CONSTRUCTION SPECIFICATIONS

SECTION 20 - GENERAL SPECIFICATIONS PAVING GRADING DRAINAGE AND EARTHWORK

20. GENERAL

20.1. IT IS THE INTENT OF THESE SPECIFICATIONS TO DESCRIBE THE MINIMUM ACCEPTABLE TECHNICAL REQUIREMENTS FOR THE MATERIALS AND WORKMANSHIP FOR CONSTRUCTION OF SITE IMPROVEMENTS FOR THIS PROJECT. SUCH IMPROVEMENTS MAY GENERALLY INCLUDE, BUT NOT TO BE LIMITED TO, CLEARING, GRADING, PAVING, REMOVAL OF EXISTING PAVEMENT STORM DRAINAGE, WATER LINES AND SANITARY SEWERS.

20.2. IT IS THE INTENT THAT THE FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION: (CURRENT EDITION) TOGETHER WITH "SUPPLEMENTAL SPECIFICATIONS TO THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" (CURRENT EDITION), AND THE FDOT STANDARD PLANS FOR ROAD CONSTRUCTION (CURRENT EDITION) BE USED WHERE APPLICABLE FOR THE VARIOUS WORK, AND THAT WHERE SUCH WORDING THEREIN REFERS TO THE STATE OF FLORIDA AND ITS DEPARTMENT OF TRANSPORTATION AND PERSONNEL, SUCH WORDING IS INTENDED TO BE REPLACED WITH THE WORDING WHICH WOULD PROVIDE PROPER TERMINOLOGY; THEREBY MAKING SUCH "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" TOGETHER WITH THE "FDOT STANDARD PLANS FOR ROAD CONSTRUCTION" AS THE "STANDARD SPECIFICATIONS" FOR THIS PROJECT. IF WITHIN A PARTICULAR SECTION, ANOTHER SECTION, ARTICLE OR PARAGRAPH IS REFERRED TO, IT SHALL BE PART OF THE STANDARD SPECIFICATIONS ALSO. THE CONTRACTOR SHALL ABIDE BY ALL LOCAL AND STATE LAWS, REGULATIONS AND BUILDING CODES WHICH HAVE JURISDICTION IN THE AREA.

20.3. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT AND PERFORM ALL OPERATIONS REQUIRED TO COMPLETE THE CONSTRUCTION OF A PAVING AND DRAINAGE SYSTEM AS SHOWN ON THE PLANS, SPECIFIED HEREIN, OR BOTH. IT IS THE INTENT TO PROVIDE A COMPLETE AND OPERATING FACILITY IN ACCORDANCE WITH THESE SPECIFICATIONS AND THE CONSTRUCTION DRAWINGS. THE MATERIAL AND EQUIPMENT SHOWN OR SPECIFIED SHALL NOT BE TAKEN TO EXCLUDE ANY OTHER INCIDENTALS NECESSARY TO COMPLETE THE WORK.

20.4. ALL LABOR, MATERIALS, AND METHODS OF CONSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH THE PLANS AND CONSTRUCTION SPECIFICATIONS AND THE MINIMUM ENGINEERING AND CONSTRUCTION STANDARDS ADOPTED BY THE UNIT OF GOVERNMENT WHICH HAS JURISDICTION AND RESPONSIBILITY FOR THE CONSTRUCTION. WHERE CONFLICTS OR OMISSIONS EXIST, THE JURISDICTIONAL GOVERNMENT ENGINEERING DEPARTMENT'S STANDARDS SHALL GOVERN. SUBSTITUTIONS AND DEVIATIONS FROM PLANS AND SPECIFICATIONS SHALL BE PERMITTED ONLY WHEN WRITTEN APPROVAL HAS BEEN ISSUED BY THE ENGINEER.

20.5. GUARANTEE - ALL MATERIALS AND EQUIPMENT TO BE FURNISHED AND/OR INSTALLED BY THE CONTRACTOR UNDER THIS CONTRACT, SHALL BE GUARANTEED FOR A PERIOD OF (1) ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE THEREOF, AGAINST DEFECTIVE MATERIALS, DESIGN AND WORKMANSHIP. UPON RECEIPT OF NOTICE FROM THE OWNER OF FAILURE OF ANY PART OF THE GUARANTEED EQUIPMENT OR MATERIALS, DURING THE GUARANTEE PERIOD, THE AFFECTED PART OR MATERIALS SHALL BE REPLACED PROMPTLY WITH NEW PARTS OR MATERIALS BY THE CONTRACTOR, AT NO EXPENSE TO THE OWNER. IN THE EVENT THE CONTRACTOR FAILS TO MAKE NECESSARY REPLACEMENT OR REPAIRS WITHIN (7) SEVEN DAYS AFTER NOTIFICATION BY THE OWNER, THE OWNER MAY ACCOMPLISH THE WORK AT THE EXPENSE OF THE CONTRACTOR.

21. EARTHWORK

21.1. ALL AREAS WITHIN THE PROJECT LIMITS SHALL BE CLEARED AND GRUBBED PRIOR TO CONSTRUCTION. THIS SHALL CONSIST OF THE COMPLETE REMOVAL AND DISPOSAL OF ALL TREES, BRUSH, STUMPS, ROOTS, GRASS, WEEDS, RUBBISH AND ALL OTHER OBSTRUCTIONS RESTING ON OR PROTRUDING THROUGH THE SURFACE OF THE EXISTING GROUND TO A DEPTH OF 1'. ALL WORK SHALL BE IN ACCORDANCE WITH SECTION 110 OF THE STANDARD SPECIFICATIONS.

21.2. NONE OF THE EXISTING LIMEROCK MATERIAL FROM DEMOLISHED PAVEMENT IS TO BE INCORPORATED IN THE NEW LIMEROCK BASE, UNLESS NOTED IN PLANS. THE EXISTING LIMEROCK MATERIAL FROM DEMOLISHED PAVEMENT MAY BE INCORPORATED INTO THE STABILIZED SUBGRADE / SUBBASE, OR STABILIZED SHOULDER.

