ORDINANCE NO. 2017-0-O9D

AN ORDINANCE OF THE CITY OF MARBLE FALLS AMENDING CHAPTER 7, AND RENAMING SAME TO BUILDING, BUILDING REGULATIONS, AND TECHNICAL CONSTRUCTION STANDARD SPECIFICATIONS AND BY ADDING A NEW ARTICLE XIII, SECTION 7-331, TO ADOPT THE TECHNICAL CONSTRUCTION STANDARD SPECIFICATIONS MANUAL (“TCSS MANUAL”) OF THE CITY OF MARBLE FALLS, TEXAS, 1ST ED., DATED AUGUST 2017; AMENDING CHAPTER 11, “FLOOD DAMAGE PREVENTION,” SECTION 11-33 “STANDARDS FOR SUBDIVISION PROPOSALS,” BY REQUIRING SUBDIVISION PROPOSALS TO CONFORM TO THE TCSS MANUAL; AMENDING CHAPTER 28, “NONPOINT SOURCE POLLUTION CONTROL,” SECTION 28-53, “NONPOINT SOURCE POLLUTION CONTROL APPROVAL,” BY REQUIRING CERTAIN DEVELOPMENT TO COMPLY WITH THE TCSS MANUAL; AMENDING APPENDIX B, “LAND USE REGULATIONS,” REQUIRING COMPLIANCE WITH THE TCSS MANUAL AS IT RELATES TO LAND USE REGULATION AND DEFINING THE SAME; PROVIDING PENALTIES UP TO $2000.00 PER VIOLATION; PROVIDING AN EFFECTIVE DATE, REPEALER, SEVERABILITY, AND PROPER NOTICE AND MEETING.

WHEREAS, The City Council of the City of Marble Falls, Texas (“City Council”), seeks to establish reasonable construction specifications to ensure that the installation of public infrastructure is of a quality acceptable to the City; and

WHEREAS, The City Council has caused to be prepared this ordinance calling for the implementation of certain construction specifications so as to implement and enforce certain necessary standards for the entire jurisdiction of the City of Marble Falls, Texas; and

WHEREAS, The City Council has set forth said construction specifications in the form of an ordinance, herein referred to as the Technical Construction Standard Specifications of the City of Marble Falls, 1st Ed., which Technical Construction Manual includes the Standard Specification and the Standard Details (collectively referred to as the “TCSS”); and

WHEREAS, The City Council seeks to update the City’s construction standards as needed in order to use the latest and most efficient methods of construction; and

WHEREAS, The City Council adopts this ordinance in order to promote the health, welfare, and safety of the City of Marble Falls and its citizens;
NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF MARBLE FALLS, TEXAS:

SECTION I.

All of the above premises are hereby found to be true and correct legislative and factual findings of the City Council, and are hereby approved and incorporated into the body of this Ordinance as if copied in their entirety.

SECTION II.


ARTICLE XIII. - TECHNICAL CONSTRUCTION STANDARD SPECIFICATIONS

Sec. 7-331. – Adoption of Technical Construction Standard Specifications

(a) The Technical Construction Standard Specifications of the City of Marble Falls, 1st Ed., consisting of the Standard Specifications and the Standard Details (collectively the “TCSS Manual”), dated August 2017, as may be amended from time-to-time, is hereby adopted.

(b) One (1) copy of the TCSS Manual is incorporated herein by reference and shall be filed in the office of development services for permanent record and inspection and a copy shall be maintained on the City’s website.

(c) All facilities constructed within the existing public right-of-way and utility easements, or newly dedicated right-of-way and utility easements which are intended to be dedicated to the City of Marble Falls, shall comply with the applicable provisions of the TCSS Manual as amended from time to time.

(d) Unless deleted, amended, expanded, or otherwise changed herein, all provisions of the TCSS Manual shall be fully applicable and binding. In the event a conflict is determined to exist between the TCSS Manual and the laws of the State of Texas, or a federal requirement, the state or federal requirements shall be construed as controlling and taking precedence over this ordinance.

(e) The TCSS Manual shall be comprised of the construction requirements and standard details for trenching and backfilling, concrete, water system, sewer system, streets, sidewalks, and driveways, storm drainage, and as otherwise set forth in the TCSS Manual. The TCSS may also include any additional provisions or requirements of the City of Marble Falls that pertain to the construction of site improvements such as streets, parking lots, driveways and sidewalk paving, storm
drainage structures, utility lines and facilities, screening walls/fences, retaining walls, landscaping and irrigation improvements, street lighting or signage, restricted access (gated) entrances to any type of development, and other similar improvements.

(f) The City Manager or designee shall have the authority to determine whether or not the engineering plans for any type of site improvement are in conformance with the City's TCSS Manual.

B. The Code of Ordinances, Chapter 11, “Flood Damage Prevention,” section 11-33 “Standards for subdivision proposals,” is hereby amended by adding a new subsection (f), which shall read as follows:

(f) All subdivision proposals shall comply with the TCSS Manual as adopted within section 7-331 of this code of ordinances, as may be amended from time to time.

C. The Code of Ordinances, Chapter 28, “Nonpoint Source Pollution Control,” section 28-53, “Nonpoint source pollution control approval,” is hereby amended by adding a new subsection (a)(3), which shall read as follows:

(a)(3) All development, redevelopment, or other construction that occurs within the right of way, public easement, or construction that is, or is intended to be, dedicated to the City, shall comply with the TCSS Manual as adopted in section 7-331 of this code of ordinances, as may be amended from time to time.

D. The Code of Ordinances, Appendix B, “Land Use Regulations,” section 803, “Application of regulations,” is hereby amended by adding a new subsection b.8., which shall read as follows:

b.8. The City of Marble Falls’ TCSS Manual, as adopted within section 7-331 of this code of ordinances, as may be amended from time to time.

E. The Code of Ordinances, Appendix B, “Land Use Regulations,” section 1007, “Access development (driveways and curb cuts)—title and purpose,” is hereby amended by adding a new subsection D.4., which shall read as follows:

D.4. All construction within the right of way, and construction that is, or is intended to be, dedicated to the City, shall comply with the latest TCSS Manual, as adopted in section 7-331 of this code of ordinances, as may be amended from time to time.

F. The Code of Ordinances, Appendix B, “Land Use Regulations,” within the subchapter entitled “Definitions”, is hereby amended by adding a new subsection 394, which shall read as follows; all other definitions within said subchapter shall be re-numbered accordingly:
III. SEVERABILITY

If any provision, section, sentence, clause or phrase of this Ordinance, or the application of same to any person or set of circumstances is for any reason held to be unconstitutional, void, invalid, or unenforceable, the validity of the remaining portions of this Ordinance or its application to other persons or sets of circumstances shall not be affected thereby, it being the intent of the City Council of the City of Marble Falls in adopting, and of the Mayor in approving this Ordinance, that no portion hereof or provision or regulation contained herein shall become inoperative or fail by reason of any unconstitutionality or invalidity of any portion, provision or regulation.

IV. REPEALER

All ordinances and parts of ordinances that are in conflict with this ordinance are hereby repealed.

V. PENALTY

A violation of any section of this ordinance shall be punishable as a misdemeanor under the provisions stated in Chapter 1, Section 1-9 of the Code of Ordinances of the City of Marble Falls.

VI. EFFECTIVE DATE

This Ordinance shall be and become effective immediately upon and after its passage and publication as may be required by governing law.

VII. PROPER NOTICE AND MEETING

It is hereby officially found and determined that the meeting at which this Ordinance was adopted was open to the public and that public notice of the time, place and purpose of said meeting was given as required by the Open Meetings Act, Chapter 551 of the Texas Government Code.

ADOPTED AND APPROVED on this 19th day of September, 2017 by a vote of the City Council of the City of Marble Falls, Texas.
CITY OF MARBLE FALLS, TEXAS

John Packer, Mayor

ATTEST:

Christina McDonald, TRMC, City Secretary

APPROVED AS TO FORM:

Patty L. Akers, City Attorney
STANDARD DETAILS

CITY OF MARBLE FALLS, TX

ENGINEERING DEPARTMENT

FIRST EDITION - AUGUST, 2017

EFFECTIVE DATE - SEPTEMBER, 2017

CITY OF

Marble Falls

T E X A S

800 Third Street
Marble Falls, Texas 78654

These Documents were prepared by or under the supervision of:

[Signature]

STATE OF TEXAS
ERALD BELAJ
107148
LICENSED PROFESSIONAL ENGINEER
9/8/17
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II. Introduction

II.1 - Authorization
For public infrastructure projects, standard design and construction practices, when applied where appropriate, help to eliminate redundant and repeated designs for the same types of structures, to facilitate plan review, and to allow City personnel to develop in-depth experience with standard designs and practices. To that end, the City Council of the City of Marble Falls, Texas has adopted the Standard Construction Details contained in this Manual, in its capacity as the governing body of the City of Marble Falls, Texas and the area within its Extraterritorial Jurisdiction.

II.2 - Scope
These Standard Details are intended for use in public projects and in projects including infrastructure items which will be accepted for maintenance by the City of Marble Falls within:
- Areas within the City of Marble Falls.
- Areas where the City of Marble Falls owns and/or maintains property, right of way, or easements.
- Areas within the Extraterritorial Jurisdiction of the City of Marble Falls.

To any other projects where specifically required by regulations and/or ordinance of the City of Marble Falls.

These Standard Details have been compiled to provide guidance for engineers and designers within the City of Marble Falls and its ETJ. These Standard Details indicate the City's design preferences for each item, and shall be used unless the designer determines that such use is inappropriate for a specific condition. These Standard Details are intended to be used without modification where appropriate by engineers and designers by simply including a reference to the appropriate Standard Detail in individual sets of Construction Drawings.

II.3 - Design Responsibility
As stated above, these Standard Details are available for use without modification where applicable; however, the determination of whether a particular Standard Detail is applicable to a specific project is the full responsibility of the design professional who uses it. The engineer or designer who uses any Standard Detail(s) takes full responsibility for the use, inclusion, or reference to such detail(s). The full responsibility for all designs, plans, and specifications will rest with the design professional who produced them.
II.4 - Methods of Use

A given set of Construction Drawings may include details created specifically for the project at hand; the drawings may include or reference Standard Details; or, the drawings may include Standard Details that have been modified or revised as needed for a specific situation. In order to make full use of these Standard Details as intended, it is imperative that any details included in Construction Drawings be clearly used and referenced in a manner that allows plan reviewers and field personnel to distinguish between actual standards and details that are specific or have been revised. Therefore, for use of these Standard Details, the methodology to be used is described immediately below and illustrated in the examples that follow:

Each of the Standard Details included in this Manual is individually numbered, with the number shown in the lower right-hand corner of each drawing. Standard Details in this Manual that are being used without modification need not actually be included in Construction Drawings; the Construction Drawings shall reference the detail to be used by calling out the detail number. For example, to reference the Standard Detail for a Culvert Crossing for Sewer Lines, Detail no. WW26, a callout in the construction plans for: "WW26" should be used as shown in Figure 1a below.

Figure 1a  Typical Plan Sheet with Callout for Standard Detail

Figure 1b, below, is a copy of the Standard Detail in this Manual.
When a reference is made as shown in Figure 1a, the physical page containing the actual Standard Detail need not be actually included in the plans; however, in that case, it is imperative that this Manual in its entirety be made a part of the Construction Documents, both during the bidding process and during the construction process.

When a Standard Detail has been revised or modified, the revised or modified detail must be physically included in the details section of construction plans with the area of revision(s) clouded and clear notes attached that describe the revision(s). The revised detail shall be referenced in the construction plans by adding the letter: "R" to the detail number. For example, to revise the Culvert Crossing for Sewer Lines detail to provide for additional clearance between the culvert and the proposed sewer line, show the location of the detail in the construction plans called out as: "RWW26" and include the revised detail in the detail section of the Construction Drawings as shown in Figures 2a and 2b.
Figure 2a Typical Plan Sheet with Callout for Revised Detail

Figure 2b, on the following page, shows the revision, cloud, and note required for a revision to a Standard Detail. As noted above, the revised detail shall be included in the Construction Drawings. This allows plan reviewers and field personnel to quickly locate areas of revisions that may require additional review or discussion.

In addition, the Title Sheet, or General Notes Sheet of the construction plans must contain a prominent note listing all the Standard Details, including those that have been revised that are included in the plan set. The note must contain the following statement: "The following City of Marble Falls Standard Details have been included in this plan set and are applicable to this project." The note must list all Standard and Revised Details by number and include the signature of the design professional responsible for the plan set. For example, to include the two details used in Figures 1 and 2, the following note must be used:
Figure 2b Revised Detail (must be included in Construction Drawings)

For use of any other details that are physically included in the Construction Drawings, the designer may use any appropriate means of calling out and locating such details.

The following City of Marble Falls Standard Details have been included or referenced in this plan set and are applicable to this project:
TREE PROTECTION NOTES:

1. **Tree Protection Fences** shall be installed prior to the commencement of any site preparation work (clearing, grubbing or grading).

2. Fences shall completely surround the tree, or clusters of trees; will be located at the outermost limit of the tree branches (drip line), and will be maintained throughout the construction project in order to prevent the following:
   
   - A. Soil compaction in the root zone area resulting from vehicular traffic, or storage of equipment or materials.
   - B. Root zone disturbances due to grade changes (greater than six inches (6") cut or fill, or trenching not reviewed and authorized by the City).
   - C. Wounds to exposed roots, trunks or limbs by mechanical equipment.
   - D. Other activities detrimental to trees, such as chemical storage, cement truck cleaning and fire.

3. Exceptions to installing fences at tree driplines may be permitted in the following cases:

   - A. Where permeable paving is to be installed, erect the fence at the outer limits of the permeable paving area.
   - B. Where trees are close to proposed buildings, erect the fence no closer than six feet (6'-0") to building.
**TREE PROTECTION NOTES:**

1. **WHERE ANY EXCEPTIONS RESULT IN A FENCE BEING CLOSER THAN FOUR FEET (4’-0”) TO A TREE TRUNK; PROTECT THE TRUNK WITH STRAPPED-ON-PLANKING TO A HEIGHT OF EIGHT FEET (8’-0”), OR TO THE LIMITS OF LOWER BRANCHING IN ADDITION TO THE REDUCED FENCING PROVIDED.**

2. **ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL BACKFILL ROOT AREAS WITH GOOD QUALITY TOP SOIL AS SOON AS POSSIBLE. IF EXPOSED ROOT AREAS ARE NOT BACKFILLED WITHIN TWO (2) DAYS, COVER THEM WITH ORGANIC MATERIAL IN A MANNER WHICH REDUCES SOIL TEMPERATURE, AND MINIMIZES WATER LOSS DUE TO EVAPORATION.**

3. **PRIOR TO EXCAVATION OR GRADE CUTTING WITHIN TREE DRIPLINE, MAKE A CLEAN CUT BETWEEN THE DISTURBED AND UNDISTURBED ROOT ZONES WITH A ROCK SAW OR SIMILAR EQUIPMENT, TO MINIMIZE DAMAGE TO REMAINING ROOTS.**

4. **TREES MOST HEAVILY IMPACTED BY CONSTRUCTION ACTIVITIES SHOULD BE WATERED DEEPLY ONCE A WEEK DURING PERIODS OF HOT, DRY WEATHER. TREE CROWNS SHOULD BE SPRAYED WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON THE LEAVES.**

5. **ANY TRENCHING REQUIRED FOR THE INSTALLATION OF LANDSCAPE IRRIGATION SHALL BE PLACED AS FAR FROM EXISTING TREE TRUNKS AS POSSIBLE.**

6. **NO LANDSCAPE TOPSOIL DRESSING GREATER THAN THE FOUR INCHES (4”) SHALL BE PERMITTED WITHIN THE DRIPLINE OF A TREE; NO SOIL IS PERMITTED ON THE ROOT FLARE OF ANY TREE.**

7. **PRUNING TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC AND EQUIPMENT SHALL TAKE PLACE BEFORE CONSTRUCTION BEGINS.**
<table>
<thead>
<tr>
<th>CONTROL TYPE</th>
<th>APPLICATION</th>
<th>DRAINAGE AREA</th>
<th>SLOPE</th>
<th>SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>SILT FENCE (Interior)</td>
<td>Areas of sheet flow or very minor channel flow</td>
<td>2 Acres</td>
<td>&lt;20%</td>
<td>200 ft.</td>
</tr>
<tr>
<td>SILT FENCE (Perimeter)</td>
<td>Downslope borders of site; upslope border if necessary to divert offsite drainage</td>
<td>N/A</td>
<td>N/A</td>
<td>200 ft.</td>
</tr>
<tr>
<td>TRIANGULAR FILTER DIKE</td>
<td>Areas within site requiring frequent vehicular access</td>
<td>1 Acre</td>
<td>&lt;10%</td>
<td>N/A</td>
</tr>
<tr>
<td>ROCK BERM</td>
<td>Drainage swales and ditches within and below site</td>
<td>5 Acres</td>
<td>&lt;30%</td>
<td>150 ft.</td>
</tr>
<tr>
<td>HIGH SERVICE ROCK BERM</td>
<td>Near critical features, high flow areas within and below site</td>
<td>5 Acres</td>
<td>&lt;30%</td>
<td>150 ft.</td>
</tr>
<tr>
<td>INLET PROTECTION</td>
<td>Storm sewer inlets receiving drainage</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SEDIMENT BASIN</td>
<td>Appropriate for large disturbed areas</td>
<td>5-100 Acres</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CONSTRUCTION EXIT</td>
<td>Should be used at all designated access points</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CONCRETE WASHOUT</td>
<td>Use on all concrete pouring operations</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
SILT FENCE NOTES:
1. THE DESIGN DETAILS INDICATED HEREIN SHOULD BE MODIFIED AS NECESSARY TO ENSURE SEDIMENT DOES NOT LEAVE THE PROJECT SITE.

SILT FENCE USAGE GUIDELINES
A SILT FENCE MAY BE CONSTRUCTED NEAR THE DOWNSTREAM PERIMETER OF A DISTURBED AREA ALONG A CONTOUR TO INTERCEPT SEDIMENT FROM OVERLAND RUNOFF.

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer’s Name PE# Date

Engineer’s Signature

SECTION
EROSION CONTROL

DETAIL NO.
EC-2

TITLE
SILT FENCE
EROSION CONTROL

EC-3

R15

10

SILT FENCE

INSTALLED AS

SHOWN IN "SILT

FENCE" DETAIL

PLAN

SEE PLANS FOR REQUIRED

COUNCIL ACTION

SCALE: NOT TO SCALE

These documents were prepared by,
or under the supervision of:

ERIC BELAJ  107148  May 31, 2017
Engineer's Name  PE#  Date

Engineer's Signature

SECTION
EROSION CONTROL

DETAIL NO.  EC-3

TITLE  SILT FENCE – J HOOK

MARBLE FALLS
800 THIRD STREET
MARBLE FALLS, TX 78654
Ph (830) 693-6737
**INSTALLATION:**
- Layout the Filter Dike following as closely as possible to the contour.
- Clear the ground of debris, rocks or plants that will interfere with installation.
- Place the Filter Dike sections one at a time, with the skirt on the uphill side towards the direction of flow, anchoring each section to the ground before the next section is placed.
- Sandbags should be placed on 3’ centers between anchors.
- Securely fasten the skirt from one section of Filter Dike to the next.
- Filter Dikes must maintain continuous contact with the ground.
- After the site is completely stabilized, the Dikes and any remaining silt should be removed. Silt should be disposed of in a manner that will not contribute to additional siltation.

**INSPECTION AND MAINTENANCE GUIDELINES:**
- Inspection should be made weekly or after each rainfall event and repair or replacement should be made promptly as needed by the contractor.
- Inspect and realign berms as needed to prevent gaps between the sections.
- Accumulated silt should be removed after each rainfall event, and disposed of in a manner which will not cause additional siltation.

These documents were prepared by, or under the supervision of:

**Engineer's Name**
ERIC BELAJ

**PE#**
107148

**Date**
May 31, 2017

**Engineer's Signature**
ROCK BERM NOTES:

1. IF SHOWN ON THE PLANS OR AS REQUIRED TO PREVENT OFF-SITE SEDIMENTATION, BERMS SHALL BE PLACED NEAR THE TOE OF SLOPES WHERE EROSION IS ANTICIPATED, UPSTREAM AND/OR DOWNSTREAM AT DRAINAGE STRUCTURES, AND IN ROADWAY DITCHES AND CHANNELS TO COLLECT SEDIMENT.

2. THE ROCK BERMS DIMENSIONS SHALL BE AS INDICATED ON THE DETAIL SHEETS.

3. SIDE SLOPES TO BE 2:1 OR FLATTER.

4. MAINTAIN A MIN. OF 1' BETWEEN TOP OF ROCK BERMS WEIR AND TOP OF EMBANKMENT FOR BERMS.

5. BERMS SHALL BE EMBEDDED A MINIMUM OF 4" INTO EXISTING GROUND.

6. ROCK BERMS TYPE 2 & 3 SHALL BE SECURED WITH 20 GAUGE GALVANIZED WOVEN WIRE MESH WITH 1" DIAMETER HEXAGONAL OPENINGS. THE AGGREGATE SHALL BE PLACED ON THE MESH TO THE HEIGHT & SLOPE SPECIFIED. THE MESH SHALL BE FOLDED AT THE UPSTREAM SIDE OVER THE AGGREGATE AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS. IN STREAMS THE MESH SHOULD BE SECURED OR STAKED TO THE STREAM BED PRIOR TO AGGREGATE PLACEMENT.

7. SACK GABIONS SHOULD BE STAKED DOWN WITH 3/4" DIA. REBAR STAKES.

8. FLOW OUTLET SHOULD BE ON A STABILIZED AREA (VEGETATION, ROCK, ETC.).

9. THE DESIGN DETAILS INDICATED HEREIN SHOULD BE MODIFIED AS NECESSARY TO ENSURE SEDIMENT DOES NOT LEAVE THE PROJECT SITE.

ROCK BERMS SHOULD BE CONSTRUCTED DOWNSTREAM FROM UNDISTURBED AREAS TO INTERCEPT SEDIMENT FROM OVERLAND RUNOFF AND/OR CONCENTRATED FLOW.

TYPE 1 (18" HIGH WITH NO WIRE MESH): TYPE 1 MAY BE USED AT THE TOE OF SLOPES, AROUND INLETS, IN SMALL DITCHES, AND AT DIKE OR SWALE OUTLETS. THIS TYPE OF DAM IS RECOMMENDED TO CONTROL EROSION FROM DRAINAGE AREAS OF 5 ACRES OR LESS. TYPE 1 SHOULD NOT BE USED IN CONCENTRATED HIGH VELOCITY FLOWS (APPROX. 8 FT/SEC OR MORE) IN WHICH AGGREGATE WASH OUT MAY OCCUR. SANDBAGS SHOULD BE USED AT THE EMBEDDED FOUNDATION (4" DEEP MIN.) FOR BETTER FILTERING EFFICIENCY OF LOW FLOWS IF CALLED FOR ON THE PLANS OR AS A RESULT OF ROUTINE INSPECTIONS.

