



SUPPLEMENT TO MAG
SPECIFICATIONS
AND
DETAILS

City of
Show Low, Arizona

February 2016

CITY OF SHOW LOW
SUPPLEMENT TO MAG
SPECIFICATIONS

INDEX

EXHIBIT A GENERAL INFORMATION

PERMITS AND POLICIES

EXHIBIT B CONDITIONS OF RIGHT OF WAY PERMIT

EXHIBIT C GENERAL SERVICE INSTALLATION

EXHIBIT D WATER INFORMATION

EXHIBIT E SEWER INFORMATION

EXHIBIT F CULVERT INFORMATION

EXHIBIT G PAVEMENT INFORMATION

EXHIBIT H LOW PRESSURE SEWER SYSTEM INFORMATION

CITY OF SHOW LOW
SUPPLEMENT TO MAG
SPECIFICATIONS

INDEX CONTINUED

PAVEMENT INFORMATION

- P-01 TYP. STREET AND UTILITY PLACEMENT DETAIL
- P-02 BACKFILL, PAVEMENT & SURFACE REPLACEMENT DETAIL
- P-03 STREET/STOP SIGN DETAIL
- P-04 SIGN BRACKET DETAIL

SEWER INFORMATION

- S-01 PRE-CAST SEWER MANHOLE DETAIL
- S-02 PRE-CAST SEWER MANHOLE SECTION DETAIL
- S-03 CAST-IN-PLACE CONCRETE SEWER MANHOLE DETAIL
- S-05 SEWER LATERAL SERVICE DETAIL
- S-06 SEWER MANHOLE COVER DETAIL
- S-07 SEWER MAIN TRENCH DETAIL
- S-08 SEWER CAST IRON VALVE BOX DETAIL

CITY OF SHOW LOW
SUPPLEMENT TO MAG
SPECIFICATIONS

INDEX CONTINUED

WATER INFORMATION

| | |
|------|--|
| W-01 | WATER LINE AIR RELEASE DETAIL |
| W-02 | WATER LINE BLOW OFF DETAIL |
| W-03 | ¾" SINGLE WATER METER DETAIL |
| W-04 | DOUBLE RESIDENTIAL METER SET DETAIL |
| W-05 | COMMERCIAL METER SET DETAIL |
| W-06 | WATER MAIN TRENCH DETAIL |
| W-07 | FIRE HYDRANT INSTALLATION DETAIL |
| W-08 | VALVE BOX INSTALLATION DETAIL |
| W-09 | DEBRIS CAP INSTALLATION DETAIL |
| W-10 | TAPPING SLEEVES AND VALVES DETAIL |
| W-11 | PRESSURE REDUCING STATION DETAIL |
| W-12 | VERTICAL REALIGNMENT OF WATER MAINS DETAIL |
| W-13 | WATER PIPE RESTRAINED JOINT TABLES DETAIL |

GENERAL INFORMATION

1. These details have been prepared in an effort to standardize construction details. They are to be used in conjunction with the current edition of the “Uniform Standard Specifications for Public Works Construction” sponsored and distributed by the Maricopa Association of Governments.
2. Many notes within these details refer to various sections of the “Uniform Standard Specifications for Public Works Construction.” Where this reference is made, only the abbreviation “Sect.” is used. An example of this reference would be: “Class ‘A’ Concrete per Sect. 725.”
3. Many notes within these details refer to other details within this book. Where this reference is made, the abbreviation “Std. Detail” is used. An example of this would be: “See Std. Detail W-09 for Valve Box Installation.”
4. Many details cover more than one sheet. These sheets have been given the same number with a suffix letter. Example: W-02A and W-02B.
5. An effort has been made to include the most commonly used construction details in this book. Items that require design consideration by the designing engineer have not been included.
6. Some of the details printed here in may be used by some of the agencies and not by others. The designing engineer should therefore contact the agency with in whose jurisdiction he is working, for direction as to which detail or portions of details should be used.
7. The details in this book are not to scale.

GENERAL INFORMATION

CHLORINATION

1. Pressure testing to be supervised by the Public Works Department and/or Engineering Department to AWWA specifications C-600 AND C-605.
2. All microbiological drinking water tests on new mains shall be taken by the Engineering or Public Works Department. The number of tests shall be determined by the Public Works Water Supervisor and/or Engineering Department. The cost of the microbiological analysis report shall be the responsibility of the owner/developer. If the project is a City CIP Project, the City will pay for the first round of testing. Any further testing as a result of a failed test will be paid for by the contractor responsible for the installation.
3. The Contractor will be required to utilize a City owned pump for all testing. The Contractor shall provide a deposit to the City to check out the pump and is responsible for any damages while the pump is in their possession.
4. If, after three testing attempts by a certified laboratory, the microbiological analysis tests results are still positive for total coliform bacteria, the Engineering Department and/or Public Works Department may, at their determination, require the developer to mechanically flush the lines utilizing properly sized equipment. After this procedure the water lines shall be pressure tested and rechlorinated per City of Show Low specifications.
 - a. Infrastructure Improvement Agreement Item #20
The City of Show Low Engineering or Public Works Department shall perform the chlorine residual and bacteriological tests. The applicant shall schedule the test to be performed after the water line has been pressure tested. The City Inspector shall be present during testing and sampling. The applicant shall pay all costs associated with performing the tests (i.e. lab fees) before the tests are performed.
5. Valves shall not be manipulated so that strong chlorine in the line being treated will flow back into the line supplying the water. This procedure will be supervised by the Public Works Department and/or Engineering Department.
6. Flushing of water mains prior to microbiological testing shall be performed by the Public Works Department and/or Engineering Department.
7. Sodium Hypochlorite and/or Calcium Hypochlorite is preferred for chlorination of water mains. HtH "High test hypochlorite" will be allowed only if dissolved in solution prior to injection, with a Hydro-static pump which may be only provided by the City of Show Low – gas alternate if qualified, contractor assumes full responsibility.

GENERAL INFORMATION

8. All new water main extensions shall have a tap saddle installed within two (2) feet of an existing water valve for chlorination purposes.
9. Water trucks, water wagons and private water trailers with pumps shall not be used for chlorination. Private Pumps shall not be used for chlorination, pump equipment shall be owned by the City.

WATER VALVES

1. Line valves shall be placed no more than 1,000 feet apart per AWWA specifications.
2. There shall be a minimum of two valves on every tee, three valves on every cross per AWWA specifications.
3. All water valves installed within five feet of a roadway shall include a concrete collar per City of Show Low Detail W-08. There is to be no concrete or bricks on top of valves. Any valves located in an alley or easement that is accessible to vehicular traffic shall also receive a concrete collar.
4. Operating nuts deeper than five-foot shall have an extension to fit each installation – MAG standard detail 391-2.
5. All valves installed in the distribution system shall have a two-inch square valve nut.
6. Installing “hot-taps” up to 2-inches shall be installed by the Public Works Water Department for a fee. Contractors may perform “hot-taps” only if supervised by the Public Works Water Department and/or Engineering Department.
7. Debris caps shall be installed by the developer in every valve per City of Show Low standard detail W-09. Styrofoam caps are not allowed.
8. Prior to acceptance of a project, the contractor shall verify that all valves are open. This shall be supervised by the City’s Engineering or Public Works department. Valves are to remain open from that point on.

METERS

1. All water meters shall be provided, maintained and installed by the Public Works Department.

GENERAL INFORMATION

2. Bulk water meters with backflow assemblies shall be provided and installed by the Public Works Department. The Contractor shall pay the required deposit and set up payment prior to the placement of the Bulk water meters and backflow assemblies. Relocation during construction shall be completed by the Public Works Department upon request.
3. Barrel locks shall be provided by the developer and installed locked-off by the Public Works Department, prior to final acceptance of the subdivision.
4. Copper washers shall not be used. Rubber washers shall be used on all resetters and all other appurtenances.
5. If water services are not installed per City of Show Low Standard Detail W-03 or W-04 a water meter will not be installed until the issue is rectified.

FIRE HYDRANT

1. All fire hydrants installed in the distribution system shall be dry barrel Mueller or Waterous only and to be manufacturer's painted yellow.
2. Fire hydrants shall be installed per the requirements outlined in the most current adopted fire code and approved by the Engineering Department.
3. Fire flow tests will be performed by the Public Works Water Department and shall have a minimum total flow for residential 1000 GPM and for commercial 1500 GPM at 20 PSI residual pressure per fire code.
4. Fire hydrants shall be installed per City of Show Low Specification W-07A. Use C-900 only.
5. All fire hydrants shall have a minimum clearance of 18" and a maximum of 24" from base to nozzles. The base shall have a 3' radius clear of debris.

AIR RELEASE VALVE (ARV) and PRESSURE REDUCING VALVE (PRV)

1. All ARV's shall be manufactured by Crispin, or approved equal.
2. Installation of ARV's shall conform to City of Show Low Detail W-01.
3. All PRV's shall be manufactured by Cla-Val.
4. Installation of PRV's shall conform to City of Show Low Detail W-11

MISCELLANEOUS

1. Water/Sewer services shall be installed with a minimum 6-foot separation where possible.
2. If a City appurtenance falls on a back slope, they shall be relocated wherever possible, or installed four (4) feet into the public utility easement (PUE).
3. Fourteen gauge coated tracer wire shall be installed on water mains and be tied to the fire hydrant nozzle.
4. All water services shall be sized by the design engineer for each specific use but shall not be smaller than 1".
5. If more than one (1) tap is to be installed, they shall have a minimum of 12" separation between tap saddles for PVC water mains. Taps shall also be a minimum of 12" away from a bell or water main fitting. Separation of taps on water mains with other material shall be determined by Engineering Department.
6. All tracer wires to be tested for continuity prior to acceptance.
7. Thrust blocks are required for all taps along with proper blocking of the tapping valve. Refer to MAG Standards for sizing. Provide calculations for site specific soil conditions. Additional blocking may be required based on site conditions as determined by the Public Works or Engineering Department.

PERMITS AND POLICIES

CONDITIONS OF RIGHT OF WAY PERMIT

1. The proposed work shall be located and constructed to the satisfaction of the City of Show Low. Two sets of construction plans shall be submitted with the ROW permit application.
2. Traffic control for any work performed within the public right-of-way shall conform to the most current **Manual of Uniform Traffic Control Devices**. A traffic control plan shall be submitted with the right to correct deficient barricading and charge the applicant.
3. The applicant shall conform to all provisions of the Arizona Blue Stake Law, and shall call **1-800-STAKE-IT** a minimum of 48 hours prior to any work involving excavation.
4. The City Public Works Department (532-4100) shall be notified 24 hours prior to starting work under this permit and as the work proceeds for these activities that require City inspection (i.e. backfilling). Failure to provide said notification would subject the work to re-excavation, removal or replacement at the permittee's expense.
5. The permittee shall take full responsibility for all work done under this permit and shall complete the work in a workmanlike manner, including cleanup, restoration of right-of-way and repair of damaged property. In addition, the permittee will warranty the work for two years from the date of completion.
6. All work shall be at the sole expense of the applicant and shall be done using standard traffic control procedures in order to cause the least inconvenience and hazard to vehicular and pedestrian traffic.
7. Excavated or stored material shall not be stored on pavement, sidewalk, or traveled roadway surface unless specifically stated and approved on the permit.
8. The applicant assumes the responsibility and all liability for any injury or damage to said street in a lawful manner, caused by or arising out of the exercise of this permit.
9. Boring shall be required in lieu of pavement cuts, where practical, for newly surfaced roadways for a period of two years from the date of acceptance of surfacing. Boring pits shall be placed a minimum of two feet from pavement edge where practical. Open cutting of paved roads, if not specifically requested in the application, will require notification to, and permission of, the City of Show Low Public Works Department. Backfill and patching will meet the requirements of standard detail number P-02.

PERMITS AND POLICIES

CONDITIONS OF RIGHT OF WAY PERMIT

10. The applicant also agrees to contact the City of Show Low Public Works Department for final inspection by the Engineering Inspector after installation is complete. If installation does not meet the City of Show Low requirements, connection to City utilities will not be established.
11. Any contractor working within the City of Show Low right-of-way shall have the appropriate contractor's certification.
12. Taps on City owned lines **shall be made by Public Works personnel only,** unless prior permission has been obtained from Public Works or Engineering Departments and City Staff is present to observe the 'hot-tap.'"
13. Driveways shall maintain the same slope of the roadway for at least five (5) feet toward the property, and shall be paved with at least four (4) inches of a City approved paving material (asphalt or concrete) from the roadway to the property line where possible.



City of Show Low

"Named by the turn of a card"

180 North 9th Street
Show Low, AZ 85901
Telephone (928)532-4000
Facsimile (928) 532-4009
www.showlowaz.gov

PERMIT FOR WORK WITHIN A PUBLIC RIGHT – OF – WAY APPLICATION

NAME OF APPLICANT: _____

MAILING ADDRESS: _____

CONTACT PERSON FOR DESIGN: _____ PHONE: _____

CONSTRUCTION TO BE DONE BY (UTILITY NAME): _____

CONTRACTOR NAME: _____ LICENSE #: _____

CONTACT PERSON FOR ROW WORK: _____ PHONE: _____

LOCATION OF WORK: _____

START DATE (ESTIMATED): _____ COMPLETION DATE (ESTIMATED): _____

TYPE OF WORK

- PAVEMENT ⁽¹⁾⁽²⁾
- CULVERT ⁽⁴⁾
- DRIVEWAY ⁽¹⁾
- MAILBOX
- LANDSCAPING ⁽¹⁾⁽²⁾
- WATER MAIN TAP ⁽³⁾
- SEWER MAIN TAP ⁽³⁾
- LINE EXTENSION ⁽³⁾
- WORKING IN EASEMENT (NOT ROW)
- COMMERCIAL CONSTRUCTION
- ESTIMATE ONLY

- (1) A plan and written description of the work is required.*
- (2) Private Retaining Structures and Fences are PROHIBITED in the City Right-Of-Way.*
- (3) Sewer and Waterline Taps and/or Extensions will incur additional costs which will be determined on a case by case basis. The City will provide a cost estimate for this work. Only City Personnel may perform water or sewer taps.*
- (4) See Culvert Policy on the back of this application.*

AGREEMENT

It is understood and agreed that all work shall conform to applicable City, State and Federal regulations and to all conditions set forth on this permit.

OTHER CONDITIONS: _____

Applicant Signature

Date

FOR CITY STAFF USE ONLY

BUILDING PERMIT # (IF APPLICABLE): _____ A.P.N. _____

RECEIVED BY: _____ DATE: _____

PRECONSTRUCTION REVIEW: _____ DATE: _____

APPROVED BY: _____ DATE: _____

INSPECTIONS: _____ DATE: _____

INSPECTIONS: _____ DATE: _____

FINAL APPROVAL: _____ DATE: _____

CULVERT POLICY

A Right of Way permit is required for the installation of culverts in the City Right of Way.

The permit application must include a sketch showing the proposed installation. The sketch must include; the location of adjacent streets, the locations of all driveways on the property, dimensions showing the length of the culvert and the dimensions from the end of the culvert to lot corners, the location of all other culverts at the property frontage, Any other structures located in the Right of Way along the property frontage. The City will determine the size of culvert that is required.

Culverts are intended for use under driveways for access to off street parking. Culverts installed for convenience, landscaping, and/or to cover roadside ditches will not be allowed on roadways designed with roadside ditches. Special consideration may be given if it is determined by City staff that adverse effects to the subject property, adjacent properties, or the City are unlikely.

It is difficult for City Crews to clean long culvert runs, therefore the maximum length allowed for a driveway culvert is 40 feet.

Culverts will be purchased and installed at the homeowner's expense. In certain cases where an existing driveway does not have a culvert or the existing roadside ditch does not function adequately, the City may elect to split the cost with the homeowner by having the homeowner purchase the culvert and the City will perform the installation.

The proposed alignment and elevation of Culverts must be field inspected by City personnel prior to installation.

PERMITS AND POLICIES

GENERAL SERVICE INSTALLATION

The City of Show Low Public Works Department has established policies following direction from the City Council and all applicable State Statutes for the installations of the subsequent services.

1. If work is needed to be performed in the right-of-way (ROW), a ROW permit must be obtained and traffic control plan must be provided.
2. The City of Show Low and State law will only permit licensed, bonded, and insured contractors to work in the ROW. All contractors must have City approval prior to commencing any work. Only those contractor with an "A" or "A-12" license classification as designated by the Registrar of Contractors are authorized to perform work in the right-of-way. It is recommended that the property owner should be confident by checking with the Registrar of Contractor that a contractor has the proper license before entering into any agreement.
3. If work is performed in the ROW, geotechnical compaction test report for the backfill must be provided or concrete slurry backfill must be used.
4. The pavement replacement, as required, shall be completed to Maricopa Association of Government (M.A.G.) Specifications and Standard Details and as modified by the City of Show Low.
5. All contractors must aide by Occupational Safety and Health administration (OSHA) regulations and Chapter 6 "Work Zone Safety" of the Manual of Uniform Traffic Control Devices (MUTCD), current edition.
6. Appointments for inspection must be made by the property owner of their representative after the service is installed, after the backfill is placed, and after the asphaltic pavement is replaced, as required.

PERMITS AND POLICIES

WATER INFORMATION

1. Prior to the installation of a water tap, the property owner's licensed contractor is responsible for exposing the main line. A City ROW Permit is required. The property owner may elect to have the City expose the main prior to the water tap for a fee.
2. Only the City of Show Low will be allowed to provide the saddle and corporation stop and will perform the actual tap to the main line for a fee.
3. If water service exists to the property and if the service is to be shared between properties, the property owner must install a tee fitting and a curb stop, as required.
4. In installations where an existing gate valve was used in place of curb stops, the gate valve must be replaced by the property owner with an acceptable curb stop and a tee fitting as needed.
5. Ford, Mueller, or City approved fittings are required for all water fittings. All waterworks materials shall be manufactured in the USA. Any substitutions to what is shown in the City of Show Low Supplement to MAG standard details shall be individually discussed and approved by the Engineering Department.
6. All water service pipes are required to be high density polyethylene of iron pipe size.
7. The City of Show Low is responsible for the water quality of the water in the main line.
8. Further specifications are provided in the *Water Service Detail (W-03)* in the City of Show Low standard details.

