Central Alabama Water

2-1/2" AND LARGER BACKFLOW PREVENTERS

2 - 1/2” & Larger Backflow Preventers

Note:

FIRE SERVICES FOUND ACTIVATED BY OTHER THAN CENTRAL ALABAMA WATER (CAW) PERSONNEL WILL BE TERMINATED BY CAW PERSONNEL AND ALL EXPENSES BILLED TO THE APPLICANT.

A TEMPORARY TURN ON FOR AN EIGHT (8) HOUR PERIOD FOR TESTING PURPOSES WITHOUT FINAL APPROVAL BY THE FIRE SERVICE INSPECTOR WILL BE GRANTED BY CAW BY CONTACTING CAW SYSTEM DEVELOPMENT DEPARTMENT TEAM AT (205) 244-4251 OR (205) 244-4254.

WHEN READY FOR PERMANENT ACTIVATION OF THE FIRE SERVICE, THE APPLICANT OR AGENT MUST CONTACT CAW TEAM AT (205) 244-4251 OR (205) 244-4254 FOR APPROVAL.

WATER SERVICE CUSTOMERS:

YOU ARE REQUIRED BY CENTRAL ALABAMA WATER (CAW) TO HAVE A BACKFLOW PREVENTION ASSEMBLY INSTALLED ON YOUR SERVICE PIPING AS CLOSE TO THE SERVICE CONNECTION AND PROPERTY LINE AS PRACTICABLE, GENERALLY WITHIN 6-10 FEET OF THE METER SETTING.

PLEASE REFER TO YOUR COPY OF THE TAP ORDER FOR THE REQUIRED BACKFLOW ASSEMBLY. DRAWINGS AND DESCRIPTIONS OF PROPER INSTALLATION FOR EACH TYPE OF BACKFLOW ASSEMBLY ARE ATTACHED AT THE END OF THIS DOCUMENT.

ALL ASSEMBLIES MUST BE TESTED WITHIN 30 DAYS OF INSTALLATION AND ANNUALLY THEREAFTER BY ONE OF THE CERTIFIED TESTERS APPROVED BY CAW. THE CUSTOMER WILL BE NOTIFIED WHEN THE PREVIOUS TEST DATE HAS EXPIRED. FOR AN UPDATED LIST OF CERTIFIED TESTERS PLEASE CONTACT OUR CAW SYSTEM DEVELOPMENT DEPARTMENT TEAM AT (205) 244-4251 OR (205) 244-4254.

THE CERTIFIED TESTER HAS THE RESPONSIBILITY TO GET THE TEST AND MAINTENANCE REPORT TO THE CUSTOMER. THE TESTER MUST ALSO SEND A COPY OF THE REPORT TO THE CAW SYSTEM DEVELOPMENT DEPARTMENT TEAM AT THE FOLLOWING EMAIL ADDRESS:

back.flow@caw-al.gov

INSTALLATION OF 2-½" AND LARGER BACKFLOW PREVENTERS

INSTALLATION OF BACKFLOW PREVENTERS FOR FIRE AND DOMESTIC SERVICES

Backflow prevention and detector assemblies as required by Central Alabama Water (CAW) shall be installed on the customer's service piping and situated on the premises as close to the meter setting and property line as practicable, generally within 6-10 feet of the meter. They shall be installed in the position as recommended by the manufacturer and should be protected from freezing. No intervening connections or by-pass shall be between the service connection and outlet side of the assembly except for by-pass meter piping on detector assemblies.

DUAL CHECK VALVE - BACKFLOW PREVENTER: The term shall mean a device composed of two in-line independently acting, approved check valves. This device is not testable and does not have shut-off valves at each end of the device or fitted with test cocks (see Section 9 Figure 9.03 in Backflow Policy Manual for additional details). This device shall only be used for residential services and to protect against a non-health hazard (i.e., pollutant).

DOUBLE CHECK VALVE - DETECTOR ASSEMBLY: The term shall mean a specifically designed assembly composed of a line-size approved double check valve assembly with a specific by-pass water meter and a meter-sized approved double check valve assembly. The meter shall register accurately for only very low rates of flow and shall show a registration for all rates of flow. (see Section 9 Figure 9.07 in Backflow Policy Manual for additional details) This assembly shall only be used on a fire protection service to protect against a non-health hazard (i.e., pollutant).

REDUCED P R E S S U R E PRINCIPLE BACKFLOW PREVENTER DEVICE (ASSEMBLY): The term shall mean an assembly containing two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valve. The unit shall include properly located test cocks and tightly closing shut-off valves at each end of the assembly (see Section 9 Figure 9.05 in Backflow Policy Manual for additional details). This assembly is designed to protect against a health hazard (i.e., contaminant).

PRESSURE VACUUM BREAKER (PVB): An assembly consisting of an independently operating, internally loaded check valve, an independently operating, loaded air-inlet valve located on the discharge side of the check valve, with properly located resilient-seated test cocks and tightly closing resilient-seated shutoff valves attached at each end of the assembly designed to be operated under pressure for prolonged periods of time to prevent backsiphonage. The pressure vacuum breaker may not be subjected to any backpressure.

SPECIFICATIONS FOR BACKFLOW PREVENTER VAULTS

1.0 - GENERAL REQUIREMENTS

1.1 - DESCRIPTION/SCOPE

This specification applies to reinforced concrete (pre-cast or cast in place) and reinforced concrete block underground vaults to be used for housing backflow preventers 2 ½" and larger.

1.2 - QUALITY ASSURANCE

The manufacturer shall furnish a notarized certification to Central Alabama Water (CAW) that all items were manufactured in full compliance with these specifications.

Any and each future change in the design of the vault ***MUST*** be resubmitted with another notarized certification and new design drawing per Section 1.3 of this specification.

The entire process of the manufacture of items to be furnished under this specification shall be open at all times to the inspection of Central Alabama Water's Engineer or his/her designated alternate. All defects shall be corrected to his/her satisfaction, or the material will be rejected. Approval at time of plant inspection shall not prevent rejection if defects are subsequently discovered.