TYPE 2 (18" HIGH WITH WIRE MESH): TYPE 2 MAY BE USED IN DITCHES AND AT DIKE OR SWALE OUTLETS.

TYPE 3 (36" HIGH WITH WIRE MESH): TYPE 3 MAY BE USED IN STREAM FLOW AND SHOULD BE SECURED TO THE STREAM BED.

TYPE 4 (SACK GABIONS): TYPE 4 MAY BE USED IN DITCHES AND SMALLER CHANNELS TO FORM AN EROSION CONTROL DAM.
EROSION CONTROL
EC-6

ROCK BERM AT SEDIMENT TRAP
TYPE 1 OR TYPE 2

ROCK BERM AT CHANNEL SECTIONS
TYPE 1 OR TYPE 2

PROFILE OF ROCK BERM AT SEDIMENT TRAP

EXCAVATION (IF SHOWN ON CONST. DRAWINGS)

A "V" SHAPE MAY BE USED FOR HIGHER VELOCITY FLOWS. (SEE "V" SHAPE PLAN BELOW)

WEIR LENGTH

WIDTH AS SPECIFIED IN PLANS

LEVEL CRESTED WEIR

GALV. WOVEN WIRE MESH FOR (TYPES 2 & 3)

OPEN GRADED ROCK

SECTION C-C

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION
EROSION CONTROL
DETAIL NO. EC-6
TITLE CHANNEL ROCK BERM

Scale: Not to Scale

Marble Falls
Marble Falls, TX 78654
800 Third Street
Phs (830) 693-6737

Marble Falls
ENGINEERING DEPARTMENT
CURB INLET PROTECTION NOTES:

1. WHEN A SANDBAG IS FILLED WITH MATERIAL, THE OPEN END OF THE SANDBAG SHOULD BE STAPLED OR TIED WITH NYLON OR POLY CHORD.

2. INLET PROTECTION SHALL BE PLACED OVER THE MOUTH OF THE INLET WITH A 2 FOOT OVERLAP ON EITHER SIDE.

3. THE FABRIC SHALL COVER AND BE A CONTINUOUS WRAPPING OF GEOTEXTILE FABRIC.

4. THE SKIRT SHALL BE WEIGHTED WITH ONE MINIMUM 18"x24"x6" SANDBAG EVERY 3 FEET.

5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.

6. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF FOUR INCHES, AND DISPOSED OF IN A MANNER WHICH WILL NOT CAUSE ADDITIONAL SILTATION.

7. AFTER THE DEVELOPMENT SITE IS COMPLETELY STABILIZED, THE INLET PROTECTION AND ANY REMAINING SILT SHALL BE REMOVED. SILT SHALL BE DISPOSED OF AS INDICATED IN NOTE 6 ABOVE.
AREA/GRATE INLET PROTECTION:

1. WHERE MINIMUM CLEARANCES CAUSE TRAFFIC TO DRIVE IN THE GUTTER, THE CONTRACTOR MAY SUBSTITUTE A 1"x4" BOARD SECURED WITH CONCRETE NAILS 3' O.C. NAILED INTO THE GUTTER IN LIEU OF SANDBAGS TO HOLD THE FILTER DIKE IN PLACE. UPON REMOVAL, CLEAN ANY DIRT/DEBRIS FROM NAILING LOCATIONS, APPLY CHEMICAL SANDING AGENT AND APPLY NON-SHRINK GROUT FLUSH WITH SURFACE OF GUTTER.

2. A SECTION OF FILTER FABRIC SHALL BE REMOVED AS SHOWN ON THIS DETAIL OR AS DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. FABRIC MUST BE SECURED TO WIRE BACKING WITH CLIPS OR HOG RINGS AT THIS LOCATION.

3. DAILY INSPECTION SHALL BE MADE BY THE CONTRACTOR AND SILT ACCUMULATION MUST BE REMOVED WHEN DEPTH REACHES 2".

4. CONTRACTOR SHALL MONITOR THE PERFORMANCE OF INLET PROTECTION DURING EACH RAINFALL EVENT AND IMMEDIATELY REMOVE THE INLET PROTECTIONS IF THE STORM-WATER BEGINS TO OVERTOP THE CURB.

5. INLET PROTECTIONS SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED.
INSTALLATION:
- Locate the sediment trap so as to disturb as few trees as possible.
- Clear and grub the area under the embankment of all vegetation and root mats.
- Layout the wire mesh and then the geotextile fabric.
- Construct the geotextile core and corresponding rock embankment to the designated height and configuration.
- Wrap the structure with the previously placed wire mesh secure enough so that when walked across the structure retains its shape. Secure with tie wire.
- Place the embankment material in 8 to 12 inch lifts and machine compact.

INSPECTION AND MAINTENANCE GUIDELINES:
- Inspection should be made weekly and after each rainfall. Check the embankment, spillways, and outlet for erosion damage and inspect the embankment for piping and settlement. Repair should be made promptly as needed by the contractor.
- Trash and other debris should be removed and the trap restored to its original dimensions when the sediment has accumulated to half of the design depth of the trap.
- Sediment removed from the trap should be deposited in an approved spoils area and in such a manner that it will not cause additional siltation.
CONSTRUCTION EXIT NOTES:

1. THE LENGTH OF THE ROCK CONSTRUCTION EXIT SHALL BE AS INDICATED ON THE PLANS, BUT NOT LESS THAN 50'.
2. THE COARSE AGGREGATE SHOULD BE OPEN GRADED WITH A SIZE OF 4" TO 8".
3. THE APPROACH TRANSITION SHOULD BE NO STEEPER THAN 6:1.
4. THE CONSTRUCTION EXIT SHALL BE GRADED TO ALLOW FOR POSITIVE DRAINAGE.
5. THE DESIGN DETAILS INDICATED HEREIN SHOULD BE MODIFIED AS NECESSARY TO ENSURE SEDIMENT DOES NOT LEAVE PROJECT SITE.
CONCRETE WASHOUT NOTES:

1. DETAIL ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY OF USE.

2. IF HAY BALES ARE USED, THEY SHALL BE PLACED IN ACCORDANCE WITH DETAILS SHOWN ON EXHIBIT FOR HAY BALES.

3. WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.

4. WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORM WATER RUNOFF.
EROSION CONTROL

EC-12

EXIT
ENTRANCE
FIELD OFFICE
AREA
MAINTENANCE
AND
STORAGE
& VEHICLE
EQUIPMENT
CONSTRUCTION
AREA
STORAGE
MATERIAL
AND WASTE
CONSTRUCTION

LEGEND

SF — SILT FENCE
FLOW ARROWS

SCALE: NOT TO SCALE

ERIC BELAJ
107148
May 31, 2017
Engineer's Name
PE#
Date

These documents were prepared by,
or under the supervision of:

MARBLE FALLS
800 THIRD STREET
MARBLE FALLS, TX 78654
PH: (830) 693-6737

SELECTION
ECOSION CONTROL
DETAIL NO.
EC-12
TITLE
CONSTRUCTION STAGING
PLAN

SECTION "A"

WIRE MESH

6" MIN. STABLE MATERIAL

NATURAL GROUND

10'

SCALE: NOT TO SCALE

MARBLE FALLS, TX 78654
800 THIRD STREET
PH: (830) 693-6737

ENGINEER'S NAME          PE#                   DATE
ERIC BELAJ             107148         May 31, 2017

DETAIL NO.                TITLE
EC-13                   LEVEL SPREADER
** METALLIC REFLECTIVE WARNING TAPE

UNDISTURBED TRENCH WALL

PLACE A 6" LAYER OF TOPSOIL FOR GROWTH OF VEGETATION

COMPACTED SELECT COMMON BACKFILL
8" LOOSE LIFTS (MAX.)

** TYPICAL BEDDING SPECIFICATIONS FOR "BEDDING".

WASTEWATER LINE
(SDR–26 PVC, GRAVITY)
(SDR–21 PVC, FORCE MAIN)
(DUCTILE IRON, AS SPECIFIED)

** REFLECTIVE WARNING TAPE SHALL INDICATE "PRESSURIZED WASTEWATER" FOR PRESSURE LINES IN AT LEAST 1.5" LETTERS CONTINUOUSLY REPEATED. REFLECTIVE WARNING TAPE SHALL INDICATE "BURIED SEWER LINE BELOW" FOR GRAVITY SEWER LINES.
NOTES:

1. A minimum of one density test shall be taken every two hundred (200) feet for each eight (8) inch loose lift of select backfill. Proctors for materials used in backfilling shall be obtained by a certified laboratory. Density tests shall be conducted by a certified laboratory or the permittee's consultants. All density tests shall be completed and accepted on each layer prior to additional backfilling. A copy of all completed and accepted density tests shall be furnished to the owner. Backfill compaction shall be a minimum 95% of optimum density as determined by TxDOT 113E test method.

2. Contractor or engineer may request for use of alternate backfill material. Alternate materials and testing protocol must be submitted to and approved by the city engineer prior to use.

3. Refer to geotechnical report for additional subgrade, flexible base and pavement requirements.

* Reflective warning tape shall indicate "pressurized wastewater" for pressure lines in at least 1.5" letters continuously repeated. Reflective warning tape shall indicate "buried sewer line below" for gravity sewer lines.

* This detail has been modified to include ductile iron pipe.
MIN. 2” HMA TYPE “D” OR MATCH EXISTING THICKNESS WHICHEVER IS GREATER
TRENCH WIDTH + 2’-0” ** METALLIC REFLECTIVE WARNING TAPE

MIN. 8” COMPACTED FLEXIBLE BASE (SEE SPECIFICATIONS)

COMPACTED SELECT BACKFILL (SEE SPECIFICATIONS)

UNDISTURBED TRENCH WALL

BEDDING SHALL BE REQUIRED AS PER TYPICAL BEDDING SPECIFICATIONS.

WASTEWATER LINE (SDR-26 PVC, GRAVITY)
( SDR-21 PVC, FORCE MAIN)
*(DUCTILE IRON, AS SPECIFIED)

NOTES:
1. REPLACED BASE MATERIAL OVER DITCH SHALL BE A MINIMUM OF TWICE THE THICKNESS OF THE ORIGINAL BASE AND IN NO CASE LESS THAN 8”.
2. BASE MATERIAL SHALL BE PLACED IN MAXIMUM 6” LIFTS AND EACH LIFT COMPACTED TO SPECIFIED DENSITY.
3. ASPHALT CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED.
4. A MINIMUM OF ONE DENSITY TEST SHALL BE TAKEN EVERY TWO HUNDRED (200) FEET FOR EACH EIGHT (8) INCH LOOSE LIFT OF SUBGRADE AND EACH OPEN CUT CROSSING. ADDITIONAL TESTS MAY BE REQUIRED AT THE ENGINEER’S DISCRETION. ALL DENSITY TESTS SHALL BE COMPLETED AND ACCEPTED ON EACH LAYER PRIOR TO ADDITIONAL BACKFILLING. A COPY OF ALL COMPLETED AND ACCEPTED DENSITY TESTS SHALL BE FURNISHED TO THE OWNER.
5. CONTRACTOR OR ENGINEER MAY REQUEST FOR USE OF ALTERNATE BACKFILL MATERIAL. ALTERNATE MATERIALS AND TESTING PROTOCOL MUST BE SUBMITTED TO AND APPROVED BY THE CITY ENGINEER PRIOR TO USE.

** REFLECTIVE WARNING TAPE SHALL INDICATE "PRESSURIZED WASTEWATER" FOR PRESSURE LINES IN AT LEAST 1.5” LETTERS CONTINUOUSLY REPEATED. REFLECTIVE WARNING TAPE SHALL INDICATE "BURIED SEWER LINE BELOW" FOR GRAVITY SEWER LINES.

* THIS DETAIL HAS BEEN MODIFIED TO INCLUDE DUCTILE IRON PIPE.
UNDISTURBED TRENCH WALL

** 6" WIDE METALLIC REFLECTIVE WARNING TAPE

COMPACTED FILL
8" LOOSE LiftS (MAX.)

6" DEPTH OF 2000 PSI CONCRETE WITH 6X6 - W1.4 X W1.4 WELDED WIRE FABRIC

PIPE O.D. + 18"

** 12" MIN.

TRENCH WIDTH + 2'-0"

12" TYP.

12" PIPE O.D. + 16"

UNDISTURBED TRENCH WALL

BEBDING SHALL BE REQUIRED AS PER STANDARD SPECIFICATIONS FOR "BEBDING"

WASTEWATER FORCE MAIN

6" PIPE O.D. 6"

BELL

6" PIPE O.D. 6"

PIPE O.D. + 12"

* WHERE 48" MINIMUM COVER CAN NOT BE OBTAINED OR DUE TO POTENTIAL SURFACE LOADING THE CITY MAY REQUIRE A CAP TO BE INSTALLED.

** REFLECTIVE WARNING TAPE SHALL INDICATE "PRESSURIZED WASTEWATER" FOR PRESSURE LINES IN AT LEAST 1.5" LETTERS CONTINUOUSLY REPEATED. REFLECTIVE WARNING TAPE SHALL INDICATE "BURIED SEWER LINE BELOW" FOR GRAVITY SEWER LINES.
NOTES:
1. AVAILABLE WITH CAST IRON RING AND COVER CAST IN PLACE
2. PERMITTED ONLY WITH WRITTEN APPROVAL FROM CITY OF MARBLE FALLS
NOTES:

1. AIR INTAKE PIPE TO BE D.I.P., CLASS 53 WITH FLANGED CONNECTIONS.
2. ALL FITTINGS TO BE 150 PSIG RATED & ANSI/AWWA C110/A21.10.
3. SURFACE PREP ABOVE GROUND PIPING TO SSPC-10-63, N.A.C.E. NO.2 STANDARD. APPLY EPOXY PRIMER 2-4 MIL DFT FOLLOWED BY 2 COATS OF AMINE ADDUCT CURED, HIGH-BUILD EPOXY (TWO COMPONENT EPOXY POLYAMIDE) 8-10 MIL DFT, NON-LEAD CEDAR GREEN COLOR.
4. IF ELEVATION OF VENT OPENING IS LESS THAN 1-FT. ABOVE 100 YR. FLOODPLAIN, FLOMATIC MODEL 408F BALL CHECK VALVE OR EQUAL WITH FLOATING TYPE BALL TO BE INSTALLED AT DOWNTURNED OPENING OF VENT. (SEE DIMENSIONAL DETAIL ABOVE RIGHT). 16 MESH 304 S.S. INSECT SCREEN TO BE PLACED IN THE OPENING.
POWER SLEEVE INTERLOCKED INSIDE OF GASKET (S.S. TYPE 304)

MANHOLE WALL

"SEAL BOOT" RESILIENT CONNECTOR PER ASTM C-923.

TAKE UP CLAMPS (S.S. TYPE 302)
(1 CLAMP ON 12" AND SMALLER)
(2 CLAMPS ON 15" AND LARGER)
GASKETED SEWER FITTING
NO. 52635 (6") AS
MANUFACTURED BY
VASSALLO, INC. OR
APPROVED EQUAL

PVC SERVICE
SDR-26 OR
SCH-40

½ BEND-SPIGOT

PVC SERVICE
SDR-26 OR
SCH-40

STAINLESS STEEL CLAMPS
SERIES 300

EXIST. WASTEWATER LINE

EXIST. WW LINE

PLAN VIEW

PART NO. | SIZE   | L1 | H  | P
---------|--------|----|----|---
52635    | 8"x6"  | 5.625 | 5.659 | 1.448

PLASTIC TRENDS INC. - 1/8 BEND - SPIGOT

PART NO. | SIZE | A  | B  | C  | D
---------|------|----|----|----|---
G 406    | 6    | 11.270 | 6.146 | 1.870 | 6.090

NOTES:
1. FLEXIBLE SADDLE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER’S REQUIREMENTS.
2. SADDLE TEE SHALL BE ORIENTATED 45°D TO MAIN. (SEE SEWER SERVICE CONNECTIONS DETAIL).
3. EXCAVATE AROUND EXISTING 8-INCH PIPE, EXPOSING SUFFICIENT ROOM FOR S.S. CLAMPS.
4. THOROUGHLY CLEAN AND DRY THE MATING SURFACE WITH RAG OR PAPER TOWEL MAKE SURE THEY ARE FREE OF DUST AND MOISTURE.
5. MARK THE SIZE OF THE HOLE TO BE CUT USING THE GASKET SKIRT OR THE SADDLE ITSELF AS THE TEMPLATE.
6. SAWS IN THE SECTION OF THE PIPE WHERE THE SADDLE WILL BE LOCATED, WITH A SAVER, KEY HOLE SAW, OR CORE DRILL.
7. TEST TO MAKE SURE SADDLE FITS HOLE PROPERLY.
8. SERVICE PIPE SHALL NOT EXTEND MORE THAN ONE-HALF INCH INTO THE MAIN.
9. PLACE GASKET SKIRT AND SADDLE OVER OPENING AND TIGHTEN BAND CLAMPS EVENLY UNTIL SADDLE IS FIRMLY ATTACHED TO THE PIPE. APPLY PRESSURE ON THE SADDLE AGAINST THE PIPE WHILE TIGHTENING THE CLAMPS AS INDICATED ABOVE. DO NOT OVER TIGHTEN, DO NOT STRIP THREAD.
10. REPLACE THE BEDDING AND BACKFILL IN ACCORDANCE WITH THE TRENCH EMBEDMENT DETAIL.
11. THE SERVICE LINE SHALL BE MINIMUM SDR-26 (GREEN), OR SCH-40.

These documents were prepared by, or under the supervision of:

ERIC BELAJ  107148  May 31, 2017
Engineer’s Name  PE#  Date

Engineer’s Signature

SECTION
WASTEWATER

DETAIL NO.
WW-9

TITLE
SERVICE CONNECTION TO EXISTING LINES
NOTES:
1. SERVICE CONNECTION RISERS SHALL TERMINATE 6' INSIDE THE PROPERTY LINE.
2. THE END OF EACH SERVICE CONNECTION RISER SHALL BE EXTENDED 12" ABOVE FINISH GRADE.
3. EACH SERVICE CONNECTION SHALL BE PLUGGED WATER-TIGHT WITH AN APPROVED CAP OR PLUG.
4. CUT OFF BELL END WHEN USING FERCO COUPLING FOR PVC. (FOR EXISTING SERVICES ONLY).
5. FOR PVC INSTALLATIONS, CONNECT TO EXISTING "BELL END" AND CONNECT OPPOSITE END WITH PVC TO PVC. KNOCK ON SLEEVE.
6. SOLIDLY TAMP BACKFILL AT LEAST ONE FOOT (1'-0") ABOVE TOP OF PIPE. SERVICES UNDER PAVED AREAS SHALL BE BACKFILLED TO THE SAME SPECIFICATIONS AS SHOWN ON PAVEMENT REPLACEMENT DETAIL.
7. CONTRACTOR SHALL MARK ON A CLEAN SET OF PLANS THE FINAL STATIONING OR DISTANCE AND DIRECTION FROM MANHOLE TO EACH SERVICE LATERAL AND GIVE TO ENGINEER FOR RECORD DRAWING PURPOSES.
8. ANY DEVIATION FROM THESE METHODS SHOULD BE APPROVED BY THE CITY OF MARBLE FALLS PUBLIC WORKS DEPARTMENT.
10. SEWER SERVICE SLOPE TO BE 45° OFF THE MAIN PIPE CENTERLINE.
11. ALL NON-RESIDENTIAL SERVICE LINES 6" OR GREATER MUST DISCHARGE TO A NEW MANHOLE ON THE MAIN PIPE.
12. ALL NON-RESIDENTIAL DOUBLE SERVICE LINES SHALL BE 8" OR LARGER.

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION
WASTEWATER

DETAIL NO.
WW-10

TITLE
SERVICE LINE
MANHOLE PLAN

NOTES:

MANHOLE DETAILS SHALL REFLECT THE CITY'S MINIMUM SPECIFICATIONS, AS STATED BELOW:

A. ALL MANHOLES SHALL BE 48" I.D., R.C.P., CLASS III, WITH RUBBER O-RING GASKET JOINTS CONFORMING TO ASTM C478, C433 AND C76.
B. ALL MANHOLES SHALL HAVE WATER-TIGHT FRAME AND COVER, WITH A MINIMUM 30" CLEAR OPENING, AS MANUFACTURED BY EAST JORDAN IRON WORKS (AS PER CONCRETE APRON AROUND MANHOLE RING & COVER DETAIL) OR APPROVED EQUAL.
C. ALL MANHOLES SHALL BE CONCRETE WITH CAST IRON FRAME AND BOLTED COVER.
D. ALL MANHOLES SHALL HAVE A CONCENTRIC LID.
E. MANHOLES MAY HAVE A FLAT LID, IF APPROVED BY CITY OF MARBLE FALLS, BEING 12" THICK WITH A MINIMUM 30" OPENING, AS MANUFACTURED BY CALVERT CONCRETE OR APPROVED EQUAL M.F.G. CONFORMING TO ASTM C478, 5000 P.S.I. CONCRETE, TRAFFIC BEARING, AND O-RING JOINT CONFORMING TO ASTM C443.
F. INVERTS AND FLEXIBLE SEAL BOOTS, PER ASTM C-923, SHALL BE CAST INTO BASE SECTION.
G. MINIMUM DROP BETWEEN INVERTS SHALL BE ONE-TENTH OF A FOOT (0.1').
H. TWO (2") INCH GRADE RINGS WITH AN I.D. TO MATCH FRAMES CLEAR OPENING, MINIMUM OF TWO (2), MAXIMUM OF FIVE (5) GRADE RINGS REQUIRED.
I. ALL MANHOLES SHALL COMPLY WITH AND BE TESTED IN ACCORDANCE WITH CURRENT TCEQ REGULATIONS.

