Section 3-1

WATER

The Town Of Buckeye Arizona

Engineering Design Standards

Section 3-1

Adopted December 2012

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STANDARD DETAILS

Section 3-1 – Water

This section provides policy and standards establishing design criteria for constructing and modifying water systems to be dedicated, and conveyed to the Town of Buckeye (Town) pursuant to, and in accordance with, Town Code. Upon Town acceptance of the water infrastructure, and dedication and conveyance to the Town, the Town will own, operate, and maintain such infrastructure. This section provides guidance on design report preparation, transmission and distribution systems, fire protection, and final plans preparation.

The requirements of this section may be modified at any time by the Town Engineer.

The Town Engineer may approve variances to the requirements of this design standard. Variance requests must be submitted in writing and include a justification for the variance requested. A copy of the Town approved variance shall be included with the submittal of any plans or design reports to the Town that incorporate the variance.

The Town Engineer is required, pursuant to Chapter 23, Article 23-2, of the Town Code, to develop standards and detail regarding public improvements to be constructed within the Town. The standards, design criteria, and policy set forth in this section were developed and recommended by the Town Engineer pursuant to Chapter 23, Article 23-2 and adopted by Town Council in Resolution No. 133-12.

3-1 Water

3-1.000 General Information:

3-1.001 Water Infrastructure Requirements:

A. This section is to aid the engineer in developing a water infrastructure design to meet the Town of Buckeye minimum standards.

B. Developers/Landowners are required, pursuant to Town Code, including the Town Development Code, to install, at their expense, all improvements necessary to provide water service to their development. This will include booster pump stations, reservoirs, transmission mains, distribution mains, pressure reducing stations, treatment technology, or other facilities; and the payment of all required development fees.

C. Developers/Landowners shall install, at their expense, all on-site and off-site improvements necessary to serve their developments.

3-1.002 Acronyms, Definitions and Abbreviations:

A. AAC - Arizona Administrative Code

B. ABC - Aggregate Base Course

C. ACC - Arizona Corporation Commission

D. ACP - Asbestos-Cement (Transite) Pipe

E. ADEQ - Arizona Department of Environmental Quality

F. ADRE - Arizona Department of Real Estate

G. ANSI - American National Standards Institute

H. ANSI/NSF Standard 60 - *American National Standards Institute/NSF International Standard 60 - 2000a, Drinking Water Treatment Chemicals* – Health Effects, November 2000

I. ANSI/NSF Standard 61 - *American National Standards Institute/NSF International Standard 61 - 2000a, Drinking Water System Components* – Health Effects, November 2000

J. A.R.S. - Arizona Revised Statutes

K. ASTM - American Society for Testing and Materials

L. ARV - Air Release Valve

M. AWWA - American Water Works Association

N. Backflow-Prevention Assembly - A mechanical device used to prevent backflow.

O. CC&R - Conditions, Covenants, and Restrictions

P. CLSM - Control Low Strength Material

Q. CMP - Community Master Plan

R. Cover - The distance between the top outside of pipe and grade elevation at location of measurement.

S. cpd - capita per day

T. Developer - Shall mean the individual or entity causing Development of land in the Town, including Development companies authorized to act on behalf of the Developer and the term Developer shall also mean a contractor ("Contractor") authorized to act on behalf of the Landowner or Developer. Developer shall also be interpreted to mean Landowner.

U. Development or development - Shall have the same meaning as defined in the Town Development Code.

V. Distribution System - A pipeline, appurtenance, device, and facility of a public water system that conducts water from a source or water treatment plant to persons served by the system.

W. D.I.P. - Ductile Iron Pipe

X. DU - Dwelling Unit

Y. EDU - Equivalent Dwelling Unit

Z. Engineer or engineer - An engineer registered professionally in the State of Arizona pursuant to the provisions of A.R.S. §32-101; §§32-121-131; §§32-141-152, as amended.

AA. Entry Point - Entry point to the distribution system, a compliance sampling point anywhere on a finished water main that is representative of a water source.

BB. EPA - United States Environmental Protection Agency

CC. FDC - Fire Department Connection

DD. fps - feet per second

EE. gpcpd - gallons per capita per day

FF. gpd - gallons per day

GG. gpm - gallons per minute

HH. gpapd - gallons per acre per day

II. gpppd - gallons per person per day

JJ. gprpd - gallons per room per day

KK. gpsfpd - gallons per square foot per day

LL. gpspd - gallons per student per day

MM. Horizontal Separation - The dimension measured horizontally between the outside of one item to the outside of an adjacent item.

NN. ID - Inner Diameter

OO. Landowner - Shall mean the owner of the land in the Town on which Development occurs. "Landowner" shall also be interpreted to mean Contractor and/or Developer, including Development companies authorized to act on behalf of the Developer/Landowner.

PP. LPPUE - Limited Purpose Public Utility Easement

QQ. MAG - Refers to the Maricopa Association of Governments Uniform Standard Specifications and Details for Public Works Construction current edition.

RR. Main lines and/or Pressure mains - are defined as the piping under constant pressure.

SS. MCESD - Maricopa County Environmental Services Department

TT. MJ - Mechanical Joint

UU. NFPA - National Fire Protection Association

VV. NSF - National Sanitation Foundation

WW. NST - National Standard Thread

XX. OD - Outer Diameter

YY. OS&Y - Outside screw and yoke

ZZ. PC - Point of Curvature

AAA. Plan(s) or plan(s) - Design drawings that are 100% complete and sealed by a registered professional Engineer as defined above.

BBB. POU - Point of Use Treatment

CCC. PRV - Pressure Reducing Valve

DDD. PUE - Public Utility Easement

EEE. PVC - Polyvinyl Chloride

FFF. Public Works Inspector - A Town employee or contracted consultant with a primary responsibility of monitoring the construction of improvements for conformance to Town requirements.

GGG. SWPPP - Storm Water Pollution Prevention Plan

HHH. ROW - Public Rights-of-Way

III. TOB - Town of Buckeye

JJJ. Town - Town of Buckeye

KKK. Town Engineer - Town of Buckeye Town Engineer or designee

LLL. Water Campus - Water facility with storage reservoir, booster station, chlorination equipment, treatment facilities, and other appurtenances required to deliver water.

MMM. Well Transmission Mains - Are defined as the piping from a water source to a water storage facility and may or may not be under constant pressure.

NNN. Vertical Separation - The dimension measured vertically between the outside of one item to the outside of another.

3-1.003 Design Policy:

A. Developers/Landowners shall comply with the Town's requirements for extension of water systems to newly developed areas and subdivisions inside the Town's service area. See Figure 1.

B. Water mains are required along the entire length of all property line frontages, whenever future upstream extension of the water system is possible. The property line frontage is that portion of the property that abuts a street, or public ROW. If a parcel to be developed has more than one property line frontage, water mains shall be installed along the entire length of all frontages or as required by the Town or pursuant to a master plan approved by the Town.

C. The engineer shall analyze the water demands from a proposed development and determine its impact on the Town's Water Distribution System, pumping and storage systems. The engineer shall provide an analysis that encompasses the development area, adjacent mains and booster stations where deemed necessary by the Town. All analyses shall conform to the approved master plans within the study area. The effects of peak water demands and fire flows shall be

evaluated to ensure proper sizing of proposed water facilities. If no water campus exists to serve the development, the engineer shall demonstrate to the satisfaction of the Town, that a water source or water sources are available to serve the demands of the development and that a water campus can be constructed to serve the demands of the development.

D. Town approval of plans and associated design reports are valid for one (1) year from the date of Town Engineer's signature.

E. Engineering Bulletin No. 10, *Guidelines for the Construction of Water Systems* published by the Arizona Department of Environmental Quality, as well as the Arizona Administrative Code, *Title 18 - Environmental Quality*, contain specific requirements for submittals, approvals and notifications when improvements of public water system are proposed. The Developer/Landowner and the engineer designing the plans shall comply with all laws, regulations, and requirements.

F. All Developers/Landowners required or desiring to connect to the Town of Buckeye water system are required to be annexed within the Town's corporate limits.

G. All construction documents shall be prepared by a registered Professional Civil Engineer licensed and practicing in the State of Arizona pursuant to the provisions of A.R.S. §§32-101, 32-121 to 131; 32-141 to 152. Each sheet of the plans shall include the appropriate professional State of Arizona seal, signature, date and date of expiration below seal. The Town does not require original seals and or signatures (wet seal) on design documents during the review cycle.

H. All final plans that include connection to or extension of the Town's water system, or on a system that is to be dedicated to the Town, shall be submitted to the Town of Buckeye for review and approval. Plan review fees shall be paid at the time of plan submittal.

I. All final plans including plans for fire protection within the Town's corporate limits, even if the water provider is a private water provider, shall be submitted to the Town of Buckeye for review and approval. Plan review fees shall be paid at the time of plan submittal.

3-1.004 Diligence:

A. Developers/Landowners shall verify the need for any water system improvements necessary to provide service to a site or to provide onsite facilities. It is the Developer's responsibility to become familiar with all of the existing site conditions. Available resources in which to find this information:

1. Records – obtain existing utility maps and As-Built drawings.
2. Town's website – http://www.buckeyeaz.gov.
3. The Town Engineer can confirm the need for any required extension or condition for water service.

B. All entities seeking water service from the Town need to be familiar with Town Code including Chapter 17 of the Town Code.

C. Any apparent field condition, error, omission, etc. shall be brought to the attention of the Town Engineer.

3-1.005 MAG Reference:

A. The engineer should be familiar with the *MAG Uniform Standard Specifications for Public Works Construction*, including all applicable Standard Details. These documents contain

construction related specifications and details that impact the design of water systems including trenching, bedding, backfill, and pavement replacement, etc.

3-1.006 Standards:

A. The following is a list of national, regional and local resources (the latest editions unless otherwise stated), which are referenced and used for the design within the Town of Buckeye.

1. Resources, Standards and References:

   a. American Water Works Association, AWWA

   b. American National Standards Institute, ANSI

   c. ADEQ Engineering Bulletin No. 8 and 10

   d. *MAG Uniform Standard Specifications for Public Works Construction*

3-1.007 Assured Water Supply:

A. A certificate of an assured water supply is required for subdivisions pursuant to Arizona law.

1. ADWR defines a "subdivision" (per A.R.S. §32-2101), as six or more parcels with at least one parcel having an area less than 36 acres. This includes residential or commercial subdivisions, stock cooperatives, condominiums, and all lands subdivided as part of a common promotional plan (including golf courses, parks, schools, and other amenities).

2. The applicant shall demonstrate financial capability to construct any necessary water storage, treatment, and delivery systems for the development.

3-1.008 EPA Regulations:

A. The EPA requires the Town to develop and implement a program to protect the public health and welfare by ensuring that all potable water distributed or sold to the public by public water systems is free from unwholesome, poisonous, deleterious, or other foreign substances, and filth or disease-causing substances or organisms. The Town's Water Resources Department is the Town Department authorized by Town Council to enforce provisions of Chapter 17 of the Town Code. Contact the Water Resources Department for details and requirements of such Chapter.

3-1.009 MCESD Requirements:

A. Policy:

1. MCESD is required to review and approve all public water main extensions and construction of water related facilities within the Town's service area, prior to the Town approving the final plans.

2. In order to gain Town approval, i.e., Town Engineer's signature on a plan set:

   a. The plans shall be signed and dated by MCESD approving the plans.

   b. An executed copy of the MCESD approved "Certificate of Approval to Construct" shall be submitted with the plans at time of Town approval.

3. Before the water system is accepted or put into service and prior to any issuance of a Certificate of Occupancy, the Developer/Landowner shall submit a Certificate of Approval of Construction signed by MCESD.

3-1.010 Implementation:

A. The implementation and enforcement of the design standards set forth in this section shall be effective the date of Town Council's adoption of the resolution approving the standards and requirements of this section and shall apply to the following:

1. All new plans and reports submitted to the Town following the effective date of Town Council's adoption of the resolution approving the standards and requirements of this section.
2. All plans and reports seeking a new Town Engineer's signature or a re-approval from the Town Engineer.
3. All expired plans and reports shall be brought into conformance with the design standards of this section.
4. All plans and reports produced under an approved CMP shall follow or be brought into conformance with the design standards of this section.
5. All current approved plans that have not been permitted shall comply with the requirements of this section. Prior to the issuance of the construction permit, the design engineer shall submit a written letter to the Town Engineer acknowledging the construction and materials shall be performed and supplied pursuant to the requirements of this section.
6. All expired or abandoned plans and reports as defined below.
    a. The Town will not hold or store plans and reports. Any plan set or report that has not been picked up from the Town within 90 days of the Towns first notification to the applicant that the plans are ready to be picked up will be deemed abandoned. The Developer/Landowner will be notified that the expired plan set or report will no longer be considered by the Town. If a plan or report is abandoned, the Developer/Landowner will be required to resubmit the abandoned plan or report and pay the Town all associated fees.
    b. If a construction permit for the plans has not been issued within 1 year from the date of approval noted on the cover sheet, the plans and reports will be required to be resubmitted to the Town for review and re-approval.
        i. In order to resubmit plans and reports, the design engineer shall bring the plans and reports into conformance of the Town's current standards and requirements.
        ii. All revised plans and reports will be subject to the Town's current fee schedule.
        iii. This resubmittal is required to go through a comprehensive review of the reports or all plan sheets.
    c. If plans and reports have not been resubmitted to the Town for review or permitting within 2 years from the date of the last Town action the plans and reports shall be considered expired. Once a plan or report has expired, the plan shall be resubmitted for first review and all associated fees shall be paid to the Town.
        i. In order to resubmit plans and reports, the design engineer shall bring the plans and reports into conformance of the Town's current standards and requirements.
        ii. All expired plans and reports being resubmitted will be subject to the Town's current fee schedule.
        iii. This new submittal is required to go through a comprehensive review of the reports or all plan sheets.

3-1.011 Service Area Establishment:

A. If a development requires that a new water service area be established, the Developer/Landowner shall provide at no cost to the Town, valid groundwater rights or other water rights approved by the Arizona Department of Water Resources and acceptable to the Town, in sufficient quantities to establish a new service area to serve the development per Town Code, Section 25-2.

3-1.012 Private Water Companies:

A. Existing Private Water Companies:

1. Portions of the Town's municipal area are provided water service by private water companies. Figure 1 delineates those areas. Proposed private water mains located within the Town's ROW or easements will require an agreement between the Town and the private water company delineating liability and maintenance responsibilities. Current private water providers are:

   a. Global Water Company (previously, Valencia Water Company)

   b. EPCOR Water Company (previously Arizona American Water Company) (also provides sewer service in some areas)

   c. Arizona Water Company

   d. Water Utility of Greater Buckeye

B. Responsibility of Private Water Companies:

1. Developer/Landowner shall obtain the approval of the applicable private water company for the construction of and modification to water systems within the franchise areas. Prior to obtaining Town approval of the design documents, the Developer/Landowner shall submit to the Town written documentation that the private water company has approved facilities shown on the final plans. The private water company approval of the design plans shall be evidenced by written signature or stamp of the authorized individual from the company on the plans. The design plans required to be approved by the private water company shall also comply with fire protection requirements of the Town.

2. Water As-Builts shall require the written approval of the applicable private water company prior to the Town's approval of the As-Builts. An approval letter from the private water company approving the As-Builts shall be provided to the Town.

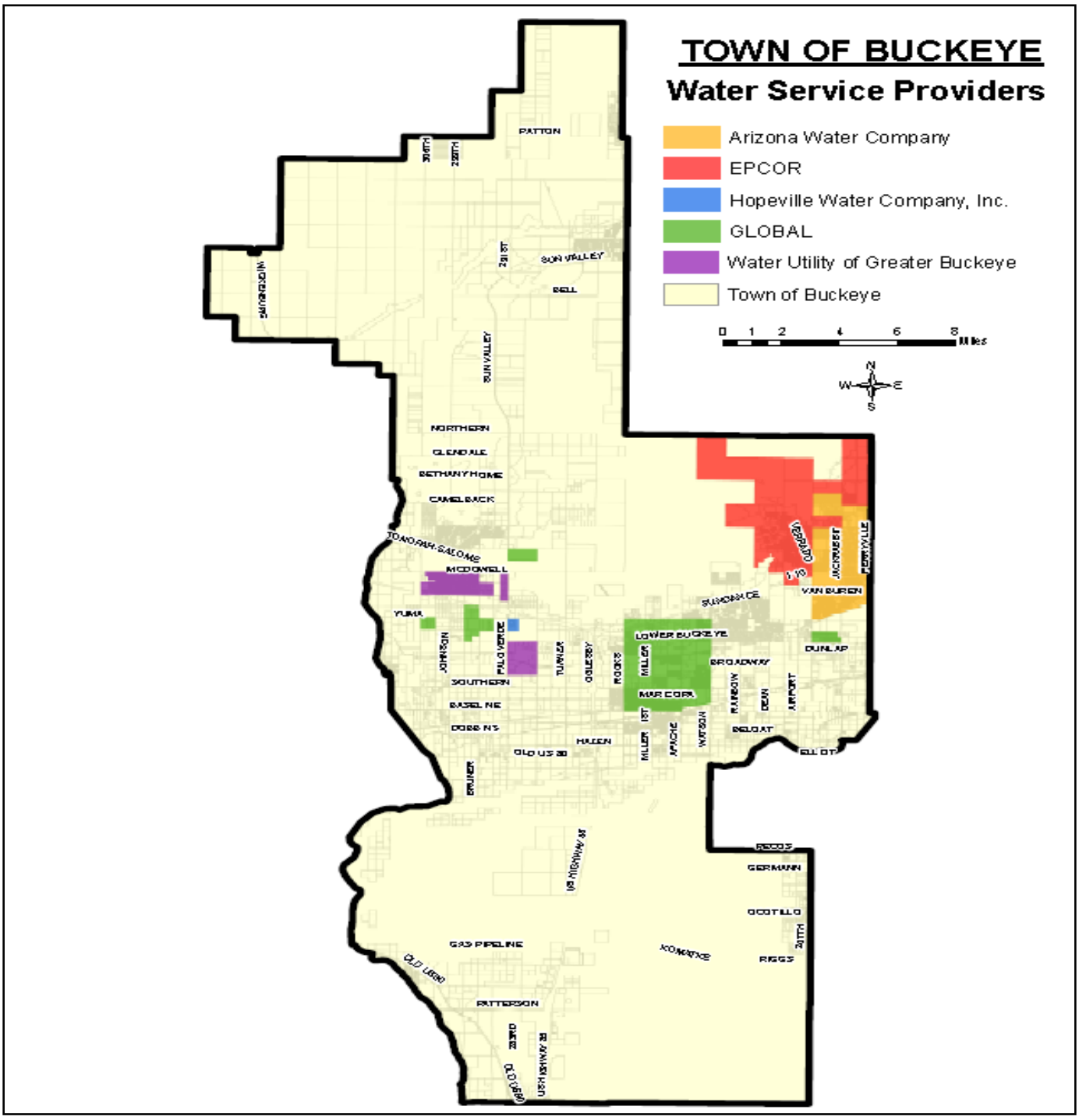
C. Town Review of Private Water System Extensions:

1. The Town cannot provide water service within private water company franchise areas. However, plans for private water system extensions shall be submitted to the Town for review and approval. The review is not for comprehensive enforcement of the private utility requirements. Town review is restricted to public health, safety and welfare issues which includes compliance with the Town fire protection requirements and work that is to occur within the Town's ROW. A note will be placed on the final plans stating that the operation and maintenance of franchise lines is not the responsibility of the Town.

2. All private water mains located adjacent to a street shall be located within the ROW and within the standard locations for water mains in the paved portion of the street. Private water mains shall not be located within a PUE or LPPUE as this easement is restricted for dry utilities only.

3. All private water mains located adjacent to a Town ROW but not constructed under the current or ultimate paving section shall be required to have private exclusive easement for the water main outside of the LPPUE and ROW.
4. A LPPUE shall be shown on the final plat that is for dry utilities use only.

Figure 1 Water Service Area Map



3-1.013 Storm Water Pollution Prevention Plan:

A. If the proposed construction will be larger than 1 acre, including linear construction, an ADEQ storm water permit is required. Proposed construction is defined as disturbed area. The SWPPP and Best Management Practices are required by state law and shall be submitted to the Town for review during the plan review process. The SWPPP shall also be maintained at the construction site for reference during construction in accordance with the most current Arizona storm water construction general permit requirements. The ADEQ storm water permit is required in order to submit an application for and receive a Town of Buckeye construction permit.

3-1.014 Water Service Agreement:

A. The County's "Water Service Agreement" form should be completed by the engineer and submitted with the final plans to the Town Engineer. It is the Developer/Landowner's responsibility to obtain necessary signatures from the applicable Town divisions. The agreements will not be signed by the Town prior to the Town approving the final plans.

3-1.100 Water Reports:

The purpose of the water report is to describe the layout and design of the proposed water system that will be owned, operated, and maintained by the Town following Town acceptance, dedication and conveyance of the improvements and real property to the Town. The description shall include the criteria and all assumptions used, the layout and sizing of the system, and provide all calculations and resources used. The proposed system shall meet the requirements of the Town.

3-1.101 General Report Requirements:

A. All reports shall be sealed and signed on the cover by a registered Professional Civil Engineer in the State of Arizona.

B. Information from a previous report or other reports that is important to the design of the proposed project shall be included in the submitted report.

C. Reports should be letter size, bound with a hard cover.

D. Maps and exhibits should be folded in sleeves with a maximum size of 24 inches by 36 inches.

E. Provide the project title on every page of the water reports.

F. All redline reports shall be returned with the submittal of the next report for review.

G. Cover Sheet:

1. Project title
2. Submittal date and submittal number
3. List all prior submittal dates and corresponding submittal number
4. Major cross streets
5. Prepared for including: contact name, company name, address, telephone number, and email
6. Prepared by including: contact name, company name, address, telephone number, and email
7. Town approval block, see Figure 2.
8. Engineers seal
9. All pages of the report shall have a sequential page number, except the cover.

Figure 2 Town Engineer Signature/Approval Block

DISCLAIMER:

THE TOWN APPROVES THIS REPORT FOR CONCEPT ONLY AND ACCEPTS NO LIABILITY FOR ERRORS OR OMISSIONS

BY: _____
BUCKEYE TOWN ENGINEER DATE

H. Table of Contents:
   1. List all sections
   2. Figures
   3. Tables
   4. Exhibits
   5. Appendices

I. Executive Summary Paragraphs:
   1. Criteria used
   2. Criteria met
   3. Project challenges
   4. Overall observations
   5. Conclusions
   6. Recommendations

J. Introduction:
   1. Provide project name, size, description, land use and type of development.
   2. Purpose of the report.
   3. Describe the water campus service area in which the development is located. Provide general information about the water campus.
   4. Explain the objectives of the report, and include a description of the infrastructure requirements, for the development. The introduction of the report shall also include a summary describing how the proposed water system complies with regulatory requirements. In addition, the introduction shall include an evaluation of the development's impact on the existing system.
   5. Indicate if the proposed water system is public or private.

K. Project Location:
   1. Township, Range and Section
   2. Description of the major cross streets

3. Vicinity Map
4. Relationship to other developments and water improvements
    a. Provide a map labeling all adjacent developments and water improvements.

L. Existing Conditions:
1. Describe the existing water system infrastructure:
    a. Include all:
        i. Storage reservoirs
        ii. Booster stations
        iii. Wells
        iv. Distribution lines
        v. Well supply water lines
        vi. Treatment facilities
2. Topography
    a. General slope of the property, high and low elevations
    b. Challenging topographic features or constraints
    c. Benchmark (s) being used
3. All adjacent land uses

M. Service Area:
1. Describe the service area in which the proposed development is located and how it is being accommodated with the proposed design.
2. Pressure zone(s) included in the service area.

N. Criteria:
1. All design criteria shall be in compliance with the standards in this section.
2. Summarize and include all Town of Buckeye and other agency requirements and design criteria used for this report.

O. Design Methodology:
1. Identify land use, population, density, demand factors, fire flow, fire duration, and peaking factors.
2. All calculations shall be converted to EDUs as well as flow.
3. Summarize all project demands according to concentration points.
4. Summarize all offsite demands per concentration points.
5. Include a demand allocation summary.
6. Include totals for each pressure zone and grand total.

P. Storage Reservoirs:

1. Prepare calculations showing the required storage for use and fire storage and how they are being met in the connecting system.
2. Include discussion on how the proposed development impacts the storage for the service area of the water campus providing storage.
3. Provide solutions for storage if the development causes storage shortfalls for the water campus service area.
4. Include totals for each pressure zone and grand total.

Q. Booster Stations:

1. Prepare calculations showing the required pumping for use and fire flow and how they are being met in the connecting system.
2. Include discussion on how the proposed development impacts the pumping for the service area of the water campus providing pumping/fire flow.
3. Provide solutions for pumping if the development causes pumping shortfalls in pumping for the water campus service area.
4. Include totals for each pressure zone and grand total.
5. The booster station section in this report does not replace the booster station design report required to accompany the design plans for the booster station.

R. Well Supply:

1. Prepare calculations showing the required raw water requirements for the development and how they are going to be met.
2. Include discussion on 18 hour pumping requirements per the "Design Standards – Section 3-5 Water Well Facility" (aka Well Facility Design Manual – DM301).
3. Provide solutions for providing well capacity for the proposed development.
4. Include totals for each pressure zone and grand total.
5. The well supply section in this report does not replace the well supply design report required to accompany the design plans for the wells.

S. Treatment:

1. Include discussion on water treatment requirements per the "Design Standards – Section 3-5 Water Well Facility" (aka Well Facility Design Manual – DM301).

T. Modeling:

1. The Town requires WaterCAD to be used for modeling of the water system. This allows the Town to easily add the proposed development to the Town's over all model.
2. Identify all assumptions made.
3. Include a section in the report that discusses the source of pressures used in the model, i.e. fire flow tests, long term pressure monitoring, existing master plans, existing models, etc.
    a. If the model is for an existing system or extension to a master system the model shall be calibrated to the current constructed and operating infrastructure.
    b. Show all current calibration data.
    c. If the model is not calibrated to the actual system the report cannot be approved.

4. Include the following information in tabular form. The column headers listed are the minimum required to be used in the Average Day Demand Reports. Separate reports will be required for each phase and pressure zone of the development.
    a. Pipe Report:
        i. Pipe label
        ii. Pipe length (ft)
        iii. Pipe diameter (in)
        iv. Flow rate (gpm)
        v. Pipe roughness coefficient
        vi. Headloss gradient (ft/1,000 ft)
        vii. Velocity (ft/sec)
    b. Junction Report:
        i. Node label
        ii. Node elevation
        iii. Node pressure (psi)
        iv. Node pressure head (ft)
        v. Base flow (gpm)
5. Include the following information in tabular form. The column headers listed are the minimum required to be used in the Maximum Day Demand Repots. Separate reports will be required for each phase and pressure zone of the development.
    a. Pipe Report:
        i. Pipe label
        ii. Pipe length (ft)
        iii. Pipe diameter (in)
        iv. Flow rate (gpm)
        v. Pipe roughness coefficient
        vi. Headloss gradient (ft/1,000 ft)
        vii. Velocity (ft/sec)
    b. Junction Report:
        i. Node label
        ii. Node elevation
        iii. Node pressure (psi)
        iv. Node pressure head (ft)
        v. Base flow (gpm)
    c. Fire Flow Report:

i. Node label
ii. Needed fire flow (gpm)
iii. Total flow needed (gpm)
iv. Total flow available (gpm)
v. Satisfies fire flow (true/false)
vi. Maximum pressure (psi)
vii. Residual pressure (psi)
viii. Calculated residual pressure (psi)
ix. Calculated minimum zone junction at total flow needed

6. Include the following information in tabular form. The column headers listed are the minimum required to be used in the Peak Hour Demand Reports. Separate reports will be required for each phase and pressure zone of the development.
   a. Pipe Report:
      i. Pipe label
      ii. Pipe length (ft)
      iii. Pipe diameter (in)
      iv. Flow rate (gpm)
      v. Pipe roughness coefficient
      vi. Headloss gradient (ft/1,000 ft)
      vii. Velocity (ft/sec)
   b. Junction Report:
      i. Node label
      ii. Node elevation
      iii. Node pressure (psi)
      iv. Node pressure head (ft)
      v. Base flow (gpm)
7. Provide an electronic copy of all models and spreadsheets with the approved report.
8. Include a map of the water system showing all junction numbers, pipe segments, pipe diameter (by color), Wells, Storage Reservoirs, Booster Station, PRVs, treatment facilities, and any other model appurtenances. The map shall be provided at a readable scale. Use multiple pages, if necessary. Separate maps will be required for each phase and pressure zone of the development.

U. Conclusion:
1. Summarize the work that has been completed.
2. Summarize all recommendations.

3. Summarize junctions and pipes that are at the extreme, i.e. highest and lowest pressure, flow and velocity etc.
4. List all reference documents.
5. Conclusion shall also include confirmation that all of the Town requirements as well as all other agencies have been satisfied.

V. Appendices:

1. Supporting calculations
2. Attach all relevant portions of external approved reports, including cover page, that validate the design of assumptions of this report.
3. All other supporting information

3-1.102 Types of Water Reports:

A. There are four (4) different types of reports that can be submitted to the Town. Each type of report has a specific use. The following is a description of each of the reports as well as their use:

B. Master Water Report:

1. A master water report is required to accompany and support all CMP submittals to the Town.
2. Master water reports are intended to cover large areas addressing all service areas of a specific water campus.
3. Master water reports can vary in detail, but the overall requirement is to show how the entire master planned area is being served by the water campus. It must cover water supply, treatment, storage, and distribution.
4. The Town may require a master water report for any development.

C. Preliminary Reports:

1. Preliminary water reports are required to accompany and support a preliminary plat or preliminary site plan.
2. Preliminary reports shall comply with all general report requirements.
3. Preliminary reports can further detail areas within a master water report, multi-phased project, or a stand-alone un-phased project.
4. Preliminary reports vary in detail. However, enough detail is required to prove how the entire preliminary plat or preliminary site plan is served by a water campus, and that the proposed design meets all Town criteria.
5. If the preliminary report is following an approved master water report, describe any and all changes from the approved master water report.
6. Update or use the most current design criteria for specific site uses if applicable.
7. Modeling is not mandatory for a preliminary report, but may be required by the Town at the sole discretion of the Town Engineer.
8. Solutions provided should include enough design calculations to validate the proposed water improvement.

9. Preliminary plats cannot be approved prior to the approval of the preliminary water report. This may also apply to preliminary site plans, depending on the nature of the preliminary site plan and its location.

D. Final Reports:

1. Final reports are required to accompany and support all final plats, site plans, and final design plans.
2. Final reports shall comply with all general report requirements.
3. Final reports shall complete the design from a preliminary report or master water report.
4. Describe all changes from the master water report or preliminary report. All changes shall be incorporated into the report, models and results.
5. The final report must include criteria, assumptions, special conditions, and complete calculation tables and figures to provide a complete description of the proposed water system as a basis of final plans and specifications.
6. All models and tables shall be complete.
7. Update or use the most current design criteria for specific site uses if applicable.
8. Final plat, site plans, and/or final plans shall not be approved until the final report is approved.

E. Private Facilities Reports:

1. Reports submitted to private water companies with service areas within the Town of Buckeye shall also be submitted to the Town for approval.
2. The Town has authority over fire protection for a development located with the Town that is within a private water company service area.
3. The Town has authority over the location and surface facilities in public ROW and property owned or controlled by the Town.
4. Reports to private water companies and the Town will not be approved by the Town unless first approved by the private water company.
5. Private reports must show that the private water company can provide adequate capacity to serve the proposed development and meet Town's fire protection requirements in addition to demonstrating compliance with the water service requirements of the private water company.
6. Private reports shall comply with all general report requirements in this section.
7. A signature line for the private utility provider shall be provided on the front cover of the report.
8. The executed "will serve" letter from the private utility company is required to be part of the report.

3-1.200 Distribution System:

3-1.201 General Requirements:

A. All water mains installed on multi-family, commercial, and industrial developments shall be private and maintained by the property owner or designee.

B. A Town approved backflow prevention device is required at all locations water mains leave ROW or Town easements.

C. Public water mains not installed in the ROW shall be located in an exclusive easement granted to the Town by the Developer/Landowner in accordance with Town requirements.

D. No private water mains or other water improvements are allowed within the ROW, LPPUE, PUE or Town easements, except for water mains owned by a private water service provider which are allowed in the ROW and as agreed to by the Town.

E. It shall be the Developer/Landowner responsibility to extend water mains to their development in order to provide potable service and fire flow. These main extensions shall be constructed and installed by the Developer/Landowner at no cost to the Town. Individual owners may be required to connect or extend the public system, at no cost to the Town, in order to serve the development.

F. The Town requires water mains to be installed along the entire length of the property line frontage of that property being developed. The property line frontage is defined as that portion of a parcel of property that abuts a street, tract, easement, or public ROW. If a parcel to be developed has more than one (1) frontage, improvements shall be installed along all frontages.

G. The Town requires the extension of water mains along a frontage, or through a subdivided parcel, to the boundary where future extension of the water main is possible, providing a point of service to adjacent properties, or as determined necessary by the Town.

H. Each lot is required to have safe, reliable, and potable water in sufficient volume and pressure for domestic use and fire protection. This shall be determined by the design engineer and verified by the Town Engineer. This will be done as part of the master plan.

I. Dry water mains are considered on a case by case basis by the Town Engineer.

J. Design of the water mains shall minimize high points.

K. When connecting to or replacing existing water mains, extreme caution should be taken to assure minimum disruption and down time to existing customers. In most cases, maximum down time will be eight (8) hours. In extreme cases, maximum allowable down time will be twelve (12) hours. All outages shall be coordinated with the Town Water Resources Department. A note requiring this coordination shall be placed on the plans.

L. Minimum separation requirement between potable water lines and non-potable lines shall meet the requirements of MAG Standard Detail 404.

3-1.202 Design Criteria:

A. Demand Criteria: See Table 1.

B. Design Flows:

1. Water demand for each development will be calculated using the average day demands, as shown in Table 1, to ensure that the existing distribution supply is sufficient. Designs will include all necessary improvements, including booster pumping stations, reservoirs, lines and appurtenances to meet the system's ultimate demand.

2. Hydraulic calculations will demonstrate that the system will provide average day, peak-hour demand, maximum-day demand and maximum day plus fire flow. The peaking factors are as shown in Table 2. These factors shall be appropriately increased for restaurants and high-demand water users.

Table 1 Average Day Water Demands in Gallons Per Day

AVERAGE DAY WATER DEMANDS				
Residential Demand Per Dwelling Unit (gallons)				
Land Use	**Capita/DU**	**Use**	**Total Use**	**Unit**
Low and Medium Density (less than 8 dwelling units per acre)	3.2	150	480	per unit
High Density (Greater than 8 units per acre includes apartments)	2.5	150	375	per unit
Active Adult (max 8 units per acre)	2	150	300	per unit
Service And Employment				
Land Use	**Design**	**Use**		**Unit**
Commercial / Mixed Use	Master Planning	2,009		gpapd
Commercial / Mixed Use	Specific Use	240		gpppd
Commercial High Rise / Multi Story	Master Planning and Specific Use	240		gpppd or per 1500 sf
Industrial[1]	Master Planning	2,009		gpapd
Industrial[1]	Specific Use	130		gpppd
Hotel / Motel	Master Planning and Specific Use	200		gprpd
School[2]	Master Planning	5000		gpapd
School[2] (without lunch or showers)	Specific Use	75		gpspd
School[2] (with lunch or showers)	Specific Use	125		gpspd
Malls / Retail Areas	Master Planning and Specific Use	0.5		gpsfpd
Non-Specified[3]	Master Planning and Specific Use	220		gpppd
1. Does not include water for industrial operations. 2. Does not include irrigation for turf areas. 3. All non-specified uses require approval by the Town Engineer.				
Special Use Areas				
Land Use	**Design**	**Use**		**Unit**
Natural Open Space	Master Planning and Specific Use	0		gpapd
Turf	Master Planning and Specific Use	4,325		gpapd
Developed Open Space – Parks	Master Planning and Specific Use	1786		gpapd
Developed Open Space – Golf Course	Master Planning and Specific Use	4285		gpapd

Table 2 Demand Peaking Factors

Demand	Peaking Factor
Maximum Day Demand	1.8 x Average Day Demand
Peak Hour Demand	3.0 x Average Day Demand

C. Fire Flow:

1. Fire flow requirements are per Table 3. These values shall be used for tank, booster pump, treatment and pipe sizing.
2. The fire flows in Table 3 are not affected with specific fire sprinkler designs except in cases where they are exceeded. If these flows are exceeded there are two options available:
   a. The development requiring larger fire flows than the public system has been planned or constructed for shall build onsite facilities to accommodate the fire flow requirements.
   b. If there is the ability to upgrade existing public facilities (storage, pumping, and parallel distribution mains) serving the development which may require larger fire flow, a proposal may be submitted to the Town for consideration.
3. Sprinkler systems are still required to be designed per Town Code and approved by the Town of Buckeye Fire Department.

Table 3 Fire Flow

Land Use	Fire Flow (gpm)	Duration (hours)
Low and Medium Density (less than 8 dwelling units per acre)	1,500	4
Active Adult (max 8 units per acre)	1,500	4
High Density (Greater than 8 units per acre includes apartments)	2,000	6
Commercial / Mixed Use	3,000	4
School	3,000	4
Malls / Retail Areas	4,000	6
Industrial / Warehouse	5,000	6
Commercial High Rise / Multi Story[1]	5,000	6

1. This is a minimum requirement and shall be verified for each high rise.

D. Hydraulic Criteria:

1. Velocity:
   a. Maximum velocity is 5 feet/sec for average day, maximum day, and peak hour flows.
   b. A headloss of 10 feet/1,000 feet shall be used for average day, maximum day, and peak hour flows.
   c. Maximum velocity is 10 feet/sec for maximum day plus fire flow.
2. Headloss Coefficient (Hazen-Williams "C" Value):
   a. New Concrete Pipe = 100

b. New Ductile Iron Pipe = 130

c. New Steel Pipe = 140

d. New PVC Pipe = 150

e. For older pipe reduce "C" valve by ten (10) or as determined from calibrating the water model using fire flow testing.

3. Minimum Pipe Size:

a. The Town's water distribution system operates on a grid system. Minimum line size requirements for this grid are as follows, unless otherwise approved by the Town Engineer:

i. Minimum pipe size for water main is 8 inches.

ii. Minimum pipe size for water main in half mile streets and collector streets is 12 inches.

iii. Minimum pipe size for water main in mile streets and arterial streets is 16 inches.

iv. Minimum pipe size may be modified pursuant to a water master plan approved by the Town. In no case shall there be less than one 16 inch main connecting to each adjacent booster station or adjacent development. The 16 inch main connections shall be coordinated with the adjacent booster service area.

b. 10 inch, 14 inch, and 18 inch water mains are not allowed.

E. Design flows for all distribution systems connecting to an existing system will be based upon flow and pressure of the existing system as documented by the engineer.

3-1.203 Pressure Requirements:

A. Pressure extremes in water systems result in the potential for contamination to enter the network. Low pressures in the water system may allow polluted fluids to be forced into the system, and high pressures may cause ruptures or breaks in the network. Table 4 lists the pressure zones to be followed in the Town.

Table 4 Summary of Pressure Zones in the Town of Buckeye

Pressure Zone	Low Elevation (feet)	High Elevation (feet)
1	820	950
2	950	1,080
3	1,080	1,210
4	1,210	1,340
5	1,340	1,470
6	1,470	1,600
7	1,600	1,730
8	1,730	1,860
9	1,860	1,990
10	1,990	2,120

B. The Town maintains several pressure zones and care must be taken to identify boundary conditions when designing near a zone line.

C. See Table 4 for water pressure zone boundaries. Static water pressure tests will be taken on a fire hydrant located on each leg of the existing water system where connections are proposed.

D. System Pressure:

1. 50 psi shall be maintained during average day, maximum day, and peak hour conditions.
2. 20 psi shall be maintained during maximum day plus fire flow conditions.
3. The residual pressure in the distribution system shall not exceed 110 psi.
4. All residential lots are required to have an individual PRV installed on the customer side of the meter.

E. Water hammer may produce momentary pressures in excess of normal static pressures, thus increasing the probability of water main failure. Suitable provisions must be made to protect the system from water hammer pressures. The occurrence and severity of water hammer can be reduced by using slow-closing valves, pressure-release valves, surge tanks, variable frequency drives, soft start motor controllers and air chambers. In cases where pressures exceed 110 psi or water hammer conditions are developed, all elements of the system will be designed accordingly.

3-1.204 Pipe System Layouts:

A. For purposes of horizontal and vertical separation, storm drains, non-potable water lines, reclaim lines, and well transmission lines shall be treated as non-potable / sewer mains.

B. To provide appropriate water pressure, water circulation and redundancy, all new water mains must be designed in a looped configuration, providing a minimum of two (2) sources that can be isolated by a shut-off valve.

C. All Town owned and operated water facilities shall be located on Town property or within ROW. Public water mains are not allowed on commercial, industrial or other private property. Water mains may be allowed to be located in easements on a case by case basis as approved by the Town Engineer.

