Design Manual

for the

Approval and Acceptance of Infrastructure

City of El Campo

315 E. Jackson St.

El Campo, TX 77437

Department of Public Works

2019

Adopted - Ordinance 2019-02
Amended – Ordinance 2019 -19
Amended – Ordinance 2020 -08
Amended – Ordinance 2020-14
Amended – Ordinance 2020-19
Amended-Ordinance 2021-12

Table of Contents

CHAPTER 1 - GENERAL AND PROCEDURE REQUIREMENTS

1.1 General Requirements

1.1.1 These Standards describe the general requirements for the preparation of construction plans and the supporting documents required for approval by the City of El Campo.

1.1.2 Construction plans for public improvements within the City of El Campo or extraterritorial jurisdiction will be reviewed by the Public Works Department and approved by the City Manager.

1.1.3 Construction plans for private improvements that connect to or affect the public infrastructure should conform to Chapter 7 and be approved by the Buildings and Code Enforcement Department.

1.1.4 Construction plans for all City Capital Improvement projects initiated and authorized by the City will follow the guidelines set forward in this Design Manual.

1.1.5 All construction plans and supporting documentation shall conform to the requirements of these Standards and regulations of all Federal, State, County, and Local entities having jurisdiction, including but not limited to:

A. Texas Accessibility Standards (TAS) of the Architectural Barriers Act, Article 9102, Texas Civil Statutes.

B. Rules and Regulations published by Texas Commission on Environmental Quality (TCEQ).

(1) Water Supply Division, Rules and Regulations for Public Water Systems, latest revision.

(2) Design Criteria for Sewer Systems, Texas Administrative Code, latest revision.

(3) Storm Water Discharge, Texas Pollution Discharge Elimination System (TPDES), General Permit No. TXR150000

C. State of Texas Engineering Practice Act.

D. State of Texas Professional Land Surveying Practices Act.

E. Wharton County Drainage Criteria Manual

F. Texas Department of Transportation Manual on Uniform Traffic Control Devices

1.1.6 The Public Works Department shall review and maintain the Design Manual. Any recommended changes to the Design Manual shall be recommended by the Public Works Director and approved by City Council. All approved changes will be summarized and updated to the Design Manual at a frequency determined, but no less than once every three years, by the Public Works Department.

1.2 Preliminary Research

1.2.1 Public Works Department personnel will be available for preliminary meetings to discuss a proposed project with the Design Engineer and/or developer. This preliminary meeting should be scheduled prior to submittal of any documents for review.

1.2.2 All projects submitted for approval shall contain sufficient detail to inform the City of estimated cost, timeline and objectives. When necessary the City may require a feasibility study to determine if the project meets the goals and objectives of the community.

1.2.3 Research of all existing utility and right-of-way or easements for conflicts with the City, Wharton County, Texas Department of Transportation, Railroad companies, Pipeline companies, Power companies, and other public and private utility agencies must be documented prior to submittal of any plans to the City.

1.3 Design Review Requirements for Public Improvement Projects

1.3.1 Projects involving construction of privately-owned facilities require review and approval of any connection to a public water line, sanitary sewer, or storm sewer or to a public street, using the process defined in this manual.

1.3.2 Submit one (1) copy of construction plans and supporting documentation to the Department of Public Works for review. When plans are submitted that conform to these Standards, without a variance request, the plans will be returned within ten (10) working days from submittal. Information furnished must be in sufficient

detail for the Department of Public Works to assess whether the design meets current City design standards.

1.3.3 After all comments have been adequately addressed, submit one (1) copy of the revised and final construction plans with the prints containing preliminary review comments to the Department of Public Works for approval by the City.

1.3.4 Submit two (2) copies of the original construction plans, two (2) copies reduced to eleven inches by seventeen inches (11" x 17"), and an electronic file copy (PDF format) to the Department of Public Works after the construction plans have been approved and signed.

1.3.5 All separate or special easements that may be required for construction must be recorded in the Wharton County Official Records prior to final approval of the construction plans.

1.4 Quality Assurance

1.4.1 All surveying and platting shall be performed under direction of a Professional Land Surveyor.

1.4.2 All final surveying and platting documents shall be sealed, signed, and dated by a Professional Land Surveyor.

1.4.3 All engineering calculations shall be prepared by or under the direct supervision of a Professional Engineer trained and licensed in disciplines required by the project scope.

1.4.4 All final design drawings shall be sealed, signed and dated by the Professional Engineer responsible for development of the drawings.

1.5 Construction Procedure Requirements for Public Improvement Projects

1.5.1 Construction cannot begin until construction plans are approved by the City and until plat approval, permits, licenses, etc. have been obtained.