* MAXIMUM MANHOLE SPACING

<table>
<thead>
<tr>
<th>PIPE DIAMETER (IN)</th>
<th>MAXIMUM MANHOLE SPACING (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 - 15</td>
<td>500</td>
</tr>
<tr>
<td>18 - 30</td>
<td>800</td>
</tr>
<tr>
<td>36 - 48</td>
<td>1000</td>
</tr>
<tr>
<td>54 OR LARGER</td>
<td>2000</td>
</tr>
</tbody>
</table>

* SEE TCEQ CHAPTER 217 FOR ADDITIONAL MANHOLE LOCATION REQUIREMENTS.
NOTES:
1. MANHOLES SHALL BE PRECAST ASTM C-478 BELL AND SPIGOT WITH "O" RING JOINTS.
2. SEE PLANS & MANHOLE SCHEDULE, FOR MANHOLE SIZE, LOCATION, CONFIGURATION, TYPE OF TOP SECTION, VENTING REQUIREMENTS, PIPE SIZE AND TYPES.
3. SEE SPECIFICATIONS ON MATERIALS AND CONSTRUCTION.
4. ENTIRE INTERIOR OF WASTEWATER MANHOLES AND UNDERSIDE OF FLAT TOPS TO BE "POLIBRID" COATED: 5 MIL DFT POLIBRID 672 PRIMER AND 75 MIL DFT POLIBRID 705 TOPCOAT.
5. AN 80 MIL COAT OF FOSROC EPOXY LINER HBS IS EQUIVALENT TO THE POLIBRID PRIMER / TOPCOAT.
6. ALL MANHOLE COVERS SHALL BE BOLTED AND GASKETED WHEN MANHOLES LOCATED OUTSIDE OF PAVEMENT.
7. MANHOLES TO BE VENTED ARE IDENTIFIED ON MANHOLE SCHEDULE. REFERENCE MANHOLE VENT DETAIL.
8. MANHOLES TO BE DESIGNED TO RESIST LATERAL AND VERTICAL SOIL FORCES RESULTING FROM MANHOLE DEPTH. ADDITIONALLY, MANHOLES LOCATED IN PAVEMENT TO BE DESIGNED FOR HS-20 TRAFFIC LOADS.
9. MANHOLES LOCATED IN PAVEMENT SHALL HAVE BACKFILL COMPACTED TO 95% OF OPTIMUM AS DETERMINED BY TXDOT TEST METHOD TX114E. DENSITY REPORTS SHALL BE PROVIDED TO CITY FOR CERTIFICATION. AN ALTERNATIVE FLOWABLE FILL MATERIAL HAVING A STRENGTH F'c RANGING FROM 300 TO 500 PSI MAY BE USED FOR BACKFILL.
10. COMPOSITE RINGS SHALL BE RUBBER COMPOSITE RISERS MANUFACTURED BY INFRA-RISER.

SCALE: NOT TO SCALE
WW-13

49" DIAMETER

8 ⅛" WALL

32 ⅞" DIAMETER

8 ⅛" WALL

5" WALL

48" DIAMETER

5" WALL

58" DIAMETER

VARIABLE

6 ⅛"

2"

PROVISION MADE FOR
(2) WHIRLEY LIFT INSERTS
LOCATED AT C.G.

IF ANY, COMPOSITE RINGS SHALL BE RUBBER COMPOSITE RISERS MANUFACTURED BY INFRA-RISER.

SCALE: NOT TO SCALE
INSTALL STAINLESS STEEL TOP STRAP IN LINE WITH THE CENTER OF INFLOW PIPE TO PREVENT MOVEMENT.

FORCE MAIN FLOW

CLEANOUT W/SCREW-IN PLUG

"" TEE W/FEMALE ADAPTER

STAINLESS STEEL SUPPORT STRAPS @ 2’ O.C.

"" SDR-21

CENTER OF FORCE MAIN OUTLET TO BE ALIGNED VERTICALLY AND HORIZONTALLY WITH OUTFLOW.

EXISTING GRAVITY SEWER

FLOW

INSTALL BOTTOM STAINLESS STEEL SUPPORT STRAP WITHIN 6 INCHES OF FORCE MAIN OUTLET. INSTALL GROUT SUPPORT BETWEEN FORCE MAIN OUTLET ELBOW AND MANHOLE WALL.

USE GROUT TO SHAPE FLOW CHANNEL AS REQUIRED.

INSTALL STAINLESS STEEL TOP STRAP WITHIN 6 INCHES OF FORCE MAIN OUTLET. INSTALL GROUT SUPPORT BETWEEN FORCE MAIN OUTLET ELBOW AND MANHOLE WALL.
NOTES:

1. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT SEWER IS LOCATED TWO (2') OR MORE ABOVE THE MAIN INVERT CHANNEL.

2. A FLOW CHANNEL SHALL BE CONSTRUCTED INSIDE MANHOLE TO DIRECT INFLUENT INTO THE FLOW STREAM.

3. WHEN P.V.C. IS USED IN SANITARY SEWER LINES, SOLVENT TYPE JOINT P.V.C. FITTINGS MAY BE UTILIZED IN THE DROP ASSEMBLY ONLY.

4. MINIMUM PIPE SIZE FOR DROP IS EIGHT INCHES (8”).

5. SEE STANDARD DETAIL (STANDARD MANHOLE SECTION) FOR ADDITIONAL REQUIREMENTS.
NOTES:

1. TO BE USED WHERE DROP IS SIX INCHES (6") TO TWO FEET (2'-0").
2. A FLOW CHANNEL SHALL BE CONSTRUCTED INSIDE MANHOLE TO DIRECT INFLUENT INTO FLOW STREAM.
3. MINIMUM PIPE SIZE FOR DROP IS EIGHT INCHES (8").
4. SEE STANDARD DETAIL (STANDARD MANHOLE SECTION) FOR ADDITIONAL REQUIREMENTS.
CONCRETE COLLAR (MIN. 3,000 PSI) WITH 6X6 - W1.4 X W1.4 WELDED WIRE FABRIC OVER BACKFILL

FINISHED GRADE (IN PAVEMENT)

MANHOLE RING AND COVER PER STANDARD WASTEWATER MANHOLE SET DETAIL

FINISHED GRADE (NOT IN PAVEMENT)

Pavement Section Per Surface Streets Detail

Backfill compacted to 95% density, with test reports provided to the city as an alternative backfill with flowable fill having a strength between 300 to 500 PSI may be used.

2'-10 1/2" CLEAR OPENING

SECTION

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name  PE# Date

Engineer's Signature

SECTION WASTEWATER

Detail No. WW-17

Title Manhole Concrete Apron
FLOW PATTERNS FOR INVERT CHANNELS

NOTES:
1. INVERT CHANNELS TO BE CONSTRUCTED FOR SMOOTH FLOW WITH NO OBSTRUCTIONS.
2. SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS PROVIDING FOR SMOOTH FLOW.
3. CHANNELS FOR FUTURE CONSTRUCTIONS (STUBS) SHALL BE CONSTRUCTED, FILLED WITH SAND, AND COVERED WITH 1" OF MORTAR.
4. SLOPE MANHOLE ITSELF WITH A 1:2 SLOPE FROM MANHOLE WALL TO CHANNEL.
5. INVERT SHALL BE A MINIMUM OF 1/2 THE DIAMETER OF THE LARGEST PIPE OR 4" DEEP.
5 ¼" LOCKING LID (F/461-S)

SEWER CLEAN-OUT
CITY OF MARBLE FALLS
(RESIDENTIAL SERVICE)

SCALE: NOT TO SCALE
SEWER VALVE LID

"WATER" TO BE CAST IN COVER WHEN USED ON WATER MAIN OR "SEWER" WHEN USED ON FORCE MAIN

FINISHED GRADE

TOP OF PAVEMENT

CONCRETE COLLAR 6" THICK MINIMUM

NOTES:
1. VALVE BOX SHALL BE AMERICAN FLOW CONTROL TRENCH ADAPTER OR APPROVED EQUAL HAVING AN ADJUSTABLE RANGE OF + OR - 6 INCHES FROM INSTALLED FINISH GRADE.
2. ACCEPTABLE GATE VALVES ARE:
   A. AMERICAN FLOW CONTROL - SERIES 2550
   B. MUELLER - 2360 SERIES
   C. GLOW

MECHANICAL JOINT, RESILIENT WEDGE, NON-RISING STEM GATE VALVE, M.J. x M.J. (AWWA)

SEE TRENCH BACKFILL DETAIL

SEE NOTE 1)

VALVE BOX

3/8" ROCK OR APPROVED SAND (TYP.)

6"

6"

3/8" ROCK OR APPROVED SAND (TYP.)

SCALE: NOT TO SCALE
"WATER" TO BE CAST IN COVER WHEN USED ON WATER MAIN OR "SEWER" WHEN USED ON FORCE MAIN

FINISHED GRADE

3/8" ROCK OR APPROVED SAND (TYP.) VALVE BOX (SEE NOTE 1)

3/8" ROCK (TYP.)

CONCRETE COLLAR 6" THICK MINIMUM

MECHANICAL JOINT, RESILIENT WEDGE, NON-RISING STEM GATE VALVE (AWWA) (SEE NOTE 2)

MECHANICAL JOINT WITH RETAINER GLAND AND LOCKING SET SCREWS

SEE TRENCH BACKFILL DETAIL

NOTES:
1. VALVE BOX SHALL BE AMERICAN FLOW CONTROL TRENCH ADAPTER OR APPROVED EQUAL HAVING AN ADJUSTABLE RANGE OF + OR - 6 INCHES FROM INSTALLED FINISH GRADE (SEE TYPICAL SEWER VALVE SETTING)

2. ACCEPTABLE GATE VALVES ARE:
   A. AMERICAN FLOW CONTROL - SERIES 2500
   B. MUELLER - 2360 SERIES
   C. CLOW

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name P.E.

Engineer's Signature

SECTION WASTEWATER
DETAIL NO. WW-21
TITLE IN-LINE VALVE
LIMITS OF PAY FOR THIS ITEM INCLUDES THE FOLLOWING:

1. INSTALLING THE TAPPING SADDLE AND CORP. STOP ONTO THE MAIN.
2. INSTALLING THE 2" PVC SCH. 80 FROM MAIN TO MANHOLE LOCATION.
3. INSTALLING THE MANHOLE (SEE STANDARD MANHOLE DETAIL).
4. INSTALLING THE AIR/VAC VALVE.

* WHERE AIR RELEASE/VACUUM VALVE CANNOT BE TIED BACK INTO A WASTEWATER MANHOLE USE OPTION 2.

ALTERNATIVE:
ARV CAN BE PLACED ON TOP OF MAIN LINE WITH APPROVAL FROM THE ENGINEER IF ROW/EASEMENT RESTRICTIONS EXIST.
NOTE:
ROTATE RISER AS NEEDED TO PROVIDE ACCESS TO COUPLING AND REDUCE POTENTIAL EROSION

"KUPFERLE" MODEL 77 MAINGUARD 2" BLOW-OFF HYDRANT W/90° BEND AT BASE

2" PVC, SCH 80

"ROCKWELL" OR EQ. (PVC ADAPTER AS REQ'D)

TAPPED TEE

FORCE MAIN

MAINGUARD 2" BLOW-OFF

"KUPFERLE" MODEL 77

NOTE:
THRUST BLOCKING SHALL BE PLACED IN A MANNER SO AS NOT TO PLUG OR BLOCK INTEGRAL WEEP HOLE FLUSH VALVES SHALL BE KUPFERLE MODEL 77 (OR EQUAL)
SERVICE NOTES:

1. PROPOSED GRINDER PUMP SYSTEM MANUFACTURER & MODEL, AS WELL AS SUPPORTING PUMP SIZING CRITERIA, SHALL BE SUBMITTED TO THE CITY OF MARBLE FALLS FOR APPROVAL PRIOR TO INSTALLATION.

2. SEWER FORCE MAIN WILL REQUIRE FLUSHING A MINIMUM OF ONCE EVERY TWO (2) WEEKS, OR AS DETERMINED BY THE CITY OF MARBLE FALLS.
NOTES:

1. Successive tees into the sewer main shall be spaced a minimum of 18" offset and at the centerline as shown on Detail "A".

2. The top of riser pipe shall be set 2' above finished grade.

3. Casing required for all pavement crossings. 4" SDR-26 or SCH-40 required for open-cut. Steel casing pipe required for jack and bore. Limits of casing should extend six feet beyond the edge of pavement or back-of-curb.

4. Any variations on fittings must be approved by the Marble Falls Public Works Department.

5. Wet connections to active wastewater force mains shall be required. Smith-Blair 372 all stainless steel, double stud service saddles shall be required for single family residential wet taps to force mains.

SCALE: NOT TO SCALE
SERVICE NOTES:

1. PROPOSED GRINDER PUMP SYSTEM MANUFACTURER & MODEL, AS WELL AS SUPPORTING PUMP SIZING CRITERIA, SHALL BE SUBMITTED TO THE CITY OF MARBLE FALLS FOR APPROVAL PRIOR TO INSTALLATION.

2. SEWER FORCE MAIN WILL REQUIRE FLUSHING A MINIMUM OF ONCE EVERY TWO (2) WEEKS, OR AS DETERMINED BY THE CITY OF MARBLE FALLS.

3. SIZE OF SERVICE PIPE AND VALVES SHALL BE CONSTANT THROUGHOUT THE SERVICE LEAD.

4. SIZE OF SERVICE LEAD SHALL BE AS CALLED OUT IN THE CONTRACT DOCUMENTS.
NOTES:
1. SUCCESSIVE TEES INTO THE SEWER MAIN SHALL BE SPACED A MINIMUM OF 18" OFFSET AND AT THE CENTERLINE AS SHOWN ON DETAIL "A".
2. THE TOP OF RISER PIPE SHALL BE SET 2' ABOVE FINISHED GRADE.
3. SDR-26 OR SCH-40 CASING REQUIRED FOR ALL PAVEMENT CROSSINGS. CASING SHALL BE AT LEAST TWICE THE DIAMETER OF THE SERVICE. STEEL CASING PIPE REQUIRED FOR JACK AND BORE. LIMITS OF CASING SHOULD EXTEND SIX FEET BEYOND THE EDGE OF PAVEMENT OR BACK-OF-CURB.
4. ANY VARIATIONS ON FITTINGS MUST BE APPROVED BY THE MARBLE FALLS PUBLIC WORKS DEPARTMENT.
5. WET CONNECTIONS TO ACTIVE WASTEWATER FORCE MAINS SHALL BE REQUIRED. SERVICE LEADS 2" IN DIAMETER SHALL USE SMITH-BLAIR 372 ALL STAINLESS STEEL DOUBLE STUD SERVICE SADDLES FOR WET TAPS TO FORCE MAINS. SERVICE LEADS LARGER THAN 2" IN DIAMETER SHALL REQUIRE SMITH-BLAIR 663 ALL STAINLESS STEEL TAPPING SLEEVES FOR WET CONNECTIONS TO FORCE MAINS.
SERVICE NOTES:

1. PROPOSED GRINDER PUMP SYSTEM MANUFACTURER & MODEL, AS WELL AS SUPPORTING PUMP SIZING CRITERIA, SHALL BE SUBMITTED TO THE CITY OF MARBLE FALLS FOR APPROVAL PRIOR TO INSTALLATION.

2. SEWER FORCE MAIN WILL REQUIRE FLUSHING A MINIMUM OF ONCE EVERY TWO (2) WEEKS, OR AS DETERMINED BY THE CITY OF MARBLE FALLS.
NOTES:
1. SUCCESSIVE TEES INTO THE SEWER MAIN SHALL BE SPACED A MINIMUM OF 18" OFFSET AND AT THE CENTERLINE AS SHOWN ON DETAIL "A".
2. THE TOP OF RISER PIPE SHALL BE SET 2' ABOVE FINISHED GRADE.
3. ANY VARIATIONS ON FITTINGS MUST BE APPROVED BY THE MARBLE FALLS PUBLIC WORKS DEPARTMENT.
4. WET CONNECTIONS TO ACTIVE WASTEWATER FORCE MAINS SHALL BE REQUIRED. SMITH-BLAIR 372 ALL STAINLESS STEEL, DOUBLE STUD SERVICE SADDLES SHALL BE REQUIRED FOR SINGLE FAMILY RESIDENTIAL WET TAPS TO FORCE MAINS.

SCALE: NOT TO SCALE

Marble Falls

800 THIRD STREET
MARBLE FALLS, TX 78654
Pjs (830) 693-6737

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

Marble Falls, TX

SECTION
WASTEWATER
DETAIL NO. WW-29
TITLE SHORT RESIDENTIAL FM SERVICE LINE SECTION
SERVICE NOTES:

1. PROPOSED GRINDER PUMP SYSTEM MANUFACTURER & MODEL, AS WELL AS SUPPORTING PUMP SIZING CRITERIA, SHALL BE SUBMITTED TO THE CITY OF MARBLE FALLS FOR APPROVAL PRIOR TO INSTALLATION.

2. SEWER FORCE MAIN WILL REQUIRE FLUSHING A MINIMUM OF ONCE EVERY TWO (2) WEEKS, OR AS DETERMINED BY THE CITY OF MARBLE FALLS.

3. SIZE OF SERVICE PIPE AND VALVES SHALL BE CONSTANT THROUGHOUT THE SERVICE LEAD.

4. SIZE OF SERVICE LEAD SHALL BE AS CALLED OUT IN THE CONTRACT DOCUMENTS.
NOTES:
1. SUCCESSIVE TEES INTO THE SEWER MAIN SHALL BE SPACED A MINIMUM OF 18" OFFSET AND AT THE CENTERLINE AS SHOWN ON DETAIL "A".

2. THE TOP OF RISER PIPE SHALL BE SET 2' ABOVE FINISHED GRADE.

3. ANY VARIATIONS ON FITTINGS MUST BE APPROVED BY THE MARBLE FALLS PUBLIC WORKS DEPARTMENT.

4. WET CONNECTIONS TO ACTIVE WASTEWATER FORCE MAINS SHALL BE REQUIRED. SERVICE LEADS 2" IN DIAMETER SHALL USE SMITH-BLAIR 372 ALL STAINLESS STEEL, DOUBLE STUD SERVICE SADDLES FOR WET TAPS TO FORCE MAINS. SERVICE LEADS LARGER THAN 2" IN DIAMETER SHALL REQUIRE SMITH-BLAIR 663 ALL STAINLESS STEEL TAPPING SLEEVES FOR WET CONNECTIONS TO FORCE MAINS.

SCALE: NOT TO SCALE

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Sections
WASTEWATER

DETAIL NO. WW-31

TITLE SHORT NON-RESIDENTIAL FM SERVICE LINE SECTION
NOTES:

1. Casing spacers shall be bolt on style with a shell made in two sections of heavy T-304 stainless steel. Connecting flanges shall be ribbed for extra strength. See specifications for approved casing spacers.

2. Casing spacers shall have runners made of ultra high molecular weight polymer, with a minimum height of 2 inches.

3. Do not use wedges between top of carrier pipe and inside of casing to keep pipe from moving.

4. Prior to inserting carrier pipe, any water should be pumped out of the casing pipe so that no more than a few inches of water remains.

5. Spacers will be required within at least 3 feet from both openings of the encasement pipe and spaced no greater than 6 feet throughout the encasement pipe. In addition, spacers shall be required within 2 feet of all pipe joints.

6. Encasement pipe shall be smooth steel 35,000 psi yield strength with thickness according to the following table:

<table>
<thead>
<tr>
<th>PIPE SIZE - CARRIER (DIAMETER)</th>
<th>PIPE SIZE - CASING (DIAMETER)(MIN.)</th>
<th>MINIMUM PIPE THICKNESS (INCHES)</th>
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</thead>
<tbody>
<tr>
<td>6”</td>
<td>16”</td>
<td>1/4</td>
</tr>
<tr>
<td>8”</td>
<td>18”</td>
<td>1/4</td>
</tr>
<tr>
<td>10”</td>
<td>20”</td>
<td>5/16</td>
</tr>
<tr>
<td>12” - 14”</td>
<td>24”</td>
<td>3/8</td>
</tr>
<tr>
<td>16” - 18”</td>
<td>30”</td>
<td>7/16</td>
</tr>
<tr>
<td>20”</td>
<td>36”</td>
<td>1/2</td>
</tr>
<tr>
<td>24”</td>
<td>42”</td>
<td>1/2</td>
</tr>
<tr>
<td>30”</td>
<td>48”</td>
<td>1/2</td>
</tr>
</tbody>
</table>

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

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SECTION WASTEWATER

DETAIL NO. WW-32

TITLE PIPE CASING
**NOTE:**

Weld all rods to frame. Mandrel shall be constructed from metal or rigid plastic material that can withstand 200 psi without being deformed.

**Mandrel Dimensions - 5% Deflection**

For O.D. controlled PVC pipe*

<table>
<thead>
<tr>
<th>Size</th>
<th>Type</th>
<th>O.D. Average</th>
<th>Min. Wall</th>
<th>Thickness</th>
<th>L1</th>
<th>L2</th>
<th>R1</th>
<th>R2</th>
<th>T1</th>
<th>T2</th>
<th>Rod Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>D3034 SDR35</td>
<td>6.275</td>
<td>0.180</td>
<td>4.50</td>
<td>6</td>
<td>2.81</td>
<td>0.75</td>
<td>0.375</td>
<td>1.0</td>
<td>0.375</td>
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<tr>
<td>8&quot;</td>
<td>D3034 SDR35</td>
<td>6.400</td>
<td>0.240</td>
<td>6.00</td>
<td>6</td>
<td>3.76</td>
<td>1.25</td>
<td>0.375</td>
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<tr>
<td>10&quot;</td>
<td>D3034 SDR35</td>
<td>10.500</td>
<td>0.300</td>
<td>7.50</td>
<td>6</td>
<td>4.70</td>
<td>1.50</td>
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<td>12&quot;</td>
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<td>9.00</td>
<td>6</td>
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<tr>
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<tr>
<td>8&quot;</td>
<td>F679 T-1</td>
<td>5.70</td>
<td>0.336</td>
<td>13.50</td>
<td>5</td>
<td>8.37</td>
<td>2.50</td>
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<td>0.632</td>
<td>15.75</td>
<td>9</td>
<td>9.87</td>
<td>3.00</td>
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<tr>
<td>14&quot;</td>
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<td>9</td>
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<td>27&quot;</td>
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<td>0.801</td>
<td>20.25</td>
<td>9</td>
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<td>0.50</td>
<td>1.5</td>
<td>0.50</td>
<td></td>
</tr>
</tbody>
</table>

* All dimensions in inches

**Scale:** Not to Scale

---

**Marble Falls Texas**

**Marble Falls**

800 Third Street
Marble Falls, TX 78654

Phone (830) 693-6737

These documents were prepared by, or under the supervision of:

**Engineer's Name**

**PE#**

**Date**

**Engineer's Signature**

**Section**

**Wastewater**

**Detail No.**

** WW-33 **

**Title**

**Mandrel**
**NOTE:**

1. **SEWER PIPE SHALL BE SDR 21 W/ PRESSURE RATING OF 200 PSI WITH MECHANICAL JOINTS.**
2. **1' MIN. SEPARATION, SEPARATE JOINTS AS FAR AS POSSIBLE FROM CROSSING.**
3. **CENTER ONE 18' MIN. JOINT OF SEWER LINE OVER CROSSING.**
4. **ALL CROSSINGS SHALL COMPLY WITH CURRENT TCEQ REQUIREMENTS AND IN ACCORDANCE W/ AWWA & ASTM STANDARDS.**
5. **WHEN POSSIBLE, ALL SEWER LINES SHALL BE ROUTED BELOW WATER LINES.**
WASTEWATER

WW-36

GRAVITY SEWER. RATING OF 160 PSI (SDR 26) FOR 200 PSI (SDR 21) AND A MIN. PRESSURE HAVE A MIN. PRESSURE RATING OF PRESSURIZED WASTEWATER PIPE SHALL HAVE A MIN. PRESSURE RATING OF 200 PSI (SDR 21) AND A MIN. PRESSURE RATING OF 160 PSI (SDR 26) FOR GRAVITY SEWER.