PERMITS AND POLICIES

SEWER INFORMATION

1. Prior to the installation of a sewer tap, the property owner's licensed contractor is responsible for exposing the main line. A City ROW Permit is required. The property owner may elect to have the City expose the main prior to the sewer tap for a fee.
2. The City of Show Low is responsible for installing the sewer lateral tap on the existing sewer main which includes the saddle and street 45 degree fitting only. This shall be done for a fee.
3. The property owner is responsible for the installation of the sewer service from the sewer lateral tap to the house. The sewer service must include a clean-outs as required by City of Show Low Standard Details and the Uniform Plumbing Code (UPC).
4. The property owner is responsible for all repairs and maintenance from the property line to the house.
5. The City of Show Low requires all sewer pipes within the City ROW and easements to be SDR-35 pipe. Other pipe material may be required based on site conditions and will be reviewed by the Engineering Department.
6. The City of Show Low requires "ring-tight" pipe to be used for sewer taps.
7. Further specifications are provided in the *Sewer Service Detail (S-05)* in the City of Show Low standard details.
8. Adjustable rings and covers shall not be used in the City of Show Low.
9. All sewer manholes shall be accessible to the City of Show Low
10. A gravity sewer main may be installed on a horizontal radius in new residential subdivisions only as approved by the Public Works Director. The City's policy for this installation and associated details are available upon request from the City of Show Low Engineering Department.
11. If the installation of a new manhole in the collection system or the reconstruction of an existing manhole in the collection system that lies within 2,000 LF upstream or downstream of an inlet of low pressure sewer,
 - a. The precast concrete manhole shall have a chemical resistant interior coating installed. The coating shall be approved by the City Engineer.
or
 - b. An approved polymer manhole shall be installed. The polymer manhole material and specifications shall be approved by the City Engineer.

PERMITS AND POLICIES

CULVERT INFORMATION

1. The property owner is responsible for all the installations and maintenance of culverts located on their property.
2. The installation of a Culvert in the City ROW shall require a City ROW Permit. The Applicant is responsible for providing their culvert and the licensed contractor for the installation. The City will maintain the culvert after the culvert is properly installed. The culvert, headwall, and all other appurtenances must be compatible with snow removal operations and roadway safety in the public right-of-way.
3. Prior to the culvert installation in the public right-of-way, the property owner shall contact the City of Show Low to obtain a RIGHT-OF-WAY permit so that the culvert can be sized and the slope determined.
4. Prior to backfilling the culvert, the City shall be contacted for an inspection of the installation for culverts in the public right-of-way.
5. The City of Show Low requires all culverts to be of 16 guage CMP or stronger or HDPE and shall be sized by City of Show Low Public Works. Culverts shall not be smaller than 12" in the City ROW.
6. Culverts shall be installed per steel pipe manufacturer's guidelines with regard to bedding, slope, etc.
7. Culvert inverts shall match ditch flow line. Ditch may require grading to provide minimum cover at the culvert. If ditch is re-graded, the flow line shall be constructed to provide positive drainage.

PERMITS AND POLICIES

PAVEMENT INFORMATION

Pavement replacement and backfill which is used for the repair of the roadway and shoulders will be performed in accordance with City of Show Low Standard Detail P-02.

In general, the following criteria will govern which type is used:

“Type A” Trench Repair pavement replacement per P-02, will be utilized on all streets where excavation is longitudinal to the centerline of the street. Type “A” may also be used for service line trench repairs.

“T-Top” Trench Repair pavement replacement per P-02, shall be utilized on all streets where excavation is transverse to the centerline of the street.

Where a longitudinal trench is partly in pavement, the pavement shall be replaced to the outside edge of the existing pavement on a straight line to establish the pavement width.

Where no part of a trench is in pavement, surfacing replacement will only be specified where existing surfacing materials have been removed.

When a trench cut is in aggregate surfaced area, the surfacing replacement shall be of a like type and depth as the existing material, compacted to the densities required in Maricopa Association of Government (M.A.G.) Standard Specifications.

Two weeks prior to pavement placement, the Contractor shall submit a project specific mix design for review by the Engineer.

All street sections without curb and gutter are required to have a thickened edge per MAG Standard Detail No. 201 – Type A.

Curbs shall be replaced to the original condition. Sidewalks shall be removed to full panel sections and replaced to the original condition.

Any broken edges shall be saw cut square to provide a straight edge for the installation of the asphalt patch.

PERMITS AND POLICIES

PAVEMENT INFORMATION

Preservative Seal

Preservative seal on streets classified as residential and local collector shall be in accordance with MAG Section 718, polymer modified type C. At the City's discretion, cash in-lieu of the installation of the preservative seal may be required. This cost will be estimated based on the paved area multiplied by a fair market unit cost.

Concrete Curb, Gutter, Sidewalk, Driveway and Alley Entrance

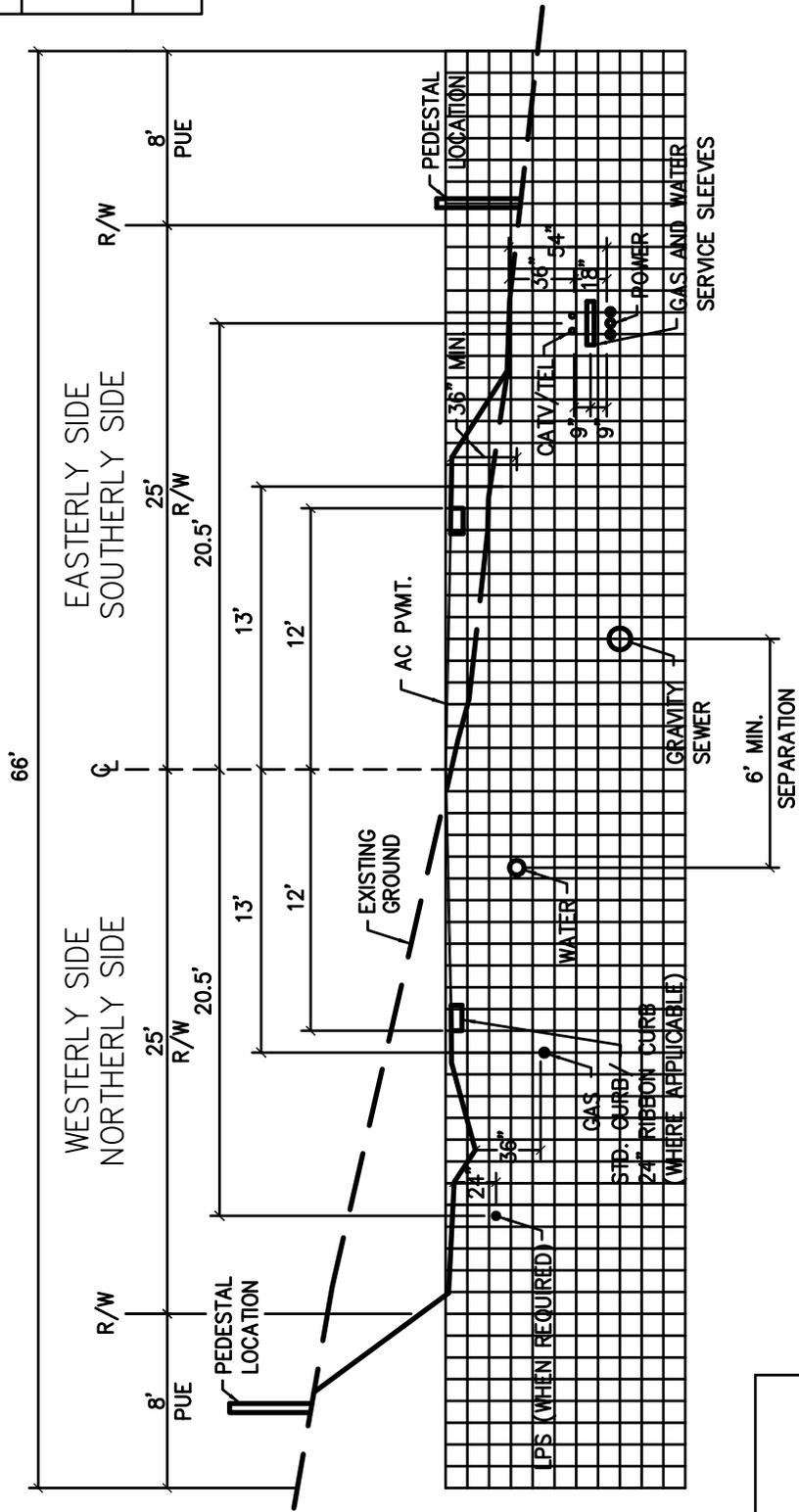
All driveways, alley entrances and sidewalk ramps constructed in the City of Show Low shall be a minimum of 8 inches thickness. All sidewalk panels, valley gutters, curb and gutters, ribbon curbs and aprons with cracks shall be replaced by the Contractor. Any section of the work deficient in depth or not conforming to the plans or specifications shall be removed and replaced by the Contractor at no additional cost to the Contracting Agency.

LOW PRESSURE SEWER SYSTEMS

GENERAL INFORMATION

NOT APPROVED, ONLY ACCEPTED BY THE CITY OF SHOW LOW UNDER SPECIAL CIRCUMSTANCES. IF APPROVED, GUIDELINES AND SPECIFICATIONS WILL BE PROVIDED BY THE CITY ENGINEER'S OFFICE.

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
|----|-------------------------|---------|------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |



- NOTES:
- 1) LOCATION OF WATER AND SEWER LINES MAY VARY PER TERRAIN
 - 2) KEEP VALVE AND MANHOLES OUT OF ADA SIDEWALK RAMPS

CROSS-SECTION LOOKING NORTH/EAST

| | |
|--------------|---|
| DETAIL NO. |  |
| P-01 | |
| SHEET 1 OF 1 | |

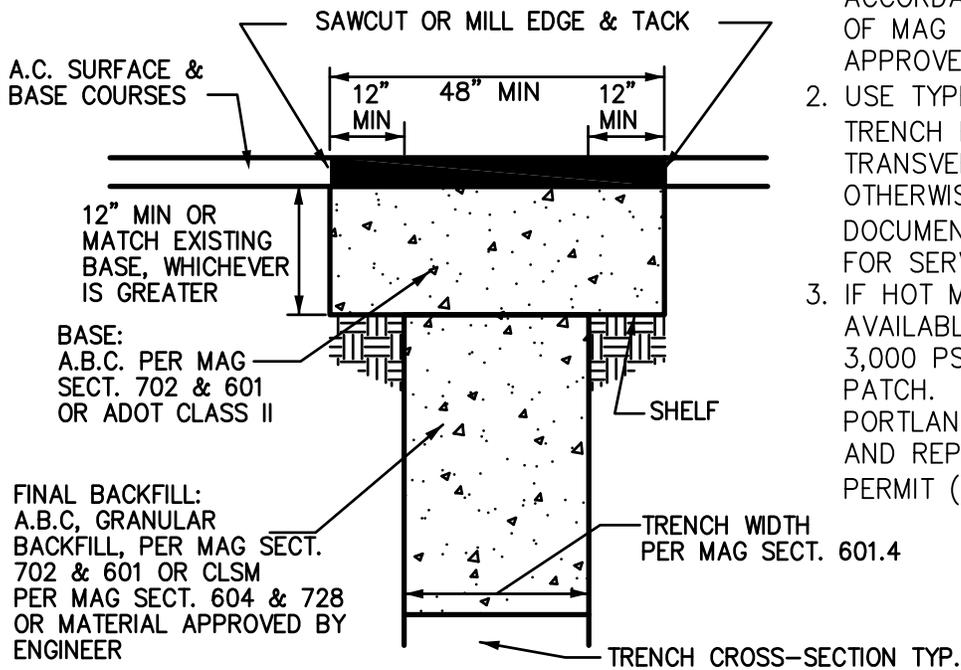
STANDARD DETAIL
 TYP. STREET AND UTILITY PLACEMENT DETAIL

APPROVED BY

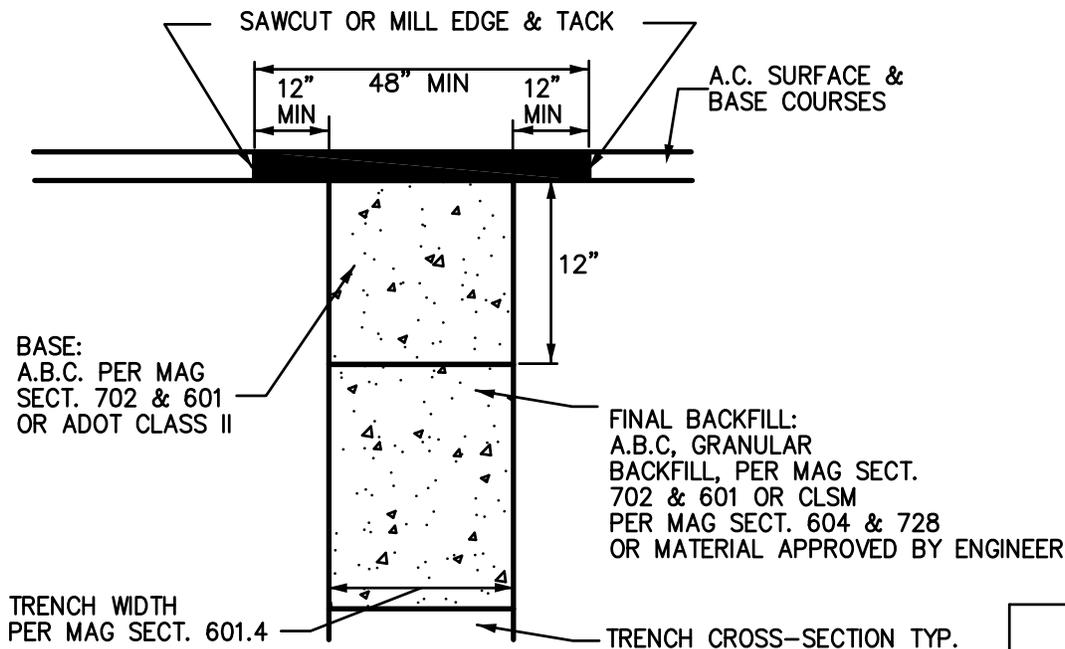
| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
|----|-------------------------|---------|------|
| 1 | | | |
| 2 | | | |
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NOTES:

1. ASPHALT CONCRETE SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF MAG SECT 321, ADOT SECT 409, OR APPROVED BY ENGINEER.
2. USE TYPE "A" FOR LONGITUDINAL TRENCH REPAIR AND USE "T-TOP" FOR TRANSVERSE TRENCH REPAIR UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS. TYPE "A" MAY BE USED FOR SERVICE LINES
3. IF HOT MIX AC IS NOT SEASONALLY AVAILABLE, CONTRACTOR TO PLACE 3,000 PSI TEMPORARY CONCRETE PATCH. CONTRACTOR SHALL REMOVE PORTLAND CEMENT CONCRETE PATCH AND REPLACE WITH AC WHEN CONDITIONS PERMIT (NO MORE THAN 7 MONTHS).



"T TOP" TRENCH REPAIR



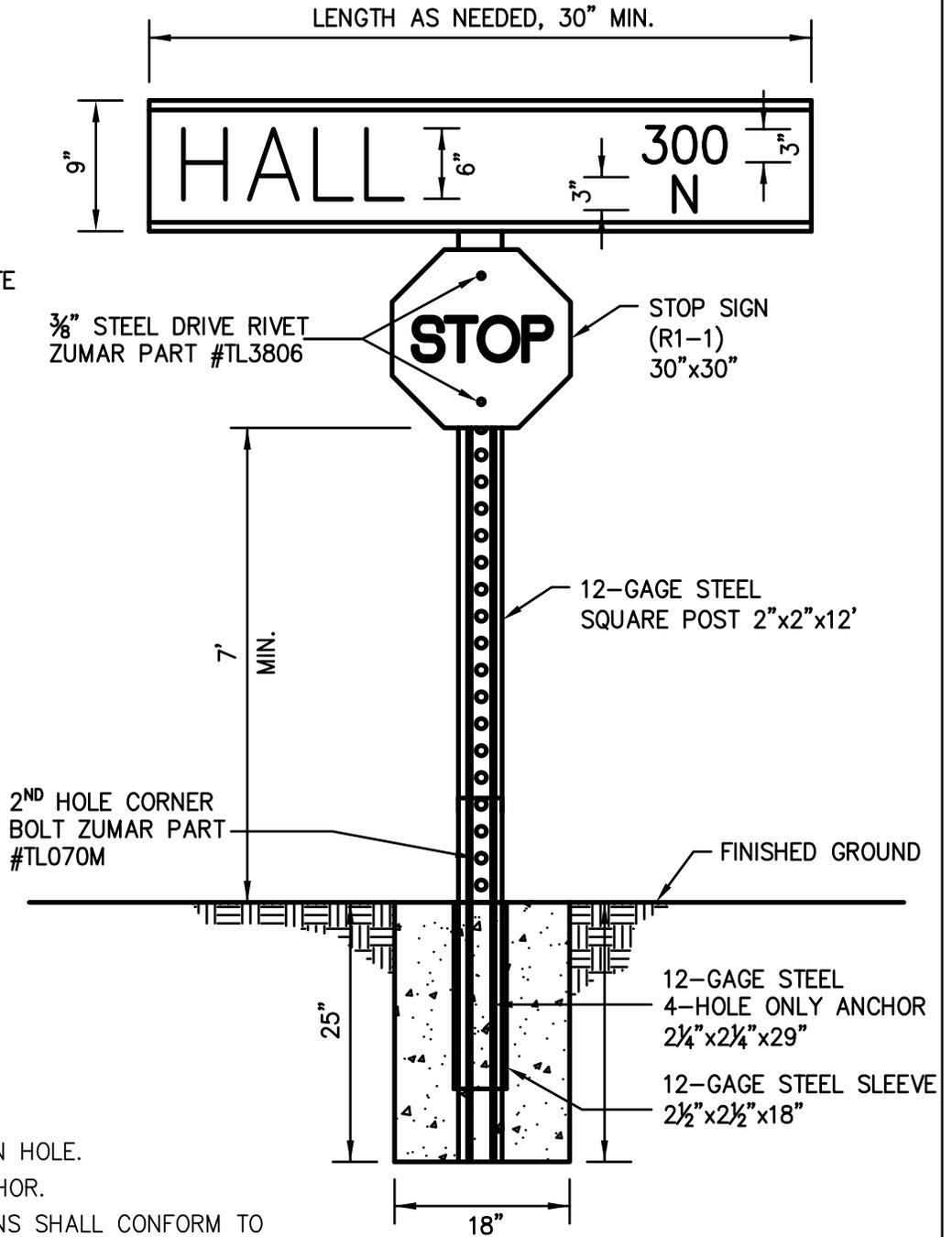
TYPE "A" TRENCH REPAIR

| | | | |
|--------------|--|--|-------------|
| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| P-02 | | BACKFILL, PAVEMENT & SURFACE REPLACEMENT | |
| SHEET 1 OF 1 | | DETAIL | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
|----|-------------------------|---------|------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

REFLECTIVE WHITE
LETTERS ON
REFLECTIVE GREEN
BACKGROUND

12 GAUGE (.080 IN.)
ALUMINUM NAME PLATE



NOTES:

2 BAGS CONCRETE MINIMUM IN HOLE.

NO CONCRETE INSIDE OF ANCHOR.

HEIGHT & PLACEMENT OF SIGNS SHALL CONFORM TO THE MUTCD.