1.5.2 Coordinate with the Department of Public Works for the pre-construction meeting for the project.

1.5.3 Within thirty (30) days after completion of the project the Design Engineer must provide to the city one set of full-size reproducible record drawings, an electronic file copy (PDF format) and an Auto CAD file

1.5.4 Changes from approved plans must be approved by the City Manager prior to construction.

1.6 Approval and Acceptance of Public Improvement Projects

1.6.1 The construction of improvements must be conducted under the supervision of a licensed engineer who will ensure and certify that work is performed in accordance with the approved drawings.

1.6.2 Final approval by the City will be granted when the following items are complete:

A. Subdivision plat and required right-of-way or easement instruments have been recorded in the Official Public Records of Wharton County.

B. Construction is completed in accordance with the approved construction plans and final inspection items have been completed.

C. All required information including record drawings is submitted to the Department of Public Works with the Design Engineer certifying the correctness of the record drawing and compliance of construction in accordance with these Standards.

D. Appropriate improvement bonds are in place for the maintenance period. For public improvement projects within the City of El Campo, bonds in the amount of one hundred percent (100%) of the total project cost, including utilities, drainage, and paving, must be provided in the name of the City of El Campo for one (1) year. A space on all applicable bonds shall be provided for the City of El Campo to sign off on the maintenance bond before releasing the Contractor.

1.7 Approvals and Variances

1.7.1 Approvals required in these Standards are the responsibility of the Owner. Failure to obtain appropriate approvals may be grounds for suspension of construction until appropriate approvals are granted. Items that do not conform to these Standards must be submitted for a variance request.

1.7.2 Materials and manufactured items used in construction of a Public Works project must be approved by the Department of Public Works prior to installation. Water

and sanitary sewer system appurtenances must be included on the approved items as listed in the Approved Water Products List available from the Department of Public Works. Items not appearing on the approved list cannot be used for construction of public works facilities in the City of El Campo or the extraterritorial jurisdiction.

1.8 Appeals

1.8.1 The Zoning Board of Adjustment shall finally decide appeals on official's interpretation of the requirement outlined in the City of El Campo's Design Manual.

CHAPTER 2 - CONSTRUCTION PLAN AND MISCELLANEOUS REQUIREMENTS

2.1 Required Plan Sheets

2.1.1 Cover sheet shall contain all general information; legal description, Site area, area of proposed buildings, etc. The purpose is to provide detailed graphic information and associated text indicating property boundaries, easements, land use, streets, utilities, drainage and other information required to evaluate the proposed development.

2.1.2 **Specific construction plans, notes, and details** shall provide detailed engineering plans and specifications for all proposed public improvements. This includes drainage, streets, utilities, water, and waste water improvements.

2.1.3 **Overall plans for proposed improvements;** including but not limited to Water, Sanitary, Drainage Area and Calculations, Lot Grading, Pavement Plans (when applicable).

2.1.4 **Plan and profiles** detailing elevations of proposed improvements.

2.1.5 **Final Plat**. The final plat includes the survey description for each lot in the plat plus plat notes and dedication, recording and approval statements. The final plat is the "recorded document" that is filed for record with the county.

2.2 Drawing Requirements

2.2.1 The seal, date, and original signature of the Design Engineer responsible for preparation of the plans is required on each sheet.

2.2.2 A bench mark elevation and description are required on construction plans. Benchmarks shall be tied to the City's system of benchmarks.

2.2.3 Label each plan sheet as to street right-of-way widths, pavement widths, and thickness, type of roadway materials, curbs, intersection radii, curve data, stationing, existing utilities type, and location, etc.

2.2.4 Stationing must run from left to right except for short streets or lines originating from a major intersection where the full length can be shown on one sheet.

2.2.5 A north arrow is required on all sheets and should be oriented either upward or to the right.

2.2.6 Show all lot lines, property lines, rights-of-way lines, and easement lines.

2.2.7 A cover sheet is required for all projects involving three or more plan and profile sheets. All plan sheet numbers should be included on the cover sheet. A vicinity map should always be included to show the project location.

2.2.8 If a roadway exists where plans are being prepared to improve or construct new pavement or to construct a utility, this roadway should be labeled as to its existing width, type of surfacing, and base thickness.

2.2.9 Do not place match lines in intersections.

2.2.10 All utility lines four inches (4") in diameter or larger within the right-of-way or construction easement should be shown in the profile view with proposed elevations. All utility lines, regardless of size, should be shown in the plan view.

