PLUMBING GENERAL NOTES:

A. ALL WORK SHALL CONFORM TO FEDERAL, STATE AND LOCAL MECHANICAL AND PLUMBING CODES AND REGULATIONS, NFPA CODES.

B. PIPING LAYOUT IS SCHEMATIC. EXACT LOCATION OF PIPING AND EQUIPMENT SHALL BE COORDINATED WITH BUILDING STRUCTURE EQUIPMENT FURNISHED, EXISTING CONDITIONS, ARCHITECTURAL DRAWINGS AND ALL OTHER TRADES PRIOR TO INSTALLATION. ANY CONTRACTOR INSTALLING WORK WITHOUT PRIOR COORDINATION SHALL RELOCATE THE WORK AT THEIR EXPENSE TO ALLOW PROPER INSTALLATION OF ANY AND ALL TRADES WORK.

C. ALL PIPING SHALL BE CAPPED DURING CONSTRUCTION TO PREVENT ENTRY OF FOREIGN MATERIAL.

D. PROVIDE BLOCKING FOR ALL PLUMBING ROUGH-IN. COPPER PIPE SOLDERED TO METAL STUDS WILL NOT BE ACCEPTED.

E. PROVIDE PLASTIC ISOLATION SEPARATORS FOR ALL COPPER PIPING RUNNING THRU METAL STUDS. INSULATE PIPING BETWEEN STUDS AND IN WALL WITH 1/2" RIGID FIBERGLASS PIPE INSULATION.

F. PROVIDE SHOCK ABSORBERS AT EACH GROUP OF FIXTURES. SIZE PER MANUFACTURER'S REQUIREMENTS.

G. UNLESS OTHERWISE NOTED ALL PIPING SHALL BE CONCEALED WHEREVER POSSIBLE. PROVIDE CHROME ESCUTHEON AT EACH PENETRATION OF A FINISHED SURFACE.

H. PLUMBING UTILITY PIPING SHALL NOT BE RUN ABOVE ELECTRICAL GEAR OR IN THE SERVICE SPACE REQUIRED BY THE NATIONAL ELECTRIC CODE.

I. ALL INVERTS, STATED OR NOT, NEW OR EXISTING SHALL BE CONFIRMED AND COORDINATED IN THE FIELD. VERIFY EXISTING INVERTS PRIOR TO STARTING WORK.

J. ALL FIXTURES SHALL HAVE SHUT-OFF STOP VALVES IN AN ACCESSIBLE LOCATION. PIPING BEYOND THE STOP VALVES IN EXPOSED OCCUPIED SPACES SHALL BE CHROME-PLATED. ANY NOTED SHUT-OFF VALVES ARE IN ADDITION TO THIS REQUIREMENT.

K. ALL WALL AND SLAB PENETRATIONS OF MASONRY OR CONCRETE CONSTRUCTION SHALL BE SLEEVED.

L. ALL PIPING SHALL BE COORDINATED WITH OUTSIDE AIR INTAKES TO PROVIDE 25'-0" CLEARANCE IN ALL DIRECTIONS FROM VENTS THRU ROOF TO OUTSIDE AIR INTAKES.

M. PLUMBING CONTRACTOR RESPONSIBLE FOR BUILDING AND 5'-0" OUTSIDE OF BUILDING UNLESS OTHERWISE NOTED. ALSO, MAKE CONNECTIONS TO SERVICE PROVIDED BY SITE WORK CONTRACTOR. REFER TO SITE WORK UTILITY CIVIL ENGINEERING DOCUMENTS FOR EXTERIOR WORK, TRENCHING, BACK FILLING, ETC.

N. THE PLUMBING SUBCONTRACTOR SHALL VERIFY UTILITY LOCATIONS AT SITE AND SHALL MAKE CONNECTION TO STUBS ON SITE.

O. THE PLUMBING SUBCONTRACTOR SHALL FILL FLOOR DRAINS WITH WATER UPON COMPLETION OF WORK AND TESTING.

P. COORDINATE THE PLUMBING WORK WITH THE ARCHITECTURAL, ELECTRICAL, MECHANICAL, AND OTHER PLANS AND DETAILS RELATED TO THIS PROJECT FOR WORK OF ALL OTHER TRADES.

LEGEND

Symbol	Description
	COLD WATER PIPING
	HOT WATER PIPING
	HOT WATER RETURN PIPING
	VENT PIPING
	WASTE PIPING
F	FIRE PIPING
ST	STORM PIPING
	EXISTING COLD WATER PIPING TO REMAIN
	EXISTING HOT WATER PIPING TO REMAIN
	EXISTING HOT WATER RETURN PIPING TO REMAIN
	EXISTING VENT PIPING TO REMAIN
	EXISTING WASTE PIPING TO REMAIN
S	EXISTING SPRINKLER PIPING TO REMAIN
OX	EXISTING OXYGEN PIPING TO REMAIN
ST	EXISTING STORM PIPING TO REMAIN
G	EXISTING GAS PIPING TO REMAIN
F	EXISTING FIRE PIPING TO REMAIN
	EXISTING COLD WATER PIPING TO BE REMOVED
	EXISTING HOT WATER PIPING TO BE REMOVED
	EXISTING HOT WATER RETURN PIPING TO BE REMOVED
	EXISTING VENT PIPING TO BE REMOVED
	EXISTING WASTE PIPING TO BE REMOVED
S	EXISTING SPRINKLER PIPING TO BE REMOVED
ST	EXISTING STORM PIPING TO BE REMOVED
G	EXISTING GAS PIPING TO BE REMOVED
	INDICATES RISE IN PIPE
	INDICATES DROP IN PIPE
	BALANCING COCK
	GATE VALVE
	CHECK VALVE

Symbol	Description
F.D.	FLOOR DRAIN
V.T.R.	VENT THRU ROOF
F.C.O.	FLOOR CLEANOUT
C.O.T.G.	CLEANOUT TO GRADE
B.F.	BELOW FLOOR
C.W.	COLD WATER
H.W.	HOT WATER
H.W.R.	HOT WATER RETURN
A.C.	ABOVE CEILING
A.D.	AREA DRAIN
S.H.	SHOWER HEAD
M.V.	MIXING VALVE
R.D.	ROOF DRAIN
O.D.	OVERFLOW DRAIN
F.H.R.	FIRE HOSE REEL
C.O.	CLEANOUT
W.H.(F.P.)	WALL HYDRANT (FREEZE PROOF)
H.B.	HOSE BIBB
W.C.O.	WALL CLEANOUT
	PRESSURE GAUGE
A	WATER HAMMER ARRESTOR (WITH P.D.I. RATING)
DR-?	DEMOLITION WASTE & VENT RISER DIAGRAM REFERENCE NO.
R-?	RENOVATION WASTE & VENT RISER DIAGRAM REFERENCE NO.
DW-?	DEMOLITION WATER RISER DIAGRAM REFERENCE NO.
W-?	RENOVATION WATER RISER DIAGRAM REFERENCE NO.

PLUMBING ABBREVIATIONS

A/E ARCHITECT / ENGINEER
AD AREA DRAIN
AFF ABOVE FINISH FLOOR
AFG ABOVE FINISH GRADE
AG AIR GAP
AP ACCESS PANEL
AS AUTOMATIC SPRINKLER
ASD ADJUSTABLE SPEED DRIVES
ASD AUTOMATIC SPRINKLER DRAIN
ASHRAE AMERICAN SOCIETY HEATING, REFRIGERATION, AIR CONDITIONING ENGINEERS
ASME AMERICAN SOCIETY MECHANICAL ENGINEERS
ASPE AMERICAN SOCIETY PLUMBING ENGINEERS
ASR AUTOMATIC SPRINKLER RISER
AV ACID VENT
AW ACID WASTE

BFP REDUCED PRESSURE BACKFLOW PREVENTER
BHP BREAK HORSEPOWER
BSP BLACK STEEL PIPE
BT BATHTUB
BTU BRITISH THERMAL UNIT
BTUH BRITISH THERMAL UNIT PER HOUR

C CELSIUS
CGA COMPRESSED GAS ASSOCIATION
CI CAST IRON
CO CLEANOUT
CS CLINICAL SINK
CV CONTROL VALVE

DCW DOMESTIC COLD WATER
DHW DOMESTIC HOT WATER
DHWR DOMESTIC HOT WATER RETURN
DHWR DOMESTIC WATER RETURN
DHWS DOMESTIC HOT WATER SUPPLY
DI DEIONIZED WATER
DN DOWN
DOE DEPARTMENT OF ENERGY
DS DOWNSPOUT
DW DISHWASHER
DWG DRAWING
DWH DOMESTIC WATER HEATER
DWR DRINKING WATER RETURN
DWS DRINKING WATER SUPPLY
DWV DRAIN WASTE VENT

EL ELEVATION
EMCS ENERGY MONOSERRAT AND CENTRAL SYSTEM
EPA ENVIROMENTAL PROTECTION AGENCY
EPACT ENERGY POLICY ACT
ESC ESCUTCHEON
ESH EMERGENCY SHOWER
ET EXPANSION TANK
EWC ELECTRIC WATER COOLER
EWC ELECTRIC WATER COOLER
EWH ELECTRIC WATER HEATER
EWS EYE WASH STATION
EX EXISTING

F FAHRENHEIT
FCO FLOOR CLEANOUT
FCW FILTERED COLD WATER
FD FLOOR DRAIN
FDC FIRE DEPARTMENT (HOSE) CONNECTION
FM FLOW METER
FOP FUEL OIL PUMP
FOR FUEL OIL RETURN
FOS FUEL OIL SUPPLY
FOV FUEL OIL VENT
FS FLOOR SINK
FS FLOW SWITCH
FU FIXTURE UNITS

