

## CHAPTER 5

## WATER FACILITIES DESIGN AND CONSTRUCTION

## 5-1 GENERAL INFORMATION

A. Water Main System

1. System Design Criteria. The approved edition of the Peoria Water System Master Plan (Master Plan) provides the criteria for development of water sources and distribution systems in the City of Peoria. All new construction shall comply with the Master Plan. The Arizona Department of Environmental Quality (ADEQ) Engineering Bulletin 10 shall apply to all water facilities constructed in the City system. The Developer's Design Engineer is responsible for evaluating the specific design conditions including the bedding and backfill requirements and trench loading conditions.
2. Requirement to Connect to Water System. All developments including single-family residences are required to connect to the City's water system. Individual water systems are not allowed. Exceptions are made only with written request to the Engineering Department and with written approval of the Utilities Department.
3. Classifications. The City of Peoria water main system is based on a grid system with three (3) basic classifications of water lines that are determined by use. These classifications are per section 5-1.A.4.(a)-(c).
4. Size and Location. All development shall provide for water distribution and service lines of appropriate sizes, in standard locations as follows: These are minimum requirements and the City may require larger sizes in unusual circumstances. Fire flow and pressure requirements must be satisfied.
  - a. Transmission water lines. Size and location will be in accordance with the Peoria Water System Master Plan.
  - b. Distribution water lines.
    - (1) Along section lines, 16-inch minimum diameter lines.
    - (2) Along north-south midsection collectors (1/2 mile), 12-inch minimum diameter lines. Along east-west midsection collectors (1/2 mile), 8-inch minimum diameter lines.
    - (3) In all other locations, 8-inch minimum diameter lines.
    - (4) 8-inch diameter lines will also be required for fire hydrant runs in excess of 100 feet in length.
    - (5) All water systems must be "looped" (connected to 2 separate feeds) as approved by the Engineering Department.
  - c. Service water lines.
    - (1) Metered taps for single-family residences shall be located per City of Peoria Standard Detail PE-363.

- (2) Standard sizes for metered taps shall be 1 inch or 2 inches. No smaller sizes will be allowed.
  - (3) For all other types of development, water meters shall be located outside of street improvements but within the right-of-way or in an easement for such purposes.
  - (4) Service taps are prohibited on any line, which is designed to service fire sprinkler systems and/or fire hydrants or transmission water lines.
- d. The Developer will be responsible for the sprinkler line/main up to and including the back-flow preventer. The City will be responsible for the maintenance of the fire line between the main line and the first valve upstream of the back-flow device. The back-flow device shall be within Right-of-Way (ROW.) Where no back-flow device exists, City will maintain to the right-of-way line only. A valve will be required at the ROW line. An approved back-flow prevention assembly is required per City of Peoria Standard Details PE-351-1, PE-351-2, PE-352-1, PE-352-2, PE-353-1 and PE353-2.
- e. Fire hydrants shall be located outside of street improvements but within the right-of-way or easement for such purposes. General spacing for fire hydrants shall be (**unless** specifically amended by Peoria Adopted **Fire Code**):
- (1) 500 feet maximum in a single-family residential development.
  - (2) 300 feet maximum in a multi-family residential development.
  - (3) 300 feet maximum in commercial/industrial areas.
  - (4) Fire hydrants shall be installed on all dead end lines as close to the end as possible (refer to Section 5-2).
  - (5) For arterial streets hydrants are required on both sides of the street. If the roadway does not have a median, the spacing indicated above shall apply and the hydrants shall be located on alternating sides of the street. If the roadway has a median, the spacing indicated above shall apply to the hydrant spacing on each side of the street.
  - (6) For higher risk protection, determination shall be made by the Fire Department, regarding fire hydrant spacing, flow and pressure requirements.
  - (7) Fire hydrants shall be per City of Peoria Standard Details PE-360-1 or PE-360-2 as applicable.
5. Water System Facilities. When a development is required to construct new water system facilities, such as booster stations, pressure reducing stations, storage facilities, etc., the applicant will be required to design such facilities in compliance with the Utilities Department criteria.