2.2.11 Show flow line elevations and direction of flow of all existing ditches.

2.2.12 Show natural ground profiles along the centerline of each right-of-way or easement line.

2.2.13 Plans should be prepared on 22” x 34” ANSI standard drawing sheets (preferred), or nominal 24" x 36" drawing sheets.

2.2.14 Plans must be drawn to accurate scale, showing proposed pavement typical cross-sections and details, lines and grades, and all existing topography within the street rights-of-way; and at intersections, the cross street shall be shown at sufficient distance in each direction along the cross street for designing adequate street crossings.

2.2.15 Grades should be labeled for the top of curb except at railroad crossings.

2.2.16 Curb return elevations and grades for turnouts shall be shown in the profile.

2.2.17 Station all points of curvature, points of tangency, radius returns and grade change, points of intersection.

2.2.18 The standard scales permitted for plans and profiles of paving and utility plans are as follow:

A. Major thoroughfares or special intersections/situations:
1" = 2' Vertical; 1" = 20' Horizontal

B. Minor streets:

1" = 5' Vertical; 1" = 50' Horizontal or 1" = 4' Vertical; 1" = 40' Horizontal

2.2.19 Include standard City details and construction notes, where applicable.

2.2.20 Construction plans should include a legend describing standard symbols.

2.2.21 All property ownership, easement, and Wharton County recording information should be shown in the construction plans.

2.3 Graphic Standards

The graphic standards for the City of El Campo are taken directly from the City of El Campo's Infrastructure Design Manual, latest revision, "General Design Requirements for Sanitary Sewers, Storm Sewers, Water Lines, and Paving". These graphic standards are available online or at the office of the Department of Public Works.

2.4 Easement Requirements; Sec. 10.02.021, Ord. 2014-08

2.4.1 Generally. For utilities not located entirely within a public right-of-way, the subdivider shall dedicate easements to the public that shall allow every lot within a subdivision to have access to all available essential public, private, and franchised utilities. Storm sewer, sanitary sewer, and water line easements must be dedicated for the specific intended use.

2.4.2 Locations and widths. (Ref. Ord., 2014-08 10.02.021) For utilities placed at the rear or side of lots, easements shall be at least 20 feet in total width, centered on lot lines except- Corner lots are treated as having two front yards. An easement shall be required from the edge of the right-of-way and shall be wide enough to satisfy the additional width needed to meet the city's engineering specifications. The width of a side yard easement may be reduced to a total of ten feet, centered on the lot lines, if approved by the Public Works Director

2.4.3 Water line easements - the following minimum width easements are required when facilities are not located within public street rights-of-way:

A. When possible, easements should be contiguous with public rights-of-way, the sub-divider shall dedicate easements to the public that shall allow every lot within a subdivision to have access to all public, private, and franchised utilities.

B. For water lines located outside of the public right-of-way:

(1) The easement should be contiguous to the street right-of-way.

(2) The minimum width of easement for lines 12 inches in diameter and smaller is 10 feet.

C. For water lines located inside of public right-of-way, less than 5 feet from right-of-way lines, the outside edge of a water line easement is a minimum of 5 feet from the right-of-way line.

D. Water lines along State rights-of-way must be installed outside of the right-of-way in a separate contiguous easement.

E. No backlot easements will be allowed for the installation of water lines.

F. Commercial developments inside the City and in the ETJ requiring on-site fire hydrants must provide a minimum 15-foot water line easement for the water lines and fire hydrants.

G. The nearest outside diameter of any water line cannot be closer to a building line, building foundation or building slab than 10 feet for water lines 12 inches in diameter and smaller.

H. When using side lot easements, such easements is a minimum of 20 feet in width, located on one lot or centered between two lots.

2.4.5 Sanitary Sewer Easements - the following minimum easement widths are required for the type of service:

A. The minimum width of a multi-use easement is 20 feet. Sec. 10.02.021 Ord. 2014-08.

B. **Exclusive sanitary sewer easement** contiguous to a public right-of-way may be 10 feet wide provided the sewer is 7.5 feet from the edge of the easement and the sewer is no deeper than 15 feet. Sewers at greater depth than 15 feet should be placed within easements described above.

C. **Exclusive easements** for force mains of all sizes have a minimum width easement of 15 feet for a single force main where the force main is not located adjacent to a public right-of-way.

2.4.6 Storm Sewer Easements - the following minimum easement widths are required:

A. The minimum width should be 20 feet where the easement is not located adjacent to a public right-of-way with the storm sewer centered in an exclusive easement.