4"  6"

DIAMETERS'

BETWEEN OUTSIDE SEPARATION DISTANCE 6" ABSOLUTE MIN.

LINE JOINTS AS POSSIBLE FROM WATER LOCATE CROSSING AS FAR AS POSSIBLE FROM WATER LINE JOINTS

≤ 45° BEND (AS REQUIRED) (PRESSURE SEWER ONLY)

6"

LOCATE CROSSING AS FAR AS POSSIBLE FROM WATER LINE JOINTS

6" ABSOLUTE MIN. SEPARATION DISTANCE BETWEEN OUTSIDE DIAMETERS'

CENTER ONE JOINT SEWER PIPE, MIN. 18' IN LENGTH, UNDER WATER LINE.

BED SANITARY SEWER LINE IN BROWN COLORED CEMENT STABILIZED SAND WITH MINIMUM CEMENT CONTENT OF 2.5 BAGS OF CEMENT PER CUBIC YARD. CEMENT STABILIZED SAND SHALL BE PLACED 6" ABOVE AND 4" BELOW THE WASTEWATER LINE AND EXTEND THE TOTAL LENGTH OF ONE PIPE SEGMENT PLUS 12" BEYOND THE JOINT AT EACH END.

* ALL CROSSINGS SHALL COMPLY WITH CURRENT TCEQ REQUIREMENTS AND IN ACCORDANCE WITH AWWA AND/OR ASTM STANDARDS.

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

ENGINEER'S SIGNATURE

WATER MAIN CROSSING PROPOSED FM UNDER FORCE MAIN LINE

PH: (830) 693-6737
MARBLE FALLS, TX 78654
800 THIRD STREET MARBLE FALLS, TX 78654
Ph: (830) 693-6737

SECTION
WASTEWATER

DETAIL NO.
WW-36

TITLE
PROPOSED FM UNDER WATER MAIN CROSSING
*" CHECK VALVE
*" GATE VALVE
*" CONCRETE VALVE VAULT

24 1/2" x 42" AL. ACCESS DOORS

DISCHARGE - *" SDR-21

36"

* SIZE AND TYPE TO BE DETERMINED BY DESIGNER

SCALE: NOT TO SCALE
LIFT STATION TOP
PLAN VIEW
N.T.S.

* REQUIRED IF FIBERGLASS WET WELL IS SPECIFIED, OR IF A BEARING RING IS CALLED FOR IN THE PLANS.
** IF NO BEARING RING IS REQUIRED.
Provide a 1" gap between lift station top and wet well or bearing ring (as required) (see gap detail).

Wet well or bearing ring (as required)

SECTION A-A

SECTION B-B

* DIMENSIONS

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>A</th>
<th>IN.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* DIMENSIONS FOR SLAB THICKNESS AND REINFORCING SCHEDULE IS SPECIFIC TO EACH USE AND MUST BE PROVIDED BY THE DESIGN ENGINEER.

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017

Engineer's Name P# Date

Engineer's Signature

WASTEWATER

WW-39

LIFT STATION TOP BEARING RING (2 OF 3)
BEARING RING
PLAN VIEW
N.T.S.

SECTION A-A
N.T.S.

* DIMENSIONS AND REINFORCING

<table>
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<tr>
<td>A</td>
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</tr>
<tr>
<td>B</td>
<td>BARS</td>
</tr>
</tbody>
</table>

* BEARING RING THICKNESS AND REINFORCING STEEL MUST BE SIZED BY THE DESIGN ENGINEER.

These documents were prepared by, or under the supervision of:

ERIC BELAJ
Engineer's Name

107148
PE#

May 31, 2017
Date

MARBLE FALLS
800 THIRD STREET
MARBLE FALLS, TX 78654

PH: (830) 693-6737

SCALE: NOT TO SCALE

WASTEWATER

LIFT STATION TOP BEARING RING (3 OF 3)
**LIFT STATION FOUNDATION**  
**ELEVATION VIEW**  
N.T.S.

<table>
<thead>
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<tbody>
<tr>
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<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
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</table>

* DIMENSIONS FOR WET WELL FOUNDATION MUST BE PROVIDED BY THE DESIGN ENGINEER. DESIGN SHOULD PROVIDE FOR A FOUNDATION TO ADEQUATELY SUPPORT THE LIFT STATION AND PREVENT AGAINST FLOATATION.

These documents were prepared by, or under the supervision of:

<table>
<thead>
<tr>
<th>Engineer's Name</th>
<th>PE#</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERIC BELAJ</td>
<td>107148</td>
<td>May 31, 2017</td>
</tr>
</tbody>
</table>

Engineer's Signature

SCALE: NOT TO SCALE

**SECTION**  
WASTEWATER

**DETAIL NO.**  
WW - 41

**TITLE**  
LIFT STATION FOUNDATION
WASTEWATER

PLAN VIEW

ODOR CONTROL SLAB

* DIMENSIONS SHALL BE AS SPECIFIED BY THE ODOR CONTROL MANUFACTURER.

SECTION A-A

#4 BARS @ 12" O.C.E.W. OR W12 WWM

SCALE: NOT TO SCALE
One 18’ (min.) length of proposed water line centered over sanitary sewer line.

Sanitary sewer line centered over proposed water line.

Bed sanitary sewer line in brown colored cement stabilized sand. Minimum cement content of 2.5 bags of cement per cubic yard. Cement stabilized sand shall be placed 6” above and 4” below the wastewater line.

*All crossings shall comply with current TCEQ requirements.

Marble Falls, TX 78654
800 Third Street
PH: (830) 693-6737

Engineer's Name          PE#                   Date
ERIC BELAJ             107148         May 31, 2017

These documents were prepared by, or under the supervision of:

Engineer's Signature

Section
WASTEWATER

Detail No.
WW-43

Title
PROPOSED WW LINE UNDER PROPOSED WATER
NOTES:
1. O-RING DIMENSION 25/32" DIA., 1013cc VOLUME.
2. DRAWING NOT TO SCALE FOR CLARIFICATION OF DIMENSIONS.
3. ADAPTED FROM CITY OF AUSTIN 506S-12.
NOTES:
1. DRAWING NOT TO SCALE FOR CLARIFICATION OF DIMENSIONS.
2. GASKET STRETCH; MIN. 10, MAX. 15%.

SCALE: NOT TO SCALE

WEDGE TYPE GASKET
TYPICAL
DIMENSIONS

These documents were prepared by,
or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION
WASTEWATER

DETAIL NO.
WW-45

TITLE
MANHOLE WEDGE SEAL JOINT
ALL MANHOLE LIDS SHALL BE BOLTED AND GASKETED

1 1/8" SQUARE BY 1/4" DEEP RECESS BELOW TREAD WITH 1 1/8" HOLE ON A 29 1/8" DIA. CIRCLE (TYP.)

1/4" LETTERS - LID WEIGHT

3/8" MIN. (TYP.)

1 1/8" MIN. (TYP.)

1 1/8" LIFT HOLE

36° TYP.

STAR LAYOUT

3/8" TYP.

LID BOTTOM VIEW

LID SECTION VIEW

SECTION A-A

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ
Engineer's Name
ENR# 107148
May 31, 2017
Date

Engineer's Signature

SECTION

WASTEWATER

DETAIL NO.

WW-46

TITLE

MANHOLE SEALED FRAME & LID

Marble Falls

800 Third Street
Marble Falls, TX 78654

Phs (830) 693-6737
NOTES:

1. ALL CONDUIT TO INCLUDE A 1500 LB CONTINUOUS MULE TAPE IN PLACE BETWEEN PULL BOXES.

2. ALL INSTALLED CONDUITS MUST PASS A PULL TEST WITH A FULL SIZED MANDREL.

3. FILTER FABRIC ALONG THE TOP OF THE TRENCH IS REQUIRED REGARDLESS OF SUBSURFACE CONDITIONS.
NOTES:

1. A minimum of one density test shall be taken every two hundred (200) feet for each eight (8) inch lift of select backfill. Proctors for materials used in backfilling shall be obtained by a certified laboratory. Density tests shall be conducted by a certified laboratory or the permittee's consultants. All density tests shall be completed and accepted on each layer prior to additional backfilling. A copy of all completed and accepted density tests shall be furnished to the owner. Backfill compaction shall be a minimum 95% of optimum density as determined by TxDOT Test Method TX113E test method.

2. Contractor or engineer may request for use of alternate backfill material. Alternate materials and testing protocol must be submitted to and approved by the City Engineer prior to use.

3. Refer to geotechnical report for additional subgrade, flexible base, and pavement requirements.

4. All communication conduit to include a 1500 lb continuous mule tape in place between pull boxes.

5. All installed conduits must pass a pull test with a full sized mandrel.

6. Filter fabric along the top of the trench is required regardless of subsurface conditions.
NOTES:
1. REPLACED BASE MATERIAL OVER DITCH SHALL BE A MINIMUM OF TWICE THE THICKNESS OF THE ORIGINAL BASE AND IN NO CASE LESS THAN 8".
2. BASE MATERIAL SHALL BE PLACED IN MAXIMUM 6" LIFTS AND EACH LIFT COMPACTED TO SPECIFIED DENSITY.
3. ASPHALT CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED.
4. A MINIMUM OF ONE DENSITY TEST SHALL BE TAKEN EVERY TWO HUNDRED (200) FEET FOR EACH EIGHT (8) INCH LOOSE LIFT OF SUBGRADE AND EACH OPEN CUT CROSSING. ADDITIONAL TESTS MAY BE REQUIRED AT THE ENGINEER’S DISCRETION. ALL DENSITY TESTS SHALL BE COMPLETED AND ACCEPTED ON EACH LAYER PRIOR TO ADDITIONAL BACKFILLING. A COPY OF ALL COMPLETED AND ACCEPTED DENSITY TESTS SHALL BE FURNISHED TO THE OWNER.
5. CONTRACTOR OR ENGINEER MAY REQUEST FOR USE OF ALTERNATE BACKFILL MATERIAL. ALTERNATE MATERIALS AND TESTING PROTOCOL MUST BE SUBMITTED TO AND APPROVED BY THE CITY ENGINEER PRIOR TO USE.
6. ALL COMMUNICATION CONDUIT TO INCLUDE A 1500 LB CONTINUOUS MULE TAPE IN PLACE BETWEEN PULL BOXES.
7. ALL INSTALLED CONDUITS MUST PASS A PULL TEST WITH A FULL SIZED MANDREL.
8. FILTER FABRIC ALONG THE TOP OF THE TRENCH IS REQUIRED REGARDLESS OF SUBSURFACE CONDITIONS.
UNDISTURBED TRENCH WALL

SELECT BEDDING SHALL BE REQUIRED AS PER STANDARD SPECIFICATIONS FOR "SELECT BEDDING"

COMPACTED SELECT COMMON FILL 8" LIFTS (MAX.)

6" DEPTH OF 2000 PSI CONCRETE WITH 6X6 - W1.4 X W1.4 WELDED WIRE FABRIC

POTABLE WATER LINE

TRENCH WIDTH + 2'-0"

6" PIPE O.D. + 12"

12" TYP.

6" WIDE METALLIC REFLECTIVE WARNING TAPE

6" DEPTH OF 2000 PSI CONCRETE WITH 6X6 - W1.4 X W1.4 WELDED WIRE FABRIC

* WHERE 30" MINIMUM COVER CAN NOT BE OBTAINED OR DUE TO POTENTIAL SURFACE LOADING THE CITY MAY REQUIRE A CAP TO BE INSTALLED.

SCALE: NOT TO SCALE

ENGINEER’S NAME        PE#               DATE
ERIC BELAJ             107148              May 31, 2017

ENGINEER’S SIGNATURE

These documents were prepared by, or under the supervision of:

WATER

WT-4

DETAIL NO.

CONCRETE CAP EMBEDMENT
NOTES:
1. ENCASEMENT TO BE CONSTRUCTED WHERE SEWER LINES PASS OVER OR UNDER A WATER MAIN WITH LESS THAN EIGHTEEN INCHES (18") CLEAR DISTANCE.
2. AT CROSSINGS, ENCASEMENT SHALL EXTEND TEN FEET (10'-0") ON EITHER SIDE OF CROSSING.
3. BEGINNING AND ENDING OF ENCASEMENTS SHALL NOT BE MORE THAN SIX INCHES (6") FROM A PIPE JOINT.
4. WHERE WATER AND SEWER LINES PARALLEL WITH LESS THAN TEN FEET (10'-0") HORIZONTAL CLEAR DISTANCE, NO ENCASEMENT IS REQUIRED IF BOTH LINES ARE 150 PRESSURE PIPE.
5. RAW WATER MAINS SHALL BE 150 PSI PRESSURE RATED WHEN PARALLELING POTABLE WATER MAINS WITH LESS THAN TEN FEET (10'-0") HORIZONTAL CLEARANCE.
6. WHERE MINIMUM COVER, THIRTY INCHES (30") IS NOT AVAILABLE, ENCASEMENT WILL BE REQUIRED.
7. ALL CONCRETE ENCASEMENTS MUST BE FORMED AND INSPECTED BY THE CITY OF MARBLE FALLS INSPECTOR PRIOR TO PLACING CONCRETE AND BACKFILLING.
8. CONCRETE SHALL BE FLOWABLE FILL HAVING A STRENGTH BETWEEN 300 TO 500 PSI.
1. Authorized service line material (2" diameter):
   A. Schedule 80, P.V.C. (2" diameter) class 200 - main line to 2" tee.
   B. Type "K" copper (1" diameter) - 2" tee to meter.
2. Angle stop shall be 1" minimum.
3. 1" angle stops with 3/4" valves shall not be permitted.
4. Multiple service/meter installations of more than 4 meters per service and service lines larger than 2" in diameter shall be handled on an individual basis.
5. Angle stops 1 1/2" and 2" in size shall be provided with both a locking cap and meter flange.
6. There shall be a 6" envelope of 3/8" rock or approved bedding sand around all service and casing pipe. Compact backfill on long services under roadways per specifications.
7. Casing requirements for service lines crossing roadways see detail long single & double water service section.
8. Any variations on fittings must be approved by the Marble Falls Public Works Department.
9. Meter box to be solid plastic with black cast iron lid and flip lid for meter reading. Model no. 36 manufactured by Mid-American Research Chemical Corporation or approved equal.
NOTES:

1. SUCCESSIVE TAPS INTO THE WATER MAIN SHALL BE SPACED A MINIMUM OF 18" OFFSET AND AT THE CENTERLINE AS SHOWN ON DETAIL "A".

2. THE TOP OF METER BOX SHALL BE SET 1" ABOVE FINISHED GRADE.

3. AUTHORIZED SERVICE LINE MATERIAL:
   A. TYPE "K" COPPER (1" DIAMETER) FROM 2" X 1" BUSHING TO METER BOX.
   B. SCHEDULE 80, P.V.C. OR MUNICIPEX (2" DIAMETER) - 200 PSI - FROM MAIN TO 2" X 1" BUSHING.
   C. TYPE "K" COPPER (1" DIAMETER) FROM 2" X 1" BUSHING TO METER BOX.

4. ROTATE THE CORPORATION STOP SO THAT THE OPERATING NUT IS ACTUATED FROM THE VERTICAL POSITION RATHER THAN THE HORIZONTAL.

5. SERVICE LINES SHALL BE CONTINUOUS FROM CORPORATION STOP TO 2" BRASS 90° BEND OR 2" BRASS TEE WITH NO FITTINGS IN BETWEEN.

6. SERVICE CASING SHALL NOT BE INSTALLED BY WATER JETTING UNDER ROADWAY.

7. CASING REQUIRED FOR ALL PAVEMENT CROSSINGS. 4" SH-40, BLUE, WHITE, OR BLACK, REQUIRED FOR OPEN-CUT. GALVANIZED CASING PIPE REQUIRED FOR JACK AND BORE. LIMITS OF CASING SHOULD EXTEND SIX FEET BEYOND THE EDGE OF PAVEMENT OR BACK-OF-CURB.

8. THERE SHALL BE A 6" ENVELOPE OF 3/8" ROCK OR APPROVED BEDDING SAND AROUND ALL SERVICE AND CASING PIPE. COMPACT BACKFILL ON LONG SERVICES UNDER ROADWAYS PER STANDARD DETAIL W03 OR W04.

9. ANY VARIATIONS ON FITTINGS MUST BE APPROVED BY THE MARBLE FALLS PUBLIC WORKS DEPARTMENT.

10. METER BOX TO BE SOLID BLACK PLASTIC WITH BLACK CAST IRON LID AND FLIP LID FOR METER READING. MODEL NO. MB-16L OR LL MANUFACTURED BY RHINO WITH HINGED READER LID OR APPROVED EQUAL.

11. CORPORATION STOPS, ANGLE STOPS AND OTHER BRASS FITTINGS SHALL BE MANUFACTURED BY FORD, OR APPROVED EQUAL.
NOTES:

1. SERVICE PIPE SHALL BE COPPER TUBE SIZE, IT SHALL BE 150 psi ANNEALED SEAMLESS TYPE "K" COPPER TUBING.
2. SERVICE SADDLES SHALL BE WRAPPED COMPLETELY WITH 6 MIL POLYETHYLENE FILM.
3. TOP OF BOXES SHALL BE 1 INCH ABOVE FINISHED GRADE.
4. SERVICE TUBING SHALL BE INSTALLED WITH A 6 INCH ENVELOPE OF BEDDING SAND OR 3/8" ROCK AROUND TUBING.
5. METER BOX TO BE SOLID BLACK PLASTIC WITH BLACK LID AND FLAP FOR METER READING. RHINO MI-16L OR LL MODEL OR APPROVED EQUAL (SUPPLIER/ MANUFACTURER).
6. ANY VARIATIONS ON FITTINGS MUST BE APPROVED BY THE CITY ENGINEER.
7. AXIS OF METER ASSEMBLY (METER STOP, METER, PIPE, AND OWNERS CUTOFF) SHALL BE 10" BELOW TOP OF BOX.
8. SLOTS PROVIDED IN METER BOX TO ACCOMMODATE PIPING INTO AND OUT OF BOX SHALL NOT BE MODIFIED.

MATERIAL LIST

A. FORD BRASS SADDLE - SERVICE CLAMP REQUIRED.
B. 1" CORPORATION STOP - SERVICE PIPE OUTLET.
C. 1" SERVICE PIPE, WATER SERVICE CASING IS REQUIRED
   FOR SERVICE LINES CROSSING UNDER ROADWAYS. SEE DETAIL W-03, NOTE #7.
D. ANGLE METER STOP, SERVICE PIPE INLET X SWIVEL COUPLING NUT OUTLET:
   - FOR 5/8" AND 3/4" METERS: 1" X 3/4"
   - FOR 1" METERS: 1" X 1"
   - JONES *J-1965 W WITH JONES J-130 SPUD
E. PLASTIC RECTANGULAR METER BOX (SEE NOTE 5).

NOTE:
F. THRU I TO BE INSTALLED UNDER SEPARATE BUILDING PERMIT.
G. WATER METER - FURNISHED AND INSTALLED BY CITY
H. WATER METER COUPLING MALE 1" P.T. X SWIVEL COUPLING NUT:
   - FOR 5/8" AND 3/4" METERS: 3/4" X 8 1/2" LONG
   - FOR 1" METERS: 1" X 8 1/2" LONG
I. BRASS GATE VALVE NON-RISING STEM 1" FEMALE 1" P.T. (PROPERTY OWNERS CUTOFF OUTSIDE METER BOX IN SEPARATE VALVE CAN WITH LID AS PER STANDARDS)
J. 1" PIPE (SCH40 PVC) BY PROPERTY OWNER

SCALE: NOT TO SCALE

These documents were prepared by,
or under the supervision of:

ERIC BELAJ

Engineer's Name

107148

PE# Date

May 31, 2017

Engineer's Signature
WHERE METER IS FOR IRRIGATION.

NOTE: BYPASS NOT ALLOWED BUILDING WATER SERVICE.
REOUIRED FOR ALL COMMERCIAL

NOTES:
1. SERVICE PIPE SHALL BE COPPER TUBE SIZE. IT SHALL BE ANNEALED SEAMLESS TYPE "K" COPPER TUBING MEETING THE CURRENT ASTM B88 STANDARD WITH NO SWEAT OR SOLDERED JOINTS.
2. SERVICE SADDLE SHALL BE WRAPPED COMPLETELY WITH 0.2 mm (8 MIL) POLYETHYLENE FILM.
3. TOP OF BOXES SHOULD BE 25 mm (1") ABOVE GROUND OR FLUSH WITH PAVEMENT SURFACE.
4. PIPING AND TUBING IN STREET RIGHT-OF-WAY SHALL BE BEDDED IN GRANULAR MATERIALS.
5. BOX MUST BE BEHIND CURB NOT TO PROPERTY LINE OR EASEMENT AND OUT OF SIDEWALK AND OUT OF VEHICULAR TRAFFIC AREA.
6. IF POLYETHYLENE TUBING IS USED, COMPRESSION FITTING REQUIRED WITH STEEL PIPE STIFFNER INSERT.

