOV	
7	SPARE	DO			
8	SPARE	DO			
9	SPARE	DO			
<b>ANALOG INPUT ADDITIONS</b>					
0	GROUND STORAGE TANK LEVEL	AI	LEVEL	LEVEL TRANSMITTER	
1	WELL PUMP CURRENT	AI	CURRENT	CT IN STARTER	
2	SPARE	AI			
3	SPARE	AI			
4	SPARE	AI			
5	SPARE	AI			

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Plot Date: Nov 25, 2024 - 1:10pm  
Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph J. Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



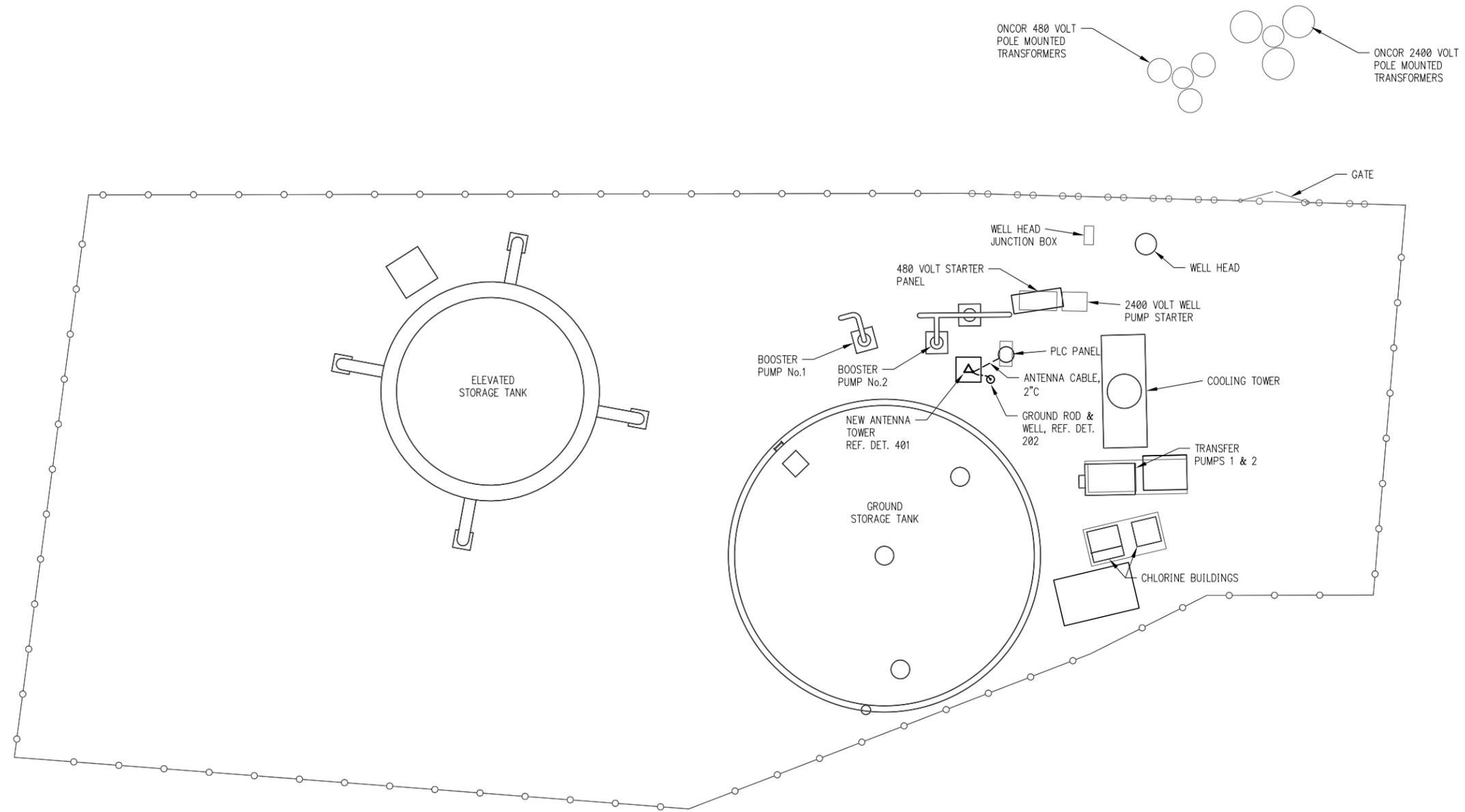
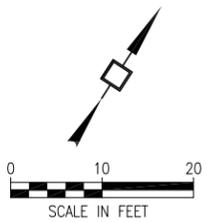
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 TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

---

BARLOW WATER PLANT  
 I/O SCHEDULES

SHEET NO. **E-14**  
 OF **28**



NOTES:

1. USE EXISTING PLC CABINET FOR NEW PLC SUBPANEL. FROM EXISTING PLC CABINET USE EXISTING CONDUITS TO STARTERS AND PROVIDE NEW WIRING FROM PLC ENCLOSURE TO EACH STARTER AND ANALOG POINT. AND INTERFACE RELAYS IN STARTERS. POWER NEW PLC FROM EXISTING 120 VAC CIRCUIT FROM PANELBOARD. PROVIDE NEW WIRING TO PANELBOARD.
2. RUN 2" C WITH 36" LONG RADIUS 90 DEGREE BENDS FROM NEW PLC CABINET TO ANTENNA TOWER. INSTALL SPECIFIED COAX CABLE IN CONDUIT.

**ELECTRICAL SITE PLAN**  
**CONCORD WATER PLANT**

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Plot Date: Nov 25, 2024 - 1:21pm  
Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph J. Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



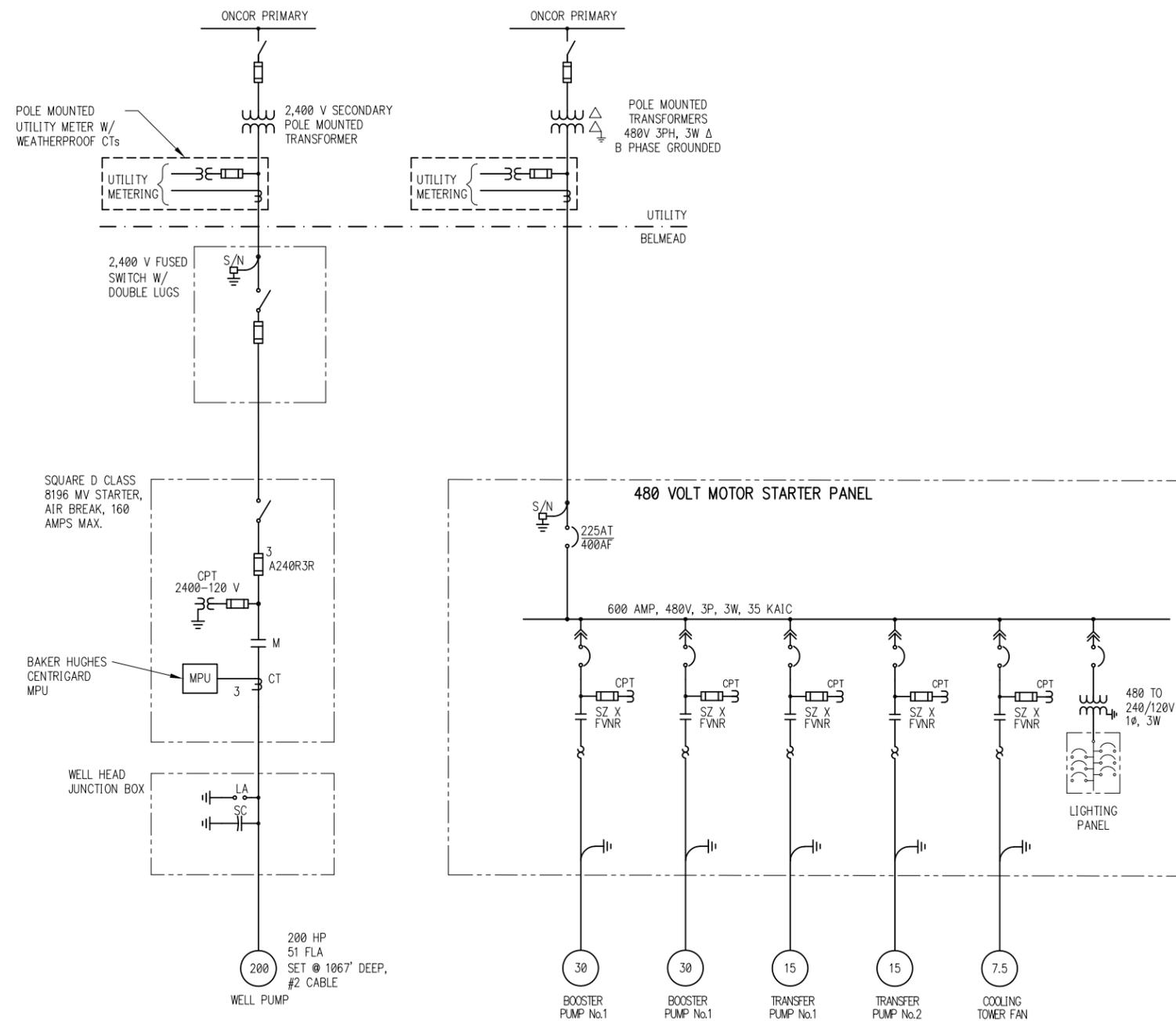
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**CONSULTING ENGINEERS**  
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**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

**ELECTRICAL**  
**CONCORD SITE PLAN**

SHEET NO. **E-15**  
 OF **28**

NOTES:  
 1. ALL THE EQUIPMENT SHOWN ON THE ONE LINE DIAGRAM IS EXISTING. THE ONE LINE DIAGRAM IS SHOWN FOR REFERENCE IN REGARD TO PLC INPUTS AND OUTPUTS.



460 VOLT MOTOR DATA									
BOOSTER PUMP No.1		BOOSTER PUMP No.2		TRANSFER PUMP No.1		TRANSFER PUMP No.2		COOLING TOWER FAN	
HP	30	HP	30	HP	15	HP	7.5	HP	7.5
RPM	1,780	RPM	1,780	RPM	1,780	RPM	1,780	RPM	1,760
FLA	34.7	FLA	34.7	FLA	18.2	FLA	18.2	FLA	11.8
CODE	H	CODE	H	CODE	J	CODE	J	CODE	H
S.F.	1.15	S.F.	1.15	S.F.	1.15	S.F.	1.15	S.F.	1.15

ONE LINE DIAGRAM

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Plot Date: Nov 25, 2024 - 1:07pm  
 Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph J. Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



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**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

CONCORD WATER PLANT  
 ONE LINE DIAGRAM

SHEET NO. **E-16**  
 OF **28**

NOTES:

1. ALL PLC CABINET WIRING AND DEVICE REQUIREMENTS SHALL BE SIMILAR TO THE PLC SCHEMATIC SHOWN FOR PARRISH WATER PLANT PLC. CHANGE THE I/O TAGGING TO THAT SHOWN ON THE SCHEDULE FOR EACH SPECIFIC WATER PLANT SITE. PROVIDE SHOP DRAWINGS FOR EACH INDIVIDUAL PLC CABINET.

PLC I/O POINTS – CONCORD WATER PLANT					
POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
<b>DIGITAL INPUT ADDITIONS</b>					
0	SITE POWER	DI	STATUS		POWER STATUS
1	DC POWER FAIL	DI	ALARM	24VDC UPS	
2	UPS BATTERY ALARM	DI	ALARM	UPS-1	
3	INTRUSION ALARM	DI	ALARM	MICROSWITCH	
4	BOOSTER PUMP No.1 RUNNING	DI	STATUS	STARTER	RUN STATUS
5	BOOSTER PUMP No.2 RUNNING	DI	STATUS	STARTER	RUN STATUS
6	WELL PUMP RUNNING	DI	STATUS	STARTER	RUN STATUS
7	TRANSFER PUMP No.1 RUNNING	DI	STATUS	STARTER	RUN STATUS
8	TRANSFER PUMP No.2 RUNNING	DI	STATUS	STARTER	RUN STATUS
9	COOLING TOWER PROBE	DI	STATUS		
10	LOWER COOLING TOWER PROBE	DI	STATUS		
11	SPARE	DI			
12	SPARE	DI			
13	SPARE	DI			
<b>DIGITAL OUTPUT ADDITIONS</b>					
0	BOOSTER PUMP No.1 START	DO	CONTROL	STARTER	RUN COMMAND
1	BOOSTER PUMP No.2 START	DO	CONTROL	STARTER	RUN COMMAND
2	WELL PUMP START	DO	CONTROL	STARTER	RUN COMMAND
3	TRANSFER PUMP No.1 START	DO	CONTROL	STARTER	RUN COMMAND
4	TRANSFER PUMP No.2 START	DO	CONTROL	STARTER	RUN COMMAND
5	GROUND STORAGE TANK FILL VALVE	DO	CONTROL	MOV	
6	ELEVATED STORAGE TANK FILL VALVE	DO	CONTROL	MOV	
7	SPARE	DO			
8	SPARE	DO			
9	SPARE	DO			
<b>ANALOG INPUT ADDITIONS</b>					
0	GROUND STORAGE TANK LEVEL	AI	LEVEL	LEVEL TRANSMITTER	
1	ELEVATED STORAGE TANK LEVEL	AI	LEVEL	LEVEL TRANSMITTER	
2	WELL PUMP CURRENT	AI	CURRENT	CT IN STARTER	
3	SPARE	AI			
4	SPARE	AI			
5	SPARE	AI			

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PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338

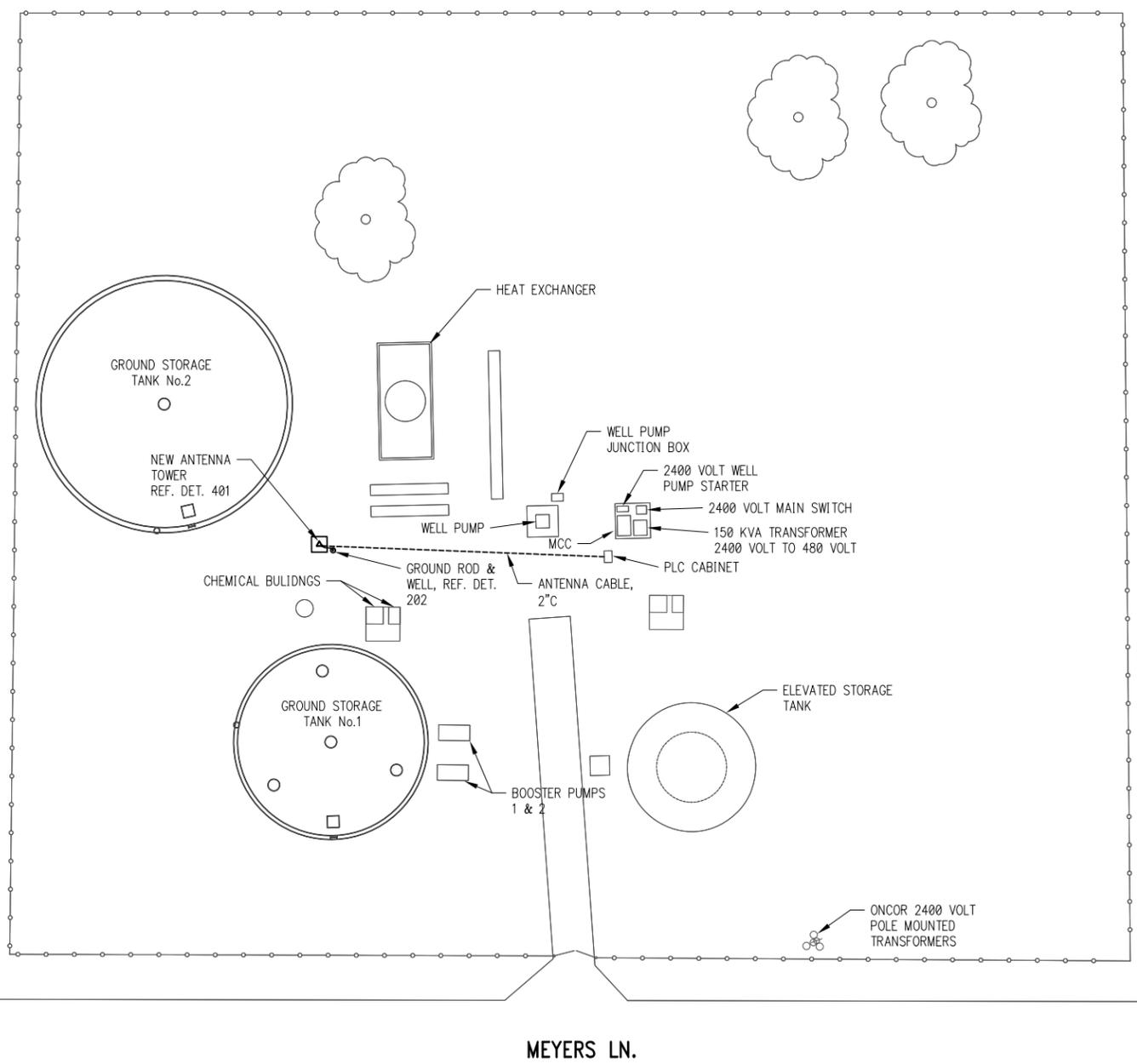
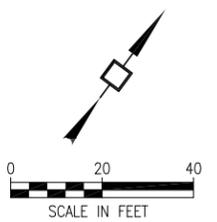


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**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

CONCORD WATER PLANT  
 I/O SCHEDULES

SHEET NO. **E-17**  
 OF **28**



CIRCLE DRIVE

MEYERS LN.

NOTES:

1. USE EXISTING PLC CABINET FOR NEW PLC SUBPANEL. FROM EXISTING PLC CABINET USE EXISTING CONDUITS TO STARTERS AND PROVIDE NEW WIRING FROM PLC ENCLOSURE TO EACH STARTER AND ANALOG POINT. AND INTERFACE RELAYS IN STARTERS. POWER NEW PLC FROM EXISTING 120 VAC CIRCUIT FROM PANELBOARD. PROVIDE NEW WIRING TO PANELBOARD.
2. RUN 2" C WITH 36" LONG RADIUS 90 DEGREE BENDS FROM NEW PLC CABINET TO ANTENNA TOWER. INSTALL SPECIFIED COAX CABLE IN CONDUIT.

**ELECTRICAL SITE PLAN**  
MEYERS LANE WATER PLANT

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Plot Date: Nov 25, 2024 - 1:17pm  
Plotted By: REBRA

PROJECT NO. 22-107

DRAWN BY Richard Brady

DESIGNED BY Joseph J. Kotrla, P.E.

APPROVED BY *Joseph J. Kotrla*

DATE NOVEMBER 25, 2024 FIRM No. F-338



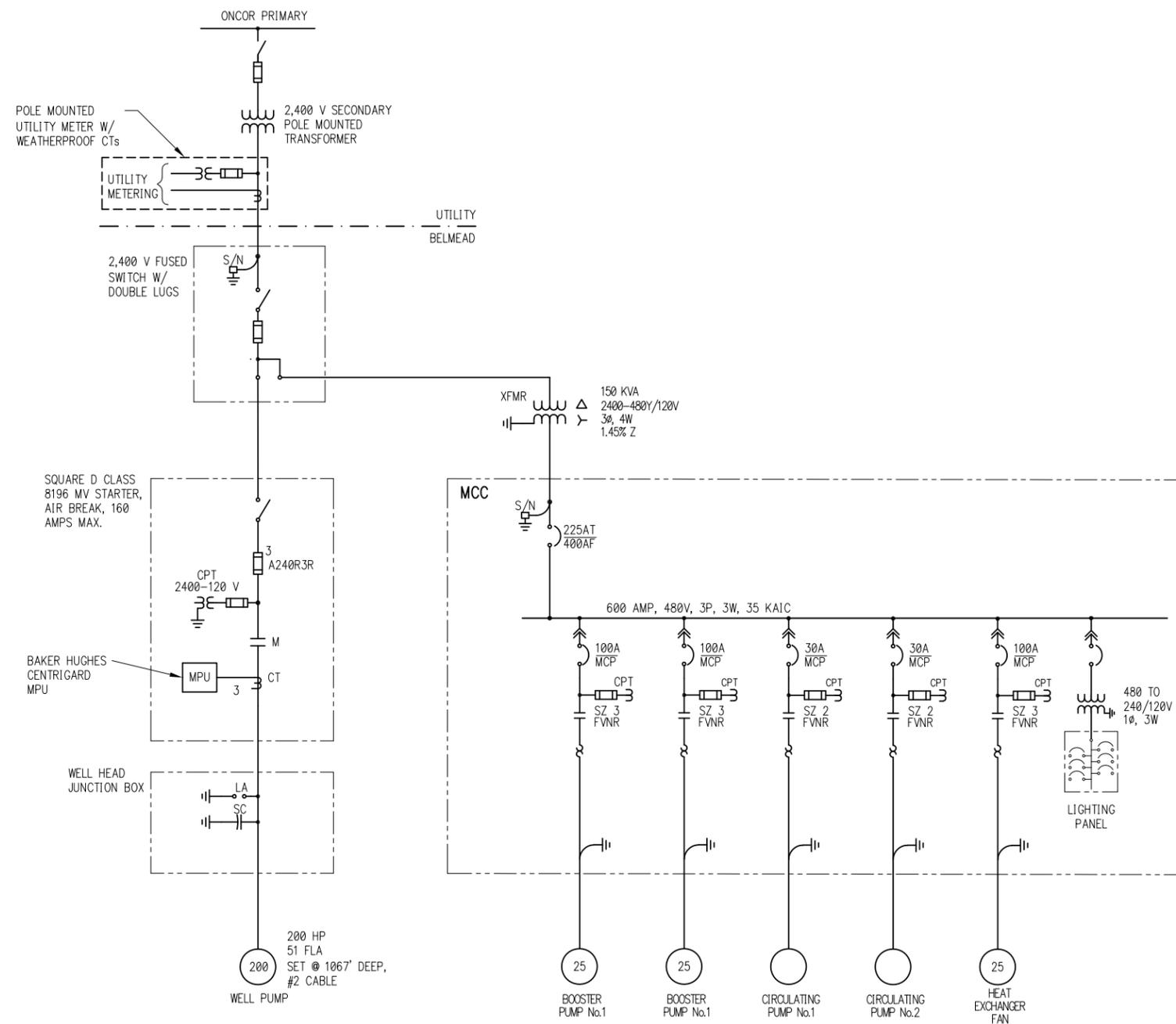
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TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
WATER SYSTEM SCADA IMPROVEMENTS

ELECTRICAL  
MEYERS SITE PLAN - EXISTING

SHEET NO. **E-18**  
OF **28**

NOTES:  
 1. ALL THE EQUIPMENT SHOWN ON THE ONE LINE DIAGRAM IS EXISTING. THE ONE LINE DIAGRAM IS SHOWN FOR REFERENCE IN REGARD TO PLC INPUTS AND OUTPUTS.



460 VOLT MOTOR DATA									
BOOSTER PUMP No.1		BOOSTER PUMP No.2		CIRCULATING PUMP No.1		CIRCULATING PUMP No.2		HEAT EXCHANGER FAN	
HP	40	HP	40	HP		HP		HP	25
RPM	1,785	RPM	1,785	RPM		RPM		RPM	1,775
FLA	49.0	FLA	49.0	FLA		FLA		FLA	29.2
CODE	G	CODE	G	CODE		CODE		CODE	G
S.F.	1.15	S.F.	1.15	S.F.		S.F.		S.F.	1.15

ONE LINE DIAGRAM

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Plot Date: Nov 25, 2024 - 1:06pm  
 Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph J. Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



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 CONSULTING ENGINEERS  
 TEMPLE, TEXAS 76501

CITY OF BELLMEAD, TEXAS  
 WATER SYSTEM SCADA IMPROVEMENTS  
 MEYERS WATER PLANT  
 ONE LINE DIAGRAM

SHEET NO. E-19  
 OF 28

NOTES:

1. ALL PLC CABINET WIRING AND DEVICE REQUIREMENTS SHALL BE SIMILAR TO THE PLC SCHEMATIC SHOWN FOR PARRISH WATER PLANT PLC. CHANGE THE I/O TAGGING TO THAT SHOWN ON THE SCHEDULE FOR EACH SPECIFIC WATER PLANT SITE. PROVIDE SHOP DRAWINGS FOR EACH INDIVIDUAL PLC CABINET.

PLC I/O POINTS – MEYERS LANE WATER PLANT					
POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
<b>DIGITAL INPUT ADDITIONS</b>					
0	SITE POWER	DI	STATUS		POWER STATUS
1	DC POWER FAIL	DI	ALARM	24VDC UPS	
2	UPS BATTERY ALARM	DI	ALARM	UPS-1	
3	INTRUSION ALARM	DI	ALARM	MICROSWITCH	
4	BOOSTER PUMP No.1 RUNNING	DI	STATUS	STARTER	RUN STATUS
5	BOOSTER PUMP No.2 RUNNING	DI	STATUS	STARTER	RUN STATUS
6	WELL PUMP RUNNING	DI	STATUS	STARTER	RUN STATUS
7	TRANSFER PUMP No.1 RUNNING	DI	STATUS	STARTER	RUN STATUS
8	TRANSFER PUMP No.2 RUNNING	DI	STATUS	STARTER	RUN STATUS
9	HEAT EXCHANGER PROBE	DI	STATUS		
10	LOWER HEAT EXCHANGER PROBE	DI	STATUS		
11	SPARE	DI			
12	SPARE	DI			
13	SPARE	DI			
<b>DIGITAL OUTPUT ADDITIONS</b>					
0	BOOSTER PUMP No.1 START	DO	CONTROL	STARTER	RUN COMMAND
1	BOOSTER PUMP No.2 START	DO	CONTROL	STARTER	RUN COMMAND
2	WELL PUMP START	DO	CONTROL	STARTER	RUN COMMAND
3	CIRCULATING PUMP No.1 START	DO	CONTROL	STARTER	RUN COMMAND
4	CIRCULATING PUMP No.2 START	DO	CONTROL	STARTER	RUN COMMAND
5	GROUND STORAGE TANK FILL VALVE	DO	CONTROL	MOV	
6	ELEVATED STORAGE TANK FILL VALVE	DO	CONTROL	MOV	
7	SPARE	DO			
8	SPARE	DO			
9	SPARE	DO			
<b>ANALOG INPUT ADDITIONS</b>					
0	GROUND STORAGE TANK LEVEL	AI	LEVEL	LEVEL TRANSMITTER	
1	ELEVATED STORAGE TANK LEVEL	AI	LEVEL	LEVEL TRANSMITTER	
2	WELL PUMP CURRENT	AI	CURRENT	CT IN STARTER	
3	SPARE	AI			
4	SPARE	AI			
5	SPARE	AI			

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NO.	DATE	REVISION	BY

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Plot Date: Nov 25, 2024 - 1:09pm  
Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



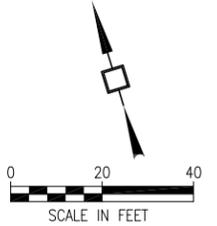
**KASBERG, PATRICK & ASSOCIATES, LP**  
**CONSULTING ENGINEERS**  
 TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

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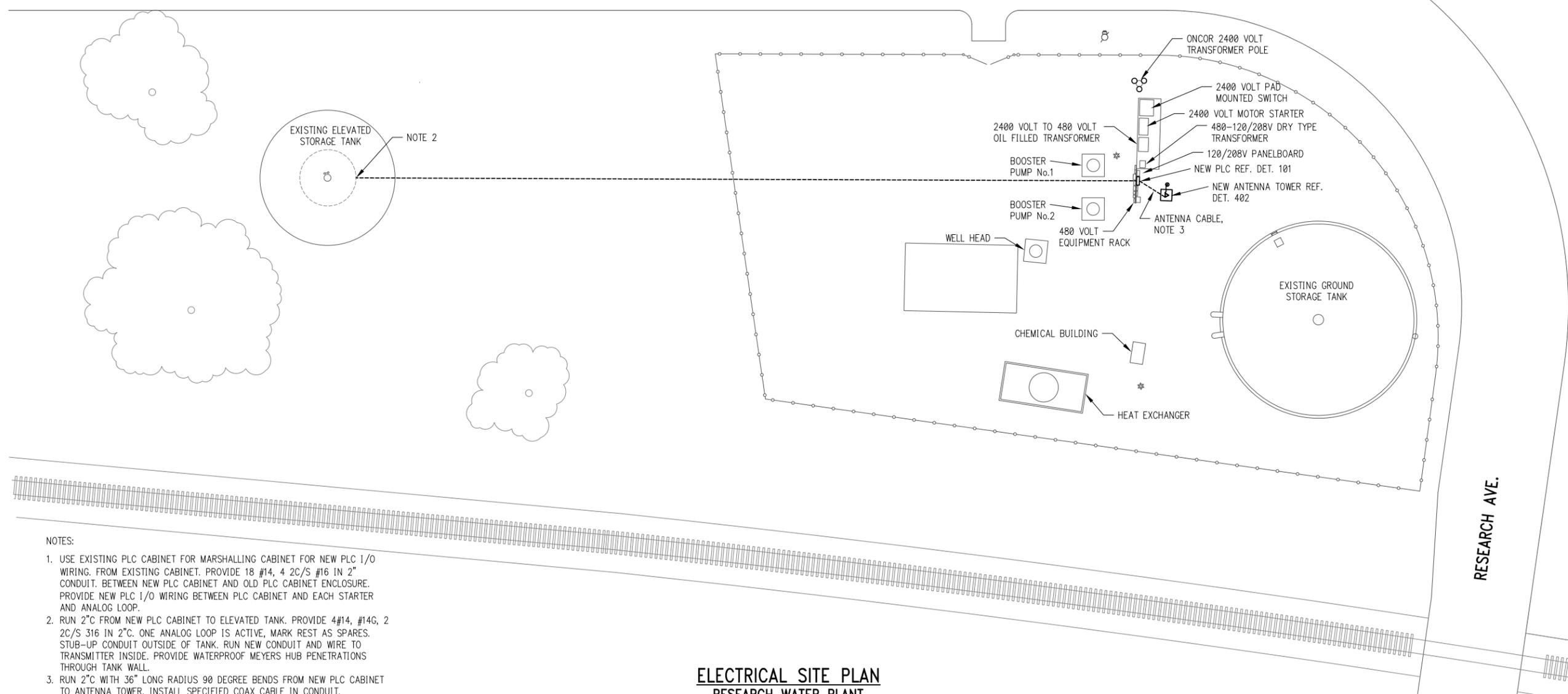
MEYERS LANE WATER PLANT  
 I/O SCHEDULES

SHEET NO. **E-20**  
 OF **28**



RESEARCH AVE.

RESEARCH AVE.



NOTES:

1. USE EXISTING PLC CABINET FOR MARSHALLING CABINET FOR NEW PLC I/O WIRING. FROM EXISTING CABINET. PROVIDE 18 #14, 4 2C/S #16 IN 2" CONDUIT. BETWEEN NEW PLC CABINET AND OLD PLC CABINET ENCLOSURE. PROVIDE NEW PLC I/O WIRING BETWEEN PLC CABINET AND EACH STARTER AND ANALOG LOOP.
2. RUN 2" C FROM NEW PLC CABINET TO ELEVATED TANK. PROVIDE 4#14, #14G, 2 2C/S 316 IN 2" C. ONE ANALOG LOOP IS ACTIVE, MARK REST AS SPARES. STUB-UP CONDUIT OUTSIDE OF TANK. RUN NEW CONDUIT AND WIRE TO TRANSMITTER INSIDE. PROVIDE WATERPROOF MEYERS HUB PENETRATIONS THROUGH TANK WALL.
3. RUN 2" C WITH 36" LONG RADIUS 90 DEGREE BENDS FROM NEW PLC CABINET TO ANTENNA TOWER. INSTALL SPECIFIED COAX CABLE IN CONDUIT.

ELECTRICAL SITE PLAN  
RESEARCH WATER PLANT

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NO.	DATE	REVISION	BY

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Plot Date: Nov 25, 2024 - 1:40pm  
Plotted By: REBRA

PROJECT NO. 22-107

DRAWN BY Richard Brady

DESIGNED BY Joseph J. Kotrla, P.E.

APPROVED BY *Joseph J. Kotrla*

DATE NOVEMBER 25, 2024 FIRM No. F-338



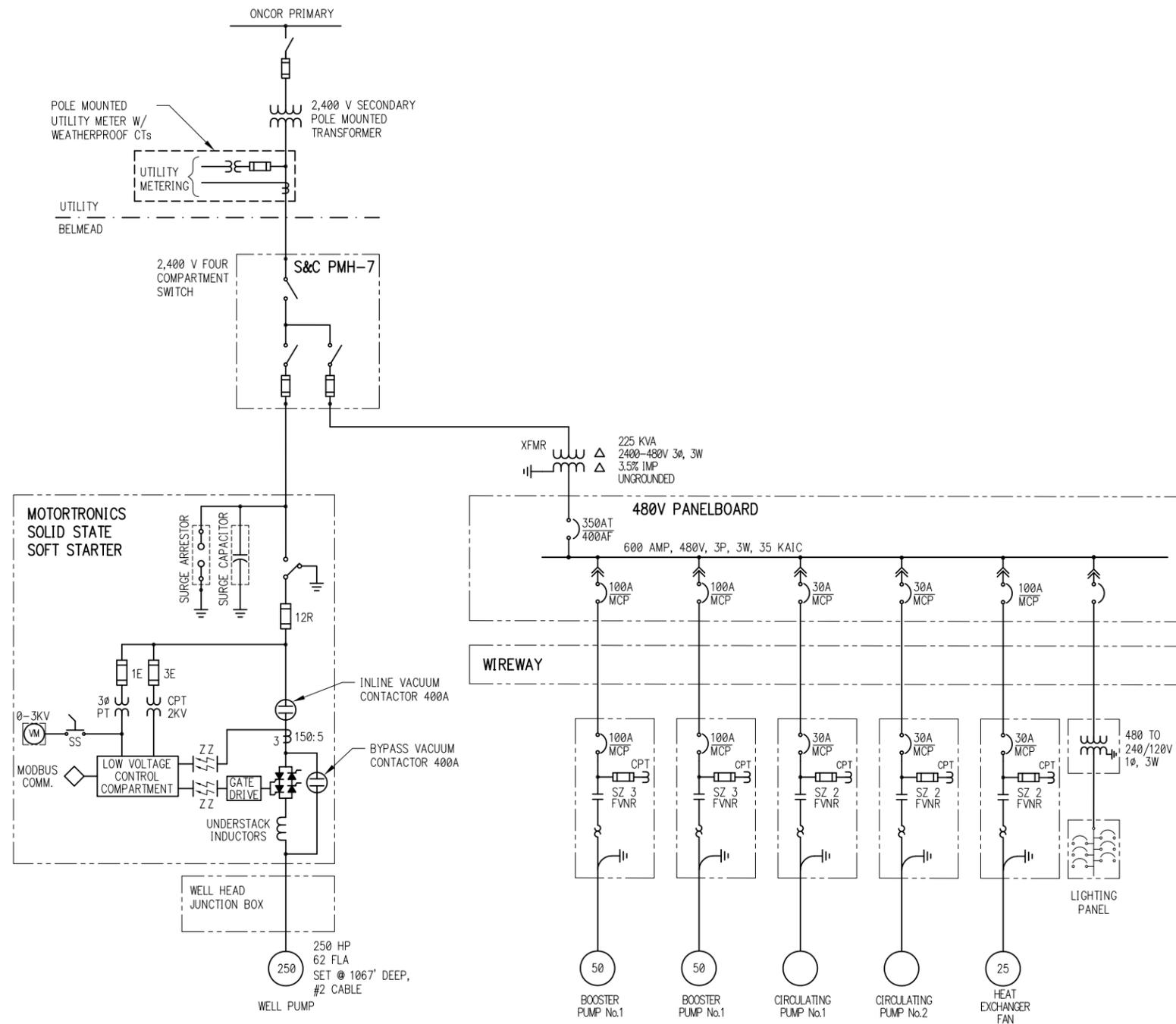
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WATER SYSTEM SCADA IMPROVEMENTS

ELECTRICAL  
RESEARCH SITE PLAN

SHEET NO. **E-21**  
OF **28**

NOTES:  
 1. ALL THE EQUIPMENT SHOWN ON THE ONE LINE DIAGRAM IS EXISTING. THE ONE LINE DIAGRAM IS SHOWN FOR REFERENCE IN REGARD TO PLC INPUTS AND OUTPUTS.



460 VOLT MOTOR DATA									
BOOSTER PUMP No.1		BOOSTER PUMP No.2		CIRCULATING PUMP No.1		CIRCULATING PUMP No.2		HEAT EXCHANGER FAN	
HP	50	HP	50	HP		HP		HP	25
RPM	1,770	RPM	1,770	RPM		RPM		RPM	1,775
FLA	57.2	FLA	57.2	FLA		FLA		FLA	29.2
CODE	G	CODE	G	CODE		CODE		CODE	G
S.F.	1.15	S.F.	1.15	S.F.		S.F.		S.F.	1.15

ONE LINE DIAGRAM

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NO.	DATE	REVISION	BY

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Plot Date: Nov 25, 2024 - 1:07pm  
 Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph J. Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



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**CITY OF BELLMEAD, TEXAS**  
 WATER SYSTEM SCADA IMPROVEMENTS

RESEARCH WATER PLANT  
 ONE LINE DIAGRAM

SHEET NO. **E-22**  
 OF **28**

**PLC I/O POINTS – MEYERS LANE WATER PLANT**

POINT	TAG DESCRIPTION	I/O TYPE	FUNCTION	FIELD DEVICE	COMMENTS
<b>DIGITAL INPUT ADDITIONS</b>					
0	SITE POWER	DI	STATUS		POWER STATUS
1	DC POWER FAIL	DI	ALARM	24VDC UPS	
2	UPS BATTERY ALARM	DI	ALARM	UPS-1	
3	INTRUSION ALARM	DI	ALARM	MICROSWITCH	
4	BOOSTER PUMP No.1 RUNNING	DI	STATUS	STARTER	RUN STATUS
5	BOOSTER PUMP No.2 RUNNING	DI	STATUS	STARTER	RUN STATUS
6	WELL PUMP RUNNING	DI	STATUS	STARTER	RUN STATUS
7	TRANSFER PUMP No.1 RUNNING	DI	STATUS	STARTER	RUN STATUS
8	TRANSFER PUMP No.2 RUNNING	DI	STATUS	STARTER	RUN STATUS
9	HEAT EXCHANGER PROBE	DI	STATUS		
10	LOWER HEAT EXCHANGER PROBE	DI	STATUS		
11	SPARE	DI			
12	SPARE	DI			
13	SPARE	DI			
<b>DIGITAL OUTPUT ADDITIONS</b>					
0	BOOSTER PUMP No.1 START	DO	CONTROL	STARTER	RUN COMMAND
1	BOOSTER PUMP No.2 START	DO	CONTROL	STARTER	RUN COMMAND
2	WELL PUMP START	DO	CONTROL	STARTER	RUN COMMAND
3	CIRCULATING PUMP No.1 START	DO	CONTROL	STARTER	RUN COMMAND
4	CIRCULATING PUMP No.2 START	DO	CONTROL	STARTER	RUN COMMAND
5	GROUND STORAGE TANK FILL VALVE	DO	CONTROL	MOV	
6	ELEVATED STORAGE TANK FILL VALVE	DO	CONTROL	MOV	
7	SPARE	DO			
8	SPARE	DO			
9	SPARE	DO			
<b>ANALOG INPUT ADDITIONS</b>					
0	GROUND STORAGE TANK LEVEL	AI	LEVEL	LEVEL TRANSMITTER	
1	ELEVATED STORAGE TANK LEVEL	AI	LEVEL	LEVEL TRANSMITTER	
2	WELL PUMP CURRENT	AI	CURRENT	CT IN STARTER	
3	SPARE	AI			
4	SPARE	AI			
5	SPARE	AI			

NOTES:

1. ALL PLC CABINET WIRING AND DEVICE REQUIREMENTS SHALL BE SIMILAR TO THE PLC SCHEMATIC SHOWN FOR PARRISH WATER PLANT PLC. CHANGE THE I/O TAGGING TO THAT SHOWN ON THE SCHEDULE FOR EACH SPECIFIC WATER PLANT SITE. PROVIDE SHOP DRAWINGS FOR EACH INDIVIDUAL PLC CABINET.

