



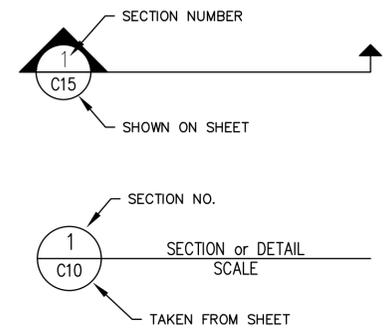
**GENERAL NOTES**

- ALL WORK TO BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
- THE CONTRACTOR IS TO PROVIDE A DETAILED CONSTRUCTION SCHEDULE DELINEATING CONSTRUCTION MILESTONES AND THE NATURE OF WORK BEING PERFORMED. THE SCHEDULE SHALL DETAIL ACTIVITIES FROM THE START OF CONSTRUCTION THROUGH STARTUP. THEIR SCHEDULE SHALL BE PROVIDED TO THE ENGINEER TWO (2) WEEKS PRIOR TO CONSTRUCTION AND UPDATED WEEKLY.
- THE CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO COMPLETE THE PROJECT IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DRAWINGS INCLUDING SUCH INCIDENTALS AS MAY BE NECESSARY TO MEET APPLICABLE AGENCY REQUIREMENTS AND PROVIDE A COMPLETED PROJECT.
- THE CONTRACTOR SHALL FURNISH ALL MATERIALS, LABOR AND EQUIPMENT AND PERFORM WORK SHOWN OR IMPLIED AS NECESSARY FOR THE COMPLETED LIFT STATION, PIPING, AND EVAPORATION PONDS, READY FOR USE.
- THE ENGINEER HAS ATTEMPTED TO LOCATE EXISTING SUBSURFACE UTILITIES, HOWEVER, SOME MAY EXIST THAT ARE NOT SHOWN. THE CONTRACTOR SHALL POT-HOLE AS NECESSARY AND EXERCISE CARE IN THEIR WORK SO AS TO AVOID DAMAGE TO ANY UTILITIES. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION STAKING, ALL DIMENSIONS, ELEVATIONS, AND LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO BEGINNING THE WORK.
- ANY SUBSURFACE CONDITIONS ENCOUNTERED THAT ARE UNUSUAL OR DIFFERENT THAN THOSE INDICATED BY THE ENGINEER SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER.
- CONTRACTOR SHALL OBTAIN, AT THEIR OWN EXPENSE, ALL PERMITS REQUIRED OF THEIR WORK AND SHALL FAITHFULLY ADHERE TO THE ALL PERMIT REQUIREMENTS.
- TEMPORARY AND PERMANENT EROSION CONTROL STRUCTURE METHODS SHALL BE IN ACCORDANCE WITH COUNTY REGULATIONS AND ARE TO BE UTILIZED DURING CONSTRUCTION.
- ALL EROSION CONTROL STRUCTURES SHOWN OR AS REQUIRED DURING CONSTRUCTION SHALL BE CONTINUOUSLY MAINTAINED THROUGH WARRANTY PERIOD AND UNTIL RE-VEGETATION TAKES HOLD.
- CONTRACTOR SHALL CLEAN UP, SEED, AND RESTORE DISTURBED AREAS IMMEDIATELY UPON COMPLETION OF THE WORK IN THE AFFECTED AREA.
- ALL EXISTING FACILITIES SHALL BE MAINTAINED IN-PLACE BY THE CONTRACTOR UNLESS OTHERWISE SHOWN OR DIRECTED. CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO SUPPORT, MAINTAIN, OR OTHERWISE PROTECT EXISTING UTILITIES AND OTHER FACILITIES AT ALL TIMES DURING CONSTRUCTION. CONTRACTOR TO LEAVE EXISTING FACILITIES IN AN EQUAL OR BETTER-THAN-ORIGINAL CONDITION.
- THE CONTRACTOR SHALL ERECT AND MAINTAIN BARRICADES, WARNING SIGNS, CONES IN ACCORDANCE WITH STATE, LOCAL AND FEDERAL GUIDELINES TO ENSURE THE SAFETY OF WORKERS AND THE PUBLIC. ALL BARRICADES, SIGNS SHALL BE IN PLACE PRIOR TO THE BEGINNING OF ANY CONSTRUCTION ACTIVITY.
- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN APPROVAL FOR A TRAFFIC CONTROL PLAN. THE TRAFFIC CONTROL PLAN MUST BE SUBMITTED AND APPROVED BY COUNTY AND THE OWNER'S REPRESENTATIVE.
- UNLESS OTHERWISE GRANTED PERMISSION BY THE OWNER IN WRITING, THE CONTRACTOR MUST ALLOW ACCESS TO ALL PROPERTIES FOR BOTH RESIDENTS AND EMERGENCY VEHICLES.
- THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR THE CLEANLINESS AND SAFETY OF ALL ROADWAYS ADJACENT TO THE PROJECT SITE. IF AT ANY TIME, THESE ROADWAYS ARE FOUND TO BE DANGEROUS OR NOT PASSABLE DUE TO DEBRIS OR MUD, THE COUNTY MAY SHUT THE PROJECT DOWN.
- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER OF ANY PROBLEM IN CONFORMING TO THE APPROVED PLANS FOR ANY ELEMENT OF THE PROPOSED IMPROVEMENTS PRIOR TO ITS CONSTRUCTION.
- BLUE STAKES - THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AND THE FACILITY OPERATOR FOR LOCATION OF UNDERGROUND UTILITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION, AS WELL AS ANY INDEPENDENT LOCATOR FOR PRIVATE LINES.
- THE CONTRACTOR SHALL NOTIFY THE INSPECTOR AT LEAST 48 HOURS PRIOR TO ANY DESIRED INSPECTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER 48 HOURS PRIOR TO THE START OF CONSTRUCTION.
- SURVEY MONUMENTS MUST BE SET WITHIN 60 DAYS OF COMPLETION OF THE PROJECT.
- SERVICE TRENCHES AND UTILITY MAIN TRENCHES SHALL BE COMPACTED THROUGHOUT THE DEPTH OF THE TRENCH PER THE SPECIFICATIONS.
- THE CONTRACTOR SHALL MAINTAIN ONE COMPLETE SET OF APPROVED DRAWINGS ON THE CONSTRUCTION SITE AT ALL TIMES WHEREON HE WILL RECORD ANY APPROVED DEVIATIONS IN THE CONSTRUCTION FROM THE APPROVED DRAWINGS AS WELL AS THE LOCATIONS AND DEPTHS OF ALL EXISTING UTILITIES. THESE FIELD RECORD DRAWINGS SHALL BE KEPT UP TO DATE AT ALL TIMES AND SHALL BE AVAILABLE FOR INSPECTION BY THE OWNER'S REPRESENTATIVE UPON REQUEST.
- UPON COMPLETION OF CONSTRUCTION AND PRIOR TO INITIAL ACCEPTANCE OF THE WORK, THE CONTRACTOR SHALL SUBMIT A CLEAN SET OF FIELD RECORD DRAWINGS CONTAINING ALL AS-BUILT INFORMATION TO THE ENGINEER. ALL INFORMATION SHOWN ON THE CONTRACTOR'S FIELD RECORD DRAWINGS SHALL BE SUBJECT TO VERIFICATION BY THE ENGINEER. IF SIGNIFICANT ERRORS OR DEVIATIONS ARE NOTED BY THE ENGINEER, AN AS-BUILT SURVEY PREPARED AND STAMPED BY A REGISTERED PROFESSIONAL LAND SURVEYOR SHALL BE

- COMPLETED AT THE CONTRACTOR'S EXPENSE.
- ALL SUBMITTAL RECORDS ARE TO BE KEPT ONSITE AS WELL AS ALL DAILY INSPECTION REPORTS, INCLUDING, BUT NOT LIMITED TO, COMPACTION TESTS, CONCRETE TESTS, ETC.
  - MEGALUGS AND CONCRETE THRUST BLOCKS WILL BE REQUIRED FOR ALL MAIN LINES.
  - TRACER WIRE IS REQUIRED ON ALL PIPES. TRACER WIRE SHALL BE 10 GAUGE DIRECT BURY SOLID SINGLE STRAND COPPER WIRE WITH TEST STATIONS AS SHOWN ON THE PLANS.
  - ALL BOLTS FOR ABOVE GRADE FITTINGS SHALL BE ASTM 316 STAINLESS STEEL.
  - CONTRACTOR SHALL HAUL OFF AND DISPOSE OF ANY EXCESS SPOIL MATERIAL, ANY MISCELLANEOUS DEBRIS, AND ANY STRUCTURES, PIPING OR OTHER DEBRIS CALLED OUT TO BE DEMOLISHED AT THEIR OWN EXPENSE. ALL MATERIAL MUST BE DISPOSED OF IN AN APPROVED OFFSITE LOCATION.
  - PIPE, FITTINGS, AND ACCESSORIES SHALL BE HANDLED IN SUCH A MANNER THAT WILL ENSURE INSTALLATION IN SOUND, UNDAMAGED CONDITION. EQUIPMENT, TOOLS, AND METHODS USED IN HANDLING AND INSTALLING PIPE AND FITTINGS SHALL NOT DAMAGE THE PIPE AND FITTINGS.
  - PRECAUTIONS SHALL BE TAKEN TO PREVENT FOREIGN MATERIAL FROM ENTERING THE PIPE DURING INSTALLATION. DEBRIS, TOOLS, CLOTHING, OR OTHER OBJECTS SHALL NOT BE PLACED IN OR ALLOWED TO ENTER THE PIPE. END OF LINES TO BE PLUGGED TO PREVENT DEBRIS OR ANIMALS FROM ENTERING PIPE.
  - CUTTING SHALL BE DONE IN A NEAT MANNER, WITHOUT DAMAGE TO THE PIPE OR THE LINING. CUTS SHALL BE SMOOTH, STRAIGHT, AND AT RIGHT ANGLES TO THE PIPE AXIS. AFTER CUTTING, THE ENDS OF THE PIPE SHALL BE DRESSED WITH A FILE OR POWER GRINDER TO REMOVE ALL ROUGHNESS AND SHARP EDGES. THE CUT ENDS OF PUSH-ON JOINT PIPE SHALL BE SUITABLY BEVELED.
  - NO DEFLECTION SHALL BE PERMITTED ON INTERIOR PIPE AND FITTINGS.
  - DIAMETRICALLY OPPOSITE NUTS SHALL BE TIGHTENED PROGRESSIVELY AND EVENLY. FINAL TIGHTENING SHALL BE DONE WITH A TORQUE LIMITING WRENCH SET FOR THE TORQUE RECOMMENDED BY THE MANUFACTURER FOR ALL FITTINGS AND SERVICE SADDLES.
  - BEFORE THE JOINT IS ASSEMBLED, THE FLANGE FACES SHALL BE THOROUGHLY CLEANED OF ALL FOREIGN MATERIAL WITH A POWER WIRE BRUSH. THE GASKET SHALL BE CENTERED AND THE CONNECTING FLANGES DRAWN UP WATERTIGHT WITHOUT UNNECESSARY STRESSING OF THE FLANGES. ALL BOLTS SHALL BE TIGHTENED IN A PROGRESSIVE DIAMETRICALLY OPPOSITE SEQUENCE USING TORQUE WRENCHES AT SETTINGS RECOMMENDED BY THE MANUFACTURER. WHERE DISSIMILAR FLANGES ARE CONNECTED, AN INSULATING CONNECTION SHALL BE PROVIDED.
  - ALL JOINTS SHALL BE WATERTIGHT AND FREE FROM LEAKS. EACH LEAK WHICH IS DISCOVERED WITHIN THE CORRECTION PERIOD STIPULATED IN THE GENERAL PROVISIONS SHALL BE REPAIRED BY AND AT THE EXPENSE OF THE CONTRACTOR.
  - ALL CONTRACTOR INSTALLED PIPE, FITTINGS, VALVES, PIPE JOINTS, AND OTHER MATERIALS WHICH ARE FOUND TO BE DEFECTIVE SHALL BE REMOVED AND REPLACED WITH NEW AND ACCEPTABLE MATERIALS, AND THE AFFECTED PORTION OF THE PIPING RETESTED BY AND AT THE EXPENSE OF THE CONTRACTOR.
  - FLEXIBLE COUPLINGS AND FLANGE ADAPTERS SHALL BE DESIGNED TO RELIEVE STRESS IN PIPELINES DUE TO THERMAL EXPANSION/CONTRACTION, DIFFERENTIAL SETTLEMENT OR MISALIGNMENT AND MECHANICAL VIBRATION. FLEXIBLE COUPLINGS SHALL CONSIST OF A SLEEVE WHICH SHALL FIT OVER THE ENDS OF THE TWO PIPE SECTIONS TO BE JOINED. THE COUPLING SHALL FORM A WATER TIGHT SEAL BY COMPRESSING RESILIENT WEDGE-SHAPED GASKETS BETWEEN THE ENDS OF THE SLEEVE AND THE PIPE SECTIONS. THE GASKETS SHALL BE COMPRESSED BY TWO RETAINER RINGS BOLTED TO ONE ANOTHER ON THE OUTSIDE OF THE COUPLING SLEEVE. FLANGE ADAPTERS SHALL BE EQUIVALENT TO FLEXIBLE COUPLINGS EXCEPT THAT ONE RETAINER RING AND GASKET SHALL BE REPLACED WITH A FLANGED CONNECTION ON THE COUPLING SLEEVE.
  - ALL VALVES SHALL HAVE THE MANUFACTURER AND SIZE OF THE VALVE VISIBLY CAST ON THE BODY OR ON A PLATE ATTACHED TO THE BODY OF THE VALVE. VALVES AND REQUIRED OPERATING APPURTENANCES SHALL BE THE PRODUCT OF THE SAME MANUFACTURER. VALVE SEALS SHALL BE ABLE TO PROVIDE TIGHT CLOSURE AND PREVENT METAL-TO-METAL CONTACT. VALVES SHALL OPEN RIGHT.
  - VALVE COMPONENTS SHALL WITHSTAND THE ENVIRONMENTAL CONDITIONS AND PROVIDE CONTINUOUS TROUBLE-FREE SERVICE.
  - ALL MATERIALS AND WORKMANSHIP FOR SANITARY SEWER CONSTRUCTION SHALL CONFORM TO THE LATEST EL PASO COUNTY STANDARDS AND SANITARY SEWER CONSTRUCTION DETAILS AND TECHNICAL SPECIFICATIONS, CDPHE AND ALL OTHER APPLICABLE AGENCIES.
  - ALL DIRECT BURY SEWER MAINS SHALL BE PVC, ASTM D-3034, SDR35 OR APPROVED EQUAL, UNLESS OTHERWISE NOTED.
  - SEWER LINES SHALL BE 10 FEET FROM WATER LINES EXCEPT WHEN CROSSING EACH OTHER. FOR SEWER LINES THAT CROSS LESS THAN 1 1/2 FEET VERTICALLY FROM WATER LINES, THE CLOSEST SANITARY SEWER JOINT SHALL BE A MINIMUM OF 6 FEET FROM THE CROSSING.
  - ALL MANHOLES SHALL BE WATER TIGHT PRECAST CONCRETE, A MINIMUM OF 48 INCH IN DIAMETER WITH ECCENTRIC CONE, 24 INCH CAST IRON RING (8" DEPTH) AND COVER, UNLESS OTHERWISE SPECIFIED. CONCRETE ADJUSTMENT RINGS SHALL BE USED FOR ADJUSTMENT TO MATCH FINAL SURFACE ELEVATIONS AND SET IN MASTIC TO OBTAIN A WATER TIGHT SEAL. CONCRETE ADJUSTMENT RINGS SHALL BE 4" MINIMUM IN DEPTH TO ELIMINATE MULTIPLE JOINTS.
  - SEWER RIM ELEVATIONS AND INVERTS SHOWN ARE APPROXIMATE ONLY AND ARE NOT TO BE TAKEN AS FINAL ELEVATIONS.
  - THE CONTRACTOR TO VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL TIE IN POINTS AND INVERTS PRIOR TO CONSTRUCTION AND PROVIDE THE DATA

- TO THE TOWN ENGINEER.
- PIPE BEDDING SHALL BE CLASS "B" AND SHALL CONFORM TO ASTM C-33 OR D-448 GRADATION NO. 6 OR NO. 67. SQUEEGEE BEDDING IS PREFERRED. BEDDING DEPTH SHALL BE 6" UNDER AND AROUND THE SIDES OF THE PIPE AND 12" OVER THE PIPE. CONSOLIDATION IN PIPE ZONE SHALL BE BY HAND TAMPING. PIPE BEDDING MATERIALS SHALL BE FREE DRAINING, COARSE-GRAINED SAND AND/OR FINE GRAVEL HAVING A MAXIMUM SIZE OF 1-INCH. SEE GEOTECHNICAL REPORT FOR REQUIREMENTS.
  - ALTHOUGH NOT ANTICIPATED, AREAS OF UNSTABLE SUBGRADE SOILS MAY BE ENCOUNTERED DURING SUBGRADE PREPARATION FOR CONSTRUCTION OF THE NEW PAVEMENT. UNSTABLE FOUNDATION SOILS MAY BE STABILIZED BY OVER-EXCAVATION AND REPLACEMENT OF THE SUBGRADE WITH SUITABLE IMPORTED ANGULAR WELL GRADED MATERIALS. OTHER ALTERNATIVES INCLUDE THE USE OF TYPE 2 BIAXIAL GEOGRID REINFORCEMENT IN COMBINATION WITH A LAYER OF CLASS 6 AGGREGATE BASE COURSE.
  - AT LEAST 5 DAYS PRIOR TO THE START OF CONSTRUCTION, A PRE-CONSTRUCTION MEETING WILL BE HELD AT THE TOWN'S OFFICE AND ATTENDED BY THE CONTRACTOR AND REPRESENTATIVES OF THE OTHER APPROVING AGENCIES. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT THE TOWN ENGINEER TO SCHEDULE THEIR MEETING.
  - THE CONTRACTOR WILL IDENTIFY THE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR WILL REPORT ANY DISCREPANCIES TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION.
  - ALL MANHOLES SHALL HAVE SHAPED INVERTS.
  - ALL SEWER LINES SHALL BE TESTED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS PRIOR TO INITIAL ACCEPTANCE OR ANY CONNECTION TO AN EXISTING SEWER LINE. THE MAXIMUM "BELLY" ON LOW SPOTS IN THE NEW SEWER MAIN SHALL NOT EXCEED 3/8 INCHES.
  - ALUMINUM FOIL WARNING TAPE SHALL BE USED FOR ALL NEW DIRECT BURY SEWER MAINS. THE TAPE WILL BE INSTALLED 2' BELOW FINISHED GRADE. TAPE MUST BE GREEN IN COLOR.
  - FERNCO STRONGBACK RC SERIES PIPE COUPLINGS WILL BE REQUIRED FOR PIPE AND LATERAL SERVICES.
  - ALL BARREL SECTIONS OF MANHOLES SHALL BE GROUTED INSIDE AT JOINTS.
  - SHOULD TRENCH DE-WATERING BECOME NECESSARY, THE CONTRACTOR WILL OBTAIN ALL REQUIRED PERMITS AND SUPPLY THE PUMPS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.
  - THE OPENING OR CHANNEL IN THE MANHOLE MUST BE NO LESS THAN THE DIAMETER OF THE PIPE, AND NO LESS THAN THE MANHOLE DIAMETER MINUS 4 INCHES IN LENGTH TO ACCOMMODATE EQUIPMENT NECESSARY TO MAINTAIN THE SEWER LINE.
  - ALL MANHOLE AND SANITARY SEWER MAIN TESTING SHALL BE WITNESSED BY A REPRESENTATIVE OF THE TOWN. A MINIMUM OF 24 HOURS ADVANCED NOTICE IS REQUIRED PRIOR TO TESTING.
  - ALL MANHOLE/VAULT EXTERIOR JOINTS SHALL BE WRAPPED IN 12-INCH WIDE CONSEAL CS 212 OR APPROVED EQUIVALENT.
  - MANHOLE/VAULT BARREL SECTIONS WILL REQUIRE AN EXTERIOR COATING OF TNEEC SERIES 46-465 OR APPROVED EQUIVALENT.
  - ALL PRECAST CONCRETE SHALL BE 4,000 PSI MINIMUM STRENGTH.
  - ALL EXISTING PIPING INTO EXISTING MANHOLES MUST BE RECONNECTED IN NEW MANHOLES.
  - WHERE FILL IS REQUIRED BY THE DRAWINGS, THE EXISTING VEGETATION AND TOPSOIL SHALL BE FULLY REMOVED AND THE SURFACE SCARIFIED PER THE SPECIFICATIONS TO PROVIDE FOR ADEQUATE BONDING OF THE FILL.
  - FILL SHALL BE PLACED TO MATCH THE CONTOURS SHOWN ON THE DRAWINGS. ALL BERM CONSTRUCTION AND OVERLOT GRADING SHALL BE UNDERTAKEN SUCH THAT THE CORNERS ARE ROUNDED AND BLENDED INTO THE EXISTING TOPOGRAPHY. NEW ELEVATION CONTOURS INDICATE FINAL SURFACE ELEVATIONS.
  - GRADING OF THE WASTEWATER TREATMENT PLANT SITE TOGETHER WITH THE GRADING AROUND MANHOLES AND STRUCTURES THAT HAVE THEIR RINGS AND COVERS INSTALLED ABOVE GRADE SHALL BE FINALIZED SUCH THAT ALL AREAS DRAIN FREELY AWAY FROM THE TREATMENT CELLS AND STRUCTURES. COORDINATE WITH THE ENGINEER AND OWNER TO ENSURE THAT THEIR CONDITION IS MET.
  - ALL EQUIPMENT AND MATERIAL IS TO BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS AND REQUIREMENTS. ALL EQUIPMENT STARTUP SHALL BE PROVIDED BY A MANUFACTURER APPROVED FIELD REPRESENTATIVE. MANUFACTURER FIELD TRAINING FOR THE OPERATIONS STAFF SHALL ALSO BE PROVIDED AT EITHER THE TIME OF STARTUP OR AT ANOTHER TIME AS APPROVED BY THE OPERATOR.
  - THE CONTRACTOR SHALL FURNISH AND INSTALL 12" X 24" SIGNS AS DIRECTED BY THE ENGINEER ON THE PERIMETER FENCING. THE GENERAL SPACING IS 200-FT CENTERS. THE SIGNS SHALL BE MADE FROM 20 GAUGE ALUMINUM SHEET METAL WITH A PAINTED WHITE BACKGROUND AND RED LETTERING. THE SIGNS SHALL READ AS FOLLOWS:  
**DANGER - KEEP OUT  
WASTEWATER TREATMENT FACILITY**
  - ALL WORK WITHIN CDOT RIGHT-OF WAY INCLUDING UTILITIES, GEOTECHNICAL BORINGS, OR TRAFFIC CONTROL MUCH HAVE A SPECIAL USE OR UTILITY PERMIT.
  - IN THE EVENT OF DISCREPANCY EL PASO COUNTY NOTES GOVERN.

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**ABBREVIATIONS**

ARVB	AIR RELIEF VACUMBREAKER VALVE	MH	MANHOLE
BEG	BELOW EXISTING GRADE	N	NORTH
BFV	BUTTERFLY VALVE	NE	NORTHEAST
CL	CENTERLINE	NW	NORTHWEST
CMP	CORRUGATED METAL PIPE	OH	OVERHEAD
DIA. OR Ø	DIAMETER	PVC	POLYVINYL CHLORIDE
E	EAST	RAD OR R	RADIUS
EA	EACH	RPP	REINFORCED POLYPROPYLENE
ELEC	ELECTRICAL LINE	S	SOUTH
EOA	EDGE OF ASPHALT	SE	SOUTHEAST
EXIST. OR EX.	EXISTING	SW	SOUTHWEST
INV	INVERT	T.O.P.	TOP OF PIPE
L.P.	LOW POINT	UON	UNLESS OTHERWISE NOTED
FM	FORCE MAIN		

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**WASTEWATER TREATMENT PLANT PLANS FOR BID**

**GENERAL NOTES**

TOWN OF RAMAH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAH, CO 80832



FOR AND ON BEHALF OF  
 ELEMENT ENGINEERING, LLC

DATE  
 JANUARY 2024

JOB NUMBER  
 0043.0001

SCALE  
 NTS

EDITION  
 BIDDING

SHEET  
 C2 OF C31

**SEWER BYPASS PUMPING**

1. IF SEWAGE BYPASS PUMPING IS NECESSARY, THE CONTRACTOR WILL SUPPLY AND MONITOR THE PUMP DURING THE ENTIRE PUMPING PERIOD. A BACK-UP PUMP WILL BE ONSITE FOR USE IF NECESSARY. BYPASS HOSE SHALL BE PROTECTED FROM TRAFFIC DAMAGE USING APPROVED APPARATUS. FOR ALL SEWAGE BYPASS PUMPING, THE CONTRACTOR WILL HAVE CONTINUOUS ON SITE MONITORING OF PUMPING OPERATIONS.
2. FURNISH ALL LABOR, MATERIALS, EQUIPMENT, AND INCIDENTALS REQUIRED TO MAINTAIN CONTINUOUS AND RELIABLE WASTEWATER SERVICE IN ALL WASTEWATER LINES DURING CONSTRUCTION.
3. DURING VARIOUS PHASES OF THE WORK, IT WILL BE NECESSARY TO CONSTRUCT AND MAINTAIN TEMPORARY BYPASS SEWERS TO MAINTAIN CONTINUOUS AND RELIABLE WASTEWATER FLOW IN ALL PIPES, INCLUDING INDIVIDUAL SERVICE CONNECTIONS. VARIOUS PHASES OF THE WORK THAT SHALL REQUIRE THE IMPLEMENTATION OF TEMPORARY BYPASS SEWERS INCLUDING, BUT ARE NOT LIMITED TO, SEWER MAIN AND MANHOLE REPLACEMENT, TRENCHLESS REHABILITATION OF EXISTING SEWERS, AND PIPELINE INSPECTION.
4. CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY BYPASS SEWERS AND BE RESPONSIBLE FOR ALL BYPASS PUMPING OF SEWAGE THAT MAY BE REQUIRED TO PREVENT BACKING UP OF SEWAGE AND ALLOW APPROPRIATE CONDITIONS FOR PROPER INSPECTION, REHABILITATION, REPLACEMENT OR RECONNECTIONS TO EXISTING SEWERS. THE CONTRACTOR SHALL IMMEDIATELY REMOVE AND DISPOSE OF ALL OFFENSIVE MATTER SPILLED DURING THE BYPASS PUMPING AT THEIR OWN EXPENSE. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PAYING ANY FINES IMPOSED AS A RESULT OF SPILLS OR OVERFLOWS THAT OCCUR AS A RESULT OF THE BYPASS PUMPING OPERATIONS.
5. CONTRACTOR SHALL PROVIDE A REDUNDANT BYPASS PUMP, INTAKE AND DISCHARGE CONDUIT, AND OTHER EQUIPMENT NECESSARY TO PROVIDE CONTINUOUS WASTEWATER FLOW AND PREVENT THE BACKING UP OF SEWAGE IN THE CASE OF EMERGENCIES AT ALL TIMES.
6. WHERE NO ALTERNATE SANITARY SEWER ROUTE IS AVAILABLE OR WHEN TWENTY-FOUR HOURS OF STORAGE IS NOT FEASIBLE, REDUNDANT BYPASS PUMPING SHALL BE INSTALLED.
7. PRIMARY BYPASS PUMPS SHALL BE CRITICALLY SILENCED WHEN USED IN RESIDENTIAL SETTINGS OR AREAS WHERE EXCESSIVE NOISE LEVELS WOULD CREATE A DISTURBANCE. REDUNDANT BYPASS PUMPING DOES NOT HAVE TO BE CRITICALLY SILENCED.
8. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER A SCHEDULE TO COMPLETE THE WORK. IT WILL INCLUDE THE SEQUENCING AND COORDINATION OF CONNECTIONS TO EXISTING SEWERS, PIPELINE INSPECTION, TRENCHLESS REHABILITATION AND TESTING OF EXISTING SEWERS, AND THE HANDLING OF WASTEWATER FLOW DURING CONSTRUCTION. THE SCHEDULE OF WORK SHALL ALSO BE REVIEWED AND APPROVED BY THE OPERATOR IN RESPONSIBLE CHARGE (ORC).
9. THE DESIGN, INSTALLATION, AND OPERATION OF THE TEMPORARY PUMPING SYSTEM SHALL BE THE CONTRACTOR'S RESPONSIBILITY. THE CONTRACTOR SHALL EITHER DEMONSTRATE, OR EMPLOY THE SERVICES OF A SUBCONTRACTOR WHO CAN DEMONSTRATE, TO THE ENGINEER AND ORC THAT THEY SPECIALIZES IN THE DESIGN AND OPERATION OF TEMPORARY BYPASS PUMPING SYSTEMS.
10. THE CONTRACTOR SHALL PREPARE A SPECIFIC, DETAILED DESCRIPTION OF THE PROPOSED PUMPING SYSTEM (BYPASS PUMPING PLAN). THE BYPASS PUMPING PLAN SHALL BE SUBMITTED AND APPROVED PRIOR TO THE MOBILIZATION OF ANY OF THE EQUIPMENT INCLUDED IN THE BYPASS PUMPING PLAN. THE BYPASS PUMPING PLAN SHALL OUTLINE ALL PROVISIONS AND PRECAUTIONS TO BE TAKEN BY THE CONTRACTOR REGARDING HANDLING OF EXISTING WASTEWATER FLOWS. THEIR BYPASS PUMPING PLAN MUST BE SPECIFIC AND COMPLETE, INCLUDING SUCH ITEMS AS SCHEDULES, LOCATIONS, CAPACITIES OF EQUIPMENT, MATERIALS, AND ALL OTHER INCIDENTAL ITEMS NECESSARY AND/OR REQUIRED TO ENSURE PROPER PROTECTION OF THE FACILITIES, INCLUDING PROTECTION OF THE ACCESS AND BYPASS PUMPING LOCATIONS FOR DAMAGE DUE TO THE DISCHARGE FLOWS, AND COMPLIANCE WITH THE REQUIREMENTS AND PERMIT CONDITIONS SPECIFIED HEREIN. NO CONSTRUCTION SHALL BEGIN UNTIL ALL PROVISIONS AND REQUIREMENTS HAVE BEEN REVIEWED AND ACCEPTED BY THE ENGINEER AND ORC. THE PLAN SHALL INCLUDE BUT NOT LIMITED TO THE FOLLOWING DETAILS:
  - A. SEWER PLUGGING METHOD AND TYPES OF PLUGS.
  - B. SIZE OF SUCTION AND DISCHARGE HOSE OR PIPING.
  - C. BYPASS PUMP SIZES (ONE STANDBY PUMP WILL BE REQUIRED AT EACH LOCATION IN CASE OF A PUMP FAILURE), CAPACITIES, AND NUMBER OF EACH SIZE TO BE PROVIDED ON- SITE INCLUDING ALL PRIMARY, SECONDARY, AND SPARE PUMPING UNITS.
  - D. METHOD OF PROTECTING DISCHARGE MANHOLES OR STRUCTURES FROM EROSION AND DAMAGE.
  - E. SECTIONS SHOWING SUCTION AND DISCHARGE PIPE DEPTH, EMBEDMENT, SELECT FILL AND SPECIAL BACKFILL, IF COVER IS NECESSARY.
  - F. METHOD OF NOISE CONTROL FOR EACH PUMP AND ANY ADDITIONAL EQUIPMENT THAT IS INCLUDED IN THE BYPASS PUMPING PLAN.
  - G. SCHEDULE FOR INSTALLATION OF AND MAINTENANCE OF BYPASS PUMPING LINES.
  - H. PLAN INDICATING LOCATION OF BYPASS PUMPING PIPE LOCATIONS.
  - I. CONTRACTORS PLAN FOR PROVIDING CONTINUOUS MONITORING OF THE BYPASS PUMPING OPERATION AS WELL AS THE MONITORING PERSONS' QUALIFICATIONS.

11. THE CONTRACTOR SHALL SUPPLY PUMPS, CONDUITS, POWER, AND OTHER EQUIPMENT TO DIVERT THE FLOW OF SEWAGE AROUND THE SECTION IN WHICH WORK IS TO BE PERFORMED. THE BYPASS SYSTEM SHALL BE OF SUFFICIENT CAPACITY TO HANDLE THE WASTEWATER FLOWS. IT IS THE INTENT OF THESE SPECIFICATIONS TO REQUIRE THE CONTRACTOR TO ESTABLISH ADEQUATE BYPASS PUMPING AS REQUIRED REGARDLESS OF THE FLOW CONDITION.
12. THE CONTRACTOR SHALL PERFORM LEAKAGE AND PRESSURE TESTS OF THE BYPASS PUMPING DISCHARGE PIPING USING CLEAN WATER PRIOR TO THE ACTUAL OPERATION. THE PRESSURE AND LEAKAGE TEST SHALL BE CONDUCTED AT ONE-AND-A-HALF TIMES THE MAXIMUM PRESSURE THE SYSTEM WILL EXPERIENCE BASED ON THE APPROVED BYPASS PUMPING PLAN FOR A PERIOD OF TWO HOURS. NO LEAKAGE IS PERMITTED DURING THEIR TEST. THE ENGINEER WILL BE GIVEN 24 HOURS NOTICE PRIOR TO TESTING. IN ADDITION, THE CONTRACTOR SHALL DEMONSTRATE THAT THE PUMPING SYSTEM IS IN GOOD WORKING ORDER AND IS SUFFICIENTLY SIZED TO SUCCESSFULLY HANDLE FLOWS BY PERFORMING A TEST RUN FOR A PERIOD OF 24 HOURS PRIOR TO BEGINNING THE WORK.
13. THE CONTRACTOR SHALL BE REQUIRED TO REPAIR, AT THEIR OWN EXPENSE, ANY DAMAGE TO PUBLIC OR PRIVATE PROPERTY CAUSED BY THEIR OPERATIONS.
14. SHOULD DAMAGE OF ANY KIND OCCUR TO THE EXISTING SEWERS, THE CONTRACTOR SHALL, AT THEIR OWN EXPENSE MAKE REPAIRS TO THE SATISFACTION OF THE ENGINEER AND THE ORC.
15. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE AUTHORITY SHOULD A SANITARY SEWER OVERFLOW (SSO) OCCUR AND TAKE THE NECESSARY ACTION TO CLEAN UP AND DISINFECT THE SPILLAGE TO THE SATISFACTION OF THE AUTHORITY AND/OR OTHER GOVERNMENTAL AGENCY. IF SEWAGE IS SPILLED ONTO PUBLIC OR PRIVATE PROPERTY, THE CONTRACTOR SHALL WASH DOWN, CLEAN UP, AND DISINFECT THE SPILLAGE TO THE SATISFACTION OF THE PROPERTY OWNER, AUTHORITY, AND/OR OTHER GOVERNMENTAL AGENCY.
16. THE CONTRACTOR SHALL NOT BE PERMITTED TO OVERFLOW, BYPASS, PUMP OR BY ANY OTHER MEANS CONVEY DRAINAGE TO ANY LAND, STREET, STORM DRAIN OR WATER COURSE.
17. THE CONTRACTOR SHALL CEASE BYPASS PUMPING OPERATIONS AND RETURN FLOWS TO THE NEW AND/OR EXISTING SEWER WHEN DIRECTED BY THE OWNER. DURING BYPASSING, NO WASTEWATER SHALL BE LEAKED, DUMPED, OR SPILLED IN OR ONTO ANY AREA OUTSIDE THE EXISTING WASTEWATER SYSTEM. WHEN BYPASS OPERATIONS ARE COMPLETE, ALL BYPASS PIPING SHALL BE FLUSHED WITH FRESH WATER AND DRAINED INTO THE WASTEWATER SYSTEM PRIOR TO DISASSEMBLY.
18. CONTRACTOR MUST TAKE CARE TO PREVENT DAMAGE TO EXISTING STRUCTURES. DISCHARGE PIPING TO GRAVITY SEWER SYSTEMS SHALL BE DESIGNED IN SUCH A MANNER AS TO PREVENT DISCHARGE FROM CONTACTING MANHOLE WALLS OR BENCHING AND FULL DISCHARGE SHALL GO INTO DOWNSTREAM PIPE WITH AS MINIMAL TURBULENCE AS POSSIBLE. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO MANHOLES. IT MAY BE NECESSARY TO REMOVE THE MANHOLE CONE TO PROVIDE SUFFICIENT SPACE FOR THE BYPASS PIPING. IF THEIR IS REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING MANHOLE COMPONENTS.
19. THE 24-HOUR MONITORING PERSON SHALL BE PROPERLY TRAINED, EXPERIENCED, AND MECHANICALLY QUALIFIED SUCH THAT THEY CAN QUICKLY AND EFFECTIVELY ADDRESS ANY POTENTIAL EMERGENCY AND NON-EMERGENCY SITUATIONS ASSOCIATED WITH THE PUMPS AND BYPASS PUMPING SYSTEM THAT MUST REMAIN IN OPERATION FOR AN EXTENDED PERIOD.

**BACKFILLING GENERAL**

- A. ALL TRENCHES SHALL BE BACKFILLED AFTER PIPES, FITTINGS AND APPURTENANCES HAVE BEEN INSTALLED, INSPECTED AND APPROVED BY THE TOWN ENGINEER.
- B. WHENEVER A COMPACTION REQUIREMENT VALUE IS SPECIFIED HEREIN, THE OPTIMUM MOISTURE CONTENT AND STANDARD PROCTOR DENSITY SHALL BE DETERMINED IN ACCORDANCE WITH AASHTO T-99 FOR NINETY-FIVE PERCENT (95%).

