22 00 00 General Information

1. Plumbing design shall meet the provisions of the current edition of the International Plumbing Code and the National Fire Codes as published by the National Fire Protection Association (NFPA) unless state or local codes prove more stringent.

2. Contractor shall show plumbing work on shop drawings using a minimum scale of 1/8" = 1'-0". Exceptions shall be indicated at a scale of 1/4" = 1'-0".

3. Identify on the plumbing drawings all equipment requiring connections to the plumbing systems by appropriate symbol number (example P-1).

4. All equipment shall be placed on a minimum 4" high housekeeping pad.

5. Due to space requirements of plumbing systems, closely coordinate the layout with all other disciplines. Where areas of interference are apparent, the designer shall provide section drawing(s) to better describe intent.

6. Piping over any mechanical or electrical equipment, or food preparation, serving, storage areas, IT and electrical rooms containing main distribution panels or motor control centers shall be avoided where possible. When piping is necessary in these areas, include provisions for leak protection. See electrical portion of this standard for more information.

7. Water conservation shall be a requirement of all plumbing systems. Use the latest water-saving plumbing fixtures by American-Standard, Eljer, Kohler, or Sloan.


22 00 23 General Duty Valves

1. Domestic Water Systems:
   a. Isolation and throttling valves 2 inches and smaller shall be ball valves. Refer to HVAC standards for acceptable materials and manufacturers.

   b. Isolation and throttling valves 2-1/2 inches and larger shall be lug type butterfly valves. Refer to HVAC standards for acceptable materials and manufacturers.
c. Check valves in all sizes shall be swing type. Refer to HVAC standards for acceptable materials and manufacturers.

d. Grooved or Press-Fit type system valves by Anvil or Victaulic shall be acceptable on a case-by-case basis, pending approval by the CCU Project Manager.

22 05 29 Hangers and Supports

1. Unless otherwise shown or specified, comply with the requirements of the Manufacturer’s Standardization Society of the Valve and Fittings Industry (MSS) Standards SP-58, and SP-69. Hang and support cast iron soil pipe and fittings in accordance with the recommendations of the Cast Iron Soil Pipe’s Institute’s (CISPI) Cast Iron Soil Pipe and Fittings Handbook.

2. Ensure that the contractor provides stamped and signed details (by a SC Licensed Professional Engineer) of seismic restraint systems to meet total design lateral force requirements for support and restraint of plumbing systems.

3. Products: Anvil, B-line, Carpenter and Patterson, Fee and Mason, Michigan Hanger.

22 05 53 Pipe, Valve and Equipment Identification

See HVAC standard.

22 07 19 Plumbing Piping Insulation

1. Fiberglass Insulation: Insulation shall be preformed, two-piece, heavy density fiberglass with self-sealing ASJ jacket conforming to ASTM C 1136 and ASTM C 547. Valves and fittings shall be insulated with fiberglass insulation of the same material thickness as insulation on adjacent pipe and have a matching, molded PVC jacket applied. Fiberglass insulation shall be as manufactured by Johns Manville, Knauf, or Owens Corning. Provide 1 inch thick insulation for all pipe sizes.


2. Closed Cell Foam Insulation: Insulation material shall be a flexible, closed-cell elastomeric insulation in tubular or sheet form. Materials shall have a flame spread index of less than 30 and a smoke developed index of less than 200 when tested in accordance with ASTM E 84, latest revision. In addition, the product, when tested, shall not melt or drip flaming particles, and the flame shall not be progressive. Insulation shall have a maximum thermal conductivity of 0.30 Btu-in./h-ft²°F at a 75°F mean temperature when tested in accordance with ASTM C 177 or ASTM C518, latest revisions. Insulation shall have a maximum water vapor transmission of 0.05 perm inches when tested in accordance with ASTM E 96, Procedure A, latest revision. Closed cell foam Insulation shall be as manufactured by Armacell or Aeroflex. Provide ½ inch thick for the following services:
Coastal Carolina University Design Guidelines

a. Domestic Cold Water Piping, above ground.

b. Horizontal Roof Drain Piping.

c. Sanitary Drains receiving Mechanical Condensate.

d. Domestic water, below grade.

22 10 05 Plumbing Piping

1. General: Specify pipe and tube of the type, joint type, grade, size and weight (wall thickness or Class) indicated for each service.

2. Natural Gas Above Ground:

   a. Piping 1½ inches and smaller shall be seamless Schedule 40 black steel, ASTM A106 or ASTM A53 Type "S", Grade A or B, with Class 150 black malleable iron threaded fittings conforming to ASME B16.3.

   b. Piping 2 inches and larger shall be Type "S" seamless or Type "E" electric resistance welded Schedule 40 black steel, ASTM A53, Grade A or B, with Schedule 40 wrought carbon steel fittings, ASTM A 234 and butt weld joints.