1.2.1 - REFERENCES, STANDARDS, AND SPECIFICATIONS

American Society for Testing and Materials (ASTM):

- **C858**

  Underground Pre-cast Concrete Utility Structures

- **C890**

  Practice for Minimum Structural Design Loading for Monolithic or Sectional Pre-cast Concrete Water and Wastewater Structures

- C913

  Pre-cast Concrete Water and Wastewater Structures

- C478

  Pre-cast Reinforced Concrete Manhole Sections

- CIS

Deformed and Plain Fillet-Steel Bars for Concrete Reinforcement

- C31

Making and Curing Concrete Test Specimens in the field

- C33

Concrete Aggregates

- **C39**

Compressive Strength of Cylindrical Concrete Specimens

- CISO

Portland Cement

- **C260**

Air-Entraining Admixture for Concrete

- C494

Chemical Admixtures for Concrete

American Welding Society (AWS):

- AWS-D1.4

Structural Welding Code (Reinforcing Steel)

American Concrete Institute (AC!):

- ACI 318

Building Code Requirements for Reinforced Concrete

American Association of State Highway and Transportation Officials (AASHTO)

(Or specify the loading that the boxes are tested at)

When reference is made in this specification to the above references, standards, and specifications, it is understood that the latest revision thereof shall apply. The manufacturer should especially note that this part of the specifications applies to all items with additional requirements set forth for each type.

1.2.2 - DEFINITIONS

- Manufacturer

Producer and/or designer of underground pre-cast concrete vaults

- Contractor

Installer of underground pre-cast concrete vaults or constructor of cast-in-place concrete and/or concrete block vaults

- Owner

Purchaser of underground pre-cast concrete, cast-in-place concrete, and/or concrete block vaults

1.3 - SUBMITTALS

The manufacturer shall submit a design drawing for the specified vaults which shall contain the following:

- Signature and dated stamp of a Professional Engineer registered in the State of Alabama
- Design loads used (i.e. AASHTO H-10 traffic loading, etc.)
- Concrete compressive strength (i.e. 4,000 psi@ 28 days, etc.)
- Grade of reinforced steel (i.e. ASTM A-615 Grade 60, etc.)
- Number, size, and placement of ALL reinforcement used to include corners and openings
- Standard Design (i.e. assumed depth below grade of top of slab, depth below grade of water table, etc.)
- Location of all associated components (i.e. manhole steps, sump, door, etc.)
- Detailed drawing and design information on the lifting anchors

1.4 - PRODUCT DELIVERY

The manufacturer shall coordinate with the owner/contractor concerning delivery and schedule. The manufacturer of pre-cast concrete vaults shall also coordinate the installation of their product with the owner/contractor

2.0 - PRODUCTS

2.1 - SERVICE CONDITIONS/DESIGN CRITERIA

- The underground vaults shall be used to house 2 ½" and larger backflow preventers and shall be constructed of reinforced concrete or reinforced concrete block. The purpose of the vault is to protect the backflow preventer assembly. The vault shall also provide adequate clearance for easy access for maintenance and testing.
- The top of the box shall be at grade.
- Any site preparation required by the manufacturer of precast underground vaults will need to be coordinated with the contractor/owner. (i.e. base material preparation, compaction, etc.)
- Each vault shall be designed and constructed to meet the applicable requirements of ASTM, AWS, and ACI references listed in Section 1.2.1 of this specification.

Minimum cleara11cesldimensions are shown on the attached sketch.

The loads used for design shall co11sist of "Dead", "Live", "Impact", and "Water" (hydrostatic) Loads. These loads are described as follows:

Dead and Water Loads:

The "Dead" and "Water" loads shall consist of soil loads and hydrostatic loads. Soil parameters used shall be a density of I 00 pcf and an "active" pressure coefficient of 0.3. The water table shall be assumed at 3.0' below grade.

Live and Impact Loads:

The "Live" and "Impact" loads shall consist of a pedestrian load of 350 psf and a traffic load using AASHTO loading H-10 loading. Ther the vault will be subject to heavy vehicular traffic, a loading of AASHTO H-20 shall be used, the "Live" and/or "Impact" load that produces the maximum shears and bending moments in the structure shall be the governing load case.

2.2 - DETAILS OF CONSTRUCTION

- The interior of each pre-cast vault shall contain the printed name of the manufacturer and vendor
- An access door will be provided and shall be Thompson THG-4A-316 or Bilko sidewalk door type J-4AL single leaf (36 x 36) or approved equal. The door shall have a cut away recess for a padlock. Tow inch diameter holes shall be cut into all four sides of the channel frame to allow for drainage into the vault. The door leaf shall be 0.25" thick aluminum plate reinforced to 300 psf "Live" load. The access door shall be located flush with the walls edge and centered over the meter, where applicable. The lids shall be rated for AASHTO H-10 loading and H-20 where applicable.
- Manhole steps will be installed and shall be Neenah No. R-1982-1 or approved equal on 15" centers.
- The backflow prevention assemblies must be approved and meet the latest standards of ASSE Std No. 1048, AWWA Std. No. C-51089, FM, UL Classified, and tested and certified by a Central Alabama Water approved backflow tester.
- The construction joint separating the top and bottom sections of the vault shall be located a minimum of 2 feet below grade. The joint shall be designed to prevent movement between the top and bottom sections of the vault.
- The sump pit shall be installed in the comer opposite the access door. The dimensions of the sump shall be 12" in diameter and 4" deep.
- The floor of the vault shall be sloped a minimum of 0.125" per foot downward toward the sump pit.
- An opening shall be provided through the wall at floor level for drainage. A 3" drain pope will be required for backflow preventers sizes 3" and smaller. Backflow preventers larger than 3" will require a 4" drainpipe.
- Openings in the wall for piping shall be sealed with an appropriate sealant.
- The exterior of reinforced concrete block vaults shall be waterproofed with cement and hydroxide coatings
- The lifting anchors shall be properly designed and installed for both lifting and handling of the product pieces.
- A minimum clearance of 8" shall be provided between the wall and the outer circumference of the hand wheel on the O.S.&Y. gate valve.
- Manufacturers vault shall comply with ALL minimum dimensions contained on the attached drawings.
- A copy of the Cross-Connection Control and Backflow Prevention Policy Manual can be obtained from the CAW System Development Department Team and may also be viewed on the Central Alabama Water website at www.caw-al.gov