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Plot Date: Nov 25, 2024 - 1:10pm  
Plotted By: REBRA

PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



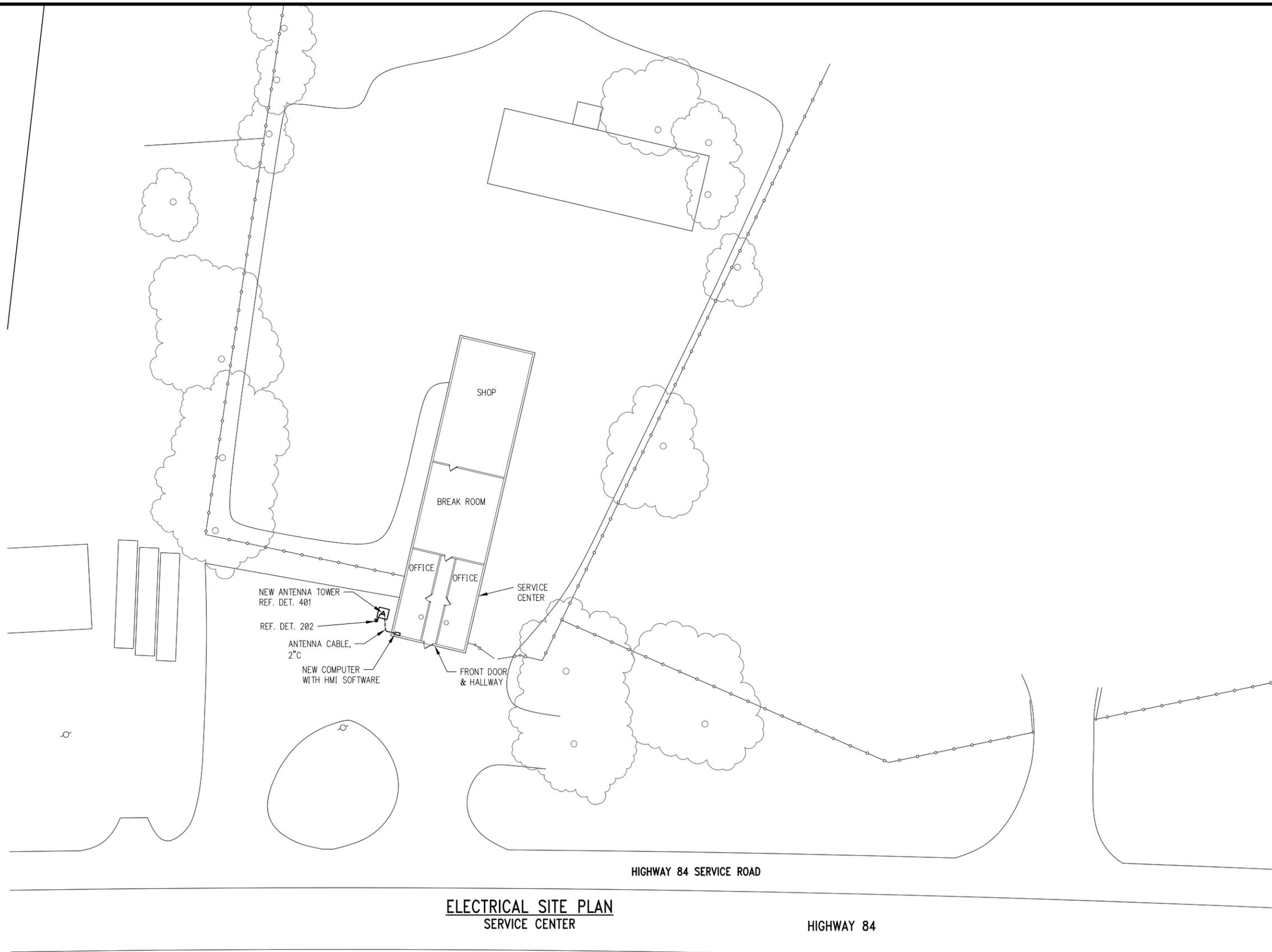
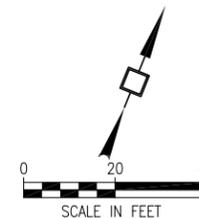
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 WATER SYSTEM SCADA IMPROVEMENTS

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RESEARCH WATER PLANT  
 I/O SCHEDULES

SHEET NO. **E-23**  
 OF **28**



**ELECTRICAL SITE PLAN**  
SERVICE CENTER

HIGHWAY 84 SERVICE ROAD

HIGHWAY 84

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NO.	DATE	REVISION	BY

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PROJECT NO. 22-107  
 DRAWN BY Richard Brady  
 DESIGNED BY Joseph J. Kotrla, P.E.  
 APPROVED BY *Joseph Kotrla*  
 DATE NOVEMBER 25, 2024 FIRM No. F-338



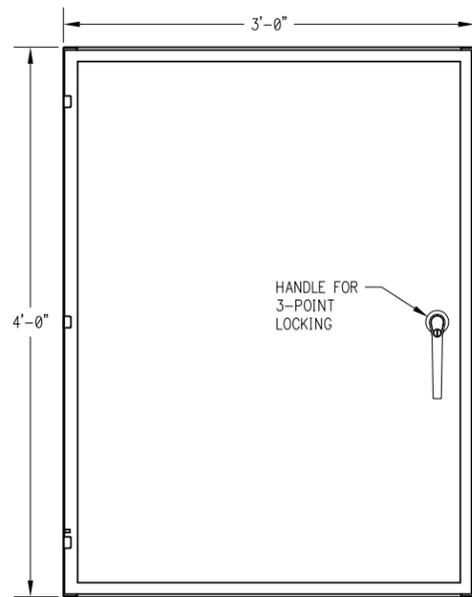
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**CONSULTING ENGINEERS**  
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 WATER SYSTEM SCADA IMPROVEMENTS

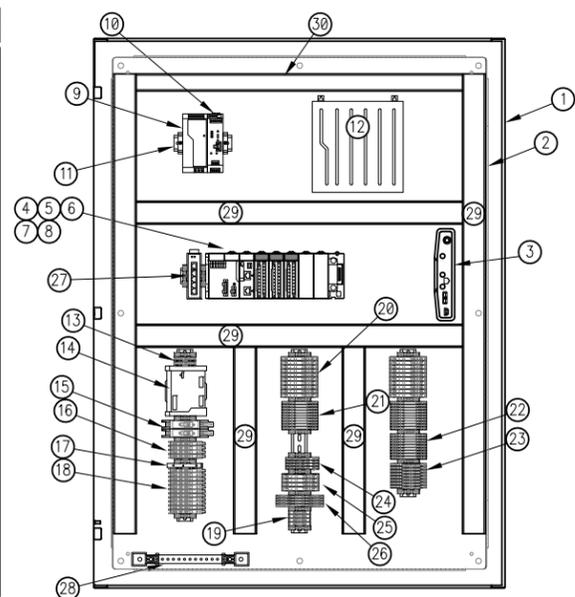
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ELECTRICAL  
SERVICE CENTER SITE PLAN

SHEET NO. **E-24**  
 OF **28**

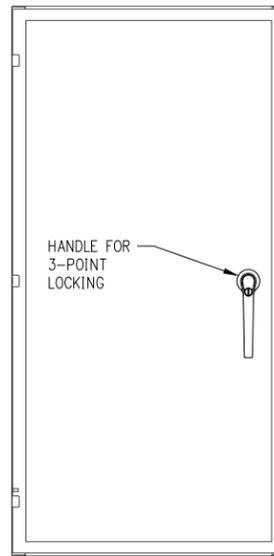


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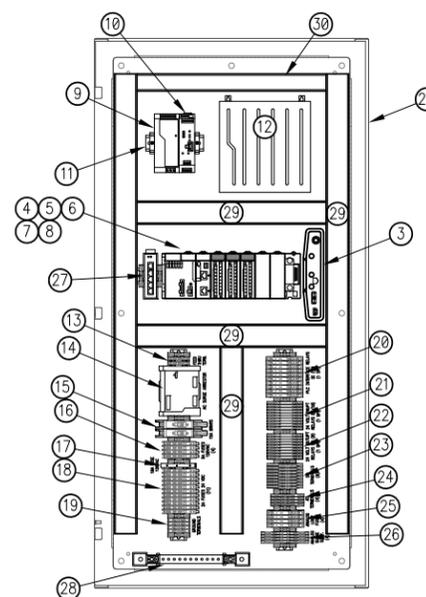


DOOR OPEN

PARRISH WATER PLANT  
RESEARCH WATER PLANT  
(ITEMS 1&2)

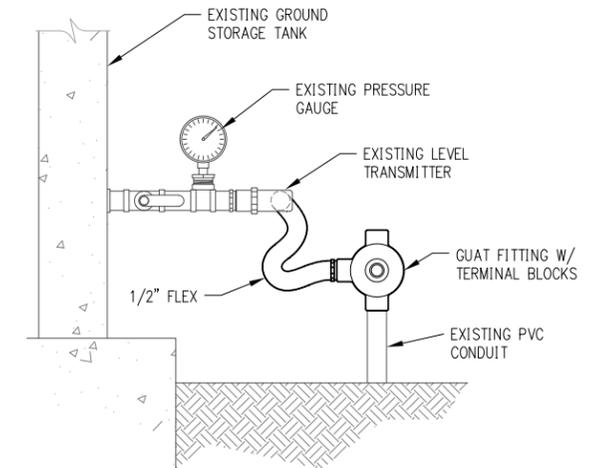


DOOR CLOSED



DOOR OPEN

BARLOW WATER PLANT  
CONCORD WATER PLANT  
MEYERS LANE WATER PLANT  
(ITEM 2A)



102 ANALOG LEVEL TRANSMITTER  
NOT TO SCALE

RTU PANEL					
ITEM	DESCRIPTION	MANUFACTURER	PART NUMBER	LOCATION	COMMENT
1	ENCLOSURE, 48"x24"x12", NEMA 4, FREE-STANDING	SAGINAW	SCE-48EL2412LPLP	PARRISH	POWDER COAT WHITE INSIDE AND OUT
2	PANEL, 48"x36"	SAGINAW	SCE-48P36	PARRISH	12 GA. STEEL, POWDER COAT WHITE
2A	EXISTING 48"x24"x12" PLC ENCLOSURE			BARLOW, CONCORD, MEYERS	USE EXISTING PANEL
2B	EXISTING 24"x24"x12" PLC ENCLOSURE			RESEARCH	
3	RADIO - 900 MHZ	ZUMLINK	Z9-P		
4	CPU M340, STANDARD PROCESSOR	MODICON	M340		
5	16 POINT DI CARD 24V DC	MODICON	BMXDD11602		
6	16 POINT DO CARD 24V DC	MODICON	BMXDD01602		
7	8 POINT AI CARD	MODICON	BMXAM10810		
8	6 SLOT BACKPLANE	MODICON	BMXXBP0600H		NOTE 2
9	24V DC 10 AMP POWER SUPPLY	PHOENIX CONTACT	2866763		
10	24V DC UPS MODULE	PHOENIX CONTACT	2320225		
11	DINRAIL	PHOENIX CONTACT	0801733		
12	24V DC UPS BATTERY	PHOENIX CONTACT	2320322		
13	FEED-THROUGH TERMINAL BLOCKS	PHOENIX CONTACT	3044131		
14	AC SURGE PROTECTION DEVICE	PHOENIX CONTACT	2856702		SFP 1-20/120AC
15	AC CIRCUIT BREAKER	PHOENIX CONTACT	QOU115		120/240 VAC, 15A, 1P, 10KA
16	5 AMP FUSE				120 VAC
17	10 AMP FUSE				120 VAC
18	2 AMP FUSE				24 VDC
19	GROUND TERMINAL	PHOENIX CONTACT	3044157		
20	PLC INTERFACE RELAY	PHOENIX CONTACT	2966171		24 VDC (DI)
21	INPUT RELAY	PHOENIX CONTACT			24 VDC (DI)
22	OUTPUT RELAY	PHOENIX CONTACT			24 VDC (DO)
23	DO TERMINALS	PHOENIX CONTACT			
24	AI TERMINALS	PHOENIX CONTACT			
25	ANALOG LOOP FUSE	PHOENIX CONTACT			
26	ANALOG SURGE SUPPRESSOR	PHOENIX CONTACT			
27	5 PORT INDUSTRIAL ETHERNET DIN-RAIL SWITCH	TENDNET	TI-E350		
28	GROUND BAR	SQUARE D	PK9GTA		
29	WIREWAY	PANDUIT	2" x 4"		
30	WIREWAY	PANDUIT	1 1/2" x 4"		

101 PLC PANEL  
NOT TO SCALE

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NO.	DATE	REVISION	BY

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KPA Firm Registration Number F-510

Plot Date: Nov 25, 2024 - 11:38am  
Plotted By: REBRA

PROJECT NO. 22-107

DRAWN BY Richard Brady

DESIGNED BY Joseph J. Kotrla, P.E.

APPROVED BY *Joseph J. Kotrla*

DATE NOVEMBER 25, 2024 FIRM No. F-338

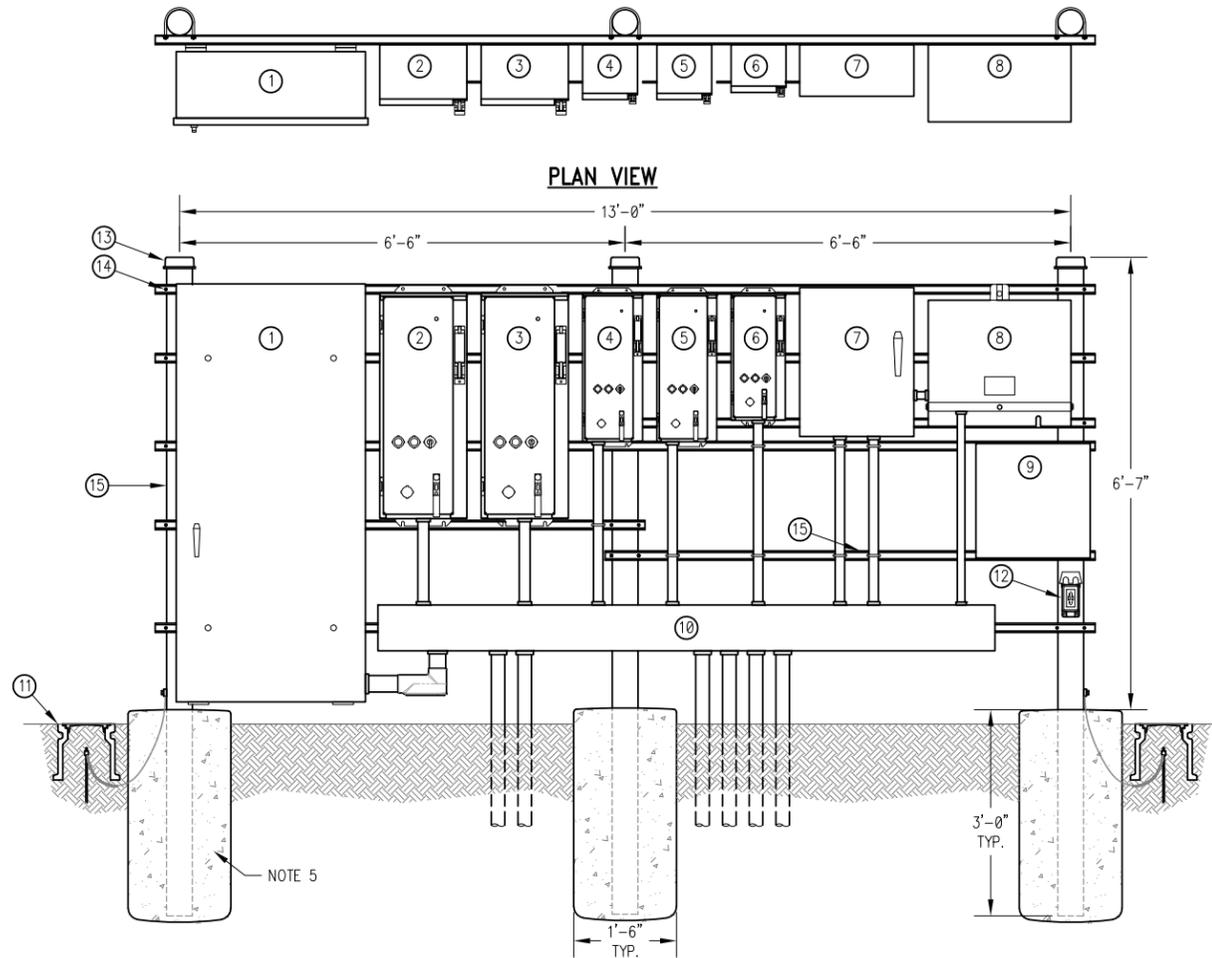


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TEMPLE, TEXAS 76501

CITY OF BELLMEAD, TEXAS  
WATER SYSTEM SCADA IMPROVEMENTS

ELECTRICAL  
DETAILS SHEET I

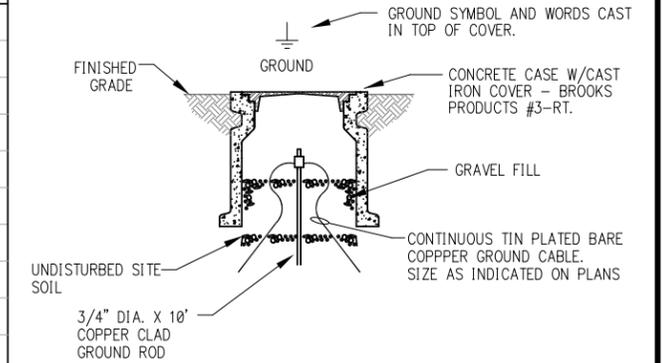
SHEET NO. E-25  
OF 28



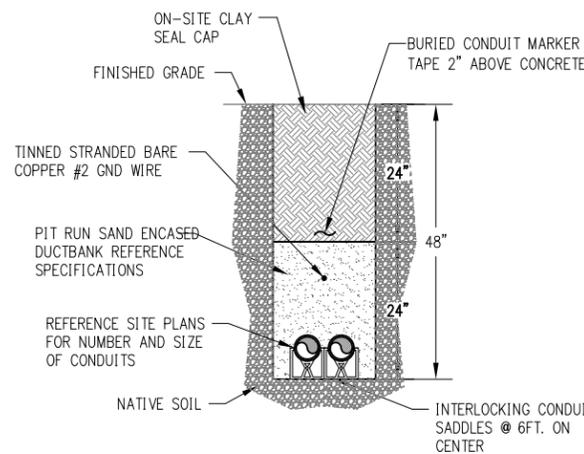
- NOTES:
- EQUIPMENT SHALL BE NEMA 4 PAINTED STEEL UNLESS OTHERWISE NOTED.
  - ALL CONDUIT CONNECTORS SHALL BE NEMA 4 MEYERS HUB.
  - BOND ALL METAL PARTS TO GROUND CONDUCTOR.
  - REFER TO CONDUIT & CABLE SCHEDULE FOR ALL CONDUIT & WIRING BETWEEN ENCLOSURES.
  - CONCRETE SHALL BE 4000 PSI @ 28 DAYS.
  - NOT ALL CONDUITS SHOWN FOR CLARITY. REF. CONDUIT & CABLE SCHEDULE.

**201 EQUIPMENT STAND**  
NOT TO SCALE

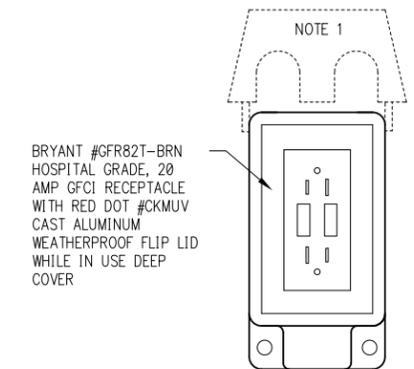
TAG	DESCRIPTION
①	DISTRIBUTION PANELBOARD - NEMA 4 PAINTED STEEL WITH SPD & BREAKERS. REFERENCE ONE LINE DIAGRAM
②	BOOSTER PUMP No.1 STARTER - SIZE 3 FVNR COMBINATION STARTER, NEMA 12/3R PAINTED STEEL ENCLOSURE
③	BOOSTER PUMP No.2 STARTER - SIZE 3 FVNR COMBINATION STARTER, NEMA 12/3R PAINTED STEEL ENCLOSURE
④	RECIRCULATION PUMP No.1 STARTER - SIZE 2 FVNR COMBINATION STARTER, NEMA 12/3R PAINTED STEEL ENCLOSURE
⑤	RECIRCULATION PUMP No.2 STARTER - SIZE 2 FVNR COMBINATION STARTER, NEMA 12/3R PAINTED STEEL ENCLOSURE
⑥	COOLING TOWER FAN STARTER - SIZE 1 FVNR COMBINATION STARTER, NEMA 12/3R PAINTED STEEL ENCLOSURE
⑦	LIGHTING PANEL "L" - NEMA 4 PAINTED STEEL ENCLOSURE. REFERENCE PANEL SCHEDULE
⑧	30 KVA TRANSFORMER 480 TO 208/120V, SINGLE PHASE, NEMA 12/3R PAINTED STEEL, ENCAPSULATED.
⑨	INSTRUMENT TERMINAL BOX - 20"x20"x6" NEMA 4 PAINTED STEEL, HINGED W/ 3 POINT LATCH.
⑩	WIREWAY - 8"x8"x108" NEMA 12/3R PAINTED STEEL
⑪	GROUND ROD & WELL, REFERENCE DETAIL 202. BOND ALL METAL PARTS THERETO. TYP. 2
⑫	GFCI RECEPTACLE, REFERENCE DETAIL 204.
⑬	4" MALLEABLE IRON HOT-DIPPED GALVANIZED PIPE CAP. GRAINGER #6KH91, TYP. FOR 3
⑭	B-LINE B501 SERIES 4" STAINLESS STEEL U-BOLT, TYP.
⑮	4"Ø STEEL PIPE SCHEDULE 40 WITH WELDED BASE, TYP. HOT DIP GALVANIZE AFTER FABRICATION. REFERENCE DETAIL 204.
⑯	TYPICAL 1-5/8" x 1-5/8" B-LINE #B22, HOT DIPPED GALVANIZED CHANNEL W/ 316 STN/STL NUTS, BOLTS & HARDWARE.



**202 GROUND ROD & WELL**  
NOT TO SCALE



**203 DETAIL - UNDERGROUND CONDUIT DUCT BANK**  
NOT TO SCALE



- NOTES:
- FLIP LID SHOWN HELD OPEN.
  - ATTACH TO WALL WITH 1/4"Ø 316 SST BOLT INTO DRILLED EXPANSION SHIELD. ATTACHED TO STANCHION OR METAL PLATE WITH 1/4"Ø 316 SST BOLTS, WASHERS, AND NUTS.
  - COVERS SHALL BE SUITABLE FOR WET LOCATIONS & SHALL BE GASKETED.
  - COVER WITH PLUG CAP INSERTED SHALL CARRY UL WET LOCATION LISTING.
  - PROVIDE ONE ASSEMBLY FOR EACH WP/GFCI LOCATION.

**204 TYPICAL WP/GFCI DEVICE**  
NOT TO SCALE

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PROJECT NO.	22-107
DRAWN BY	Richard Brady
DESIGNED BY	Joseph J. Kotrla, P.E.
APPROVED BY	<i>Joseph Kotrla</i>
DATE	NOVEMBER 25, 2024
FIRM No.	F-338

NO.	DATE	REVISION	BY

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Plot Date: Nov 25, 2024 - 11:37am  
Plotted By: REBRA



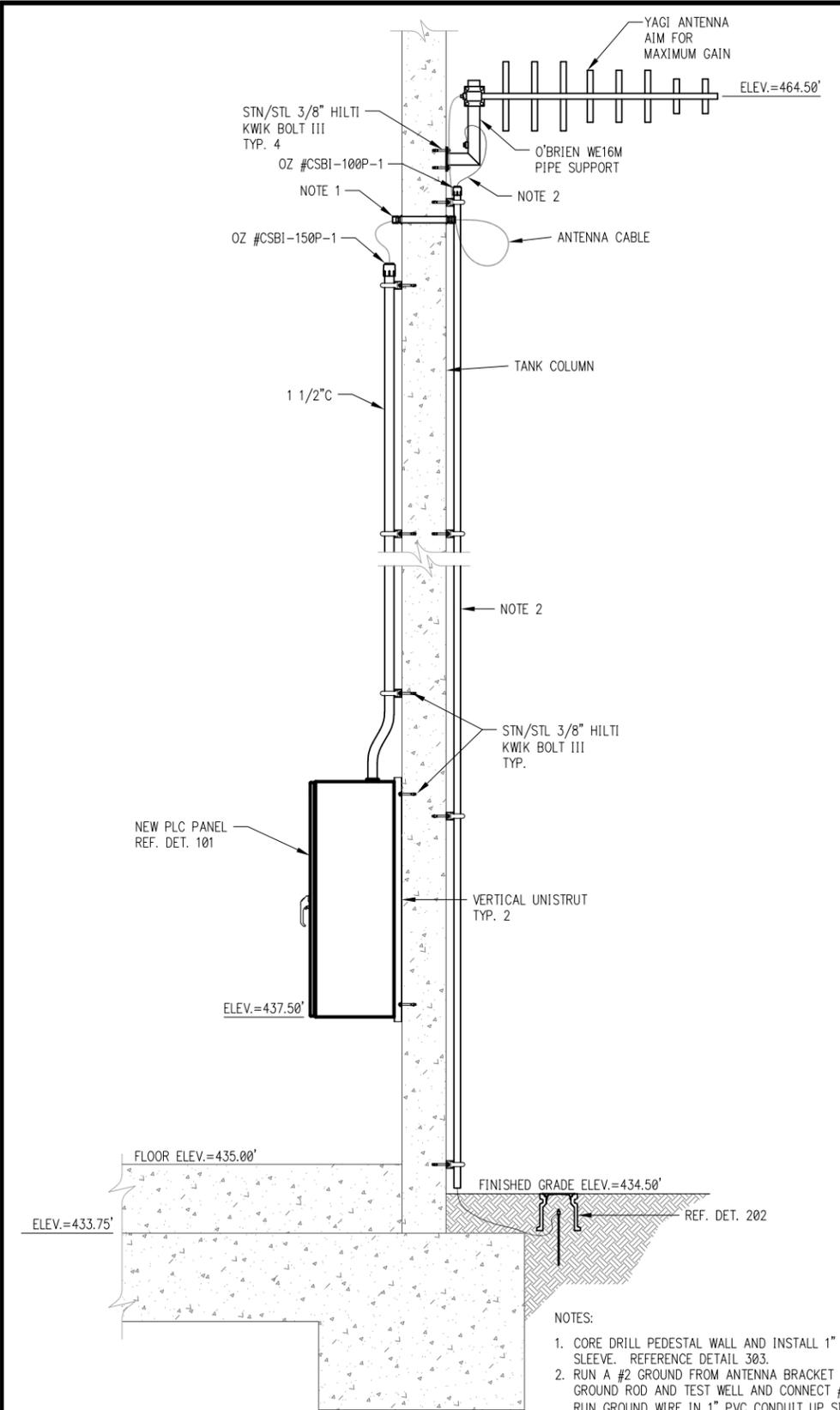
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TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
WATER SYSTEM SCADA IMPROVEMENTS

ELECTRICAL  
DETAILS SHEET II

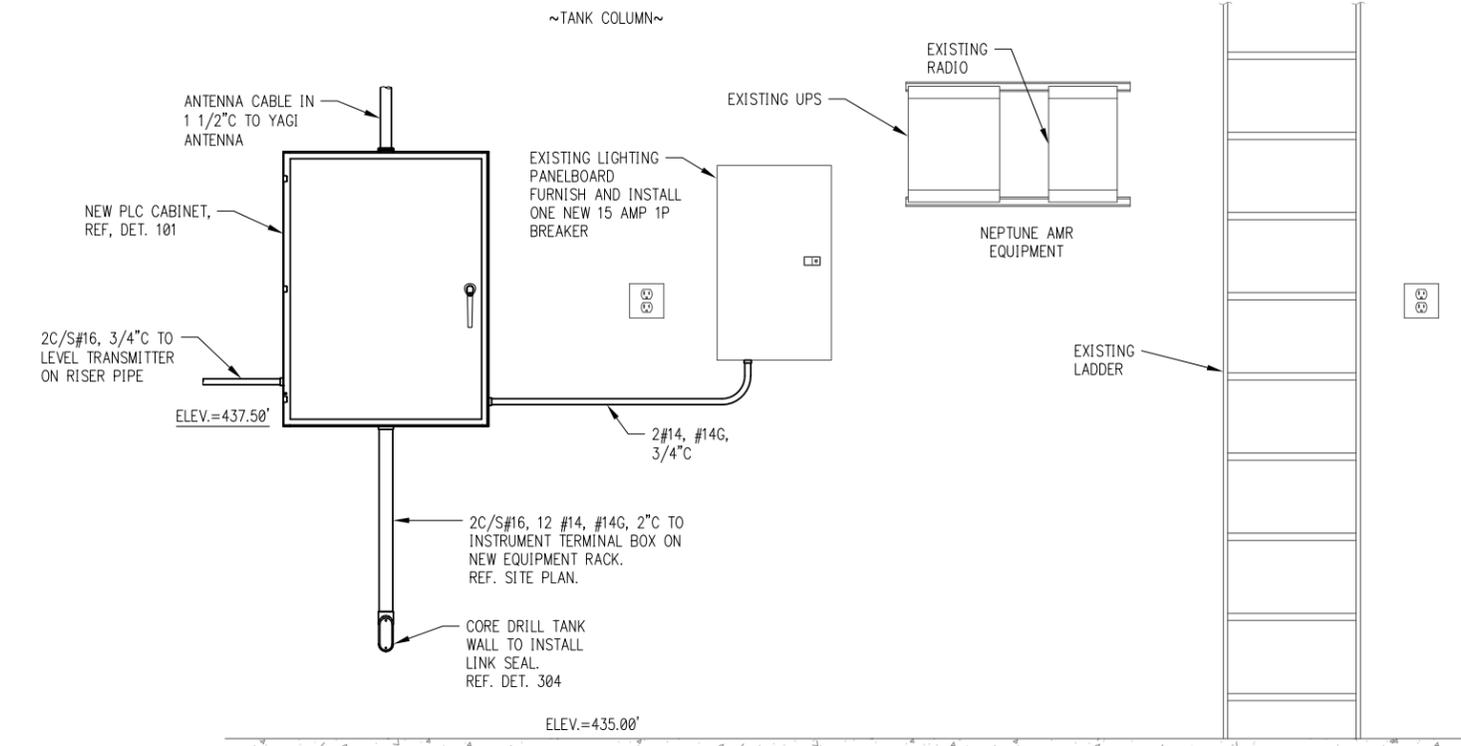
SHEET NO. **E-26**

OF **28**

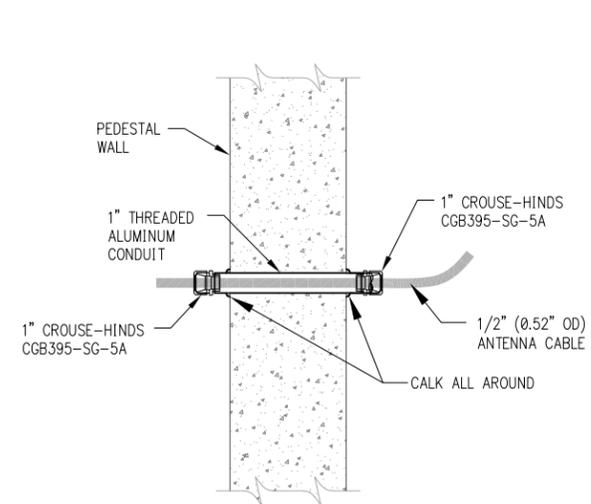


**301 PARTIAL TANK ELEVATION**  
NOT TO SCALE

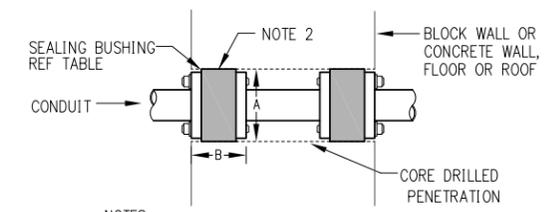
- NOTES:
1. CORE DRILL PEDESTAL WALL AND INSTALL 1" RIGID ALUMINUM CONDUIT SLEEVE. REFERENCE DETAIL 303.
  2. RUN A #2 GROUND FROM ANTENNA BRACKET TO GROUND LEVEL. INSTALL GROUND ROD AND TEST WELL AND CONNECT #2 GROUND TO GROUND ROD. RUN GROUND WIRE IN 1" PVC CONDUIT UP SIDE OF BUILDING. SUPPORT CONDUIT AT 5' INTERVALS WITH CONDUIT HANGER.



**302 ELEVATION - PLC PANEL INSTALLATION**  
NOT TO SCALE



**303 DETAIL - PEDESTAL WALL PENETRATION**  
NOT TO SCALE



- NOTES:
1. TYPICAL FOR NEW PENETRATIONS OF EXISTING WALLS, ROOFS & FLOORS.
  2. CAULK ALL AROUND WITH SILICONE SEALANT PRIOR TO INSTALLING BUSHING
  3. REPAIR ALL DAMAGE DONE BY CORE DRILL.

CONDUIT NOM. I.D.	CORE DRILLED HOLE DIA. "A"	"B"	O-Z GEDNEY CATALOG #
3/4"	2"	1 5/8"	CSM1-200P
1"	2 1/2"	1 5/8"	CSM1-250P
1 1/4"-1 1/2"	3"	1 5/8"	CSM1-300P
2"	4"	1 7/8"	CSM1-400P
2 1/2"-3"	5"	1 7/8"	CSM1-500P
3 1/2"-4"	6"	1 7/8"	CSM1-600P

**304 WATERTIGHT CONDUIT PENETRATION**  
NOT TO SCALE

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Plot Date: Nov 25, 2024 - 11:37am  
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PROJECT NO. 22-107

DRAWN BY Richard Brady

DESIGNED BY Joseph J. Kotrla, P.E.

APPROVED BY *Joseph J. Kotrla*

DATE NOVEMBER 25, 2024 FIRM No. F-338

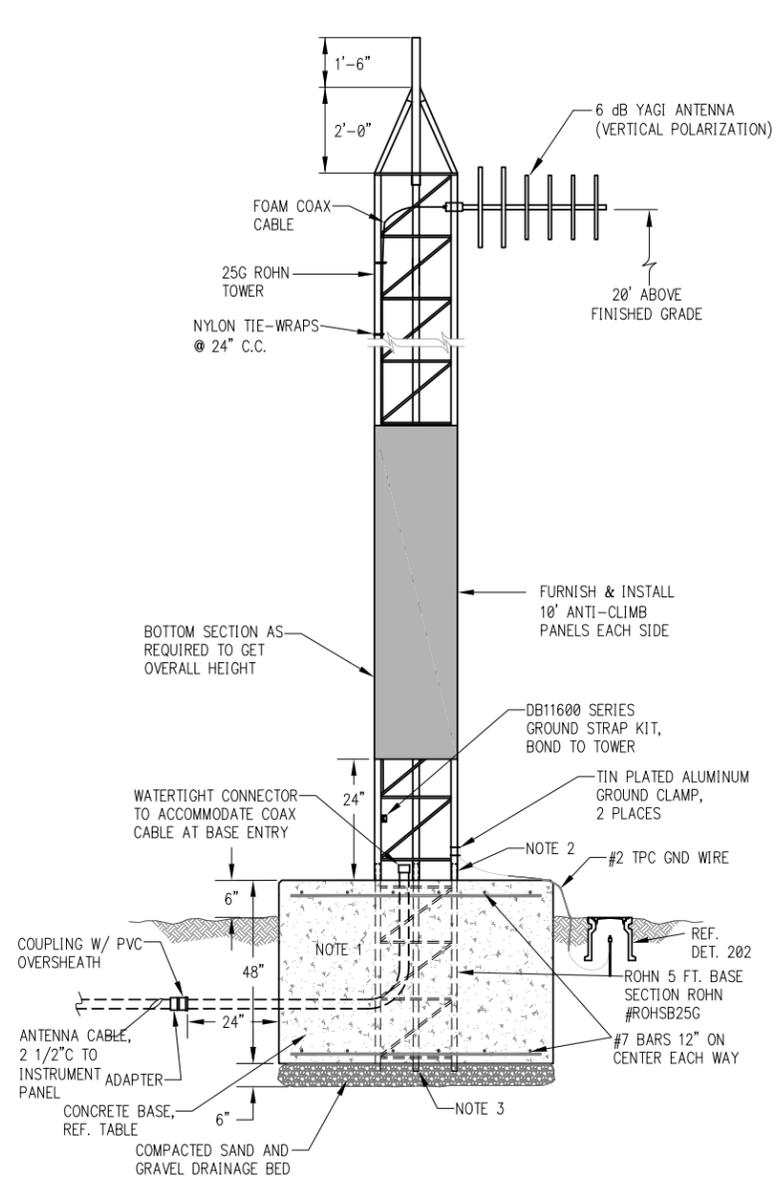


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TEMPLE, TEXAS 76501

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WATER SYSTEM SCADA IMPROVEMENTS

ELECTRICAL  
DETAILS SHEET III

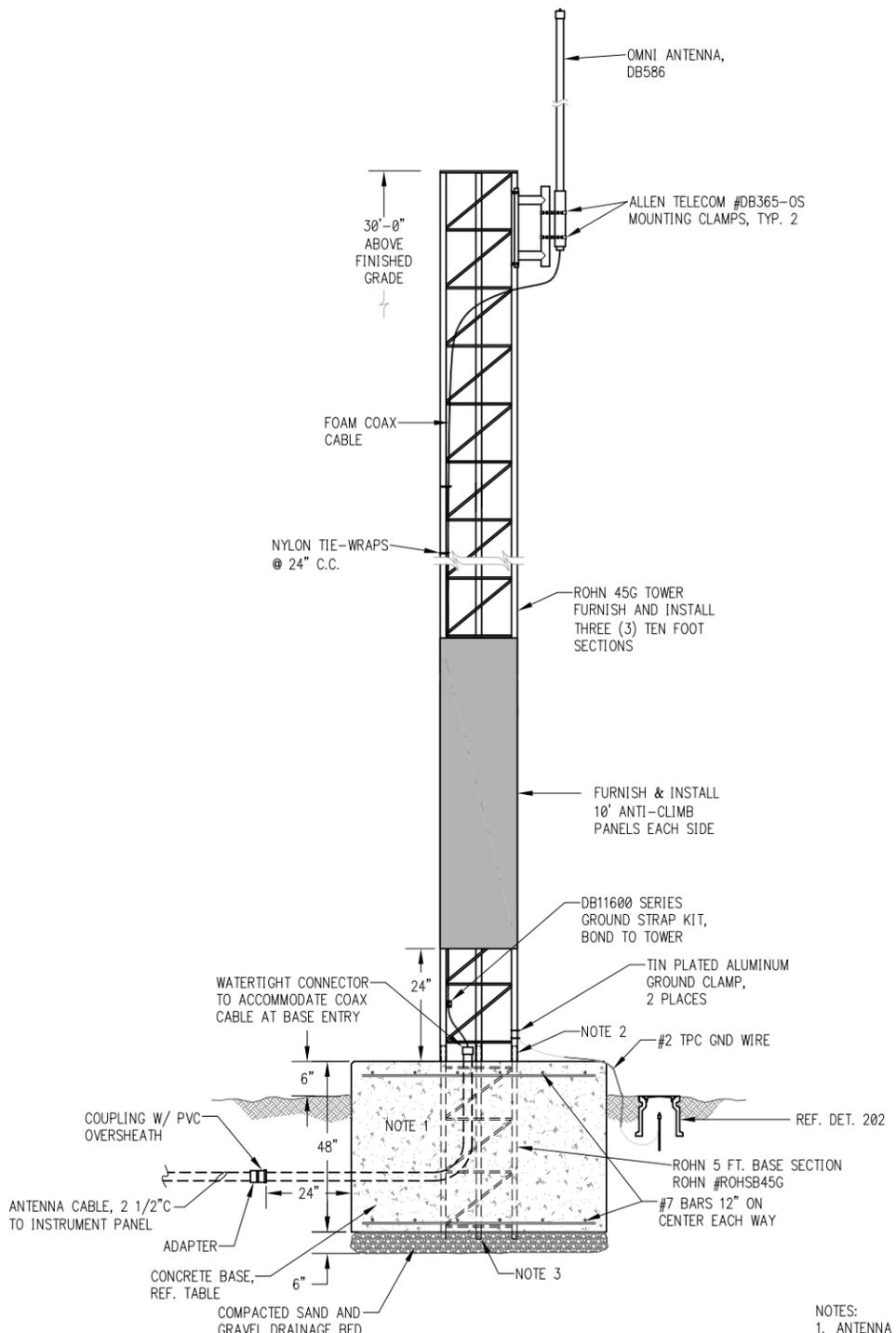
SHEET NO. **E-27**  
OF **28**



TOWER HEIGHT	ROHN MODEL	CONCRETE BASE	TOWER BASE	ANTENNA HEIGHT	SITES
25'	25G	4'-0" SQ.	#ROHSB25G	20 FT.	BARLOW, CONCORD MEYERS, SERVICE CENTER

- NOTES:
1. ANTENNA BASE SHALL BE CLASS A, 3,000 PSI CONCRETE AND CONSTRUCTED AS SHOWN AS A MINIMUM. SEE TABLE FOR DIMENSION.
  2. 6" MINIMUM PROJECTION ABOVE FINISHED CONCRETE.
  3. 2" MINIMUM PROJECTION REQUIRED FOR PROPER DRAINAGE.
  4. ALL CONDUIT BENDS SHALL BE 36" RADIUS.
  5. FURNISH AND INSTALL 10' ANTI-CLIMB PANELS ON EACH SIDE.

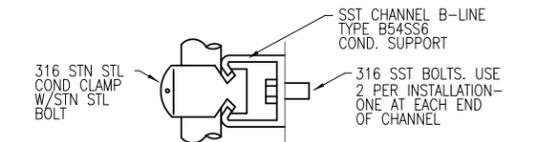
**401 ANTENNA AND 25G TOWER DETAIL**  
NOT TO SCALE



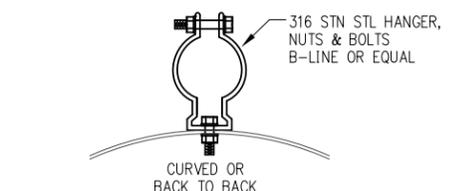
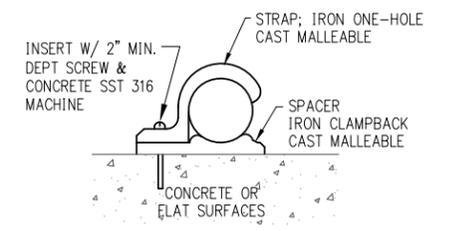
TOWER HEIGHT	ROHN MODEL	CONCRETE BASE	CONCRETE BASE	ANTENNA HEIGHT	SITE
30'	45G	5'-0" SQ.	#ROHSB45G	30 FT.	RESEARCH

- NOTES:
1. ANTENNA BASE SHALL BE CLASS A, 3,000 PSI CONCRETE AND CONSTRUCTED AS SHOWN AS A MINIMUM. SEE TABLE FOR DIMENSION.
  2. 6" MINIMUM PROJECTION ABOVE FINISHED CONCRETE.
  3. 2" MINIMUM PROJECTION REQUIRED FOR PROPER DRAINAGE.
  4. ALL CONDUIT BENDS SHALL BE 36" RADIUS.
  5. FURNISH AND INSTALL 10' ANTI-CLIMB PANELS ON EACH SIDE.

**402 ANTENNA AND 45G TOWER DETAIL**  
NOT TO SCALE



**403 TYPICAL CONDUIT SUPPORT ON CONCRETE STRUCTURES FOR MULTIPLE CONDUIT RUNS**  
NOT TO SCALE



**404 TYPICAL CONDUIT SUPPORT SINGLE CONDUIT**  
NOT TO SCALE

Z:\02.107\Drawg\Electrical\E-28 Details IV.dwg - GENERAL-01

NO.	DATE	REVISION	BY

© 2024 Kasberg, Patrick & Associates, LP  
KPA Firm Registration Number F-510

Plot Date: Nov 25, 2024 - 11:45am  
Plotted By: REBRA

PROJECT NO. 22-107

DRAWN BY Richard Brady

DESIGNED BY Joseph J. Kotrla, P.E.

APPROVED BY *Joseph J. Kotrla*

DATE NOVEMBER 25, 2024 FIRM No. F-338



**KASBERG, PATRICK & ASSOCIATES, LP**  
CONSULTING ENGINEERS  
TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
WATER SYSTEM SCADA IMPROVEMENTS

**ELECTRICAL DETAILS SHEET IV**

SHEET NO. **E-28**  
OF **28**

# CITY OF BELLMEAD, TEXAS



SPECIFICATIONS AND CONTRACT DOCUMENTS  
FOR THE REHABILITATION OF

## *Water System SCADA Improvements*

Prepared By



**KASBERG, PATRICK & ASSOCIATES, LP**  
CONSULTING ENGINEERS  
TEMPLE, TEXAS



November 2024

11/6/2024

# WATER SYSTEM SCADA IMPROVEMENTS

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Division 26	- Electrical Specifications

## NOTICE TO BIDDERS

Sealed bids addressed to the City of Bellmead will be received at the Bellmead City Hall Council Chambers; 3015 Bellmead Drive; Bellmead, Texas 76705 until 2:00 PM on Tuesday, December 17, 2024 for the construction of the Water System SCADA Improvements in the City of Bellmead, Texas. The bids shall be labeled:

Water System SCADA Improvements  
Bellmead, Texas

Bids must be submitted on the Bid Form provided and must be accompanied by a cashier's check, certified check or acceptable bidder's bond payable without recourse to the City of Bellmead, Texas in an amount not less than five (5) percent of the bid submitted as a guarantee that the bidder will enter into a contract and execute a Performance Bond and a Payment Bond within fifteen (15) days after the notification of the award of the contract.