21.3. FILL MATERIAL SHALL BE IN ACCORDANCE WITH SECTION 120 AND 125 OF THE STANDARD SPECIFICATIONS.

21.4. ALL FILL MATERIAL IN AREAS NOT TO BE PAVED SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99.

21.5. ALL MATERIAL OF CONSTRUCTION SHALL BE SUBJECT TO INSPECTION AND TESTING TO ESTABLISH CONFORMANCE WITH THE SPECIFICATIONS AND SUITABLY FOR THE USES INTENDED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 24 HOURS PRIOR TO THE TIME CONTRACTOR WILL BE READY FOR AN INSPECTION OR TEST. THE CONTRACTOR SHALL FOLLOW CITY AND COUNTY INSPECTION PROCEDURES. THE CONTRACTOR SHALL NOT PROCEED WITH ANY PHASE OF WORK DEPENDENT ON AN INSPECTION OR TEST OF AN EARLIER PHASE OF WORK, PRIOR TO THAT TEST OR INSPECTION PASSING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING CERTIFIED MATERIAL TEST RESULTS TO THE ENGINEER OF RECORD PRIOR TO THE RELEASE OF FINAL CERTIFICATION BY THE ENGINEER. TEST RESULTS MUST INCLUDE, BUT MAY NOT BE LIMITED TO, DENSITIES FOR SUBGRADE AND LIMEROCK, UTILITIES, EXCAVATION, ASPHALT GRADATION REPORTS, CONCRETE CYLINDERS, ETC.

21.6. WHEN MUCK, CLAY, ROCK, OR ANY OTHER MATERIAL THAT IS UNSUITABLE IN ITS ORIGINAL POSITION ARE ENCOUNTERED BENEATH PROPOSED PAVEMENT AND SIDEWALK AREAS, THE UNSUITABLE MATERIALS SHALL BE COMPLETELY REMOVED FROM BENEATH THE PAVEMENT AND SIDEWALK AREAS AND (10) TEN FEET BEYOND THE EDGE OF PAVEMENT. ALL SUCH UNSUITABLE MATERIAL REMOVED BY THE SUBSOIL EXCAVATION, SHALL BE REPLACED WITH ACCEPTABLE EMBANKMENT MATERIAL, AS SPECIFIED IN THE STANDARD SPECIFICATIONS.

21.7. WHEN MUCK, CLAY,HARDPAN OR ANY OTHER MATERIAL THAT IS UNSUITABLE IN ITS ORIGINAL POSITION, ARE ENCOUNTERED BENEATH PROPOSED DRAINAGE SWALES OR DRY RETENTION AREAS, THE UNSUITABLE MATERIALS SHALL BE COMPLETELY REMOVED FROM BENEATH THE DRAINAGE SWALES AND DRY RETENTION AREAS. ALL SUCH UNSUITABLE MATERIAL REMOVED BY THE SUBSOIL EXCAVATION, SHALL BE REPLACED WITH COARSE SAND, OR OTHER SUITABLE GRANULAR MATERIAL, AS SPECIFIED IN THE STANDARD SPECIFICATIONS.

21.8. ALL UNDERGROUND UTILITIES AND DRAINAGE INSTALLATIONS SHALL BE IN PLACE PRIOR TO SUBGRADE COMPACTION AND PAVEMENT CONSTRUCTION.

21.9. GROUND ADJACENT TO ROADWAY/PAVEMENT HAVING RUNOFF SHALL BE GRADED (2) TWO INCHES LOWER THAN THE EDGE OF PAVEMENT TO ALLOW FOR THE PLACEMENT OF SOD.

21.10. SITE GRADING ELEVATIONS SHALL BE WITHIN 0.1' OF THE REQUIRED ELEVATION FOR NON PAVED AREAS AND ALL AREAS SHALL BE GRADED TO DRAIN WITHOUT PONDING.

21.11. THE CONTRACTOR SHALL PERFORM ALL EXCAVATION, FILL, EMBANKMENT AND GRADING TO ACHIEVE THE PROPOSED PLAN GRADES INCLUDING TYPICAL ROAD SECTIONS, SIDE SLOPES AND CANAL SECTIONS. ALL WORK SHALL BE IN ACCORDANCE WITH SECTION 120 OF THE STANDARD SPECIFICATIONS. IF FILL MATERIAL IS REQUIRED IN EXCESS OF THAT GENERATED BY THE EXCAVATION, THE CONTRACTOR SHALL SUPPLY THIS MATERIAL AS REQUIRED FROM OFF-SITE.

21.12. A 2" BLANKET OF TOP SOIL SHALL BE PLACED OVER ALL AREAS TO BE SODDED OR SEEDED AND MULCHED WITHIN THE PROJECT LIMITS UNLESS OTHERWISE INDICATED ON THE PLANS.

21.13. SOD SHALL BE ST. AUGUSTINE UNLESS OTHERWISE INDICATED ON THE PLANS, AND SHALL BE PLACED ON THE GRADED TOP SOIL AND WATERED TO INSURE SATISFACTORY CONDITION UPON FINAL ACCEPTANCE OF THE PROJECT.

22. DRAINAGE

22.1. INLETS - ALL INLETS SHALL BE THE TYPE DESIGNATED ON THE PLANS, AND SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 425 OF THE STANDARD SPECIFICATIONS. ALL INLETS AND PIPE SHALL BE PROTECTED DURING CONSTRUCTION TO PREVENT SILTATION IN THE DRAINAGE SYSTEMS BY WAY OF TEMPORARY PLUGS AND PLYWOOD OR PLASTIC COVERS OVER THE INLETS. THE ENTIRE DRAINAGE SYSTEM SHALL BE CLEANED OF ALL DEBRIS PRIOR TO FINAL ACCEPTANCE.

22.2. PIPE SPECIFICATIONS: PIPE MATERIAL SHALL BE IN ACCORDANCE WITH SECTION 430 OF THE STANDARD SPECIFICATIONS, AND AS SHOWN IN THE PLANS.