NOTES:
1. DRAWING NOT TO SCALE FOR CLARIFICATION OF DIMENSIONS.
2. ADAPTED FROM CITY OF AUSTIN 5205-13.
### MATERIALS LIST

<table>
<thead>
<tr>
<th>Description</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. SERVICE CLAMP FOR CONNECTION— REQUIRED ON ALL PLASTIC AND ASBESTOS CEMENT PIPE AND ALL IRON PIPE 300 mm (12&quot;) AND SMALLER</td>
<td>(1 1/2&quot;)</td>
</tr>
<tr>
<td>B. CORPORATION STOP — SERVICE PIPE OUTLET</td>
<td>(1 1/2&quot;)</td>
</tr>
<tr>
<td>C. SERVICE PIPE</td>
<td>(1 1/2&quot;)</td>
</tr>
<tr>
<td>D. COUPLING: SERVICE PIPE TO MALE I.P.T. (COMPRESSION FITTING)</td>
<td>(1 1/2&quot;)</td>
</tr>
<tr>
<td>E. BALL VALVE, SEE SPL WW 275</td>
<td>(1 1/2&quot;)</td>
</tr>
<tr>
<td>F. TEES, BRASS</td>
<td>(1 1/2&quot;x8&quot;)</td>
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<tr>
<td>G. CLOSE—NIPPLE, BRASS</td>
<td>(1 1/2&quot;)</td>
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<tr>
<td>H. ANGLE METER STOP, FEMALE I.P. THREAD INLET X FLANGE OUTLET</td>
<td>(1 1/2&quot;)</td>
</tr>
<tr>
<td>I. WATER METER LENGTH WITH GASKETS</td>
<td>(13 1/2&quot;)</td>
</tr>
<tr>
<td>J. FLANGE, BRASS, FEMALE I.P. THREAD</td>
<td>(1 1/2&quot;)</td>
</tr>
<tr>
<td>K. NIPPLES, BRASS</td>
<td>(1 1/2&quot;x3&quot;)</td>
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<tr>
<td>L. BALL VALVE</td>
<td>(1 1/2&quot;)</td>
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<tr>
<td>M. NIPPLES, BRASS</td>
<td>(1&quot;x5&quot;)</td>
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<tr>
<td>N. 90 DEGREE ELBOWS, BRASS</td>
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<tr>
<td>O. NIPPLES, BRASS</td>
<td>(1 1/2&quot;x3&quot;)</td>
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<td>P. CURB STOP, BRASS, FEMALE I.P. THREAD BOTH ENDS WITH LOCK NUTS</td>
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<td>Q. COUPLINGS, BRASS, SERVICE PIPE TO MALE THREAD</td>
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<td>R. SERVICE PIPE</td>
<td>(1 1/2&quot;)</td>
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<tr>
<td>S. RECTANGULAR METER BOX</td>
<td>(1 1/2&quot;)</td>
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<tr>
<td>T. METER BOX MSBCF 1730-12, METER BOX LID</td>
<td>32131701</td>
</tr>
<tr>
<td>U. RECTANGULAR BOX FOR CUSTOMER'S CUT-OFF VALVE (AND PRV WHEN REQUIRED)</td>
<td>(12&quot;x17&quot;x12&quot;)</td>
</tr>
<tr>
<td>V. CUSTOMER'S BALL VALVE</td>
<td>(1 1/2&quot;)</td>
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</tbody>
</table>

### NOTES:

1. DRAWING NOT TO SCALE FOR CLARIFICATION OF DIMENSIONS.
2. ADOPTED FROM CITY OF AUSTIN 520S-13.
NOTES:
1. SERVICE PIPE SHALL BE 2" SCH. 80 PVC, CLASS 200 OR MUNICIPEX PIPE.
2. SERVICE SADDLES SHALL BE WRAPPED COMPLETELY WITH 8 MIL (0.2mm) POLYETHYLENE FILM.
3. TOP OF METER BOX SHALL BE SET 1 INCH ABOVE FINISHED GRADE.
4. SERVICE PIPE AND CASING PIPE SHALL BE INSTALLED WITH A 6 INCH ENVELOPE OF BEDDING SAND OR 3/8" ROCK AROUND TUBING AND CASING PIPE.
5. ANY VARIATIONS ON FITTINGS MUST BE APPROVED BY THE CITY ENGINEER AND/OR THE CITY OF MARBLE FALLS PUBLIC WORKS DEPARTMENT.
6. AXIS OF METER ASSEMBLY (BALL VALVE, METER, PIPING AND GATE VALVE) SHALL BE 12" BELOW TOP OF BOX.
7. METER BOX SHALL NOT BE MODIFIED.

MATERIAL LIST
A. BRASS TAPPING SADDLE – SERVICE CLAMP REQUIRED – FORD S91 (FOR 2" – 12" C900 PVC ONLY) FOR PVC PIPE SIZES LARGER THAN 12" OR PIPE MATERIALS OTHER THAN PVC, FORD 202B BRASS TAPPING SADDLES SHALL BE USED.
B. AS SUPPLIED.
D. 2" FEMALE I.P. THREAD TO SERVICE PIPE (COMPRESSON).
E. 2" SCH. 80 PVC OR MUNICIPEX SERVICE PIPE. WATER SERVICE CASING IS REQUIRED FOR LONG SERVICE LINES CROSSING UNDER ROADWAYS. CASING REQUIRED FOR ALL PAVEMENT CROSSINGS. 4" SDR-26 REQUIRED FOR OPEN-CUT. STEEL CASING PIPE REQUIRED FOR JACK AND BORE. LIMITS OF CASING SHOULD EXTEND SIX FEET BEYOND THE EDGE OF PAVEMENT OR BACK-OF-CURB.
F. 2" BRASS CURB STOP – "FORD" B77-777, OR APPROVED EQUAL. (BOTH SIDES OF BALL VALVE). SERVICE PIPE TO MALE I.P. THREAD (COMPRESSON FITTINGS). OUTSIDE METER BOX IN SEPARATE 10" VALVE BOX CAN WITH LID (WESTERN IRON WORKS CASTING NO. 3171000.)
G. G. 2" SCH. 80 PVC 90° BEND (SOLVENT WELD)
H. ANGLE METER VALVE – (FEMALE IP X FLANGE OUTLET) "FORD" FV73-777W OR APPROVED EQUAL.
I. METER BOX TO BE SOLID BLACK PLASTIC WITH BLACK LID AND FOR METER READING. RHINO MB-16L OR LL MODEL, OR APPROVED EQUAL.

NOTE: J THRU L TO BE INSTALLED UNDER SEPARATE BUILDING PERMIT.
J. 2" WATER METER – SHALL BE MASTER METER TYPE, FURNISHED BY CITY AND INSTALLED BY CITY (AT OWNER’S EXPENSE).
L. 2" PIPE (SCH. 80 PVC) BY PROPERTY OWNER.
### PLAN VIEW

- **REMovable Top**
- **30''x30'' HATCH SPL# 614**
- **5'x7' PRECAST METER VAULT H20 LOADING SPL# 288**

### ELEVATION

- **18'' GRAVEL CLEAR.**

### Table: Overall Length

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<tr>
<td>B</td>
<td>METER + NIPPLE + FCA</td>
<td>34 1/2 ''</td>
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<td>C</td>
<td>CENTER OF MAINLINE TO OUTSIDE OF BYPASS</td>
<td>17 1/2 ''</td>
</tr>
<tr>
<td>D</td>
<td>CENTERLINE OF MAINLINE TO INSIDE OF VAULT</td>
<td>30''</td>
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<tr>
<td>E</td>
<td>CENTERLINE OF MAINLINE TO INSIDE OF VAULT</td>
<td>30''</td>
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</table>

### Notes:
1. DRAWING NOT TO SCALE FOR CLARIFICATION
2. ADOPTED FROM CITY OF AUSTIN 520-15B

---

These documents were prepared by,

**ENGINEER’S NAME**

**PE#**

**DATE**

---

**SECTION**

WATER

**DETAIl NO.**

WT-12

**TITLE**

4'' COMPOUND METER

---

**MARBLE FALLS**

800 THIRD STREET
MARBLE FALLS, TX 78654

Phs (830) 693-6737
**NOTES:**

1. PIPE AND METER SIZE SHALL BE AS DETERMINED BY OWNER, SUBJECT TO APPROVAL BY THE CITY. PLANS MUST BE PREPARED BY LICENSED ENGINEER IF INSTALLATION IN RIGHT-OF-WAY IS BY OTHER THAN CITY FORCES.

2. METER VAULT MUST BE BEHIND CURB AND/OR WALK AND OUT OF VEHICULAR TRAFFIC.

3. MAIN LINE AND BYPASS VALVES WILL BE RESILIENT SEAT TYPE WITH CORROSION RESISTANT FUSION BONDED EPOXY COATING INSIDE AND OUTSIDE, NON-RISING STEM. MAIN LINE VALVES SHALL HAVE SQUARE OPERATING NUTS. BYPASS VALVE WILL HAVE A HANDWHEEL. PROPERTY OWNER’S VALVE MUST BE LOCATED OUTSIDE OF THE CITY’S METER VAULT.

4. APPROVAL WILL BE NEEDED IF HEIGHT OF VAULT EXCEEDS 72”.

5. HATCH OPENING WILL BE 30” X 30”.

6. IRON PIPE TAPPING SLEEVE IN STREET RIGHT-OF-WAY SHALL BE IMBEDDED IN GRANULAR MATERIALS.

7. DOUBLE HARNESS MJ WITH TIE RODS. ALL OTHER FITTINGS INSIDE VAULT WILL BE FLANGED.

8. CONTACT THE CITY OF MARBLE FALLS CITY ENGINEER PRIOR TO INSTALLATION OF COMPOUND METERS FOR PROPER DOMESTIC DEMANDS.

9. NOTCHES WHERE PIPING GOES THROUGH VAULT SHALL BE FILLED WITH MORTAR.

10. THE TOP OF THE METER VAULT SHALL BE AT AN ELEVATION SUCH THAT THE SURROUNDING GROUND SLOPES AWAY FROM THE VAULT.

**NOTE:**

1. DRAWING NOT TO SCALE FOR CLARIFICATION

2. ADAPTED FROM CITY OF AUSTIN 520-158  

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<tr>
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<tr>
<td>2</td>
<td>4” FLANGED x PLAIN END</td>
<td>12”</td>
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<tr>
<td>3</td>
<td>4” FLANGED COUPLING ADAPTER</td>
<td>5”</td>
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<td>4</td>
<td>COA 4” GATE VALVE SQUARE NUT</td>
<td>9”</td>
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<tr>
<td>5</td>
<td>4” x 4” x 4” FLANGED TEE</td>
<td>13”</td>
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<tr>
<td>6</td>
<td>PROPERTY OWNER’S 4” GATE VALVE SQUARE NUT</td>
<td>9”</td>
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<td>7</td>
<td>4” FLANGED LONG RADIUS ELBOW 90’</td>
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<td>8</td>
<td>4” BYPASS GATE VALVE with HANDWHEEL</td>
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<td>9</td>
<td>4&quot; BYPASS DUCTILE IRON PIPE</td>
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*DIMENSIONS—SUBJECT TO CHANGE. CHECK WITH INSPECTOR
### Table

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<td>37 1/2”</td>
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<td>C</td>
<td>CENTER OF MAINLINE TO OUTSIDE OF BYPASS</td>
<td>17 1/2”</td>
</tr>
<tr>
<td>D</td>
<td>CENTERLINE OF MAINLINE TO INSIDE OF VAULT</td>
<td>30”</td>
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<tr>
<td>E</td>
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### Notes

1. DRAWING NOT TO SCALE FOR CLARIFICATION
2. ADAPTED FROM CITY OF AUSTIN 520-15C
### Table of Dimensions

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<td>6&quot; FLANGED COUPLING ADAPTER</td>
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<td>4</td>
<td>COA 6&quot; GATE VALVE SQUARE NUT</td>
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<td>5</td>
<td>6&quot; x 6&quot; x 6&quot; FLANGED TEE</td>
<td>16&quot;</td>
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<td>6</td>
<td>PROPERTY OWNER'S 6&quot; GATE VALVE SQUARE NUT</td>
<td>10.5&quot;</td>
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<td>7</td>
<td>6&quot; FLANGED ELBOW 90°</td>
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<td>8</td>
<td>6&quot; BYPASS GATE VALVE with HANDWHEEL</td>
<td>10.5&quot;</td>
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<td>9</td>
<td>6&quot; BYPASS DUCTILE IRON PIPE</td>
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<tr>
<td>10</td>
<td>6&quot; FLANGED SPOOL</td>
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*DIMENSIONS - SUBJECT TO CHANGE, CHECK WITH INSPECTOR

### Notes:

1. PIPE AND METER SIZE SHALL BE AS DETERMINED BY OWNER, SUBJECT TO APPROVAL BY THE CITY. PLANS MUST BE PREPARED BY LICENSED ENGINEER IF INSTALLATION IN RIGHT-OF-WAY IS BY OTHER THAN CITY FORCES.

2. METER VAULT MUST BE BEHIND CURB AND/OR WALK AND OUT OF VEHICULAR TRAFFIC.

3. MAIN LINE AND BYPASS VALVES WILL BE RESILIENT SEAT TYPE WITH CORROSION RESISTANT FUSION BONDED EPOXY COATING INSIDE AND OUTSIDE, NON-RISING STEM. MAIN LINE VALVES SHALL HAVE SQUARE OPERATING NUTS. BYPASS VALVE WILL HAVE A HANDWHEEL. PROPERTY OWNER'S VALVE MUST BE LOCATED OUTSIDE OF THE CITY'S METER VAULT.

4. APPROVAL WILL BE NEEDED IF HEIGHT OF VAULT EXCEEDS 72".

5. HATCH OPENING WILL BE 30" X 30".

6. IRON PIPE TAPPING SLEEVE IN STREET RIGHT-OF-WAY SHALL BE IMBEDDED IN GRANULAR MATERIALS.

7. DOUBLE HARNESS MJ WITH TIE RODS. ALL OTHER FITTINGS INSIDE VAULT WILL BE FLANGED.

8. CONTACT THE CITY OF MARBLE FALLS CITY ENGINEER PRIOR TO INSTALLATION OF COMPOUND METERS FOR PROPER DOMESTIC DEMANDS.

9. NOTCHES WHERE PIPING GOES THROUGH VAULT SHALL BE FILLED WITH MORTAR.

10. THE TOP OF THE METER VAULT SHALL BE AT AN ELEVATION SUCH THAT THE SURROUNDING GROUND SLOPES AWAY FROM THE VAULT.

### Note:

1. DRAWING NOT TO SCALE FOR CLARIFICATION

2. ADAPTED FROM CITY OF AUSTIN 520-15C

---

**Marble Falls, Texas**

**Marble Falls**

800 Third Street

Marble Falls, TX 78654

Ph: (830) 693-6737

These documents were prepared by,
or under the supervision of:

**ERIC BELAJ**

107148 May 31, 2017

Engineer's Name PE# Date

Engineer's Signature

**SECTION**

WATER

**DETAIL NO.**

WT-15

**TITLE**

6" COMPOUND METER

(2 OF 2)
NOTES:
1. GATE VALVE SHALL BE A HAMMOND 18645, CLASS 125, BRONZE GATE, SCREWED BONNET, NON-RISING STEM, SOLID WEDGE DISC WITH THREADED ENDS OR APPROVED EQUAL.

2. DROP-IN VALVE CAP SHALL BE CAST WITH THE WORD "WATER" ON TOP.

3. USE SCHEDULE 80, M.I.P. ADAPTER AS REQUIRED.
"WATER" TO BE CAST IN COVER WHEN USED ON WATER MAIN OR "SEWER" WHEN USED ON FORCE MAIN.

FINISHED GRADE

TOP OF PAVEMENT

CONCRETE COLLAR 6" THICK MINIMUM

3/8" ROCK OR APPROVED SAND (TYP.)

VALVE BOX (SEE NOTE 1)

MECHANICAL JOINT, RESILIENT WEDGE, NON-RISING STEM GATE VALVE, M.J. x M.J. (AWWA) (SEE NOTE 2)

3/8" ROCK OR APPROVED SAND (TYP.)

SEE TRENCH BACKFILL DETAIL

NOTES:
1. VALVE BOX SHALL BE DOMESTIC EAST JORDAN IRON WORKS OR APPROVED EQUAL HAVING AN ADJUSTABLE RANGE OF + OR - 6 INCHES FROM INSTALLED FINISH GRADE.
2. ACCEPTABLE GATE VALVES ARE:
   A. N/A
   B. MUELLER - 2360 SERIES
   C. CLOW

Scale: Not to Scale

Marble Falls
Texas
Marble Falls
800 Third Street
Marble Falls, TX 78654
Ph: (830) 693-6737

These documents were prepared by, or under the supervision of:

ERIC BELAJ
107148
May 31, 2017
Engineer's Name
PE#
Date

Engineer's Signature

SECTION
WATER

DETAIL NO.
WT-17

TITLE
WATER VALVE
SEWER VALVE LID

"WATER" TO BE CAST IN COVER WHEN USED ON WATER MAIN OR "SEWER" WHEN USED ON FORCE MAIN

FINISHED GRADE

"SEWER" TO BE CAST IN COVER WHEN USED ON FORCE MAIN

FINISHED GRADE

3/8" ROCK OR APPROVED SAND (TYP.)

VALVE BOX (SEE NOTE 1)

CONCRETE COLLAR 6" THICK MINIMUM

3/8" ROCK (TYP.)

SEEN TRENCH BACKFILL DETAIL

MECHANICAL JOINT, RESILIENT WEDGE, NON-RISING STEM GATE VALVE (AWWA) (SEE NOTE 2)

NOTES:

1. VALVE BOX SHALL BE EAST JORDAN IRON WORKS OR APPROVED EQUAL HAVING AN ADJUSTABLE RANGE OF ± 6 INCHES FROM INSTALLED FINISH GRADE. (SEE TYPICAL SEWER VALVE SETTING)

2. ACCEPTABLE GATE VALVES ARE:
   A. N/A
   B. MUELLER – 2360 SERIES
   C. CLOW
NOTES:

1. TRAFFIC BEARING METER BOXES WILL BE REQUIRED IN ALL PAVED AREAS AND AREAS WHICH MAY BE PAVED IN THE FUTURE.

2. TUBING SHALL BE CONTINUOUS FROM CORPORATION STOP TO CURB STOP, NO FITTINGS SHALL BE PERMITTED.
NOTES:
1. FIRE HYDRANT SHALL BE INSTALLED ON SAME SIDE OF ROAD AS WATER MAIN.
2. FIRE HYDRANT SHALL BE INSTALLED PLUMB AND TRUE.
3. ALL FIRE HYDRANT EXTERIORS SHALL BE FACTORY PRIMED AND PAINTED MARBLE FALLS STANDARD COLOR. USING A HIGH GRADE ENAMEL.
4. HEEL AND THRUST BLOCKS TO REST IN UNDISTURBED SOIL.
5. ACCEPTABLE FIRE HYDRANTS ARE:
   A. MUELLER CENTURION
   B. AMERICAN DARLING
   C. CLOW MEDALLION
6. DOUBLE BLUE REFLECTOR "HYE-LITES" BRAND, MANUFACTURED BY PAVEMENT MARKERS INC. TO BE INSTALLED AT CENTERLINE OF STREET PERPENDICULAR TO HYDRANT.

PRICE ITEMS:
- 6" DUCTILE IRON MIN. CL 250
- 12" STANDARD HOSEOUTLETS "N.P.T. 2 MJ X MJ"
- 6" GATE VALVE, RESILIENT WEDGE, OPEN LEFT MJ X MJ NON-RISING STEM
- 6" FOSTER ADAPTER OR SWIVEL TEE
- 8" X 24" X 24" STANDARD CONCRETE COLLAR-FINISHED GRADE OR PAVEMENT SURFACE
- 5 ½" STORZ QUICK-CONNECT OUTLET FACNG ACCESS STREET AND TWO 2 ½" NPT STANDARD HOSE OUTLETS

REMARKS:
- STANDARD CONCRETE COLLAR 8" X 24" X 24" PAVEMENT SURFACE FINISHED GRADE OR (SEE STANDARD DETAIL)
- 6" ABove HOLE Minimum
- 18" MIN.
- 36" MAX.

 blocked:
- UNDISTURBED SOIL
- 3/4" WASHED ROCK GRAVEL
- 12" HOLES MINIMUM
- 6" ABove HOLE Minimum
- 5 ½" STORZ QUICK-CONNECT OUTLET FACING ACCESS STREET AND TWO 2 ½" NPT STANDARD HOSE OUTLETS
- STANDARD CONCRETE COLLAR 8" X 24" X 24" PAVEMENT SURFACE FINISHED GRADE OR (SEE STANDARD DETAIL)
- 6" ABove HOLE Minimum
- 18" MIN.
- 36" MAX.

Marble Falls, TX 78654
800 THIRD STREET
MARBLE FALLS, TX 78654
Ph: (830) 693-6737
NOTES:

1. FIRE HYDRANT SHALL BE INSTALLED ON SAME SIDE OF ROAD AS WATER MAIN.
2. FIRE HYDRANT SHALL BE INSTALLED PLUMB AND TRUE.
3. ALL FIRE HYDRANT EXTERIORS SHALL BE FACTORY PRIMED AND PAINTED MARBLE FALLS STANDARD COLOR. USING A HIGH GRADE ENAMEL.
4. HEEL AND THRUST BLOCKS TO REST IN UNDISTURBED SOIL.
5. ACCEPTABLE FIRE HYDRANTS ARE:
   A. MUELLER CENTURION
   B. AMERICAN DARLING
   C. CLOW MEDALLION
6. DOUBLE BLUE REFLECTOR "HYE-LITES" BRAND, MANUFACTURED BY PAVEMENT MARKERS INC. TO BE INSTALLED AT CENTERLINE OF STREET PERPENDICULAR TO HYDRANT.

SCALE: NOT TO SCALE
CONCRETE COLLAR (MIN. 3,000 PSI) WITH 6x6#6 WELDED WIRE MESH OVER BACKFILL COMPACTED TO 95% DENSITY WITH TEST REPORTS PROVIDED TO THE CITY. SEE NOTE 1.

NOTE:
PLAN VIEW SHOWN ONLY FOR CLARIFICATION OF SECTION "X-X" AND "Y-Y".

WELDED CAP OR FILL WITH CONCRETE
2 7/8" PIPE
MIN 3/8" DIA.
U-BOLTS WITH SADDLE OR APPROVED EQUAL FINISHED GRADE (IN PAVEMENT)

3" ALL AROUND OPENING SEAL WATER TIGHT WITH NON-SHRINKING WATERPROOF GROUT.

CONCRETE

24" DIA. OPENING FILLED WITH " ROCK

2" ~ SCH 80 PVC

MANHOLE RING AND COVER PER STANDARD WATER MANHOLE SET DETAIL

SCREENED END

6" THICK CONCRETE COLLAR

3" WASHED GRAVEL (SEE STANDARD SPECIFICATIONS)

SECTION "X-X"

NOTES:
1. OMIT CONCRETE COLLAR IN AREAS OUTSIDE THE LIMITS OF ROADWAY OR DRIVEWAY PAVEMENT

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION WATER

DETAIL NO. WT-22

TITLE AIR RELEASE-VACUUM VALVE (1 OF 2)
CONCRETE COLLAR (MIN. 3,000 PSI) WITH 6x6x/#6 WELDED WIRE MESH OVER BACKFILL COMPACTED TO 95% DENSITY WITH TEST REPORTS PROVIDED TO THE CITY. SEE NOTE 1

NOTE:
PLAN VIEW SHOWN ONLY FOR CLARIFICATION OF SECTION "X-X" AND "Y-Y".

SCALE: NOT TO SCALE

SECTION "Y-Y"
**Plan View**

- 1-DIAMETERx6" TANGENTIAL OUTLET TEE - MJxMJxFLG.
- 1-6" M.J. X FLANGE GATE VALVE
- 1-6" M.J. 45° BEND
- 1-6" M.J. CAP 1-VALVE BOX

**Elevation**

- 6" CAP - M.J.
- CONCRETE COLLAR - 24" SQUARE X 6" THICK
- WATER MAIN
- LIMIT OF PAY ITEM FOR "FLUSH VALVE ASSEMBLY"

**Details**

- 36" MIN.
- 6" PVC - AWWA, C-900, CL 150
- 6" 45° ELL - M.J. (MEGA-LUG RESTRAINT)
- SEE TYPICAL WATER VALVE SETTING

**SCALE:** NOT TO SCALE
SET POINTS: VALVE SETTINGS SHALL BE DETERMINED BY DESIGN ENGINEER.

NOTE:
1. INSTALL VALVE AS SHOWN WITH WEIGHT OF VALVE FULLY SUPPORTED ON COMPACTED MORTAR SAND BEFORE ADDING WATER TIGHT GROUT OR CEMENT STABILIZED SAND.
2. INSTALL GAUGES TO BE VISIBLE FROM VAULT OPENING.
3. ALL MJ FITTINGS TO INCORPORATE "MEGALUG" RETRAINING GLANDS.