The bids will be publicly opened and read aloud in the Council Chambers at Bellmead City Hall; 3015 Bellmead Drive; Bellmead, Texas; 76705 at 2:00 PM on Tuesday, December 17, 2024. The City Council will officially review the bids and award the contract as soon thereafter as practical. The City of Bellmead reserves the right to accept or reject any and all bids, as the best interest of the City may require, and to waive any informality in bids received.

Plans, specifications and bidding documents may be secured beginning Monday, November 25, 2024 at Kasberg, Patrick & Associates, LP; (254) 773-3731; 19 North Main Street; Temple, Texas 76501 for a non-refundable cost of \$50.00 per set (11"x17") printed (or no charge for PDF download). Checks shall be made payable to Kasberg, Patrick & Associates, LP.

A Non-Mandatory Pre-Bid Conference will be held in the Bellmead City Hall located at 3015 Bellmead Drive, Bellmead, Texas 76705 at 9:00 AM on Wednesday, December 4, 2024. Although this is not a mandatory Pre-Bid Conference, it is highly recommended that all bidders attend, as there will be an opportunity for site visits immediately following the Pre-Bid Conference.

Technical questions and inquiries should be directed to Joe Kotrla, P.E., [jkotrla@mccreary-engr.com](mailto:jkotrla@mccreary-engr.com), until 12:00 p.m. on Tuesday, December 10, 2024. The Engineer and/or Owner shall not be bound by any references obtained by the Bidders unless an addendum is produced and released.

Waco Tribune-Herald & City of Bellmead Website

CITY OF BELLMEAD, TEXAS

November 21, 2024

December 3, 2024

Karen Evans, CPA – Assistant City Manager

**SPECIAL PROJECT INFORMATION  
TO BIDDERS/CONTRACTORS**

- A. All questions and inquiries about the project should be directed to Joe Kotrla, P.E., until 12:00 p.m. on Tuesday, December 10, 2024. Questions after that time and date will not be addressed and the Engineer and/or Owner shall not be bound by any references or dates obtained by the Bidders unless an official addendum is produced and released by Kasberg, Patrick & Associates, LP.
- B. Contract Administration and Pay Estimate Audits will be provided by KPA Engineers.
- C. The Bid Item for Mobilization, Bonds and Insurance shall not exceed 5% of the total amount Bid for any particular Base Bid, Add Alternate Bid or Alternate Bid.

## **INSTRUCTION TO BIDDERS**

1. Use of Separate Bid Forms

These contract documents include a complete set of bid and contract forms which are for the convenience of the bidders and are not to be detached from the contract document, completed or executed. Separate bid forms will be provided for your use.

2. Interpretations or Addenda

Each request for an interpretation shall be made to the engineer. Each interpretation made will be in the form of an Addendum to the contract documents and will be distributed to all parties holding contract documents no less than one (1) day prior to the bid opening. It is, however, the bidder's responsibility to make inquiry as to any addenda issued. All such addenda shall become part of the contract documents and all bidders shall be bound by such addenda, whether or not received by the bidder.

3. Inspection of Site

Each bidder should visit the site of the proposed work and fully acquaint himself with the existing conditions there and should fully inform himself as to the facilities involved, the difficulties and restrictions attending the performance of the contract. The bidder should thoroughly examine and familiarize himself with the drawings, technical specifications and all other contract documents. The contractor, by the execution of the contract, shall in no way be relieved of any obligation under it due to his failure to receive or examine any form or legal document or to visit the site or acquaint himself with the conditions there existing. The City of Bellmead will be justified in rejecting any claim based on lack of inspection of the site prior to the bid.

4. Bids

- a) All bids must be submitted on the forms provided and are subject to all requirements of the Contract Documents, including the Drawings.
- b) All bids must be regular in every respect and no interlineation, excisions or special conditions may be made or included by the bidder.
- c) The City of Bellmead may consider as irregular any bid on which there is an alteration of or departure from the bid form and, at its option, may reject any irregular bid.
- d) If contract is awarded, it will be awarded to a responsible bidder on the basis of the lowest/best bid and the selected alternate bid items, if any. The contract will require the completion of the work in accordance with the contract documents.

5. Bid Bond

- a) A bid bond in the amount of 5% of the bid issued by the acceptable surety shall be submitted with each bid. A certified check or bank draft payable to the City of Bellmead may be submitted in lieu of the Bid Bond.
- b) The bid bond or its comparable, will be returned to the bidder as soon as practical after the opening of the bids.

6. Unit Price

The unit price for each of the several items in the bid shall include its pro rata share of overhead so that the sum of the products obtained by multiplying the quantity shown for each item by the unit price bid represents the total bid. Any bid not conforming to this requirement may be rejected as informal. Special attention is drawn to this condition, as the unit prices will be used to determine the amount of any change orders resulting from an increase or decrease in quantities.

7. Corrections

Erasures or other corrections in the bid must be noted over the signature of the bidder.

8. Time for Receiving Bids

Bids received prior to the advertised hour of opening will be kept securely sealed. The officer appointed to open the bids shall decide when the specified time has arrived and no bid received thereafter will be considered; except that when a bid arrives by mail after the time fixed for opening, but before the reading of all other bids is completed, and it is shown to satisfaction of the City of Bellmead that the late arrival of the bid was solely due to delay in the mail for which the bidder was not responsible, such bid will be received and considered.

9. Withdrawal of Bids

Bidder may withdraw the bid before the time fixed for the opening of bids, by communicating his purpose in writing to the City of Bellmead. Upon receipt of such notice, the unopened bid will be returned to the bidder. The bid guaranty of any bidder withdrawing his bid will be returned promptly.

10. Award of Contract/Rejection of Bids

- a) The contract will be awarded to the responsive, responsible Bidder submitting the lowest/best bid. The bidder selected will be notified at the earliest possible date. The City of Bellmead reserves the right to reject any or all bids and to waive any informality in bids received where such rejection or waiver is in its interest.

11. Execution of Agreement/Performance and Payment Bonds

- a) The failure of the successful bidder to execute the agreement and supply the required bonds within ten (10) days after the prescribed forms are presented for signature, or within such extended period as the City of Bellmead may grant, shall constitute a default and the City of Bellmead may, at its option either award the contract to the next lowest responsible bidder, or re-advertise for bids. In either case, the City of Bellmead may charge against the bidder the difference between the amount of the bid, and the amount for which a contract is subsequently executed irrespective of whether this difference exceeds the amount of the bid bond. If a more favorable bid is received through re-advertisement, the defaulting bidder shall have no claim against the City of Bellmead for a refund.

**CITY OF BELLMEAD**  
**WATER SYSTEM SCADA IMPROVEMENTS**  
**BID SCHEDULE**

**Base Bid**

Item No.	Estimated Quantity	Unit	Description	Unit Price	Total Amount (in numerals)
1	100%	Lump Sum	Mobilization, Bonds and Insurance, not-to-exceed 5% of the Base Bid Amount, Complete For	\$ _____	\$ _____
2	100%	Lump Sum	Electrical equipment including distribution panel, starters, dry type transformer, lighting panelboards and equipment rack at Parrish Water Plant, complete and in place for:	\$ _____	\$ _____
3	100%	Lump Sum	Electrical conduit and wiring for all sites, complete and in place for:	\$ _____	\$ _____
4	100%	Lump Sum	SCADA equipment including PLCs, radios, subpanels, enclosures, and miscellaneous termination materials complete and in place for:	\$ _____	\$ _____
5	100%	Lump Sum	Computer, computer software, uninterruptable power supply, HMI software and radio, complete and in place for:	\$ _____	\$ _____
6	100%	Lump Sum	Antenna towers, antennas, cable and all associated accessories including tower foundation for all sites, complete and in place for:	\$ _____	\$ _____
7	100%	Lump Sum	Provide Project Record Drawings (As Built), Complete For	\$ _____	\$ _____
8	100%	Lump Sum	Provide video of pre-construction and post construction site conditions for the total project, Complete For	\$ _____	\$ _____

**TOTAL BASE BID AMOUNT (ITEMS 1 - 8)**

**BID AMOUNT: \$ \_\_\_\_\_**  
 (numerals)

**CITY OF BELLMEAD**  
**WATER SYSTEM SCADA IMPROVEMENTS**  
BID SCHEDULE

**Total Base Bid: \$** \_\_\_\_\_

Receipt is hereby acknowledged of the following addenda to the Contract Documents.

Addendum No. 1 dated _____	Received _____
Addendum No. 2 dated _____	Received _____
Addendum No. 3 dated _____	Received _____
Addendum No. 4 dated _____	Received _____

The above prices shall include all labor, materials, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

The work proposed to be done shall be accepted when fully completed and finished in accordance with the plans, specifications and Project Schedule shown herein to the satisfaction of the Engineer.

The undersigned bidder hereby declares that they have visited the site of the work and has carefully examined the Contract Documents pertaining to the work covered in the above bid, and that the bid prices contained in the proposal have been carefully checked and are submitted as correct and final.

Respectfully submitted: \_\_\_\_\_ Name: \_\_\_\_\_

By: \_\_\_\_\_ Company Name: \_\_\_\_\_

\_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Seal & Authorization (if a Corporation) Telephone Number: \_\_\_\_\_

Attest: \_\_\_\_\_

\_\_\_\_\_ Fax Number: \_\_\_\_\_

Secretary \_\_\_\_\_

Email Address: \_\_\_\_\_

\_\_\_\_\_

**BID BOND**

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,  
\_\_\_\_\_ as Principal, and  
\_\_\_\_\_ as  
Surety, are hereby held and firmly bound unto \_\_\_\_\_ as OWNER in the penal  
sum of \_\_\_\_\_ for payment of  
which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

SIGNED, this \_\_\_\_\_ day of \_\_\_\_\_, 2024. The Condition of the above obligation is  
such that whereas the Principal has submitted to \_\_\_\_\_  
a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the

**Water System SCADA Improvements**

NOW, THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

THE SURETY, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

\_\_\_\_\_(L.S.)  
Principal

\_\_\_\_\_  
Surety

By: \_\_\_\_\_

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

END OF SECTION

**STANDARD FORM OF AGREEMENT**

STATE OF TEXAS

COUNTY OF McLennan }

THIS AGREEMENT, made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 2024, by and between The City of Bellmead, Texas of the County of McLennan and State of Texas, acting through Yousry Zakhary, City Manager thereunto duly authorized so to do, Party of the First Part, hereinafter termed OWNER, and \_\_\_\_\_ of the City of \_\_\_\_\_, County of \_\_\_\_\_ and State of \_\_\_\_\_, Party of the Second Part, Hereinafter termed CONTRACTOR.

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the Party of the First Part (OWNER), and under the conditions expressed in the bond bearing even date herewith, the said Party of the Second Part (CONTRACTOR), hereby agrees with the said Party of the First Part (OWNER) to commence and complete the construction of certain improvements described as follows:

**Water System SCADA Improvements**

and all extra work in connection therewith, under the terms as stated in the General Conditions of the Agreement and at his (or their) own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said construction, in accordance with the conditions and prices stated in the Proposal attached hereto, and in accordance with the Notice to Contractors, General and Special Conditions of Agreement, Plans and other drawings and printing or written explanatory matter thereof, and the Specifications and addenda therefor, as prepared by Kasberg, Patrick & Associates, LP; Nineteen North Main; Temple, Texas, 76501; (254) 773-3731, herein entitled the ENGINEER, each of which has been identified by the CONTRACTOR and the ENGINEER, together with the CONTRACTOR'S written Proposal, the General Conditions of the Agreement, and the Performance and Payment Bonds hereto attached; all of which are made a part hereof and collectively evidence and constitute the entire contract.

The CONTRACTOR agrees to commence work within ten (10) calendar days after the date written notice to do so shall have been given him, and to substantially complete construction within \_\_\_\_\_ calendar days after issuance of the "Notice to Proceed" and to be at Final Completion within \_\_\_\_\_ calendar days after the issuance of the "Notice to Proceed", subject to such extensions of time as are provided by the General and Special Conditions.

The OWNER agrees to pay the CONTRACTOR in current funds the price or prices shown in the proposal, which forms a part of this contract, such payments to be subject to the General and Special Conditions of the contract.

IN WITNESS WHEREOF, the parties to these presents have executed this Agreement in the year and day first above written.

City of Bellmead

Party of the First Part (OWNER)

\_\_\_\_\_  
Party of the Second Part (CONTRACTOR)

By: \_\_\_\_\_  
Yousry Zakhary, City Manager

By: \_\_\_\_\_  
Title: \_\_\_\_\_

ATTEST:

ATTEST:

\_\_\_\_\_  
Holly Owens, City Clerk

\_\_\_\_\_

APPROVED AS TO FORM:

\_\_\_\_\_  
Charlie Buenger, City Attorney

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That \_\_\_\_\_, a Texas corporation, whose address is \_\_\_\_\_, Texas, \_\_\_\_\_; as Principal, and \_\_\_\_\_, whose address is \_\_\_\_\_, a corporation organized and existing under the laws of the State of Texas, as Surety, are held firmly bound unto the City of Bellmead, Texas as Obligee, in the amount of \_\_\_\_\_ Dollars (\_\_\_\_\_) for the payment of which sum we will bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has entered into a certain written contract with the Obligee, dated the \_\_\_\_\_ day of \_\_\_\_\_, 2024, for the construction of the

**Water System SCADA Improvements**

specifically including in the scope of this work the bond, the additional guaranty provisions set forth in the contract conditions, which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein, as well as Principal’s primary obligation to perform according to the plans and specifications.

NOW, THEREFORE, the condition of this obligation is such, that if the said Principal shall faithfully perform the work in accordance with the plans, specifications, instructions to bidders, general and special conditions and other contract documents and shall fully indemnify and save harmless Obligee from all costs and damage which Obligee may suffer by reason of Principal's default, and reimburse and repay Obligee all outlay and expense which Obligee may incur in making good such default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to Chapter 2253 of the Texas Government Code, as amended, and all liabilities on this bond shall be determined in accordance with the provisions of such statute, to the same extent as if it were copied at length herein.

PROVIDED further that if any legal action be filed on this bond, venue shall be in McLennan County, Texas.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder, or the plans, specifications, or drawings accompanying the same, or any assignment of the contract as may be provided for in the instructions to bidders, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract, assignment thereof, or to the work to be performed thereunder. The Surety is responsible for additional amounts authorized by any change orders.

IN WITNESS WHEREOF, this instrument has been executed by the duly authorized representatives of the Principal and the Surety.

Signed and sealed this \_\_\_\_ day of \_\_\_\_\_, 2024.

Principal: \_\_\_\_\_

By: \_\_\_\_\_

\_\_\_\_\_ (Title)

Surety: \_\_\_\_\_

By: \_\_\_\_\_

TDI Company Number: \_\_\_\_\_

The name and address of the Resident Agent of Surety is:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Note: Attach Power of Attorney and Required Notices Rider

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, That \_\_\_\_\_ a Texas corporation, whose address is \_\_\_\_\_, Texas; as Principal, and \_\_\_\_\_, whose address is \_\_\_\_\_, a corporation organized and existing under the laws of the State of Texas, as Surety, are held firmly bound unto the City of Bellmead, Texas as Obligee, in the amount of \_\_\_\_\_ Dollars (\$\_\_\_\_\_) for the payment of which sum we will bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has entered into a certain written contract with the Obligee, dated the \_\_\_\_\_ day of \_\_\_\_\_, 2024, for the construction of the

**Water System SCADA Improvements**

specifically including in the scope of this work the bond, the additional guaranty provisions set forth in the contract conditions, which contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, That if the said Principal shall well and faithfully make payment to each and every claimant (as defined in Chapter 2253, Texas Government Code, as amended) supplying labor or materials to it in the prosecution of the work provided for in said contract, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED further that if any legal action be filed on this bond, venue shall be in McLennan County, Texas.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code, as currently amended, and all liabilities on this bond shall be determined in accordance with the provisions of said statute to the same extent as if it were copied at length herein.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed thereunder, or the plans, specifications, or drawings accompanying the same, or any assignment of the contract as may be provided for in the instructions to bidders, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract, assignment

thereof, or to the work to be performed thereunder. The Surety is responsible for additional amounts authorized by any change orders.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument on the \_\_\_\_ day of \_\_\_\_\_, 2024.

Principal: \_\_\_\_\_

By: \_\_\_\_\_  
\_\_\_\_\_, (Title)

Surety: \_\_\_\_\_

By: \_\_\_\_\_

TDI Company Number: \_\_\_\_\_

The name and address of the Resident Agent of Surety is:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Note: Attach Power of Attorney and Required Notices Rider

## CERTIFICATE OF INSURANCE

THIS CERTIFICATE IS ISSUED FOR THE DURATION OF THE PROJECT AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES LISTED BELOW.

NAME AND ADDRESS OF AGENCY	COMPANIES AFFORDING COVERAGES COMPANY A <u>LETTER</u> COMPANY B <u>LETTER</u> COMPANY C <u>LETTER</u> COMPANY D <u>LETTER</u> COMPANY E <u>LETTER</u>
NAME AND ADDRESS OF INSURED	COMPANY C <u>LETTER</u> COMPANY D <u>LETTER</u> COMPANY E <u>LETTER</u>

This is to certify that policies of insurance listed below have been issued to the insured named above and are in force at this time. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusions and conditions of such policies.

COMPANY LETTER	TYPE OF INSURANCE	POLICY NUMBER	POLICY EXPIRATION DATE	LIMITS OF LIABILITY IN THOUSANDS (000)		
					EACH OCCURENC	AGGREGATE
_____	GENERAL LIABILITY ___ <b>Comprehensive Form</b>  Premises-Operations ___ Explosions and <b>Collapse Hazard</b> ___ Underground Hazard ___ Products/Completed Operations Hazard ___ Contractual Insurance ___ Broad Form Property Damage ___ Independent Contractors ___ Personal Injury			Bodily Injury	\$	\$
				Property Damage	\$	\$
				Bodily Injury and Property Damage Combined	\$	\$
				Personal Injury		\$

_____	AUTOMOBILE LIABILITY  ___ Comprehensive Form ___ Owned ___ Hired ___ Non-Owned			Bodily Injury (Each Person)	\$
				Bodily Injury (Each Accident)	\$
				Property Damage	\$
				Bodily Injury and Property Damage Combined	\$
_____	EXCESS LIABILITY  ___ Umbrella Form ___ Other than Umbrella				
_____	WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY			Statutory	
					\$ (Each Account)

**OTHER**

Builders Risk

Description of Operations/  
Locations/Vehicles

PROJECT TITLE: Water System SCADA Improvements  
PROJECT LOCATION: Bellmead, Texas

The City of Bellmead and the Engineer are named as an additional insureds under all insurance, other than Workman's Compensation.

**Cancellation:** No policies will be cancelled or reduced, restricted, or limited until ten (10) days after the owner has received written notice as evidence by return receipt or registered or certified letter.

NAME AND ADDRESS OF CERTIFICATE HOLDER:

---

DATE ISSUED: \_\_\_\_\_, 2024 AUTHORIZED REPRESENTATIVE

**END OF SECTION**

# Notice of Award

Date: \_\_\_\_\_

Project: **Water System SCADA Improvements**

Owner: City of Bellmead Texas

Owner's Contract No.:

Contract: **Water System SCADA Improvements**

Engineer's Project No.: 2024-164

Bidder:

Bidder's Address:

You are notified that your Bid dated \_\_\_\_\_, for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for:

## Water System SCADA Improvements

The amount of the Contract is \_\_\_\_\_ (\$ \_\_\_\_\_).

5 copies of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

5 sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner [5] fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders, General Conditions, and Supplementary Conditions.
3. Other conditions precedent:

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

\_\_\_\_\_  
Kasberg, Patrick & Associates, LP

By: \_\_\_\_\_

Ginger R. Tolbert, P.E.

\_\_\_\_\_  
Project Manager

# Notice to Proceed

Date: \_\_\_\_\_

Contract: Water System SCADA Improvements

Engineer's Project No.: 2024-164

To: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

In accordance with the Agreement dated \_\_\_\_\_, by and between the City of Bellmead, Texas (Owner) and \_\_\_\_\_ (Contractor) for work to be performed in conjunction with the Water System SCADA Improvements.

Construction shall be completed within \_\_\_\_\_ calendar days of the issuance of this Notice to Proceed.

1. Contractor is hereby notified to commence work on \_\_\_\_\_, 2025. The Project shall be fully complete within \_\_\_\_\_ calendar days.
2. Liquidated damages to be paid by the Contractor for failure to complete the work by the completion date will be assessed at the rate of \$ 500.00 per day for each working day after the working days allotted have expired. The procedure and basis for the assessment of damages will be in accordance with the Special Conditions, Section 21.

ISSUED ON BEHALF OF

ACCEPTED ON BEHALF OF

City of Bellmead Texas

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Printed Name: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date

Date

**AFFIDAVIT AND RELEASE OF LIEN**

**THE STATE OF TEXAS  
COUNTY OF MCLENNAN**

WHEREAS, the undersigned \_\_\_\_\_,  
who being duly sworn , on oath, says that he/she is the legal representative of \_\_\_\_\_  
\_\_\_\_\_, has been employed by \_\_\_\_\_ The City of Bellmead Texas \_\_\_\_\_,  
to furnish labor and materials for the installation of the Water System SCADA Improvements  
in Bellmead, Texas.

NOW THEREFORE, for and in consideration of the sum of \_\_\_\_\_  
\_\_\_\_\_ DOLLARS (\$ \_\_\_\_\_) and other  
good and valuable consideration, the receipt of which is hereby anticipated, being payment in full for all  
labor and/or materials furnished by the undersigned up to and including \_\_\_\_\_ 20\_\_\_\_,  
the undersigned hereby waives and releases any and all lien or claim of right of lien on said project or  
premises on account of labor and/or materials furnished and further states that all applicable sales  
taxes, State, Local and Federal, and all labor hired by him and all material purchased by him and used  
in the construction of said project improvements have been paid in full. The undersigned hereby  
warrants to defend The City of Bellmead Texas against any liens or claims made by said laborers  
or suppliers of materials used in connection with said project.

Date \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

SWORN TO AND SUBSCRIBED BEFORE ME ON THIS THE \_\_\_\_ DAY OF \_\_\_\_\_, 2024,  
\_\_\_\_\_ DID PERSONALLY APPEAR AND SIGN IN  
ACKNOWLEDGMENT OF THE AFOREGOING AFFIDAVIT.

\_\_\_\_\_  
NOTARY PUBLIC IN AND FOR  
THE STATE OF TEXAS

# **GENERAL CONDITIONS**



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**FOR**

**GENERAL CONDITIONS OF AGREEMENT**

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# GENERAL CONDITIONS OF AGREEMENT

## 1. DEFINITIONS OF TERMS

**1.01 ... OWNER, CONTRACTOR AND ENGINEER.** The OWNER, the CONTRACTOR and the ENGINEER are those persons or organizations identified as such in the Agreement and are referred to throughout the Contract Documents as if singular in number and masculine in gender. The term ENGINEER means the ENGINEER or his duly authorized representative. The ENGINEER shall be understood to be the ENGINEER of the OWNER, and nothing contained in the Contract Documents shall create any contractual or agency relationship between the ENGINEER and the CONTRACTOR.

**1.02 ... CONTRACT DOCUMENTS.** The Contract Documents shall consist of the Notice to Contractors (Advertisement), Special Conditions (Instructions to Bidders), Proposal, signed Agreement, Performance and Payment Bonds (when required), Special Bonds (when required), General Conditions of the Agreement, Technical Specifications, Plans, and all modifications thereof incorporated in any of the documents before the execution of the agreement.

The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. In case of conflict between any of the Contract Documents, priority of interpretation shall be in the following order: Signed Agreement, Performance and Payment Bonds, Special Bonds (if any), Proposal, Special Conditions of Agreement, Notice to Contractors, Technical Specifications, Plans, and General Conditions of Agreement.

**1.03 ... SUB-CONTRACTOR.** The term Sub-Contractor, as employed herein, includes only those having a direct contract with the CONTRACTOR and it includes one who furnishes material worked to a special design according to the plans or specifications of this work, but does not include one who merely furnishes material not so worked.

**1.04 ... WRITTEN NOTICE.** Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered mail to the last business address known to him who gives the notice.

**1.05 ... WORK.** The CONTRACTOR shall provide and pay for all materials, supplies, machinery, equipment, tools, superintendence, labor, services, insurance, and all water, light, power, fuel, transportation and other facilities necessary for the execution and completion of the work covered by the Contract Documents. Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of a good quality. The CONTRACTOR shall, if required, furnish satisfactory evidence as to the kind and quality of materials. Materials or work described in words, which so applied, have a well-known technical or trade meaning shall be held to refer to such recognized standards.

**1.06 ... EXTRA WORK.** The term "Extra Work" as used in this contract shall be understood to mean and include all work that may be required by the ENGINEER or OWNER to be done by the CONTRACTOR to accomplish any change, alteration or addition to the work

shown upon the plans, or reasonably implied by the specifications, and not covered by the CONTRACTOR'S Proposal, except as provided under "Changes and Alterations", herein.

**1.07 ... WORKING DAY.** A "Working Day" is defined as any day not including Saturdays, Sundays or any legal holidays, in which weather or other conditions, not under the control of the CONTRACTOR, will permit construction of the principal units of the work for a period of not less than seven (7) hours between 7:00 a.m. and 6:00 p.m.

**1.08 ... CALENDAR DAY.** "Calendar Day" is any day of the week or month, no days being excepted.

**1.09 ... SUBSTANTIALLY COMPLETED.** By the term "substantially completed" is meant that the structure has been made suitable for use or occupancy or the facility is in condition to serve its intended purpose, but still may require minor miscellaneous work and adjustment.

## **2. RESPONSIBILITIES OF THE ENGINEER AND THE CONTRACTOR**

**2.01 ... OWNER - ENGINEER RELATIONSHIP.** The ENGINEER will be the OWNER'S representative during construction. The duties, responsibilities and limitations of authority of the ENGINEER as the OWNER'S representative during construction are as set forth in the Contract Documents and shall not be extended or limited without written consent of the OWNER and ENGINEER. The ENGINEER will advise and consult with the OWNER, and all of OWNER'S instructions to the CONTRACTOR shall be issued through the ENGINEER.

**2.02 ... PROFESSIONAL INSPECTION BY ENGINEER.** The ENGINEER shall make periodic visits to the site to familiarize himself generally with the progress of the executed work and to determine if such work generally meets the essential performance and design features and the technical and functional engineering requirements of the Contract Documents; provided and except, however, that the ENGINEER shall not be responsible for making any detailed, exhaustive, comprehensive or continuous on-site inspection of the quality or quantity of the work or be in any way responsible, directly or indirectly, for the construction means, methods, techniques, sequences, quality, procedures, programs, safety precautions or lack of same incident thereto or in connection therewith. Notwithstanding any other provision of this agreement or any other Contract Document, the ENGINEER shall not be in any way responsible or liable for any acts, errors, omissions or negligence of the CONTRACTOR, any subcontractor or any of the CONTRACTOR'S or subcontractor's agents, servants or employees or any other person, firm or corporation performing or attempting to perform any of the work.

**2.03 ... PAYMENTS FOR WORK.** The ENGINEER shall review CONTRACTOR'S applications for payment and supporting data, determine the amount owed to the CONTRACTOR and approve, in writing, payment to CONTRACTOR in such amounts; such approval of payment to CONTRACTOR constitutes a representation to the OWNER of ENGINEER'S professional judgment that the work has progressed to the point indicated to the best of his knowledge, information and belief, but such approval of an application for payment to CONTRACTOR shall not be deemed as a representation by ENGINEER that ENGINEER has

made any examination to determine how or for what purpose CONTRACTOR has used the moneys paid on account of the Contract price.

**2.04 ... INITIAL DETERMINATIONS.** The ENGINEER initially shall determine all claims, disputes and other matters in question between the CONTRACTOR and the OWNER relating to the execution or progress of the work or the interpretation of the Contract Documents and the ENGINEER'S decision shall be rendered in writing within a reasonable time. Should the ENGINEER fail to make such decision within a reasonable time, appeal to arbitration may be taken as if his decision had been rendered against the party appealing.

**2.05 ... OBJECTIONS.** In the event the ENGINEER renders any decision which, in the opinion of either party hereto, is not in accordance with the meaning and intent of this contract, either party may file with the ENGINEER within thirty days his written objection to the decision, and by such action may reserve the right to submit the question so raised to arbitration as hereinafter provided.

**2.06 ... LINES AND GRADES.** Unless otherwise specified, all lines and grades shall be furnished by the ENGINEER or his representative. Whenever necessary, construction work shall be suspended to permit performance of this work, but such suspension will be as brief as practicable and the CONTRACTOR shall be allowed no extra compensation therefor. The CONTRACTOR shall give the ENGINEER ample notice of the time and place where lines and grades will be needed. All stakes, marks, etc., shall be carefully preserved by the CONTRACTOR, and in case of careless destruction or removal by him or his employees, such stakes, marks, etc., shall be replaced at the CONTRACTOR'S expense.

**2.07 ... CONTRACTOR'S DUTY AND SUPERINTENDENCE.** The CONTRACTOR shall give adequate attention to the faithful prosecution and completion of this contract and shall keep on the work, during its progress, a competent superintendent and any necessary assistants. The superintendent shall represent the CONTRACTOR in his absence and all directions given to him shall be as binding as if given to the CONTRACTOR.

The CONTRACTOR is and at all times shall remain an independent contractor, solely responsible for the manner and method of completing his work under this contract, with full power and authority to select the means, method and manner of performing such work, so long as such methods do not adversely affect the completed improvements, the OWNER and ENGINEER being interested only in the result obtained and conformity of such completed improvements to the plans, specifications and contract.

Likewise, the CONTRACTOR shall be solely responsible for the safety of himself, his employees and other persons, as well as for the protection of the safety of the improvements being erected and the property of himself or any other person, as a result of his operations hereunder. Engineering construction drawings and specifications as well as any additional information concerning the work to be performed passing from or through the ENGINEER shall not be interpreted as requiring or allowing CONTRACTOR to deviate from the plans and specifications, the intent of such drawings, specifications and any other such instructions being to define with particularity the agreement of the parties as to the work the CONTRACTOR is to perform. CONTRACTOR shall be fully and completely liable, at his own expense, for design, construction, installation and use, or non-use of all items and methods incident to performance of

the contract, and for all loss, damage or injury incident thereto, either to person or property, including, without limitation, the adequacy of all temporary supports, shoring, bracing, scaffolding, machinery or equipment, safety precautions or devices, and similar items or devices used by him during construction.

Any review of work in process, or any visit or observation during construction, or any clarification of plans and specifications, by the ENGINEER, or any agent, employee, or representative of either of them, whether through personal observation on the project site or by means of approval of shop drawings for temporary construction on construction processes, or by other means or method, is agreed by the CONTRACTOR to be for the purpose of observing the extent and nature of work completed or being performed, as measured against the drawings and specifications constituting the contract, or for the purpose of enabling CONTRACTOR to more fully understand the plans and specifications so that the completed construction work will conform thereto, and shall in no way relieve the CONTRACTOR from full and complete responsibility for the proper performance of his work on the project, including but without limitation the propriety of means and methods of the CONTRACTOR in performing said contract, and the adequacy of any designs, plans or other facilities for accomplishing such performance. Deviation by the CONTRACTOR from plans and specifications that may have been in evidence during any such visitation or observation by the ENGINEER, or any of his representatives, whether called to the CONTRACTOR'S attention or not shall in no way relieve CONTRACTOR from his responsibility to complete all work in accordance with said plans and specifications.

**2.08 ... CONTRACTOR'S UNDERSTANDING.** It is understood and agreed that the CONTRACTOR has, by careful examination, satisfied himself as to the nature and location of the work, the conformation of the ground, the character, quality and quantity of the materials to be encountered, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work under this contract. No verbal agreement or conversation with any officer, agent or employee of the OWNER or ENGINEER either before or after the execution of this contract, shall affect or modify any of the terms or obligations herein contained.

**2.09 ... CHARACTER OF WORKMEN.** The CONTRACTOR agrees to employ only orderly and competent men, skillful in the performance of the type of work required under this contract, to do the work; and agrees that whenever the ENGINEER shall inform him in writing that any man or men on the work are, in his opinion, incompetent, unfaithful or disorderly, such man or men shall be discharged from the work and shall not again be employed on the work without the ENGINEER'S written consent.

**2.10 ... CONTRACTOR'S BUILDINGS.** The building of structures for housing men, or the erection of tents or other forms of protection, will be permitted only at such places as the ENGINEER shall direct, and the sanitary conditions of the grounds in or about such structures shall at all times be maintained in a manner satisfactory to the ENGINEER.

**2.11 ... SANITATION.** Necessary sanitary conveniences for the use of laborers on the work, properly secluded from public observation, shall be constructed and maintained by the CONTRACTOR in such a manner and at such points as shall be approved by the ENGINEER, and their use shall be strictly enforced.

**2.12 ... SHOP DRAWINGS.** The CONTRACTOR shall submit to the ENGINEER, with such promptness as to cause no delay in his own work or in that of any other Contractor, four checked copies, unless otherwise specified, of all shop and/or setting drawings and schedules required for the work of the various trades, and the ENGINEER shall pass upon them with reasonable promptness, making desired corrections. The CONTRACTOR shall make any corrections required by the ENGINEER; file with him two corrected copies and furnish such other copies as may be needed. The ENGINEER'S approval of such drawings or schedules shall not relieve the CONTRACTOR from responsibility for deviations from drawings or specifications, unless he has in writing called the ENGINEER'S attention to such deviations at the time of submission, nor shall it relieve him from responsibility for errors of any sort in shop drawings or schedules. It shall be the CONTRACTOR'S responsibility to fully and completely review all shop drawings to ascertain their effect on his ability to perform the required contract work in accordance with the plans and specifications and within the contract time.

Such review by the ENGINEER shall be for the sole purpose of determining the sufficiency of said drawings or schedules to result in finished improvements in conformity with the plans and specifications, and shall not relieve the CONTRACTOR of his duty as an independent contractor as previously set forth, it being expressly understood and agreed that the ENGINEER does not assume any duty to pass upon the propriety or adequacy of such drawings or schedules, or any means or methods reflected thereby, in relation to the safety of either person or property during CONTRACTOR'S performance hereunder.

**2.13 ... PRELIMINARY APPROVAL.** The ENGINEER shall not have the power to waive the obligations of this contract for the furnishing by the CONTRACTOR of good material, and of his performing good work as herein described, and in full accordance with the plans and specifications. No failure or omission of the ENGINEER to discover, object to or condemn any defective work or material shall release the CONTRACTOR from the obligations to fully and properly perform the contract, including without limitations, the obligation to at once tear out, remove and properly replace the same at any time prior to final acceptance upon the discovery of said defective work or material; provided, however, that the ENGINEER shall, upon request of the CONTRACTOR, inspect and accept or reject any material furnished, and in event the material has been once accepted by the ENGINEER, such acceptance shall be binding on the OWNER, unless it can be clearly shown that such material furnished does not meet the specifications for this work.

Any questioned work may be ordered taken up or removed for re-examination, by the ENGINEER, prior to final acceptance, and if found not in accordance with the specifications for said work, all expense of removing, re-examination and replacement shall be borne by the CONTRACTOR, otherwise the expense thus incurred shall be allowed as EXTRA WORK, and shall be paid for by the OWNER; provided that, where inspection or approval is specifically required by the specifications prior to performance of certain work, should the CONTRACTOR proceed with such work without requesting prior inspection or approval he shall bear all expense of taking up, removing, and replacing this work if so directed by the ENGINEER.

**2.14 ... DEFECTS AND THEIR REMEDIES.** It is further agreed that if the work of any part thereof, or any material brought on the site of the work for use in the work or selected for the same, shall be deemed by the ENGINEER as unsuitable or not in conformity with the

specifications, the CONTRACTOR shall, after receipt of written notice thereof from the ENGINEER, forthwith remove such material and rebuild or otherwise remedy such work so that it shall be in full accordance with this contract.

**2.15 ... CHANGES AND ALTERATIONS.** The CONTRACTOR further agrees that the OWNER may make such changes and alterations as the OWNER may see fit, in the line, grade, form, dimensions, plans or materials for the work herein contemplated, or any part thereof, either before or after the beginning of the construction, without affecting the validity of this contract and the accompanying Performance and Payment Bonds.

If such changes or alterations diminish the quantity of the work to be done, they shall not constitute the basis for a claim for damages, or anticipated profits on the work that may be dispensed with, except as provided for unit price items under Section 5 "Measurement and Payment." If the amount of work is increased, and the work can fairly be classified under the specifications, such increase shall be paid for according to the quantity actually done and at the unit price, if any, established for such work under this contract, except as provided for unit price items under Section 5 "Measurement and Payment;" otherwise, such additional work shall be paid for as provided under Extra Work. In case the OWNER shall make such changes or alterations as shall make useless any work already done or material already furnished or used in said work, then the OWNER shall recompense the CONTRACTOR for any material or labor so used, and for any actual loss occasioned by such change, due to actual expenses incurred in preparation for the work as originally planned.

### **3. GENERAL OBLIGATIONS AND RESPONSIBILITIES**

**3.01 ... KEEPING OF PLANS AND SPECIFICATIONS ACCESSIBLE.** The ENGINEER shall furnish the CONTRACTOR with an adequate and reasonable number of copies of all plans and specifications without expense to him, and the CONTRACTOR shall keep one copy of the same constantly accessible on the work, with the latest revisions noted thereon.

**3.02 ... OWNERSHIP OF DRAWINGS.** All drawings, specifications and copies thereof furnished by the ENGINEER shall not be reused on other work, and, with the exception of the signed contract sets, are to be returned to him on request, at the completion of the work. All models are the property of the OWNER.

**3.03 ... ADEQUACY OF DESIGN.** It is understood that the OWNER believes it has employed competent engineers and designers. It is, therefore, agreed that the OWNER shall be responsible for the adequacy of the design, sufficiency of the Contract Documents, the safety of the structure and the practicability of the operations of the completed project; provided the CONTRACTOR has complied with the requirements of the said Contract Documents, all approved modifications thereof, and additions and alterations thereto approved in writing by the OWNER. The burden of proof of such compliance shall be upon the CONTRACTOR to show that he has complied with the said requirements of the Contract Documents, approved modifications thereof and all approved additions and alterations thereto.

**3.04 ... RIGHT OF ENTRY.** The OWNER reserves the right to enter the property or location on which the works herein contracted for are to be constructed or installed, by such agent or agents as he may elect, for the purpose of inspecting the work, or for the purpose of constructing or installing such collateral work as said OWNER may desire.

**3.05 ... COLLATERAL CONTRACTS.** The OWNER agrees to provide by separate contract or otherwise, all labor and material essential to the completion of the work specifically excluded from this contract, in such manner as not to delay the progress of the work, or damage said CONTRACTOR, except where such delays are specifically mentioned elsewhere in the Contract Documents.

**3.06 ... DISCREPANCIES AND OMISSIONS.** It is further agreed that it is the intent of this contract that all work must be done and all material must be furnished in accordance with the generally accepted practice, and in the event of any discrepancies between the separate contract documents, the priority of interpretation defined under "Contract Documents" shall govern. In the event that there is still any doubt as to the meaning and intent of any portion of the contract, specifications or drawings, the ENGINEER shall define which is intended to apply to the work.

**3.07 ... EQUIPMENT, MATERIALS AND CONSTRUCTION PLANT.** The CONTRACTOR shall be responsible for the care, preservation, conservation, and protection of all materials, supplies, machinery, equipment, tools, apparatus, accessories, facilities, all means of construction, and any and all parts of the work, whether the CONTRACTOR has been paid, partially paid, or not paid for such work, until the entire work is completed and accepted.

**3.08 ... DAMAGES.** In the event the CONTRACTOR is damaged in the course of the completion of the work by the act, neglect, omission, mistake or default of the OWNER, or of the ENGINEER, or of any other CONTRACTOR employed by the OWNER upon the work, thereby causing loss to the CONTRACTOR, the OWNER agrees that he will reimburse the CONTRACTOR for such loss. In the event the OWNER is damaged in the course of the work by the act, negligence, omission, mistake or default of the CONTRACTOR, or should the CONTRACTOR unreasonably delay the progress of the work being done by others on the job so as to cause loss for which the OWNER becomes liable, then the CONTRACTOR shall reimburse the OWNER for such loss.

**3.09 ... PROTECTION AGAINST ACCIDENT TO EMPLOYEES AND THE PUBLIC.** The CONTRACTOR shall at all times exercise reasonable precautions for the safety of employees and others on or near the work and shall comply with all applicable provisions of Federal, State, and Municipal safety laws and building and construction codes. All machinery and equipment and other physical hazards shall be guarded in accordance with the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America except where incompatible with Federal, State, or Municipal laws or regulations. The CONTRACTOR shall provide such machinery guards, safe walkways, ladders, bridges, gangplanks, and other safety devices. The safety precautions actually taken and their adequacy shall be the sole responsibility of the CONTRACTOR, acting at his discretion as an independent contractor.

**3.10 ... PERFORMANCE AND PAYMENT BONDS.** Unless otherwise specified, it is further agreed by the parties to this Contract that the CONTRACTOR will execute separate performance and payment bonds, each in the sum of one hundred (100) percent of the total contract price, in standard forms for this purpose, guaranteeing faithful performance of the work and the fulfillment of any guarantees required, and further guaranteeing payment to all persons supplying labor and materials or furnishing him any equipment in the execution of the Contract, and it is agreed that this contract shall not be in effect until such performance and payment bonds are furnished and approved by the OWNER.

Unless otherwise approved in writing by the OWNER, the surety company underwriting the bonds shall be acceptable according to the latest list of companies holding certificates of authority from the Secretary of the Treasury of the United States.

Unless otherwise specified, the cost of the premium for the performance and payment bonds shall be included in the CONTRACTOR'S proposal.

**3.11 ... LOSSES FROM NATURAL CAUSES.** Unless otherwise specified, all loss or damage to the CONTRACTOR arising out of the nature of the work to be done, or from the action of the elements, or from any unforeseen circumstance in the prosecution of the same, or from unusual obstructions or difficulties which may be encountered in the prosecution of the work, shall be sustained and borne by the CONTRACTOR at his own cost and expense.

**3.12 ... PROTECTION OF ADJOINING PROPERTY.** The said CONTRACTOR shall take proper means to protect the adjacent or adjoining property or properties in any way encountered, which might be injured or seriously affected by any process of construction to be undertaken under this Agreement, from any damage or injury by reason of said process of construction; and he shall be liable for any and all claims for such damage on account of his failure to fully protect all adjoining property. The CONTRACTOR agrees to indemnify, save and hold harmless the OWNER and ENGINEER against any claim or claims for damages due to any injury to any adjacent or adjoining property, arising or growing out of the performance of the contract; but any such indemnity shall not apply to any claim of any kind arising out of the existence or character of the work.