**DENSITY REQUIREMENTS IN TRENCH**

THE CONTRACTOR SHALL OBTAIN A STANDARD PROCTOR DENSITY OF NINETY-FIVE (95%) STANDARD PROCTOR FOR THE TOTAL DEPTH OF ALL TRENCHES IN OPEN FIELDS AND IN DEDICATED ROWS. BACKFILLING SHALL BE DONE WITH GOOD SOUND EARTH, SAND OR GRAVEL, AND NO BITUMINOUS PAVEMENT, CONCRETE, ROCK OR OTHER LUMPY MATERIAL SHALL BE USED IN THE BACKFILL UNLESS THESE MATERIALS ARE SCATTERED AND DO NOT EXCEED SIX INCHES (6") IN ANY DIMENSION AND ARE NOT PLACED WITHIN ONE FOOT OF THE 2-1/2" LIMIT. MATERIAL OF PERISHABLE, SPONGY OR OTHERWISE IMPROPER NATURE SHALL NOT BE USED IN BACKFILLING AND NO MATERIAL GREATER THAN FOUR INCHES (4") IN ANY DIMENSION SHALL BE PLACED WITHIN ONE FOOT (1') OF ANY PIPE, MANHOLE OR STRUCTURE. BACKFILLING SHALL BE ACCOMPLISHED IN THE ZONE IN LAYERS NOT TO EXCEED TWO FEET (2') OR AS RECOMMENDED BY TESTER. ALL BACKFILL MATERIAL SHALL BE SUBJECT TO THE APPROVAL OF THE TOWN ENGINEER.

**COMPACTED FILL**

COMPACTION SHALL BE DONE BY USE OF VIBRATORY EQUIPMENT, TAMPING ROLLERS, PNEUMATIC TIRE ROLLERS OR OTHER MECHANICAL TAMPERS OF THE TYPE AND SIZE APPROVED BY THE TOWN ENGINEER. HAND TAMPERS SHALL BE USED AROUND ALL MANHOLES, VALVE BOXES, AND ANY SURFACE STRUCTURE. THE BACKFILL SHALL BE PLACED IN HORIZONTAL LAYERS OF SUCH DEPTHS AS ARE CONSIDERED PROPER FOR THE TYPE OF COMPACTING EQUIPMENT BEING USED IN RELATION TO THE BACKFILL MATERIAL BEING PLACED. EACH LAYER SHALL BE EVENLY SPREAD, PROPERLY MOISTENED AND COMPACTED. ANY DAMAGE TO THE PIPE AS A RESULT OF CONTRACTOR'S OPERATION SHALL BE REPAIRED AND/OR REPLACED.

**COMPACTION TESTS**

COMPACTION TESTS WILL BE TAKEN BY AN APPROVED TESTING LABORATORY AT LOCATIONS DESIGNATED BY THE TOWN ENGINEER. ALL EXPENSES INVOLVED IN THESE TESTS WILL BE BORNE BY THE CONTRACTOR. RESULTS OF THE TESTS WILL BE MADE AVAILABLE TO THE TOWN ENGINEER IMMEDIATELY AND COPIES OF TEST RESULTS WILL BE SUPPLIED TO THE TOWN ENGINEER ONCE PER WEEK. A FINAL TYPED BOUND COPY OF FINAL TEST RESULTS MUST BE SUBMITTED TO THE TOWN ENGINEER AT THE END OF THE PROJECT. IN ALL CASES WHERE THE TESTS INDICATE COMPACTION LESS THAN THAT REQUIRED IN THESE STANDARDS, ADDITIONAL COMPACTION AND TESTS WILL BE REQUIRED UNTIL THESE SPECIFICATIONS ARE MET. PROBATIONARY ACCEPTANCE OF THE LINES BY THE TOWN WILL BE CONTINGENT UPON SATISFACTORY COMPACTION RESULTS. NO HYDROSTATIC TESTING OF THE WATER MAIN WILL BE ALLOWED UNTIL SATISFACTORY COMPACTION IS OBTAINED. FREQUENCY OF TESTING WILL BE AS FOLLOWS:

- A. ONE (1) TEST AT EVERY ABOVE GROUND APPURTENANCE (I.E. VALVE BOX, MANHOLE) AT TWO-FOOT (2.0') VERTICAL INCREMENTS.
- B. ONE (1) TEST EVERY FOUR HUNDRED (400) LF OF MAINLINE FORCEMAIN TRENCH AT TWO-FOOT (2.0') VERTICAL INCREMENTS BEGINNING TWO FEET (2') ABOVE PIPE TO FINAL GRADE AND ONE TEST AT FINAL GRADE.
- C. SEE TECHNICAL SECTION 02200 FOR EMBANKMENT TESTING REQUIREMENTS.



NO.	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID

**GENERAL NOTES**

TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832



DATE  
JANUARY 2024

JOB NUMBER  
0043.0001

SCALE  
NTS

EDITION  
BIDDING

SHEET  
C3 OF C31

**STANDARD NOTES FOR EL PASO COUNTY CONSTRUCTION PLANS**

- ALL DRAINAGE AND ROADWAY CONSTRUCTION SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD NOTIFICATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CALL 811 TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC).
- CONTRACTOR SHALL KEEP A COPY OF THESE APPROVED PLANS, THE GRADING AND EROSION CONTROL PLAN, THE STORMWATER MANAGEMENT PLAN (SWMP), THE SOILS AND GEOTECHNICAL REPORT, AND THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES, INCLUDING THE FOLLOWING:
  - EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
  - CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2
  - COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
  - CDOT M & S STANDARDS
- NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING. ANY MODIFICATIONS NECESSARY TO MEET CRITERIA AFTER-THE-FACT WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
- IT IS THE DESIGN ENGINEER'S RESPONSIBILITY TO ACCURATELY SHOW EXISTING CONDITIONS, BOTH ONSITE AND OFFSITE, ON THE CONSTRUCTION PLANS. ANY MODIFICATIONS NECESSARY DUE TO CONFLICTS, OMISSIONS, OR CHANGED CONDITIONS WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
- CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT (PCD) - INSPECTIONS, PRIOR TO STARTING CONSTRUCTION.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO UNDERSTAND THE REQUIREMENTS OF ALL JURISDICTIONAL AGENCIES AND TO OBTAIN ALL REQUIRED PERMITS, INCLUDING BUT NOT LIMITED TO EL PASO COUNTY EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP), REGIONAL BUILDING FLOODPLAIN DEVELOPMENT PERMIT, U.S. ARMY CORPS OF ENGINEERS-ISSUED 401 AND/OR 404 PERMITS, AND COUNTY AND STATE FUGITIVE DUST PERMITS.
- CONTRACTOR SHALL NOT DEVIATE FROM THE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE DESIGN ENGINEER AND PCD. CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY ERRORS OR INCONSISTENCIES.
- ALL STORM DRAIN PIPE SHALL BE CLASS III RCP UNLESS OTHERWISE NOTED AND APPROVED BY PCD.
- CONTRACTOR SHALL COORDINATE GEOTECHNICAL TESTING PER ECM STANDARDS. PAVEMENT DESIGN SHALL BE APPROVED BY EL PASO COUNTY PCD PRIOR TO PLACEMENT OF CURB AND GUTTER AND PAVEMENT
- ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
- SIGHT VISIBILITY TRIANGLES AS IDENTIFIED IN THE PLANS SHALL BE PROVIDED AT ALL INTERSECTIONS. OBSTRUCTIONS GREATER THAN 18 INCHES ABOVE FLOWLINE ARE NOT ALLOWED WITHIN SIGHT TRIANGLES.
- SIGNING AND STRIPING SHALL COMPLY WITH EL PASO COUNTY DOT AND MUTCD CRITERIA. [IF APPLICABLE, ADDITIONAL SIGNING AND STRIPING NOTES WILL BE PROVIDED.]
- CONTRACTOR SHALL OBTAIN ANY PERMITS REQUIRED BY EL PASO COUNTY DOT, INCLUDING WORK WITHIN THE RIGHT-OF-WAY AND SPECIAL TRANSPORT PERMITS.
- THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWNER/DEVELOPER SHALL OBTAIN WRITTEN PERMISSION AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY OWNER(S) PRIOR TO ANY OFF-SITE DISTURBANCE, GRADING, OR CONSTRUCTION.

**STANDARD NOTES FOR EL PASO COUNTY GRADING AND EROSION CONTROL PLANS**

- STORMWATER DISCHARGES FROM CONSTRUCTION SITES SHALL NOT CAUSE OR THREATEN TO CAUSE POLLUTION, CONTAMINATION, OR DEGRADATION OF STATE WATERS. ALL WORK AND EARTH DISTURBANCE SHALL BE DONE IN A MANNER THAT MINIMIZES POLLUTION OF ANY ON-SITE OR OFFSITE WATERS, INCLUDING WETLANDS.
- NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS TO REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING.
- A SEPARATE STORMWATER MANAGEMENT PLAN (SMWP) FOR THEIR PROJECT SHALL BE COMPLETED AND AN EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP) ISSUED PRIOR TO COMMENCING CONSTRUCTION. DURING CONSTRUCTION THE SWMP IS THE RESPONSIBILITY OF THE DESIGNATED

QUALIFIED STORMWATER MANAGER OR CERTIFIED EROSION CONTROL INSPECTOR AND SHALL BE LOCATED ON SITE AT ALL TIMES DURING CONSTRUCTION AND SHALL BE KEPT UP TO DATE WITH WORK PROGRESS AND CHANGES IN THE FIELD.

- ONCE THE ESQCP IS APPROVED AND A "NOTICE TO PROCEED" HAS BEEN ISSUED, THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL MEASURES AS INDICATED ON THE APPROVED GEC. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY STAFF.
- CONTROL MEASURES MUST BE INSTALLED PRIOR TO COMMENCEMENT OF ACTIVITIES THAT MAY CONTRIBUTE POLLUTANTS TO STORMWATER. TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED IMMEDIATELY UPON COMPLETION OF THE DISTURBANCE.
- ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED AND REMAIN IN EFFECTIVE OPERATING CONDITION UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND FINAL STABILIZATION IS ESTABLISHED. ALL PERSONS ENGAGED IN LAND DISTURBANCE ACTIVITIES SHALL ASSESS THE ADEQUACY OF CONTROL MEASURES AT THE SITE AND IDENTIFY IF CHANGES TO THOSE CONTROL MEASURES IS NEEDED TO ENSURE THE CONTINUED EFFECTIVE PERFORMANCE OF THE CONTROL MEASURES. ALL CHANGES TO TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST BE INCORPORATED INTO THE STORMWATER MANAGEMENT PLAN PRIOR TO IMPLEMENTATION
- TEMPORARY STABILIZATION SHALL BE IMPLEMENTED ON DISTURBED AREAS AND STOCKPILES WHERE GROUND DISTURBING CONSTRUCTION ACTIVITY HAS PERMANENTLY CEASED OR TEMPORARILY CEASED FOR LONGER THAN 14 DAYS. AN AREA THAT IS GOING TO REMAIN IN AN INTERIM STATE FOR MORE THAN 60 DAYS SHALL ALSO BE STABILIZED.
- FINAL STABILIZATION MUST BE IMPLEMENTED AT ALL APPLICABLE CONSTRUCTION SITES. FINAL STABILIZATION IS ACHIEVED WHEN ALL GROUND DISTURBING ACTIVITIES ARE COMPLETE AND ALL DISTURBED AREAS EITHER HAVE A UNIFORM VEGETATIVE COVER WITH INDIVIDUAL PLAN DENSITY OF 70 PERCENT OF PRE-DISTURBANCE LEVELS ESTABLISHED OR EQUIVALENT PERMANENT ALTERNATIVE STABILIZATION METHOD IS IMPLEMENTED. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED UPON FINAL STABILIZATION AND BEFORE PERMIT CLOSURE.
- ALL PERMANENT STORMWATER MANAGEMENT FACILITIES SHALL BE INSTALLED AS DEFINED IN THE APPROVED PLANS. ANY PROPOSED CHANGES THAT EFFECT THE HYDROLOGY OR HYDRAULICS OF A PERMANENT STORMWATER MANAGEMENT STRUCTURES MUST BE APPROVED BY THE ECM ADMINISTRATOR PRIOR TO IMPLEMENTATION.
- ANY EARTH DISTURBANCE SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY MINIMIZE ACCELERATED SOIL EROSION AND RESULTING SEDIMENTATION. ALL DISTURBANCES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST PRACTICAL PERIOD OF TIME. PRE-EXISTING VEGETATION SHALL BE PROTECTED AND MAINTAINED WITHIN 50 HORIZONTAL FEET OF A WATERS OF THE STATE, UNLESS INFEASIBLE.
- COMPACTION OF SOIL MUST BE PREVENTED IN AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES OR WHERE FINAL STABILIZATION WILL BE ACHIEVED BY VEGETATIVE COVER. AREAS DESIGNATED FOR INFILTRATION CONTROL SHALL ALSO BE PROTECTED FROM SEDIMENTATION DURING CONSTRUCTION UNTIL FINAL STABILIZATION IS ACHIEVED.
- ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF STORMWATER AROUND, THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE A STABILIZED CONVEYANCE DESIGNED TO MINIMIZE EROSION AND THE DISCHARGE OF SEDIMENT OFF SITE.
- CONCRETE WASH WATER SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE SWMP. NO WASH WATER SHALL BE DISCHARGED TO OR ALLOWED TO RUNOFF TO STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES. CONCRETE WASHOUT SHALL NOT BE LOCATED IN AN AREA WHERE SHALLOW GROUNDWATER MAY BE PRESENT, OR WITHIN 50 FEET OF A SURFACE WATER BODY.
- DEWATERING OPERATIONS: UNCONTAMINATED GROUND WATER MAY BE DISCHARGED ON SITE, BUT MAY NOT LEAVE THE SITE IN THE FORM OF SURFACE RUNOFF.
- EROSION CONTROL BLANKETING IS TO BE USED ON SLOPES STEEPER THAN 3:1.
- BUILDING, CONSTRUCTION, EXCAVATION, OR OTHER WASTE MATERIALS SHALL NOT BE TEMPORARILY PLACED OR STORED IN THE STREET, ALLEY, OR OTHER PUBLIC WAY, UNLESS IN ACCORDANCE WITH AN APPROVED TRAFFIC CONTROL PLAN. BMP'S MAY BE REQUIRED BY EL PASO COUNTY ENGINEERING IF DEEMED NECESSARY, BASED ON SPECIFIC CONDITIONS AND CIRCUMSTANCES.
- VEHICLE TRACKING OF SOILS AND CONSTRUCTION DEBRIS OFF-SITE SHALL BE MINIMIZED. MATERIALS TRACKED OFFSITE SHALL BE CLEANED UP AND PROPERLY DISPOSED OF IMMEDIATELY.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL WASTES FROM THE CONSTRUCTION SITE FOR DISPOSAL IN ACCORDANCE WITH LOCAL AND STATE REGULATORY REQUIREMENTS. NO CONSTRUCTION DEBRIS, TREE SLASH, BUILDING MATERIAL WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, OR DISCHARGED AT THE SITE.
- THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL CONSTRUCTION DEBRIS, DIRT, TRASH, ROCK, SEDIMENT, AND SAND THAT MAY ACCUMULATE IN THE STORM SEWER OR OTHER DRAINAGE CONVEYANCE SYSTEM AND STORMWATER APPURTENANCES AS A RESULT OF SITE DEVELOPMENT.
- THE QUANTITY OF MATERIALS STORED ON THE PROJECT SITE SHALL BE LIMITED, AS MUCH AS PRACTICAL, TO THAT QUANTITY REQUIRED TO PERFORM THE WORK IN AN ORDERLY SEQUENCE. ALL MATERIALS STORED ON-SITE SHALL BE

STORED IN A NEAT, ORDERLY MANNER, IN THEIR ORIGINAL CONTAINERS, WITH ORIGINAL MANUFACTURER'S LABELS.

- NO CHEMICALS ARE TO BE USED BY THE CONTRACTOR, WHICH HAVE THE POTENTIAL TO BE RELEASED IN STORMWATER UNLESS PERMISSION FOR THE USE OF A SPECIFIC CHEMICAL IS GRANTED IN WRITING BY THE ECM ADMINISTRATOR. IN GRANTING THE USE OF SUCH CHEMICALS, SPECIAL CONDITIONS AND MONITORING MAY BE REQUIRED.
- BULK STORAGE OF PETROLEUM PRODUCTS OR OTHER LIQUID CHEMICALS IN EXCESS OF 55 GALLONS SHALL HAVE ADEQUATE SECONDARY CONTAINMENT PROTECTION TO CONTAIN ALL SPILLS AND PREVENT ANY SPILLED MATERIAL FROM ENTERING STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES.
- NO PERSON SHALL CAUSE THE IMPEDIMENT OF STORMWATER FLOW IN THE FLOW LINE OF THE CURB AND GUTTER OR IN THE DITCH FLOW LINE.
- INDIVIDUALS SHALL COMPLY WITH THE "COLORADO WATER QUALITY CONTROL ACT" (TITLE 25, ARTICLE 8, CRS), AND THE "CLEAN WATER ACT" (33 USC 1344), IN ADDITION TO THE REQUIREMENTS INCLUDED IN THE DCM VOLUME II AND THE ECM APPENDIX I. ALL APPROPRIATE PERMITS MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION (NPDES, FLOODPLAIN, 404, FUGITIVE DUST, ETC.). IN THE EVENT OF CONFLICTS BETWEEN THESE REQUIREMENTS AND LAWS, RULES, OR REGULATIONS OF OTHER FEDERAL, STATE, OR COUNTY AGENCIES, THE MORE RESTRICTIVE LAWS, RULES, OR REGULATIONS SHALL APPLY.
- ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
- PRIOR TO ACTUAL CONSTRUCTION THE PERMITEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES.
- A WATER SOURCE SHALL BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
- THE SOILS REPORT FOR THEIR SITE HAS BEEN PREPARED BY KUMAR AND ASSOCIATES, INC. AND SHALL BE CONSIDERED A PART OF THESE PLANS.
- AT LEAST TEN (10) DAYS PRIOR TO THE ANTICIPATED START OF CONSTRUCTION, FOR PROJECTS THAT WILL DISTURB 1 ACRE OR MORE, THE OWNER OR OPERATOR OF CONSTRUCTION ACTIVITY SHALL SUBMIT A PERMIT APPLICATION FOR STORMWATER DISCHARGE TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, WATER QUALITY DIVISION. THE APPLICATION CONTAINS CERTIFICATION OF COMPLETION OF A STORMWATER MANAGEMENT PLAN (SWMP), OF WHICH THEIR GRADING AND EROSION CONTROL PLAN MAY BE A PART. FOR INFORMATION OR APPLICATION MATERIALS CONTACT:  
  
COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT  
WATER QUALITY CONTROL DIVISION  
WQCD - PERMITS  
4300 CHERRY CREEK DRIVE SOUTH  
DENVER, CO 80246-1530  
ATTN: PERMITS UNIT
- THE PARTIES RESPONSIBLE FOR THEIR PLAN HAVE FAMILIARIZED THEMSELVES WITH ALL CURRENT ACCESSIBILITY CRITERIA AND SPECIFICATIONS AND THE PROPOSED PLAN REFLECTS ALL SITE ELEMENTS REQUIRED BY THE APPLICABLE ADA DESIGN STANDARDS AND GUIDELINES AS PUBLISHED BY THE UNITED STATES DEPARTMENT OF JUSTICE. APPROVAL OF THEIR PLAN BY EL PASO COUNTY DOES NOT ASSURE COMPLIANCE WITH THE ADA OR ANY REGULATIONS OR GUIDELINES ENACTED OR PROMULGATED UNDER OR WITH RESPECT TO SUCH LAWS.



NO	DATE	BY	REVISIONS	
			DESCRIPTION	

WASTEWATER TREATMENT PLANT PLANS FOR BID

**GENERAL NOTES**

TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF



FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

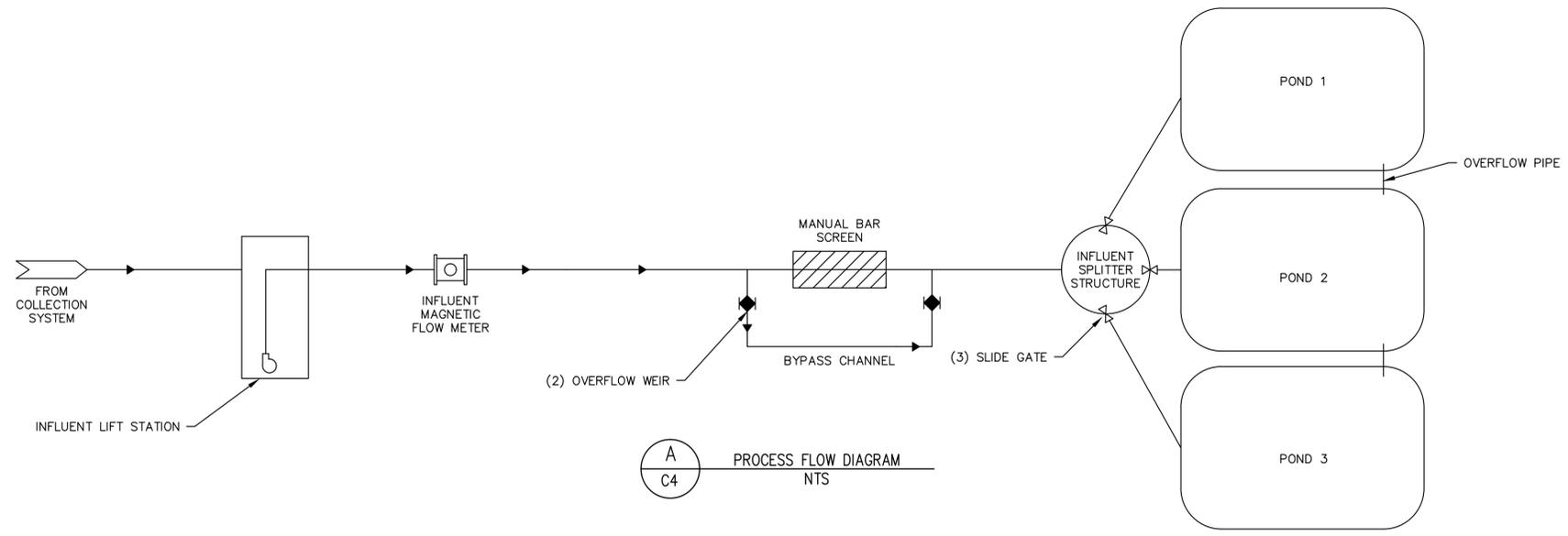
DATE  
JANUARY 2024

JOB NUMBER  
0043.0001

SCALE  
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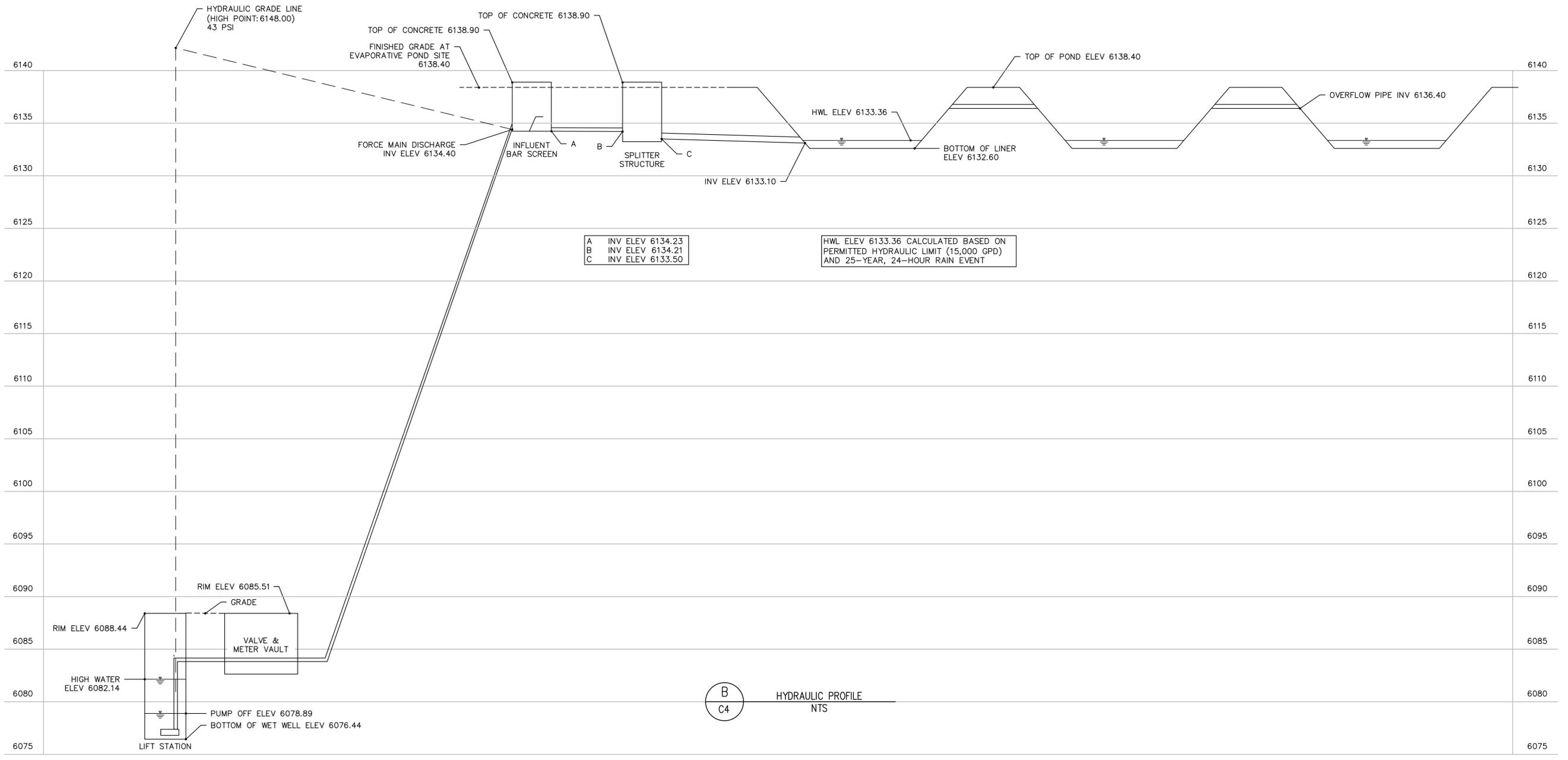
EDITION  
BIDDING

SHEET  
C4 OF C31



DESIGN SUMMARY		
PERMITTED DESIGN FLOW	0.015	MGD
PERMITTED ORGANIC LOADING	32	LBS/DAY
EXISTING AVERAGE DAY FLOW (APPROX)	0.011	MGD
PEAK DAY FLOW (APPROX)	0.022	MGD
PEAK HOUR FLOW	0.060	MGD
LIFT STATION PERMITTED FLOW	42	GPM
TOTAL BOTTOM OF POND AREA	310,000	SF
TOTAL TOP OF POND AREA	372,049	SF

A  
C4  
PROCESS FLOW DIAGRAM  
NTS



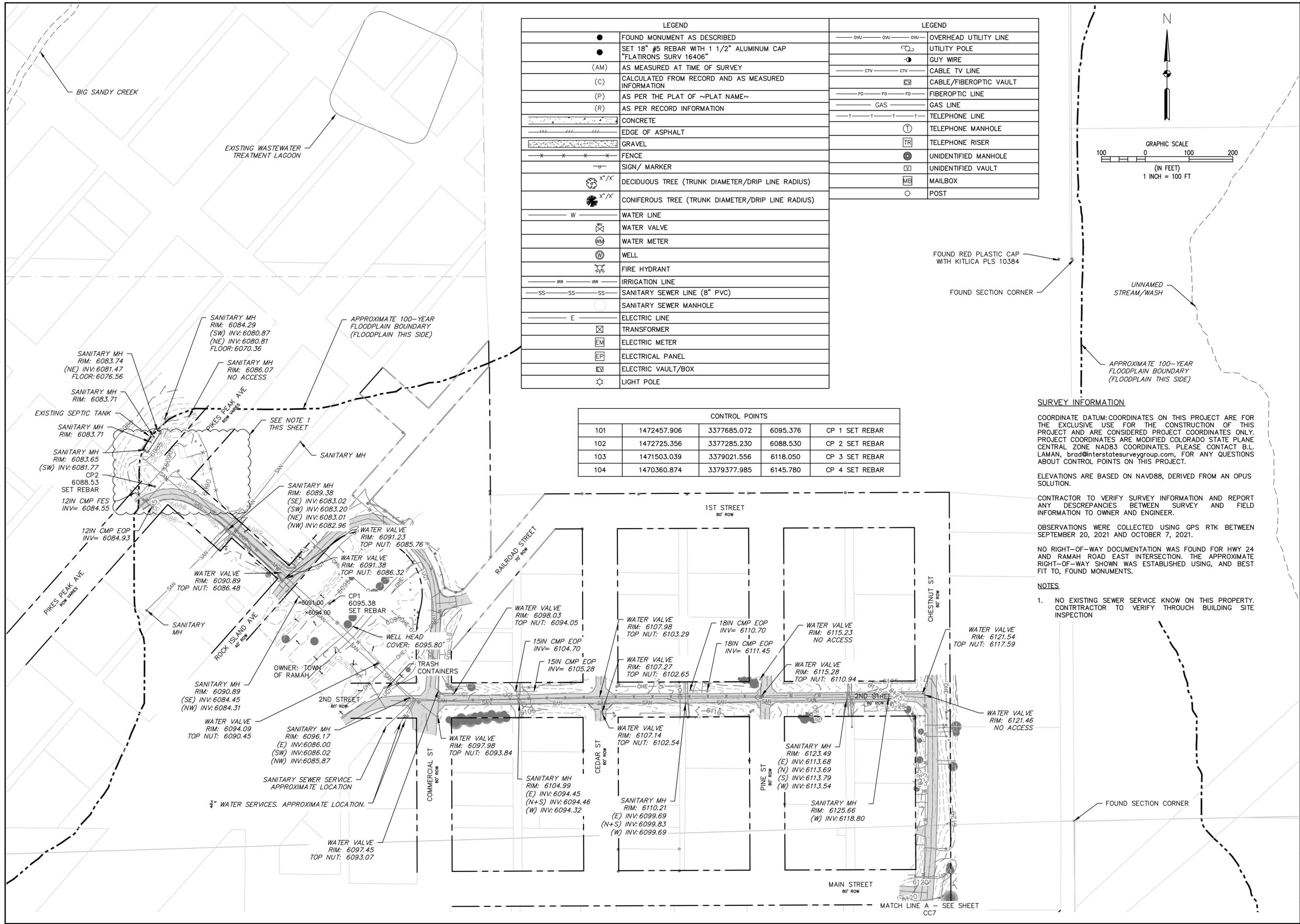
B  
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HYDRAULIC PROFILE  
NTS

NO.	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID  
**PROCESS FLOW DIAGRAM  
 & HYDRAULIC PROFILE**  
 TOWN OF RAMAHH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAHH, CO 80832



DATE: JANUARY 2024  
 JOB NUMBER: 0043.0001  
 SCALE: NTS  
 EDITION: BIDDING  
 SHEET: C5 OF C31



LEGEND	
●	FOUND MONUMENT AS DESCRIBED
●	SET 18" #5 REBAR WITH 1 1/2" ALUMINUM CAP "FLATIRONS SURV 16406"
(AM)	AS MEASURED AT TIME OF SURVEY
(C)	CALCULATED FROM RECORD AND AS MEASURED INFORMATION
(P)	AS PER THE PLAT OF ~PLAT NAME~
(R)	AS PER RECORD INFORMATION
[Pattern]	CONCRETE
[Pattern]	EDGE OF ASPHALT
[Pattern]	GRAVEL
[Pattern]	FENCE
[Symbol]	SIGN / MARKER
[Symbol]	DECIDUOUS TREE (TRUNK DIAMETER/DRIP LINE RADIUS)
[Symbol]	CONIFEROUS TREE (TRUNK DIAMETER/DRIP LINE RADIUS)
W	WATER LINE
[Symbol]	WATER VALVE
[Symbol]	WATER METER
[Symbol]	WELL
[Symbol]	FIRE HYDRANT
IRR	IRRIGATION LINE
SS	SANITARY SEWER LINE (8" PVC)
[Symbol]	SANITARY SEWER MANHOLE
E	ELECTRIC LINE
[Symbol]	TRANSFORMER
[Symbol]	ELECTRIC METER
[Symbol]	ELECTRICAL PANEL
[Symbol]	ELECTRIC VAULT/BOX
[Symbol]	LIGHT POLE

LEGEND	
[Symbol]	OVERHEAD UTILITY LINE
[Symbol]	UTILITY POLE
[Symbol]	GUY WIRE
[Symbol]	CABLE TV LINE
[Symbol]	CABLE/FIBEROPTIC VAULT
[Symbol]	FIBEROPTIC LINE
[Symbol]	GAS LINE
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[Symbol]	TELEPHONE RISER
[Symbol]	UNIDENTIFIED MANHOLE
[Symbol]	UNIDENTIFIED VAULT
[Symbol]	MAILBOX
[Symbol]	POST

CONTROL POINTS				
101	1472457.906	3377685.072	6095.376	CP 1 SET REBAR
102	1472725.356	3377285.230	6088.530	CP 2 SET REBAR
103	1471503.039	3379021.556	6118.050	CP 3 SET REBAR
104	1470360.874	3379377.985	6145.780	CP 4 SET REBAR

**SURVEY INFORMATION**

COORDINATE DATUM: COORDINATES ON THIS PROJECT ARE FOR THE EXCLUSIVE USE FOR THE CONSTRUCTION OF THIS PROJECT AND ARE CONSIDERED PROJECT COORDINATES ONLY. PROJECT COORDINATES ARE MODIFIED COLORADO STATE PLANE CENTRAL ZONE NAD83 COORDINATES. PLEASE CONTACT B.L. LAMAN, [blaman@interstatesurveygroup.com](mailto:blaman@interstatesurveygroup.com), FOR ANY QUESTIONS ABOUT CONTROL POINTS ON THIS PROJECT.

ELEVATIONS ARE BASED ON NAVD88, DERIVED FROM AN OPUS SOLUTION.

CONTRACTOR TO VERIFY SURVEY INFORMATION AND REPORT ANY DISCREPANCIES BETWEEN SURVEY AND FIELD INFORMATION TO OWNER AND ENGINEER.

OBSERVATIONS WERE COLLECTED USING GPS RTK BETWEEN SEPTEMBER 20, 2021 AND OCTOBER 7, 2021.

NO RIGHT-OF-WAY DOCUMENTATION WAS FOUND FOR HWY 24 AND RAMAH ROAD EAST INTERSECTION. THE APPROXIMATE RIGHT-OF-WAY SHOWN WAS ESTABLISHED USING, AND BEST FIT TO, FOUND MONUMENTS.