3. Natural Gas Below Ground or Slab: Pipe shall be DriscoPlex™ polyethylene pipe and shall be manufactured and tested in accordance with the latest published edition of ASTM D 2513. Polyethylene heat fusion fittings shall be manufactured and tested by the pipe manufacturer in accordance with ASTM D 2513 and D.O.T. requirements. Provide underground warning tape. Provide continuous yellow with black letter printed message repeated every 16 to 36 inches warning of pipe buried below (e.g.: “CAUTION GAS LINE BURIED BELOW”). Tape shall be manufactured by Reef Industries “Terra Tape” or approved equal.

4. Natural gas isolation valves shall be two-piece, full-port, bronze ball valves with bronze trim: MSS SP-110.

5. Domestic Water Distribution - Copper Tube (Type K for Below Ground, Type L for Above Ground): ASTM B88 Type (wall thickness) as indicated for each service; hard-drawn temper, except as otherwise indicated for sizes ¼” to 4”. Solder and brazing alloy for use on domestic water piping shall be lead free. Type M Copper Tube shall not be permitted.

6. DWV Above Ground - No Hub Cast Iron Soil Pipe: CISPI 301 with ASTM C-1277 couplings and ASTM C-564 gasket. All pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute ® and listed by NSF® International.

7. DWV Below Ground - Cast Iron Hub and Spigot Soil Pipe: ASTM A 74 98 with ASTM C-564 neoprene elastomeric compression gasket. All pipe and fittings shall be marked with
the collective trademark of the Cast Iron Soil Pipe Institute® and listed by NSF® International

8. DWV Below Ground - Pipe and fittings shall be manufactured from PVC compound with a cell class of 12454 per ASTM D 1784 and conform with National Sanitation Foundation (NSF) standards 14 and 61. Pipe shall be iron pipe size (IPS) conforming to ASTM D 1785. Socket fittings shall conform to ASTM D 2467; threaded fittings shall conform to ASTM D 2464 or D 2467. Flanges shall be 150# type per ANSI/ASME B 16.5. All pipe and fittings to be produced by a single manufacturer and to be installed in accordance with manufacturer’s recommendations and local code requirements. Buried pipe shall be installed in accordance with ASTM F 1668. Solvent cements shall conform to ASTM D 2564, primer shall conform to ASTM F 656. All buried plastic pipe and fittings shall be installed per ASTM D 2321.

22 30 00 Grooved Pipes, Valves and Fittings for Plumbing Systems

1. Manufacturers: Anvil International or Victaulic.

2. Fittings:
   a. Couplings and Grooved Flange Adapters shall conform to ASTM A-536 Ductile Grade 65-45-12 or to ASTM A-47 Malleable Grade 32510.

   b. Gaskets: Grade "E" EPDM pressure responsive design for all water service.

   c. Gasket Lubricant: Coupling gaskets except where noted shall be lubricated with approved lubricant.

   d. Provide Grooved Couplings for Steel Pipe Systems and other Approved Piping.

   e. Provide Grooved Couplings for Copper Tube Systems. Coupling working pressure not to exceed 300 psig.

   f. Provide Grooved Flange Adapters: Flange adapters to transition from flange to groove with no nipple.

   g. Grooved Fittings for Steel Piping Systems - Shall be cast ductile, malleable, forged steel, and/or segmental welded steel fittings.

   h. Grooved Copper Fittings: Wrot Copper fittings per ASTM B-75 and ANSI B-16.22, alloy C12200.
i. Di-Electric Insulated Pipe Connections: Grooved by grooved or grooved by thread insulating nipples.

j. Branch Outlets: Shall be Clamp-T Styles, and Clamp-T Cross with grooved or threaded outlets.

k. Outlet Couplings: Shall have grooved or threaded outlets. Working pressure shall be 500 psig minimum.

22 08 00 Pipe Cleaning and Testing

1. Thoroughly clean pipe and tubing prior to installation. During installation, prevent foreign matter from entering systems. Prevent if possible and remove stoppages or obstructions from piping and systems.

2. Piping shall prove tight under test and shall not show loss in pressure or visible leaks, during test operations or after the minimum duration of time as specified.

3. Remove piping which is not tight under test; remake joints and repeat test until no leaks occur.

4. Water Systems:
   a. Domestic water (potable cold, domestic hot and recirculation) inside buildings.
   b. Before fixtures, faucets, trim and accessories are connected, perform hydrostatic test at 125 psig minimum for 4 hours.
   c. After fixtures, faucets, trim and accessories are connected, perform hydrostatic retest at 75 psig for 4 hours.