**3.13 ... PROTECTION AGAINST CLAIMS OF SUB-CONTRACTORS, LABORERS, MATERIALMEN AND FURNISHERS OF MACHINERY, EQUIPMENT AND SUPPLIES.** The CONTRACTOR agrees that he will indemnify and save the OWNER and ENGINEER harmless from all claims growing out of the lawful demands of sub-contractors, laborers, workmen, mechanics, materialmen and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this contract. When so desired by the OWNER, the CONTRACTOR shall furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged or waived. If the CONTRACTOR fails so to do, then the OWNER may at the option of the CONTRACTOR either pay directly any unpaid bills, of which the OWNER has written notice, or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to liquidate any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged, whereupon payments to the CONTRACTOR shall be resumed in full, in accordance with the terms of this contract, but in no event shall the provisions of this sentence be construed to impose any obligation upon the OWNER by either the CONTRACTOR or his Surety.

**3.14 ... PROTECTION AGAINST ROYALTIES OR PATENTED INVENTION.**

The CONTRACTOR shall pay all royalties and license fees, and shall provide for the use of any design, device, material or process covered by letters patent or copyright by suitable legal agreement with the patentee or owner. The CONTRACTOR shall defend all suits or claims for infringement of any patent or copyright rights and shall indemnify and save the OWNER and ENGINEER harmless from any loss on account thereof, except that the OWNER shall defend all such suits and claims and shall be responsible for all such loss when a particular design, device, material or process or the product of a particular manufacturer or manufacturers is specified or required by the OWNER; provided however, if choice of alternate design, device, material or process is allowed to the CONTRACTOR, the CONTRACTOR shall indemnify and save OWNER harmless from any loss on account thereof. If the material or process specified or required by the OWNER is an infringement, the CONTRACTOR shall be responsible for such loss unless he promptly gives such information the OWNER.

**3.15 ... LAWS AND ORDINANCES.** The CONTRACTOR shall at all times observe and comply with all Federal, State and local laws, ordinances and regulations, which in any manner affect the contract or the work, and shall indemnify and save harmless the OWNER and ENGINEER against any claim arising from the violation of any such laws, ordinances, and regulations whether by the CONTRACTOR or his employees, except where such violations are called for by the provisions of the Contract Documents. If the CONTRACTOR observes that the plans and specifications are at variance therewith, he shall promptly notify the ENGINEER in writing, and any necessary changes shall be adjusted as provided in the contract for changes in the work. If the CONTRACTOR performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the ENGINEER, he shall bear all costs arising therefrom. In case the OWNER is a body politic and corporate, the law from which it derives its powers, insofar as the same regulates the objects for which, or the manner in which, or the conditions under which the OWNER may enter into contract, shall be controlling, and shall be considered as part of this contract, to the same effect as though embodied herein.

**3.16 ... ASSIGNMENT AND SUBLETTING.** The CONTRACTOR further agrees that he will retain personal control and will give his personal attention to the fulfillment of this contract and that he will not assign by Power of Attorney, or otherwise, or sublet said contract without the written consent of the ENGINEER, and that no part or feature of the work will be sublet to anyone objectionable to the ENGINEER or the OWNER. The CONTRACTOR further agrees that the subletting of any portion or feature of the work, or materials required in the performance of this contract, shall not relieve the CONTRACTOR from his full obligations to the OWNER, as provided by this Agreement.

**3.17 ... INDEMNIFICATION.** The CONTRACTOR shall defend, indemnify and hold harmless the OWNER and the ENGINEER and their respective officers, agents and employees, from and against all damages, claims, losses, demands, suits, judgments and costs, including reasonable attorneys' fees and expenses, arising out of or resulting from the performance of the work, provided that any such damages, claim, loss, demand, suit, judgment, cost or expense:

- .....(1) . . . is attributable to bodily injury, sickness, disease or death or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting therefrom; and

.....(2) . . . is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any one of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

The obligation of the CONTRACTOR under this Paragraph shall not extend to the liability of the ENGINEER, his agents or employees arising out of the preparation or approval of maps, drawings, reports, surveys, Change Orders, designs or specifications, or the giving of or the failure to give directions or instructions by the ENGINEER, his agents or employees, provided such giving or failure to give is the primary cause of the injury or damage.

**3.18 ... INSURANCE.** The CONTRACTOR at his own expense shall purchase, maintain and keep in force such insurance as will protect him from claims set forth below which may arise out of or result from the CONTRACTOR'S operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.....(1) . . . Workmen's compensation claims, disability benefits and other similar employee benefit acts;

.....(2) . . . Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees, and claims insured by usual bodily injury liability coverages;

.....(3) . . . Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees, and claims insured by usual bodily injury liability coverages; and

.....(4) . . . Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

**3.18.1 ... CERTIFICATE OF INSURANCE.** Before commencing any of the work, CONTRACTOR shall file with the OWNER valid Certificates of Insurance acceptable to the OWNER and the ENGINEER. Such Certificates shall contain a provision that coverages afforded under the policies will not be canceled until at least fifteen days' prior written notice has been given to the OWNER.

The CONTRACTOR shall also file with the OWNER valid Certificates of Insurance covering all sub-contractors.

## 4. PROSECUTION AND PROGRESS

**4.01 ... TIME AND ORDER OF COMPLETION.** It is the meaning and intent of this contract, unless otherwise herein specifically provided, that the CONTRACTOR shall be allowed to prosecute his work at such times and seasons, in such order of precedence, and in such manner as shall be most conducive to economy of construction: provided, however, that the

order and the time of prosecution shall be such that the work shall be substantially completed as a whole and in part, in accordance with this contract, the plans and specifications, and within the time of completion designated in the Proposal; provided, also, that when the OWNER is having other work done, either by contract or by his own force, the ENGINEER may direct the time and manner of constructing the work done under this contract, so that conflict will be avoided and the construction of the various works being done for the OWNER shall be harmonized.

The CONTRACTOR shall submit, at such times as may reasonably be requested by the ENGINEER schedules which shall show the order in which the CONTRACTOR proposes to carry on the work, with dates at which the CONTRACTOR will start the several parts of the work, and estimated dates of completion of the several parts.

**4.02 ... EXTENSION OF TIME.** Should the CONTRACTOR be delayed in the completion of the work by any act or neglect of the OWNER or ENGINEER, or of any employee of either, or by other contractors employed by the OWNER, or by changes ordered in the work, or by strikes, lockouts, fires, and unusual delays by common carriers, or unavoidable cause or causes beyond the CONTRACTOR'S control, or by any cause which the ENGINEER shall decide justifies the delay, then an extension of time shall be allowed for completing the work, sufficient to compensate for the delay, the amount of the extension to be determined by the ENGINEER, provided, however, that the CONTRACTOR shall give the ENGINEER prompt notice in writing of the cause of such delay.

**4.03 ... HINDRANCES AND DELAYS.** No claims shall be made by the CONTRACTOR for damages resulting from hindrances or delays from any cause (except where the work is stopped by order of the OWNER) during the progress of any portion of the work embraced in this contract. In case said work shall be stopped by the act of the OWNER, then such expense as in the judgment of the ENGINEER is caused by such stoppage of said work shall be paid by the OWNER to the CONTRACTOR.

## **5. MEASUREMENT AND PAYMENT**

**5.01 ... QUANTITIES AND MEASUREMENTS.** No extra or customary measurements of any kind will be allowed, but the actual measured and/or computed length, area, solid contents, number and weight only shall be considered, unless specifically provided.

**5.02 ... ESTIMATED QUANTITIES.** This agreement, including the specifications, plans and estimate, is intended to show clearly all work to be done and material to be furnished hereunder. Where the estimated quantities are shown for the various classes of work to be done and material to be furnished under this contract, they are approximate and are to be used only as a basis for estimating the probable cost of the work and for comparing the proposals offered for the work. It is understood and agreed that the actual amount of work to be done and material to be furnished under this contract may differ somewhat from these estimates, and that where the basis for payment under this contract is the unit price method, payment shall be for the actual amount of such work done and the material furnished.

Where payment is based on the unit price method, the CONTRACTOR agrees that he will make no claim for damages, anticipated profits or otherwise on account of any differences which may be found between the quantities of work actually done, the material actually

furnished under this contract and the estimated quantities contemplated and contained in the proposal; provided, however, that in case the actual quantity of any major item should become as much as 20% more than, or 20% less than the estimated or contemplated quantity for such items, then either party to this Agreement, upon demand, shall be entitled to a revised consideration upon the portion of the work above or below 20% of the estimated quantity.

A "Major Item" shall be construed to be any individual bid item incurred in the proposal that has a total cost equal to or greater than five (5) percent of the total contract cost, computed on the basis of the proposal quantities and the contract unit prices.

Any revised consideration is to be determined by agreement between the parties, otherwise by the terms of this Agreement, as provided under "Extra Work."

**5.03 ... PRICE OF WORK.** In consideration of the furnishing of all the necessary labor, equipment and material, and the completion of all work by the CONTRACTOR, and on the completion of all work and of the delivery of all material embraced in this Contract in full conformity with the specifications and stipulations herein contained, the OWNER agrees to pay the CONTRACTOR the prices set forth in the Proposal hereto attached, which has been made a part of this contract. The CONTRACTOR hereby agrees to receive such prices in full for furnishing all material and all labor required for the aforesaid work, also for all expense incurred by him, and for well and truly performing the same and the whole thereof in the manner and according to this Agreement.

**5.04 ... PARTIAL PAYMENTS.** On or before the 10th day of each month, the CONTRACTOR shall prepare and submit to the ENGINEER for approval or modification a statement showing as completely as practicable the total value of the work done by the CONTRACTOR up to and including the last day of the preceding month; said statement shall also include the value of all sound materials delivered on the site of the work that are to be fabricated into the work.

The OWNER shall then pay the CONTRACTOR on or before the 15th day of the current month the total amount of the approved statement, less 10 percent of the amount thereof, which 10 percent shall be retained until final payment, and further less all previous payments and all further sums that may be retained by the OWNER under the terms of this Agreement. It is understood, however, that in case the whole work be near to completion and some unexpected and unusual delay occurs due to no fault or neglect on the part of the CONTRACTOR, the OWNER may -- upon recommendation of the ENGINEER -- pay a reasonable and equitable portion of the retained percentage to the CONTRACTOR, or the CONTRACTOR at the OWNER'S option, may be relieved of the obligation to fully complete the work and, thereupon, the CONTRACTOR shall receive payment of the balance due him under the contract subject only to the conditions stated under "Final Payment".

**5.05 ... USE OF COMPLETED PORTIONS.** The OWNER shall have the right to take possession of and use any completed or partially completed portions of the work, notwithstanding the time for completing the entire work or such portions may not have expired but such taking possession and use shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents. If such prior use increases the cost of or delays the work, the CONTRACTOR shall be entitled to such extra compensation, or extension of time, or both, as the ENGINEER may determine.

The CONTRACTOR shall notify the ENGINEER when, in the CONTRACTOR'S opinion, the contract is "substantially completed" and when so notifying the ENGINEER, the CONTRACTOR shall furnish to the ENGINEER in writing a detailed list of unfinished work. The ENGINEER will review the CONTRACTOR'S list of unfinished work and will add thereto such items as the CONTRACTOR has failed to include. The "substantial completion" of the structure or facility shall not excuse the CONTRACTOR from performing all of the work undertaken, whether of a minor or major nature, and thereby completing the structure or facility in accordance with the Contract Documents.

**5.06 ... FINAL COMPLETION AND ACCEPTANCE.** Within ten (10) days after the CONTRACTOR has given the ENGINEER written notice that the work has been completed, or substantially completed, the ENGINEER and the OWNER shall inspect the work and within said time, if the work be found to be completed or substantially completed in accordance with the Contract Documents, the ENGINEER shall issue to the OWNER and the CONTRACTOR his Certificate of Completion, and thereupon it shall be the duty of the OWNER within ten (10) days to issue a Certificate of Acceptance of the work to the CONTRACTOR or to advise the CONTRACTOR in writing of the reason for non-acceptance.

**5.07 ... FINAL PAYMENT.** Upon the issuance of the Certificate of Completion, the ENGINEER shall proceed to make final measurements and prepare final statement of the value of all work performed and materials furnished under the terms of the Agreement and shall certify same to the OWNER, who shall pay to the CONTRACTOR on or after the 30th day, and before the 35th day, after the date of the Certificate of Completion, the balance due the CONTRACTOR under the terms of this Agreement, provided he has fully performed his contractual obligations under the terms of this contract; and said payment shall become due in any event upon said performance by the CONTRACTOR. Neither the Certificate of Acceptance nor the final payment, nor any provision in the Contract Documents, shall relieve the CONTRACTOR of the obligation for fulfillment of any warranty which may be required.

**5.08 ... PAYMENTS WITHHELD.** The OWNER may, on account of subsequently discovered evidence, withhold or nullify the whole or part of any certificate to such extent as may be necessary to protect himself from loss on account of:

- .....(a) .....Defective work not remedied
- .....(b) .....Claims filed or reasonable evidence indicating probable filing of claims.
- .....(c) .....Failure of the CONTRACTOR to make payments properly to subcontractors or for material or labor.
- .....(d) .....Damage to another contractor.
- .....(e) .....Reasonable doubt that the work can be completed for the unpaid balance of the contract amount.
- .....(f) .....Reasonable indication that the work will not be completed within the contract time.

When the above grounds are removed or the CONTRACTOR provides a Surety Bond satisfactory to the OWNER, which will protect the OWNER in the amount withheld, payment shall be made for amounts withheld because of them.

**5.09 ... DELAYED PAYMENTS.** Should the OWNER fail to make payment to the CONTRACTOR of the sum named in any partial or final statement, when payment is due, then the OWNER shall pay to the CONTRACTOR, in addition to the sum shown as due by such statement, interest thereon at the rate of six (6) percent per annum, unless otherwise specified, from date due as provided under "Partial Payments" and "Final Payments", until fully paid, which shall fully liquidate any injury to the CONTRACTOR growing out of such delay in payment, but the right is expressly reversed to the CONTRACTOR in the event payments be not promptly made, as provided under "Partial Payments", to at any time thereafter treat the contract as abandoned by the OWNER and recover compensation, as provided under "Abandonment of Contract", unless such payments are withheld in accordance with the provisions of "Payments Withheld".

## **6. EXTRA WORK AND CLAIMS**

**6.01 ... CHANGE ORDERS.** Without invalidating this Agreement, the OWNER may, at any time or from time to time, order additions, deletions or revisions to the work; such changes will be authorized by Change Order to be prepared by the ENGINEER for execution by the OWNER and the CONTRACTOR. The Change Order shall set forth the basis for any change in contract price, as hereinafter set forth for Extra Work, and any change in contract time which may result from the change.

In the event the CONTRACTOR shall refuse to execute a Change Order which has been prepared by the ENGINEER and executed by the OWNER, the ENGINEER may in writing instruct the CONTRACTOR to proceed with the work as set forth in the Change Order and the CONTRACTOR may make claim against the OWNER for Extra Work involved therein, as hereinafter provided.

**6.02 ... MINOR CHANGES.** The ENGINEER may authorize minor changes in the work not inconsistent with the overall intent of the Contract Documents and not involving an increase in Contract Price. If the CONTRACTOR believes that any minor change or alteration authorized by the ENGINEER involves Extra Work and entitles him to an increase in the Contract Price, the CONTRACTOR shall make written request to the ENGINEER for a written Field Order.

In such case, the CONTRACTOR by copy of his communication to the ENGINEER or otherwise in writing shall advise the OWNER of his request to the ENGINEER for a written Field Order and that the work involved may result in an increase in the Contract Price.

Any request by the CONTRACTOR for a change in Contract Price shall be made prior to beginning the work covered by the proposed change.

**6.03 ... EXTRA WORK.** It is agreed that the basis of compensation to the CONTRACTOR for work either added or deleted by a Change Order for which a claim for Extra Work is made shall be determined by one or more of the following methods:

.....Method (A) - ... By agreed unit prices; or

.....Method (B) - ... By agreed lump sum; or

.....Method (C) - ...If neither Method (A) nor Method (B) be agreed upon before the Extra work is commenced, then the CONTRACTOR shall be paid the “actual field cost” of the work, plus fifteen (15) percent.

In the event said Extra Work be performed and paid for under Method (C), then the provisions of this paragraph shall apply, and the “actual field cost” is hereby defined to include the cost to the CONTRACTOR of all workmen, such as foreman, timekeepers, mechanics and laborers, and materials, supplies, teams, trucks, rentals on machinery and equipment, for the time actually employed or used on such Extra Work, plus actual transportation charges necessarily incurred, together with all power, fuel, lubricants, water and similar operating expenses, also all necessary incidental expenses incurred directly on account of such Extra Work, including Social Security, Old Age Benefits and other payroll taxes, and a rateable proportion of premiums on Performance and Payment Bonds and Maintenance Bonds, Public Liability and Property Damage and Workmen’s Compensation and all other insurance as may be required by any law or ordinance or directed by the OWNER or by them agreed to. The ENGINEER may direct the form in which accounts of the “actual field cost” shall be kept and the records of these accounts shall be made available to the ENGINEER. The ENGINEER or OWNER may also specify in writing, before the work commences, the method of doing the work and the type and kind of machinery and equipment to be used; otherwise these matters shall be determined by the CONTRACTOR. Unless otherwise agreed upon, the prices for the use of machinery and equipment shall be determined by using 100 percent, unless otherwise specified, of the latest schedule of Equipment Ownership Expense adopted by the Associated General Contractors of America. Where practicable the terms and prices for the use of machinery and equipment shall be incorporated in the Written Extra Work Order. The fifteen (15%) percent of the “actual field cost” to be paid the CONTRACTOR shall cover and compensate him for his profit, overhead, general superintendence and field office expense, and all other elements of cost and expense not embraced within the “actual field cost” as herein defined, save that where the CONTRACTOR’S Camp or Field Office must be maintained primarily on account of such Extra Work; then the cost to maintain and operate the same shall be included in the “actual field cost”.

No claim for Extra Work of any kind will be allowed unless ordered in writing by the ENGINEER. In case any orders or instructions, either oral or written, appear to the CONTRACTOR to involve Extra Work for which he should receive compensation or an adjustment in the construction time, he shall make written request to the ENGINEER for written order authorizing such Extra Work. Should a difference of opinion arise as to what does or does not constitute Extra Work, or as to the payment therefor, and the ENGINEER insists upon its performance, the CONTRACTOR shall proceed with the work after making written request for written order and shall keep an accurate account of the “actual field cost” thereof, as provided under Method (C). The CONTRACTOR will thereby preserve the right to submit the matter of payment to arbitration, as herein below provided.

**6.04 ... TIME OF FILING CLAIMS.** It is further agreed by both parties hereto that all questions of dispute or adjustment presented by the CONTRACTOR shall be in writing and filed with the ENGINEER within thirty (30) days after the ENGINEER has given any directions, order or instruction to which the CONTRACTOR desires to take exception. The ENGINEER shall reply within thirty (30) days to such written exceptions by the CONTRACTOR and render his final decision in writing. In case the CONTRACTOR should appeal from the ENGINEER’S decision, any demand for arbitration shall be filed with the ENGINEER and the OWNER in writing within ten (10) days after the date of delivery to CONTRACTOR of the ENGINEER’S

final decision. It is further agreed that final acceptance of the work by the OWNER and the acceptance by the CONTRACTOR of the final payment shall be a bar to any claims by either party, except where noted otherwise in the Contract Documents.

**6.05 ... ARBITRATION.** All questions of dispute under this Agreement shall be submitted to arbitration at the request of either party to the dispute. The parties may agree upon one arbiter, otherwise, there shall be three, one named in writing by each party, and the third chosen by the two arbiters so selected; or if the arbiters fail to select a third within ten (10) days, he shall be chosen by a District Judge serving the County in which the major portion of the project is located, unless otherwise specified. Should the party demanding arbitration fail to name an arbiter within ten (10) days of the demand, his right to arbitrate shall lapse, and the decision of the ENGINEER shall be final and binding on him. Should the other party fail to choose an arbiter within ten (10) days, the ENGINEER shall appoint such arbiter. Should either party refuse or neglect to supply the arbiters with any papers or information demanded in writing, the arbiters are empowered by both parties to take ex parte proceedings.

The arbiters shall act with promptness. The decision of any two shall be binding on both parties to the contract. The decision of the arbiters upon any question submitted to arbitration under this contract shall be a condition precedent to any right of legal action. The decision of the arbiter or arbiters may be filed in court to carry it into effect.

The arbiters, if they deem the case demands it, are authorized to award the party whose contention is sustained, such sums as they deem proper for the time, expense and trouble incident to the appeal, and if the appeal was taken without reasonable cause, they may award damages for any delay occasioned thereby. The arbiters shall fix their own compensation, unless otherwise provided by agreement, and shall assess the cost and charges of the arbitration upon either or both parties. The award of the arbiters must be made in writing.

## **7. ABANDONMENT OF CONTRACT**

**7.01 ... ABANDONMENT BY CONTRACTOR.** In case the CONTRACTOR should abandon and fail or refuse to resume work within ten (10) days after written notification from the OWNER, or the ENGINEER, or if the CONTRACTOR fails to comply with the orders of the ENGINEER, when such orders are consistent with the Contract Documents, then, and in that case, where performance and payment bonds exist, the Sureties on these bonds shall be notified in writing and directed to complete the work, and a copy of said notice shall be notified in writing and directed to complete the work, and a copy of said notice shall be delivered to the CONTRACTOR.

After receiving said notice of abandonment, the CONTRACTOR shall not remove from the work any machinery, equipment, tools, materials or supplies then on the job; but the same, together with any materials and equipment under contract for the work, may be held for use on the work by the OWNER or Surety on the performance bond, or another contractor in completion of the work; and the CONTRACTOR shall not receive any rental or credit therefor (except when used in Work and Claims), it being understood that the use of such equipment and materials will ultimately reduce the cost to complete the work and be reflected in the final settlement.

Where there is no performance bond provided or in case the Surety should fail to commence compliance with the notice for completion herein before provided for, within ten (10) days after service of such notice, then the OWNER may provide for completion of the work in either of the following elective manners:

**7.01.1** The OWNER may thereupon employ such force of men and use such machinery, equipment, tools, materials and supplies as said OWNER may deem necessary to complete the work and charge the expense of such labor, machinery, equipment, tools, materials and supplies to said CONTRACTOR, and expense so charged shall be deducted and paid by the OWNER out of such moneys as may be due, or that may thereafter at any time become due to the CONTRACTOR under and by virtue of this Agreement. In case such expense is less than the sum which would have been payable under this contract, if the same had been completed by the CONTRACTOR, then said CONTRACTOR shall receive the difference. In case such expense is greater than the sum which would have been payable under this contract, if the same had been completed by said CONTRACTOR, then the CONTRACTOR and/or his Surety shall pay the amount of such excess to the OWNER; or

**7.01.2** The OWNER under sealed bids, after five (5) days' notice published one or more times in a newspaper having general circulation in the county of the location of the work, may let the contract for the completion of the work under substantially the same terms and conditions which are provided in this contract. In case any increase in cost to the OWNER under the new contract as compared to what would have been the cost under this contract, such increase shall be charged to the CONTRACTOR and Surety shall be and remain bound therefor. However, should the cost to complete any such contract prove to be less than what would have been the cost to complete under this contract, the CONTRACTOR and/or his Surety shall be credited therewith.

When the work shall have been substantially completed the CONTRACTOR and his Surety shall be so notified and Certificates of Completion and Acceptance, as provided in Paragraph 5.06 hereinabove, shall be issued. A complete itemized statement of the contract accounts, certified to by the ENGINEER as being correct, shall then be prepared and delivered to the CONTRACTOR and his Surety, whereupon the CONTRACTOR and/or his Surety, or the OWNER as the case may be, shall pay the balance due as reflected by said statement, within fifteen (15) days after the date of such completion.

In the event the statement of accounts shows that the cost to complete the work is less than that which would have been the cost to the OWNER had the work been completed by the CONTRACTOR under the terms of this contract; or when the CONTRACTOR and/or his Surety shall pay the balance shown to be due by them to the OWNER, then all machinery, equipment, tools, materials or supplies left on the site of the work shall be turned over to the CONTRACTOR and/or his Surety. Should the cost to complete the work exceed the contract price, and the CONTRACTOR and/or his Surety fail to pay the amount due the OWNER within the time designated hereinabove, and there remains any machinery, equipment, tools materials or supplies on the site of the work, notice thereof, together with an itemized list of such equipment and materials shall be mailed to the CONTRACTOR and his Surety at the respective addresses designated in this contract, provided, however, that actual written notice given in any manner will satisfy this condition. After mailing, or other giving of such notice, such property shall be held at the risk of the CONTRACTOR and his Surety subject only to the duty of the OWNER to

exercise ordinary care to protect such property. After fifteen (15) days from the date of said notice, the OWNER may sell such machinery, equipment, tools, materials or supplies and apply the net sum derived from such sale to the credit of the CONTRACTOR and his Surety. Such sale may be made at either public or private sale, with or without notice, as the OWNER may elect. The OWNER shall release any machinery, equipment, tools, materials, or supplies, which remain on the work, and belong to persons other than the CONTRACTOR or his Surety, to their proper owners. The books on all operations provided herein shall be open to the CONTRACTOR and his Surety.

**7.02 ... ABANDONMENT BY OWNER.** In case the OWNER shall fail to comply with the terms of this contract, and should fail or refuse to comply with said terms within ten (10) days after written notification by the CONTRACTOR, then the CONTRACTOR may suspend or wholly abandon the work, and may remove therefrom all machinery, tools and equipment, and all materials on the site of work that have not been included in payments to the CONTRACTOR and have not been wrought into the work. And thereupon the ENGINEER shall make an estimate of the total amount earned by the CONTRACTOR, which estimate shall include the value of all work actually completed by said CONTRACTOR (at the prices stated in the attached proposal where unit prices are used), the value of all partially completed work at a fair and equitable price, and the amount of all Extra Work performed at the prices agreed upon, or provided for by the terms of this contract, and a reasonable sum to cover the cost of any provisions made by the CONTRACTOR to carry the whole work to completion and which cannot be utilized. The ENGINEER shall then make a final statement of the balance due the CONTRACTOR by deducting from the above estimate all previous payments by the OWNER and all other sums that may be retained by the OWNER under the terms of this Agreement and shall certify same to the OWNER who shall pay to the CONTRACTOR on or before thirty (30) days after the date of the notification by the CONTRACTOR the balance shown by said final statement as due the CONTRACTOR, under the terms of this Agreement.

# **SPECIAL CONDITIONS**



# CITY OF BELLMEAD, TEXAS

## WATER SYSTEM SCADA IMPROVEMENTS

### SPECIAL CONDITIONS

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**CITY OF BELLMEAD, TEXAS**

**WATER SYSTEM SCADA IMPROVEMENTS**

SPECIAL CONDITIONS

SC.01 GENERAL

The provisions of this section of the specifications shall govern in the event of any conflict between them and the "General Conditions of Agreement."

SC.02 DEFINITIONS

Agreement. "Agreement" shall mean the contract document as herein set forth.

Calendar Day. "Calendar Day" shall mean any day of the week or month, no days being excepted.

Working Day. "Working Day" shall mean Monday through Friday, except for Federal Holidays. No work shall be performed on Sundays. Written authorization shall be received by the Contractor from the City of Bellmead before Thursday at 12:00 noon if work is anticipated to be performed on a Federal Holiday or Saturday. Work performed on a Federal Holiday or Saturday will be charged and counted as a working day. Additionally, a working day is defined as time used from 7 AM to 6 PM or in case of night time work, from 7 PM to 6 AM.

Extra Work. "Extra Work" shall mean and include all work that may be required by the Owner to be done by the Contractor to accomplish any change, alteration, or addition to the work shown on the plans or reasonably implied by the specifications, and not covered by the Contractor's proposal.

Parties. The parties to this agreement are the Owner and the Contractor.

Project. "Project" shall mean the work embraced by this agreement, including the Plans and Specifications, General and Special Conditions, Performance and Payment Bonds attached hereto; generally described as follows:

**WATER SYSTEM SCADA IMPROVEMENTS**

Subcontractor. "Subcontractor" shall mean only those having a direct contract with the Contractor for performance of work on the project contemplated by these contract documents.

Substantially Completed. "Substantially Completed" shall mean that the project contemplated by the contract documents has been made suitable for use or occupancy, or the facility is in a condition to serve its intended purpose; but still may require minor miscellaneous work and adjustment, provided, however, that final payment of the contract price including retainage, shall not be made until completion of all punch list items and upon acceptance by the Owner. Acceptance by the Owner shall not impair any warranty obligation of the Contractor.

Work. "Work" or "Scope or Work" shall mean American Rescue Plan Act - Lift Stations Improvements, as more fully described in the Scope of Work contained in SC.06.

SC.03      ENGINEER

The word "Engineer" in these specifications shall be understood as referring to Kasberg, Patrick & Associates, LP, Consulting Engineers; 19 North Main; Temple, Texas 76501, Engineer of the Owner, or such other representatives as may be authorized by said Owner to act in any particular position.

SC.04      LOCATION OF PROJECT

This project is located at various Bellmead Water System sites.

SC.05      EXAMINATION OF SITE OF PROJECT

Prospective bidders shall make a careful and thorough examination of the site of the project, including all soil and water conditions to be encountered, improvements to be protected, disposal sites for surplus materials, arrangements necessary for providing ingress and egress to private properties and methods of handling traffic during prosecution of all the work involved.

SC.06      SCOPE OF WORK

The work to be performed under this contract consists of furnishing all materials, labor, supervision, tools, equipment and incidentals required, and performing all work necessary for the improvements of:

The proposed improvements will include three existing duplex lift stations to be removed from service and replaced with three new submersible lift stations.

SC.07      FORMS, PLANS AND SPECIFICATIONS

Forms of Proposal, Contract and Bonds, and Plans and Specifications may also be viewed at the office of Kasberg, Patrick & Associates, LP. The non-refundable fee for the printed and bound plans and specifications is \$50.00 per set.

SC.08      COPIES OF PLANS AND SPECIFICATIONS FURNISHED

Five (5) sets of the plans and specifications shall be furnished to the successful Contractor, at no charge, for construction purposes. Additional copies may be obtained at the cost of reproduction upon request.

SC.09      PRE-BID CONFERENCE

A Non-Mandatory Pre-Bid Conference will be held in the Bellmead City Hall located at 3015 Bellmead Drive, Bellmead, Texas 76705 at 9:00 AM on Wednesday, December 4, 2024.

SC.10      ADDENDA

Bidders desiring further information, or interpretation of the plans and specifications must make a request in writing to the Engineer as outlined in this Section and in the Instructions to Bidders for Construction. Each interpretation made will be in the form of an

Addendum to the contract documents and will be distributed to all parties holding contract documents. It is the bidder's responsibility to make inquiry as to any addenda issued. All addenda will be bound with and made a part of the contract documents. No other explanation or interpretation will be considered official or binding.

The proposals as submitted by the Contractor will be so constructed as to include any addenda if such are issued by the Engineer prior to twenty-four (24) hours before the opening of bids.

In order that all plan holders will have equal access to information on this project, all requests to the Engineer for information or interpretation of the plans and specifications must be received before 12:00 PM (Noon) on Tuesday, December 10, 2024. If there is a need to clarify any requests at that time, the Engineer will issue a written addendum after 12:00 PM, (Noon) on Friday, December 13, 2024. The Engineer and Owner will not attempt to further clarify any written or oral requests after that time.

#### SC.11 PREPARATION OF PROPOSAL

The Bidder shall submit his proposal on the forms furnished. All blank spaces in the form shall be correctly filled in and the bidder shall state the price, in numerals, for which he proposes to do the work contemplated or furnish the materials required. Such prices shall be written in ink, distinctly and legibly, or typewritten. If the proposal is submitted by an individual, his name must be signed by him or his duly authorized agent. If a proposal is submitted by a firm, association, or partnership, the name and address of each member must be given and the proposal signed by a member of the firm, association or partnership, or person duly authorized. If the proposal is submitted by a company or corporation, the company or corporate name and business address must be given, and the proposal signed by an official or duly authorized agent. Powers of attorney authorizing agents or others to sign proposal must be properly certified and must be in writing and submitted with the proposal. The proposal shall be executed in ink.

Each proposal shall be enclosed in a sealed envelope, addressed as specified in the Notice to Contractors, and endorsed on the outside of the envelope in the following manner:

- a. Bidder's name.
- b. Proposal for "Water System SCADA Improvements."

Bid proposal may be withdrawn and resubmitted at any time prior to the time set for opening of the bids, but no proposal may be withdrawn or altered after the opening of the bids.

#### SC.12 QUALIFICATION OF LOW BIDDER

Prior to award of contract, the bidder shall submit such evidence as the Owner may require to establish the bidder's qualifications to satisfactorily perform the work included in this project. Information that may be required shall include (1) the bidder's current financial statement including amount of funds readily available to commence and carry out

the work, (2) a list of equipment available for this project, (3) a list of projects that of the same general type as included in this contract, together with the names, addresses and phone numbers of persons familiar with this work, and (4) other information that may be pertinent to the bidder's qualifications.

Should the bidder fail to promptly produce evidence satisfactory to the Owner on any of the foregoing points, he may be disqualified and the work awarded to the next bidder so qualifying.

SC.13 AWARD OF CONTRACT

It is the intention of the Owner to award a contract on the basis of the lowest acceptable bid submitted by a qualified bidder as determined by the Owner. The right is reserved, as the interest of the Owner may require, to reject any and all bids and to waive any informality in bids received.

The City of Bellmead will notify the successful bidder, in writing, within sixty (60) days of the date of receiving bids, of its acceptance of his proposal. The Contractor shall complete the execution of the required Bond and Contract within ten (10) days of such notice.

SC.14 SEQUENCE OF CONSTRUCTION

The time allotted for completion of this project is described under Section SC.16 of these Special Conditions.

Prior to beginning construction on this project, the Contractor shall prepare a written construction sequence and schedule for review by the Engineer and approval by the Owner. This construction sequence and schedule shall be followed by the Contractor unless changes are approved by the Owner.

No partial payment estimates will be issued until the Sequence and Schedule of Construction has been approved.

SC.15 TIME ALLOTTED FOR COMPLETION AND NOTICE TO PROCEED

The Water System SCADA Improvements shall be substantially completed within 180 calendar days and final completion within 180 calendar days of the issuance of the Notice to Proceed. The Notice to Proceed shall consist of a written request by the city Engineer for the Contractor to proceed with the construction of the project.

SC.16 PRECONSTRUCTION CONFERENCE

After award of bid and prior to beginning construction, a conference will be held with representatives of the Contractor, Owner, Engineer, and the affected Utility Companies to discuss schedules and utility conflicts in the project. The purpose is to establish lines of communication between the parties involved. The time and place for the Preconstruction Conference shall be determined at the time of Bid Award.

SC.17 CONSTRUCTION IN PUBLIC ROADS AND PRIVATE DRIVES

No public or private road shall be entirely closed overnight. It shall be the responsibility of the Contractor to build and maintain all weather bypasses and detours, if necessary, and to properly light, barricade, and mark all bypasses and detours that might be required on and across the roads involved in the work included in this contract.

The Contractor shall be responsible for repair and maintenance of all roadways damaged as a result of the construction of this project for a period of one year after completion or acceptance of the work. Within this period of one year time, if it becomes necessary for the Owner to make such repairs, the Contractor shall reimburse the Owner for the cost of such repairs.

SC.18 REFERENCE SPECIFICATIONS

Where reference is made in these specifications to specifications compiled by others, such reference is made for expediency and standardization from the material supplier's point of view, and such specifications referred to are hereby made a part of these specifications.

SC.19 EXTENSION OF TIME

Contractor agrees he has submitted his proposal in full recognition of the time required for the completion of this project, taking into consideration the average climatic range and material manufacturing conditions prevailing in this locality, and has considered the liquidated damage provision herein, and that he shall not be entitled to, nor will he request, an extension of time on this contract, except when his work has been delayed by an act or neglect of the Owner, employees or representatives of the Owner, or other contractors employed by the Owner, or by changes ordered in the work, or reductions thereto in writing. The Contractor may apply in writing for an extension of time, submitting therewith all written justification as may be required by the Engineer for such and extension as requested by Contractor. The Engineer, within ten (10) days after receipt of a written request for an extension of time by the Contractor, which is supported by all requested documentation, shall decide if an extension of time shall be allowed.

SC.20 LIQUIDATED DAMAGES FOR DELAY BY CONTRACTOR

The Contractor agrees that time is of the essence on this contract and that the Owner will be damaged as a result of any delay beyond the date agreed upon in the completion of all items of work herein specified and contracted for. The parties understand and agree that the actual damages will be sustained by the Owner because of such delay will be uncertain and difficult of ascertainment and it is further agreed that a reasonable estimate of the actual amount of such damages in light of the facts known to the parties at the time of execution of this contract will be five hundred dollars (\$500.00) per day.

It is therefore agreed that the Owner may withhold permanently from the Contractor's total compensation, the total sum of \$500.00 per day as liquidated damages for delay for each day of delaying completion beyond the date agreed upon for completion of the items of work herein specified and contracted for (after due allowance for such extension of time as is provided for in the General Conditions of Agreement and in Paragraph SC.20).

SC.21 DAMAGES

Article 3.08 of the General Conditions of Agreement is hereby voided and replaced with the following:

In the event the Contractor is damaged in the course of the completion of the work by the neglect, or default of the Owner, or representative of the Owner, or of any other Contractor employed by the Owner upon the work, thereby causing loss to the Contractor, the Owner agrees that he will reimburse the Contractor for such loss. In the event the Owner is damaged in the course of the work by the act, negligence, omission, mistake or default of the Contractor, or should the Contractor unreasonably delay the progress of the work being done by others on the job so as to cause loss for which the Owner becomes liable, then the Contractor shall reimburse the Owner for such loss.

SC.22 OBJECTIONS AND TIME OF FILING CLAIMS

In Paragraph 6.04 of the General Conditions, add the following after the first sentence:

“Failure to file such an objection during such period shall constitute waiver thereof and consent to the decision rendered by the Engineer.”

Also, delete the third sentence, which deals with arbitration.

Also, in Paragraph 2.05 of the General Conditions, delete the last clause dealing with arbitration and insert:

“Failure to file such an objection during such period shall constitute waiver thereof and consent to the decision rendered by the Engineer.”

SC.23 MEDIATION

Article 6.05 of the General Conditions of Agreement is hereby voided and replaced with the following:

In an effort to resolve any conflicts that arise during the construction of the Project or following the completion of the Project, the Owner and the Contractor agree that all disputes between them arising out of or relating to this Agreement or the Project shall be submitted to nonbinding mediation unless the parties mutually agree otherwise.

The Owner and Contractor further agree to include a similar mediation provision in all agreements with their subcontractors, subconsultants, suppliers and fabricators, thereby providing for mediation as the primary method for dispute resolution between the parties to all those agreements.

SC.24 FEES AND ROYALTIES

All fees or royalties for any patented invention, process, article, or arrangement in any manner connected with the work, or with these specifications, shall be included in the price stated in the proposal.

SC.25 INDEMNITY

Contractor agrees to and shall indemnify and hold harmless Owner, its officers, agents and employees, from and against any and all claims, losses, damages, causes of action, suits,

and liability of every kind, including all expenses damages, causes of action, suits, and liability of every kind, including all expenses of litigation, court costs, and attorney's fees, for injury to or death of any person, or for damage to any property, arising out of or in connection with the work done by Contractor under this contract, regardless of whether such injuries, death or damages are caused in whole or in part by the negligence of the City of Bellmead.

Contractor assumes full responsibility for the work to be performed hereunder, and hereby releases, relinquishes and discharges Owner, its officers, agents and employees, from all claims, demands, and causes of action of every kind and character including the cost of defense thereof, for any injury to, including death of, person (whether they be third persons, contractor, or employees of either the parties hereto) and any loss of or damage to property (whether the same be that of either of the parties hereto or of third parties) caused by or alleged to be caused by, arising out of, or in connection with Contractor's work to be performed hereunder whether or not said claims, demands and causes of action in whole or in part are covered by insurance regardless of whether such loss, damage, or injury was caused by Owner. Owner, by this agreement does not give consent to litigation.

SC.26 LAWS TO BE OBSERVED

The Contractor shall, at his own expense, do those things necessary for the procurement of and shall procure all permits, certificates and licenses required of him by the law or governmental regulation for the performance of his work. He shall comply with all federal, state and local laws, ordinances or rules and regulations relating to the performance of his work. In addition to all other laws, ordinances and rules and regulations, these shall include any such laws, ordinances or rules and regulations relating to noise from the Contractor's operations.

SC.27 STATE AND CITY SALES TAXES

This contract is issued by an organization which qualifies for exemption provisions pursuant to Provisions of the Texas Tax Code. Sections 151.301, 151.307, 151.309 and 151.311. The Contractor must obtain a limited sales excise and use tax permit or exemption certificate which shall enable him to buy the materials to be incorporated into the work without paying the tax at the time of purchase.

SC.28 ANTITRUST

The Contractor hereby assigns to the Owner any and all claims for overcharges associated with this contract which arise under the antitrust laws of the United States, 15 U.S.C.A. Section 1, et seq, (1973).

SC.29 GUARANTY AGAINST DEFECTIVE WORK

The Contract shall indemnify the Owner against any repairs which may become necessary to any part of the work performed under each contract, arising from defective workmanship or material used therein, for a period of one (1) year from the date of final acceptance of the work, unless the technical specifications provide for another period.

Neither the Certificate of Acceptance nor any provision in the Contract Documents, nor partial or entire use, or occupancy of the premise by the Owner will constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials.

SC.30

INSURANCE

Satisfactory certificates of insurance for all coverage listed herein shall be filed with the Owner prior to starting any construction work on this contract. Insurance shall include the Owner, the Engineer and the State of Texas as additional insured parties.

Workmen's Compensation and Employer's Liability

This insurance shall protect Contractor against all claims under applicable state workmen's compensation laws. Contractor shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workmen's compensation law. This policy shall include an "all states" endorsement.

The liability limits shall not be less than:

Workmen's Compensation	Statutory
Employer's Liability	\$100,000 each occurrence

Comprehensive Automobile Liability

This insurance shall be written in comprehensive form and shall protect Contractor against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, and shall cover operation on or off site of all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired.

The liability limits shall not be less than:

Bodily Injury	\$250,000 each person \$500,000 each occurrence \$1,000,000 aggregate
Property Damage	\$100,000 each occurrence \$100,000 aggregate

Comprehensive General Liability

This insurance shall be written in comprehensive form and shall protect Contractor and additional insured parties against all claims arising out of any act or omission of the Contractor or his agents, employees or subcontractors.

The liability limits shall be not less than:

Bodily Injury	\$500,000 each person \$500,000 each occurrence \$500,000 aggregate
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Property Damage      \$100,000 each occurrence  
                                 \$100,000 aggregate

Excess Liability Insurance

The Contractor shall obtain, pay for and maintain a policy during the contract term, insuring Contractor for an amount of not less than \$1,000,000 combined single limit bodily injury and property damage liability insurance, including death, in excess of the primary coverage required hereinabove. The Owner and the Engineer shall be named as additional insureds.

The Contractor shall furnish a Certificate of Insurance for the above coverage with a provision that the Owner will be notified by the insurance company ten (10) days prior to cancellation of the policy during the term of the contract, and if canceled, a new policy must be furnished prior to cancellation.