**NOTES**

- NO EXISTING SEWER SERVICE KNOWN ON THIS PROPERTY. CONTRACTOR TO VERIFY THROUGH BUILDING SITE INSPECTION

ELEMENT ENGINEERING LLC

720.749.4165  
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12687 W. CEDAR DRIVE, SUITE 300  
LAFENWOOD, CO 80228

NO.	DATE	BY	DESCRIPTION

REVISIONS

DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID

TOPOGRAPHIC SURVEY

TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

FOR AND ON BEHALF OF

COLORADO LICENSED  
 PROFESSIONAL ENGINEER  
 33550  
 1/24/21

DATE

JANUARY 2024

JOB NUMBER

0043.0001

SCALE

1" = 100'

EDITION

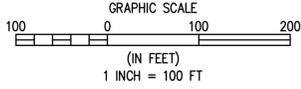
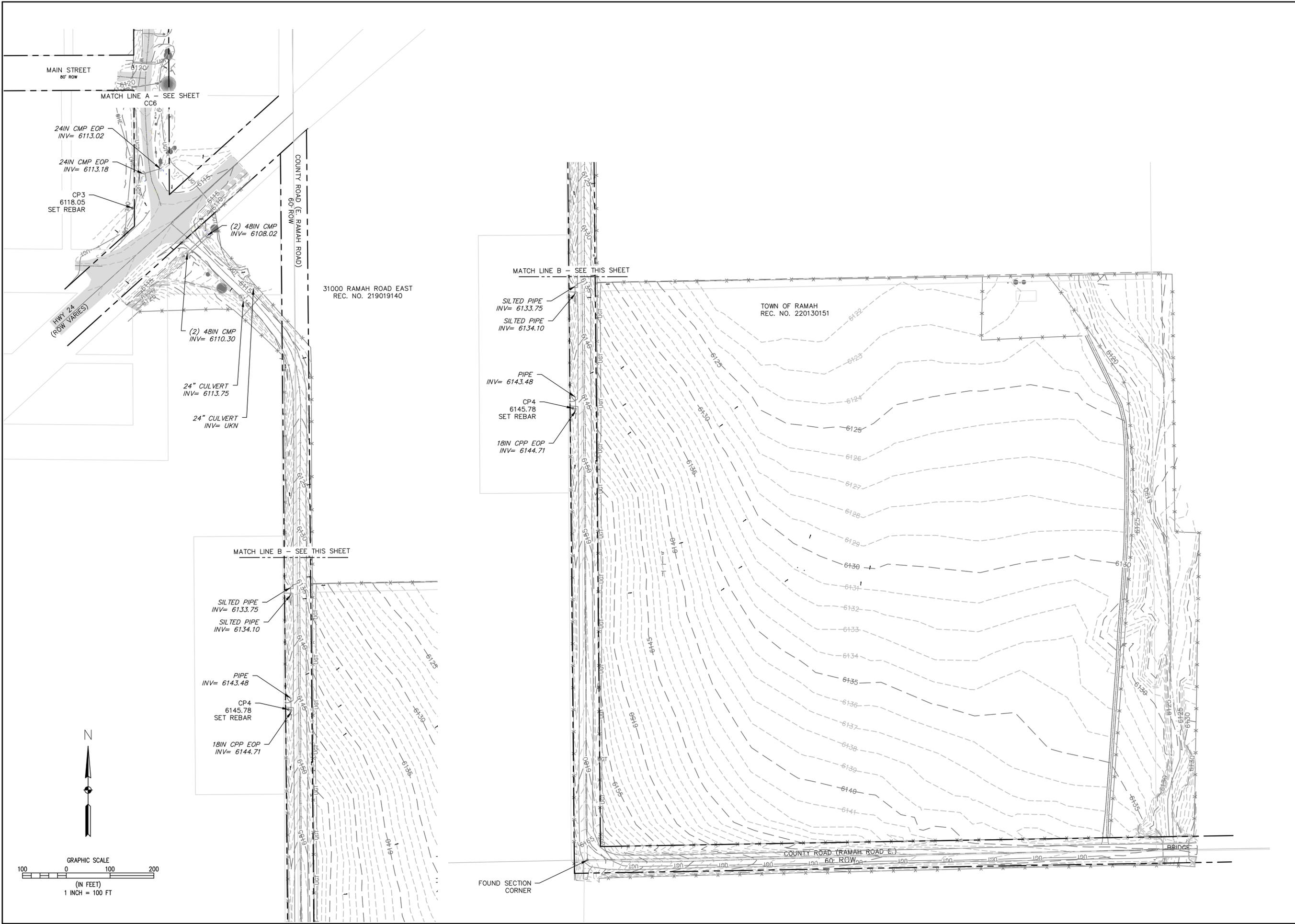
BIDDING

SHEET

C6

OF

C31



NO.	REVISIONS	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID

**TOPOGRAPHIC SURVEY**

TOWN OF RAMAH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

FOR AND ON BEHALF OF  
 ELEMENT ENGINEERING, LLC

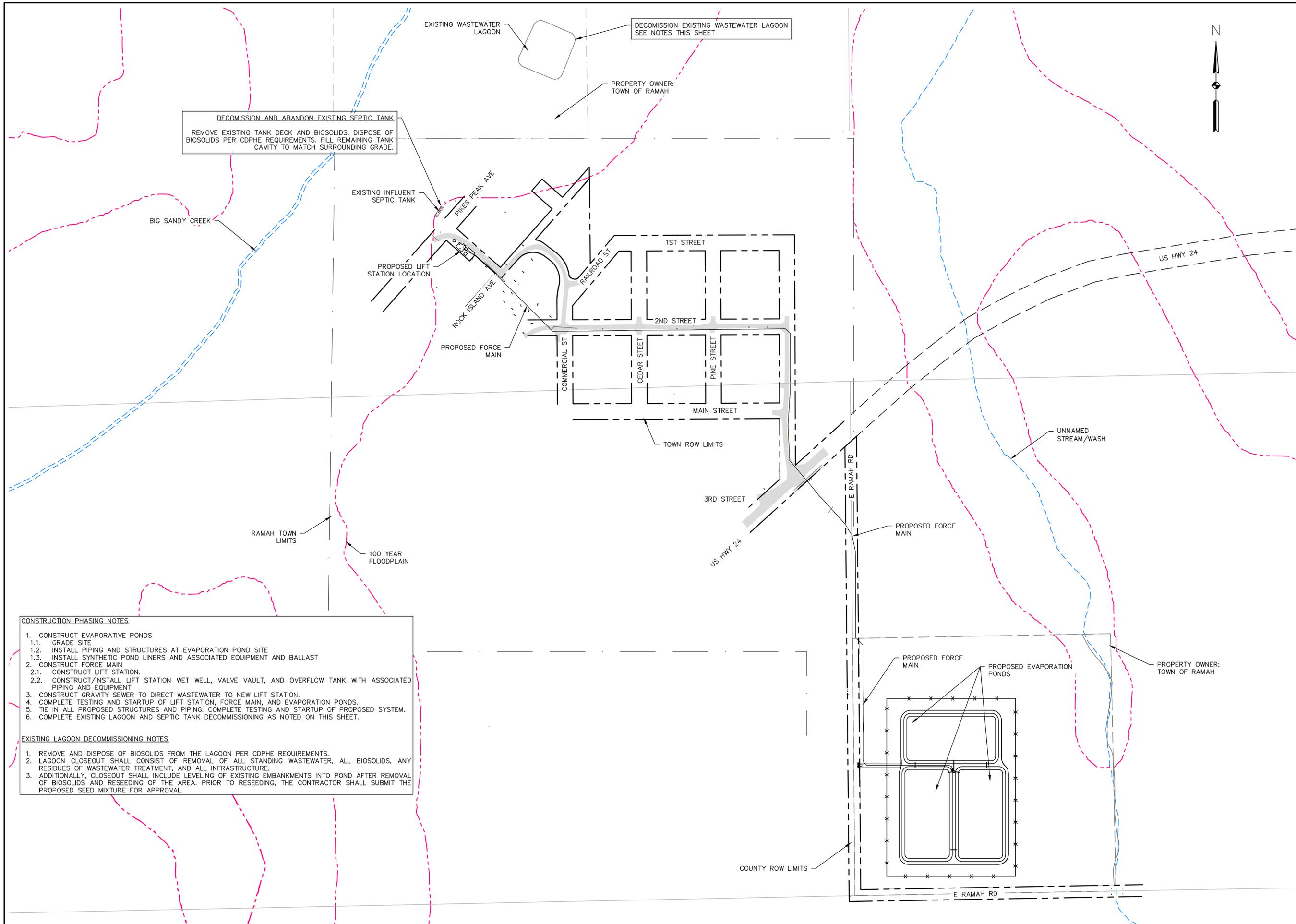
DATE  
**JANUARY 2024**

JOB NUMBER  
 0043.0001

SCALE  
**1" = 100'**

EDITION  
**BIDDING**

SHEET  
 C7 of C31



**DECOMMISSION AND ABANDON EXISTING SEPTIC TANK**  
 REMOVE EXISTING TANK DECK AND BIOSOLIDS. DISPOSE OF BIOSOLIDS PER CDPHE REQUIREMENTS. FILL REMAINING TANK CAVITY TO MATCH SURROUNDING GRADE.

DECOMMISSION EXISTING WASTEWATER LAGOON  
 SEE NOTES THIS SHEET

PROPERTY OWNER:  
 TOWN OF RAMAH

BIG SANDY CREEK

EXISTING INFLUENT SEPTIC TANK

PROPOSED LIFT STATION LOCATION

PROPOSED FORCE MAIN

COMMERCIAL ST

CEDAR ST

PINE ST

1ST STREET

2ND STREET

MAIN STREET

TOWN ROW LIMITS

3RD STREET

US HWY 24

PROPOSED FORCE MAIN

UNNAMED STREAM/WASH

RAMAH TOWN LIMITS

100 YEAR FLOODPLAIN

PROPOSED FORCE MAIN

PROPOSED EVAPORATION PONDS

PROPERTY OWNER:  
 TOWN OF RAMAH

COUNTY ROW LIMITS

E RAMAH RD



**CONSTRUCTION PHASING NOTES**

1. CONSTRUCT EVAPORATIVE PONDS
  - 1.1. GRADE SITE
  - 1.2. INSTALL PIPING AND STRUCTURES AT EVAPORATION POND SITE
  - 1.3. INSTALL SYNTHETIC POND LINERS AND ASSOCIATED EQUIPMENT AND BALLAST
2. CONSTRUCT FORCE MAIN
  - 2.1. CONSTRUCT LIFT STATION
  - 2.2. CONSTRUCT/INSTALL LIFT STATION WET WELL, VALVE VAULT, AND OVERFLOW TANK WITH ASSOCIATED PIPING AND EQUIPMENT
3. CONSTRUCT GRAVITY SEWER TO DIRECT WASTEWATER TO NEW LIFT STATION.
4. COMPLETE TESTING AND STARTUP OF LIFT STATION, FORCE MAIN, AND EVAPORATION PONDS.
5. TIE IN ALL PROPOSED STRUCTURES AND PIPING. COMPLETE TESTING AND STARTUP OF PROPOSED SYSTEM.
6. COMPLETE EXISTING LAGOON AND SEPTIC TANK DECOMMISSIONING AS NOTED ON THIS SHEET.

**EXISTING LAGOON DECOMMISSIONING NOTES**

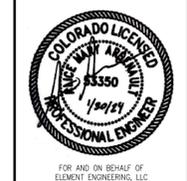
1. REMOVE AND DISPOSE OF BIOSOLIDS FROM THE LAGOON PER CDPHE REQUIREMENTS.
2. LAGOON CLOSEOUT SHALL CONSIST OF REMOVAL OF ALL STANDING WASTEWATER, ALL BIOSOLIDS, ANY RESIDUES OF WASTEWATER TREATMENT, AND ALL INFRASTRUCTURE.
3. ADDITIONALLY, CLOSEOUT SHALL INCLUDE LEVELING OF EXISTING EMBANKMENTS INTO POND AFTER REMOVAL OF BIOSOLIDS AND RESEEDING OF THE AREA. PRIOR TO RESEEDING, THE CONTRACTOR SHALL SUBMIT THE PROPOSED SEED MIXTURE FOR APPROVAL.

**ELEMENT ENGINEERING LLC**  
 720.749.4165  
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 LAKEWOOD, CO 80226

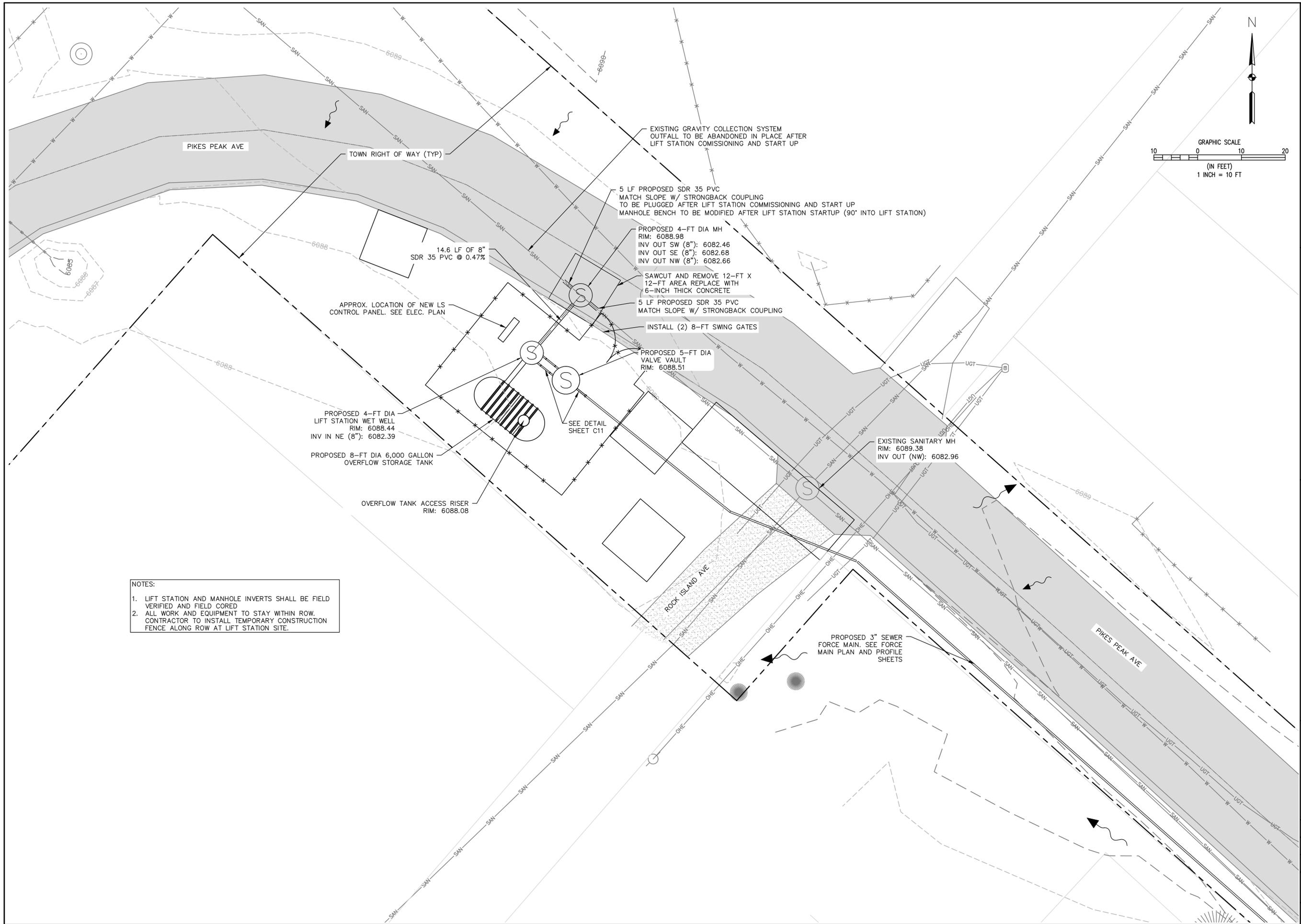
NO.	REVISIONS	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID  
**PROPOSED IMPROVEMENTS,  
 CONST. PHASING, AND DEMO**  
 TOWN OF RAMAH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF



DATE: JANUARY 2024  
 JOB NUMBER: 0043.0001  
 SCALE: NTS  
 EDITION: BIDDING  
 SHEET: C8 OF C31



NOTES:

- LIFT STATION AND MANHOLE INVERTS SHALL BE FIELD VERIFIED AND FIELD CORED
- ALL WORK AND EQUIPMENT TO STAY WITHIN ROW. CONTRACTOR TO INSTALL TEMPORARY CONSTRUCTION FENCE ALONG ROW AT LIFT STATION SITE.

NO.	REVISIONS	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID  
**LIFT STATION YARD PIPING**  
 TOWN OF RAMAH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

FOR AND ON BEHALF OF  
 ELEMENT ENGINEERING, LLC

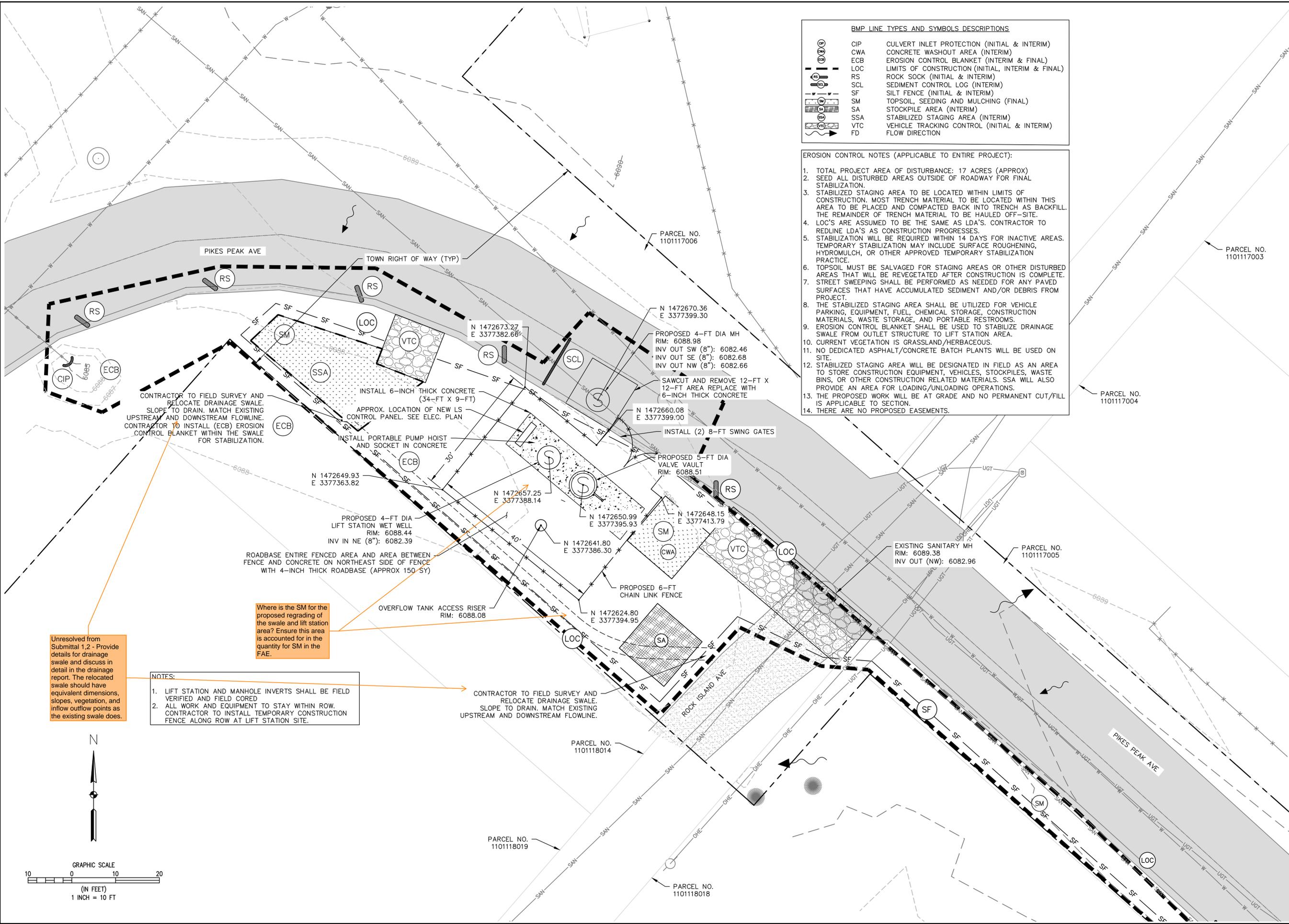
DATE  
 JANUARY 2024

JOB NUMBER  
 0043.0001

SCALE  
 1" = 10'

EDITION  
 BIDDING

SHEET  
 C9 OF C31



**BMP LINE TYPES AND SYMBOLS DESCRIPTIONS**

	CIP	CULVERT INLET PROTECTION (INITIAL & INTERIM)
	CWA	CONCRETE WASHOUT AREA (INTERIM)
	ECB	EROSION CONTROL BLANKET (INTERIM & FINAL)
	LOC	LIMITS OF CONSTRUCTION (INITIAL, INTERIM & FINAL)
	RS	ROCK SOCK (INITIAL & INTERIM)
	SCL	SEDIMENT CONTROL LOG (INTERIM)
	SF	SILT FENCE (INITIAL & INTERIM)
	SM	TOPSOIL, SEEDING AND MULCHING (FINAL)
	SA	STOCKPILE AREA (INTERIM)
	SSA	STABILIZED STAGING AREA (INTERIM)
	VTC	VEHICLE TRACKING CONTROL (INITIAL & INTERIM)
	FD	FLOW DIRECTION

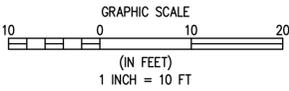
- EROSION CONTROL NOTES (APPLICABLE TO ENTIRE PROJECT):**
- TOTAL PROJECT AREA OF DISTURBANCE: 17 ACRES (APPROX)
  - SEED ALL DISTURBED AREAS OUTSIDE OF ROADWAY FOR FINAL STABILIZATION.
  - STABILIZED STAGING AREA TO BE LOCATED WITHIN LIMITS OF CONSTRUCTION. MOST TRENCH MATERIAL TO BE LOCATED WITHIN THIS AREA TO BE PLACED AND COMPACTED BACK INTO TRENCH AS BACKFILL. THE REMAINDER OF TRENCH MATERIAL TO BE HAULED OFF-SITE.
  - LOC'S ARE ASSUMED TO BE THE SAME AS LDA'S. CONTRACTOR TO REDLINE LDA'S AS CONSTRUCTION PROGRESSES.
  - STABILIZATION WILL BE REQUIRED WITHIN 14 DAYS FOR INACTIVE AREAS. TEMPORARY STABILIZATION MAY INCLUDE SURFACE ROUGHENING, HYDROMULCH, OR OTHER APPROVED TEMPORARY STABILIZATION PRACTICE.
  - TOPSOIL MUST BE SALVAGED FOR STAGING AREAS OR OTHER DISTURBED AREAS THAT WILL BE REVEGETATED AFTER CONSTRUCTION IS COMPLETE. STREET SWEEPING SHALL BE PERFORMED AS NEEDED FOR ANY PAVED SURFACES THAT HAVE ACCUMULATED SEDIMENT AND/OR DEBRIS FROM PROJECT.
  - THE STABILIZED STAGING AREA SHALL BE UTILIZED FOR VEHICLE PARKING, EQUIPMENT, FUEL, CHEMICAL STORAGE, CONSTRUCTION MATERIALS, WASTE STORAGE, AND PORTABLE RESTROOMS.
  - EROSION CONTROL BLANKET SHALL BE USED TO STABILIZE DRAINAGE SWALE FROM OUTLET STRUCTURE TO LIFT STATION AREA.
  - CURRENT VEGETATION IS GRASSLAND/HERBACEOUS.
  - NO DEDICATED ASPHALT/CONCRETE BATCH PLANTS WILL BE USED ON SITE.
  - STABILIZED STAGING AREA WILL BE DESIGNATED IN FIELD AS AN AREA TO STORE CONSTRUCTION EQUIPMENT, VEHICLES, STOCKPILES, WASTE BINS, OR OTHER CONSTRUCTION RELATED MATERIALS. SSA WILL ALSO PROVIDE AN AREA FOR LOADING/UNLOADING OPERATIONS.
  - THE PROPOSED WORK WILL BE AT GRADE AND NO PERMANENT CUT/FILL IS APPLICABLE TO SECTION.
  - THERE ARE NO PROPOSED EASEMENTS.

Unresolved from Submittal 1.2 - Provide details for drainage swale and discuss in detail in the drainage report. The relocated swale should have equivalent dimensions, slopes, vegetation, and inflow/outflow points as the existing swale does.

Where is the SM for the proposed regrading of the swale and lift station area? Ensure this area is accounted for in the quantity for SM in the FAE.

- NOTES:**
- LIFT STATION AND MANHOLE INVERTS SHALL BE FIELD VERIFIED AND FIELD CORED
  - ALL WORK AND EQUIPMENT TO STAY WITHIN ROW. CONTRACTOR TO INSTALL TEMPORARY CONSTRUCTION FENCE ALONG ROW AT LIFT STATION SITE.

CONTRACTOR TO FIELD SURVEY AND RELOCATE DRAINAGE SWALE. SLOPE TO DRAIN. MATCH EXISTING UPSTREAM AND DOWNSTREAM FLOWLINE.



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NO.	DATE	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID

LIFT STATION SITE PLAN & EROSION CONTROL

TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

DATE: JANUARY 2024

JOB NUMBER: 0043.0001

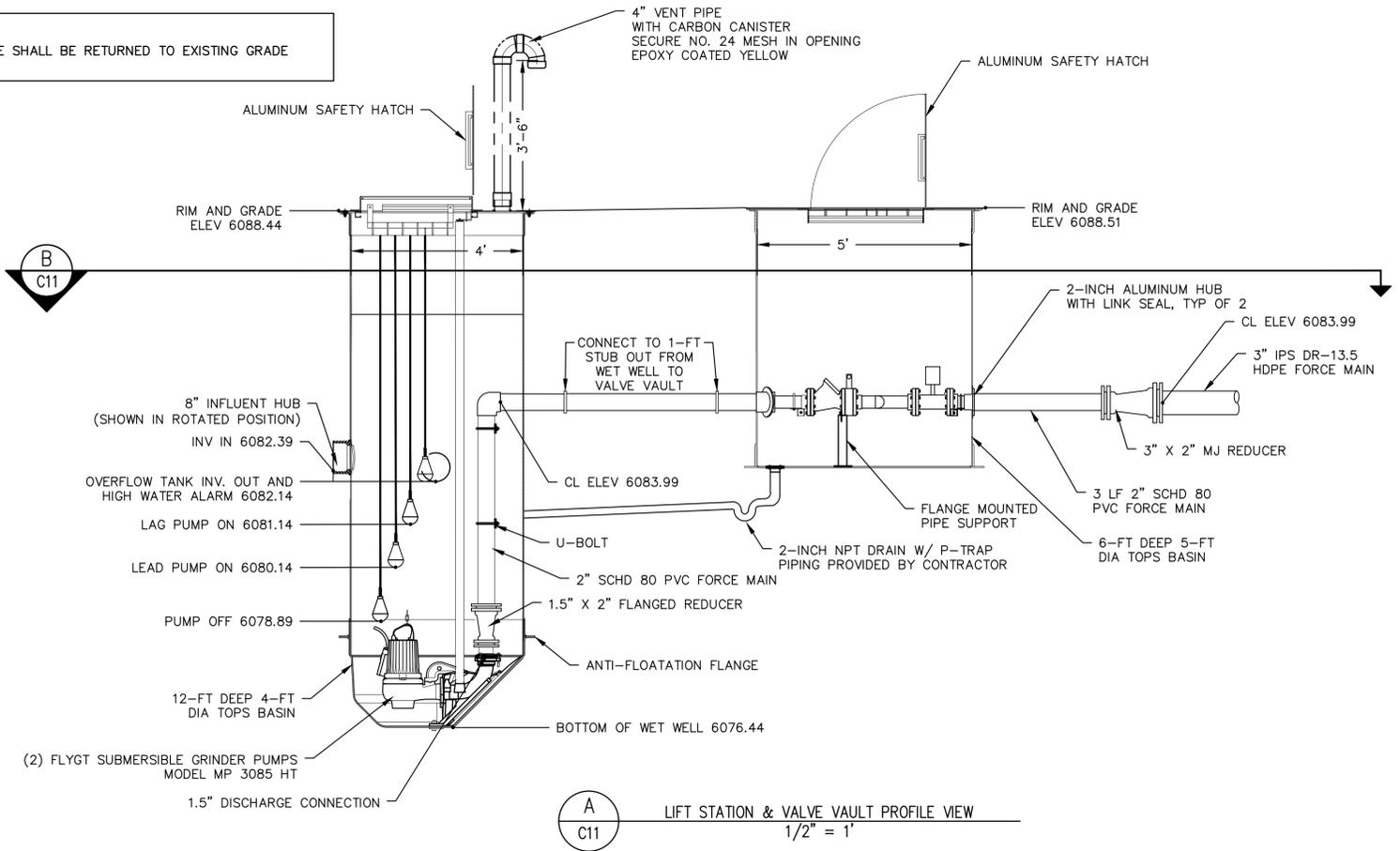
SCALE: 1" = 10'

EDITION: BIDDING

SHEET: C10 OF C31

FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

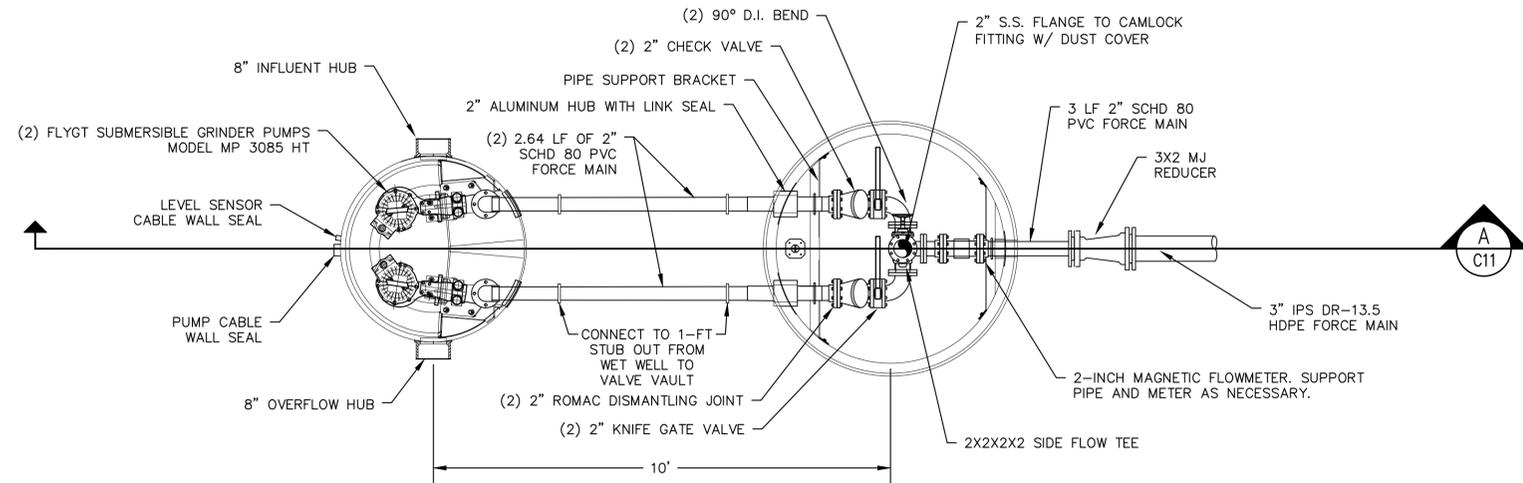
GRADE NOTES:  
 1. FINAL GRADE SHALL BE RETURNED TO EXISTING GRADE ELEVATION



A  
C11 LIFT STATION & VALVE VAULT PROFILE VIEW  
1/2" = 1'

LIFT STATION DESIGN POINT: 42 GPM  
 ADJUST KNIFE GATE TO CREATE ARTIFICIAL SYSTEM HEAD TO ALLOW DESIGN POINT OPERATION (APPROX 99 FT TDH)

INFLUENT PUMP & MOTOR INFORMATION	
PUMP MAKE	FLYGT SUBMERSIBLE GRINDER
PUMP MODEL	MP 3085 HT
DISCHARGE DIAMETER	1.5 IN
IMPELLER DIAMETER	150 MM
RATED POWER	4 HP
FREQUENCY	60 HZ
RATED VOLTAGE	200 V
NO. POLES	2
RATED CURRENT	12.0 AMP
STARTING CURRENT	63.0 AMP
RATED SPEED	3395 RPM



B  
C11 LIFT STATION & VALVE VAULT PLAN VIEW  
1/2" = 1'

- LIFT STATION NOTES:
- DISCHARGE CL MUST BE AT LEAST 18" FROM BOTTOM OF VALVE VAULT
  - DISCHARGE CL OF VAULT MUST EQUAL DISCHARGE CL OF ORDERED STATION
  - ALL BOLT PENETRATIONS THRU WALLS MUST BE SEALED WITH SILICONE SEALANT
  - ALL 2-INCH FORCE MAIN PIPING SHALL BE SCHD 80 PVC
  - ALL 3-INCH FORCE MAIN PIPING SHALL BE IPSS DR-13.5 HDPE
  - ALL 8-INCH GRAVITY PIPING SHALL BE SDR 35 PVC
  - PIPE COATING/COLORING AND LABELING PER SPECIFICATIONS
  - PIPE AND STRUCTURE PRESSURE TESTING PER SPECIFICATIONS
  - PIPE FITTINGS SHALL MATCH PIPE REQUIREMENTS INCLUDING INTERIOR COATING
  - FLOATS SHALL BE PLACED AS FAR AWAY FROM THE INFLUENT INVERT AS ALLOWABLE BASED ON THE GEOMETRY OF THE BASIN. THE PUMP OFF FLOAT SHALL BE LOCATED AT THE FURTHEST ALLOWABLE POSITION. FLOATS SHALL BE LOCATED IN INCREASING HEIGHT AS THEY GET CLOSER TO THE INFLUENT INVERT, WITH THE HIGH-WATER ALARM FLOAT BEING CLOSEST TO THE INVERT. FLOAT LOCATIONS SHOWN ON THESE PLANS ARE FOR ILLUSTRATIVE PURPOSES ONLY.

NO.	REVISIONS	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID  
**LIFT STATION DETAILS**  
 TOWN OF RAMAH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAH, CO 80832



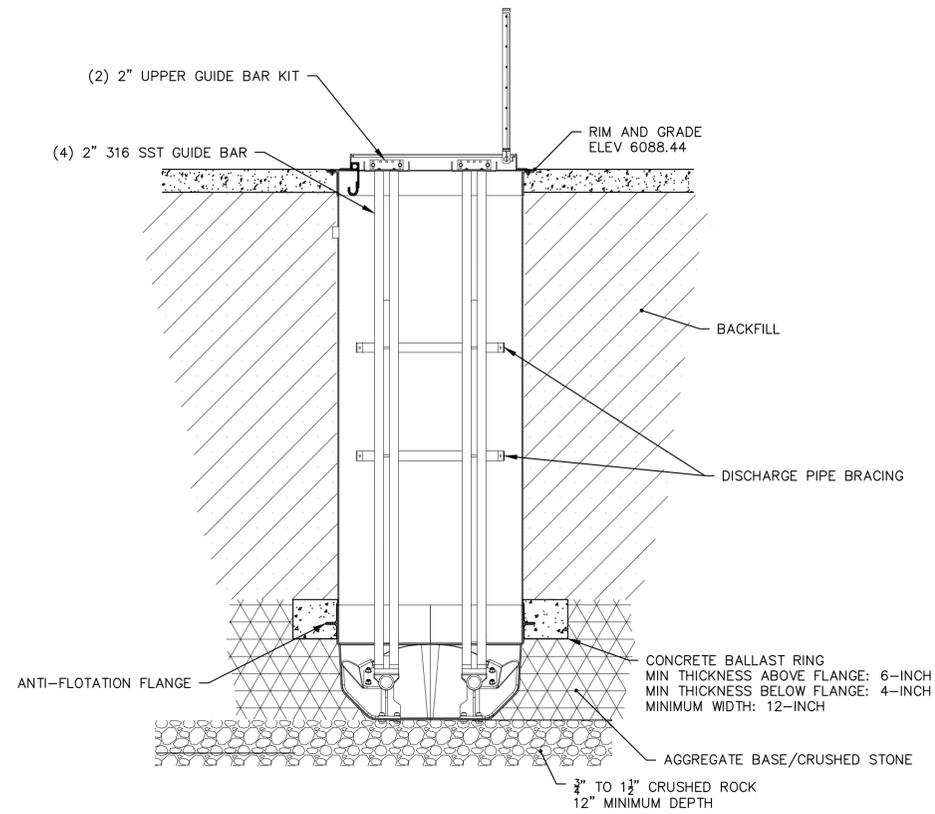
DATE: JANUARY 2024  
 JOB NUMBER: 0043.0001  
 SCALE: AS SHOWN  
 EDITION: BIDDING  
 SHEET: C11 OF C31

**LIFT STATION CONSTRUCTION NOTES:**

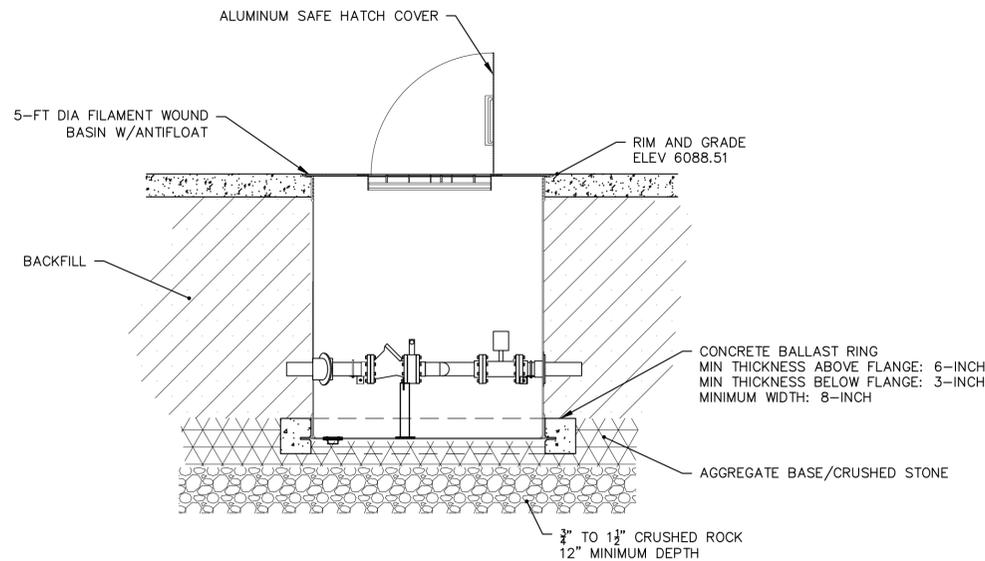
1. CONTRACTOR TO SUBMIT A CONSTRUCTION PHASING PLAN TO ENGINEER FOR APPROVAL PRIOR TO BEGINNING CONSTRUCTION. AN EXAMPLE CONSTRUCTION PHASING PLAN IS AS FOLLOWS:
  - 1.1. CONSTRUCT THE PROPOSED LIFT STATION INCLUDING INSTALLING ALL PUMPS, RAILS, PANELS, ETC.
  - 1.2. CONSTRUCT ALL YARD PIPING UP TO THE PROPOSED TIE IN LOCATIONS.
  - 1.3. TEST THE PROPOSED LIFT STATION PUMPS AND EQUIPMENT.
  - 1.4. INSTALL PROPOSED SANITARY SEWER MANHOLE.
  - 1.5. COMPLETE CONSTRUCTION OF ALL YARD PIPING. FINALIZE GRADING AND INSTALLATION OF ALL REQUIRED CONCRETE, BOLLARDS, ETC.
2. BYPASS PUMPING WILL BE REQUIRED DURING CONSTRUCTION. THE CONTRACTOR MUST SUBMIT A BYPASS PUMPING PLAN TO THE ENGINEER FOUR (4) WORKING DAYS PRIOR TO BEGINNING BYPASS PUMPING. NO BYPASS PUMPING SHALL BE ALLOWED UNTIL THE BYPASS PUMPING PLAN IS APPROVED BY THE ENGINEER IN WRITING. THE BYPASS PUMPING PLAN SHALL INCLUDE THE FOLLOWING ITEMS AT A MINIMUM:
  - 2.1. NUMBER OF PUMPS PROVIDED
  - 2.2. BASIC LAYOUT OF BYPASS PUMPS AND PIPE
  - 2.3. BYPASS PUMPING STAFFING PLAN
  - 2.4. EMERGENCY RESPONSE PLAN INCLUDING EMERGENCY CONTACT NUMBERS SHOULD A SANITARY SEWER OVERFLOW (SSO) OCCUR. NOTE THAT ANY REPORTING AND FINES RELATING TO A SSO SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. CONTRACTOR TO LOCATE ALL PROPOSED TIE IN LOCATIONS TO VERIFY DEPTH AND LOCATION. CONTRACTOR TO PROVIDE ANY MATERIALS, FITTINGS, BENDS AND PIPE NECESSARY TO TIE INTO EXISTING PIPES AND STRUCTURES. ANY DISCREPANCIES IN TIE IN LOCATIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER.
4. PUMPS, RAILS, FLOATS, VALVES AND ALL ANCILLARY EQUIPMENT SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATIONS AND SPECIFICATIONS.
6. AN ADDITIONAL 5 FEET OF WIRE FROM THE CONTROL BOX TO THE FLOATS SHALL BE ASSUMED TO ENSURE SLACK IN THE WIRE.
7. VENT PIPING SHALL BE 4-INCH DUCTILE IRON COATED YELLOW WITH EXTERIOR RATED EPOXY COATING PRODUCT. SECURE NO. 24 MESH IN OPENING. INSTALL CARBON CANISTER FOR ODOR CONTROL.
8. ALL CONCRETE STRUCTURES SHALL BE PRE-CAST. ALL HATCHES SHALL BE CAST INTO THE MANHOLE TOP.
9. PUMP STARTUP AND TRAINING TO BE COMPLETED BY A MANUFACTURER TRAINED AND APPROVED REPRESENTATIVE.
10. PUMP TESTING SHALL BE COMPLETED WITH CLEAN WATER WHICH MAY BE OBTAINED FROM THE TOWN. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY CONSTRUCTION WATER DISCHARGE PERMITS NECESSARY.
11. FOUR (4) HOURS OF OPERATOR ON SITE TRAINING SHALL BE INCLUDED DURING PUMP STARTUP AND AUTO-DIALER STARTUP. ALL STARTUP AND TRAINING COSTS SHALL BE AT THE CONTRACTOR'S EXPENSE.
12. CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING EQUIPMENT AND STRUCTURES FROM DAMAGE. ANY DAMAGE WILL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN A MANNER ACCEPTABLE TO THE TOWN.
13. ALL MANHOLE CORES AND PENETRATIONS SHALL BE FIELD CORED AFTER VERIFYING EXISTING UTILITY INFORMATION.
14. CONTRACTOR TO POTHOLE ALL UTILITY CROSSINGS PRIOR TO CONSTRUCTION.

