PLUMBING

DESCRIPTION OF WORK: The extent of plumbing work includes all labor, materials, equipment and services necessary to complete the plumbing system in accordance with latest copy of Uniform Plumbing Code as shown on the drawings and herein specified, including final connections to any and all site utilities to provide a complete plumbing system. All equipment and work shall be guaranteed for one year after date of acceptance.

Product Options: Equipment and accessories are based on specific types, manufacturers, and models indicated. Equipment and components having equal performance characteristics by other manufacturers may be considered, provided deviations in dimensions, operation, and other characteristics do not change the design concept or intended performance as judged by the Engineer. The burden of proof of product equality will be borne by the Subcontractor. Deliver and store equipment and large accessories in factory–installed shipping skids and small accessories in factory–fabricated fiberboard containers.

SYSTEM PERFORMANCE REQUIREMENTS: Provide components and installation capable of producing piping systems with the following minimum working pressure ratings, Water Distribution Systems, Below Ground: 150 psig, Water Distribution Systems, Above Ground: 125 psig, Soil, Waste, and Vent Systems: 10–foot head of water, Storm Drainage Systems: 10–foot head of water.

SUBMITTALS: Submit the following: Water samples, test results, and reports specified in "Field Quality Control" and "Cleaning" Articles.

QUALITY ASSURANCE: Comply with the provisions of ASME B31.9 "Building Services Piping" for materials, products, and installation. Provide listing/approval stamp, label, or other marking on piping made to specified standards.

PRODUCTS

PIPES AND TUBES: The application of the following pipe, tube, and fitting materials and joining methods required for plumbing piping systems are indicated in "Pipe and Fittings Applications." Hard Copper Tube: ASTM B 88, Type L, water tube, drawn temper, Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper, Copper Drainage Tube: ASTM B 306, Type DWV, drawn temper, Hubless, Cast–Iron Soil Pipe: CISPI 301.

PIPE FITTINGS AND TUBE FITTINGS: Wrought–Copper, Solder–Joint Pressure Fittings: ASME B16.22. Wrought–Copper, Solder–Joint, DWV Drainage Fittings: ASME B16.29.

Cast–Copper–Alloy, Solder–Joint, DWV Drainage Fittings: ASME B16.23. Bronze Flanges: ASME B16.24, Classes 150 and 300. Copper Unions: ASME B16.18, cast–copper–alloy body, hexagonal stock, with ball–and–socket joint, metal–to–metal seating surfaces, and solder–joint, threaded, or solder–joint and threaded ends. Mechanically Formed Outlets: Manufacturer's standard written procedure for forming tee–branch outlet from pipe and tube. Hubless, Cast–Iron Soil Pipe Fittings: CISPI 301.

JOINING MATERIALS: Cast–Iron Soil Pipe and Fittings: ASTM C 564 neoprene rubber gaskets and lubricant. CISPI Couplings for Hubless Cast–Iron Soil Pipe and Fittings: CISPI 310, having ASTM C 564 neoprene sealing sleeve, with 300 Series stainless–steel corrugated shield–and–clamp assembly. Cast–Iron, Heavy–Duty Couplings for Hubless Cast–Iron Soil Pipe and Fittings: ASTM C 564 neoprene sealing gasket, with cast–iron housing and stainless steel bolts. Sleeve–Type Couplings for Plain–End, Nonpressure System Pipe: Rubber or elastomeric sleeve and stainless steel band assembly, fabricated to match outside diameters of pipes to be joined. ASTM C 564, rubber for cast–iron soil pipe and ASTM F 477, elastomeric seal for plastic pipe. Sleeves for dissimilar or other pipe materials shall be compatible with pipe materials being joined. Stainless steel bands, one at each pipe insert. Gasket–Type Couplings for Plain–End, Nonpressure System Pipe: Rubber or elastomeric compression gasket, made to match pipe inside diameter or hub and adjoining pipe outside diameter. ASTM C 564, rubber for cast–iron soil pipe and gaskets for dissimilar or other pipe materials shall be compatible with pipe materials being joined. Roof drainage piping shall be jointed with use of minimum 4 banded stainless steel couplings similar to huskey 4000 or equal.