APPROVED MANUFACTURERS OF BACKFLOW PREVENTER ASSEMBLY STRUCTURES

Prefabricated Concrete Vault Manufacturers:

(To be used for 2" and larger backflow preventers)

a. BARTOW PRECAST
Phone: (770) 382-4462
Contact: Josh Gaines
approved for submitted vaults with inside clear 4'x6'x4½', 5'x8'x5½', and 6'x!0'x7'

b. Eagle Wholesale Supply, Inc.
Phone: (256) 232-2I 00
Contact: Curtis Anderson
approved for submitted vaults with inside clear 4'x6'x5½', and 5'x8'x4½'

Prefabricated Insulated Cover Manufacturer

(To be used for RP backflow preventers)

a. HOTBOX/ HUBBELL
Phone: (800) 346-3062

b. SAFE-T-COVER, INC.
Phone: (800) 245-6333

c. AQUA SHEILD
Phone: (800) 613-3339

d. G&C ENCLOSURES
Phone: (888) 753-6565

Backflow Preventer Box Manufacturer

(To be used for 2 inch and smaller backflow preventers)

a. Old Castle Precast
Phone: (888) 965-3227
Supplied by Core and Main
Phone: (205) 621-4561
Approved for BCF Series Meter Boxes

b. Hubbell
Phone: (800) 346-3062
Approved for Quazite PG I 730BA30 Boxes

CENTRAL ALABAMA WATER SERVICE AREA:

Contractor Punch List

Fire Service

- BFP Type (Refer to tap order) meets ASSE, AWWA, FM, UL, and USC standards
- No water in vault. Vault floor sloped 1/8" per foot toward sump and drain. (Do not grout floor)
- O.S.&Y. or Butterfly Valves meet USC, UL and FM fire protection approval.
- No. One Test Cock on inlet side of No. One Shut Off Valve. Brass plugs installed in all test cocks.
- By-pass Assembly installed correctly (Detector Double Check Only)
- Mag Meter or By-Pass Meter installed correctly (meter furnished and installed by Central Alabama Water)
- Minimum clearance of assembly in vault. Vault constructed correctly per Central Alabama Water BFP specifications.
- Manhole steps 15" on center and centered under sidewalk door.
- Sidewalk door. (Central Alabama Water approved 36" x 36" access hatch)
- Adjustable pipe jacks installed under Backflow Preventer Assembly
- Drain installed correctly (PVC pipe extending 6' from vault into no less than 1 cy yard of crushed stone)
- Sump pump installed and working properly. Sump pit 12 inches in diameter and 4 inches deep
- The interior of each pre-cast vault shall contain the printed name of both the manufacturer & vendor
- The opening for the Fire Department connection shall be grouted with Portland Cement

Domestic Service

- BFP Type (Refer to tap order) meets ASSE, AWWA, FM, UL, and USC standards
- No water in vault. Vault floor sloped 1/8" per foot toward sump and drain. (Do not grout floor)
- O.S.&Y. or Butterfly Valves meet USC standards (3" and larger)
- Ball valves for 2" and smaller
- No. One Test Cock on inlet side of No. One Shut-Off Valve. Brass plugs installed in all test cocks
- Minimum clearances of assembly in vault or in approved enclosure
- Manhole steps 15" on center and centered under sidewalk door.
- Sidewalk door. (Central Alabama Water approved 36" x 36" access hatch)
- Minimum drain opening in above ground enclosure; 4 times area of discharge opening
- Adjustable pipe jacks installed under Backflow Preventer Assembly.
- Drain installed correctly (PVC pipe extending 6' from vault into no less than 1 cy yard of crushed stone)
- Sump pump installed and working properly. Sump pit 12 inches in diameter and 4 inches deep
- The interior of each pre-cast vault shall contain the printed name of both the manufacturer & vendor
- The RPZ must be installed 12" - 36" above final grade and CANNOT be installed in a basement
- RPZ minimum drain opening must be 4 times the area of the relief valve opening

Central Alabama Water (CAW)

* For inquiries contact the CAW System Development Department Team at (205) 244-4251, (205) 244-4254, or (205) 244-4256.

FIVE (5) TYPES OF INSTALLATION THAT REQUIRE BACKFLOW PREVENTION

1. Any new commercial, irrigation, or fire service must be equipped with the required backflow prevention assembly determined by Central Alabama Water (CAW).
2. Any new residential service which is two (2) inches or greater in diameter.
3. Any new residential service where an alternate water supply exists on the property, or where an irrigation system will be attached.
4. Any new or existing service where, in the judgement of CAW, protection from a backflow condition, either actual or potential, is required.
5. Any backflow prevention assembly which was required to be installed by CAW must be tested and reported thereof within thirty (30) days of activation of service and on an annual basis thereafter.