5. Gas Piping: Before backfilling or concealment perform air test of duration and pressure as required by the local gas company. However, for gas piping designed for pressures of from 4 inches to 6 inches water column, air test at 15 inches Hg for one hour, without drop in pressure. Test gas piping with air only. Check joints for leaks with soap suds.

6. Drainage, Vent, Conductor and Roof Drain Piping (Inside Buildings): Perform tests before fixtures are installed. Test by filling the entire system with water, and allowing to stand for 3 hours, with no noticeable loss of water. Test joints under a minimum head of 10 feet of water, except the uppermost section. Test the uppermost section to overflowing.

7. Disinfection of Potable Water Systems
   a. Disinfect potable water pipe and equipment.
b. Completely fill the piping, including water storage equipment if installed, with a water solution containing 50 mg/L available chlorine, and allow stand for 24 hours. Operate all valves during this period to assure their proper disinfection.

c. After the retention period, discharge the solution to an approved waste and flush the system thoroughly with water until substantially all traces of chlorine are removed. Drain and flush water storage equipment if installed. Connect plumbing fixtures and equipment and place the system into service.

22 10 06 Plumbing Piping and Drainage Specialties

1. Water Hammer Arresters:
   b. Description: Precharged, permanently sealed, all stainless steel water hammer arrester including bellows.
   c. Acceptable Manufacturers: Other acceptable manufacturers shall be Josam or Zurn.
   d. The use of air chambers shall not be allowed.
   e. Include these units to internally absorb the hydrostatic shock pressure occurring in water lines at all solenoid, remote operated or quick closing valves and at each plumbing fixture or battery of plumbing fixtures. Install on both hot and cold water branch lines in an upright position as close as possible to the valve or valves being served. Size water hammer arresters as indicated in Plumbing and Drainage Institute “Standard - WH-201.

2. Reduced Pressure Zone Assembly Backflow Preventers: A Reduced Pressure Zone Assembly shall be provided at each cross-connection to prevent back siphonage and backpressure of hazardous materials into the potable water supply. The assembly shall consist of a pressure differential relief valve located in a zone between two positive seating check valves. The assembly shall include two (2) ball type shutoff valves before and after the assembly, test cocks and a protective strainer upstream of the first shutoff valve. Materials of construction shall be bronze or cast iron bodies, with stainless steel internals. Unit size shall be ½” through 4”. The assembly shall meet the requirements of ASSE Std. 1013; AWWA Std. C-511-92 and be listed by IAPMO (UPC) and SBCCI (Standard Plumbing code). Provide with air gap fitting. The assembly shall be a Watts Regulator Company Series 909QTS. Other acceptable manufacturers shall be Febco, or, Zurn.

3. Double Check Valve Assembly Backflow Preventers: A Double Check Valve Assembly shall be installed at each noted location and at each cross-connection to prevent back siphonage and backpressure of hazardous materials into the potable water supply. The assembly shall consist of two positive seating check modules with captured springs and
rubber seat discs. The check module seats and seat discs shall be replaceable. Service of all internal components shall be through a single access cover secured with stainless steel bolts. The assembly shall also include two resilient seated isolation valves; four top mounted, resilient seated test cocks. Materials of construction shall be bronze or cast iron bodies, with stainless steel internals. Provide a protective strainer upstream of the first shutoff valve. Unit size shall be ½” through 4”. The assembly shall meet the requirements of ASSE Std. 1015 and AWWA Std. C510. The assembly shall be a Watts Series 007QTS. Other acceptable manufacturers shall be Febco, or, Zurn.

4. Floor Drain:
   b. Description: Cast iron, bottom or side outlet, drain with 7 inch adjustable nickel bronze strainer head. Provide color and round/square shape to match Architect’s final finishes. Provide with trap primer connection as warranted by project and location.
   c. Acceptable Manufacturers: Other acceptable manufacturers shall be Josam or Zurn.

5. Vacuum Relief Valves: A Vacuum Relief Valve shall be installed on domestic hot water supply tanks/ heaters/ unit heaters/ steam kettles as indicated on plans. The vacuum relief valve shall be ANSI Z21.22 rated and CSA certified. The vacuum relief valve shall have an all brass body and include a protective cap. Provide Watts Model N36-M1 or approved equal by Cash Acme.


7. Potable Water Expansion Tank: Provide a pre-charged vertical steel expansion tank with integral, heavy-duty butyl blend diaphragm and lined dome, FDA approved for domestic potable water. The tank shall have an NPTF system connection, and a .305"-32 charging valve connection (standard tire valve) to facilitate on-site charging of the tank to meet system requirements. The tank shall be designed for a maximum working pressure of 150 PSI and maximum working temperature of 150 °F. Each tank shall be Bell & Gossett PT series or approved equal by Amtrol, or Taco. Size shall be as required to handle calculated system volume and temperature change.

