

**WATER SYSTEM**  
**TABLE OF CONTENTS**

I.	Materials.....	1
II.	Alignment.....	1
III.	Size.....	2
IV.	Cover.....	2
V.	Connection to an Existing Main.....	2
VI.	Valving.....	3
VII.	Service Laterals and Water Meters .....	3
VIII.	Fire Hydrants.....	5
IX.	Backflow Devices .....	6
X.	Pressure .....	6
XI.	Specialty Items .....	7
XII.	Special Conditions .....	7
XIII.	Engineer's Approved List .....	8
	Standard 502 & 503.....	8
	Standard 505.....	9
	Standard 506, 507, 508.....	10
	Standard 515, 516, 525.....	11
	Standard 531.....	12



## WATER SYSTEM

### I. Materials

- A. Service laterals shall be constructed per applicable City standards.
- B. 8" and 12" water mains shall be Polyvinyl Chloride (PVC) C900, Class 150, minimum, or Ductile Iron Pipe, C151, Class 50, minimum.
- C. 14", 16" or 18" diameter water mains shall be Ductile Iron Pipe or PVC C905, 165 psi or as shown on plans and specifications.
- D. 20" and larger water mains shall be Concrete Cylinder pipe, Wrapped Steel pipe, or Ductile Iron Pipe.
- E. Asbestos Cement pipe shall not be allowed under any circumstances.
- F. Ductile Iron Pipe must be polyethylene encased and have approved cathodic protection (see Section XII-A).
- G. Mains outside the paved roadway or crossing a delineated fault zone (see Section XII-B) must be Ductile Iron Pipe unless the City Engineer approves an alternative.
- H. Where the normal mainline static pressure exceeds 100 psi, Ductile Iron Pipe or Class 200 PVC must be used.

### II. Alignment

- A. Public water mains outside the public street are not allowed without special permission from the City Engineer.
- B. Minimum allowable radius for 8" diameter water mains is 250 feet and for 12" diameter water mains is 350 feet.
- C. New mains must match the grade and centerline offset of existing water mains where possible.
- D. Maintain a constant distance from centerline wherever possible.
- E. Conform to the State of California Department of Health Services "Criteria for the Separation of Water Main and Sanitary Sewers".
- F. Install felt expansion material between pipes with 1" or less vertical clearance.
- G. Minimum horizontal separation from existing gas, electrical, and telephone lines

shall be 3 feet between pipes.

H. Minimum clear horizontal separation from a metallic pipeline with an induced current shall be 5 feet.

I. Minimum clear horizontal separation from a storm drain shall be 5 feet.

### **III. Size**

A. Water mains must be sized to meet minimum Fire Code requirements. (See Section VIII).

B. For residential/commercial installations, public and private mains shall be 8" minimum.

C. For industrial installations, looped system shall be a minimum 8" in diameter, and a dead end system requires a minimum of 12" diameter pipe.

D. The minimum main size for all new projects is 8".

E. The City Engineer may require increased pipe size for overall system benefit.

### **IV. Cover**

A. Definition: Cover is the distance from the top of the pipe to finished grade.

B. Standard installation shall be in accordance with Standard 500 Note 3.

C. Where cover is greater than 32", but less than standard cover, Class 50 Ductile Iron Pipe is required.

D. Where cover exceeds 8', special permission from the City Engineer is required.

E. Service laterals must have minimum cover in accordance with the approved standards.

### **V. Connection to an Existing Main**

A. In most major streets, or in new streets, the new water main must be bored and jacked into place. Conditions should be verified with the City Engineer.

B. For connecting 2" diameter pipes and smaller, use a hot tap.

C. For connections of pipes 4" - 12" in diameter, a hot tap or a cut-in tee may be done in conformance with the provisions of Standard 500, Note 26.

- D. Cut-in tee must be used if additional valves are required on the existing main. If the new lateral is larger than the existing main, the tee shall be the size of the new lateral and reduced to size of the existing main.
- E. Size-on-size taps are allowed up to 8" in accordance with the approved standards.
- F. 12" size-on-size taps are allowed only under emergency situations and with the specific approval of the City Engineer.
- G. A mechanical joint tapping sleeve must be used in accordance with approved City standards.

## **VI. Valving**

- A. Valving at intersections shall be in accordance with the following:
  - Tee - 3 valves
  - Cross - 4 valves
- B. Main line valves within 250' of an intersection may be considered as part of the intersection.
- C. All hydrants must be on separately valved sections of the public main.