D. Pipe Cover:

1. Cover or depth of bury for water mains will be measured from the proposed finished grade as follows:
   a. For 8 inch and 12 inch diameter mains (in local streets), provide a minimum cover of 48 inches over the top of pipe.
   b. For 12 inch and 16 inch diameter mains (in collector and arterial streets), provide a minimum cover of sixty 60 inches over the top of pipe.
   c. For all mains 20 inches and greater in diameter, special design is required with a minimum of 60 inches of cover.
   d. In no case will water mains be installed with less than 4 feet of cover over the top of the pipe, unless otherwise approved by the Town Engineer.
2. Special cover and trench design shall be required where water mains are not located in Town ROW, poor soil conditions exist, where a water main is located in non-typical terrain, washes, rivers, rock, and other areas as required by the Town.
3. If a water main is installed within an area to be filled at a later time, adequate pipe protection shall be provided. This may include temporary berming for pipe protection or constructing the water main to a minimum depth of 5 feet below the existing grade and adjusting to standard bury depth in the future. The Town Engineer shall be notified when cover could become an issue. In no case shall the main be installed without adequate cover.

4. If a water main is installed in water logged areas, a dewatering plan is required and special trench and backfill requirements shall be required.

E. Horizontal Location:

1. Generally, water mains constructed along a street grid should be aligned parallel to, and north or east of the street centerline.
2. Mains should not cross the street centerline except in cases where curvilinear street alignments are encountered, and then only as specified by the Town Engineer.
3. Public water mains (if approved by the Town Engineer) within commercial, industrial or multi-family developments shall meet all Town easement requirements.
4. Water mains shall be placed under the pavement. When not in pavement or within Town ROW, they shall be placed in an exclusive easement granted to the Town in accordance with Town requirements.
5. In local streets, water mains shall be placed 7 feet from street monument line. On curvilinear streets and knuckles, water mains may be placed 5 feet to 9 feet from monument line. Alternate locations must be approved by the Town Engineer.
6. If storm drains are present and shown at their typical monument line location, the water main separation shall be 6 feet outside of pipe to outside of pipe, except that the outside of the water main shall not be within 2 feet of the lip of gutter.
7. In collector and arterial streets, water mains shall be centered in a travel lane or on a lane line. Typical standard offsets from street monument lines are 18, 24, 30, 36 feet, etc. However, it is the design engineer's responsibility to ensure that vehicle wheel path criteria are met.
8. The outside of water pipe in all streets shall be no closer than 2 feet to the centerline of the roadway and 2 feet to the lip of any gutter or 4 feet from the back of any curb.
9. Water mains shall not be placed in easements under retention basins.
10. Water mains in easements at wash crossings shall not locate appurtenances such as manholes, fire hydrants, or valves within the 100-year flood elevation of the wash.
11. Where existing easements or ROW are encountered, the Town will review the use of these on a case by case basis.
12. Design deflection shall not exceed half of the manufacturer's recommendations.
13. Curved water mains are permissible where the individual joint deflection does not exceed one-half (½) the manufacturer's recommendations. Where water main deflection exceeds the above criteria, MJ fittings will be required.

F. Vertical Location and Vertical Separation:

1. Vertical separation of water and sanitary sewer mains must be in compliance with AAC, Title 18 – Environmental Quality and MAG Standard Specification Section 610.5. The Zones requiring extra protection are as shown in MAG Standard Detail 404-1.
2. Water mains will not be allowed to cross under sewer mains, at any depth. For this reason, typical vertical realignment construction and details are not applicable. The design engineer shall take this into account when preparing preliminary analysis and detailed design plans. To accommodate this requirement, separation criteria and minimum cover requirements of the water main may be allowed, as long as minimum State regulations and MAG Detail 404-

1, Zone 'A' criteria are met. When existing shallow sewers are encountered, a meeting shall be scheduled with the Town Engineer to discuss proposed water and sewer extensions in the areas of shallow conditions.

3. Where conditions prevent adequate horizontal and vertical separation:
    a. The water main shall be constructed of D.I.P. (minimum pressure Class 350) with restrained joints for a minimum distance of 10 feet on each side of the crossing. No ductile iron sewer pipe is allowed in the Town of Buckeye. The sewer main shall be encased in 6 inches of Class "C" concrete, for a minimum distance of 10 feet on each side of the water main, per MAG Standard Detail 404-3.
    b. An alternative methodology is to install either or both sewer and water mains in a steel sleeve, a minimum of 10 feet on each side of crossing.
    c. Where an existing water main is other material than restrained ductile iron, the water main shall be replaced with restrained D.I.P. per MAG Standard Detail 404-2 and 404-3.
    d. Where the existing or proposed sewer main requires extra protection, the sewer main shall be encased in concrete per MAG Standard Detail No. 404-3.
    e. Water mains crossing over culverts and storm drains must maintain both a minimum of 12 inches (24 inches preferred) vertical separation and the minimum depth of bury. If the design cannot provide these clearances, a vertical below the storm drain realignment is necessary.
    f. Any vertical realignment that is not shown in profile shall be designed per the TOB Detail 31225.
    g. The clearance under culverts, storm drains, and other utilities shall be a minimum of 2 feet.
    h. For profiled water mains full dips to avoid utilities is highly discouraged. The profile of the water main needs to be modified to only cause one-half (½) of the dip section to be needed. One-half (½) vertical realignments shall be used to avoid dip sections were possible and shall be constructed of D.I.P.
    i. Deflecting of pipe for vertical realignment is not allowed.
4. Minimum separation requirement between potable water lines and non-potable lines shall meet the requirements of MAG Standard Detail 404.
5. Design calculations for wall thickness will be required in cases where pipelines could be subjected to heavy external loads. These include, but are not limited to, pipelines crossing under storm drain lines greater than 36 inches in diameter, pipelines in the roadway alignments that would be exposed to heavy construction vehicle loads prior to paving, and installations exceeding the pipe manufacturer's maximum depth of bury.
6. Vertical clearance between water mains and sewer service connections, the main shall not be less than 12 inches above the sewer service.

G. Horizontal Separation:
1. Minimum separation requirement between two potable water mains and all other utilities is 6 feet.
2. Provide a horizontal separation from any structural footing or substantial improvement. The separation shall be calculated by a structural engineer and submitted for review and approval.

3. All horizontal clearances shall be measured from the largest outside dimension on each utility, including manholes.
4. Separation of water and sewer mains shall be per the following criteria:
    a. Caution should be taken in the design and construction of the water mains in the vicinity of sewer mains to protect all water supplies from wastewater contamination, per MAG Section 610.

3-1.205 Easement Requirements:

A. Easements may be considered in the following cases:
    1. For single family, individually lotted, residential developments, Town water mains may be constructed in private streets, meeting the minimum width of 32 feet back of curb to back of curb, and meet the minimum easement width and requirements below.
    2. The development route falls in a future ROW alignment.
    3. The development route falls in a major utility, canal, or drainage channel corridor.

B. For a short segment of water main, such that is not technically feasible to design the water main in the ROW and the proposed alignment of the water main in an easement results in more efficient operation of the water network.

C. All Town water mains proposed outside of the ROW require approval of the Town Engineer.

D. Water Main Easement:
    1. Water mains outside of a public ROW are required to be located within an exclusive easement granted to the Town by the landowner in accordance with Town requirements. PUE's are not acceptable.
    2. Such easement shall be free from any dry or private utilities running parallel to the water main. No other non-Town utilities are allowed in a Town easement.
    3. All Town water easements shall be located in tracts, open space, or public access easements. In no case shall the water easement be located on residential lots.
    4. The minimum easement width shall be per Table 5 for a single water main. If multiple water mains (separate pressure zone mains or well transmission main) are to be located within the same easement an additional 15 feet per additional main shall be added to the minimum easement. A maximum of three (3) water mains may be located in any water easement.
    5. The minimum easement widths may be increased by the Town Engineer to accommodate construction or maintenance activities or topographical challenges.
    6. All water mains located within an approved private access way shall have a minimum easement width of 25 feet, back of curb to back of curb. The private access shall also have 10 foot PUE's on both sides to accommodate the other utilities.
    7. Single water mains are to be located in the center of the easement. In special cases with Town Engineer approval, the water main can be offset in the easement but in no event closer than 15 feet to the edge of the easement.
    8. Multiple water mains are to meet separation requirements of these standards; in no event shall any water main be closer than 15 feet to the edge of the easement.

9. For water easements not located within a public or private access, an all-weather access road is required if manholes, valves, fire hydrants, or other appurtenance requiring Town access are located within the easement. The access road shall have a minimum width of 10 feet and shall be paved or constructed of minimum 6 inch thick stabilized decomposed granite or MAG ABC. Each end of the access road shall connect to a public street or private access way or a turn-around easement shall be provided. The maintenance of access roads in which the easement(s) is located is the responsibility of the property owner or HOA and shall be indicated as such in the CC&R's. A copy of the CC&R's providing evidence of this maintenance responsibility by the HOA or other ownership group shall be submitted to the Town for verification.
10. Water easements shall not have a slope greater then 10:1 or 10% in any direction.
11. The easement shall not be located in a fenced area or areas with restricted access, and will be accessible at all times to Town service equipment such as trucks, backhoes, etc.
12. No new cacti are allowed within a water easement. Native cacti will be allowed.
13. Trees shall only be located in the outer 5 feet of the easement when the pipe is centered in the easement. The only landscaping allowed within the entire easement is average size shrubs and ground cover as approved by the Town.
14. It is not the responsibility of the Town to maintain, repair, or replace any landscaping within the easement.
15. No landscaping shall be placed within an easement which would render the easement inaccessible by equipment. The Town may cause any obstruction to be removed without notice to the property owner and all related costs shall be the property owner's responsibility. The maintenance of all landscaping in easements is the responsibility of the property owner or HOA and shall be indicated as such in the CC&R's. A copy of the CC&R's providing evidence of this maintenance responsibility by the HOA or other ownership group shall be submitted to the Town, for verification.
16. Easements shall be free and clear of improvements, i.e. screen walls, fences, retaining walls and other obstructions.
17. If the water main crosses a wash, access is required from both sides of the wash. In the case where the wash is not passable with a typical maintenance vehicle a widened easement is required on both sides of the wash to provide a turn-around area.
18. Easements or ROW dedication shall be through a map of dedication or final plat or by separate instrument with prior Town Engineer approval.
19. All real property to be conveyed to the Town, or real property interests granted to the Town through an easement, shall first comply with Town requirements set forth in Chapter 25 of the Town Code.
20. Regardless of the easement width, buildings shall have a sufficient setback from the easement boundary such that buildings, building foundations, or building slabs will not be undermined or damaged by a water main break. Proposed developments with buildings, building foundations, or building slabs proposed to be closer than 20 feet from a waterline boundary, shall be required to submit structural and soil calculations, signed and sealed by a registered Arizona professional engineer, which verify integrity of structures adjacent to the water main under the condition of a main failure.

E. Wastewater and Water Main Easements:

1. When wastewater and water mains must be placed in a common exclusive easement to be granted to the Town, the following criteria shall apply:
   a. The sewer main shall be typically located in the standard location of the sewer easement. To place a water main in a common water and sewer easement, calculate the sewer easement as normal, per "Design Standards - Section 4-1 Gravity Sewer, then add an additional 15 feet for less than 8 feet deep water main.
   b. The water main shall be located 15 feet from the edge of the total easement opposite the sewer.
   c. For water mains greater than 8 feet deep use half of the value in Table 5 in addition to the sewer easement.

Table 5 Easement Width

Main Diameter	Cover Depth, Location	Minimum Easement Width
12 inches and smaller	< 8 ft.	25 feet
12 inches and smaller	> 8 ft	50 feet
16 through 30 inches	< 8 ft.	50 feet
16 through 30 inches	> 8 ft	80 feet
Larger than 30 inches	< 8 ft.	80 feet
Larger than 30 inches	> 8 ft	100 feet
Fire hydrants, blow-offs, etc	Centered	20 feet by 20 feet

3-1.206 Service Main and Meters:

A. The water service main and meter will be sized based upon the total daily demands for the development and the recommended maximum capacity shown in the Table 6.

B. That portion of the water service from the water main up to, and including the meter is public and will be maintained by the Town. That portion of the water service from the meter into the site is private and will be maintained by the property owner.

C. Design of the private on-site portion of the water service shall comply with the latest applicable codes, ordinances, and resolutions as adopted by the Town.

D. Each property shall have its own individual meter.

E. Water services shall be 1 inch minimum.

F. Copper tubing for 1 inch thru 2 inch shall be new seamless copper conforming to all the requirements of ASTM Designation B-88-49 Type "K" soft copper.

G. Due to the Town's water billing rate structure, meter sizes will not exceed the size of the service main such as a 1½ inch meter will not be allowed on 1 inch service.

H. Extra attention is recommended when sizing services for custom home lots where demands occasionally necessitate meter sizes exceeding 1 inch and residential fire suppression systems are common.

I. Service mains are required to be sized to meet domestic, fire, and irrigation demands.

J. Connection of two (2) or more meters in a manifold (or yolk) configuration is prohibited.

K. Commercial service taps or 'T' main shall be constructed per TOB Detail 31370.

L. Installation of metered 1 inch to 2 inch water services will be in accordance with TOB Detail 31330.

M. Installation of 3 inch to 6 inch metered services require a tee and gate valve, or tapping sleeve and valve on the public main per MAG Standard Detail No. 340 and 391-1, Type "C", and a meter vault in accordance with TOB Detail 31335, 31336, and 31338.

N. Final plans will show locations of service mains and meters to each unit referenced with stations and dimensions, or offsets, from the street centerline or monument line. For services not perpendicular to the main, station the tap at the main and provide an offset from the end of service to the property line at the ROW, or an identifiable end point.

O. Service mains and meter boxes will be located within public ROW, easement within a private street tract, or a Town water easement.

P. Meters shall be accessible to Town workers at all times and shall be located as close as possible to the main.

Q. Do not place water service mains and meters in driveways, sidewalks, washes, PUE's, LPPUE's, or retention/detention basins.

R. Water service mains will be located within 3 feet of the property line unless otherwise approved by the Town Engineer.

S. Services shall be continuous from the main to the meter with no bends, fittings or welded joints. There shall be no joints within public ROW.

T. No service connections or fire protection systems will be made directly to water mains larger than 12 inches in diameter, or to water mains designed solely to transmit water from one (1) pressure zone to another pressure zone unless approved by the Town Engineer.

U. No service connections are allowed directly to transmissions lines.

V. All existing public galvanized iron and polyethylene water service mains in sizes 1 inch through 2 inch, which are exposed during construction, will be replaced in their entirety with Type "K" soft copper tubing. This includes the replacement of iron service saddles with bronze or stainless steel saddles and replacement of both the corporation stop and meter stop in all cases. This includes the removal of the saddle and/or corporation stop and installation of stainless steel double band saddle or full circle repair clamp.

W. Existing water services not used by a development will be noted on the plans to be abandoned at the main. If the saddle meets this design standard's minimum standards, install a brass plug. If not, a full circle repair clamp shall be used.

X. Developments having more than one building or user are required to construct an onsite private main. This private main can be fed by a "gang" of meters or a single larger meter. Private mains require a minimum of two connections to the public main.

Y. All meters shall be supplied by the Town.

Z. All residential meters shall be installed by the Developer/Landowner.

A. Location:

1. All service main connections shall be installed perpendicular to the water main and with no bends until the water meter with the exception of cul-de-sacs.
2. All services shall be marked with a steel stud painted blue. The service location shall also be stamped in the curb using a "W" to mark the location.
3. Water service mains shall have a continuous slope from the main line to the meter. No localized high points shall be allowed.
4. Opposite side service taps must be a minimum of 3 feet apart.
5. Same side service taps shall be 6 feet apart.
6. Water services shall not be located closer than 3 feet to the property line.
7. As an alternate location the water service may be placed in the middle of the lot.
8. Water services must be located a minimum of 10 feet from sewer services.
9. The design engineer shall coordinate all utilities to avoid conflicts with the water service.
10. Water services shall not be installed under or within 2 feet of driveways.
11. Water service mains and meters shall not be placed in driveways, sidewalks, washes, PUE's, LPPUE's, or retention/detention basins.

Table 6 Meter Capacities

Disc Meter Size	Safe Max. Capacity (gal./min.)	Safe Max. Capacity (gal./day)	Town Allowable Max. Capacity (gal./min.)	Town Allowable Max. Capacity (gal./day)
1	50	72,000	25	36,000
1½	100	144,000	50	72,000
2	160	230,400	80	115,200
Compound Meter Size	**Safe Max. Capacity (gal./min.)**	**Safe Max. Capacity (gal./day)**	**Town Allowable Max. Capacity (gal./min.)**	**Town Allowable Max. Capacity (gal./day)**
3	320	460,800	160	230,400
4	500	720,000	250	360,000
6	1,000	1,440,000	500	720,000
Turbine Meter Size	**Safe Max. Capacity (gal./min.)**	**Safe Max. Capacity (gal./day)**	**Town Allowable Max. Capacity (gal./min.)**	**Town Allowable Max. Capacity (gal./day)**
3	350	504,000	180	259,200
4	1,000	1,440,000	500	720,000
6	2,000	2,880,000	1,000	1,440,000

B. Water mains and sewer mains shall be designed to allow for the water service mains to pass above sewer mains with 12 inches of vertical clearance to comply with MAG clearance requirements.

C. Service connections to existing mains:

1. All taps to existing mains shall be hot tapped under the supervision of the Town. The coupon shall be given to the Town representative onsite.
2. A Town approved service saddle appropriate for the pipe material shall be used.
3. Any time a water main is tapped, a new service main to the ROW is required.
4. A new meter box and meter are required.
5. Where a service connection to an existing main is made a "W" shall be ground/cut, minimum ¼ inch deep in the existing curb directly over the new service.

3-1.207 Valves:

A. Valves will be installed on water mains at locations within the distribution system that allow sections of the system to be taken out of service for repairs or maintenance without significantly curtailing service in other areas.

B. Special consideration should be given to the number of fire hydrants taken out of service.

C. A sufficient number of valves should be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs.

D. Valves will be located such that closing no more than four (4) valves can isolate any section of the system, or a maximum of 30 dwelling units.

E. Two (2) valves are required at all tee's and three (3) valves are required at each cross.

F. Maximum spacing of water distribution main isolation valves shall be as follows:

1. Valve spacing shall not exceed 600 foot intervals in commercial, institutional, multi-family, and industrial areas.
2. In single family residential, valve spacing shall not exceed 800 foot intervals.
3. Maximum spacing of water transmission main isolation valves shall be per Table 8.

G. Any design not complying with the above spacing requirements must be approved in writing by the Town Engineer.

H. All valves shall be installed at the PC of curb returns at street intersections, and aligned with a property line or lot line at mid-block locations.

I. All valves must be stationed and offset from monument line.

J. There shall be one (1) valve on each side of a major crossing including, but not limited to, the following: canals, railroads, freeways, bridges, and drainage channels regardless of size.

K. Provide a valve on each hydrant branch per MAG Standard Detail 360.

L. Do not install valves in sidewalks, curbs, valley gutters, residential driveways, handicap ramps, multi-use paths or bicycle lanes.

M. All valves 16 inches or smaller shall be direct bury resilient wedge gate type.

N. All valves 20 inch and larger shall be direct bury resilient wedge gate with bypass.

O. Pressure rating on all valves shall be equal to or greater than the pressure rating of adjacent piping.

P. Valve boxes shall be installed per MAG Standard Detail No. 391-1, Type "C" and shall be heavy duty with a minimum lid height of 6 inches.

Q. The grade of a valve box and cover located outside of a paved area shall be 1 to 2 inches above adjacent grade. Where valve boxes are located outside the street or sidewalk, there shall be a Class "B" concrete ring 6 inches thick, and 30 inches in diameter placed around the valve box, and flush with the top of the valve box. There shall be a number four (4) bar centered in the concrete ring and the contractor shall install a Blue Carsonite Marker labeled "WATER VALVE" within 2 feet of the valve.

R. Valve bypass shall be required on all 20 inch and larger diameter lines, as shown on TOB Detail 31420.

S. Valve bypass shall be required on every other valve. See TOB Detail 31420.

T. All valves shall be blocked per MAG Standard Detail 301. For mains larger than 12 inches, the design engineer shall provide design calculations and details on the plans.

U. All valves shall be manufactured, tested, and/or installed in accordance with AWWA and other standards.

3-1.208 Fittings:

A. No water main will be deflected either vertically or horizontally, in excess of one-half (½) of that recommended by the manufacturer of the pipe or coupling without the appropriate use of approved fittings.

B. All fittings shall match rating specifications with piping.

C. A minimum distance between fittings shall be 3 feet; measured from edge of fitting to edge of fitting. The design engineer is responsible for verifying the minimum distance between fittings for maintenance purposes.

D. All fittings shall be manufactured, tested and/or installed in accordance with AWWA and other standards.

E. All fittings shall be blocked per MAG Standard Detail 380. For mains larger than 12 inches, the design engineer shall provide design calculations and details on the plans.

F. All fittings shall be D.I.P.

3-1.209 Thrust Restraint:

A. Thrust restraint shall be used at all bends, elbows, tee's, crosses, dead ends, stubs, fire hydrants and valve locations, and all diameter water mains where water flow changes direction or is stopped.

B. Thrust blocking is the preferred method of thrust restraint in the Town of Buckeye and required on all fire hydrants. Thrust blocks shall be constructed in accordance with MAG Standard Detail 380.

C. Joint restraint systems are not allowed for use on any pipe material except D.I.P.

D. Where line size exceeds MAG published sizes the design Engineer shall submit calculations and add a thrust block sizing table to the plan set.

E. Thrust restraint other than thrust blocking shall be provided as follows:

1. Tie Rod restraint per MAG Standard Detail 302.

2. Joint Restraint per MAG Standard Detail 303.
3. Welded joints in steel pipelines.

F. The determination of whether or not a given section of pipeline needs restrained joints, or other means of anchorage, shall be made by the engineer and reviewed by the Town Engineer.

G. Design all thrust restraint for one and one-half (1½) times the static line pressure or 200 psi, whichever is greater.

H. MAG Standard Detail No. 303-1 and 303-2 include acceptable means of joint restraint. The engineer should pay attention to the water pressures and soil bearing pressures that are assumed by the standard details.

I. The MAG Standard Detail No. 303-1 and 303-2 are minimum restraining joint lengths and shall be verified by the engineer for the soil conditions where the main will be placed. In no case will the Town allow shorter restrained lengths than published in the MAG table.

J. All restrained pipe lengths must be specified on the final plans or referenced to a standard detail and sealed by an Arizona registered engineer.

K. Joint restraint is prohibited on PVC pipe.

3-1.210 Tracer Wire:

A. All water main lines (including D.I.P.) within the Town shall have tracer wire attached directly to the top of the pipe and will be taped to the main every plus/minus (+/-) 10 feet.

B. The wire must be copperhead reinforced tracer wire and be manufactured by “Kris-Tech” or approved equal.

C. The wire must be 10 gauge, direct bury, solid core wire with a minimum 35 millimeter Polyethylene insulation. The wire color shall be utility appropriate (blue = potable water, purple = reclaim water).

D. An approved type, 5 pound magnesium anode shall be installed for each 1,000 linear feet of tracer wire or at least one (1) anode at each end of the development as follows:

1. Tracer wire connection stations shall consist of upper sections of Town of Buckeye approved water valve boxes or specialty tracer wire connection stations.
2. The anodes for water main tracer wire shall be installed at fire hydrants or water valves (not in the roadway), the anode shall be placed at a tracer wire connection station under the valve box. Upon approval from the Town engineer tracer wire connection stations may be located adjacent to water services. Connection stations shall be located a minimum of 1 foot away and a maximum of 3 feet away from hydrants, valves, or services.
3. A tracer wire connection station shall be installed at each fire hydrant, one station for each 500 linear feet of water main, and at each end of the project (located on the same side of the street) (Copperhead Industries – snake pit magnetized tracer box).
4. No tracer wires shall be wrapped around a fire hydrant barrel.
5. The tracer wire shall be looped from the main tracer wire and run to a connection station located adjacent to a fire hydrant.
6. 8 feet of tracer wire shall be loosely coiled inside the connection station.

7. The contractor shall "As-Built" the location of all tracer wire, anodes, and connection stations.
8. All tracer wire splices shall be carefully soldered. Wires are to be inserted into a direct burial splice, use "Scotch 3M DBR-6" or equivalent.
9. The tracer wire, anodes, and connection stations shall be detailed on the water line construction plan As-Built drawings.
10. All tracer wire shall be tested and verified by the Town to ensure that there are no breaks in the wire prior to any paving operations.

3-1.211 Air Release Valves (ARV):

A. The use of ARV's is strongly discouraged in the Town. However, where there is a potential for entrapped air, cavitation or vacuum, a method of release must be provided.

B. The use of fire hydrants to release air at well-defined high points, including vertical realignments is preferred.

C. The use of ARV's, also at well-defined high points, may be approved:

1. When water main changes from a positive slope to a zero (0) slope, or a negative slope in the primary direction of flow.
2. When water main changes from a zero slope to a negative slope in a primary direction of flow.
3. For vertical alignment changes to cross under or over another facility, such as utility, drainage washes, etc. See TOB Detail 31225.
4. ARV's may be omitted if fire hydrant laterals are located to allow for the elimination of air.
5. Slopes less than or equal to 0.002 ft/ft shall be treated as zero slopes. In the absence of any changes in slope, fire hydrants will be installed not more than 1,000 feet apart.
6. All ARV's will be a combination air/vacuum release type and installed per TOB Detail 31340.
7. 12 inch and larger mains shall be designed to eliminate high points to the greatest extent possible.
8. ARV's are not permitted on any mains smaller than 12 inches unless the smaller mains do not have services then ARV's may be considered. Smaller mains shall be designed to eliminate high spots as best as possible.
9. ARV's shall be placed at all high points of the water main; unless requested or approved by the Town Engineer.

D. On 8 inch (un-profiled) mains, the use of full vertical realignments is allowed. Install fire hydrants at high points on high side(s) of the vertical realignment, as necessary to bleed off entrapped air. There should be a minimum of one (1) hydrant in high points created by vertical realignments on 8 inch mains.

E. On 12 inch and larger mains, the use of full vertical realignments is prohibited, unless specifically approved by the Town Engineer. One-half (½) vertical realignments will be allowed and a fire hydrant installed if a high point is created.

F. ARV's shall be per TOB Detail 31340 adjacent to the roadway where applicable. Locations for all valves and vent pipes must be shown on the final plans and will be within the ROW, private street tract, or easement.

3-1.212 Backflow Prevention and Cross Connection Control:

A. All metered services within the Town, other than single family residential, require the installation of an approved backflow prevention device immediately adjacent to the meter on private property unless approved otherwise by the Town Engineer. Installation within the PUE or LPPUE may be allowed.

B. The back flow prevention valve and the service main will be of equal size, unless the engineer submits calculations with final plans demonstrating that losses through a smaller device do not adversely affect water pressure to the building.

C. All backflow prevention devices shall be shown to scale and stationed on the plans. The location of backflow preventers and the adjacent meter shall take into consideration opportunities to screen with landscaping or consolidate into common areas providing utility service to a building.

D. Generally, backflow preventers shall not be located at:

1. Entrances to buildings unless appropriately screened.
2. At locations where they interfere with opening car doors.
3. Areas of high visibility.
4. In clear zones adjacent to roadways.

E. Every effort must be made to locate the water meter and vault in the public ROW and that can accommodate a properly installed backflow preventer. Refer to TOB Detail 31370 for proximity of meter to backflow preventer.

F. When the location of a backflow preventer cannot be accommodated adjacent to the meter, the designer shall:

1. Request permission from the Town Engineer to separate the meter from the backflow preventer.
2. Backfill the water service between the meter box and the backflow preventer with one-half (½) sack CLSM per MAG, Section 728. CLSM shall be placed to the full width of the trench and to 6 inches above top of pipe.
3. Note on the plans that inspection of the water piping connecting the meter to the backflow preventer shall be done by a Town backflow prevention specialist prior to CLSM and backfill.

G. Backflow prevention devices larger than 2 inches require location to be stationed and offset on the final plans.

H. Fire lines require backflow prevention at either the property line or within the vertical riser, when permitted.

I. The Town requires backflow prevention on temporary construction meters for all extensions of the water system.

J. All private water mains, fire lines or any type of extension that are not owned or maintained by the Town shall have backflow prevention where jurisdiction goes from public to private.

3-1.213 Temporary Dead End Lines and Stub Outs:

A. Temporary dead end water mains in the Town will comply with the following requirements:

1. The maximum length for a temporary dead-end water distribution main, 8 inch and 12 inch diameter will be 660 feet in length.
2. The maximum length for a temporary dead end transmission main, 16 inch and larger shall be 1,000 feet. Temporary dead end transmission mains exceeding 1,000 feet in length requires approval from the Town Engineer.
3. Temporary dead end mains shall be extended one (1) pipe length beyond the edge of paved surfaces or 20 feet, whichever is greater.
4. Temporary capped dead-end mains will be fitted with a flushing device as per MAG Standard Detail No. 390, Type "A".
5. Valves on temporary dead-end mains that will be extended shall be provided with two (2) full pipe lengths between the valve and the plug for mains 12 inches and larger, and one (1) full pipe length for mains smaller than 12 inches.
6. Blow-off valves, fire hydrants, or other suitable means will be installed at the end of temporary dead-end mains to allow periodic flushing of the mains. Flushing devices shall not be located in washes, detention areas, retention areas, sidewalks, driveways, or paved areas.

B. Water stub outs must be provided for all adjacent undeveloped property and all major parcels within, or adjacent to a development. All water stubs shall be D.I.P.

C. A commercial 'T' main, per TOB Detail 31370 shall be provided on commercial, institutional, industrial, and multifamily applications.

1. The function of a 'T' main is to provide a single main connection with a manifold to provide domestic water, irrigation, fire protection systems, and a public fire hydrant.
2. Single, small fire, domestic, and irrigation connections may be permitted with the approval of the Town Engineer.
3. The 'T' main shall be installed to the back of the P.U.E.

3-1.214 Crossings:

A. All wash crossings will be constructed using restrained MJ D.I.P. or "Field Lok" style joint restraints.

B. Bury requirements to place water mains under washes or channels shall be based upon the 100 year, 6 or 24 hour peak design discharge (Q100), including scour depth considerations in the channel or wash.

C. All wash crossings will be designed to have the water main a minimum or three (3) feet below the scour depth of the wash. See Table 7 for the minimum criteria that shall be used for wash crossings.

D. Wash crossings with a 100-year flow above 500 cfs will use the Arizona State Standard Attachment SSA 5-96, Guideline 2, Level 1, as published by the ADWR to estimate the scour depth. The design engineer will estimate the depth of scour and design the top of pipe to be 3 feet below the estimated scour depth. The design engineer will provide a detailed analysis of the scour depth with final plans or in final water report for review and approval.

Table 7 Minimum Depth of Bury for Washes

100 Year Flow Rate	Minimum Depth Of Bury
1 to 49 cfs	6 feet
50 to 99 cfs	7 feet
100 to 499 cfs	8 feet
More than 499 cfs	Scour depth based on scour analysis, Minimum 8 feet

E. All pipelines shall be located out of the scour zone.

F. All water mains crossing under culverts or storm drains whose span exceeds 20 feet shall be installed within a steel casing. If the culvert is existing, the steel casing must be installed by the bore and jack method.

G. All pipes within any casing shall be D.I.P.

H. Valves, ARV's, or other appurtenances shall not be allowed within a wash crossing.

3-1.215 Main and Water Appurtenance Protection:

A. Any water appurtenance that has been proposed in what is deemed by the Town to be in "harm's way" shall be approved by the Town Engineer. If approved, an engineered design shall be required to fully protect the water appurtenance. Requirements for protection of the water appurtenance shall be determined in the Town's sole discretion.

B. Anytime access to a water main is restricted by 20 or more feet by items such as multiple storm pipes, box culverts, 404 washes, ROW not controlled by the Town, or other items; the water main shall be constructed in a casing per Town requirements.

C. If the water main is located outside the pavement or with less than 4 feet of cover, the Town may require a concrete cap be placed on the water main per TOB Detail 31382.

3-1.216 Easement Abandonments:

A. Requirements:

1. Written requests for the abandonment or termination of public water easements shall be submitted to the Town Engineer.
2. All existing utilities within an easement to be abandoned or terminated shall be relocated and removed out of such easement with prior approval of the Town Engineer and at no cost to the Town.
3. All requests for easement abandonments and terminations require the approval of the Town Engineer.
4. If a water main is to be abandoned within the abandoned easement, remove the main and cap it at appropriate end points.

3-1.217 Private Water Mains:

A. Within ROW:

1. Private water mains and appurtenances are not permitted within Town ROW or PUE's.
2. The only exception for private water mains within ROW are mains owned and operated by a private utility company authorized by the ACC.

3. All on-site private water mains must meet the MCESD, Town of Buckeye fire protection, and the Town Code requirements for approval.
4. Private water mains and appurtenances authorized to be installed within Town ROW shall be pursuant to the private utility company's requirements, except for structure location, which the Town may dictate in order to minimize impact on traffic and roadway features within the Town, such as valves, covers, and other appurtenances.

B. Outside of ROW:

1. All on-site private water mains shall comply with requirements of MCESD, AAC, and Town of Code.

3-1.218 High Groundwater Areas:

A. High groundwater levels have been identified adjacent to the Gila River extending northerly to the Buckeye Water Conservation and Drainage District canal. This area is referred to as the "waterlogged area" in the Town water resources plan. It is noted in the water resources plan that the depth to groundwater is less than five feet in portions of the Town. For water main design plans that propose installation of improvements within the high groundwater area, the following additional requirement shall be included with the design plan submittal.

B. General Requirements:

1. A geotechnical engineer shall prepare and submit for approval a groundwater investigation plan that characterizes the expected groundwater levels along the alignment of the work and investigates the composition of the soils that constitute the zones of water main foundation and trench.
2. Buoyancy of water mains shall be considered and flotation of the pipe shall be prevented with appropriate construction where high groundwater conditions are anticipated.
3. The geotechnical report shall propose effective mitigation measures for the dewatering of trenches and excavations, possible trench shoring methods, and identify locations to discharge any extracted groundwater. The report shall address the effects of the high groundwater during and after construction.
4. The design shall consider measures to preclude flotation of the work, during and after construction. The design shall additionally include any measures adopted from the geotechnical report.
5. The plans will note in profile the water depth information obtained in the investigation stage and any measures to mitigate the effects of high groundwater.
6. The design shall address possible migration of the groundwater and any transport of "fines" within the bedding and backfill zones.

3-1.219 Cathodic Protection:

A. All D.I.P. that is installed within any high voltage easement, greater than 69kv, shall be cathodically protected.

B. All D.I.P. that is installed adjacent to or in proximity to an electrically charged gas pipeline shall be cathodically protected.

C. All cathodic protection shall be designed by "Corrpro Waterworks" or Town approved equal.

3-1.220 Asbestos-Cement Pipe (ACP):

A. When more than 3 feet of existing ACP or other unapproved materials are exposed during construction and the bedding is disturbed, the water main shall be replaced with approved pipe material.

B. ACP water main shall be removed to the nearest joint and the collar removed. The contractor shall tie in to the milled end of the ACP.

C. Contractor shall be responsible for clean-up and disposal of all friable asbestos per approved standards.

3-1.221 Sampling Stations:

A. Water sampling stations are required in all new residential subdivisions.

1. One sampling station minimum per subdivision.
2. Sampling stations are required for a maximum of every 300 lots.
3. A sampling station will be installed within the first phase of any parcel or subdivision. This will serve the first 300 lots and then prior to the subsequent phases of 300 lots.

B. Sampling stations shall be located:

1. Within the ROW, private street tract, or utility easement.
2. In front of tracts and open space. Sampling stations shall never be located in front of a single family lot.
3. 3 feet behind the sidewalk and within 5 feet of a property line.

C. Construction shall be per TOB Detail 31375.

3-1.300 Transmission Mains:

3-1.301 General Requirements:

A. Transmission mains shall meet all requirements of standard distribution mains unless modified by this section.

B. Service connection will not be allowed on transmission mains.

C. All mains 48 inch and larger require special design parameters set forth by the Town on a project by project basis.

3-1.302 Design Criteria:

A. See Table 8 for below design requirements.

B. Transmission mains for distribution water shall be designed to carry peak flow including fire flow without exceeding maximum velocities.

C. Transmission mains for raw water shall be designed to carry max day flow without exceeding maximum velocity.

D. Transmission mains for specific uses shall have a Town approved design flow but will meet all of the minimum velocity criteria.

3-1.303 Location / Alignment:

A. Line segments shall be set at a constant slope.

B. Roller coaster type of vertical alignment shall be avoided.

C. Shall meet all distribution horizontal and vertical criteria.

3-1.304 Valves:

A. All valves shall be resilient wedge gate valves.

B. If the Town requires the installation of electronic monitoring and remote operation equipment, the line valve must be a gate valve with a rectangular vault, housing the valve operator and telemetry equipment. Each installation will require individual details. The design engineer shall verify with the Town on acceptable equipment and the specific design requirements.

3-1.305 Thrust Restraint:

A. All bends, fittings, line valves and bulkheads shall be restrained by using a joint restraint system compatible with the type of pipe. The Town shall approve all restraint systems. The length of the restraint system shall be shown on the construction plans and complete supporting data on the restraint system design shall be submitted to the Town for review and approval.

B. Concrete thrust blocks will not be accepted.

3-1.306 Cathodic Protection:

A. All transmission mains 36 inch and larger require cathodic protection.

B. All D.I.P. that is installed within any high voltage easement, greater than 69kv, shall be cathodically protected.

C. All D.I.P. that is installed adjacent to or in proximity to an electrically charged gas pipeline shall be cathodically protected.

D. All cathodic protection shall be designed by "Corrpro Waterworks" or Town approved equivalent.

3-1.307 Geotechnical:

A. When requested by the Town, a geotechnical engineer shall perform a soil investigation to determine the soil bearing capacity, soil backfill suitability, presence of groundwater or bedrock, corrosion potential and other conditions, which may affect the construction of the transmission main. Test holes shall be located at a maximum spacing of not more than 1,000 feet and at railroad, highway and canal crossings.

Table 8 Headloss and Velocity Criteria

Pipe Size (inches)	Maximum Allowable Velocity (fps)	Maximum Allowable Headloss (ft/1000ft)	Maximum Valve Spacing (ft)
12	5	6.17	2640
16	5	6.06	2640
20	5	4.66	5280
24 and larger	5	3.00 *	5280
* For larger pipe diameter the Town will approve all headloss values.			

3-1.308 Materials:

A. All materials for transmission mains shall conform to materials as standard mains except as modified herein.

B. Valves shall be ductile iron.

C. Fittings shall be ductile iron.

D. Pipe Material:

1. 8 inch through 48 inch class 350 D.I.P.
2. 36 inch through 48 inch concrete cylinder pipe
3. 48 inch and larger shall be D.I.P. or concrete cylinder pipe

3-1.400 Fire Protection:

3-1.401 General Requirements:

A. It is the intent of the Town to establish requirements consistent with nationally recognized practices for safeguarding life and property from hazards of fire and explosion arising from the storage, handling and use of hazardous substances, materials and devices, and from conditions hazardous to life and property arising from the use or occupancy of buildings or premises.

B. All design shall meet the Town adopted version of the International Fire Code.

3-1.402 Design Policy:

A. If the development is to be supplied with domestic service and with fire flows from a storage tank or facility, the engineer must provide a report indicating that sufficient volumes exist, as required by the Town, and are available to meet the calculated fire demands as defined by the engineer.

B. Particular attention will be given to the fire hydrant locations on final plans for infrastructure where future building locations are not identified.

C. Final building location and elevation may necessitate the addition of another water main, fire hydrant, and/or fire pump to serve that structure after the Town has accepted the system.

D. Compliance with the fire hydrant spacing and pressure requirements are the responsibility of the party requesting a building permit.

3-1.403 Fire Hydrants:

A. The spacing of fire hydrants is to be measured along the street or roadway centerline in which a fire hose would be laid. Generally, this spacing is measured along the centerline and shall be inclusive of the distance up a private driveway to the proposed structure.

B. The Fire Department will stipulate fire hydrant locations during the site planning process or on the final plans review. The following standards shall be used as a guide:

1. All residential single family dwellings shall be 500 feet on center.
2. All commercial and industrial complexes shall be 300 feet on center.
3. Additional hydrants and attention to the spacing may be required to meet the distances above for large lots including, but not limited to:

a. No structures shall be located more than 500 feet from a fire hydrant, as measured along the street centerline, ROW, private street tract, or utility easement.

4. A 6 inch fire hydrant lateral shall not be tapped for fire sprinkler supply lines or water services.
5. Auxiliary fire hydrant valves must be connected to the water main by flanged tee.
6. A fire hydrant is required at the beginning and end of all cul-de-sacs.

C. Hydrant connections must have a minimum bury depth of 4 feet.

D. Hydrants that require adjustment as a result of improvements will be adjusted using a "Gradelok" or approved equal when vertical adjustment is in excess of 6 inches.