SIGN BRACKETS: SHALL BE A MIN. OF 12" IN LENGTH WITH TWO 1/4" STEEL RIVETS TO HOLD SIGN TO BRACKET AND BRACKET TO POST. (REFER TO DETAIL P-4 FOR FURTHER INFORMATION)

| | | | |
|--------------|--|-----------------|-------------|
| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| P-03 | | SIGN DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
|----|-------------------------|---------|------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |

LETTERS SHALL BE 6" UPPER CASE FOR STREET NAME, ADDRESSING SHALL USE 3" UPPER CASE LETTERS W/BLOCK NUMBER ON TOP LINE & DIRECTIONAL LETTERS ON BOTTOM LINE. (REFER TO DETAIL P-3 FOR FUTHER INFORMATION)

NOTES:

NAME PLATE: EXTRUDED BLADE WITH 0.250" BULB & 0.091" WEB.

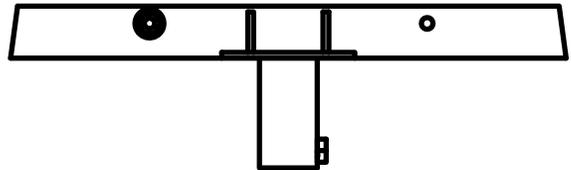
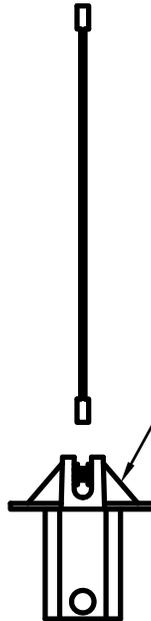
SIGN SIZE SHALL BE 9" BY VARYING LENGTHS 30" MIN., 48" MAX.

SHEETING SHALL BE 3M DG3 OR PROPOSED ASTM 11 WITH 3M 1177 GREEN TRANSLUCENT OVERLAY OR EQUIVALENT.

SIGNS SHALL BE DOUBLE FACED W/SQUARE CORNERS.

SIGNS: REGULATORY, WARNING, GUIDE, CONSTRUCTION, PUBLIC INFORMATION, & SPECIALTY SIGNS ARE TO BE MANUFACTURED FROM 6061T6 OR 5052-H38 ALUMINUM ALLOY.

ALL REGULATORY SIGNS SHALL USE HIGH INTENSITY PRISMATIC SHEETING.



BRACKETS SHALL BE A MIN. 12" IN LENGTH WITH TWO 1/4" STEEL RIVETS HOLDING EACH SIGN TO THE BRACKET. ZUMAR PART # 85146.

ATTACH TO TOP OF Z SQUARE POST WITH 1/4" RIVET ZUMAR PART # 85146.

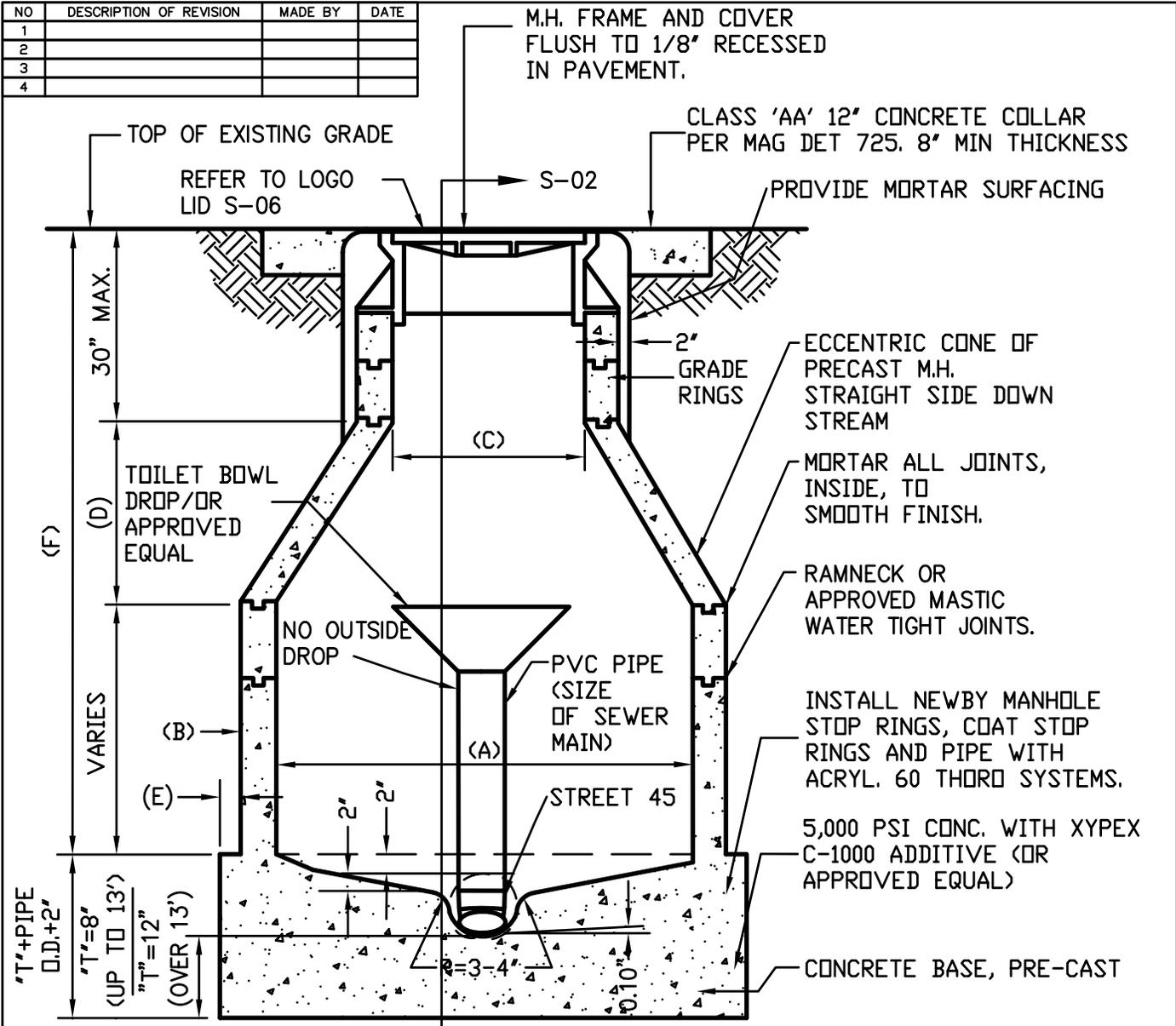
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|--------------|
| DETAIL NO. |
| P-04 |
| SHEET 1 OF 1 |



| |
|------------------------|
| STANDARD DETAIL |
| SIGN BRACKET DETAIL |

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| APPROVED BY |
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| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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NOTES:

1. IF MANHOLE IS LOCATE OUTSIDE IF PAVEMENT LID SHALL BE 6"-9" ABOVE ADJACENT GRADE. CONCRETE COLLAR REQUIRED
2. ALL MANHOLE EXCAVATIONS SHALL BE BACKFILLED WITH A 1-SACK SLURRY MIX THAT IS APPROVED BY THE ENGINEER.
3. BOLT DOWN LIDS MAY BE REQUIRED BY CITY DEPENDING ON LOCATION
4. CROWN ELEVATION OF STUB TO MATCH CROWN OF MAIN LINE

| PIPE SIZE | (A) | (B) | (C) | (D) |
|-------------|-----|-----|-----|-----|
| 17" OR LESS | 48" | 6" | 24" | 24" |
| 18" TO 36" | 60" | 8" | 36" | 32" |

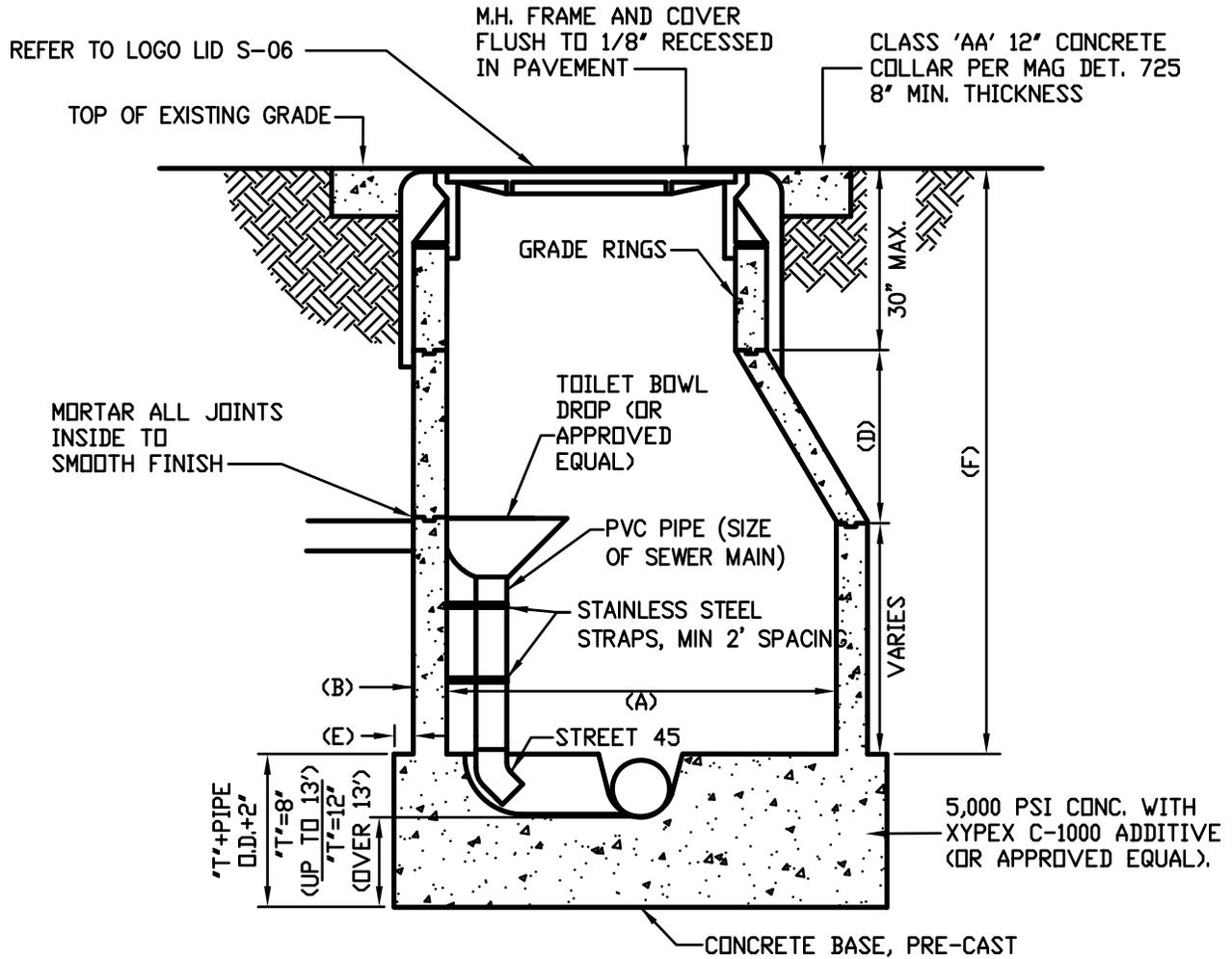
| (F) | BASE THICKNESS | (E) |
|----------|----------------|-----|
| UP TO 8' | 6" | 8" |
| 8-12' | 8" | 8" |
| OVER 12' | 12" | 12" |

| | | | |
|--------------|--|-------------------------------|-------------|
| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| S-01 | | PRE-CAST SEWER MANHOLE DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
|----|-------------------------|---------|------|
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NOTES:

PRE-CAST, REINFORCED M.H. SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH A.S.T.M. C-478 EXCEPT AS MODIFIED BY STANDARD DETAILS BELOW LEFT. USE LOW ALKALI CEMENT ONLY. ALL MANHOLES WILL BE VACUUM TESTED TO CITY SPECS.

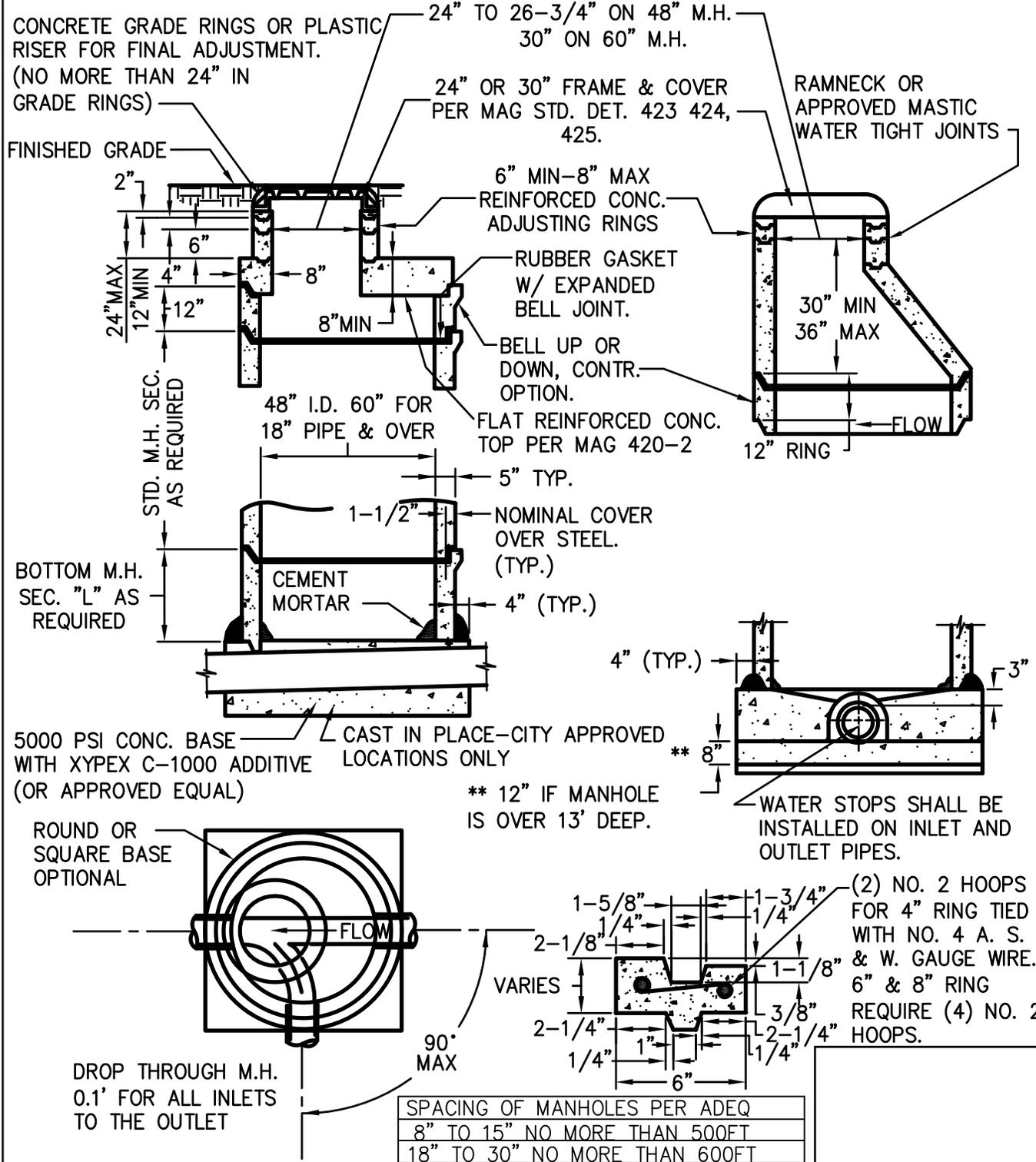


| PIPE SIZE | (A) | (B) | (C) | (D) |
|-------------|-----|-----|-----|-----|
| 17" OR LESS | 48" | 6" | 24" | 24" |
| 18" TO 36" | 60" | 8" | 36" | 32" |

| (F) | BASE THICKNESS | (E) |
|----------|----------------|-----|
| UP TO 8' | 6" | 8" |
| 8-12' | 8" | 8" |
| OVER 12' | 12" | 12" |

| | | | |
|--------------|---|---|-------------|
| DETAIL NO. |  | STANDARD DETAIL | APPROVED BY |
| S-02 | | PRE-CAST SEWER MANHOLE SECTION DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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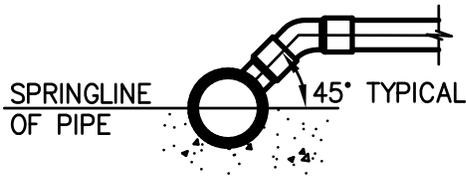
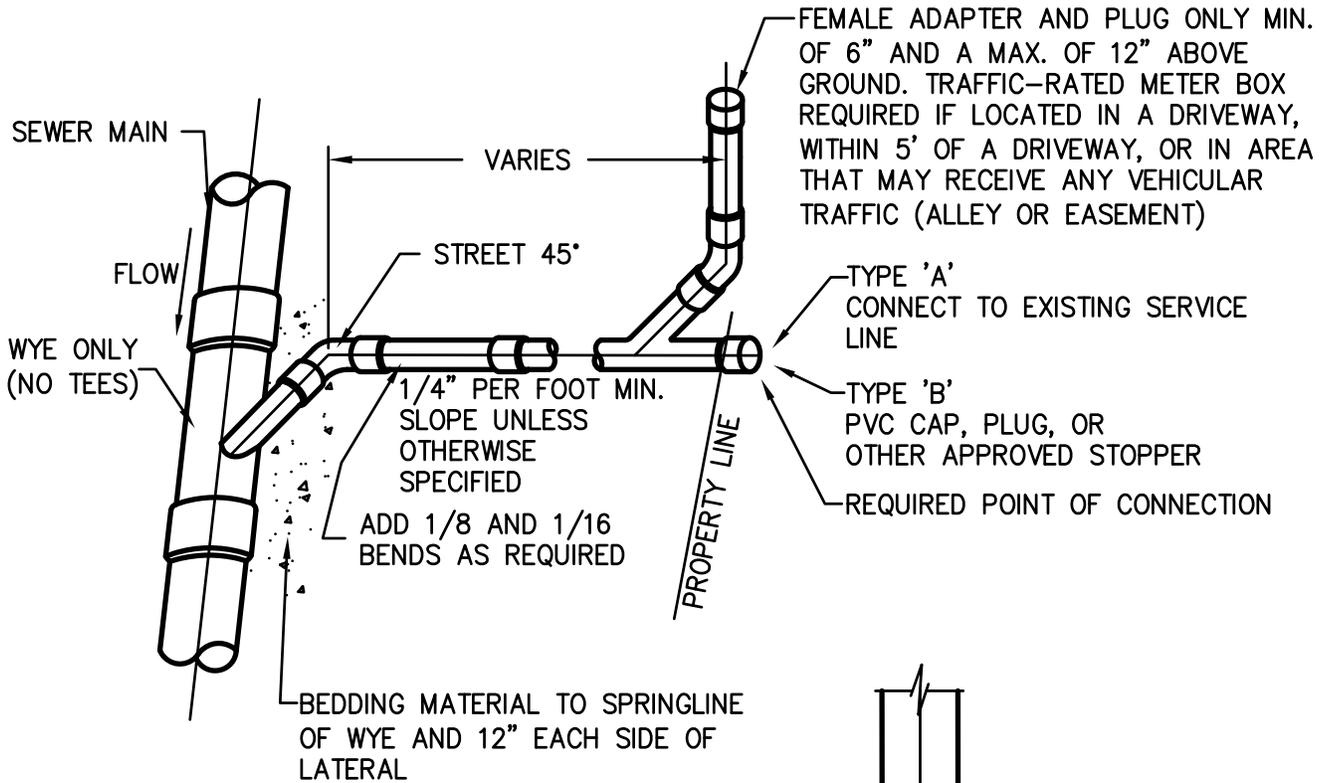


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| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| S-03 | | CAST-IN-PLACE CONCRETE SEWER MANHOLE DETAIL | |
| SHEET 1 OF 1 | | | |

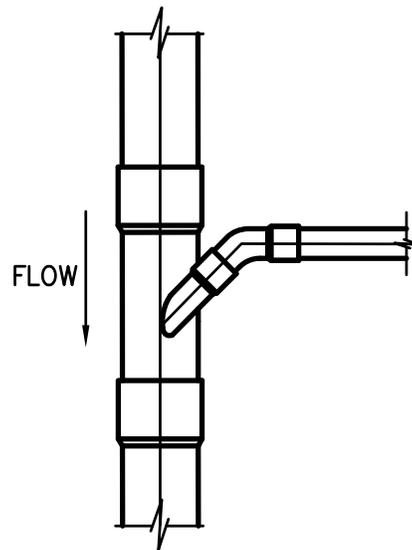
| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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NOTE:

MIN. 6' SEPARATION BETWEEN CLEAN OUT AND WATER METER.