SCALE: NOT TO SCALE
**LARGE UTILITY VAULT OLD CASTLE (OR APPROVED EQUAL)**

**PRV** REQUIRED

RESTRAIN AS (TYP)

**FLANGED** NIPPLE

*FLG X FLG* GATE VALVE

INLINE STRAINER

FLANGED 90° ELBOW (TYP)

BACK FILL WITH COMPACTED CEMENT STABILIZED SAND—MIN. 2.5 SACKS/TON (TYP. BOTH SIDES)

DOWNSTREAM LOW PRESSURE

FLANGED OUTLET OR RODDED OUTLET D.I. PIPE

FLANGED NIPPLE (TYP)

*FLG X FLG* NIPPLE

**SLEEVE**

**FLANGED TEE** (TYP)

**FLANGED GATE VALVE**

*FLG X FLG* GATE VALVE

INLINE STRAINER

**FL X FL** GATE VALVE

UPSTREAM HIGH PRESSURE

RESTRAIN AS REQUIRED

FLANGED INLET D.I. PIPE

NOTE:

**ACTUAL SIZE OF BOX WILL BE DESIGNED BY ENGINEER BASED ON PRV SIZE.**

**SIZE AND TYPE TO BE DETERMINED BY DESIGN ENGINEER.**

ELEVATION

**NOTES:**

1. GATE VALVES TO BE WHEEL OPERATED.
2. ALL SLEEVES TO BE ON DOWNSTREAM SIDE FOR SAFETY PURPOSES.
3. ALL UPSTREAM OR HIGH PRESSURE MATERIALS TO BE FLANGED.
4. ALL NON-FLANGED PIPE TO BE INSTALLED WITH MEG-A-LUG RETAINER GLAND OR APPROVED EQUIVALENT RETAINER.
5. ALL VALVES TO HAVE CONCRETE SUPPORT BLOCKS.
6. ALL POINTS "A" THROUGH "D" TO A MIN. 18" CLEARANCE.
7. ALL PIPE IN PRV/BY-PASS INSTALLATION TO BE THREADED BRASS OR FLANGED D.I. OR C.I. PIPE.
8. PRESSURE REDUCER VALVE SHALL BE PRE APPROVED BY THE CITY OF MARBLE FALLS.
10. PRV WILL NOT BE INSTALLED IN TRAFFIC AREAS.
11. WEIGHT OF VALVE SHALL BE FULLY SUPPORTED ON COMPACTED MORTAR SAND BEFORE ADDING WATER TIGHT GROUT OR CEMENT STABILIZED SAND.

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017

Engineer's Name PE# Date

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SCALE: NOT TO SCALE

Marble Falls

Marble Falls

800 Third Street

Marble Falls, TX 78654

Phone (830) 693-6737

WATER

WT-26

DUAL PRESSURE REDUCING VALVE
PLAN

DALWORTH 36" X 36" PARKWAY FRAME AND HINGED TORSION COVER OR EQUIVALENT

USE DALWORTH 48-VAR OR EQUIVALENT WITHOUT FLOOR, TO BE APPROVED BY THE ENGINEER

STANDARD MANHOLE STEPS

SECTION A-A

*SIZE AND TYPE TO BE DETERMINED BY DESIGN ENGINEER.
APPROVED BRANDS ARE ZURN-WATKINS AND WATTS.
**VARIES – TOP OF VAULT SHALL BE 6" ABOVE ADJACENT FINISHED GRADE.
WATER

WT-28

CHECK VALVES (2)

ESCUTCHEON

FIRE DEPT. INLET CONNECTION

ASPHALT

36"

2' MIN

12" MIN.

6" BOLLARD AS REQ'D

PVC

D.I.

FITTING

TRANSITION COUPLING

SECTION VIEW

CHECK VALVES (2)

TRANSITION COUPLING

FITTING

PVC

D.I.

PLAN VIEW

6" BOLLARD AS REQ'D

SCALE: NOT TO SCALE
NOTES:
1. CASING SPACERS SHALL BE BOLT ON STYLE WITH A SHELL MADE IN TWO SECTIONS OF HEAVY T-304 STAINLESS STEEL. CONNECTING FLANGES SHALL BE RIBBED FOR EXTRA STRENGTH.
2. CASING SPACERS SHALL BE MADE BY CASCADE WATERWORKS MFG. CO. OR APPROVED EQUAL. CASING SPACERS SHALL HAVE RUNNERS MADE OF ULTRA HIGH MOLECULAR WEIGHT POLYMER, WITH A MINIMUM HEIGHT OF 2 INCHES.
3. DO NOT USE WEDGES BETWEEN TOP OF CARRIER PIPE AND INSIDE OF CASING TO KEEP PIPE FROM MOVING.
4. PRIOR TO INSERTING CARRIER PIPE, ANY WATER SHOULD BE PUMPED OUT OF THE CASING PIPE SO THAT NO MORE THAN A FEW INCHES OF WATER REMAINS.
5. SPACERS WILL BE REQUIRED WITHIN AT LEAST 3 FEET FROM BOTH OPENINGS OF THE ENCASEMENT PIPE AND SPACED NO GREATER THAN 6 FEET THROUGHOUT THE ENCASEMENT PIPE. IN ADDITION, SPACERS SHALL BE REQUIRED WITHIN 2 FEET OF ALL PIPE JOINTS.
6. ENCASEMENT PIPE SHALL BE SMOOTH STEEL 35,000 PSI YIELD STRENGTH WITH THICKNESS ACCORDING TO THE FOLLOWING TABLE:

<table>
<thead>
<tr>
<th>PIPE SIZE—CARRIER</th>
<th>PIPE SIZE—CASING</th>
<th>MINIMUM PIPE THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(DIAMETER)</td>
<td>(DIAMETER)(MIN.)</td>
<td>(INCHES)</td>
</tr>
<tr>
<td>6&quot;</td>
<td>16&quot;</td>
<td>1/4</td>
</tr>
<tr>
<td>8&quot;</td>
<td>18&quot;</td>
<td>1/4</td>
</tr>
<tr>
<td>10&quot;</td>
<td>20&quot;</td>
<td>1/4</td>
</tr>
<tr>
<td>12&quot; – 14&quot;</td>
<td>24&quot;</td>
<td>5/16</td>
</tr>
<tr>
<td>16&quot; – 18&quot;</td>
<td>30&quot;</td>
<td>3/8</td>
</tr>
<tr>
<td>20&quot;</td>
<td>36&quot;</td>
<td>7/16</td>
</tr>
<tr>
<td>24&quot;</td>
<td>42&quot;</td>
<td>1/2</td>
</tr>
<tr>
<td>30&quot;</td>
<td>48&quot;</td>
<td>1/2</td>
</tr>
</tbody>
</table>

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer’s Name  PE# Date

Engineer’s Signature
ALL THRUST BLOCKS SHALL BE FORMED. LAID FORMS SHALL BE INSPECTED BY THE CITY OF MARBLE FALLS PRIOR TO THE POURING OF CONCRETE AND SHALL ALSO BE INSPECTED BY THE CITY OF MARBLE FALLS PRIOR TO COVERING. TYPICAL LOCATIONS WHICH REQUIRE CONCRETE REACTION (THRUST) BLOCKS, FOR PRESSURE MAINS FOUR INCHES (4") AND GREATER. CONCRETE SHALL HAVE 2500 P.S.I. MINIMUM STRENGTH AT TWENTY EIGHT (28) DAYS AND BEAR AGAINST UNDISTURBED STABLE SOILS. AREA OF CONTACT SHALL BE GOVERNED BY PIPE SIZE, MAXIMUM PRESSURE IN PIPE, AND BEARING CAPACITY OF SOIL. PROTECT FITTINGS, BOLTS, ETC. BY COVERING WITH VISQUEEN OR OTHER ACCEPTABLE MATERIAL. CONCRETE SHALL BE A MINIMUM OF TWELVE INCHES (12") THICK.

VALUES ARE FOR 90' BENDS, BASED ON 2000 P.S.F. SAFE BEARING LOAD AND PIPE PRESSURE OF 150 P.S.I. PLUS 33% SAFETY FACTOR FOR OTHER SOILS AND PRESSURES. THE AREA REQUIRED IS IN DIRECT PROPORTION.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>THRUST BLOCK AREA REQUIRED</th>
<th>PIPE SIZE</th>
<th>THRUST BLOCK AREA REQUIRED</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>2.0 SQ. FT.</td>
<td>18&quot;</td>
<td>30.0 SQ. FT.</td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>4.0 SQ. FT.</td>
<td>20&quot;</td>
<td>37.0 SQ. FT.</td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>6.6 SQ. FT.</td>
<td>24&quot;</td>
<td>53.0 SQ. FT.</td>
<td></td>
</tr>
<tr>
<td>10&quot;</td>
<td>10.0 SQ. FT.</td>
<td>27&quot;</td>
<td>80.0 SQ. FT.</td>
<td></td>
</tr>
<tr>
<td>12&quot;</td>
<td>14.0 SQ. FT.</td>
<td>30&quot;</td>
<td>98.0 SQ. FT.</td>
<td></td>
</tr>
<tr>
<td>14&quot;</td>
<td>18.0 SQ. FT.</td>
<td>36&quot;</td>
<td>127.0 SQ. FT.</td>
<td></td>
</tr>
<tr>
<td>16&quot;</td>
<td>24.0 SQ. FT.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* THE ENGINEER OF RECORD SHALL CALCULATE THE SIZE OF THE DEADMAN REQUIRED AS WELL AS ANY INSTALLATION WHICH IS NOT COVERED BY THE ABOVE.

ENGINEER'S NAME          PE#                   DATE
ERIC BELAJ             107148         MAY 31, 2017

These documents were prepared by, or under the supervision of:
FIRE HYDRANT AS SPECIFIED

2 1/2" X 3/4" HYDRANT ADAPTER

3/4" P.V.C. SHC. 40 OR COPPER

3/4" GATE VALVE

FIRE HYDRANT AS SPECIFIED

1'-6" MINIMUM

2'-0" MINIMUM

2'-6" TYPICAL

3'-0" MINIMUM

FINISHED GRADE

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ  107148  May 31, 2017

Engineer's Name  PE#  Date

Engineer's Signature

SECTION

WATER

DETAIL NO.

WT-31

TITLE

FIRE HYDRANT

SAMPLE POINT
NOTE:

1. IF BORE IS THROUGH ROCK MATERIAL, BOTTOM OF PIPE BARREL SHALL BE SUPPORTED OFF BOTTOM WITH MORTAR BANDS ON C.S.C. PIPE OR STAINLESS STEEL CASING SPACERS ON D.I. OR PVC PIPE. IF BORE IS THROUGH DIRT MATERIAL, CLEAN BOTTOM OF BORE PIT TO REMOVE ROCKS PRIOR TO INSTALLING PIPE.
NOTES:
1. PIPE CENTERED WITH 2' SEPARATION, CENTER CROSSING OVER SEGMENT OF WASTE WATER LINE WHEN POSSIBLE. IF EXISTING WASTE WATER MAIN IS DISTURBED OR SHOW SIGNS OF LEAKAGE NOTIFY ENGINEER IMMEDIATELY.

* ALL CROSSINGS SHALL COMPLY WITH CURRENT TCEQ REQUIREMENTS AND IN ACCORDANCE WITH AWWA AND/OR ASTM STANDARDS.
NOTES:

1. 1 1/2" HOT MIX ASPHALTIC CONCRETE.
2. FLEXIBLE BASE COURSE VARIES IN THICKNESS FROM MINIMUM 8".
3. 6" LIME STABILIZED SUBGRADE OR SELECT SUBBASE MATERIAL AS REQUIRED.
4. COMBINED THICKNESS OF FLEXIBLE BASE COURSE, TREATED SUBGRADE OR SUBBASE SHALL BE AS REQUIRED TO SUPPORT TRAFFIC LOADS AND VOLUME ON SUBGRADE.
5. GEOTECHNICAL REPORT MAY REQUIRE BASE MATERIAL GREATER THAN 12" BEHIND CURB.

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

MARBLE FALLS
TEXAS

MARBLE FALLS
800 THIRD STREET
MARBLE FALLS, TX 78654
Ph: (830) 693-6737

SECTION
PAVING

DETAIL NO.
PV-1
NOTE:
1. REFER TO ROAD SECTION WITH TYPICAL UTILITY ASSIGNMENTS FOR SECTION VIEWS FOR MAIN UTILITY AND COMMUNICATION LINE LOCATIONS.
2. SET EDGE OF WATER METER BOX ON PROPERTY/R.O.W. LINE.
NOTE:

1. WHEN USING JOINT TRENCH FOR ELECTRIC AND TELECOMMUNICATIONS, GAS MAIN WILL BE LOCATED ON THE OPPOSITE SIDE OF THE STREET FROM THE JOINT TRENCH.
NOTE:
1. CUL-DE-SAC SHALL BE CONSTRUCTED WITH A MINIMUM 1.5% ROADWAY SLOPE TO ENSURE PROPER DRAINAGE, WITH A 9-INCH CROWN.
NOTE:
1. **CUL-DE-SAC SHALL BE CONSTRUCTED WITH A MINIMUM 1.5% ROADWAY SLOPE TO ENSURE PROPER DRAINAGE, WITH A 9-INCH CROWN.**
NOTES:
1. EXPANSION JOINT INTERVALS NOT TO EXCEED 40'-0".
2. "SCORE" CURB AT 10'-0" INTERVALS.

SCALE: NOT TO SCALE
1. Expansion Joint Intervals Not to Exceed 40'-0".
2. "Score" Curb at 10'-0" Intervals.

MOUNTABLE CURB

NOTES:
1. All work and material shall conform to ASTM A615, A615M, C309, and D1752. Broom finish exposed surface.
2. Contraction joint spacing 10'-0" max.
3. Expansion joints as per STD. ASTM D-1752.

CURB DOWEL DETAIL

NOTES:
1. Expansion joint intervals not to exceed 40'-0".
2. "Score" curb at 10'-0" intervals.

SCALE: NOT TO SCALE
1. Expansion joint intervals not to exceed 40'-0".
2. "Score" curb at 10'-0" intervals.

RIBBON CURB

NOTES:
1. All work and material shall conform to ASTM A615, A615M, C309, and D1752. Broom finish exposed surface.
2. Contraction joint spacing 10' max.
3. Expansion joints as per STD. ASTM D-1752.

CURB DOWEL DETAIL

NOTES:
1. Expansion joint intervals not to exceed 40'-0".
2. "Score" curb at 10'-0" intervals.
NOTES:
1. MAXIMUM WIDTH OF APPROACH SHALL BE 24'-0" FOR RESIDENTIAL, 30'-0" FOR NON-RESIDENTIAL UNDIVIDED AND 45'-0" FOR NON-RESIDENTIAL DIVIDED.
2. DRIVEWAY PERMITS TO BE ACQUIRED FROM CITY INSPECTION OFFICE.
3. SPACING OF DRIVEWAY CUTS SHALL BE AS REQUIRED BY SECTIONS 33043 - 33044 OF THE CITY’S SUBDIVISION REGULATIONS.
4. MINIMUM WIDTH OF APPROACH SHALL BE 10'-0" FOR RESIDENTIAL AND 15'-0" FOR NON-RESIDENTIAL.
5. LINEAR "RADIUS" AT CORNERS, PERMITTED FOR "SINGLE FAMILY" OR "TWO FAMILY" RESIDENTIAL DRIVEWAY APPROACH.
NOTES:
1. MAXIMUM WIDTH OF APPROACH SHALL BE 24'-0" FOR RESIDENTIAL, 30'-0" FOR NON-RESIDENTIAL UNDIVIDED AND 45'-0" FOR NON-RESIDENTIAL DIVIDED.
2. DRIVEWAY PERMITS TO BE ACQUIRED FROM CITY INSPECTION OFFICE.
3. SPACING OF DRIVEWAY CUTS SHALL BE AS REQUIRED BY SECTIONS 33043 - 33044 OF THE CITY’S SUBDIVISION REGULATIONS.
4. MINIMUM WIDTH OF APPROACH SHALL BE 10'-0" FOR RESIDENTIAL AND 15'-0" FOR NON-RESIDENTIAL.
5. LINEAR "RADIUS" AT CORNERS, PERMITTED FOR "SINGLE FAMILY" OR "TWO FAMILY" RESIDENTIAL DRIVEWAY APPROACH.
6. SIDEWALK LOCATION TO BE APPROVED BY CITY ENGINEER PRIOR TO FINAL DESIGN.
NOTES:
1. MINIMUM WIDTH OF APPROACH SHALL BE 12'-0" FOR RESIDENTIAL AND 15'-0" FOR
   NON-RESIDENTIAL.
2. MAXIMUM WIDTH OF APPROACH SHALL BE 24'-0" FOR RESIDENTIAL, 30'-0" FOR NON-RESIDENTIAL
   UNDIVIDED AND 45'-0" FOR NON-RESIDENTIAL DIVIDED.

SCALE: NOT TO SCALE

These documents were prepared by,
or under the supervision of:
ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION PAVING
DETAIL NO. PV-11
TITLE DITCH DRIVEWAY APPROACH
TYPE 'C'
SECTION A-A

NOTES:
1. ALL SAWED DUMMY JOINTS SHALL BE SEALED WITH EZ-7 OR APPROVED EQUVALENT COLD POUR JOINT SEALANT.
2. TOOLED OR SAWED JOINT MUST BE REQUIRED AT CENTERLINE OF ALL DRIVEWAYS LESS THAN 24' WIDE. ADDITIONAL JOINTS WILL BE REQUIRED AT EQUALLY SPACED FOR DRIVEWAYS WIDER THAN 24'.
3. OFFSETS IN DRIVE TO MATCH PROPOSED WALKS WILL BE BUILT MONOLITHIC WITH THE DRIVE.
4. PAVEMENT JOINTS WILL NOT EXTEND THROUGH DRIVE EXCEPT AS PROVIDED FOR IN NOTES 9 AND 10 FOR CENTERLINE DRIVEWAY JOINTS.
5. KEYWAY LIMITS WILL CONFORM WITH LIMITS OF 1" CURB.
6. REINFORCING STEEL WILL NOT EXTEND THROUGH KEYWAY. DRIVE WILL NOT BE TIED TO PAVEMENT.
7. LENGTH OF TRANSITION FOR CURB AT EACH SIDE OF DRIVE MAY VARY TO STREET GRADES AND REQUIREMENTS TO HOLD MAXIMUM SLOPE OF 1%/1'.
8. AN EXPANSION JOINT WILL BE REPLACED AT THE PROPERTY LINE.
9. TRANVERSE SAWED DUMMY JOINTS SHALL BE CONSTRUCTED ON 15' SPACINGS FOR DRIVEWAYS AS MEASURED FROM THE BACK OF CURB.
10. LONGITUDINAL SAWED OR TOOLED DUMMY JOINTS SHALL BE CONSTRUCTED FROM THE GUTTER EDGE TO THE PROPERTY LINE FOR ALL DRIVEWAYS WIDER THAN 15'.
11. STREET JOINTS SHALL BE ADJUSTED IN LOCATIONS TO LINE UP WITH DRIVEWAY CENTERLINES.

SECTION B-B

NOTES:
1. ALL SAWED DUMMY JOINTS SHALL BE SEALED WITH EZ-7 OR APPROVED EQUVALENT COLD POUR JOINT SEALANT.
2. TOOLED OR SAWED JOINT MUST BE REQUIRED AT CENTERLINE OF ALL DRIVEWAYS LESS THAN 24' WIDE. ADDITIONAL JOINTS WILL BE REQUIRED AT EQUALLY SPACED FOR DRIVEWAYS WIDER THAN 24'.
3. OFFSETS IN DRIVE TO MATCH PROPOSED WALKS WILL BE BUILT MONOLITHIC WITH THE DRIVE.
4. PAVEMENT JOINTS WILL NOT EXTEND THROUGH DRIVE EXCEPT AS PROVIDED FOR IN NOTES 9 AND 10 FOR CENTERLINE DRIVEWAY JOINTS.
5. KEYWAY LIMITS WILL CONFORM WITH LIMITS OF 1" CURB.
6. REINFORCING STEEL WILL NOT EXTEND THROUGH KEYWAY. DRIVE WILL NOT BE TIED TO PAVEMENT.
7. LENGTH OF TRANSITION FOR CURB AT EACH SIDE OF DRIVE MAY VARY TO STREET GRADES AND REQUIREMENTS TO HOLD MAXIMUM SLOPE OF 1%/1'.
8. AN EXPANSION JOINT WILL BE REPLACED AT THE PROPERTY LINE.
9. TRANVERSE SAWED DUMMY JOINTS SHALL BE CONSTRUCTED ON 15' SPACINGS FOR DRIVEWAYS AS MEASURED FROM THE BACK OF CURB.
10. LONGITUDINAL SAWED OR TOOLED DUMMY JOINTS SHALL BE CONSTRUCTED FROM THE GUTTER EDGE TO THE PROPERTY LINE FOR ALL DRIVEWAYS WIDER THAN 15'.
11. STREET JOINTS SHALL BE ADJUSTED IN LOCATIONS TO LINE UP WITH DRIVEWAY CENTERLINES.

CONCRETE DRIVEWAY CONNECTION TO GRAVEL SECTION

SCALE: NOT TO SCALE
HALF PLAN ASPH, CONC, PVMT, WITH SEPARATE CONC. CURB AND GUTTER

DRIVEWAYS ON ARTERIAL STREETS SHALL HAVE 10' FACE OF CURB RADII.

PAVEMENT REINFORCEMENT LAPPED 30 DIA. OR NO. 3 BAR DOWEL 2'-0" LONG

FACE OF CURB

BLOCK-OUT LIMIT IF NOT MONOLITHIC WITH STREET PVMT.

PAVEMENT REINFORCEMENT LAPPED 30 DIA. OR NO. 3 BAR DOWEL 2'-0" LONG

FACE OF CURB

SCALE: NOT TO SCALE
These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017

Engineer's Name PE# Date

Engineer's Signature

SECTION

PAVING

DETAIL NO.

PV-14

TITLE

FLARED DRIVEWAY REINFORCING PLAN

SCALE: NOT TO SCALE
TYPE I - AS REQUIRED FOR SINGLE FAMILY, DUPLEXES AND TOWNHOUSES.
TYPE II - AS REQUIRED FOR APARTMENTS, OFFICE AND PARKING LOTS, COMMERCIAL AND INDUSTRIAL.