TYPICAL BACKFLOW PREVENTION DEVICE INSTALLATIONS

DOUBLE CHECK VALVE ASSEMBLY (DC) INSTALLATION

SEE SEC. 9.4

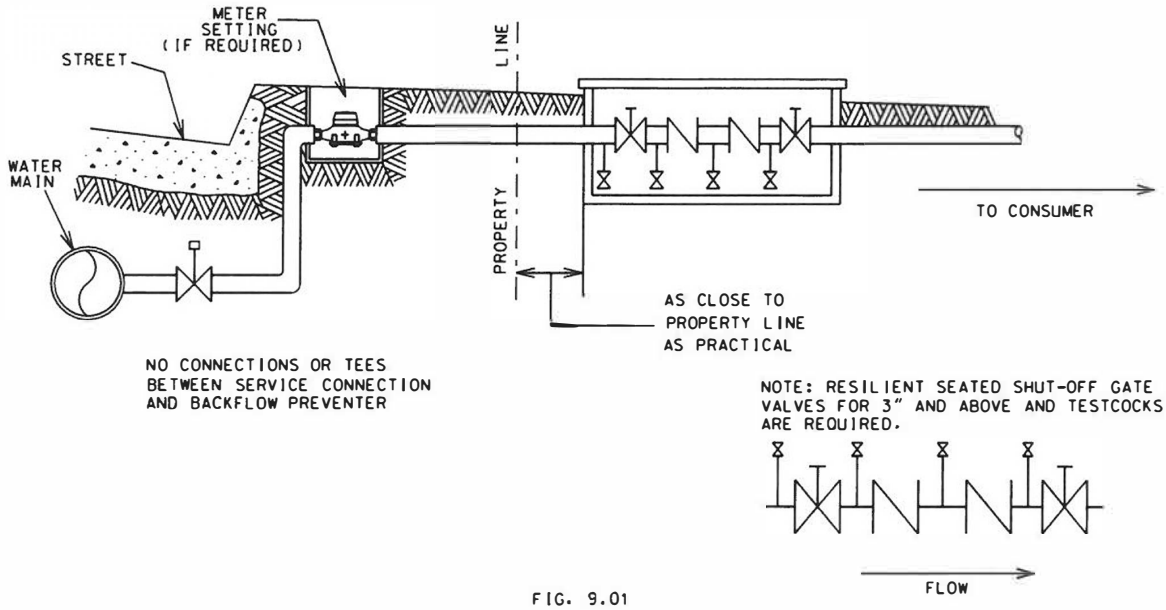

FIG. 9.01

REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY (RP) INSTALLATION

SEE SEC. 9.5

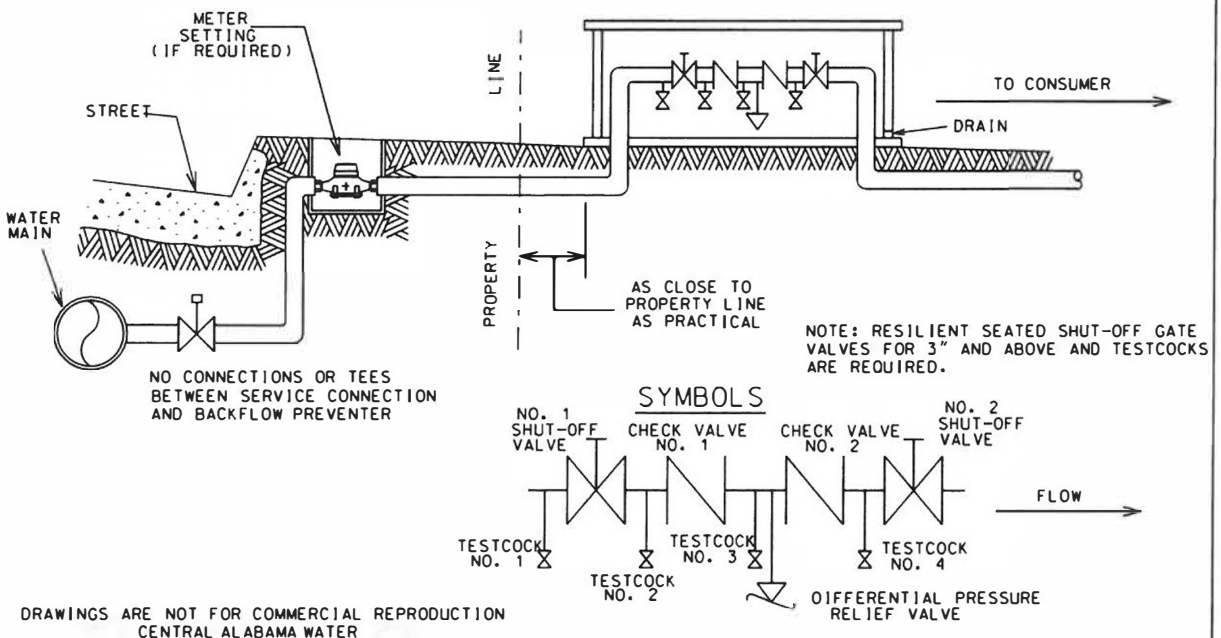

FIG. 9.11

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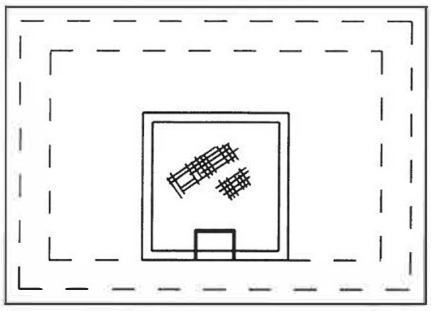
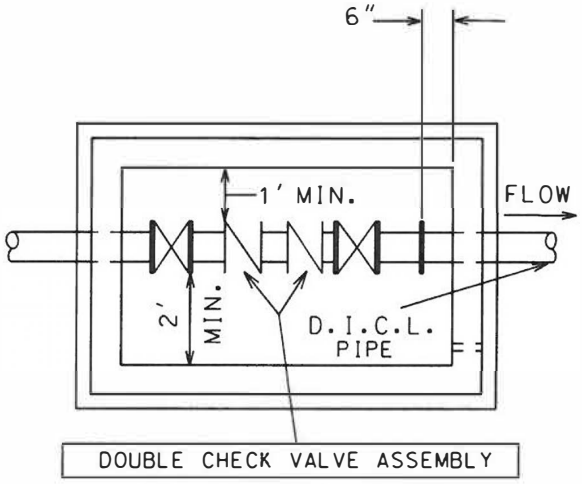
DOUBLE CHECK VALVE (DC) BACKFLOW PREVENTER TYPICAL INSTALLATION FOR 2½" AND LARGER