Insulation for horizontal roof drainage piping including the vertical portion of pipe from the roof drain including to the horizontal run within ceiling cavity shall be 1–1/2" thick glass fiber wrapped with Kraft reinforced foil with white vapor barrier, fire retardant with double self–sealing laps, with self–sealing butt strips. Owens–Corning Fiberglass or equal.

Insulation for domestic hot and cold water system with "Raychem" heating cable system shall be 25/50 rated, flexible, closed cell, polyolefin foam, fuse seal joining method nsulation (ASTM E 84) "Imcoshield" by Insulation Materials Corp. of America or Owen–Corning fiberglass insulation in the following thickness: 1/2" thru 1" copper tube size use 1", 1–1/4" thru 2" use 1–1/2", 2–1/2" thru 6" use 2" thickness.

PREPARATION OF FOUNDATION FOR BURIED PIPING: Grade trench bottom to provide smooth, firm, stable, and rock–free foundation throughout length of piping. Remove unstable, soft, and unsuitable materials at surface on which piping is to be laid and backfill with clean sand or pea gravel to indicated level. Shape bottom of trench to fit bottom of piping. Fill unevenness with tamped–sand backfill. Dig bell holes at each pipe joint to relieve bells of loads and to ensure continuous bearing of pipe barrel on foundation.

PIPE AND FITTINGS APPLICATIONS: Water Distribution Piping Above and Below Ground and Floor: 1/2" Soft copper tube, Type L, cast–copper–alloy, solder–joint pressure fittings and soldered joints with Alloy Sn95, Sn94, or E solder (trap primer lines only). 4" and Smaller: Hard copper tube, Type L; wrought–copper or cast–copper–alloy pressure fittings; copper unions; bronze flanges; and solder joints with Alloy Sn95 solder. Fittings Option: Mechanically formed "T–drill" type outlets, brazing filler alloy, and brazed joints (above slab only). Solder shall be "stay–safe bridgit" or equal. Use ball valves (Hammond 8401/8411). 600 psi WOG non–shock, bronze body.

Storm, Soil, Waste, and Vent Piping Above and Below Ground: 1–1/2" to 10": Hubless cast–iron soil pipe; hubless cast–iron soil pipe fittings; CISPI–type couplings for hubless cast–iron soil pipe and fittings; and hubless joints. 1–1/4" to 8": Copper drainage tube wrought–copper or cast–copper–alloy drainage fittings, may be used with soldered joints with Alloy E solder.

WATER DISTRIBUTION PIPING INSTALLATION: Install piping level without pitch. Fittings Option: Mechanically formed outlets may be used instead of fittings. Piping shall be installed to drain completely at one or more building drains.

DRAINAGE AND VENT PIPING INSTALLATION: Install cast–iron soil pipe and cast–iron soil pipe fittings according to CISPI 1990 revised and edited edition of "Cast Iron Soil Pipe and Fittings Handbook, Volume I," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings." Sanitary Building Drain: and Storm Drain: 1/4" per foot for piping 2 inches and smaller; 1/8 inch per foot for piping 3 inches and larger. Vent Piping: 1/8 inch per foot (1 percent).

Sleeves are not required for cast–iron soil pipes passing through concrete slab, without membrane waterproofing, on grade. The installation of piping shall be carefully planned. Piping shall be installed in such a manner as to prevent the forming of sags or pockets. Vent piping thru roof shall have flashing sleeve with 3 lb. sheet lead terminated within the sleeve and the remaining annular space caulked with molten lead. Base flashing 12" square on the roof. Vent piping thru sloping metal roofs shall have a "standard vent pipe flashing accessory" as manufactured by Metal Roof Mfg. Co. or equal. Vent piping thru rigid insulation and composite, rubberized type materials shall be flashed per another Division. Offset piping to avoid structural members, cants, flashing, mechanical and electrical equipment, etc. All vents thru roof shall be installed a minimum of 10'–0" from all fresh air intake to air handling equipment and offset minimum of 3'0" from edge of roof lines, parapets and all other flashing. Vent piping shall be collected so roof will be pierced a minimum number of times. Plumbing vents thru roof shall be a minimum of 4 inches. All insulated piping shall have an insulation protection shield installed at each pipe hanger and/or support. All 3" and 4" horizontal sanitary cleanout sweeps shall be of two–way with bronze plug type.