**LIFT STATION EXCAVATION AND BALLASTING NOTES:**

1. PRE-PACKAGED LIFT STATION:
  - 1.1. EXCAVATION AREA SHALL PROVIDE ADEQUATE WORKING ROOM AROUND THE PUMP STATION. SEE PUMP STATION INSTALLATION, CARE AND MAINTENANCE MANUAL FOR HANDLING, INSTALLATION, AND BALLASTING INSTRUCTIONS.
  - 1.2. CONCRETE BALLAST DESIGN SHALL BE SUFFICIENT TO RESIST HEAD PRESSURE AND SOIL LOADING WITH PUMP STATION COMPLETELY EMPTY AND WATER TO GRADE. THE DETAIL SHOWN HEREIN SATISFIES THIS CONDITION.
  - 1.3. DO NOT LET CONCRETE FREE FALL TO BOTTOM OF HOLE MORE THAN 3 TO 4 FEET. PLACE CONCRETE USING A TREMMY CHUTE TO HELP PRECLUDE SEGREGATION OF AGGREGATE FROM THE MATRIX. ENSURE THAT CONCRETE FLOWS UNDER THE FIBERGLASS ANTI-FLOTATION FLANGE. CONSOLIDATE CONCRETE WITH PROPER VIBRATION PER THE RECOMMENDED PRACTICE OF ACI 318-05 SECTION 5.10.
  - 1.4. BACKFILL AND COMPACTION SHALL MEET OR EXCEED THE REQUIREMENTS SET FORTH IN THE INSTALLATION, CARE, AND MAINTENANCE MANUAL FOR THE PACKAGE PUMP STATION.
  - 1.5. SLINGING, INSTALLATION, AND HANDLING SHALL FOLLOW ALL MANUFACTURERS REQUIREMENTS.



1  
CC12 LIFT STATION BALLAST AND BACKFILL DETAILS  
1/2" = 1'



2  
CC12 VALVE VAULT BALLAST AND BACKFILL DETAILS  
1/2" = 1'

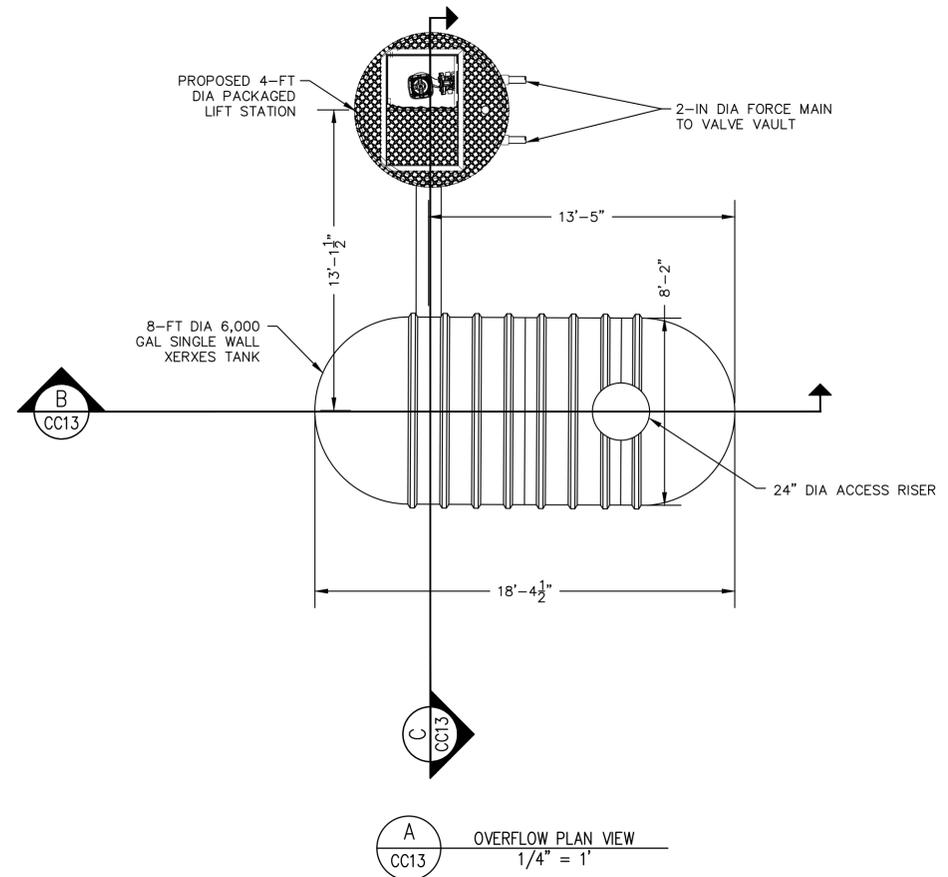
GRADE NOTES:  
1. FINAL GRADE SHALL BE RETURNED TO EXISTING GRADE ELEVATION

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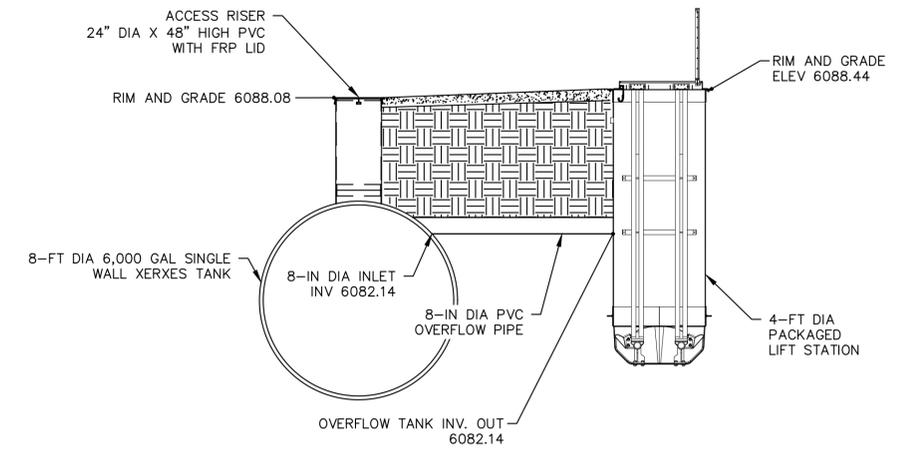
WASTEWATER TREATMENT PLANT PLANS FOR BID  
LIFT STATION NOTES & BALLASTING  
TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832



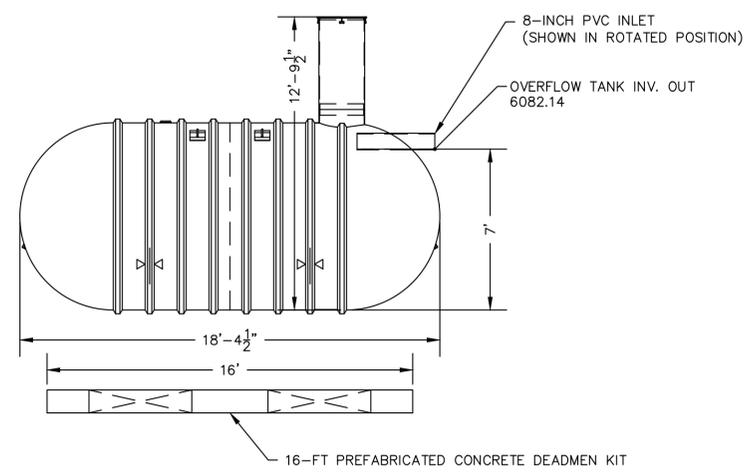
DATE: JANUARY 2024  
JOB NUMBER: 0043.0001  
SCALE: AS SHOWN  
EDITION: BIDDING  
SHEET: C12 OF C31



**A** OVERFLOW PLAN VIEW  
 CC13 1/4" = 1'



**C** OVERFLOW SIDE VIEW  
 CC13 1/4" = 1'



**B** OVERFLOW PROFILE VIEW  
 CC13 1/4" = 1'

NOTE: ALL EQUIPMENT SHOWN IN OVERFLOW PROFILE VIEW PROVIDED BY MANUFACTURER

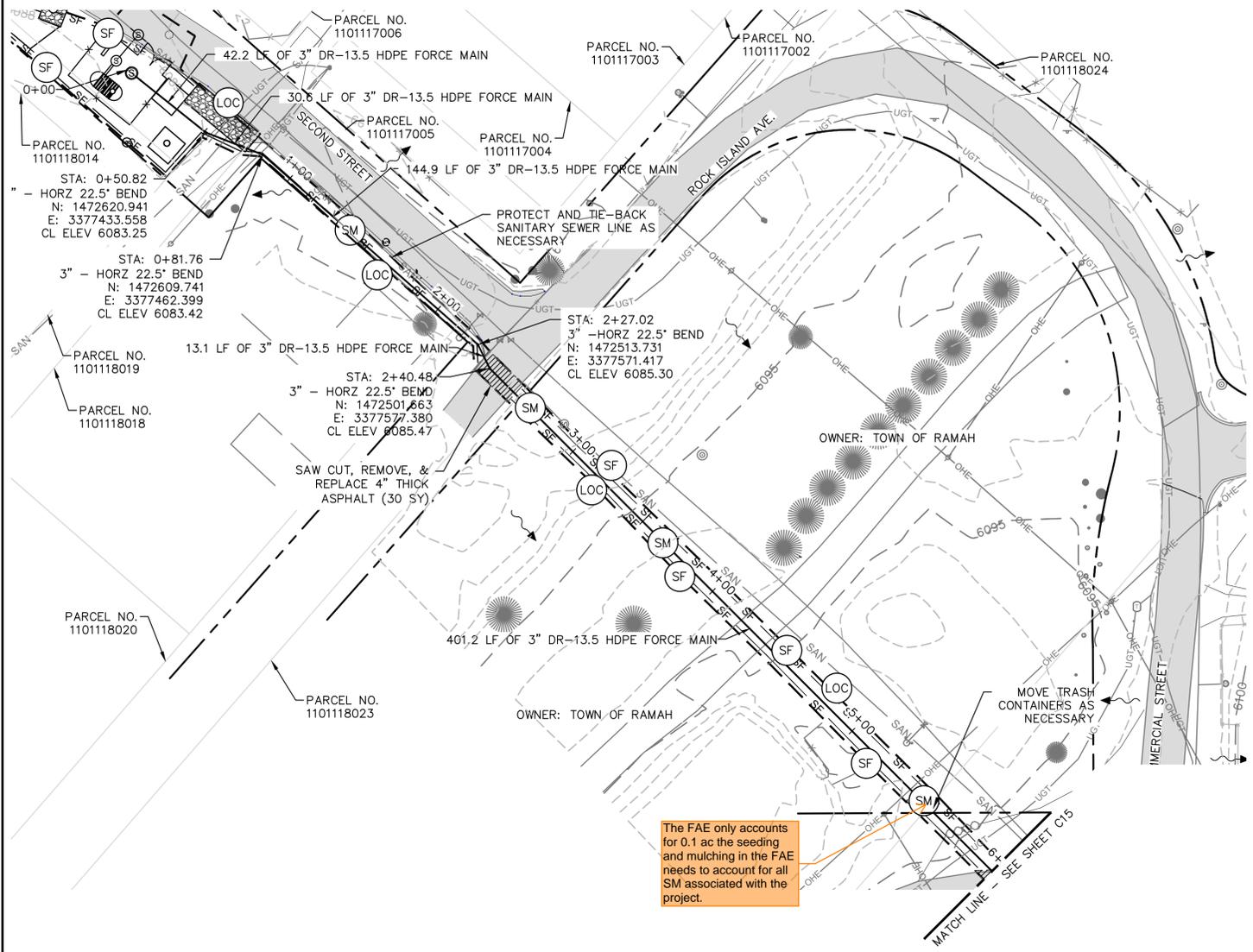
8-FT DIAMETER 6,000 GALLON TANK	
QTY	DESCRIPTION
1	4" NPT SERVICE FITTING
1	8" DIA PVC INLET HORIZONTAL PIPE
1	23 1/2" IS FIBERGLASS ACCESS OPENING WITH 23 1/2" OD ALIGNMENT RING
1	24" DIA X 48" HIGH PVC RISER WITH FRP LID WITH GASKET
2	LIFTING LUG (10" X 8") 25", 25"
2	16-FT PREFABRICATED CONCRETE DEADMENT
2	HOLD DOWN STRAP

NO.	REVISIONS	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID  
**OVERFLOW DETAILS**  
 TOWN OF RAMAHH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAHH, CO 80832

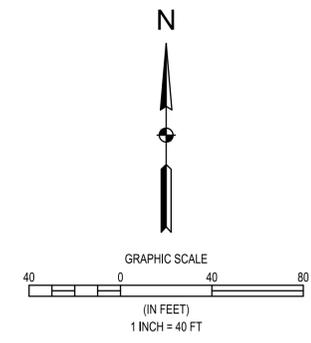


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 SHEET: C13 OF C31



The FAE only accounts for 0.1 ac of the seeding and mulching in the FAE needs to account for all SM associated with the project.

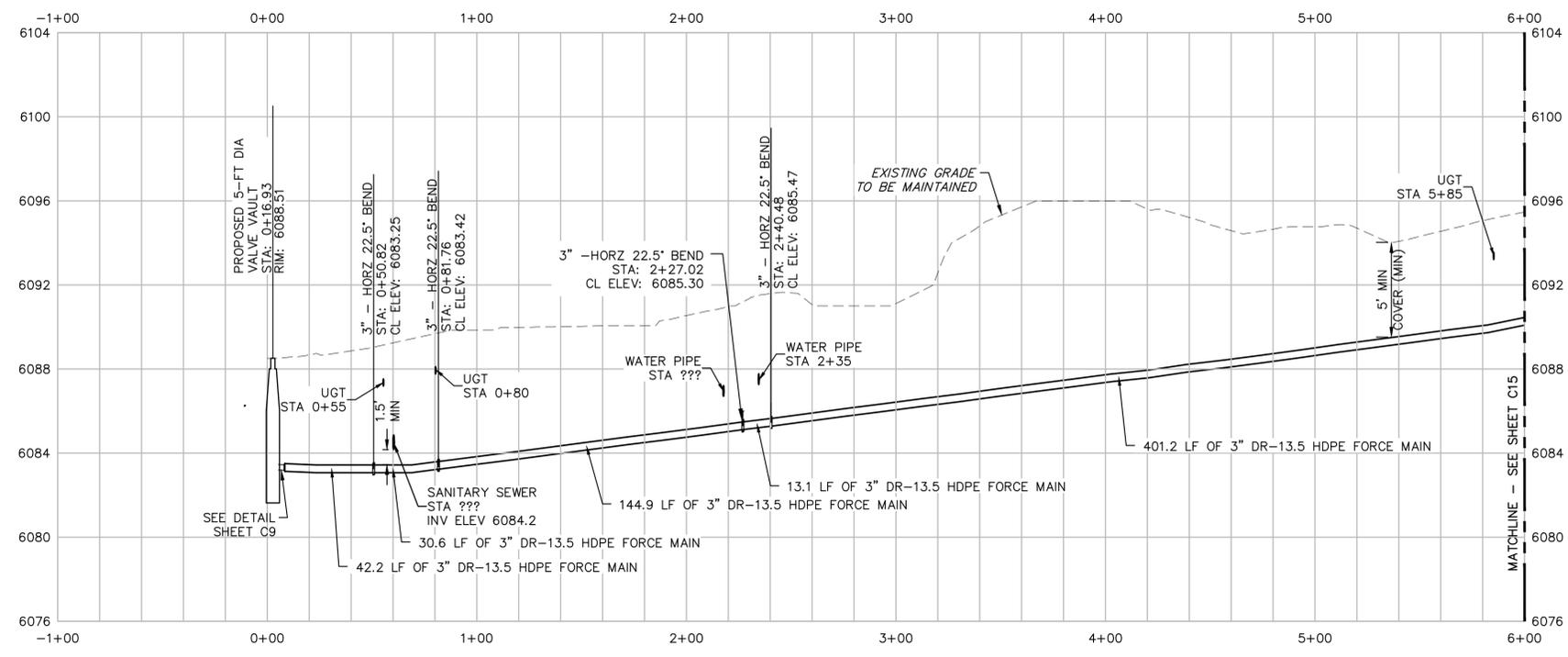
BMP LINE TYPES AND SYMBOLS DESCRIPTIONS	
	CIP CULVERT INLET PROTECTION (INITIAL & INTERIM)
	CWA CONCRETE WASHOUT AREA (INTERIM)
	ECB EROSION CONTROL BLANKET (INTERIM & FINAL)
	LOC LIMITS OF CONSTRUCTION (INITIAL, INTERIM & FINAL)
	RS ROCK SOCK (INITIAL & INTERIM)
	SCL SEDIMENT CONTROL LOG (INTERIM)
	SF SILT FENCE (INITIAL & INTERIM)
	SM TOPSOIL, SEEDING AND MULCHING (FINAL)
	SA STOCKPILE AREA (INTERIM)
	SSA STABILIZED STAGING AREA (INTERIM)
	VTC VEHICLE TRACKING CONTROL (INITIAL & INTERIM)



**EROSION CONTROL NOTES (APPLICABLE TO ENTIRE PROJECT):**

- TOTAL PROJECT AREA OF DISTURBANCE: 17 ACRES (APPROX)
- SEED ALL DISTURBED AREAS OUTSIDE OF ROADWAY FOR FINAL STABILIZATION.
- STABILIZED STAGING AREA TO BE LOCATED WITHIN LIMITS OF CONSTRUCTION. MOST TRENCH MATERIAL TO BE LOCATED WITHIN THIS AREA TO BE PLACED AND COMPACTED BACK INTO TRENCH AS BACKFILL. THE REMAINDER OF TRENCH MATERIAL TO BE HAULED OFF-SITE.
- LOC'S ARE ASSUMED TO BE THE SAME AS LDA'S. CONTRACTOR TO REDLINE LDA'S AS CONSTRUCTION PROGRESSES.
- STABILIZATION WILL BE REQUIRED WITHIN 14 DAYS FOR INACTIVE AREAS. TEMPORARY STABILIZATION MAY INCLUDE SURFACE ROUGHENING, HYDROMULCH, OR OTHER APPROVED TEMPORARY STABILIZATION PRACTICE.
- TOPSOIL MUST BE SALVAGED FOR STAGING AREAS OR OTHER DISTURBED AREAS THAT WILL BE REVEGETATED AFTER CONSTRUCTION IS COMPLETE.
- STREET SWEEPING SHALL BE PERFORMED AS NEEDED FOR ANY PAVED SURFACES THAT HAVE ACCUMULATED SEDIMENT AND/OR DEBRIS FROM PROJECT.
- THE STABILIZED STAGING AREA SHALL BE UTILIZED FOR VEHICLE PARKING, EQUIPMENT, FUEL, CHEMICAL STORAGE, CONSTRUCTION MATERIALS, WASTE STORAGE, AND PORTABLE RESTROOMS.
- THE PROPOSED WORK WILL BE AT GRADE AND NO PERMANENT CUT/FILL IS APPLICABLE TO SECTION.
- THERE ARE NO PROPOSED EASEMENTS.

- NOTES:**
- INSTALL 3" IPS DR-13.5 HDPE FORCE MAIN TO MAINTAIN 5-FT TO 6-FT BURY DEPTH WITH TRACER WIRE. INSTALL VERTICAL BENDS AS NECESSARY.
  - TRACER WIRE LOCATE BOXES WITH MARKER POST SHALL BE OFFSET, AND PLACED EVERY 1000 FEET AT THE RIGHT-OF-WAY LINE.
  - FORCE MAIN BENDS SHOWN MAY BE ACCOMPLISHED BY MANUFACTURER ACCEPTABLE DEFLECTION IN PIPE RATHER THAN A BUTT WELD FITTING.
  - AVOID HIGH POINTS IN THE FORCE MAIN WHERE POSSIBLE. AIR VAC VAULTS SHALL BE REQUIRED AT ALL HIGH POINTS.
  - CONTRACTOR TO SURVEY AND MARK RIGHT-OF-WAY.
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  - CONTRACTOR TO POTHOLE UTILITIES AT ALL CROSSINGS. EXISTING UTILITY PROFILE DEPTHS ARE ESTIMATED, NO POTHOLES WERE PERFORMED AS PART OF THE DESIGN PHASE.
  - MAINTAIN 18-INCH MINIMUM VERTICAL SEPARATION AT ALL UTILITY CROSSINGS.



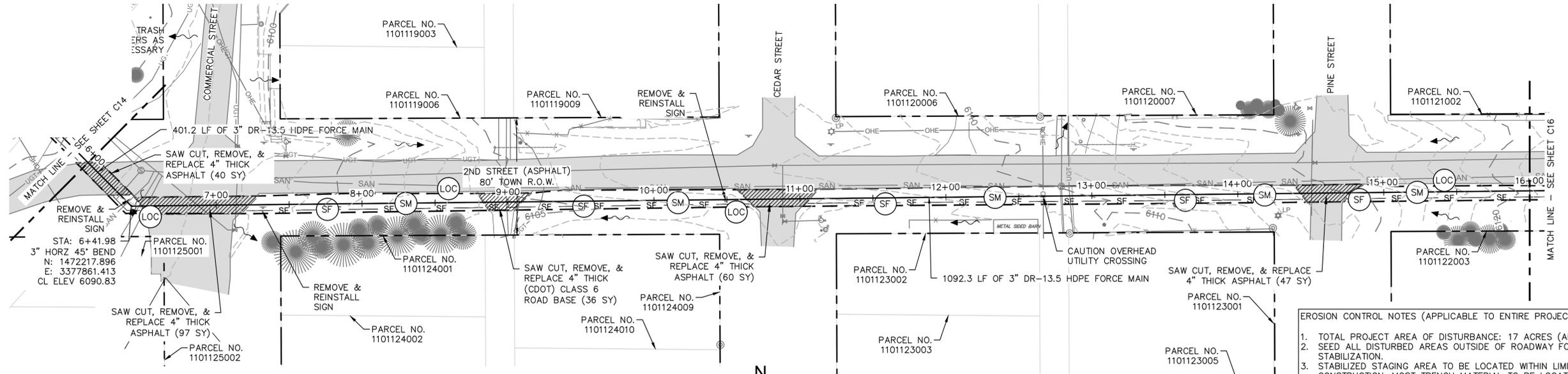
HORIZ. SCALE: 1" = 40'  
VERT. SCALE: 1" = 4'

NO.	REVISIONS	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID  
FORCE MAIN PLAN & PROFILE STA 0+00 - 6+00 & EROSION CONTROL  
TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832



DATE	JANUARY 2024
JOB NUMBER	0043.0001
SCALE	1" = 40'
EDITION	BIDDING
SHEET	C14 OF C31

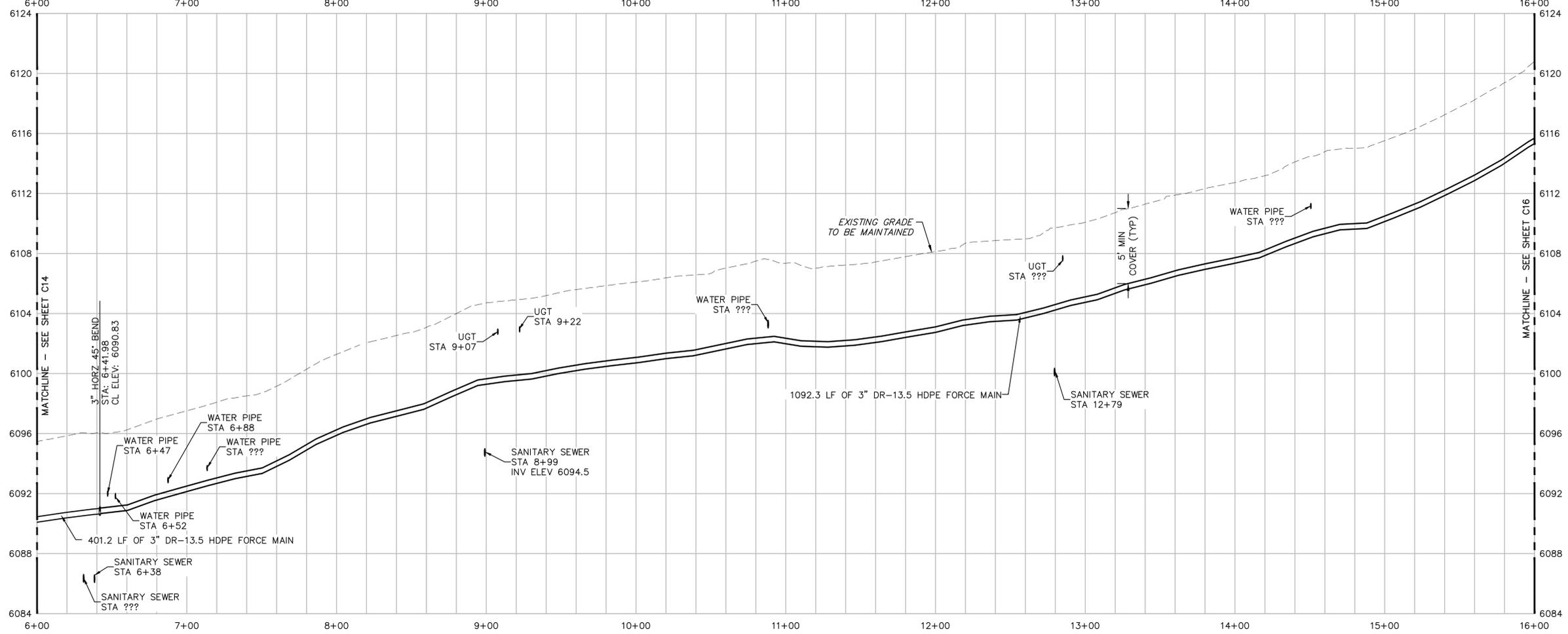
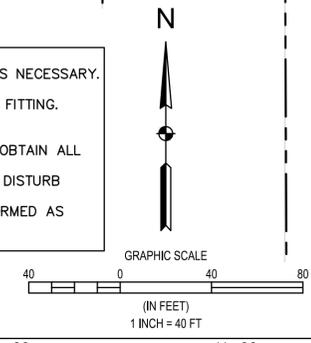


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**BMP LINE TYPES AND SYMBOLS DESCRIPTIONS**

	CIP	CULVERT INLET PROTECTION (INITIAL & INTERIM)
	CWA	CONCRETE WASHOUT AREA (INTERIM)
	ECB	EROSION CONTROL BLANKET (INTERIM & FINAL)
	LOC	LIMITS OF CONSTRUCTION (INITIAL, INTERIM & FINAL)
	RS	ROCK SOCK (INITIAL & INTERIM)
	SCL	SEDIMENT CONTROL LOG (INTERIM)
	SF	SILT FENCE (INITIAL & INTERIM)
	SM	TOPSOIL, SEEDING AND MULCHING (FINAL)
	SP	STOCKPILE AREA (INTERIM)
	SSA	STABILIZED STAGING AREA (INTERIM)
	VTC	VEHICLE TRACKING CONTROL (INITIAL & INTERIM)

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- TOTAL PROJECT AREA OF DISTURBANCE: 17 ACRES (APPROX)
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HORIZ. SCALE: 1" = 40'  
VERT. SCALE: 1" = 4'

NO.	REVISIONS	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID  
 FORCE MAIN PLAN & PROFILE STA 6+00  
 - 16+00 & EROSION AND CONTROL  
 TOWN OF RAMAH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

DATE: JANUARY 2024  
 JOB NUMBER: 0043.0001  
 SCALE: 1" = 40'  
 EDITION: BIDDING  
 SHEET: C15 OF C31

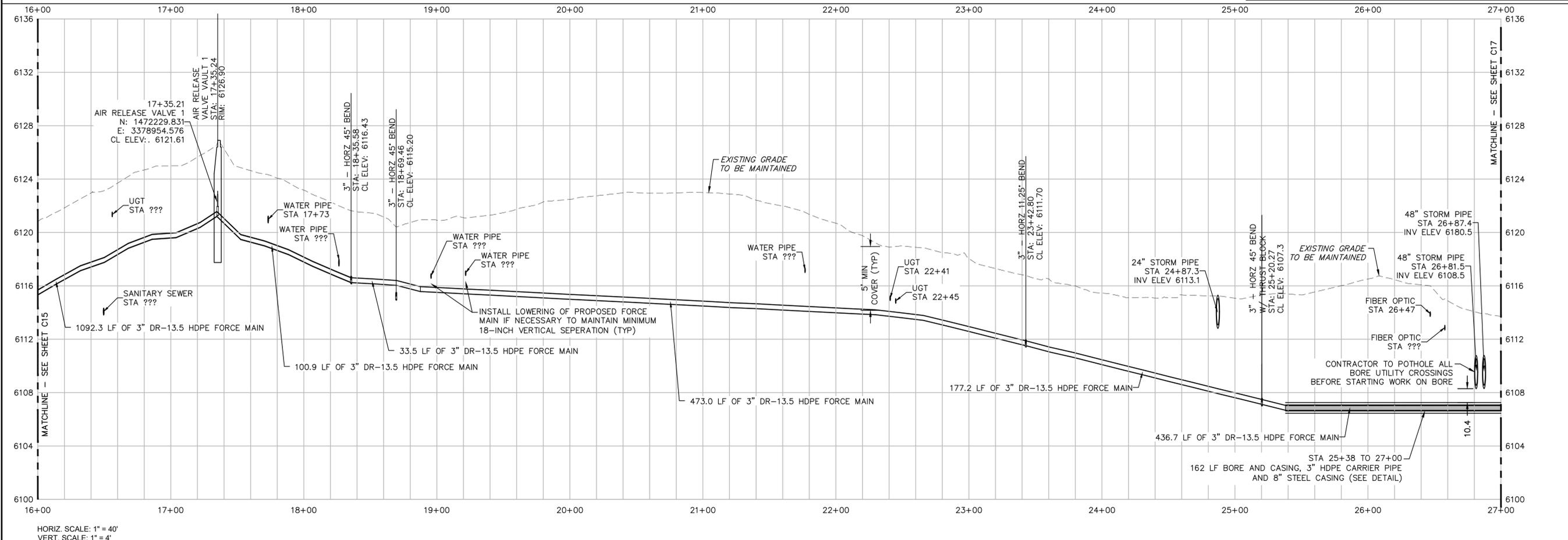
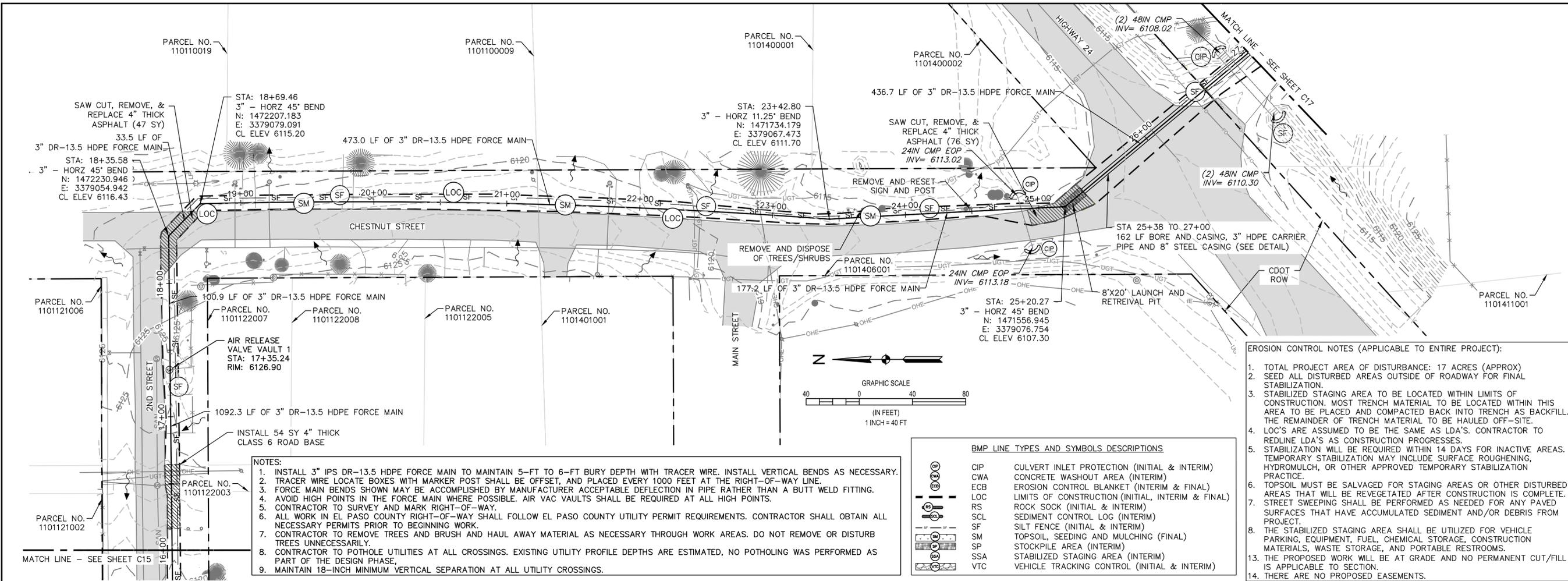


NO.	DATE	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID  
FORCE MAIN PLAN & PROFILE STA  
16+00 - 27+00 & EROSION CONTROL  
TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832



DATE	JANUARY 2024
JOB NUMBER	0043.0001
SCALE	1" = 40'
EDITION	BIDDING
SHEET	C16 OF C31



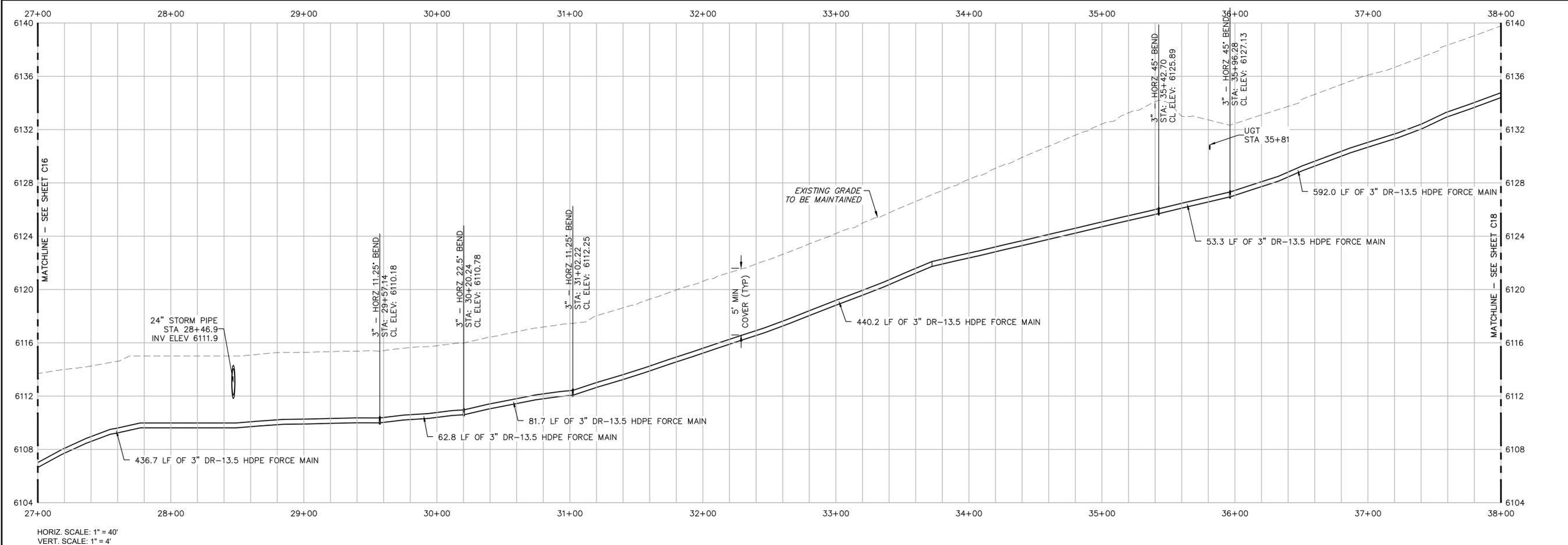
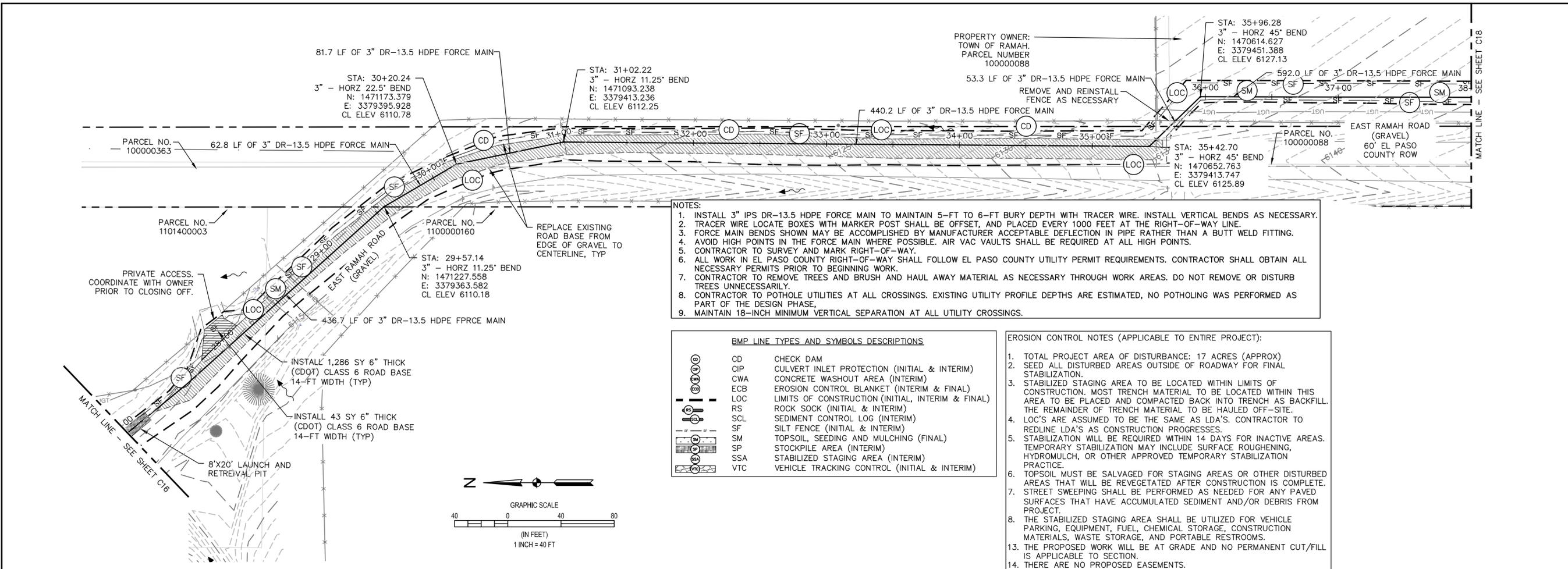