22.3. PIPE BACKFILL - REQUIREMENTS FOR PIPE BACKFILL CROSSING ROADS OR PARKING AREAS SHALL BE AS DEFINED IN THE SECTION 125-8, OF THE STANDARD SPECIFICATIONS. PIPELINE BACKFILL SHALL BE PLACED IN 6 INCH LIFTS AND COMPACTED TO 100% OF THE STANDARD PROCTOR (AASHTO T-99 SPECIFICATIONS)

22.4. LOCATION OF DRAINAGE STRUCTURES SHALL GOVERN, AND PIPE LENGTH MAY HAVE TO BE ADJUSTED TO ACCOMPLISH CONSTRUCTION AS SHOWN ON THESE PLANS.

22.5. DISTANCE AND LENGTHS SHOWN ON PLANS AND PROFILE DRAWINGS ARE REFERENCED TO THE INNER WALLS OF STRUCTURES.

22.6. FILTER FABRIC SHALL BE MIRAFI, TYPAR OR EQUAL CONFORMING TO SECTION 985 OF THE STANDARD SPECIFICATIONS.

23. ASPHALT PAVING

23.1. WHERE NEW ASPHALT MEETS EXISTING ASPHALT, THE EXISTING ASPHALT SHALL BE SAW CUT TO PROVIDE A STRAIGHT EVEN LINE. PRIOR TO REMOVING CURB OR GUTTER, THE ADJACENT ASPHALT SHALL BE SAW CUT TO PROVIDE A STRAIGHT EVEN LINE.

23.2. INTERNAL ASPHALT PAVING CONSTRUCTED ON EXISTING SANDY SOILS SHALL BE CONSTRUCTED WITH A 12" SUBGRADE, COMPACTED TO A MINIMUM DENSITY OF 100% MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99. THE COMPACTED SUBGRADE SHALL BE CONSTRUCTED IN THE LIMITS SHOWN ON THE PLANS. ALL SUBGRADE SHALL HAVE AN LBR OF 40 UNLESS OTHERWISE NOTED.

23.3. ASPHALTIC CONCRETE SURFACE COURSE SHALL BE CONSTRUCTED TO THE LIMITS SHOWN ON THE PLANS. THE SURFACE COURSE SHALL CONSIST OF THE THICKNESS AND TYPE ASPHALTIC CONCRETE AS SPECIFIED IN THE PLANS. ALL ASPHALTIC CONCRETE SHALL BE IN ACCORDANCE WITH SECTIONS 300, 320, 327, 330, 334, 337, 338, 339 AND 341 OF THE STANDARD SPECIFICATIONS.

23.4. LIMEROCK BASE SHALL BE PREPARED, COMPACTED AND GRADED AND SHALL BE IN ACCORDANCE WITH SECTION 200 OF THE STANDARD SPECIFICATIONS. ALL LIMEROCK SHALL BE COMPACTED TO 98% PER AASHTO T-180 AND HAVE NOT LESS THAN 70% OF CARBONATES OF CALCIUM AND MAGNESIUM UNLESS OTHERWISE DESIGNATED. THE ENGINEER SHALL INSPECT THE COMPLETED BASE COURSE AND THE CONTRACTOR SHALL CORRECT ANY DEFICIENCIES AND CLEAN THE BASE COURSE PRIOR TO THE PLACEMENT OF THE PRIME COAT. A TACK COAT WILL ALSO BE REQUIRED IF THE ENGINEER FINDS THAT THE PRIMED BASE HAS BECOME EXCESSIVELY DIRTY OR THE PRIME COAT HAS CURED TO THE EXTENT OF LOSING BOUNDING EFFECT PRIOR TO PLACEMENT OF THE ASPHALTIC CONCRETE SURFACE COURSE. THE PRIME AND TACK COATS SHALL BE IN ACCORDANCE WITH SECTION 300 OF THE STANDARD SPECIFICATIONS.

23.5. LIMEROCK BASE MATERIAL SHALL BE PLACED IN MAXIMUM 6" LIFTS. BASES GREATER THAN 6" SHALL BE PLACED IN TWO EQUAL LIFTS. IF, THROUGH FIELD TESTS, THE CONTRACTOR CAN DEMONSTRATE THAT THE COMPACTION EQUIPMENT CAN ACHIEVE DENSITY FOR THE FULL DEPTH OF A THICKER LIFT, AND IF APPROVED BY THE ENGINEER, THE BASE MAY BE CONSTRUCTED IN SUCCESSIVE COURSES OF NOT MORE THAN 8 INCHES (200 MM) COMPACTED THICKNESS.

23.6. ASPHALT EDGES THAT ARE NOT CURBED SHALL BE SAW CUT TO PROVIDE A STRAIGHT EVEN LINE TO THE DIMENSIONS SHOWN ON PLANS.

24. CONCRETE CONSTRUCTION

24.1. CONCRETE SIDEWALK AND DRIVEWAYS SHALL BE IN ACCORDANCE WITH SECTION 522 OF THE STANDARD SPECIFICATIONS AND IN ACCORDANCE WITH FDOT STANDARD PLANS FOR ROAD CONSTRUCTION, INDEX NO. 522-001, 522-002, AND 522-003. CONCRETE SIDEWALK SHALL BE 4" THICK, UNLESS OTHERWISE NOTED.

24.2. SIDEWALK CURB RAMPS SHALL BE IN ACCORDANCE WITH FDOT STANDARD PLANS FOR ROAD CONSTRUCTION , INDEX NO. 522-002.

24.3. CONCRETE CURB SHALL BE CONSTRUCTED TO THE LIMITS SHOWN ON THE PLANS. THE CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS AND SHALL BE IN ACCORDANCE WITH SECTION 520 OF THE STANDARD SPECIFICATIONS. CONCRETE CURBING SHALL BE IN ACCORDANCE WITH FDOT STANDARD PLANS FOR ROAD CONSTRUCTION, INDEX NO. 520-001.

SECTION 30 - WATER DISTRIBUTION AND SANITARY SEWER FORCE MAINS.

30. MATERIALS:

NOTE: IF MATERIALS LIST HERE ON ARE IN CONFLICT WITH UTILITY OWNER, MATERIAL OWNER REQUIREMENTS SHALL GOVERN.