8. Water Pressure Reducing Valve: PRV’s shall be provided on the water service pipe near its entrance to the building where supply main pressure exceeds 60 psig to reduce it to 50 psig or lower. Hose bibbs and outside wall hydrants may be left on full main pressure at the option of the Engineer. Provision shall be made to permit the bypass flow of water back through the valve into the main when pressures, due to thermal expansion on the outlet side of the valve, exceed the pressure in the main supply. Pressure reducing valves with built-in bypass check valves and strainer will be acceptable. Materials shall be bronze or iron bodies, replaceable stainless steel seat, reinforced Buna-N diaphragm, and EPDM valve disc. Maximum working pressure shall be 300 psig. Temperature range shall be 33°F to 160°F. Adjustable reduced pressure range shall be 25 to 75 psig. Valve sizes shall be ½” to 2-1/2”. Approved valves shall comply
with ASSE 1003. Valve shall be a Watts Series 223-S with a separate wye strainer to be included. Other acceptable manufacturers shall be Apollo or Zurn.

9. Floor Cleanout:
   b. Description: Cast iron floor level cleanout assembly with round or square, adjustable, scoriated, nickel bronze top, and no-hub outlet. Provide color and round/square shape to match Architect’s final finishes.
   c. Acceptable Manufacturers: Other acceptable manufacturers shall be Josam, or Zurn.
   d. Floor cleanouts shall be spaced no more than 50’.

10. Trench Drains:
   b. Description: 6 inch wide sloped precast polymer concrete channel with QuickLock cover grate and rail.
   c. Acceptable Manufacturers: Other acceptable manufacturers shall be Josam, or Zurn.

11. Backwater valve:
   b. Description: Cast iron body with stainless steel gate and flexible PVC diaphragm/expansion chamber.
   c. Acceptable Manufacturers: Other acceptable manufacturers shall be Josam or Zurn.
   d. Notes: Include this type of flood-gate automatic backwater valve providing "closure" protection during emergency storm conditions or when building is completely shut down.

12. Backwater valve:
   b. Description: Cast iron body and cover with removable wheel handle, bronze gate, bronze flapper valve, and brass stem.
   c. Acceptable Manufacturers: Other acceptable manufacturers shall be Josam, or Zurn.
d. Include this type of inline gate backwater valve to provide normal protection against sewage backflow into building.

13. Domestic Water HW Circulation Pumps: The contractor shall furnish and install in-line circulating pumps as illustrated on the plans and in accordance with the following specifications:

   a. The pumps shall be of the horizontal system lubricated type specifically designed and guaranteed for quiet operation.
   b. Pump to be suitable for 225°F operation at 150 psig working pressure.
   c. The pumps shall have a ceramic shaft supported by carbon bearings.
   d. Bearings are to be lubricated by the circulating fluid.
   e. Pumps to have a capacity (GPM, head) sufficient to meet system requirements when powered by 115 volt, 60 cycle, single phase electrical supply.
   f. Pump body shall be lead-free bronze.
   g. Motor stator to be isolated from circulating fluid through use of stainless steel can. Rotor to be sheathed in stainless steel.
   h. Motors shall be non-overloading at any point on the pump curve.
   i. Provide recirculation pumps with timers and/or immersion type aquastats.
   j. Armstrong, Grundfos, Taco (B&G not acceptable).

14. Roof Drain:

   b. Description: Cast iron body with flashing clamp, sump receiver, underdeck clamp, and metal dome.
   c. Provide Extension as required for insulated roofs.
   d. Provide Vandal proof construction when required.
   e. Acceptable Manufacturers: Other acceptable manufacturers shall be Josam, or Zurn.

15. Acid Waste Pipe & Fittings: Orion, Charlotte Pipe Chem Drain

   a. Special drainage system for corrosive or acid waste shall be manufactured from CPVC Type IV Grade I compounds with a minimum
cell classification of 23447. Pipe and Fittings shall conform to ASTM F2618. Pipe shall be Schedule 40 dimensions. One-Step solvent cement shall be specially formulated for chemical waste applications and conform to ASTM F493.

16. Cleanout Plug
   a. Cast brass or bronze, with threaded end, and raised or countersunk head.
   b. Tapped head for attachment of cleanout wall or deck plate covers where required.
   c. Plugs shall be J.R. Smith, Josam, or Zurn.

17. Cleanout
   a. Threaded pipe fitting or cast iron ferrule with gas tight cleanout plug. Cleanouts shall be J.R. Smith, Josam, or Zurn.