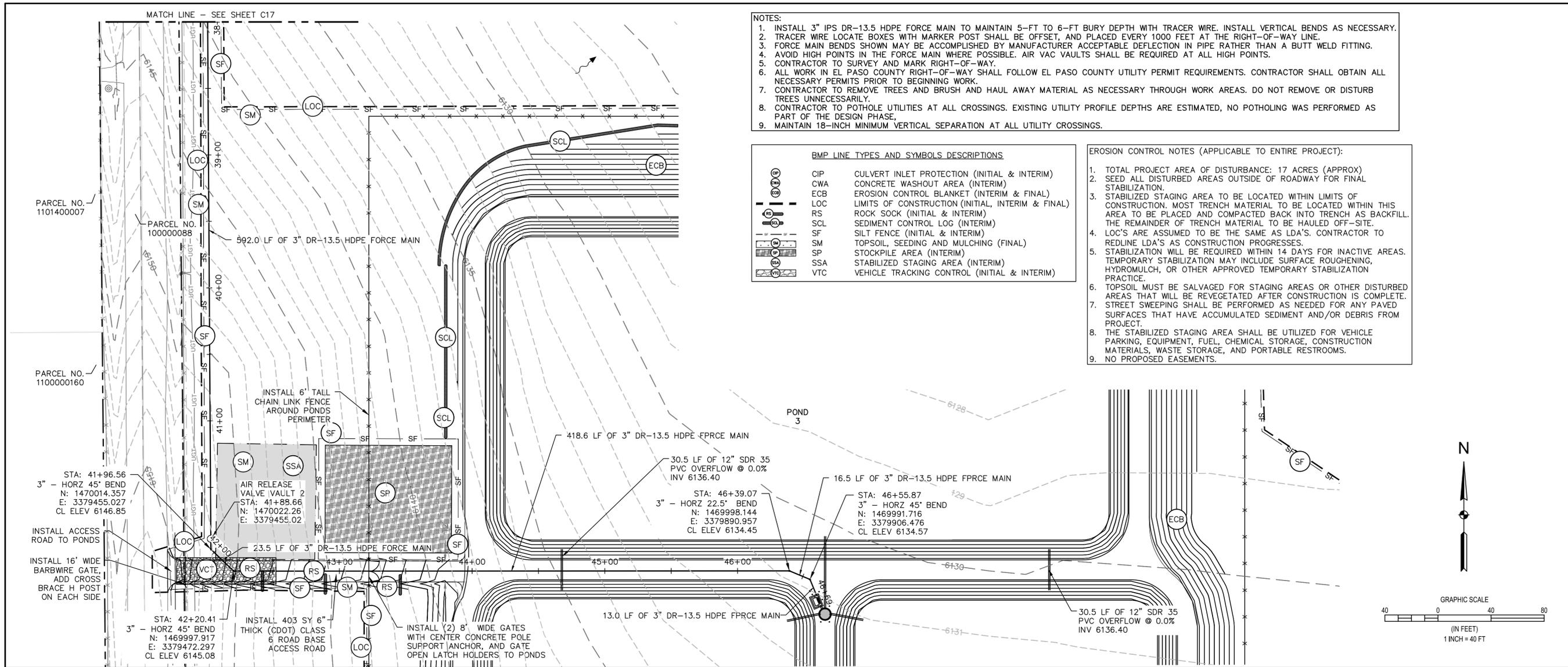
NO.	DATE	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID  
FORCE MAIN PLAN & PROFILE STA  
27+00 - 38+00 & EROSION CONTROL  
TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

DATE: JANUARY 2024  
JOB NUMBER: 0043.0001  
SCALE: 1" = 40'  
EDITION: BIDDING  
SHEET: C17 OF C31



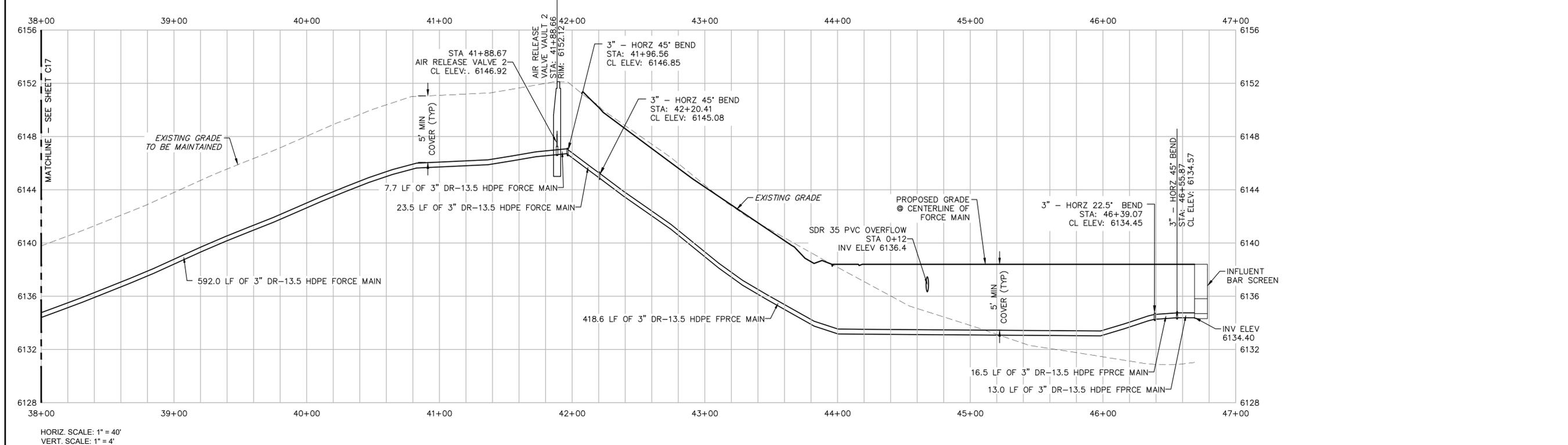
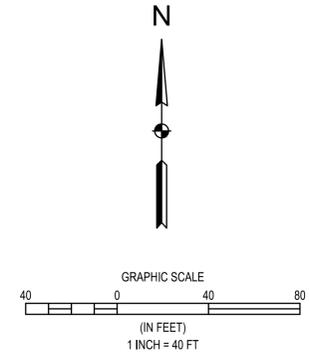


- NOTES:
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	ECB	EROSION CONTROL BLANKET (INTERIM & FINAL)
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  9. NO PROPOSED EASEMENTS.



ELEMENT ENGINEERING LLC

720.749.4165 WWW.ELEMENTENGINEERING.NET

12687 W. CEDAR DRIVE, SUITE 300 LAKEWOOD, CO 80228

WASTEWATER TREATMENT PLANT PLANS FOR BID

FORCE MAIN PLAN & PROFILE STA 38+00 - 47+00 & EROSION CONTROL

TOWN OF RAMAH - PCD FILE NO. PPR2325 113 S. COMMERCIAL STREET RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

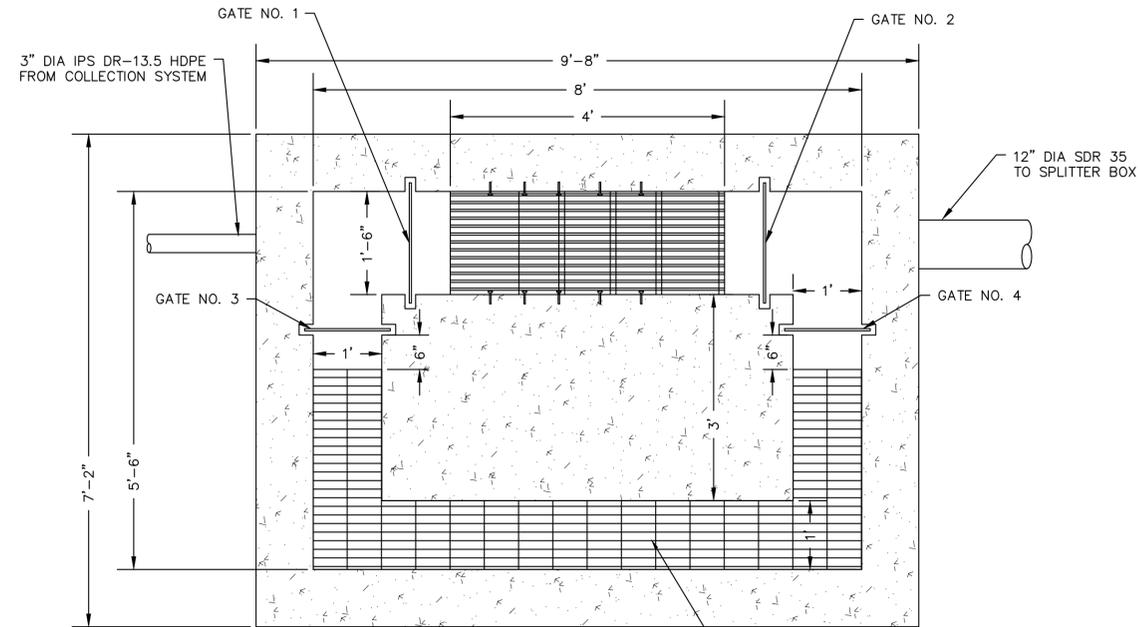
DATE: JANUARY 2024

JOB NUMBER: 0043.0001

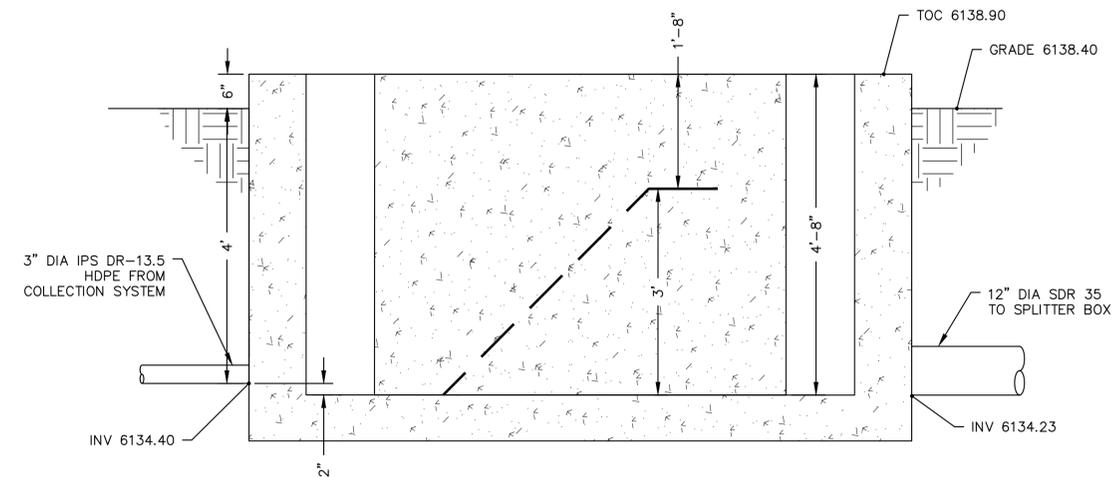
SCALE: 1" = 40'

EDITION: BIDDING

SHEET: C18 OF C31



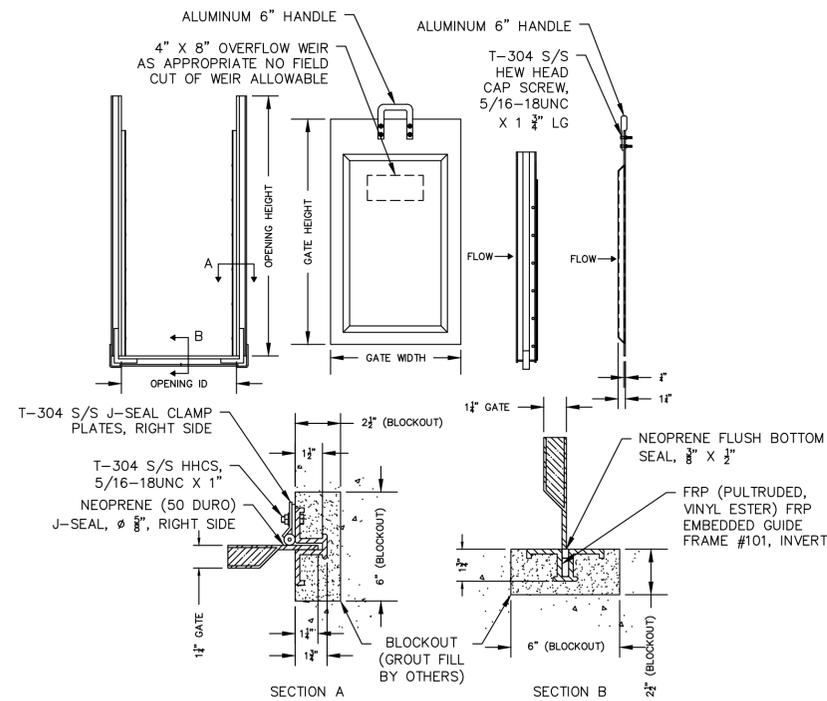
**A**  
C19 INFLUENT BAR SCREEN PLAN  
3/4" = 1'



**B**  
C19 INFLUENT BAR SCREEN PROFILE  
3/4" = 1'

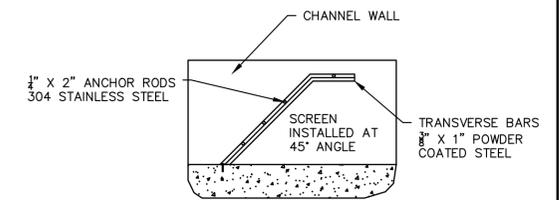
GATE TABLE				
GATE NUMBER	GATE TYPE	MOUNTING TYPE	CHANNEL DIMENSIONS (H' X W')	NOTES
1	MANUAL STOP GATE	FE	3'-6" X 1'-6"	
2	MANUAL STOP GATE	FE	3'-6" X 1'-6"	
3	MANUAL STOP GATE	FE	3'-6" X 1'	EMERGENCY OVERFLOW WEIR
4	MANUAL STOP GATE	FE	3'-6" X 1'	EMERGENCY OVERFLOW WEIR

FE FRAME EMBEDDED INSIDE CHANNEL  
H HEIGHT  
W WIDTH

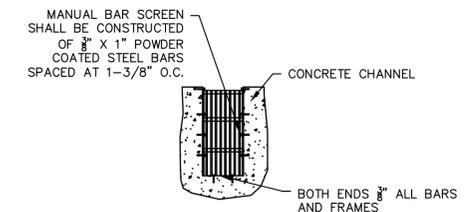


- NOTES:
- STOP GATES TO BE MANUFACTURED BY PLASTI-FAB OR ENGINEER APPROVED EQUAL
  - SEE PLANS FOR OPENING AND GATE DIMENSIONS
  - STOP GATE IS SANDWICH CONSTRUCTION W/ FRP SKINS, FOAM CORE, AND INTERNAL STRUCTURAL STEEL
  - STOP GATE COLOR IS GREY
  - RESIN: MCWHORTER 712-3765
  - GUIDE FRAME IS PULTRUDED FRP (VINYL-ESTER)
  - ALL JOINTS ARE BONDED WITH PLEXUS MA-300
  - ALL HARDWARE MATERIAL IS T-304 S/S
  - APPROXIMATE WEIGHT OF GATE ALONE IS 14 LBS

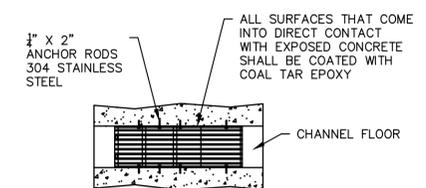
**1**  
C19 STOP GATE DETAIL  
NTS



**2**  
C19 MANUAL BAR SCREEN SECTION  
NTS



**3**  
C19 MANUAL BAR SCREEN FRONT VIEW  
NTS



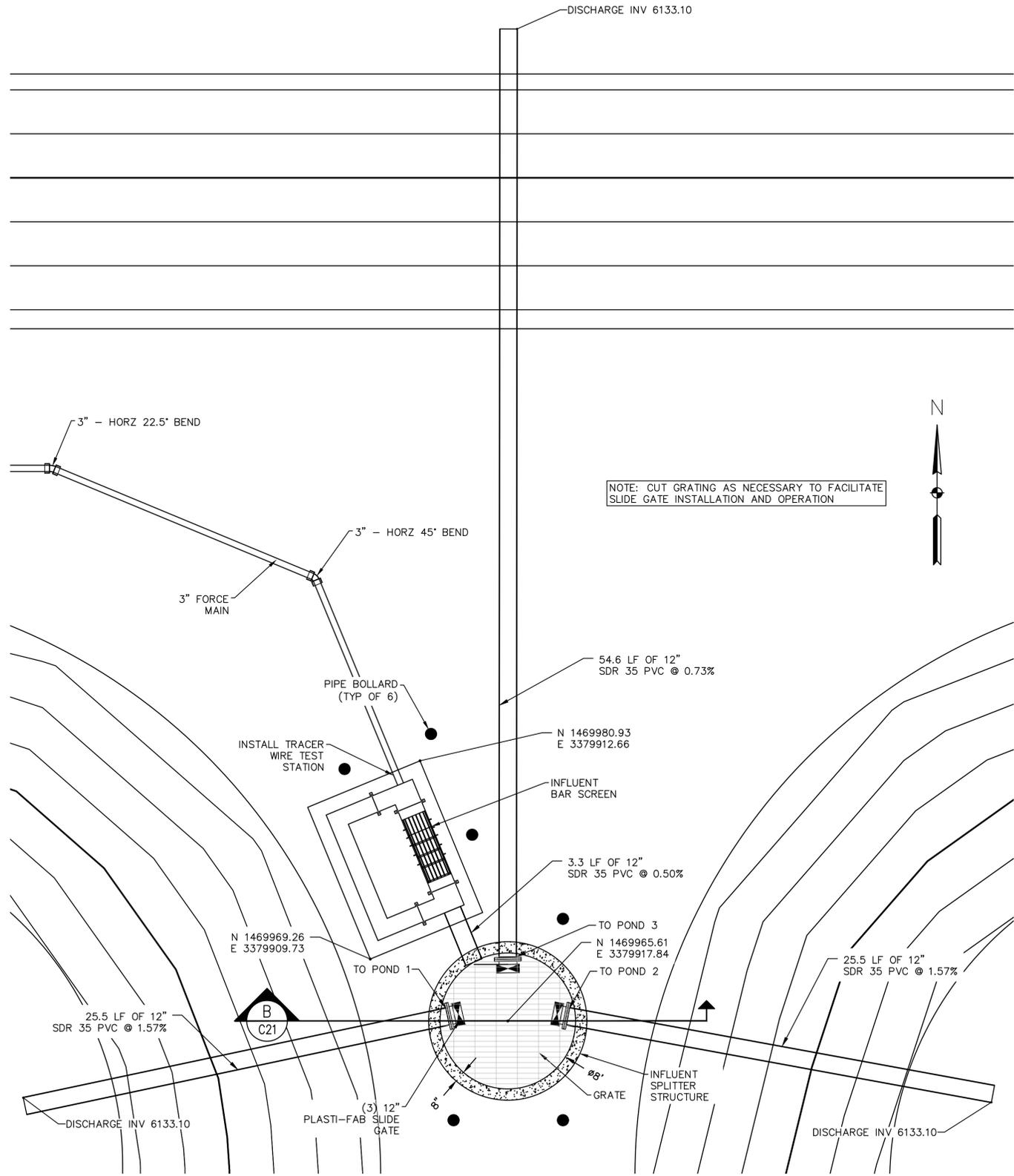
**4**  
C19 MANUAL BAR SCREEN TOP VIEW  
NTS

NO.	REVISIONS	DESCRIPTION	DATE	BY

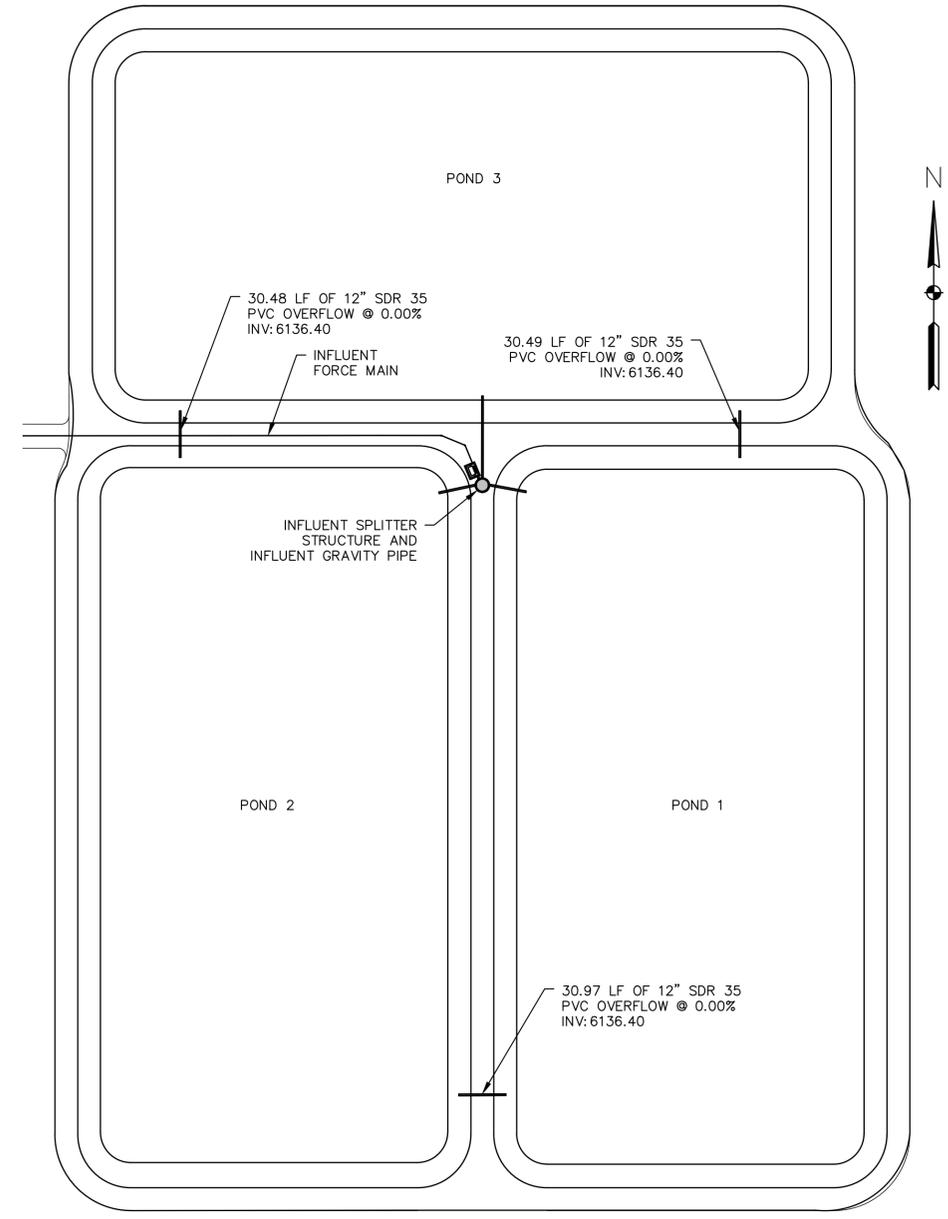
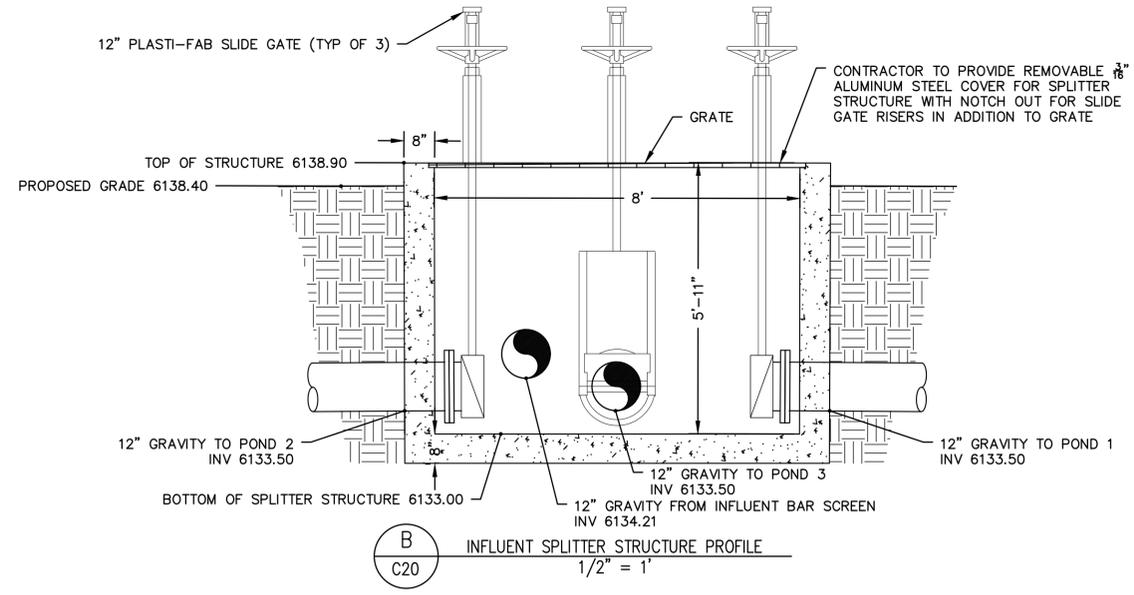
WASTEWATER TREATMENT PLANT PLANS FOR BID  
INFLUENT SCREEN DETAILS  
TOWN OF RAMAHH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAHH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF  
  
 FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE  
JANUARY 2024  
JOB NUMBER  
0043.0001  
SCALE  
AS SHOWN  
EDITION  
BIDDING  
SHEET  
C19 OF C31



**A** INFLUENT SPLITTER STRUCTURE AND INFLUENT PIPING PLAN  
C20 1/4" = 1'



**C** OVERFLOW PIPING  
C20 1" = 60'

NO.	DATE	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID  
**SPLITTER BOX & POND OVERFLOW PIPING**  
TOWN OF RAMAHH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAHH, CO 80832



PREPARED UNDER THE DIRECT SUPERVISION OF  
DATE: JANUARY 2024  
JOB NUMBER: 0043.0001  
SCALE: AS SHOWN  
EDITION: BIDDING  
SHEET: C20 OF C31

NOTES:  
 1. CONTRACTOR TO STRIP TOP 6" OF EXISTING MATERIAL AND VEGETATION AND DISPOSE OF OFF-SITE.

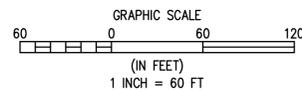
Unresolved from Submittal 1,2 - The geotechnical hazard report references a natural drainage swale in the middle of the east edge of the site that connects to an eroding gully. Show and label the existing drainageways. On page 20 of the report under the erosional features section, the report state that engineering controls should be implemented to prevent concentrated flows from the eroding existing swales from progressing the headward erosion. Show repairs and engineering control work to address this geotechnical finding.

CURVE TABLE					
CURVE	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD
C1	65.97'	42.00'	90°00'00"	N43°52'52"E	59.50'
C2	65.97'	42.00'	90°00'00"	S46°07'08"E	59.50'
C3	49.59'	56.00'	50°44'10"	S25°22'05"E	47.98'
C4	66.76'	42.50'	90°00'00"	S45°00'00"E	60.10'
C5	65.97'	42.00'	90°00'00"	S43°52'52"W	59.50'
C6	65.97'	42.00'	90°00'00"	S46°07'08"W	59.50'
C7	65.97'	42.00'	90°00'00"	S43°52'52"W	59.50'
C8	65.97'	42.00'	90°00'00"	S46°07'08"W	59.50'
C9	65.97'	42.00'	90°00'00"	S46°07'08"W	59.50'

ESTIMATED CUT/FILL QUANTITIES  
 CUT (EST): 49,781 CY  
 FILL (EST): 38,341 CY (1.15 COMPACTION FACTOR)  
 TOP SOIL REMOVAL (EST): 9,916 CY

ESTIMATED POND LINER  
 POND LINER (EST): 402,446 SF

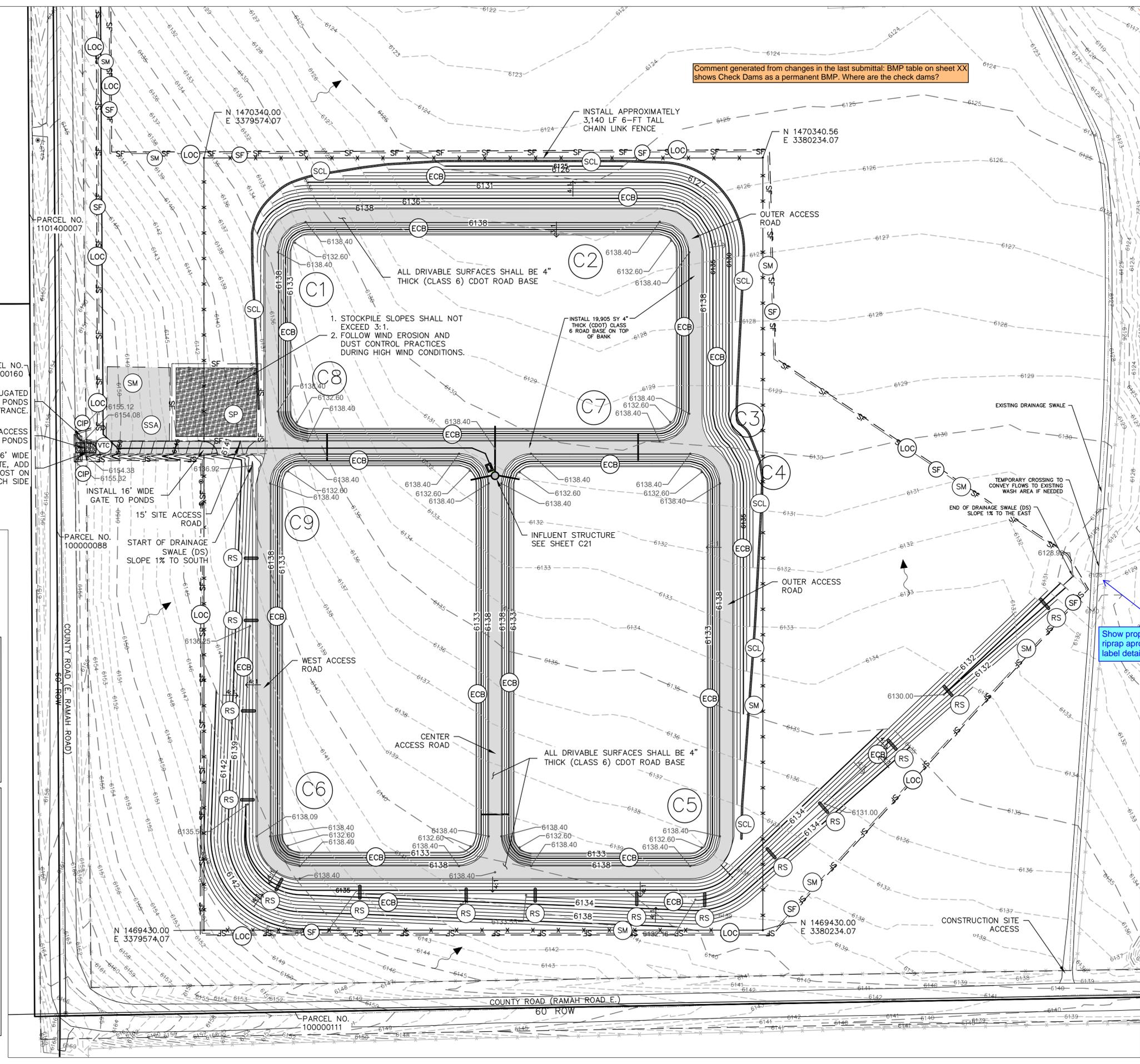
NOTE: CUT, FILL, AND POND LINER ARE BID AS LUMP SUM. LINER LUMP SUM TO INCLUDE ANCHOR TRENCH, ETC. CONTRACTOR TO VERIFY QUANTITIES FROM CAD FILES PRIOR TO BIDDING.



BMP LINE TYPES AND SYMBOLS DESCRIPTIONS	
	CIP CULVERT INLET PROTECTION (INITIAL & INTERIM)
	CWA CONCRETE WASHOUT AREA (INTERIM)
	ECB EROSION CONTROL BLANKET (INTERIM & FINAL)
	LOC LIMITS OF CONSTRUCTION (INITIAL, INTERIM & FINAL)
	RS ROCK SOCK (INITIAL & INTERIM)
	SCL SEDIMENT CONTROL LOG (INTERIM)
	SF SILT FENCE (INITIAL & INTERIM)
	SM TOPSOIL, SEEDING AND MULCHING (FINAL)
	SA STOCKPILE AREA (INTERIM)
	SSA STABILIZED STAGING AREA (INTERIM)
	VTC VEHICLE TRACKING CONTROL (INITIAL & INTERIM)
	FD FLOW DIRECTION

EROSION CONTROL NOTES (APPLICABLE TO ENTIRE PROJECT):

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- EROSION CONTROL BLANKET SHALL BE USED TO STABILIZE DRAINAGE SWALE FROM OUTLET STRUCTURE TO LIFT STATION AREA.
- CURRENT VEGETATION IS GRASSLAND/HERBACEOUS.
- NO DEDICATED ASPHALT/CONCRETE BATCH PLANTS WILL BE USED ON SITE.
- STABILIZED STAGING AREA WILL BE DESIGNATED IN FIELD AS AN AREA TO STORE CONSTRUCTION EQUIPMENT, VEHICLES, STOCKPILES, WASTE BINS, OR OTHER CONSTRUCTION RELATED MATERIALS. SSA WILL ALSO PROVIDE AN AREA FOR LOADING/UNLOADING OPERATIONS.



Comment generated from changes in the last submittal: BMP table on sheet XX shows Check Dams as a permanent BMP. Where are the check dams?