JOINT CONSTRUCTION: Cast–Iron Soil Pipe and Cast–Iron Soil Pipe Fitting Joints: Make joints according to recommendations in CISPI 1990 revised and edited edition of "Cast Iron Soil Pipe and Fittings Handbook, Volume I," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings." Copper piping; install in accordance with Copper Development Association, Inc.

INSTALLATION OF VALVES: Shutoff Valves: Install shutoff valves on inlet to each plumbing equipment item, on each supply to each plumbing fixture not having stops on supplies, and elsewhere as indicated. Check Valves: Install swing check valve as indicated. Use Hammond valve 967/968.

Hanger and support devices shall be in accordance with MSS SP–58, MSS–69 and MSS–SP–89 and shall be type used in Seismic Zone 4.

FIELD QUALITY CONTROL:

Do not enclose, cover, or put into operation water distribution, drainage and vent piping system until it has been inspected and approved by the authority having jurisdiction. During progress of the installation, notify the plumbing official having jurisdiction at least 24 hours prior to time inspection must be made. Perform tests specified below in presence of the plumbing official.

Test for leaks and defects in new water distribution piping system. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of system tested.

Leave uncovered and unconcealed until it has been tested and approved. Expose work that has been covered or concealed before it has been tested and approved for testing.

Cap and subject the piping system to a static water pressure of 50 psig above the operating pressure without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for 4 hours. Leaks and loss in test pressure constitute defects that must be repaired.

Repair leaks and defects with new materials and retest system or portion thereof until satisfactory results are obtained. Prepare reports for tests and required corrective action.

CLEANING: Clean and disinfect water distribution piping as follows: Purge potable water distribution piping systems prior to use. Use purging and disinfecting procedure prescribed by authority having jurisdiction or, if a method is not prescribed by that authority, the procedure described in either AWWA C651 or AWWA C652.

COMMISSIONING: Before operating systems, perform these steps: Close drain valves, hydrants, and hose bibbs. Open shutoff valves to full open position. Open throttling valves to proper setting. Remove plugs used during testing of piping systems and plugs used for temporary sealing of piping during installation. Remove and clean strainer screens. Remove filter cartridges from housings and verify that cartridges are as specified for application where used, clean, and ready for use. Check plumbing equipment and verify proper settings, adjustments, and operation. Do not operate water heaters before filling with water. Check plumbing specialties and verify proper settings, adjustments, and operation.

PROTECTION: Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work. Place plugs in ends of uncompleted piping at end of day or when work stops. Protect all work from freezing by draining until building heating system is operational.

HOT WATER TEMPERATURE MAINTENANCE

QUALITY ASSURANCE: Firms regularly engaged in manufacture of electric self–regulating heaters, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years. The National Electric code and Underwriter's Laboratories codes and standards apply to all or part of the products or procedures covered in this specification.

PRODUCTS: The heater and components must have a UL System Listing specifically for maintaining domestic water systems at selected temperatures. Temperatures must be maintained with straight runs of heating cable on the pipe. Spiralling will not be acceptable. The product shall be "HWAT–PLUS" heating cable, HWAT–B2 for 105øF interior domestic hot water and "XT" heating cable shall be installed on interior domestic cold water, interior rainleaders as manufactured by Raychem Corporation. Insulate all water heat traced systems.

EXECUTION: Install self–regulating heater and components with manufacturer's installation instructions. Install glass tape cable ties to attach heating cable to pipe every one foot not two feet. Install heat trace cable tight as possible in contact with water piping system. Tees shall be installed in accessible areas. Heat tract system shall be installed to within 2'–0" of the most remote fixture within the system. HWAT "Installation Testing Records", "HWAT Circuit Schedules" and "HWAT Location Schedules" shall be kept by the Contractor and shall be a copy of the form found in the HWAT Installation Manual. Records shall be submitted at completion of project to the Owner.