B. A minimum distance of five feet must be maintained from the easement line to the outside edge of the storm sewer.

C. Easements for storm water detention basins should be dedicated by plat or by separate instrument filed in conjunction with plat approval. Such easements must be dedicated to the developer, owner, or City. Such easements should have a minimum 30-foot width for maintenance access surrounding the perimeter of the detention basin as measured from top of bank unless adjacent to a street right-of-way. If adjacent to a street right-of-way, the minimum width of maintenance access as measured from the top bank to the street right-of-way can be 15 feet.

2.4.7 Drainage/Floodway Easements - Drainage easements must be provided along all natural and man-made drainage channels and floodways, which drain two (2) or more lots or tracts of land, with sufficient width for the water course to handle the flow from the 100 year equivalent frequency storm plus a minimum 30-foot width for maintenance access on each side beyond top of bank, for clearance from fences, and for adequate slope maintenance necessary along the bank.

2.5 Utility Locations

All utility systems, including water, sewerage, gas and electric, along with component parts, structures, appendages and materials, shall be designed to applicable standards and be approved by the city. All utility systems shall be installed underground. Above-ground utility systems will not be permitted, except where certain appurtenances and accessories must be installed above-ground for servicing.

2.5.1 Utility easements locations for the rear or back of a lot are discouraged.

2.5.2 Water Main Location - Must be located within a public right-of-way or within dedicated water main easements.

2.5.3 Sanitary Sewer Location - Should be located within the right-of-way between the property line and the back of curb on the opposite side of the right-of-way from the water main.

2.5.4 Storm Sewers - All storm sewer lines should be located within public rights-of-way or approved easements. Placement of a storm sewer inside lot and back lot easements is discouraged. Specific approval of the City for the use of side lot or back lot easements for storm sewers should be obtained prior to plan preparation.

2.6 Private Facility Locations (Not Including Landscaping)

2.6.1 Installation of private facilities, including utilities, in public road rights-of-way and their adjoining easements, must be approved by the City and cannot conflict with other public utilities or traffic visibility.

2.7 Crossings

2.7.1 Highway Crossings - All State and County Roads - A utility main must be encased in a steel pipe casing extending at least ten feet (10') from outside edge of each service road or outside edge of pavement, across the right-of-way to a similar location on the other side of the highway.

2.7.2 Street Crossings

A. All water main and sprinkler line crossings under major thoroughfares should be constructed using a minimum Class 150, AWWA C900 Polyvinyl Chloride.

B. Conduits and sewers that do not carry liquid under pressure may be bored and jacked into place without a steel encasement pipe.

C. Crossings under existing concrete streets, other than major thoroughfares, should be constructed by boring and jacking.

D. All open cut installations under existing or proposed streets must be backfilled with cement stabilized sand backfill conforming to requirements of Section 4.2.3.

2.7.3 Railroad and Pipeline Crossings - A utility main shall be encased in a steel pipe casing extending at least ten feet (10') from outside edge of railroad or pipeline right-of-way and must be coordinated and approved by owning entity.

2.7.4 Ditch and Stream Crossings

A. Crossing under a stream or ditch is preferred by the City. The top of the carrier pipe should be designed to provide a minimum clearance of at least 3 feet below the ultimate flow line and sides of the ditch and with sufficient bottom, length to exceed the ultimate future ditch sections.

B. Separate, aerial, free-standing crossings across drainage ways are not allowed.

C. All stream or ditch crossings must be approved by the City.

2.8 Trench Safety

All construction within the City of El Campo and its extraterritorial jurisdiction must conform to the requirements of state and federal guidelines for trench safety.

Adequate details for construction in accordance with applicable OSHA regulations will be required in all construction plans that are approved by the City of El Campo.

2.9 Street Lighting

2.9.1 The installation of street lighting is mandatory along all public streets in the City of El Campo. In addition, the installation of street lighting is strongly encouraged along existing or repaved streets. Where streetlights are proposed, streetlight easements necessary to serve such lights shall be provided. Streetlight easements shall be a minimum of five feet in width and shall be utilized only for streetlight wiring.

A. Street lights should provide a general illumination along the street. Street lights are not normally intended to illuminate the driving route (headlights are preferred), but to reveal signs and hazards outside of the headlights' beam.
B. All designs, plans, and specifications for street light installations shall be reviewed and approved by the Public Works Department. Requests for approval of designs other than the City's standard design must include calculations of average, maximum, and minimum light levels; and installation, operation and maintenance costs.
C. Installation of street lights is subject to available funding as authorized by the City Council in the City's annual budget.
D. All street lighting installations shall be in accordance with design criteria approved by the Public Works Department. Electrical conduits for underground installation shall be utilized whenever possible. All new installations shall be energy efficient Light Emitting Diodes (LED) in public Right of ways.
E. Existing utility poles, where available at specific locations and overhead wiring may be used under certain circumstances, subject to approval by the City.
F. The City will not install or maintain street lights along private streets.
G. Street lights should be provided at the beginning and ends of all bridges and at approximate 150 foot spacing along the length of the bridge. The lights should be located on alternate sides along the length of the bridge.