## 5-2 TECHNICAL DESIGN REQUIREMENTS

### A. General

1. Materials. For allowable materials, refer to City of Peoria Standard Detail PE-101. All below ground Ductile Iron Pipe (DIP) shall be polywrapped. Exceptions are only allowed by written request to the Engineering Department and with written approval by the Utilities Department.

2. Pavement Replacement. Pavement replacement type and compaction type shall be indicated per MAG Standard Details and Specifications on each sheet or as modified in the City of Peoria General Notes.
3. Passage Under Structures. Where water lines pass under major Structures such as box culverts, railroads, highways, canals, etc., the water line(s) will be installed inside a steel pipe casing as approved by the Engineering Department. In instances where the water line passes under less significant structures Pressure Class 350 DIP pipe will be required for a distance of 20-feet beyond the structure, or as directed by the Engineering Department. In instances where critical water service is designated, two or more redundant water lines shall be provided as directed by the Engineering Department.
4. For Permitting Purposes. Estimated quantities for all items of work within the public right-of-way or a public utility easement shall be listed on the plan cover sheet.

**B. Location Within Right-of-Way**

1. Conveyance. Rights-of-way shall be dedicated prior to any construction.
2. Major Arterial Streets. Water main alignment shall be approved by the Utilities and Engineering Departments.
3. Minor Arterial Streets. Water mains shall be offset from street centerline 13-feet north or east.
4. Collector Streets. Water mains shall be offset from street centerline 9-feet north or east.
5. Local Streets. Water mains shall be offset from street centerline 6-feet north or east.
6. Valve Locations. Generally the intent is to locate the valve lids so that wheel line of normal vehicular traffic does not track over the casting. The location for the valve covers and lids should not be closer than 6 feet from the gutter line where possible.
7. Alignment. All water mains shall be parallel to the street centerlines or property lines, or as close as possible.
8. Separation. Vertical and horizontal separation from sewer lines shall be in accordance with MAG Section 610.5 and MAG Standard Detail 404-1.

**C. Easements**

1. Conveyance. Water utility easements shall be dedicated prior to any construction.
2. Width. The minimum clear width of the easement for all water lines shall be 20 feet (Minimum of 10 feet each side of the water facility). The minimum width for a shared easement with sanitary sewer shall be 30 feet. Larger easement widths will be required for deeper installations as determined by the Utilities or Engineering Department.
3. Location Within Easements. Water lines shall be centered in easements with 10-foot minimum clearance from any other utility unless otherwise approved by the Engineering Department. No other parallel utilities shall be located within the water or sewer easement.
4. Dedicated. Water easements are to be dedicated for the specific use, maintenance and repair of the water line, and any associated appurtenances. Water easements are to be

dedicated as part of a Final Plat or by separate instrument with written approval from the Engineering Department.

**D. Cover and Depth**

1. Cover Requirements. Minimum cover from finish grade to top of the pipe shall be:
  - a. As specified by the Developer's Design Engineer, but not less than 60 inches for water lines 12-inches diameter and larger in arterial streets, and for water lines 16 inches or larger in diameter regardless of the location.
  - b. As specified by the Developer's Design Engineer, but not less than 48 inches for water lines less than 12-inches in diameter, for locations in other than arterial streets, including easements, unless design conditions warrant additional cover.
  - c. Where cover is less than 4 feet (due to topography or facilities such as canals, washes, rivers, drainage basins etc.) an encasement per MAG Standard Details 404-3, shall be constructed. This is allowed only with the written request by the Developer's Design Engineer and written approval by the Engineering Department.
2. Plan Notation. The proposed depth shall be clearly noted on each plan sheet. Any changes in depth required to avoid conflicting utilities, etc., shall be noted.

**E. Water Line Dead Ends**

All water line dead ends require a fire hydrant, as specified by the Engineering Department.

**F. Pipe Bedding Requirements**

All water lines installed within City of Peoria easements and rights-of-way shall be bedded from bottom of excavation to one foot above the pipe with granular bedding material in accordance with the manufacturers' recommendations, or City of Peoria Standard Detail PE-401, whichever is more restrictive. Bedding compaction densities shall be per MAG Specification Table 601-2. Specially designed and alternate beddings may be approved on a case by case basis by the Engineering Department.