18. Drain Accessories: P-traps, strainers, angle stops, escutcheons and supplies shall be heavy gauge, chrome-plated construction by EBC, Dearborn, McGuire, or Brasscraft.

19. Cleanout Wall Plate
   a. Round, stainless steel or polished chrome plated bronze cover plate with stainless steel vandal resistant fastener to secure to cleanout plug.
   b. Cleanout wall plates shall be J.R. Smith, Josam, or Zurn.

20. Non-Freeze Wall Hydrant:
   a. Model: J.R. Smith No. 5509QT.
   b. Description: Bronze nickel-plated quarter turn non-freeze hydrant with hose connection, integral vacuum breaker, "T" handle key, and stainless steel box with full 180° cover opening.
   c. Acceptable Manufacturers: Other acceptable manufacturers shall be Josam, or Zurn.
   d. Note: Include this unit for a box type non-freeze wall hydrant with integral vacuum breaker. Use similar J.R. Smith series for non box type unit. Provide with a removable key to prevent unauthorized use.

21. Interior Hose Bibb/Wall Hydrant
   a. Model: J.R. Smith No. 5618
b. All Bronze Warm Climate Hydrant with Chrome Plated Face, Hose Connection and Integral ASSE 1011 Vacuum Breaker, 360° Swivel Inlet Connection and "T" Handle Key.

c. Acceptable Manufacturers: Other acceptable manufacturers shall be Josam or Zurn.

d. Note: For installation in interior or exterior walls of building where an exposed hose connection is acceptable and there is no danger of freezing. Hydrant shall include an integral type vacuum breaker. Provide with a removable key to prevent unauthorized use.

22. Drain Primers vs. Trap Guards: A/E must present trap guards for approval.

23. Master Mixing Valve: Provide factory assembled and tested dual valve type thermostatic water mixing valve assembly, with solid bi-metal thermostat directly linked to valve porting, color coded dials (HOT-COLD with directional indicators), locking temperature regulator handles, adjustable limit stops set for 120°F, integral hot and cold supply checkstops, outlet ball valves, color coded dial thermometer, and inlet piping manifold. Provide unit with rough bronze finish. Unit shall be factory preassembled and tested. Assembly shall provide full time standby service should one mixing valve require maintenance and shall be piped according to manufacturer's required piping method.


   b. Other acceptable manufacturers shall be Lawler, and Symmons.

   c. Note: Use a similar Leonard series unit for chrome-plated, and units requiring cabinets.

24. Thermostatic Point of Use Mixing Valve.

   a. Materials: Bronze body, copper encapsulated thermostat assembly with polymer thermoplastic shuttle stainless steel springs.

   b. Buna-N O'rings.

   c. Integral check valves on hot and cold inlets.

   d. Compression fittings on inlets and outlet.

   e. Locked temperature adjustment cap (vandal resistant)

   f. Maximum Pressure: 125 PSIG.

   g. Maximum Hot Water temperature: 200°F.
Coastal Carolina University Design Guidelines

h. Approach Temperature 5°F above setpoint.


j. Other acceptable manufacturers shall be Lawler, and Symmons.

22 30 00 Plumbing Equipment


   a. Natural gas water heaters: Water heaters shall be equal to A. O. Smith Cyclone Xi series with up to 96% thermal efficiency, a storage capacity, an input rating, and a recovery rating as required for the project. Water heater shall:

      i. Have seamless glass-lined steel tank construction.

      ii. Meet or exceed the thermal efficiency and/or standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IESNA 90.1.

      iii. Have foam insulation and a CSA Certified and ASME rated T&P relief valve.

      iv. Have a down-fired power burner designed for precise mixing of air and gas for optimum efficiency, requiring no special calibration on start-up;

      v. Be approved for zero clearance to combustibles.

      vi. Heater shall be supplied with maintenance-free powered anode.

      vii. The control shall be an integrated solid-state temperature and ignition control device with integral diagnostics, graphic user interface, fault history display, and shall have digital temperature readout.

      viii. Water heater shall be suitable for power direct venting.

      ix. Heater shall include an ASME Rated T&P relief valve and drain valve.

   b. Electric Water Heaters: The heater shall be equal to a glass-lined Custom Xi series commercial electric water heater as manufactured by A. O. Smith Corporation. Heater electrical characteristics shall be as required for the project. Heaters shall be constructed in accordance with ASME Code, shall bear appropriate symbol and be listed with the National Board as required. Heater shall be listed with Underwriters’ Laboratories and approved to The National Sanitation Foundation Standard No. 5. All internal surfaces of the tank shall be glass-lined with an alkaline borosilicate composition that has been fused-to-steel by firing at a temperature of 1600°F. Tank shall be
cathodically protected with powered anodes. Water heater shall have an electronic control with large LCD displaying current water heater status; provide real time element status and sensing, low water cutoff and economy mode operation. The panel shall house 120 volt control circuit transformer, transformer fusing, magnetic contactors, element fusing per N.E.C., and commercial grade incoloy sheathed flange mounted elements with prewired terminal leads. Temperature controls include limiting switch which will require resetting manually in the event the temperature reaches 190°F. Foam insulation shall meet or exceed the thermal efficiency and/or standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IESNA 90.1. Heater shall include an ASME Rated T&P relief valve and drain valve.

i. Other acceptable manufacturers shall be Lochinvar, Bradford White, PVI and State.

ii. LEED Considerations: Energy and Atmosphere, EAP2, EAP3, EA1, EA4.