## **VII. Service Laterals and Water Meters**

- A. Size of water meter shall be determined by the Designer using the current AWWA guidelines.
- B. Maintain a minimum 5' separation from the sewer lateral.
- C. All meters must be located within public right-of-way. Meters (including backflow detection meters) can only be installed outside of the right-of way- upon approval by the City Engineer.
- D. Residential (single unit)
  - 1. One meter per lot.
  - 2. Individual 1" services, 1" meter.
  - 3. Rubber seated check valves shall be required to separate the domestic and fire systems on the site.
- E. Apartments (2 - 6 units)
  - 1. May be master metered with the size based on the total demand.
  - 2. Individual meters must be clustered and located within the public right-of-way.

- F. Apartments (7 or more units) and Mobile Home Parks
1. Must be master metered with the size based on the total demand.
  2. Separate irrigation meters are required.
  3. This may require a combination water service.
  4. Mobile home park owners may sub-meter to the tenants at their own expense.
- G. Condominiums
1. Shall be individually metered.
  2. Individual meters must be clustered and located within the public right-of-way.
  3. A maximum of six meters per manifold.
  4. Separate irrigation meters for common areas are required.
  5. Combination of water services may be required.
- H. Commercial
1. Size of the meter and service are based on calculations by the Designer in accordance with AWWA standards.
  2. A separate irrigation meter is required.
  3. A minimum 1" service shall be required for office use.
  4. A minimum 2" service lateral for a shell building or light industrial if the lot is greater than ½ acre.
  5. A minimum 8" service for industrial lots and shopping centers on lots of 12 acres or larger.
  6. Most commercial installations will require backflow prevention. (See Section IX).
- I. Combination Services
1. 8" laterals are the minimum required for most installations.
  2. Combination services are required in commercial subdivisions per Std. Dwg. 513 and 514.
- J. Irrigation
1. Separate irrigation meters must be provided for all commercial users, master metered condominiums, PUDs, apartment complexes and mobile home parks.
  2. All irrigation services must have reduced pressure backflow devices.
  3. Irrigation meter size shall be determined by the maximum flow required at any one control valve.
  4. Sizing of irrigation meters shall be coordinated with the City Engineer.
  5. Backflow devices specified on the irrigation plan must conform to City Standard and must be on the current USC Approved List of Devices.
- K. Private Fire Systems
1. Private fire systems must be installed per NFPA 24.
  2. Before combustible materials may be stored or constructed on site, the Fire

District must approve fire flow and access. Before a fire hydrant may be placed in service, a high velocity flush of the fire hydrant shall be witnessed and approved by City Personnel.

3. Lateral size must be the same or larger than the size required for the sprinkler system or the private hydrant system.
4. All private fire systems require backflow prevention assemblies in accordance with City Standards.
5. Reduced pressure backflow assemblies are required if fire systems are used with chemical additives such as:
  - a. Antifreeze
  - b. Auxiliary water supply (well) exists on site
  - c. A health hazard exists on the site.
6. On residential systems, rubber seated check valve assemblies approved by the Fire District must be installed where fire system connects to the domestic water system.
7. Fire Department connection location must be approved by the Fire District
8. A fire hydrant shall be installed within 50' of a Fire Department connection or at a location approved by the Fire Chief.
9. The maximum length of a fire hydrant lateral from a private main to the hydrant bury is 40'.
10. Private fire line installation must keep joints exposed until after inspection and pressure testing is complete.

**K. Cathode Protection**

1. All water services shall have cathodic protection installed using a zinc anode as shown in City Standard 531.

**VIII. Fire Hydrants**

- A. Before combustible materials may be stored or constructed on site, the Fire Department must approve fire flow and access. Before a fire hydrant may be placed in service, a high velocity flush of the fire hydrant shall be witnessed and approved by City Personnel.
- B. Location of fire hydrants must be approved by the Fire Department.
- C. Each hydrant must be on a separate valved main line section.
- D. Whenever possible, locate hydrants at street intersections.
- E. If it's not possible to locate at an intersection, locate the hydrant near a property line or where it will minimize interference with property use.
- F. Locate hydrants a minimum of 10' from roll down of driveways.

- G. Residential areas -
  - 1. Space fire hydrants every 300' or as approved by the Fire Marshal.
  - 2. Evenly distribute hydrants throughout the project.
  - 3. No building may be more than 150' from the nearest hydrant.
  
- H. Commercial and Industrial Areas -
  - 1. General hydrant spacing shall be every 300'.
  - 2. Evenly distribute hydrants throughout the project.
  - 3. No building may be more than 150' from the nearest hydrant.
  