E. Fire hydrants shall have the following setbacks from back of curb:

1. Arterials no closer than 7 feet and no further away than 10 feet.
2. Collectors no closer than 5 feet and no further away than 8 feet.
3. Local streets with roll curb or vertical curb and/or attached walk, 2 feet behind walk.
4. Local streets with vertical curb, 3 feet behind curb.

F. Fire hydrants being located on streets without curb shall be located out of the clear zone as calculated per the AASHTO requirements.

G. For more information contact the Town of Buckeye Fire Department.

3-1.404 Pavement Markers:

A. Two-way, reflective blue, raised pavement markers shall be provided to identify the location of fire hydrants and remote fire department connections. These markers are readily available from businesses providing highway marker materials. Refer to TOB Detail 31440 for Pavement Markers for Fire Hydrants.

3-1.405 Fire Lines and Building Sprinkler Lines:

A. Determine the location of on-site fire lines and taps by the site relationship of the fire department connection, riser location, emergency access, and fire hydrant locations.

B. Determine the size of fire lines from the flow test data provided by the engineer for design of the development.

C. Fire systems must include a Town approved backflow prevention device. Refer to TOB Detail 31430 and 31431.

D. An approved vertically mounted backflow prevention device located on the building riser is preferred by the Town.

E. Show all fire lines on the civil site plans.

F. Installation of 1½ to 2 inch fire service lines requires a saddle connection.

G. Installation of 3 inch and larger fire service lines use a tee and valve.

H. Meters are not required on services used solely for fire sprinkler systems.

I. Fire service lines shall be installed perpendicular or radial to the main line within the ROW or easement.

J. All on-site fire line construction shall comply with the MAG Standard Specifications and Details and the Town supplements thereto.

3-1.406 Building Sprinkler System Requirements:

1. See Town Code for a complete listing of requirements.

3-1.407 Sprinkler System Design:

A. Base building sprinkler system design on a certified flow test:

1. A copy of the flow test shall be submitted with the design plans or shop drawings for Town review.
2. The drawings will be of uniform size 24 inch by 36 inch, or 30 inch by 42 inch and drawn to scale.
3. One (1) set of the approved civil water final plans need to accompany these submittals. Also include on the working drawings any applicable Town and International Fire Code construction notes.
4. The building sprinkler contractor shall submit three (3) sets of shop drawings and a minimum of two (2) sets of calculations and supporting documents to the Town of Buckeye Fire Department.

B. Include the following note on the final plans:

1. "Installation will be per approved final plans. Any deviation from approved final plans will require written permission of the authority having jurisdiction."

C. The professional registrant in charge or fire code official may require a technical opinion and report prepared by a qualified party, and/or a professional registrant activities report containing all professional registrant duties as assigned by the State Board of Technical Registration with seal and signature of an Arizona Registrant, who is qualified in fire sprinkler design to accompany the plan submittal.

D. The professional registrant in charge is responsible for coordinating deferred submittals, professional registrant activities, technical assistance reports, modifications, alternative materials and methods, and for determining that the deferred submittal documents are in general conformance with the design of the building.

E. Inspections will be per NFPA 13 and as required by the Town.

3-1.408 Fire Department Connection (FDC):

A. FDC's:

1. FDC's shall be located on the building whenever possible.
2. FDC's shall be located within 30 feet of any fire lane.
3. A fire hydrant is required to be located within 15 to 50 feet of the FDC.

B. Remote FDC:

1. If a remote FDC for a sprinkler system is required, it must be installed between 4 and 8 feet from the back of curb of a public or private roadway, on-site driveway or sidewalk. The location of the sprinkler system connection must be unobstructed and readily accessible to the Fire Department.

2. A fire hydrant is required to be located within 15 to 50 feet of the remote FDC.
3. All remote fire departments connections shall have the building address that is serves.

C. Pavement markers for Fire Department sprinkler system connections shall be provided.

3-1.409 Auxiliary Storage Tanks and Pumps:

A. All auxiliary tanks and pumps shall meet all requirements of the Town. Sizing of tanks and pumps shall comply with the requirements of this section.

B. A fire pump and tank package installation may be required when the building's construction type, occupancy fire load commodities' classification, volumetric building areas, building height and individual square footage areas per floor level produce a pressurized fire flow demand in excess of the water transmission mains capabilities.

C. All privately constructed fire protection shall be certified for fire use.

3-1.410 Fire Signage:

A. See all signage details for addressing and labeling.

B. All buildings shall be labeled per addressing details.

C. All FDC's and remote FDC's require a sign per Town requirements.

D. All fire lanes require signage per TOB Detail 31452 and 31454.

E. All fire riser rooms require signage per TOB Detail 31450.

3-1.411 Fire Lanes:

A. Shall meet the current Town adopted version of the International Fire Code.

B. All non-paved fire lanes shall meet the following criteria:

1. MAG 222 Type A curb on the edges of the fire lane.
2. A minimum or an 8 inch ABC base.
3. A 4 inch thick ¾ inch minus granite surface wetted and compacted at installation.
4. Calculations shall be submitted with the fire lane submittal to verify the Town minimum thickness is acceptable to carry the weight of a standard fire truck (appx. 50,000 lbs). If the design requires a larger section than the Town minimums the larger section shall be constructed.

C. All paved fire lanes shall be a minimum of 20 feet clear in width and conform to the Town's local street paving section at a minimum.

D. For access control on fire lanes see TOB Detail 31460.

E. For fire access turn-arounds see TOB Detail 31445.

3-1.500 Plan Preparation:

3-1.501 General Requirements:

A. All plans shall comply with "Design Standards - Section 1-2 Plan Submittal Requirements" General Construction Notes and Standard Sheets for Infrastructure Plan Submittals.

3-1.502 Design Plan Requirements:

A. All plans shall be neat and legible.

B. All plans shall be drawn to scale.

1. Horizontal scale shall not be smaller than 1:40 feet on plan views.
2. Vertical scale shall not be smaller than 1:4 feet on profile views unless otherwise approved by the Town Engineer.

C. A Summary of Quantities is required on the cover sheet. The minimum items listed are as follows:

Table 9 Summary of Quantities

Description	Unit	Quantity
Water Main	Linear Foot (LF)	
Water Service	Each (EA)	
Flush / Curb Stop / Blow-off	Each (EA)	
Fire Line	Linear Foot (LF)	
Fire Hydrant	Each (EA)	
Backflow Device up to and including 3 inches	Each (EA)	
Backflow Device greater than 3 inches	Each (EA)	
Sampling Station / Air Release Valve	Each (EA)	
Tapping Sleeve and Valve / Tie-in	Each (EA)	
Mainline / Lateral / Fire Hydrant Valve	Each (EA)	
Residential/Commercial Water Tap to Existing Main	Each (EA)	
Provide separate Summary of Quantities tables for Town water quantities and private water quantities.		

D. Plans shall have only one plan and profile per sheet.

E. Water design is the only design allowed on the water plans, no other utility designs allowed.

F. Plans shall not be phased.

G. All design shown shall be constructed under one permit and construction sequence.

H. Profile all water mains 12 inches and larger with line gradients and elevations.

I. All pipe stubs 12 inches and larger shall be profiled.

J. Water mains are required to be stationed and offset from the centerline/monument line of the roadway.

K. All profiles shall contain the following information:

1. Pipe size, length, slope, and pipe material.
2. Existing and finished ground or paving elevation over the water main.
3. Pipe invert elevations every 400 feet and invert elevations of all fittings.
4. Show all fittings and taps.
5. All utilities that cross or are proposed to cross the proposed water main shall be shown in the profile.

6. All utilities shall have an invert elevation and a calculated vertical separation shown. All vertical separations shall be calculated taking into account pipe wall thicknesses. All separation dimensions shall be from outside of pipe to outside of pipe.
7. Show and label all separation remediation protection.
8. All commercial services within the ROW shall be profiled.

L. All plan views shall contain the following information:

1. Stationing and offset for all services, valves, hydrants, blow offs and all other appurtenances associated with the construction of the water main.
2. Show and label all separation remediation protection.
3. All services and pipe stubs that are not perpendicular to the main shall have a dimension from the property line at the ROW. Pipe stubs may require a station and offset depending on the complexity.
4. In the case of knuckles and cul-de-sacs, the service shall be stationed at the main line connection. An additional dimension from the nearest property line to where the service crosses the ROW line shall be shown.
5. All easement information, including widths, slopes, access road, etc.

3-1.503 Submittal Requirements:

A. Plan Review Submittals:

1. Booster pump stations, PRV stations, wells and reservoirs require separate plan submittals in accordance with the respective sections of the water design standards.
2. In addition to bond copies, a CD with the following items is required to accompany the plans submitted for signature to the Town:
   a. Base map for the area on the plans seeking approval including all property lines, ROW, PUE's, easements etc.
   b. All water mains, fire hydrants, services, and other water items shown and located properly.
   c. All the information shall be shown on a single map, not cut sheets like the plans and located on reasonable layers in CAD.

B. Plan Revisions or Re-Approvals:

1. Town approval of plans and associated design reports are valid for one (1) year from the date of the Town Engineer's signature.

3-1.504 Town of Buckeye Permit:

A. The Developer/Landowner shall secure a permit from the Town for constructing all water infrastructure on the approved water plans.

B. If a revised plan set is submitted, approved by the Town, and signed then the Developer/Landowner is responsible for securing a revised permit from the Town.

3-1.505 Materials:

A. All materials in contact with water shall meet and be certified per the requirements of NSF-61 (no lead).

B. Submittals:

1. All materials used on the development or incorporated into the construction are subject to approval or rejection by the Town Engineer.
2. Town approved technical material/manufacturer data is required for all pipe materials and appurtenances used on the development before work commences.
3. All delivered materials shall match the approved technical data or it will be rejected.
4. The contractor shall submit four (4) copies of the submittals to the Town Engineer.
5. All work installed prior to approval of submittals is subject to rejection by the Town.
6. A copy of the approved material submittals shall be on the jobsite at all times.
7. Each of the submittals shall clearly show the manufacturer and have comprehensive technical data for the proposed product.
8. All material submittals shall be submitted at or before the pre-construction meeting for review and approval by the Town Engineer.

C. Pipe Material:

1. 8 inch distribution mains on local streets can be PVC AWWA C900 with a DR 14 rating or class 350 D.I.P.
2. 8 inch distribution mains in collector and arterial shall be class 350 D.I.P.
3. 12 inch through 48 inch water mains shall be class 350 D.I.P.
4. Transmission mains that will operate between pressure zones, have a working pressure above 175 psi, shall be D.I.P. with a minimum thickness class of 54 and require special design by the engineer.
5. All D.I.P. shall be cement lined per ANSI/AWWA.
6. ACP is not allowed in any size.

D. Service Material:

1. All brass shall be lead free brass.
2. All copper shall be type “K” copper.
3. All corporation stops and angle meter stops shall be brass and be Pac-Joint (stainless steel ball) style.
4. Saddles shall be Stainless strap style for PVC and Bronze strap for D.I.P.
5. All water meter boxes shall be polymer concrete.

E. Pipe Zone Material:

1. Pipe zone material shall be MAG ABC per MAG section 702.

F. Gate Valves:

1. Shall be ductile iron in accordance with ANSI/AWWA.
2. Shall be resilient wedge gate valves.

3. Have a minimum working pressure of 250 psi.

G. Fittings:

1. All fittings shall be ductile iron in accordance with ANSI/AWWA.
2. For standard use fittings 3 through 24 inch shall be rated for 350 psi working pressure.
3. For standard use fittings 30 through 48 inch shall be rated for 250 psi working pressure.
4. All fittings shall be cement lined per ANSI/AWWA.

H. Valve Boxes and Lids:

1. Shall be rated heavy duty.
2. Shall be two (2) piece cast iron slip type.
3. Shall have a minimum ID of 5¼ inch diameter.
4. Shall be coated with asphaltic bituminous coating minimum of 1.0 millimeter thickness.
5. Lids shall be a minimum of 12 pounds.
6. Lids shall be a minimum of 4 inches in height.

I. Tracer Wire:

1. The wire must be 10 gauge, direct bury, solid core wire.
2. Shall have a minimum of 35 millimeter polyethylene insulation.
3. The wire insulation color should be utility appropriate (blue = potable water, purple = reclaimed water, etc.).
4. Boxes shall be D.I.P. valve box (Tops only) or equivalent.

J. Tapping Sleeves:

1. Shall be two (2) piece ductile iron.

3-1.600 As-Built Drawings:

3-1.601 General Requirements:

A. All plans shall comply with “Design Standards - Section 1-2 Plan Submittal Requirements.”

3-1.602 "To Pave" As-Built Drawings:

A. This review is to identify any underground issues that may have been missed during construction. These issues can more easily be fixed prior to the placement of the pavement; therefore, “To Pave” As-Built drawings are required prior to paving. Street paving shall not be permitted to start prior to the approval of these As-Built drawings.

B. “To Pave" As-Built drawings required for submittal:

1. All stations and offsets.
2. All plan inverts shown.
3. All utility crossing dimensions and separations (outside of utility to outside of utility).
4. All pipe length, pipe slope, pipe sizes and pipe material.

5. All service stationing and dimensions.
6. Horizontal location of the water, including dimensioning from center line.
7. All water services located.
8. All offset dimensions to the property line shall be As-Built.
9. Dimensions shown from centerline to water main are to be As-Built.

3-1.603 "For Final" or "Final" As-Built Drawings:

A. "For Final" As-Built drawings required for submittal:

1. All fire hydrant stationing and offsets shall be completed.
2. All valve adjustments shall be verified.
3. All tracer wire and anode connections to be verified.
4. All monuments and brass caps shall be As-Built.

3-1.604 Tolerances and Corrections:

A. Water As-Built review is separate from construction inspection and field quality control measures.

B. All field identified problems shall be corrected prior to As-Built drawing review commencing.

C. Deviations as a result of construction activities may be allowed by the Town, but deviations beyond certain limits will not be allowed. Any deviation allowed by the Town will be determined at the Town's sole discretion. In these cases the water shall be removed and replaced at the Developer/Landowner's expense. A partial listing of unacceptable water installations are shown below:

1. Water services not constructed to the designed development;
2. Separation from sewer or other "non-potable" pipeline that violate the MAG Zone "A" tolerances;
3. Creation of high points that did not exist in the design or that does not have a proper way to bleed air;
4. If a test location fails to pass hydrostatic (leakage) tests after two (2) attempts, the failing test section shall be replaced in its entirety;
5. If the Town minimum cover decreases by 6 inches or greater the water main shall be removed and replaced.
6. Water mains outside of ROW or Town easements shall be removed and replaced.
7. All water mains within 5 feet of the edge of the easement shall be removed and replaced.

[END OF SECTION]

Appendix 1 Standard Details

31100-1	Water Notes, Page 1 of 2
31100-2	Water Notes, Page 2 of 2
31200	Unauthorized Water Valve Shut Off
31220	Service Brand Detail
31225	Dipped Water Line
31330	Water Service Line Connection
31331-1	Water Meter Box No.1
31331-2	Water Meter Box Cover No. 1
31332-1	Water Meter Box No.2
31332-2	Water Meter Box Cover No. 2
31333-1	Water Meter Box No.3
31333-2	Water Meter Box Cover No. 3
31335	Water Meter Vault 3" & 4"
31336	Water Meter Vault 6"
31338-1	3", 4", & 6" Meter Equipment Layout
31338-2	3", 4", & 6" Meter Vault Installation
31339	Water Meter Boxes - Traffic Rated
31340-1	2" Air/Vacuum Release Valve
31340-2	2" Air/Vacuum Release Valve Notes
31342	Air Release Hydrant Assembly with Flushing Pipe
31344	Tapping Sleeves
31350	Double Check Valve Assembly w/ Bypass Meter, 3" Through 10"
31351	Double Check Valve Assembly ¾" Through 2 ½"
31352	Reduced Pressure Principle Backflow Assembly, 3" Through 10"
31353	Reduced Pressure Principle Backflow Assembly, ¾" Through 2 ½"
31354	"N" Shaped Double Check Valve Assembly, 3" Through 10"
31355	"N" Shaped Double Check Valve Assembly, ¾" Through 2 ½"
31356	Pressure Vacuum Breaker Assembly, ½" Through 2"
31358	Backflow Prevention Enclosures
31359	Guard Posts for Backflow Prevention Assemblies
31364	Hydrant Meter Assembly
31368	Water Stub Out
31370	Commercial "T" Main
31375	Water Quality Sampling Station
31380	Water Trench Detail
31382	Concrete Cap
31384	Casing Pipe & Spacer
31410	Fire Hydrant Location
31412	Fire Hydrant Clearance
31414	Fire Hydrant Identification and Color
31420	Fire Hydrant Bypass Assembly
31425	Fire Hydrant Out Of Service Signs
31430	Fire Sprinkler Riser Detail - Vertical Installation #1
31431	Fire Sprinkler Riser Detail - Vertical Installation #2

31435	Remote Fire Department Connection
31440	Pavement Markers for Fire Hydrants
31441	Fire and Emergency Access and Delineation
31445	Fire Apparatus Turnaround Requirements
31450	Fire Riser Room Placard
31452	Fire Lane Sign
31454	Fire Lane Signage (Private Streets and Subdivisions)
31456	Fire Department Connection Signage
31458	Building Address Identification
31460	Fire Department Access Barrier

WATER NOTES

1. Backfilling shall not be started until lines have been inspected and approved by the Town.
2. Fire hydrants shall be Watrous "Pacer", Mueller or Clow break-away, dry-barrel design and shall be furnished by the contractor. All fire hydrants shall be painted NFPA Yellow or other colors based on Standard Detail 31414 after installation. Each fire hydrant shall be furnished with a gate valve and National Standard threads. Fire hydrants shall be installed such that the centerline of the main pumper nozzle shall not be less than 18-inches or more than 24" above finished grade or adjacent top of curb.
3. All valves shall be resilient wedge gate type and open to the left.
4. All service lines shall be type K copper pipe from Town main to meter (through 2" size). Service connections shall conform to the Town of Buckeye Standard Detail 31330.
5. All taps shall use a bronze service saddle. Eight (8) inches or less shall be single strap and twelve (12) inches or greater shall be double strap. Stainless steel strap(s) shall be used for PVC pipe; or bronze strap(s) for ductile iron pipe.
6. Meter boxes and lids shall be supplied by the developer and installed facing this lot. Adjustment to final grade shall be by developer or its contractor. Polymer Concrete meter boxes with concrete lid shall be used for all installations per TOB Details 31331 through 31336.
7. All water meters shall be purchased and installed by the developer or contractor. All meters and boxes shall be in accordance with Town standards and shall be compatible with AMR system. 5/8" and 3/4" meters are not permitted.
8. All valve boxes shall be MAG Std. Detail 391-1 Type "C" and manufactured by Tyler Union, Sigma heavy duty rated, or Town approved equal. Where valve boxes are located outside the street or sidewalk there shall be a class 'B' concrete ring 6" thick, and 30" in diameter placed around the valve box and flush with the top of the valve box. The valve box shall be set 0.1' higher than the surrounding grade. There shall be a #4 bar centered in the concrete ring and contractor shall install a Blue Carsonite Marker labeled "WATER VALVE."
9. All waterline compaction shall be Type 1 per MAG Specification Section 601.
10. All waterline fittings shall be ductile iron with mechanical joints.
11. All backflow preventers shall have AWWA certification. Prior to occupancy, Contractor or Owner shall provide testing by a certified tester for all backflow preventers. Testing shall be witnessed by the Town Inspector. A copy of test reports shall be provided to the Town Inspector.
12. Water line testing shall be in conformance with MAG standard specification 610.15. One hundred (100%) percent of all new waterlines and services shall be pressure tested. Disinfection shall be in accordance with MAG Std. Specification 611.
13. Refer to Detail No. 31200 for Unauthorized Water Valve Shutoff Requirements.
14. Water jetting per MAG Sc. 601.4 is allowed only for waterline trench backfill in new, local, and collector street roadways within new developments. Backfill material lifts for water jetting shall not exceed 4' (loose) in depth. Water consolidation shall not be allowed for backfill and compaction of water line trenches in or adjacent to existing roadways or new arterial street roadways. Trench flooding is not allowed.
15. Shut-downs and night tie-ins shall be approved and scheduled with the Town of Buckeye Water Department.
16. All DIP shall be poly-wrapped and cement mortar lined.
17. 1" water meter curb stops to be set 8" below the bottom of meter box lid. All water services shall be 1" or larger.
18. Contractor shall mark all meter locations with a 2" x 4" metal stud marker, painted blue, placed 3' below grade and 2'above grade. All meter locations shall also be reference marked with blue paint on adjacent concrete as directed by the Town Inspector.

WATER NOTES (cont.)

19. Tracer wire shall be used on all water line construction. The wire shall be run directly on top of the water main during construction. Tracer wire #10 gauge (THHN) or approved water main tracer wire insulated copper wire. The wire shall be run with all water mains, looped up all valve boxes, and to run all termination points of the water line. There shall be minimal underground splices. If a splice is necessary, the connection shall be made with a water tight connector as to protect all uninsulated wire. Tracer wire is not required on copper service lines.

20. Non-detectable plastic warning tape shall be placed above all water lines. The tape shall be 6" wide, blue, and have a permanent marking: "CAUTION BURIED WATER LINE BELOW," spaced every 36".

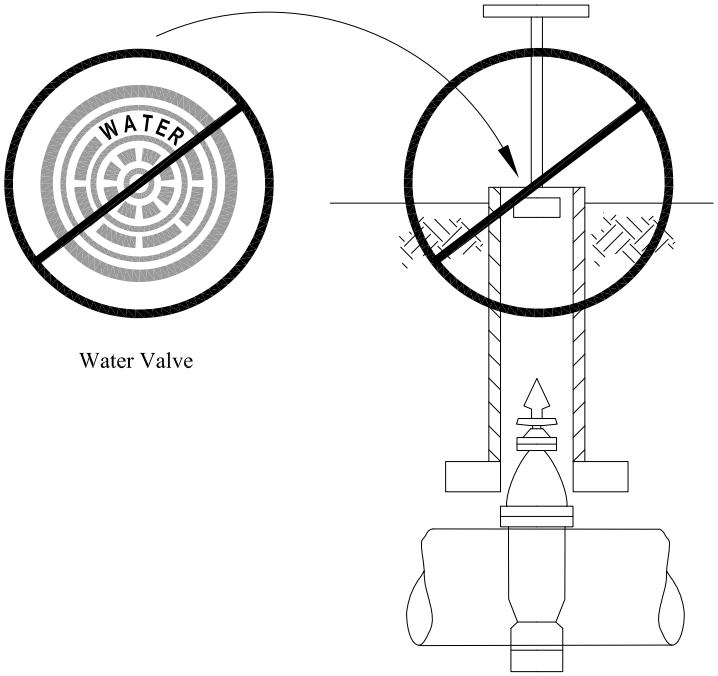
21. Contractor shall provide adequate cut/elevation construction staking for all water line installations, to allow for proper depth installation and inspections. Minimum staking locations include all mechanical fittings and valves.

22. All plans submitted to the Town for water main installation, shall include the technical data for the following items, for review and approval by the Town Engineer, prior to construction (submittal requirements shall not be limited by the following):

    22.1. Pipe material including all fittings, valves, gaskets, tapping sleeves, couplings, corporation stops, copper pipe, meter stops, fire hydrants, blow-offs, air release valves, copper fittings, meter boxes, valve boxes, tracer wire, ABC, concrete, and all other items as requested by the Town Engineer.

23. All water mains and laterals shall be bedded with 4" and shaded and backfilled to 12" above the top of pipe with approved ABC material.

NOTE:
Unauthorized Personnel Shutting Off Water Valves And Fire Hydrants Are In Violation Of Town Of Buckeye Requirements. Contact Water Resource Department 48 Hours Prior To Schedule All Shut Downs - (623) 349-6800 Monday - Thursday 7 AM to 6 PM.

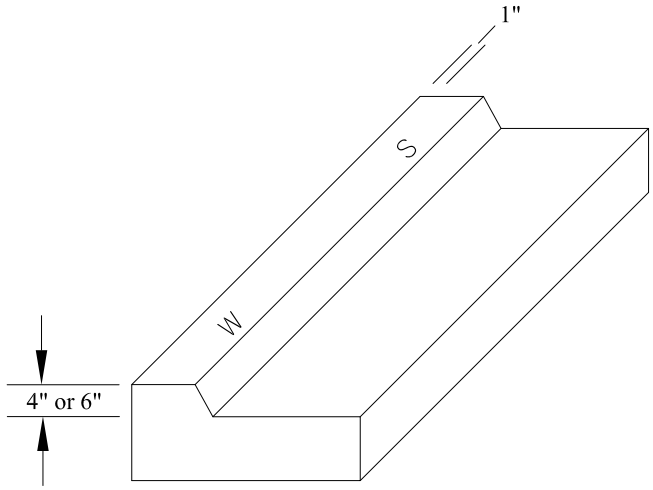


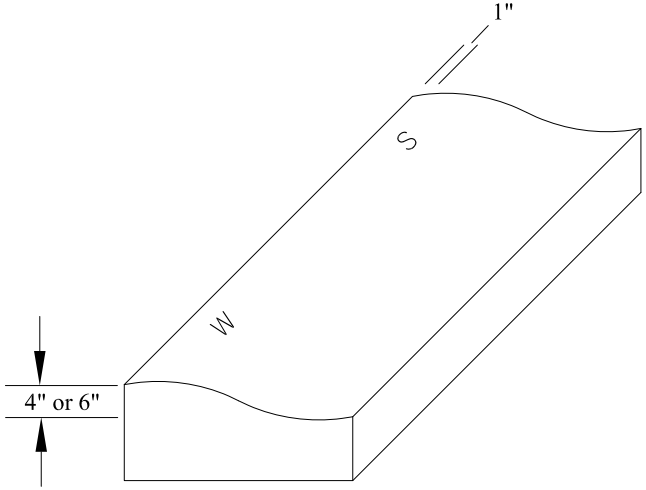
Water Valve

Superintendent Signature: _____ Date: _____

This Is To Be Posted In The Construction Office

31200	Town of Buckeye Standard Details	UNAUTHORIZED WATER VALVE SHUT OFF	Revised: 12-31-12	Detail No. 31200

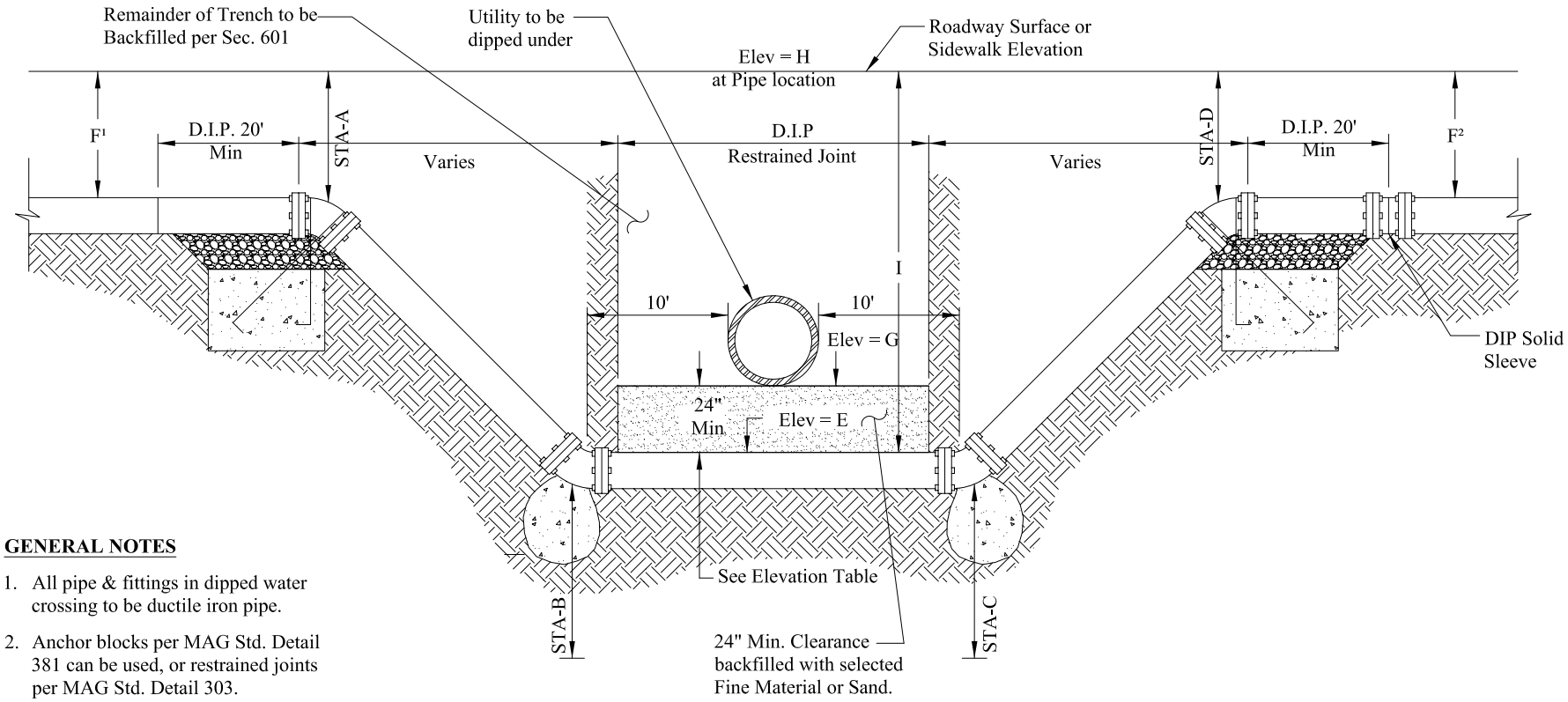




GENERAL NOTES

1. Sewer/water services locations shall be located by branding a "W" or "S" in the top of the curb.
2. The "W" or "S" shall be 4" in height. It shall have a minimum impression of $\frac{1}{4}$".
3. The brand shall be constructed of cast or machined lettering. Re-Bar is not allowed.
4. The impression of the brand must be within 6" of the actual service location.
5. The brand must be a minimum of 1" from back of curb.

31220	Town of Buckeye Standard Details	**SERVICE BRAND DETAIL**	Revised: 12-31-12	Detail No. 31220

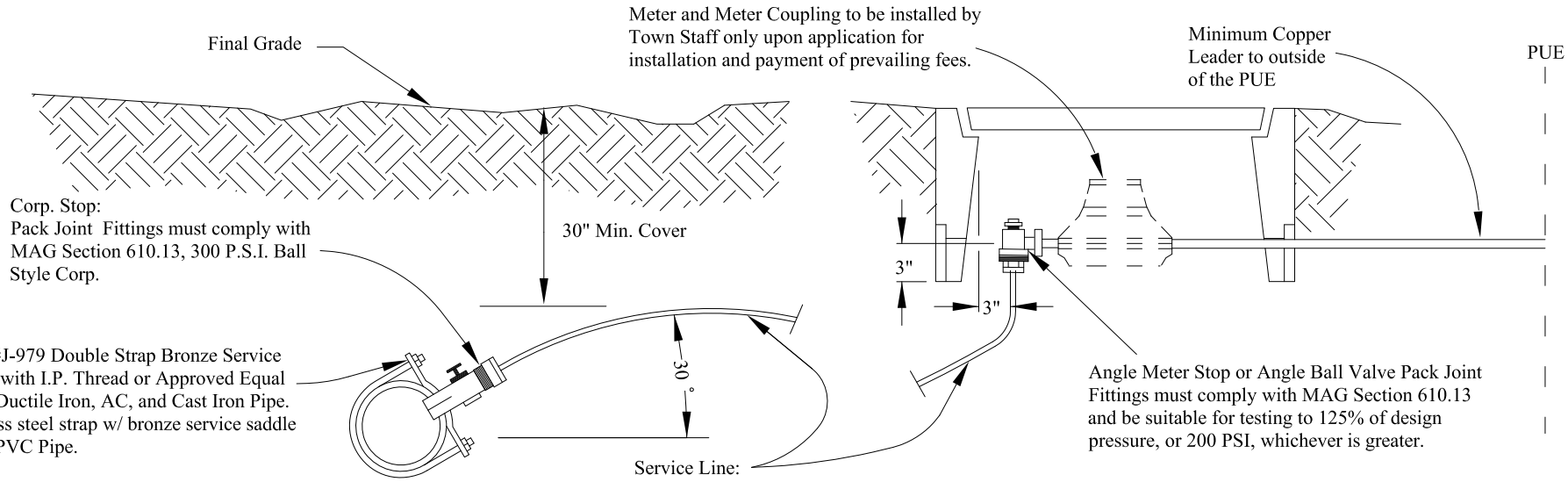


GENERAL NOTES

1. All pipe & fittings in dipped water crossing to be ductile iron pipe.
2. Anchor blocks per MAG Std. Detail 381 can be used, or restrained joints per MAG Std. Detail 303.
3. All vertical realignment fittings shall be 45° ells.

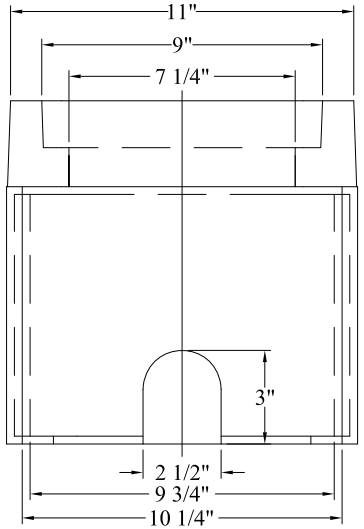
Dipped Water Crossing Ductile
Iron Restrained Mechanical Joint
(MAG Std. Detail 370 & 404)

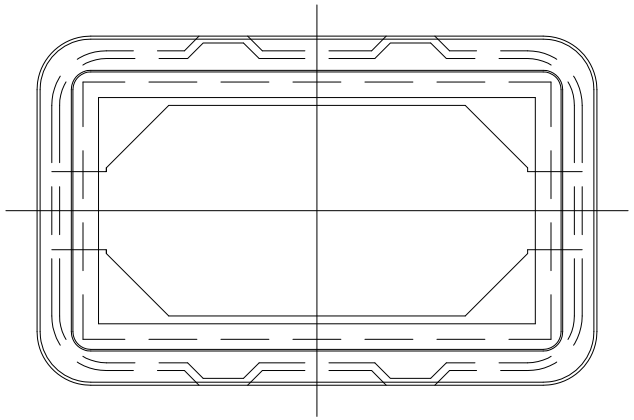
LOCATION	SHEET	STA-A	AB-A	STA-B	AB-B	STA-C	AB-C	STA-D	AB-D	E	AB-E	F¹	AB-F¹	F²	AB-F²	G	AB-G	H	AB-H	I	AB-I
1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–



GENERAL NOTES:

1. All taps must be made using a service saddle.
2. All Service Line sizes shall have the pack joint compression fittings for corp stops and meter stops.
3. Where a contractor is installing new water lines, all water service connections shall also be installed. The contractor's installation shall include the service saddle, corp. stop, service pipe, appurtenant fittings, meter stop, concrete polymer meter box and concrete polymer box cover, per TOB Details 31331 through 31333.
4. Copper Service Lines in the 1", 1-1/2" and 2" sizes that cross streets will be one continuous piece.
5. Rough grade shall be set to 1-1/2" below top of meter box. Final landscape grade shall be set flush to top of meter box.
6. Service lines shall be shaded w/ sand or native material meeting ASTM D2321 Class II Standard SW sand gradation.
7. Hinged Saddles are not allowed.
8. Meter size shall be determined by the water utility provider.
9. Within the TOB service area a minimum meter size of 1" shall be used.
10. For water meter sizing outside of the Town of Buckeye service area refer to the requirements of the specific water provider or as stated on the improvement or building plans.

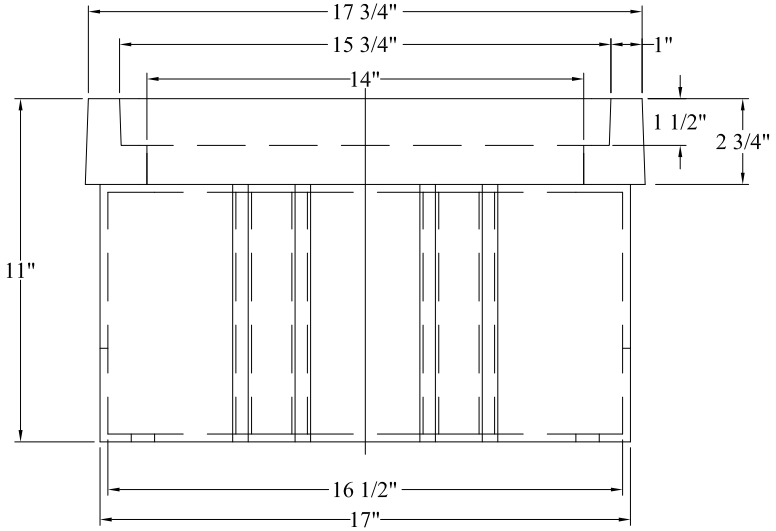


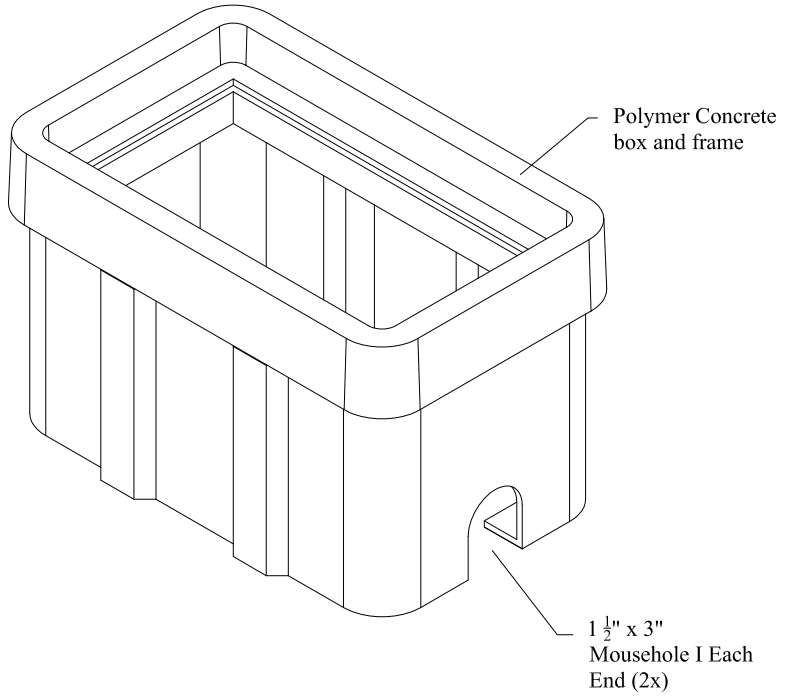


GENERAL NOTES

Water Meter Boxes

1. BOX: Approximate Weight = 19 LBS.
2. This box shall be utilized in dirt and grass only. Application in traffic areas is not authorized.
3. Each meter box shall be placed on minimum of 2-inches of compacted A.B.C.
4. Meter boxes shall be polymer concrete type manufactured by Armorcast Products Company or approved equal.



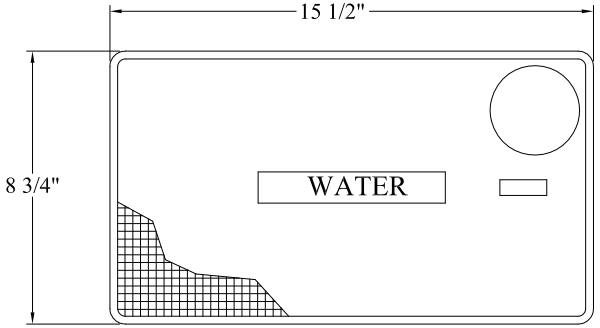


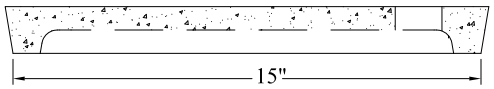
31 331-1	Town of Buckeye Standard Details	**WATER METER BOX NO. 1**	Revised: 12-31-10	Detail No. 31331-1

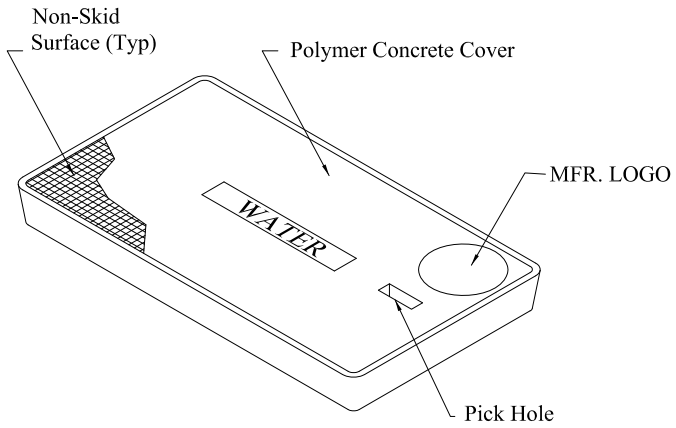
GENERAL NOTES

Water Meter Box Covers

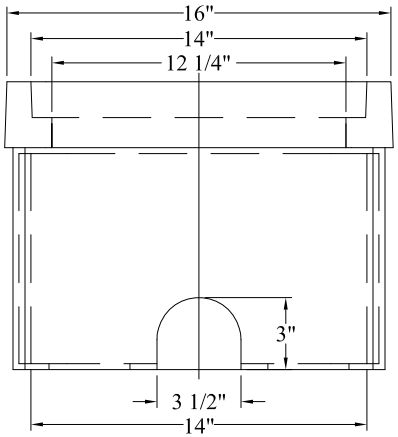
1. COVER: Approximate Weight = 9 LBS.
2. This meter box cover shall be utilized in dirt and grass areas only. Application in traffic areas is not authorized.
3. Meter box covers shall be polymer concrete type, as manufactured by Armorcast Products Company, or approved equal with "WATER" imprinted on the top.