ELEVATION



PLAN

NOTES:

1. WHERE WYE IS INSTALLED WITHOUT HOUSE LATERAL, AN APPROVED CAP, PLUG OF STOPPER SHALL BE INSTALLED.
2. LATERAL SIZE TO BE 4" FOR SINGLE OR MULTIPLE FAMILY RESIDENTIAL, AND 6" FOR COMMERCIAL.
3. THE LATERAL SHALL BE BEDDED THE SAME AS THE MAIN LINE SEWER.
4. FOR LATERALS IN CUL-DE-SACS AND LATERALS THAT ARE OTHER THAN 90° TO THE MAIN, 12 GA. TRACER WIRE SHALL BE INSTALLED.

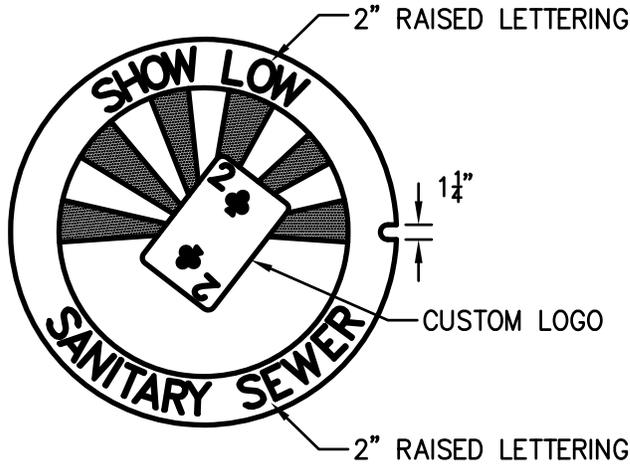
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| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| S-05 | | SEWER LATERAL SERVICE DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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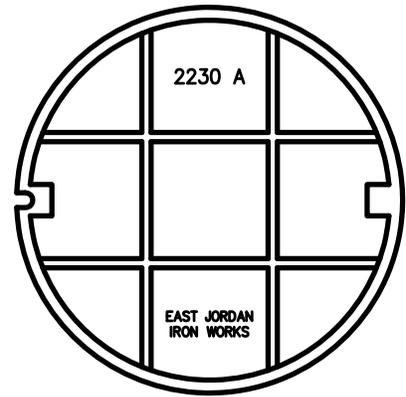
NOTE:

EAST JORDAN IRON WORKS OR EQUAL
 PRODUCT 00223172
 CATALOG 2230 A
 LOGO DWG 00223171

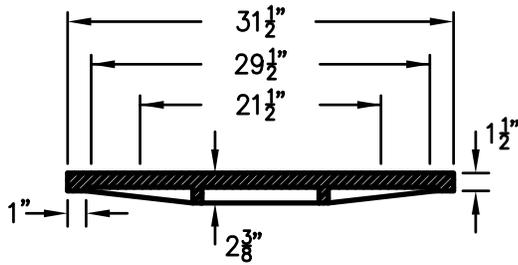
EST. WT. 221 LBS
 MAT'L SPEC. GRAY IRON ASTM A48 CL35B
 LOAD RATING HEAVY DUTY



TOP



BOTTOM



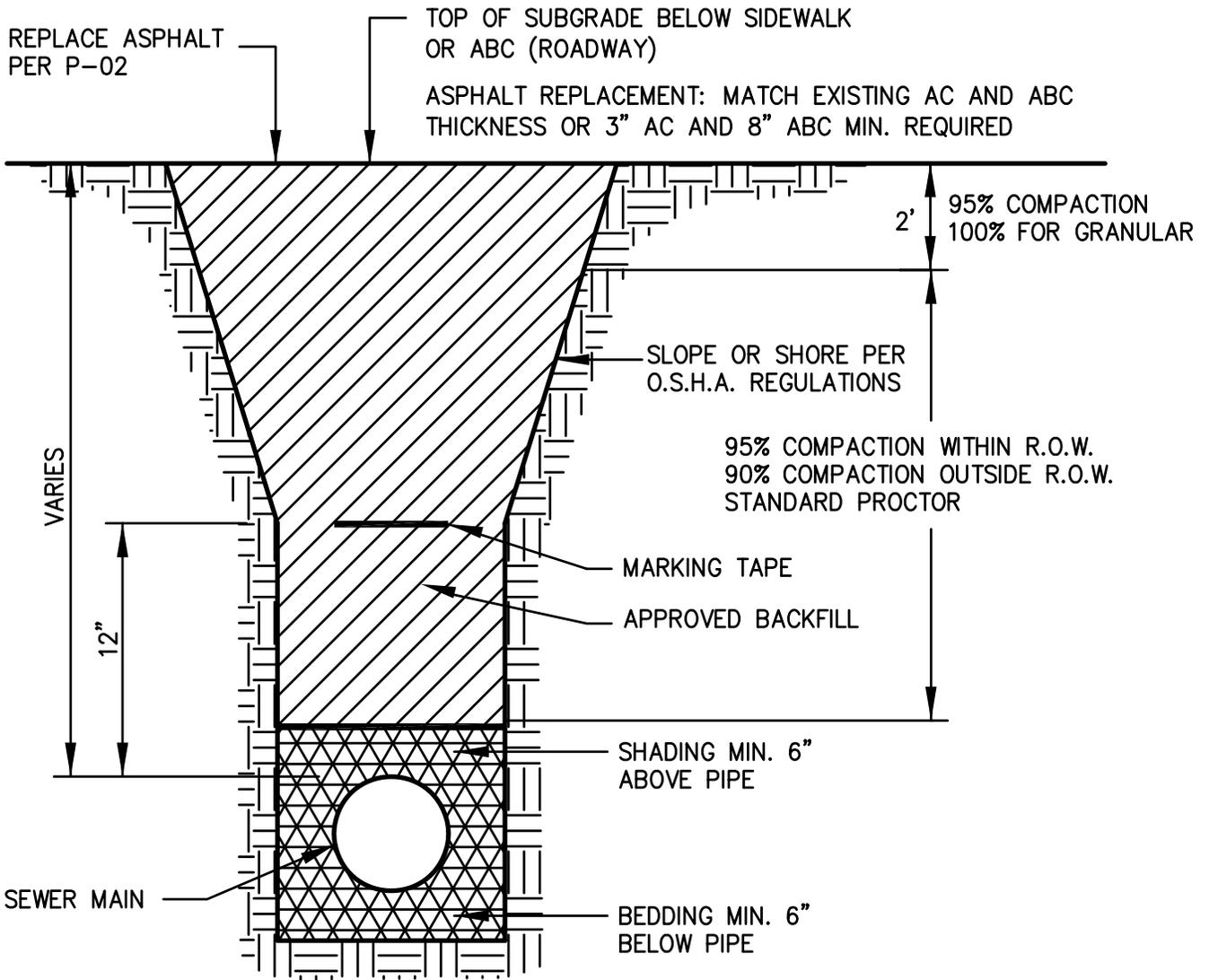
SECTION

NOTE:

TOP OF CASTINGS CAN'T BE
 HIGHER THAN RIM OF FRAME

| | | | |
|--------------|--|-------------------------------|-------------|
| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| S-06 | | SEWER MANHOLE COVER DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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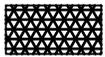


NOTE:

1. A SLURRY MIX (1 SACK) WILL BE ALLOWED AS BACKFILL IN THE TRENCH ABOVE THE MARKING TAPE. IF SEWER MAIN IS IN ADOT ROW, SLURRY MIX SHALL MEET ADOT SPECIFICATIONS.



BACKFILL MATERIAL - MAG AB, ADOT CLASS II AB, 3/4" DIRTY SCREEN CINDER. MATERIAL APPROVED BY ENGINEER.



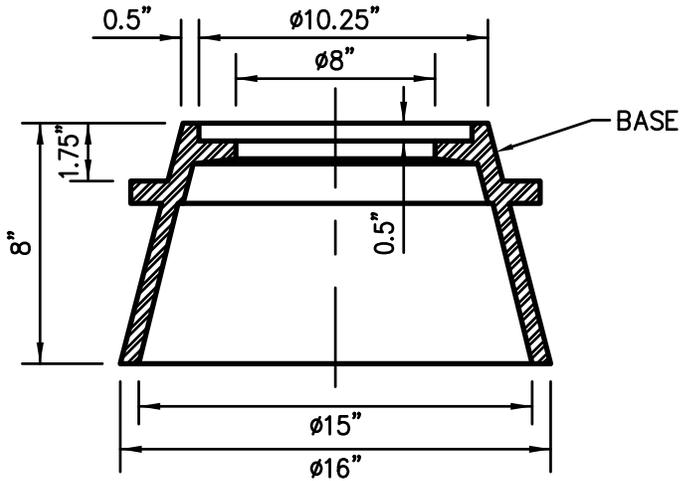
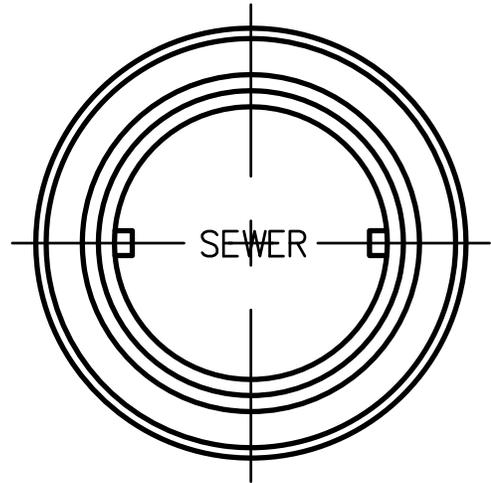
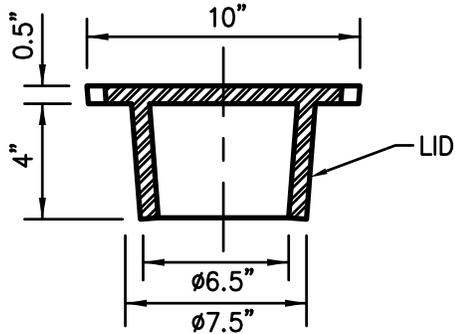
BEDDING MATERIAL - APPROVED BY ENGINEER AND COMPACTED TO 95%. PLSD BLEND MATERIAL SHALL NOT BE USED.



UNDISTURBED NATIVE EARTH.

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| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| S-07 | | SEWER MAIN TRENCH DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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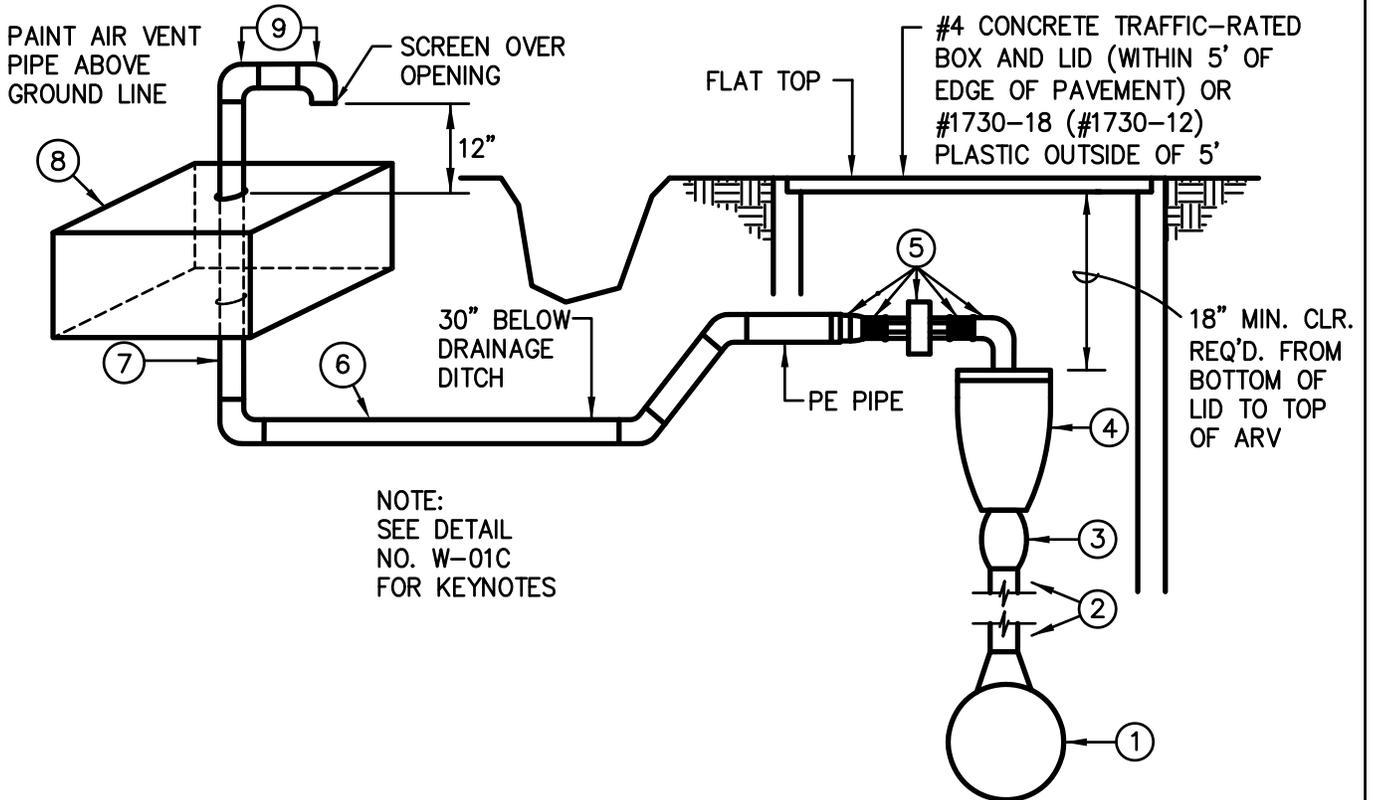


NOTES:

1. MATERIAL TO BE CAST IRON VALVE BOX VBDLT198 PER ASTM A48 CLASS 30B.
2. APPROXIMATE WEIGHT IS 63 LBS. FOR THE BASE AND 16 LBS. FOR THE LID.
3. TOP OF SEWER CLEANOUT TO BE MAX. 3" BELOW CAST IRON LID.
4. SEWER CLEANOUT SHALL BE AT PROPERTY LINE, THE WORD "SEWER" SHALL BE VISIBLE IN CONCRETE DRIVEWAY.
5. MATERIALS AVAILABLE AT LOCAL SUPPLIERS.
6. CAST IRON VALVE BOX MAY BE USED FOR TRAFFIC-RATED PROTECTION IF CLEAN OUT IS LOCATED IN A DRIVEWAY, WITHIN 5' OF DRIVEWAY, OR IN ANY AREA THAT MAY RECEIVE ANY VEHICULAR TRAFFIC (ALLEY OR EASEMENT).

| | | | |
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| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| S-08 | | SEWER CAST IRON VALVE BOX DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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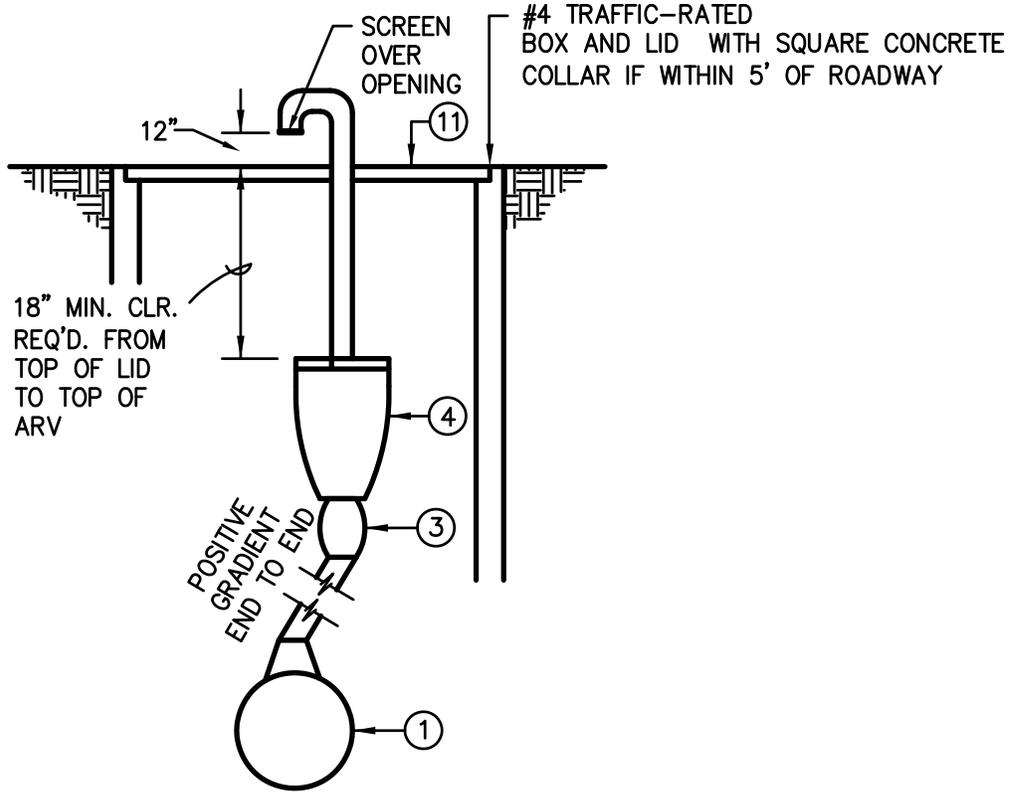
TYPE "A" ROADWAY INSTALLATION
VENT ACROSS DRAINAGE DITCH

NOTE:
LOCATION MAY VARY, PLACE
IN CITY APPROVED LOCATION.

| | | | |
|--------------|--|----------------------------------|-------------|
| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-01A | | WATER LINE AIR RELEASE DETAIL | |
| SHEET 1 OF 3 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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NOTE:
REALIGN THIS LOCATION
TO INSIDE OF PUE.