VACUUM CLEANING SYSTEM

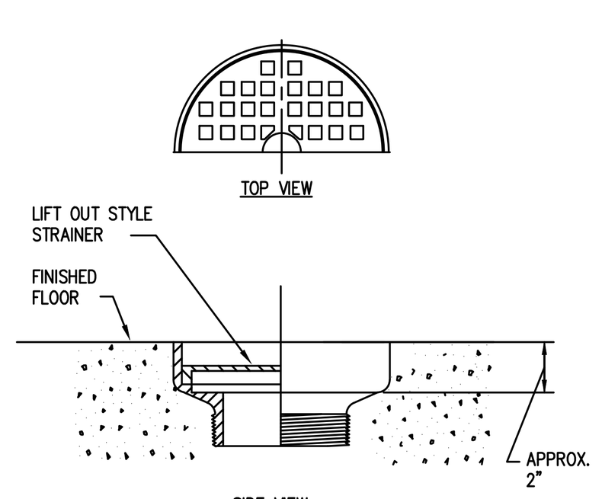
PRODUCTS: Piping materials shall be designed for vacuum cleaning systems and fittings shall be long radius. Pipe and fittings 2" to 4" diameter shall be 16 gage galvanized steel as manufactured by Spencer or equal. Inlet Valves: Inlet valves shall be stainless–steel flush mounted as shown on the drawings.

Product Options: Equipment and accessories are based on specific types, manufacturers, and models indicated. Equipment and components having equal performance characteristics by other manufacturers may be considered, provided deviations in dimensions, operation, and other characteristics do not change the design concept or intended performance as judged by the Engineer. The burden of proof of product equality will be borne by the Subcontractor. Deliver and store equipment and large accessories in factory–installed shipping skids and small accessories in factory–fabricated fiberboard containers.

The vacuum producer equipment shall be of either fabricated steel or cast iron construction. The unit shall be a centrifugal multistage machine mounted on a common base with its motor driver and suitable for interior installation. The impeller shall be aluminum. The unit shall be currently in use in industrial vacuum systems with a minimum of five years satisfactory performance. Unit volume and vacuum pressure requirements shall be as shown on the contract drawings. Motors shall be open drip proof and shall have surge protection and three–phase 480 volts. Provide discharge silencer. The vacuum system shall be provided with a dry separator composed of a combination of centrifugal separator and grounded tubular bags capable of removing 99.99 percent of the entrained dust and dirt. Air flow entrance should be below the bags and the outlet shall be above the bag section. Bags shall be attached to a manual shaker plate operated from outside the separator housing. Air to cloth ratio for the bags shall be a minimum of 5 to 1. An access plate shall be provided for filter bag replacement. An explosion relief port shall be provided on the separator and vented thru roof. The system shall be capable of handling two operators in the most distant location simultaneously each using a 37'–6" length of 1–1/2" hose with cleaning attachments. Provide control wiring such that unit is energized from a remote switch in the control room or when the future shoe cleaner solenoid is activated. Provide for minimum run time of one minute.

EXECUTION: The installation of the vacuum cleaning system shall be per manufacturer's instructions and the contract drawings. Manufacturer's Representative of the equipment installed shall be present at start–up and shall give complete instructions on start–up and service to the owners and operators of the facility.