SC.31

PAYMENTS TO CONTRACTOR

Progress Payments

Article 5.04 of the General Conditions of Agreement, is hereby voided and replaced by the following:

The Contractor shall prepare a requisition for progress payment as of the 25th day of the month and submit to the Engineer. On or before the 10th day of each month, the Engineer will then verify quantities and prepare a statement showing as completely as practicable the total value of the work done by the Contractor up to and including the last day of the preceding month; said statement shall also include the invoice value of all sound materials delivered, and properly stored and protected, on the site of the work that are to be fabricated into the work.

The Owner shall then issue payment the Contractor on or before the 25th day of the current month the total amount of the approved statement. The amount of the payment due the Contractor shall be determined by adding to the total value of work completed to date, the value of materials properly stored on the site and deducting (1) five percent (5%) of the total amount, as a retainage and (2) the amount of all previous payments. The total value of work completed to date shall be based on the estimated quantities of work completed and on the unit process contained in the agreement and adjusted by approved change orders. The value of materials properly stored on the site shall be based upon the estimated quantities of such materials and the invoice prices. Copies of all invoices shall be furnished to the Engineer.

The Contractor shall be responsible for the care and protection of all materials and work upon which payments have been made until final acceptance of such work and materials by the Owner. Such payment shall not constitute a waiver of the right of the Owner to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the Owner in all details.

The five percent (5%) retainage of the progress payments otherwise due to the Contractor may not be reduced until the building of the project is substantially complete and a reduction in the retainage has been authorized by the Owner.

#### Withholding Payments

The Owner may withhold from any payment otherwise due the Contractor so much as may be necessary to protect the Owner and if so elects may also withhold amounts due from the Contractor to any subcontractors or material dealers, for work performed or material furnished by them. The foregoing provisions shall be construed solely for the benefit of the Owner and will not require the Owner to determine or adjust any claims or disputes between the Contractor and his subcontractors or material dealers, or to withhold any moneys for their protection unless the Owner elects to do so. The failure or refusal of the Owner to withhold any moneys from the Contractor shall in no way impair the obligations of any surety or sureties under any bond or bonds furnished under this Contract.

#### Separate Payment

Except as modified by Change Orders subsequent to execution of the Contract for this proposed work, no separate payment shall be made for work described in these Specifications or shown on the Plans. Total compensation to the Contractor shall be as set forth in the various Bid Items in the Proposal and Bid Schedule.

The Owner, before paying the final estimate, may require the Contractor to furnish releases or receipts from all subcontractors having performed any work and all persons having supplied materials, equipment (installed on the Project) and services to the Contractor, if the Owner deems the same necessary in order to protect the Owner's interests. The Owner, however, may if it deems such action advisable make payment in part or in full to such Contractor without requiring the furnishing of such releases or receipts and any payments so made shall in no way impart the obligations of any surety or sureties furnished under this Contract.

Withholding of any amount due the Owner, under general and/or special conditions regarding "Liquidated Damages," shall be deducted from the final payment due the Contractor.

All sentences of Article 5.07 of the General Conditions shall remain and govern the contract as stipulated.

#### SC.32 WAGE RATES

All employees of the Contractor on the work to be performed under this contract shall be paid the prevailing wage scale in this locality for work of similar character, and in no event less than the rates shown in the schedule of minimum wage rates furnished in these Special Conditions.

#### SC.33 EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this contract, the Contractor agrees as follows:

- (a) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, age or national origin. The Contractor shall take affirmative action to insure that applicants are employed, that employees are treated during employment without regard to their race, color, sex, religion, age or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination, rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees or applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (b) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants shall receive consideration for employment without regard to race, color, religion, sex, national origin or age.
- (c) The Contractor shall send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided, advising the said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (d) The Contractor shall include the provisions of this section in all subcontracts pertaining to the work.

SC.34 SUPERINTENDENCE BY CONTRACTOR

The Contractor shall have on the project at all times, as his agent, a competent Superintendent capable of reading and of thoroughly understanding the plans and specifications and thoroughly experienced in the type of work being performed. The Superintendent shall have full authority to execute orders or directions and to promptly supply such materials, equipment, tools, labor and incidentals as may be required. Such superintendence shall be furnished regardless of the amount of the work subcontracted.

SC.35 INSPECTION

The word "Inspection" or other forms of the word, as used in the contract documents for this project shall be understood as meaning the Engineer will observe and check the construction in sufficient detail to satisfy himself that the work is proceeding in general accordance with the contract documents, but he will not be a guarantor of the Contractor's performance.

SC.36 SHOP DRAWINGS

Contractor shall submit shop drawings in accordance with the following:

All shop drawings submitted by subcontractors for review by the Owner shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

The Contractor shall review all subcontractor's shop drawings regarding measurements, size of members, materials, and details to satisfy himself that they conform to the intent of the Drawings and Specifications. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission thereof.

All details on shop drawings submitted for review shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted for review.

The review of shop drawings, samples or product data by the Engineer shall not relieve the Contractor from his/her responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Engineer will have no responsibility therefor.

No portion of the work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the review of such item. Fabrication performed, materials purchased or on-site construction accomplished which does not conform to reviewed shop drawings and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections, of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.

Shop Drawings may be submitted to the Project Engineer in digital format. Each shop drawing shall be legible and submitted in a format no larger than 11" x 17". The submission is also applicable to the Trench Safety Plan, the Traffic Control Plan and the Storm Water Pollution Prevention Plan as well.

SC.37

#### TRADE NAMES AND MATERIALS

Where materials or equipment are specified by a trade or brand name, it is not the intention of the Owner to discriminate against any equal product of another manufacturer, but rather to set a definite standard of quality or performance, and to establish an equal basis for the evaluation of bids. Where the words "equivalent," "proper," or "equal to" are used, they shall be understood to mean that the thing referred to shall be proper, the equivalent of, or equal to some other thing. Unless otherwise specified all materials shall be of the best of their respective kinds, shall be in all cases fully equal to approved samples and shall never have been used for any temporary purpose whatsoever. Notwithstanding that the words "or equal to" or other such expressions may be used in the specifications in connection

with a material, manufactured article or process specifically designated shall be used, unless a substitute shall be approved in writing before installation.

SC.38 TESTING OF MATERIALS

Testing and control of construction materials and methods used in the work shall be done by an approved local commercial laboratory employed and paid directly by the Owner, or other approved personnel employed by the Owner. Where a commercial laboratory is used, all representative testing caused by test failure will be accomplished at the Contractor's expense plus 10%.

SC.39 COORDINATION WITH OTHERS

In the event other contractors are doing work in the same area simultaneously with this project, the Contractor shall coordinate his proposed construction with that of other contractors.

SC.40 EXISTING UTILITIES AND SERVICE LINES

The Contractor shall be responsible for the protection of all existing utilities or service lines crossed or exposed by his construction operations. Where existing utilities or service lines are cut, broken, or damaged, the Contractor shall replace or pay for replacement of the utilities or service lines with the same type of original construction, or better, at his own cost and expense.

SC.41 EXISTING STRUCTURES

The plans show the location of all known surface and subsurface structures. However, the Owner assumes no responsibility for failure to show any or all of these structures on the plans, or to show them in their exact locations. It is mutually agreed that such failure shall not be considered sufficient basis for claims for additional compensation for extra work or for increasing the pay quantities in any manner whatsoever, unless the obstruction encountered is such as to necessitate changes in the lines or grades, or require the building of special work, provisions for which are not made in these plans and proposal, in which case the provisions in these specifications for extra work shall apply.

SC.42 CONNECTIONS TO EXISTING FACILITIES

Connections to existing facilities which are in service shall be thoroughly planned in advance, and all required equipment, materials and labor shall be on hand at the time of undertaking the connections. Work shall proceed continuously (around the clock if necessary) to complete connections in the minimum time. Operations of valves or other appurtenances on existing utilities, when required, shall be by or under direct supervision of the Owner.

The Contractor should anticipate that the length of time for various connections, disconnections and modifications will be minimal. Also, the time of day when connections and disconnections may be accomplished will generally be during periods of low flow. The Contractor should plan his construction sequence and schedule accordingly.

SC.43 PROPERTY LINES AND MONUMENTS

The Contractor shall protect all property corner markers, and when any such markers or monuments are in danger of being disturbed they shall be properly referenced and if disturbed shall be reset at the expense of the Contractor.

SC.44 USE OF EXPLOSIVES

Use of explosives will not be allowed.

SC.45 LINES AND GRADES

All work under this Contract shall be constructed with the lines and grades shown on the Plans or as given by the Engineer. The full responsibility for holding to alignment and grade shall rest upon the Contractor.

The Engineer will provide offset construction staking once for the project.

The Contractor shall stockpile excavation and other materials as to cause no inconvenience in the use of the lines and grades given. The Contractor shall remove any obstruction created by him contrary to this provision.

The Contractor shall safeguard all control points and bench marks established on the site by the Engineer, shall bear the cost of re-establishing same, if disturbed, and shall assume the entire expense of rectifying work improperly constructed due to failure to maintain and protect such established control points and bench marks.

SC.46 ACCESS TO PROJECT SITE AND RIGHT-OF-WAY

The Contractor shall provide at its expense all improvements and make suitable provisions for ingress and egress. The Contractor also shall provide at its expense necessary all weather access roads to the project location as required for transporting equipment and materials.

If additional area is needed by the Contractor, it shall be the responsibility of the Contractor to make all necessary arrangements and pay all costs associated with the acquisition and utilization of such area.

Specific right-of-way easement arrangements between the Owner and property owners include restrictions that may affect the Contractor's construction operations. These restrictions are summarized on a sheet included in the plans.

SC.47 BARRICADES, LIGHTS AND WATCHMEN

The Contractor shall, at his own cost and expense, furnish and erect such barricades, fences, lights and danger signals, shall provide such watchmen, and shall provide such other precautionary measures for the protection of persons or property and of work as are necessary. There shall be no open trenches not properly barricaded at the end of each workday. Barricades shall be painted in a color that will be visible at night. From sunset to sunrise, the Contractor shall furnish and maintain sufficient lights at each barricade and

sufficient numbers of barricades shall be erected to keep vehicles from being driven on or into any work under construction. The Contractor shall furnish watchmen in sufficient numbers to protect the work.

The Contractor will be held responsible for all damage due to failure of barricades, signs, lights and watchmen. The Contractor's responsibility for the maintenance of barricades, signs and lights, and for providing watchmen shall not cease until the project has been accepted by the Owner.

SC.48 PROTECTION OF TREES AND LANDSCAPING

No trees or landscaping shall be removed or cut without the Owner's approval except those that provide direct interference with the installation of the utility line within the permanent and temporary easements. The Contractor shall use proper caution to minimize removal of trees within the temporary easement. Trees adjacent to the permanent and temporary easements, but not interfering with the work, shall be protected from damage by the construction operations.

SC.49 LIGHTS AND POWER

The Contractor shall provide, at his own expense, temporary lighting and power facilities required for the proper prosecution of the work.

SC.50 WATER FOR CONSTRUCTION AND TESTING

The Contractor shall make the necessary arrangements for securing and transporting all water required in the construction.

SC.51 TRENCH SAFETY SYSTEM

Contractor shall provide a trench safety system which conforms to OSHA Standards. The trench safety system shall meet all the requirements of Trench Safety Requirements Section of the Technical Specifications.

SC.52 TOOLS AND ACCESSORIES

The Contractor shall, unless otherwise stated in the specifications, furnish with each type, kind or size of equipment, one (1) complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment. Ordinary mechanic's tools are not considered special tools. Such special tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

Each piece of equipment shall be provided with a substantial name plate, securely fastened in place and clearly inscribed with the manufacturer's name, year or manufacture, and principal rating data.

SC.53 PROJECT MAINTENANCE

The Contractor shall maintain, and keep in good repair, the improvements covered by these plans and specifications during life of this contract.

SC.54 FENCES, IMPROVEMENTS AND DRAINAGE CHANNELS

Fencing and gates removed to permit construction shall be replaced in the same location and left in a condition as good as, or better, than that in which they were found. Fences to be removed and not replaced are noted on the plans.

Where surface drainage channels, storm sewers, or drainage structures are disturbed or altered during construction, they shall be restored to their original condition as soon as possible.

SC.55 DISPOSAL OF WASTE AND SURPLUS EXCAVATION

All trees, stumps, slashings, brush or other debris removed from the site as a preliminary to the construction shall be chipped or removed from the property. No burning will be allowed. No trash, debris or refuse from construction shall exist on the ground.

All excavated earth in excess of that required for backfilling shall be disposed of in a satisfactory manner in locations approved by the Owner.

SC.56 CLEANUP

The Contractor shall at all times keep the job site as free from all material, debris and rubbish as is practical and shall remove same from any portion of the job site as construction of that portion is completed.

Upon completion of the work, the Contractor shall remove from the site all plant, materials, tools and equipment belonging to him and leave the site with an acceptable appearance. The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver over such materials and equipment in a bright, clean, polished and new-appearing condition.

SC.57 ARCHEOLOGICAL DISCOVERIES

No activity which may affect a State Archeological Landmark is authorized until the Owner has complied with the provisions of the Antiquities Code of Texas. The Owner has previously coordinated with the appropriate agencies and impacts to known cultural or archeological deposits have been avoided or mitigated. However, the Contractor may encounter unanticipated cultural or archeological deposits during construction.

If archeological sites or historic structures are discovered after construction operations are begun, the Contractor shall immediately cease operations in that particular area and notify the Owner, and the Texas Historical Commission, (512-463-6096). The Contractor shall take reasonable steps to protect and preserve the discoveries until they have been inspected by the Owner. The Owner will promptly coordinate with the Texas Historical Commission and any other appropriate agencies to obtain any necessary approvals or permits to enable the work to continue. The Contractor shall not resume work in the area of the discovery until authorized to do so by the Owner.

Compensation to the Contractor, if any, for lost time or changes in construction resulting from the find, shall be determined in accordance with changed or extra work provisions of the Contract Documents.

SC.58 SERVICE OF MANUFACTURER'S REPRESENTATIVE

The contract price for the project shall include the cost of furnishing competent and experienced representatives from the manufacturers involved. Such representatives shall assist the Contractor, when required, to install, adjust, and test the equipment in conformity with the contract documents. After the equipment is placed in permanent operation by the City of Bellmead, such representatives shall make all adjustments and tests as specified or required to comply with the contract documents, and shall instruct the Owner in the operation and maintenance of the equipment.

SC.59 FINAL FIELD TESTS

Upon completion of the work and prior to final payment, all items installed under this contract shall be subject to acceptance tests as specified or required to provide compliance with the contract documents.

SC.60 AS-BUILT (RECORD DRAWINGS) DIMENSIONS AND DRAWINGS

Contractor shall make appropriate daily measurements of work constructed and keep accurate records of location (horizontal and vertical) of all constructed work.

Upon completion of the project, the Contractor shall furnish the Owner with one set of direct prints, marked with red pencil, to show as-built dimensions and locations of all work constructed. As a minimum, the final drawings shall include the following:

- (1) Horizontal and vertical locations of work.
- (2) Changes in material and dimensions due to substitutions.
- (3) Deletions, additions, and changes to scope of work.
- (4) Any other changes made.

This set of marked up prints shall be incorporated into record drawings prepared by the Engineer.

Final payment will not be made until such drawings are provided to the Engineer.

Payment for the preparation of record drawings will be made to the Contractor as shown in the Bid Schedule.

# WAGE DECISION

01/05/2024 TX20240023

"General Decision Number: TX20240023 01/05/2024

Superseded General Decision Number: TX20230023

State: Texas

Construction Types: Heavy (Sewer/Water Treating Plant and Sewer/Incid. to Hwy.)

Counties: Bell, Bosque, Coryell, Falls, Freestone, Hamilton, Hill, Lampasas, Leon, Limestone, McLennan, Milam, Mills, Navarro, Robertson and Williamson Counties in Texas.

WATER & SEWAGE TREATMENT PLANTS AND LIFT PUMP STATIONS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number      Publication Date  
0                              01/05/2024

SUTX1990-003 02/09/1990

	Rates	Fringes
CARPENTER.....	\$ 9.00 **	
CEMENT MASON/CONCRETE FINISHER...	\$ 8.00 **	
ELECTRICIAN.....	\$ 13.45 **	.80+8 1/2%
Form Builder.....	\$ 7.25 **	
Form Setter.....	\$ 7.25 **	
LABORER.....	\$ 7.25 **	
Pipelayer.....	\$ 7.50 **	
Power equipment operators:		
Bulldozers.....	\$ 7.25 **	
Cranes, Clamshells, Backhoes, Derricks, Dragline, Shovels.....	\$ 7.25 **	
Front End Loaders.....	\$ 10.00 **	
Scrapers.....	\$ 7.25 **	
Steel Setter.....	\$ 9.50 **	
Steel Worker.....	\$ 7.25 **	
Truck drivers:		
Tandem Axles.....	\$ 7.25 **	
Transit Mix.....	\$ 7.25 **	
Utility Laborer.....	\$ 7.25 **	

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.20) or 13658 (\$12.90). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours

they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the

wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

# TECHNICAL SPECIFICATIONS

## TECHNICAL SPECIFICATIONS

Section G01 - Pipe Excavation, Trenching, Embedment, Encasement and Backfilling

Section G02 - Trench Safety Systems

Section G03 - Construction within Right-Of-Way Of Highways, County Roadways, City Streets And Railroads

Section G04 - Preparing Right-Of-Way

Section G05 - Concrete

Section G06 - Removing and Replacing Existing Pavement, Driveways, Sidewalks and Paved Waterways

Section G07 - Sedimentation and Erosion Control

Section G08 - Finish Grading and Grass Planting

Section G09 - Site Conditions

### Division 26 – Electrical

26 00 05 Summary of Work

26 00 10 Electrical General Provisions

26 01 10 Raceways

26 01 20 Wire and Cable

26 01 91 Dry Type Transformers

26 01 95 Lighting Panelboards

26 01 96 Distribution Panelboards

26 01 98 Enclosed Motor Starters

26 01 99 Miscellaneous

26 04 10 Underground Electrical

26 04 50 Grounding

26 09 10 Instrumentation

26 09 20 Radios

26 09 30 SCADA

26 09 40 Computers and HMI

## TECHNICAL SPECIFICATIONS

### SECTION G01 - PIPE EXCAVATION, TRENCHING, EMBEDMENT, ENCASEMENT AND BACKFILLING

#### G01.01 DESCRIPTION OF WORK

- A. This specification covers the requirements for furnishing all labor, equipment and material and performing all work necessary, in connection with excavation, trenching, embedment, encasement, and backfilling, for the installation of water lines in this project.

#### G01.02 EXCAVATION

A. General

1. Excavation shall include the removal of any trees, stumps, brush, debris, or other obstacles that may obstruct the line of work, and the excavation and removal of all earth, rock or other materials to the extent necessary to install the pipe and appurtenances in conformance with the line and grades shown in the plans, or as specified.

B. Topsoil

1. Topsoil and grass shall be stripped a minimum of twelve inches over the trench excavation site and stockpiled separately prior to start of excavation.
2. After the trench has been backfilled, topsoil shall be replaced to the extent that rock, excavated from the trench, shall be completely covered and the area returned to its original condition.

C. Maximum and Minimum Width of Trenches

1. The sides of all trenches shall be cut as nearly vertical as possible. Unless otherwise specified on the plans, the minimum width of trench in which the pipe may be installed shall not be less than eighteen (18) inches plus the outside diameter of the pipe, and the maximum width shall not be more than twenty-four (24) inches plus the outside diameter of the pipe, measured at an elevation in the trench which is twelve (12) inches above the top of the pipe when it is laid to grade.
2. Wherever the prescribed maximum trench width is exceeded, the Contractor shall use the class embedment or encasement required by the Engineer to provide the load carrying capacity for the trench width as actually cut, and the additional cost incurred will be borne by the Contractor.

D. Sheeting and Shoring

1. Sheeting and/or shoring shall be provided in accordance with the Contractor's Trench Safety Plan, or where required for other reasons in caving ground, or in wet, saturated or flowing materials, the sides of all trenches and excavations shall be adequately sheeted and braced so as to maintain the excavation free from slides or cave-ins.

E. Dewatering Excavations

1. There shall be sufficient pumping equipment, in good working order, available at all times to remove any water that accumulates in excavations. Where the pipeline crosses natural drainage channels, the work shall be conducted in such a manner that unnecessary damage or delays in the prosecution of the work will be prevented. Provisions shall be made for the satisfactory disposal of surface water pumped so as to prevent damage to public or private property. The Contractor shall be responsible for maintaining safe working conditions and suitable construction techniques.

F. Disposal of Excavated Materials

1. Suitable excavated materials may be piled adjacent to the work to be used for backfilling. Excavated materials unsuitable for backfilling, or in excess of that required for backfilling, shall be disposed of by the Contractor. Desirable topsoil, sod, etc., shall be carefully removed and piled separately adjacent to the work when required. Excavated materials shall be handled at all times in such a manner as to cause a minimum of inconvenience to public travel. Suitable selected bedding or backfill material shall be provided at no additional cost to the Owner. The Contractor shall indemnify and hold harmless the Owner and all of his officers, agents and employees from all suits, actions, or claims of any character resulting from his arrangements for and disposal of excavated materials.

G. Trench Depth

1. Subgrade in Earth

- a. Where a firm and stable foundation for the pipe can be obtained in the natural soil and where special embedment or encasement is not shown on the plans or specified herein, the bottom of the trench shall be excavated to a depth of not less than three (3) inches below the bottom of the pipe, one (1) inch below bell, and brought to true subgrade elevation with the embedment or encasement shown in the plans. Bell holes shall be accurately located and shall be of sufficient depth to allow ample room for making the joint and to relieve the pipe bell of all load.
- b. Where special embedment or encasement is shown on the plans, the subgrade shall be excavated to the section shown prior to placing the embedment or encasement.

2. Subgrade in Rock

- a. If the bottom of the excavation for the pipeline is found to be in rock or other hard material that cannot be excavated to a true subgrade and shaped to provide uniform bearing for the pipe barrel, the rock or other material shall be removed to a depth not less than three (3) inches below subgrade and the bottom of the trench brought to true subgrade elevation with the embedment or encasement shown in the plans. When constructing in expansive rock formations, the ditch shall be allowed to remain open for at least 24 hours to allow rock expansion prior to the placement of the pipe.

H. Soft Subgrade

1. Where soft or spongy material is encountered in the excavation at subgrade level, it shall be removed to such a depth that by replacing the unsuitable material with tamped gravel, a firm and stable foundation can be secured.
2. Gravel used shall be washed gravel or crushed stone and may fit any gradation of size up to three (3) inches. The particular gradation shall take into consideration the actual field conditions. Gravel with sharp edges will not be allowed.

I. Excavated Materials

1. Excavated materials shall be piled adjacent to the work to be used for backfilling as required. After the trench has been refilled, topsoil shall be replaced to the extent that rock excavated from the trench will be completely covered and the area is returned to its original condition.
2. Where required on the plans or when otherwise specified, desirable topsoil shall be piled separately in a careful manner and replaced in its original position.

J. Damage to Existing Utilities

1. Where existing utilities are damaged, they shall be replaced immediately with material equal to or better than the existing material. Such work shall be at the entire expense of the Contractor.

G01.03 EMBEDMENT AND ENCASEMENT

A. General

1. Embedment shall be as required in the plans. All embedment materials shall be free of grass, roots, vegetation, and other deleterious materials. Embedment details are shown on the Plans.
2. When the pipe has been checked for line and grade, the trench shall be backfilled with enough granular material or concrete on both sides to hold the pipe firmly in position. When placing granular material or concrete around the pipe, care shall be taken to fill all voids around the pipe. The pipe shall not be floated. The embedment or encasement material shall be carefully tamped to assure uniform pipe support and density.

B. Sand Embedment

Refer to City of Belton Standard Details.

C. Crushed Stone for Embedment

Refer to City of Belton Standard Details.

Pipe shall be bedded in accordance with the standard details shown in the plans and with the class of embedment specified on the plan-profile sheets. Crushed stone embedment shall be evenly spread to grade. Bell holes shall be dug to allow placement of the joint wrapper. After the pipe has been laid, embedment material shall be placed adjacent to the haunches of the pipe as shown in the Detail Sheet. Whenever the prescribed maximum trench width is exceeded, the Contractor shall utilize at his own expense the class of embedment or encasement required to provide the load-carrying capacity for the trench width as actually cut, as approved by the Engineer.

D. Embedment

NOT USED

E. Concrete Embedment and Encasement

1. Concrete embedment and encasement and cap shall have a minimum compressive strength of 2,000 pounds per square inch at 28 days.
2. Concrete shall be mixed to obtain a slump of not less than one (1) inch or more than four (4) inches.
3. After pipe joints are completed, the voids at the joints in the embedment section shall be filled with concrete, and the embedment shall be brought up to proper grade. Where concrete is placed over or along the pipe, it shall be placed in such manner as not to damage or injure the joints or displace the pipe. Care shall be taken in the placement of concrete to assure that a uniform pad, free of voids and of specified thickness, is constructed under the entire pipe section.
4. A cleavage line between the base concrete and the side embedment concrete will not be allowed. Backfilling shall be done in a careful manner and at such time, after concrete embedment of encasement has been placed, as not to damage the concrete in any way.
5. 2,000 psi Concrete shall be used and shall be paid for at the unit contract price per cubic yard for 2,000 psi Concrete actually placed and approved by the Engineer.

G01.04 BACKFILLING

A. General

1. Backfilling shall include the refilling and consolidating of the fill in trenches and excavations up to the surrounding ground surface or road grade at crossings. No backfill shall be placed until the Owner or Owner's Representative has observed the trench and pipe in place and has authorized the placing of backfill.
2. Backfilling shall be done with select material or concrete backfill as described hereafter and shown on the plans. No material of a perishable, spongy or otherwise unsuitable nature shall be used in backfilling.

B. Select Backfill Material

1. Unless otherwise shown on the plans, or approved by the Engineer, select material shall be used for backfill. Select materials shall be placed over the top of the embedment/encasement material, where designated on the plans and as shown in embedment details. Select material shall consist of a free-flowing material like sand or mixed sand and gravel, free from lumps, large stones, clay, debris, and organic materials. Select material may also include rock cuttings from a ditching machine (preferably wheel-type), provided that the largest chips shall have an average dimension in one place less than one (1) inch, and no dimension greater than two (2) inches.
2. If approved by the Engineer, good, sound excavated materials may be used as select material for backfill over the pipe. Good, sound excavated materials are defined as gravel, sandy loam or loam, free from excessive clay and having a Plasticity Index less than 22. Select material shall not have rocks with an average dimension larger than two (2) inches.
3. It shall be the full responsibility of the Contractor to explore the project and subsurface materials to determine if the trench excavation will be suitable for use as select materials and to follow as closely as possible this specification to insure a good, sound pipeline when completed.

C. Concrete Backfill

1. Where shown on the plans, concrete backfill shall consist of selected rock material or granular sand material mixed with a minimum of three sacks of cement per cubic yard. All material shall be mixed in a concrete mixer or transit mixed unless approved otherwise by the Owner.

D. Backfilling Operation

1. After the pipe and embedment have been placed to twelve (12) inches above the top of the pipe, the method of backfilling pipe trenches shall be as follows: Select material shall be carefully placed in layers of not more than six (6) inches in loose thickness. Select material shall consist of a free-flowing material like sand, free from lumps, large stones, clay, debris, and organic materials or excavated material from the trench which has a maximum dimension of two (2) inches, processed excavated material from the trench which has a maximum particle dimension of two (2) inches. Rock cuttings from a wheel-type ditching machine having an average dimension in one place of less than one (1) inch and no dimension greater than three (3) inches and shall be free from lumps, large stone and organic materials. The select material shall then be compacted with mechanical compactors. Select backfill material shall be compacted to 95% density ASTM D698 unless otherwise specified.

2. All trenches under proposed or existing roadways, driveways and sidewalks, paved waterways with concrete base, gravel roadways, and roadways with gravel base and asphalt surface, shall be backfilled by hand or mechanically tamping selected materials in six to eight inch layers to a minimum compaction of 95 percent ASTM D6904 at optimum moisture density.
3. After the trench has been refilled, topsoil shall be replaced to the extent that rock excavated from the trench will be completely covered or removed and the area is returned to its original condition, a minimum of 12 inches of topsoil shall be replaced.

G01.05 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this specification for excavating, trenching, embedment, and backfilling. All costs incurred shall be included in the contract price for the appropriate items in the Proposal and Bid Schedule.
- B. No separate payment will be made for sand or gravel used in embedment. All costs incurred shall be included in the contract price for the appropriate bid item.
- C. Separate payment will be made for implementation of the Trench Safety Plan at the contract unit price as provided in the Proposal and Bid Schedule.
- D. Separate payment will be made for 2,000-PSI Concrete Encasement or Backfill at the contract unit price as provided in the Proposal and Bid Schedule.

**END OF SECTION**

## TECHNICAL SPECIFICATIONS

### SECTION G02 - TRENCH SAFETY SYSTEMS

#### G02.01 DESCRIPTION OF WORK

- A. This specification covers the requirements for providing trench safety systems consisting of shoring, sheeting, trench shield, and/or laid back slopes to meet the trench safety requirements of the Occupational Safety and Health Administrations, as required for this project and specified herein.

#### G02.02 GENERAL

- A. Trench safety systems shall be provided by the Contractor as provided in Subpart P-Excavation, Trenching and Shoring, Part 10526 of the Code of Federal Regulations which describes safety and health regulation as administered by the U.S. Department of Labor Occupational Safety and Health Administration (O.S.H.A). The standard specified by the O.S.H.A. Regulation shall be the minimum allowed on this project. It shall be the responsibility of the Contractor to design and install adequate trench safety systems for all trenches excavated on this project.
- B. Before beginning construction, the Contractor shall furnish to the Owner for inclusion in the Contract Documents, a Trench Safety Plan for the entire project. The trench safety plan must be prepared and sealed by a Professional Engineer registered in the State of Texas. In addition, all trench safety systems utilized in this project must be designed by a Professional Engineer registered in the State of Texas. The Contractor shall be totally responsible for the safety of all persons involved in the construction of this project.

#### G02.03 SOIL BORINGS

- A. Any borings and soil data furnished by the Owner are for the convenience of the Contractor. The Contractor shall be responsible for any additional soil or geotechnical information required. The Contractor shall be responsible for properly designed trench safety systems to be utilized for any type or subsurface condition found on this project. The furnishing of soil information by the Owner in no way relieves the Contractor of this obligation.

G02.04 MEASUREMENT AND PAYMENT

- A. Payment for Trench Safety Systems shall be made per linear foot for pipe and per square foot for structural excavations as provided in the Proposal and Bid Schedule for Furnishing and Installing Trench Safety Systems. The payment shall be full compensation for all planning, engineering, materials, equipment, fabrications, installation, recovery and all incidental work required. All excavation and backfill in addition to that specified elsewhere in these specifications shall be considered subsidiary to this bid item.

**END OF SECTION**

## TECHNICAL SPECIFICATIONS

### SECTION G03 - CONSTRUCTION WITHIN RIGHT-OF-WAY OF HIGHWAYS, COUNTY ROADWAYS, CITY STREETS AND RAILROADS

#### G03.01 DESCRIPTION OF WORK

This section of the specifications shall govern unless otherwise specified in applicable permits, the installation of pipelines along and across the rights-of-way of highways, roadways, and city streets.

#### G03.02 CONSTRUCTION IN TEXAS DEPARTMENT OF TRANSPORTATION RIGHTS-OF-WAY

- A. Pipelines to be placed across rights-of-way of the Texas Department of Transportation (TxDOT) shall be installed as shown on the plans and as specified herein.
- B. Encasement pipe shall be installed under the highway by boring in accordance with details shown on the plans. The pipe shall be installed with even bearing throughout its length, and all voids between the earth and encasement pipe shall be filled with grout. The pipe shall be tightly jointed to prevent leakage.
- C. The Contractor shall notify TxDOT of his construction schedule not less the 5 days prior to commencing work within the right-of-way. The Contractor shall conform to the requirements of TxDOT as to details of construction methods and time of construction. All construction equipment must be kept well off the highway pavement unless otherwise approved by TxDOT.
- D. Where encasement of carrier pipe is required to be installed under highways, streets, or other facilities by jacking of boring methods, construction shall be made in a manner that will not interfere with the operation of the highway, or other facility, and will not weaken or damage any embankment or structure. During construction operations, barricades and lights to safeguard traffic and pedestrians shall be furnished and maintained, as required, until such time as the backfill has been completed and then shall be removed from the site.
- E. The Contractor shall take the proper precautions to avoid excavating earth or rock or shattering rock beyond the limits of excavation needed to install the conduit. All damages by excavating and blasting either of surface or subsurface structures, shall be repaired or replaced by the Contractor at his own cost and expense.
- F. The removal of any obstruction that may be found to conflict with the placing of this pipe will not be measured for payment or paid for as separate contract pay item. The removal of any such obstruction will be included in such contract pay items as are provided in the proposal and contract.

G03.03 CONSTRUCTION IN RIGHTS-OF-WAY OF COUNTY ROADS AND CITY STREETS

- A. Pipelines may be placed along and across county roads, city streets and private driveways by the open cut method, unless designated otherwise on the plans. However, the Contractor shall at all times, keep a sufficient width of the roadway clear of dirt and other material to allow free flow on one lane of traffic. It shall be the responsibility of the Contractor to build and maintain all weather by-passes and detours, if necessary, and to furnish all flagmen and to properly light, barricade and mark all by-passes and detours that might be required on and across the roadways involved in this project. Barricades, construction signs and warning lights shall conform to TxDOT and Public Transportation Standards of Construction.
- B. The Contractor shall make every effort to complete construction and allow immediate access to adjacent property at all driveway entrances located along the roadways or streets. Owners or tenants of improvements where access and/or entrance drives are located shall be notified at least eight (8) hours prior to the time the construction will be started at their drive-ins or entrances and informed as to the length of time driveways will be closed, which period shall not exceed six (6) hours.
- C. The Contractor shall be responsible for all road and entrance reconstruction, and repairs and maintenance of same, for a period of one year from the date of such reconstruction. In the event the repairs and maintenance are not made immediately, and it becomes necessary for the City to make such repairs, the Contractor shall reimburse the City for the cost of such repairs.
- D. Backfill in trenches within the rights-of-way of county roads and city streets shall be placed in accordance with requirements of the agency having jurisdiction of such roads or streets, and according to the various applicable sections of these specifications which govern the installation of the pipelines. Before completion of the proposed work, all roadway shoulders, slopes, ditches and berms shall be restored to their original condition.

G03.04 MEASUREMENT AND PAYMENT

No separate payment will be made for items included in this section. All related costs shall be included in the proper item of the Proposal and Bid Schedule.

END OF SECTION

## TECHNICAL SPECIFICATIONS

### SECTION G04 – PREPARING RIGHT OF WAY

#### G04.01 DESCRIPTION OF WORK

- A. The work to be performed under this section of specifications shall consist of the preparation of the right of way for construction operations by the removal and disposal of all obstructions from the right of way and from designated easements, where removal of all such obstruction is not otherwise shown on the construction drawings and specifications.
- B. Such obstructions shall be considered to include remains of houses, foundations, floor slabs, concrete, brick, lumber, plaster, septic tank drain fields, basements, abandoned utility pipes or conduits, equipment, fences, retaining walls and buildings.
- C. This item shall also include the removal of trees and shrubs and other landscape features, not designated for preservation and stumps, brush, roots, vegetation, logs, curb and gutter, driveways, paved parking areas, miscellaneous stone, sidewalks, drainage structures, manholes, inlets, abandoned railroad tracks, scrap iron and debris, whether above or below ground except live utility facilities.
- D. These obstructions do not include wells which shall not be removed unless specifically noted to be removed. Where wells are to remain in place, they shall be protected in accordance with appropriate state or county regulations.

#### G04.02 CONSTRUCTION METHODS

- A. General
  - 1. All areas, as shown on the plans, shall be cleared of all structures and obstructions as defined above. Those trees, shrubs and other landscape features specifically designated on the plans for preservation shall be carefully protected from abuse, marring, or damage during construction operations. Continual parking and/or servicing of equipment under branches of trees marked for preservation will not be permitted. When trees and shrubs are designated for preservation and require pruning, they shall be trimmed as directed by the Owner and all exposed cuts over 2 inches in diameter shall be treated with a material approved by the Owner or his representative.
  - 2. Culverts, storm sewers, manholes and inlets shall be removed in appropriate sequence for maintenance of traffic and drainage.

B. Disposal of Material

1. Unless otherwise shown on the plans, all materials and debris removed shall become the property of the Contractor, including all merchantable timber, and shall be removed from the right of way and disposed of in a manner satisfactory to the Owner.

C. Backfill

1. Holes remaining after removal of all obstructions, objectionable material, trees, stumps, etc., shall be backfilled with approved material, compacted and restored to its original contours by blading, bulldozing, or by other methods, as approved by the Owner. In areas to be immediately excavated, the backfilling of holes may not be required when approved by the Owner or his representative.
2. Before backfilling, the remaining ends of all abandoned storm sewers, culverts, sanitary sewers, conduits, and water or gas pipes over 3 inches in diameter, shall be plugged with an adequate quantity of concrete to form a tight closure or as otherwise stated.

G04.03 MEASUREMENT AND PAYMENT

- A. Preparation of right of way will be measured and paid for as provided for in the Proposal and Bid Schedule.

**END OF SECTION**

## TECHNICAL SPECIFICATIONS

### SECTION G05 - CONCRETE

#### G05.01 DESCRIPTION OF WORK

- A. This specification covers the requirements for the manufacture, transporting, placing, jointing, finishing and curing of concrete of the structures included in the plans and specified herein.

#### G05.02 GENERAL

A. Submittals

The Contractor shall submit the following for review by the Owner:

1. Concrete mix designs prepared by a testing laboratory acceptable to the Owner.
2. Joint filler technical data.
3. Curing materials technical data.
4. Layout of construction joints locations prior to the submittal of steel reinforcement shop drawings.
5. Sieve analysis of aggregates.
6. Los Angeles Machine test results.
7. Elastomeric waterproof coating technical data.

B. Standards

The following standard specifications are a part of these specifications:

- |           |   |
|-----------|---|
| ACI 301,  | Specifications for Structural Concrete for Buildings. |
| ACI 347,  | Recommended Practice for Concrete Formwork.           |
| ACI 318,  | Building Code Requirements for Reinforced Concrete.   |
| ACI 305R, | Hot Weather Concreting.                               |
| ACI 306R, | Cold Weather Concreting.                              |
| ACI 308,  | Standard Practice for Curing Concrete.                |
| ACI 309,  | Standard Practice for Consolidation of Concrete.      |

ACI 304, Guide for Measuring, Mixing, Transporting and Placing Concrete.

ACI 304.2R, Placing Concrete by Pumping Methods.

ACI 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.

G05.03 MATERIALS AND PRODUCTS

A. Portland Cement

ASTM C 150, Type I cement shall be used. Portland cement used shall be made by a well-known manufacturer and produced by not more than one plant.

B. Water

Mixing water shall be potable, unless approved by Owner.

C. Fine Aggregate

1. Fine aggregate shall conform to ASTM C 33 and shall consist of natural sand or a mixture of natural sand and not more than fifty percent (50%) of stone screenings.
2. Stone screenings shall consist of clean, hard, durable un-coated fragments resulting from the crushing of stone.
3. Fine aggregates shall be free of any materials that are deleteriously reactive with the alkalis in the cement.

D. Coarse Aggregate

1. Coarse aggregate shall conform to ASTM C 33 Size No. 467, No. 57 or No. 67 for all concrete in direct contact with sewage or sewage effluent. Size No. 7 may be used in other concrete.
2. Coarse aggregates shall be free of any materials that are deleteriously reactive with the alkalis in the cement.
3. Coarse aggregates shall have a percent of wear of not more than forty-five (45) as determined in accordance with ASTM C 131, Resistance to Abrasion of Small Size Coarse Aggregate by use of the Los Angeles Machine.

4. Nominal maximum size of coarse aggregate shall not be larger than one-fifth of the narrowest dimension between sides of the forms, one-third of the depth of slabs, or three-fourths of the minimum clear spacing between reinforcing bars.
5. Where lightweight structural concrete is indicated on the drawings, coarse aggregate shall conform to ASTM C 330.

E. Admixtures

1. Only admixtures produced by established reputable manufacturers and used in compliance with the manufacturer's printed instructions may be used.
2. Only admixtures which have been incorporated and tested in the accepted mixes shall be used unless otherwise authorized in writing by the Owner.
3. Concrete admixtures shall conform to the following specifications:
4. Air Entraining Admixtures - ASTM C 260.
5. Specifications for Chemical Admixtures for Concrete - ASTM C 494.
6. Use of calcium chloride is not permitted.

F. Curing Materials

1. Water shall meet requirements for concrete mixing water and shall not stain or leave unsightly residue.
2. Liquid curing materials shall conform to specifications for Liquid Membrane-Forming Compounds for Curing Concrete - ASTM 309.
3. Sheet materials shall conform to specifications for Sheet Materials for Curing Concrete - ASTM C 101.

G. Non-Shrink Grout

Non-shrink grout shall contain no iron filings and shall be Embeco Non-Shrink Mortar, Halco Non-Shrink Grout, or an approved equal.

G05.04

STORAGE AND HANDLING OF MATERIALS

- A. Sacked cement shall be stored in a suitable ventilated, weathertight building which will protect the cement from dampness and placed in such a manner that will permit easy access for proper inspection and identification of each shipment. Store cement clear from floor or ground to prevent absorption of moisture.

- B. Suitable means shall be taken during handling and storage of aggregates to insure that intrusion of foreign materials and segregation of the coarse and fine aggregates does not occur and the grading is not affected. Store on wooden platforms, metal sheets or similar material; if stored on the ground, the sites of stockpiles shall be grubbed, cleaned of all vegetation and leveled off, the bottom six (6) inch layer of aggregate shall not be disturbed and shall not be used in the work.
- C. At the time of use, aggregates shall be free from frozen or foreign material, such as grass, wood, sticks, burlap, paper or dirt which may have become mixed with the aggregate in stockpiles or in handling.
- D. Where coarse aggregates are delivered to the job in two (2) or more sizes or types, each size or type shall be kept separate and not mixed prior to matching.

G05.05 PROPORTIONING AND DESIGN OF MIXES

- A. It shall be the responsibility of the Contractor to design the proportions of the concrete mixes within the limits indicated in Table "A" to produce concrete of the consistency and workability required, and to conform to the strength requirements specified.
- B. Concrete proportions shall be established on the basis of previous field experience or laboratory trial mixtures as specified in ACI 301, Chapter 3.

TABLE "A"

Class Concrete	"Minimum or Required 28-Day Compressive Strength, PSI (See Quality Control)	Minimum Factor, Sacks Cement (94-lbs) per C.Y. Concrete	Maximum Water per 94 lbs. Cement, Gallons*	Maximum Water per 94 lbs. Cement, Gallons**	Maximum Size of Aggregate	Slump Range In.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
"A"	4,000	6.00	5.2	N/A	1½"	4"-6"
"B"	3,000	5.00	7.0	7.5	1½"	4"-6"
"C"	2,000	4.50	6.5	8.0	3"	2"-6"

\* With air-entraining agent added.  
 \*\* Without air-entraining agent added.