30.1. ALL WATER MAIN PIPE, INCLUDING FITTINGS, SHALL BE COLOR CODED OR MARKED USING BLUE AS A PREDOMINANT COLOR TO DIFFERENTIATE DRINKING WATER FROM RECLAIMED OR OTHER WATER. UNDERGROUND PLASTIC PIPE SHALL BE SOLID-WALL BLUE PIPE, SHALL HAVE A CO-EXTRUDED BLUE EXTERNAL SKIN, OR SHALL BE WHITE OR BLACK PIPE WITH BLUE STRIPES INCORPORATED INTO, OR APPLIED TO, THE PIPE WALL; AND UNDERGROUND METAL OR CONCRETE PIPE SHALL HAVE BLUE STRIPES APPLIED TO THE PIPE WALL. PIPE STRIPED DURING MANUFACTURING OF THE PIPE SHALL HAVE CONTINUOUS STRIPES THAT RUN PARALLEL TO THE AXIS OF THE PIPE, THAT ARE LOCATED AT NO GREATER THAN 90-DEGREE INTERVALS AROUND THE PIPE, AND THAT WILL REMAIN INTACT DURING AND AFTER INSTALLATION OF THE PIPE. IF TAPE OR PAINT IS USED TO STRIPE PIPE DURING INSTALLATION OF THE PIPE, THE TAPE OR PAINT SHALL BE APPLIED IN A CONTINUOUS LINE THAT RUNS PARALLEL TO THE AXIS OF THE PIPE AND THAT IS LOCATED ALONG THE TOP OF THE PIPE; FOR PIPES WITH AN INTERNAL DIAMETER OF 24 INCHES OR GREATER, TAPE OR PAINT SHALL BE APPLIED IN CONTINUOUS LINES ALONG EACH SIDE OF THE PIPE AS WELL AS ALONG THE TOP OF THE PIPE.

30.2. DUCTILE IRON PIPE FOR WATER DISTRIBUTION MAINS SHALL CONFORM TO ANSI/AWWA STANDARD C151/A21.51 LATEST REVISION, "DUCTILE IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS OR SAND-LINED MOLDS" WITH A MINIMUM WALL THICKNESS OF CLASS 51 (PRESSURE CLASS 350) UNLESS OTHERWISE NOTED IN THE PLANS. DUCTILE IRON PIPE SHALL BE CEMENT LINED AND SEAL COATED IN ACCORDANCE WITH ANSI/AWWA STANDARD C104/A21.4 LATEST REVISION. THE PIPE SHALL BE ADAPTED FOR USE WITH CLASS 250 FITTINGS FOR ALL SIZES. WATER MAIN SHALL BE COLORED BLUE IN ACCORDANCE WITH FLORIDA STATE STATUTES.

30.3. DUCTILE IRON PIPE FOR SEWAGE FORCE MAINS SHALL CONFORM TO ANSI/AWWA STANDARD C151/A21.51 LATEST REVISION, "DUCTILE IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS OR SAND- LINED MOLDS" WITH A MINIMUM WALL THICKNESS OF CLASS 51 (PRESSURE CLASS 350) UNLESS OTHERWISE NOTED IN THE PLANS. DUCTILE IRON PIPE SHALL BE INTERIOR CERAMIC EPOXY LINED AND EXTERIOR COATED WITH THE MANUFACTURER'S COATING SYSTEM (PROTECTO 401 CERAMIC EPOXY WITH A MINIMUM DRY FILM THICKNESS OF 40 MILS AND AN OUTSIDE COATING OF EITHER COAL TAR EPOXY OR ASPHALT). CEMENT MORTARED LININGS ARE NOT APPROPRIATE FOR THIS APPLICATION.

30.4. ALL PIPE & FITTINGS ON THE LIFT STATION SITES SHALL BE DUCTILE IRON CONFORMING TO THE SAME SPECIFICATIONS AS ABOVE FOR SEWAGE FORCE MAINS EXCEPT THAT FLANGED DUCTILE IRON PIPE & FITTINGS SHALL BE USED INSIDE VALVE PITS AND WET WELLS. FLANGED PIPE AND FITTINGS SHALL CONFORM TO ANSI/AWWA C115/A21.15 LATEST REVISION AND ANSI/AWWA C110/A21.10 LATEST REVISION. THE FOLLOWING THICKNESS CLASSES SHALL BE ADHERED TO: 4" - 12" - CLASS 52, 14" & LARGER - CLASS 51.

30.5. PVC PRESSURE PIPE FOR SIZES 4" THROUGH 12" AND SHALL CONFORM TO ANSI/AWWA STANDARD C900 LATEST REVISION. PVC PRESSURE PIPE SHALL BE MADE FROM CLASS 12454-A OR CLASS 12454-B VIRGIN MATERIAL AND CONFORM WITH THE OUTSIDE DIAMETER OF CAST IRON PIPE WITH A MINIMUM WALL THICKNESS OF DR SERIES 18. ULTRA VIOLET DEGRADATION OR SUN BLEACHED PIPE WILL BE CAUSE FOR REJECTION. WATER MAIN SHALL BE COLORED BLUE IN ACCORDANCE WITH FLORIDA STATE STATUTES. FORCE MAIN SHALL BE IMPREGNATED WITH GREEN PIGMENT. REUSE MAIN SHALL BE IMPREGNATED WITH PURPLE PIGMENT.

30.6. DUCTILE IRON FITTINGS FOR WATER DISTRIBUTION MAINS SHALL CONFORM TO ANSI/AWWA STANDARD C110/A21.10 LATEST REVISION. FITTINGS 4" AND LARGER SHALL BE CEMENT LINED AND SEAL COATED IN ACCORDANCE WITH ANSI/AWWA STANDARD C104/A21.4 LATEST REVISION. WATER MAIN FITTING SHALL BE COLORED BLUE IN ACCORDANCE WITH FLORIDA STATE STATUTES.

30.7. CAST IRON AND DUCTILE IRON FITTINGS FOR SEWAGE FORCE MAINS SHALL CONFORM TO ANSI/AWWA STANDARD C110/A21.10 LATEST REVISION. FITTINGS 4" AND LARGER SHALL BE COATED IN ACCORDANCE WITH THE REQUIREMENTS OF DUCTILE IRON PIPE FOR SEWAGE FORCE MAINS.