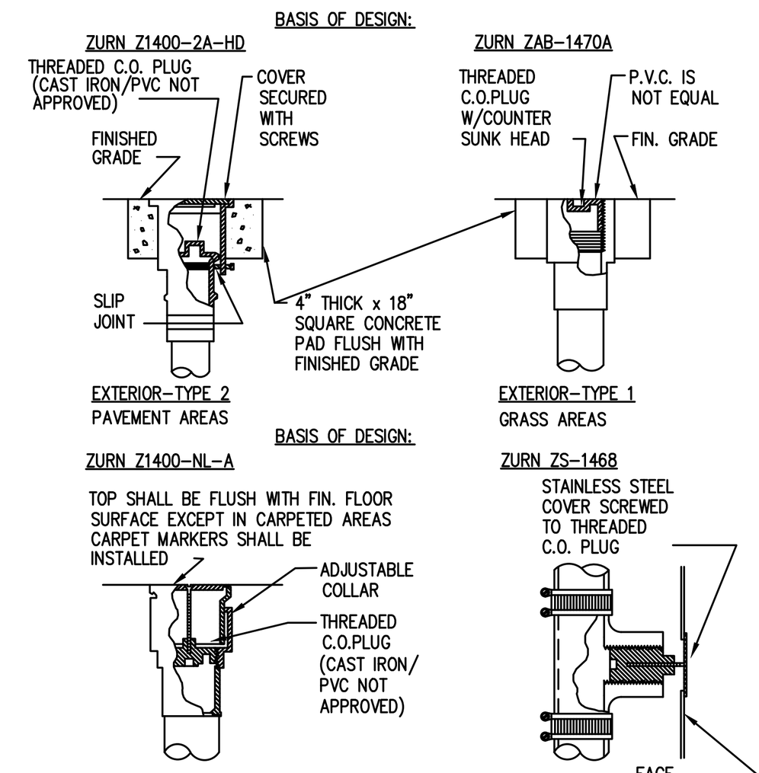
Piping installation shall be installed according to manufacturer's instructions. Vacuum piping connection shall be made with slip couplings. Piping shall be grounded. All piping and equipment shall be cleaned and free of debris before installation. System shall be tested using a 4" globe vacometer at the end of a 37'–6" 1–1/2" hose. System shall be capable of maintaining not less than 3" Hg vacuum with a 5/8" diameter orifice or 2" Hg vacuum with a 7/8" diameter orifice when one other hose is equipped with the same orifice.



BASIS OF DESIGN: ZURN ZB415–7"I

TYPICAL FLOOR DRAIN "B" DETAIL

N.T.S.



TYPICAL CLEAN–OUT BOX DETAIL

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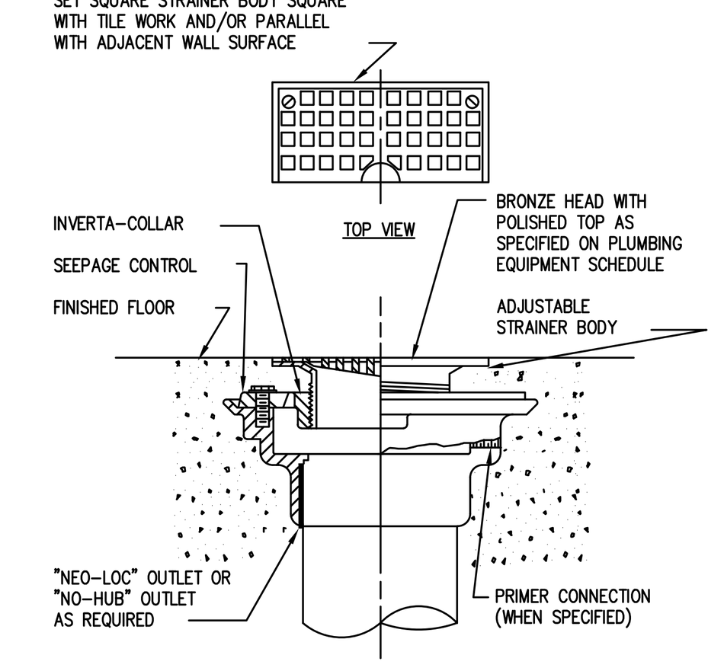

BASIS OF DESIGN: ZURN ZB415–5X5S–TPO

TYPICAL FLOOR DRAIN "A" DETAIL

N.T.S.

RECORD DRAWING

△	DATE	REVISION	BY	CHK
0	3–21–97	RELEASE FOR BID	RAP	ACW
5	4–20–98	INCORPORATE BID PHASE ADDENDA 1 AND 2; RELEASE FOR CONSTRUCTION	AMT	
11	8–30–02	RECORD DRAWINGS	LCP	AMT

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NARROW CAPE, KODIAK ISLAND, ALASKA
PAYLOAD PROCESSING FACILITY

PLUMBING/F.P. SPECS/DETAILS

ALASKA AEROSPACE DEVELOPMENT CORPORATION

DATE 3–21–97
DESIGNED BY F. FARMER
DRAWN BY E. KEGEL
CHECKED BY L. HOUSER
CAD CODE 3597.22\PPF\PP–7
PROJECT NO. 3597.22
DRAWING NO. PP–7
SHEET OF

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