Show proposed riprap apron and label details

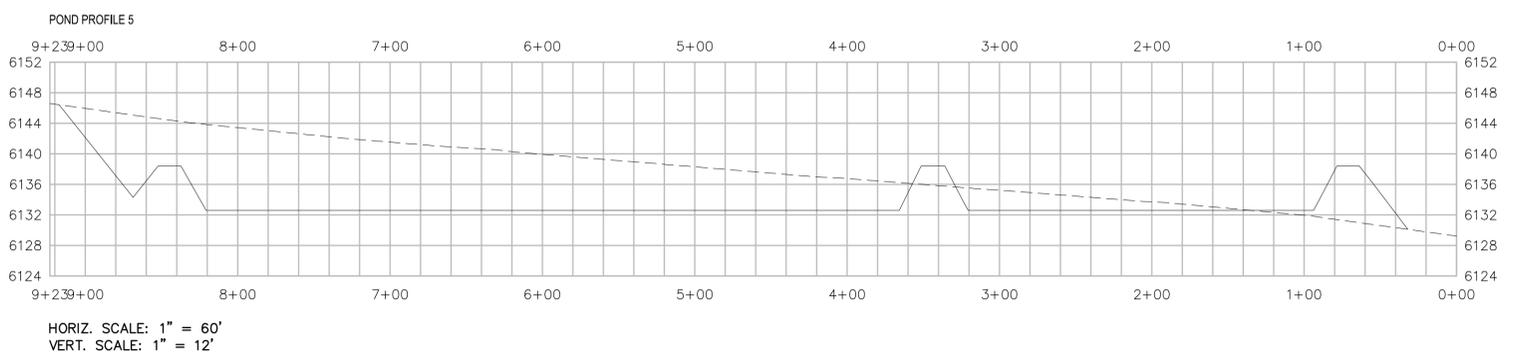
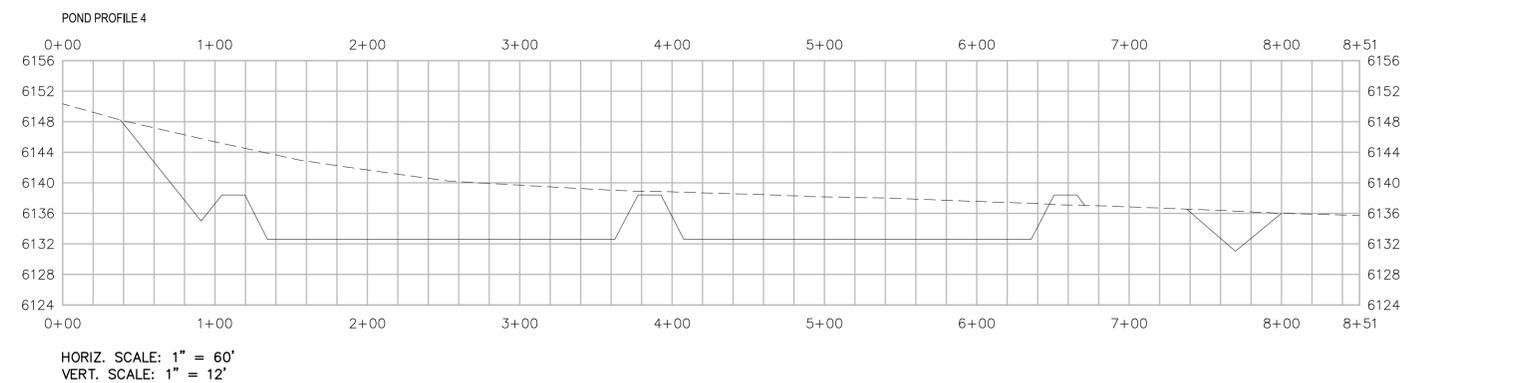
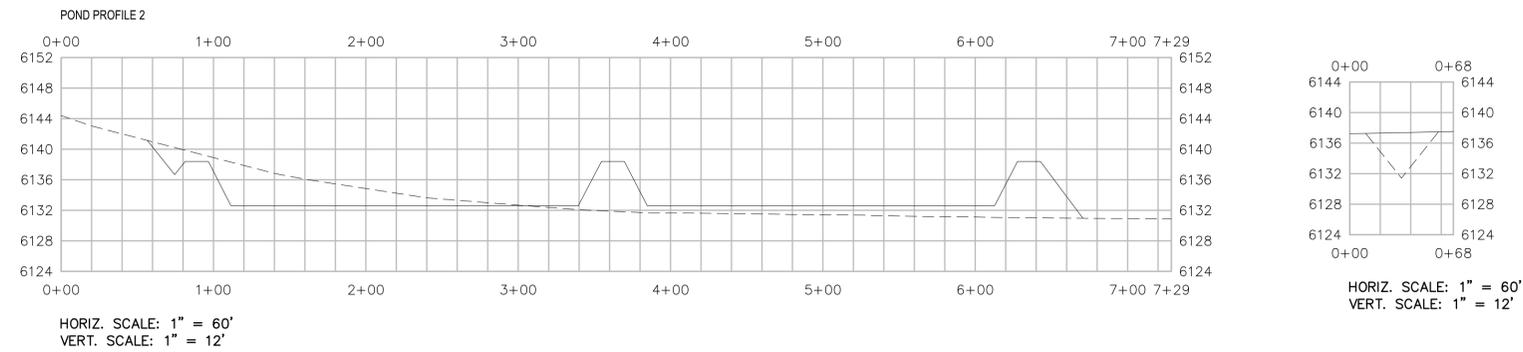
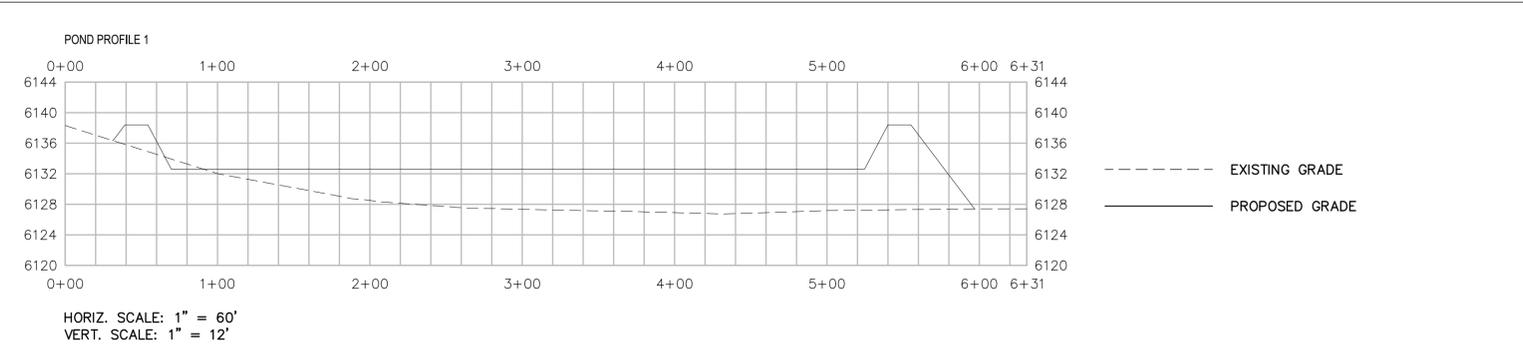
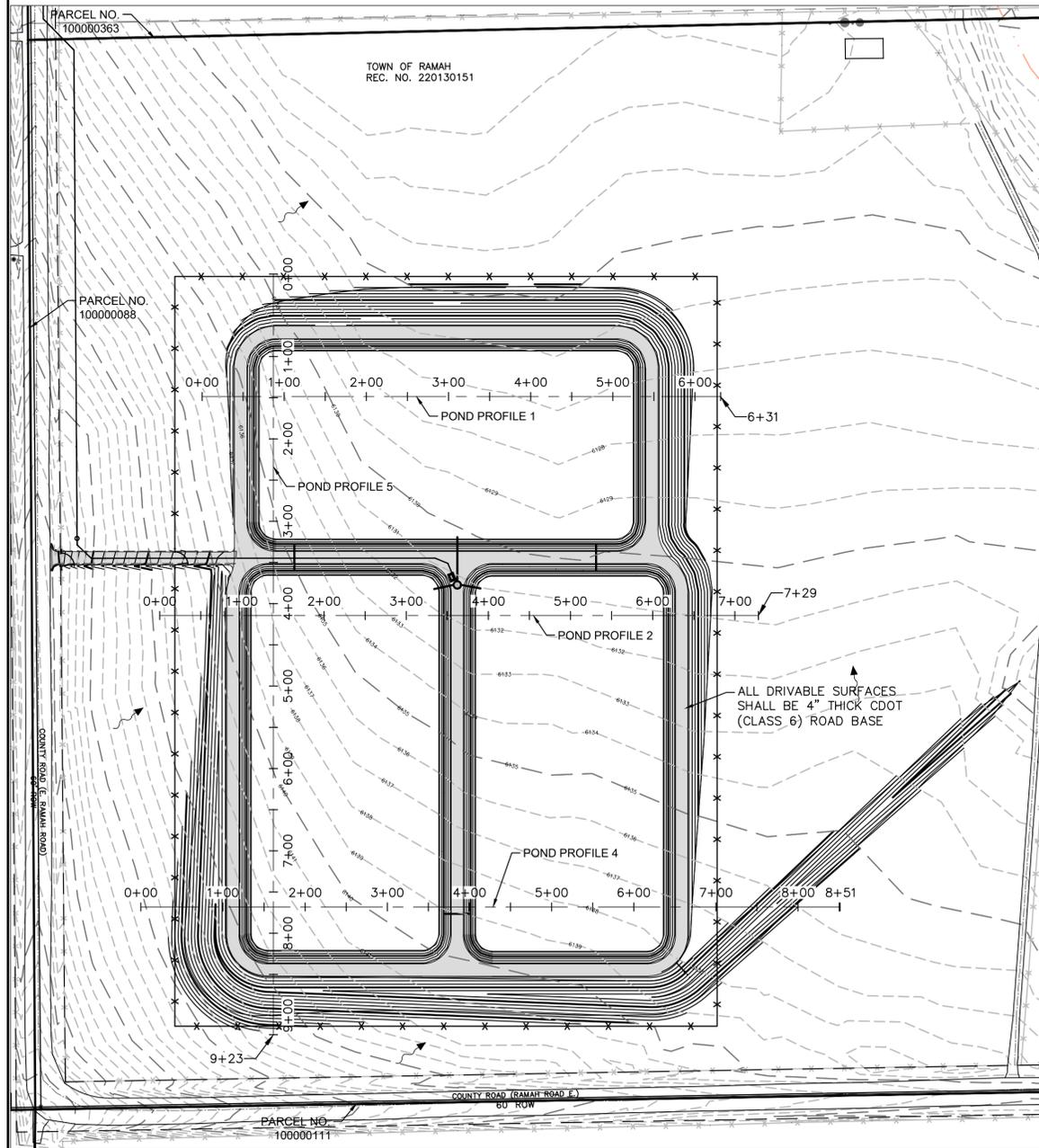
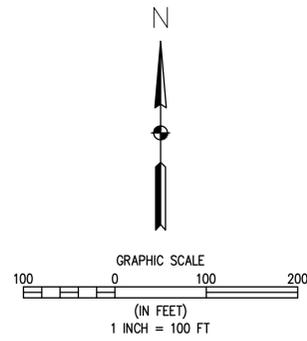
**ELEMENT ENGINEERING LLC**  
 12687 W. CEDAR DRIVE, SUITE 300  
 LAKEWOOD, CO 80226  
 720.749.4165  
 WWW.ELEMENTENGINEERING.NET

NO.	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANTS FOR BID  
 HORIZONTAL CONSTRUCTION &  
 GRADING & EROSION CONTROL  
 TOWN OF RAMAH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

DATE: JANUARY 2024  
 JOB NUMBER: 0043.0001  
 SCALE: 1" = 60'  
 EDITION: BIDDING  
 SHEET: C21 OF C31



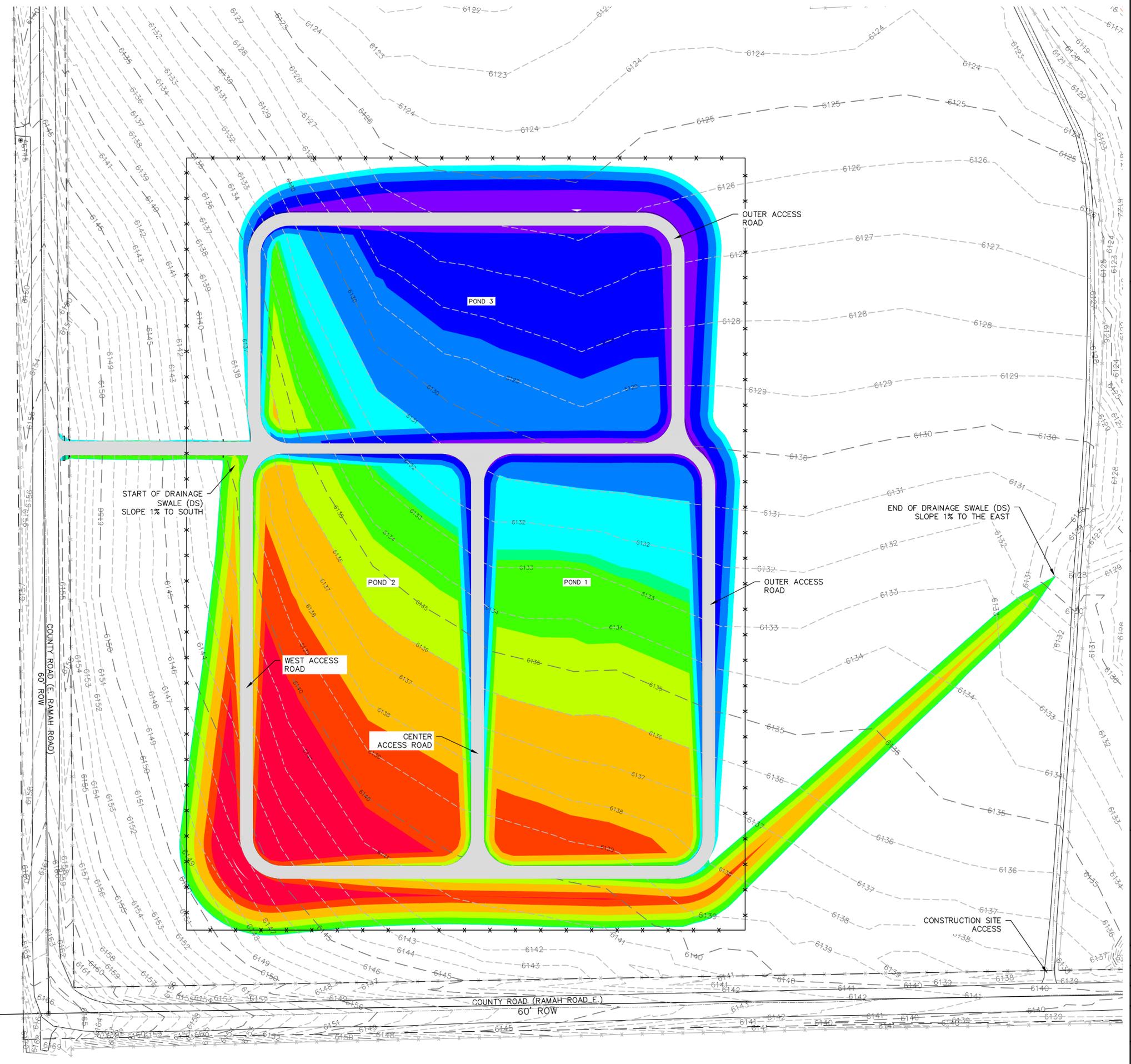
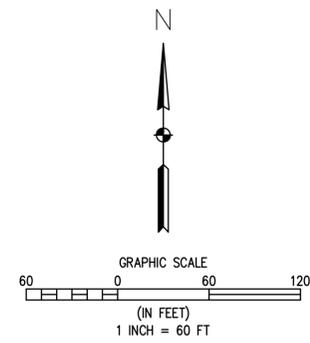
NO.	REVISIONS	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID  
**POND GRADING PROFILES**  
 TOWN OF RAMAH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAH, CO 80832



FOR AND ON BEHALF OF  
 ELEMENT ENGINEERING, LLC  
 DATE: JANUARY 2024  
 JOB NUMBER: 0043.0001  
 SCALE: 1" = 100'  
 EDITION: BIDDING  
 SHEET: C22 OF C31

ELEVATIONS TABLE			
NUMBER	MINIMUM ELEVATION	MAXIMUM ELEVATION	COLOR
1	-11.98	-7.62	Red
2	-7.62	-5.76	Orange
3	-5.76	-3.40	Yellow
4	-3.40	-1.76	Light Green
5	-1.76	-0.23	Green
6	-0.23	0.00	Light Blue
7	0.00	1.64	Cyan
8	1.64	4.11	Blue
9	4.11	7.28	Dark Blue
10	7.28	12.90	Purple



NO.	REVISIONS	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID  
**CUT & FILL PLAN**  
 TOWN OF RAMAH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAH, CO 80852

PREPARED UNDER THE DIRECT SUPERVISION OF

FOR AND ON BEHALF OF  
 ELEMENT ENGINEERING, LLC

DATE  
 JANUARY 2024

JOB NUMBER  
 0043.0001

SCALE

EDITION  
 BIDDING

SHEET  
 C23 OF C31

LINER AND VENT INFORMATION

LINER MATERIAL: 45-MIL FPP-R (FLEXIBLE REINFORCED POLYPROPYLENE) OR 45-MIL LLDPE-R (LINEAR LOW DENSITY REINFORCED POLYETHYLENE)

AIR/GAS VENT STRIP: DIMPLED STRIP AT 45-FT ON CENTER BOTH DIRECTIONS (SEE DETAIL)

AIR/GAS VENTS: ON SIDE SLOPE WITH EACH VENT STRIP (SEE DETAIL)

SPECIFICATIONS: SEE TECHNICAL SPECIFICATIONS FOR SPECIFIC MATERIAL PROPERTIES AND REQUIREMENTS.

NOTES:

- CONTRACTOR TO REMOVE ANY DIRT AND DEBRIS WHICH MAY DAMAGE LINER SYSTEM. ANY DEBRIS GREATER THAN 3/8" DIAMETER TO BE REMOVED PRIOR TO INSTALLATION.
- CONTRACTOR RESPONSIBLE FOR LOCATION AND PROTECTION OF ALL UTILITIES PRIOR TO AND DURING CONSTRUCTION.
- AIR/GAS VENTING STRIP TO BE INSTALLED AFTER SUBGRADE IS COMPACTED AND AT FINAL GRADE.
- CONTRACTOR TO FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS FOR HAULING, STOCKPILING, STAGING, UNLOADING, AND INSTALLATION OF LINER SYSTEM.
- PROTECT EXISTING ASPHALT, STRUCTURES, AND CURB AND GUTTER FROM DAMAGE. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY DAMAGE TO EXISTING INFRASTRUCTURE.
- PRIOR TO INSTALLATION OF LINER, ENGINEER'S REPRESENTATIVE SHALL APPROVE THE INSTALLATION OF AIR/GAS VENTING STRIPS.
- PRIOR TO INSTALLATION OF BALLAST, ENGINEER'S REPRESENTATIVE SHALL APPROVE THE LINER AND AIR/GAS VENT.
- AIR/GAS VENTING STRIP TO MEET THE FOLLOWING SPECIFICATIONS:
  - STRUCTURE: SIMPLED STRIP
  - POLYMER: PS
  - THICKNESS: 1-INCH
  - THRU-FLOW: YES
  - COMPRESSIVE STRENGTH (ASTM D 1621): 9,500 PSF
  - FLOW (ASTM D 4716): 30 GPM/FT
  - FABRIC/BACKING: CORE ENCAPSULATED W/ 4 OZ NW
  - WIDTH: 12-INCH
- INSTALL AIR/GAS VENT 6-INCHES BELOW CREST OF LINER ABOVE EACH AIR/GAS VENTING STRIP. SEE DETAILS FOR INSTALLATION INFORMATION.
- ENGINEER AND LINER MANUFACTURER REPRESENTATIVE TO APPROVE SUBGRADE PREPARATION PRIOR TO LINER INSTALLATION.
- LINER AND MESH UNDER-LINER TO BE INSTALLED BY MANUFACTURER CERTIFIED INSTALLATION TECHNICIANS.
- RESTORE AND RE-SEED SITE PER SPECIFICATIONS.
- BALLAST INSTALLATION REQUIREMENTS (PER POND)

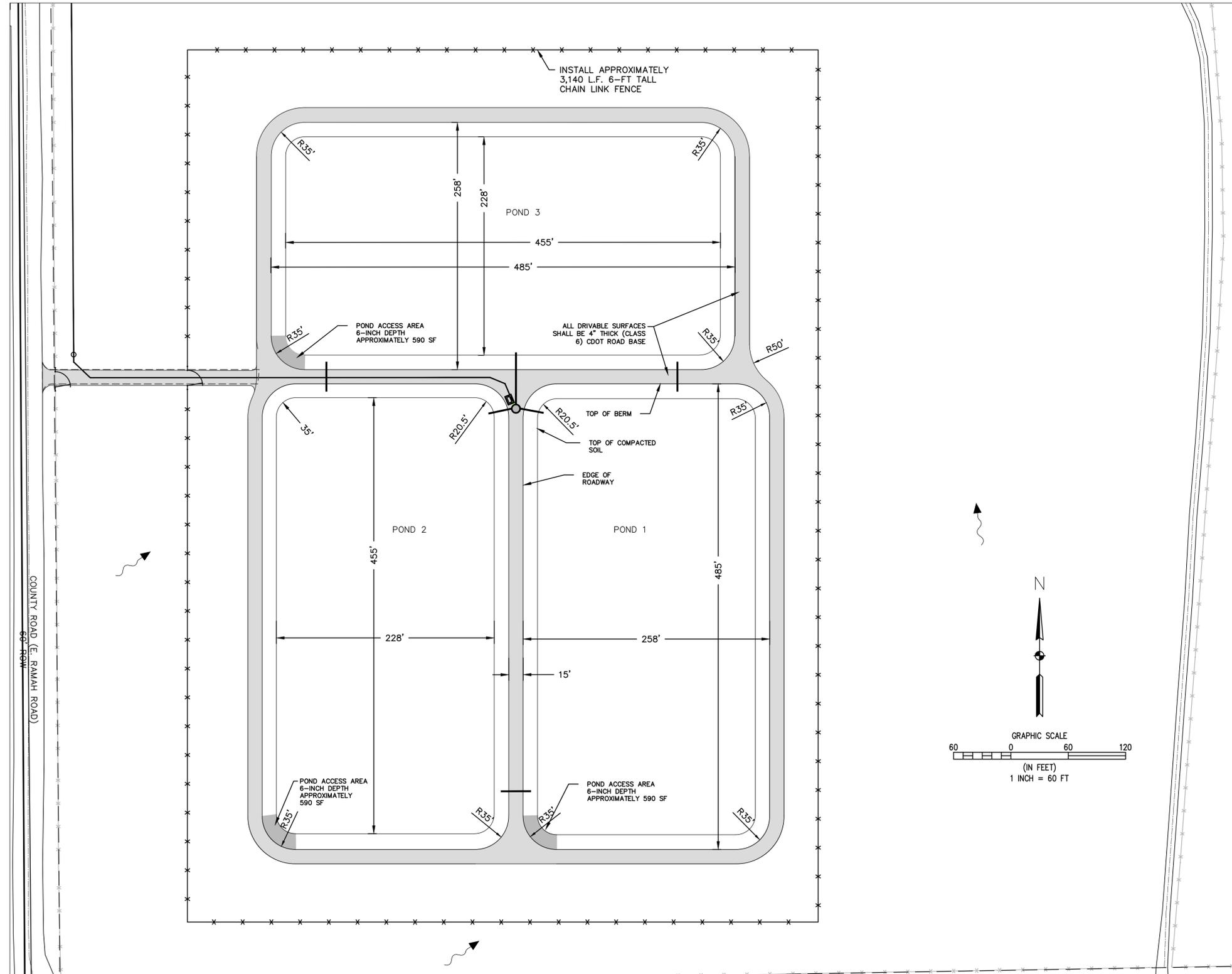
TOE OF SLOPE WILL REQUIRE PERMANENT TOE BALLAST IN THE FORM OF UV RESISTANT SAND TUBES. TOE BALLAST MINIMUM REQUIREMENTS ARE ONE 45 KG SAND TUBE SPACED 5.2 M CENTER TO CENTER ALONG THE TOE OR APPROXIMATELY 80 BALLAST TUBES ALONG THE TOE. IN ADDITION, ALL SLOPE AREAS OF THE CONTAINMENT SHOULD BE BALLASTED ON THE SLOPE WITH A MINIMUM OF 3 SAND TUBES PER CABLE SUPPORTED STRING WITH RESTRAINING CABLE TIE-OFF AT THE TOP OF SLOPE WITHIN THE ANCHOR TRENCH. SPACING OF BALLAST TUBE STRINGS SHOULD BE AT 10.2 M (33.5 FT) INTERVALS ALONG THE INSIDE SLOPE WHICH RESULTS IN APPROXIMATELY 40 BALLAST STRINGS AND 120 BALLAST TUBES. FOR THE BOTTOM OPEN AREA, THE TUBES SHALL BE PLACED IN OFFSET STRINGS PARALLEL TO THE POND LONG DIMENSION OR WIDTH DIMENSION IN SO FAR AS PRACTICAL BUT POSITIONED TO APPROXIMATE ONE TUBE PER 16.4 SQM (176 SF) OR A TOTAL OF 430 BOTTOM SAND TUBES. TOTAL NUMBER OF SAND TUBES PER POND IS ESTIMATED TO BE 630.

SUMMARY BALLAST TUBES PER POND

3H:1V SLOPES	120 (40 BALLAST STRINGS WITH 3 EACH)
TOE OF SLOPE	80 (2 BALLAST TUBES BETWEEN SLOPE TUBES)
BOTTOM	430 (1 BALLAST TUBE PER 16.4 SQM)
TOTAL	630

POND DIMENSION INFORMATION

POND BOTTOM SURFACE AREA (PER POND):	103,333 SF (2.37 ACRES)	RADIUS OF CORNER AT BOTTOM:	20-FT
POND TOP SURFACE AREA (PER POND):	124,016 SF (2.85 ACRES)	RADIUS OF CORNER AT TOP:	35-FT
ASSUMED SLUDGE DEPTH:	6-INCHES	WIDTH OF POND AT BOTTOM:	228-FT
MAX OPERATING WATER LEVEL:	3-FEET	LENGTH OF POND AT BOTTOM:	455-FT
FREEBOARD:	2-FEET	WIDTH OF POND AT TOP:	258-FT
SIDE SLOPE RATIO:	3:1	LENGTH OF POND AT TOP:	485-FT
POND LENGTH TO WIDTH RATIO:	2:1	ROADWAY WIDTH:	15-FT
NO. PONDS	3		



NO.	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID

**POND DETAILS**

TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

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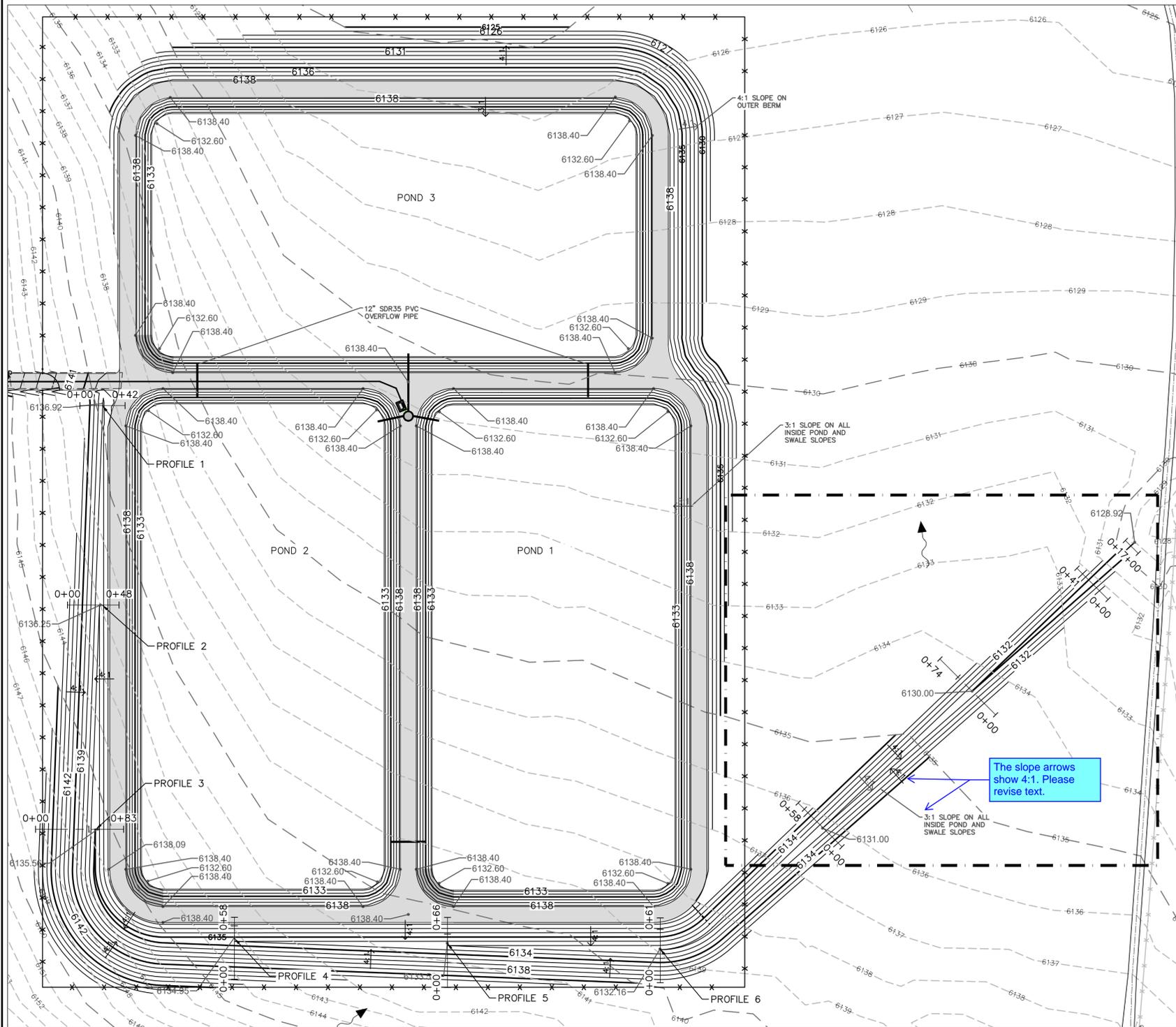
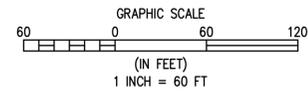
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JOB NUMBER: 0043.0001

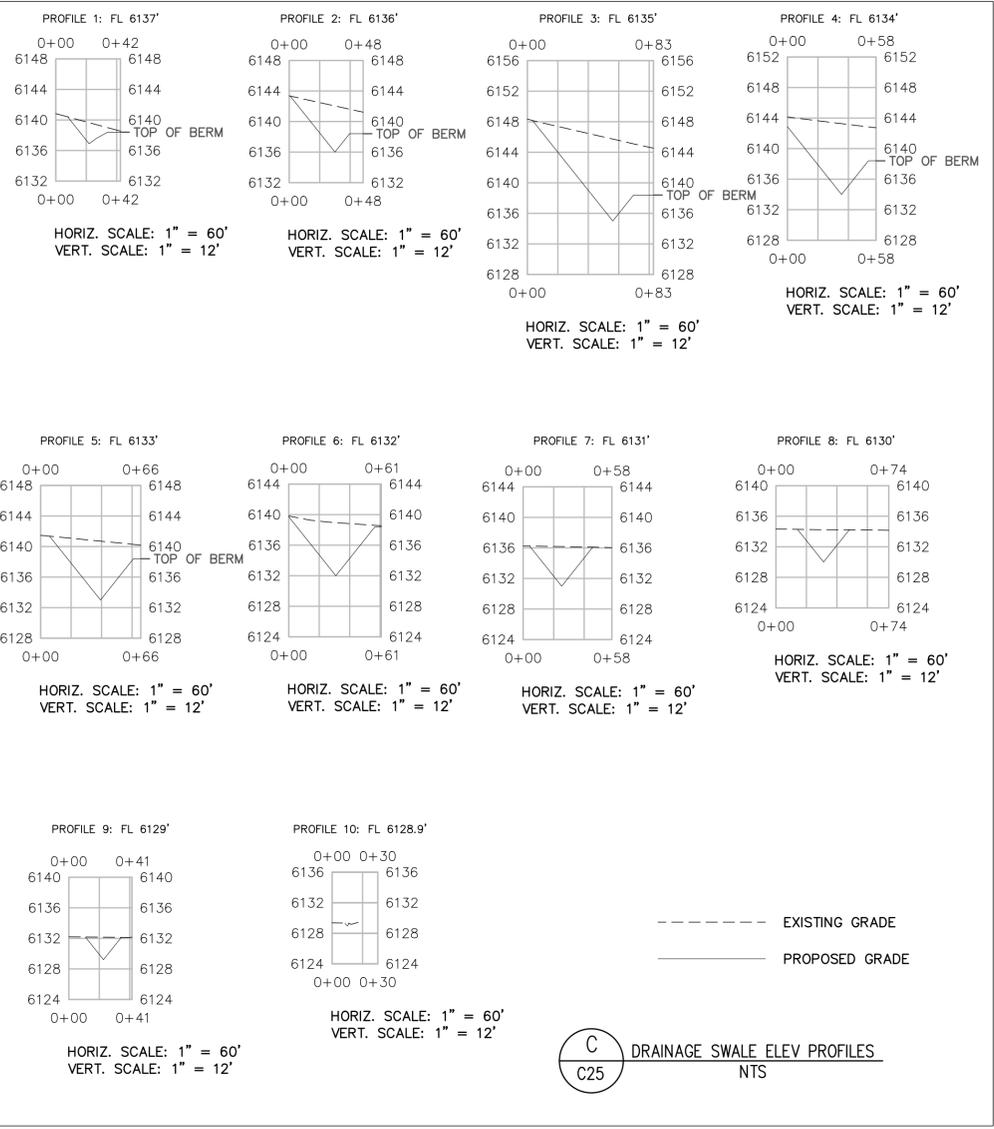
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EDITION: BIDDING

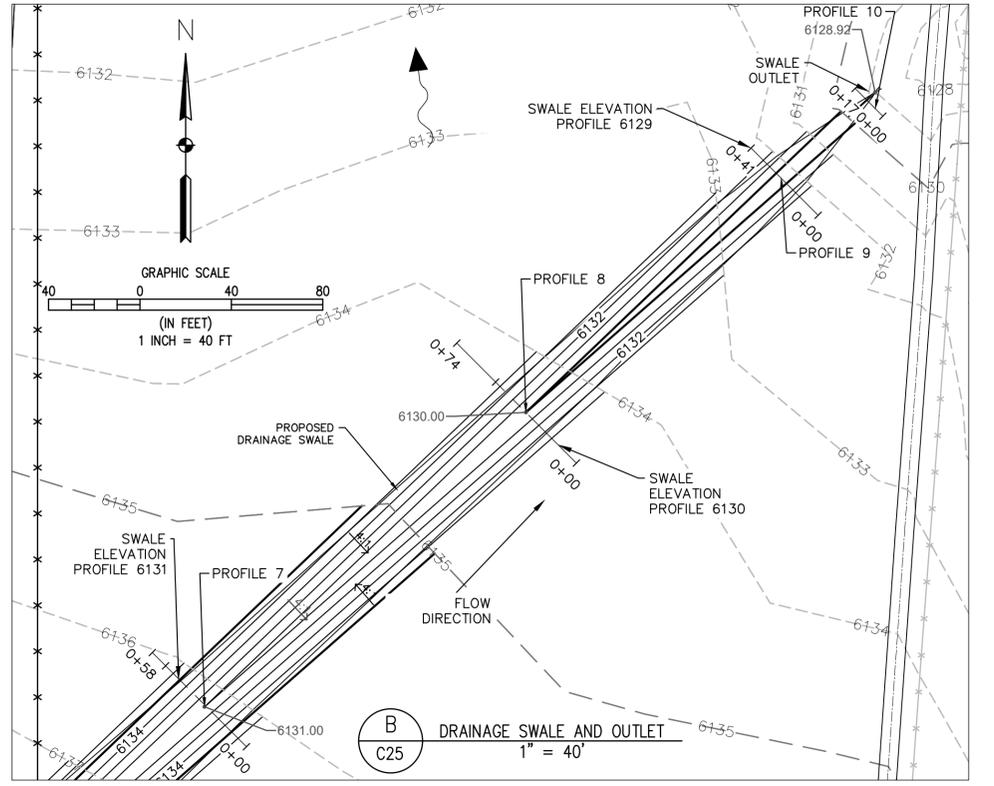
SHEET: C24 OF C31



A EVAPORATIVE PONDS DRAINAGE PLAN  
1" = 60'



C DRAINAGE SWALE ELEV PROFILES  
NTS



B DRAINAGE SWALE AND OUTLET  
1" = 40'