- I. Minimum fire flow required at all fire hydrants shall be per the requirements as specified in the Fire Code or per the following whichever is greater.
  - 1. Residential and commercial areas - 1,000 gallons per minute with a 20-psi residual.
  - 2. Commercial areas 2,000 gallons per minute with a 20-psi residual.
  - 3. Industrial areas – 3,000 gallons per minute with a 20-psi residual.
  
- J. Require water analysis study unless otherwise specified by the City Engineer.

**IX. Backflow Devices**

- A. Backflow devices are required to be installed by State of California Title 17.
- B. All backflow devices that are installed must be on the approved USC list.
- C. Backflow assemblies must be installed as near as possible to the water meter.
- D. Where residential fire sprinklers are installed, rubber sealed check valve devices are required where the fire service connects to the domestic service. The backflow preventer must be accessible for testing and maintenance.
- E. Properties with private sewer lift stations must have reduced pressure backflow assemblies on their water systems.
- F. All irrigation services require reduced pressure backflow assemblies.
- G. Parcels with two or more water service laterals must have double check valves installed on each service.
- H. Properties using a well for irrigation must have a reduced pressure backflow preventer on the domestic service.

**X. Pressure**

- A. Maximum allowable main line pressure is 150 psi measured at a fire hydrant.



- B. Maximum allowable static service pressure measured at a faucet is 80 psi.
- C. Minimum service pressure measured at the meter is 40 psi.
- D. If the service pressure exceeds the maximum of 80 psi, an individual pressure regulator will be required on the service line.
- E. Fire flows must be calculated for all projects.
- F. For calculating pressures in all water zones, calculate the minimum pressure using the elevation of the reservoir at one-half full.

## **XI. Specialty Items**

- A. Air relief valves.
  - 1. Air relief valves are required at locations in the system that are one pipe diameter or more higher than the remainder of the system, such as over a hilltop. A fire hydrant may be used in place of an air relief valve at the discretion of the City Engineer.
  - 2. Air relief valves are not required in residential areas if services are installed at or near the crown within one pipe diameter vertically of the high point.
- B. Pressure reducing valves are installed to maintain overall system balance.
- C. Surge or pressure relief valves are installed where pressure could potentially reach above the maximum allowable.

## **XII. Special Conditions**

- A. The need for cathodic protection will be determined by the City Engineer for each project. This may require soils reports or other additional information.
- B. Delineated fault zones.
  - 1. Ductile Iron Pipe must be installed in delineated fault zones and extend to 100' outside each side of the delineated fault boundaries.
  - 2. Pumper connections or fire hydrants shall be installed approximately 50' outside each side of the delineated fault zone.
  - 3. Flextend assembly, as manufactured by EBAA Iron, Inc. of Eastland, Texas, or approved alternative, with valve must be installed adjacent to and on the fault side of the pumper connection or fire hydrant.
  - 4. A valve must be located between the Flextend assembly and the fire hydrant.
- C. Abandon water mains and services.
  - 1. For water lines 1" or smaller, expose lateral at the main, close the corporation stop, disconnect the lateral and plug or cap the corporation stop.
  - 2. For lines 1½" or larger, remove the valve and plug the main.

3. Valve boxes for abandoned valves must be removed.
  4. Abandoned mains, valves and risers located within the street structural section must be removed.
  5. All water mains 12" and larger, within the public right-of-way must be broken every 50' and filled with sand slurry.
- D. Private water mains vs. Public water mains
1. Public water mains may not be constructed outside the street right-of-way without specific approval of the City Engineer.
  2. Fire hydrants required on site to serve one lot would be private systems.
  3. Water mains and fire hydrants located on site shall be private systems.
  4. Normally, where the water mains are publicly maintained, the sewer mains should also be publicly maintained.
  5. Fire mains must be installed per NFPA 24.
- E. Water mains installed at a slope of 15% or greater shall be constructed with restrained joints.
- F. Water mains installed outside of the paved roadway must be Ductile Iron Pipe and shall have suitable access.