H. Street lights between intersections should generally be located at lot lines.
I. Street lighting will not be installed in alleys.

2.9.2 The location of street lights will be designed by AEP Energy or Wharton County Electric Cooperative (WCEC) and approved by the City of El Campo.

Street lighting will generally be installed:

A. At intersections.
B. At the end of all cul-de-sac and dead-end streets longer than 200 feet.
C. At significant changes in direction of the roadway; generally defined as those where, when standing in the center of the roadway at one street light, you cannot see the next street light due to horizontal or vertical changes in the roadway.
D. Mid-block street lights will be allowed provided spacing between lights of no less than 300 feet is maintained; except along a City park where the spacing may be reduced to 200 feet or less.
E. Existing utility poles may be used when available at the proper locations.
F. Underground Electrical should be utilized whenever possible.
G. Street lights that are not Cobra Head or that are not mounted above 30 feet are considered ornamental street lights and are not the responsibility of the City of El Campo.

2.9.3 Street Light Lumen Size

The lumen size of street lights required to be installed will be in accordance with the following:

A. **Residential Developments** (not on major thoroughfares). In residential developments, not on major thoroughfares, 9,500-lumen street lights shall be installed.

B. **Commercial/Industrial Developments** (not on major thoroughfares). In commercial/industrial developments not on major thoroughfares, a 9,500-lumen light shall be installed at all street intersections, 9,500-lumen lights shall be installed at all median openings and 9,500-lumen lights shall be installed for all other required street lights.

C. **Major Thoroughfares.** Along major thoroughfares, 16,000-lumen lights shall be installed with the following number of lights at intersections.

1. At the intersection of two major thoroughfares, two 16,000 lumen lights shall

be installed.

2. At the intersection of a major thoroughfare and a non-major thoroughfare street, one 16,000 lumen light shall be installed.

2.9.4 Existing Development.

A. In existing developments where lighting has not been installed, the City will arrange to have standard light poles and fixtures installed in accordance with the current design criteria, subject to:
   a) Most of the adjacent property owners petition the Department of Public Works for street lights;
   b) The property owners provide the necessary utility easements for electrical service to the lights at no cost to the City;
   c) (Property owners pay any additional costs if other than the standard street light pole and fixture is requested.

B. **In-fill project.** Where an existing neighborhood or developed area already has street lighting but is below the current design standard, the City will arrange to have standard light poles and fixtures installed in accordance with the current design criteria, subject to:
   a) Most of the adjacent property owners petition the Department of Public Works for a street light;
   b) The property owners provide the necessary utility easements for electrical service to the light at no cost to the City;
   c) Property owners pay any additional costs if other than the standard street light pole and fixture is requested.

2.9.5 General Design Criteria
   a) All street lighting installations shall be in accordance with design criteria approved by the Public Works Department. Electrical conduits for underground installation shall be utilized whenever possible. LED's shall be installed on all new installations in public right of ways.
   b) Existing utility poles, where available at specific locations, and overhead wiring may be used under certain circumstances, subject to
   c) approval by the City.
   d) The developer shall furnish, at his sole expense, on a plat at a standard engineering scale, the street light design for the development. For developments scheduled to be done in phases, the developer shall submit a plat showing the total development with the master plan for street lights.
   e) The developer shall provide all necessary utility easements required for

the street lighting system.

f) The developer shall pay all costs associated with using equipment other than the standard wood light pole and fixture.

2.9.6 Dark Sky Friendly Fixtures

IDA's Fixture Seal of Approval program certifies outdoor lighting fixtures as being Dark Sky Friendly, meaning that they minimize glare while reducing light trespass and sky glow.
All fixtures and easements shall be in accordance with design criteria approved by the Public Works Department. Property owners or developers pay any additional costs if other than the standard street light pole and fixture is requested.

2.10 Right of Way Management

2.10.1 Introduction

This section is intended to provide technical criteria and details necessary to implement the provisions of Right-of-Way Management. The Director of Public Works (Director) is authorized to administer and enforce the provisions of this section, and to promulgate regulations including, but not limited to, engineering, technical, and other criteria and standards.