- C. Class "A" concrete, as indicated in Table "A" shall be used for all reinforced concrete work included in this contract except as otherwise indicated on the Plans or as hereinafter provided.

- D. The maximum quantity of water per 94 pounds of cement as specified shall include the free water in the aggregates, not including moisture absorbed by the aggregates.
- E. In proportioning the mix and establishing the permissible slump, the Contractor shall make allowances for the water reducing potential of the admixtures, if used in the concrete, and to the use of high frequency mechanical vibration for compacting the concrete.
- F. Mix designs shall be proportioned to result in concrete slump at the point of placement as specified in Table "A".
- G. Contractor shall use an independent testing facility acceptable to the Owner for preparing and reporting proposed mix designs.
- H. Written reports of proposed concrete mixes shall be submitted to the Owner at least 15 days prior to the start of work. The Contractor shall not begin concrete production until mixes have been reviewed by the Owner. Review of the mix design does not relieve the Contractor of the responsibility for meeting all requirements specified herein.
- I. Adjustments to concrete mix designs may be requested by the Contractor when characteristics of materials, job conditions, weather, test results or other circumstances warrant; at no additional cost to and when acceptable to the Owner. Laboratory test data for revised mix designs and strength results shall be submitted to and accepted by the Owner before using the revised mixes.

G05.06 FORMING OF CONCRETE

A. General

1. Design and construction of all form work is the responsibility of the Contractor.
2. For all surfaces which are exposed in the finished work, forms shall be of steel, metal surfaces on wood, plywood, pressed boards, or well-seasoned boards, dressed all over and smooth. They shall be so built that when removed, the concrete will be left free from offsets, fins, ridges, or other unsightly defects.
3. Formwork shall be constructed so as to ensure that the concrete surfaces will conform to the tolerances of Section 3.3.1, "Recommended Practice for Concrete Formwork" (ACI 347). Forms shall be sufficiently tight to prevent leakage of mortar. The size and spacing of studs and wales shall be determined by the nature of the work and the height to which concrete is placed. Joints shall be snug, and shall occur at the designated locations only.
4. All forms shall be cleaned and inspected immediately prior to placing concrete. Deformed, broken, or defective forms shall be removed from the

work. Temporary openings shall be provided where necessary to facilitate cleaning and inspection just prior to placing concrete.

5. Should the forms show any sign of yielding, spreading or otherwise becoming displaced from correct alignment of position during or after the placing of concrete, they shall be corrected immediately by adjustment or bracing to the extent necessary, or, if required, shall be removed in part or in their entirety and rebuilt or reset.
6. The entire inside surfaces of forms shall be oiled with an approved, non-toxic form oil, or shall be thoroughly wetted just prior to placing concrete.
7. All exposed corners and edges shall have a formed  $\frac{3}{4}$ -inch chamfer unless otherwise indicated on the Plans.
8. The Contractor shall provide openings in formwork to accommodate the work under this and other sections and build into the formwork all items such as sleeves, anchor bolts, inserts and all other items to be embedded in concrete for which placement is not specifically provided under other Sections.

B. Plain Sheathing Forms

1. Wooden forms for surfaces not exposed to view may be built of sound No. 1 yellow pine, Douglas fir, or equivalent acceptable lumber, dressed on all sides and neatly fitted. Matched lumber, shiplap, or other satisfactory joint lumber shall be used throughout, and tongue and grooved material shall be used where required.
2. The sheathing shall be erected in level random courses. All vertical joints shall be squared, and all horizontal joints shall be level and matched throughout the entire job. Except for panel forms, vertical joints shall not exceed the width of one board and shall be staggered at least thirty-two inches (32") and made on the center of a stud. Inside forms shall not be placed until exterior forms have been checked, or vice versa.
3. Forms for beam and girder soffits shall be constructed with nominal 2-inch lumber, and all joints shall be tight and even. Beam and girder soffits shall be sufficiently braced, shored, and wedged to prevent deflection.

C. Plywood Forms

Forms for all interior exposed concrete surfaces and designated areas of exterior exposed concrete surfaces shall be constructed with minimum thickness  $\frac{3}{4}$ -inch plywood for straight sections and  $\frac{1}{2}$ -inch plywood for curved sections. Plywood shall be made with a waterproof glue and manufactured especially for concrete form work. Edges shall be square in both directions and adjoining panels shall match in thickness, width, and length. Full size sheets of plywood shall be used, except where otherwise required or where smaller pieces will cover an entire area. Forms shall be placed so that markings will be symmetrical. Plywood shall be thoroughly oiled on contact faces and edges with raw linseed oil or other approved

form lacquer. Surplus oil shall be wiped off forms before reinforcing steel is placed and while the surfaces are accessible.

D. Steel Forms

If steel forms are proposed, they shall be approved prior to use. The forms shall be accurately constructed in a standard size and in such minor multiple widths and lengths as required. Steel forms shall be coated before each use, with a light, clear, paraffin-base oil, or other acceptable commercial preparation which will not discolor the concrete. Plates shall be wire brushed after each use.

E. Carton Forms

1. Where indicated on the Plans, a structural void at least 6 inches deep shall be provided between the earth and concrete through the use of carton forms which will remain in place and retain their strength until after the concrete has cured. Forms shall be corrugated fiberboard carton forms as manufactured by the Container Corporation of America and fabricated by Savway Concrete Forms, Inc., Dallas, Texas or approved equal.
2. The cover, ribs, and caps of forms shall be constructed of durable-wall corrugated fiberboard, laminated with waterproof adhesive. Covers and end caps shall be coated on the outside with paraffin containing polyethylene. All fabricated forms shall be capable of supporting a minimum load of 150 pounds per square foot.
3. Forms shall be securely held in position and protected from excessive moisture or other damage prior to and during the concreting operation. Free falls of wet concrete in excess of 2 feet, 6 inches will not be permitted on carton forms.
4. Voids below grade beams, walls, and slabs shall be closed by a monolithic extension of the concrete member at its edges, or by precast concrete blocks which extend at least 6 inches into the subgrade to retain the adjacent soil.

F. Form Ties

Only form ties, hangers, and clamps indicated on the forming plans shall be used, and they shall be of such type that no metal will be closer than 1½ inches from the surface. Wire ties will not be permitted. The assembly should provide cone-shaped depressions at the forms at the surface at least one (1) inch in diameter and 1½ inches deep to allow filling and patching. The spacing of form ties, hangers, and clamps shall be strictly in accordance with manufacturer's directions.

G. Removal of Forms

In general, forms shall not be removed until the concrete has hardened sufficiently to support its own load safely plus any superimposed loads that might be placed

thereon. In any event, forms shall be left in place at least the minimum required length of time specified below, after the placing of concrete in them:

Columns .....	48 hours
Side forms for girders and beams .....	48 hours
Bottom forms of slabs .....	7 days
Bottom forms of beams and girders.....	7 days
Walls.....	48 hours

G05.07 MIXING AND PRODUCTION OF CONCRETE

A. General

1. All concrete not placed in the work within forty-five (45) minutes after addition of water to batch shall be rejected and disposed of by the Contractor at his own cost and expense.
2. The Contractor shall provide access to the mixing plant for inspection by the Owner.

B. Ready Mix Concrete

1. All ready mix concrete shall be batched, mixed and transported in accordance with ASTM C 94.
2. Plant equipment and facilities shall conform to National Ready-Mix Concrete Association "Plan and Delivery Equipment Specification."
3. The production and delivery of ready-mixed concrete shall be such that will provide a continuous finishing operation and in no case more than twenty (20) minutes shall elapse between the depositing of successive batches of concrete in any monolithic unit.

C. Job Site Mixing

Site batched and mixed concrete shall comply with the recommendations of ACI 301, Chapter 7.

D. Control of Admixtures

1. Admixtures shall be charged into the mixer as solutions and shall be measured by means of an acceptable mechanical dispensing device. The liquid shall be considered a part of the mixing water.
2. If two or more admixtures are used, they shall be added separately to avoid possible interaction.
3. Addition of retarding admixtures shall be completed within one (1) minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, which ever occurs first.

E. Cold and Hot Weather Requirements

1. The Contractor shall comply with requirements of ACI 305 "Recommended Practice for Hot Weather Concreting" during hot weather conditions and when ambient temperature is 90 degrees F or above. Concrete deposited in hot weather shall have a placing temperature (not exceeding 90 degrees F) which will not cause difficulty in loss of slump, flash set or cold joints. The ingredients shall be cooled before mixing, or well crushed ice may be substituted for all or part of the mixing water if, due to high temperatures or other climatic factors, any undesirable effects are encountered. Cement shall not be added to the mixtures of water and aggregate when the temperature of the mixture is greater than 100 degrees F.
2. The Contractor shall comply with requirements of ACI 306 during cold weather conditions. Unless the temperature is at least 40 degrees F and rising, the temperature of the concrete when placed shall be at least 55 degrees F. If water or aggregate has been heated, the water shall be combined with the aggregate in the mixer before cement is added.

G05.08 PLACING CONCRETE

A. Preparation Before Placing

1. Before placing of concrete in any portion of a structure, adequate provision shall be made for walkways from which the concrete to be placed can be worked or runways over which the concrete may be transported in buggies, when such are to be used. Buggy runways shall be clear of the reinforcements in slabs or footings. Runways or walkways used for placing or working concrete in walls shall be properly supported and adequate in width for safe use by workmen. Runways shall provide convenient access to the entire length of wall in which concrete is being placed. Hand rails shall be installed on walkways or runways in accordance with OSHA Standards.
2. The Contractor shall remove frost, snow, ice, water and any other foreign materials from forms, secure reinforcement in place, and position joint materials and other embedded items.
3. In cold weather, the Contractor shall have protective blankets ready and heaters operational and in-place prior to placing concrete.
4. In hot weather, when temperature of reinforcing or forms is above 120 degrees F, the Contractor shall spray forms and reinforcement with water just prior to placing concrete.
5. Structural concrete shall be placed only on a firm and unyielding subgrade or sub-base, which is free from all loose material and debris. Subgrade shall be free of frost. The Contractor shall keep subgrade moist at time of concreting. If necessary, dampen with water in advance of concreting. The

Contractor shall allow no free water standing on subgrade nor any muddy or soft spots when concrete is placed.

B. Conveying and Depositing in Forms

1. The Contractor shall handle concrete from mixer to place of final deposit as rapidly as practicable by methods which prevent segregation or loss of ingredients to assure that quality is maintained.
2. To prevent segregation, the Contractor shall deposit concrete in approximately horizontal layers of 18 to 24 inches as near as possible to its final position.
3. Concrete shall not be allowed to drop freely more than four (4) feet or through a cage of reinforcing steel.
4. Chutes used to transport concrete shall have a slope not exceeding one vertical to two horizontal and not less than one vertical to three horizontal. The end of each chute shall be provided with a baffle to help prevent segregation, or the concrete shall be discharged through a tremie or elephant trunk directly into the form.
5. Pumping equipment shall be a suitable type with adequate pumping capacity. Loss of slump in pumping shall not exceed 1½ inches.
6. The Contractor shall consolidate all concrete by vibration, so that concrete is thoroughly worked around reinforcement, around embedded items and into corners of forms eliminating all air or stone pockets which may cause honeycombing, pitting, or places of weakness. The Contractor shall use internal vibrators having a minimum frequency of 8,000 vibrations per minute to consolidate concrete effectively. The Contractor shall not use vibrators to transport concrete within forms. The Contractor shall insert vibrators and withdraw at points approximately 18 inches apart. At each insertion, the Contractor shall allow duration sufficient to consolidate concrete but not sufficient to cause segregation; generally from 5 to 15 seconds. Where concrete is to have an as-cast finish, bring a full surface of mortar against form by vibration process, supplemented if necessary by spading, to work coarse aggregate back from formed surface.
7. While concrete is being placed adjacent to a joint in which a waterstop is specified, care shall be taken to see that the concrete is properly placed and worked along the joint in which the waterstop is held and that the waterstop itself is in the position specified on the drawings and is firmly bedded in mortar on all sides.
8. The concrete comprising each section of wall between joints shall be deposited continuously in layers of such thickness that none will be deposited on concrete which has hardened sufficiently to cause the formation of seams or places of weakness within the section.

C. Joints

1. Joints shall be provided in slabs on grade; locate joints as indicated. If saw cut joints are required or permitted, time cutting properly with set of concrete; start cutting as soon as concrete has hardened sufficiently to prevent aggregates from being dislodged by saw. Complete before shrinkage stresses produce cracking.
2. Other construction joints, not indicated on drawings, shall be located so as to least impair strength of the structure. Place joints in locations approved by the Owner.
3. Vertical construction joints shall be prepared and bonded in accordance with ACI 301, Chapter 6.

## G05.09 FINISH OF CONCRETE SURFACES

### A. Scope

The provisions of this subsection shall apply to all exposed exterior concrete surfaces and all interior concrete surfaces of conduits and structures whose finish is not specified elsewhere in these specifications or specifically indicated on the Plans.

### B. General

1. The exposed tops of walls of structures shall be brought to true level, floated to bring a workable grout to the surface, struck off and leveled where necessary with cement grout of the same proportions as the mortar of the concrete. The wall tops shall then be floated, finished and edged unless otherwise indicated on the Plans. The edger used shall be of ½-inch radius and shall have its flanges ground to a knife edge so as to have as little burr as possible.
2. Slabs shall be edged as appropriate.

### C. Finish of Formed Surfaces

#### 1. General

- a. Unless otherwise noted on the drawings, the following finishes shall be used as applicable:
- b. Rough form finish - For exterior wall surfaces of structures, flumes and conduits not exposed to public view up to one foot below grade.
- c. Smooth rubbed finish (or paint type finish at Contractor's option) - For exterior wall surfaces exposed to view and interior wall surfaces of structures, flumes and conduits. Interior wall surfaces which shall receive the Smooth Rubbed Finish shall be all interior surfaces to a point one (1) foot below the minimum water surface

of open vessels containing liquids. Surfaces one foot or more below minimum water surface elevation in vessels containing liquids shall receive a Rough Form Finish. Apply the same finish on all surfaces.

2. Rough Form Finish

Tie holes and defects shall be patched. Fins exceeding ¼-inch shall be chipped or rubbed off. Otherwise, surfaces shall be left with the texture imparted by forms.

3. Smooth Form Finish

- a. Use form facing materials which shall produce a smooth, hard, uniform texture on the concrete. Arrange panels in an orderly and symmetrical manner with a minimum of seams.
- b. Tie holes and defects shall be patched and all fins shall be completely removed.

4. Smooth Rubbed Finish

- a. Provide smooth rubbed finish to surfaces which have received smooth form finish.
- b. Surfaces to be rub-finished shall be thoroughly wetted and kept in that condition until the rubbing work of each section is completed.
- c. Surfaces shall be rubbed with carborundum blocking or other abrasive and water until fins and any surplus materials have been removed and the surface is uniformly smooth. Grout or mortar shall not be used in the rubbing process and plastering of the surfaces will not be permitted. Rubbing blocks shall be driven by electric or compressed air tools except as hand rubbing is specifically permitted by the Owner.
- d. Rubbing of concrete surfaces shall commence within one (1) day after removal of forms.

5. Paint Type Finish

Finish shall be Elastomeric Waterproofing Coating 10 as manufactured by Sherwin Williams or approved equal. Apply one coat in accordance with manufacturer's recommendations, at a coverage of fifty (50) square feet per gallon.

D. Finish of Unformed Surfaces

1. Unless otherwise noted on the drawings, the following finishes shall be used as applicable:

2. Floated Finish - Top surfaces of slabs of all structures, water carrying conduits and liquid containers; surfaces intended to receive roofing, waterproofing membranes or sand bed terrazzo.
3. Troweled Finish - Interior floors intended as walking surfaces or for reception of floor coverings.
4. Non-Slip Broom Finish - Sidewalks, ramps and concrete paved areas (other than roadways and parking area); exterior platforms, steps and landings; exterior and interior pedestrian ramps, exposed floor areas and steps likely to be wet.

E. Finishing Tolerances

1. The following finishing tolerances shall be provided:
2. Class A Tolerance - Finishes shall be true planes within  $\frac{1}{8}$ -inch in ten (10) feet as determined by a 10-foot straightedge placed anywhere on the slab in any direction.
3. Class B Tolerance - Finishes shall be true planes within  $\frac{1}{4}$ -inch in ten (10) feet as determined by a 10-foot straightedge placed anywhere on the slab in any direction.
4. Class C Tolerance - Finishes shall be true planes within  $\frac{1}{4}$ -inch in two (2) feet as determined by a 2-foot straightedge placed anywhere on the slab in any direction.
5. Tolerances shall be checked with a 10-foot straightedge for Class A or B tolerance and with a 2-foot straightedge for Class C tolerance applied at no less than two different angles.

F. Floated Finish

The top of the slab shall be screeded to grade and cross section. Concrete shall not be worked further until ready for floating. Begin floating when water sheen has disappeared and when surface has stiffened sufficiently to permit operation of float. Use a wood float only. Float to a surface within Class C tolerance. No further finish will be required on top slabs of structures of conduits which are to be buried. For all other slabs, float to a surface within Class B tolerance and refloat immediately to a uniform sandy texture.

G. Troweled Finish

1. Surface shall first receive floated finish. It shall next be power troweled, and finally hand troweled. Begin final troweling when the surface produces a ringing sound as trowel is moved over surface.
2. Finished surface shall be essentially free of trowel marks, and uniform in texture and appearance. Interior floor surfaces of administrative and similar

areas shall be plane to a Class A tolerance. Other surfaces shall be plane to a Class B tolerance.

H. Nonslip Broom Finish

Immediately after the concrete has received a floated finish, it shall be given a coarse transverse scored texture by drawing a fiber-bristle broom across the surface.

G05.10 CURING AND PROTECTION OF CONCRETE

A. General

1. Curing shall commence immediately following initial set or completion of surface finishing.
2. Standard Portland cement concrete surfaces normally exposed to the atmosphere shall be protected against too rapid drying by curing for a minimum period of seven (7) days. Similarly exposed high-early-strength concrete surfaces shall be cured for a minimum period of three (3) days.

B. Curing of Formed Surfaces

The Contractor shall cure formed surfaces, including the undersides of beams, supported slabs and other similar surfaces by moist curing. Minimize moisture loss from surfaces placed against forms by keeping forms wet until they can be safely removed. After form removal cure concrete until end of time prescribed. Vertical surfaces shall be protected from too rapid drying by covering with burlap.

C. Curing of Unformed Surfaces

1. For concrete surfaces not in contact with forms, one of the following procedures shall be applied immediately after completion of placement and finishing:
2. Ponding or continuous sprinkling.
3. Application of waterproof sheet materials conforming to ASTM C 101.
4. Application of curing compound conforming to ASTM C 309.
5. Apply curing materials in accordance with manufacturer's recommendations.
6. Apply curing compound immediately after water sheen has disappeared from surface. Curing compound shall not be used on any surface against which additional concrete or other material is to be bonded.
7. Curing materials shall, when tested in accordance with the method of "Test for Water Retention Efficiency of Liquid Membrane-Forming Compounds and Impermeable Sheet Materials for Curing Concrete", ASTM C 156, be

effective in limiting the water loss in the concrete test specimens to 3½ percent when applied at the rate recommended by the manufacturer.

D. Protection From Mechanical Injury

1. During the curing period, protect concrete from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration, and from damage by rain or flowing water.
2. Protect all finished concrete from damage by subsequent construction operations.

G05.11 CONCRETE REPAIRS

- A. All honeycomb, rock pockets and voids over ½-inch diameter shall be removed down to sound concrete. The area to be patched and an area at least six inches wide surrounding it shall be dampened to prevent absorption of water from the patching mortar.
- B. A bonding grout of 1 part cement to 1 part fine sand passing the No. 30 sieve, mixed to the consistency of thick cream, shall be brushed into the surface after surface water has evaporated. The patching mixture shall be made of the same materials as the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than 1 part cement to 2½ parts sand by damp loose volume. The quantity of mixing water shall be no more than necessary for handling and placing. Patching mortar shall be mixed and allowed to stand with frequent manipulation with a trowel until it has reached the stiffest consistency that will permit placing.
- C. Apply patching mortar when bonding grout begins to lose water sheen. Mortar shall be thoroughly consolidated and struck off leaving patch slightly higher than surrounding area. Finish and cure in same manner as adjacent concrete.
- D. The Contractor shall thoroughly clean and dampen all tie holes.
- E. Tie holes shall be grouted solid with non-metallic non-shrinking grout. Tie holes shall be filled from the large end of the cone-shaped hole and packed solid by rodding.

G05.12 QUALITY CONTROL

A. Tests on Concrete

1. As the work progresses, concrete shall be sampled in accordance with ASTM Method of Sampling Fresh Concrete (ASTM C 102).
2. Slump tests shall be made according to ASTM Method of Test for Slump of Portland Cement Concrete (ASTM C 143).
3. Compression test specimens shall be made and cured according to ASTM Method of Mixing and Curing Concrete Test Specimens in the Field

(ASTM C 31). Not less than four compression specimens shall be made for each test at each age (Specifications for Ready-Mixed Concrete, ASTM C 94), nor less than one test for each 50 cubic yards of concrete of each class. At least one test per day shall be made for each class of concrete used that day. These specimens shall be cured under laboratory conditions. Additional specimens cured under job conditions may be required when, in the opinion of the Engineer, there is a possibility of the surrounding air temperature falling below 40 degrees F or rising above 90 degrees F.

4. Specimens shall be tested according to ASTM Method of Test for Compressive Strength of Cylindrical Concrete Cylinders (ASTM C 39).
5. Not less than two specimens shall be tested at seven (7) days and not less than two specimens at twenty-eight (28) days after pouring.
6. If the average strength of any three consecutive tests of laboratory-cured cylinders representing each class of concrete falls below required compressive strengths as indicated in Table "A", or if more than 10 percent of strength tests have values less than the required strength, the Owner shall have the right to order a change in the mix proportions for the remaining portion of the structure or project. If the average strength of the job-cured cylinders falls below the required strength, the Owner shall have the right to require changes in conditions of temperature and moisture necessary to secure the required strength. He may require test in accordance with ASTM Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete (ASTM C 42) or order load tests to be made on the portions of the structures so affected.
7. In the event that changes are required in the water-cement ratio specified, the cost of such changes shall be borne by the Contractor.
8. Contractor shall furnish samples of aggregates to the testing laboratory. All concrete required for testing shall be furnished by the Contractor. No additional compensation will be paid the Contractor for concrete so used.
9. Owner shall normally pay for services of testing laboratory in connection with test made in the field or laboratory on concrete. Any testing or retesting required as a result of actual or apparent failure of concrete to fulfill specification requirements shall be paid for by the Contractor.

B. Acceptance of Work

1. Completed concrete work which fails to meet one or more requirements of this specification will be considered rejected until it has been repaired in a manner acceptable to the Owner.
2. If rejected concrete work cannot be brought into compliance by repairing, work may be remedied by one of the following:
  - a. Structural analysis or testing when strength of structure is deficient.

- b. Removal and replacement of concrete.
  - c. Reinforcement of the structure.
  - d. Contractor shall pay all costs of additional testing and/or engineering at no additional expense to Owner.
- 3. Contractor shall repair or replace rejected work at no additional cost to Owner.
  - 4. Failure to detect any defective work shall not in any way prevent later rejection when such defect is discovered.

G05.13 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work in accordance with this section of the specifications, and the cost thereof shall be included in the proper item of the Proposal and Bid Schedule.
- B. The placement of concrete in excess of that shown in the Plans, which is approved in writing in advance by the Owner, will be paid for under the proper items in the Proposal and Bid Schedule.

END OF SECTION

## TECHNICAL SPECIFICATIONS

### SECTION G06 - REMOVING AND REPLACING EXISTING PAVEMENT, DRIVEWAYS, SIDEWALKS AND PAVED WATERWAYS

#### G06.01 DESCRIPTION OF WORK

- A. This specification covers the requirements for removing and replacing existing pavement, driveways, sidewalks and paved waterways as shown in the plans and described herein.

#### G06.02 GENERAL

- A. Where it is necessary to remove pavement to allow the installation of the pipeline, the Contractor shall replace the pavement as specified herein.
- B. The existing pavement shall be removed for the width as shown in the plans for the particular type of pavement unless a greater width is authorized by the Engineer. Any pavement removed beyond the limits authorized shall be replaced by the Contractor and no separate payment will be made for replacement of the pavement beyond the authorized limits.
- C. Where damage to pavement beyond the authorized limits of removal occurs due to the construction of this project it shall be the responsibility of the Contractor to restore the damage prior to beginning construction. No separate payment will be made for the restoration of the damaged pavement.

#### G06.03 TRENCH BACKFILLING

- A. All trenches under or within 8 feet of existing concrete driveways, sidewalks, paved waterways, brick roadways, asphalt roadways, gravel roadways, shall be backfilled by hand or mechanically tamping selected materials in six-inch (6") layers until full settlement is reached at the depths shown on the Plans.

#### G06.04 CONCRETE PAVEMENT AND CONCRETE CURB OR CURB AND VARIABLE WIDTH GUTTER

- A. Existing reinforced or un-reinforced concrete driveway shall be removed for the actual width of the trench plus twelve (12") inches on either side of the firm walls of the trench, and the reinforcing steel shall be cleaned and laid back. After the trench has been properly backfilled, the reinforcing steel shall be bent and spliced into place as shown on the Plans, and a concrete slab at least six inches (6"), shall be poured and finished to meet the existing pavement.
- B. Where the proposed work transverses an existing concrete curb or curb and variable width gutter, the curb or curb and variable width gutter shall be replaced to conform to the existing section, or as directed by the Engineer. The "Mule and Plaster" method of construction for curb and gutter will be allowed.

- C. Concrete used for replacing concrete pavement and concrete curb or curb and variable width gutter shall be 3,000 psi concrete.

G06.05 ASPHALTIC CONCRETE PAVEMENT, CONCRETE BASE WITH AN ASPHALT SURFACE, BRICK PAVEMENT OR GRAVEL BASE WITH AN ASPHALT SURFACE

- A. Existing asphaltic concrete pavement, concrete base with asphalt surface, brick pavement, and a gravel base with an asphalt surface shall be removed for the actual width of the trench plus twelve (12) inches on either side of the firm wall of the trench. After the trench has been properly embedded and backfilled with select material a gravel base 12" thick shall be placed, tamped and rolled to a level 1 ½ inches below the existing pavement surface. A tack coat of Grade RC-2 asphalt shall be applied to the gravel base before the placement of asphaltic concrete surfacing. Then a layer of an approved type of asphaltic concrete 1 ½ inches thick shall be placed, tamped, and rolled with a flat wheel roller to meet the existing pavement.

G06.06 GRAVEL ROADWAY

- A. After the trench has been properly backfilled where a gravel roadway has been cut, a minimum compacted thickness of eight (8") inches of an approved grade of fresh road gravel shall be placed on the full width of the trench and rolled with a flat wheel roller to meet the existing surface.

G06.07 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed in accordance with this section of the specifications, and the cost thereof shall be included in the appropriate item of the Proposal and Bid Schedule.

**END OF SECTION**

## TECHNICAL SPECIFICATIONS

### SECTION G07 - SEDIMENTATION AND EROSION CONTROL

#### G07.01 SCOPE

- A. This specification covers the requirements for installing, maintaining, removing and cleaning the areas related to sedimentation control work as shown on the Drawings and as specified herein. The work shall include, but not necessarily be limited to: installation of temporary access ways and staging areas, stone filter boxes, sediment removal and disposal, device maintenance, removal of temporary devices, temporary mulching, excelsior matting installation and final cleanup.

#### G07.02 GENERAL

- A. The Contractor shall be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the movement of sediment from the construction site to off site areas or into the stream system via surface runoff or underground drainage systems. Measures in addition to those shown on the Drawings necessary to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up at the expense of the Contractor. No additional charges to the Owner will be considered.
- B. Sedimentation and erosion control measures shall conform to the requirements outlined in the Texas Commission on Environmental Quality, Chapter 313.

#### G07.03 MATERIALS

- A. Crushed stone for sediment filtration devices, access ways and staging areas shall conform to Texas Department of Transportation "Standard Specifications for Construction of Highways, Streets and Bridges."
- B. Berm structural stone shall be rip-rap as follows:
  - 1. Rip-rap shall be sound, durable rock which is roughly rectangular shape and of suitable quality to insure permanence in the condition in which it is to be used. Rounded stones, boulders, sandstone or similar soft stone will not be acceptable. Material shall be free from overburden, spoil, shale, and organic material, meet the Engineer's approval and be well graded within the following limits:

Weight of Stone	Percent Finer by Weight
40 lb	100
12 lb	50
3 lb	0

C. Silt Fence

1. Steel posts shall be a minimum of 5 feet in length, 2-1/2-in by 2-1/2-in by 1/4-in angle post with self-fastening tabs and a 5-in by 4-in (nominal) steel anchor plate at bottom.
2. Welded wire fabric shall be 4-in by 4-in mesh of 12 gauge by 12 gauge steel wire.
3. Silt fence fabric shall be a woven, polypropylene, ultraviolet resistant material such as Mirafi 100X as manufactured by Mirafi, Inc., Charlotte, NC or equal.
4. Tie wires for securing silt fence fabric to wire mesh shall be light gauge metal clips (hog rings), or 1/32-in diameter soft aluminum wire.
5. Prefabricated commercial silt fence may be substituted for built-in-field fence. Pre-fabricated silt fence shall be "Envirofence" as manufactured by Mirafi Inc., Charlotte, NC or equal.

D. One quarter inch woven wire mesh shall be galvanized steel or hardware cloth.

E. Straw mulch shall be utilized on all newly graded areas to protect areas against washouts and erosion. Straw mulch shall be comprised of threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold or other objectionable material. The straw mulch shall contain at least 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.

F. Latex acrylic copolymer, such as Soil Sealant with coalescing agent as manufactured by Soil Stabilization Co., Merced, CA or approved equivalent shall be used as straw mulch tackifier.

G. An asphalt tackifier shall only be used when temperatures are too low to allow the use of a latex acrylic copolymer and only with prior written approval from the Engineer.

H. Excelsior matting blanket shall be installed in all seeded drainage swales and ditches as shown on the Drawings or as directed by the Engineer. Excelsior matting shall be AMXCO Curlex Blanket as manufactured by American Excelsior Company, Arlington, TX or equal.

G07.04 INSTALLATION

A. Silt Fence Installation

1. Silt fences shall be positioned as indicated on the Drawings and as necessary to prevent off site movement of sediment produced by construction activities as directed by the Engineer.
2. Dig trench approximately 6-in wide and 6-in deep along proposed fence lines.
3. Drive metal-stakes, 8 feet on center (maximum) at back edge of trenches. Stakes shall be driven 2 feet (minimum) into ground.
4. Hang 4 by 4 woven wire mesh on posts, setting bottom of wire in bottom of trench. Secure wire to posts with self-fastening tabs.
5. Hang filter fabric on wire carrying to bottom of trench with about 4-in of fabric laid across bottom of trench. Stretch fabric fairly taut along fence length and secure with tie wires 12-in O.C. both ways.
6. Backfill trench with excavated material and tamp.
7. Install pre-fabricated silt fence according to manufacturer's instructions.

- B. Construct filter boxes as detailed on the Drawings, from 1/4-in woven wire mesh or hardware cloth and wood. Fill with crushed stone and place over all drop inlets and manholes to storm drain system as each inlet is completed. This should be done prior to setting casting, if there is a delay between installation of inlet structures or drain manholes and setting of castings. An alternate method is to ring each inlet with a silt fence.

C. Rock Berm Installation

1. Place berm structural stone across channel just below lower sandbag wall at work area. Face upstream side of structural berm with crushed stone.

- D. Staging areas and access ways shall be surfaced with a minimum depth of 4-in of crushed stone.

G07.05 MAINTENANCE AND INSPECTIONS

A. Inspections

1. Contractor shall make a visual inspection of all sedimentation control devices once per week and promptly after every rainstorm. If such inspection reveals that additional measures are needed to prevent movement of sediment to offsite areas or into the vent trench, Contractor shall promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.

B. Device Maintenance

1. Silt Fences
  - a. Remove accumulated sediment once it builds up to one-half of the height of the fabric.
  - b. Replace damaged fabric, or patch with a 2-ft minimum overlap.
  - c. Make other repairs as necessary to ensure that the fence is filtering all runoff directed to the fence.
2. Filter Boxes: Replace crushed stone when it becomes saturated with silt.
3. Stone Filter Berm
  - a. Muck out trapped silt from dewatering operations when it has built up to within 6-in of the top of the berm.
  - b. Replace crushed stone filter when saturated with silt.
4. Add crushed stone to access ways and staging area as necessary to maintain a firm surface free of ruts and mudholes.

G07.06 TEMPORARY MULCHING

- A. Apply temporary mulch to areas where rough grading has been completed but final grading is not anticipated to begin within 30 days of the completion of rough grading.
- B. Straw mulch shall be applied at rate of 100 lbs/1000 ft<sup>2</sup> and tackified with latex acrylic copolymer at a rate of 1 gal/1000 ft<sup>2</sup> diluted in a ratio of 30 parts water to 1 part latex acrylic copolymer mix.

G07.07 REMOVAL AND FINAL CLEANUP

- A. Once the site has been fully stabilized against erosion, remove sediment control devices and all accumulated silt. Dispose of silt and waste materials in proper manner. Regrade all areas disturbed during this

process and stabilize against erosion with surfacing materials as indicated on the Drawings.

G07.08 MEASUREMENT AND PAYMENT

- A. Payment will be made for work performed in accordance with this section of the specifications, and the cost thereof shall be included in the appropriate items of the Proposal and Bid Schedule.

END OF SECTION

## TECHNICAL SPECIFICATIONS

### SECTION G08 - FINISH GRADING AND GRASS PLANTING

#### G08.01 GENERAL

- A. The Contractor shall perform finish grading as shown on the plans and described herein. The Contractor shall also provide all equipment and materials required and shall develop and present to the Owner a Bermuda grass ground cover at the plant site.
- B. It is the intent of these specifications that areas to be grassed beyond those specifically shown on the Landscaping plans shall include the slopes of all new embankments, the ground surrounding proposed buildings and plant structures, and those grassed areas of the existing plant grounds which are disturbed during proposed construction.
- C. It shall be understood and agreed that the actual limits of areas to be grassed shall be established on the site by the Owner.
- D. The hydromulching system of grass planting is described herein. Other procedures such as sodding or live sprigging may be used if approved by the Owner. The system used shall prevent erosion of topsoil until adequate ground cover develops and serves to control erosion.

#### G08.02 FINISH GRADING

- A. Finish grading shall involve bringing final ground surfaces to contour elevations shown on the plans, including placement of topsoil as described herein.
- B. Placement of structural fill, road subgrade, and area or site fill is described under other sections of these Specifications.
- C. Topsoil shall be used for the upper four (4) inches of soil in the finished plant site. It shall be supplied from stockpiled topsoil from the site or other local sources. Approximately six (6) inches, loose measure, of topsoil shall be placed in order to obtain the 4-inch layer of consolidated topsoil. Topsoil shall be lightly compacted. The Owner may require tilling of topsoil, if he feels it is over-compacted, prior to grass planting.

#### G08.03 GRASS PLANTING

##### A. Fertilizer

18-18-5, (Nitrogen, Phosphoric Acid, Potash) slow release granular at a rate of 25 pounds per 1000 square feet.

B. Water

The Contractor shall provide water necessary for grass planting and maintenance until acceptance by the Owner.

C. Planting Seasons

Grass planting by sodding, sprigging, or hydromulching shall normally be done between May 1 and September 15.

D. Hydromulching

Grass planting by hydromulching shall consist of applying water, Bermuda grass seed, fibrous mulch, and fertilizer to initiate grass cover.

G08.04 MAINTENANCE OF DEVELOPING GRASS

- A. The Contractor shall water and maintain all grassed areas until final acceptance. He shall also re-fertilize at the rate of 1 lb. of nitrogen and 1 lb. of phosphorous per 1,000 square ft. every 60 days until the grass is accepted.
- B. Areas which, due to settling or improper leveling, do not have positive drainage shall be re-leveled with topsoil and replanted with grass.
- C. Areas damaged by erosion, vehicle ruts and similar damage shall be re-leveled with topsoil and replanted. Finished ground surface shall be sufficiently smooth and level to facilitate mowing.

G08.05 ACCEPTANCE

- A. Work under this section shall be considered acceptable when finish graded surfaces are level and well-drained, when grass achieves full coverage and is at least 2 inches high, and when other requirements listed herein are met.
- B. Acceptance of work normally coincides with final acceptance of the entire project. However, seasonal factors may be cause for delay in grass planting, development, and acceptance.
- C. The Owner will accept responsibility for normal maintenance when project is accepted. However, the Contractor shall remain responsible for any subsequent grass damage that he causes, and for warranty of materials and workmanship as required in the Special Conditions.

G08.06 MEASUREMENT AND PAYMENT

- A. Grass seeding or grass sodding shall be measured and paid for by the square yard complete in place after provisional acceptance at the unit contract price as provided in the Proposal and Bid Schedule.

END OF SECTION

## GENERAL REQUIREMENTS

### SECTION G09 - SITE CONDITIONS

#### G09.01 SUBSURFACE INFORMATION

- A. No Subsurface investigations have been made by the Owner. The Contractor shall be responsible for any subsurface explorations and tests he deems necessary.

#### G09.02 SITE INVESTIGATION AND REPRESENTATION

- A. The Contractor acknowledges that he has satisfied himself as to the nature and location of the work; the general and local conditions, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads, and uncertainties of weather, river/stream stages, or similar physical conditions at the site; the conformation and conditions of the ground; the character of equipment and facilities needed preliminary to and during the prosecution of the work and all other matters which can in any way affect the work or the cost thereof under this Contract.
- B. The Contractor further acknowledges that he has satisfied himself as to the character, quality, and quantity of surface and subsurface materials to be encountered from inspecting the site, as well as from information presented herein as a part of these Contract Documents. Any failure by the Contractor to acquaint himself with all the available information will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work. Neither the Owner nor the Engineer assume responsibility for any conclusion or interpretation made by the Contractor on the basis of the information made available by the Owner or the Engineer.
- C. Existing ground profiles shown on the Plans were plotted from field surveys.

#### G09.03 RESPONSIBILITY FOR UTILITY PROPERTIES AND SERVICE

- A. Known utilities and structures adjacent to or encountered in the work are shown on the Drawings. The locations shown are taken from existing records and the best information available from existing plans; however, it is expected that there may be some discrepancies and omissions in the locations and quantities of utilities and structures shown. Those shown are for the convenience of the Contractor only, and no responsibility is assumed by either the Owner or the Engineer for their accuracy or completeness.
- B. Neither the Owner nor his officers or agents shall be responsible to the Contractor for damages as a result of the Contractor's failure to protect utilities encountered in the work.

- C. The Contractor shall at all times provide unobstructed access to fire hydrants, underground conduit, manholes, and water or gas valve boxes.
- D. Where the Contractor's operations could cause damage which might result in considerable expense, loss, and inconvenience when his operations are adjacent to or near railway, telegraph, telephone, television, power, oil, gas, water, sewer, irrigation, or other systems, no operations shall be commenced until the Contractor has made all arrangements necessary for the protection of these utilities and services.
- E. The Contractor shall notify all utility offices that are affected by the construction operation at least 15 days in advance of commencing construction operations. The Contractor shall not expose any utility without first obtaining permission from the affected agency. Once permission has been granted, locate and, if necessary, expose and provide temporary support for all existing underground utilities in advance of operations.
- F. The Contractor shall be solely and directly responsible to the Owners and operators of such utility properties for any damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of any character brought because of any injuries or damage that may result from the construction operations under this Contract.
- G. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of accidental breakage due to construction operations, the Contractor shall promptly notify the proper authority and cooperate with said authority in restoration of service as promptly as possible and bear all costs of repair. In no event shall interruption of any water or utility service be allowed unless prior approval is granted by the owner of the utility.
- H. The Contractor shall replace, at his own expense, any and all other existing utilities or structures removed or damaged during construction, unless otherwise provided for in these Contract Documents.
- I. Where existing utility lines or structures are so located as to physically conflict with permanent structures to be constructed under this Contract, the conflicting utility line or structure shall be permanently relocated. Such relocations shall be considered as required by this Contract.
- J. The Contractor shall give immediate notice to the Engineer, the Owner and the owner of the utility (where applicable) when a physical conflict is determined to exist. The actual relocation of a public utility will be accomplished by the owner of the utility at his expense unless otherwise specified in these Contract Documents. Any delays resulting from the required relocations of the utilities are the responsibility of the Contractor.
- K. Where existing utility lines or structures are so located as to interfere with the Contractor's prosecution of the work, but do not physically conflict with completed manholes or other permanent structures to be constructed under this Contract, any modification, alteration, or relocation of interfering utility,

either permanent or temporary, shall be accomplished at the expense of the Contractor.

- L. The Contractor shall give immediate notice to the Engineer and the Owner of the utility when an interference is determined to exist and shall obtain approval to relocate such utility or to discontinue service therein from the Engineer and the owner of the utility. The owner of the utility shall have the right to do all work required to discontinue, relocate, and replace interfering utilities and charge the Contractor for all costs thereof. When approved by the Engineer and the owner of the utility, all work required to discontinue, relocate, and replace interfering utilities may be done by, or arranged for, by the Contractor. All such discontinuance, relocation, and replacement shall be accomplished in accordance with all requirements of the owner of the utility.
- M. When notified by the Contractor that an interference or conflict has been determined to exist, the Owner and the Engineer will determine whether such interference shall be considered as required by construction or as incidental to construction.

#### G09.04 INTERFERING STRUCTURES

- A. Take necessary precautions to prevent damage to existing structures whether on the surface, aboveground, or underground. An attempt has been made to show major structures on the Plans. While the information has been compiled from the best available sources, its completeness and accuracy cannot be guaranteed, and it is presented as a guide to avoid known possible difficulties.
- B. Protect existing structures from damage, whether or not they lie within the right-of-way or the limits of the easements obtained by the Owner. Where existing structures must be removed to properly carry out the work, or are damaged during the work, they shall be restored at the Contractor's own expense to at least their original condition and to the satisfaction of the Engineer.
- C. The Contractor may, with the approval of the Engineer and without additional compensation, remove and replace in a condition as good as or better than original, any small interfering structures such as fences and signposts that interfere with the Contractor's operations.

#### G09.05 FIELD RELOCATION

- A. During the progress of the work, minor relocations of the work may be necessary. Such relocations shall be made only by direction of the Engineer and the Owner. If existing structures are encountered that will prevent construction as shown, notify the Engineer before continuing with the work in order that the Engineer may make such field revisions as necessary to avoid conflict with the existing structures. If the Contractor shall fail to notify the Engineer when an existing structure is encountered and proceeds with the work despite this interference, he shall be responsible for any damage that may occur.

G09.06 LAND MONUMENTS

- A. The Contractor shall preserve or replace any existing Federal, State, County, City, and private land monuments encountered. All monument replacement by the Contractor shall be performed by a land surveyor licensed in the State of Texas.