TYPE "B" SHOULDER
INSTALLATION

NOTE:
LOCATION MAY VARY, PLACE
IN CITY APPROVED LOCATION.

| | | | |
|--------------|---|----------------------------------|-------------|
| DETAIL NO. |  | STANDARD DETAIL | APPROVED BY |
| W-01B | | WATER LINE AIR RELEASE DETAIL | |
| SHEET 2 OF 3 | | | |

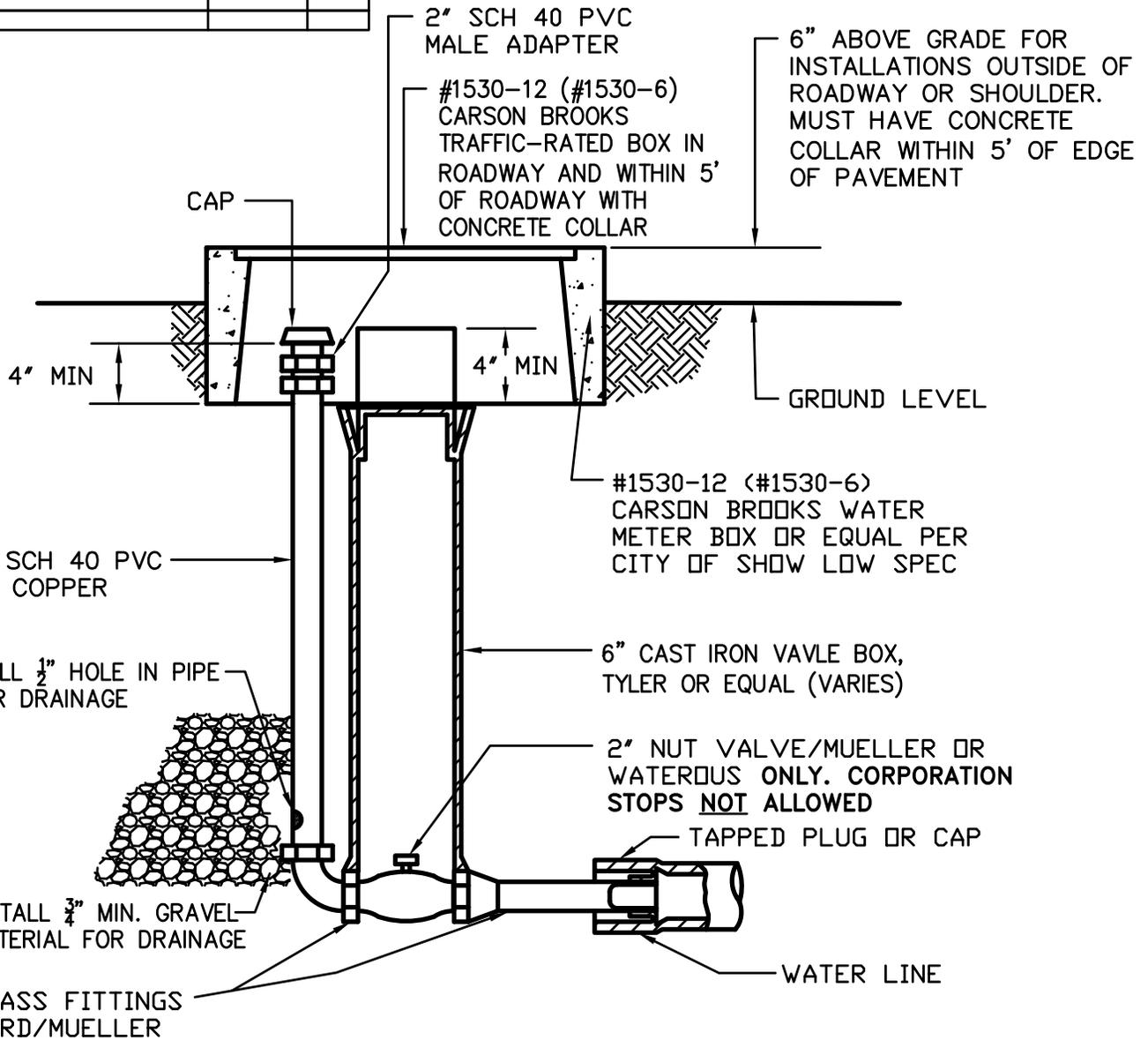
| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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NOTES:

1. FORD/MUELLER TAP SADDLE.
2. BRASS OR COPPER PIPE.
3. FORD/MUELLER CORPORATION STOP.
4. CRISPIN A-10 AIR-RELEASE VALVE, OR APPROVED EQUAL. AIR AND VACUUM COMBO UNITS NOT ALLOWED.
5. A. MALE PEP PIPE ADAPTER.
B. 2" NIPPLES, GALVANIZED OR BRASS.
C. UNION, GALVANIZED OR BRASS.
D. STREET 90 ELL, GALVANIZED OR BRASS.
6. GALVANIZED, BRASS COPPER PIPE, OR POLY.
7. RISER (GALVANIZED, BRASS OR COPPER) PIPE.
8. #1530-12 (#1530-6) CARSON/BROOKS METER BOX WITH LID AND 1" HOLE DRILLED IN THE CENTER FOR RISER. PLACE IN CITY APPROVED LOCATION.
9. 2-90° ELL'S WITH FINE MESH SCREEN OVER OPENING.
10. PVC NOT APPROVED FOR ANY NON-BURIED INSTALLATION.
11. 1730-18 (#1730-12) CARSON/BROOKS METER BOX WITH LID AND 1" HOLE DRILLED IN THE CENTER FOR RISER. PLACE IN CITY APPROVED LOCATION.

| | | | |
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| DETAIL NO. |  | STANDARD DETAIL | |
| W-01C | | WATER LINE AIR RELEASE DETAIL | |
| SHEET 3 OF 3 | | APPROVED BY | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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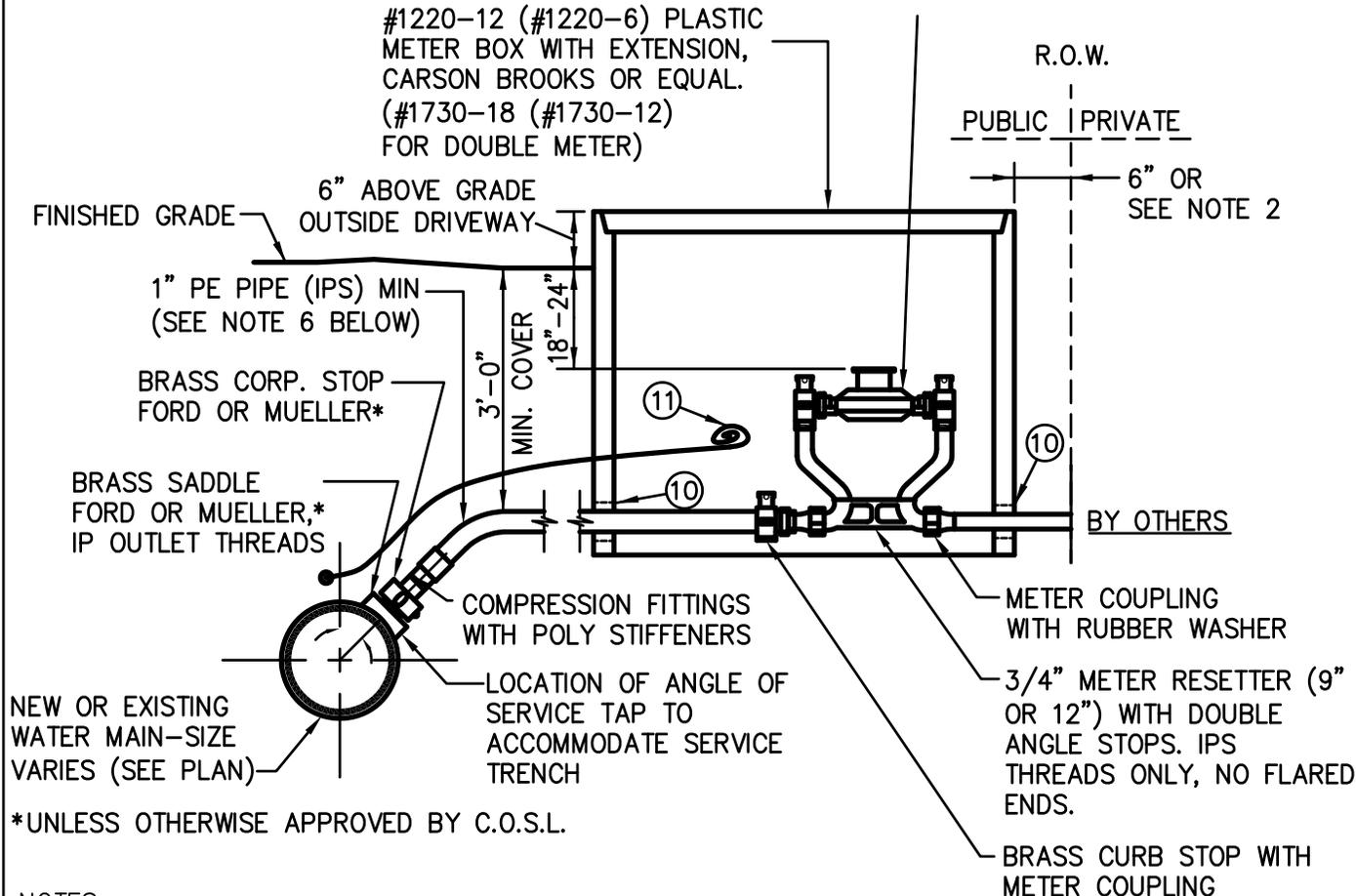
NOTE:

- MEGA LUGS ARE REQUIRED; LENGTH OF RESTRAINT TO BE DETERMINED BY DESIGN ENGINEER.

| | | | |
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| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-02 | | WATER LINE BLOW OFF DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
|----|-------------------------|---------|------|
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INSTALL 3/4" CITY PROVIDED METER
 @ FUTURE METER LOCATION
 (METER NOT IN CONTRACT)



*UNLESS OTHERWISE APPROVED BY C.O.S.L.

NOTES:

1. INSTALL P.E. PIPE (AWWA C-901) FOR NEW SERVICES.
2. EXISTING SERVICE LINES MAY BE RECONNECTED UPON APPROVAL BY THE CITY. MODIFY CORP. STOP AND COUPLINGS ACCORDINGLY.
3. USE OF COUPLING TO CONNECT NEW SERVICE CONNECTION TO EXISTING SERVICE LINE ONLY BY APPROVAL BY THE CITY.
4. ALL FITTINGS FROM THE CITY WATER MAIN TO INSIDE THE METER BOX SHALL BE BRASS. NO GALVANIZED FITTINGS SHALL BE USED.
5. COUPLINGS SHALL BE MUELLER AND FORD COMPRESSION TYPE WITH POLY STIFFENERS.
6. WATER METERS AND SERVICE LINES FROM THE METER TO THE RESIDENCE SHALL BE SIZED PER THE CURRENT ADOPTED VERSION OF THE UNIFORM PLUMBING CODE BY DESIGN ENGINEER.
7. COPPER WASHERS ARE NOT ALLOWED. USE RUBBER WASHERS ONLY.
8. FULLY PORTED BALL VALVES ONLY. NO KEY BALL VALVES.
9. INSTALL TRAFFIC-RATED BOX IF METER IS LOCATED IN DRIVEWAY, WITHIN 5' OF DRIVEWAY, OR ANY AREA THAT MAY RECEIVE VEHICULAR TRAFFIC.
10. CUT HOLE IN BOX NO MORE THAN 1/4" LARGER THAN SERVICE LINE
11. INSTALL 14 GA TRACER WIRE TO MAIN. LOOP MIN, 2' EXTRA IN BOX

| | | | |
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| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-03 | | 3/4" SINGLE WATER METER DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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NOTE:

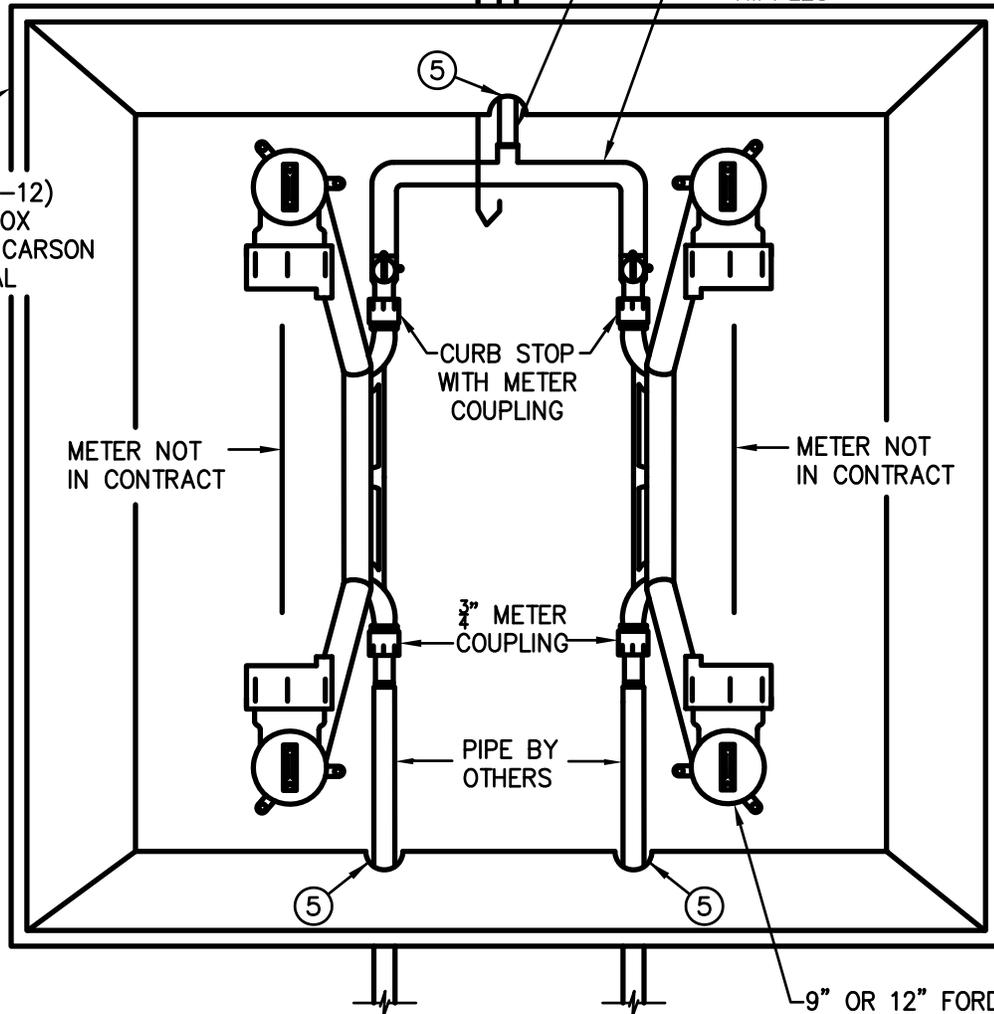
IF INSTALLING A DOUBLE METER SET, CONTRACTOR MUST INSTALL A CURB STOP ON UNDEVELOPED SIDE OF MANIFOLD.

SERVICE LINE MIN. 1½" DIA.

1½" FORD/MUELLER COMPRESSION FITTING

FORD/MUELLER 7½" OR 10½" U-BRANCH WITH VALVES. U-BRANCH MAY BE BUILT WITH APPROVAL WITH BRASS TEE AND NIPPLES

#1730-18 (#1730-12) PLASTIC METER BOX WITH EXTENSION, CARSON BROOKS OR EQUAL



NOTES:

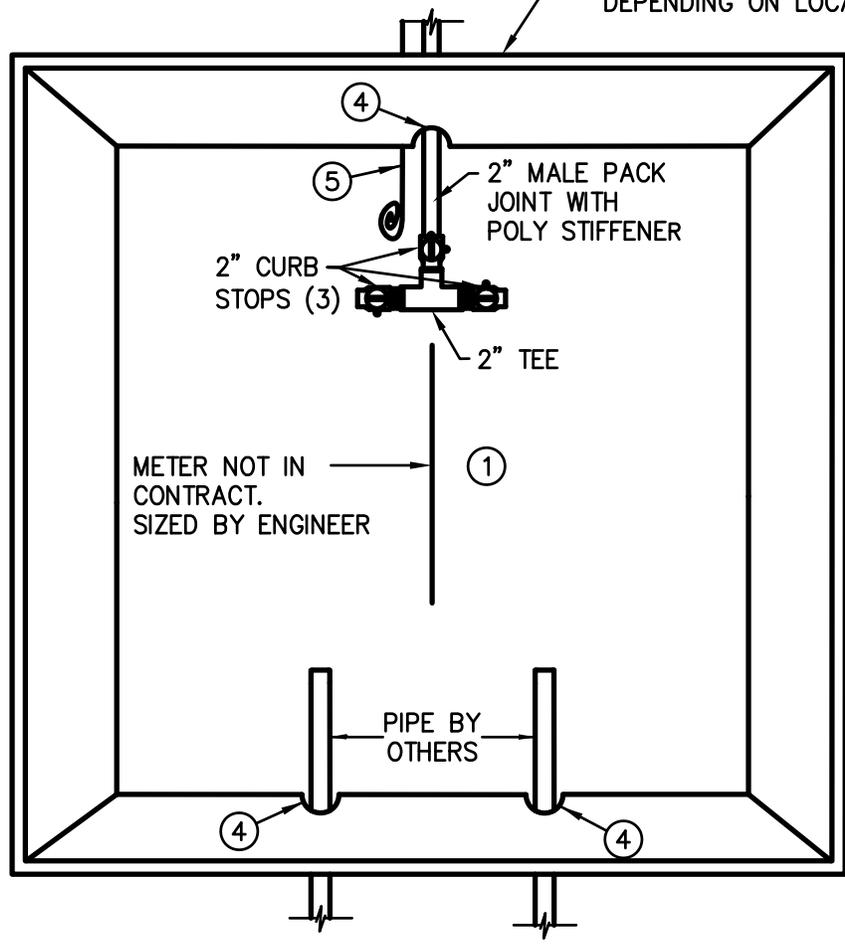
1. NO GALVANIZED PIPE CONNECTED TO METER COUPLING.
2. COPPER WASHERS NOT ALLOWED.
3. WATER METERS AND SERVICE LINES FROM THE METER TO THE RESIDENCE SHALL BE SIZED PER THE CURRENT ADOPTED VERSION OF THE UNIFORM PLUMBING CODE BY THE DESIGN ENGINEER.
4. FULLY PORTED BALL VALVES ONLY. NO KEY BALL VALVES.
5. CUT HOLE IN BOX NO MORE THAN ¼" LARGER THAN SERVICE LINE.
6. INSTALL TRAFFIC-RATED BOX IF METER IS LOCATED IN DRIVEWAY, WITHIN 5' OF DRIVEWAY, OR ANY AREA THAT MAY RECEIVE VEHICULAR TRAFFIC.
7. INSTALL 14 GA TRACER WIRE TO MAIN. LOOP MIN 2' EXTRA IN BOX.