NOTES:
1. FOR ROLLER STAMPED SIDEWALK: 4000 P.S.I. CONCRETE WITH 3/8" AGGREGATE.
2. STANDARD LOCATION OF SIDEWALK IS OFF BACK OF CURB. SPECIAL DESIGNS MAY BE APPROVED BY THE CITY ENGINEER, PRIOR TO FINAL DESIGN.
TYPICAL CURB RAMP PLACEMENTS AT INTERSECTIONS

NOTE:
CURB RAMPS WITH RETURNED CURBS INSTEAD OF SIDE FLARES ARE PERMITTED WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP.

TYPICAL INTERSECTION LAYOUT WITH OFFSET SIDEWALKS
PAVING PV-17
RAMP RUN TO TOTAL SIDEWALK WIDTH
SIDEWALK FLARE 1:50
SIDEWALK 1:12 1:10
SLOPE 1:50
CROSSWALK
LANDING: 5' X 5'

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION PAVING
DETAIL NO. PV-17
TITLE PERPENDICULAR RAMP SECTION (2 OF 2)
PARALLEL RAMP

SCALE: NOT TO SCALE

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION
PAVING

DETAIL NO.
PV-18

TITLE
PARALLEL RAMP
GENERAL NOTES:

1. THIS ITEM WILL BE MEASURED BY SQUARE FOOT OF CONCRETE PLACED AND PAID FOR UNDER 4" CONCRETE SIDEWALK.

2. SIDEWALKS 4'-0" IN RESIDENTIAL AREAS, 5'-0" IN COMMERCIAL AREAS, AND 5'-0" WHEN ADJACENT TO CURB REGARDLESS OF ZONING.

3. THE RAMP SHALL HAVE A DETECTABLE WARNING AND CONTRASTING COLORED SURFACE. RAMP SHALL BE STAMPED AND DYED CONCRETE OR APPROVED EQUAL.

4. POSITION OF RAMP MAY BE ALTERED IN THE FIELD BY THE ENGINEER, BUT ONLY WITH PUBLIC WORKS DEPARTMENT APPROVAL.

5. SAW CUTTING APPLICABLE FOR INSTALLATION WHERE CURB LAYDOWN FOR RAMP NOT PROVIDED.

SECTION "A - A"

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer’s Name PE# Date

Engineer’s Signature

SECTION

PAVING

DETAIL NO.

PV-19

TITLE

CORNER RAMP
CONCRETE PAVER NOTES:

CONCRETE PAVER UNITS SHALL MEET ALL REQUIREMENTS OF ASTM C-936, C-33, AND SHALL BE Laid IN A TWO BY TWO UNIT BASKET WEAVE PATTERN, UNLESS SHOWN OTHERWISE IN THE PLANS.

CONCRETE PAVER UNITS SHALL HAVE A TRUNCATED DOME TOP SURFACE FOR DETECTABLE WARNING TO PEDESTRIANS.

CONCRETE PAVER UNIT COLOR FOR THE RAMP SHALL BE A CONTRASTING COLOR TO THE ADJACENT SURFACES. THE COLOR OF THE CONCRETE PAVER UNITS SHALL BE SHOWN ELSEWHERE IN THE PLANS. (ADJACENT SURFACES INCLUDE SIDE FLARES).

CONCRETE PAVER UNITS SHALL BE SAW CUT ONLY AND ANY CUT UNIT SHALL BE NOT LESS THAN 25 PERCENT OF A FULL UNIT.

CURB RAMP NOTES:

CONCRETE SURFACE AREAS THAT ARE IDENTIFIED IN THE PLANS TO RECEIVE SEALER/STAIN TREATMENT, SHALL NOT BE TREATED W/ CURING COMPOUND (RETARDANT) AND SHALL BE ALLOWED TO CURE A MINIMUM OF 30 DAYS PRIOR TO APPLICATION OF THE SEALER/STAIN.

THE SEALER/STAIN FOR THE RAMP SHALL BE A CONTRASTING COLOR TO THE ADJACENT SURFACES (ADJACENT SURFACES INCLUDE THE SIDE FLARES). THE COLOR OF THE SEALER/STAIN SHALL BE SHOWN ELSEWHERE IN THE PLANS.

SEALER/STAIN SHALL BE APPLIED IN ACCORDANCE WITH APPLICABLE SPECIFICATIONS.

AREAS RECEIVING SEALER/STAIN TREATMENT SHALL BE CLEANED USING A "DRY" (SAND) BLAST CLEANING METHOD IN ACCORDANCE WITH APPLICABLE SPECIFICATIONS.

DETECTABLE WARNINGS SHALL CONSIST OF RAISED TRUNCATED DOMES, WITH A DIAMETER OF NOMINAL 0.9 IN, A HEIGHT OF NOMINAL 0.2 IN AND A CENTER-TO-CENTER SPACING OF NOMINAL 2.35 IN AND SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT.

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ  107148  May 31, 2017

Engineer's Name  PE#  Date

Engineer's Signature

SECTION

PAVING

DETAIL NO.

PV-20

TITLE

RAMP TRUNCATED DOME TEXTURING
OPTIONAL RAIL POST WITHOUT CURB

FLOOR MOUNTED

HANDRAIL TERMINATION AT RAMP-TYP.
(both sides of steps)

STAIR HANDRAIL
(both sides of steps)

GENERAL NOTES:

DESIGN CONFORMS TO TEXAS ACCESSIBILITY STANDARDS AND AASHTO 1993 STANDARD AND CURRENT INTERIM SPECIFICATIONS.

SEE SIDEWALK AND RAMP DETAILS FOR RAMP SLOPE, DIMENSIONS AND FOR TYPICAL CONCRETE AND REINFORCING STEEL. THIS SHEET SHOWS ADDITIONAL REINFORCING STEEL REQUIRED FOR HANDRAIL.

MATERIAL FOR POSTS AND HANDRAILS SHALL BE ASTM A53 OR B, OR A501. BASE PLATES SHALL BE A36, ALL PARTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE SPECIFICATIONS.

SQUARE TUBING OF EQUIVALENT OUTSIDE DIMENSIONS AND STRENGTH MAY BE SUBSTITUTED FOR THE ROUND SHAPES SHOWN AS DIRECTED BY THE ENGINEER.

ANCHOR BOLTS FOR HANDRAILS ATTACHED TO THE WALL SHALL BE PLACED USING AN ADHESIVE DOWELING SYSTEM APPROVED BY THE ENGINEER. ANCHOR BOLTS SHALL HAVE AN ALLOWABLE CAPACITY OF 2400 LBS IN TENSION AND 2300 LBS IN SHEAR. INSTALLATION OF THE ANCHOR BOLTS INCLUDING HOLE DEPTH AND DIAMETER SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS' RECOMMENDATION. IF REQUIRED BY THE ENGINEER, 3 OF THE FIRST 10 ANCHORS, AND 5% OF THE REMAINING ANCHORS SHALL BE TESTED TO 70% OF MINIMUM SPECIFIED YIELD. THE CONTRACTOR SHALL PROVIDE A SUITABLE RAM, PUMP, PRESSURE GAUGE AND REACTION SYSTEM.

ANCHOR BOLTS FOR POSTS ATTACHED ON THE RAMPS SHALL CONFORM TO ASTM A36 OR APPROVED EQUAL. NUTS FOR ANCHOR BOLTS SHALL CONFORM TO ASTM A563 OR A OR BETTER HEAVY HEX. THREADS FOR ANCHOR BOLTS AND NUTS SHALL BE ROLLED OR CUT. THREADS OF UNIFIED NATIONAL COARSE (UNC) THREAD SERIES. BOLTS AND NUTS SHALL HAVE CLASS 2A AND 2B FIT TOLERANCES. ANCHOR BOLTS AND EXPOSED NUTS SHALL BE GALVANIZED OR COATED WITH ZINC-RICH PAINT. WASHERS SHALL BE GALVANIZED. ANCHOR BOLTS IN RAM AND SIDEWALK MAY BE ANCHORED USING A DRILL AND GROUT SYSTEM.

EXPOSED EDGES OF HANDRAIL AND HANDRAIL POSTS SHALL BE ROUNDED OR CHAMFERED TO APPROXIMATELY 1/8 INCH BY GRINDING.

ANCHOR BOLTS, NUTS AND WASHERS TO BE INCLUDED IN UNIT PRICE BID FOR RAILING.

ERECTION DRAWINGS SHOWING PANEL LENGTHS, SPLICE LOCATIONS, RAIL POST SPACING AND ANCHOR BOLTS SETTING SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

RAIL MAY BE ASSEMBLED (WELDED) IN THE FIELD.

PIPE SHALL BE GALVANIZED, OR PRIMED, AND PAINTED AS DIRECTED BY THE ENGINEER.

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017

Engineer's Name  PE#  Date

Engineer's Signature

SECTION
PAVING

DETAIL NO.
PV-22

TITLE
RAMP HANDRAIL
(2 OF 2)
Paving
PV-23

Limit of pavement for conc. valley gutter
Width varies
Radius varies

Limit of pavement for curb and gutter

6" - Class A Concrete

#3 bar

1/2" Premolded Expansion Joint Material

#3 bars at 18" center to center

3/4"

3"

6'-0"

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION
PAVING

DETAIL NO.
PV-23

TITLE
VALLEY GUTTER
NOTE:
1. 7-FOOT MIN. HEIGHT FROM GROUND TO BOTTOM OF LOWEST SIGN

NOTE:
STREET NAME BACKGROUND COLOR SHOULD BE ROYAL BLUE

SCALE: NOT TO SCALE
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts, and washers shall be galvanized per item 445, "Galvanizing." Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively. Adhesive type anchors shall have stud bolts installed with type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.

Concrete anchor consists of 5/8" diameter concrete anchor - 8 places (embed a minimum of 5 1/2" and torque to min. of 50 ft-lbs). Anchor may be expanded or adhesive type. If shown in plans, the engineer may require the roll pin to be installed to reduce possible sign rotation.

These documents were prepared by, or under the supervision of:

ERIC BELAJ

E: (830) 693-6737

MARBLE FALLS
800 THIRD STREET
MARBLE FALLS, TX 78654
APPLICATION:

1. **ON EXISTING 6" CURB:** PAINT **RED LANE STRIPE** ON **BOTH FACE AND TOP OF CURB PAINT WHITE LETTERS ON FACE OF CURB ONLY.**

2. **LOW CURB (HEADER CURB):** PAINT **RED LANE STRIPE AND WHITE LETTERS ON TOP OF CURB.**

3. **ASPHALT:** PAINT **RED LANE STRIPE AND WHITE LETTERS TO THE LIMITS AS INDICATED ON THE PLANS.**

4. **50 FEET SPACING BETWEEN THE BEGINNING OF THE WHITE LETTERING.**

**NOTE:**

1. **FIRE LANE STRIPING ALONG CURBS ONLY. PROVIDE "FIRE LANE - NO PARKING" SIGNS ALONG FIRE LANE.**
APPLICATION:
1. ON PROPOSED 18” RIBBON CURB: PAINT 6” RED LANE STRIPE ON TOP OF CURB. PAINT WHITE LETTERS ON TOP OF CURB.
2. ASPHALT: PAINT RED LANE STRIPE AND WHITE LETTERS TO THE LIMITS AS INDICATED ON THE PLANS.
3. 50 FEET SPACING BETWEEN THE BEGINNING OF THE WHITE LETTERING.

NOTE:
1. FIRE LANE STRIPING ALONG CURBS ONLY. PROVIDE “FIRE LANE - NO PARKING” SIGNS ALONG FIRE LANE.
ALL CONCRETE SHALL BE CLASS "A" IN ACCORDANCE WITH ITEM 403.
REMOVAL AND DISPOSAL OF WASTE MATERIAL SHALL BE CONSIDERED SUBSIDIARY TO THIS PAY ITEM.

EXISTING STRUCTURES.

THE METHOD OF CONSTRUCTION AND MATERIALS FOR THE NEW MAILBOXES SHALL BE SIMILAR TO PRIOR TO BIDDING, THE CONTRACTOR SHALL REVIEW THE MASONRY TYPE MAILBOXES ON THE PROJECT.

MAILBOX - MASONRY TYPE

SIZE NO. 1 MAILBOX

Prior to bidding, the Contractor shall review the Masonry Type Mailboxes on the Project. The method of construction and materials for the new mailboxes shall be similar to existing structures.

Removal and disposal of waste material shall be considered subsidiary to this Pay Item.
NOTES:
1. THE DESIGN OF THIS BARRICADE IS IN COMPLIANCE WITH THE TEXAS MANUAL ON UNIFORM
   TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS.
2. WIDTH OF RAIL SHALL BE A MINIMUM OF 8" AND MAY BE UP TO A MAXIMUM OF 12", 2"
   NOMINAL SMOOTH LUMBER.
3. RAILS SHALL BE FASTENED TO EACH POST WITH 1/4" STEEL BOLTS WITH WASHERS ON
   EACH SIDE OR WITH 3-20d NAILS.
4. THE RAILS SHALL RECEIVE TWO COATS OF WHITE OIL BASE OUTSIDE PAINT, THEN SHALL HAVE
   6" WIDE REFLECTORIZED RED STRIPES OF TAPE PLACED ON 45° SLOPES, DOWN AND TOWARD
   THE CENTER OF THE BARRICADE.
5. BARRICADES MAY BE CONSTRUCTED IN SECTIONS OR MAY BE CONTINUOUS ACROSS ROADWAY
   WIDTH. SPLICES ON CONTINUOUS RAIL BARRICADES SHALL BE AT POSTS AND SHALL HAVE
   A 2' SPLICE BLOCK ON BACK SIDE OF THE SAME MATERIAL AS RAIL.
6. 18" DIAMOND REFLECTORIZED RED PANEL OR 18" DIAMOND RED OR BLACK PANEL WITH 9-3"
   DIAMETER RED REFLECTORS SYMMETRICALLY PLACED AT CENTER POSTS, A MINIMUM OF 4'
   ABOVE GROUND SHALL BE USED FOR END OF ROAD MARKERS.
GENERAL NOTES:
1. TYPICAL INSTALLATION PLAN MAY VARY AS SHOWN ELSEWHERE ON THE PLANS OR AS DIRECTED BY THE ENGINEER. LOCATION OF GATES SHOWN ELSEWHERE ON PLANS.
2. GATE-FRAME MEMBERS SHALL BE BOLTED, AT FRAME CORNERS, TO JOINT FITTINGS WITH FOUR 1/2" BOLTS PER JOINT.
3. ALL CABLE CONNECTIONS ARE TO BE MADE WITH TWO 3/8" CABLE CLAMPS.
4. ALL PULL POSTS AND END POSTS AND THEIR FOUNDATIONS SHALL HAVE THE SAME RESPECTIVE DIMENSIONS AS THOSE SHOWN FOR CORNER POST.
5. ALL PULL POST SHALL BE FURNISHED WITH TWO STRETCHER BARS.
6. ONE END OF EACH TURNBUCKLE MAY BE ATTACHED DIRECTLY TO FITTINGS WITH A CLEVIS.
7. BARBED WIRE ARMS SHALL BE ACCORDING TO INDUSTRY STANDARD AND APPROVED BY THE ENGINEER.

SCALE: NOT TO SCALE

These documents were prepared by,
or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION PAVING
DETAIL NO. PV-32
TITLE SECURITY FENCE
CONCRETE EXPANSION JOINTS SHALL BE PROVIDED IN ACCORDANCE WITH SD-10.

ALL HIKE AND BIKE TRAILS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA).

1. HIKE AND BIKE SURFACE MATERIAL SHALL BE EITHER GRANITE GRAVEL, HMAC, OR CONCRETE. DEPTH SHALL BE AS INDICATED IN THE CONSTRUCTION DOCUMENTS, BUT SHALL NOT BE LESS THAN SHOWN.
2. DEPTH OF RIBBON CURB OR BLOCKS SHALL MATCH THE DEPTH OF THE HIKE AND BIKE TRAIL SURFACE.
3. ALL HIKE AND BIKE TRAILS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA).
4. CONCRETE EXPANSION JOINTS SHALL BE PROVIDED IN ACCORDANCE WITH SD-10.

* A MINIMUM WIDTH OF 10' SHALL BE REQUIRED FOR EMERGENCY ACCESS THROUGH THE ENTIRE LENGTH OF HIKE AND BIKE TRAILS THAT SHALL EXTEND MORE THAN 200' FROM PUBLIC RIGHT OF WAY. ALL WIDTHS SHALL BE AS REQUIRED BY THE CITY OF MARBLE FALLS.

** Scale: Not to Scale **

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION
PAVING

DETAIL NO.
PV-33

TITLE
HIKE & BIKE TRAIL SECTION (1 OF 2)
GRANITE TRAIL SECTION

NOTES:

1. SUBGRADE SHALL BE COMPACTED TO AN OPTIMUM MOISTURE CONTENT, TO 95% AT (+/-)2% MODIFIED PROCTOR DENSITY AS DETERMINED BY ASTM D1557.

2. A MINIMUM OF 4" TOPSOIL SHALL BE REMOVED THROUGHOUT THE IMPACTED AREA PRIOR TO INSTALLATION OF PROPOSED IMPROVEMENTS.

3. CONTRACTOR SHALL ESTABLISH GRASS ON ALL IMPACTED AREAS.

4. THE NON-WOVEN FABRIC SHALL BE OF MEDIUM WEIGHT. CONTRACTOR SHALL PROVIDE A FABRIC SAMPLE TO CITY REPRESENTATIVE FOR APPROVAL.

5. CONTRACTOR SHALL PROVIDE A SAMPLE OF THE CRUSHED GRANITE TO CITY REPRESENTATIVE FOR APPROVAL.

6. RIBBON CURBS SHALL HAVE A CONTRACTION JOINT AT 10' O.C. AND AN EXPANSION JOINT AT 40' O.C. PER ASTM C1752.

7. ALL CONCRETE SHALL BE CLASS "A" CONC.

8. ALL CONSTRUCTION SHALL BE DONE PER CITY OF MARBLE FALLS STANDARDS AND SPECIFICATIONS.
1. Avoid direct drain spout onto sidewalk.
2. Upon excavation review options with city prior to installation of new sidewalk or vertical construction.

Tree type must be approved by city. Tree type must be from city approved tree & plant list in the landscape ordinance.

Irrigation and electric outlet to be provided to each typical.

Planting basin dimensions shall be based on tree type and size with a minimum width of 4'.

Property line

Brick and limestone veneer (typ.)

5'

Commerce Zone Pedestrian Zone Landscaping/Furniture Zone

5'

10'

On-street parking

6' curb

4' x 4' tree grate (cast iron)

Tree planting section

Scale: not to scale

Marble Falls, Texas

Marble Falls
800 Third Street
Marble Falls, TX 78654
Ph: (830) 693-6737

These documents were prepared by, or under the supervision of:

Kacey Paul 120200 September 19, 2018
Engineer's Name PE# Date

Engineer's Signature

Section

Paving

Detail No.

PV-35

Title

Downtown Sidewalk Section
NOTES:

1. BRICK INLAYS SHALL BE RED BRICK IN A HERRINGBONE PATTERN. THERE SHALL BE A MINIMUM RATIO OF BRICK INLAY TO CONCRETE OF 3:1 AND THE SPACE BETWEEN THE CONCRETE SHALL BE A MINIMUM OF 4". FINAL LAYOUT DESIGN MUST BE APPROVED BY CITY OF MARBLE FALLS.

2. SIDEWALKS SHALL COMPLY WITH TCSS FOR TYPICAL SIDEWALK SECTION, ASTM STANDARDS, AND ADA REQUIREMENTS.
HANDRAIL FABRICATION NOTES:

1. BALUSTERS SHALL BE EVENLY SPACE 4" O.C. MAX WITH NO OPENINGS TO EXCEED 1/4".

2. HANDRAIL SHALL BE SECURED TO SIDEWALK WITH STEEL MOUNTING BASE PLATE WITH 1/2" X 10" ANCHOR BOLTS (STAINLESS STEEL). BASE PLATES SHALL BE SPACED NO MORE THAN 6' APART.

3. HANDRAIL SHALL HAVE THE FOLLOWING MATERIAL PARAMETERS:
   a) TOP OF RAIL - 1 1/4" X 1/4" X 1/8" STEEL TUBE.
   b) BALUSTER - 1/2" STEEL BAR
   c) BOTTOM RAIL - 1 1/4" X 1 1/4" X 1 1/8" STEEL TUBE.

4. TOP OF HANDRAIL SHALL HAVE A MILLED STEEL CAP WITH EASE EDGES.

GENERAL NOTES:

1. HANDRAIL SHALL BE PARALLEL TO THE GROUND.

2. HANDRAILS SHALL HAVE A POWDERCOAT BLACK FINISH.

3. HANDRAIL SHALL MATCH HANDRAILS IN THE DOWNTOWN AREA AND PROPERLY CONNECT WITH NEIGHBORING HANDRAIL, WHERE POSSIBLE.
TREE TYPE MUST BE APPROVED BY CITY.
TREE TYPE MUST BE FROM CITY APPROVED TREE & PLANT LIST
IN THE LANDSCAPE ORDINANCE.

IRRIGATION AND ELECTRIC OUTLET TO BE PROVIDED TO EACH TREE.
PLANTING BASIN DIMENSIONS SHALL BE BASED ON TREE TYPES AND SIZES
WITH A MINIMUM WIDTH OF 4'.

TYPICAL 4'

6" CURB

TREE PLANTING SECTION

TREE GRATE

NOTES:

1. TYPICAL GRATES SHALL BE 4'X 4' AND SHALL CONSIST
OF NO FEWER THAN 2 PIECES. GRATE PIECES SHALL BE
BOLTED TOGETHER.

2. GRATES SHALL BE CAST IRON.

3. TREE GRATES SHALL BE DESIGNED TO COMPLY WITH
ADA STANDARDS.

4. PATTERN VARIATION ON TREE CRATE SHALL SLOT SIZE
OPENINGS NO LARGER THAN 3/8". PATTERN DESIGNS SHALL
BE APPROVED BY CITY OF MARBLE FALLS.

5. ALL GRATES SHALL HAVE A POWDERCOAT BLACK FINISH.

6. CENTER OPENING SHALL BE SIZED APPROPRIATELY FOR TREE
SIZE TO LAY FLAT, PROTECT YOUNGER TREES, AND ALLOW FOR
TREE GROWTH.

7. TREE GRATES SHALL BE 1 1/2" THICK WITH A STEEL SUPPORT
FRAME SET INTO CONCRETE PAVING.

SCALE: NOT TO SCALE

These documents were prepared by,
or under the supervision of:

KACEY PAUL 120200 September 19, 2018
Engineer's Name PE# Date

Engineer's Signature

SECTION
PAVING

DETAIL NO.
PV-39

TITLE
DOWNTOWN TREE GRATES
NOTES:
1. A minimum of 4" topsoil shall be removed throughout the impacted area prior to installation of proposed improvements.