GAL GALLON
GCO GRADE CLEANOUTS
GPD GALLONS PER DAY
GPH GALLONS PER HOUR
GPM GALLONS PER MINUTE
GPR GAS PRESSURE REGULATOR
GRS GAS REGULATOR STATION
GT GREASE TRAP
GVTR GAS VENT THROUGH ROOF
GWH GAS FIRED WATER HEATER

H&CW HOT AND COLD WATER
HB HOSE BIBB
HD HUB DRAIN
HEX HEAT EXCHANGER
HP HORSEPOWER
HS HAND SINK
HST HOT WATER STORAGE TANK (DOMESTIC)
HWB HOT WATER BOILER
HWCP HOT WATER CIRCULATING PUMP
HWP HOT WATER PUMP
HYD HYDRANT

ICW INDUSTRIAL COLD WATER
INV INVERT
IPC INTERNATIONAL PLUMBING CODE
IRW IRRIGATION WATER
IW INDIRECT WASTE
IWH INSTANTANEOUS WATER HEATER
IWR INDUSTRIAL WATER RETURN
IWS INDUSTRIAL WATER SUPPLY

KW KILOWATT
KWHR KILOWATT-HOUR

L/S LITER PER SECOND
LA LABORATORY AIR
LAV LAVATORY
LBS/HR POUNDS PER HOUR
LCW LABORATORY COLD WATER
LHW LABORATORY HOT WATER
LNG LIQUID NATURAL GAS
LOX LIQUID OXYGEN
LV LABORATORY VACUUM
LW LOW WATER

PLUMBING ABBREVIATIONS

M METER
MA MEDICAL AIR
MAV MANUAL AIR VENT
MBH 1000 BTUH
MED MEDICAL
MER MECHANICAL EQUIPMENT ROOM
MH MANHOLE
MOU MEMORANDUM OF UNDERSTADING
MSB MOP SERVICE BASIN
MV MEDICAL VACUUM

N2 NITROGEN
N20 NITROUS OXIDE
NC NORMALLY CLOSED
NG NATURAL GAS
NIC NOT IN CONTRACT
NO NORMALLY OPEN
NOM.NOMINAL
NPW NON POTABLE WATER
NTC NOT TO SCALE

O2 OXYGEN
OC ON CENTER
OD OUTSIDE DIAMETER
OFD OVERFLOW DRAIN
OR OPERATING ROOM
OVFL OVERFLOW

PA PASCAL
PD PRESSURE DROP OR DIFFERENCE
PDI PLUMBING AND DRAINAGE INSTITUTE
PG PRESSURE GAGE
PP PLUMBING PUMP
PPM PARTS PER MILLION
PRS PRESSURE REDUCING STATION
PRV PRESSURE REDUCING VALVE
PSI POUNDS PER SQUARE INCH
PSIA POUNDS PER SQUARE INCH ATMOSPHERE
PSIG POUNDS PER SQUARE INCH GAUGE
PTRV PRESSURE TEMPERATURE RELIEF VALVE
PW POTABLE WATER

RD ROOF DRAIN
RDL ROOF DRAIN LEADER
RL ROOF LEADER
RO REVERSE OSMOSIS WATER
RWL RAIN WATER LEADER

SAN SANITARY SEWER
SMACNA SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
SCFM STANDARD CUBIC FOOT/MINUTE
SCW SOFTENED COLD WATER
SDMH STORM DRAIN MANHOLE
SP SUMP PUMP
SPR SPRINKLER LINE
SQFT SQUARE FEET
SS STAINLESS STEEL
ST STORAGE TANK
SW STORM WATER

TCV TEMPERATURE CONTROL VALVE
TD TEMPERATURE DIFFERENCE
TD TRENCH DRAIN
TDH TOTAL DYNAMIC HEAD
TEMP TEMPERATURE
TMV THERMOSTATIC MIXING VALVE
TP TRAP PRIMER
TSTAT THERMOSTAT
TWR TEMPERED WATER RETURN
TWS TEMPERED WATER SUPPLY
TYP TYPICAL

UPC UNIFORM PLUMBING CODE

V VENT
VAC VACUUM
VB VACUUM BREAKER
VCO VACUUM CLEANER OUTLET
VP VACUUM PUMP
VS VENT STACK
VTR VENT THROUGH ROOF

W WASTE
WC WATER CLOSET
WCO WALL CLEANOUT
WG WATER GAGE
WH WALL HYDRANT
WH WATER HEATER
WHA WATER HAMMER ARRESTER
WL WATER LINE
WM WATER METER
WPD WATER PRESSURE DROP
WS WASTE STACK

YCO YARD CLEANOUT
YH YARD HYDRANT

WATER HAMMER ARRESTOR SCHEDULE

MARK	FIXTURE UNIT RATING	I.P.S.	SIOUX CHIEF MODEL NO.
WHA-A	1-11	3/4"	600 SERIES
WHA-B	12-32	1'	600 SERIES
WHA-C	33-60	1'	600 SERIES
WHA-D	61-113	1'	600 SERIES
WHA-E	114-154	1'	600 SERIES
WHA-F	155-330	1'	600 SERIES

DRAWING SYMBOLS

2 / PL105 — DETAIL NUMBER — DRAWING NUMBER WHERE DRAWN

A / PL105 — SECTION LETTER — DRAWING NUMBER WHERE SHOWN

CIRCULATING PUMPS

PUMP NO.	LOCATION	SYSTEM	CIRCULATING FLUID: FLUID	GPM	PUMP HEAD FT. FLUID	TEMP F	SP. GR.	% EFF. (MIN)	PIPING CIRCUIT SERVED	TYPE	MOTOR: NOM. HP.	VOLTS PHASE	RPM	REMARKS	MANUFACTURER/MODEL
DCWR-1	BM-108	DCW	WATER	15	25	45	1	54	DCW	INLINE	1 1/2	208-3	1750		GRUNDFOS CME5-3
DCWR-2	BM-108	DCW	WATER	15	25	45	1	54	DCW	INLINE	1 1/2	208-3	1750	STAND-BY	GRUNDFOS CME5-3
DHWR-1	BM-108	DHW	WATER	15	25	140	1	54	DHW	INLINE	1 1/2	208-3	1750		GRUNDFOS CME5-3
DHWR-2	BM-108	DHW	WATER	15	25	140	1	54	DHW	INLINE	1 1/2	208-3	1750	STAND-BY	GRUNDFOS CME5-3

NOTE:
1. PROVIDE PUMP IN STAINLESS STEEL FOR DOMESTIC WATER SERVICE.

MEDICAL GAS SCHEDULE

TYPE	DESCRIPTION	PIPE SIZE	MANUFACTURER	NOTES
O	OXYGEN WALL OUTLET	1/2"	AMICO O-FASC-CH-U-OXY	1,5
V	VACUUM WALL INLET	3/4"	AMICO O-FASC-CH-U-VAC	1,5
MA	MEDICAL AIR WALL OUTLET	1/2"	AMICO O-FASC-CH-U-AIR	1,5
ZVD	ZONE VALVE BOX DOOR	--	AMICO V-X-DOOR-3-SS	2,5
ZV	ZONE VALVE BOX	1', 1, 1,	AMICO VBU-P101010	3,5
GA	AREA GAS ALARM	--	AMICO A3AR-U-OAV	4,5

NOTES:
1. COORDINATE LOCATION OF OUTLETS WITH OWNER AND ARCHITECT.
2. STAINLESS STEEL SECURITY DOOR AND FRAME.
3. PRESSURE GAUGES; OXYGEN 0-100 PSI; MEDICAL AIR 0-100 PSI; VACUUM 0-30 IN , HG.
4. LCD SCREEN WITH 5 YEARS WARRANTY.
5. ALL EQUIPMENT ND SYSTEM SHALL COMPLY WITH NFPA 99.

DRAIN SCHEDULE

MARK	TYPE	SIZE	MANUFACTURER	MODEL No.	TOP	REMARKS
FD-1	FLOOR DRAIN	2"	ZURN	415	N.B.	4" DEEP SEAL 'P' TRAP, TRAP PRIMER; SEE NOTES BELOW
FD-2	FLOOR DRAIN	3"	ZURN	Z508-91	CAST IRON	9" DIA, EXTRA HEAVY DUTY, W/ SEDIMENT BUCKET
FCO-1	FLOOR CLEANOUT	4"	SMITH	4020	NICKLE BRONZE	
WCO-1	WALL CLEANOUT	2"-4"	SMITH	4402	STAINLESS STEEL	COUNTER SUNK PLUG
GCO-1	GRADE CLEANOUT	4"-6"	SMITH	4256	CAST IRON	COUNTER SUNK PLUG
TD-1	TRENCH	2"	QUICKDRANS	PROLINE	STAINLESS STEEL	18GA. 3161 STAINLESS STEEL STRAINER/TOP/PN007

NOTE:
1. PROVIDE WITH PROSET SYSTEMS "TRAP GUARD". COORDINATE WITH PROSET SYSTEMS FOR PART NUMBERS AND INSTALLATION. TEL. #1-800-262-5355. FOR ALL FLOOR DRAINS AS ALLOWED PER CODE.
2. VERIFY LOCATION OF FLOOR DRAIN AND SIZE REQUIRED.