**G. Trench Backfill Requirements**

1. General. Minimum trench backfill requirements shall be Type I per MAG Specification 601.4.3, with compaction densities per MAG Specification Table 601-2. Backfill requirements provided by the Developer's Design Engineer shall apply, when such provisions are more restrictive than the applicable MAG Specification.
2. Use of CLSM. Within the existing pavement section of public streets, the backfill shall be ½ sacks Controlled Low Strength Material per MAG Specification 728 as an option to G.1 above.

**H. Automatic Air/Vacuum Release**

Combination Air/Vacuum release valves shall be installed at high points in the water line and where the water line changes slope or as required by the Engineering Department. The valves shall be installed per City of Peoria Standard Detail PE-395.

**I. Fire Hydrants**

1. Materials and Details.

- a. Fire hydrants shall be installed per City of Peoria Standard Details PE-360-1 or PE-360-2.
- b. The developer shall provide the approved fire hydrant, other necessary materials and all labor for installation.

2. Locations.

- a. Fire hydrants at intersections shall be placed 2-feet back of and clear of the curb line, or 1 foot back of and clear of a sidewalk attached to the curb, and 4-feet either direction and along the curb return from the P.T. or P.C. of the radius. Additionally, fire hydrants shall be located at least 1 foot from any face of the sidewalk, ramp, trail or path. Fire hydrants in mid-block shall be placed in line with the side property line projection, 2-feet back of and clear of the curb or one-foot back of and clear of the sidewalk, ramp, trail or path, as applicable. Care shall be taken to minimize conflicts with any future improvements such as sidewalks, driveways, etc.
- b. On private property, the fire hydrant shall be contained within a dedicated easement, 10- feet from the sides and 6-feet behind the fire hydrant. Fire hydrants shall be maintained at least 3-feet clear of any constructed obstructions and 6-feet clear of any landscaping. Consideration shall be given to the location of driveways, especially residential, adjacent to any side of a fire hydrant whereby a vehicle or other obstruction may be temporarily located, to perpetually maintain the 6-foot clearance.
- c. There shall be 18 inches of clearance from a finished grade to the lowest nozzle, but no nozzle shall be greater than 24-inches from the finished grade.

3. Hydrant Marker:

- a. Markers shall be as specified in City of Peoria Standard Detail PE-362.

**J. Valves**

1. Materials and Details.

- a. See the Materials List, Peoria Standard Detail PE-101, for allowable materials.
- b. Gate valves, required to control the operation of the water system shall be installed per City of Peoria Standard Detail PE-270. Gate valves shall be used for water main sizes up to and including 16-inches in diameter. Butterfly valves shall be required on mains 24-inches in diameter and larger.
- c. Mechanical Thrust Restraint may be provided with a Meg-a-Lug or equivalent mechanical restraint joint, as approved by the Engineering Department. Mechanical Thrust Restraint is preferred over Thrust Blocks.
- d. Thrust Blocks will be concrete only per MAG Standard Details 301 and/or 340 and Class "B" concrete per MAG Specification 725.
- e. Valve boxes shall conform to MAG Standard Detail 270.

2. Spacing.

- a. The maximum spacing of valves in industrial, commercial and multi-family districts shall be 500-feet. In single-family residential, the spacing shall be such that a maximum of two fire hydrants may be shut down at one time or 800-feet, whichever is least. There shall be a minimum of two valves per tee and three valves per cross.
- b. The maximum spacing of valves on transmission mains shall be 1,320-feet on lines 16-inch in diameter and 2,640-feet on lines larger than 16-inches.
- c. Two fire hydrants are the maximum number to be out of service per closure. The design of water systems shall locate no more than two fire hydrants for any valved segment of the system.
- d. Any 8" and larger water line that will be extended in the future shall have a valve, along with a 13-foot minimum stub with cap and 2 inch corporation stop, at the terminus per MAG Standard Detail 390-type A.
- e. For all water distribution lines crossing significant structures greater than 10 feet wide, such as drainage canals, and railroads, one valve shall be placed on each side of the structure as directed by the Engineering Department.
- f. One gate valve shall be placed between each fire hydrant and the main, typically flanged to the Tee, except for fire hydrants on mains of 100-feet or more, where a second gate valve is required within 20-feet of the fire hydrant.