3. Contractor shall establish grass on all impacted areas.

3. All concrete shall be class "A" conc.

4. All construction shall be done per City of Marble Falls Standards and Specifications.

5. Place 12"x12"x12" area of crushed rock or gravel wrapped in geofabric at every weep hole.

TY-1 WALL SECTION

TY-1 WALL CORNER SECTION

TY-2 WALL SECTION

TOMBSTONE SECTION

NOTE:
1. On the longitudinal edge the slab shall be 6" minimum beyond the tombstone.

2. Dowel and epoxy grout at 2' spacing. Min. 2 dowels per tombstone. Dowel shall be 8' min.

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ
107148
MAY 31, 2017
Engineer's Name
PE# Date

Engineer's Signature

SECTION
PAVING

DETAIL NO.
PV-40

TITLE
CEMETERY WALL SECTION
NOTES:
1. ALL CONCRETE SHALL BE MINIMUM 5 SACK CONCRETE WITH A 28 DAY COMPRESSIVE STRENGTH OF CLASS A MINIMUM.
2. STORM SEWER PIPE MATERIAL TO BE AS INDICATED IN THE CONTRACT DOCUMENTS.
3. AT INLETS WHERE MULTIPLE PIPES ARE CONNECTED, THE INVERT SHALL BE GROUTED AND SHAPED AS REQUIRED TO PROVIDE AN EFFICIENT FLOW PATH FOR EACH PIPE.
4. WHERE AN INLET HAS MULTIPLE PIPES, ALIGN FLOW DIRECTIONS AS CLOSELY AS POSSIBLE TO MINIMIZE DIRECTIONAL CHANGES.

STORM DRAINAGE
DETAIL NO. SD-1
TITLE STANDARD CURB INLET
1. All concrete shall be Class "A".
2. All reinforcing steel shall be Grade 60.
3. Dimensions relating to reinforcing steel are to centers of bars.
4. Vertical steel may be spliced (15" min. lap) in the lower one-half of all inlet walls.
5. In areas of conflict between reinforcing steel, pipes and manhole frame the reinforcement shall be bent or adjusted to clear as directed by the engineer.
6. Payment will be made for each inlet of the type specified, complete in place including manhole frame and cover.
7. Chamfer all exposed edges 3/4".
8. Manhole frame and covers shall be furnished with the cast-on eyes and chain as shown in the cast-on eye and cover chain details.
9. The contractor may propose alternate procedures for the construction of inlets, including precast units. Plans for such proposed alternates shall be submitted to the engineer for review and approval before construction.
10. All inlet walls shall be formed except where the nature of the surrounding material is such that it can be trimmed to a smooth vertical face. When inlet walls are placed to neat excavation lines, the wall thickness shall not exceed 10 inches.
11. Payment for inlets at the contract price shall include the transition curb.
12. Invert of inlet shall be sloped 1:20 with fill concrete.
13. At inlets where multiple pipes are connected, the invert shall be grouted and shaped as required to provide an efficient flow path for each pipe.
14. Where an inlet has multiple pipes, align flow directions as closely as possible to minimize directional changes.
15. Install a 6" center wall support in the mouth of the inlet every 10'.

**SCALE:** NOT TO SCALE

**GENERAL LAYOUT**

**REINFORCING STEEL SCHEDULE**

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<th>SIZE</th>
<th>SPACING</th>
<th>BARS</th>
<th>SIZE</th>
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**NOTES:**

1. All concrete shall be Class "A".
2. All reinforcing steel shall be Grade 60.
3. Dimensions relating to reinforcing steel are to centers of bars.
4. Vertical steel may be spliced (15" min. lap) in the lower one-half of all inlet walls.
5. In areas of conflict between reinforcing steel, pipes and manhole frame the reinforcement shall be bent or adjusted to clear as directed by the engineer.
6. Payment will be made for each inlet of the type specified, complete in place including manhole frame and cover.
7. Chamfer all exposed edges 3/4".
8. Manhole frame and covers shall be furnished with the cast-on eye and chain as shown in the cast-on eye and cover chain details.
9. The contractor may propose alternate procedures for the construction of inlets, including precast units. Plans for such proposed alternates shall be submitted to the engineer for review and approval before construction.
10. All inlet walls shall be formed except where the nature of the surrounding material is such that it can be trimmed to a smooth vertical face. When inlet walls are placed to neat excavation lines, the wall thickness shall not exceed 10 inches.
11. Payment for inlets at the contract price shall include the transition curb.
12. Invert of inlet shall be sloped 1:20 with fill concrete.
13. At inlets where multiple pipes are connected, the invert shall be grouted and shaped as required to provide an efficient flow path for each pipe.
14. Where an inlet has multiple pipes, align flow directions as closely as possible to minimize directional changes.
15. Install a 6" center wall support in the mouth of the inlet every 10'.

**SCALE:** NOT TO SCALE

**GENERAL LAYOUT**
GENERAL NOTES:

1. CONCRETE FOR DROP INLETS SHALL BE CLASS "A".
2. BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED.
3. REFER TO THE TxDOT STANDARD SPECIFICATION FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES. JUNE 2004. PLACEMENT OF CONCRETE RIPRAP CLASS "B" AND GRATES SHALL BE IN ACCORDANCE WITH TXDOT SPECIFICATION 471, FRAMES, GRATES, RINGS AND COVERS. PAYMENT FOR THESE ITEMS WILL NOT BE MADE DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO ITEM 701.10, "GRATE INLET."
4. FOR INSTALLATION ON BOX CULVERTS, ADJUSTMENTS MAY BE MADE BY THE ENGINEER TO FIT UNUSUAL CONDITIONS.
5. RIPRAP CONCRETE CLASS "B" SHALL BE PLACED AS SOON AS PRACTICAL TO MINIMIZE EROSION.
6. REINFORCEMENT FOR RIPRAP SHALL BE WWF 6X6-W2.9XW2.9.
7. CONNECTING PIPES SHOULD ENTER WITHIN 10 DEGREES OF NORMAL TO INLET WALL. IF NECESSARY, PIPE ELBOW OR CURVED APPROACH ALIGNMENT SHOULD BE USED TO STAY WITHIN THIS LIMIT.
8. EXCAVATION AND BACKFILL WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDARY TO ITEM 701.10, "GRATE INLET."

NOTE: FILLET WELD ALL JOINING SURFACES.

These documents were prepared by,
or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

MARBLE FALLS T EXAS

MARBLE FALLS
800 THIRD STREET
MARBLE FALLS, TX 78654
Phone: (830) 693-6737
STORM DRAINAGE

SECTION

PLAN

NOTE:
1. REQUIRED FOR USE IN STORM SEWER STRUCTURES HAVING A DEPTH OF 4- FEET OR LESS.
2. ALL MANHOLE COVERS SHOULD SAY "STORM DRAIN"
SECTION

PLAN

MACHINE THIS SURFACE

SCALE: NOT TO SCALE
NOTES:
1. REQUIRED FOR USE IN STORM SEWER STRUCTURES HAVING A DEPTH OF GREATER THAN 4-FEET.

2. STORM SEWER MANHOLE FRAME AND COVER TO BE EAST JORDAN IRON WORKS, INC. V-1600-5, OR APPROVED EQUAL.

3. COVER TO BE TYPE 36 MARKED "STORM SEWER".

4. LID SHALL HAVE A TYPE 4 STAINLESS STEEL PICK BAR. REFER TO PICK BAR DETAIL.

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SCALE: NOT TO SCALE
NOTES:

1. MINIMUM COVER OVER CULVERT PIPE SHALL BE 6" (SEE NOTE 5).

2. 5" CONCRETE OR ROCK RIP-RAP SHALL BE INSTALLED.

3. CULVERT PIPE TO BE MINIMUM OF 18" DIAMETER.

4. CULVERT PIPE MATERIAL TO BE R.C.P. (CLASS III), A.D.S. "N-12", AS DIRECTED BY THE ENGINEER.

5. MINIMUM COVER OVER CULVERT PIPE SHALL PROVIDE H2O LOADING.

6. BACKFILL AROUND CULVERT PIPE SHALL BE SELECT MATERIAL TO BE PLACED AND COMPACTED TO 95%.

7. WHEN CULVERT INSTALLATION CONSISTS OF A SINGLE CIRCULAR CONDUIT OF 48" DIAMETER OR LESS INSTALLED IN AN EARTHE DITCH OR CHANNEL, THE DRAINAGE CONDUIT SHALL BE AT ELEVATION 6" BELOW THE NOMINAL FLOW LINE OF THE DITCH OR CHANNEL.

SCALE: NOT TO SCALE
NOTES:
1. MINIMUM COVER OVER CULVERT PIPE SHALL BE 6” (SEE NOTE 5).
2. 5” CONCRETE RIP-RAP SHALL BE INSTALLED WITH #3 BARS AT 18” O.C.E.W OR W6xW6 WIRE MESH.
3. CULVERT PIPE TO BE MINIMUM OF 18” DIAMETER.
4. CULVERT PIPE MATERIAL TO BE R.C.P. (CLASS III), A.D.S. “N-12”, AS DIRECTED BY THE ENGINEER.
5. MINIMUM COVER OVER CULVERT PIPE SHALL PROVIDE H2O LOADING.
6. BACKFILL AROUND CULVERT PIPE SHALL BE SELECT MATERIAL TO BE PLACED AND COMPACTED TO 95%.
7. WHEN CULVERT INSTALLATION CONSISTS OF A SINGLE CIRCULAR CONDUIT OF 48” DIAMETER OR LESS INSTALLED IN AN EARTHEN DITCH OR CHANNEL, THE DRAINAGE CONDUIT SHALL BE AT ELEVATION 6” BELOW THE NOMINAL FLOW LINE OF THE DITCH OR CHANNEL.

SCALE: NOT TO SCALE
GEOTEXTILE FABRIC

PLANT GRASS SEED OR HYDROMULCH

4" (SANDY LOAM)

18" (1/2 ~ 1" WASHED GRAVEL)

2" (1/2 ~ 1" WASHED GRAVEL)

(2) 4" PERFORATED PVC PIPE WITH GEOFABRIC SOCK. PLACE PIPE WITH PERFORATIONS FACING UP.

SCALE: NOT TO SCALE
STORM DRAINAGE

SD-10

3'-0" (MIN.)

3'-0" (MIN.)

3'-0" (MIN.)

3'-0" (MIN.)

PIPE

PIPE

PLAN

SECTION

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer’s Name  PE#  Date

Engineer’s Signature

CONCRETE VALLEY DRAIN

SECTION

STORM DRAINAGE

DETAIL NO. SD-10

Title

CONCRETE VALLEY DRAIN

Marble Falls

800 Third Street
Marble Falls, TX 78654

Phs (830) 693-6737
NOTES:

1. WHEN HEADWALLS AND WINGWALLS ARE REQUIRED, THEY SHALL CONFORM TO THE TxDOT STANDARDS, OR AS DIRECTED BY THE CITY.

2. ENERGY DISAPPATATORS IF PIPE VELOCITY EXCEEDED 5.0 F.P.S. OR AS DIRECTED BY THE CITY.
STORM DRAINAGE

EMBANKMENT

△ PIPE

△ 2 2/3"x1/2" CORRUGATION (MIN.) WHEN USING CMP.
MIN. D-LOAD OF 1350 WHEN USING RCP.

TYPICAL SECTION

△ PIPE

* RIPRAP (CONC) (CL B)  

TOE WALL

END OF PIPE FOR PAYMENT

CMP AR (DES 2) & 2~CMP AR (DES 2) 2'-6" 4'-6"
CMP AR (DES 3) & 2~CMP AR (DES 3) 2'-6" 7'-0"
2~RCP (24") & CMP AR (DES 4) 2'-6" 9'-0"
2~CMP AR (DES 5) 2'-6" 11'-6"
2~RCP (30") 2'-6" 12'-6"

° MAY VARY TO SUIT CONDITIONS.

TYPICAL PLAN

VARIABLES SEE ABOVE
LENTH OF PIPE FOR PAYMENT
VARIABLES SEE ABOVE

S.E.T. (TY II) INCLUDES RIPRAP

TOE WALL

TYPICAL PROFILE
NOTE:

Use same dimensions for multiple pipe.

LIMITS OF SAFETY END TREATMENT
END OF PIPE FOR PAYMENT
END OF PIPE FOR PAYMENT

ROADWAY EMBANKMENT

VARIES

CONFORMS TO SLOPE

COMP. MIN. D-LOAD OF 1350 WHEN USING RCP.

NOTE:

Pipe ends shall be cut in the field to match the roadway slope.

*All riprap concrete shown with the S.E.T. will not be paid for directly but shall be considered subsidiary to the bid item "safety end treatment".

**All riprap (conc) (cl b) placed outside the S.E.T. limits (ditch block, etc.) will be paid for in accordance with the bid item "riprap".

If in the opinion of the engineer that a ditch block is needed, 100 LF of MBGF and 2 T.A.S. will be placed at the location determined by the engineer.

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION
STORM DRAINAGE

DETAIL NO.
SD-13

TITLE
SLOPED END TREATMENT TYPE 'B' (2 OF 2)
NOTE:
1. CONCRETE RIP RAP SHALL BE REINFORCED WITH #3 BARS, GRADE 60, AT 12" C.C. EACHWAY OR EQUIVALENT WELDED WIRE MESH.
STORM DRAINAGE

SD-15

CHANNEL DEPTH

CHANNEL WIDTH

EXISTING NATURAL GROUND

3:1 MINIMUM

TYPICAL 6 FOOT WIDE CONCRETE PILOT CHANNEL WITH 6x6x#6 WIRE MESH (3000 PSI CONCRETE)

CHANNEL SIDESLOPES MAY BE 2:1 IN ROCK

3:1

5:1

FILL AS REQUIRED

SCALE: NOT TO SCALE

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ERIC BELAJ 107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION
STORM DRAINAGE

DETAIL NO.
SD-15

TITLE
PILOT CHANNEL

MARBLE FALLS T E X A S

MARBLE FALLS
800 THIRD STREET
MARBLE FALLS, TX 78654
Ph: (830) 693-6737
NOTES:

1. \( L = \text{the length of the riprap apron (ft).} \) \((L=0.5V \times D)\)
2. \( d = 1.5 \times \text{the maximum stone diameter but not less than 6” (inches).} \)
3. \( \text{In a well-defined channel extend the apron up the channel banks.} \)
4. \( \text{A filter blanket or filter fabric should be installed between the riprap and soil foundation.} \)
5. \( \text{Stones shall be field stone or rough quarry stone, the stone should be highly weather resistant, hard, angular & well graded.} \)
STORM DRAINAGE

PLAN

SECTION A-A

SECTION B-B

DIMENSIONS IN INCHES

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ERIC BELAJ 107148 May 31, 2017

Engineer's Name PE# Date

Engineer's Signature

SECTION

STORM DRAINAGE

DETAIL NO. SD-17

TITLE HEADWALL ENERGY DISSIPATORS
STORM DRAINAGE

SD-18

NOTES:
1. ALL CONCRETE SHALL BE CLASS "A" WITH GRADE 8 AGGREGATE.
2. ALL REINFORCEMENT SHALL BE GRADE 60 DEFORMED BARS.
3. IN SHALLOW INSTALLATION WHERE THERE IS INSUFFICIENT DEPTH FOR MANHOLE CONES AND RINGS, SET GRADE RING DIRECTLY ON TOP OF BOX STRUCTURE.
4. CONSTRUCT BOX AT DEPTHS AND WITH VERTICAL CLEARANCE AS REQUIRED TO ACCOMMODATE ALL PIPE CONNECTIONS.
5. USE THE CITY OF MARBLE FALLS STANDARD STORM SEWER SET, STORM SEWER MANHOLE FRAMES AND COVER TO BE EAST JORDAN IRON WORKS, INC. V-1600-5 OR APPROVED EQUAL (24" OR 38")

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name  PE# Date

Engineer's Signature

SECTION
STORM DRAINAGE

DETAIL NO.
SD-18

TITLE
JUNCTION BOX (1 OF 2)
NOTE 5

MANHOLE CONE

PORTLAND CEMENT MORTAR BEDS

PRECAST REINFORCED CONCRETE RINGS

MANHOLE LID

MANHOLE RING

#5 REBAR

ASPHALT

CONCRETE RINGS WITH GROUT IN BETWEEN RINGS FOR ADJUSTMENTS

NON-SHRINK GROUT PLACED IN THIS AREA

MANHOLE CONE SECTION

CONCRETE POURED AROUND MANHOLE ADJUSTMENT

SCALE: NOT TO SCALE

MARBLE FALLS

800 THIRD STREET
MARBLE FALLS, TX 78654

Ph: (830) 693-6737

ENGINEER'S NAME          PE#          DATE

ERIC BELAJ             107148         May 31, 2017

STORM DRAINAGE

JUNCTION BOX

(2 OF 2)
NOTES:

1. DRILLED SHAFT FOOTING—USE CLASS "C" CONCRETE. VISIBLE PORTION OF CONCRETE TO RECEIVE RUBBED FINISH.

2. FOUR GALVANIZED STEEL ANCHOR BOLTS (MIN. YIELD = 55 KSI) *F(DIA.) X *H(LENGTH) WITH "H" HOOKS AT BOTTOM. BOLTS SHALL BE ACCORDING TO POLE MANUFACTURER'S SPECIFICATIONS AND INSTALLED WITH POLE MANUFACTURER'S TEMPLATE.

3. ONE SCH. 40 PVC CONDUIT SIZED AS REQUIRED FOR PULLING WIRE. CONDUIT SHALL BE ROUTED FROM POLE TO PULL BOX AS REQUIRED.

4. ONE 3/8" COPPER GROUND ROD. POLE AND SYSTEM TO BE CONNECTED TO GROUND ROD AT INSTALLATION OF POLE.

5. EIGHT BARS #4 EVENLY SPACED, MAINTAIN MIN. 3" CLEAR.

6. SPIRAL 3/8" DIA. AT 12" PITCH. MAINTAIN MIN. 3" CLEAR.

7. ALL LUMINARIES AND POLES SHALL INCLUDE ALL REQUIRED MISCELLANEOUS PARTS, FITTINGS, WIRING, FUSES, AND LAMPS REQUIRED TO PRODUCE A FULLY FUNCTIONING SYSTEM.

* DIMENSIONS

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* DIMENSIONS AND REINFORCING SCHEDULE IS SPECIFIC TO EACH USE. APPROPRIATE DESIGN MUST BE PROVIDED BY DESIGN ENGINEER.

Install conduit and trench in accordance with the National Electric Code (NEC)
LID SHALL HAVE THE WORD "COMMUNICATION" PERMANENTLY CAST OR ENGRAVED IN LETTERS 1.5" HIGH

* MIN. OPENING AT TOP

PULL BOX

PROPOSED COMMUNICATION CONDUIT

WATER MAIN

PLAN VIEW
N.T.S.

BOLT-ON LID W/ H2O WHEEL LOAD CAPACITY

TOP OF LID TO MATCH FINISHED GRADE

PVC CAP WITHOUT GLUE

FIBERCRETE, CONCRETE OR POLYMER PULL BOX WITH OPEN BOTTOM

TOPSOIL

UNDISTURBED SOIL

INSTALL BOX BY BEDDING ON 3/4" WASHED GRAVEL

CONDUIT SHALL ENTER THE PULL BOX WITH LONG RADIUS SWEEPING ELBOWS AS SHOWN

ELEVATION
N.T.S.

SCALE: NOT TO SCALE

These documents were prepared by, or under the supervision of:

ERIC BELAJ 107148 May 31, 2017
Engineer's Name  P# Date

Engineer's Signature

SECTIONS
ELECTRICAL

DETAIL NO.
EL-2

TITLE
ELECTRICAL & COMM. PULL BOX (1 OF 2)
END VIEW - CONDUIT IN WATER LINE TRENCH
N.T.S.
NOTES:

MANHOLE DETAILS SHALL REFLECT THE CITY’S MINIMUM SPECIFICATIONS, AS STATED BELOW:

1. ALL MANHOLES SHALL BE 48” I.D., R.C.P., CLASS III, WITH RUBBER O-RING GASKET JOINTS CONFORMING TO ASTM C478, C433 AND C76.
2. ALL MANHOLES SHALL HAVE WATER-TIGHT FRAME AND COVER, WITH A MINIMUM 30” CLEAR OPENING, AS MANUFACTURED BY EAST JORDAN IRON WORKS (AS PER CONCRETE APRON AROUND MANHOLE RING & COVER DETAIL) OR APPROVED EQUAL.
3. ALL MANHOLES SHALL BE CONCRETE WITH CAST IRON FRAME AND BOLTED COVER.
4. ALL MANHOLES SHALL HAVE A CONCENTRIC LID.
5. TWO (2”) INCH GRADE RINGS WITH AN I.D. TO MATCH FRAMES CLEAR OPENING, MINIMUM OF TWO (2), MAXIMUM OF FIVE (5) GRADE RINGS REQUIRED.
6. MANHOLES SHALL BE PRECAST ASTM C-478 BELL AND SPIGOT WITH “O” RING JOINTS.
7. SEE SPECIFICATIONS ON MATERIALS AND CONSTRUCTION.
8. ALL MANHOLE COVERS SHALL BE BOLTED. MANHOLES LOCATED IN PAVEMENT TO BE DESIGNED FOR HS-20 TRAFFIC LOADS.
9. MANHOLES LOCATED IN PAVEMENT SHALL HAVE BACKFILL COMPACTED TO 95% OF OPTIMUM AS DETERMINED BY TXDOT TEST METHOD TX114E. DENSITY REPORTS SHALL BE PROVIDED TO CITY FOR CERTIFICATION. AS AN ALTERNATIVE FLOWABLE FILL MATERIAL HAVING A STRENGTH F’c RANGING FROM 300 TO 500 PSI MAY BE USED FOR BACKFILL.
10. SEE CITY OF MARBLE FALLS STANDARD MANHOLE DETAILS FOR DETAILS NOT SHOWN HERE.
SECTION A-A

FINISHED GRADE
(IN PAVEMENT)

STANDARD CASTING AND COVER, AS SPECIFIED. BOLTED MANHOLES
PER WATER-TIGHT MANHOLE.

FINISHED GRADE
(NOT IN PAVEMENT)

GROUT

CONCRETE GRADE RINGS
2 MIN./5 MAX.

CONCENTRIC CONE

2'-10 1/2"
CLEAR OPENING

4'-0"MIN.
UNLESS NOTED OTHERWISE

WATER MAIN

12"

2" SCH. 40 CONDUIT
USE SINGLE 90° BEND
ROLLED AS NEEDED
(TYP)

2" OPENING
FILLED W/ GRAVEL

3/4" WASHED ROCK GRAVEL

CLASS A
CONCRETE SLAB
WITH #4 @
12" O.C.E.W.

12" OPENING
FILLED W/ GRAVEL

MANHOLE ELEVATION

SCALE: NOT TO SCALE

These documents were prepared by,
or under the supervision of:

ERIC BELAJ
107148 May 31, 2017
Engineer's Name PE# Date

Engineer's Signature

SECTION
ELECTRICAL

DETAIL NO.
EL-5

TITLE
ELECTRICAL & COMM.
MANHOLE (2 OF 2)