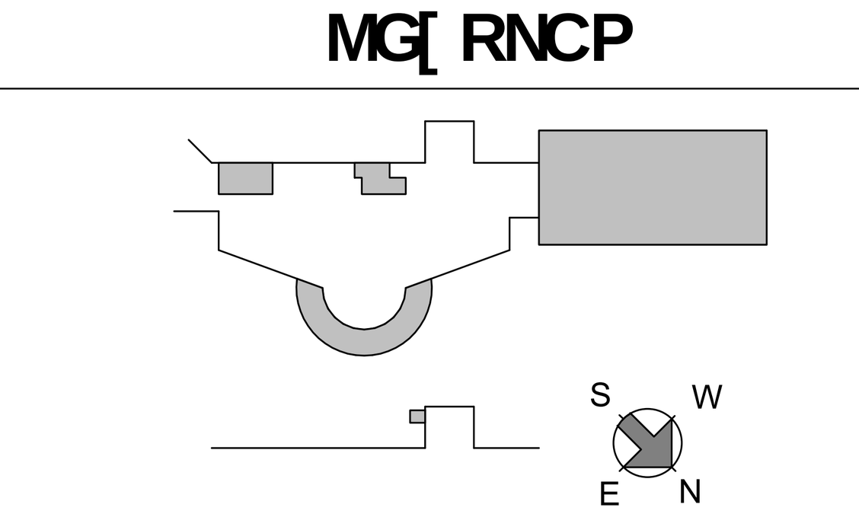
PLUMBING EQUIPMENT SCHEDULE

MARK NO.	MANUFACTURER	MODEL	DESCRIPTION	ELECTRICAL HP	ELECTRICAL V/PH	NOTES
DWM-1	BADGER	M120				WITH REMOTE MONITORING LIKE HRE ENCODER
DPRV-1	WATTS	SERIES 2300				3"
EX-1	AMTROL	ST-12	EXPANSION TANK	-	-	
RPZ-1	WATTS	9570SY	RPZ BACKFLOW PREVENTER	-	-	3" W/ STRAINER
MIX-1	SYMMONS	ST-5-120-CKX	POINT OF USE MIXING VALVE	-	-	WITH SEPARATE STOPS SET 110°F DISCHARGE TEMP
			2" WATER METER			
			PRESSURE REDUCING VALVE			

FIXTURE SCHEDULE

MARK	FIXTURE	CW	HW	WASTE	REMARKS
P-101	WATER CLOSET	1"	——	4"	ADA
P-102	WATER CLOSET	1"	——	4"	ADA
P-114	WATER CLOSET BARIATRIC	1"	——	4"	ADA
P-301	BATHTUB	1/2"	1/2"	3"	
P-413	LAVATORY PATIENT ROOMS	3/8"	3/8"	1-1/2"	ADA
P-414	LAVATORY WALL MOUNTED	3/8"	3/8"	1-1/2"	ADA
P-521	LAUNDRY TUB	1/2"	1/2"	2"	
P-524	STAINLESS STEEL 2-COMP. SINK	3/8"	3/8"	1-1/2"	
P-528	STAINLESS STEEL 1-COMP. SINK	3/8"	3/8"	1-1/2"	
P-501	SERVICE SINK	1/2"	1/2"	1-1/2"	
P-505	CLINICAL SINK	1-1/2"	1/2"	4"	
R-604	WATER COOLER	1/2"	——	1-1/4"	
P-701	SHOWER	1/2"	1/2"	2"	
P-711	BATHTUB SHOWER	3/8"	3/8"	——	
P-801	HYDRANT	1/2"	——	——	FREEZE PROOF
P-804	HOSE BIBB	1/2"	——	——	
P-808	WASHING MACHINE CONNECTION BOX	1/2"	1/2"	2"	OATLEY #38995, 1/4 TURN BRASS BALL VALVES WITH WATER HAMMER ARRESTORS.
P-810	EYE WASH, WALL MTD SINK	1/2"	1/2"	2"	GUARDIAN G1848LH-L &TMV G36000LF MIXING VALVE

MG[RNCP



FULLY SPRINKLERED

CONTRACT DOCUMENTS

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"DAE" Project #14049

Drawing Title: PLUMBING SYMBOLS & ABBREVIATIONS

Approved: Project Director

Project Title: EXPAND 10A COMMUNITY LIVING CENTER

Location: Carl Vinson VAMC, Dublin, GA 31021

Date: 5/16/2016 | Checked: DEH | Drawn: ILP

Project Number: VA 247 150 0107

Building Number: 10A

Drawing Number: PQ001

Office of Construction and Facilities Management

Department of Veterans Affairs

Purpose
Veteran's Health Administration (VHA) Policy establishes guidelines for the prevention and control of healthcare-associated Legionella disease in VHA buildings.

The efficacy of biocides on suppressing or killing waterborne pathogens is dependent on multiple factors such as water quality, organic and inorganic contaminants, pH levels, disinfectant concentrations, and contact time. Water entering the building shall be continuously monitored for the following by means of gauges, sensors, and a grab sample port:

Temperature, Oxidant level (water disinfectant), pH, and Pressure

Water systems within the building shall be monitored as follows in the table below. Temperature and oxidant levels are the two primary engineering controls to limit bacterial growth. Oxidant levels shall be measured continuously as water enters the building and through grab samples taken from building plumbing fixtures. Temperature shall be measured throughout the domestic water system (hot and cold). In addition to being a primary control measure, temperature can be a secondary indicator of flow since temperature of stagnant water will lower for hot water and rise for cold water.

Background
Legionella is a bacterium that causes respiratory diseases collectively referred to as *Legionellosis*, that includes *Legionella* pneumonia. *Legionella* pneumonia is also known as *Legionnaires* Disease (LD). *Legionella* bacteria are found naturally in water and have been associated with disease from building water distribution systems. LD occurs after inhalation or aspiration of contaminated water. *Legionella* bacteria are not transmitted from person to person. The elderly and persons with immune compromised systems are most at risk. *Legionella* bacteria growth increases in tepid water in a range from 20 deg C [68 deg F] to 50 deg C [123 deg F].

Given the various factors and complexities associated with LD, 100% prevention of LD is likely not possible. However, prevention and control practices can be implemented to reduce the risk of exposing people to *Legionella* in building water distribution systems. The following are engineering controls that will suppress *Legionella* growth. More than one control may be necessary for successful inhibition of *Legionella* growth.
(a) Temperature
• Maintenance of appropriate water temperatures is required. Water above 51.1 deg. C [124 deg. F] inhibits growth of Legionella in hot water systems. Precautions for the prevention of scalding shall be included in the hot water distribution system.
• Cold water temperatures below 19.4 deg. C [67 deg. F] inhibit the growth of Legionella.
(b) Flow
• Recirculation of water distribution systems is a means of limiting Legionella growth due to low flow or non-use periods. Recirculation aids in maintaining required water temperatures. Hot and cold water distribution systems shall be continuously circulated and piping insulated.
(c) Oxidant (Disinfectant)
• Maintenance of disinfectant at a sufficient level to control Legionella growth may be required. The minimum level required to suppress bacterial growth will vary from building to building and by the type of oxidant (disinfectant) used. Monitoring of levels is required.

Piping Installation Guidelines for Legionella Mitigation:
• The need to chill or cool the domestic cold water supply shall be evaluated at the schematic phase. Legionella can propagate in temperatures exceeding 20 deg C [67 deg F]. The domestic cold water distribution system shall have a recirculation system. For cold water systems, although circulation back to the source location for the building is ideal, for renovation efforts, recirculation within the department (or floor) area of renovation would be acceptable.
• Ice maker water supply lines shall be copper and insulated. Avoid routing water lines near source of heat such as the compressor system of the ice maker.
• Cold and hot water piping systems shall be insulated in accordance with the latest version of ASHRAE 90.1.
• To enable thermal eradication and emergency shock chlorination, consider providing taps for connection of temporary booster heaters. Provide adequate electrical connections.
• PVC pipe shall not be used for sanitary and vent lines because of the high temperature water during thermal eradication. Cast iron shall be used.
• Aerators are prohibited in order to reduce exposure to *Legionella* contaminated water.
• Piping materials shall be in accordance with VA Master Spec 22 11 00 Facility Water Distribution.
• Piping and components must be cleaned and protected from accumulation of debris and contamination prior to and during installation.
• Ensure that newly installed piping and components are flushed of debris and disinfected prior to being placed into service.

Supplemental Water Disinfection Methods
In addition to maintaining the appropriate water temperatures, minimum concentrations of various biocides (e.g. oxidizing agents such as chlorine) can inhibit the growth of *Legionella* in building potable water distribution systems. When considering the use of supplemental water disinfection methods for the prevention of *Legionella*, plumbing designers and the VA project manager (in collaboration with other facility stakeholders such as infectious diseases and infection prevention and control) shall review the merits of the many types of supplemental systems available prior to making a final selection. VHA recognizes United States (U.S.) Environmental Protection Agency (EPA) approved oxidants (chlorine, monochloramine, and chlorine dioxide) as acceptable disinfectants for use in potable water distribution systems.

Selection of the necessary equipment, piping and controls and adequate space for the maintenance and operations, are a must. The EPA regulates contaminant levels and disinfectant treatment for use under the Safe Drinking Water Act. Usually, the EPA delegates primacy to States for the regulation and enforcement of the Act within individual State boundaries. Systems must be specifically approved or recognized for the intended use by the State regulatory water authority. Federal and state safety regulations and permitting shall be followed. Designers shall coordinate permitting requirements with the local authority having jurisdiction. The facility must consult with the State (or its delegated local water authority) for regulating drinking water for guidance on system selection, achieving an appropriate biocide residual level at building outlets for *Legionella* growth suppression, system design, system operation, and ensuring compliance with regulations regarding water treatment system(s) and safety. Once a type of system is selected, either the State (or its delegated local water authority) or the manufacturer of the system must provide the minimum and maximum outlet biocide
levels in writing for both hot and cold water.

Design parameters to evaluate for supplemental water disinfection include:
• Potential impact of supplemental disinfectant on special use water systems.
• Need for emergency power.
• System may need to be duplex for redundancy and maintenance.
• Spare parts may need to be purchased and stored locally.
• Federal and state safety regulations and permitting must be observed.
• Interaction of supplemental disinfection if shock chlorination is used as an emergency remediation method.