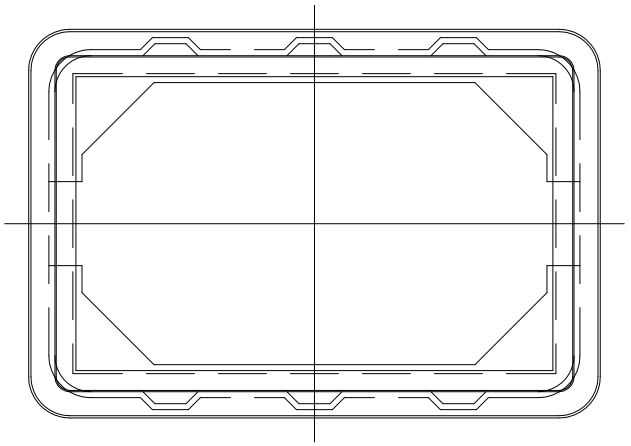




31 331-2	Town of Buckeye Standard Details	**WATER METER BOX COVER NO. 1**	Revised: 12-31-12	Detail No. 31331-2



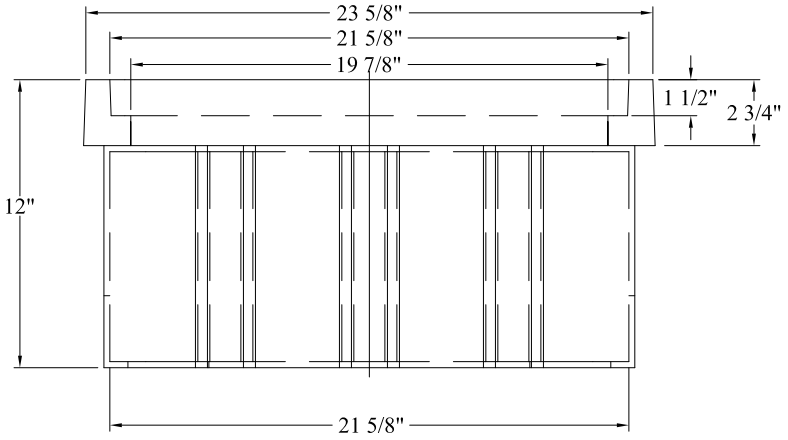
END VIEW



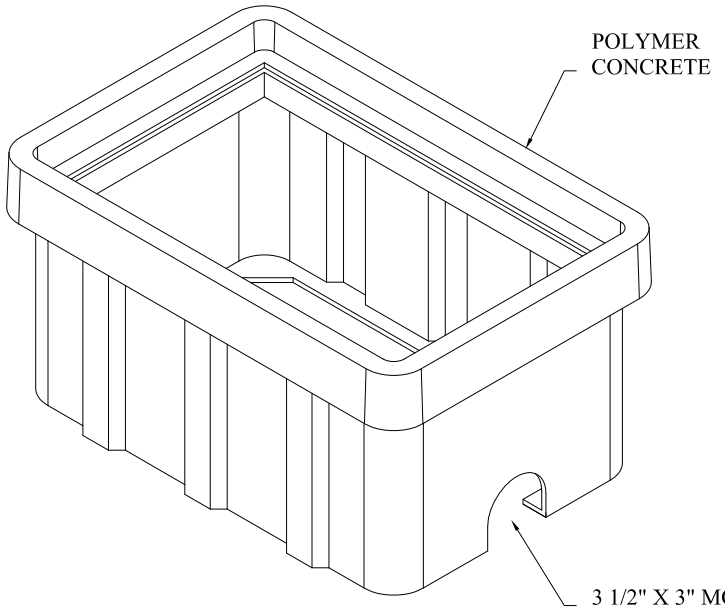
GENERAL NOTES

Water Meter Boxes

1. BOX: Approximate Weight = 27 LBS.
2. This box shall be utilized in dirt and grass only. Application in traffic areas is not authorized.
3. Each meter box shall be placed on minimum of 2-inches of compacted A.B.C.



FRONT VIEW

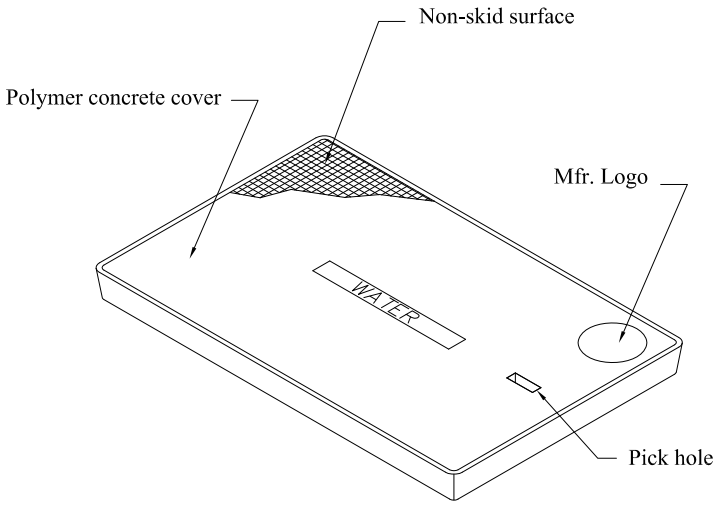


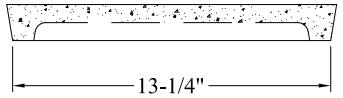
31 332-1	Town of Buckeye Standard Details	**WATER METER BOX NO. 2**	Revised: 12-31-12	Detail No. 31332-1

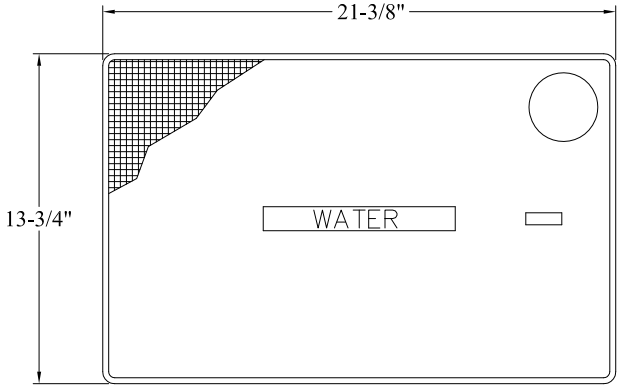
GENERAL NOTES

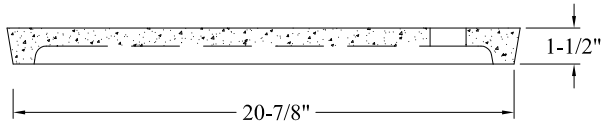
Water Meter Box Covers

1. COVER: Approximate Weight = 18 LBS.
2. This meter box cover shall be utilized in dirt and grass areas only. Application in traffic areas is not authorized.
3. Meter box covers shall be polymer concrete type, as manufactured by Armorcast Products Company, or approved equal with "WATER" imprinted on the top.

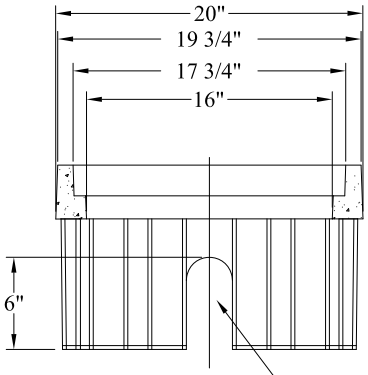






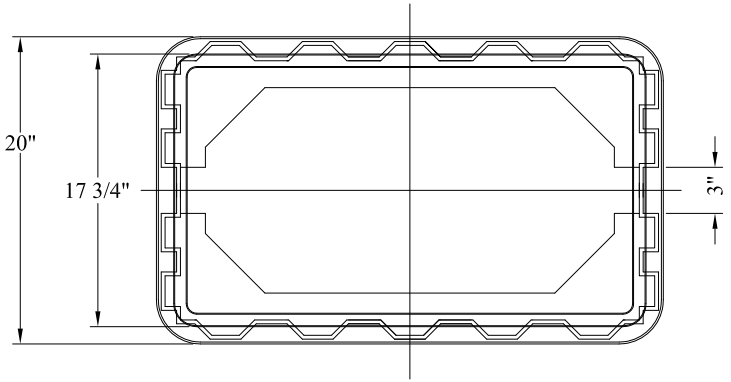


31 332-2	Town of Buckeye Standard Details	WATER METER BOX COVER NO. 2	Revised: 12-31-12	Detail No. 31332-2



END VIEW

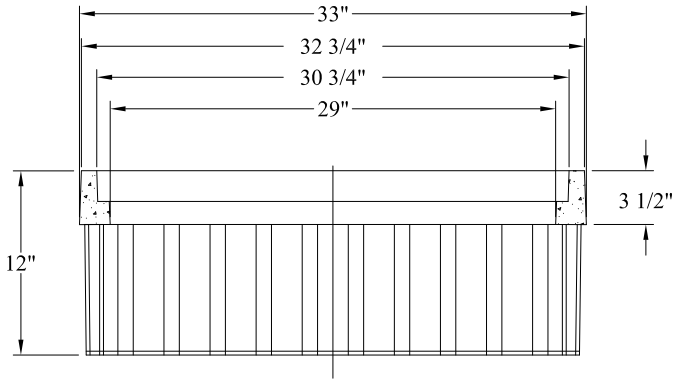
3" x 6" Mouse hole
one each end (2X)



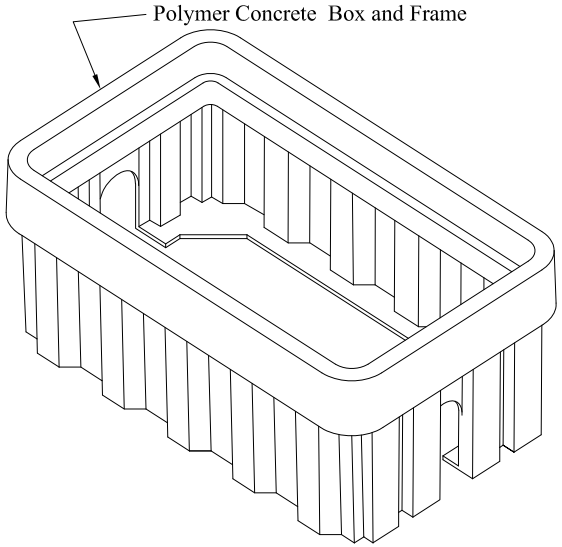
GENERAL NOTES

Water Meter Boxes

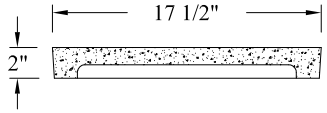
1. BOX: Approximate Weight = 42 LBS.
2. This box shall be utilized in dirt and grass only. Application in traffic areas is not authorized.
3. Each meter box shall be placed on minimum of 2-inches of compacted A.B.C.
4. Meter boxes shall be polymer concrete type manufactured by Armorcast Products Company or approved equal.

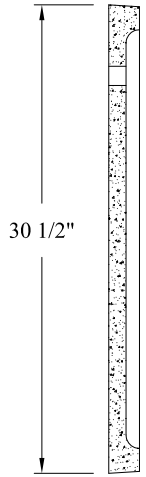


SIDE VIEW



31 333-1	Town of Buckeye Standard Details	**WATER METER BOX NO. 3**	Revised: 12-31-12	Detail No. 31333-1

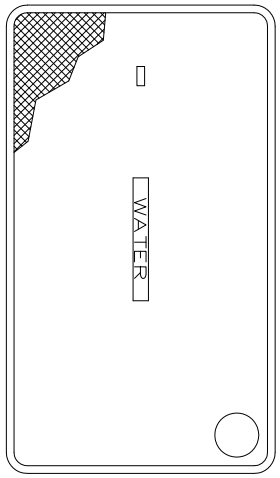


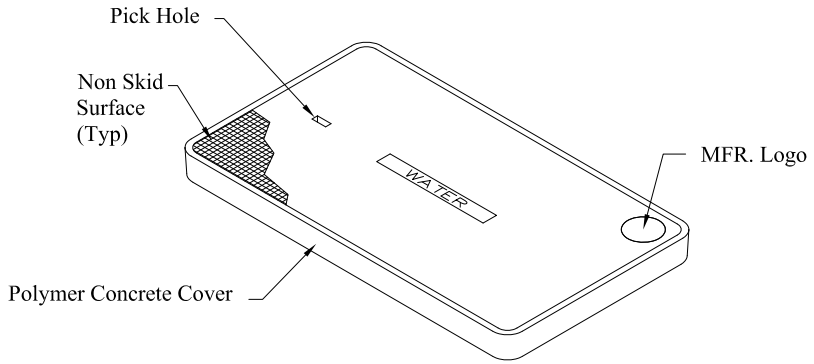


GENERAL NOTES

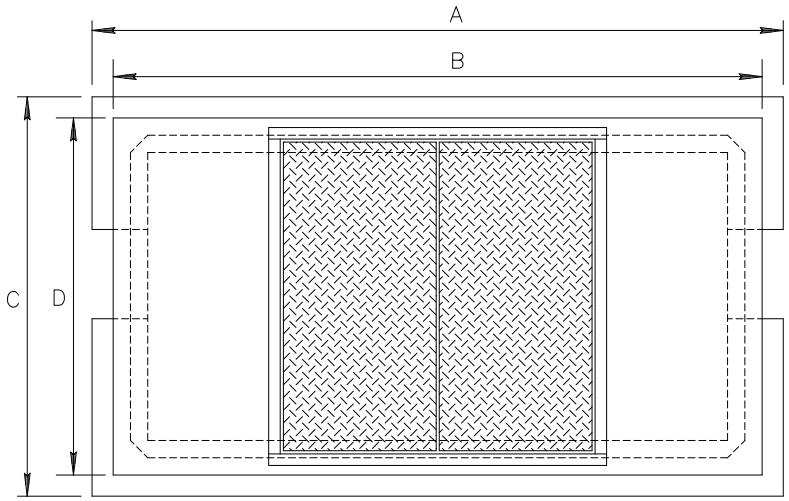
Water Meter Box Covers

1. COVER: Approximate Weight = 43 LBS.
2. This meter box cover shall be utilized in dirt and grass areas only. Application in traffic areas is not authorized.
3. Meter box covers shall be polymer concrete type, as manufactured by Armorcast Products Company, or approved equal with "WATER" imprinted on the top.

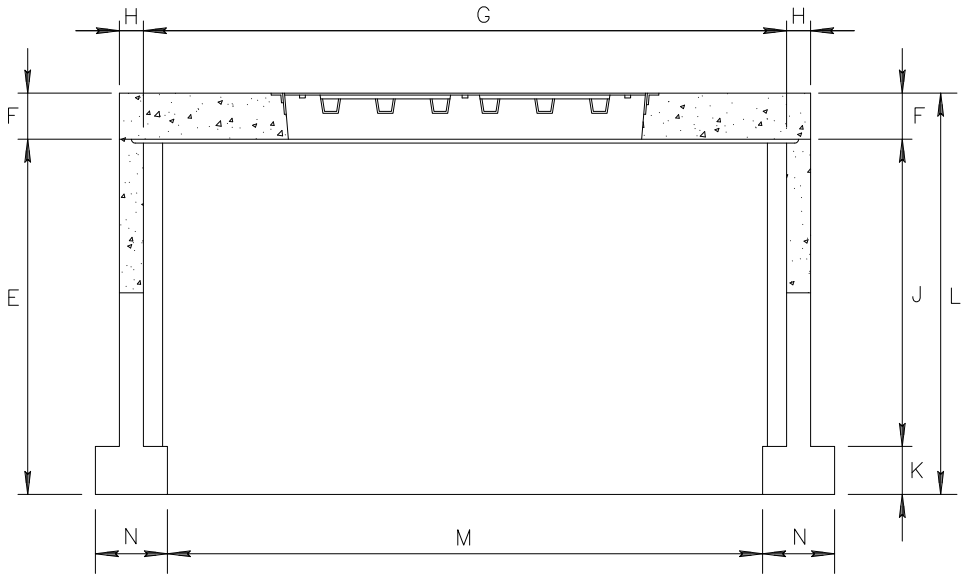




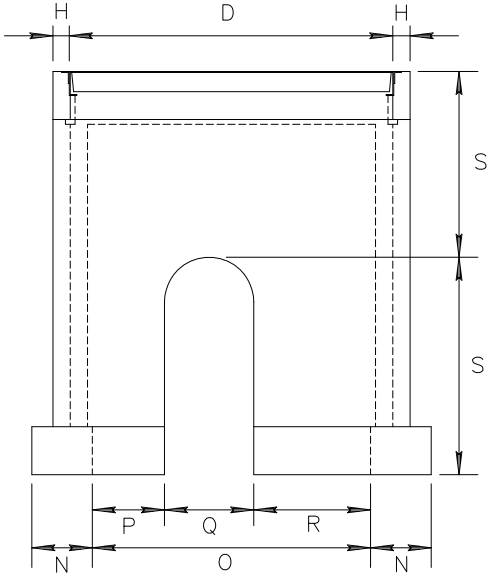
31 333-2	Town of Buckeye Standard Details	**WATER METER BOX COVER NO. 3**	Revised: 12-31-12	Detail No. 31333-2



PLAN VIEW



SECTION VIEW



END VIEW

STRUCTURAL NOTES

1. Concrete: 28 day compressive strength F'C = 4500 PSI
2. Rebar: ASTM A-615 Grade 60
3. Mesh: ASTM A-185 Grade 65
4. Design: ACI-318-99 building code
   ASTM C-857 "Minimum Structural Design loading for underground precast concrete utility structures"
5. Loads: HS20-44 w/ 30% impact per AASHTO

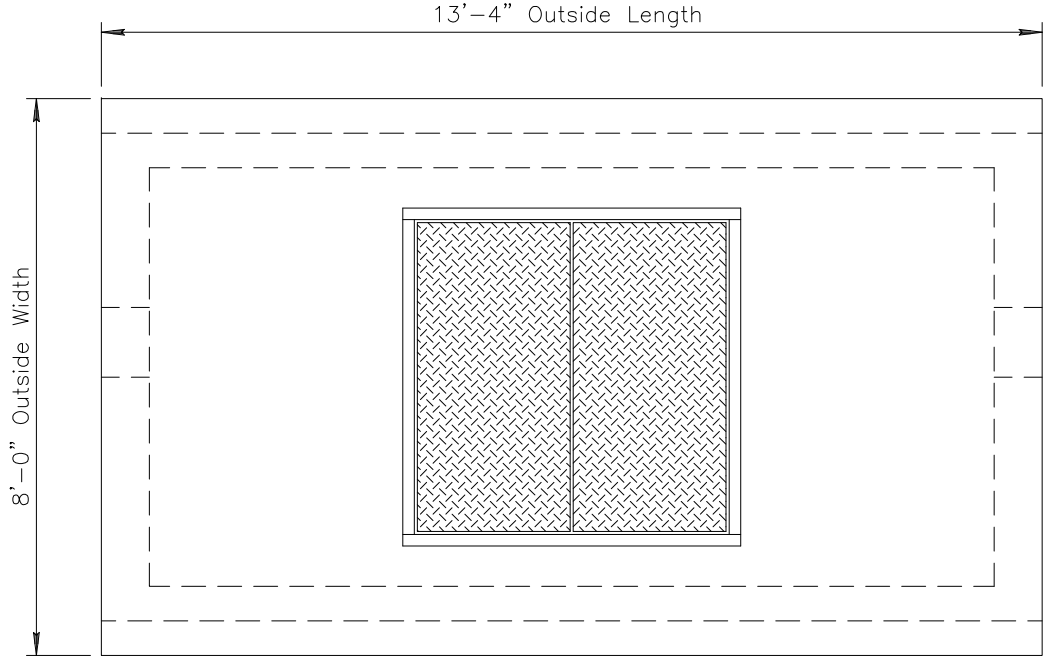
GENERAL NOTES

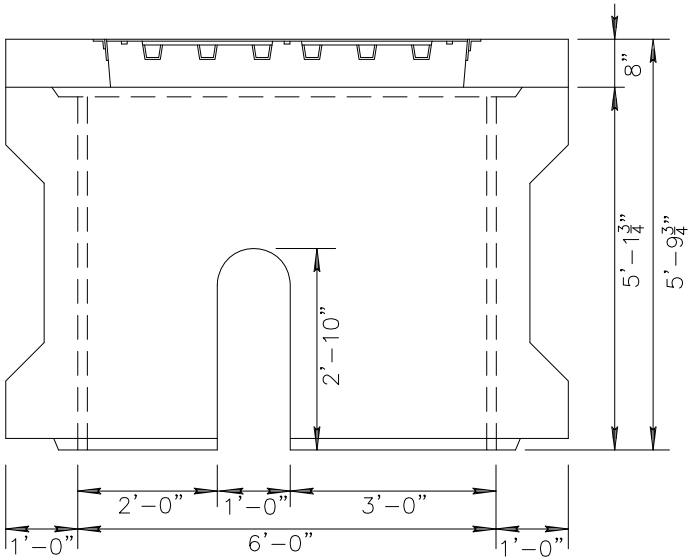
1. All joints shall be sealed using Conseal CS-101 BUTYL rubber rope.

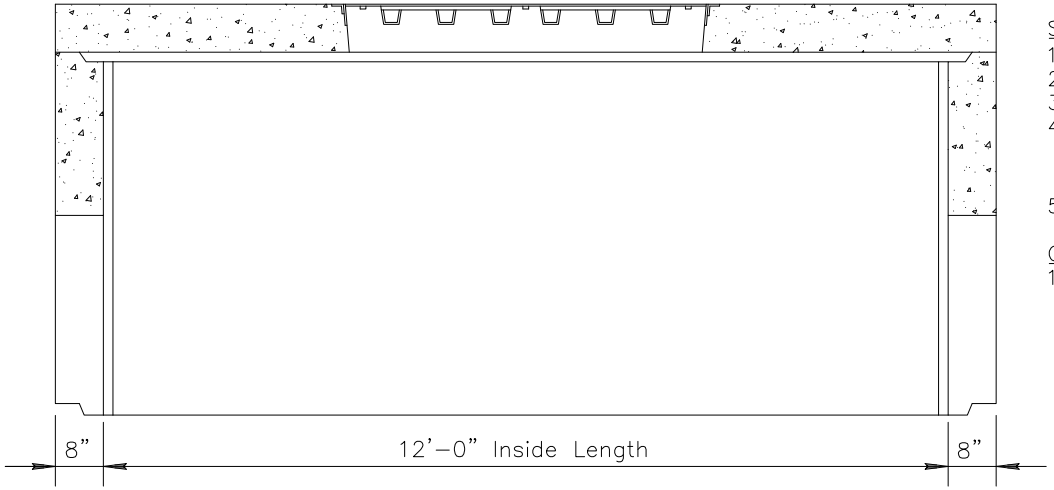
Meter Size	DIMENSIONS									
	A	B	C	D	E	F	G	H	J	K
3"	9'-8"	9'-0"	5'-8"	5'-0"	5'-0"	8"	8'-4"	4"	4'-4"	8"
4"	11'-10"	11'-2"	5'-8"	5'-4"	5'-0"	8"	10'-6"	4"	4'-4"	8"

Meter Size	DIMENSIONS									
	L	M	N	O	P	Q	R	S		
3"	5'-8"	7'-8"	1'-0"	3'-8"	8"	9'-8"	2'-0"	2'-10"		
4"	5'-8"	9'-10"	1'-0"	4'-4"	1'-0"	1'-0"	2'-4"	2'-10"		

31335	Town of Buckeye Standard Details	METER VAULTS 3" & 4"	Revised: 12-31-12	Date: 31335







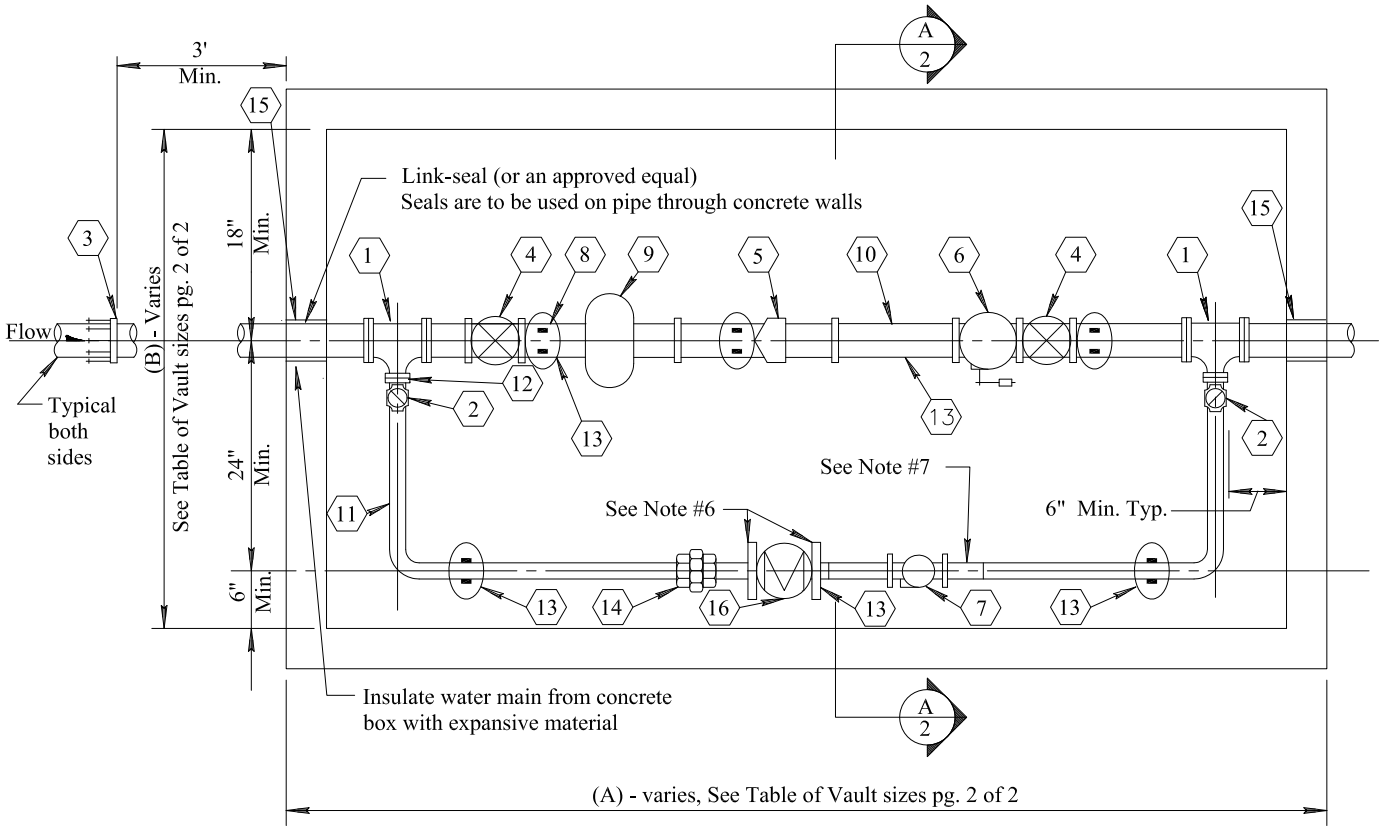
STRUCTURAL NOTES

1. Concrete: 28 day compressive strength F'C = 4500 PSI
2. Rebar: ASTM A–615 Grade 60
3. Mesh: ASTM A–185 Grade 65
4. Design: ACI–318–99 building code
   ASTM C–857 "Minimum Structural Design loading for underground precast concrete utility structures"
5. Loads: HS20–44 w/ 30% impact per AASHTO

GENERAL NOTES

1. All joints shall be sealed using Conseal CS–101 BUTYL rubber rope.

31336	Town of Buckeye Standard Details	**METER VAULT 6"**	Revised: 12-31-12	Date: 31336



General notes

1. For larger meters special vault design is required.
2. Use of remote reading device at option of utility.
3. Precast concrete vaults - with double torsion doors - spring assisted. (contact tob water department for approved vault before installation).
4. Inlet and outlet pipes must be joint restrained dip to permit removal of fittings or meter.
5. Meter to be provided and installed by the town upon payment of fees.
6. Solder 2" copper to flange adapters either side of 2" meter.
7. Solder 2" copper to male thread adapters.

Legend

1. Flanged tee for bypass.
2. Curbstop, 2" ball type with bronze or brass body, lockable to be normally closed.
3. Adapter, flanged to mech. Joint for a.C.P.
4. Gate valve, flanged, with hand wheel, open left. With pipe support
5. Compound meter (contact tob water resources for current style and lay length. (see note 5).
6. Flanged swing check valve with external lever and weight.
7. 2" bronze check valve.
8. Flanged spool 12" min. Length.
9. Strainer, 3", 4", 6", manufacturer approved for the meter installed.
10. Flanged spool (3 pipe diameters in length).
11. 2" type k rigid copper by-pass (use silver flow brazing alloy for joints).
12. Companion flange with 2" tap for by-pass.
13. 2" adjustable pipe support. 1 at each valve, 1 at each meter and 2 spaced equally on the bypass assembly.
14. 2" brass union.
15. Form and fill pipe opening with class b concrete after pipe is installed
16. 2" turbine (high flow) or combined meter. See note #5.

31 338-1	Town of Buckeye Standard Details	**3", 4", 6" METER EQUIPMENT LAYOUT**	Revised: 12-31-12	Date: 31338-1

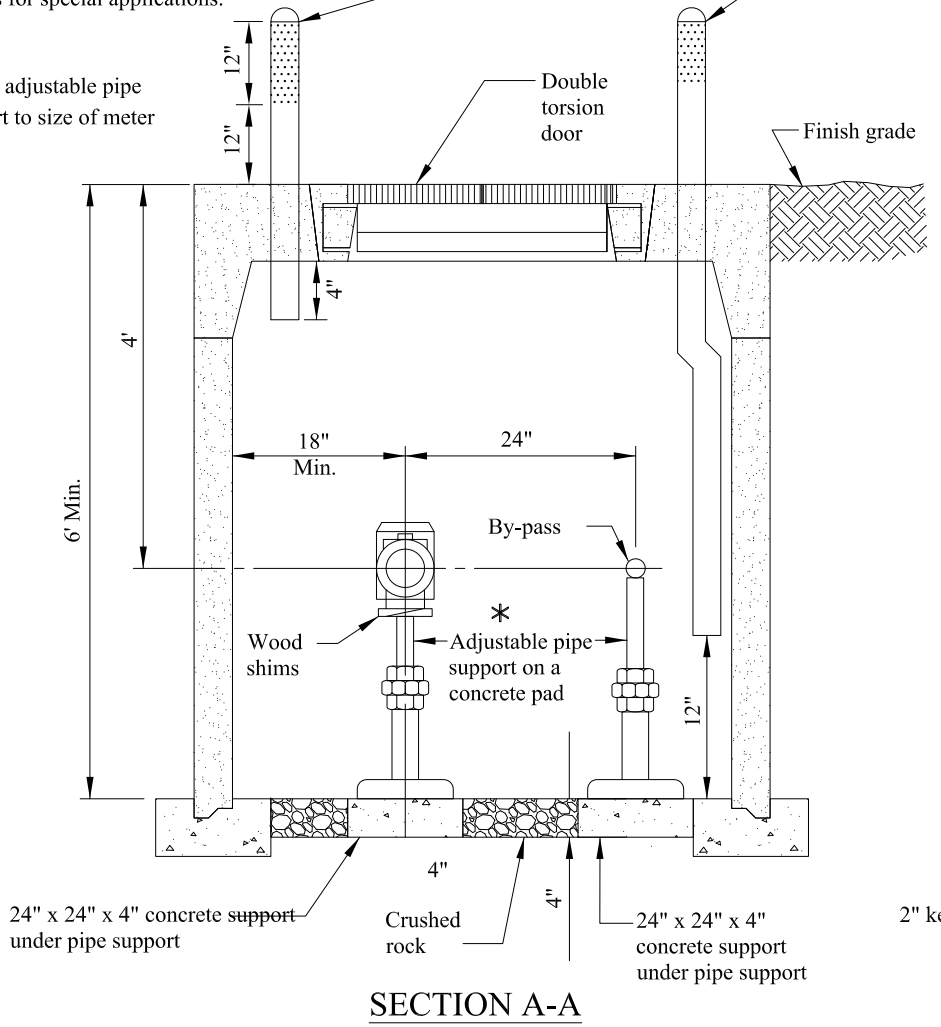
Water meter vault must be a utility vault co./town of buckeye spec. Vault.

See details 31335 and 31336 for vault details.

8" & larger contact TOB water resources for special applications.

* Match adjustable pipe support to size of meter

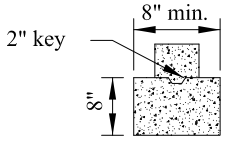
3" Dia. Sch 40 steel vent pipe w/ 3". Wrap pipe with reflective tape then drill 1/4" dia. holes 1" OC on the top 12" of the pipe. Vent pipe shall be mechanically anchored to the vault wall. 2 locations min.



SECTION A-A

General notes

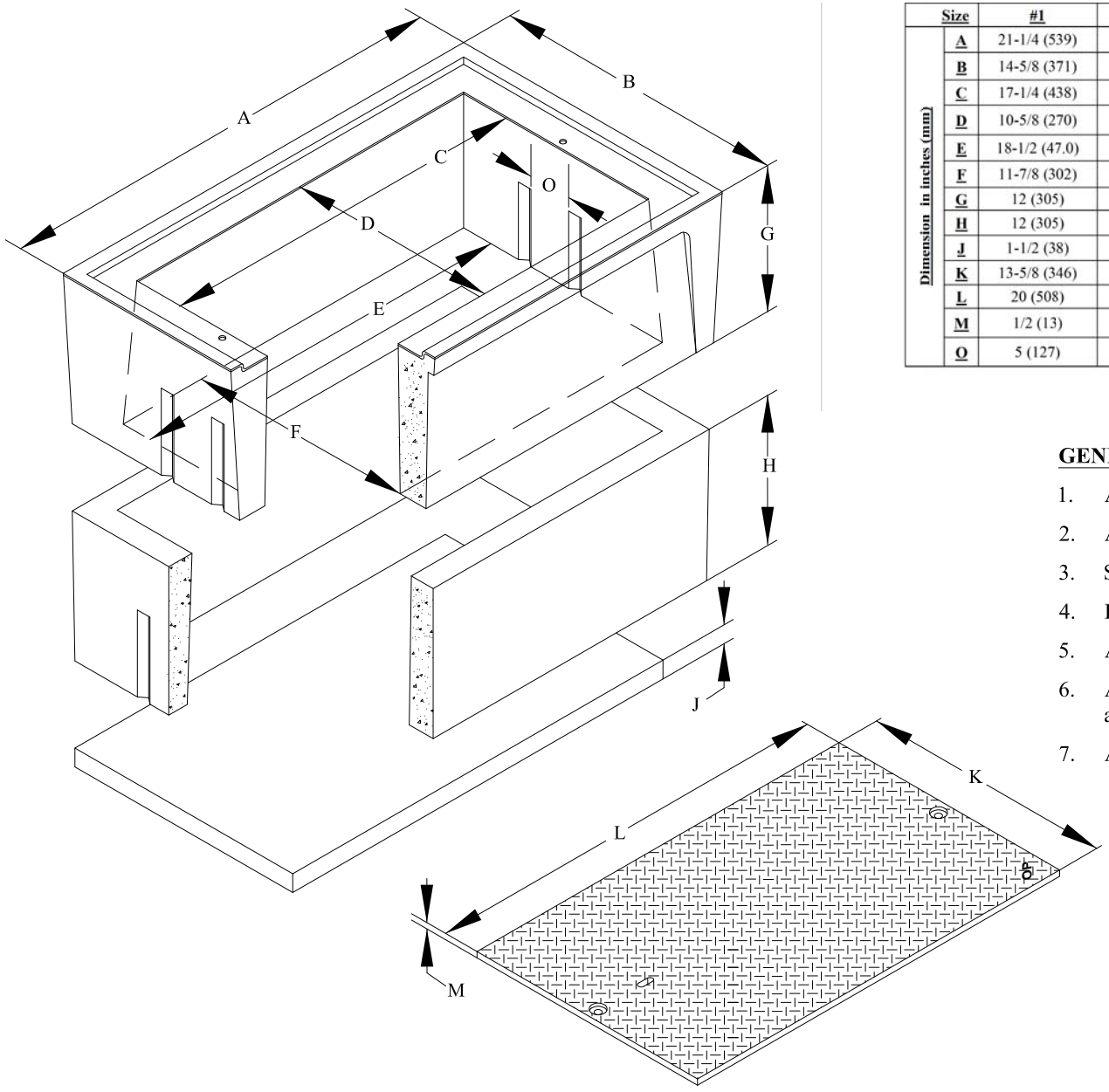
1. Do not perform any in the field vault placement before contacting and coordinating necessary work with the TOB water resources department @ 623-349-6800
2. Pre-cast reinforced vaults shall be constructed in conformance with the "utility vault company": 3",4",6" & larger water meter vaults for the TOB or an approved equal design.
3. Cast-in place reinforced vaults shall be constructed using class "A" concrete with #5 rebar, 6" OC each way and shall conform to mag spec. 725.
4. Block masonry reinforced vaults shall be constructed using solid grouted walls with #4 rebar in every other cell and shall conform to MAG spec. 776.
5. The water meter vault shall include the following features:
6. Vault top shall include 4 exposed pull irons for setting top.
7. Spring assist torsion door(s) sized per table with H-20 wheel loaded lid, recessed lift handle, pentahead bolt locking assembly (flush fit) or recessed locking hasp.
8. The pipe slot at both ends of the vault shall be sealed, blocking the slot with a suitable material to the bottom of the water pipe, and then wrapping the pipe with #30 felt and finishing with non-shrink mortar prior to backfilling and compacting.
9. A vault installation exceeding 7' inside depth shall include an osha approved fixed-in-place aluminum ladder with a pull-up extension to 3' above the top of the vault.
10. Place 8"of crushed rock (no 5) under the entire footprint of the vault.