G09.07 PAYMENT

- A. The work specified in this Section shall be considered incidental and payment will be included as part of the appropriate lump sum or unit prices specified in the Proposal and Bid Schedule.

END OF SECTION

**CITY OF BELLMEAD**

**WATER SYSTEM SCADA IMPROVEMENTS**

**ELECTRICAL  
SPECIFICATIONS**

PREPARED BY:

**McCREARY & ASSOCIATES, INC.**  
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Joseph Kotrla, P.E.

November 25, 2024

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Date

**CITY OF BELLMEAD**  
**WATER SYSTEM SCADA IMPROVEMENTS**  
**ELECTRICAL SPECIFICATIONS**

Division 26	Electrical
26 00 05	Summary of Work
26 00 10	Electrical General Provisions
26 01 10	Raceways
26 01 20	Wire and Cable
26 01 91	Dry Type Transformers
26 01 95	Lighting Panelboards
26 01 96	Power Distribution Panelboards
26 01 98	Enclosed Motor Starters
26 01 99	Miscellaneous
26 02 10	Electric Utility Service
26 04 10	Underground Electrical
26 04 50	Grounding Systems
26 09 10	Instrumentation
26 09 20	Radios
26 09 30	SCADA
26 09 40	Computers and HMI

## **PART 1 - GENERAL**

### **1.1 SCOPE**

- A. This section shall include summary of work to be performed in accordance with the contract documents.

### **1.2 CONTRACT DESCRIPTION**

- A. The scope shall include engineering for upgrading the Water System SCADA System for the City of Bellmead.
- B. The scope shall include a new radio system and computer system with new software at the Service Center.
- C. The scope shall include electrical work at Parish Water Plant. The electrical work shall consist of equipment to replace a 480 volt MCC, dry type transformer, and panelboards. The scope shall include a new outdoor rack with a 480 volt distribution panelboard, five starters, a dry type transformer and lighting panelboard. The scope shall include new conduit and cable to connect the distribution panelboard to the City's existing oil filled transformer. The scope shall include new conduit and wire to reconnect existing motors to the new starters and new conduit and wire for the lighting panel circuits.
- D. A new 30' radio tower shall be constructed at the Research Water Plant to be the master antenna for the system. The Parrish Water Plant shall have the antenna on the side of the existing elevated tank as shown on the drawings. All other sites shall have new 20' towers constructed in locations as shown on the drawings.
- E. The scope shall include new PLCs at each site as indicated on the drawings. Provide a new PLC enclosure for Research and Parrish Water Plant Sites. All other sites shall have the new PLC furnished on a new packpanel that shall be installed in the existing 48" tall by 24" deep enclosure.
- F. The scope shall include a new computer at the Service Center. The new computer with HMI (Human Machine Interface) software shall communicate with the remote sites. A PLC is not required at the Service Center. Furnish a new tower in location shown at the Service Center. Engineer.
- G. Downtime for equipment change over shall be coordinated with the owner. Research, Parrish, and Barlow can each be down for 8 hours if done independently at different days. Down time shall be limited to 4 hours at Concord and Meyers Water Plants.
- J. Perform Work of Contract under bid item descriptions in accordance with Conditions of the Contract.

K. Drawings and technical specifications cover Work of the Contract.

**PART 2 – PRODUCTS [NOT USED]**

**PART 3 – EXECUTION [NOT USED]**

**PART 1 GENERAL**

1.01 GENERAL CONDITIONS

- A. The General Conditions and Requirements, Special Provisions, are hereby made a part of this Section.
- B. The Electrical Drawings and Specifications under this Section shall be made a part of the Contract Documents. The Drawings and Specifications of other sections of this contract, as well as supplements issued thereto, information to bidders and pertinent documents issued by the Owner's Representative are a part of these Drawings and Specifications and shall be complied with in every respect. All the above documents will be on file at the office of the Owner's representative and shall be examined by all the bidders. Failure to examine all documents shall not relieve the responsibility or be used as a basis for additional compensation.
- C. Furnish all work, labor, tools, superintendence, material, equipment and operations necessary to provide for a complete and workable electrical system as defined by the Contract Documents. A licensed journeyman shall be on site at all times while electrical work is being performed and a licensed master electrician shall be in charge of the work. Submit license for master electrician and all journeymen.
- D. Be responsible for visiting the site and checking the existing conditions. Ascertain the conditions to be met for installing the work and adjust bid accordingly. This project shall include electrical work as shown on the Location Map.
- E. It is the intent of the Contract Documents that upon completion of the electrical work, the entire system shall be in a finished, workable condition.
- F. All work that may be called for in the Specifications but not shown on the Drawings, or, all work that may be shown on the Drawings but not called for in the Specifications, shall be performed by the Contractor as if described in both. Should work be required which is not set forth in either document, but which work is nevertheless required for fulfilling of the intent thereof, then the Contractor shall perform all work as fully as if it were specifically set forth in the Contract Documents.
- G. The definition of terms used throughout the Contract Documents shall be as specified by the following agencies:
  - 1. Underwriters Laboratories
  - 2. National Electrical Manufacturers Association
  - 3. American National Standards Institute
  - 4. Insulated Power Cable Engineers Association
  - 5. National Electrical Code
  - 6. National Fire Protection Association
- H. The use of the terms "as (or where) indicated", "as (or where) shown", "as (or where) specified", or "as (or where) scheduled" shall be taken to mean that the reference is made to the Contract Documents, either on the Drawings or in the Specifications, or both documents.

- I. The use of the words "furnish", "provide", or "install" shall be taken to mean that the item or facility is to be both furnished and installed under Division 16, unless stated to the contrary that the item or facility is to be either furnished under another Division or under another Contract, furnished under this Division and installed under another Division or under another Contract, or furnished and installed under another Division or under another Contract.

## 1.02 PERMITS AND CODES

- A. Secure all permits, licenses, and inspection as required by all authorities having jurisdiction. Give all notices and comply with all laws, ordinances, rules, regulations and contract requirements bearing on the work.
- B. The minimum requirements of the electrical system installation shall conform to the latest edition of the National Electrical Code, as well as state and local codes.
- C. Codes and ordinances having jurisdiction and specified codes shall serve as minimum requirements, but, if the Contract Documents indicate requirements which are in excess of those minimum requirements, then the requirements of the Contract Documents shall be followed. Should there be any conflicts between the Contract Documents and codes, or any ordinances, report these with bid.

## **PART 2 PRODUCTS**

### 2.01 STANDARDS

- A. All materials and equipment shall conform to the requirements of the Contract Documents. They shall be new, free from defects, and they shall conform to the following standards where these organizations have set standards:
  - 1. Underwriters Laboratories (UL)
  - 2. National Electrical Manufacturer's Association (NEMA)
  - 3. American National Standards Association (ANSI)
  - 4. Insulated Cable Engineers Association (ICEA)
- B. All material and equipment of the same class shall be supplied by the same manufacturer, unless specified to the contrary.
- C. All products shall bear UL labels where standards have been set for listing. All other products shall be UL labeled. Motor control centers, switchboards, and switchgear shall have UL labels. Custom panels, modified motor starters, control panels, and instrument panels and the like shall be manufactured by a fabricator approved as a UL508A shop and shall bear a UL 508A or UL Industrial Control Panel label.
- D. When the Contractor provides a product for this project he shall be bound by the terms and conditions of the Contract Documents and he shall agree to warrant and to be liable for the merchantability and fitness of his product to the applications to which his product is applied under the Contract Documents.

## 2.02 SHOP DRAWINGS AND SUBMITTALS

- A. Shop drawings and submittals shall comply with general conditions and as specified herein.
- B. Shop drawings shall be taken to mean detailed drawings with dimensions, schedules, weights, capacities, installation details and pertinent information that will be needed to describe the material or equipment in detail.
- C. Submittals shall be taken to mean catalog cuts, general descriptive information, catalog numbers and manufacturer's name.
- D. Submit for review all shop drawings and submittals as hereinbefore called for.
- E. Review of submittals or shop drawings shall not remove the responsibility for furnishing materials or equipment or proper dimensions, quantity, and quality, nor will such review remove the responsibility for error in the shop drawings or submittals.
- F. Failure to process submittals or shop drawings on any item and/or items specified shall make the Contractor responsible for the suitability for the item and/or items, even though the item and/or items installed appear to comply with the Contract Documents.
- G. Assume all costs and liabilities which may result from the ordering of any material or equipment prior to the review of the shop drawings or submittals, and no work shall be done until the shop drawings or submittals have been reviewed. In case of correction or rejection, resubmit until such time as they are accepted by the Owner's Representative, and such procedures will not be cause for delay.
- H. Submittals and shop drawings shall be compiled from the manufacturer's latest product data. Should there be any conflicts between this data and the Contract Documents, report this information for each submittal and/or shop drawing.
- I. Shop drawings and submittals will be returned and unchecked if the specific items proposed are not clearly marked, or if the General Contractor's approval stamp is omitted.
- J. When requested, furnish samples of materials for acceptance review. If a sample has been reviewed and accepted, then that item of material or equipment installed on the job shall be equal to the sample; if it is found that the installed item is not equal, then replace all such items with the accepted sample equivalent.

## 2.03 ACCEPTANCE AND SUBSTITUTIONS

- A. All manufacturers named are a basis as a standard of quality and substitutions of any equal product will be considered for acceptance. The judgment of equality of product substitution shall be made by the Engineer.
- B. Substitutions after award of Contract shall be made only within sixty (60) days after the notice to proceed. Furnish all required supporting data. The submittal of substitutions for review shall not be cause for time extensions.
- C. Where substitutions are offered, the substituted product shall meet the product performance as set forth in the specified manufacturer's current catalog literature, as well as meeting the details of the Contract Documents.

- D. The details on the drawings and the requirements of the Specifications are based on the first listed material or equipment. If any other than the first listed material or equipment is furnished, then assume responsibility for the correct function, operation, and accommodation of the substituted item. In the event of misfits or changes in work required, either in this section or other sections of the Contract, or in both, bear all costs in connection with all changes arising out of the use of other than the first listed item specified.
- E. Substitutions of products under other sections may occur. Make necessary adjustments and additions to work under Division 26 to accommodate those substitutions. Such adjustments and additions shall be performed in compliance with Division 26 Specifications at no additional charge.
- F. Energy efficiency of each item of power consuming equipment shall be considered one of the standards for evaluation.

### **PART 3 EXECUTION**

#### **3.01 CUTTING AND PATCHING**

- A. Cutting and patching required under this section shall be done in a neat workmanlike manner. Cutting lines shall be uniform and smooth.
- B. Use concrete saws for large cuts in concrete and use core drills for small round cuts in concrete.
- C. Where openings are cut through masonry walls, provide lintel or other structural support to protect the remaining masonry. Adequate support shall be provided during the cutting operation to prevent damage to masonry.
- D. Where large openings are cut through metal surfaces, attach metal angle around the opening.
- E. Patch concrete openings that are to be filled with non-shrinking cementing compound. Finish concrete patching shall be troweled smooth and shall be uniform with surrounding surfaces.

#### **3.02 WATERPROOFING**

Provide waterproof flashing for each penetration of exterior walls and roofs.

#### **3.03 CONSTRUCTION REQUIREMENTS**

- A. Except where specifically noted or shown, the locations and elevations of equipment are approximate and are subject to small revisions as may prove necessary or desirable at the time the work is installed. Locations changed substantially from that shown on the drawings shall be confirmed with the Engineer in advance of construction.

- B. Where equipment is being furnished under another Division, request from Engineer an accepted drawing that will show exact dimensions of required locations or connections. Install the required facilities to the exact requirements of the accepted drawings.
- C. All work shall be done in the best and most workmanlike manner by qualified, careful electricians who are skilled in their trade. The standards of work required throughout shall be of the first class only.
- D. Unless shown in detail, the Drawings are diagrammatic and do not necessarily give exact details as to elevations and routing of raceways, nor do they show all offsets and fittings; nevertheless, install the raceway system to conform to the structural and mechanical conditions of the construction.
- E. Holes for raceway penetration into sheet metal cabinets and boxes shall be accurately made with an approved tool. Cutting openings with a torch or other device that produces a jagged, rough cut will not be acceptable.
- F. Cabling inside equipment shall be carefully routed, trained and laced. Cables so placed that they obstruct equipment devices will not be acceptable.
- G. Equipment shall be set level and plumb. Supporting devices installed shall be set and so braced that equipment is held in a rigid, tight-fitting manner.

#### 3.04 EQUIPMENT PROTECTION

- A. Provide suitable protection for all equipment, work and property against damage during construction.
- B. Assume full responsibility for material and equipment stored at the site.
- C. Conduit openings shall be closed with caps or plugs during installation and made watertight. All outlet boxes and cabinets shall be kept free of concrete, plaster, dirt and debris.
- D. Equipment shall be covered and tightly sealed against entrance of dust, dirt and moisture.
- E. All equipment not energized shall be protected against moisture and dirt absorption by a suitable covering. Also, maintain heat inside the covering by means of 100 watt minimum heaters.

#### 3.05 COOPERATION WITH WORK UNDER OTHER DIVISIONS

- A. Cooperate with all other trades so as to facilitate the general progress of their work. Allow all other trades every reasonable opportunity for the installation of their work and the storage of their materials.
- B. The work under this section shall follow the general building construction closely. Set all pipe sleeves, inserts, etc., and see that opening for chases, pipes, etc., are provided before concrete is placed or masonry installed.

- C. Work with other trades in determining exact locations of outlets, conduits, fixtures, and pieces of equipment to avoid interference with lines as required to maintain proper installation of other work.
- D. Make such progress in work that will not delay the work of other trades. Schedule the work so that completion dates as established by the Engineer are met. Furnish sufficient labor or work overtime to accomplish these requirements if directed to do so.

### 3.06 INSTALLATION OF WORK UNDER ANOTHER DIVISION

- A. Verify the electrical capacities of all motors and electrical equipment furnished under other sections, or furnished by the Owner, and request wiring information from the Engineer if wiring requirements are different from that specified under this Section. Do not make rough-ins until equipment verification has been received.
- B. Install all motors, controllers, terminal boxes, pilot devices, and miscellaneous items of electrical equipment that are not integrally mounted with the equipment furnished under other divisions. All such equipment shall be securely mounted and adequately supported in a neat and workmanlike manner.

### 3.07 CLEAN-UP

- A. Remove all temporary labels, dirt, paint, grease, and stains from all exposed equipment. Upon completion of work, clean equipment, and the entire installation so as to present a first-class job suitable for occupancy. No loose parts or scraps of equipment shall be left on the premises.
- B. Equipment paint scars shall be repaired with paint kits supplied by the equipment manufacturer or with an approved paint.
- C. Clean interiors of each item of electrical equipment. At completion of work all equipment interiors shall be free from dust, dirt and debris.

### 3.08 TESTS

- A. Test all systems furnished under Division 26 and repair or replace all defective work. Make all necessary adjustments to the systems and instruct the Owner's personnel in the proper operation of the system.
- B. Make all circuit breaker and protective relay adjustments and settings.
- C. Make the following minimum tests and checks prior to energizing the electrical equipment:
  - 1. Check all wire and cable terminations for tightness.
  - 2. Test all wiring as specified in Section 26 01 20.
  - 3. Test grounding system as specified in Section 26 04 50.
  - 4. Set all transformer taps as required to obtain the proper secondary voltage.

5. Carefully check all interlocking, control and instrument wiring for each system to ascertain that the system will function properly as indicated by schematics, wiring diagrams, or as specified herein.
6. Mechanical inspection of all low voltage circuit breakers, disconnect switches, motor starters, control equipment, etc. for proper operation.
7. Provide all instruments and equipment required for the above tests.

### 3.09 RECORD DRAWINGS

- A. At the start and during the progress of the job, keep one separate set of blue-line prints for making construction notes and mark-ups.
- B. Show conduit routing and wiring runs as constructed and identify each.
- C. Record all deviations from the Contract Documents.
- D. Submit set of marked-up drawings for review. The final payment will not be made until the review is complete.

### 3.11 OPERATIONS AND MAINTENANCE MANUALS

- A. Compile an Operations and Maintenance Manual on each item of equipment. These manuals shall include detailed instructions and maintenance as well as spare parts lists.
- B. Submit copies for review as hereinbefore specified.
- C. Preliminary Operations and Maintenance Manuals shall be included with the initial shipments.

END OF SECTION

**PART 1 GENERAL**

1.01 SCOPE

- A. This section shall include raceways, enclosures, supporting devices ancillary fittings and appurtenances. Furnish and install the complete raceway systems as shown on the Drawings and as specified herein.
- B. Raceway is a broad-scope term that shall be defined by the National Electrical Code under Article 100.

1.02 APPLICATIONS

- A. Except as otherwise shown on the Drawings, or otherwise specified, all underground and in-slab conduit raceways shall be of the following type:
  - 1. Except as otherwise specified, all power and control underground conduit runs shall be made with schedule 40 PVC. Bends to grade shall be made with plastic coated rigid aluminum conduit.
- B. Except as otherwise shown on the Drawings, or otherwise specified, all above grade conduit raceways shall be of the following type:
  - 1. Indoor exposed power and control conduit shall be rigid aluminum conduit. Instrumentation, signal, and communication conduit shall have 24" separation from power conduits.
  - 2. Outdoor exposed power, control, and instrumentation, signal, and communication conduit shall be rigid aluminum conduit, except where areas are denoted as corrosive or NEMA 4X. In those area furnish plastic coated rigid aluminum conduit, fittings, and boxes.
  - 3. Instrument conduits shall be separated by 24" from power conduits when run in parallel for more than 5'.

1.03 SUBMITTALS AND SHOP DRAWINGS

- A. Process catalog submittals for the following:
  - 1. Rigid Metallic Aluminum Conduit
  - 2. Plastic Jacketed Rigid Aluminum Conduit
  - 3. Rigid Non-Metallic Conduit
  - 4. Liquid-tight Flexible Conduit
  - 5. Liquid-tight Fittings
  - 6. Conduit Bushings
  - 7. Conduit Bodies
  - 8. Conduit Sealing Fittings
  - 9. Expansion-Deflection Fittings
  - 10. Expansion Fittings
  - 11. Cast Metal Boxes
  - 12. Tape Products

- 13. Wiring Devices
- 14. Supporting Devices
- 15. Labels
- 16. Grounding Devices
- 17. Foam Sealant

## **PART 2 PRODUCTS**

### **2.01 RACEWAYS**

- A. Rigid metallic aluminum conduit shall be manufactured of 6063 alloy, T-1 temper, with no more than 0.02% copper content. All conduit couplings shall be threaded aluminum. All such conduit shall be listed with UL and comply with UL-6 and ANSI C80.5. Aluminum conduit shall be New Jersey Aluminum, or equal.
- B. Plastic coated rigid aluminum conduit shall consist of rigid aluminum body that complies with above specifications for rigid aluminum conduit, plus conduit shall have 40 mil thick heat-fused PVC over outside and 2 mil coat of fully catalyzed phenolic inside. The inside coat shall have the chemical resistance of the outer coating and shall not dissolve in lacquer thinner. All couplings shall be equipped with PVC sleeves that extend one pipe diameter or 2", whichever is less, beyond the end of the coupling. All plastic-coated conduit shall conform to NEMA Standard #RNI-1974 (Type A) and such conduit shall be manufactured by Robroy, Perma-Cote, or Kor-Kap.
- C. Non-metallic rigid conduit shall be Schedule 40 PVC. Such conduit shall be UL listed for 90 degrees C and shall conform to NEMA TC-2 and UL-651 standards. Furnish Carlon, Sedco, or equal. Furnish manufacturer's approved solvent for joining couplings.
- D. Liquid-tight flexible conduit shall be constructed of non-metallic sunlight resistant PVC with aluminum core. Furnish Anaconda or equal product.

### **2.02 CONDUIT FITTINGS**

- A. Conduit Hubs for rigid metallic conduit shall be constructed of aluminum. Furnish Meyers Hubs.
- B. Conduit field-applied hubs for sheet metal enclosures shall be aluminum body with recessed neoprene sealing ring, threaded NPT insert, and shall be, T&B 370 AL series, or equal products by OZ/Gedney.
- C. Conduit hubs for non-metallic enclosures shall be fiberglass polyester reinforced with galvanized steel core, complete with locknut and grounding bushing. All such hubs shall be Crouse-Hinds Type NHU, or equal.
- D. Rigid metallic conduit chase nipples, split couplings, slip fittings, unions, reducers, and enlargers, shall be aluminum.
- E. Rigid metallic conduit short els and long els shall be rigid aluminum with NPT threaded hubs and male ends. Throats shall be smooth and free from burrs. All such fittings shall be OZ/Gedney Type "9" Series, Appleton, or equal.

- F. Rigid metallic conduit split couplings shall be made of aluminum and have threaded body with split tightening shelves with neoprene sandwich. Such fittings shall be OZ type "SSP", or equal.
- G. Rigid metallic conduit grounding bushings shall be aluminum body with threaded hub, bakelite insulated throat, and tin-plated copper ground lug. Furnish OZ/Gedney type ABLG, or equal.
- H. Liquid-tight flexible conduit fittings shall be suitable for the specified flexible conduit and shall be type B. Furnish straight or angle connectors as required. All such connectors shall be OZ/Gedney type 4QP, or equal.
- I. Rigid metallic conduit expansion fittings shall consist of metallic barrel joined to hubs at each end. One hub shall be threaded to barrel and other hub shall have slip fit to allow up to four (4") inches of conduit lateral movement. Provide external bonding jumper for each expansion joint. Shall have stainless steel clamps and aluminum straps. Furnish OZ Type "EXA", or equal for expansion fitting and OZ Type ABJ for jumper.
- J. Conduit waterstops for sealing inside of conduit runs shall consist of aluminum pressure discs with sandwiched neoprene seal and with 316 stainless steel hardware. Furnish OZ/Gedney type "CS" series products, as indicated.
- K. Conduit sealing bushings for penetrations in exterior walls shall be constructed of neoprene and shall have a stainless-steel disk with stainless steel bolts and hardware. Furnish OZ/Gedney "CSM" series products. For existing walls core drill wall to size recommended by manufacturer of sealing bushing. Use two bushings per wall penetration, one each side. For newly constructed walls provide a PVC Schedule 40 sleeve in concrete pour. PVC sleeve shall have water stop and the sleeve size shall be as recommended by the manufacturer of the sealing bushing.

## 2.03 CONDUIT BODIES AND BOXES

- A. Conduit bodies such as "C", "LB", "T" and the like pulling fittings shall be aluminum. Covers for damp and/or wet location use shall be gasketed cast metal with "wedge-nut" clamps. Covers for dry locations shall be cast aluminum and hardware shall be 316 stainless-steel. All covers shall be equipped with clamp type clevises. Furnish Crouse-Hinds Form 7, or Appleton Form "FM7" products.
- B. Conduit bodies for use in corrosive areas shall be as specified above but shall have 40 mil plastic coated PVC jacket and 2 mil interior coating as specified for plastic coated rigid metallic conduit. Furnish Robroy, Perma-Cote, or Kor-Kap
- C. Conduit bodies such as "GUA", "GUAT", "GUAL", and the like pulling/splicing fittings shall be cast aluminum with threaded cast aluminum covers. All such conduit bodies shall be Killark "GE" series, or equal products by Crouse-Hinds or Appleton.
- D. Outlet boxes, pullboxes, and junction boxes whose volume is smaller than 100 cubic inches shall be sand-cast, copper-free aluminum. All boxes shall have threaded hubs and integral cast mounting lugs. Furnish Crouse-Hinds "FD" style condulets, Appleton "FD" style Unilets, or equal.

- E. Covers for cast metal boxes shall be gasketed cast metal covers with 316 stainless steel screws and shall be suitable for use in wet or damp locations.
- F. Conduit and device boxes for use in concealed drywall applications only shall be pressed sheet steel type. Furnish Raco or equal.

#### 2.04 PULL AND JUNCTION BOXES

- A. Pullboxes and junction boxes whose volume is less than 100 cubic inches shall be furnished as specified hereinbefore except where sheet metal types are shown, in which case, furnish such sheet metal enclosures in NEMA 4X 316 stainless steel construction with gasketed covers of same material. Provide 316 SS quick release luggage type latches.
- B. Pullboxes and junction boxes whose volume is 100 cubic inches and greater shall be NEMA 4X 316 grade stainless steel type with gasketed stainless steel covers. Provide print pocket and interior back panel for mounting of terminal strips where terminal strips are called for on the drawings. Sheet metal boxes shall be as manufactured by Hoffman or equal. Provide 316 SS quick release luggage type latches.
- C. Covers for sheetmetal pullboxes and junction boxes over 100 cubic inches (and for smaller sized where shown) shall have hinged doors. All hardware shall be stainless steel.
- D. Cast metal junction boxes shall be cast aluminum type with gasketed, cast metal covers, integral mounting lugs, and with stainless steel cover screws.

#### 2.05 LABELS

- A. Buried conduit marking tape for marking path of secondary buried conduits shall be four (4") inch nominal width strip of polyethylene with highly visible, repetitive marking "BURIED CONDUIT" or similar language, repeated along its length.
- B. Voltage warning labels for cabinets shall be waterproof vinyl strips with adhesive back and shall have "DANGER (VOLTAGE) - DISCONNECT ALL SOURCES OF POWER BEFORE ENTERING". Letters shall be highly visible red color on white background.
- C. Specify stainless steel or non-metallic machine printed conduit tags attached with stainless steel wire or nylon tie wraps.

#### 2.06 SUPPORTING DEVICES

- A. Mounting hardware, nuts, bolts, lockwashers, and washers, shall be Grade 316 stainless steel.
- B. Unless otherwise indicated, channel framing and supporting devices shall be manufactured of ASTM 6063, T6 grade aluminum; 1-5/8" wide x 3-1/4" deep (double opening type). Thickness shall be 0.105". Clamp nuts for use with channels shall be grade 316 stainless-steel.

- C. Where indicated, furnish grade 316 stainless steel slotted channel members 1-5/8" wide x 1-5/8" deep or 1 5/8" x 3 1/4" deep, double-faced type, 12 gauge. All hardware and conduit clamps shall be grade 316 stainless-steel.
- D. Conduit clamp supports for terminating conduits onto cable trays shall be mechanically galvanized 316 SS or aluminum with adjustable angle clamp. Fittings shall be provided with 316 stainless steel hardware. Furnish OZ/Gedney type CTC products.
- E. All such channel members and fittings shall be B-Line, Unistrut or equal.
- F. Conduit straps, and associated nuts, lockwashers and bolts for use with channels shall be 316 stainless-steel with 316 stainless steel hardware. Furnish B-Line products or equal.
- G. After-set concrete inserts (drilled expansion shields "D.E.S.") shall consist of two types. For anchors to accommodate 5/16" diameter bolts and smaller, provide HILTI "HDI" series 316 stainless steel anchors. For anchors to accommodate 3/8" diameter and larger bolts, provide HILTI "HVA" series with 316 stainless steel threaded inserts.
- H. Hanger rod shall be 3/8" minimum diameter Type 316 stainless-steel all-thread.
- I. Nest-back or clamp-back conduit supports shall be two-piece type constructed of copper free aluminum. Furnish Thomas & Betts 1976AL Series, or equal.
- J. Conduit beam clamps shall be stainless steel or hardened aluminum and shall be as follows:

TYPE	MANUFACTURER
1. Right Angle	OZ/Gedney Type "UBCG", or equal.
2. Parallel	OZ/Gedney Type "UPCG", or equal.
3. Edge	OZ/Gedney Type "UECG", or equal.
- K. Hanger rod beam clamps shall be clamp type with hardened 316 stainless steel, bolt, Steel City "500" Series, Crouse-Hinds type "MW", or equal. Furnish swivel stud for each rod make- up.
- L. Conduit "J" hangers shall consist of stainless-steel straddle with detachable bolt. Furnish Kindorf type "C-149", Unistrut "J-1200" Series, or equal.
- M. Conduit "U" bolts shall be 316 stainless-steel with 316 stainless steel hex-head bolts.
- N. Equipment stands for supporting devices such as control stations, device boxes and the like, shall consist of a welded structural aluminum c-channel and plate aluminum floor plate as detailed on the drawings.

**2.07 MISCELLANEOUS MATERIAL**

- A. Double bushings for insulating wiring through sheet metal panels shall consist of mating male and female threaded phenolic bushings. Phenolic insulation shall be high-impact thermosetting plastic rated 150 degrees C. Furnish OZ Type "ABB", or equal.
- B. Conduit pull-cords for use in empty raceways shall be glass-fiber reinforced tape with foot-marked identification along its length. Furnish Thomas, Greenlee, or equal products.
- C. Conduit thread coating compound shall be conductive, non-galling, and corrosion-inhibiting. Furnish Crouse- Hinds Type "STL", Appleton Type "ST", or equal.
- D. Plastic compound for field-coating of ferrous material products shall be PVC in liquid form that sets-up semi- hard upon curing. Furnish Rob Roy "Rob Kote", Sedco "Patch Coat", or equal.
- E. Openings around electrical penetrations of fire-resistant rated walls, floors, or ceilings shall maintain the fire resistance rating using approved methods per NEC 300-21. Fire barrier shall be 3M 2001 RW silicon RTV foam or approved equal. All conduits entering building below grade and terminating at cable trays shall have the area between the cables and the conduit sealed with 3M 2001 RW Silicone RTV foam or approved equal.

**PART 3 EXECUTION**

**3.01 RACEWAYS**

- A. Install the conduit system to provide the facility with the utmost degree of reliability and maintenance free operation. The conduit system shall have the appearance of having been installed by competent workmen. Kinked conduit, conduit inadequately supported or carelessly installed, do not give such reliability and maintenance free operation and will not be accepted.
  - 1. Parallel runs of conduit shall be parallel to each other throughout the entire run. Bends and offsets shall occur at the same point such that all offset angles are the same.
  - 2. Conduits making vertical or horizontal changes in direction such that concentric bends are required are acceptable. All concentric bends shall have radii with the same center point.
  - 3. Conduit installation shall be planned such that conduits crossing each other will be minimized.
  - 4. Conduit installations not meeting these criteria in the sole judgment of the Owner or Engineer shall be removed and reinstalled at no charge in the contract price or schedule.
  - 5. Conduits having conductors installed shall not be a reason to not remove and reinstall unacceptable conduit installations. The installed conductors shall be removed and replaced if present in unacceptable conduit systems.
- B. Raceways shall be installed for all wiring runs, except as otherwise indicated.

- C. Conduit sizes, where not indicated, shall be N.E.C. code-sized to accommodate the number and diameter of wires to be pulled into the conduit. Unless otherwise indicated, 3/4" trade-size shall be minimum size conduit.
- D. Unless otherwise noted, conduit runs shall be installed exposed. Such runs shall be made parallel to the lines of the structure. Conduit shall be installed such that it does not create a tripping hazard or an obstruction for headroom.
- E. All runs of rigid conduit shall be threaded, and all male threads shall be coated with non-galling thread compound prior to assembly.
- F. Plastic coated metallic conduit lengths shall be joined with threaded metallic coupling that shall be each equipped with a 40-mil thickness sleeve that shall extend over the threads of the joined conduit. Each joint shall be watertight.
- G. Field-cut threads in runs of plastic-coated metallic conduit shall be cut with a special die that has rear reamed out oversize to slip over plastic coating. Do not attempt to cut threads on plastic coated conduit with regular dies, whereby plastic coating is skinned back to allow the incorrect die to be used. Coat all field-cut threads with cold-galvanizing spray, use two coats to provide 1-mil minimum coating thickness.
- H. Conduit runs made in concrete pours or surface-mounted runs that are attached to the structure, shall be equipped with an expansion/deflection fitting where they cross an expansion joint, or at every 100 feet.
- I. Unless otherwise shown, conduit penetrations through floors located below enclosures, shall be made each with couplings set flush with the outside faces of the concrete pour. Each pair of couplings shall be joined with a threaded spool piece. Use coated aluminum couplings.
- J. Rigid metallic conduit runs shall have their couplings and connections made with screwed fittings and shall be made up wrench tight. Check all threaded conduit joints prior to wire pull. Coat all male threads with Crouse-Hinds "STL" or equal, conductive lubricant prior to joining.
- K. All conduit runs shall be watertight over their lengths of run, except where drain fittings are indicated. In which cases, install specified drain fittings.
- L. Plastic jacketed flexible steel conduit shall be used to connect wiring to motors, limit switches, bearing thermostats, and other devices that may have to be removed for servicing. Unless otherwise indicated, maximum lengths of flex shall be three (3') feet.
- M. Where plastic jacketed flex is installed, make up terminal ends with liquid-tight flex connectors. In wet locations, install sealing gaskets on each threaded male connector. Each flex connector shall be made-up tightly so that the minimum pull-out resistance is at least 150 lbs. Install external spirally wrapped ground wire around each run of liquid-tight flex and bond each end to specified grounding-type fittings.
- N. Empty conduits shall have pull-ropes installed. Identify each terminus as to location of other end and trade size of conduit. Use blank plastic waterproof write-on label and write information on each label with waterproof ink. Pull a mandrel through each conduit

to check and clear blockage before installing pull-rope. Owner's representative shall witness test. Provide documentation that all conduits are clear and ready for future use. Cap exposed ends of empty conduit with threaded plugs.

- O. Conduit runs into boxes, cabinets and enclosures shall be set in a neat manner. Vertical runs shall be set plumb. Conduits set cocked or out of plumb will not be acceptable.
- P. Conduit entrances into equipment shall be carefully planned. Cutting away of enclosure structure, torching out sill or braces, and removal of enclosure structural members, will not be acceptable. No top entry into NEMA 4X where installed outdoors.
- Q. Use approved hole cutting tools for entrances into sheet metal enclosure. Use of cutting torch or incorrect tools will not be acceptable. Holes shall be cleanly cut and they shall be free from burrs, jagged edges, and torn metal.
- R. All raceways shall be swabbed clean after installation. There shall be no debris left inside. All interior surfaces shall be smooth and free from burrs and defects that would injure wire insulation.
- S. Outdoor aluminum runs of raceways shall be installed with expansion fittings and supports as required to accommodate thermal expansion due to changes in temperature appropriate with the structure from which the conduit is supported. Installation shall not appear to be loose or non-linear with changes in temperature from night today or from summer to winter. In no case shall a straight run of conduit be installed over 20' without an expansion fitting. Furnish additional expansion fittings if required by the characteristics of the particular installation.

### 3.02 CONDUIT BODIES AND BOXES

- A. Conduit bodies such as "LB", "T", "GUAT", etc., shall be installed in exposed runs of conduit wherever indicated and where required to overcome obstructions and to provide pulling access to wiring. Covers for such fittings shall be accessible and unobstructed by the adjacent construction. GUA series pulling bodies rather than LB fittings and the like, shall be used for splicing purposes as well as pulling access.
- B. Covers for all conduit bodies shall be installed with gasketed cast metal type where located in damp or wet locations.
- C. All conduit boxes installed whose inside volume is less than 100 cubic inches shall be cast metal type with gasketed cast metal cover, unless otherwise indicated.
- D. All conduit boxes whose inside volume exceeds 100 cubic inches shall be sheet metal type except where gasketed cast metal type, stainless steel or fiberglass reinforced polyester are indicated.
- E. Aluminum boxes and aluminum strut shall be supported 1/4" off of concrete surfaces with insulating washers or similar material or shall be coated with bitumastic.
- F. Use mounting lugs. Drilling through back of boxes is prohibited.

**3.03 RACEWAY SUPPORT**

- A. All raceway systems shall be adequately and safely supported. Loose, sloppy, and inadequately supported raceways will not be acceptable. Supports shall be installed at intervals not greater than those set forth by the NEC, unless shorter intervals are otherwise indicated, or unless conditions require shorter intervals of supports.
- B. Multiple runs of surface mounted conduit on concrete or masonry surfaces shall be supported off the surface by means of aluminum or stainless-steel channels. Attach each slotted channel support to concrete surface by means of two (2) 1/4" diameter stainless steel bolts into drilled expansion shields.
- C. Single runs of surface mounted conduit on concrete or masonry surfaces shall be supported with hot-dipped malleable iron conduit clamps and nest-back spacers. Furnish plastic coated malleable iron conduit clamps and nest backs where corrosive areas are called out.
- D. Conduit runs that are installed along metallic structures shall be supported by means of beam clamps as specified herein.
- E. Where Aluminum is used, install neoprene spacers to prevent Aluminum from direct contact with CMU or concrete.

**3.04 LABELING**

- A. In addition to labeling requirements as specified throughout this and other Sections, install wiring and raceway labeling as follows:
  - 1. Apply identification labels as specified to empty conduits to identify each conduit as to terminus of other end and also to identify trade size of conduit.
  - 2. Where active conduits terminate into bottoms of motor control centers, install label on each conduit terminus and show number and size of wiring and function of circuitry and trade size of conduit.

**END OF SECTION**

## **PART 1 GENERAL**

### 1.01 SCOPE

This section shall include wire and cable, terminating devices, splice kits, labeling, and appurtenances.

### 1.02 STANDARDS

- A. ASTM
- B. UL 1277 Electrical Power and Control Tray Cables
- C. UL 1685 Flame Exposure Test for Tray Cables
- D. ICEA T-29-520 Vertical Cable Tray Flame Test
- E. IEEE 1202 Flame Testing of Cables for use in Cable Tray

### 1.03 SUBMITTALS AND SHOP DRAWINGS

- A. Process catalog submittals for the following:
  - 1. Power and control cable
  - 2. Instrument cable
  - 3. Conductor Connectors
  - 4. Tape Products
  - 5. Labels

## **PART 2 PRODUCTS**

### 2.01 WIRE AND CABLE

- A. All conductors shall be soft-drawn annealed copper, Class B stranding that meets ASTM B-8. Copper conductors shall be uncoated, except as otherwise specified.
- B. Single conductor cable for power, control, and branch circuits shall have cross-linked polyethylene insulation, rated for 600 volts. Cable shall be NEC type XHHW-2. All such cable shall be rated for wet or dry use. Cable insulation shall be color coded with factory pigmented colors below size #6 awg. Color coding shall be as specified under Part 3 of this section. Cable shall be as manufactured by Southwire or equal.
- C. Instrument cable for analog circuits, shall be # 16 awg, twisted shielded pairs or triads with PVC insulation and overall jacket. Cable assembly shall be rated for 600 volts, wet or dry locations. Furnish Okonite "Okoseal-N Type P-OS" or approved equal.
- D. Single conductor cable for 24-volt dc control shall be minimum size #16. Furnish MTW type insulation for panel wiring and XHHW-2 insulation for field wiring in conduits.

- E. Ground mat and associated upcomers and grounding conductors shall be tin-plated stranded copper.

**2.02 CONNECTORS**

- A. Mechanical connectors for 600V class wiring shall be tin-plated copper alloy bolted pressure type with bronze tin-plated hardware. Furnish connectors as follows:

<u>TYPE</u>	<u>MANUFACTURER &amp; TYPE</u>
Single conductor to flat-plate connector	Blackburn LH
Multiple conductor to flat plate connector	Blackburn L2H, L3H, L4H
Split-bolt connector	Blackburn HPS
Two-bolt parallel connector with spacer	Blackburn 2BPW
Cross Connector	Blackburn XT
Splice Connector	Blackburn S
Flush ground connector	OZ Type "VG"

- B. Insulated spring wire connectors, "wire-nuts", for small building wire taps and splices shall be plated spring steel with thermoplastic jacket and pre-filled sealant. Connector shall be rated for 600 volts, 75 degrees C continuous. Furnish King Technology, or equal.
- C. Connectors for control conductor connections to screw terminals shall be crimp-type with vinyl insulated barrel and tin-plated copper ring-tongue style connector. Furnish T&B "Sta-Kon", 3M "Scotchlok", or equal.
- D. Terminal strips for miscellaneous field terminations of control and instrumentation circuits shall consist of 12-point box lug terminals with marking surface. Terminal assembly shall accept #18 to #12 awg and shall be rated 600 volts. Furnish Allen-Bradley #1492-HJ812 terminal blocks.

**2.03 INSULATING PRODUCTS**

- A. Tape products shall be furnished as hereinafter specified and shall be Plymouth, Okonite, 3M, or equal.
- B. General purpose electrical tape shall be 7 mil thick stretchable vinyl plastic, pressure adhesive type, "Slipknot Grey", 3M Scotch 33+, or equal.

- C. Insulating void-filling tape and high voltage bedding tape shall be stretchable ethylene propylene rubber with high-tack and fast fusing surfaces. Tape shall be rated for 90 degrees C continuous, 130 degrees C overload, and shall be moisture-proof. Void filling tape shall be "Plysafe", 3M Scotch 23, or equal.
- D. High temperature protective tape shall be rated 180°C continuous indoor/outdoor, stretchable, self-bonding silicone rubber. High temperature tape shall be Plysil #3455, 3M Scotch 70, or equal.
- E. Insulation putty filler-tape shall be Plymouth #32074, 3M Scotchfill, or equal.
- F. Arc and fireproofing tape shall be Plymouth #3318, 3M Scotch #70 or equal.

#### 2.04 LABELS

- A. Colored banding tape shall be 5 mil stretchable vinyl with permanent solid color. Colors shall be as hereinafter specified. Tape shall be Plymouth "Slipknot 45", 3M Scotch #35, or equal.
- B. Numbered wire marking labels shall be PVC sleeve-type markers, T&B, Brady or equal. Markers using adhesive are not acceptable.
- C. Cable identification ties shall be weather resistant polyester with blank write-on space, T&B, Brady or equal.

#### 2.05 MISCELLANEOUS MATERIAL

- A. Cable grips shall be 316 SS grip-type wire mesh with machined metal support. Furnish Kellems, Appleton, or equal products.
- B. Wire pulling compound shall be non-injurious to insulation and to conduit and shall be lubricating, non-crumbling, and non-combustible. Furnish Gedney "Wire- Quick", Ideal "Yellow" or equal.

### **PART 3 EXECUTION**

#### 3.01 POWER AND CONTROL CABLE

- A. Power and control conductors shall be sized as shown and where no size is indicated, the conductor size shall be #12 awg for power circuits #14 awg for 120 vac control circuits, and #16 awg for instrumentation circuits.
- B. Equipment grounding conductors shall be installed with type XHHW insulated stranded copper conductors and the insulation color shall be green in sizes up to and including #10 awg.
- C. Color coding shall be as follows. Non-factory color coded cables shall be marked with specified color tape. Use the following colors:

CONDUCTOR	120/208V SYSTEMS	480V SYSTEMS
Phase A or L1	Black	Brown
Phase B or L2	Red	Orange
Phase C	Blue	Yellow
Neutral	White	N/A
Ground	Green	Green

- D. Branch circuits may be spliced for receptacle, lighting, and small appliance load inside appropriate junction boxes. Feeders, branch circuit, power wiring, control wiring, and signal wiring shall be installed without splice.
- E. Except as otherwise specified, taps and splices with #10 AWG and smaller, shall be made with insulated spring wire connectors. Such connectors in damp or wet locations shall be waterproofed by filling interstices around wires with silicone rubber and further insulating with an envelope of stretched piece of EPR tape around each wire. Then, apply one-half lapped layer of electrical tape overall.
- F. Motor connections made with #10 AWG and smaller wire shall be made up with set-screwed copper lugs with threaded-on insulating jacket. After make-up of each connector, install two (2) layers half-lapped, of high temperature tape over connector barrel and down one (1") inch over wires.
- G. Taps, splices, and connections in #8 AWG and larger wires shall be made with copper alloy bolted pressure connectors. Each such connector shall be insulated by means of applying insulation putty over sharp edges to present a smooth bonding surface. Next, apply at least four (4) layers, half-lapped each layer of EPR tape. Then, make final wrapping of at least three (3) layers, half-lapped each layer of electrical tape.
- H. Control wiring connections to stud type and screw type terminals shall be made with ring-tongue type crimp connectors. Label each terminal jacket with wire marking label at each connection.
- I. Each wire connection shall be made up tightly so that resistance of connection is as low as equivalent length of associated conductor resistance.
- J. Numbered marking labels shall be installed to identify circuit numbers from panelboards. Install labels on each wire in each panelboard, junction, pullbox and device connection.
- K. Label each wiring run with write-on waterproof labels inside motor control center. Install write-on label ties around wire group at conduit entrance and write-on label the wire size, conduit size and service.