9" OR 12" FORD/MUELLER RESETTERS WITH DOUBLE ANGLE STOPS

| | | | |
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| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-04 | | DOUBLE RESIDENTIAL METER SET DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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#1730-18 (#1730-12) PLASTIC OR CONCRETE METER BOX WITH EXTENSION, CARSON BROOKS OR EQUAL. TRAFFIC RATED BOX MAY BE REQUIRED BY THE CITY DEPENDING ON LOCATION OF METER.



NOTES:

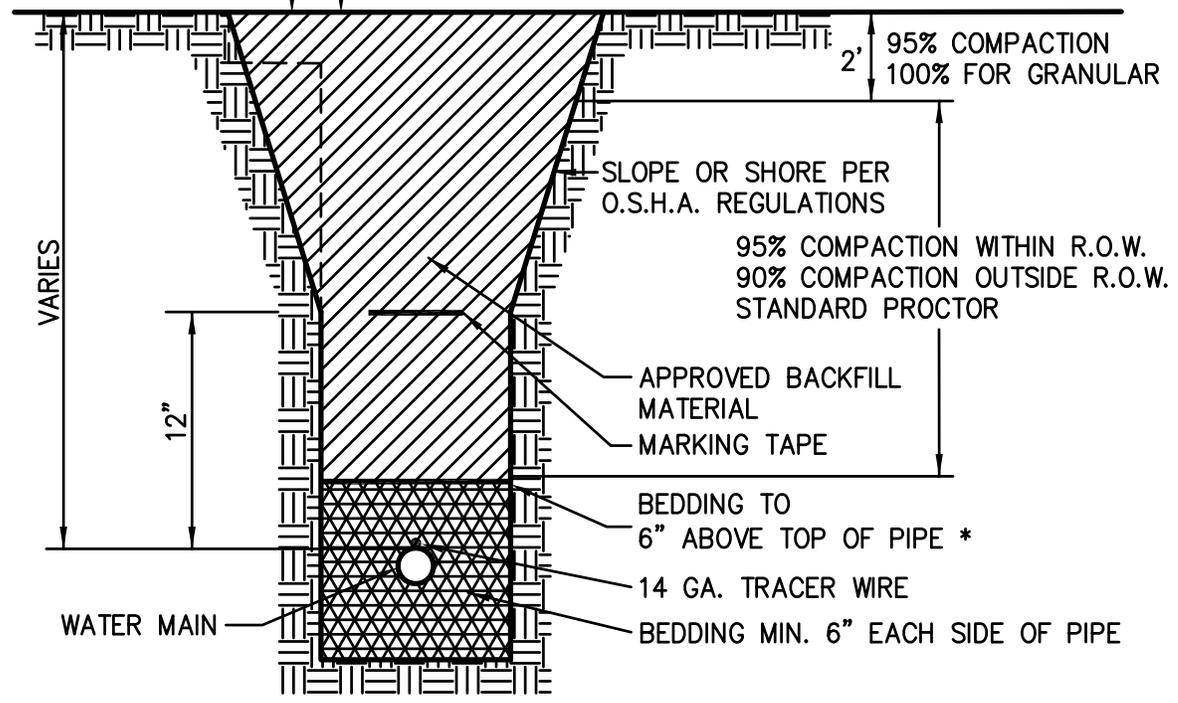
1. IF COMMERCIAL RESETER IS USED, SERVICE DEPTH MUST BE ADJUSTED TO PROVIDE 18"-24" FROM TOP OF METER TO GROUND LEVEL.
2. 2" MIN. P.E. (IPS) SERVICE WITH COMPRESSION FITTINGS AND POLY STIFFENERS. SERVICE LINE AND METER TO BE SIZED PER CURRENT EDITION U.P.C. BY THE DESIGN ENGINEER.
3. INSTALL TRAFFIC-RATED BOX IF METER IS LOCATED IN DRIVEWAY, WITHIN 5' OF DRIVEWAY, OR ANY AREA THAT MAY RECEIVE VEHICULAR TRAFFIC.
4. CUT HOLE IN BOX NO MORE THAN 1/4" LARGER THAN SERVICE LINE.
5. INSTALL 14 GA TRACER WIRE TO MAIN. LOOP MIN, 2' EXTRA IN BOX.

| | | | |
|--------------|--|-----------------------------|-------------|
| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-05 | | COMMERCIAL METER SET DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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PAVEMENT REPLACEMENT
SEE DETAIL P-02

TOP OF SUBGRADE BELOW SIDEWALK
OR ABC (ROADWAY)
ASPHALT REPLACEMENT: MATCH EXISTING AC AND ABC
THICKNESS OR 3" AC AND 8" ABC MIN. REQUIRED



2' 95% COMPACTION
100% FOR GRANULAR

SLOPE OR SHORE PER
O.S.H.A. REGULATIONS

95% COMPACTION WITHIN R.O.W.
90% COMPACTION OUTSIDE R.O.W.
STANDARD PROCTOR

APPROVED BACKFILL
MATERIAL
MARKING TAPE

BEDDING TO
6" ABOVE TOP OF PIPE *

14 GA. TRACER WIRE

BEDDING MIN. 6" EACH SIDE OF PIPE

VARIES

12"

WATER MAIN

*BEDDING MATERIAL APPROVED BY ENGINEER AND
COMPACTED TO 95% MIN.

NOTES:

1. A SLURRY MIX (1 SACK) WILL BE ALLOWED AS BACKFILL IN THE TRENCH. INSTALL MARKING TAPE ON TOP OF PIPE BEDDING, WHEN USING SLURRY. IF WATER MAIN IS IN ADOT ROW, SLURRY MIX SHALL MEET ADOT SPECIFICATIONS.
2. RESTRAINT LENGTH MAY INCREASE WITH ALTERNATE BEDDING MATERIAL. CALCULATIONS ARE REQUIRED.



BACKFILL MATERIAL - MAG AB, ADOT CLASS II AB, 3/4" DIRTY SCREEN CINDER. MATERIAL APPROVED BY ENGINEER.



BEDDING MATERIAL - APPROVED BY ENGINEER AND COMPACTED TO 95%. PLSD BLEND MATERIAL SHALL NOT BE USED.



UNDISTURBED NATIVE EARTH.

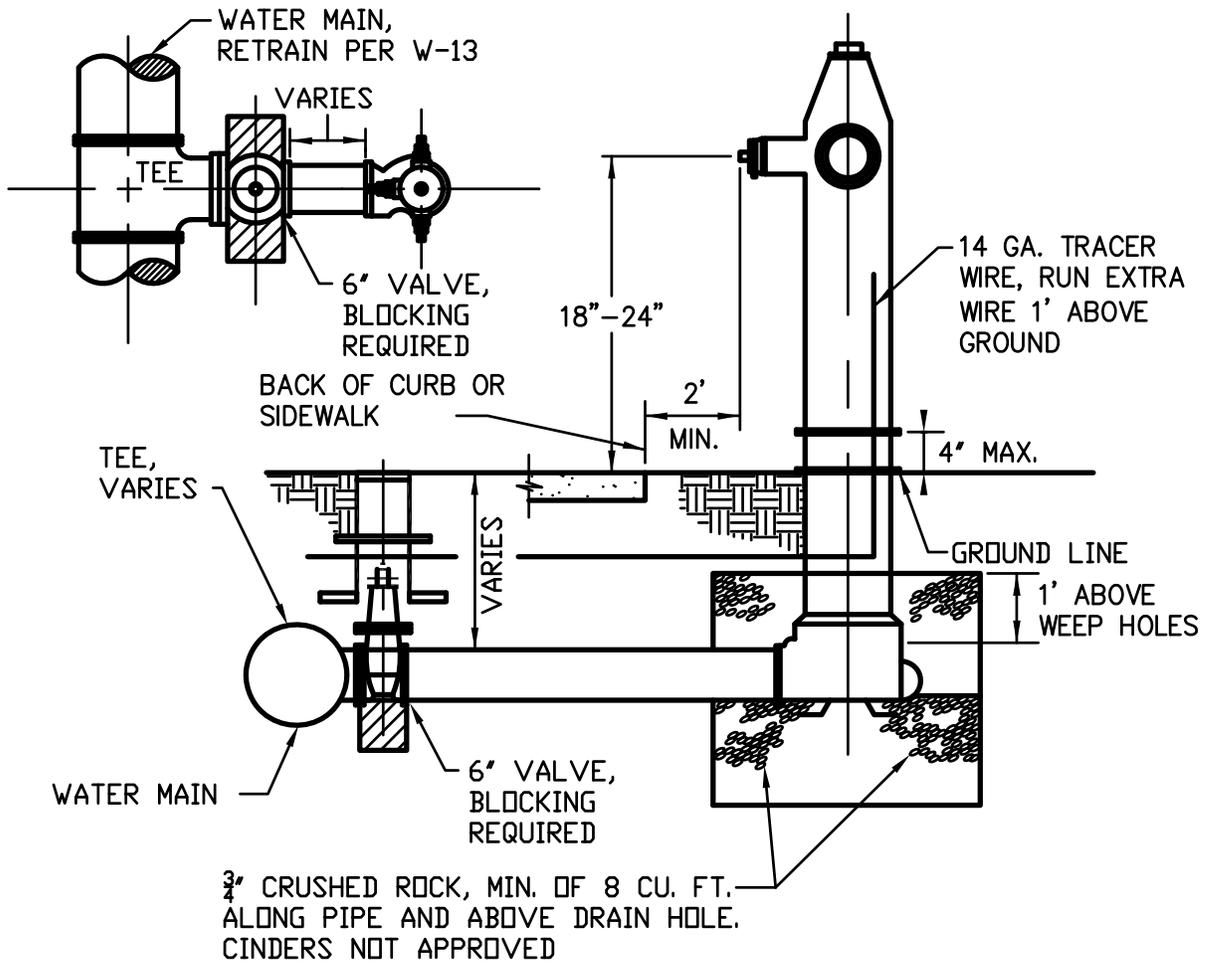
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| DETAIL NO. |
| W-06 |
| SHEET 1 OF 1 |



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| STANDARD DETAIL |
| WATER MAIN TRENCH DETAIL |

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| APPROVED BY |
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| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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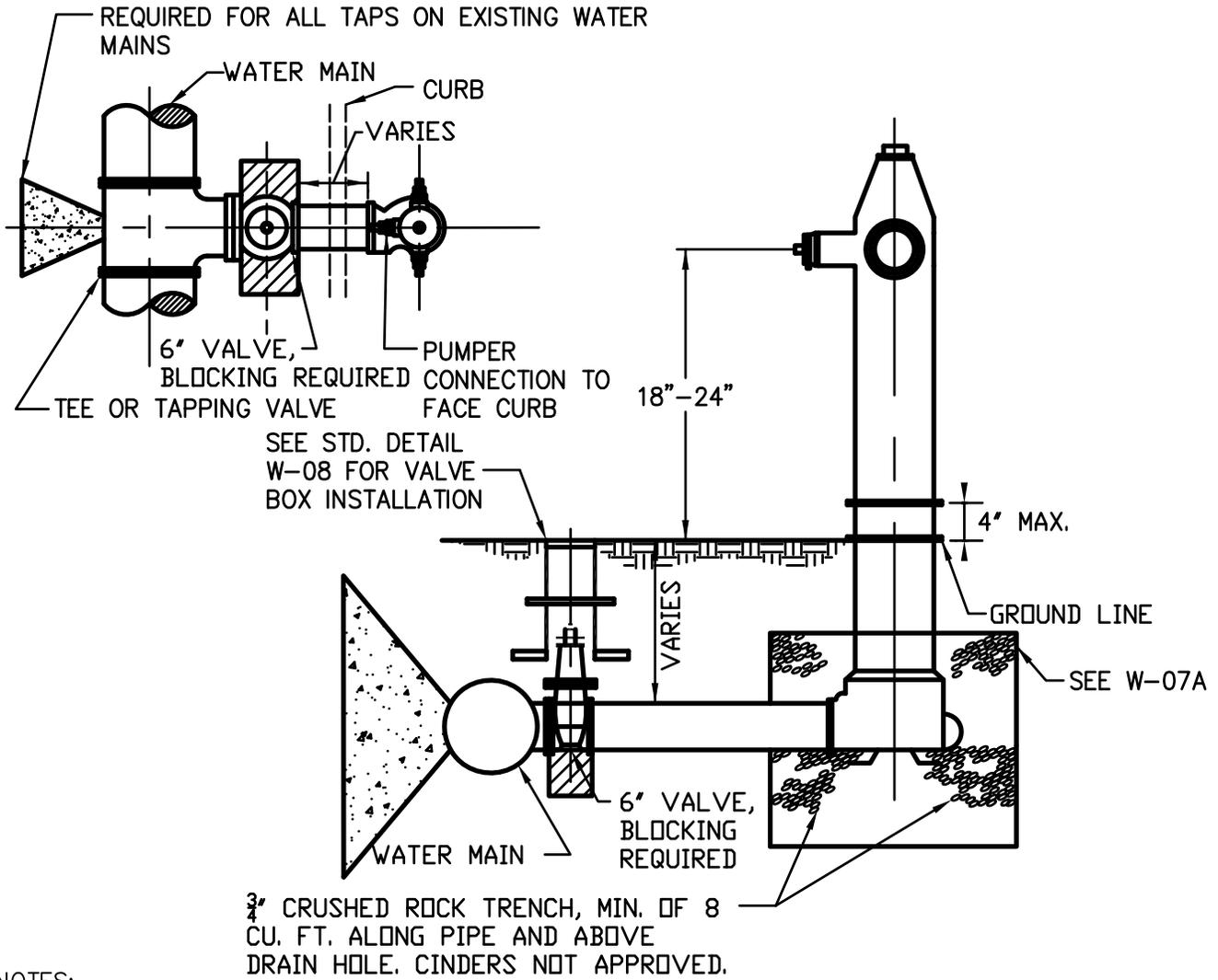


NOTES:

1. JOINTS BETWEEN THE VALVE AND THE MAIN MAY BE FLANGED TYPE. JOINTS BETWEEN THE VALVE AND HYDRANT SHALL BE MECHANICAL JOINT TYPE.
2. A FLANGE JOINT BY MECHANICAL JOINT VALVE MAY BE USED AS THE TRANSITION BETWEEN THE JOINT TYPES.
3. SEE STANDARD DETAIL W-07C FOR LOCATION OF HYDRANT.
4. WATEROUS OR MUELLER HYDRANTS ONLY.
5. DO NOT INSTALL HYDRANTS IN ROADSIDE DITCHES.
6. F.H. EXTENSION MAY BE USED TO ADJUST TO PROPER GRADE, PROVIDED BY THE CONTRACTOR. THE CITY SHALL SUPERVISE FIRE HYDRANT INSTALLATION.

| | | | |
|--------------|--|------------------------------|-------------|
| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-07A | | FIRE HYDRANT INSTALLATION | |
| SHEET 1 OF 3 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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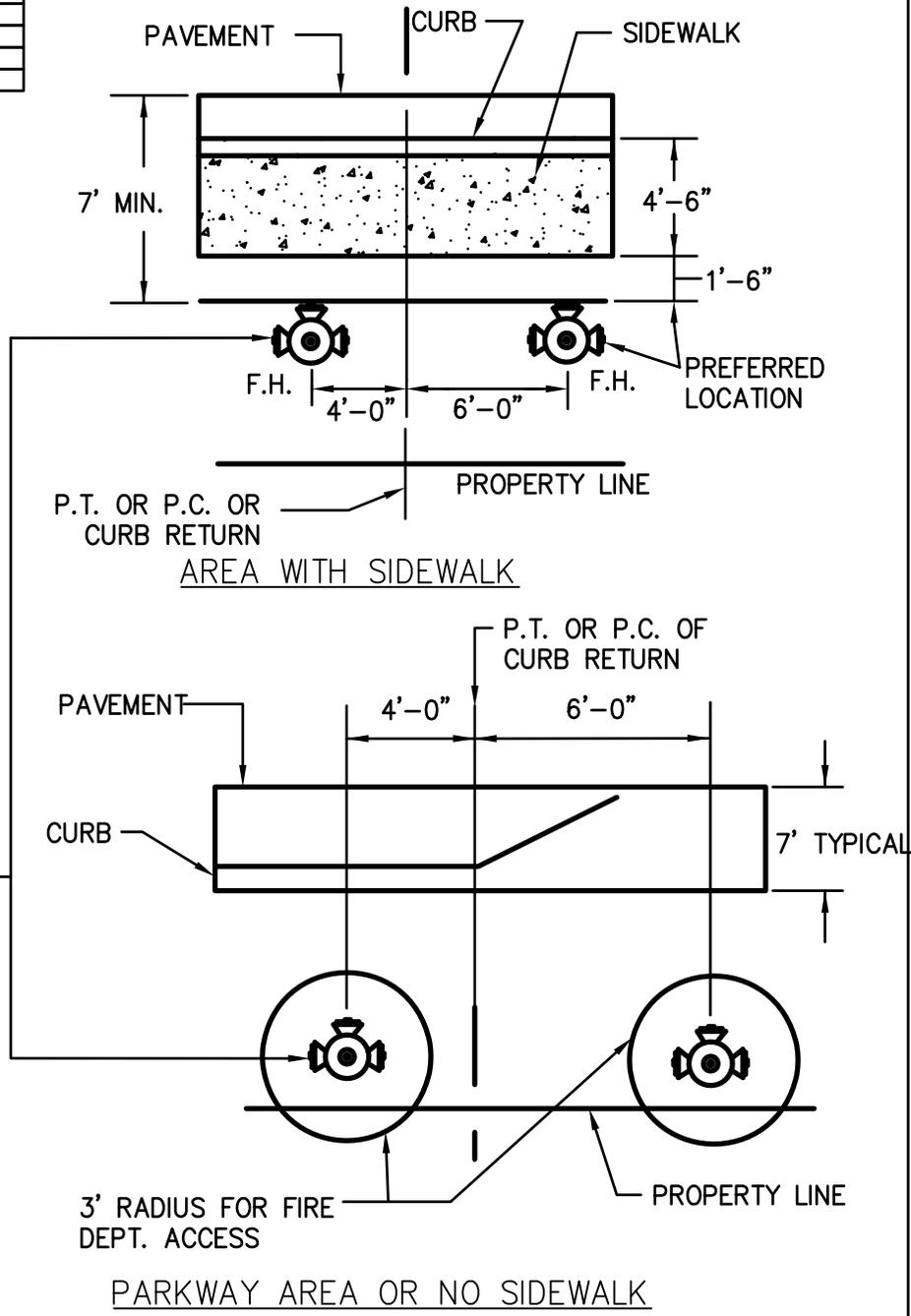