Footer detail

Vault door size table			
Meter size	3"	4"	6"
Door size	D36"x60"	D48"x48"	D36"x60"

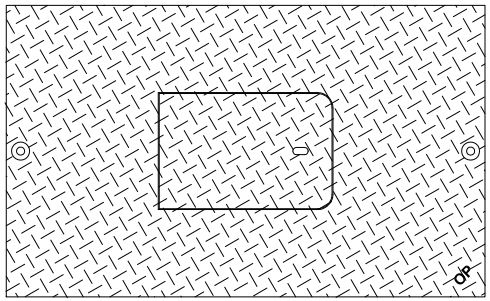
31 338-2		Town of Buckeye Standard Details	**3", 4", 6" METER VAULT INSTALLATION**	Revised: 12-31-12	Date: 31338-2



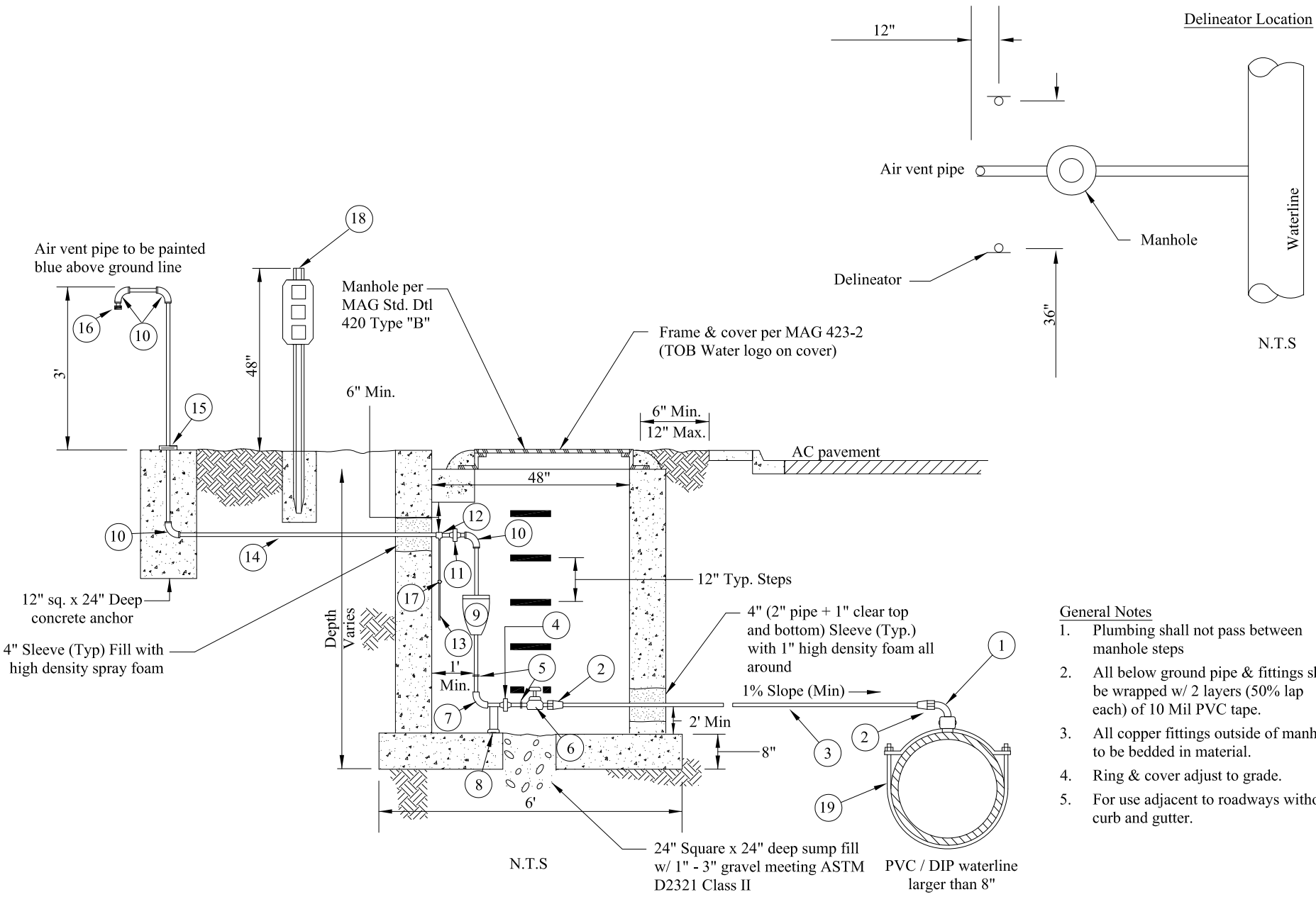
Dimension in inches (mm)	Size	#1	#2	#3	#4	#5
	A	21-1/4 (539)	29-1/2 (749)	36-3/4 (933)	43 (1092)	54-7/16 (1383)
	B	14-5/8 (371)	18-3/4 (476)	23-3/4 (603)	31 (787)	36-5/16 (922)
	C	17-1/4 (438)	24 (610)	30 (762)	36 (914)	48-1/4 (1226)
	D	10-5/8 (270)	13-1/4 (336)	17 (432)	24 (610)	30-1/4 (768)
	E	18-1/2 (47.0)	25 (635)	31-1/4 (794)	37-1/2 (953)	49-1/2 (1257)
	F	11-7/8 (302)	14-1/4 (362)	18-1/4 (464)	25-1/2 (648)	31-1/2 (800)
	G	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
	H	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
	J	1-1/2 (38)	1-1/2 (38)	1-1/2 (38)	1-1/2 (38)	1-1/2 (38)
	K	13-5/8 (346)	16-1/4 (413)	20-1/4 (514)	28 (711)	33-1/2 (851)
	L	20 (508)	27 (686)	33-1/4 (845)	40 (1016)	51-3/4 (1314)
	M	1/2 (13)	1/2 (13)	1/2 (13)	1/2 (13)	1/2 (13)
	O	5 (127)	5 (127)	5 (127)	5 (127)	5 (127)

GENERAL NOTES

1. All concrete shall be high strength (4000 PSI min.).
2. All concrete shall be fiber reinforced.
3. Steel checker plate shall meet H20 loading.
4. Boxes and lids shall be H20 certified.
5. All boxes shall be Arizona DOT approved.
6. All boxes shall meet the minimum dimensions shown above.
7. All lids shall be galvanized.



31339	Town of Buckeye Standard Details	WATER METER BOXES - TRAFFIC RATED	Revised: 12-31-12	Detail No. 31339



General Notes

1. Plumbing shall not pass between manhole steps
2. All below ground pipe & fittings shall be wrapped w/ 2 layers (50% lap each) of 10 Mil PVC tape.
3. All copper fittings outside of manhole to be bedded in material.
4. Ring & cover adjust to grade.
5. For use adjacent to roadways without curb and gutter.

31 340-1	Town of Buckeye Standard Details	**2" AIR/VACUUM RELEASE VALVE**	Revised: 12-31-12	Detail No. 31340-1

GENERAL NOTES:

1. Swing Joint Assembly:
   Service saddle, double strap;
   2" corp (1) IP x IP
   2" 90° brass ells (1)
   2" brass nipple, 2 1/2" to 6" long

2. 2" Corp. stop IP threads x Pac-Joint per TOB Specs.

3. 2" Type "K" soft copper

4. 2" brass union

5. 2" brass nipple

6. 2" ball curb stop. Locate curb stop on it's side so that it is accessible from MH opening.

7. 2" brass 90° ell

8. Adjustable pipe support ---- Standon Model 589 or approve equal.

9. 2" combination AIR RELEASE VALVE manufactured by ARI or approved equal.

10. 2" 90° ell ---- galvanized steel standard weight

11. 2" galvanized union

12. 2" X 1/2" galvanized tee

13. 1/2" galvanzied drain tube

14. 2" schedule 40 galvanized steel pipe

15. 2" AWWA class B flanges (threaded) with minimum 2 threaded bolts

16. 2" OEM mushroom vent cap or approved equal.

17. 1/2" Check valve

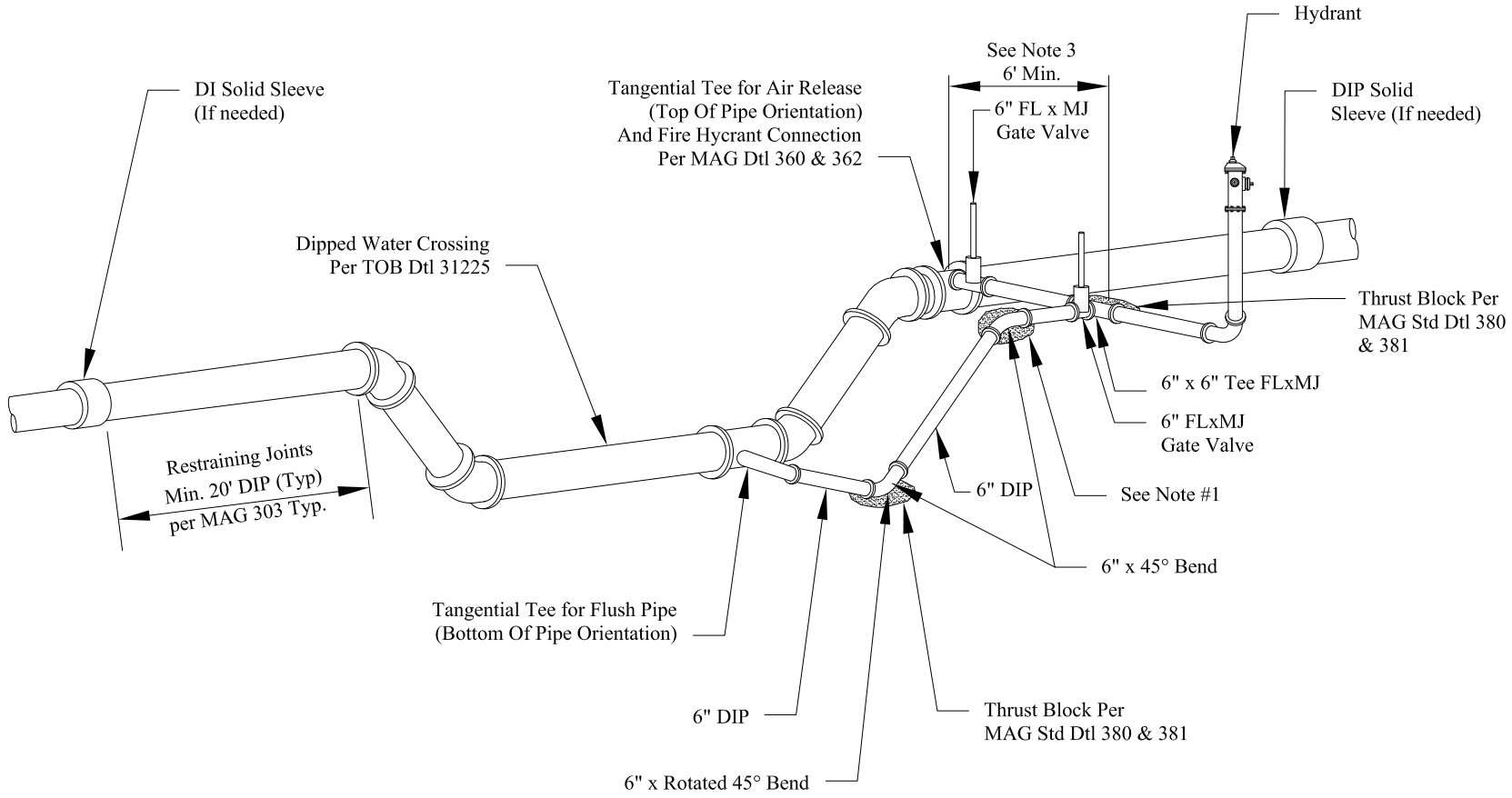
18. Standard Delineator per MUTCD sign OM2-1V set in a 12" x 24" base FACING ONCOMING TRAFFIC (2ea.)

19. Saddle shall be per TOB Detail 31330

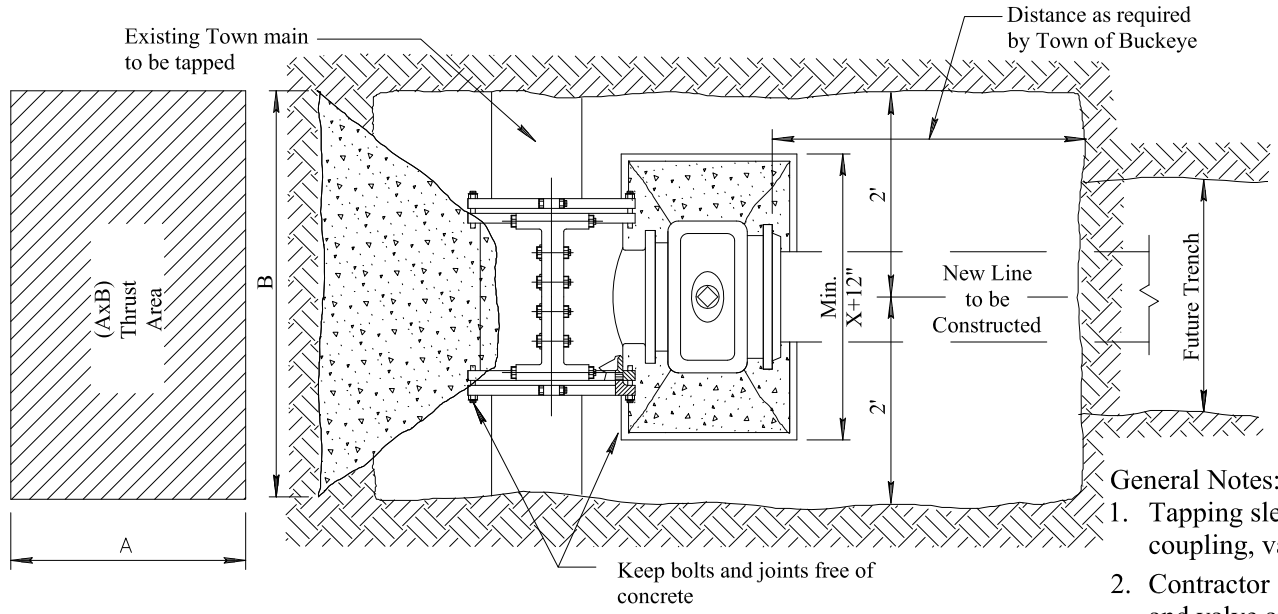
31 340-2	Town of Buckeye Standard Details	**2" AIR/VACUUM RELEASE VALVE NOTES**	Revised: 12-31-12	Detail No. 31340-2

GENERAL NOTES

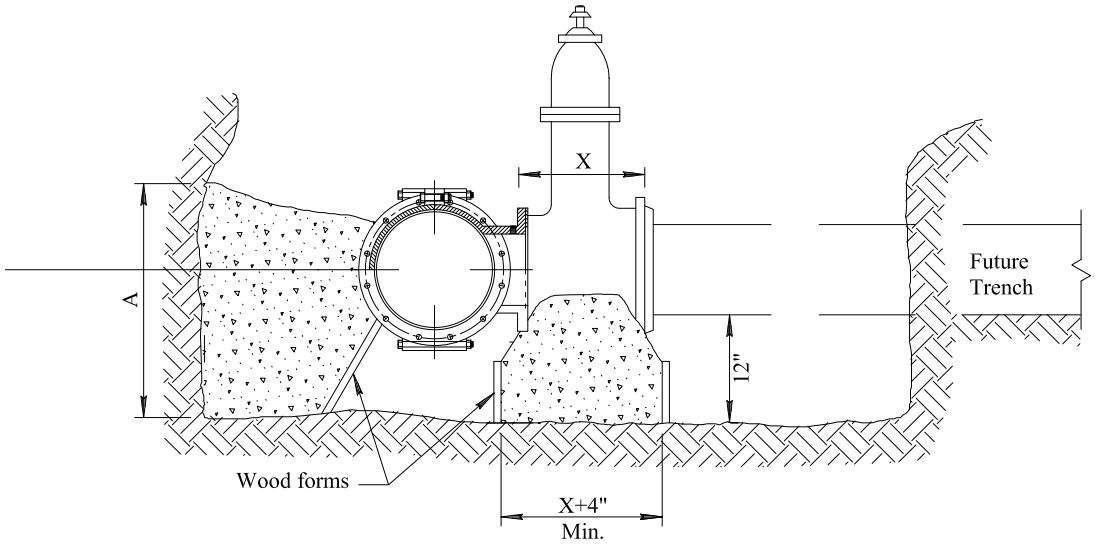
1. Piping system to be restrained per MAG Std Dtl 303-1 and 303-2 for all vertical piping.
2. All piping within the DIP Section shall be Restraining Joint.
3. Ensure water valve is not in curb and gutter or sidewalk.



31342	Town of Buckeye Standard Details	**AIR RELEASE HYDRANT ASSEMBLY WITH FLUSHING PIPE**	Revised: 12-31-12	Detail No. 31342



PLAN



ELEVATION

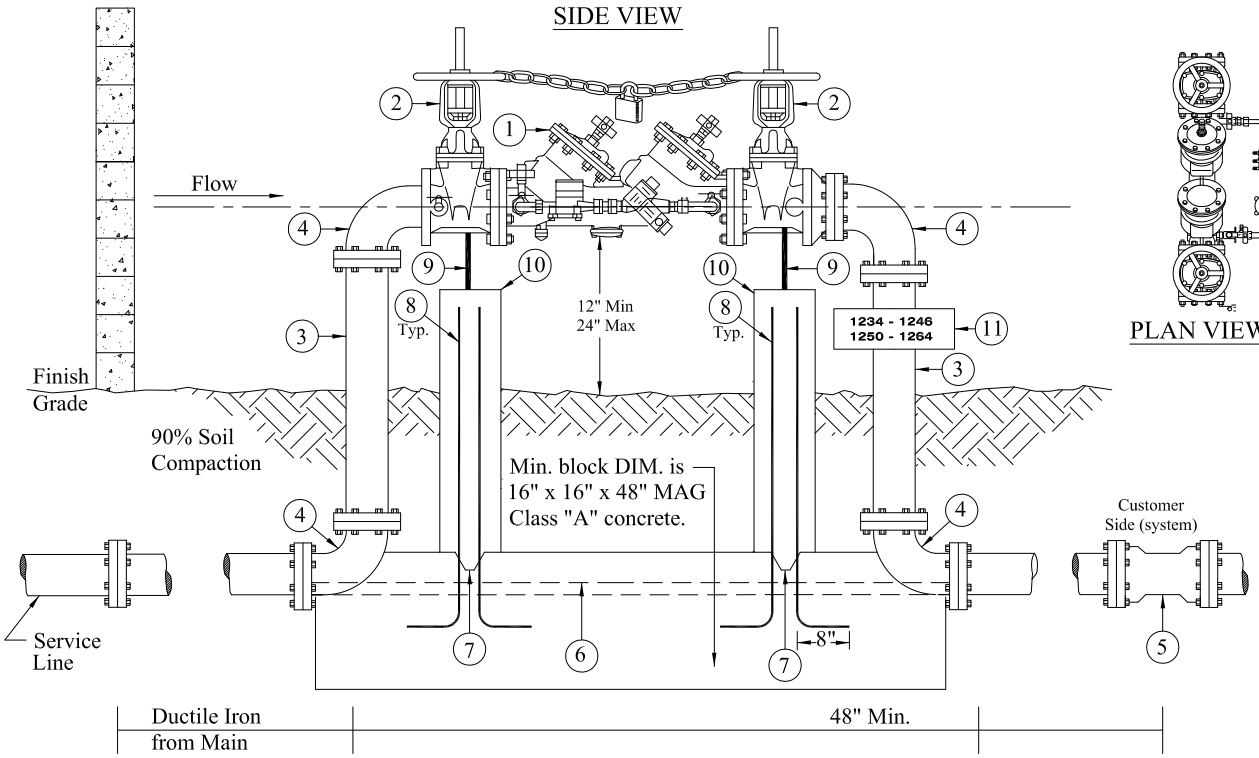
Size of Pipe Being Connected	Minimum Thrust Area Required Equals (AxB) (Square Feet)
4" and less	3
6"	4
8"	6
10"	9
12"	13
16"	23

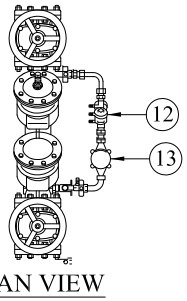
* All tapping sleeves shall be 2 piece ductile iron.

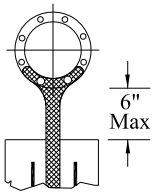
General Notes:

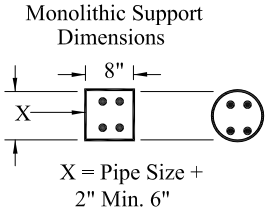
1. Tapping sleeve to be placed a minimum of 18" from any bell coupling, valve, fitting or other obstruction.
2. Contractor shall excavate as shown and shall set tapping sleeve and valve and tighten all bolts prior to the pressure test.
3. All tapping sleeves and valves must be pressure tested prior to blocking or tapping. The test must be witnessed and approved by the inspector.
4. Blocks are to extend to undisturbed ground and be installed before the tap is made. All flange bolts shall be free and clear of concrete.
5. Concrete thrust blocks shall be class 'B' per Sect. 725. Normally, cure time for concrete is 24 hours before backfilling.
6. Taps shall be made by city crews at prevailing rates or by approved contractors when allowed by agency. This detail covers tapping sleeves
7. 4" through 16" in size on ductile iron, cast iron and asbestos cement pipe. Any other size or type of pipe will require a separate submittal and approval by the engineer.
8. Same size taps shall be approved by the Town Engineer.
9. The inspector shall observe the coupon after tap is complete.
10. For pipe 16" and larger the thrust block shall be designed by the engineer.

31344	Town of Buckeye Standard Details	**TAPPING SLEEVES**	Revised: 12-31-12	Detail No. 31344









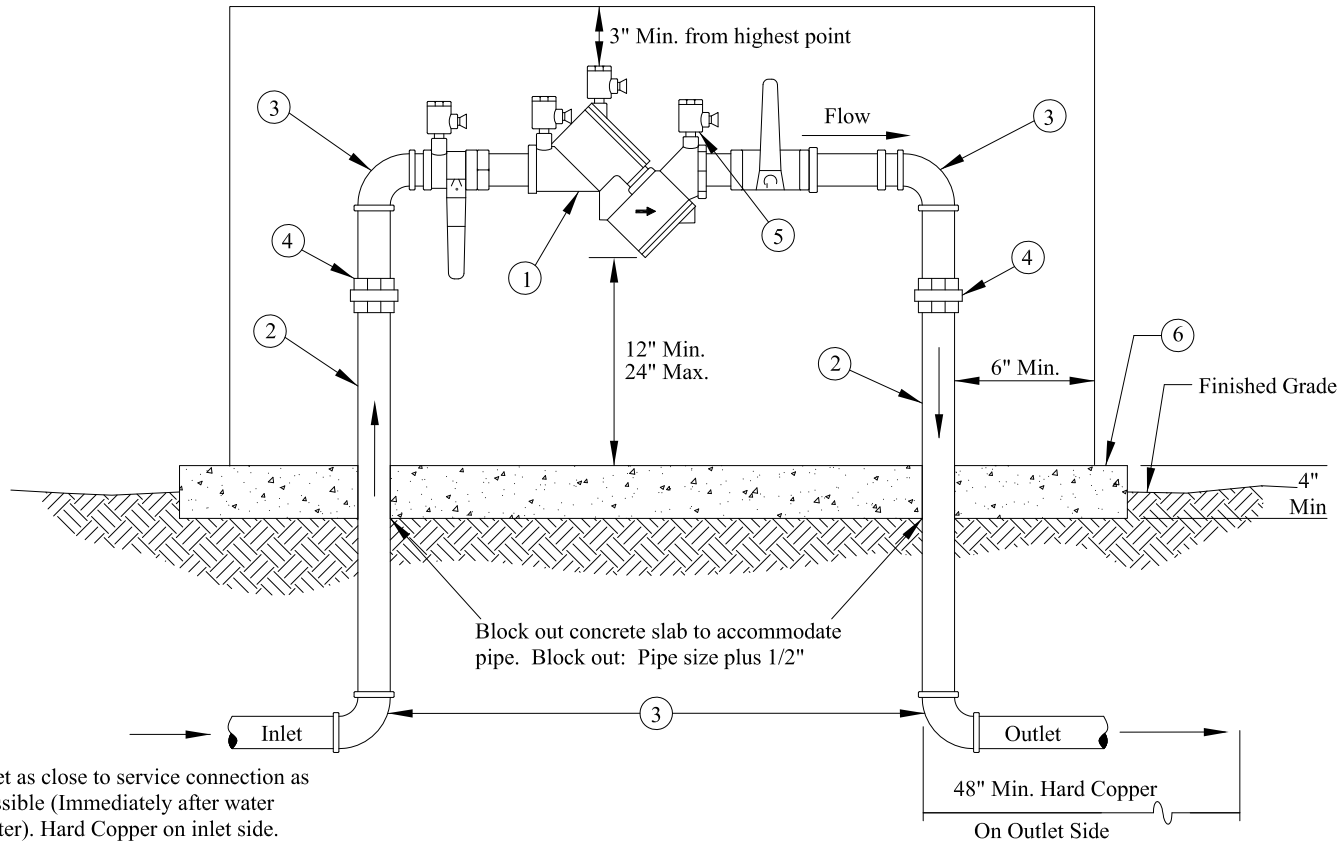
LIST OF MATERIALS

1. Approved double check valve backflow prevention assembly.
2. Resilient seated OS & Y gate valve.
3. Pipe spool. (Flanged D.I.P.)
4. 90° elbow. (Flanged D.I.P.)
5. Ductile iron solid sleeve (where required).
6. 3/4" Zinc coated threaded rod, bolted to flanges, four minimum, equally spaced. (5/8" Rods on 3" & 4" sizes)
7. Construction joint key to be 1-3/4" x 2-1/2".
8. #6 reinforcing steel, deformed bar, 4" apart, evenly spaced; 2" apart for 6" supports.
9. Adjustable pipe support permanently attached to base with minimum 1" adjusting rod.
10. Square or round monolythic castin place concrete column, minimum MAG Class "A" concrete.
11. TOB signage per TOB Std. Dtl. 31456.
12. 3/4" reduced pressure backflow per Town Requirements.
13. 3/4" meter to be supplied by the Town. Contact TOB Water Resources.

NOTES

1. Double check detector assembly with bypass meter shall be UL listed or FM approved for fire protection use and shall be as approved by U.S.C. foundation for cross-connection control and hydraulic research. This assembly is to be used for pollution hazards only as recommended in the AWWA-M14 MANUAL.
2. All piping, valves, fittings and appurtenances downstream of the service line side O.S.& Y. valve shall be approved for fire protection use and installed per N.F.P.A. #24.
3. For backflow preventers requiring guard posts See Detail 31359. Backflow preventers enclosed by screening shall maintain a 24" clearance around assembly.
4. Valve Hand wheels shall be secured with chain and lock.
5. Assemblies shall be painted tenemec desert sands or TOB approved equal. Do not paint name tags or brass parts.
6. Call for underground inspection before backfilling trench.
7. Bypass meters are required on unmetered lines.
8. Backflow assemblies shall be tested by a certified tester recognized by the Town.
9. Screenwalls and landscaping shall be no closer than 24" to the assembly.
10. Test cocks w/t Brass Plugs or adaptors w/t caps installed

31350	Town of Buckeye Standard Details	DOUBLE CHECK VALVE ASSEMBLY W/ BYPASS METER, 3" TO 10"	Revised: 12-31-12	Detail No. 31350

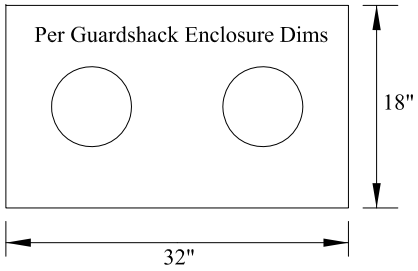


GENERAL NOTES

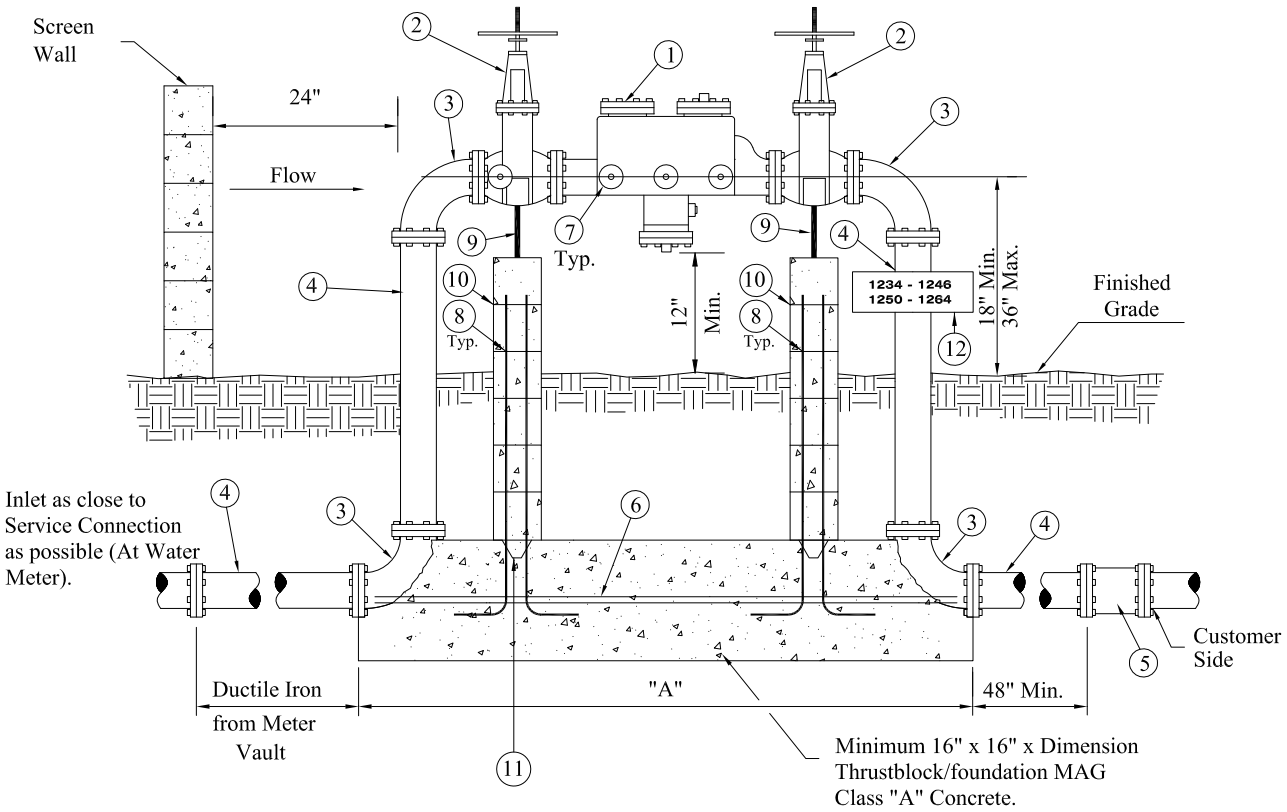
1. Backflow assemblies shall be tested for proper operation per the TOB requirements. All testing shall be performed by a certified tester recognized by the Town.
2. Copper fittings shall be connected with lead free solder joints.
3. Finished grade underneath the backflow preventer shall be at 95% compaction.
4. All nipples to be copper or brass.
5. Inlet / Outlet piping must be type "L" hard copper.
6. Call for underground inspection before backfilling trench.
7. Vertical installations of assemblies on fire sprinkler systems are allowed using assemblies approved for use in the vertical position on fire systems.
8. Approved backflow assemblies shall have a Seal of Approval from the American Society of Sanitation Engineers. Backflow assemblies installed on fire supression systems must also have approval from Underwriters Laboratories and/or Factory Mutual Research Corporation.

LIST OF MATERIALS

(1) Approved double check valve backflow prevention assembly, (2) ball valves included.
(2) Type "L" hard copper, 3/4" thru 2-1/2".
(3) 90° ell, hard copper, 3/4" thru 2-1/2" sweated fitting.
(4) Pipe union, brass or copper.
(5) Test cocks with brass plugs or adaptors with caps installed. (4 Required)
(6) Install 4" concrete pad , enclosures and hardware. Enclosures shall be "Guardshack, GS-M1" or approved equal (Minimum pad DIM 32" x 18" x 4" - L x W x Thickness).



31351	Town of Buckeye Standard Details	DOUBLE CHECK VALVE ASSEMBLY, 3/4" THROUGH 2-1/2"	Revised: 12-31-12	Detail No. 31351



LIST OF MATERIALS

① Approved reduced pressure principle backflow prevention assembly.

② Resilient seated gate valve. O.S. & Y. (fire line connection). N.R.S. (non fire line).

③ 90° elbow flanged D.I.P. 3" thru 10", may be used on underground joints.

④ Pipe spool. flanged D.I.P. 3" thru 10", mega lug or approved equal may be used on underground joints.

⑤ Restrained ductile iron solid sleeves.

⑥ 3/4" zinc coated threaded rod, (5/8" rod on 3" to 4" sizes), bolt to flanges as shown, typical both sides.

⑦ Test cocks with brass plugs or adaptors with caps installed. (4 required).

⑧ #6 reinforcing steel, deformed bar, 4" apart, evenly spaced; 2" apart for 6" supports.

⑨ Adjustable pipe support permanently attached to base with minimum 1" adjusting rod.

⑩ Square or round monolythic cast in place concrete column, minimum MAG Class "A" concrete.

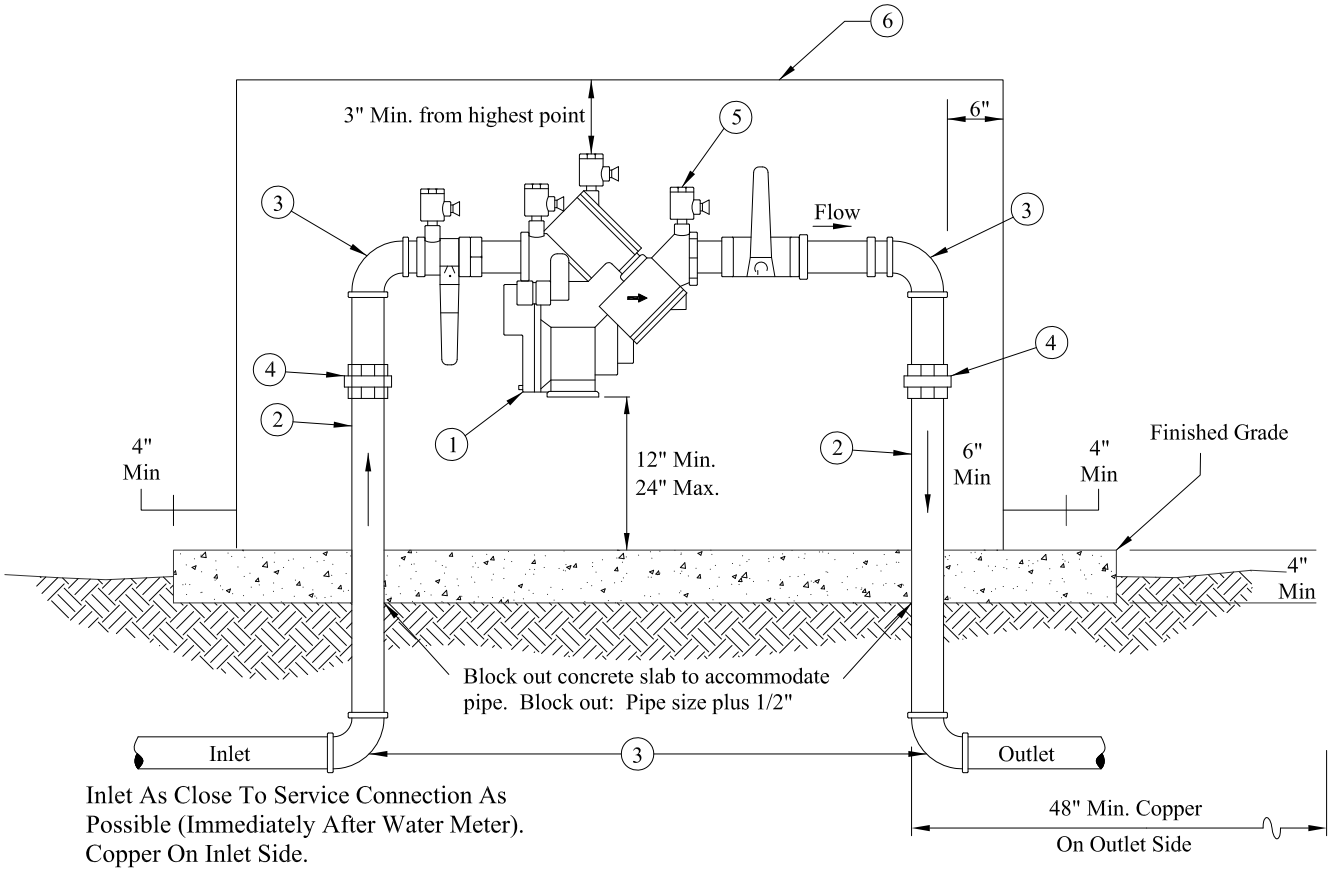
⑪ Construction joint key to be 1-3/4" x 2-1/2".

⑫ TOB signage per TOB Std. Dtl. 31456.

GENERAL NOTES

1. Backflow assemblies shall be tested for proper operation per the TOB requirements. All testing shall be performed by a certified tester recognized by the Town.
2. Backflow preventers shall be painted tenemec desert sands or TOB approved equal. Do not paint the name plate or any brass parts on the assembly.
3. For backflow preventers requiring guard posts see Detail 31359. Backflow preventers enclosed by screening shall maintain a 24" clearance around the assembly.
4. Finished grade underneath the backflow preventer shall be at 95% compaction.
5. Backflow preventers on fire lines may require tamper switches on the shut off valves. Contact TOB Building, or Fire Department for more information on switches.
6. Call for underground inspection before backfilling trench.
7. Approved backflow assemblies shall have a Seal of Approval from the American Society of Sanitation Engineers. Backflow assemblies installed on fire supression systems must also have approval from Underwriters Laboratories and/or Factory Mutual Research Corporation.

31352	Town of Buckeye Standard Details	REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY, 3" THROUGH 10"	Revised: 12-31-12	Detail No. 31352



GENERAL NOTES

1. Backflow assemblies shall be tested for proper operation per the TOB requirements. All testing shall be performed by a certified tester recognized by the Town.
2. Copper fittings shall be connected with lead free solder joints.
3. Finished grade underneath the backflow preventer shall be at 95% compaction.
4. All nipples to be copper or brass.
5. Piping under the Town right of way must be type "K" copper.
6. Call for underground inspection before backfilling trench.
7. Approved backflow assemblies shall have a Seal of Approval from the American Society of Sanitization Engineers. Backflow assemblies installed on fire suppression systems must also have approval from Underwriters Laboratories and/or Factory Mutual Research Corporation..

LIST OF MATERIALS

① Approved reduced pressure principle backflow prevention assembly, (2) ball valves included.

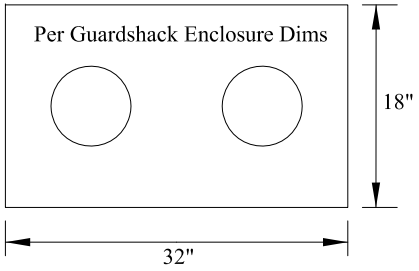
② Pipe spool, type "L" hard copper, 3/4" thru 2 1/2".

③ 90° ell, copper, 3/4" thru 2 1/2" sweated fittings.

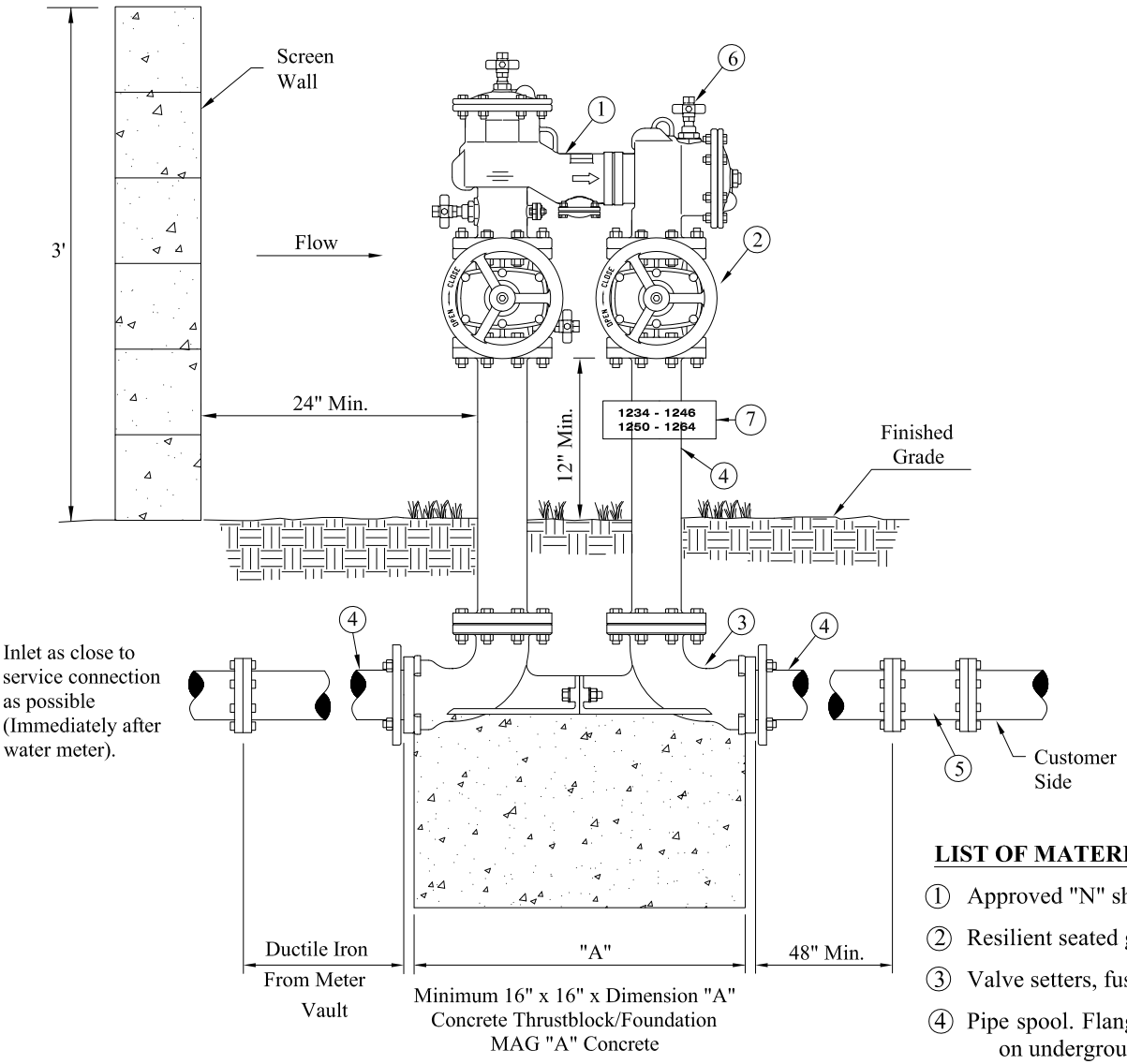
④ Pipe union, brass or copper.