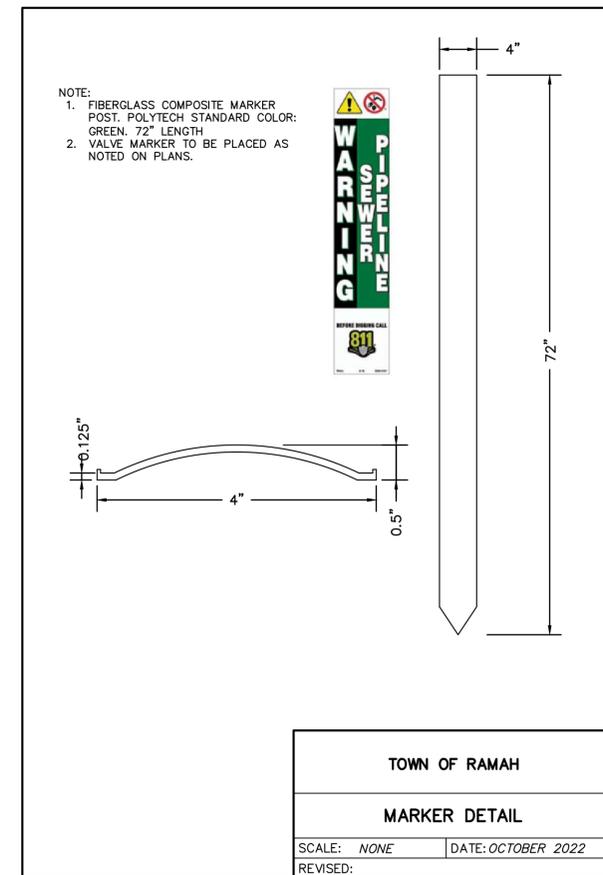
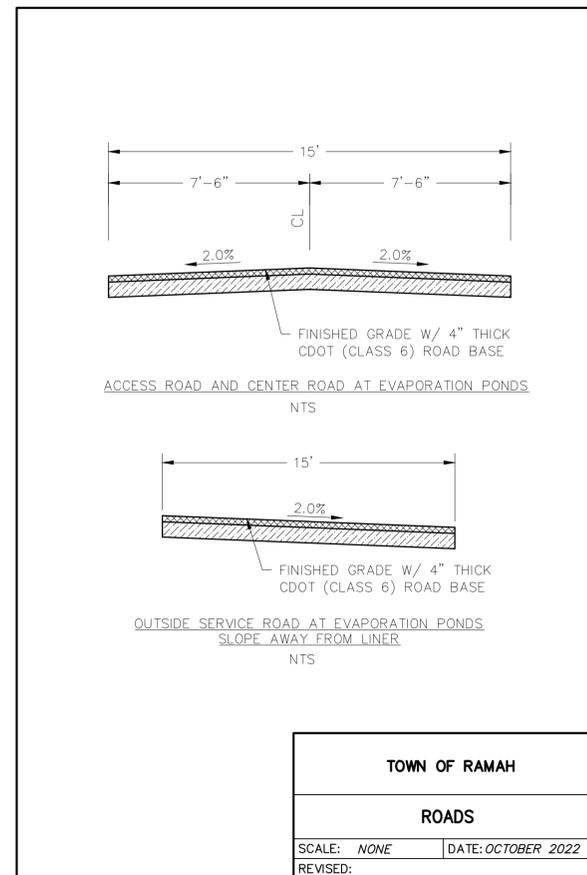
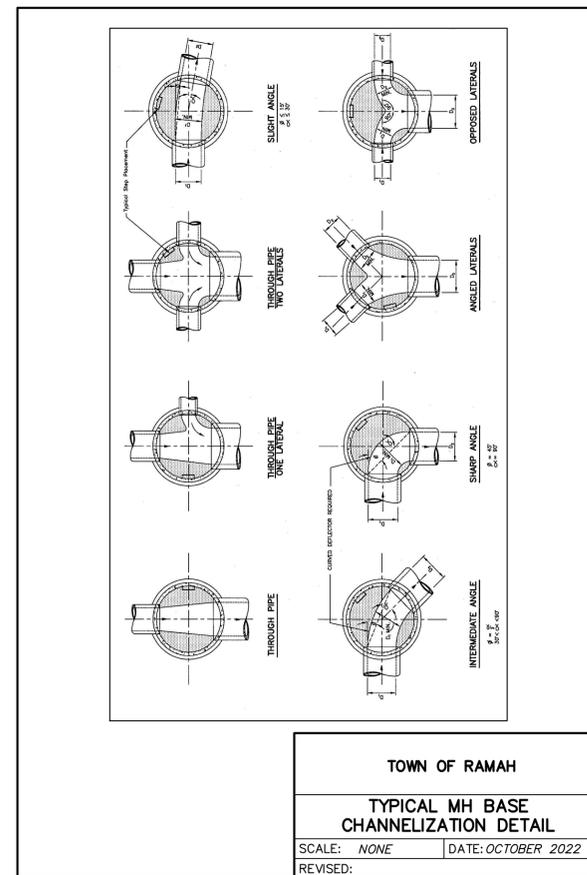
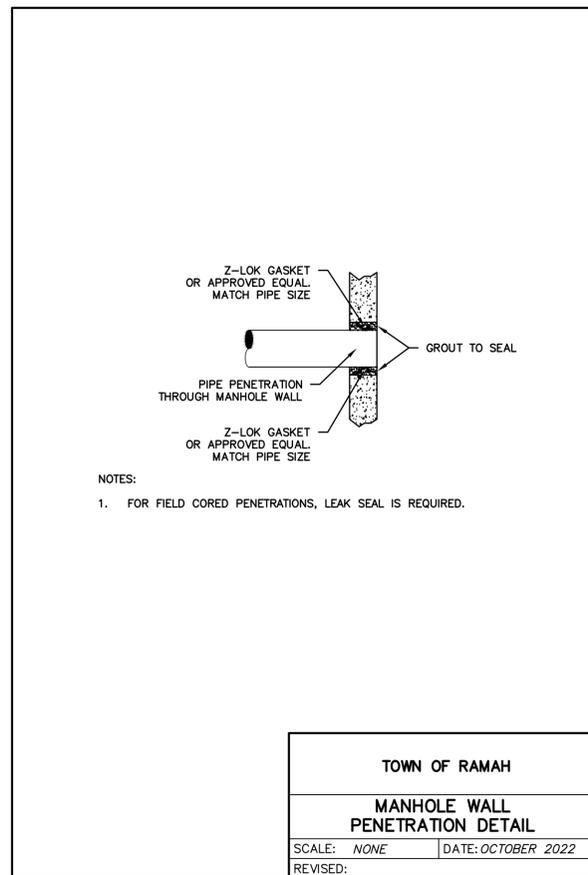
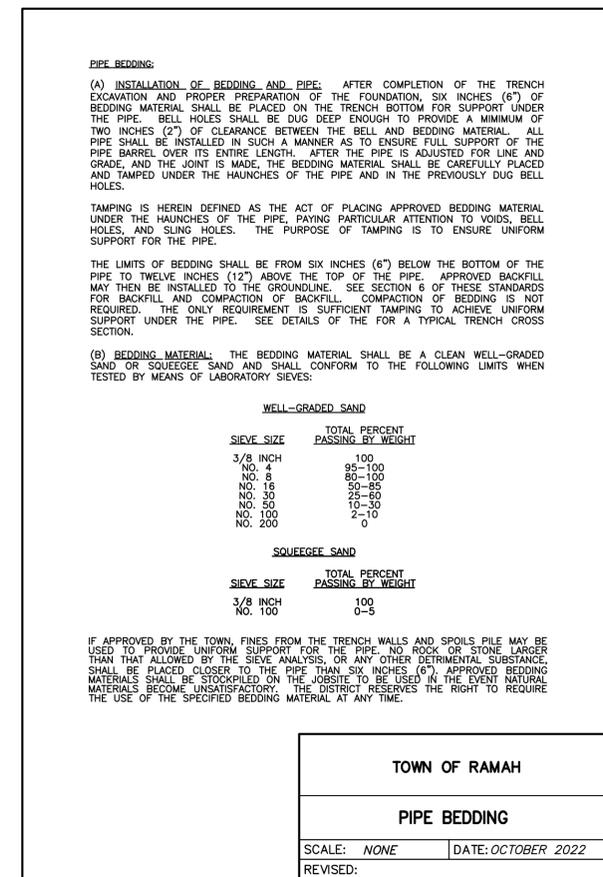
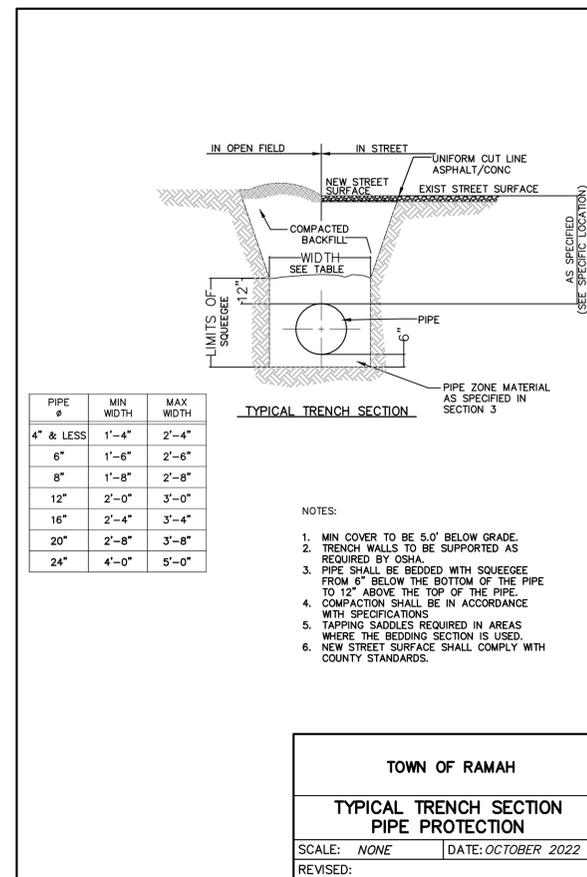
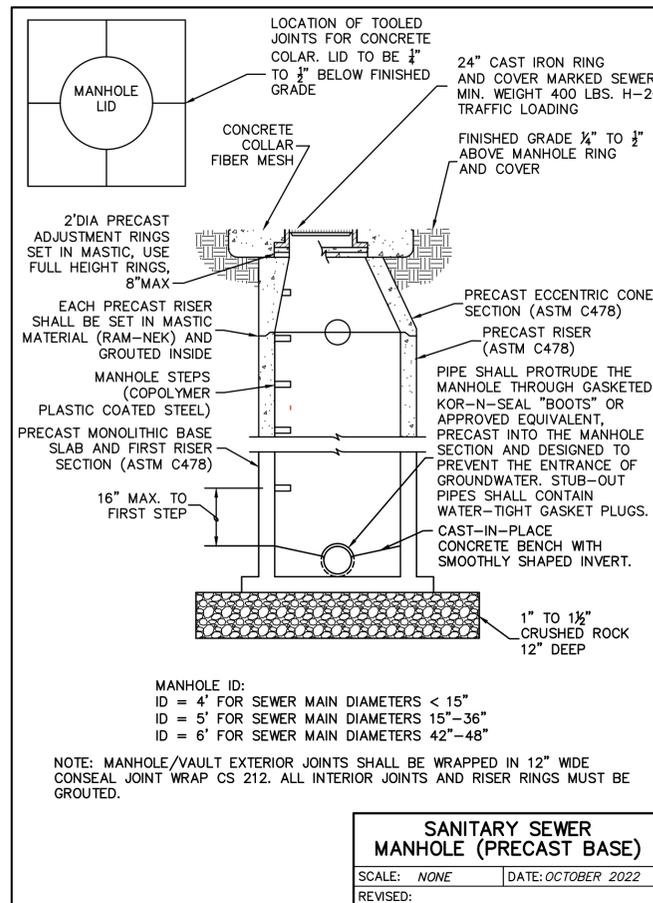
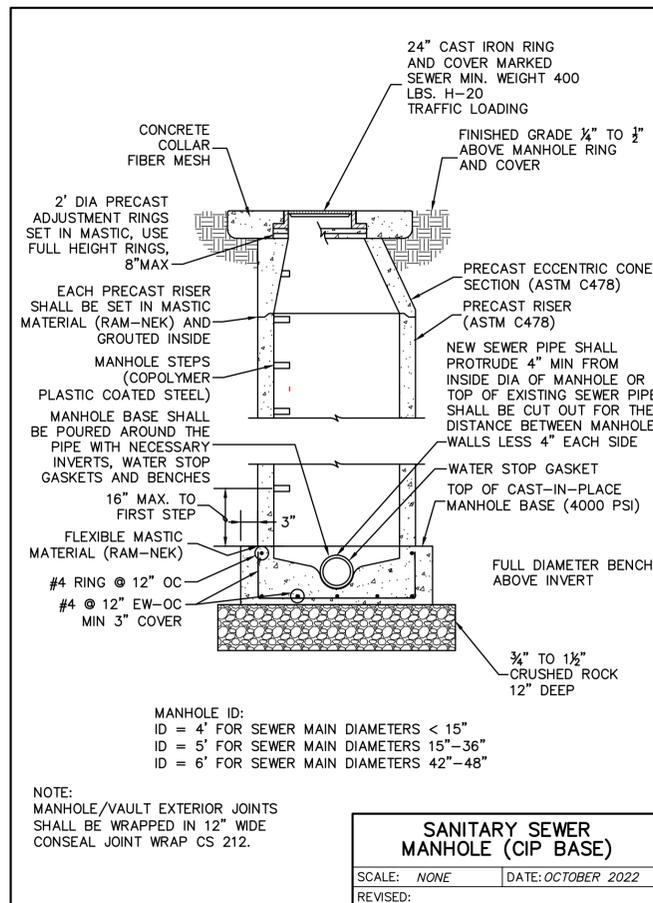
NO.	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID  
DRAINAGE SWALE PLAN & PROFILE  
TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

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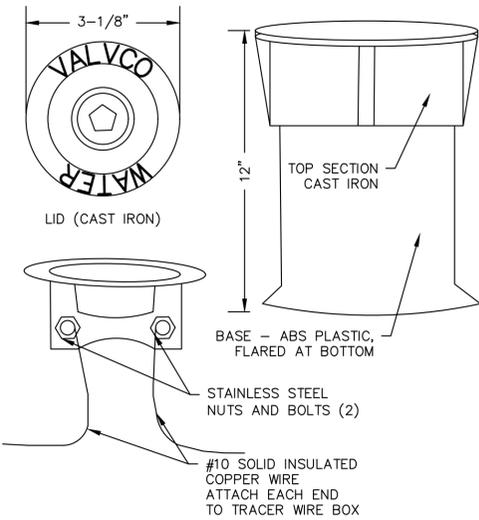
FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE: JANUARY 2024  
JOB NUMBER: 0043.0001  
SCALE: AS SHOWN  
EDITION: BIDDING  
SHEET: C25 OF C31

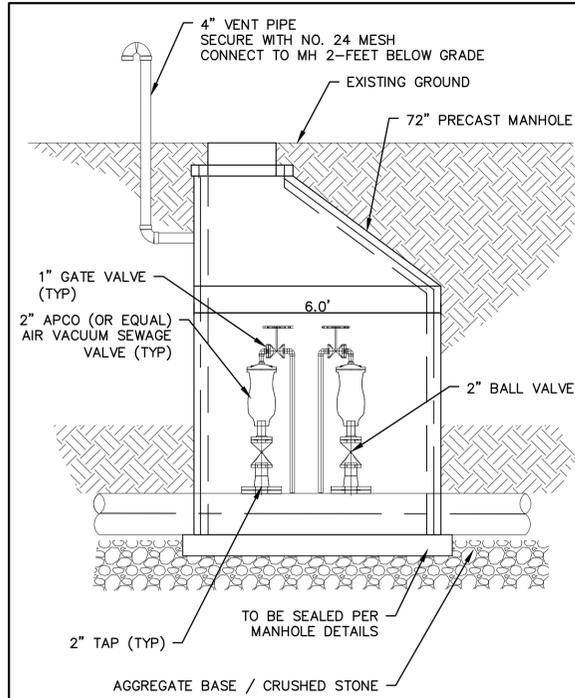


NO.	REVISIONS	DATE	BY

NOTE:  
 TRACER WIRE SHALL BE TERMINATED AT EACH END IN A FLUSH MOUNT ACCESS BOX. ACCESS BOX SHALL HAVE A CAST IRON LID THAT CAN BE LOCKED AND OPENED WITH A STANDARD PENTAGON HEAD KEY WRENCH. TRACER WIRES SHALL BE STRIPPED AND ATTACHED TO STAINLESS STEEL SCREWS MOUNTED TO THE UNDERSIDE OF THE LID. SUFFICIENT SLACK SHALL BE LEFT IN THE WIRE LENGTH SO COVER CAN BE LIFTED WITH WIRE INTACT. TRACER WIRE ACCESS BOX SHALL BE LOCATED DIRECTLY IN FRONT OF FIRE HYDRANTS OR WHERE INDICATED ON DRAWINGS AND BE SET TO GRADE. TRACER WIRE ACCESS BOX SHALL BE OF DOMESTIC MANUFACTURE AND BE EQUAL TO VALVCO TWAB.



<b>TOWN OF RAMAH</b>	
<b>TRACER WIRE ACCESS BOX</b>	
SCALE: NONE	DATE: OCTOBER 2022
REVISED:	



<b>TOWN OF RAMAH</b>	
<b>AIR RELEASE VALVE VAULT</b>	
SCALE: NONE	DATE: OCTOBER 2022
REVISED:	

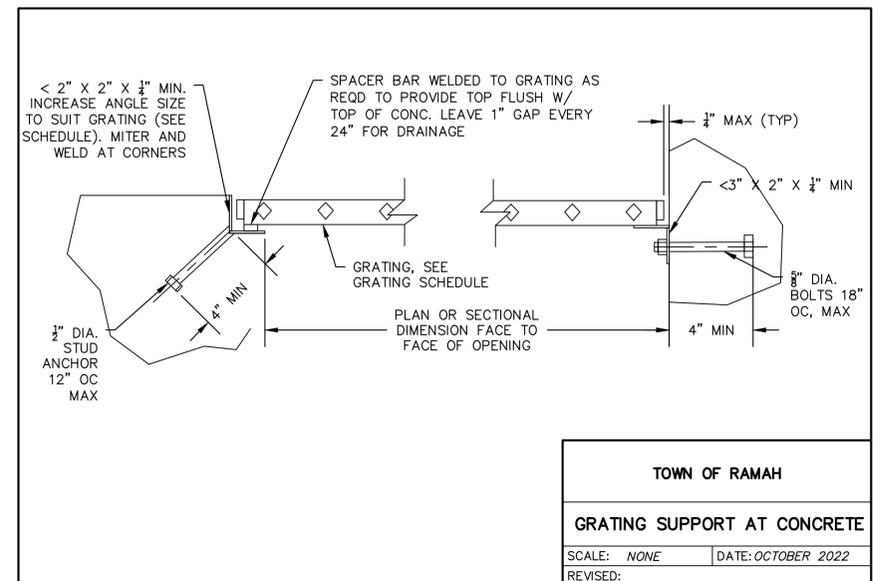
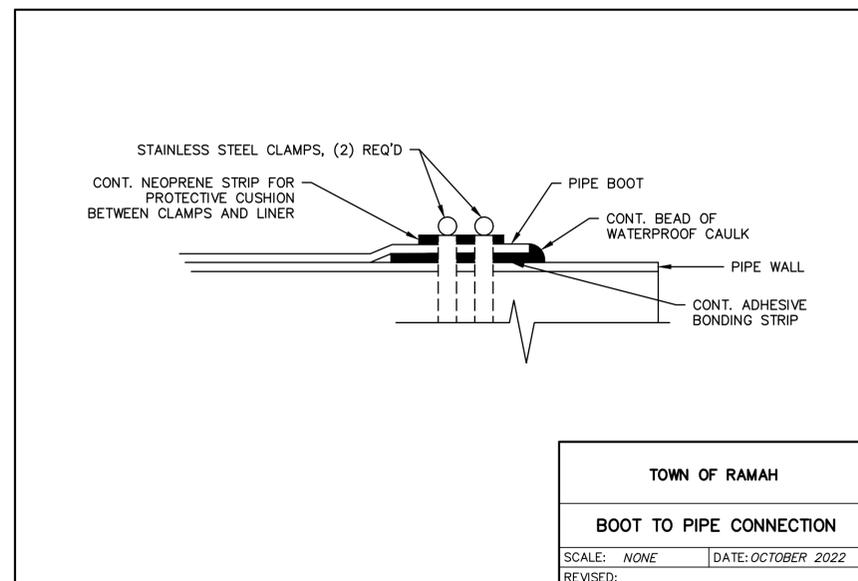
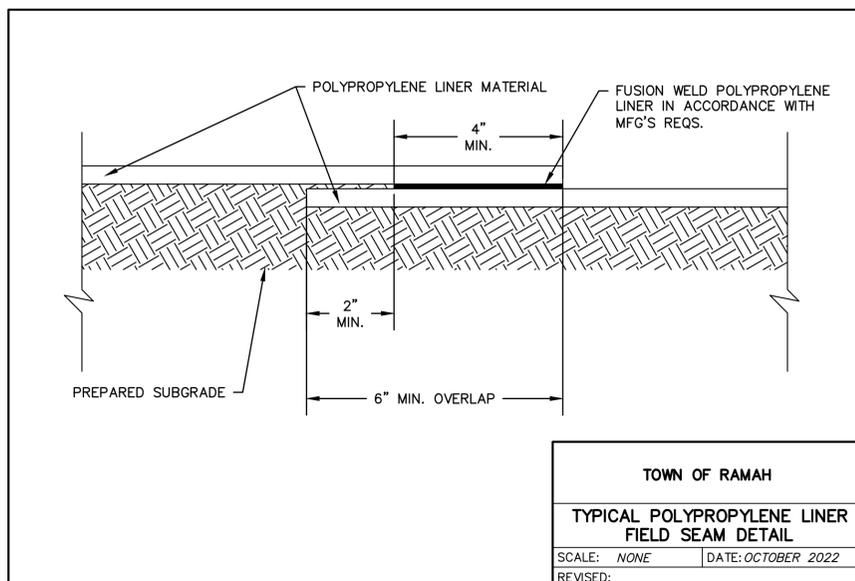
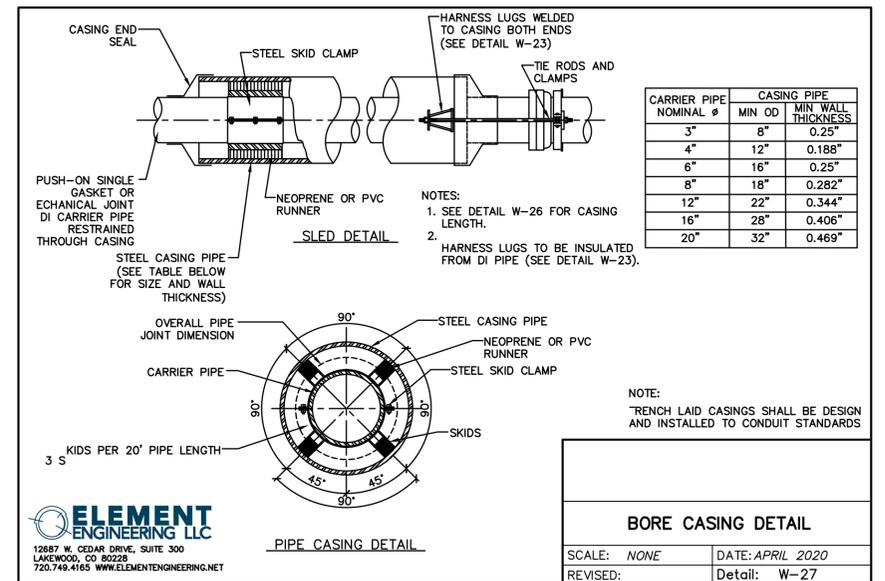
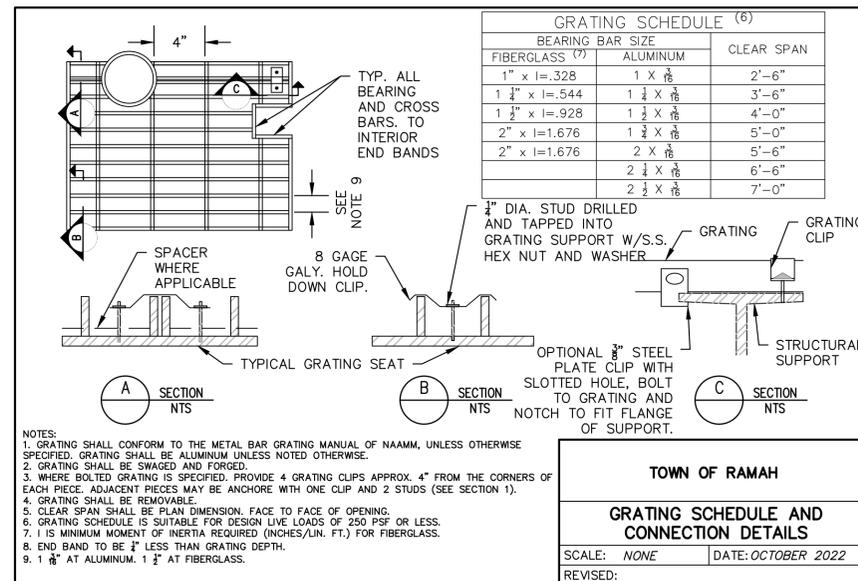
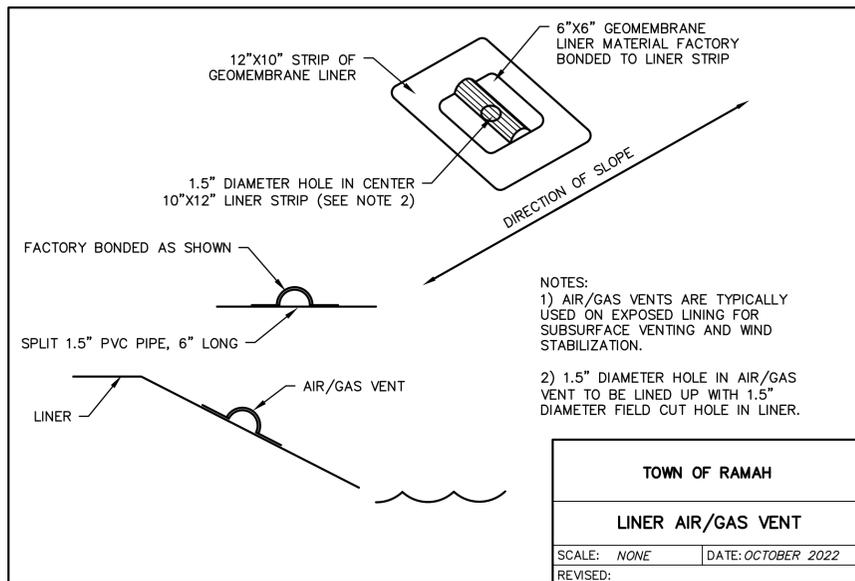
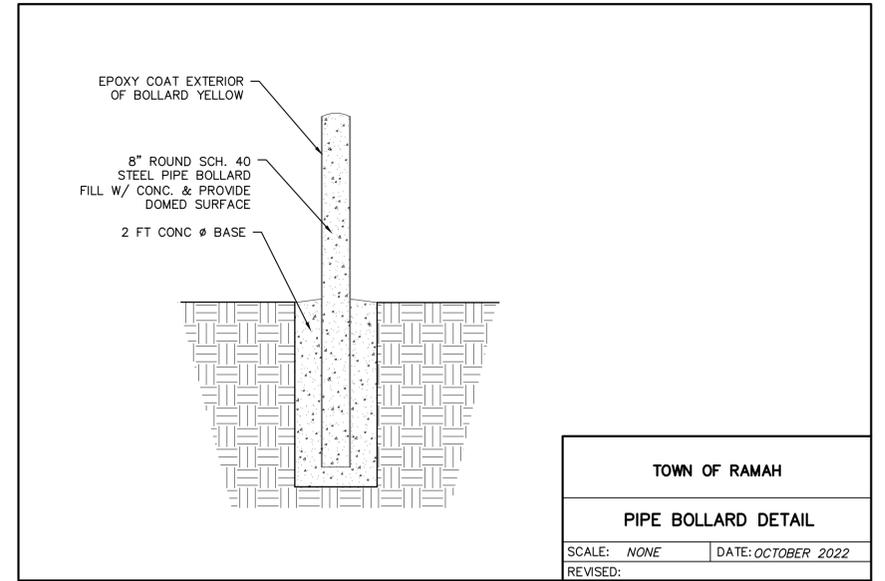
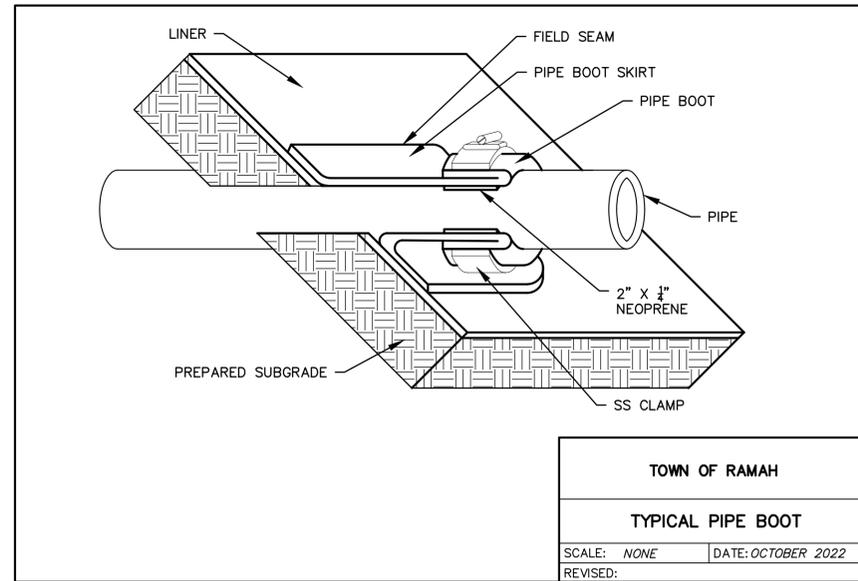
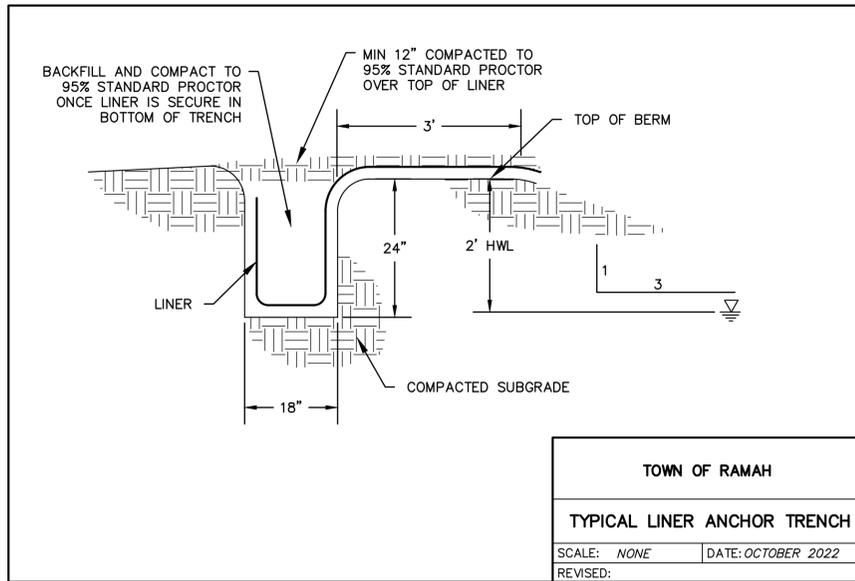
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WASTEWATER TREATMENT PLANT PLANS FOR BID  
**GENERAL DETAILS**  
 TOWN OF RAMAH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAH, CO 80832



PREPARED UNDER THE DIRECT SUPERVISION OF

DATE	JANUARY 2024
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SCALE	NTS
EDITION	BIDDING
SHEET	C27 OF C31



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WASTEWATER TREATMENT PLANT PLANS FOR BID

**GENERAL DETAILS**

TOWN OF RAMAH - PCD FILE NO. PPR2325  
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RAMAH, CO 80832



STANDARD EROSION AND SEDIMENT CONTROL PLAN NOTES

GENERAL NOTES

- THE APPROVED EROSION CONTROL PLAN SHALL BE MAINTAINED FOR THE ENTIRE DURATION OF THIS PROJECT.
- THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION AND SEDIMENT CONTROL MEASURES AT ALL TIMES DURING CONSTRUCTION.
- A THOROUGH INSPECTION OF THE STORMWATER MANAGEMENT PLAN BEST MANAGEMENT PRACTICES (BMPs) IS RECOMMENDED EVERY FOURTEEN (14) DAYS AND AFTER ANY PRECIPITATION OR SNOW MELT EVENT.
- PERIODIC INSPECTIONS SHALL ALSO INCLUDE INSPECTING EQUIPMENT FOR LEAKS AND REVIEWING EQUIPMENT MAINTENANCE PRACTICE. ALL INSPECTIONS AND MAINTENANCE SHALL BE DOCUMENTED BY THE PROJECT EROSION CONTROL SUPERVISOR AND MADE AVAILABLE TO THE OWNER AND CDPHE UPON REQUEST. ANY EROSION CONTROL BMP THAT HAS BEEN COMPROMISED OR HAS BEEN DISTURBED SHALL BE REPLACED OR RECONSTRUCTED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL EROSION CONTROL BMPs IN PLACE AND EFFECTIVE PRIOR TO A STORM EVENT.
- THE STORMWATER MANAGEMENT PLAN LOG BOOK SHALL BE UPDATED EVERY FOURTEEN (14) DAYS. THIS LOG SHALL REMAIN ON SITE AVAILABLE FOR REVIEW BY SAGUACHE COUNTY AND CDPHE UPON REQUEST UNTIL AN INACTIVATION NOTICE FOR CONSTRUCTION STORMWATER DISCHARGE GENERAL PERMIT CERTIFICATION HAS BEEN OBTAINED. MAINTENANCE ACTIVITIES TO CORRECT PROBLEMS NOTED DURING INSPECTIONS MUST BE DOCUMENTED AND KEPT IN THE STORMWATER MANAGEMENT PLAN LOG BOOK.
- ALL STREETS WITHIN AND IMMEDIATELY SURROUNDING A CONSTRUCTION SITE SHALL BE CLEANED OF DIRT AND DEBRIS ON A WEEKLY BASIS. STREETS SHALL BE CLEANED BY SCRAPING AND SWEEPING THE DIRT OFF THE ROADWAYS. SCRAPED OR SWEEPED MATERIAL SHALL NOT BE DEPOSITED IN THE STORM SEWER SYSTEM. DIRT TRACKED ONTO ROADWAYS AND OTHER PAVED SURFACES SHALL BE CLEANED UP BY THE END OF THE WORKDAY.
- ALL CONSTRUCTION SITE OPERATORS SHALL CONTROL WASTE SUCH AS DISCARDED BUILDING MATERIALS, CONCRETE TRUCK WASHOUT, HAZARDOUS CHEMICALS (TO INCLUDE BUT NOT LIMITED TO HEAVY EQUIPMENT MAINTENANCE FLUIDS, MOTOR OIL, ANTIFREEZE AND VEHICLE FUEL), LITTER, AND SANITARY WASTE AT THE CONSTRUCTION SITE THAT MAY CAUSE ADVERSE IMPACTS TO STORMWATER QUALITY.
- ALL POTENTIAL POLLUTION SOURCES ON-SITE SHALL BE IDENTIFIED AND CONTROL MEASURES INSTALLED AND PRACTICED TO MINIMIZE THE LIKELIHOOD OF A RELEASE. REFER TO THE SPILL PREVENTION, CONTROL, AND COUNTERMEASURE (SPCC) PLAN FOR MEASURES TO RESPOND TO ANY SPILLS, LEAKS OR OTHER RELEASES.
- ALL PORTABLE TOILET FACILITIES SHALL BE LOCATED AWAY FROM GUTTERS, INLETS DITCHES, DRAINAGEWAYS, RECEIVING WATERS AND AREAS SUSCEPTIBLE TO FLOODING OR DAMAGE BY CONSTRUCTION EQUIPMENT.
- ALL PORTABLE TOILET FACILITIES SHALL BE SECURED IN PLACE BY STAKES INTO THE GROUND TO PREVENT TIPPING.
- STOCKPILES INCLUDING LANDSCAPING MATERIALS, EARTH MATERIALS AND DIRT FROM GRADING OR EXCAVATION SHALL NOT BE LOCATED ADJACENT TO WATERWAYS; SHALL BE STABILIZED WITHIN FOURTEEN (14) DAYS OF ESTABLISHMENT BY SURFACE ROUGHENING, SEEDING, AND MULCHING; AND SHALL NOT EXCEED TEN FEET IN HEIGHT.
- SLOPES 3:1 OR STEEPER SHALL BE PROTECTED WITH BIODEGRADABLE EROSION CONTROL BLANKETS.
- ALL MATERIAL IMPORTED TO OR EXPORTED FROM THE SITE SHALL BE PROPERLY COVERED TO PREVENT THE LOSS OF MATERIAL DURING TRANSPORT. HAUL ROUTES MUST BE PRE-APPROVED BY THE COUNTY. NO MATERIAL SHALL BE TRANSPORTED TO ANOTHER SITE WITHOUT FIRST OBTAINING A HAULING PERMIT FROM THE OWNER.
- THE CONCRETE WASHOUT CONTAINMENT STRUCTURE SHALL CONTAIN ALL WASHOUT WATER. STORMWATER SHALL NOT CARRY WASTES FROM WASHOUT LOCATION.
- THE CONCRETE WASHOUT CONTAINMENT STRUCTURE SHALL BE LOCATED A MINIMUM OF FIFTY (50) FEET HORIZONTAL FROM WATERS OF THE STATE. THE CONCRETE WASHOUT CONTAINMENT STRUCTURE SHALL BE SIGNED AS - CONCRETE WASHOUT.
- PERMANENT SOIL STABILIZATION MEASURES SHALL BE APPLIED WITHIN FOURTEEN (14) DAYS TO DISTURBED AREAS IN WHICH FINAL GRADE IS COMPLETED.

BMP MAINTENANCE NOTES

- IT IS ANTICIPATED THAT THE BMPs IMPLEMENTED AT THE SITE WILL HAVE TO BE MODIFIED TO ADAPT TO CHANGING CONDITIONS OR TO ENSURE THAT POTENTIAL POLLUTANTS ARE BEING PROPERLY MANAGED AT THE SITE.
- ALL INLET/OUTLET PROTECTIONS WILL BE CHECKED FOR MAINTENANCE AND FAILURE. SEDIMENT SHALL BE REMOVED AND PROPERLY DISPOSED OF ONCE IT HAS ACCUMULATED TO HALF THE DESIGN OF THE TRAP.
- ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY OR CONTAINED UNTIL APPROPRIATE CLEANUP METHODS CAN BE EMPLOYED. MANUFACTURE'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE FOLLOWED, ALONG WITH PROPER DISPOSAL METHODS.
- EACH CONCRETE TRUCK OPERATOR SHALL BE AWARE OF THE DESIGNATED CONCRETE WASHOUT AREA.
- THE CONTRACTOR SHALL CHECK THE CAPACITY FOR ALL CONCRETE WASHOUT AREAS. WASTE MATERIALS MUST BE REMOVED BY THE CONTRACTOR AND LEGALLY DISPOSED OF WHEN ACCUMULATIONS AMOUNT TO TWO-THIRDS OF THE WET STORAGE CAPACITY OF THE STRUCTURE.
- ALL CONCRETE WASHOUT AREAS SHALL BE CLEARLY MARKED. THE CONCRETE WASHOUT CONTAINMENT DETAIL WILL INCLUDE ORANGE PLASTIC CONSTRUCTION FENCING OR EQUIVALENT AROUND THE WASHOUT STRUCTURE AND A SIGN POSTED WITH THE WORDS "CONCRETE WASHOUT".
- THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND/OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
- AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED OF AT AN APPROVED WASTE SITE.
- ALL SEDIMENT SHALL BE REMOVED UPON INITIAL ACCEPTANCE FROM TEMPORARY SEDIMENT BASINS AND STORM SEWER FACILITIES, I.E., PIPES, OUTLETS AND INLETS. THIS SEDIMENT SHALL NOT BE FLUSHED OFF-SITE, BUT SHALL BE CAPTURED ON-SITE AND DISPOSED OF AT AN APPROVED LOCATION.
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

CHECK DAM INSTALLATION NOTES

- SEE PLAN VIEW FOR:
  - LOCATION OF CHECK DAMS
  - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM)
  - LENGTH (L), CREST LENGTH (CL), AND DEPTH (D)
- CHECK DAMS INDICATED ON INITIAL SWMP SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.
- RIPRAP UTILIZED FOR CHECK DAMS SHOULD BE OF APPROPRIATE SIZE FOR THE APPLICATION. TYPICAL TYPES OF RIPRAP USED FOR CHECK DAMS ARE TYPE M (D50 12") OR TYPE L (D50 9").
- RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'.
- THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1'-6" HIGHER THAN THE CENTER OF THE CHECK DAM.