3. Location.

- a. See City of Peoria Standard Detail PE-398 for valve locations from a tee and cross.
- b. Valves for fire hydrant connections shall be a flange to the tee, except when second valve is required; the valve shall be no more than 20-feet from the hydrant.
- c. Any valves not located within pavement must have approved markers delineating valve location.
- d. On private property, the valves shall be contained within a dedicated easement, 6-feet from the sides and 6-feet behind the valve. Valves shall be maintained at least 3-feet clear of any constructed obstructions and 6-feet clear of any landscaping. Consideration shall be given to the location of driveways, especially residential, adjacent to the valve cover whereby a vehicle or other obstruction may be temporarily located, to perpetually maintain the 6-foot clearance.

4. Operation.

- a. Representatives of the Utilities Department are the only personnel authorized to operate water valves on the City's existing water system.
- b. Representatives of the Utilities Department are the only personnel authorized to operate water valves that control the City's water system zone split.
- c. To request a water system shut down a water system shut down request form must be submitted. This form shall be submitted 10 working days in advance of any requests to shut down any lines in the City of Peoria's potable water distribution system. The form is to be submitted through the Engineering Inspector assigned to

the project, who will in turn coordinate with necessary Utility Department staff. Failure to complete this form will result in delays to construction activities.

**K. Water Services**

1. General. The size of the service will be as determined by the Developer's Design Engineer, in accordance with the sizes herein, and there will be one service per lot and one meter per service line.
2. Standard Sizes and Fittings. Water services, pipe and fittings, whether new or replaced, shall be exclusively 1 inch, 1-1/2 inch or 2 inches for domestic uses, per City of Peoria Standard Detail PE-363. Reducers or increasers may be installed to connect a meter or other fitting of differing diameter.
3. Meter Box Installation. The developer shall install all water meter boxes per City of Peoria Standard Detail PE-363.
4. Fees. The developer is responsible for submitting applications and payment of all applicable fees.
5. Location for Access and Maintenance. Water services installed outside of public right-of-way shall be contained within a dedicated easement, for such purposes, including access for maintenance and reading of meters, and shall be installed per this Section. Water meters shall not be located in parking lots, driveways, or in areas of paving or where traffic may cause damage to the service, meter or meter box.
6. Access and Drainage Control. Meters will not be fenced in or enclosed and must be accessible at all times. If a meter is to be installed in a landscaped area, the meter service will be installed so that any runoff will flow away from the meter installation.
7. Use of CLSM. When using Controlled Low Strength Material (CLSM) as an alternate material for back-filling a trench, protect all water service lines with minimum 2" thick sand shading to prohibit contact with metallic water line fittings, metallic joint restraint, valves and valve bonnets, copper and bronze fittings.

**L. Water Meters**

1. General. Water meters shall be as determined by the Developer's Design Engineer, sized and designed in accordance with requirements of the Uniform Plumbing Code. Where appropriate, the MAG Uniform Standard Details shall also apply. A single meter is permitted on any one service line, unless specific written request is submitted to the Engineering Department and written approval is acknowledged by the City.
2. Water Meters 2 Inch Diameter and Smaller. Water meters 2-inch and smaller shall be installed per City of Peoria Standard Detail PE-363. Water meters will be supplied and placed by the City of Peoria Meters Services Division.
3. Water Meters Larger than 3 Inch Diameter. Water meters 3-inch and larger shall be installed above grade in accordance with MAG Standard Detail 345-1 & 345-2, without the vault. Meter vaults are prohibited. Details for pipe risers and cages to protect the installation shall be provided by the Developer's Engineer. Water meters will be supplied by the City of Peoria Meters Services Division. Water Meters shall be installed by the Developer.

**M. Tapping Sleeves**

1. Tapping sleeves will not be allowed on Milled Over All (M.O.A.) Asbestos Cement Pipe.
2. Tapping sleeves are not allowed to be installed on water mains 16-inch or larger.
3. Tapping sleeves are allowed to be installed on waterlines 12-inch and less in diameter; however size on size is not allowed. Any exceptions must be approved in writing by the Utilities Department.