⑤ Test cocks with brass plugs or adaptors with caps installed (Four (4) required)

⑥ Install 4" concrete pad, enclosure and hardware. Enclosure shall be "Guardshack, GS-M1" or approved equal (Min pad DIM - 32" x 18" x 4" - L x W x Thickness).



31353	Town of Buckeye Standard Details	**REDUCED PRESSURE PRINCIPLE BACKFLOW ASSEMBLY, 3/4" THROUGH 2-1/2"**	Revised: 12-31-12	Detail No. 31353



GENERAL NOTES

1. Backflow assemblies shall be tested for proper operation per the TOB requirements. All testing shall be performed by a certified tester that is recognized by the Town.
2. Backflow preventers shall be painted Tenemec Desert Sands or TOB Approved Equal. Do not paint the name plate or any brass parts on the assembly.
3. For backflow preventers requiring guard posts see Detail 31359. Backflow preventers enclosed by screening shall maintain a 24 inch clearance around the assembly.
4. Finished grade underneath the backflow preventer shall be at 95% compaction.
5. Backflow preventers on fire lines may require tamper switches on the shut off valves. Contact Town Of Buckeye Building or Fire Deptartments for more information on switches.
6. Call for underground inspection before backfilling trench.
7. Approved backflow assemblies shall have a Seal of Approval from the American Society of Sanitation Engineers. Backflow assemblies installed on fire suppression systems must also have approval from Underwriters Laboratories and/or Factory Mutual Research Corporation.

LIST OF MATERIALS

① Approved "N" shape double check valve backflow prevention assembly.

② Resilient seated gate valve. O.S. & Y. (fire line connection) N.R.S. (non fire line)

③ Valve setters, fusion epoxy coated ductile iron, plated nuts and bolts. (2 required)

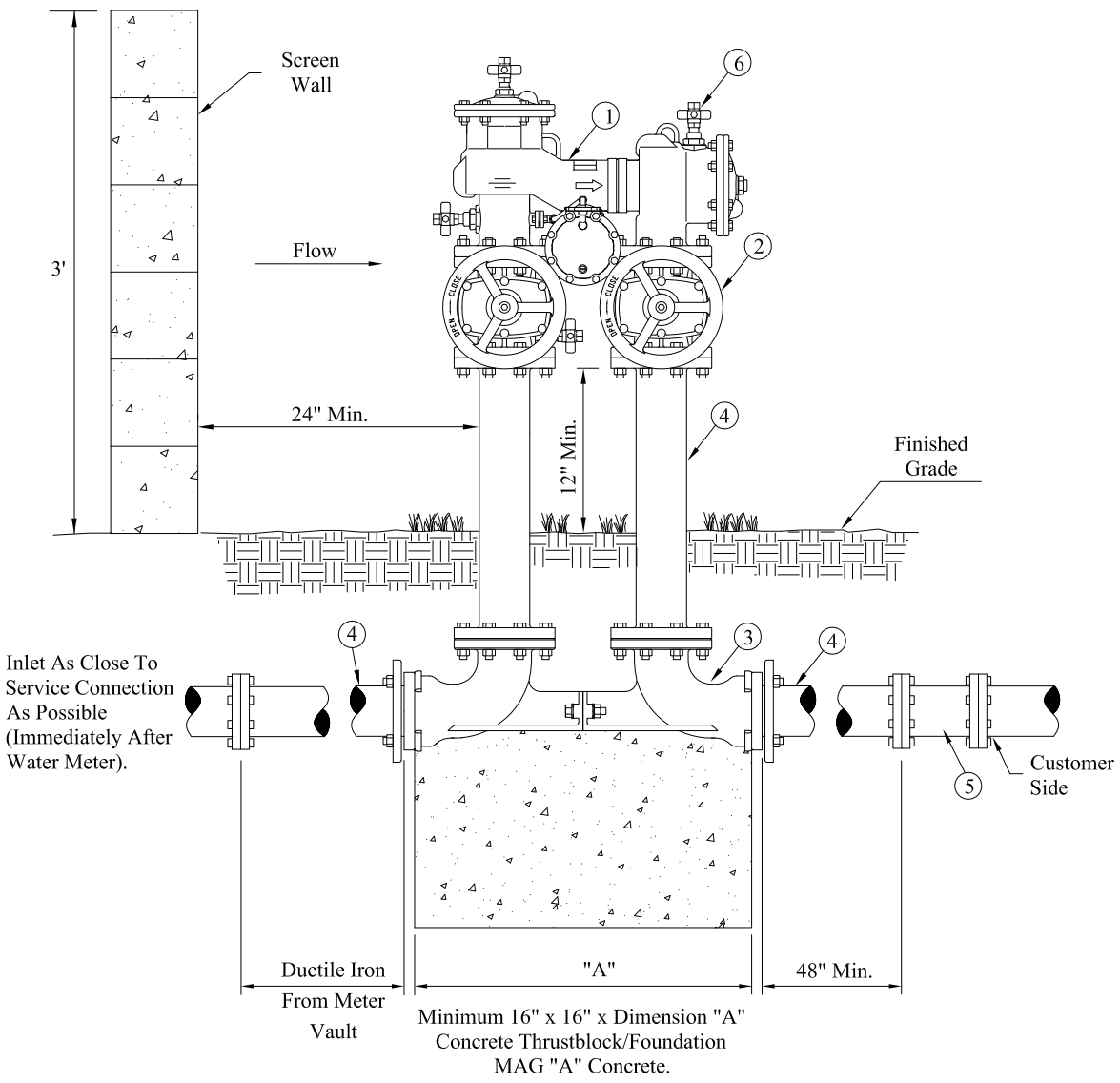
④ Pipe spool. Flanged D.I.P. 3" thru 10", Mega Lug or approved equal may be used on underground joints.

⑤ D.I.P. solid sleeve.

⑥ Test cocks with brass plugs or adaptors with caps installed. (4 required)

⑦ TOB signage per TOB Std. Dtl. 31456.

31354	Town of Buckeye Standard Details	"N" SHAPED DOUBLE CHECK VALVE ASSMEBLY, 3" THROUGH 10"	Revised: 12-31-12	Detail No. 31354



GENERAL NOTES

1. Backflow assemblies shall be tested for proper operation per the TOB requirements. All testing shall be performed by a certified tester recognized by the Town.
2. Backflow preventers shall be painted light tan or a color to match the building. Do not paint the name plate or any brass parts on the assembly.
3. For backflow preventers requiring guard posts see Detail 31359. Backflow preventers enclosed by screening shall maintain a 24 inch clearance around the assembly.
4. Finished grade underneath the backflow preventer shall be at 95% compaction.
5. Backflow preventers on fire lines may require tamper switches on the shut off valves. Contact TOB Building Dept. and Fire Dept.
6. Call for underground inspection before backfilling trench.
7. Approved backflow assemblies shall have Seal of Approval from the American Society of Sanitation Engineers. Backflow assemblies installed on fire suppression systems must also have approval from Underwriters Laboratories and/or Factory Mutual Research Corporation.

LIST OF MATERIALS

① Approved "N" shape reduced pressure principle backflow prevention assembly.

② Resilient seated gate valve. O.S. & Y. (fire line connection) N.R.S. (non fire line)

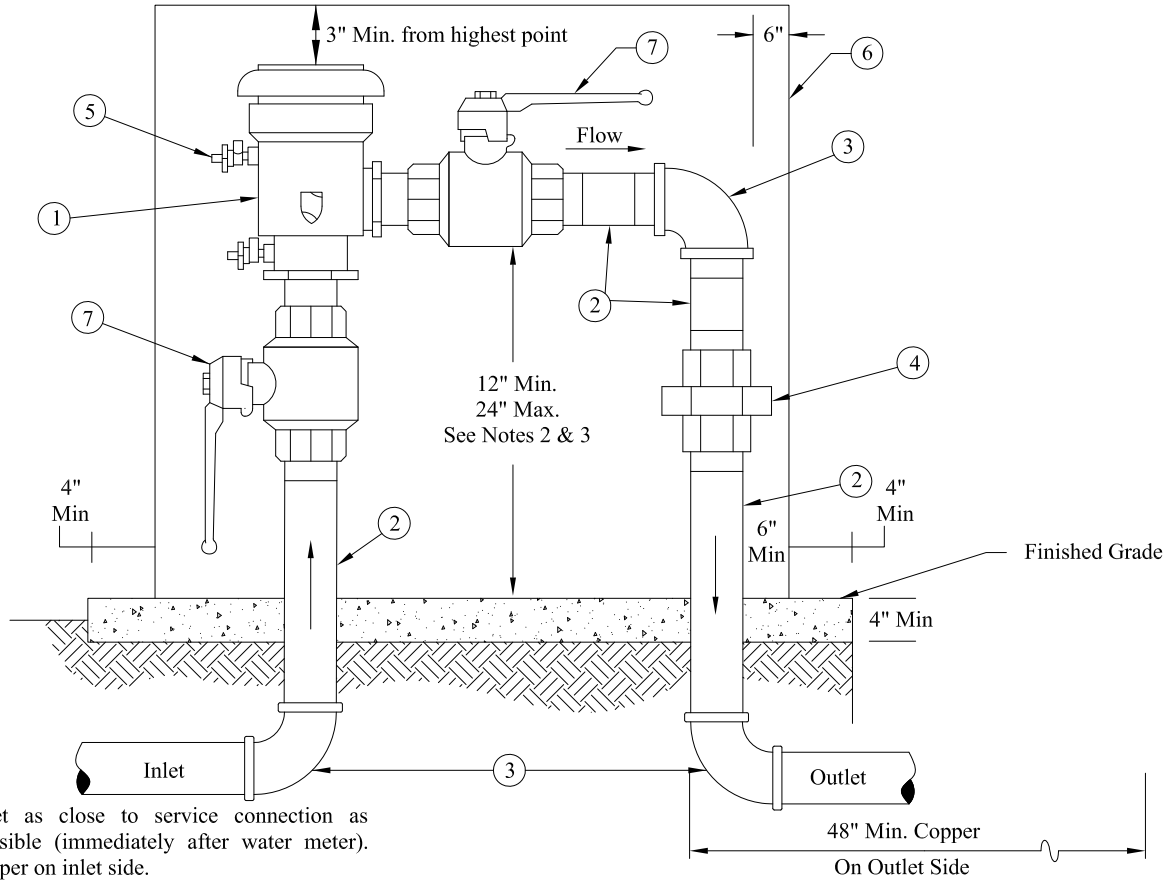
③ Valve setters, fusion epoxy coated ductile iron, plated nuts and bolts. (2 required)

④ Pipe spool. Flanged D.I.P. 3" thru 10", Mega Lug or approved equal may be used on underground joints.

⑤ Dip solid sleeve.

⑥ Test cocks with brass plugs or adaptors with caps installed. (4 required)

31355	Town of Buckeye Standard Details	"N" SHAPED DOUBLE CHECK VALVE ASSEMBLY, 3/4" THROUGH 2-1/2"	Revised: 12-31-12	Detail No. 31355



Inlet as close to service connection as possible (immediately after water meter). copper on inlet side.

LIST OF MATERIALS

(1) Approved pressure vacuum breaker assembly.

(2) Type "L" hard copper, 1/2" thru 2".

(3) 90° ell, copper, 1/2" thru 2" sweated fittings.

(4) Pipe union, brass or copper.

(5) Test cocks with brass plugs or adaptors with caps installed. (2 required)

(6) Install 4" MAG "A" concrete pad, enclosure and hardware. Enclosure shall be "Guard Shack GS-M1" or approved equal (TOB Detail 31358).

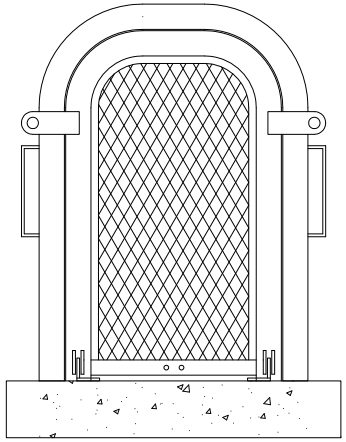
(7) (2) ball valves included.

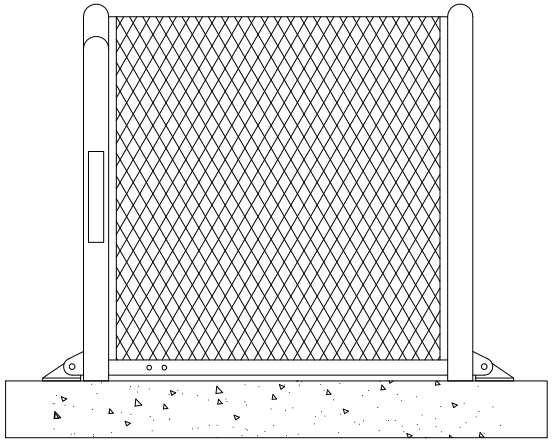
GENERAL NOTES

1. Backflow assemblies shall be tested for proper operation per the TOB requirements. All testing shall be performed by a certified tester recognized by the Town.
2. Pressure vacuum breakers must be installed at least 12" above all downstream piping.
3. If this distance exceeds 24", a reduced pressure principle backflow prevention assembly must be utilized.
4. Copper fittings shall be connected with lead free solder joints.
5. Finished grade underneath the backflow preventer shall be at 95% compaction.
6. All nipples to be copper or brass.
7. Piping under the Town right of way must be type "K" copper.
8. Call for underground inspection before backfilling trench.
9. Approved backflow assemblies shall have a Seal of Approval from the American Society of Sanitization Engineers. Backflow assemblies installed on fire suppression systems must also have approval from Underwriters Laboratories and/or Factory Mutual Research Corporation.
10. Block out concrete slab to accommodate pipe. Block out: Pipe size plus 1/2"

31356	Town of Buckeye Standard Details	**PRESSURE VACUUM BREAKER ASSEMBLY, 1/2" THROUGH 2" ASSEMBLIES**	Revised: 12-31-12	Detail No. 31356

STANDARD GUARDSHACK™ ENCLOSURES





STANDARD GUARDSHACK™ AND COAST GUARDSHACK™ SIZES INTERNAL DIMENSIONS

GS - M1	**16” W x 37” H x 18” L HINGED W/ GATE**
GS - M2	**16” W x 48” H x 18” L HINGED W/ GATE**
GS - NP1	**24” W x 40” H x 31” L HINGED W/ GATE**
GS - NP1.5	**24” W x 40” H x 38” L HINGED W/ GATE**
GS - NP2	**30” W x 48” H x 47” L HINGED W/ GATE**
GS - NP3	**38” W x 60” H x 47” L HINGED W/ GATE**
GS - NP3.5	**38” W x 60” H x 58” L HINGED W/ GATE**

For 304 S. S. , order as CGS using same model #

GUARDSHACK™ GENERAL SPECIFICATIONS

- All pipe shall be 1 ¼" schedule 40 A.S.T.M. A-53 Grade A- Electric Weld pipe.
- Angle Iron shall be 1" x 1" x ⅛" steel.
- Stainless steel units shall be 1 ¼" schedule 10 A.S.T. M. A-312 304 S.S.
- Expanded metal shall be ½" spacing x # 13 Ga. flattened diamond pattern steel.
- Stainless steel units shall be ½" spacing x # 13 Ga. flattened expanded metal diamond pattern type 304 S.S.
- All stainless steel expanded metal shall be sandblasted prior to fabrication to remove burrs, flashing and sharp edges.
- There shall be no exposed ends of expanded metal on the outside of the enclosure.
- Welding shall be a minimum of ¼" long welds on 4" spacing.
- Standard mounting brackets shall be welded on each end of lift off enclosures.
- One bracket on hinged units shall be welded on end opposite hinges.
- Hardware kits provided for mounting enclosures.
- On 304 S.S. units, all hinges, exposed hardware, and brackets shall be 304 S.S.
- All hardware shall be securely attached to enclosures.
- All enclosures shall withstand a minimum of 200 lbs. per square foot without any permanent deflection or distortion.
- 3/8” spacing between angle iron framework of enclosure and slab to prevent rusting. Only pipe ends to touch slab.

POWDERCOATED UNITS

Pre-powdercoat Treatment Process

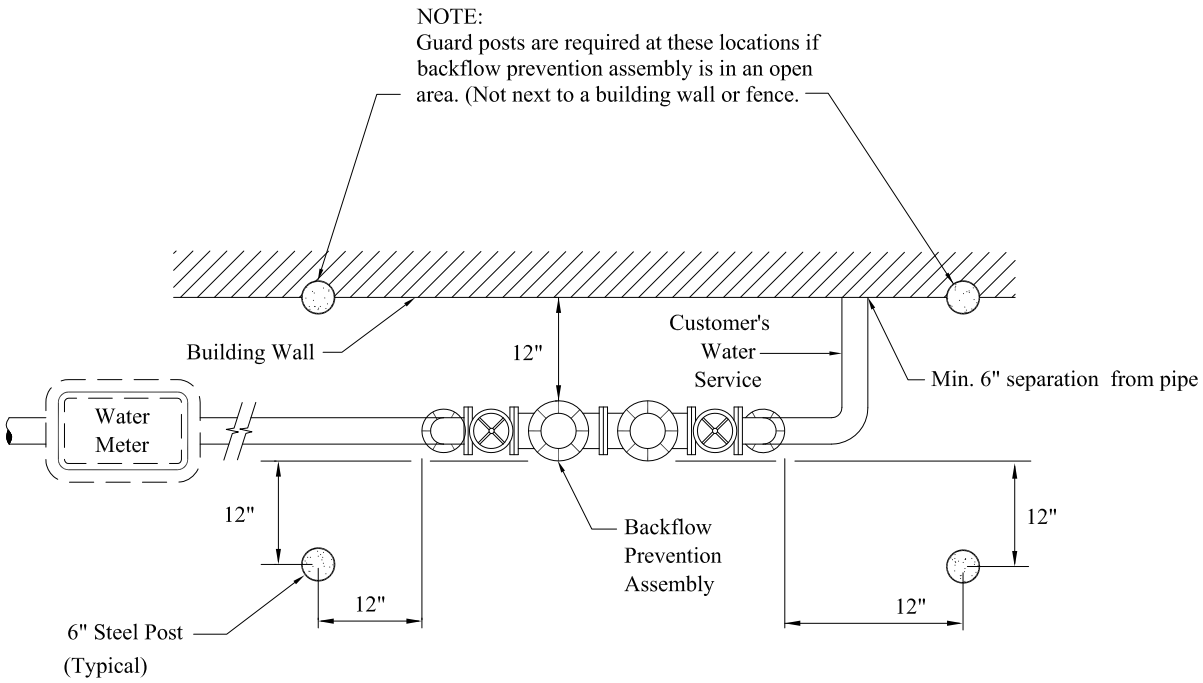
Clean GuardShack™ unit with a S-44 alkaline cleaner, overflow rinse, apply an AC-8115 iron phosphate treatment, overflow rinse and finish with a #198 sealer rinse to prevent rusting and improve adhesion.

Powdercoat Treatment Process

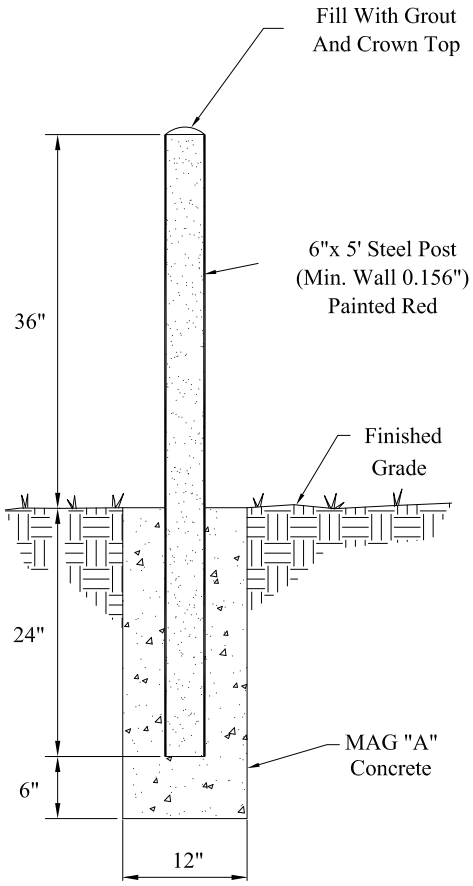
Units shall be preheated and coated by electrostatic application of 2.0 to 3.5 mil thickness on all surfaces. Powder shall be RAL 1019 Woodlands Tan or TCI 8810-6058 Forest Green or approved equal Impact Resistance Finish 160 inch pounds direct 160 inch pounds reverse, per ASTM D-2794 specs. Gloss Finish >85, per ASTM D-523. Adhesion to be rated excellent when tested to ASTM D-3359 standards.

STAINLESS STEEL ELECTRO-POLISH FINISH

All 304 Stainless Steel units shall be chemically electro-polished to impart a lustrous finish to the unit.



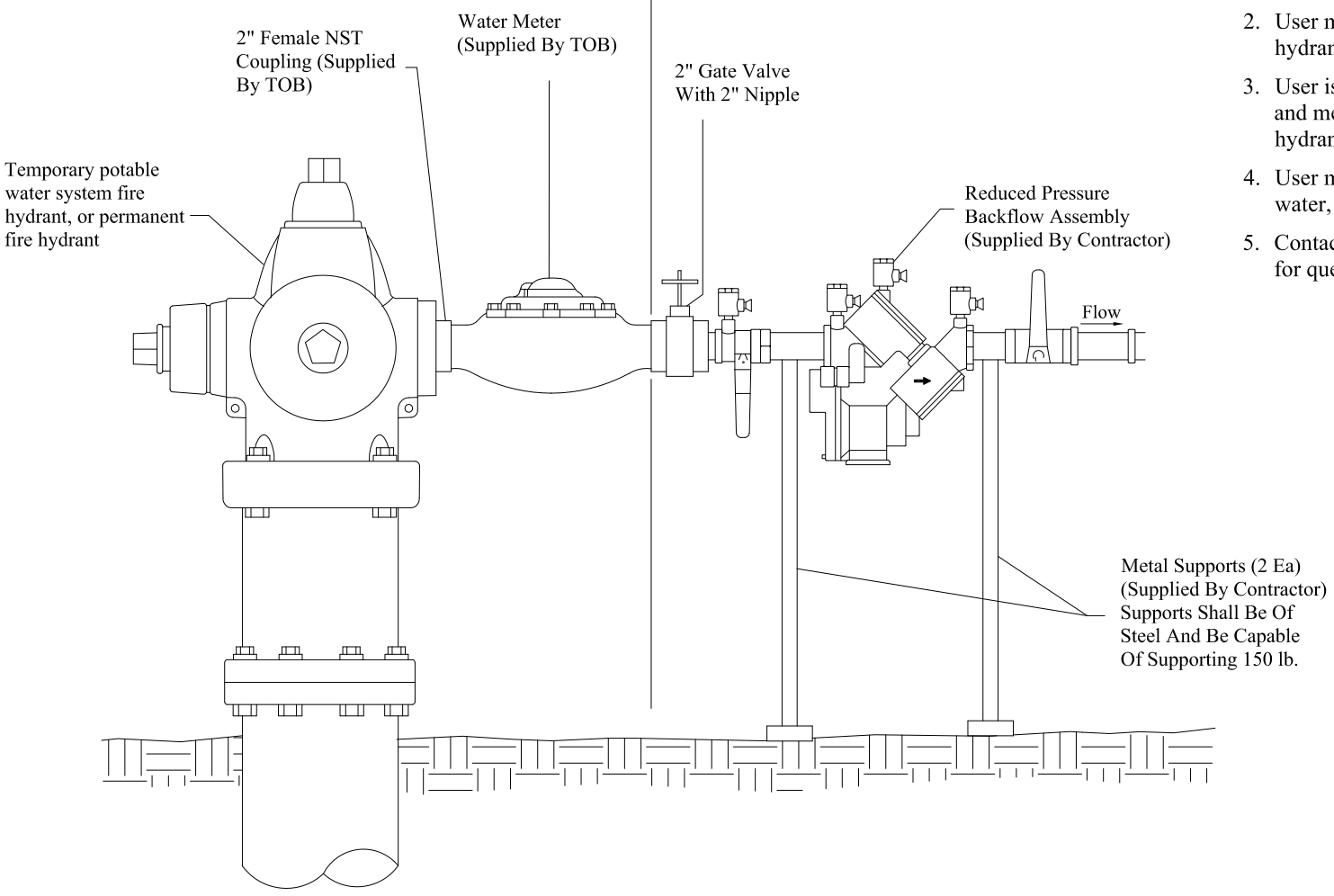
PLAN VIEW



GUARD POST SECTION

31359	Town of Buckeye Standard Details	**GUARD POSTS FOR BACKFLOW PREVENTION ASSEMBLIES**	Revised: 12-31-12	Detail No. 31359

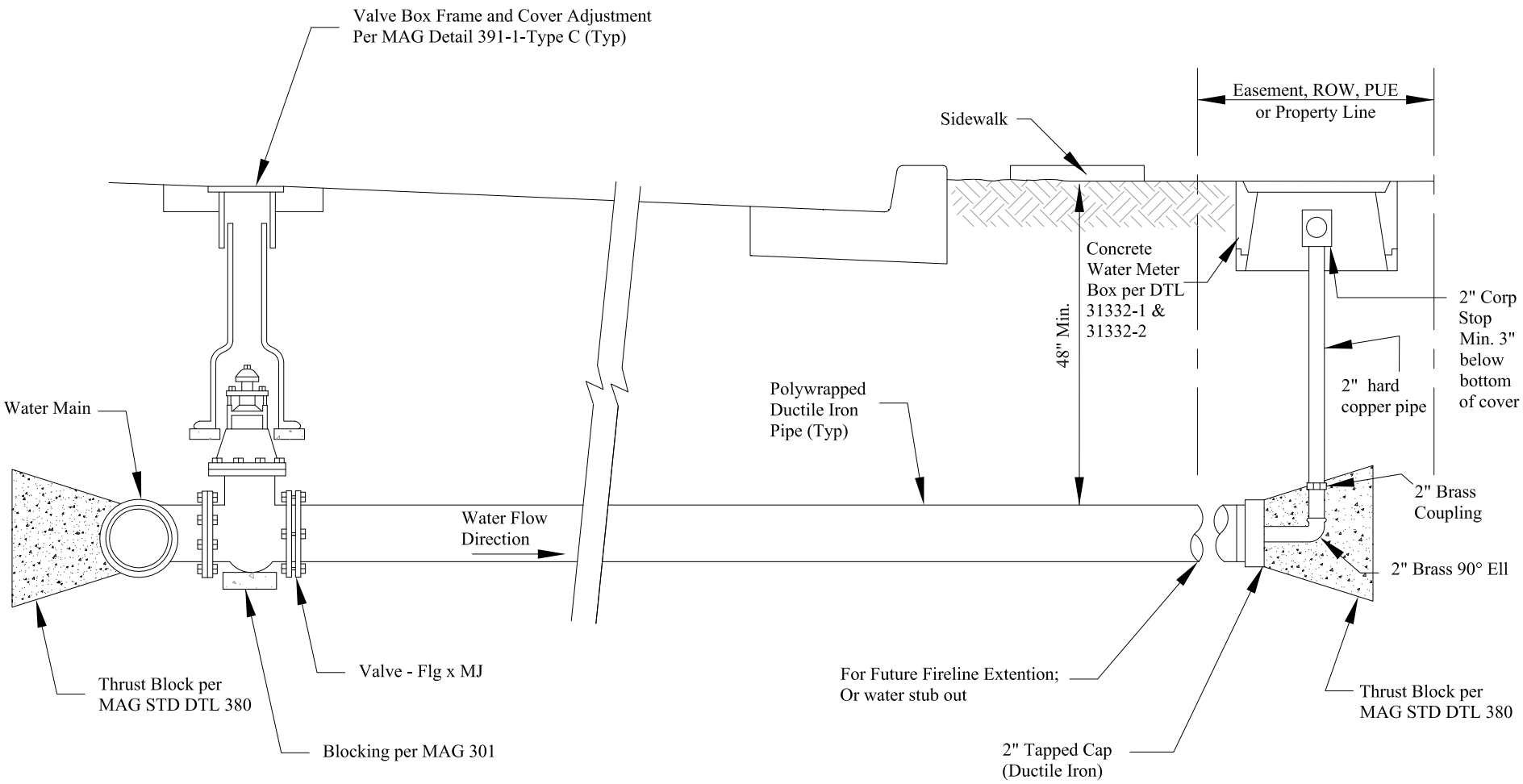
TOWN SUPPLIED | **CONTRACTOR SUPPLIED**



GENERAL NOTES:

1. Backflow assemblies shall be tested for proper operation per the TOB requirements. All testing shall be performed by a certified tester recognized by the Town.
2. User must remove backflow assembly when hydrant meter is removed or relocated.
3. User is liable for any damage to the hydrant and meter including all attachments to the hydrant.
4. User must use gate valve to control flow of water, not the hydrant valve assembly.
5. Contact TOB Building, or Fire Department for questions.

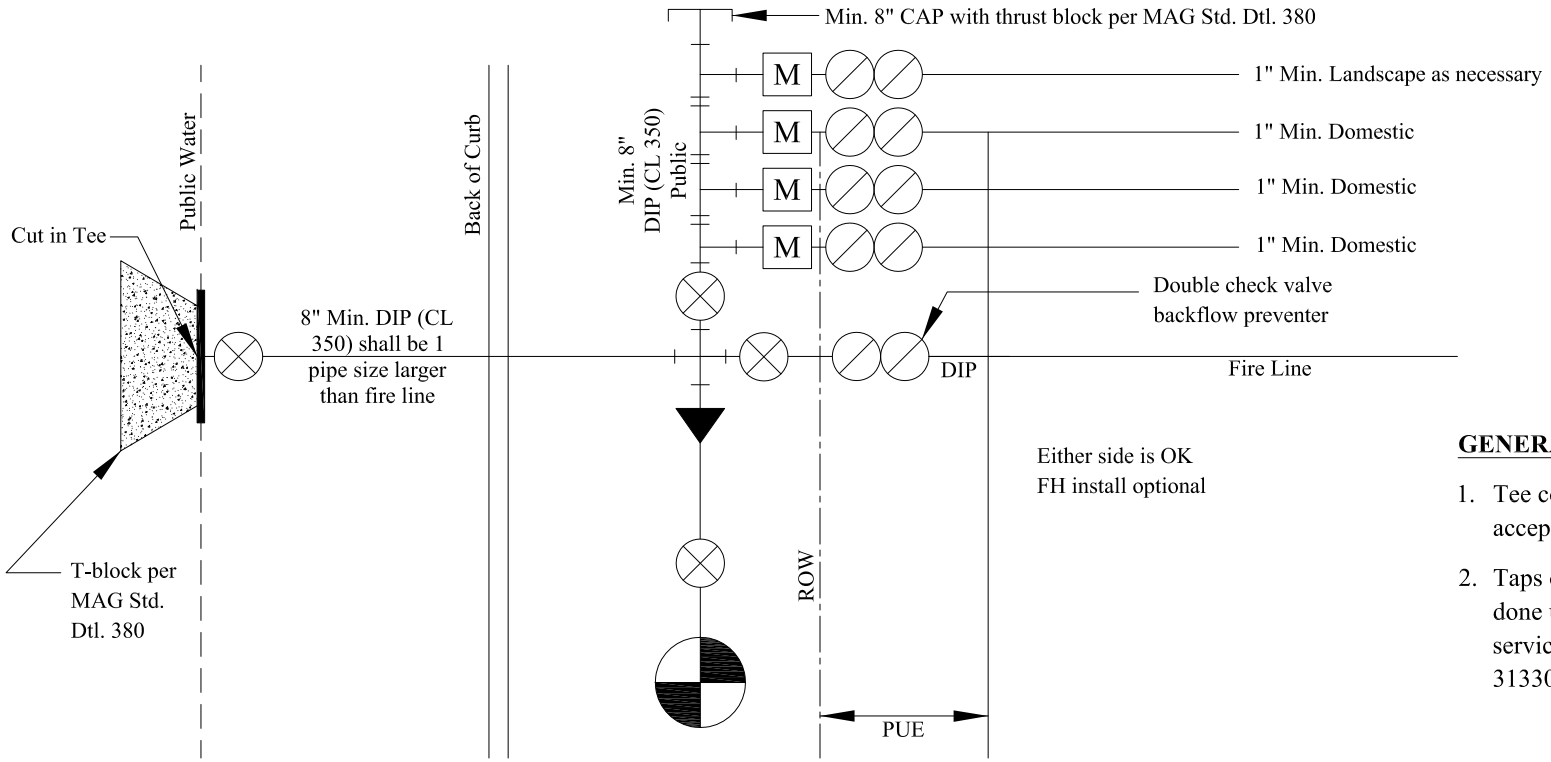
31364	Town of Buckeye Standard Details	**HYDRANT METER ASSEMBLY**	Revised: 12-31-12	Detail No. 31364



GENERAL NOTES

1. All water lines within the rights-of-way or public utility easement shall be polywrapped ductile iron pipe.
2. Joint restraint shall conform to the requirements of MAG Std. Detail 303-1 and 303-2.

31368	Town of Buckeye Standard Details	**WATER STUB-OUT**	Revised: 12-31-12	Detail No. 31368



GENERAL NOTES

1. Tee configuration is also acceptable.
2. Taps off of the public main shall be done using a double strap bronze service saddle per TOB Detail 31330.

= Min. 8" x 8" cross

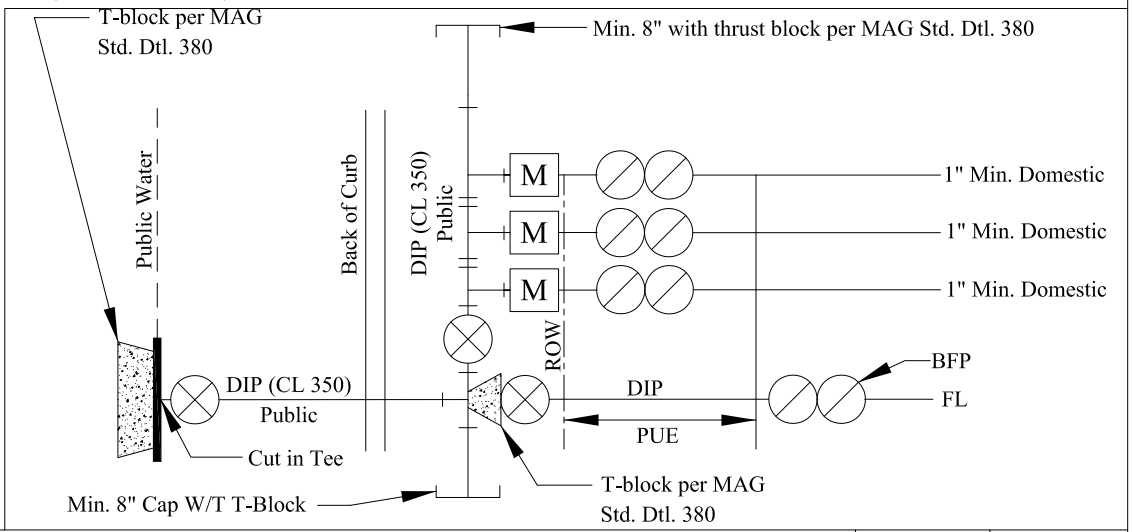
= Valve

= Min. 8" x 6" reducer

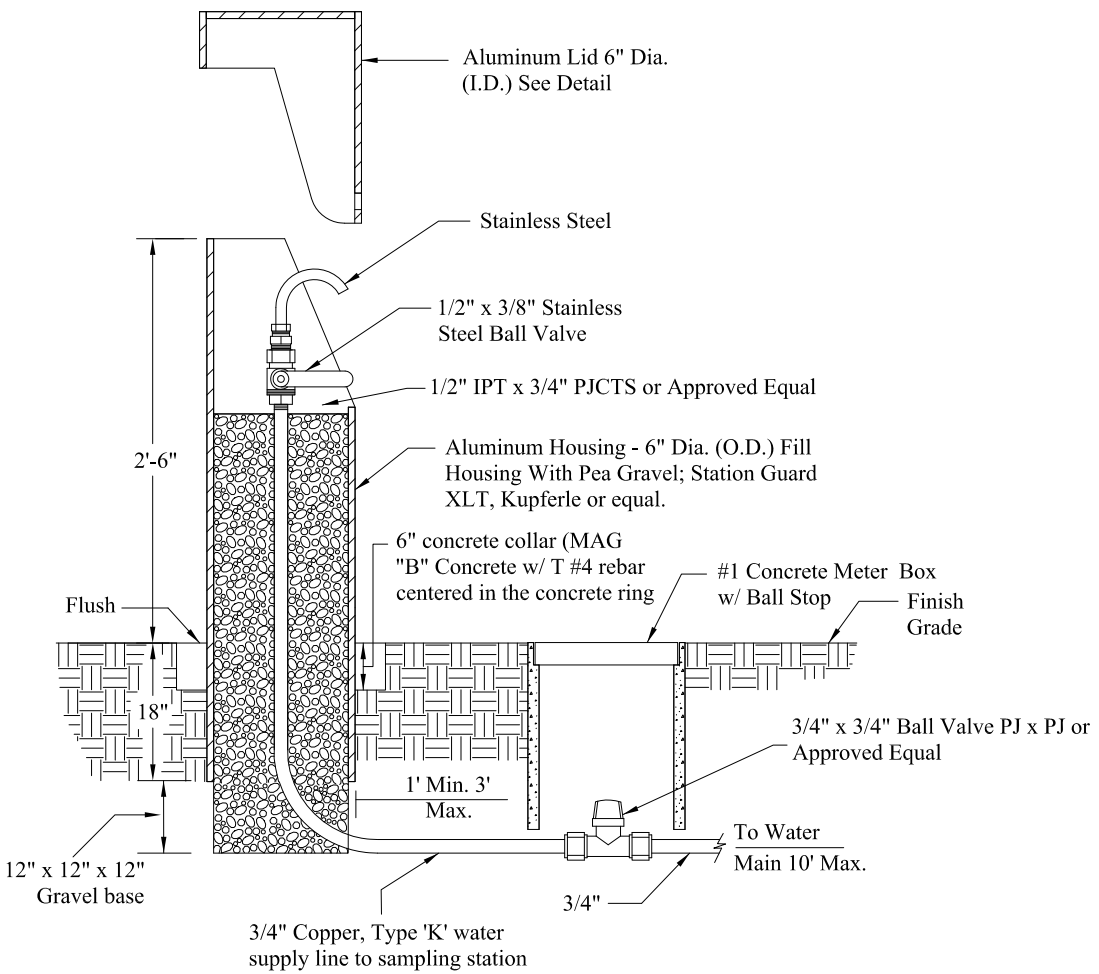
M = Water Meter

= Backflow preventer

= Fire hydrant per MAG/TOB Standards

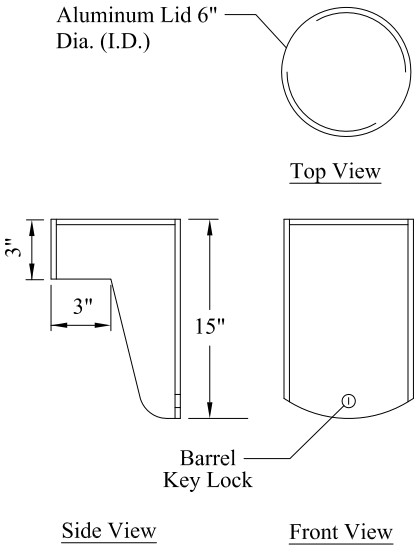


31370	Town of Buckeye Standard Details	COMMERCIAL "T" MAIN	Revised: 12-31-12	Detail No. 31370



TYPICAL INSTALLATION

N.T.S.