22 40 00 Plumbing Fixtures

1. Water Closets:

a. Manual Flushometer and ADA Compliant Floor Mounted Water Closet: Sloan Model WETS 2020.1001-1.28 (17” rim height) & Sloan Model WETS 2000.1001-1.28 (15” rim height), synthetic rubber diaphragm, ADA compliant metal non-hold-open handle, 1”IPS angle stop, vandal-resistant stop cap, adjustable tailpiece, spud coupling and flange for 1-1/2” spud, floor mounted, vitreous china, elongated bowl, 1-1/2” top spud inlet, 2” trapway diameter, integral flushing rim, siphon jet flush, 1.28 gallons per flush. Provide approved equal by the following: American Standard, Kohler, Crane, or Eljer. Provide white, plastic open-front extra heavy-duty seat, Centoco Model 1500 STSCSS, or approved equal by Bemis or Church. Provide Sloan Model ST-2020-1.28 for 17” rim height water closet only, and Sloan Model ST-2000-1.28 for 15” rim height water closet only.

b. Solar-Powered Flushometer and ADA Compliant Floor Mounted Water Closet: Sloan Model WETS 2020.1201-1.28 Solis (17” rim height) & Sloan Model WETS 2000.1201-1.28 (15” rim height), ADA compliant Optima Plus solar-powered infrared sensor for automatic no hands operation, infrared sensor with multiple focused sensing fields for high and low target detection, latching solenoid operator, courtesy flush override button, sensor assembly powered by a solar cell getting power from incandescent or fluorescent light, four size AA battery backup source, synthetic rubber diaphragm, 1”IPS angle stop, vandal-resistant stop cap, adjustable tailpiece, spud coupling and flange for 1-1/2” spud, floor mounted, vitreous china, elongated bowl, 17” height, 1-1/2” top spud inlet, 2” trapway diameter, integral flushing rim, siphon jet flush, 1.28 gallons per flush. Provide approved equal by the following: American Standard, Kohler, Crane, or
Eljer. Provide white, plastic open-front extra heavy-duty seat, Centoco Model 1500 STSCSS, or approved equal by Bemis or Church.

c. Manual Flushometer and ADA Compliant Wall Hung Water Closet: Sloan Model WETS 2050.1001-1.28, synthetic rubber diaphragm, ADA compliant metal non-hold-open handle, 1"IPS angle stop, vandal-resistant stop cap, adjustable tailpiece, spud coupling and flange for 1-1/2" spud, wall hung, vitreous china, elongated bowl, 1-1/2" top spud inlet, 2-1/8" trapway diameter, integral flushing rim, siphon jet flush, 1.28 gallons per flush. Provide approved equal by the following: American Standard, Kohler, Crane, or Eljer. Provide white, plastic open-front extra heavy-duty seat, Centoco Model 1500 STSCSS, or approved equal by Bemis or Church. Provide carrier by J.R. Smith, Josam, or Zurn. Provide Sloan Model ST-2050-A-1.28 for water closet only.

d. Solar-Powered Flushometer and ADA Compliant Wall Hung Water Closet: Sloan Model WETS 2050.1201-1.28 Solis, ADA compliant Optima Plus solar-powered infrared sensor for automatic no hands operation, infrared sensor with multiple focused sensing fields for high and low target detection, latching solenoid operator, courtesy flush override button, sensor assembly powered by a solar cell getting power from incandescent or fluorescent light, four size AA battery back-up source, synthetic rubber diaphragm, 1"IPS angle stop, vandal-resistant stop cap, adjustable tailpiece, spud coupling and flange for 1-1/2" spud, wall hung, vitreous china, elongated bowl, 1-1/2" top spud inlet, 2-1/8" trapway diameter, integral flushing rim, siphon jet flush, 1.28 gallons per flush. Provide approved equal by the following: American Standard, Kohler, Crane, or Eljer. Provide white, plastic open-front extra heavy-duty seat, Centoco Model 1500 STSCSS, or approved equal by Bemis or Church. Provide carrier by J.R. Smith, Josam, or Zurn.