**N. Service Taps**

1. Dry Taps. The Developer shall make all dry taps for 1-inch, 1-1/2-inch and 2-inch water service connections.
2. Location of Taps on Main. Taps shall be a 3-foot minimum separation is required between taps and an 18-inch minimum separation from any fittings or mainline joints.
3. Materials. Water service taps shall be per City of Peoria Standard Detail PE-363.

**O. Metallic Locating Tape**

1. Materials. All water lines require the installation of metallic locating tape, in accordance with MAG Spec. 616.4. The tape shall be solid blue in color. Markings shall be in accordance with MAG Spec. 616.4 except with the following words printed thereon "CAUTION POTABLE WATER LINE BELOW."
2. Location. Installation of the pipe locating tape shall be per MAG Specification 616.4 and placed 2' above the top of the pipe.

**P. Fire Flow Tests**

Conduct Fire Flow Tests according to the City of Peoria Fire Flow Testing Procedure 07001 as published by the City of Peoria Fire Department. Flow tests are not provided by the City. However, the Fire Department is required to observe the test and acknowledge approval of the flow. Contact the Fire Department to schedule the observation of the flow test.

**Q. Backflow Prevention**

Back-flow protection will be required on potable water supply lines to prevent the possibility that the potable water supply may become polluted or contaminated. Backflow prevention assemblies will be required to offer secondary protection to all facilities. If water is used for anything other than for bathrooms or drinking fountains, additional backflow prevention assemblies may be required to isolate potential inside hazards.

1. Containment or secondary protection will be installed at the service connection or downstream side of the water meter. The backflow assembly will be installed as close as possible to the water meter for domestic and landscape connections, or as close as possible to the property line for a fire sprinkler system. Backflow assembly requirements for containment will be determined during the plans review process. Installation of secondary backflow protection shall be according to City of Peoria Standard Details 351, 352-1, and/or 353

2. All commercial/industrial landscape irrigation systems will require a reduced pressure zone (RP) back-flow preventer. Installation of the backflow assembly shall be in accordance with City of Peoria Standard Detail 352-1
3. Inside or primary protection may be required within the customer's potable water system at the point of use to isolate all potential inside hazards. Inside backflow assembly requirements will be determined during the plans review process. Installation of inside backflow assemblies shall be in accordance with City of Peoria Standard Detail 352-2.
4. Class 1 & 2 fire systems are not required at this time to have back-flow protection. Fire sprinkler systems must be sized to allow for a ten (10) psi head loss plus the losses associated with all fittings, valves, elbows and risers.
5. All backflow assembly installations shall be in accordance with 2006 Uniform Plumbing Code and current City of Peoria Code. Installation shall be completed by a qualified licensed contractor and meet current City of Peoria Standard Details. Backflow assembly testing may only be conducted by City of Peoria Recognized Testers. A final inspection will be required by a member of the Environmental/Industrial Users Division prior to the issuance of a Certificate of Occupancy.
6. New Residential Developments should plan on installing at least one water quality sampling station per Standard Detail PE-371. The stations will be located such that they are not obtrusive to the homeowner and provide a representative sample of water within the development. Sampling station location(s) will be chosen by the Utilities Department and provided to the developer during plan review.

### **5-3 CONSTRUCTION**

#### **A. Construction**

All construction shall be per the latest MAG Uniform Standard Details and Specifications for Public Works Construction, as revised and subject to City of Peoria modifications, as revised.

#### **B. Tie-ins to Existing System**

Construction plans shall indicate that any tie-ins to the existing, active system shall be made only after completion of all new work and written approval of the City Engineering Inspector.

#### **C. Pressure Testing**

Pressure testing of new mains shall be by the contractor per MAG Section 610.15 and documented on City forms (available from the City Off-Site Inspectors), except fire sprinkler lines. Fire sprinkler lines shall be tested per the Uniform Fire Code adopted by the City. Water usage for line filling is to be reported to the Utilities Department on City forms.

#### **D. Chlorination, Flushing and Bacteriological Testing**

Chlorination and flushing of new mains shall be performed by the contractor per MAG Section 611 and Part V of ADEQ Engineering Bulletin No. 8, except as stated below.

1. General.
  - a. Before being placed in service, all newly installed pipe, valves, hydrants, and appurtenances shall be flushed, disinfected, kept clean, and will be sampled for acceptable bacteriological analysis.