2.10.2 Public Service Provider Registration

This section is intended to provide technical criteria and details necessary to implement the provisions of Right-of-Way Management. The Director of Public Works (Director) is authorized to administer and enforce the provisions of this section, and to promulgate regulations including, but not limited to, engineering, technical, and other criteria and standards.

A. **Authority**

Prior to registration, a public service provider must be either a Certificated Telecommunications Provider under Chapter 283 of the Texas Local Government Code, have a Certificate of Convenience and Necessity authorized by Chapter 13 of the Texas Water Code, have a franchise or license agreement with the City, have an interlocal agreement, or otherwise be permitted by State law to operate facilities within public rights-of-way. All public service providers must provide a Certificate of Liability Insurance for Worker's Comp and Employer's Liability, Commercial General Liability, Automobile Liability; and Umbrella Liability; and a Maintenance Bond.

B. **Process**

Prior to obtaining a permit to perform construction within the public right-of-way, a public service provider must first register with the Public Works

Department of the City of El Campo in accordance with Chapter 36 Article III Right of Way Maintenance. A copy of the registration form is included with this document. Questions regarding registration for construction within the public right-of-way may be directed to:

Public Works Department
Attn: Public Works Director
618 Monseratte St
El Campo, Texas 77437
kthompson@cityofelcampo.org
979-541-5075

2.10.3 Construction Permitting Procedure

A. Permitting Process

Prior to performing construction within the public right-of-way, the public service provider, or its authorized representative, is required to obtain a permit from the Planning Department in accordance with Chapter 36 Article III of the City of El Campo Code of Ordinances. The following procedures shall be adhered to when making an application for a permit.

1. The public service provider, or his authorized representative (permittee), must complete a Public Right-of-Way Construction Permit Application.

2. The applicant shall submit two sets of plans with the application and the application fee to the Planning Department.

3. The Planning Department will distribute the plans to other reviewing departments within the City. The Planning Department will make every effort to compile and forward all comments to the applicant within 10 business days.

4. The permittee shall correct the plans based on the comments received and resubmit two sets of revised plans to the Planning Department.

5. If the comments have been addressed to the satisfaction of the City, the permit will be issued. If not, the Planning Department will issue another review letter and the permittee will have an opportunity to correct the plans. This process will continue until the comments have been addressed and the permit is issued.

6. Except in an emergency situation, the City recommends that the permittee provide the Director with electronic formats of photographs, maps, or other

display of the project site before the commencement of the work, which show fences, driveways, landscaping, roadways, sidewalks, mailboxes, and other improvements along the length of the project.

All new submittals for a permit shall include a completed application, construction plans, and application fee. In addition, depending on the type of work, a storm water pollution prevention plan, traffic control plan, and trench safety plan may also be required. All submittals shall be in accordance with the following subsections.

Revised plans addressing review comments shall be resubmitted with a copy of the original permit application and shall be clearly marked as "resubmittal".

B. Permit Application

The permittee is required to complete the Public Right-of-Way Construction Permit Application (application). If a utility structure larger than 60 cubic feet is proposed, a separate Utility Structure Permit will also be required. The permit application is also included in the Right of Way (ROW) Construction Permit. Construction must begin no later than 90 days after the permit is issued by the Planning Department, or as otherwise extended. Otherwise, the permittee must resubmit a new permit application. For any work within the state right-of-way, the public service provider shall, upon request from the City, provide to the Planning Department evidence of permit from the state.

C. Construction Plans

The construction plans shall be submitted electronically and on paper, and are required to show the following:

1. Whether a facility is overhead or underground;

2. The full limits of the proposed work. The minimum paper plan size is 11" x 17";

3. The location of all existing public facilities, including City water lines, storm drainage facilities, and sanitary sewer lines in relation to all proposed utilities,

   if there is a potential for conflict. Maps for existing and proposed public facilities may be viewed on the City website or at the Service Center. If there is a potential for conflict, the location of the existing public facilities shall be noted, or a profile shown, in relation to the proposed utility line. The plans shall indicate how potential conflicts will be avoided.

4. If there is a potential conflict, the construction plans shall show the location of the City's underground electric and communication lines for streetlights and traffic signals.