• Ensure enough maintenance access is provided around equipment.
• Provide sample points throughout the system to monitor effectiveness. Some critical points should be provided with automated data collection and alarm.
• Operational and maintenance requirements must be maintained to ensure system effectiveness.
• System must be equipped with automated features to ease of use and proper maintenance and operation.
• Requirements for off gassing associated with the specific chemicals (for example Sodium hypochlorite).
• Chemical spill containment systems must be provided.
• Chemical storage requirements.

Emergency Water Disinfection Methods
Emergency disinfection is the process of implementing immediate, temporary actions to reduce the amount of Legionella in a water distribution system.

Thermal Eradication
Requires potable water in the system to be raised to 71 - 77 deg C [160 - 170 deg F] and flushed through every fixture for 30 minutes. Some design considerations are as follows:

• Central water heating equipment must be capable of raising water temperature to 82 deg C [180 deg F].
• Master thermostatic mixing valve located in the hot water distribution system may have to be bypassed to allow hot water to circulate in the distribution system.
• Select point-of-use thermostatic mixing valves that are amenable to thermal eradication procedures. See VA Master Specification 22 05 23 for required mixing valves.
• Provide taps for a connection of temporary booster heater to facilitate thermal eradication.
• Provide adequate electrical connections for temporary booster heaters. Coordinate with electrical engineer.
• All equipment and appurtenances in the system will need to be reviewed for operation at elevated temperature (e.g. ensure water supply stops can withstand required temperatures).
• Means of tempering discharge will need to be considered to accommodate code requirements on discharge to sanitary sewer (max temp of 60 deg C [140 deg F]). Ensure discharge is compliant with the local requirements.

Shock Chlorination
Installation of a chlorinator is required. Shock chlorination involves the addition of chlorine to the water system in one of the forms listed above.

Some design considerations are as follows:
• Provide taps for connection of temporary equipment.
• All equipment and appurtenances in the system will need to be reviewed for operation at elevated oxidant levels.

Special Use Water Systems (e.g., hemodialysis, laboratory, pharmacy compounding)
It is important to consider the implications of Legionella mitigation strategies on special use water systems within the building. Special use water systems include: Hemodialysis, Laboratory Service, Pharmacy Compounding, and Supply Process Service (SPS). Water treatment strategies and chemical disinfectants may result in the introduction of products into, or the formation of disinfection byproducts in, the building water supply at concentrations that may be toxic to patients on hemodialysis. Accordingly, the impact of mitigation strategies must account for potential toxicity, methods for removal of the chemical agent and byproducts from the special use water system, and availability of assay methods to measure the chemical agent and byproducts for assuring patient safety. VA authorities responsible for the oversight of special use water systems are to be consulted during design development of the project and prior to any final decisions regarding water treatment strategies for Legionella.

INSPECTIONS AND WITNESS OF TESTS
The inspection plan needs the approval of the project technical COR. Frequency and requirements for inspections and testing must be added to the construction documents. Regarding inspections and test witnessing, the plumbing drawings and specifications shall coordinate with the VA Manual on Systems Commissioning and the project's commissioning specifications.

Ensure that newly installed piping and distribution system components are flushed of debris and disinfected prior to being placed into service. Piping and components must be cleaned and protected from accumulation of debris and contamination prior to and during installation. Documentation of flushing and disinfection must be maintained. Disinfection for new installations or maintenance of piping, equipment, and components shall be conducted in accordance with the requirements of the IPC, American Water Works Association (AWWA C651-05), and VA Master Construction Specifications.

WATER DISTRIBUTION SYSTEMS
Water Storage Tanks: Provide adequate space for maintenance access to clean the interior of all water storage tanks. Tanks shall be provided with a man way access to allow for inspection, maintenance and cleaning. Tanks shall be constructed to minimize stagnation and thermal gradients. Mechanical cooling may be needed to maintain water temperature.

Measuring and Indicating Devices
Analog gauge and electronic sensors/devices shall be used in tandem as much as is practicable. The gauge device will provide a local or immediate indicator of current conditions for troubleshooting and verification purposes. The electronic sensor/device will be used for continuous monitoring of water conditions and shall be connected to the building automation system. All electrical devices shall be on emergency power. All measuring devices shall be calibrated in accordance with the manufacturer's recommendations.

Domestic Cold Water Sequence of Operation

See schematic

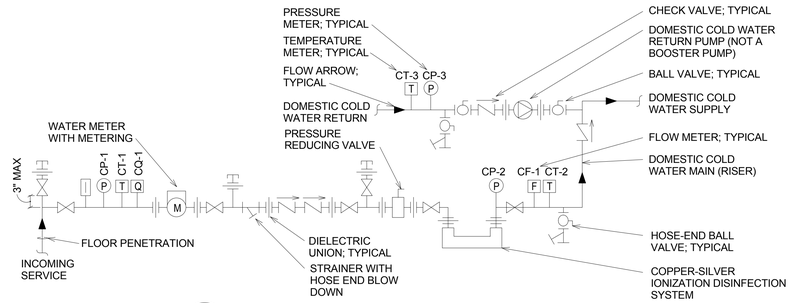
Water will flow as required for fixture use. Water temperature will be measured at a minimum of three locations: CT-1 at the meter; CT-2 on the return pipe; and CT-3 near the first plumbing fixture.

Once all fixture use has stopped as measured by flow meter CF-1, the flow meter will send a signal to the Domestic Cold Water Pump to start. Pump will circulate domestic cold water until flow meter CF-2 senses fixture usage and pump will stop.

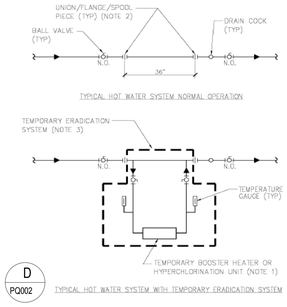
Domestic Hot Water Sequence of Operation

Water will flow as required for fixture use. Water temperature will be measured at a minimum of four locations: CT-1 near the water heating source; CT-2 after mixing valve; and CT-3 near the middle of the domestic hot water piping; and CT-4 at the farthest point from the heating source. Domestic hot water piping will be looped to feed all fixtures before returning back to the water heating source.

Domestic Hot Water Return Pump shall circulate hot water continuously (no shut down or aqua senser). Water flow shall be monitored by CF-1. Once flow stops, CF-1 shall send a signal to the Building Control System indicating a flow failure.



A PQ002 **BUILDING WATER SERVICE** NO SCALE



Legionella Management Notes

1. The length of branch piping from the hot water main to fixture mixing faucet shall be such that the piping will maintain a maximum of 32 oz of hot water according to the table below:

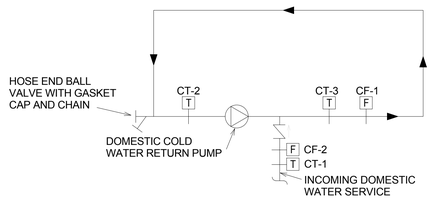
APPROXIMATE PIPE LENGTH (FEET) PER SIZE OF PIPE TO MAINTAIN 32 oz. OF WATER													
Pipe Size	Copper Type M	Copper Type L	Copper Type K	CPVC SDR 11	CPVC SCH 40	PEX-AL-PEX	PE-AL-PE	CPVC SCH 80	PEX SDR 9	PE-RT SDR 9	PP SDR 6	PP SDR 7.3	PP SDR 11
3/8"	30.19	32.99	38.10	N/A	27.35	50.79	50.79	N/A	50.00	50.00	35.16	29.36	25.81
1/2"	18.93	20.65	22.07	25.60	16.93	24.43	24.43	21.92	27.12	27.12	32.00	19.05	15.09
1/4"	9.33	9.94	11.03	11.99	9.47	9.44	9.44	11.68	13.62	13.62	0.78	12.21	9.50
1"	5.51	5.83	6.19	7.22	5.79	5.76	5.76	7.00	8.18	8.18	8.79	7.34	5.76
1 1/4"	3.68	3.83	3.96	4.84	3.31	3.77	3.77	3.88	5.51	5.51	5.58	4.70	3.72
1-1/2"	2.63	2.70	2.79	3.47	2.42	2.31	2.31	2.81	3.96	3.96	3.54	3.02	2.38
2"	1.52	1.55	1.60	2.03	1.46	1.49	1.49	1.67	2.31	2.31	2.24	1.88	1.50

2. Stored Hot Water shall be maintained at 140 degrees F (60 deg. C) or higher.

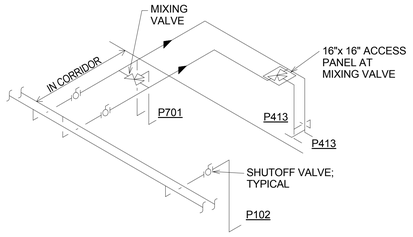
3. Hose-end ball valves shall be provided such that hot water distribution system may be flushed with biocide. Location of ports will be in vicinity of downstream of the hot water mixing valve and at the farthest end of the distribution system.

4. Prior to use of the domestic water distribution system by the public OR if water quality test deem necessary, proper and effective shock-chlorination procedure requires:

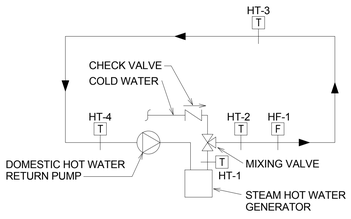
- A dosage of 50 to 200 ppm of free chlorine evenly distributed throughout the piping and fixtures
- Testing of the residual to verify that the levels are present at the fixtures and hose bib or valves sections.
- Contact time with the piping, undisturbed for 12 hours and retesting of the chlorine residual after 12 hours. I
- If the chlorine residual is less than 10 ppm after 12 hours, repeat the entire procedure above. If the beginning dose is 50 to 100 ppm and the remaining residual after 12 hours is less than 10 ppm, this indicates severe bio-fouling or large amounts of dirt or slime present requiring system flushing and repeating the sanitizing process.