CHECK DAM MAINTENANCE NOTES

- SEDIMENT ACCUMULATED UPSTREAM OF THE CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS WITHIN 1/2 OF THE HEIGHT OF THE CREST.
- CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
- WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL. DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH GEOTEXTILE OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

CULVERT INLET PROTECTION INSTALLATION NOTES

- SEE PLAN VIEW FOR LOCATION OF CULVERT INLET PROTECTION
- SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINING DETAIL.

CULVERT INLET PROTECTION MAINTENANCE NOTES

- SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS 1/2 THE HEIGHT OF THE ROCK SOCK.
- CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

EARTH DIKE AND DRAINAGE SWALE INSTALLATION NOTES

- SEE SITE PLAN FOR:
  - LOCATION OF DIVERSION SWALE
  - TYPE OF SWALE (UNLINED, COMPACTED AND/OR LINED)
  - LENGTH OF EACH SWALE
  - DEPTH, D, AND WIDTH, W DIMENSIONS
  - FOR ECB/TRM LINED DITCH, SEE ECB DETAIL
  - FOR RIPRAP LINED DITCH, SIZE OF RIPRAP, D50
- SEE DRAINAGE PLANS FOR DETAILS OF PERMANENT CONVEYANCE FACILITIES AND/OR DIVERSION SWALES EXCEEDING 2-YEAR FLOW RATE OR 10 CFS.
- EARTH DIKES AND SWALES INDICATED ON SWMP SHALL BE INSTALLED PRIOR TO LAND-DISTURBING ACTIVITIES IN PROXIMITY.
- EMBANKMENT IS TO BE COMPACTED TO 90% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT ACCORDING TO ASTM D698.
- SWALES ARE TO DRAIN TO A SEDIMENT CONTROL BMP.
- FOR LINED DITCHES, INSTALLATION OF ECB/TRM SHALL CONFORM TO THE REQUIREMENTS OF THE ECB DETAIL.
- WHEN CONSTRUCTION TRAFFIC MUST CROSS A DIVERSION SWALE, INSTALL A TEMPORARY CULVERT WITH A MINIMUM DIAMETER OF 12 INCHES.

EARTH DIKE AND DRAINAGE SWALE MAINTENANCE NOTES

- SWALES SHALL REMAIN IN PLACE UNTIL THE END OF CONSTRUCTION; IF APPROVED BY LOCAL JURISDICTION, SWALES MAY BE LEFT IN PLACE.
- WHEN A SWALE IS REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.

EROSION CONTROL BLANKET INSTALLATION NOTES

- SEE PLAN VIEW FOR:
  - LOCATION OF ECB
  - TYPE OF ECB (STRAW, STRAW-COCONUT, COCONUT, OR ECESLOR)
  - AREA, A, IN SQUARE YARDS OF EACH TYPE OF ECB
- 100% NATURAL AND BIODEGRADABLE MATERIALS ARE PREFERRED FOR RECPS, ALTHOUGH SOME JURISDICTIONS MAY ALLOW OTHER MATERIALS IN SOME APPLICATIONS.
- IN AREAS WHERE ECBs ARE SHOWN ON THE PLANS, THE PERMITTEE SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING AND MULCHING. SUBGRADE SHALL BE SMOOTH AND MOIST PRIOR TO ECB INSTALLATION AND THE ECB SHALL BE IN FULL CONTACT WITH SUBGRADE. NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
- PERIMETER ANCHOR TRENCH SHALL BE USED ALONG THE OUTSIDE PERIMETER OF ALL BLANKET AREAS.
- JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF ECBs TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL ECBs EXCEPT STRAW WHICH MAY USE AN OVERLAPPING JOINT.
- INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF ROLL LENGTH FOR COCONUT AND ECESLOR ECBs.
- OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF ECBs TOGETHER FOR ECBs ON SLOPES.
- MATERIAL SPECIFICATIONS OF ECBs SHALL CONFORM TO TABLE ECB-1.
- ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING ECBs SHALL BE RESEEDED AND MULCHED.
- DETAILS ON DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION WILL GOVERN IF DIFFERENT FROM THOSE SHOWN HERE.

EROSION CONTROL BLANKET MAINTENANCE NOTES

- ECBS SHALL BE LEFT IN PLACE TO EVENTUALLY BIODEGRADE, UNLESS REQUESTED TO BE REMOVED BY THE LOCAL JURISDICTION.
- ANY ECB PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE REPAIRED OR REINSTALLED. ANY SUBGRADE AREAS BELOW THE GEOTEXTILE THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEEDED, AND MULCHED AND THE ECB REINSTALLED.

SILT FENCE INSTALLATION NOTES

- SILT FENCE MUST BE PLACED AWAY FROM THE TOE OF THE SLOPE TO ALLOW FOR WATER PONDING. SILT FENCE AT THE TOW OF A SLOPE SHOULD BE INSTALLED IN A FLAT LOCATION AT LEAST SEVERAL FEET (2-5 FT) FROM THE TOW OF THE SLOPE TO ALLOW ROOM FOR PONDING AND DEPOSITION.
- A UNIFORM 6" X 4" ANCHOR TRENCH SHALL BE EXCAVATED USING TRENCHER OR SILT FENCE INSTALLATION DEVICE. NO ROAD GRADERS, BACKHOES, OR SIMILAR EQUIPMENT SHALL BE USED.
- COMPACT ANCHOR TRENCH BY HAND WITH A "JUMPING JACK" OR BY WHEEL ROLLING. COMPACTION SHALL BE SUCH THAT SILT FENCE RESISTS BEING PULLED OUT OF ANCHOR TRENCH BY HAND.
- SILT FENCE SHALL BE PULLED TIGHT AS IT IS ANCHORED TO THE STAKES. THERE SHOULD BE NO NOTICEABLE SAG BETWEEN STAKES AFTER IT HAS BEEN ANCHORED TO THE STAKES.
- SILT FENCE FABRIC SHALL BE ANCHORED TO THE STAKES USING 1" HEAVY DUTY STAPLES OR NAILS WITH 1" HEADS. STAPLES AND NAILS SHOULD BE PLACED 3" ALONG THE FABRIC DOWN THE STAKE.
- AT THE END OF A RUN OF SILT FENCE ALONG A CONTOUR, THE SILT FENCE SHOULD BE TURNED PERPENDICULAR TO THE CONTOUR TO CREATE A "J-HOOK". THE "J-HOOK" EXTENDING PERPENDICULAR TO THE CONTOUR SHOULD BE OF SUFFICIENT LENGTH TO KEEP RUNOFF FROM FLOWING AROUND THE END OF THE SILT FENCE (TYPICALLY 10' - 20').
- SILT FENCE SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

SILT FENCE MAINTENANCE NOTES

- SEDIMENT ACCUMULATED UPSTREAM OF THE SILT FENCE SHALL BE REMOVED AS NEEEDED TO MAINTAIN THE FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY 6".
- REPAIR OR REPLACE SILT FENCE WHEN THERE ARE SIGNS OF WEAR, SUCH AS SAGGING, TEARING, OR COLLAPSE.
- SILT FENCE IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION, OR IS REPLACED BY AN EQUIVALENT PERIMETER SEDIMENT CONTROL BMP.
- WHEN SILT FENCE IS REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED, AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

STABILIZED STAGING AREA INSTALLATION NOTES

- SEE PLAN VIEW FOR:
  - LOCATION OF STAGING AREA(S)
  - CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION
- STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING CONSTRUCTION.
- STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.
- THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THINK GRANULAR MATERIAL.
- UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.
- ADDITIONAL PERIMETER BMPs MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SILT FENCE AND CONSTRUCTION FENCING.

STABILIZED STAGING AREA MAINTENANCE NOTES

- ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.
- STABILIZED STAGING AREA SHALL BE ENLARGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNLOADING/LOADING OPERATIONS.
- THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE LOCAL JURISDICTION, USED ON SITE, AND THE AREA COVERED WITH TOPSOIL, SEEDED, AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.
- NOTE: MANY MUNICIPALITIES PROHIBIT THE USE OF RECYCLED CONCRETE AS GRANULAR MATERIAL FOR STABILIZED STAGING AREAS DUE TO DIFFICULTIES WITH RE-ESTABLISHMENT OF VEGETATION IN AREAS WHERE RECYCLED CONCRETE WAS PLACED.

STABILIZED CONSTRUCTION ENTRANCE/EXIT INSTALLATION NOTES

- SEE PLAN VIEW FOR:
  - LOCATION OF CONSTRUCTION ENTRANCE(S)/EXIT(S)
  - TYPE OF CONSTRUCTION ENTRANCE(S)/EXIT(S) (WITH/WITHOUT WHEEL WASH, CONSTRUCTION MAT OR TRM)
- CONSTRUCTION MAT OR TRM STABILIZED CONSTRUCTION ENTRANCES ARE ONLY TO BE USED ON SHORT DURATION PROJECTS (TYPICALLY RANGING FROM A WEEK TO A MONTH) WHERE THERE WILL BE LIMITED VEHICULAR ACCESS.
- A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE LOCATED AT ALL ACCESS POINTS WHERE VEHICLES ACCESS THE CONSTRUCTION SITE FROM PAVED RIGHT-OF-WAYS.
- STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
- A NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE STABILIZED CONSTRUCTION ENTRANCE/EXIT PRIOR TO THE PLACEMENT OF ROCK.
- UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.

STABILIZED CONSTRUCTION ENTRANCE/EXIT MAINTENANCE NOTES

- ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY TO THE STABILIZED ENTRANCE/EXIT TO MAINTAIN A CONSISTENT DEPTH.
- SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED THROUGHOUT THE DAY AND AT THE END OF THE DAY BY SHOVELING OR SWEEPING. SEDIMENT MAY NOT BE WASHED DOWN STORM SEWER DRAINS.

APPLICATION, CONTROL MEASURE	CONTROL MEASURE IMPLEMENTATION PHASE		
	INITIAL ACTIVITIES	INTERIM ACTIVITIES	PERMANENT STABILIZATION
SILT FENCE OR SEDIMENT CONTROL LOGS		X	
CULVERT INLET PROTECTION	X	X	X
CONCRETE WASHOUT AREAS		X	
VEHICLE TRACKING CONTROL	X		
STABILIZED STAGING AREA	X	X	
STOCKPILE MANAGEMENT	X	X	
ROCK SOCKS	X	X	
PERMANENT SEEDING AND MULCHING/HYDROSEED			X
EROSION CONTROL BLANKET	X	X	X
SURFACE ROUGHENING		X	
STREET SWEEPING	X	X	
WIND EROSION/DUST CONTROL	X	X	
MINIMIZE SOIL COMPACTION	X	X	
CONSTRUCTION PHASING	X	X	
COVER STOCKPILES AND STORED MATERIALS/CHEMICALS	X	X	
DESIGNATED AREAS	X	X	
PESTICIDES AND FERTILIZERS	X	X	
CHECK DAMS			X

Culvert inlet protection is a temporary BMP - if some type of permanent inlet protection is proposed, show permanent detail, not just temporary BMP standard detail.

CONSTRUCTION CONTRACTOR IS RESPONSIBLE FOR FINAL STABILIZATION UNTIL 70% VEGETATION IS ACHIEVED.



720.749.4165  
WWW.ELEMENTENGINEERING.NET  
12687 W. CEDAR DRIVE, SUITE 300  
LAKEWOOD, CO 80226

NO.	REVISIONS	DATE	BY
		DESCRIPTION	

WASTEWATER TREATMENT PLANT PLANS FOR BID  
EROSION CONTROL DETAILS  
TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF



FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC  
DATE  
JANUARY 2024  
JOB NUMBER  
0043.0001  
SCALE  
NTS  
EDITION  
BIDDING  
SHEET  
C29 OF C31

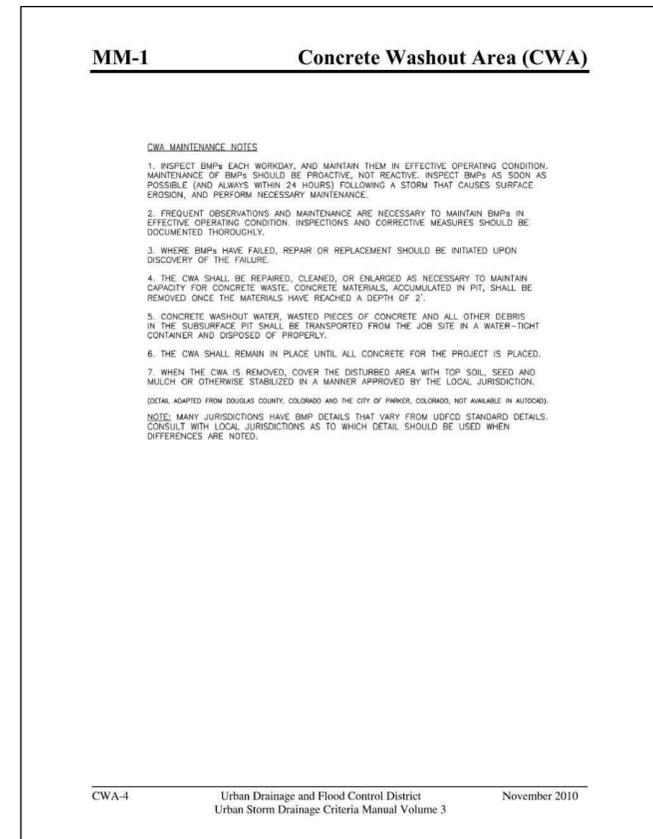
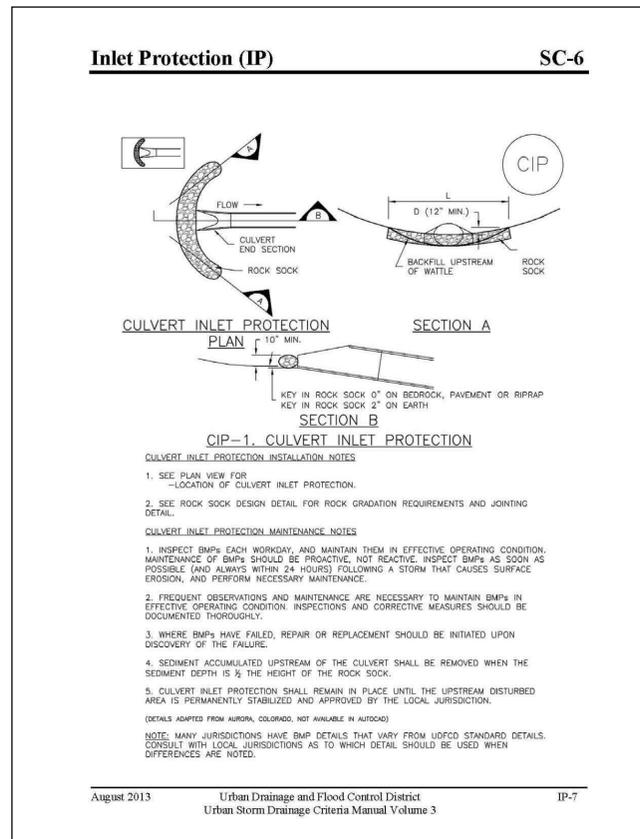
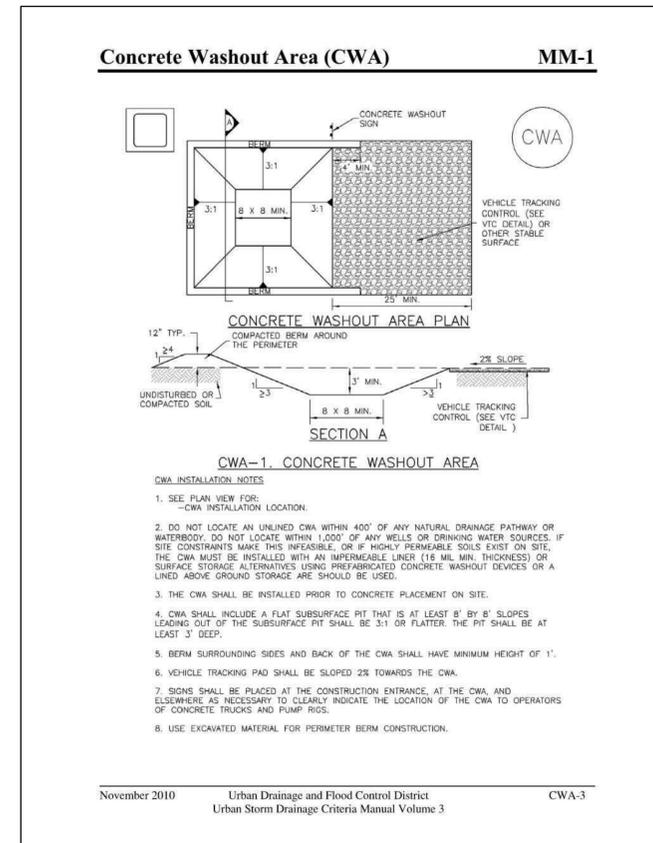
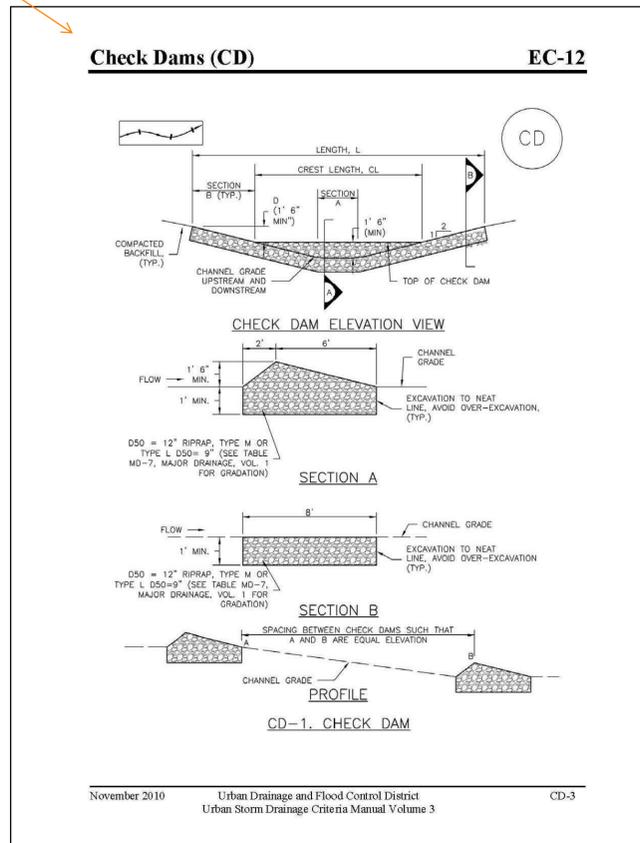
**STANDARD NOTES FOR EL PASO COUNTY GRADING AND EROSION CONTROL PLANS**

- STORMWATER DISCHARGES FROM CONSTRUCTION SITES SHALL NOT CAUSE OR THREATEN TO CAUSE POLLUTION, CONTAMINATION, OR DEGRADATION OF STATE WATERS. ALL WORK AND EARTH DISTURBANCE SHALL BE DONE IN A MANNER THAT MINIMIZES POLLUTION OF ANY ON-SITE OR OFF-SITE WATERS, INCLUDING WETLANDS.
- NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING.
- A SEPARATE STORMWATER MANAGEMENT PLAN (SWMP) FOR THIS PROJECT SHALL BE COMPLETED AND AN EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP) ISSUED PRIOR TO COMMENCING CONSTRUCTION. MANAGEMENT OF THE SWMP DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE DESIGNATED QUALIFIED STORMWATER MANAGER OR CERTIFIED EROSION CONTROL INSPECTOR. THE SWMP SHALL BE LOCATED ON SITE AT ALL TIMES DURING CONSTRUCTION AND SHALL BE KEPT UP TO DATE WITH WORK PROGRESS AND CHANGES IN THE FIELD.
- ONCE THE ESQCP IS APPROVED AND A NOTICE TO PROCEED HAS BEEN ISSUED, THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL MEASURES AS INDICATED ON THE APPROVED DEC. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY STAFF.
- CONTROL MEASURES MUST BE INSTALLED PRIOR TO COMMENCEMENT OF ACTIVITIES THAT COULD CONTRIBUTE POLLUTANTS TO STORMWATER. CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, AND DISTURBED LAND AREAS SHALL BE INSTALLED IMMEDIATELY UPON COMPLETION OF THE DISTURBANCE.
- ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED AND REMAIN IN EFFECTIVE OPERATING CONDITION UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND FINAL STABILIZATION IS ESTABLISHED. ALL PERSONS ENGAGED IN LAND DISTURBANCE ACTIVITIES SHALL ASSESS THE ADEQUACY OF CONTROL MEASURES AT THE SITE AND IDENTIFY IF CHANGES TO THOSE CONTROL MEASURES ARE NEEDED TO ENSURE THE CONTINUED EFFECTIVE PERFORMANCE OF THE CONTROL MEASURES. ALL CHANGES TO TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST BE INCORPORATED INTO THE STORMWATER MANAGEMENT PLAN.
- TEMPORARY STABILIZATION SHALL BE IMPLEMENTED ON DISTURBED AREAS AND STOCKPILES WHERE GROUND DISTURBING CONSTRUCTION ACTIVITY HAS PERMANENTLY CEASED OR TEMPORARILY CEASED FOR LONGER THAN 14 DAYS.
- FINAL STABILIZATION MUST BE IMPLEMENTED AT ALL APPLICABLE CONSTRUCTION SITES. FINAL STABILIZATION IS ACHIEVED WHEN ALL GROUND DISTURBING ACTIVITIES ARE COMPLETE AND ALL DISTURBED AREAS EITHER HAVE A UNIFORM VEGETATIVE COVER WITH INDIVIDUAL PLANT DENSITY OF 70 PERCENT OF PRE-DISTURBANCE LEVELS ESTABLISHED OR EQUIVALENT PERMANENT ALTERNATIVE STABILIZATION METHOD IS IMPLEMENTED. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED UPON FINAL STABILIZATION AND BEFORE PERMIT CLOSURE.
- ALL PERMANENT STORMWATER MANAGEMENT FACILITIES SHALL BE INSTALLED AS DESIGNED IN THE APPROVED PLANS. ANY PROPOSED CHANGES THAT AFFECT THE DESIGN OR FUNCTION OF PERMANENT STORMWATER MANAGEMENT STRUCTURES MUST BE APPROVED BY THE ECM ADMINISTRATOR PRIOR TO IMPLEMENTATION.
- EARTH DISTURBANCES SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY MINIMIZE ACCELERATED SOIL EROSION AND RESULTING SEDIMENTATION. ALL DISTURBANCES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST PRACTICAL PERIOD OF TIME. PRE-EXISTING VEGETATION SHALL BE PROTECTED AND MAINTAINED WITHIN 50 HORIZONTAL FEET OF A WATERS OF THE STATE UNLESS SHOWN TO BE INFEASIBLE AND SPECIFICALLY REQUESTED AND APPROVED.
- COMPACTION OF SOIL MUST BE PREVENTED IN AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES OR WHERE FINAL STABILIZATION WILL BE ACHIEVED BY VEGETATIVE COVER. AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES SHALL ALSO BE PROTECTED FROM SEDIMENTATION DURING CONSTRUCTION UNTIL FINAL STABILIZATION IS ACHIEVED. IF COMPACTION PREVENTION IS NOT FEASIBLE DUE TO SITE CONSTRAINTS, ALL AREAS DESIGNATED FOR INFILTRATION AND VEGETATION CONTROL MEASURES MUST BE LOOSENEED PRIOR TO INSTALLATION OF THE CONTROL MEASURE(S).
- ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF STORMWATER AROUND, THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE A STABILIZED CONVEYANCE DESIGNED TO MINIMIZE EROSION AND THE DISCHARGE OF SEDIMENT OFF SITE.
- CONCRETE WASH WATER SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE SWMP. NO WASH WATER SHALL BE DISCHARGED TO OR ALLOWED TO ENTER STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES. CONCRETE WASHOUTS SHALL NOT BE LOCATED IN AN AREA WHERE SHALLOW GROUNDWATER MAY BE PRESENT, OR WITHIN 50 FEET OF A SURFACE WATER BODY, CREEK OR STREAM.
- DURING DEWATERING OPERATIONS OF UNCONTAMINATED GROUND WATER MAY BE DISCHARGED ON SITE, BUT SHALL NOT LEAVE THE SITE IN THE FORM OF SURFACE RUNOFF UNLESS AN APPROVED STATE DEWATERING PERMIT IS IN PLACE.
- EROSION CONTROL BLANKETING OR OTHER PROTECTIVE COVERING SHALL BE USED ON SLOPES STEEPER THAN 3:1.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL WASTES FROM THE CONSTRUCTION SITE FOR DISPOSAL IN ACCORDANCE WITH LOCAL AND STATE REGULATORY REQUIREMENTS. NO CONSTRUCTION DEBRIS, TREE SLASH, BUILDING MATERIAL WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, OR DISCHARGED AT THE SITE.
- WASTE MATERIALS SHALL NOT BE TEMPORARILY PLACED OR STORED IN THE STREET, ALLEY, OR OTHER PUBLIC WAY, UNLESS IN ACCORDANCE WITH AN APPROVED TRAFFIC CONTROL PLAN. CONTROL MEASURES MAY BE REQUIRED BY EL PASO COUNTY ENGINEERING IF DEEMED NECESSARY, BASED ON SPECIFIC CONDITIONS AND CIRCUMSTANCES.
- TRACKING OF SOILS AND CONSTRUCTION DEBRIS OFF-SITE SHALL BE MINIMIZED. MATERIALS TRACKED OFF-SITE SHALL BE CLEANED UP AND PROPERLY DISPOSED OF IMMEDIATELY.
- THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL CONSTRUCTION DEBRIS, DIRT, TRASH, ROCK, SEDIMENT, SOIL, AND SAND THAT MAY ACCUMULATE IN ROADS, STORM DRAINS AND OTHER DRAINAGE CONVEYANCE SYSTEMS AND STORMWATER APPURTENANCES AS A RESULT OF SITE DEVELOPMENT.
- THE QUANTITY OF MATERIALS STORED ON THE PROJECT SITE SHALL BE LIMITED, AS MUCH AS PRACTICAL, TO THAT QUANTITY REQUIRED TO PERFORM THE WORK IN AN ORDERLY SEQUENCE. ALL MATERIALS STORED ON-SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER, IN THEIR ORIGINAL CONTAINERS, WITH ORIGINAL MANUFACTURER'S LABELS.

This check dam detail is a temporary control measure detail. If the check dams are proposed features they need to be designed as permanent facilities and this detail may not be sufficient for larger storms.

- NO CHEMICAL(S) HAVING THE POTENTIAL TO BE RELEASED IN STORMWATER ARE TO BE STORED OR USED ON-SITE UNLESS PERMISSION FOR THE USE OF SUCH CHEMICAL(S) IS GRANTED IN WRITING BY THE ECM ADMINISTRATOR. IN GRANTING APPROVAL FOR THE USE OF SUCH CHEMICAL(S), SPECIAL CONDITIONS AND MONITORING MAY BE REQUIRED.
- BULK STORAGE OF ALLOWED PETROLEUM PRODUCTS OR OTHER ALLOWED LIQUID CHEMICALS IN EXCESS OF 55 GALLONS SHALL REQUIRE ADEQUATE SECONDARY CONTAINMENT PROTECTION TO CONTAIN ALL SPILLS ON-SITE AND TO PREVENT ANY SPILLED MATERIALS FROM ENTERING STATE WATERS, ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR OTHER FACILITIES.
- NO PERSON SHALL CAUSE THE IMPEDIMENT OF STORMWATER FLOW IN THE CURB AND GUTTER OR DITCH EXCEPT WITH APPROVED SEDIMENT CONTROL MEASURES.
- OWNER/DEVELOPER AND THEIR AGENTS SHALL COMPLY WITH THE 'COLORADO WATER QUALITY CONTROL ACT' (TITLE 25, ARTICLE 8, CRS), AND THE 'CLEAN WATER ACT' (33 USC 1344), IN ADDITION TO THE REQUIREMENTS OF THE LAND DEVELOPMENT CODE, DCM VOLUME II AND THE ECM APPENDIX I. ALL APPROPRIATE PERMITS MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION (1041, NPDES, FLOODPLAIN, 404, FUGITIVE DUST, ETC.). IN THE EVENT OF CONFLICTS BETWEEN THESE REQUIREMENTS AND OTHER LAWS, RULES, OR REGULATIONS OF OTHER FEDERAL, STATE, LOCAL, OR COUNTY AGENCIES, THE MOST RESTRICTIVE LAWS, RULES, OR REGULATIONS SHALL APPLY.
- ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE ONLY AT APPROVED CONSTRUCTION ACCESS POINTS.
- PRIOR TO CONSTRUCTION THE PERMITTEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES.
- A WATER SOURCE SHALL BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND SHALL BE UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
- THE SOILS REPORT FOR THIS SITE HAS BEEN PREPARED BY KUMAR AND ASSOCIATES ON JANUARY 6TH, 2023 AND SHALL BE CONSIDERED A PART OF THESE PLANS.
- AT LEAST TEN (10) DAYS PRIOR TO THE ANTICIPATED START OF CONSTRUCTION, FOR PROJECTS THAT WILL DISTURB ONE (1) ACRE OR MORE, THE OWNER OR OPERATOR OF CONSTRUCTION ACTIVITY SHALL SUBMIT A PERMIT APPLICATION FOR STORMWATER DISCHARGE TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, WATER QUALITY DIVISION. THE APPLICATION CONTAINS CERTIFICATION OF COMPLETION OF A STORMWATER MANAGEMENT PLAN (SWMP), OF WHICH THIS GRADING AND EROSION CONTROL PLAN MAY BE A PART. FOR INFORMATION OR APPLICATION MATERIALS CONTACT:  
  
COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT  
WATER QUALITY CONTROL DIVISION  
WOOD - PERMITS  
4300 CHERRY CREEK DRIVE SOUTH  
DENVER, CO 80246-1530  
ATTN: PERMITS UNIT

Unresolved from Submittal 2 - Provide details for: SCL SA



NO.	REVISIONS	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID  
**EROSION CONTROL DETAILS**  
 TOWN OF RAMAHH - PCD FILE NO. PPR2325  
 113 S. COMMERCIAL STREET  
 RAMAHH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF



FOR AND ON BEHALF OF  
 ELEMENT ENGINEERING, LLC  
 DATE  
**JANUARY 2024**  
 JOB NUMBER  
 0043.0001  
 SCALE  
 NTS  
 EDITION  
**BIDDING**  
 SHEET  
 C30 OF C31



**Rock Sock (RS)**

**SC-5**

**ROCK SOCK MAINTENANCE NOTES**

1. INSPECT BMPs EACH WORKDAY AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.

2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.

3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

4. ROCK SOCKS SHALL BE REPLACED IF THEY BECOME HEAVILY SOILED, OR DAMAGED BEYOND REPAIR.

5. SEDIMENT ACCUMULATED UPSTREAM OF ROCK SOCKS SHALL BE REMOVED AS NEEDED TO MAINTAIN FUNCTIONALITY OF THE BMP. TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY 1/2 OF THE HEIGHT OF THE ROCK SOCK.

6. ROCK SOCKS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

7. WHEN ROCK SOCKS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

NOTE: THE DETAILS INCLUDED WITH THIS FACT SHEET SHOW COMMONLY USED, CONVENTIONAL METHODS OF ROCK SOCK INSTALLATION IN THE DENVER METROPOLITAN AREA. THERE ARE MANY OTHER SIMILAR PROPRIETARY PRODUCTS ON THE MARKET. UDFCD NEITHER ENDORSES NOR DISCOURAGES USE OF PROPRIETARY PROTECTION PRODUCTS; HOWEVER, IN THE EVENT PROPRIETARY METHODS ARE USED, THE APPROPRIATE DETAIL FROM THE MANUFACTURER MUST BE INCLUDED IN THE SWMP AND THE BMP MUST BE INSTALLED AND MAINTAINED AS SHOWN IN THE MANUFACTURER'S DETAILS.

**Mulching (MU)**

**EC-4**

**Description**

Mulching consists of evenly applying straw, hay, shredded wood mulch, rock, bark or compost to disturbed soils and securing the mulch by crimping, tackifiers, netting or other measures. Mulching helps reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff.

Although often applied in conjunction with temporary or permanent seeding, it can also be used for temporary stabilization of areas that cannot be reseeded due to seasonal constraints.

Mulch can be applied either using standard mechanical dry application methods or using hydromulching equipment that hydraulically applies a slurry of water, wood fiber mulch, and often a tackifier.

**Appropriate Uses**

Use mulch in conjunction with seeding to help protect the seedbed and stabilize the soil. Mulch can also be used as a temporary cover on low to mild slopes to help temporarily stabilize disturbed areas where growing season constraints prevent effective reseeding. Disturbed areas should be properly mulched and tacked, or seeded, mulched and tacked promptly after final grade is reached (typically within no longer than 14 days) on portions of the site not otherwise permanently stabilized.

Standard dry mulching is encouraged in most jurisdictions; however, hydromulching may not be allowed in certain jurisdictions or may not be allowed near waterways.

Do not apply mulch during windy conditions.

**Design and Installation**

Prior to mulching, surface-roughen areas by rolling with a crimping or punching type roller or by track walking. Track walking should only be used where other methods are impractical because track walking with heavy equipment typically compacts the soil.

A variety of mulches can be used effectively at construction sites. Consider the following:

Mulch	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No



Photograph MU-1. An area that was recently seeded, mulched, and crimped.

**EC-4**

**Mulching (MU)**

- Clean, weed-free and seed-free cereal grain straw should be applied evenly at a rate of 2 tons per acre and must be tacked or fastened by a method suitable for the condition of the site. Straw mulch must be anchored (and not merely placed) on the surface. This can be accomplished mechanically by crimping or with the aid of tackifiers or nets. Anchoring with a crimping implement is preferred, and is the recommended method for areas flatter than 3:1. Mechanical crimpers must be capable of tacking the long mulch fibers into the soil to a depth of 3 inches without cutting them. An agricultural disk, while not an ideal substitute, may work if the disk blades are dull or blunted and set vertically; however, the frame may have to be weighted to afford proper soil penetration.
- Grass hay may be used in place of straw; however, because hay is comprised of the entire plant including seed, mulching with hay may seed the site with non-native grass species which might in turn out-compete the native seed. Alternatively, native species of grass hay may be purchased, but can be difficult to find and are more expensive than straw. Purchasing and utilizing a certified weed-free straw is an easier and less costly mulching method. When using grass hay, follow the same guidelines as for straw (provided above).
- On small areas sheltered from the wind and heavy runoff, spraying a tackifier on the mulch is satisfactory for holding it in place. For steep slopes and special situations where greater control is needed, erosion control blankets anchored with stakes should be used instead of mulch.
- Hydraulic mulching consists of wood cellulose fibers mixed with water and a tackifying agent and should be applied at a rate of no less than 1,500 pounds per acre (1,425 lbs of fibers mixed with at least 75 lbs of tackifier) with a hydraulic mulcher. For steeper slopes, up to 2000 pounds per acre may be required for effective hydroseeding. Hydromulch typically requires up to 24 hours to dry; therefore, it should not be applied immediately prior to inclement weather. Application to roads, waterways and existing vegetation should be avoided.
- Erosion control mats, blankets, or nets are recommended to help stabilize steep slopes (generally 3:1 and steeper) and waterways. Depending on the product, these may be used alone or in conjunction with grass or straw mulch. Normally, use of these products will be restricted to relatively small areas. Biodegradable mats made of straw and jute, straw-coconut, coconut fiber, or excelsior can be used instead of mulch. (See the ECM/TRM BMP for more information.)
- Some tackifiers or binders may be used to anchor mulch. Check with the local jurisdiction for allowed tackifiers. Manufacturer's recommendations should be followed at all times. (See the Soil Binder BMP for more information on general types of tackifiers.)
- Rock can also be used as mulch. It provides protection of exposed soils to wind and water erosion and allows infiltration of precipitation. An aggregate base course can be spread on disturbed areas for temporary or permanent stabilization. The rock mulch layer should be thick enough to provide full coverage of exposed soil on the area it is applied.

**Maintenance and Removal**

After mulching, the bare ground surface should not be more than 10 percent exposed. Recapply mulch, as needed, to cover bare areas.

NO.	REVISIONS	DESCRIPTION	BY		DATE	
			DATE	DESCRIPTION	DATE	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID  
**EROSION CONTROL DETAILS**  
TOWN OF RAMAHH – PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAHH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF



FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE  
JANUARY 2024

JOB NUMBER  
0043.0001

SCALE  
NTS

EDITION  
BIDDING

SHEET  
C32 OF C31