5. If there is a potential conflict, the location of the City's fiber optic cables and communication lines. The applicant should contact the Public Works Department for network information;

6. Detail of proposed facility installation, including pipe size, depth, and dimensions of occupied space. If a utility structure is proposed, the dimensions, type, and location of the structure shall be indicated on the plans;

7. Pavement removal and replacement limits for street cuts, when allowed;

8. The length and depth of all bores;

9. Identification of any proposed bores, trenches, hand holes, manholes, vaults, switch gears, transformers, and pedestals, including depth;

10. Landscape protection measures; and

11. Complete legend of drawings.

D. Storm Water Pollution Prevention Plan

The permittee shall submit two sets of a Storm Water Pollution Prevention Plan to the Public Works Department in cases where stream/creek crossings are open cut. A four-foot vertical clearance below the bottom of the proposed stream bed or drainage facility is required. The permittee shall contact the Public Works Director for future improvements to the stream/creek, which may impact the proposed alignment.

The following pollution prevention measures shall be used where applicable:

1. Avoid placing pollution prevention structural controls in the floodway.

2. Trap/contain boring "slurry/mud" or waste material to prevent flow in the street and/or storm drain system through the use of a vacuum excavator, or equivalent method and remove from the public right-of-way.

3. Remove construction debris and trash daily.

4. Place erosion control matting, hydromulch seeding or sod on bare ground as soon as possible, but no later than 10 days after completion of construction work.

5. Clean sediment from streets and other paved surfaces. Sediment shall be removed by sweeping and not by washing into the storm drain system.

E. Traffic Control Plan

Any work that may impact traffic flow or result in lane closures in streets will require a traffic control plan and the closures shall comply with the most current edition of The Texas Manual on Uniform Traffic Control Devices. The permittee shall indicate on the permit application if a lane closure is required. In addition:

1. A permittee shall minimize interference with traffic flow on any street included during the hours of 7:00 a.m. through 8:30 a.m. and 4:30 p.m. through 6:00 p.m. Monday through Friday. If construction on a partially closed street stops for the day, all lanes must be reopened to traffic. The Director may waive these requirements upon a finding of good cause shown by the permittee or public service provider.

2. The permittee shall notify the Public Works Department in writing 48 hours in advance prior to any work on a weekend that requires the inspection of a City employee. Except as provided by State law, the permittee shall compensate the City of an inspector, inspections, and re-inspections as set in the City's fee schedule. Except for emergencies, no work shall be performed on weekends or city holidays unless approved by the Director.

   The Director shall consider overall convenience to the public and to the service provider's customers when considering allowing work on weekends.

3. Except in the case of an emergency, no work shall be performed between the hours of 10:00 p.m. and 6:00 a.m. unless authorized in writing by the Director. The Director shall consider overall convenience to the public and to the service provider's customers when considering work between 10:00 p.m. and 6:00 a.m. Except as provided by State law, the permittee shall reimburse the City for any inspections made between the hours of 5:00 p.m. and 8:00 a.m. The reimbursement shall be on an hourly basis at the rate set in the City's fee schedule.

4. The Director may require that the work occur overnight when necessary to expedite construction and minimize disruption to traffic.

F. Trench Safety Plan

Trench safety systems shall meet or exceed U.S. Occupational Safety and Health Administration standards and requirements.

G. Boring Requirements

All concrete driveways and streets shall be bored rather than open cut.

No pavement cuts in newly constructed, reconstructed or resurfaced (greater than one inch) asphalt streets shall be made for 60 months after the completion of the street work the public service provider may submit written documentation and the Director may grant an exception based on finding that the following criteria have been met:

1. Boring or jacking without disturbing the pavement is not practical due to physical characteristics of the street or alley or other utility conflicts; and

2. Alternative utility alignments that do not involve excavating the street or alley are found to be impracticable; and

3. The proposed excavation cannot reasonably be delayed until the five-year deferment period has lapsed; or

4. Emergency service restoration is required, and no other timely alternatives are available; or

5. New technology that sufficiently minimizes damage to the pavement structure is available; or

6. A utility line required to be located is located under the pavement.

2.10.4 Construction Requirements:

Once a Right of Way (ROW) construction permit is issued, permittee shall give the Public Works Department a minimum notice of 48 hours prior to commencing work so that a City of El Campo inspector may be assigned.

.

A. Notification to the Public:

Prior The following notification procedures apply if it is necessary to close, in whole or in part, a public right-of-way:

1. For any closure of a traffic lane or blocking of a sidewalk or alley lasting one day or less, the person performing the work on behalf of the public service provider shall conspicuously mark their vehicle with the company name and telephone number.

2. Any closure of a traffic lane or blocking of a sidewalk or alley lasting longer than one day must be identified by a 3-foot by 3-foot sign that is clearly legible

to the traveling public. The sign must be posted at or in close proximity to the work site and must contain:

a. The name of the owner and permittee; and
b. The name of the person performing the construction on behalf of the public service provider; and
c. A project manager's contact number.