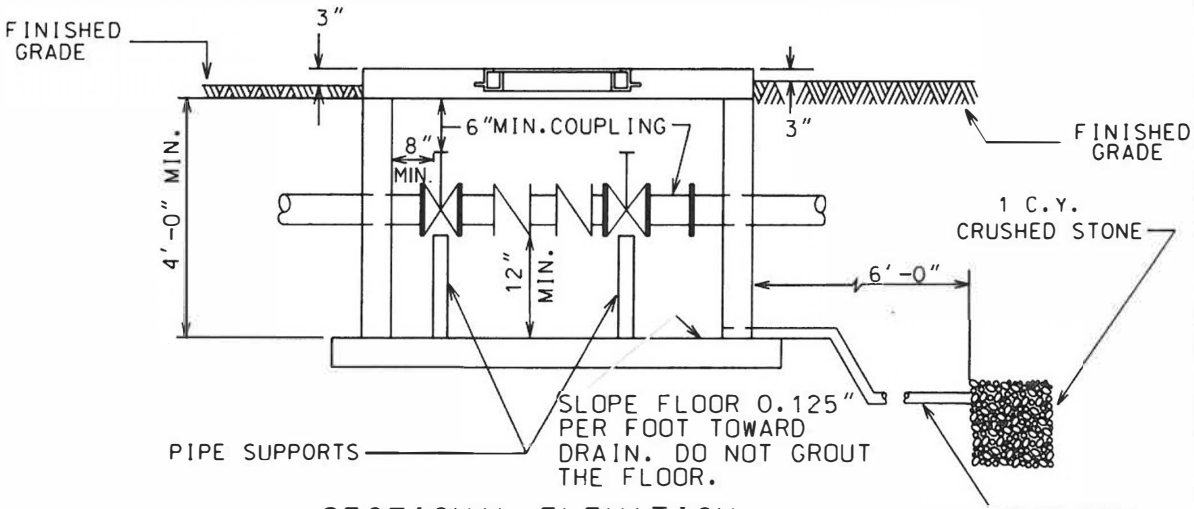
PLAN



SECTIONAL PLAN

NOTES:

1. THE TYPE OF VAULT CONSTRUCTION IS OPTIONAL WITH OWNER. THE OBJECTIVES ARE PROTECTION FOR THE ASSEMBLY, ADEQUATE CLEARANCE AND EASY ACCESS FOR MAINTENANCE AND TESTING.
2. THIS DRAWING IS STRICTLY TO ILLUSTRATE MINIMUM CLEARANCES AND DIMENSIONS OF THE VAULT. FOR SPECIFIC DESIGN DETAILS, REFERENCE ATTACHED SPECIFICATION.
3. PREFABRICATED CONCRETE VAULTS MAY BE INSTALLED. REFER TO APPROVED MANUFACTURERS OF BACKFLOW PREVENTER ASSEMBLY STRUCTURES ON PAGE 6 OF THE ATTACHED SPECIFICATIONS.



SECTIONAL ELEVATION

FIG. 9.04

DRAWINGS ARE NOT FOR COMMERCIAL REPRODUCTION
CENTRAL ALABAMA WATER

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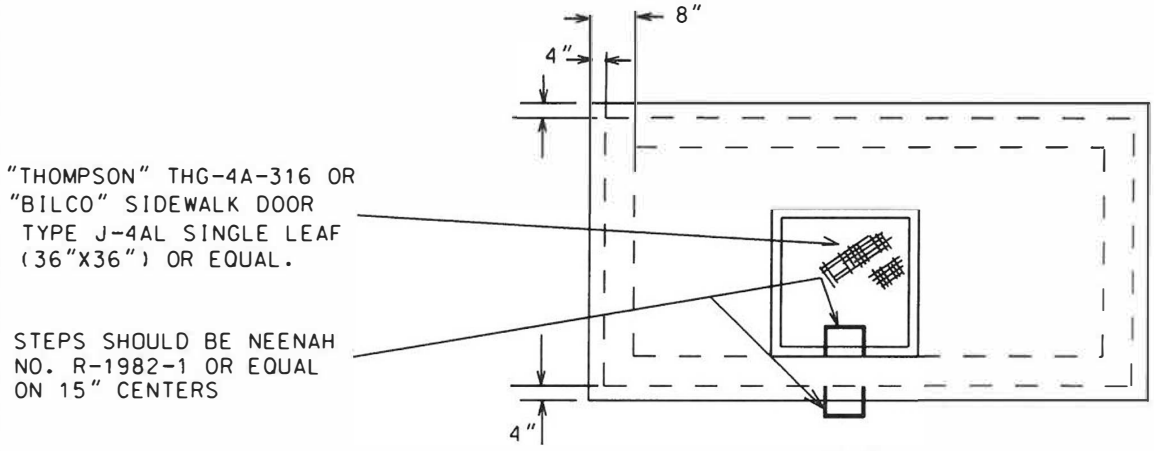
FEBRUARY 2000
REV. JUNE 2000

TYPICAL INSTALLATION FOR REDUCED PRESSURE PRINCIPLE (RP) BACKFLOW PREVENTERS



PLAN

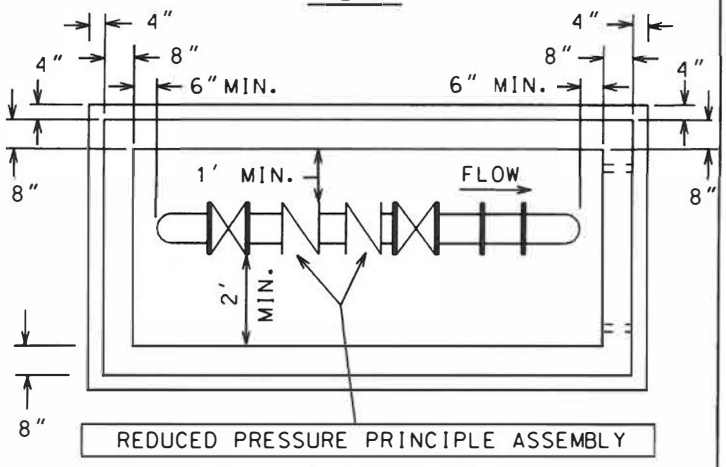
NOTES:

1. THE TYPE OF VAULT CONSTRUCTION AND OUTSIDE FINISH IS OPTIONAL WITH OWNER. THE OBJECTIVES ARE PROTECTION FOR THE ASSEMBLY, ADEQUATE CLEARANCE, EASY ACCESS FOR MAINTENANCE AND TESTING.