LID DETAILS

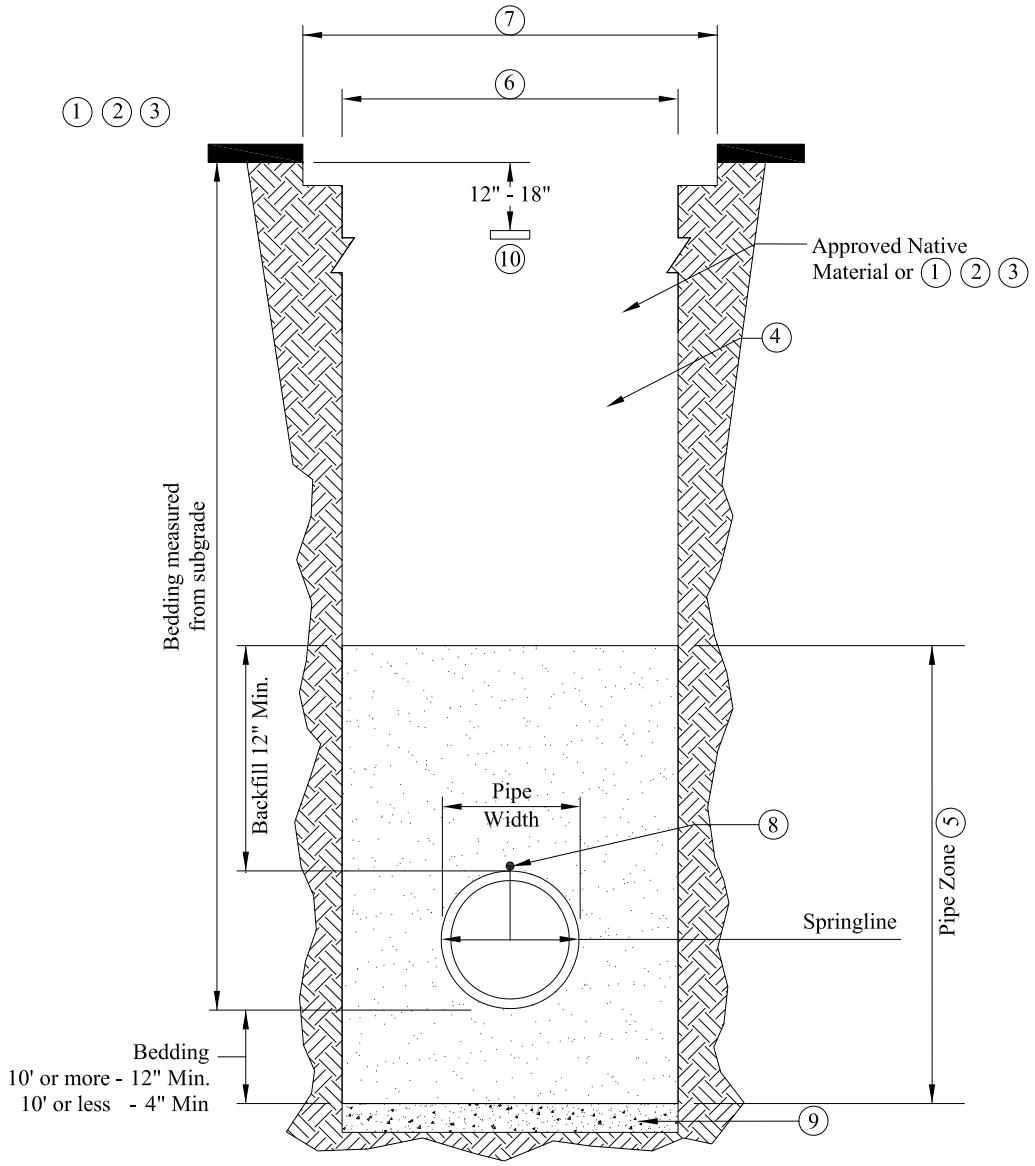
N.T.S.

GENERAL NOTES

1. Water Quality Sampling Station to be Kupferle model #88W6 with Town Logo on front or Town approved equal.
2. Keys to locks shall be delivered to TOB Water Quality Department upon acceptance.

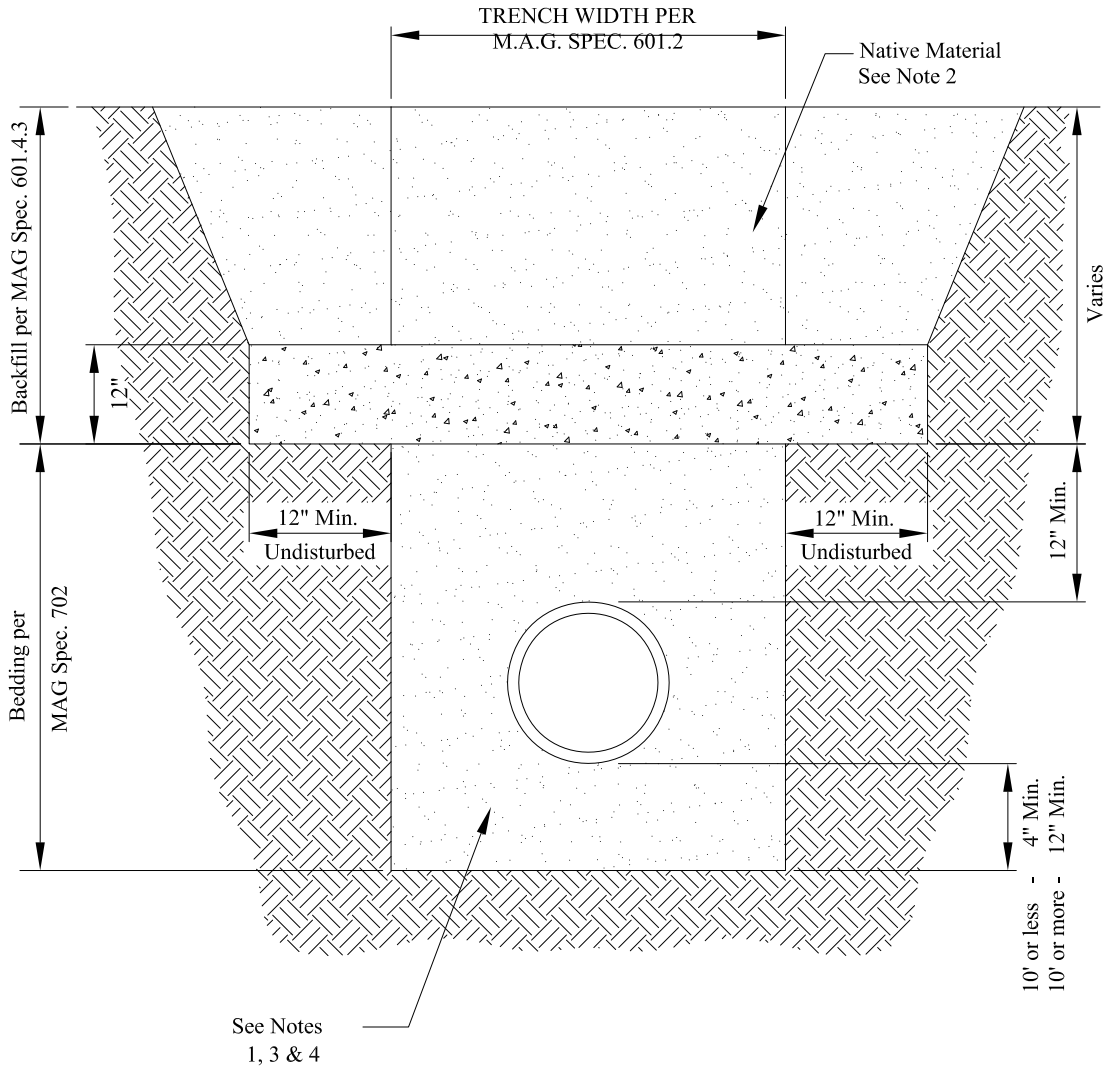
31375	Town of Buckeye Standard Details	WATER QUALITY SAMPLING STATION	Revised: 12-31-12	Detail No. 31375

WATER TRENCH DETAIL



GENERAL NOTES

1. All transverse trenching in existing streets shall be 100% 1/2 sack slurry per MAG Spec 728. Backfill bedding base material to top of adjacent pavement.
2. All longitudinal trench cuts within 2' of existing pavement shall be backfill 100% with ABC and compacted to 95%. Last two feet shall be compacted to 100%.
3. All trenching in unpaved streets can use native backfill. This also includes streets that will be completely reconstructed.
4. Trench compaction shall meet backfill Type 1, per MAG Std. Spec Table 601-2.
5. Pipe zone material shall be approved ABC material placed per MAG Std. Spec 601.4 and compacted per Table 601-2.
6. Excavated trench width per MAG Spec Table 601-1.
7. Trenches in existing roads shall be per MAG Std. Dtl 200 "T-Top"
8. Tracer wire shall be a minimum 10 AWG and Blue in color for water lines. Tracer wire shall be taped to the top of the pipe using 10 Mil plastic pipe tape.
9. Foundation stabilization (if necessary) shall be over excavation a min. of 6". An open graded material shall be placed back. Over excavation and open graded material shall be approved by the Town Engineer or authorized representative. An approved geotextile fabric may be used between the bedding and foundation (based on soil conditions) if requested by the Town Engineer or representative.
10. Non detectable plastic warning tape shall be placed 12" to 18" below finished subgrade. This shall be utility specific; (blue = water, purple = reclaimed water, etc.) and shall be permanently imprinted every 36" with, "CAUTION BURIED WATER LINE BELOW" or "CAUTION BURIED RECLAIMED WATER LINE BELOW".

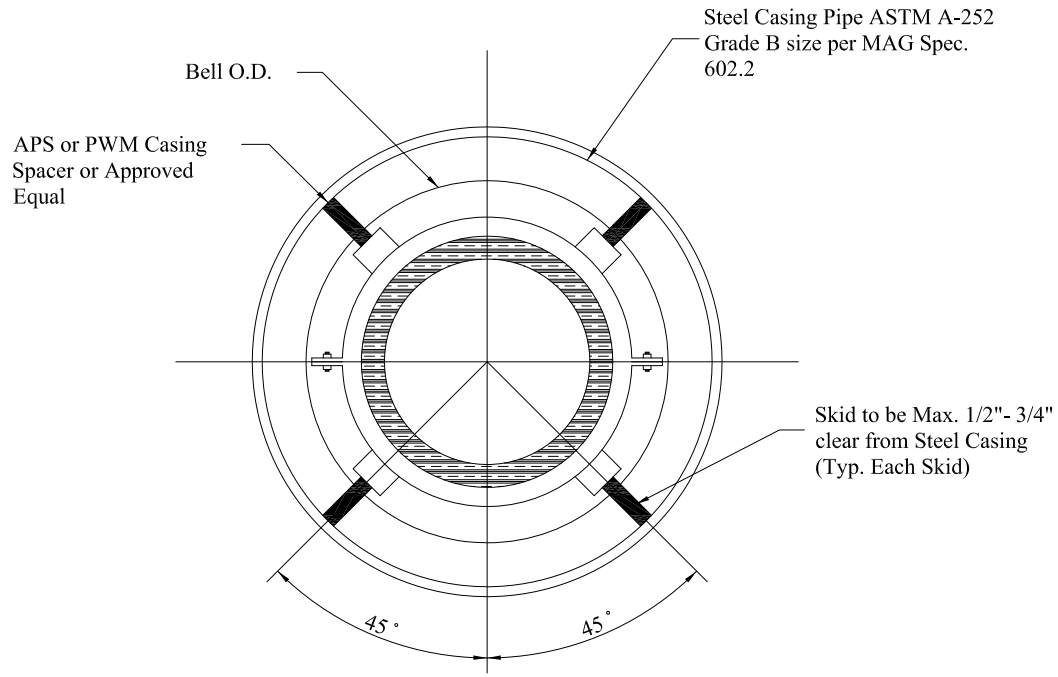


GENERAL NOTES:

1. Bedding material to be A.B.C. per MAG Spec. 702.
2. Native material as described in MAG Spec. 601.4.3.
3. All compaction densities: Type 1 as described in MAG Spec. 601.4.4.
4. Compaction methods: As described in MAG Spec. 601.4.5.
5. All concrete shall be Class 'C', MAG Spec. 725.

Installation of water pipe class, type, necessary trench width, excavation and layback shall be per MAG Specifications and project geotechincal report requirements for normal and extra depth conditions. Clarification of excavation, backfill bedding and layback requirements shall be made in writing to the project geotechnical and testing consultant with a copy to the engineer.

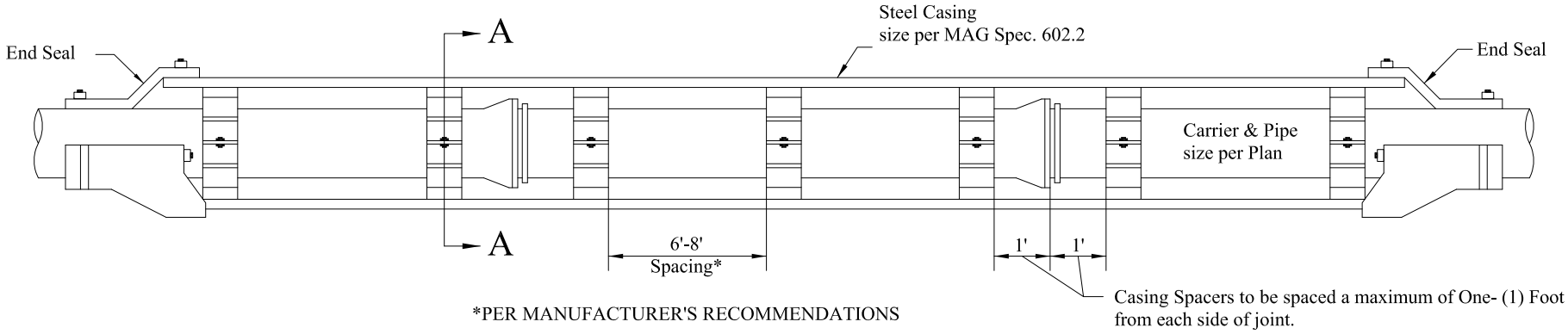
31382	Town of Buckeye Standard Details	**CONCRETE CAP**	Revised: 12-31-12	Detail No. 31382



CASING SPACER DETAIL
SECTION A-A

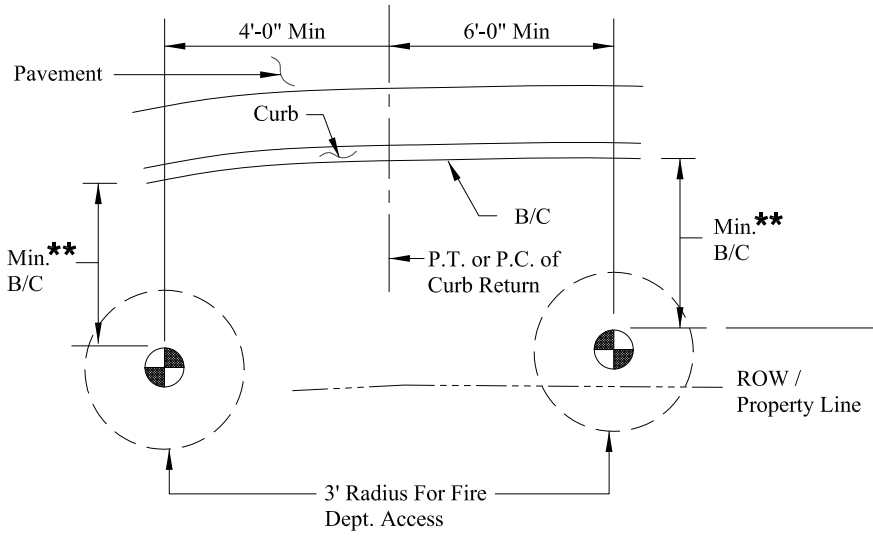
GENERAL NOTES

1. Installation to be in accordance with Manufacturer's Specifications.
2. Safety: Equipment Certification for installation of Casing / Carrier Pipe.
3. End seal to provide a water tight connection shall be approved by the TOB. All end seals to include a MAG 427 brick plug.
4. APS or PWM injected molded Polyethylene Spacers, or approved equal.
5. All hardware within the casing shall be ductile iron or stainless steel.

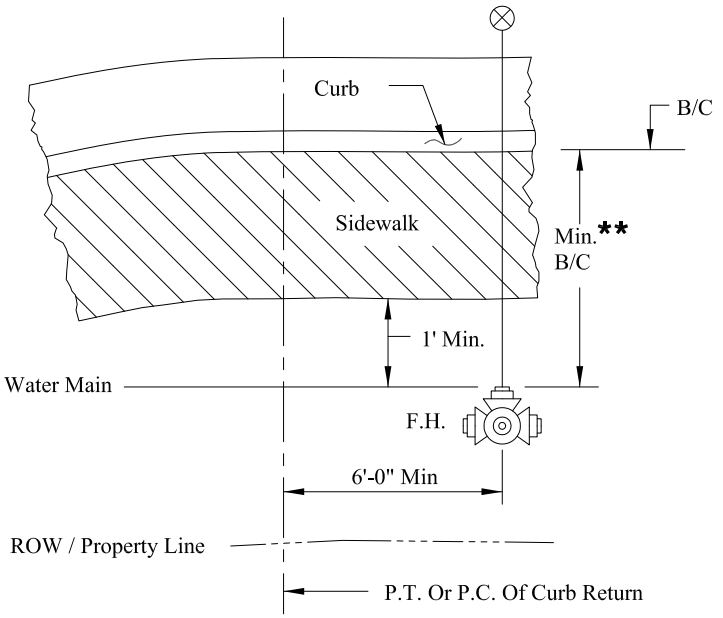


*PER MANUFACTURER'S RECOMMENDATIONS

31384	Town of Buckeye Standard Details	**CASING PIPE & SPACER**	Revised: 12-31-12	Detail No. 31384



PARKWAY AREA, NO SIDEWALK



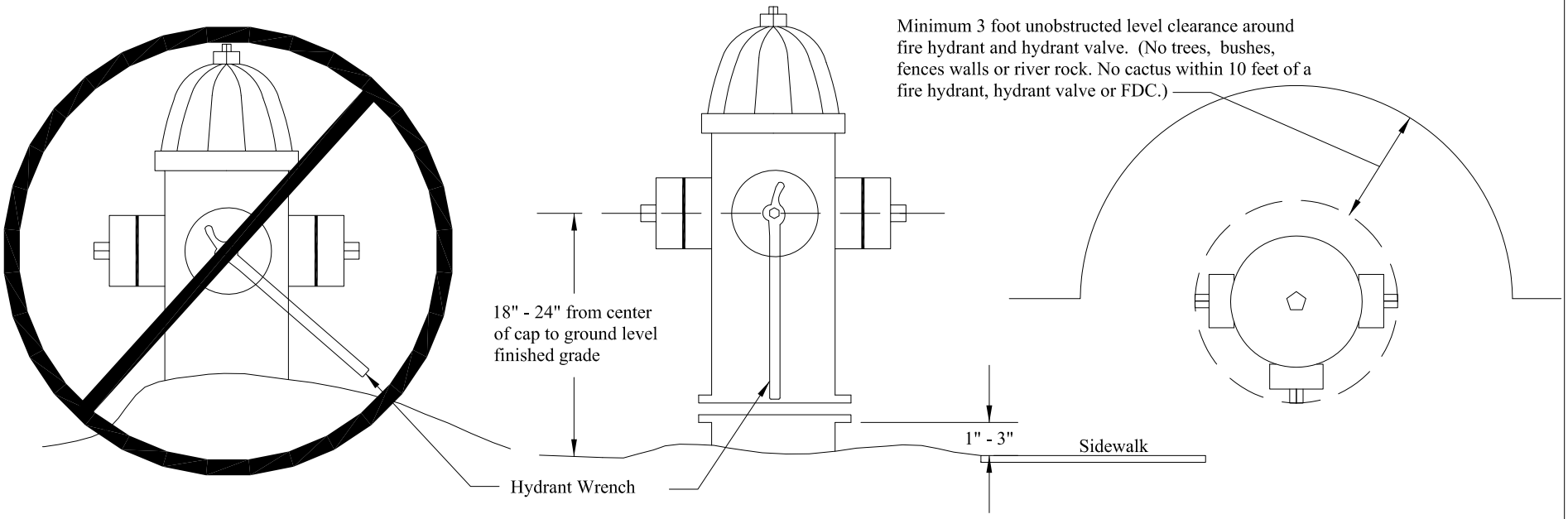
PARKWAY AREA WITH SIDEWALK

GENERAL NOTES

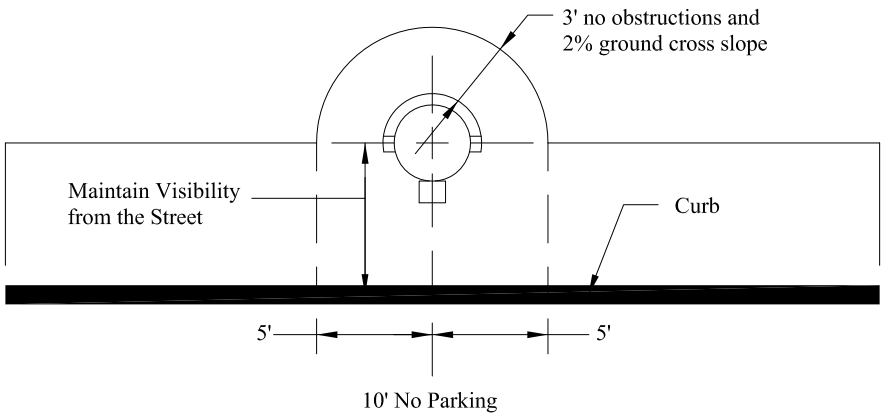
1. Obstructions such as utility poles, street signs, irrigation boxes, fences, etc., must not be placed between curb and hydrant.
2. Dimensions shown on construction drawings supersede locations shown here.
3. On midblock locations, the fire hydrant shall be aligned with a property line and 6' minimum from driveways.
4. All fire hydrants installed per MAG standards and will be located in accordance with this detail.
5. In Industrial/Commercial zones a minimum of 6' from driveways must be maintained with valve installed away from driveway.
6. Bottom flange of fire hydrant shall be 1" to 3" above sidewalk or curb.
7. All dimensions shall be measured to end of main steamer nut.

** Fire hydrant offsets shall be:

Arterial:	No closer than 7', no farther than 10'
Collector:	No close than 5', no farther than 8'
Local:	With Attached Sidewalk: 2' behind sidewalk
	With Curb & Gutter, and No Sidewalk: 3' behind curb

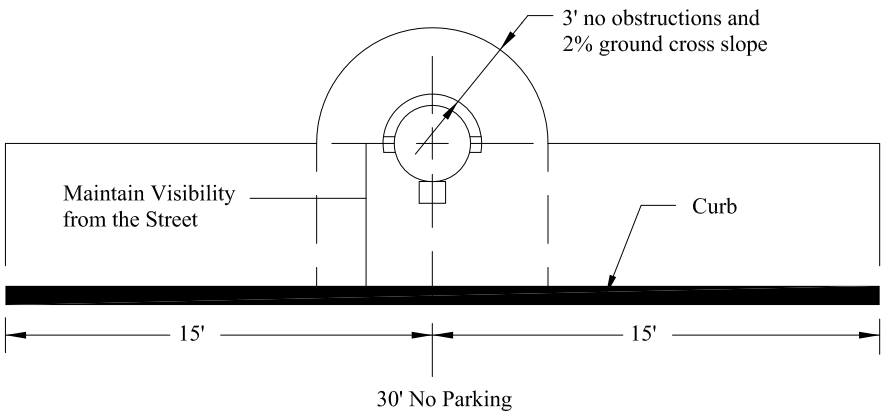


A clear and level space of 3 feet shall be maintained around fire hydrants and hydrant valve. (No trees, bushes, fences, walls or river rock. No cactus within 10 feet of a fire hydrant, hydrant valve or FDC).



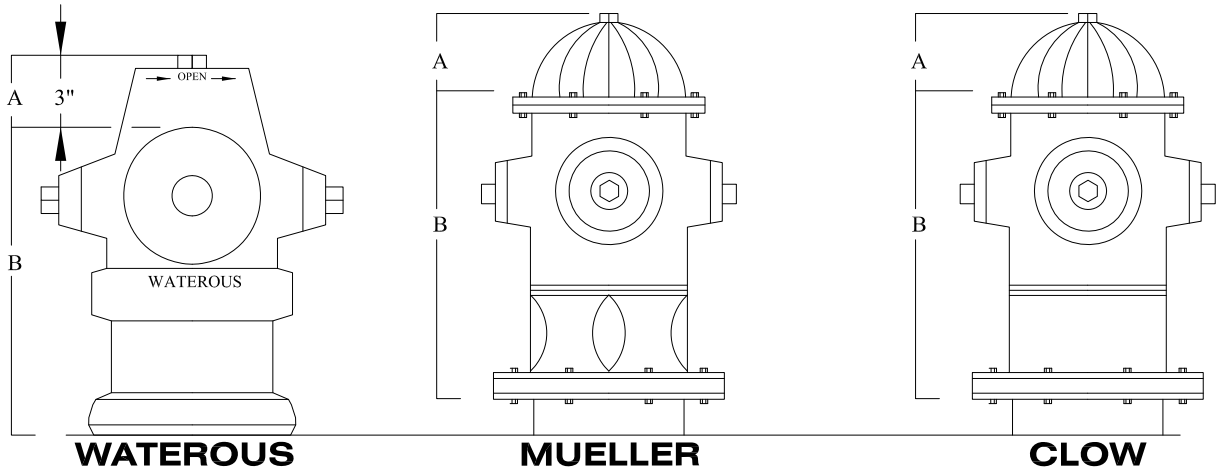
Residential

A clear and level space of 3 feet shall be maintained around fire hydrants and hydrant valve. (No trees, bushes, fences, walls or river rock. No cactus within 10 feet of a fire hydrant, hydrant valve or FDC).



Non-Residential

31412	Town of Buckeye Standard Details	**FIRE HYDRANT CLEARANCE**	Revised: 12-31-12	Detail No. 31412



LEGEND

1. (A) = Bonnet
   (B) = Barrel
2. Type Denotes Color Code Designation:
   (CY) = Cat Yellow
   (BR) = Brillant Red

Type	A	B
1	CY	CY
2	GW	CY
3	BR	BR

GENERAL NOTE

1. On Waterous Hydrants only: Bonnet (A) will be painted 3" down from the top.

COLOR CODE

The Town of Buckeye Water Resource Department and Fire Department utilize the following Color Code in distinguishing the various types of Fire Hydrants:

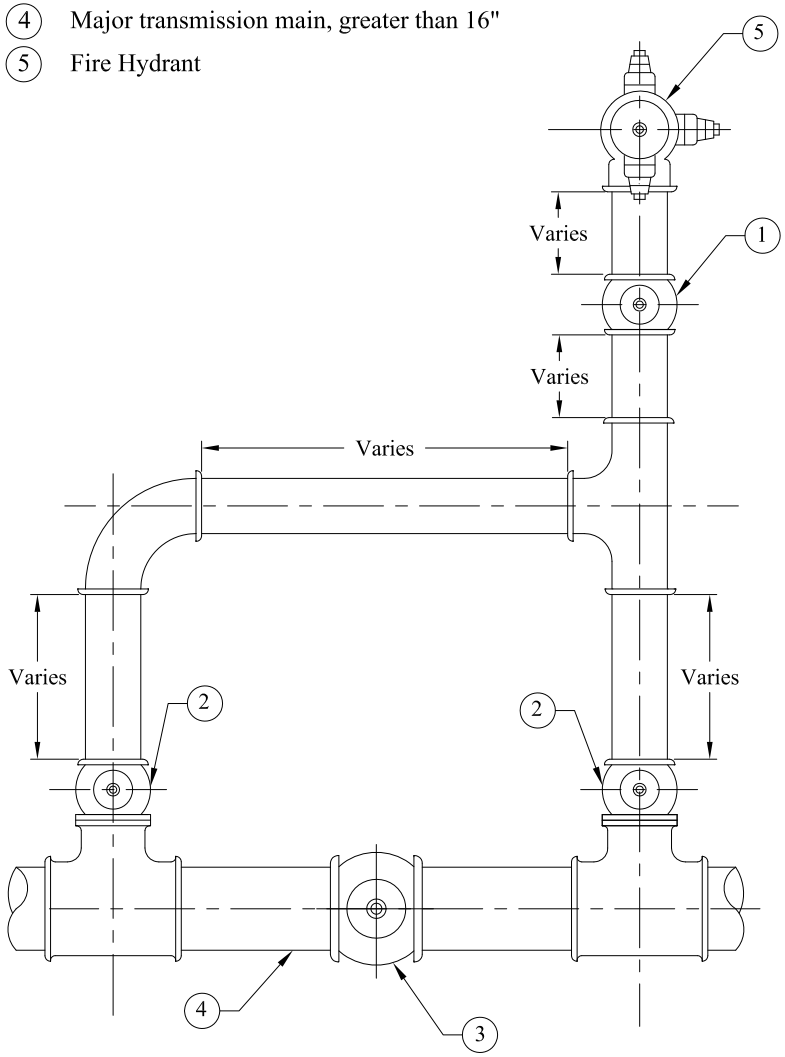
1. **Cat Yellow:** The barrell and bonnet of all fire hydrants installed on public water mains in rights-of-way and in public utility easements (PUE's) shall be painted cat yellow.
2. **Gloss White/Cat Yellow:** The bonnet of all fire hydrants installed on privately owned and maintained water mains shall be painted gloss white. the barrel shall be painted cat yellow.
3. **Brilliant Red:** The barrel and bonnet of all fire hydrants installed on private fire lines shall be painted brilliant red. All such fire hydrants shall be isolated from the municipal water system by double detector check valves. All red hydrants shall be approved by the Town Fire Marshal.

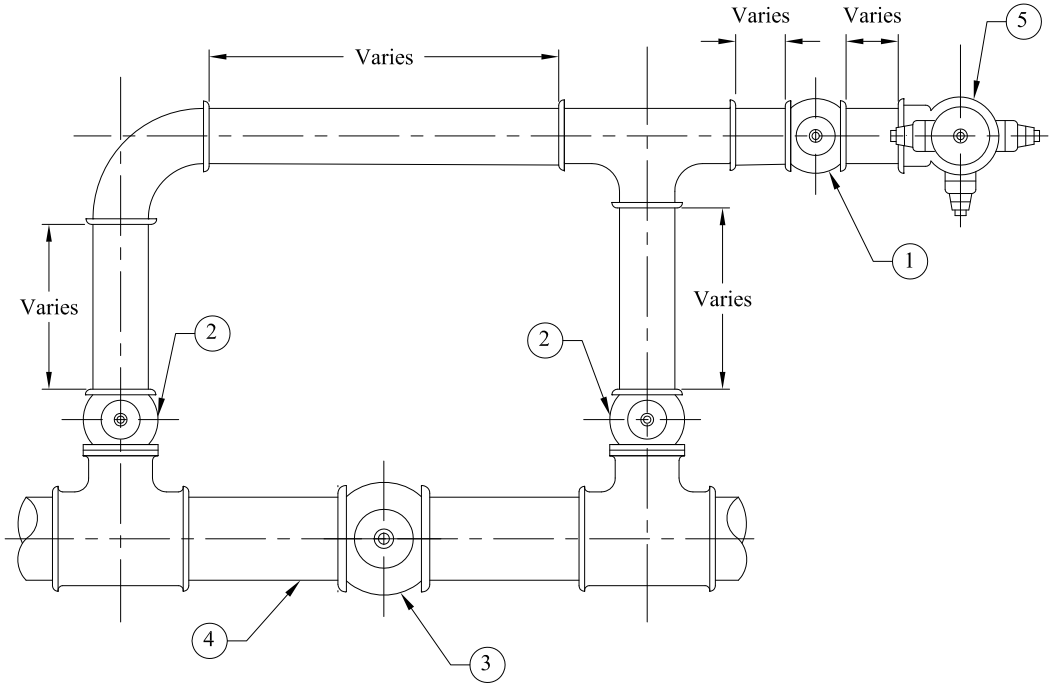
List Of Materials

1. 6" valve MJ X MJ
2. 6" valve FLG X MJ
3. Large pipe shut-off gate valve
4. Major transmission main, greater than 16"
5. Fire Hydrant

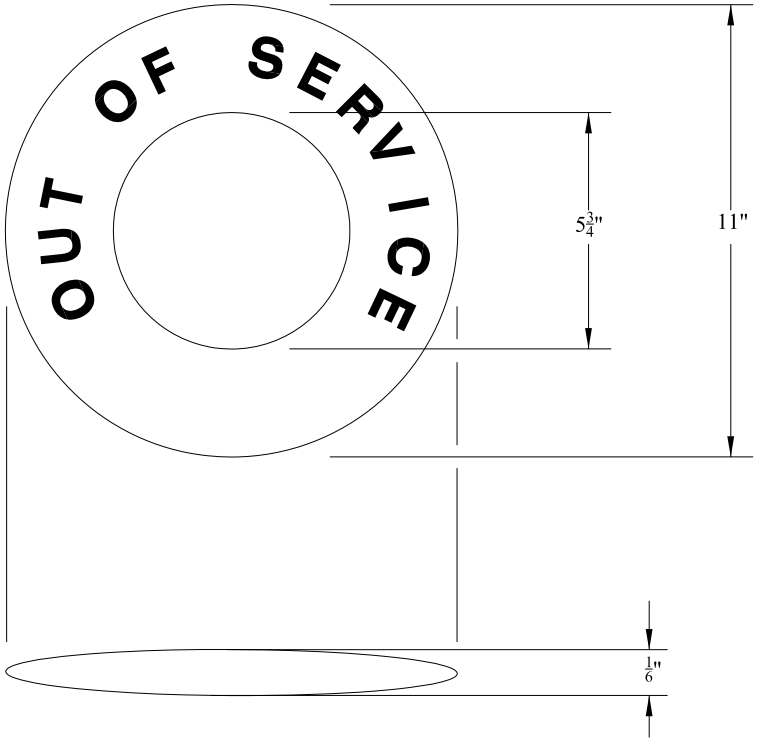
GENERAL NOTES

1. All joints in hydrant run-out to be restrained joints.
2. See MAG Std. Detail 391-1 Type "C" for valve box installation.
3. For water valve blocking see MAG Std. Detail 301.
4. For additional information see MAG Std. Detail 360.





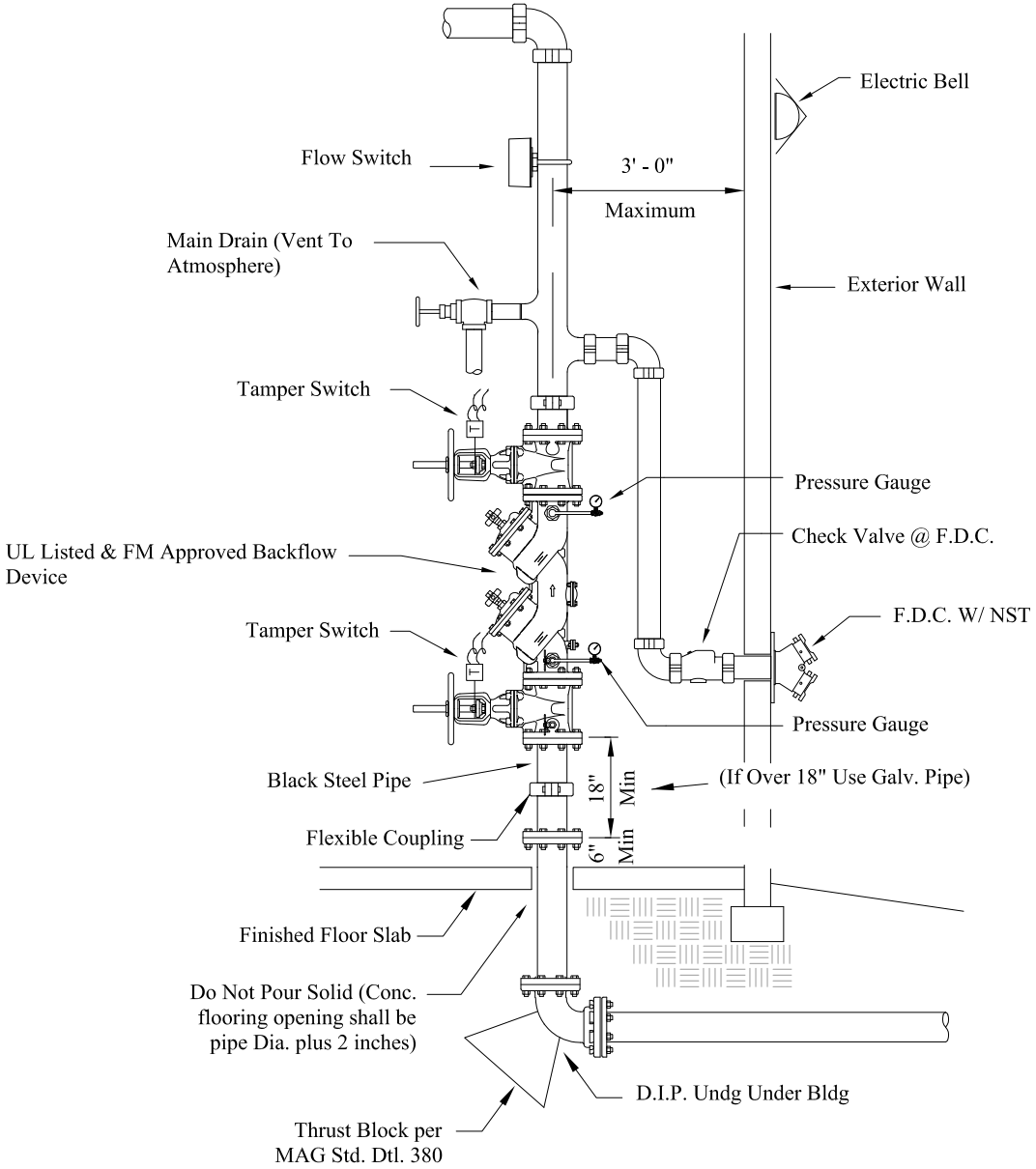
31420	Town of Buckeye Standard Details	FIRE HYDRANT BYPASS ASSEMBLY	Revised: 12-31-12	Detail No. 31420



GENERAL NOTES

1. All fire hydrants installed on private and public water lines shall be provided with "Out of Service" sign if hydrant is out of service.
2. Upon completion of required inspections, tests, acceptance, and approval of the water system by a TOB Inspector and the system is verified to be in service, the "Out of Service" signs shall be removed.
3. A hydrant removed from service shall be provided an "Out of Service" sign within the initial 2 hours of being notified of the service interruption.
4. Signs shall be in accordance with this detail.
5. Signs shall be permanently marked and constructed of weatherproof metal or rigid plastic material.
6. The color of lettering on signs shall be in high contrast with their background.
7. Signs shall have the words "Out of Service" on the sign in block capital letters not less than 1½" in height with a stroke of not less than ¼".

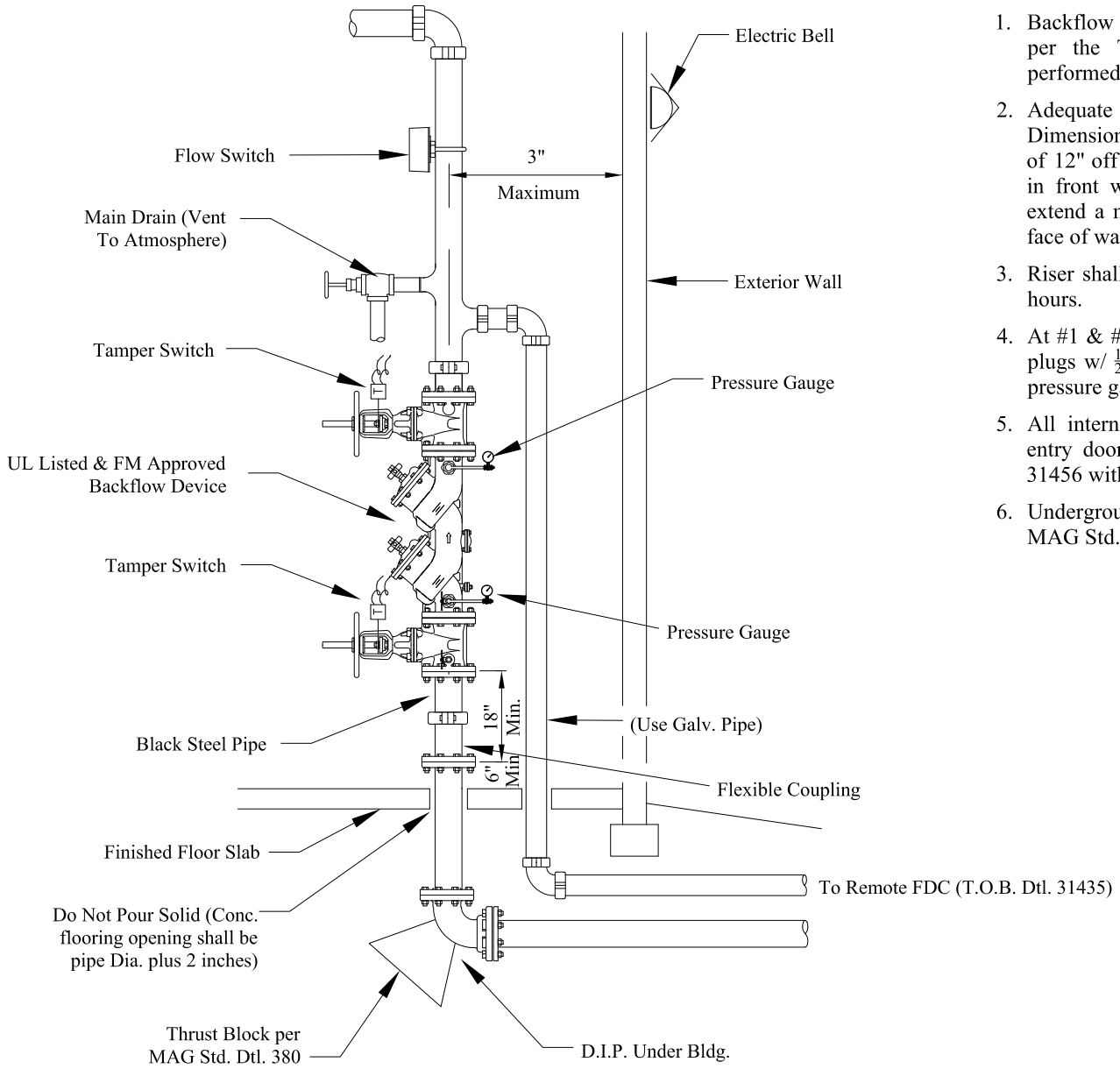
31425	Town of Buckeye Standard Details	**HYDRANT "OUT OF SERVICE" SIGNS**	Revised: 12-31-12	Detail No. 31425



GENERAL NOTES

1. Backflow assemblies shall be tested for proper operation per the TOB requirements. All testing shall be performed by a certified tester recognized by the Town.
2. Adequate clearance shall be provided around fire riser. Measure a minimum of 12" off the back wall, 18" on each side and 36" clear in front with a full height door. The fire line shall extend a maximum of 3' into the building from inside face of wall to center of pipe.
3. Riser shall be Hydrostatically tested at 200 PSI for two hours.
4. At #1 & #4 test ports install a $\frac{1}{2}$" brass nipple, tee & plugs w/ $\frac{1}{2}$" x $\frac{1}{4}$" male flared connection w/ cap (Install pressure gauge on tee outlet).
5. All internal fire riser shall have a separate external entry door and lock box with a Fire Dept. placard per TOB Detail 31456 with Knox Box.
6. Underground fittings shall be flanged or restrained per MAG Std. Dtl. 303-2.