NOTES:

1. JOINTS BETWEEN THE VALVE AND THE MAIN MAY BE FLANGED TYPE. JOINTS BETWEEN THE VALVE AND HYDRANT SHALL BE MECHANICAL JOINT RESTRAINT TYPE.
2. FOR CONCRETE THRUST BLOCKS, SEE STD. DETAIL W-10.
3. A FLANGE JOINT BY MECHANICAL JOINT VALVE MAY BE USED AS THE TRANSITION BETWEEN THE JOINT TYPES.
4. SEE STD. DETAIL W-07C FOR LOCATION OF HYDRANT.
5. F.H. EXTENSION MAY BE USED TO ADJUST TO PROPER GRADE, PROVIDED BY THE CONTRACTOR. THE CITY SHALL SUPERVISE F.H. EXTENSION INSTALLATION
6. IF CONCRETE IS USED, DRAIN HOLES MUST REMAIN OPEN.
7. IN CASES WHERE A HYDRANT IS ADDED TO AN EXISTING MAIN OR WHERE A TAPPING VALVE IS USED. CONCRETE THRUST BLOCKS MUST BE INSTALLED BEHIND TEE. MAG STD. DETAIL 340.

| | | | |
|--------------|--|-------------------------------------|-------------|
| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-07B | | FIRE HYDRANT INSTALLATION DETAIL | |
| SHEET 2 OF 3 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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| 1 | | | |
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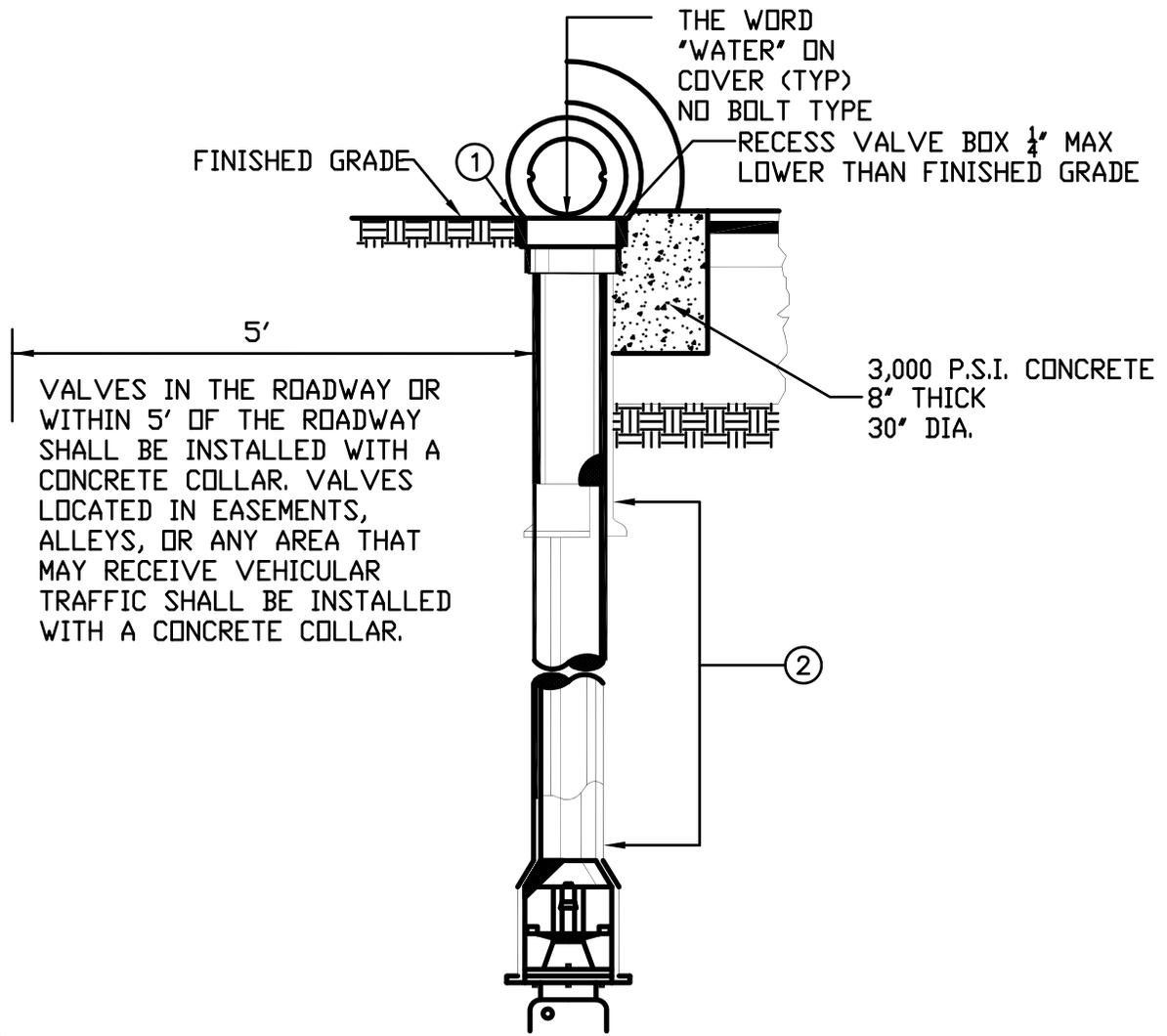
ACCEPTABLE LOCATION IF CURB RADIUS IS 20' OR MORE

NOTES:

1. NO OBSTRUCTIONS SUCH AS UTILITY POLES, STREET SIGNS, IRRIGATION BOXES, FENCES, ETC., MAY BE PLACED BETWEEN CURB AND HYDRANT.
2. ON LOCATIONS IN MID BLOCK, THE FIRE HYDRANT WILL BE ALIGNED WITH A PROPERTY LINE.
3. DO NOT INSTALL HYDRANT IN ROADWAY DITCH.
4. IF HYDRANT LIES IN DITCH BACK SLOPE, EXCAVATE AND BENCH TO MIN. RADIUS FOR ACCESS.

| | | | |
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| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-07C | | FIRE HYDRANT INSTALLATION DETAIL | |
| SHEET 3 OF 3 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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VALVES IN THE ROADWAY OR WITHIN 5' OF THE ROADWAY SHALL BE INSTALLED WITH A CONCRETE COLLAR. VALVES LOCATED IN EASEMENTS, ALLEYS, OR ANY AREA THAT MAY RECEIVE VEHICULAR TRAFFIC SHALL BE INSTALLED WITH A CONCRETE COLLAR.

NOTES:

1. VALVE BOX SHALL BE ADJUSTED TO THE FINAL FINISHED GRADE AFTER PLACEMENT OF THE ASPHALTIC CONCRETE, ABC, OR CONCRETE SURFACE.
2. USE PARKSON TYLER, APCO, OR EQUAL DEEP SKIRTED LID (6" OR MORE) TYPE, SLIDING ADJUSTABLE CAST IRON VALVE BOX. C.I. MIN. T.S. 30,000 P.S.I. DOMESTIC ONLY.
3. VALVES THAT ARE DEEPER THAN 5' MUST HAVE A FIBERGLASS EXTENSION.
4. CONCRETE COLLARS REQUIRED WITHIN ALL ROADWAY RIGHT OF WAYS AND EASEMENTS UP TO 5' OFF OF ROADWAY.
5. DOMESTIC ONLY - TYLER, EAST JORDAN OR EQUAL.

| | | | |
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| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-08 | | VALVE BOX INSTALLATION DETAIL | |
| SHEET 1 OF 1 | | | |

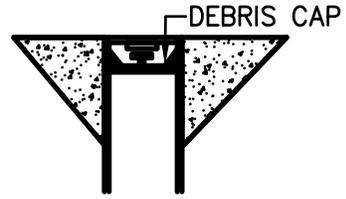
| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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DEBRIS CAP

VALVE BOX AND
COVER MAG STD.
DETAIL 391-1
TYPE "A"

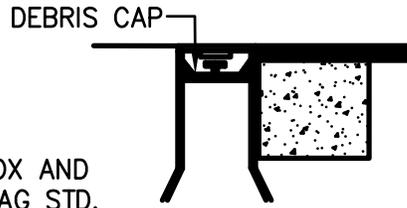
TYPE "A"



DEBRIS CAP

VALVE BOX AND
COVER MAG STD.
DETAIL 391-1
TYPE "B"

TYPE "B"



DEBRIS CAP

VALVE BOX AND
COVER MAG STD.
DETAIL 391-1
TYPE "C"

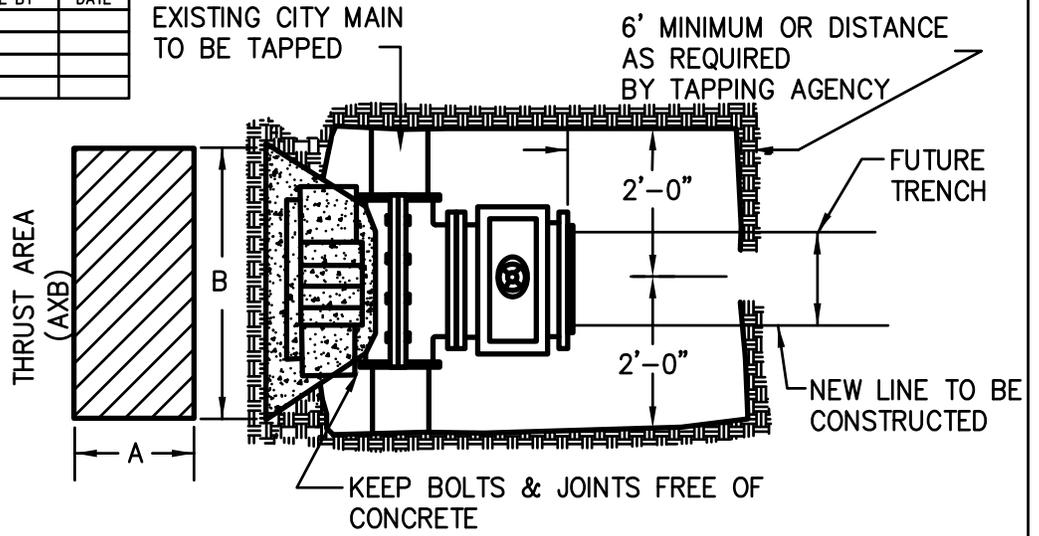
TYPE "C"

NOTES:

1. THE DEBRIS CAP SHALL BE DESIGNED AND INSTALLED TO PREVENT DEBRIS SUCH AS DIRT, DUST, SAND, ETC., FROM PASSING AROUND THE CAP AND DOWN INTO THE VALVE HOUSING. THE CAP SHALL BE HELD IN PLACE BY A MECHANISM WHICH WILL NOT DAMAGE THE VALVE HOUSING. ONCE INSTALLED THE CAP MUST WITHSTAND, WITHOUT SLIPPAGE, A MINIMUM VERTICAL FORCE OF 50 POUNDS, AT A LOADING RATE OF 1.0 IN./MIN.
2. THE CAP SHALL BE MANUFACTURED OF CORROSIVE RESISTANT MATERIAL.
3. DEBRIS CAP SHALL BE INSTALLED AS CLOSE AS POSSIBLE UNDER THE CAST IRON COVER WITHOUT INTERFERING WITH COVER OPERATION.
4. THE CAP SHALL BE CAPABLE OF SECURELY HOLDING A STANDARD LOCATING COIL, "SCOTCH MARK" 4 DISK MARKER BY 3M OR EQUAL.
5. THE HANDLE AND/OR BODY OF THE CAP SHALL BE INTEGRALLY COLORED IF REQUIRED BY THE AGENCY. IF REQUIRED, THE COLOR SHALL CONFORM TO THE ONE CALL LOCATING SERVICE (BLUE STAKE) COLORS (ARS 40-360.21)
6. THE CAP SHALL BE INSTALLED IN ALL VALVE HOUSINGS AS REQUIRED BY THE CONTRACT DOCUMENTS OR BY THE AGENCY'S POLICIES.
7. THE DEBRIS CAP SHALL BE MANUFACTURED BY SW SERVICES, INC., PHOENIX, ARIZONA OR APPROVED EQUAL.

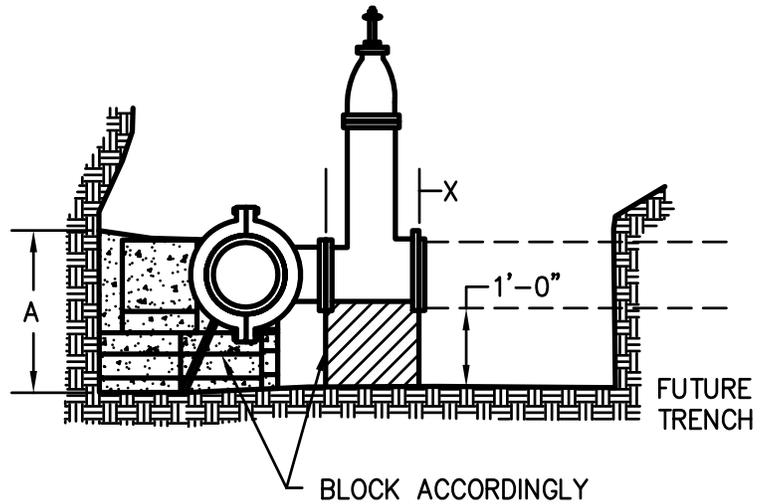
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| DETAIL NO. | | STANDARD DETAIL | |
| W-09 | | DEBRIS CAP INSTALLATION DETAIL | |
| SHEET 1 OF 1 | | APPROVED BY | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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OPTIONAL BLOCKING—2"X8"X12" SOLID CONCRETE MASONRY UNITS AS INDICATED.

| SIZE OF PIPE BEING CONNECTED | MINIMUM THRUST AREA REQUIRED EQUALS (AXB) |
|------------------------------|---|
| 4" & LESS | 3 SQUARE FEET |
| 6" | 4 " " |
| 8" | 6 " " |
| 10" | 9 " " |
| 12" | 13 " " |
| 16" | 23 " " |



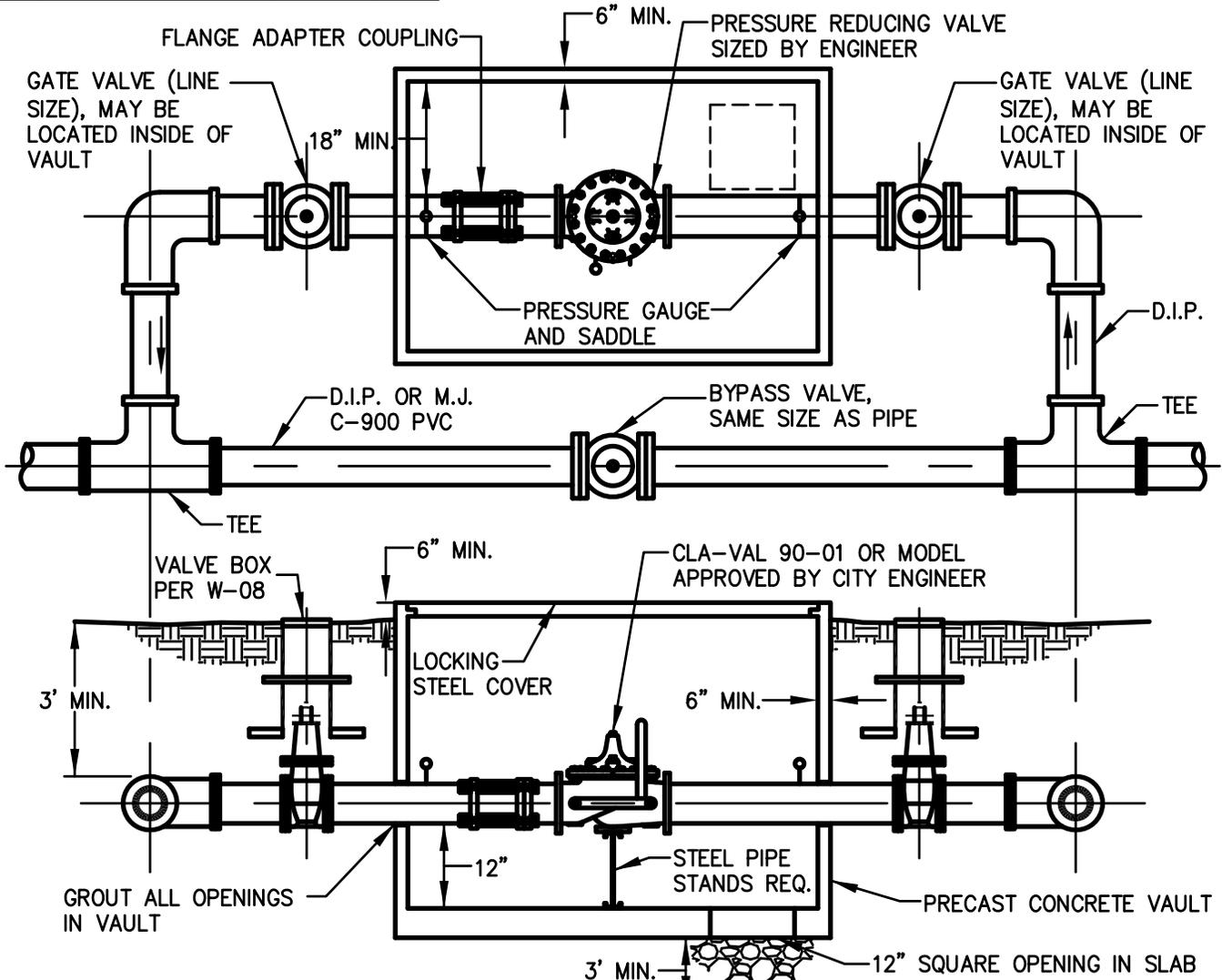
NOTES:

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 OR WATER DEPARTMENT.
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. TAPS SHALL BE MADE BY CITY CREWS AT PREVAILING RATES OR BY APPROVED CONTRACTORS WHEN ALLOWED BY CITY.
6. THIS DETAIL COVERS TAPPING SLEEVES 4" THROUGH 16" IN SIZE ON DUCTILE IRON, C-900 AND ASBESTOS CEMENT PIPE. ANY OTHER SIZE OR TYPE OF PIPE WILL REQUIRE A SEPARATE SUBMITTAL AND APPROVAL BY THE ENGINEER.