30.8. JOINTS FOR BELL AND SPIGOT DUCTILE IRON PIPE AND FITTINGS SHALL CONFORM TO ANSI/AWWA STANDARD C111/A21.11 LATEST REVISION. MECHANICAL JOINT OR PUSH-ON JOINT TO BE RUBBER GASKET COMPRESSION-TYPE. SPECIAL FITTINGS AND JOINTS SHALL BE CONSIDERED FOR SPECIFIC INSTALLATION SUBJECT TO THE APPROVAL OF THE ENGINEER.

30.9. JOINTS FOR PVC PRESSURE PIPE SHALL BE BELL AND SPIGOT PUSH-ON RUBBER GASKET TYPE ONLY. NO SOLVENT WELD OR THREADED JOINTS WILL BE PERMITTED.

30.10. WATER DISTRIBUTION SYSTEM RESTRAINT: ALL FITTINGS AND SPECIFIC PIPE JOINTS SHALL BE RESTRAINED AS OUTLINED BELOW:

- JOINT RESTRAINT
- PUSH-ON P.V.C. EBAA IRON SERIES 1600
- PUSH-ON DIP EBAA IRON SERIES 1700
- TR-FLEX BY U.S. PIPE OR
- FLEX RING BY AMERICAN
- FITTINGS W/ DIP EBAA IRON SERIES 1100 MEGALUG
- FITTINGS W/ P.V.C. EBAA IRON SERIES 2000 MEGALUG
- LENGTH OF RESTRAINED PIPE SHALL BE AS INDICATED ON RESTRAINED JOINT PIPE DETAIL. (SEE WATER & SEWER DETAIL SHEET)

30.11. SEWAGE FORCE MAIN SYSTEM RESTRAINT: ALL FITTINGS AND SPECIFIC PIPE JOINTS SHALL BE RESTRAINED AS OUTLINED BELOW

- JOINT RESTRAINT
- PUSH-ON P.V.C. EBAA IRON SERIES 1600
- PUSH-ON DIP EBAA IRON SERIES 1700
- TR-FLEX BY U.S. PIPE OR
- FLEX RING BY AMERICAN
- FITTINGS W/ DIP EBAA IRON SERIES 1100 MEGALUG
- FITTINGS W/ P.V.C. EBAA IRON SERIES 2000 MEGALUG
- LENGTH OF RESTRAINED PIPE SHALL BE AS INDICATED ON RESTRAINED JOINT PIPE DETAIL. (SEE WATER & SEWER DETAIL SHEET)

30.12. WATER DISTRIBUTION VALVES SHALL BE GATE VALVES, IRON BODY, FULLY RESILIENT SEAT BRONZED MOUNTED NON-RISING STEM, RATED AT 200 PSI AND CONFORMING TO ANSI/AWWA C509 LATEST REVISION, AND SHALL HAVE MECHANICAL JOINTS.

30.12.1.1. GATE VALVES 4" AND LARGER SHALL BE MUELLER A-2361/2362, AMERICAN 250 LINE OR CLOW F-6100, CONFORMING TO ANSI/AWWA C500 LATEST REVISION OR APPROVED EQUAL.

30.12.1.2. TAPPING VALVES SHALL BE MUELLER T-2361/2362 OR APPROVED EQUAL.

30.12.1.3. GATE VALVES 3" OR LESS SHALL BE NIBCO T-133 OR T-136 WITH MALLEABLE HAND WHEELS OR APPROVED EQUAL.

30.13. TAPPING SLEEVES SHALL BE MUELLER H615, CLOW F- 2505 OR APPROVED EQUAL.

30.14. VALVE BOXES SHALL BE U.S. FOUNDRY 7500 OR APPROVED EQUAL PAINTED BLUE WITH THE DESIGNATION "WATER".

30.15. RETAINER GLANDS FOR DIP SHALL CONFORM TO ANSI/AWWA C111/A21.11 LATEST REVISION. ALL GLANDS SHALL BE MANUFACTURED FROM DUCTILE IRON AS LISTED BY UNDERWRITERS LABORATORIES FOR 250 PSI MINIMUM WATER PRESSURE RATING. CLOW CORPORATION MODEL F-1058, STANDARD FIRE PROTECTION EQUIPMENT COMPANY OR APPROVED EQUAL.

30.16. DRESSER COUPLINGS SHALL BE REGULAR BLACK COUPLINGS WITH PLAIN GASKETS FOR GALVANIZED STEEL PIPE. THEY SHALL BE DRESSER STYLE 90. NO SUBSTITUTIONS ALLOWED.

30.17. FIRE HYDRANTS SHALL BE MUELLER CENTURION TRAFFIC TYPE A-423 WITH 5 1/4" INTERNAL VALVE OPENING OR APPROVED EQUAL. PUMPER NOZZLE TO BE 18" FROM FINISHED GRADE. ALL HYDRANTS TO BE INSTALLED WITH CONTROL VALVE. RETAINER GLANDS ARE PREFERRED FOR RESTRAINING. FIRE HYDRANT SHALL COMPLY WITH ANSI/AWWA C502 LATEST REVISION. FIRE HYDRANTS SHALL BE PAINTED IN ACCORDANCE WITH NFPA #291 OR PER AGENCY STANDARDS HAVING JURISDICTION. BLUE RAISED REFLECTIVE PAVEMENT MARKER (RPM) SHALL BE USED TO IDENTIFY FIRE HYDRANT LOCATION. THE PLACEMENT OF THE RPM TO BE AT THE CENTERLINE OF THE OUTSIDE ROADWAY LANE.