- L. Install PVC sleeve type numbered marking on each control wire termination at each terminal strip and at each device. Do this in motor control center, terminal cabinets, safety switches, remote controllers, pilot operators, and instrumentation equipment. Number selected shall correspond to number on terminal strip.
- M. All wiring inside equipment enclosures shall be neatly trained and laced with nylon tie-wraps.

### 3.02 INSTRUMENTATION WIRING

- A. All 4-20mA analog pairs shall have shields grounded at the instrumentation panel and insulated on the field end unless otherwise required by instrument supplier. Single point grounding shall be maintained.

### 3.03 GROUND WIRING

- A. Each item of equipment shall be adequately and thoroughly grounded. Comply with Article 250 of N.E.C., except where higher standards of grounding have been specified. In addition to requirements as specified under Section 26 04 50, install grounding for general wiring systems as follows.
- B. Equipment grounding conductors (EGC) shall be installed in each run of power and control conduits. These wires shall be green colored in sizes #6 AWG and smaller and green banded in larger sizes. Ground wires shall be type XHHW-2 insulated copper wires.
- C. EGC runs into equipment shall be grounded to equipment bus where available, or to equipment ground lugs.
- D. Where grounding type bushings are installed, bond EGC thereto, and furthermore, ground each bushing lug to equipment ground bus or ground lug, or ground rod.
- E. In each motor terminal box, install equipment ground lug and connect EGC thereto. Bond pump frame to motor frame. Bond motor and pump to grounded electrode conductor.

### 3.04 LABELING

- A. In addition to labeling requirements as specified throughout this Section, install wiring and raceway labeling as follows:
  - 1. Apply numbered wire marking labels to control wiring terminations for each termination in each item of equipment. Use PVC sleeve type labels.
  - 2. Apply numbered wire marking labels to power and control wiring terminations in motor control centers, panelboards, and at outlets, to identify circuit numbers. Use PVC sleeve type labels.

3. Apply numbered wire marking labels to each signal wire termination in each instrument junction box, and in each item of equipment served by instrumentation circuits. Use PVC sleeve type labels.
4. Apply write-on identification labels to wiring sets in each motor control center, and in each pullbox and junction box. Show wire size, conduit size, and line and load information. Use waterproof plastic write-on labels with nylon tie-wraps.

### 3.05 TESTING

- A. Each run of 600V class power and control wiring shall be tested prior to connection of line and load. Make tests with 1000V dc hand-crank or motor driven ohmmeter. Each run of wiring shall be tested phase-to-phase and/or phase-to-neutral, and phase-to-ground. Test results for each test shall be equal to or greater than 25,000,000 ohms with 1000V dc applied. All tests shall be made in the presence of the Owners representative or Engineer.
- B. Test all runs of signal wiring with 250V dc megger. Insulation values shall meet or exceed 1,000,000 ohms per 100 feet (cable to shield).
- C. Should any cable or circuit fail to meet the above tests, replace wire and retest.

END OF SECTION

**PART 1 - GENERAL**

1.01 SCOPE

- A. This section refers to dry-type transformers. Furnish and install transformers as shown on the Drawings and as specified hereinafter.

1.02 STANDARDS

- A. Dry-type transformers shall be listed by UL and shall comply with UL-506, NEMA ST-20.

1.03 SUBMITTALS

- A. Process catalog submittals on dry type transformers.

**PART 2 - PRODUCTS**

2.01 GENERAL

- A. Dry type transformers shall be totally enclosed non-ventilated, 115°C rise. Core and coil shall be totally encapsulated in sand and resin or equivalent.
- B. Each transformer shall be equipped with two 2.5% full-capacity below normal.
- C. Furnish transformers in KVA and voltage ratings as shown on the Drawings. Transformer enclosure shall be suitable for outdoor use. Provide NEMA 3R enclosure.
- D. Sound level of each transformer shall not exceed 42 db at three feet.
- F. Furnish Square D, Eaton, Siemens, or equal products.

**PART 3 - EXECUTION**

3.01 INSTALLATION

- A. Install transformers where shown. Adequately support wall-mounted transformers.
- B. Bond neutral of each transformer to its enclosure and to grounding electrode conductors per NEC article 250. Install grounding electrode conductors from transformer secondary neutral to ground mat.

END OF SECTION

**PART 1 GENERAL**

1.01 SCOPE

- A. This specification covers the requirements for 240 volt and 208 volt lighting panelboards.
- B. This specification defines minimum requirements, characteristic guidelines and features required.

1.02 STANDARDS

- A. All panelboards shall be designed, manufactured, and tested in accordance with the latest applicable standards of UL and NEMA. Panelboards shall be UL listed.

1.03 SUBMITTALS

- A. Submit outline and dimensional drawings and catalog literature to Engineer for review.

**PART 2 PRODUCTS**

2.01 GENERAL

- A Ratings shall be as indicated on the drawings.
- B Circuit Breakers shall be stab in and rated 10,000 amps rms symmetrical interrupting capacity.
- C Panelboards shall have integrated SPD rated for 120 kA. Provide alarm contacts, event counter, and indicator lights.

2.02 CONSTRUCTION

- A. All buses shall be tin-plated copper.
- B. Enclosures shall be painted steel.
- C. NEMA 4 for installation outdoors.

2.03 MANUFACTURER

- A. Panelboards shall be Square D type NQ or equal product by Eaton, General Electric or equal.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install panelboards as scheduled and in locations shown on the Drawings. Provide grounding as specified per 26 04 50 and per NEC.

END OF SECTION

**PART 1 GENERAL**

1.01 SCOPE

- A. This specification covers the requirements for 480 volt distribution panelboards.
- B. This specification defines minimum requirements, characteristic guidelines and features required.

1.02 STANDARDS

- A. All panelboards shall be designed, manufactured, and tested in accordance with the latest applicable standards of UL, NEMA and NEC. The following standards shall apply:

- UL 50 Standard for enclosures for electrical equipment
- UL 67 Standard for panelboards
- NFPA 70 National Electrical Code

1.03 SUBMITTALS

- A. Submit outline and dimensional drawings and catalog literature to Engineer for review.

**PART 2 PRODUCTS**

2.01 GENERAL

- A Ratings shall be as indicated on the drawings.
- B Circuit Breakers shall be rated 35,000 amps rms symmetrical interrupting capacity. Main shall have LSIG electronic trip. Circuit breakers shall have provisions for pad locking for lockout/tagout.
- C Panelboards shall have integrated 480 volt SPD rated for 240 kA. Provide alarm contacts, event counter, and indicator lights.
- D Panelboard shall have space for integral power quality metering unit with ModBus TCP/IP capability with Ethernet port.

2.02 CONSTRUCTION

- A. All buses shall be tin-plated copper.
- B. Breakers shall be stab on type and shall be secured with physical bolt to panel frame.
- C. Enclosures shall be painted steel, NEMA 4 gasketed.
- D. The minimum breaker frame size shall be 125 amp.

2.03 MANUFACTURER

- A. Panelboards shall be ABB ReliaGear neXT, Square D type I-Line or approved equal.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. Install panelboards as scheduled and in locations shown on the drawings. Provide grounding as specified per 26 04 50 and per NEC.

END OF SECTION

**PART 1 GENERAL**

1.01 SCOPE

- A. This specification covers the requirements for 480 volt enclosed motor starters.
- B. This specification defines minimum requirements, characteristic guidelines and features required.

1.02 STANDARDS

- A. All enclosed circuit breakers shall be designed, manufactured, and tested in accordance with the latest applicable standards of UL and NEMA. Enclosed starters shall have UL 508 label.

1.03 SUBMITTALS

- A. Submit outline and dimensional drawings and catalog literature to Engineer for review.

**PART 2 PRODUCTS**

2.01 GENERAL

- A Ratings shall be as indicated on the drawings. Motor starters shall be combination type with circuit breaker disconnect, control power transformer, and pilot devices.
- B Circuit Breakers shall be rated 35,000 amps rms symmetrical interrupting capacity at 480 volts.
- C Starters shall be full voltage, NEMA rated contactors with overloads.
- D Pilot devices shall be NEMA A600 rated. Pilot lights shall be LED type with push to test feature.

2.02 CONSTRUCTION

- A. Enclosures shall be painted steel for non-explosion proof and cast aluminum for explosion proof.
- B. NEMA 12/3R gasketed for installation outdoors.
- C. Provide control power transformer on 480 volt starters with fused primary and secondary. Provide 120 volt controls as indicated on the drawings.
- D. Each starter shall have a 24 volt dc power supply rated 0.7 amps for PLC relay interface. Power supply shall be din rail mounted next to interface relay. Power supply shall be Weidmuller PRO INST series or equal. Relay shall be Schneider RPM12BD with RPZF1 socket or equal. Mount on din rail and provide all end caps and mounting hardware.

2.03 MANUFACTURER

- A. Enclosed starters shall be as manufactured by AA Controls, LLC, Farmersville, Texas, Five Star Electric, San Antonio, Motorcontrols, Inc, Dallas, Texas or approved equal.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. Install starters as shown on the one line diagrams and in locations shown on the drawings. Provide grounding as specified per 26 04 50 and per NEC. Provide pipe support and concrete slab as required per details for control panels.
- B. Retrofit all existing 480 volt starters and each 2400 volt well pump with 24 volt dc power supply and interface relay specified in section 2.02 D above. This shall be done at all Water Plant Sites.
- C. Make breaker trip unit settings and motor overload settings per the motor nameplate data.

END OF SECTION

**PART 1 - GENERAL**

1.01 SCOPE

- A. This section shall include miscellaneous devices.
- B. Furnish and install all such devices and completely connect and wire each device.

1.02 SUBMITTALS AND SHOP DRAWINGS

- A. Process catalog submittals, and equipment data for the following:
  - 1. Receptacles
  - 2. Device boxes

**PART 2 - PRODUCTS**

2.01 RECEPTACLES & LIGHT SWITCHES

- A. Receptacles and light switches shall be specification grade and shall meet NEMA WD-1 requirements. Color shall be brown unless otherwise noted. Furnish Bryant #GFR82T-BRN 20 amp GFCI receptacles where GFCI are called for.
- B. Receptacle covers for outdoors shall be cast aluminum and shall be rated for outdoors "while in use" per NEC. Furnish Red-Dot or approved equal. Plastic enclosures are not acceptable. Indoor receptacles shall have FS type covers constructed of sand cast copper free aluminum.
- C. Device boxes shall be FS type with mounting feet and shall be constructed of sand cast copper free aluminum. Furnish Crouse-Hinds or equal.

**PART 3 - EXECUTION**

3.01 GENERAL

- A. Furnish and install devices where indicated on the drawings and test and verify operation.

END OF SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- A. Furnish and install a system of underground raceways and wiring as shown on the drawings.

1.02 APPLICATIONS

- A. Except as otherwise shown on the Drawings, or otherwise specified, all underground and in-slab conduit raceways shall be of the following type:
  - 1. For small diameter conduits for instrumentation and feeder circuits, conduit runs shall be made with schedule 40 PVC. Bends to grade shall be made with plastic coated rigid aluminum conduit. All conduit coming out of the ground in grass areas shall have concrete mow protection as detailed on the drawings. Plastic coated conduit in all cases shall extend 3" above the concrete.
  - 2. All instrumentation underground conduit runs shall be made with schedule 40 PVC conduit with plastic coated rigid metallic conduit upturns. A 24" separation shall be maintained from power conduit ductbanks or if in the same ductbank, it shall be plastic coated rigid steel conduit the whole way.

1.03 SUBMITTALS

- A. Process submittals for the following:
  - 1. Non-Metallic conduit
  - 2. Metallic conduit
  - 3. Grounding Bushings
  - 4. Buried conduit marker tape
  - 5. Conduit supporting saddles

1.04 RELATED WORK SPECIFIED UNDER OTHER SECTIONS

- A. Refer to Section 26 01 10 for raceways.
- B. Refer to Section 26 01 20 for wiring.
- C. Refer to Section 26 04 50 for grounding.

**PART 2 PRODUCTS**

2.01 RACEWAYS

- A. Raceways shall be as specified in Section 26 01 10.

2.02 MISCELLANEOUS

- A. Gravel for underbedding of conduits shall be washed type pea gravel.
- B. Plastic saddles (where allowed) for spacing and supporting conduits shall be interlocking types as manufactured by Cantex.
- C. Plastic marker label tape for buried conduits shall be yellow background with black letters with repetitive marking "ELECTRIC LINE" on yellow background, continuous along its length. Furnish T&B # NA-0608, or equal tape.

### **PART 3 EXECUTION**

#### **3.01 EXCAVATION AND BACKFILLING**

- A. Do all excavating and backfilling necessary for the installation of the work. This shall include shoring and pumping in ditches to keep them dry until the work has been installed.
- B. All excavations shall be made to proper depth, with allowances made for floors, forms, beams, piping, finished grades, etc. Ground under conduits shall be undisturbed earth or if disturbed, mechanically compacted to a density ratio of 95% before conduits are installed.
- C. All backfilling shall be made with selected soil, free of rocks and debris, and shall be pneumatically tamped in six (6") inch layers to secure a field density ratio of 95%.
- D. Field check and verify the locations of all underground utilities prior to any excavating. Avoid disturbing these as far as possible. In the event existing utilities are broken into or damaged, they shall be repaired to make their operation equal to that before the trenching was started.
- E. Where conduits turn up provide 6" rise of concrete encasement to protect conduit from mowing.

#### **3.02 RACEWAYS**

- A. All underground conduits shall be PVC schedule 40 unless otherwise noted. All bends to grade shall be made with plastic coated rigid metallic conduits and shall extend to 6" above grade. Conduits shall be watertight over the entire length of the underground run.
- B. Install all power, control, and signal wiring. Label each single conductor wire at each connection with PVC sleeve type wire labels. Label each signal cable at each end with plastic waterproof write-on type label to identify terminal connection and function and device served.
- C. Where empty conduits terminate into equipment install blank "disc" under grounding bushing and bring specified foot-marked pull tape through disc. Label each end of each

pull tape with waterproof plastic label to identify terminus of other end and also show conduit size.

**3.03 WIRING**

- A. All underground wiring runs shall be installed from line to load without splice.

END OF SECTION

**PART 1 GENERAL**

1.01 SCOPE

- A. This section covers the general requirements for the instrumentation.
- B. Auxiliary and accessory devices necessary for system operation or performance, such as relays, din connectors, or terminals to interface with other Sections of these Specifications, shall be included.

1.02 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of products of this type, and whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer: Qualified with at least 5 years of successful installation experience on projects with work similar to that required for this project.
- C. NEC Compliance: Comply with the National Electrical Code, NFPA 70, as applicable to wiring and other electrical construction of the unit.
- D. UL Compliance: Provide components with UL listing and labeling for applicable UL categories. Custom panels, control panels, and instrument panels and the like shall be manufactured by a fabricator approved as a UL508A shop and shall bear a UL 508A (UL Industrial Control Panel) label.
- E. Provide complete unit and installation to conform with NFPA-90A.

1.03 SUBMITTALS

- A. Submit catalog literature, specification material and installation and operation manual for each instrument and device specified herein.
- B. Submit outline and dimensional drawings and wiring diagrams to Engineer for review.
- C. Submit shop drawings for including wiring and dimensional outlines. Shop drawings shall include ISA loop drawings. Loop drawings shall include all device terminal numbers and wire numbers.

1.04 SYSTEM RESPONSIBILITY

The contractor shall assume complete "SYSTEM RESPONSIBILITY" for the instrumentation system. "System Responsibility" shall mean that the Contractor is responsible for the overall operation, satisfactory performance, and integration of the individual components into the whole system so that the entire system functions in whole and in its parts as intended by the Contract Documents.

1.05 RELATED WORK

26 09 30 SCADA Equipment

**PART 2 PRODUCTS**

2.01 SURGE SUPPRESSORS

- A. Surge suppressors for protecting 120vac circuits shall meet UL 1449, UL 1283, NEMA LS-1 1992, and ANSI/IEEE C62.41 and C62.45. Load current rating shall be 20 amps at 120vac.

2.02 ENCLOSURES

- A. Enclosures for PLC and instrumentation equipment shall be hinged door type and shall have interior mounting sub panel. Enclosure shall be NEMA 4 with 3-point latch. Enclosure shall be sized to house the specified equipment but shall not be less than the size indicated on the drawings.
- B. Enclosure rating for locations in the elevated tank pedestal shall be NEMA 4. Outdoor enclosures shall be factory powder coated and painted off white.

2.03 INSTRUMENTS

- A. All instruments for tank levels are existing loop powered transmitters and shall be reused. Provide new conduit and wire to existing transmitter. Provide flex conduit connection for instrument lead wires and terminate in new junction box.

2.06 MISCELLANEOUS

- A. Terminal strips for connection of field wiring shall be DIN rail mounted channel mounted terminals suitable for connecting #22 to #12 wire sizes. Terminals shall be solderless box lug type with pressure plate and removable terminal marking strips. Box lugs shall be tin-plated copper. Terminals shall be Allen-Bradley 1492-HMI series with required DIN rail mounting channel and end clamps. Fused terminals for 24-volt dc instrumentation circuits shall be rated 10-57 volts dc, shall have blown fuse LED indicator and shall be Allen-Bradley 1492-H5 series. Fused terminals for 120-volt ac circuits shall be rated 300 volts ac, shall have neon blown fuse indicator and shall be Allen-Bradley 1492-H4 series. Terminal strips shall have factory terminal markers.
- B. PLC interface relays shall be din rail mounted, single pole with 24 vdc coil. Furnish Phoenix Contact model PLC-RSC-24DC/21 relay module.
- C. Analog loops shall have surge suppression on each loop. Surge suppressors shall be din rail mounted, provide Phoenix Contact model TTC-6-1X2-24DC-UT surge protection device.

- D. Circuit breakers shall be din rail mounted. 120 vac circuit breakers shall be rated 10kA interrupting rating. Furnish Schneider model QOU115 or equal. 24 vdc circuit breakers shall be Schneider model M9F42105 or equal.
- E. Non fused terminal blocks shall be din rail mounted, furnish Phoenix Contact UT 6 feed through terminal blocks.
- F. Ground terminal blocks shall be Phoenix Contact UT 6-PE ground terminal blocks.
- G. Furnish all required terminal strip end covers and end clamps as required by each terminal block type.
- H. Furnish control panel devices as indicated in the drawings. Pushbuttons, selector switches, and pilot lights shall be oil tight, Allen-Bradley type 800H or equal. Pilot lights shall be LED, transformer type and shall have push-to-test option.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION GENERAL**

- A. Permanently mount the instruments, and all required appurtenances in accordance with manufacturer's requirements. All work shall be done in accordance with industry standards, the NEC, ISA recommendations and in a workmanship like manner.
- B. Calibrate and test all instruments.
- C. Certify that all instrument installations and calibrations are done in accordance with ISA and the manufacturer's recommendations.
- D. Provide completed ISA calibration sheets for all new instruments provided.
- E. All surge suppression devices shall be grounded with minimum #8 ground wire.

#### **3.02 OPERATIONS AND MAINTENANCE MANUALS**

- A. Six (6) weeks prior to the completion of the project, compile an Operations and Maintenance Manual on the instrumentation equipment. These manuals shall include detailed instructions, periodic calibration requirements and maintenance, as well as recommended spare parts lists.

END OF SECTION

**PART 1 GENERAL**

1.01 SCOPE

- A. This section covers radio systems, antenna, and antenna cable. Furnish and install all equipment and materials as shown on the drawings and specified herein. Work shall include all necessary materials, equipment, labor, and services.
- B. Auxiliary and accessory devices necessary for system operation or performance, such as relays din connectors, or terminals to interface with other Sections of these Specifications, shall be included.

1.02 QUALITY ASSURANCE

- A. Comply with Section 26 09 30.

1.03 RELATED WORK

- A. Section 26 09 10, Instrumentation

1.04 SUBMITTALS AND SHOP DRAWINGS

- A. Process catalog submittals, and equipment data for the following:
  - 1. Antennas
  - 2. Antenna cable and accessories
  - 3. Radios
  - 4. Antenna mounting brackets

**PART 2 PRODUCTS**

2.01 RADIOS

- A. Radios shall be unlicensed 900 Mhz 1 watt radios.
- B. Furnish new radio for each site and one spare. Radios shall be Freewave ZumLink model Z9-PE2.

2.02 DIRECTIONAL ANTENNAS

- A. Antenna shall be Yagi type. Antenna shall have 6 dBi gain and shall be vertically polarized.
- B. Directional antenna shall be Samco 936 or approved equal.

2.03 OMNI DIRECTIONAL ANTENNAS

- A. Omni directional antenna shall be 6 dBd gain. The frequency range shall be 890 Mhz to 960 Mhz.

- B. Omni directional antenna shall be Andrews DB586 or approved equal.

#### 2.04 ANTENNA CABLE AND ACCESSORIES

- A. Antenna cable shall be 1/2" TIMES MICROWAVE #LMR400 coaxial cable.
- B. Each antenna cable shall be grounded outside of the PLC enclosure with a TIMES MICROWAVE Products # GK-S400TT series grounding strap kit.
- C. Connectors shall be N type, TIMES MICROWAVE EZ-400-NMH-X.
- D. Each antenna cable shall have a Polyphasor PCTEL BWS07 grounded surge arrester at the bottom of the RTU or radio enclosure.
- E. Furnish 1/2" foam superflex, Andrew #FSJ4-50A for final connections to antenna and radio and where indicated on the drawings. Superflex shall have factory installed connectors.

#### 2.05 ANTENNA SUPPORTS

- A. Furnish and install Omni antenna on the top of the new tower at Research Water Plant.
- B. Provide new Rohn 45G tower at Research Water Plant. Furnish side mount and install Yagi on the side of the Parrish Elevated Tank at the Parrish Water Plant. All other sites shall have a new Rohn 25G as indicated on the drawings.

### **PART 3 EXECUTION**

#### 3.01 ANTENNA INSTALLATION

- A. Furnish and install the new Omni directional antenna at the Research Water Plant. Furnish and install new directional antennas at all other sites and aim at Research Water Plant.

#### 3.02 ANTENNA AND CABLE INSTALLATION

- A. Weatherproof all outdoor connectors with shrink tubing. Carefully inspect installed cable for nicks and kinks.
- B. Check VSWR (voltage standing wave ratio) at each site after installation and submit test results to engineer for review.

END OF SECTION

**PART 1 GENERAL**

1.01 SCOPE

- A. This section covers SCADA equipment, testing and verification. Work shall include all necessary materials, equipment, labor, and services.

1.02 QUALITY ASSURANCE

- A. All PLC and radio equipment assemblies shall be fabricated by qualified integrator. The following companies are pre-approved:
  - 1. RLC Controls, McKinney, Texas
  - 2. Control Panel USA, Inc. Austin, Texas
  - 3. Wallace Electric Controls, Meridian, Texas
  - 4. WHECO, Fort Worth, Texas
  - 5. Multivolt Electric, Temple, Texas

**PART 2 PRODUCTS**

2.01 PLC

- A. New PLCs shall be Modicon M340 system. Enclosure shall be per 26 09 10. The PLC shall have the following components:
  - 1) CPU Module – Modicon M340 Central Processing Unit (CPU), model BMEP342020.
  - 2) 24-volt DC power supply, model BMXCPS2010.
  - 3) Sixteen-point discrete input module, model BMXDDI1602, units as required.
  - 4) Sixteen-point discrete output module, model BMXDDO1602, units as required.
  - 5) Eight-point analog input module model BMXAMI0810, units as required.
  - 6) PLC Rack, units as required, BMXXBP0600, units as required.

2.02 24 VOLT UPS AND POWER SUPPLY AND NETWORK COMPONENTS

- A. Furnish and install a 24V DC 10 Amp Power Supply (PSU) for the equipment as shown on the drawings. The 24V DC PSU shall be Phoenix Contact #2866763.
- B. Furnish and install a 24V DC 10 Amp Uninterruptable Power Supply (UPS) for the equipment as shown on the drawings. The 24V DC UPS shall be Phoenix Contact #2320225.
- C. Furnish and install a 24V DC 7 Amp Hour Battery Module. The Battery Module shall be Phoenix Contact #1274118.
- D. Network switch shall be a unmanaged 5 port copper ethernet switch. Furnish Trendnet TI-E50 or equal.

**2.03 ENCLOSURE**

- A. Provide a new enclosures for the Parrish Water Plant Site and Research Water Plant. Enclosures shall be NEMA 12 indoors and NEMA 4 outdoors with three point latch and sub panel. Provide Hoffman, Saginaw or equal product. Outdoor enclosure shall be factory painted white.
- B. All other sites shall use existing 24" wide by 48" tall by 12" deep. Provide PLC equipment, radio, Ethernet switch, UPS & dc power supply, interface relays and terminal strips on a 45" tall by 21" wide subpanel.

**PART 3 EXECUTION**

**3.01 GENRAL**

- A. PLC programming will be furnished by others. Provide factor test. All discrete input points and output points shall be verified to terminal strips. All analog loops shall be tested and verified from field terminal to PLC I/O register. Scale all analog points to a range of 4000 to 20,000. Test each analog input at 25%, 50%, 75%, and 100%. Provide 10 days notice to Engineer. Provide address register list documentation.
- B. Field test each I/O point to PLC I/O address register. Verify status inputs and control outputs to end device. Coordinate with Owners Representative. Final startup will be by others.

## PART 1 - GENERAL

### 1.01 SCOPE

- A. This section covers computer systems and HMI (human machine interface) software. Work shall include all necessary materials, equipment, labor, and services.
- B. Auxiliary and accessory devices necessary for system operation or performance, such as relays din connectors, or terminals to interface with other Sections of these Specifications shall be included.

### 1.02 QUALITY ASSURANCE

Comply with Section 26 09 10, Part 1.02, Paragraph B.

### 1.03 RELATED WORK

Section 26 09 10, Instrumentation  
Section 26 09 30, SCADA Equipment

## PART 2 - PRODUCTS

### 2.01 COMPUTER SYSTEM

- A. Furnish and install one (1) workstation with the following minimum specification:

Hardware:

Dell	Precision 3660 Tower
Processor:	Intel® Core i7-13700 (30 MB Cache, 16 Core (8+8), 2.1 GHZ
Memory:	32 GB DDR5 UDIMM 4400MHz
Monitors:	Dell 24 Monitor – P2422H
Video Card:	Nvidia T1000 8GB
Storage:	Two each - 2 TB 7200 SATA 3.5" HDD
Removable:	16X DVD+/-RW, with Roxio Creator & CyberlinkPowerDVD

Software:

Operating System:	Window® 11 Professional
Productivity Software:	Microsoft® Office Latest Version
Document Software:	Adobe Acrobat Pro Latest Version
Antivirus/spam/firewall:	MacAfee® Total Protection

- B. Provide HMI software required for a complete and operational system. The workstation shall be configured as a stand alone system. Provide VTSCADA software.
- C. VTScada Software shall be 200 tag Development Runtime, Alarm Notification, 1 thin client & 12 months of Support Plus.
- D. Provide 1500 VA UPS. UPS shall be APC model BX1500M, mini tower, 120 vac in and out.

**PART 3 - EXECUTION**

3.01 GENERAL

- A. Furnish new computer system and install at the service center in location shown on the drawing. Install all software except VT SCADA. Provide license to Owner.

3.02 CONFIGURATION

- A. New computer system and HMI configuration. Configuration will be performed by others.

END OF SECTION

Source Water Name

1 – Parrish Well

2 - Barlow Well

3 - Concord Well

4 - Meyers Well

5 – Research Well

Type of Water

GW

GW

GW

GW

GW

Report Status Location

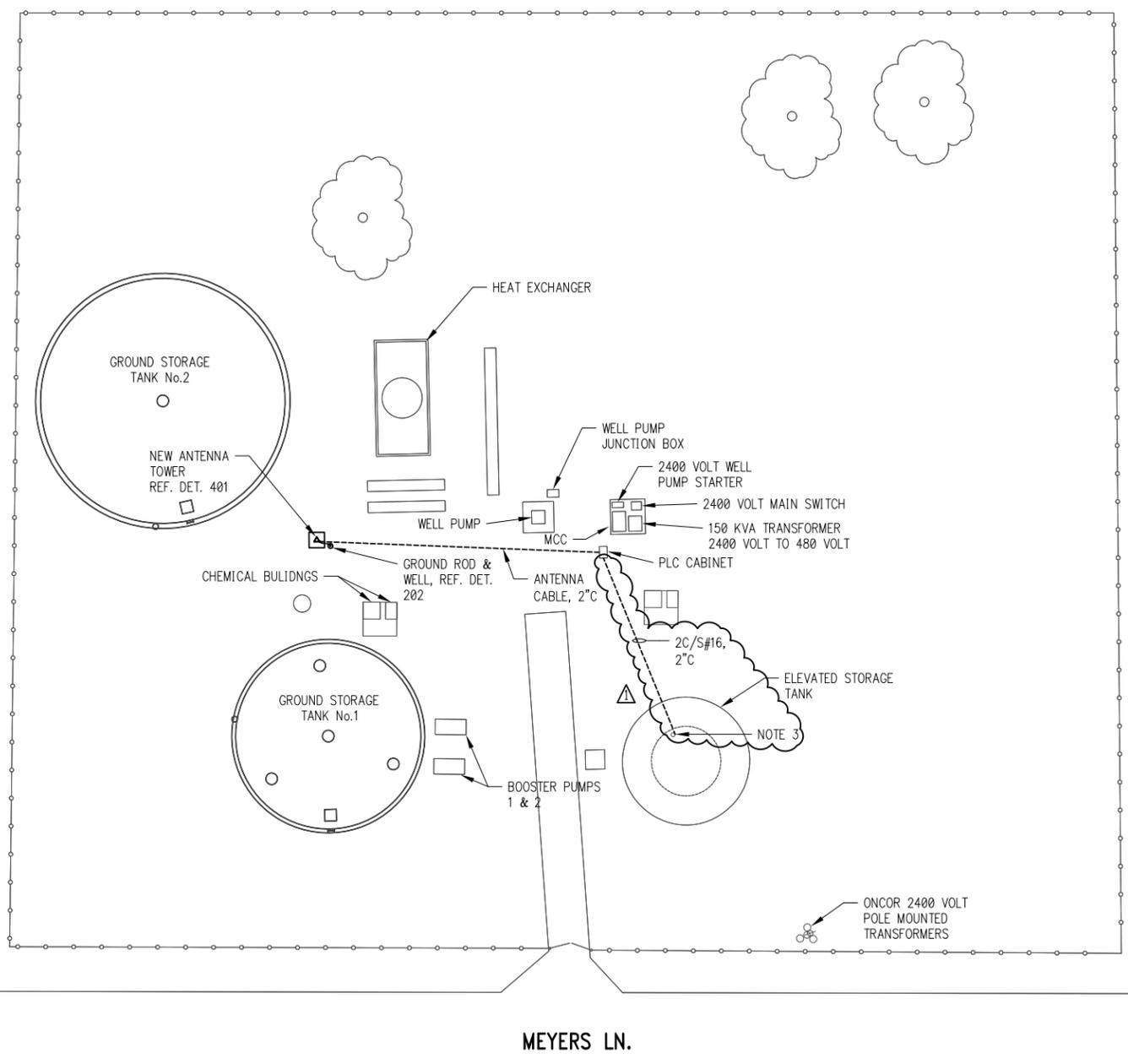
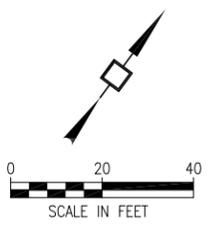
2801 Parrish St.

3709 Hatcher St.

4505 Concord Ave.

4410 Meyers Ln.

601 Research Blvd.



- NOTES:
1. USE EXISTING PLC CABINET FOR NEW PLC SUBPANEL. FROM EXISTING PLC CABINET USE EXISTING CONDUITS TO STARTERS AND PROVIDE NEW WIRING FROM PLC ENCLOSURE TO EACH STARTER AND ANALOG POINT. AND INTERFACE RELAYS IN STARTERS. POWER NEW PLC FROM EXISTING 120 VAC CIRCUIT FROM PANELBOARD. PROVIDE NEW WIRING TO PANELBOARD.
  2. RUN 2" C WITH 36" LONG RADIUS 90 DEGREE BENDS FROM NEW PLC CABINET TO ANTENNA TOWER. INSTALL SPECIFIED COAX CABLE IN CONDUIT.
  3. PROVIDE SADDLE TAP ON 6" VERTICAL RISER AND ADD LOOP POWERED TRANSMITTER, 0 TO 100 PSI. ASHCROFT G17M024F2100# OR EQUAL.

**ELECTRICAL SITE PLAN**  
MEYERS LANE WATER PLANT

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NO.	DATE	REVISION	BY
	12/12/2024	REVISION No.1	JJK

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KPA Firm Registration Number F-510

Plot Date: Dec 12, 2024 - 4:06pm  
Plotted By: REBRA

PROJECT NO. 22-107

DRAWN BY Richard Brady

DESIGNED BY Joseph J. Kotrla, P.E.

APPROVED BY *Joseph J. Kotrla*

DATE NOVEMBER 25, 2024 FIRM No. F-338

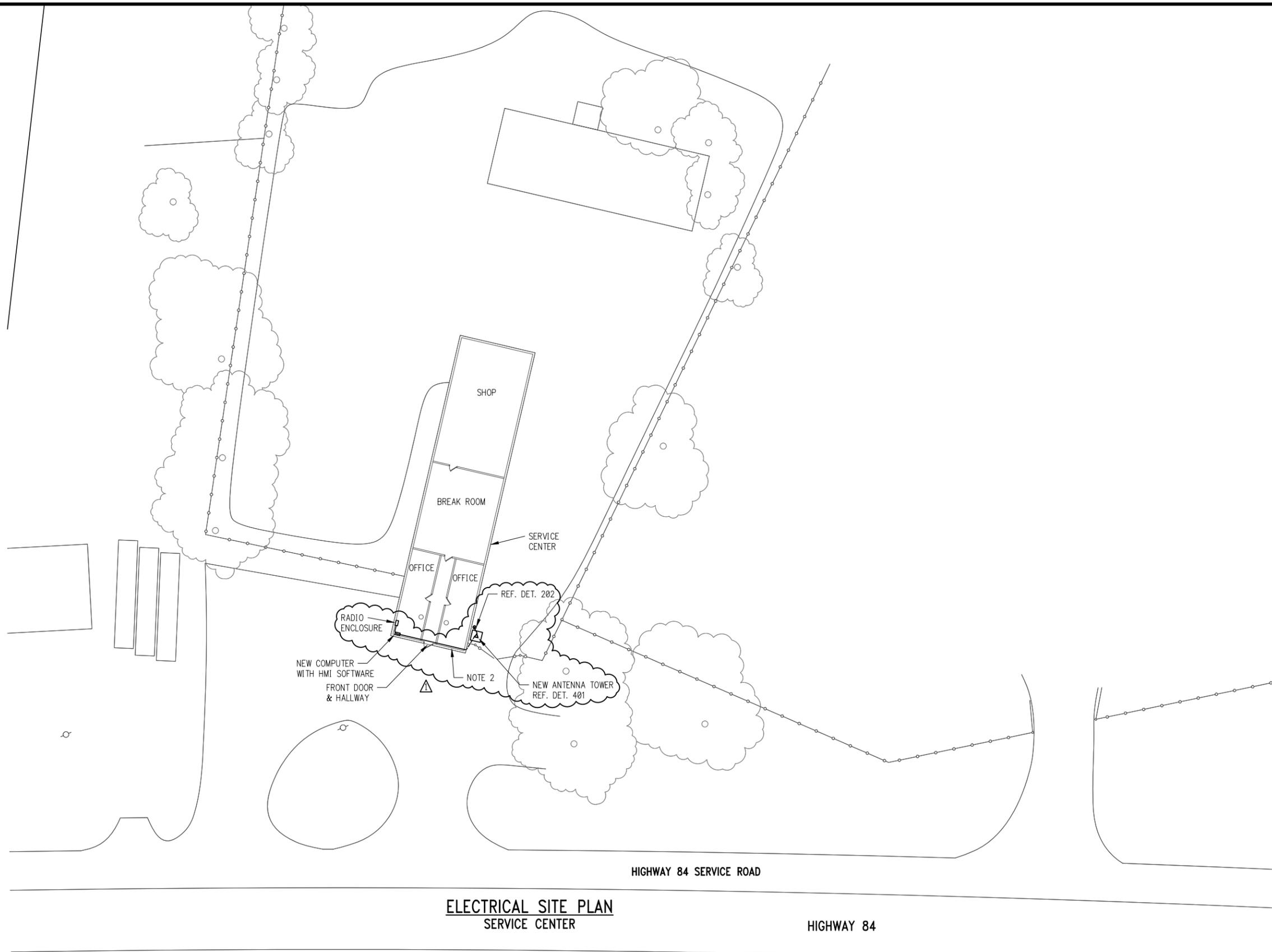
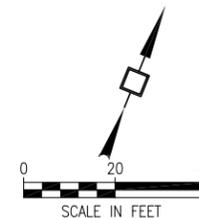


**KASBERG, PATRICK & ASSOCIATES, LP**  
CONSULTING ENGINEERS  
TEMPLE, TEXAS 76501

**CITY OF BELLMEAD, TEXAS**  
WATER SYSTEM SCADA IMPROVEMENTS

ELECTRICAL  
MEYERS SITE PLAN - EXISTING

SHEET NO. **E-18**  
OF **28**



- NOTES:
1. PROVIDE RADIO, ETHERNET SWITCH AND 24 VOLT UPS IN NEMA 1 ENCLOSURE W/ 3 POINT LATCH. MOUNT ON WALL.
  2. RUN ANTENNA CABLE EXPOSED FROM TOWER TO RADIO ENCLOSURE IN 2" CONDUIT. RUN CONDUIT EXPOSED IN CORNER OF CEILING INSIDE SERVICE CENTER.
  3. PROVIDE 120 VAC TO RADIO ENCLOSURE AND COMPUTER UPS FROM RECEPTACLE IN OFFICE NEAR COMPUTER DESK. COMPUTER DESK FURNISHED BY OWNER.

**ELECTRICAL SITE PLAN**  
SERVICE CENTER

HIGHWAY 84

Z:\202.107\Drawg\Electrical\E-05 Electrical Site Plans-Modified.dwg - GENERAL-01

12/12/2024	REVISION No.1	JJK
NO.	DATE	REVISION
© 2024 Kasberg, Patrick & Associates, LP		Plot Date: Dec 12, 2024 - 4:07pm
KPA Firm Registration Number F-510		Plotted By: REBRA

PROJECT NO.	22-107
DRAWN BY	Richard Brady
DESIGNED BY	Joseph J. Kotrla, P.E.
APPROVED BY	<i>Joseph Kotrla</i>
DATE	NOVEMBER 25, 2024
FIRM No.	F-338



**KASBERG, PATRICK & ASSOCIATES, LP**  
CONSULTING ENGINEERS  
TEMPLE, TEXAS 76501

<b>CITY OF BELLMEAD, TEXAS</b> WATER SYSTEM SCADA IMPROVEMENTS
<b>ELECTRICAL SERVICE CENTER SITE PLAN</b>

SHEET NO. **E-24**  
OF **28**



Description \_\_\_\_\_ Project No. \_\_\_\_\_

Originator \_\_\_\_\_ Sheet No. \_\_\_\_\_ of \_\_\_\_\_

Date 12/9/24

Grid: 5x5=1"

# Bellmead SCADA Pre-Bid

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- John Alligood                      Trac-n-trol                                [jalligood@tracntrol.com](mailto:jalligood@tracntrol.com)
- Jake Weaver                        Trac-n-trol                                [jweaver@tracntrol.com](mailto:jweaver@tracntrol.com)
- Chris Argo                            Trac-n-trol                                [cargo@tracntrol.com](mailto:cargo@tracntrol.com)

**CITY OF BELLMEAD, TEXAS**  
**Water System SCADA Improvements**

**ADDENDUM NO. 1**  
**December 4, 2024**

The construction plans and specifications for the City of Bellmead Water System SCADA Improvements, on which bids are to be received until 2:00 P.M. on Tuesday, December 17, 2024 are hereby modified as follows:

1. The non-mandatory Pre-Bid Conference is rescheduled for Monday, December 9, 2024 at 9:00 A.M.
2. Technical questions and inquiries should be directed to Joe Kotrla, P.E., [jkotrla@mccreary-engr.com](mailto:jkotrla@mccreary-engr.com), until 12:00 p.m. on Thursday, December 12, 2024. The Engineer and/or owner shall not be bound by any references obtained by the Bidders unless an addendum is produced and released.
3. Bidders shall acknowledge receipt of this Addendum in the space provided in the proposal.

*Ginger R. Tolbert*

Ginger R. Tolbert, P.E.  
Kasberg, Patrick & Associates, LP  
19 North Main Street  
Temple, Texas 76501

12/4/2024

Date



**CITY OF BELLMEAD, TEXAS**  
**Water System SCADA Improvements**

**ADDENDUM NO. 2**  
**December 12, 2024**

The construction plans and specifications for the City of Bellmead Water System SCADA Improvements, on which bids are to be received until 2:00 P.M. on Tuesday, December 17, 2024 are hereby modified as follows:

**1. Specifications:**

Reference Specification Section 26 09 30 SCADA, Part 1.02 Paragraph A. Add the following companies to the pre-approved list:

- 6. Trac-N-Trol, Inc, Georgetown, Texas
- 7. Dedicated Controls, LLC, Austin, Texas

2. Reference Specification Section 26 09 30 SCADA, Part 2.01 Paragraph A. Make the following changes: Change the CPU Module from a Modicon Model M340 Model BMEP342020 to a Modicon Model M340 model BMXP34100. Add Item 7 to the paragraph “7) Ethernet Network Module Model BMXNOE0100.”

Add the attached Specification Section 26 09 40 Computers and HMI to the specifications.

**3. Drawings:**

Replace E-18 with the attached Revised E-18

Replace E-24 with the attached Revised E-24

4. Bidders shall acknowledge receipt of this Addendum in the space provided in the proposal.

  
\_\_\_\_\_  
Ginger R. Tolbert, P.E.  
Kasberg, Patrick & Associates, LP  
19 North Main Street  
Temple, Texas 76501

12/12/2024  
\_\_\_\_\_  
Date