### **XIII. Engineer's Approved List**

#### **STANDARD 502**

##### Hydrants

	Residential (All 1-2½" & 1-4½" outlet)	Commercial & Industrial (4½", 4½", 2½")	
Clow	950	Clow	865
Long Beach	614	Long Beach	435

#### **STANDARD 503**

##### Angle Meter Ball Valve (House side & Street side) – 1"

Ford	BA43-444WG
Jones	J1963W-SG
Mueller	B24258

##### Corporation Stop (Ball Valve) – 1"

Ford	FB1000
Jones	1937SG
Mueller	B25008

##### Tapping Service Saddle

	C-900 Pipe
Ford	S-90 & FC202
Jones	J-996
Rockwell	313 or 317-Nylon coated

Romac 202N (Double) 101-N

Ductile Iron Pipe

Ford FCV202  
Rockwell 313  
Romac 202N

Existing ACP

Ford FS202  
Rockwell 317

Meter Boxes and Covers

1" (Non-Traffic Loading Area)

<u>Box:</u>		<u>Cover:</u>	
Christy	B16	Christy	B30
Quazite	PG1730BA12	Quazite	PG1739WAP250

1" (Traffic Loading Area)

<u>Box:</u>		<u>Cover:</u>	
Christy	N30	Christy	B36P-61G
Quazite	PG1730BA12	Quazite	PG1730HAP250

**STANDARD 505**

2" Fl. x M.I.P Brass Ball Meter Valve

Ford BF83-777  
Jones J1915W Fl. x F.I.P.  
Mueller B24337

2" Fl. x F.I.P Brass Ball Valve

Ford BFA 13-777W  
McDonald 4604B  
Mueller B24337

2" Brass M.I.P. x Compression Coupling

Jones J-2605  
J-2605-SG  
McDonald 4753-T  
Mueller B25028

2" Resilient Seated Gate Valve

Clow F-6103  
Ford B81-777  
Jones J-2816

2" Bronze Comp 90° E11

Jones J2611  
Romac 202N

**Meter Boxes and Covers**

(Non-Traffic Loading Area)

<u>Box:</u>		<u>Cover:</u>	
Christy	B36	Christy	B36E
Extension	1395		
Quazite	PG1730BA12	Quazite	PG1730WAP250

(Traffic Loading Area)

<u>Box:</u>		<u>Cover:</u>	
Christy	B1730	Christy	B1730-61G

**STANDARD 506 & 507**

Size on Size 10" and over (examples 10" on 10", 12" on 12")

Existing ACP use only:

Clow M.J.	F-5205 & 5207
Mueller M.J.	H-615 & H-619
Power Seal	Model 3400

**Meter Boxes and Covers**

(Non-Traffic Loading Area)

<u>Box:</u>		<u>Cover:</u>	
Christy	B48 w/ext.	Christy	B48M
Quazite	PG3048BA18	Quazite	LG3048WAQ150

(Traffic Loading Area)

<u>Box:</u>		<u>Cover:</u>	
Christy	B48 w/ext.	Christy	B48-62GH

**STANDARD 508**

Tapping Sleeves

Refer to Standard 506 on Approved List.

**Meter Boxes and Covers**

(Non-Traffic Loading Area)

<u>Box:</u>		<u>Cover:</u>	
Christy	B48 w/ext.	Christy	B48M
Quazite	PG3048BA18	Quazite	LG3048WAQ150

(Traffic Loading Area)

<u>Box:</u>		<u>Cover:</u>	
Christy	B48 w/ext.	Christy	B48-62GH

## STANDARD 515 & 516

### 2" Brass Ball Valve

Ford	B11-777
Jones	J-1900W
Mueller	B-20200

### 3" Brass ball Valve

Watts	Series WBV
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### Meter Box, Valves and Covers

#### Box:

Christy	B30
Quazite	PG1324BA12

#### Cover:

Christy	B30D
Quazite	PG11324WA50

## STANDARD 525

### Tapping Service Saddle

Refer to Standard 503 on Approved List

### Ball Valve #1

Ford	B11-444
Jones	J-1900
Mueller	B25008

### Corporation Stop (Ball Valve) - 1"

Ford	FB400
Jones	J-1943
Mueller	B2245

### 1" M.I.P. x Comp - 90° ell

Ford	L84-44G
Jones	J2619-SG
McDonald	4779-MT
Mueller	H15531

### 1" F.I.P. x Comp- 90° ell (Brass)

Ford	L14-44
Jones	K2621-SG
Mueller	H15533

### Combination Valves

APCO	143C
Crispin	AL10
Golden-Anderson	945-Kinetic

### Meter Boxes and Covers

(Non-Traffic Loading Area)

Box:

Christy B36  
Quazite PG17330WA12

Cover:

Christy B36D  
Quazite PG1730WA50

(Traffic Loading Area)

Box:

Christy B36  
Quazite PG1730BA12

Cover:

Christy 36-61D  
Quazite PG1730HAR250

**STANDARD 531**

Zinc Anode

Farwest Corrosion Control

01-12500