| | | | |
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| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-10 | | TAPPING SLEEVES AND VALVES DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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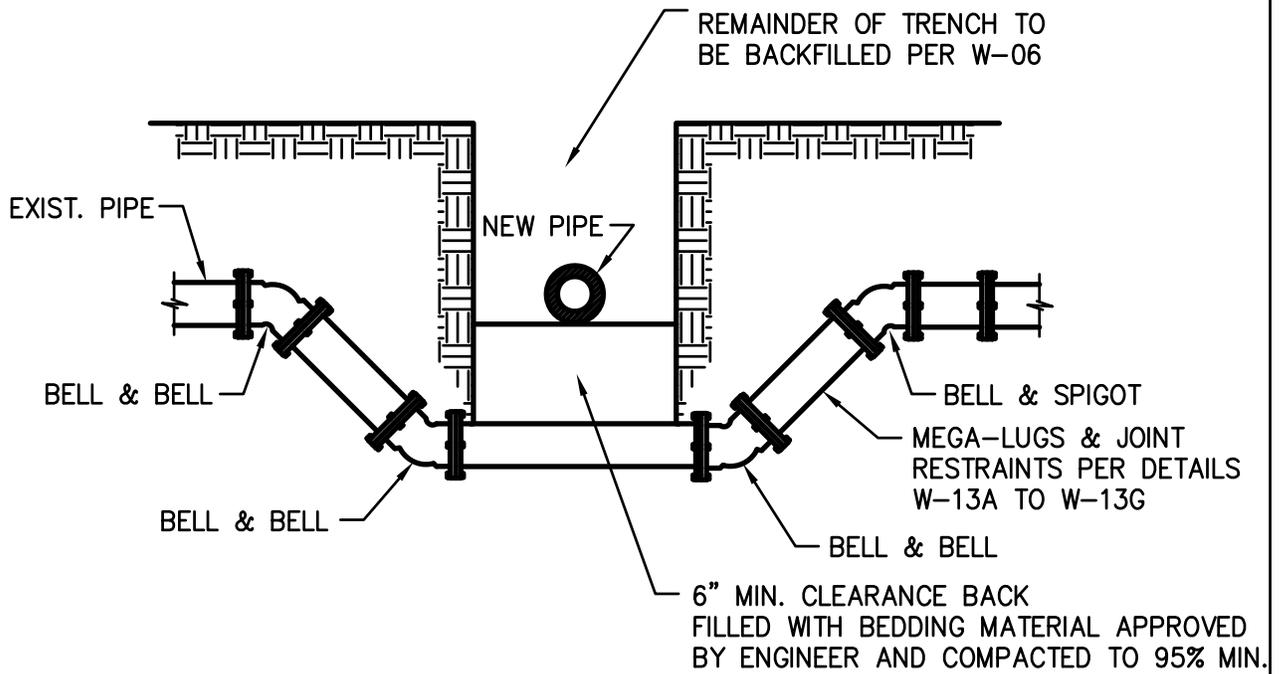
NOTE:
PIPE, FITTINGS AND VALVES TO BE SAME SIZE AS P.R.



- NOTES:
1. VALVE SHALL BE DOUBLE IRON BODY, CLASS 150, FLANGED ENDS, HYDRAULICALLY OPERATED, PILOT CONTROLLED, DIAPHRAGM TYPE. IT SHALL BE TREATED AT 175 P.S.I. MINIMUM PRESSURE.
 2. MANUFACTURER'S NAME, YEAR OF MANUFACTURE, SIZE OF VALVE AND GUARANTEED WORKING PRESSURE SHALL BE ENGRAVED ON THE VALVE OR ON A NAMEPLATE ATTACHED TO THE VALVE.
 3. VALVE SHALL BE OPERATED BY A CONTROL SYSTEM WHICH INCLUDES PILOT CONTROLS FOR PRESSURE REDUCING DETERMINED BY ENGINEER. BOTH PILOT CONTROLS SHALL BE FIELD ADJUSTABLE FOR ANY PRESSURE IN THE RANGE OF 40 TO 120 P.S.I.
 4. ALL FITTINGS SHALL HAVE MEGA LUG JOINT RESTRAINTS AND/OR FLANGE TYPE.
 5. CAST IRON VALVE BOXES INSTALLED ON ALL VALVES, TYLER OR EQUAL. DOMESTIC ONLY
 6. BY-PASS VALVE MAY BE OUTSIDE OF VAULT.
 7. A SMALLER FLOW PRV MAY BE REQUIRED IN THE VAULT BY ENGINEER BASED ON LOCATION AND EXISTING CONDITIONS.
 8. GAUGES SHALL BE INSTALLED UPSTREAM AND DOWNSTREAM OF PRV.

| | | | |
|--------------|---|----------------------------------|-------------|
| DETAIL NO. |  | STANDARD DETAIL | APPROVED BY |
| W-11 | | PRESSURE REDUCING STATION DETAIL | |
| SHEET 1 OF 1 | | | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
|----|-------------------------|---------|------|
| 1 | | | |
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C-900 / DUCTILE PIPE
MECHANICAL JOINT

| | | | |
|--------------|--|---|-------------|
| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-12 | | VERTICAL REALIGNMENT OF WATER MAINS DETAIL | |
| SHEET 1 OF 1 | | | |

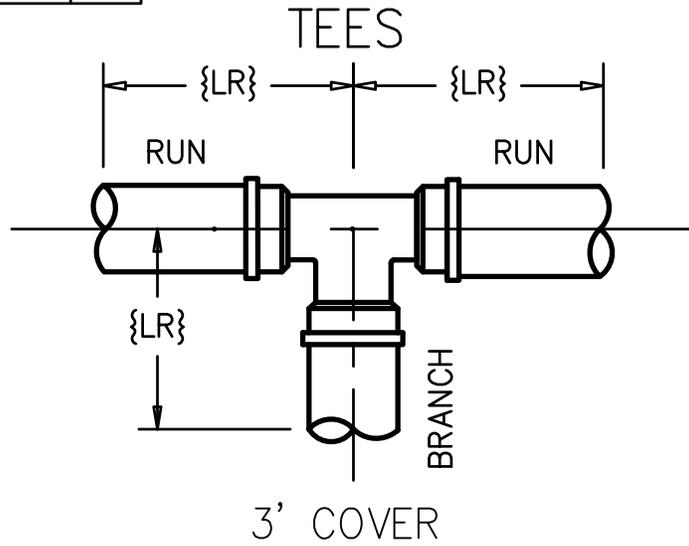
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GENERAL NOTES:

1. THE LENGTHS OF RESTRAINT OR CONTINUOUS PIPE CALLED OUT IN THE FOLLOWING TABLES ARE FOR INSTALLATION OF MECHANICALLY RESTRAINT FITTINGS AND ARE CALCULATED BASED ON THE FOLLOWING PARAMETERS:
 - A. THE PIPE MATERIAL IS POLYVINYL CHLORIDE (PVC).
 - B. THE SOIL TYPE IS "ML" AS DEFINED BY THE UNIFIED SOIL CLASSIFICATION, ASTM STANDARD D2487.
 - C. THE SAFETY FACTOR RATIO IS 1.5 TO 1.
 - D. THE TRENCH IS TYPE 5, AS PER ANSI/AWWA C 150/A21.5, TRENCH CONDITIONS.
 - E. THE DEPTH OF COVER IS AS SHOWN ON THE FOLLOWING TABLES.
 - F. THE TEST PRESSURE OF THE WATER SYSTEM IS ONE HUNDRED AND FIFTY POUNDS PER SQUARE INCH (150 PSI).
2. EBAA IRON INC., RESTRAINT LENGTH CALCULATOR (VERSION 5.0.2) PROGRAM WAS USED ALONG WITH THE ABOVE LISTED DESIGN PARAMETERS TO CALCULATE THE LENGTHS SHOWN IN THE TABLES ON THE FOLLOWING SHEETS.
3. CONSERVATIVE ASSUMPTIONS HAVE BEEN MADE IN THE DESIGN OF THE FOLLOWING TABLES. DESIGN ENGINEERS MAY OPT TO PROVIDE THEIR OWN CALCULATIONS PROVIDED THAT THE CALCULATIONS ARE STAMPED BY AN ARIZONA REGISTERED PROFESSIONAL ENGINEER.

| | | | |
|--------------|---|---|--|
| DETAIL NO. |  | STANDARD DETAIL | |
| W-13A | | WATER PIPE LENGTH RESTRAINT TABLES DETAIL | |
| SHEET 1 OF 6 | | GENERAL NOTES | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
|----|-------------------------|---------|------|
| 1 | | | |
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| TEE SIZE & PIPE MATERIAL | | MINIMUM ATTACHED LENGTH OF PIPE (LR) | | | | | | | | | | |
|--------------------------|-----|--------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 0' | 2' | 4' | 6' | 8' | 10' | 12' | 14' | 16' | 18' | 20' |
| PVC | 4x4 | 51' | 37' | 23' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' |
| | 6x4 | 48' | 29' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' |
| | 6x6 | 71' | 57' | 43' | 30' | 20' | 20' | 20' | 20' | 20' | 20' | 20' |
| | 8x4 | 45' | 21' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' |
| | 8x6 | 68' | 50' | 33' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' |
| | 8x8 | 93' | 79' | 65' | 51' | 37' | 23' | 20' | 20' | 20' | 20' | 20' |

4' COVER

| TEE SIZE & PIPE MATERIAL | | MINIMUM ATTACHED LENGTH OF PIPE (LR) | | | | | | | | | | |
|--------------------------|-------|--------------------------------------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 0' | 2' | 4' | 6' | 8' | 10' | 12' | 14' | 16' | 18' | 20' |
| PVC | 12x6 | 48' | 24' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' |
| | 12x8 | 67' | 47' | 27' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' |
| | 12x12 | 101' | 87' | 73' | 59' | 45' | 30' | 20' | 20' | 20' | 20' | 20' |
| | 16x8 | 61' | 36' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' | 20' |
| | 16x12 | 95' | 77' | 59' | 41' | 22' | 20' | 20' | 20' | 20' | 20' | 20' |
| | 16x16 | 130' | 116' | 101' | 87' | 73' | 58' | 44' | 30' | 20' | 20' | 20' |

DETAIL NO.
W-13B
SHEET 2 OF 6

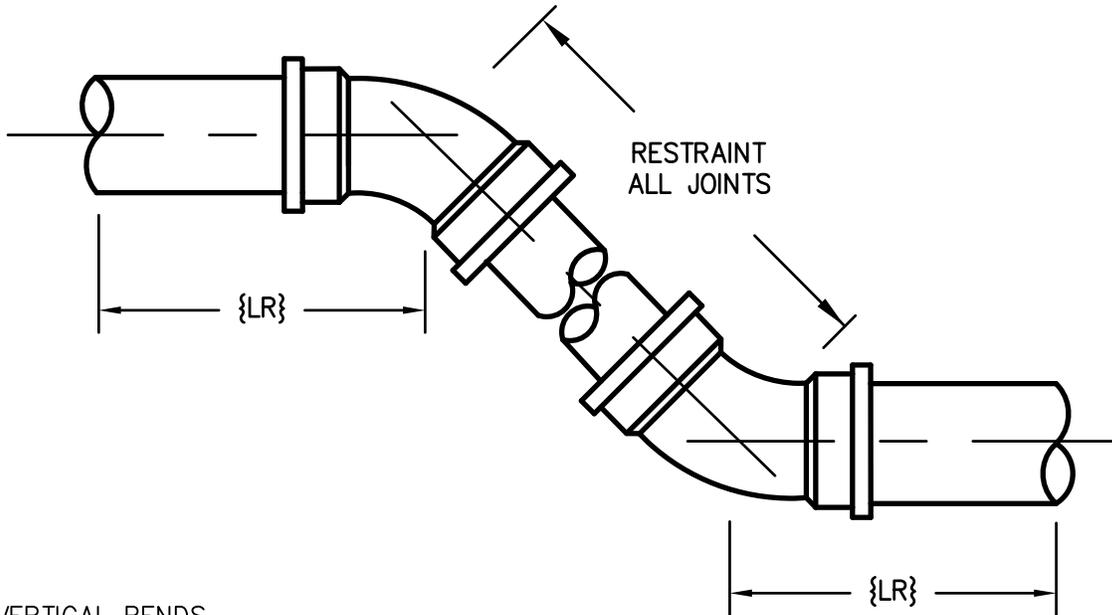


STANDARD DETAIL
WATER PIPE LENGTH
RESTRAINT TABLES DETAIL
TEES

APPROVED BY

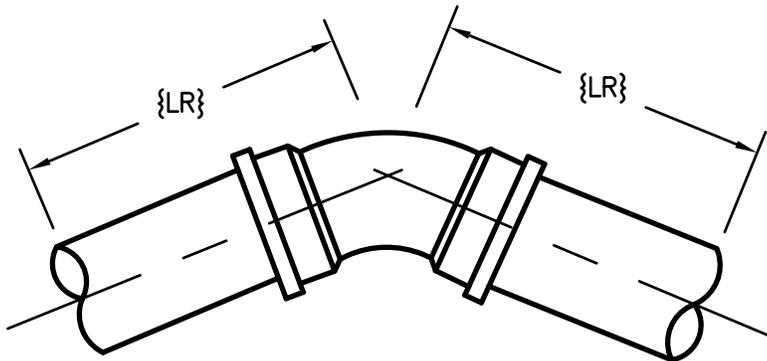
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BENDS



VERTICAL BENDS

THE MINIMUM PIPE LENGTH RESTRAINT (LR) TO BE RESTRAINT ON BOTH SIDES OF THE VERTICAL OFFSET SHALL BE DERIVED FROM THE TABLES ON DETAIL NO. W-13E.



HORIZONTAL BENDS

THE MINIMUM PIPE LENGTH RESTRAINT (LR) TO EXTEND IN BOTH DIRECTIONS FROM THE HORIZONTAL BEND SHALL BE DERIVED FROM THE TABLES ON DETAIL NO. W-13E.

| | | | |
|--------------|--|---|-------------|
| DETAIL NO. | | STANDARD DETAIL | APPROVED BY |
| W-13C | | WATER PIPE LENGTH RESTRAINT TABLES DETAIL | |
| SHEET 3 OF 6 | | BENDS | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
|----|-------------------------|---------|------|
| 1 | | | |
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BENDS

3' COVER

| PIPE SIZE & MATERIAL | | HORIZONTAL BENDS | | | | VERTICAL BENDS | | |
|----------------------|----|------------------|-------|-----|-----|----------------|-------|-----|
| | | 11.25° | 22.5° | 45° | 90° | 11.25° | 22.5° | 45° |
| PVC | 4" | 2' | 4' | 7' | 16' | 6' | 11' | 22' |
| | 6" | 3' | 5' | 9' | 22' | 8' | 15' | 31' |
| | 8" | 3' | 6' | 12' | 29' | 10' | 20' | 40' |

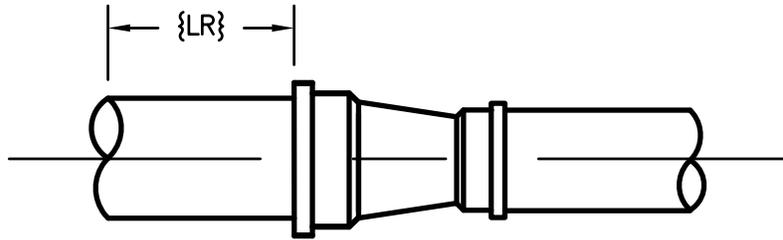
4' COVER

| PIPE SIZE & MATERIAL | | HORIZONTAL BENDS | | | | VERTICAL BENDS | | |
|----------------------|-----|------------------|-------|-----|-----|----------------|-------|-----|
| | | 11.25° | 22.5° | 45° | 90° | 11.25° | 22.5° | 45° |
| PVC | 12" | 3' | 7' | 12' | 31' | 11' | 21' | 44' |
| | 16" | 4' | 8' | 17' | 39' | 14' | 27' | 56' |

| | | | |
|--------------|---|--|--|
| DETAIL NO. |  | STANDARD DETAIL | |
| W-13D | | WATER PIPE LENGTH RESTRAINT TABLES DETAIL | |
| SHEET 4 OF 6 | | BENDS | |

| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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REDUCERS



REDUCERS

THE MINIMUM PIPE LENGTH RESTRAINT (LR) TO BE RESTRAINT ON THE LARGE SIDE OF THE REDUCER SHALL BE DERIVED FROM THE TABLES BELOW.

3' COVER

| REDUCER SIZE & PIPE MATERIAL | | MINIMUM LENGTH RESTRAINT |
|------------------------------|-----|--------------------------|
| PVC | 6x4 | 38' |
| | 8x4 | 70' |
| | 8x6 | 41' |

4' COVER

| REDUCER SIZE & PIPE MATERIAL | | MINIMUM LENGTH RESTRAINT |
|------------------------------|-------|--------------------------|
| PVC | 12x4 | 91' |
| | 12x6 | 76' |
| | 12x8 | 56' |
| | 16x6 | 114' |
| | 16x8 | 99' |
| | 16x12 | 58' |

| |
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| DETAIL NO. |
| W-13E |
| SHEET 5 OF 6 |

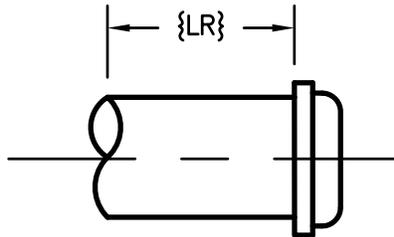


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| STANDARD DETAIL |
| WATER PIPE LENGTH RESTRAINT TABLES DETAIL |
| REDUCERS |

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| NO | DESCRIPTION OF REVISION | MADE BY | DATE |
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DEAD ENDS



DEAD ENDS

THE MINIMUM PIPE LENGTH RESTRAINT (LR) TO BE RESTRAINT ON A DEAD END SHALL BE DERIVED FROM THE TABLES BELOW.

3' COVER

| DEAD END SIZE & PIPE MATERIAL | | MINIMUM LENGTH RESTRAINT |
|-------------------------------|----|--------------------------|
| PVC | 4" | 53' |
| | 6" | 74' |
| | 8" | 97' |

4' COVER

| DEAD END SIZE & PIPE MATERIAL | | MINIMUM LENGTH RESTRAINT |
|-------------------------------|-----|--------------------------|
| PVC | 12" | 105' |
| | 16" | 135' |

APPROVED BY

| |
|--------------|
| DETAIL NO. |
| W-13F |
| SHEET 6 OF 6 |



| |
|---|
| STANDARD DETAIL |
| WATER PIPE LENGTH RESTRAINT TABLES DETAIL DEAD ENDS |