- b. Newly installed Water Main will have a sample taken from each and every 500 foot interval, and at each end. For each hydrant lateral over 18 feet in length, a sample will be taken at the hydrant end. Hoses for sampling will not be allowed. On new Water Main without hydrant, temporary sampling taps shall be provided, and then removed and plugged after acceptable bacteriological results are received. Hydrant used for sampling shall be fitted with an approved sampling tap.
  - c. The Contractor shall coordinate with the Engineering Department for the location of sampling taps.
2. Pre-disinfection Flushing
- a. Pipe shall first be flushed to remove any solid or contaminated material. Flushing velocity shall be at least 2.5 feet per second in the pipe. Flushing period shall be at least 5 minutes for every 150 feet of new pipe but in no case less than 30 minutes.
  - b. One 2-1/2 inch hydrant opening will, under normal pressure of 40 psi, provide this velocity in pipe sizes up to and including 12 inches.
  - c. For pipe sizes exceeding 12-inch diameter, flushing taps size requirements are:

**REQUIRED FLOW AND OPENING TO FLUSH WATER MAINS**

Pipe Diameter (inches)	Flow Required to Produce 2-1/2 feet per second (fps) Velocity in Water Main (gpm)	Number - Size (inch) of Taps Required for a 2-1/2 fps Flush
14	1200	3 - 2", or 1 - 3"
16	1600	4 - 2", or 1 - 4"
24	3600	4 - 3", or 2 - 4", or 1 - 6"
30	5625	4 - 4", or 2 - 6", or 1 - 8"
36	8100	2 - 6", or 1 - 8"
42	11025	3 - 6", or 1 - 10"

- 3. Final Flushing and Testing. Following chlorination, all treated water shall be flushed from the pipe until the replacement water treated throughout its lengths shows an absence of chlorine. If chlorine is normally used in the source of supply, tests shall show a residual not in excess of that carried in the system. Flushing velocity shall be at least 2.5 feet per second in the Water Main. Flushing period shall be at least 5 minutes for every 150 feet of new Water Main but in no case less than 30 minutes. All hydrants on the new Water Main shall be flushed to remove excess chlorine from the hydrant and hydrant branch.
- 4. Documentation. Document on City forms (available from the City Off-Site Inspectors). Samples will be taken and tested by the City. Water usage for line filling and flushing is to be reported to the Utilities Department on City forms.

**E. Protection of Monuments**

The Developer is responsible for protecting and restoring if damaged, construction survey stakes and property corner monuments used by the City to locate the water services.

**F. Existing Water System Facility Requirements**

- 1. Water Service Installations. Requirements for lowering, extending and relocating meters are as follows;
  - a. A construction permit is required for any work on the City water system regardless of

the location of the facility. Construction permits can be obtained through the Engineering Department.

- b. The contractor or licensed plumber, shall obtain permission from the Meter Services Division to complete all work including meter disconnects and reconnects.
  - c. Materials shall be copper and bronze in accordance with City of Peoria Standard Detail PE-363.
  - d. The Contractor's representative shall be responsible for water customer notification.
2. Fire Hydrant Setbacks and Water Main Relocations to Eliminate Conflicts. All work shall be done by contractor including chlorination and testing requirements that apply to this type of work. Contractor shall not operate valves; Representatives of the Utilities Department are the only personnel authorized to operate water valves on the City's existing water system.
  3. Switch-overs and Abandonments. Work will be done by contractor after written authorization by the City Utilities Department.

#### 5-4 PLANS PREPARATION

##### A. Plan Approvals

1. Plans shall be prepared per the guidelines in Chapter 1, Section K Improvement Plan Preparation.
2. A Design Report is to be submitted with all Water Infrastructure Improvement Plans. This Design Report is to include the following at a minimum:
  - Water System Analysis shall be compliant with the approved edition of the Peoria Water System Master Plan. Refer to Appendix - Sample Water and Sewer System Analysis Report
  - Hydraulic Model, using software as approved by the Utilities Department.
  - Joint Restraint specifications and calculations for situations not addressed by MAG.
  - Statement of compliance with the Peoria Water System Master Plan intended use for the area being served/developed.
3. Water systems shall be located within public rights-of-way or centered within a 20-foot wide easement dedicated for water line, or within a 30-foot wide easement (minimum width) dedicated for both water and sewer lines. Larger easement widths will be required for deeper installations as determined by the Utilities or Engineering Department. Easements shall be dedicated to the City. Water systems shall not be located within the limits of retention/detention basins.
4. A copy of a "Certificate of Approval to Construct," issued by Maricopa County Environmental Services Department (MCESD) and the cover sheet signed by MCESD must be submitted to the Engineering Department prior to receiving final plan approval from the City.