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30.18. SEWAGE FORCE MAIN VALVES SHALL BE PLUG VALVES WHICH SHALL BE OF THE NON-LUBRICATED, ECCENTRIC TYPE WITH RESILIENT FACED PLUGS, PORT AREAS FOR VALVES 20 INCHES AND SMALLER SHALL BE AT LEAST 80% OF FULL PIPE AREA. PORT AREA OF VALVES 24 INCHES AND LARGER SHALL BE AT LEAST 70% OF FULL PIPE AREA. THE BODY SHALL BE OF SEMI-STEEL (ASTM A-126 C1.B) AND SHALL HAVE BOLTED BONNET WHICH GIVES ACCESS TO THE INTERNALS OF THE VALVE. SEATS SHALL BE WELDED OVERLAY OF HIGH NICKEL CONTENT OR A STAINLESS STEEL PLATE LOCKED IN THE BODY CAVITY. IF A PLATE IS USED, IT SHALL BE REPLACEABLE THROUGH THE BONNET ACCESS. BEARINGS SHALL BE PERMANENTLY LUBRICATED OF STAINLESS STEEL, BRONZE OR TEFLON LINED, FIBER GLASS BACKED DURALON. BEARING AREAS SHALL BE ISOLATED FROM THE FLOW WITH GRIT SEALS. VALVES SHALL HAVE PACKING BONNETS WHERE THE SHAFT PROTRUDES FROM THE VALVE AND THE PACKING SHALL BE SELF-ADJUSTING CHEVRON TYPE WHICH CAN BE REPLACED WITHOUT REMOVING THE BONNET. ALL NUTS, BOLTS, SPRINGS AND WASHERS SHALL BE STAINLESS STEEL.

30.19. PLUG VALVES SHALL BE DESIGNED FOR A WORKING PRESSURE OF 150 PSI THE VALVE AND ACTUATOR SHALL BE CAPABLE OF SATISFACTORY OPERATION IN EITHER DIRECTION OF FLOW AGAINST PRESSURE DROPS UP TO AND INCLUDING 100 PSI (FOR PLUG VALVES OVER 12" IN DIAMETER). VALVES SHALL BE BUBBLE TIGHT IN BOTH DIRECTIONS AT 100 PSI DIFFERENTIAL. PLUG VALVES OVER 12" IN DIAMETER SHALL HAVE WORM GEAR OPERATORS. THE OPERATING MECHANISM SHALL BE FOR BURIED SERVICE WITH A 2 INCH SQUARE OPERATING NUT.

30.20. PLUG VALVES ARE TO BE INSTALLED WITH THE SEAT POINTED TOWARDS THE UPSTREAM FLOW, WHEN SPECIFIED.

30.21. SWING CHECK VALVES FOR WATER, SEWAGE, SLUDGE, AND GENERAL SERVICE SHALL BE OF THE OUTSIDE LEVER AND SPRING OR WEIGHT TYPE, IN ACCORDANCE WITH ANSI/AWWA C 508 LATEST REVISION SWING-CHECK VALVES FOR WATERWORKS SERVICE, 2" THROUGH 24" NPS, UNLESS OTHERWISE INDICATED, WITH FULL-OPENING PASSAGES, DESIGNED FOR A WATER-WORKING PRESSURE OF 150 PSI THEY SHALL HAVE A FLANGED COVER PIECE TO PROVIDE ACCESS TO THE DISC.

30.22. HIGH DENSITY POLYETHYLENE PIPE (HDPE) FOR WATER DISTRIBUTION MAINS SHALL CONFORM TO AWWA C906 STANDARD, LATEST REVISION. PIPES SHALL BE COLOR-CODED BLUE, MINIMUM 40 FEET STANDARD LENGTHS.

31. SERVICE CONNECTION:

31.1. SERVICE SADDLES SHALL BE FUSION BONDED PLASTIC COATED DUCTILE IRON (ASTM A536) WITH STAINLESS STEEL STRAPS, SADDLES SHALL BE DOUBLE STRAP TYPE.

31.2. SERVICE LINES SHALL BE POLYETHYLENE (PE 3408), 200 P.S.I RATED, DR9. PIPE JOINTS SHALL BE OF THE COMPRESSION TYPE TOTALLY CONFINED GRIP SEAL AND COUPLING NUT.

31.3. CORPORATION STOPS SHALL BE MANUFACTURED OF BRASS ALLOY IN ACCORDANCE WITH ASTM B-62 WITH THREADED ENDS, AS MANUFACTURED BY FORD BALLCORP, CATALOG # 1100 OR APPROVED EQUAL.

31.4. CURB STOPS SHALL BE FORD V63-44W-X" LATEST REVISION OR APPROVED EQUAL.

31.5. METER STOPS SHALL BE 90 DEGREE LOCKWING TYPE AND SHALL BE OF BRONZE CONSTRUCTION IN ACCORDANCE FV63-777W" LATEST REVISION WITH ASTM B-62. METER STOPS SHALL BE CLOSED BOTTOM DESIGN AND RESILIENT "0" RING SEALED AGAINST EXTERNAL LEAKAGE AT THE TOP. STOPS SHALL BE EQUIPPED WITH A METER COUPLING NUT ON THE OUTLET SIDES, AS MANUFACTURED BY FORD OR APPROVED EQUAL.

32. INSTALLATION:

32.1. WHERE RESTRAINED PIPE JOINTS ARE REQUIRED DUE TO FITTINGS, APPURTENANCES, ETC., PIPE MATERIAL SHALL BE DIP

32.2. ALL PVC PIPE SHALL BE INSTALLED IN ACCORDANCE WITH THE UNI-BELL PLASTIC PIPE ASSOCIATION "GUIDE FOR INSTALLATION OF PVC PRESSURE PIPE FOR MUNICIPAL WATER DISTRIBUTION SYSTEM," AND ANSI/AWWA C605-XX LATEST REVISION STANDARD.

32.3. ALL DIP SHALL BE INSTALLED IN ACCORDANCE WITH ANSI/ C600-XX LATEST REVISION.

32.4. ALL WATER MAINS SHALL TYPICALLY BE LAID WITH A MINIMUM 36" COVER FOR PVC AND 30" COVER FOR DIP.

32.5. DETECTOR TAPE SHALL BE LAID 18 INCHES ABOVE ALL WATER AND SEWER LINES. A 14 GAUGE MULTI-STRAND WIRE SHALL BE ATTACHED TO ALL NONCONDUCTIVE WATER MAINS TO FACILITATE LOCATION. AN EXTRA 4 FEET OF WIRE SHALL BE PROVIDED AT ALL VALVES, BLOW-OFFS, HYDRANTS, ETC. THE WIRE SHALL BE TESTED FOR CONTINUITY AT THE PRESSURE TEST.