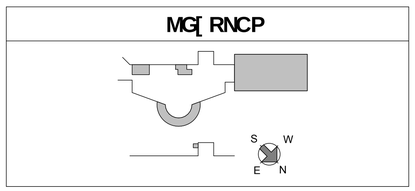
B PQ002 **DOMESTIC COLD WATER SCHEMATIC** NO SCALE



E PQ002 **PATIENT ROOM DESIGN** NO SCALE



C PQ002 **DOMESTIC HOT WATER SCHEMATIC** NO SCALE



FULLY SPRINKLERED
CONTRACT DOCUMENTS

CONSULTANTS:

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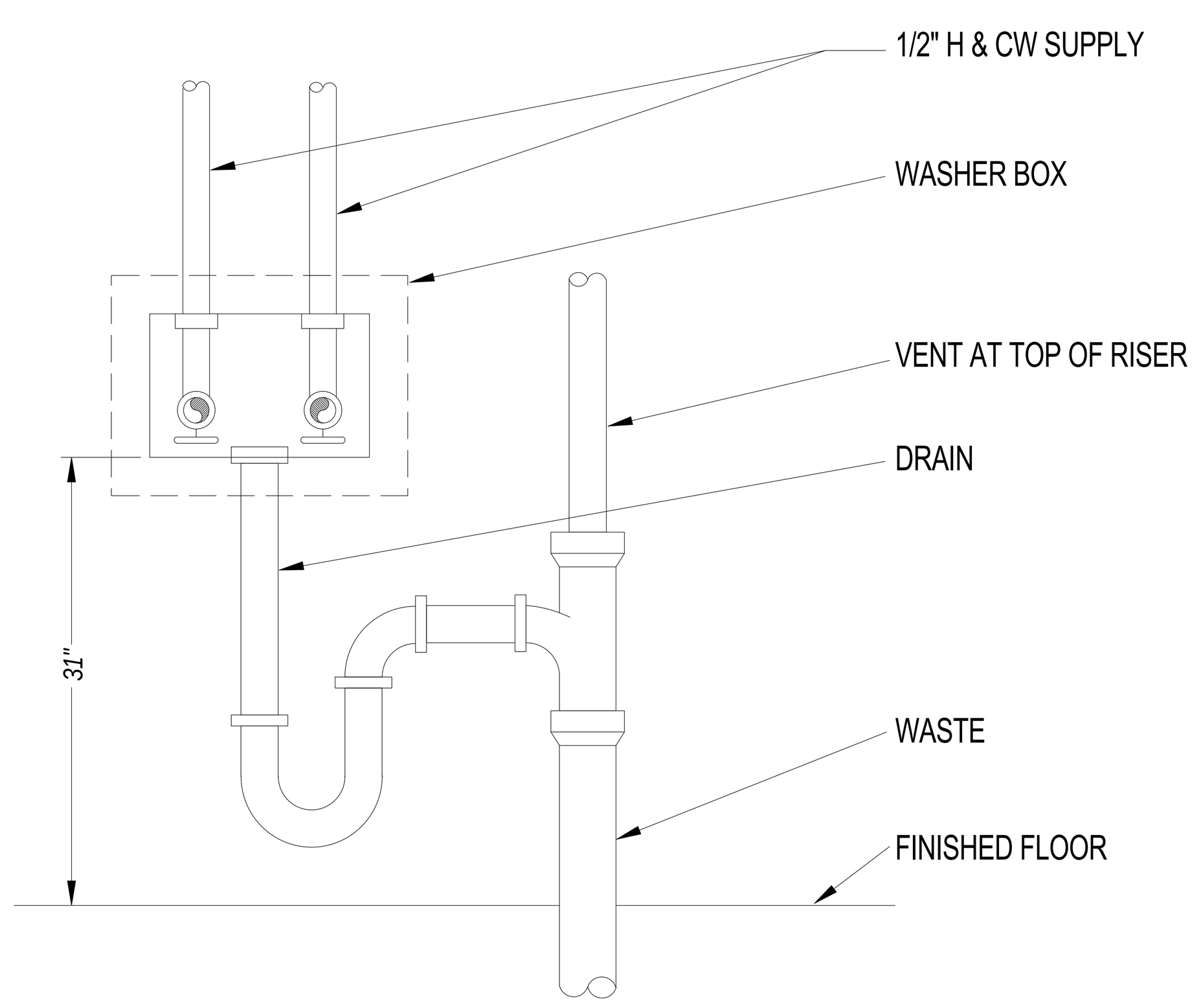
HDHD Project #XXXXXXXX
DESIGN-AIRE ENGINEERING, INC.
220 North College Ave | Indianapolis, IN 46202 | 317.464.9090 | www.daengineering.com
"DAE" Project #14049

Drawing Title: *LEGIONELLA MANAGEMENT PLAN*
Approved: Project Director

Project Title: *EXPAND 10A COMMUNITY LIVING CENTER*
Location: Carl Vinson VAMC, Dublin, GA 31021
Date: *5/16/2016* Checked: *DEH* Drawn: *ILP*
Project Number: *VA 247 150 0107*
Building Number: *10A*
Drawing Number: *PQ002*

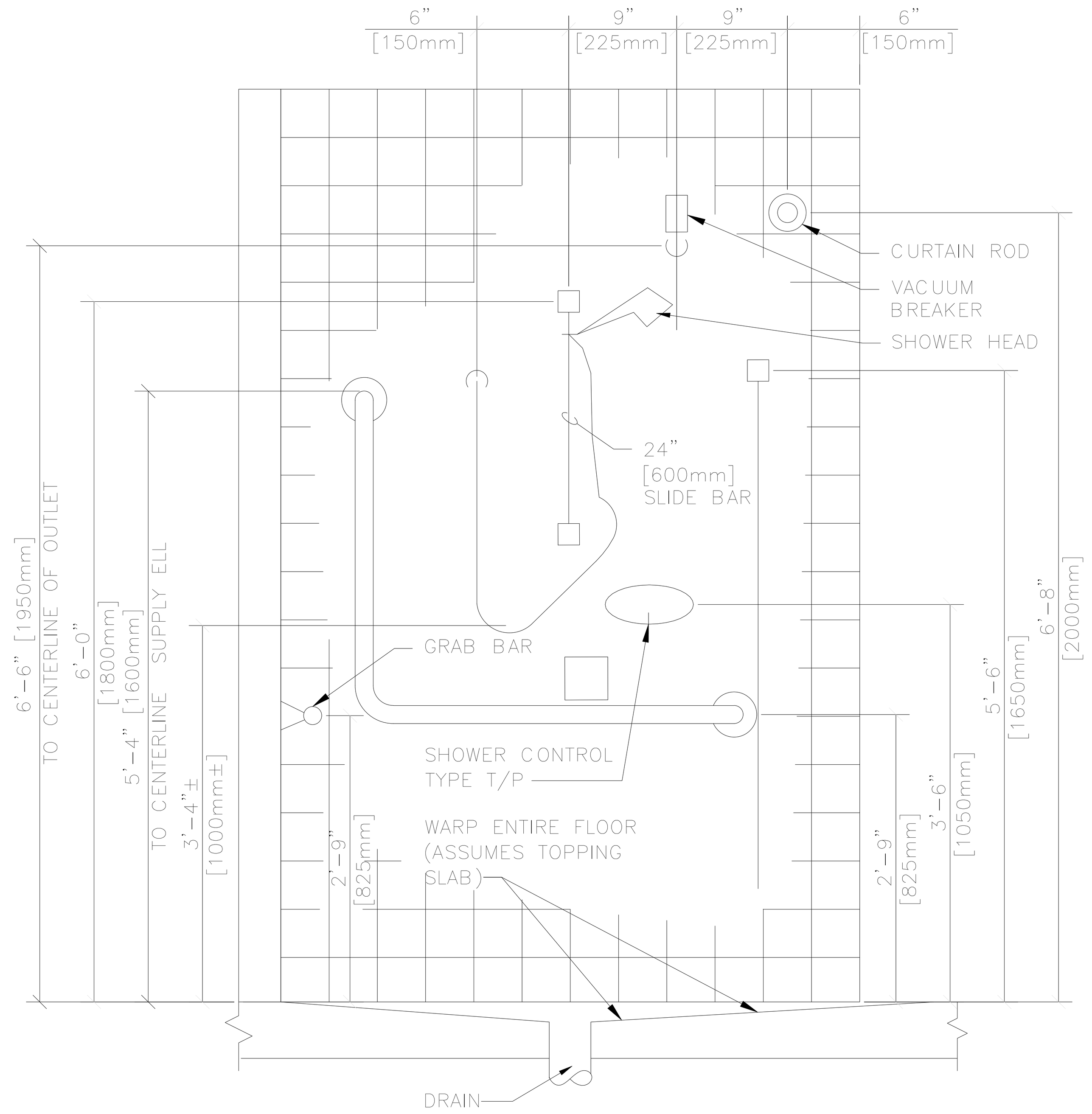
Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231, Oct 1978