2. Urinals: Manual Flushometer and ADA Compliant Wall Hung Urinal: Sloan Model WEUS -1000.1001-0.13, synthetic rubber diaphragm, ADA compliant metal non-hold-open handle, 1"IPS angle stop, vandal-resistant stop cap, adjustable tailpiece, spud coupling and flange for 3/4" spud, wall hung, vitreous china, elongated bowl, 3/4" top spud inlet, 2" outlet flange, integral flushing rim, 0.13 gallons per flush. Provide approved equal by the following: American Standard, Kohler, Crane, or Eljer. Provide carrier by JR Smith, Josam, or Zurn.

3. Solar-Powered Flushometer and ADA Compliant Wall Hung Urinal: Sloan Model WEUS -1000.1201-0.13 Solis, ADA compliant Optima Plus solar-powered infrared sensor for automatic no hands operation, infrared sensor with multiple focused sensing fields for high and low target detection, latching solenoid operator, courtesy flush override button, sensor assembly powered by a solar cell getting power from incandescent or fluorescent light, four size AA battery back-up source, synthetic rubber diaphragm, 3/4"IPS angle stop, vandal-resistant stop cap, adjustable tailpiece, spud coupling and flange for 3/4" spud, wall hung, vitreous china, elongated bowl, 3/4" top spud inlet, 2" outlet flange, integral flushing rim, 0.13 gallons per flush. Provide approved equal by the following: American Standard, Kohler, Crane, or Eljer. Provide carrier by JR Smith, Josam, or Zurn.


6. Hand wash Sinks. Franke/Kindred

7. 3-Compartment Sinks. Franke/Kindred

8. Laundry Sinks. Fiat MODELS: L-1, FL-1, DL-1 fabricated from Molded Stone, nominal overall dimensions of 20"x17"x35" high. Provide integral Drain with stopper, 17 gallon Capacity. White color. Wall mounted tubs shall be provided with a heavy gauge galvanized - steel bracket capable of withstanding 600 pounds. The side fillers and bottom tub support, which are assembled in field to the mounting brackets, shall be made of white molded plastic polymer. Floor mounted tubs shall be provided with white baked enamel angle legs with leveling devices. The countertop installed unit shall be provided with a self-rimming flange, four locking corner bars and screws for fast tightening into integral molded mounting legs and against the underside of the countertop. Provide Fiat A-1 deck type faucet, made of solid brass with serving spout to mount on rear deck. Other acceptable manufacturers shall be Crane or Mustee.

9. Mop Sinks: Provide a 24”x24” molded stone mop basin with 10” high sides and an integral 3” chrome plated drain with a seal for connection to the waste piping. The mop basin shall be fitted with stainless steel bumper guards, a chrome-plated, solid brass faucet with vacuum breaker and hose bracket. The mop basin shall be white drift in color and the faucet shall be mounted 36” above the finished floor. The mop basin shall be a Fiat Model No. MSB-2424 with 1239BB bumperguards. Flat 1453 BB –stainless steel grid strainer, Provide Chicago 897-CP faucet with Fiat 832-AA hose and bracket. Kohler, provided with bucket hook, backflow preventer, shut-off valves on HW and CW. Other
acceptable manufacturers shall be the mop sink shall be Acorn, and for the faucet, T&S Brass & Bronze.

10. Showers: Individual shower valves shall be Leonard PAM-II-ST –F Pressure Actuated mixer with stainless steel balancing piston to equalize hot and cold supply pressures. Built-in shutoff for single handle operation. Removable one piece upper and lower valve seat, Internal parts of bronze and stainless steel, Cast wall flange and lever handle, polished chrome plated, Maximum operating pressure: 125 PSIG, Adjustable high temperature limit stop set for 110°F, Color coded dial, Off through Hot, with directional indicators, Minimum flow 1.5 GPM, ASSE· 1016 Certified, Angle checkstops, copper tube connection, Vandal resistant screws, Leonard H-02 brass shower head, 2.5 GPM, arm and flange. Other acceptable manufacturers shall be Chicago Faucet, and Symmons.