2. VAULT CONSTRUCTION SHOULD BE OF CONCRETE BLOCKS OR FORMED WITH CONCRETE, 6" THICK.

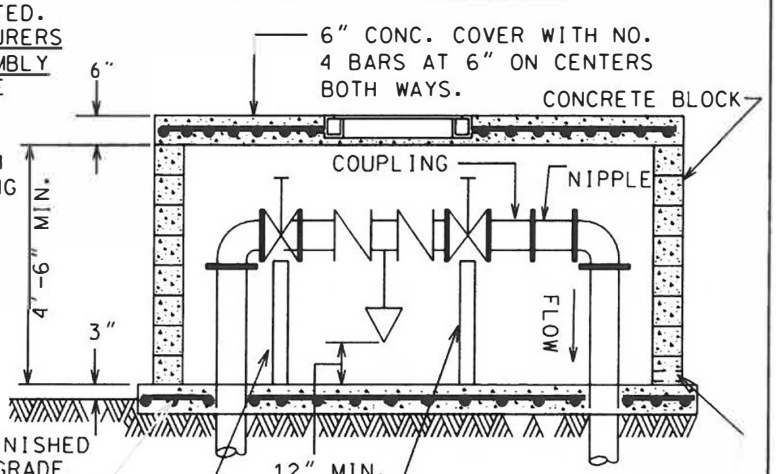
3. **PREFABRICATED** INSULATED COVERS FOR RP BACKFLOW PREVENTERS MAY BE SUBSTITUTED. REFER TO APPROVED MANUFACTURERS OF BACKFLOW PREVENTER ASSEMBLY STRUCTURES ON PAGE 6 OF THE ATTACHED SPECIFICATIONS.

4. DRAIN HOLE SHALL BE MINIMUM (4) TIMES AREA OF RELIEF OPENING OF DEVICE.



REDUCED PRESSURE PRINCIPLE ASSEMBLY

SECTIONAL PLAN



SECTIONAL ELEVATION

FIG. 9.05

NOVEMBER 1993
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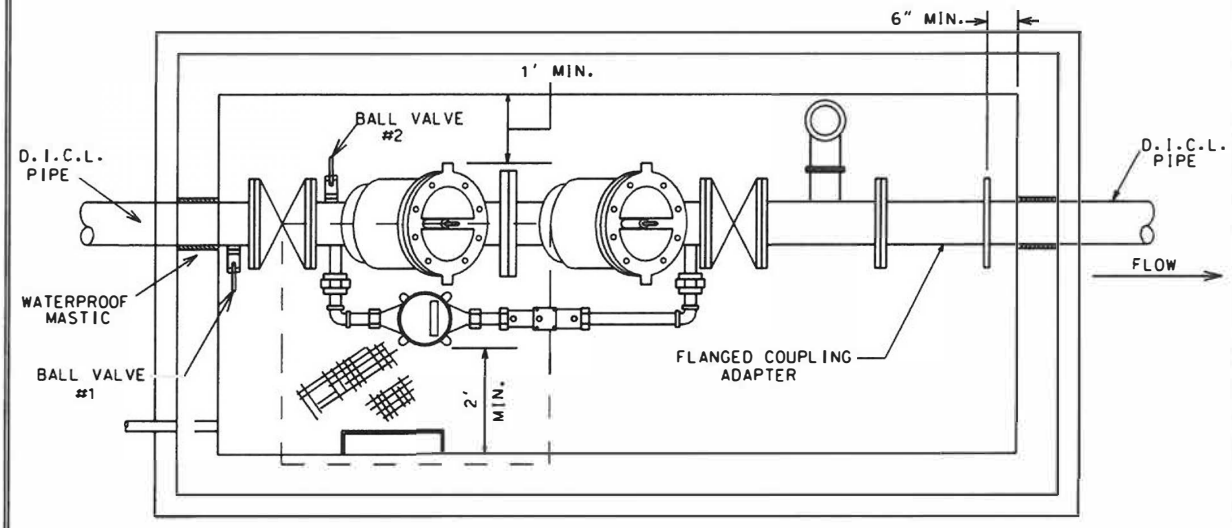
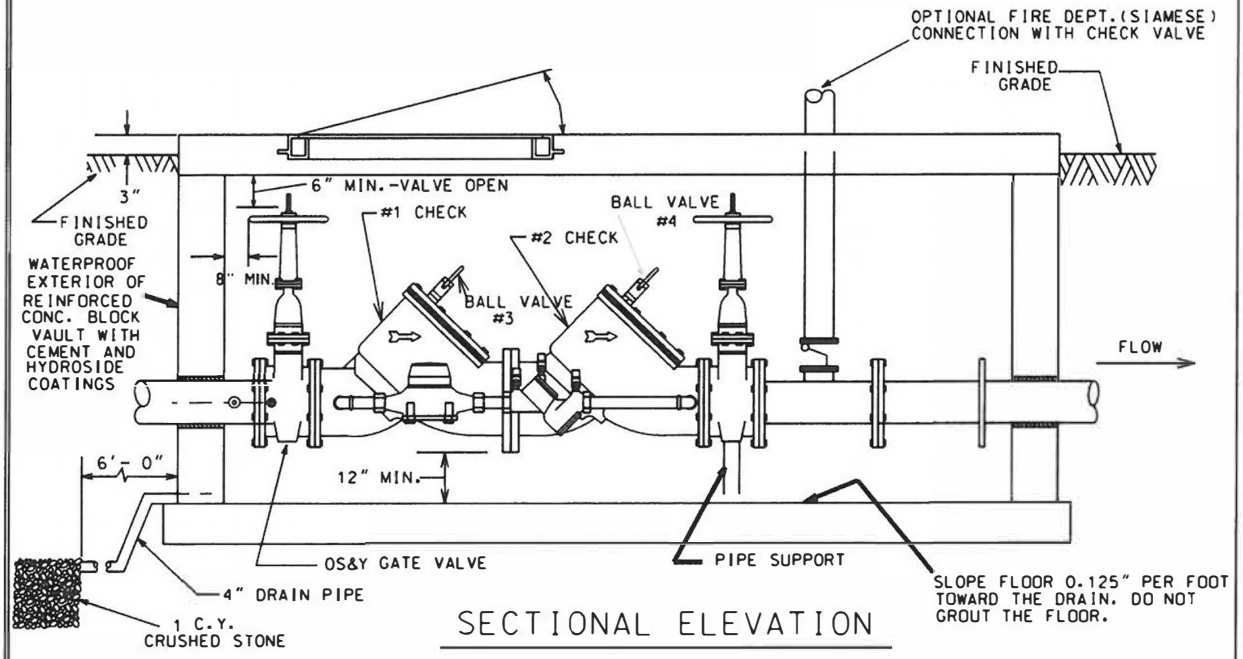
DETECTOR DOUBLE CHECK VALVE DETAIL INSTALLATION