32.6. PIPE DEFLECTION SHALL NOT EXCEED 50% OF THE MAXIMUM DEFLECTION RECOMMENDED BY THE MANUFACTURER.

32.7. A CONTINUOUS AND UNIFORM BEDDING SHALL BE PROVIDED. BACKFILL MATERIAL SHALL BE PLACED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.

32.8. ALL VALVES SHALL BE INSTALLED WITH ADJUSTABLE CAST IRON VALVE BOXES WITH THE WORD "WATER" OR "SEWER", AS APPLICABLE, CAST IN THE COVER. U.S. FOUNDRY OR APPROVED EQUAL.

33. TESTING:

33.1. BEFORE ANY PHYSICAL CONNECTIONS AND ACCEPTANCE FOR OPERATION TO THE EXISTING WATER MAINS ARE MADE, THE COMPLETE WATER SYSTEM SHALL BE FLUSHED, PRESSURE TESTED AND DISINFECTED. COPIES OF PASSING BACTERIOLOGICAL RESULTS AND PRESSURE TEST RESULTS MUST BE SUBMITTED TO, AND APPROVED BY, THE ENGINEER, UTILITY OWNER, AND HEALTH DEPARTMENT. HYDROSTATIC TESTING OF NEW MAINS SHALL BE PERFORMED AT A MINIMUM STARTING PRESSURE OF 150 PSI FOR TWO HOURS IN ACCORDANCE WITH ANSI/AWWA C600-05 (HYDROSTATIC TEST). THE PRESSURE TEST SHALL NOT VARY MORE THAN 5 PSI DURING THE TEST. THE ALLOWABLE LEAKAGE DURING THE PRESSURE TEST SHALL BE LESS THAN THE NUMBER OF GALLONS PER HOUR AS DETERMINED BY THE FORMULA:

$L = (SD(P)1/2)/148,000.$

IN WHICH L EQUALS THE ALLOWABLE LEAKAGE IN GALLONS PER HOUR. S EQUALS LENGTH OF PIPE (LINEAR FEET), D EQUALS NOMINAL DIAMETER OF PIPE (INCHES) AND P EQUALS THE AVERAGE TEST PRESSURE (POUNDS PER SQUARE INCH GAUGE). MAXIMUM LENGTH OF TEST PIPE SECTION SHOULD BE 2000 FEET. THE WATER SYSTEM SHALL BE DISINFECTED IN ACCORDANCE WITH THE ANSI/AWWA C651-05 (WATER MAIN BACTERIOLOGICAL TESTS).

33.2. THE PRESSURE TEST SHALL BE WITNESSED BY A REPRESENTATIVE OF THE UTILITY OWNER AND THE ENGINEER OF RECORD.

33.3. FOR WATER DISTRIBUTION PIPES, SAMPLING POINTS SHALL BE PROVIDED BY THE CONTRACTOR AT THE LOCATIONS SHOWN ON THE PLANS.

33.4. FOR WATER DISTRIBUTION PIPES, DISINFECTION AND BACTERIOLOGICAL TESTING SHALL BE IN ACCORDANCE WITH ANSI/AWWA C651-14 (WATER MAIN BACTERIOLOGICAL TESTS). MAXIMUM DISTANCE BETWEEN SAMPLING POINTS SHALL BE AS FOLLOWS:

- TRANSMISSION MAINS: EVERY 1200 FEET
- BRANCH MAINS: EVERY 1000 FEET
- ISOLATED MAINS < 1000 FEET: 2 SAMPLE POINTS
- ISOLATED MAINS > 1000 FEET: 3 SAMPLE POINTS

SECTION 40 - GRAVITY SANITARY SEWER COLLECTION SYSTEM

40. GENERAL:

40.1. MANHOLE, VALVE BOX, METER BOX AND OTHER STRUCTURE RIM ELEVATIONS WITHIN THE LIMITS OF CONSTRUCTION ARE TO BE ADJUSTED TO CONFORM TO PLAN GRADES PROPOSED IN THESE PLANS. IF NO OTHER INDIVIDUAL COST ITEM IS INCLUDED IN THE CONTRACT SCHEDULE FOR A PARTICULAR STRUCTURE ADJUSTMENT.

40.2. DISTANCE AND LENGTHS SHOWN ON PLANS AND PROFILE DRAWINGS ARE REFERENCED TO THE CENTER OF STRUCTURES.

41. MATERIALS:

NOTE: IF MATERIALS LIST HERE ON ARE IN CONFLICT WITH UTILITY OWNER, MATERIAL OWNER REQUIREMENTS SHALL GOVERN.

41.1. ALL PVC SEWER PIPE AND FITTINGS SHALL BE NON-PRESSURE POLYVINYL CHLORIDE (PVC) PIPE CONFORMING TO ASTM D 3034, SDR 26, WITH PUSH-ON RUBBER GASKET JOINTS.

41.2. DUCTILE IRON PIPE SHALL CONFORM TO ANSI/AWWA C151/A21.51-XX LATEST REVISION, "DUCTILE IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS OR SAND-LINED MOLDS" WITH WALL THICKNESS CLASS 51 FOR 8" AND ABOVE, CLASS 52 FOR 4" AND 6", UNLESS OTHERWISE DIRECTED BY THE ENGINEER. DUCTILE IRON PIPE SHALL BE EPOXY LINED OR COATED WITH THE MANUFACTURER'S COATING SYSTEM AS APPROVED BY THE ENGINEER OF RECORD AND THE LOCAL MUNICIPALITY OR UTILITY OWNER. IN EITHER CASE, THE ENGINEER'S REVIEW AND APPROVAL IS REQUIRED FOR EITHER ALTERNATIVE PRIOR TO CONSTRUCTION. CEMENT MORTARED LININGS ARE NOT APPROPRIATE FOR THIS APPLICATION.

41.3. ALL DUCTILE IRON FITTINGS SHALL CONFORM TO ANSI/AWWA STANDARD C110/A21.10-XX LATEST REVISION. ALL FITTINGS AND ACCESSORIES SHALL BE EPOXY LINED AND AS MANUFACTURED OR SUPPLIED BY THE PIPE MANUFACTURER OR APPROVED EQUAL.