11. Electric Water Coolers: Cooler shall deliver 8.0 gph of 50° F degree water at 90° F ambient and 80° F inlet water. Models shall be accessible style, and include front and side push pads to activate the flow of water. Basin shall be designed to eliminate splashing and standing water. Bubbler shall have flexible guard and operate between 20 and 120 PSI. Cabinet finish shall be Sandstone or Greystone powder coated paint on galvanized steel or brushed stainless steel. Cooling system shall use R-134a refrigerant, shall comply with ANSI A117.1 and ADA, be listed by Underwriters’ Laboratories to U.S. and Canadian standards, shall comply with ANSI/NSF 61. Provide Oasis P8ACSL or approved equal by Halsey-Taylor, or Elkay.

   a. Elkay EZH20 system Cooler / Bottle Filling Station Model LZS8WSLK (single filtered cooler with bottle filling station) and Model LZSTL8WSLK (bi-level filtered cooler with bottle filling station)

12. Wash Fountains:

   a. Provide and install a solid surface material, corner style washfountain (specify exact model number and all options). Bowl, sprayhead and pedestal side panels shall be constructed of cast polyester resin (with aluminum trihydrate and other fillers) and shall conform to ANSI Z124.3 and Z124.6 (specify color). Provide an ASSE 1016-1996/1070 compliant temperature pressure balancing mixing valve with integral checks and strainers in hot and cold supply and field set water temperature at 105 degrees F. Provide grid strainer and waste tailpiece. Basis of design is Acorn Corterra, with other acceptable manufacturers to include Bradley, and Willoughby.


   c. Spray nozzles shall be vandal-resistant with 0.5 GPM flow controls.

13. Service Sinks:

   a. Enameled cast iron (inside only enameled).
b. Supplied with wall hanger and rim guard.

c. Provide with plain back for mounting faucet above on wall.

d. Provide American Standard "Akron" Service Sink Model 7695.000 With plain back and 8379.026 rim guard, nominal dimensions 24"x20-1/2"x10-1/2" deep meeting or exceeding ASME A112.19.1 for Cast Iron Plumbing Fixtures. Provide with American Standard faucet: 8341.076 exposed yoke wall-mount utility faucet with vacuum breaker and stops in shank and 7798.030 cast iron “P” trap standard to wall, and strainer for 3” iron pipe. Other acceptable manufacturers shall be Kohler, or Eljer.

14. Emergency Shower Eyewash Stations: Provide a pedestal mounted combination station with an eyewash, a stainless steel bowl, ABS plastic eyewash spray heads, an inline strainer and a stay-open 1/2” ball valve with a push handle and a shower with a plastic showerhead and a 1” stay-open ball valve with a pull rod. Provide Acorn Safety Model S1330 or approved equal by Haws or Guardian. Provide with accessory Acorn Safety Model S0000-TMV33 thermostatic mixing valve.

15. Precast Concrete Grease Interceptors

a. Precast Concrete Grease interceptors as Manufactured by Kistner Concrete Products, Inc.

b. Producer shall be certified by the National Precast Concrete Association (NPCA) Plant Certification Program. Manufacturer shall be certified at the time of bidding.

c. All Products shall meet ASTM C 1613 Latest Rev.

d. Shapes and Sizes:

   i. Interceptors are to be precast concrete tanks meeting: ASTM – Per Plan, Segmental or monolithically cast sections are desirable with min. wall thickness of 3” Non-Traffic & 6” Traffic.

   ii. Internal Dimensions: Per plans.

   iii. Roof, Base and Wall thickness to be determined by manufacturer.

e. Joints:

   i. Each section shall have a male and female shiplap joint or toung & groove with a minimum of 1/2” thickness.

   ii. Each section shall be sealed with a ½” or 1” depending on tank, butyl rubber joint gasket supplied with shipment.

f. Material Properties and Design Loads:
Coastal Carolina University Design Guidelines

i. Minimum Concrete Compressive Strength: 4,000 PSI @ 28 days.

ii. Steel Reinforcement: ASTM A615-75, Grade 60.

iii. Entrained Air: 5% - 9%.

g. Soil Data:

i. Unit Weight of Soil: 120 PCF.

ii. Unit Weight of Concrete: 150 PCF.

iii. Lateral Earth Pressure: 60 PCF max, 30 PCF min.

h. Loading Data:

i. Loading:
   1. Non Traffic: 100 lbs PSF.
   2. Traffic: AASHTO H20, HS20, HS25. - As per project requirement.

ii. Earth Cover: Maximum 3’-0” Non-Traffic. Notice: All tanks buried > 3’ Cover must be Traffic Loading.

i. Reinforcement Coverage:

   i. Unless noted otherwise all concrete cover over reinforcing steel shall be 1” minimum on the walls, floor slab and roof slab.


17. Non – Potable water distribution piping (In-Building) - ½” through 2” sizes: ReUzeTM made with FlowGuard Gold® CPVC Copper Tube Size manufactured to standard dimension ratio (SDR) 11 and shall conform to ASTM D 2846. Pipe to be purple pigmented and have two rows of marking 180˚ apart to include “WARNING: NON-POTABLE WATER DO NOT DRINK”. Fittings to be either tan or purple in color. Transition fittings to have brass male or female connections with integral CPVC socket connections as manufactured by Charlotte Pipe and Foundry Company.