SECTIONAL PLAN



SECTIONAL ELEVATION

NOTES: DETECTOR DOUBLE CHECK VALVE ASSEMBLY MUST BE APPROVED AND MEET THE LATEST STANDARDS OF A.S.S.E. STD. NO. 1048. AWWA STD. NO. C-51089. FM. UL CLASSIFIED. AND TESTED AND CERTIFIED UNDER USC'S FCCC&HR. AS MANUFACTURED BY WATTS REGULATOR-NO. 709 OR 770DCOA SERIES. COMBRACO-NO. 40-600 SERIES. FEBCO-MODEL NO. 806. HERSEY-MODEL DDCII. AMES CO. MODEL NO. 3000 OR AN APPROVED EQUAL ACCEPTED BY CENTRAL ALABAMA WATER.

2. NO VALVES SHALL BE ON BY-PASS PIPING ASSEMBLY THAT WOULD PROHIBIT FLOW THROUGH THE 5/8" METER.

3. 5/8" METER ON BY-PASS ASSEMBLY MUST READ IN CUBIC FEET. THE 5/8" METER W ILL BE FURNISHED BY THE CAW.

4. THIS DRAWING IS STRICTLY TO ILLUSTRATE MINIMUM CLEARANCES AND DIMENSIONS OF THE VAULT. FOR SPECIFIC DESIGN DETAILS. REFERENCE ATTACHED SPECIFICATION.

5. PERFABRICATED CONCRETE VAULTS MAY BE INSTALLED. REFER TO APPROVED MANUFACTURERS OF BACKFLOW PREVENTER ASSEMBLY STRUCTURES ON PAGE 6 OF THE ATTACHED SPECIFICATIONS.

FIG. 9.07

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OCTOBER 1999

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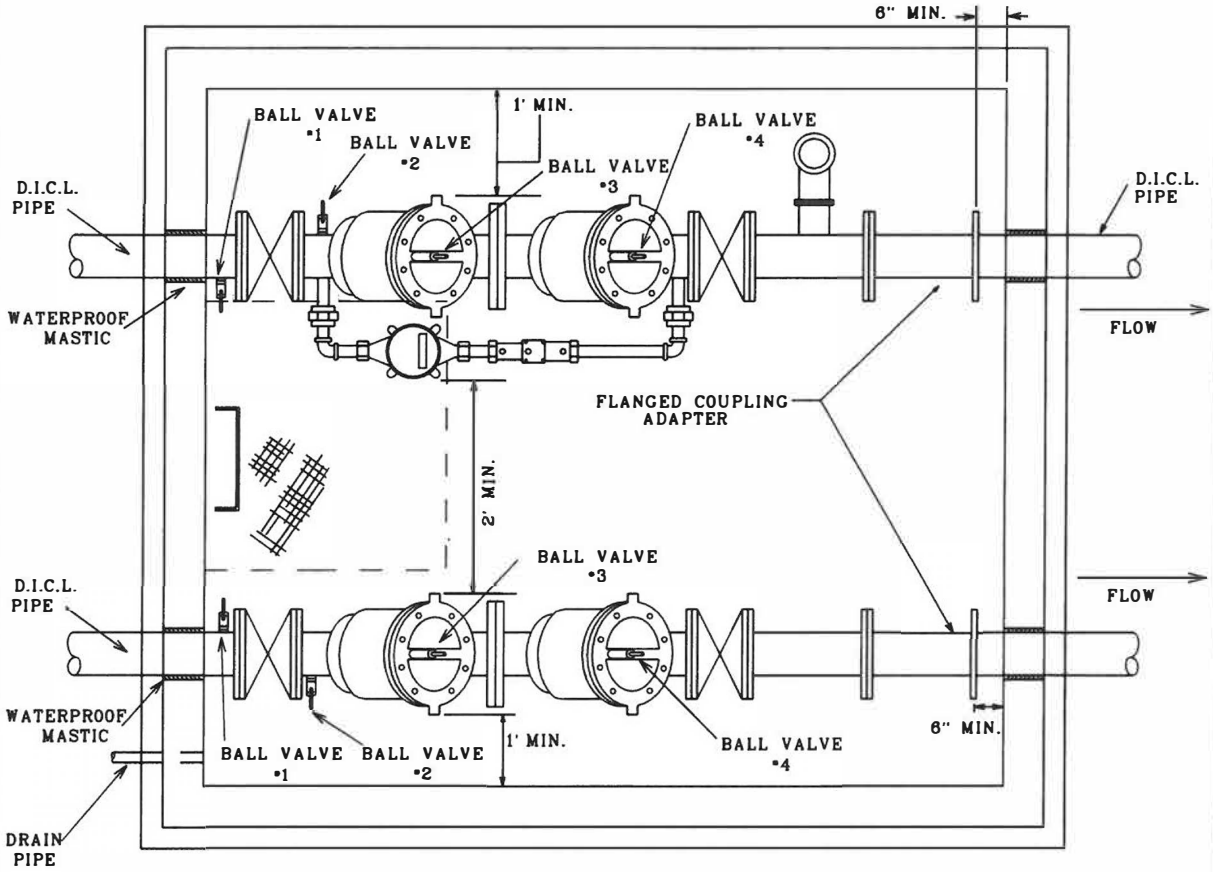
SECTION 9 (CONTINUED)