41.4. MANHOLES SHALL BE PRECAST PER ASTM C 478 AND IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.

41.5. MANHOLES ARE TO BE SEALED WITH TYPE II SULPHATE RESISTANT CEMENT OR APPROVED EQUAL - NO MOLDING PLASTER.

41.6. JOINTS FOR BELL AND SPIGOT DUCTILE IRON PIPE AND FITTINGS SHALL CONFORM TO ANSI/AWWA STANDARD C111/A21.11-XX LATEST REVISION. MECHANICAL JOINT OR PUSH-ON JOINT TO BE RUBBER GASKET COMPRESSION- TYPE.

41.7. PVC CLEAN-OUTS TO HAVE SCREW TYPE ACCESS PLUG. LONG RADIUS WYE CONNECTIONS AND FITTINGS SHALL BE USED IN ORDER TO ACCESS CLEAN-OUT OPERATIONS.

41.8. CLEANOUTS SHALL BE INSTALLED AT ALL SEWER SERVICES EXCEEDING 100' IN LENGTH (EVERY 100') WITH A CLEAN OUT AT THE PROPERTY LINE, EASEMENT LINE, OR 5' FROM A BUILDING. THE CONTRACTOR SHALL COORDINATE THE LOCATION OF THE BUILDING CLEANOUT (5' FROM THE BUILDING) AND ELEVATION OF THE END OF THE SEWER SERVICE WITH THE BUILDING PLUMBING CONTRACTOR. CLEANOUTS SHALL BE THE SAME SIZE AS THE SERVICE LATERAL IN WHICH THEY ARE INSTALLED.

42. INSTALLATION:

42.1. PVC SEWER PIPE SHALL BE LAID IN ACCORDANCE WITH ASTM D 2321 AND THE UNI-BELL PLASTIC PIPE ASSOCIATION'S "RECOMMENDED PRACTICE FOR THE INSTALLATION OF PVC SEWER PIPE."

42.2. DIP SHALL BE INSTALLED IN ACCORDANCE WITH ANSI/AWWA C-600-XX LATEST REVISION.

42.3. PIPE TO MANHOLE CONNECTION TO BE FERNCO NEOPRENE BOOT COUPLINGS WITH STAINLESS STEEL ACCESSORIES OR APPROVED EQUAL.

42.4. MANHOLES SHALL BE SET PLUMB TO LINE AND GRADE ON FIRM SUBGRADE PROVIDING UNIFORM BEARING UNDER THE BASE.

42.5. ALL OPENINGS AND JOINTS SHALL BE SEALED WATERTIGHT.

42.6. TWO COATS OF KOPPERS 300-M, FIRST RED, SECOND ONE BLACK, SHALL BE APPLIED TO THE INSIDE OF ALL MANHOLES AND SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS (16 MILS PER COAT). COATING AS REQUIRED BY UTILITY OWNER OR ENGINEER SHALL BE APPLIED TO THE OUTSIDE OF THE MANHOLE. THE INTERIOR COATS SHALL BE APPLIED AFTER SEWER LAMPING OF LINES. AFTER THE APPLICATION OF EACH COAT, THE UTILITY OWNER AND ENGINEER SHALL INSPECT THE MANHOLES. THE INSPECTION SHALL BE SCHEDULED A MINIMUM OF 48 HOURS PRIOR TO INSPECTION.

43. TESTING: TESTING OF GRAVITY SEWER MAINS AND LATERALS SHALL BE IN ACCORDANCE WITH THE UTILITY OWNER'S MINIMUM DESIGN AND CONSTRUCTION STANDARDS LATEST REVISION.

43.1. AFTER CONSTRUCTION OF THE SEWER SYSTEM, THE ENGINEER MAY REQUIRE A VISUAL INFILTRATION AND/OR EXFILTRATION TEST TO BE PERFORMED ON THE ENTIRE SYSTEM OR ANY PART THEREOF.

43.2. AN AIR TEST MAY BE SUBSTITUTED FOR THE WATER EXFILTRATION TEST, UPON APPROVAL OF THE ENGINEER.

43.3. THE ALLOWABLE LIMITS OF SEWER PIPE LEAKAGE FOR GRAVITY SEWER MAINS SHALL NOT EXCEED 100 GALLONS PER INCH OF INSIDE PIPE DIAMETER PER MILE PER DAY FOR ANY SECTION TESTED. NO VISIBLE LEAKAGE SHALL BE ALLOWED.

43.4. THE INSTALLED SEWERS MAY REQUIRE VIDEO INSPECTIONS.

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REVISIONS

NO.	DESCRIPTION	DATE

PRELIMINARY PLAN
NOT FOR CONSTRUCTION

THESE PLANS ARE NOT FULLY PERMITTED AND ARE SUBJECT TO REVISIONS MADE DURING THE PERMITTING PROCESS.

RESPONSIBILITY FOR THE USE OF THESE PLANS PRIOR TO OBTAINING PERMITS FROM ALL AGENCIES HAVING JURISDICTION OVER THE PROJECT WILL FALL SOLELY UPON THE USER.

ISSUE DATE:	10/15/2025
DESIGNED BY:	BB
DRAWN BY:	JS
CHECKED BY:	NW
BID-CONTRACT:	

This item has been digitally signed and sealed by **Thomas F. Donahue**, P.E. on the date adjacent to the seal.

THOMAS F. DONAHUE LICENSE No. 60529 STATE OF FLORIDA PROFESSIONAL ENGINEER

Signature must be verified on any electronic copies.

2025.12.04 14:20:47-05'00'

THOMAS F. DONAHUE, P.E.
FLORIDA REG. NO. 60529
(FOR THE FIRM)

CLIENT

FIRST INDUSTRIAL

PROJECT

FIRST 95 DISTRIBUTION CENTER- PHASE II
1000-1041 NW 12th Ter.
Pompano Beach, FL

SHEET TITLE

CONSTRUCTION SPECIFICATIONS

SHEET NUMBER **GI-003**

PROJECT NUMBER **10607.14**

Plotted by: dosuna On 12/3/2025 9:30 AM
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STATUS: PRELIMINARY