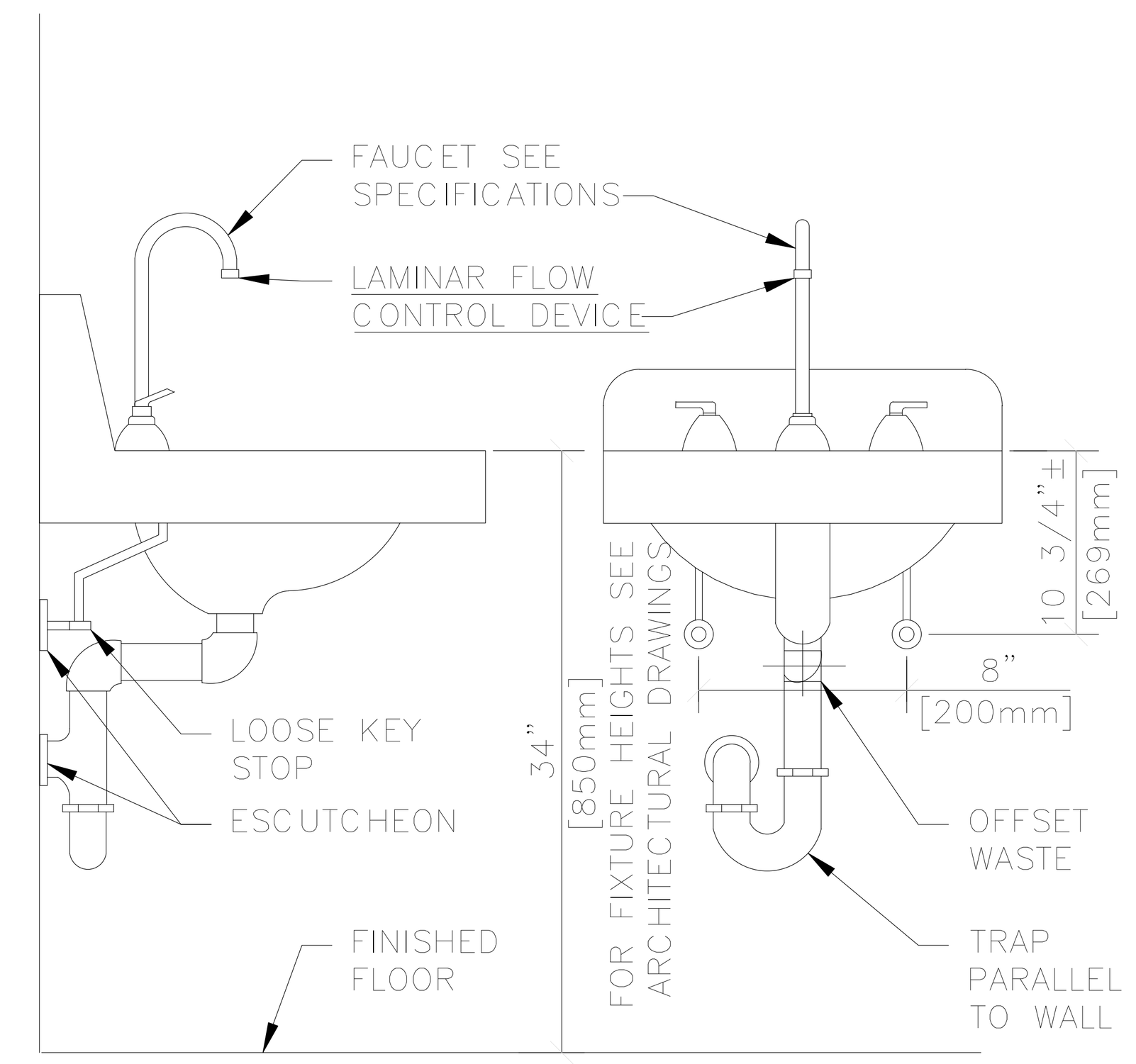
D PQ003 CLOTHES WASHER SUPPLY AND DRAIN DETAIL

NTS



C PQ003 P-701 PATIENT SHOWER

NTS



B PQ003 TYPICAL WHEELCHAIR LAVATORY DETAIL

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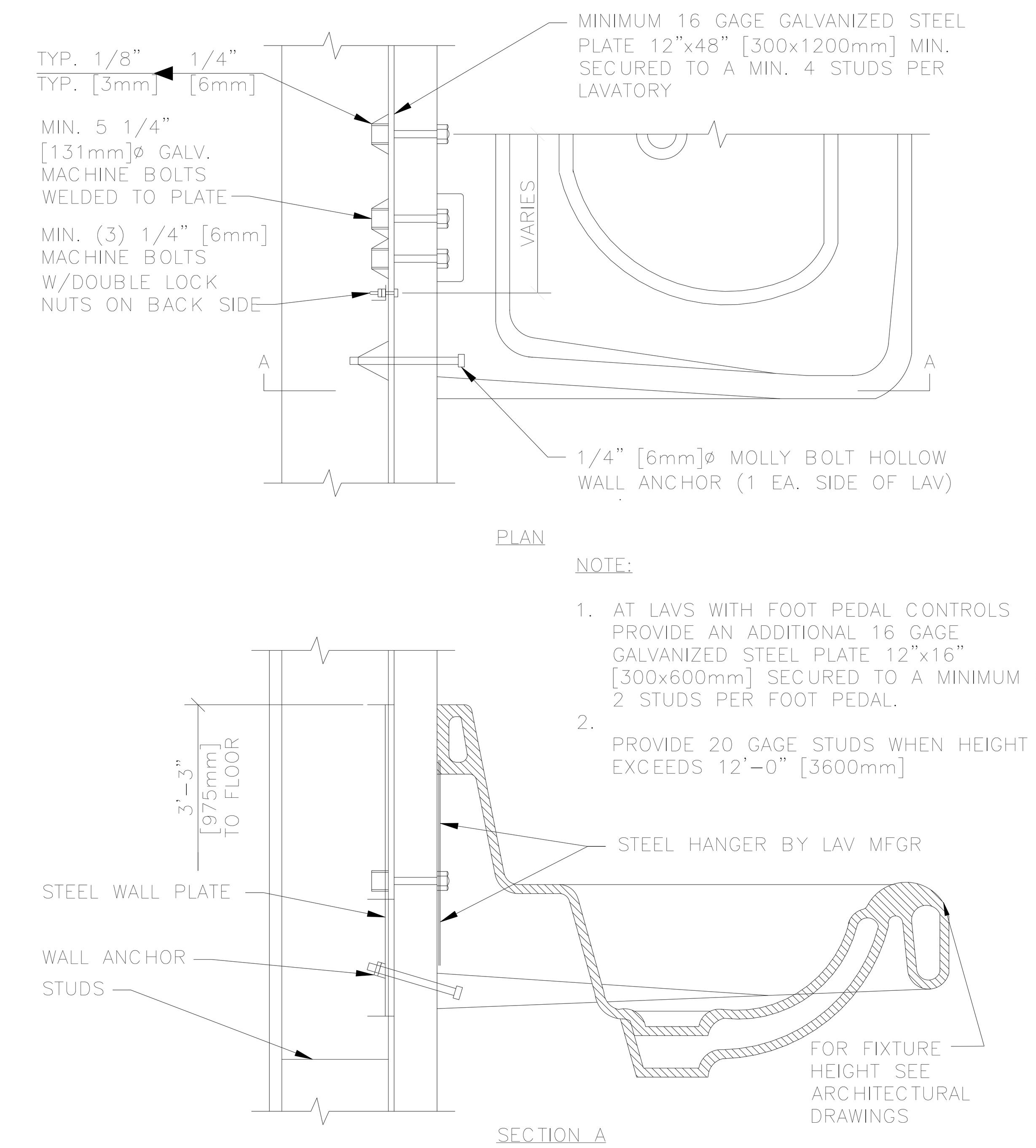