PARALLEL INSTALLATION DETAIL
DETECTOR DOUBLE CHECK AND DOUBLE CHECK VALVE ASSEMBLIES



SECTIONAL PLAN

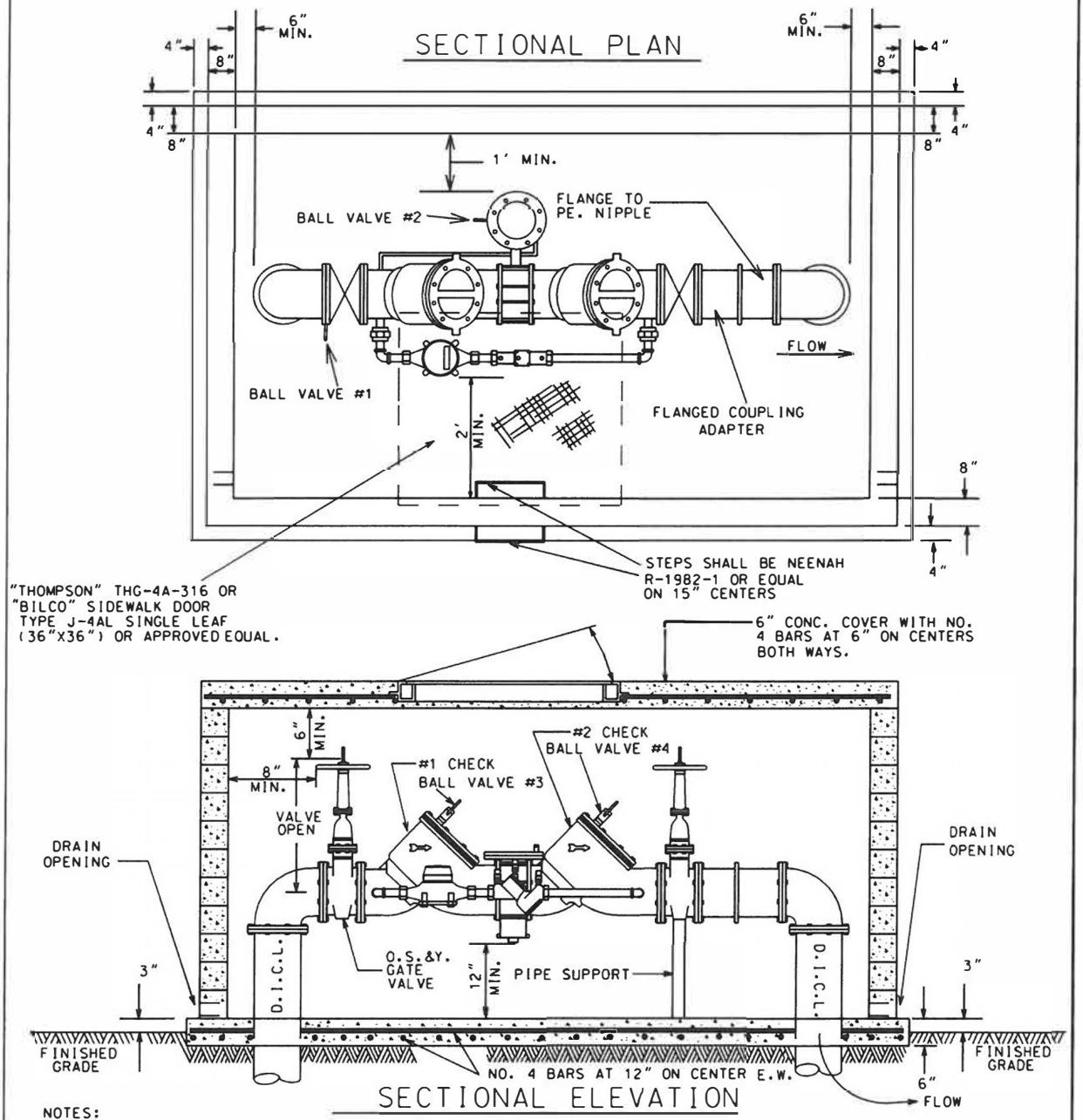
NOTES:
1. FOR SECTIONAL ELEVATION REFER TO DETECTOR DOUBLE CHECK VALVE DETAIL INSTALLATION (FIG. 9.07, PAGE 29) AND DOUBLE CHECK VALVE (DC) BACKFLOW PREVENTER TYPICAL INSTALLATION (FIG 9.04, PAGE 26).
2. ALL NOTES AND SECTIONAL ELEVATION DETAILS ON PAGES 26 AND 29 MUST BE ADHERED TO.

FEBRUARY 1993
REVISED MARCH 2001

FIG. 9.07.1

SECTION 9 (CONTINUED)

DETECTOR REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER DETAIL INSTALLATION



NOTES:

1" DETECTOR REDUCED PRINCIPLE BACKFLOW PREVENTOR ASSEMBLY MUST BE APPROVED AND MEET THE LATEST STANDARDS AS MANUFACTURED BY WATTS REGULATOR-NO.909RPDA SERIES. COMBRACO-SERIES NO40-70A. C.E.&G. SERIES. FEBCO-MODEL NO. 825. HERSEY-MODEL NO. 6CM-RPDA. AMES MODEL NO. 5000 RPOA OR AN APPROVED EQUAL ACCEPTED BY CAW.

2" NO VALVES SHALL BE ON BY-PASS PIPING ASSEMBLY THAT WOULD PROHIBIT FLOW THROUGH THE $^{5}/_{8}$" METER.

3" THE $^{5}/_{8}$" METER ON BY-PASS MUST READ IN CUBIC FEET AND WILL BE FURNISHED BY CENRAL ALABAMA WATER.

4. DRAIN OUTLET SHALL BE MIN. FOUR(4) TIMES AREA OF RELIEF OPENING OF DEVICE.

5. THE TYPE OF WALL CONSTRUCTION AND OUTSIDE FINISH FOR VAULTS ARE OPTIONAL WITH OWNER. THE OBJECTIVES ARE PROTECTION FROM FREEZING FOR THE ASSEMBLY. ADEQUATE CLEARANCE AND EASY ACCESS FOR METER READING. TESTING AND MAINTENANCE.

6. PREFABRICATED INSULATED COVERS FOR RP BACKFLOW PREVENTER ASSEMBLIES MAY BE SUBSTITUTED. REFER TO APPROVED MANUFACTURERS OF BACKFLOW PREVENTER ASSEMBLY STRUCTURES ON PAGE 6 OF THE ATTACHED SPECIFICATIONS.

FIG. 9.08

JUNE 2000