31430	Town of Buckeye Standard Details	FIRE SPRINKLER RISER DETAIL - VERTICAL INSTALLATION #1	Revised: 12-31-12	Detail No. 31430



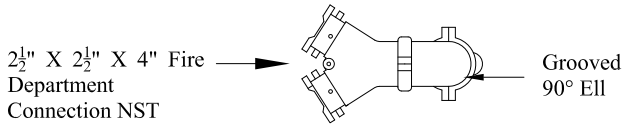
GENERAL NOTES

1. Backflow assemblies shall be tested for proper operation per the TOB requirements. All testing shall be performed by a certified tester recognized by the Town.
2. Adequate clearance shall be provided around fire riser. Dimensions from face of pipe shall measure a minimum of 12" off the back wall, 18" on each side and 36" clear in front with a full height door. The fire line shall extend a maximum of 3" into the building from inside face of wall to center of pipe.
3. Riser shall be hydrostatically tested at 200 PSI for two hours.
4. At #1 & #4 test ports install a $\frac{1}{2}$" brass nipple. Tee and plugs w/ $\frac{1}{2}$" x $\frac{1}{4}$" male flared connection w/ cap (Install pressure gauge on tee outlet).
5. All internal fire risers shall have a separate external entry door with a Fire Dept. placard per TOB Detail 31456 with Knox Box.
6. Underground fittings shall be flanged or restrained per MAG Std. Dtl. 303-2.

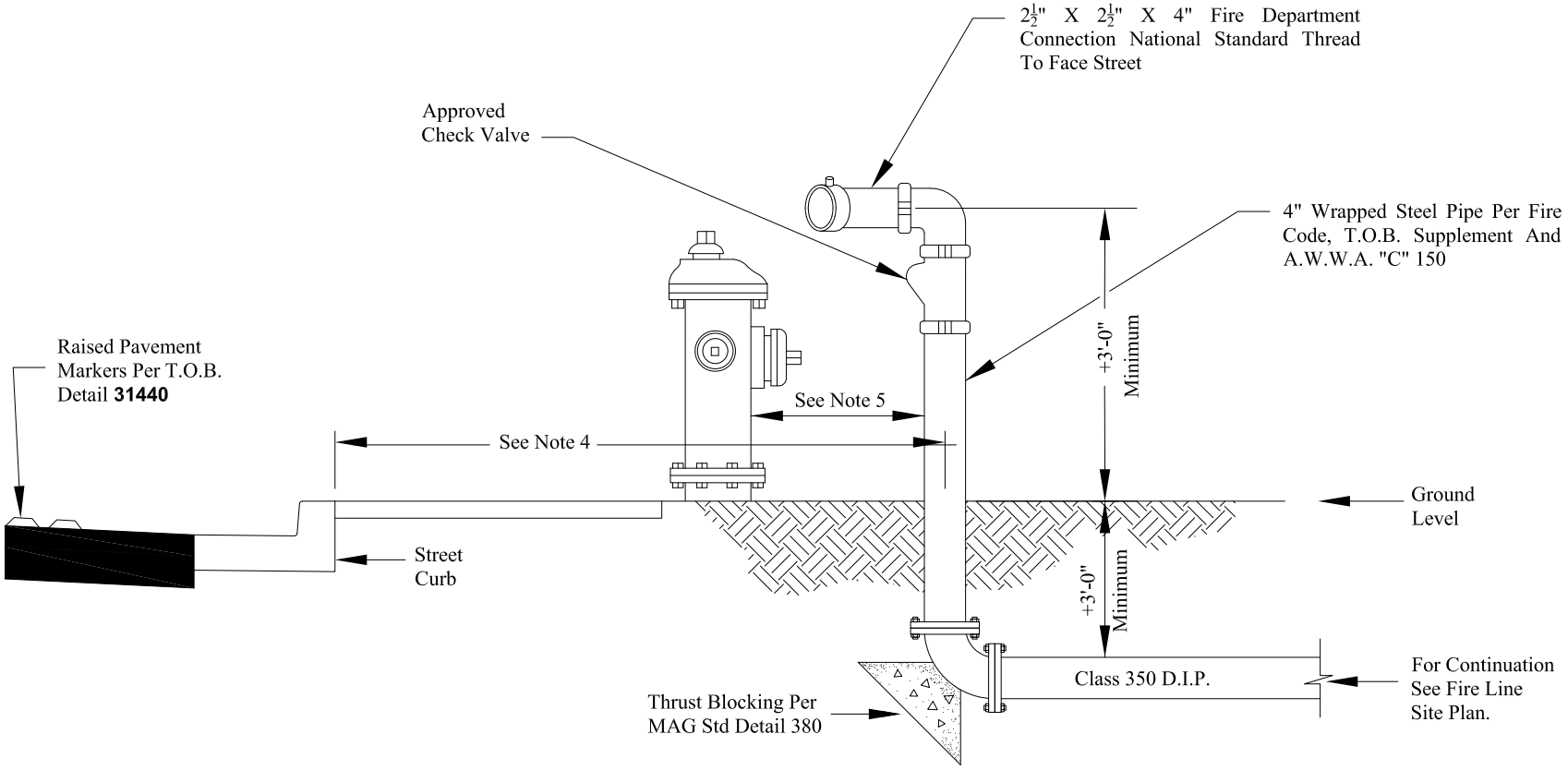
31431	Town of Buckeye Standard Details	FIRE SPRINKLER RISER DETAIL - VERTICAL INSTALLATION #2	Revised: 12-31-12	Detail No. 31431

GENERAL NOTES:

1. Provide building I.D. on remote Fire Dept. connection per TOB Detail 31456.
2. No trees, bushes or walls within 5' radius of Fire Department connection.
3. If fire sprinkler design indicates demand of 1000 GPM Or greater, the underground Fire Dept. connection line shall be increased to 6" diameter with a three way $2\frac{1}{2}$" Fire Dept. hose connection.
4. 4' min. to back of curb, or 2' min to back of sidewalk, or when no curb, 4' max. outside the clear zone.
5. Locate FDC within 50' of an approved fire hydrant.

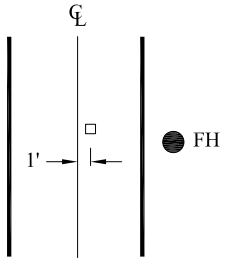


Top View

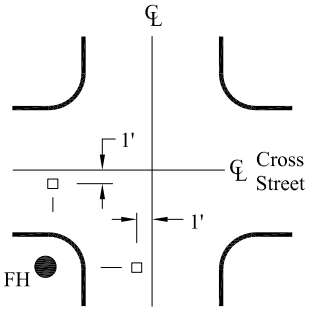


Side View

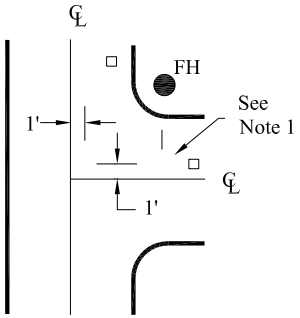
31435	Town of Buckeye Standard Details	**REMOTE FIRE DEPARTMENT CONNECTION**	Revised: 12-31-12	Detail No. 31435



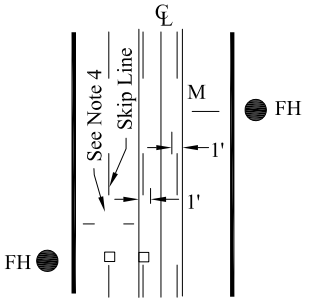
Midblock
Local



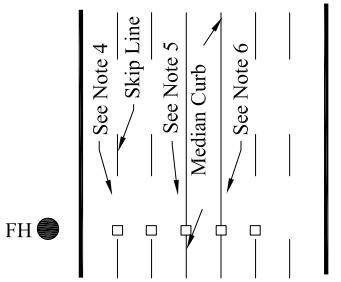
Local Cross
Intersection



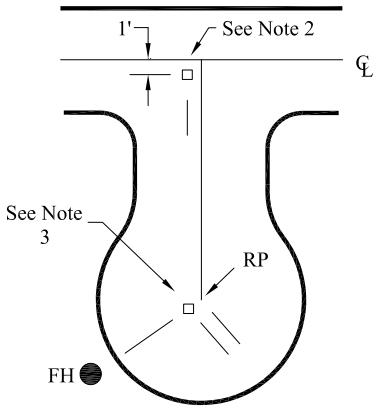
Local 'T'
Intersection



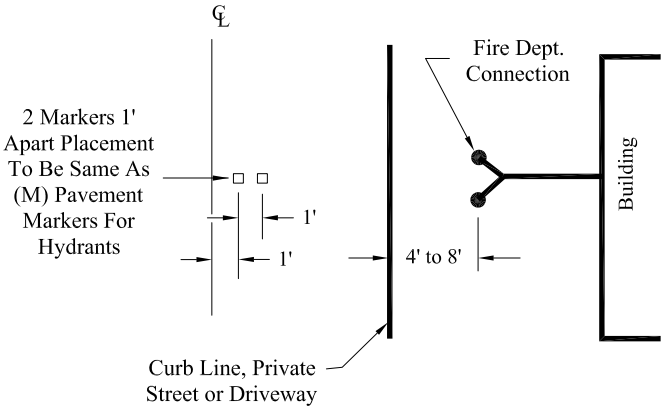
Midblock With Center
Lane Or Skip Lines



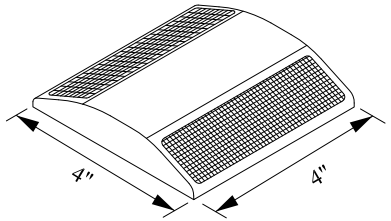
Midblock With
Raised Median



Cul-De-Sac Street



Fire Dept. Connection

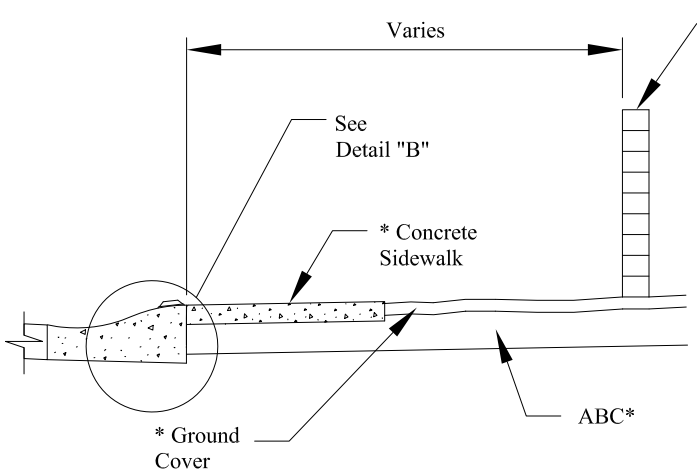


□ Pavement Marker (2-way reflective blue)

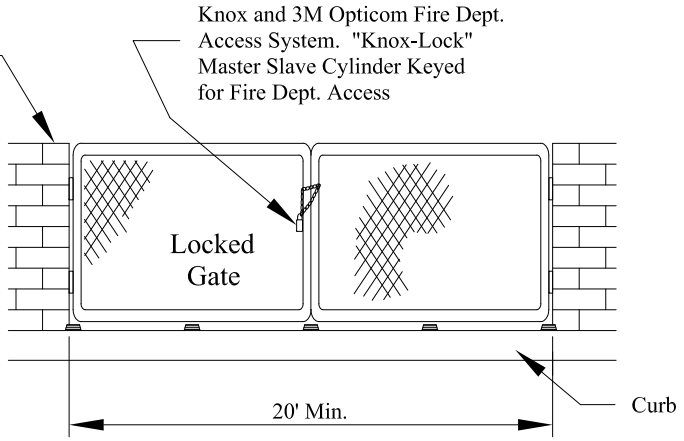
GENERAL NOTES

1. Not required on Dead End Streets without Hydrants.
2. Place on Hydrant side of centerline.
3. Not required when Cul-de-Sac is less than 250'.
4. To be placed in line with Skip Line.
5. Place on Gutter or adjacent to Curb.
6. Place on Top of Curb. (This location optional).
7. Pavement Markers shall not be placed within One (1) Foot of a Paint Line (Center to Center).

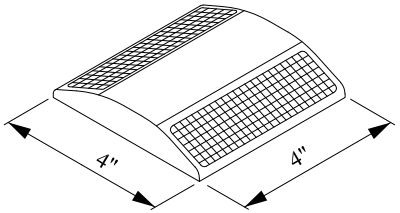
31440	Town of Buckeye Standard Details	**PAVEMENT MARKERS FOR FIRE HYDRANTS**	Revised: 12-31-12	Detail No. 31440



Side View

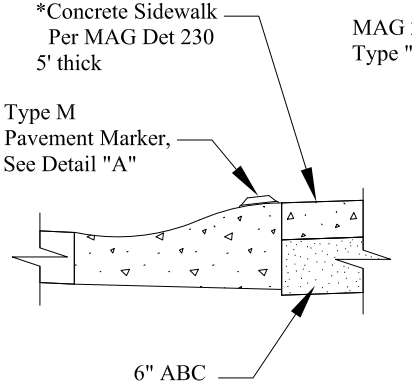


Front View



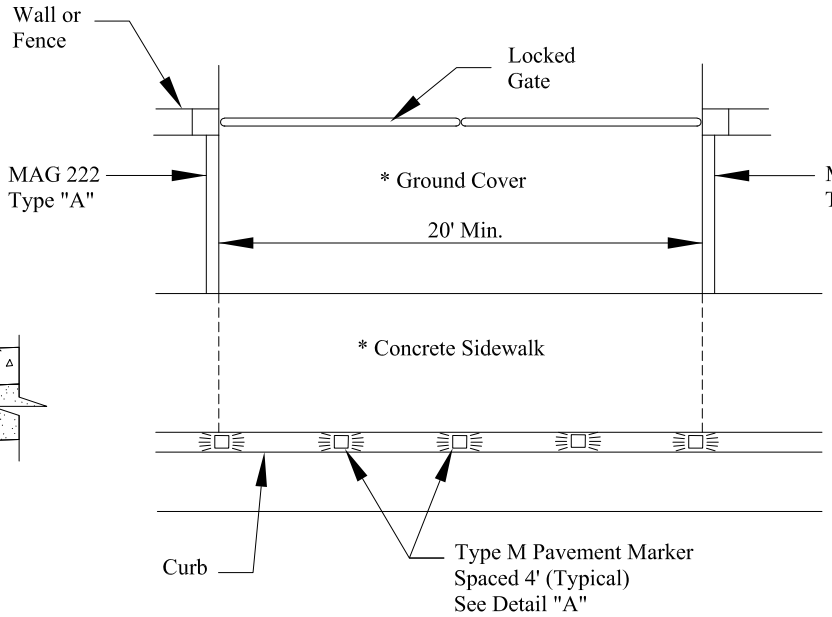
Type M Pavement Marker
(2-Way Reflective Blue)

Detail "A"



Roll Curb

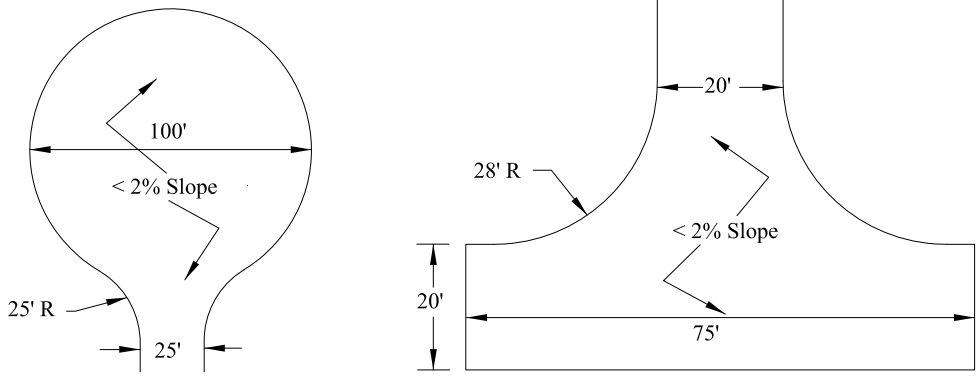
Detail "B"



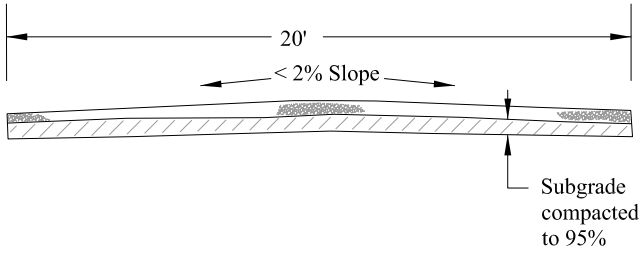
Top View

*Note: Sidewalk and/or 4" Max. ground cover over Min. 8" ABC

31441	Town of Buckeye Standard Details	FIRE AND EMERGENCY ACCESS AND DELINEATION	Revised: 12-31-12	Detail No. 31441



DETAIL A



DETAIL B

GENERAL NOTES

1. Unpaved Temporary access shall be in accordance with the Fire Code.
2. Access shall be constructed as per Detail B above and fire apparatus turnarounds shall be in accordance with either example in Detail Above when the access is in excess of 150'.
3. Fire apparatus access shall be designed and maintained to support the imposed loads of fire apparatus (75,000 lbs min.) and shall be provided with a surface so as to provide all weather driving capabilities.
4. For both UNPAVED and PAVED all dimensions displayed above are minimum values.
5. Paved Access Requirements

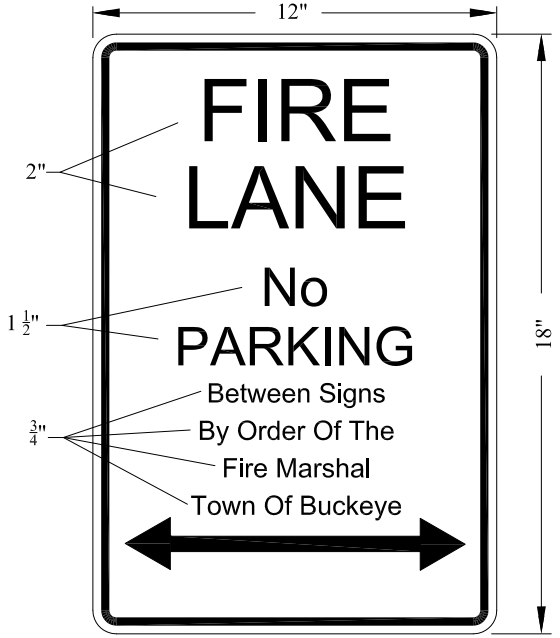
Turnarounds:	All dead-end fire apparatus access in excess of 150' in length shall be provided with approved apparatus turnarounds.
Surface:	Paved per TOB local street section minimum. Unpaved 4"3/4-minus decomposed granite on 8" MAG ABC all compacted to 95%.
Height:	Unobstructed vertical clearance shall be not less than 13'- 6".
Width:	Unobstructed width shall not be less Than 20'.
Slopes:	Max slopes within the "T" & cul-de-sac shall be no greater than 2% in any direction.

31445	Town of Buckeye Standard Details	FIRE APPARATUS TURNAROUND REQUIREMENTS	Revised: 12-31-12	Detail No. 31445

GENERAL NOTES

1. Red reflective lettering with white background shall be 2" in height and 1/2" stroke.
2. Red reflective lettering with white background shall be 1" in height and 1/8" stroke.
3. All signs shall be weather resistant.
4. Font used on the sign shall be "CLEARVIEW"

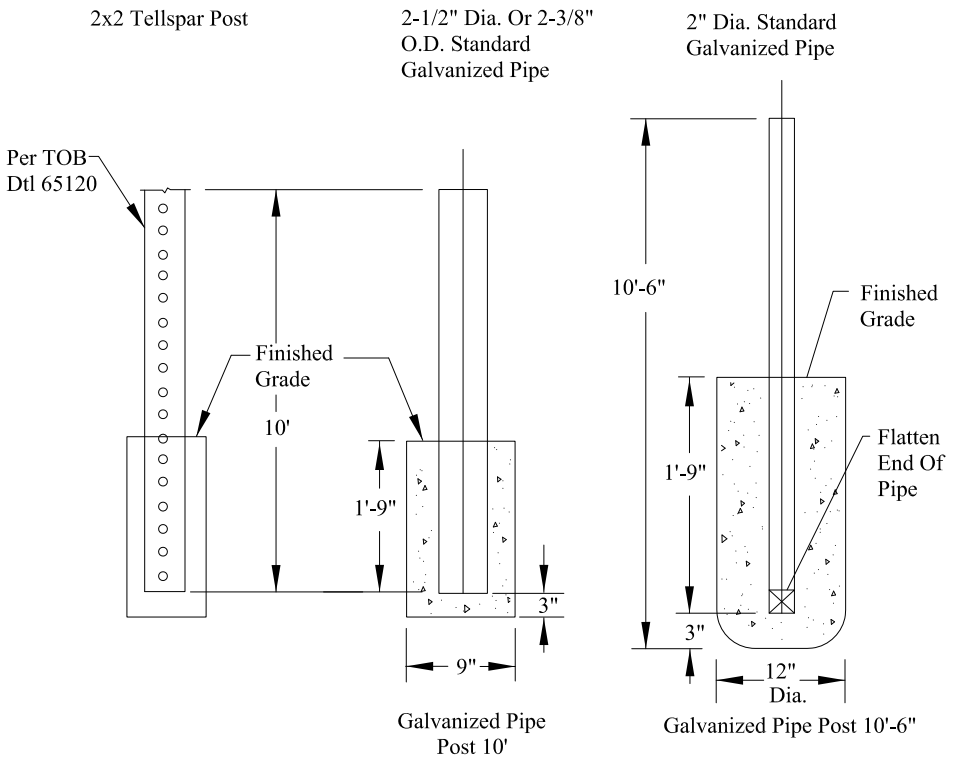
31450	Town of Buckeye Standard Details	**FIRE RISER ROOM PLACARD**	Revised: 12-31-12	Detail No. 31450



GENERAL NOTES

1. At the beginning and end of the fire lane, the sign shall have a single headed arrow pointing in the direction the regulation is in effect. The intermediate signs shall have double headed arrows pointing in both directions.
2. The maximum spacing of the signs shall be 100', contingent upon the Town Engineer's review and approval.
3. The signs shall be set at an angle of not less than 30° nor more than 45° with the curb or line of traffic flow.
4. The clearance to the bottom of the sign shall be 7'. There shall be no other signs attached to the sign or the sign pole.
5. The sign plate shall be a minimum of 12" x 18" with a thickness of 0.80".
6. The sign face shall meet the TOB sign sheeting standards. Use the standard sign face blank for a R7-32 or equivalent.
7. Signage letter shall be from the "CLEARVIEW" Font.

Fire Lane Sign Base



Type 'A': 2x2 Tellspar Post

Type 'B' & 'C': Concrete base foundations shall be Class 'C' concrete.

31452	Town of Buckeye Standard Details	FIRE LANE SIGN	Revised: 12-31-12	Detail No. 31452

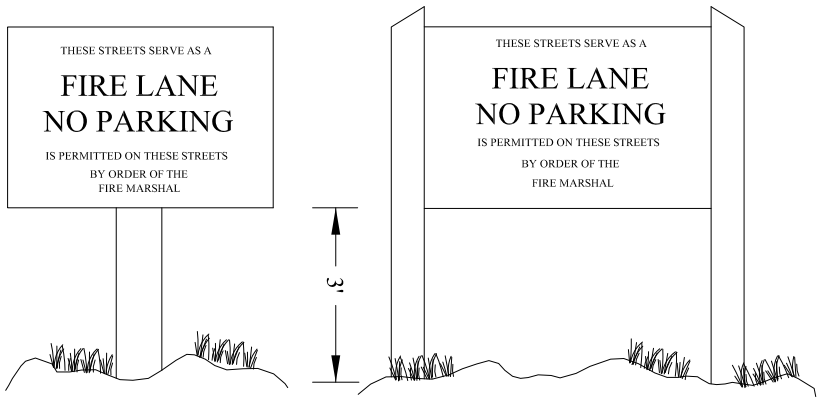
Minimum street width for fire lane sign placement

* Width	Parking Conditions	Signs Required
Less than 25'	No parking on Either side of street	This detail
25' to less than 32'	Parking on one side Of street only	One side
32' or more	Parking on both Sides of street	Not required

* Rolled curbs shall be measured from back of curb to back of curb.
* All other curbs shall be measured from face of curb to face of curb.

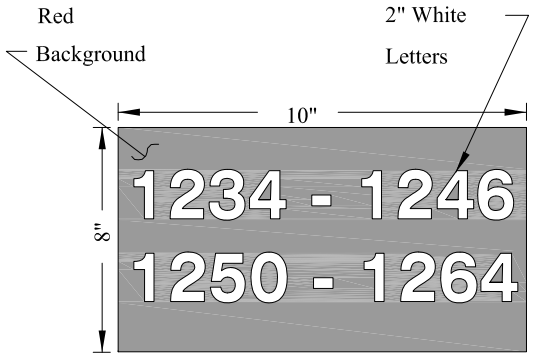
GENERAL NOTES

1. This sign may be used for private street and subdivisions in lieu of fire lane signs being posted every 75' and painted curbs.
2. 3" letters are 5/8" wide
3. 2-1/2" letters are 1/2 inch wide
4. 1" inch letters are 1/8" wide
5. All letters are red with a white background
6. Signs shall be mounted on either a single center post or double side posts. Posts may be Aluminum or wood.
7. Signs shall have a minimum dimension of 24" by 18" high.
8. The bottom of the sign is to be 3' above grade signs and posts are not supplied by the TOB.
9. All signs shall be visible upon entering the private street.
10. All signs shall be maintained, so they are legible.

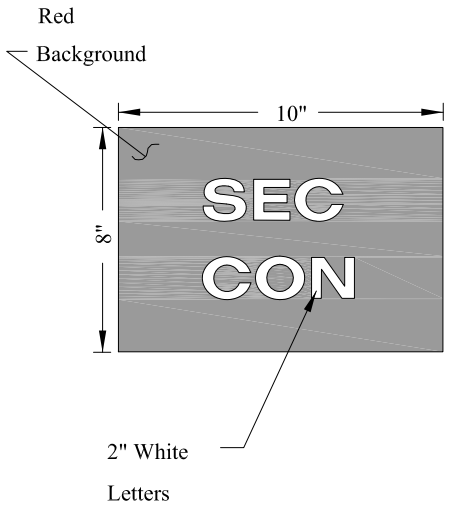


31454	Town of Buckeye Standard Details	**FIRE LANE SIGNAGE (PRIVATE STREETS AND SUBDIVISIONS)**	Revised: 12-31-12	Detail No. 31454

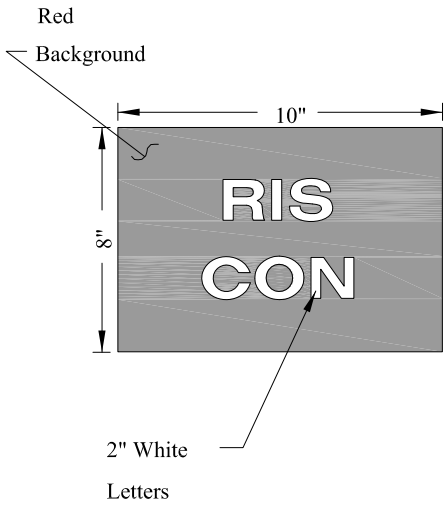
SIGNAGE A

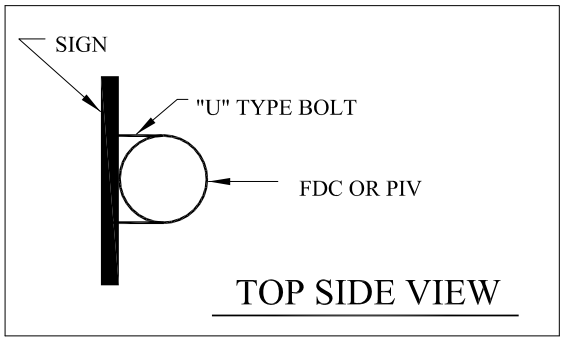


SIGNAGE B



SIGNAGE C

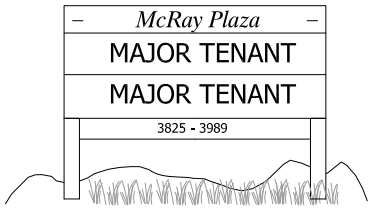




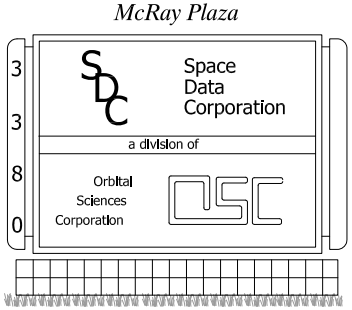
GENERAL NOTES

1. The signs shall include the address(s) of the premise(s) serving the FDC or PIV.
2. The signs shall be red in color with white lettering and shall be 0.08 gauge Aluminum and shall be securely attached to the FDC or PIV with "U" type bolts.
3. The sign face shall meet all TOB sign sheeting requirements.

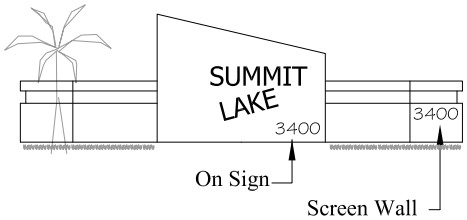
31456	Town of Buckeye Standard Details	**FIRE DEPARTMENT CONNECTION SIGNAGE**	Revised: 12-31-12	Detail No. 31456



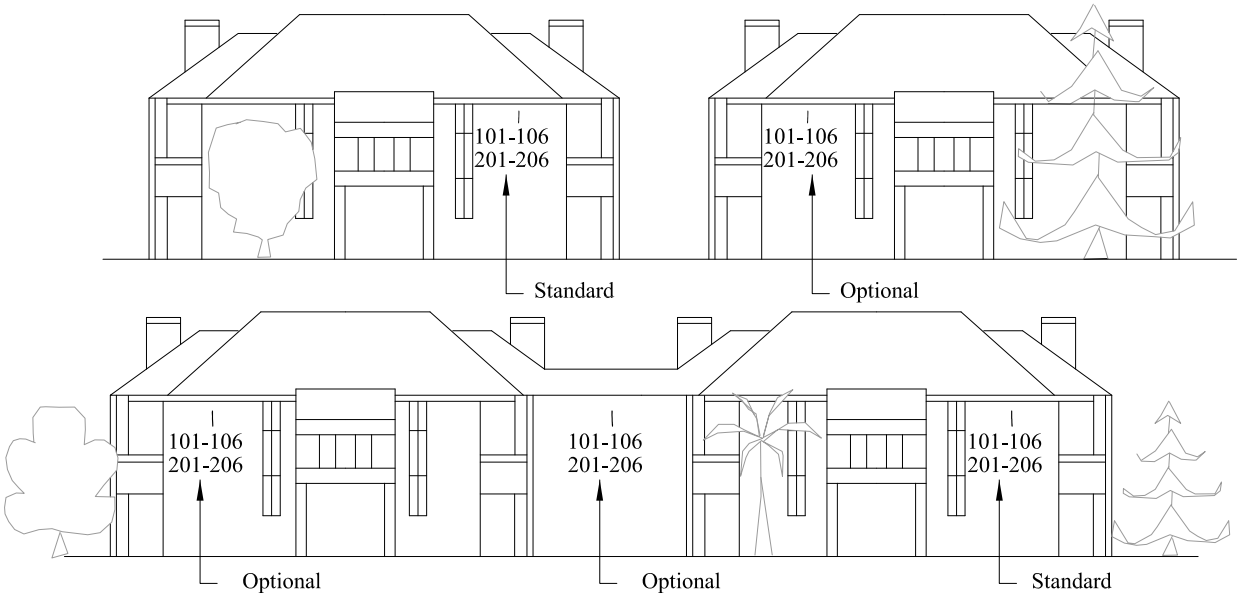
The low-high address shall be posted on the center identification sign at main entrance of commercial mall, center, village, or square, so as to be visible from a North-South or East-West direction.



Permanent fixture with the Situs Address shall be placed in a conspicuous location if not viewable from thoroughfare frontage so as to be visible from a North- South or East-West direction.



Address may be displayed on a complex identification sign or on the screen wall at the main entrance so as to be visible from a North-South or East-West direction.



Building identification numbers and intervals of sub-structure suffixes assigned to individual units shall be displayed in the upper, right hand corner at the end of each building so as to be plainly visible from the access thoroughfare. Alpha characters may be assigned for building identification for multi-family developments where single digit sub-structure suffixes are used. Multifamily developments with internal drives, building letters/numbers and range of sub-structure suffixes shall be posted on each side of building so as to be clearly visible from all access drives and thoroughfares.

** EXCEPTION: Interval of sub-structure suffixes may be displayed elsewhere on building due to required landscaping, subject to approval of the street naming and addressing coordinator. Color of numbers/letters and background shall contrast and conform to requirements for Helvetica Medium numbering/lettering. Distance at which letters/numbers shall be legible from center of thoroughfare:

0-50' 4" - Applies to single family and multifamily residential, commercial malls, centers or villages.

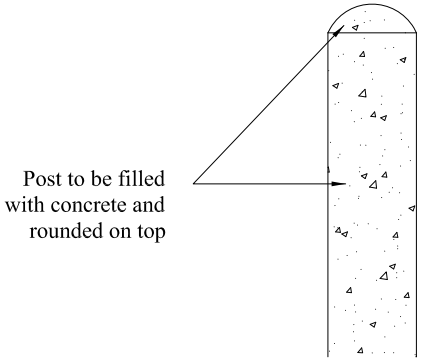
50-200' 10" - Interval of low-high sub-structures suffixes for Multi-Family developments may be a minimum of 6"-8" in height. Interval of low-high situs addresses on center identification sign may be a minimum of 8" in height.

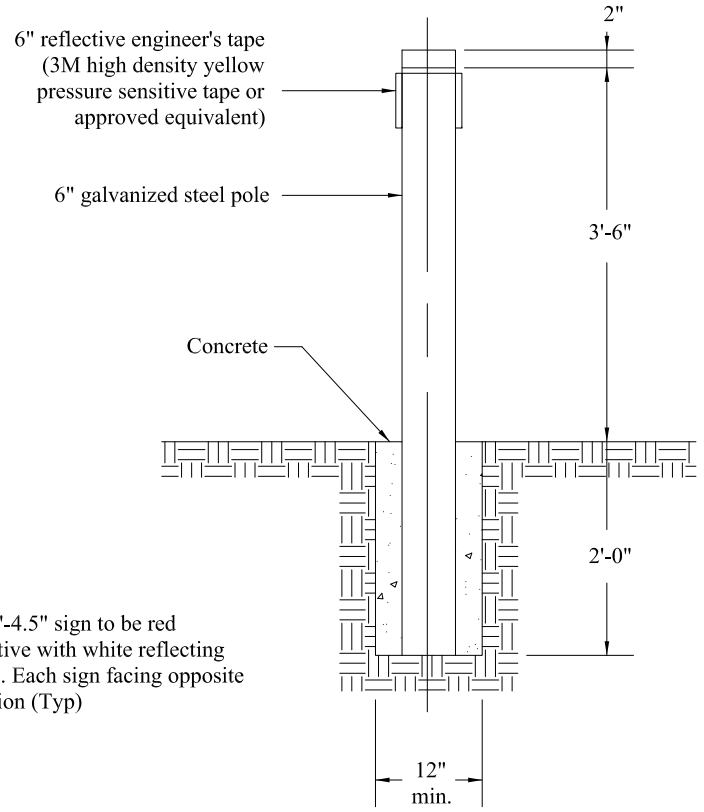
201-300' - 12"

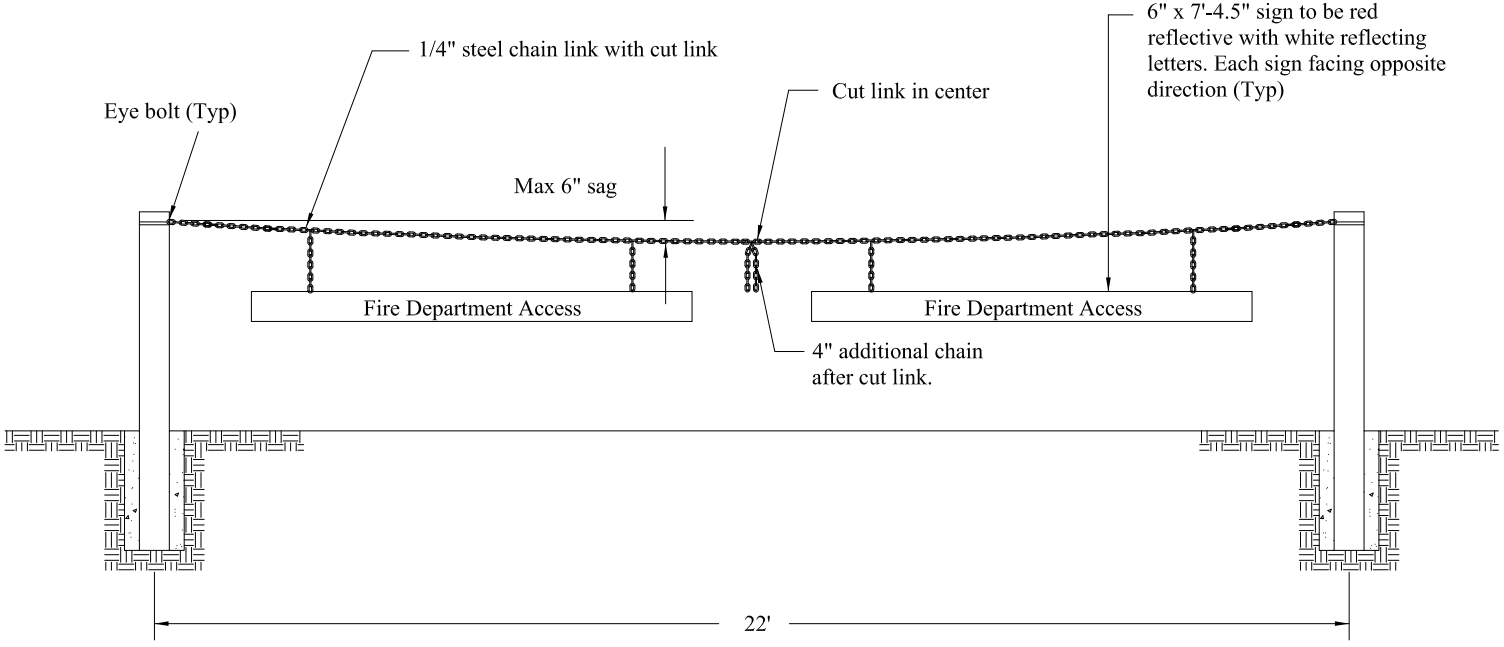
301-400' - 14"

For commercial malls, centers, villages and squares, distance to be measured from center of access drive to structure(s).

31458	Town of Buckeye Standard Details	**BUILDING ADDRESS IDENTIFICATION**	Revised: 12-31-12	Detail No. 31458







31460	Town of Buckeye Standard Details	**FIRE DEPARTMENT ACCESS BARRIER**	Revised: 12-31-12	Date: 31460