A PQ003 LAVATORY MOUNTING DETAIL

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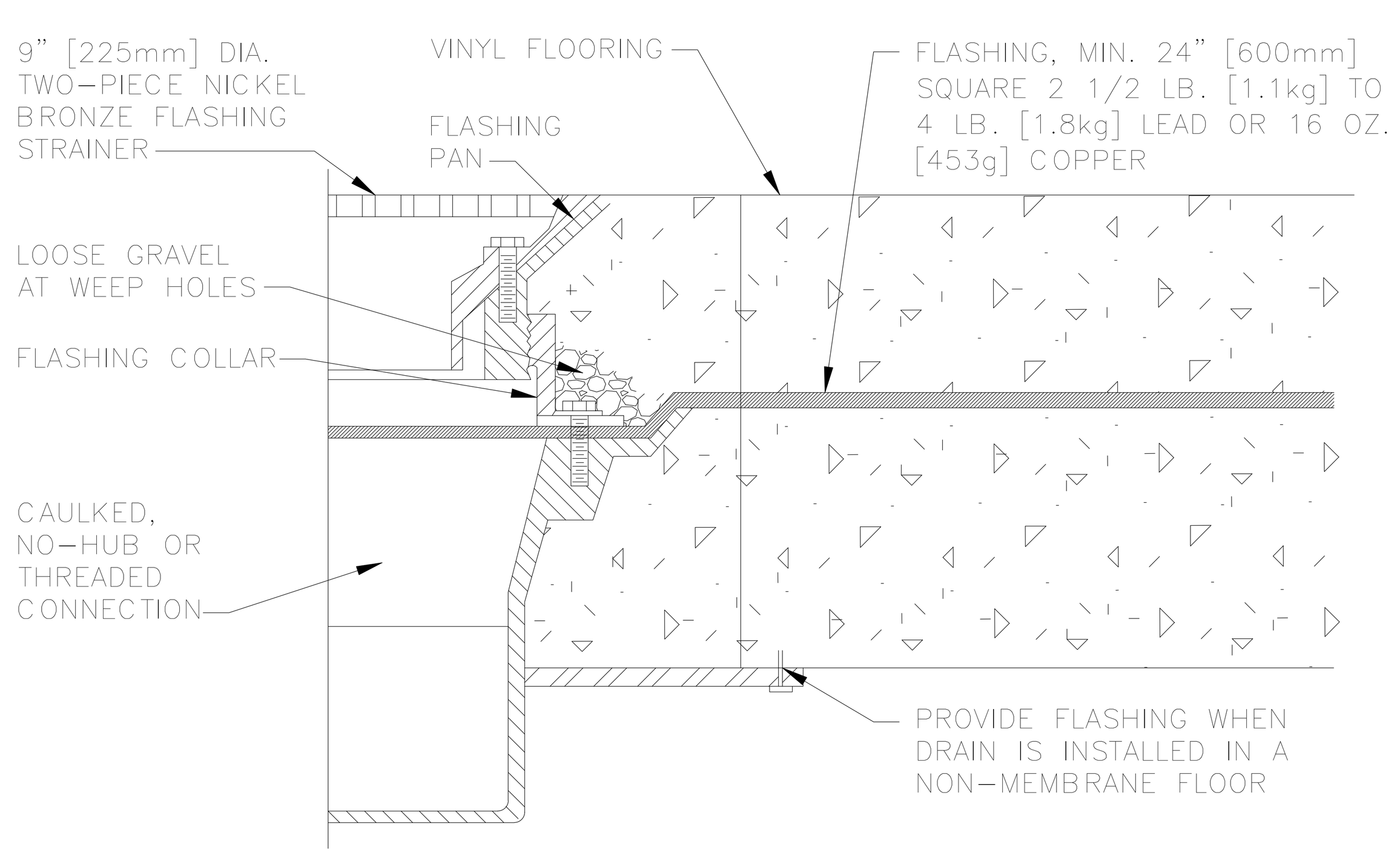
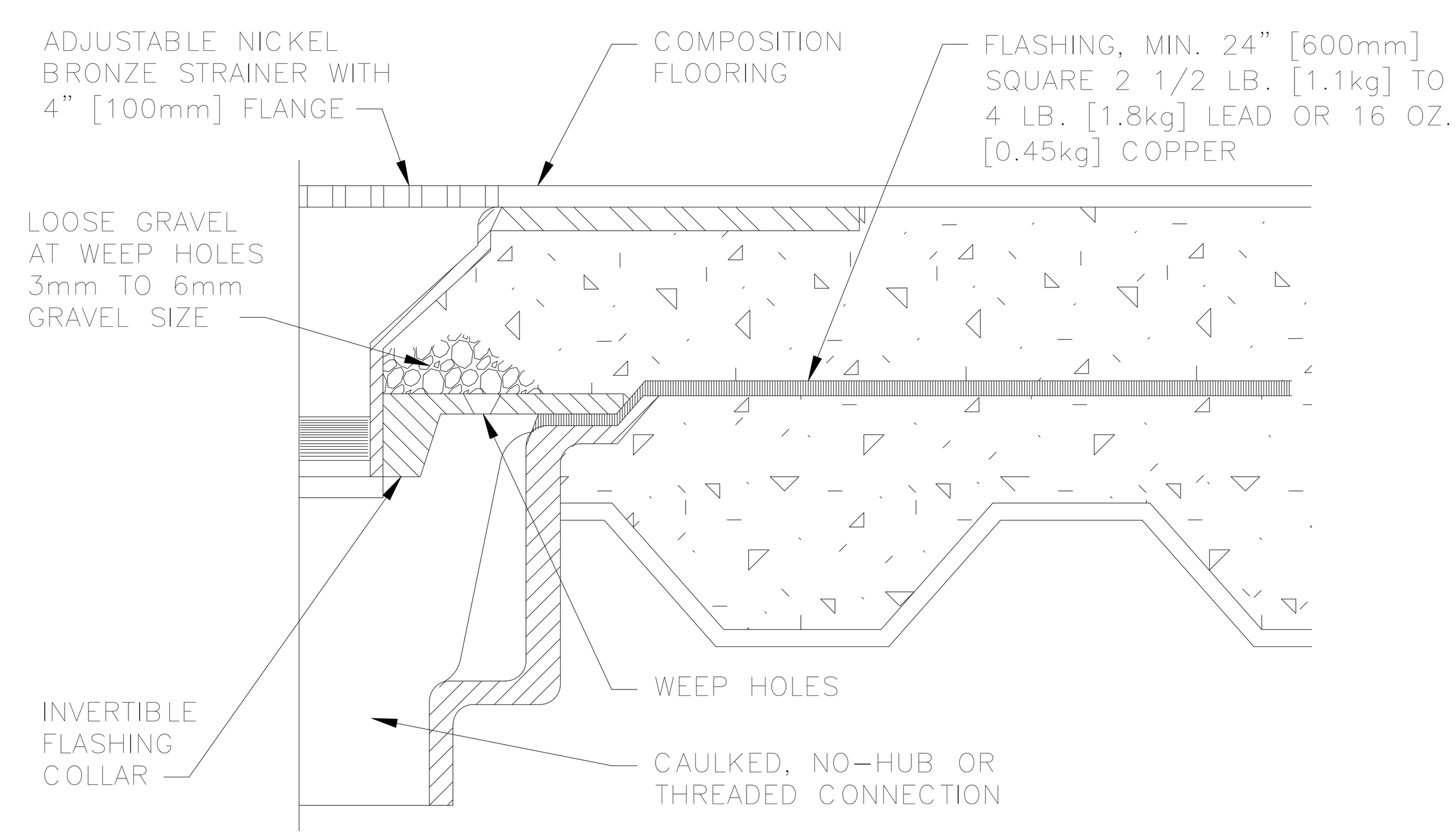


G PQ003 TYPE "F" FLOOR DRAIN DETAIL

NTS

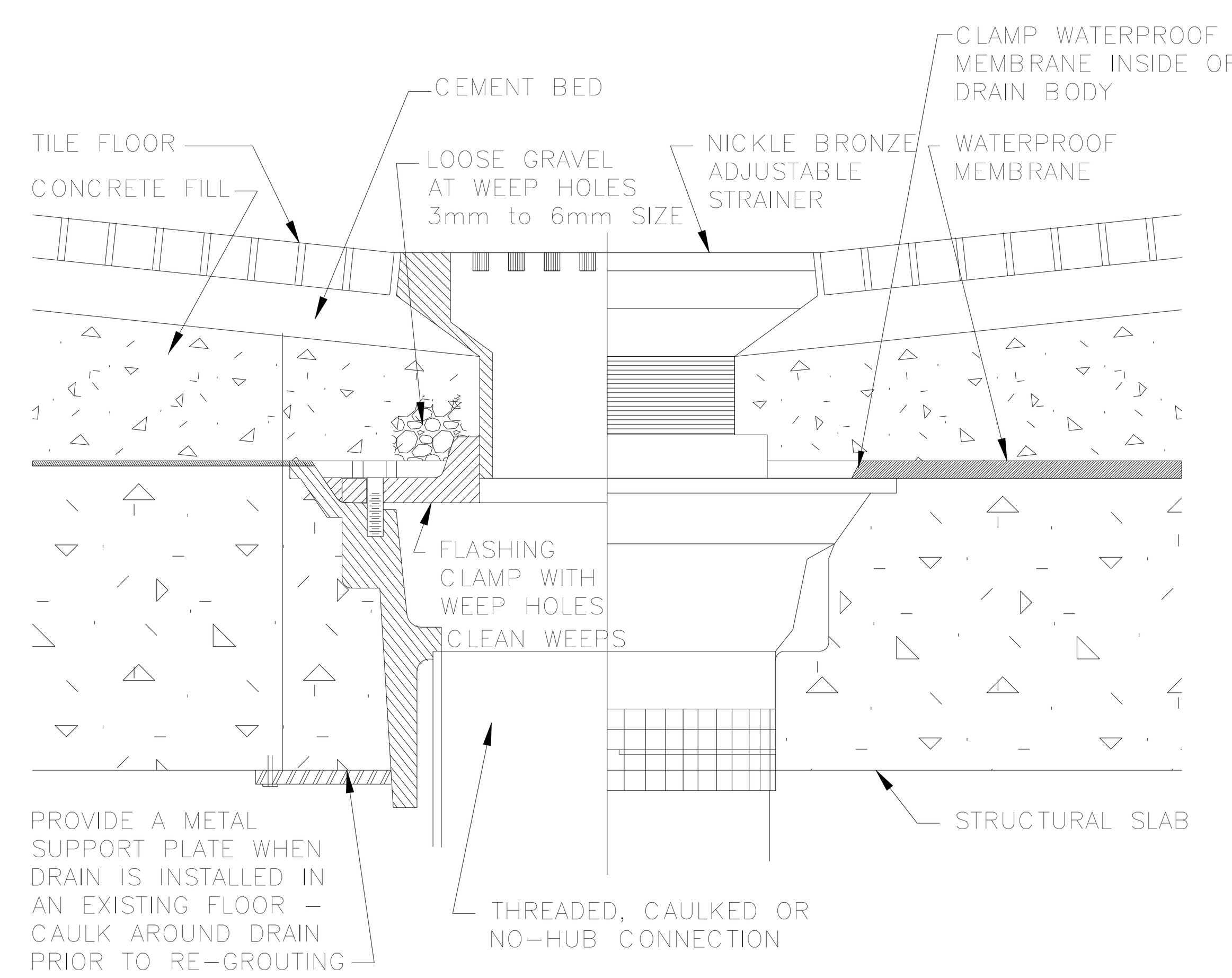


NOTE:

PROVIDE FLASHING WHEN DRAIN IS INSTALLED IN A NON MEMBRANE FLOOR

F PQ003 TYPE "D" FLOOR DRAIN DETAIL

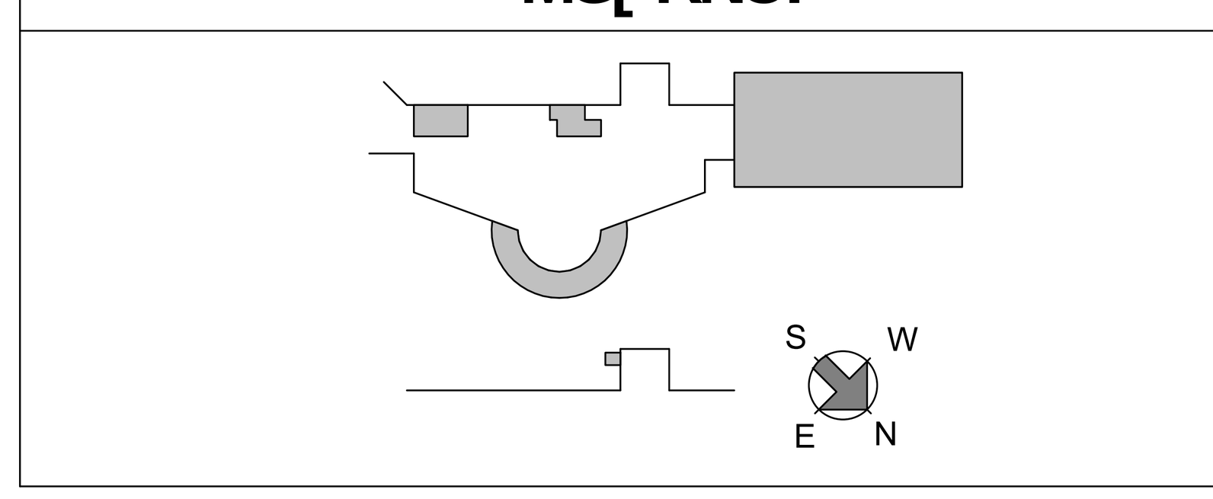
NTS



E PQ003 TYPE "C" FLOOR DRAIN DETAIL

NTS

MG[RNCP



FULLY SPRINKLERED

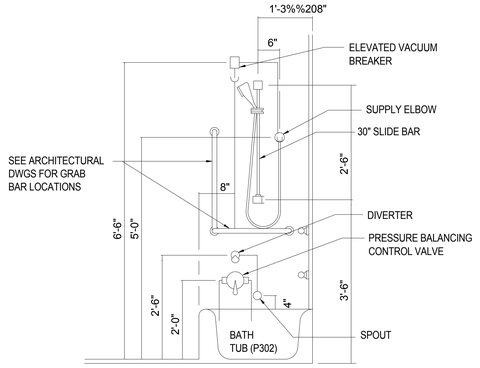
CONTRACT DOCUMENTS

CONSULTANTS:	STAMP	ARCHITECTS/ENGINEERS:	Drawing Title: PLUMBING DETAILS	Project Title: EXPAND 10A COMMUNITY LIVING CENTER	Project Number: VA 247 150 0107	Office of Construction and Facilities Management
		HUELAT DAVIS HEALING DESIGN — Xiki lplc 635 S. Fairfax Street Alexandria, VA 22314 703.838.8414 www.healingdesign.com; DAE DESIGN-AIRE ENGINEERING, INC. 220 North College Ave Indianapolis, IN 46202 317.464.9090 www.daengineering.com	Approved: Project Director	Location: Carl Vinson VAMC, Dublin, GA 31021	Building Number: 10A	Department of Veterans Affairs
		HDHD Project #XXXXXXXX; DAE Project #14049		Date: 5/16/2016 — Checked: DEH — Drawn: ILP	Drawing Number: PQ003	

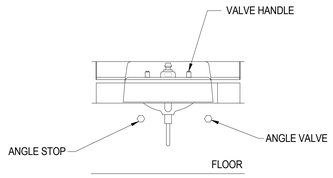
VA FORM 08-6231, Oct 1978

8/12/2016 4:03:35 PM D:\My Projects\14130-DUBLIN-15-CENTRAL_dcorrico@daengineering.com.rvt

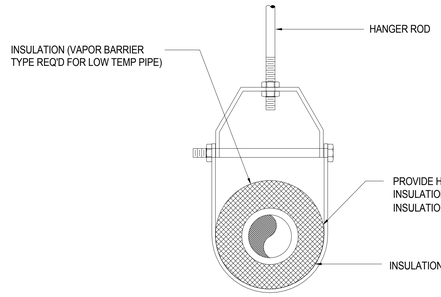
MAXIMUM PIPE/TUBING SUPPORT SPACING, FEET																	
NOM. SIZE	THRU 3/4"	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6	8	10	12	14	16	18	20	20
PIPE	7 FT.	7	7	9	10	11	12	14	16	17	19	22	23	25	27	28	30	32
TUBING	5 FT.	6	7	8	8	9	10	12	13	14	16	——	——	——	——	——	——	——
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																		



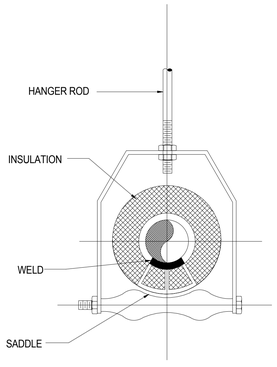
P-302 PATIENT BATHTUB ROUGH-IN
NO SCALE



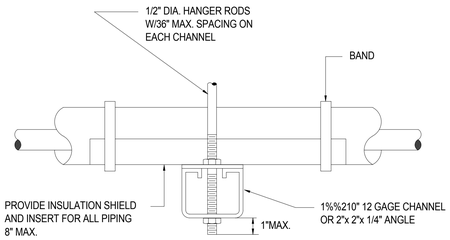
DETAIL OF P-407 LAVATORY IN PATIENT ROOM
NOT TO SCALE



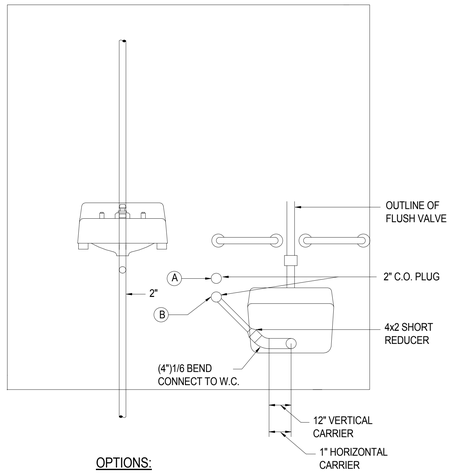
ADJUSTABLE CLEVIS HANGER TYPE 1



ADJUSTABLE ROLLER HANGER TYPE 43



TRAPEZE HANGER FOR UP TO 1000 POUND UNIFORM LOAD



OPTIONS:

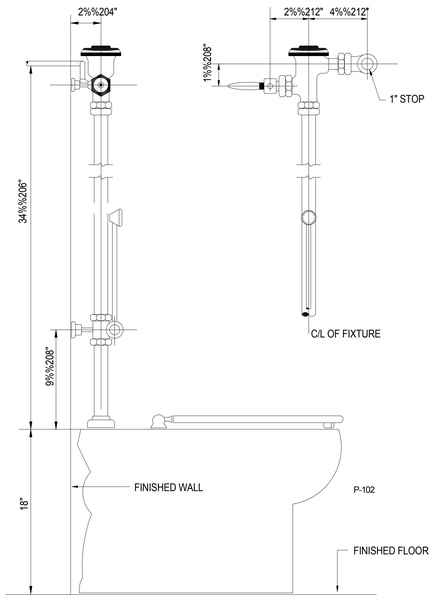
(A) LOCATION OF WALL CLEANOUTS WHERE LAVATORY AND MIRROR OCCURS

(B) LOCATION OF WALL CLEANOUTS WHERE WATERCLOSET OCCURS

WALL CLEANOUT DETAIL ELEVATION
NOT TO SCALE

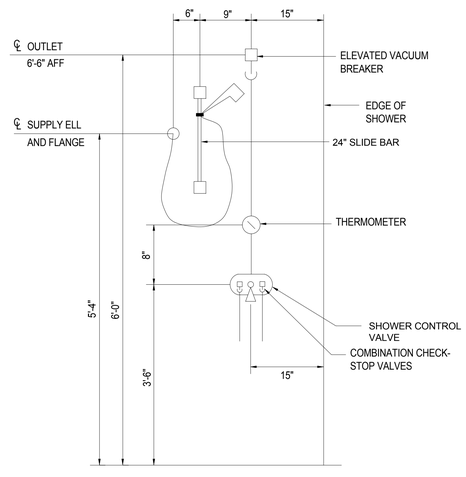
NOTE: WATER PRESSURE 35 P.S.I. MIN. 85 P.S.I. MAX.

CONGREGATE BATH TUB ROUGH-IN
NO SCALE

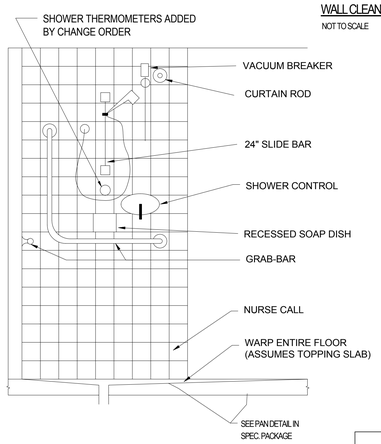


DETAIL OF P-102 WATER CLOSET
NO SCALE

PIPE HANGERS



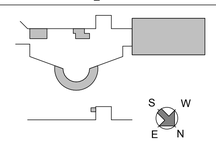
P-711 SHOWER (HANDICAP)
NO SCALE



P-701 PATIENT SHOWER
NO SCALE

SECTION A-A
SECTION B-B OPPOSITE HAND

MG[RNCP



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CONTRACT DOCUMENTS

CONSULTANTS:

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ARCHITECTS/ENGINEERS:

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HDHD Project #XXXXXXXX

DAE DESIGN-AIRE ENGINEERING, INC.
220 North College Ave Indianapolis, IN 46202 | 317.464.9090 | www.daengineering.com
"DAE" Project #1049

Drawing Title: *PLUMBING DETAILS*

Approved: Project Director

Project Title: *EXPAND 10A COMMUNITY LIVING CENTER*

Location: Carl Vinson VAMC, Dublin, GA 31021

Date: *5/16/2016* | Checked: *DEH* | Drawn: *ILP*

Project Number: *VA 247 150 0107*

Building Number: *10A*

Drawing Number: *PQ004*

Office of Construction and Facilities Management

Department of Veterans Affairs