5. Submit electronic versions of final design documents. Drawings shall be in AutoCAD and follow requirements a – i below and specifications are to be in Microsoft Word. This information will be required at final plans approval from the City.

- a. **Compact Disc or DVD**

A Disc containing AutoCAD drawing files, through release 2005, will be required. Compact Disc will be labeled with the Project Name and Review Number. No data compression should be utilized.

- b. **Disc Folder Structure / CAD Sheet Naming Convention**

Create a folder with the Project Name or Review Number. Within the Project folder create subfolder's and label them Water, Sewer, Paving, Grading & Draining, and Storm Drainage and copy the corresponding CAD Dwg files in those sub-folders. Copy all water drawings to the water sub-folder and all sewer drawings into the sewer sub-folder and so on.

Example:

-  Project Name & Review Number: (SCA Office Building - R010011)
-  Water
-  Sewer
-  Paving
-  Grading & Drainage (use G/D to abbreviate Grading & Drainage sheets)
-  Storm Drainage (use S/D abbreviate sheets)
-  Xref

- c. **Model Space / Paper Space**

All CAD as-built line work is to be created in model space.

CAD work in Paper space is for Page Layout, Title Block, Notes, Legend, etc.

- d. **Coordinates System**

CAD Drawings site/civil base models supplied will be created in relation to its geographic location. Use the Arizona State Plane Coordinate system, FIPZONE 0202, North American Datum 1983, Units: International Feet (0.3048 Meters) will be used to ensure consistency with the current City of Peoria Projection Model.

- e. **Geodetic Ties**

All CAD drawings (model space) will be referenced to (at least) two accepted geodetic control points identifiable via the Peoria Geodetic Network - these points may be part of the existing Peoria Bench Mark control project, Maricopa County Geodetic Densification and Control Survey (GDACS) control network (published through MCDOT), or any approved (via Peoria Engineering Department) monumented survey control.

- f. **X References**

The City of Peoria would prefer that X references **NOT** be used; If X references are utilized, all X referenced drawings will need to be placed in one common directory (Xrefs) and the subdirectory tree structure will need to be sent accordingly. Further, each drawing will need to be opened prior to sending to verify the X references will load properly.

- g. **References Information**

Ensure that all non-related cad structures as empty layers, unused blocks, line types, dimension styles, plot styles, text styles, shapes, etc. are purge from the folders. A denied status will be generated for Non-compliances to this standard.

h. **Fonts**

The use of standard AutoCAD fonts and shapes is required. Non-standard FONTS and Shapes Must be transmitted with the drawings in the original file format as separate FONTS subdirectory.

i. **Blocks**

All Blocks or Symbols will include a single point feature. If BLOCK ATTRIBUTES are used, the BLOCK ATTRIBUTES STRUCTURES and BLOCK NESTING should be included in the transmittal. Use Microsoft Word to create such list is preferred. ANSI text files are also acceptable.

**B. Water Infrastructure Acceptance**

Copies of the following documents must be submitted to the Engineering Department prior to acceptance of the water line(s) by the City.

1. A copy of the "Certificate of Approval of Construction" (AOC) issued by MCESD.
2. A copy of the "Engineer's Certification of Completion".
3. Refer to Chapter 7 of this document for as-built requirements.
4. Water Accounting Form indicating all water quantities used for line fill, flushed quantities and any other water used not recorded by water meters.
5. Waterline Pressure Testing documentation.
6. Waterline Flushing documentation.
7. Waterline Disinfection and Bacteriological Testing documentation certified by a State of Arizona Registered Water Distribution Operator including laboratory analytical results.