3. The requirements above are in addition to any signs, barricades, or warning devices required by law or ordinance. The sign information listed above may be included on barricades or warning devices.

4. When permitted construction will last longer than two weeks, the permittee will give written notification to all adjacent property occupants by mail or by conspicuously posting the notification on each adjacent property at least 72 hours before commencement of construction, unless the Director determines that an emergency exists.

B. Existing Facility Locates

Prior to construction, the contractor shall obtain utility locates by utilizing one of the three following numbers:

Texas Excavation Safety System	1-800-344-8377
Texas One Call System	1-800-245-4545
Lone Star Notification Center	1-800-669-8344

C. Existing Facility Locates

The permittee and any person responsible for construction shall protect the public right-of-way surface, and all existing facilities and improvements both above and below ground from excavated materials, equipment operations, and other construction activities.

The permittee shall ensure that no excavated material or contamination of any type is allowed to enter or remain in a water or wastewater main or access structure, drainage facility, or natural drainage feature.

The removal of portions of existing pavement, drives, slabs, and sidewalks shall require full depth sawcut by the use of a power-driven saw. Where concrete removal is approved by the Director, locations of the removal shown on the plans are indicative only of the need for a sawcut, and where designated locations coincide with or fall within 3 feet of an existing sawed joint, construction joint, or expansion joint, removal shall be to existing joint. Concrete replacement shall be in accordance with Chapter 6 in the **City of El Campo Design Standards.**

In the event that it is necessary to place a temporary surface on any cut opening, the temporary surface may be composed of rock Flexible Base material and shall conform to TxDOT Item 247 "Flexible Base." The base material shall be Type A Grade 2 for a period of no longer than 14 days unless otherwise approved by the director.

Temporary surfaces shall be adequately compacted to prevent deterioration of repair during the temporary period. In the event of deterioration, the surface shall be reconstructed with additional flex base, however, the deadline to permanently repair the trench shall not be extended.

If a pavement cut is to be covered, the permittee shall use steel plates, or equivalent plates, of sufficient strength and thickness to support all traffic. Plates must be sufficiently secured in place so as not to become dislodged or in any way cause a hazard to traffic. Asphalt transitions must be placed as required to provide a smooth riding surface.

Plates must be marked with the name of the person performing the construction and with a local 24-hour contact number that can be used in case of an emergency, unless a sign identifying the contractor is posted at or in close proximity to the work site.

The Director may cause to be removed any temporary surface that fails to provide a non-deteriorating riding surface or fails to meet the requirements of these specifications. The temporary surface shall be replaced at the permittee's expense.

D. Installation

a. Facility Spacing Requirement

i. All facilities installed under pavement shall be buried to a minimum depth of 42 inches under top of pavement for the fully improved ultimate roadway width. This measurement shall be made from the existing or proposed top of pavement, whichever is lower. In the parkway, the facilities shall be buried a minimum of 24 inches. However, conditions may require additional depth

due to other constraints or utilities. Upon written request, an exception may be granted by the Director.

ii. All facilities that cross existing drainage facilities, sanitary sewer, or water mains shall either be buried under the existing pipes with a two-foot minimum vertical clearance at the underside of the existing pipes or be placed above the existing pipes with a two-foot vertical clearance at the top of the existing

pipe. In either case, the proposed facility must be 42 inches under top of pavement. The location and elevation of all crossed existing utilities must be potholed prior to installation of new facility.

iii. All facilities that cross proposed storm sewer, sanitary sewer or water mains shall have a galvanized steel or PVC (not less than Schedule 40) encasement, or approved equivalent, and have two feet minimum clearance on any side of the proposed pipes. In lieu of the encasement, the conduit may be buried five feet below the proposed pipe.

iv. All facilities that run parallel to an existing or proposed drainage facility, sanitary sewer, or water main shall have five feet minimum horizontal clearance from the exterior face of the pipes or manholes. Please note that the elevation of the individual lateral services of these pipes may vary. All conduit must be two feet below all lateral service pipes.

b. Landscape Protection Requirements

i. The proposed facility route shall be designed to minimize damage to trees and/or landscaping.

ii. All trees within street medians must be bored 36 inches under the root system. Boring shall begin 24 inches outside of the drip line and exit 24 inches outside the drip line on the other side of the tree. The drip line is an imaginary line that extends from the tree's outer branches and leaves,

directly to the ground. Where trees with tap roots are being bored, the bore must be offset a minimum of five feet from the trunk of the tree.

iii. Manholes shall be placed outside the drip line of the tree.

iv. Should work need to be performed near a tree, a temporary construction fence shall be erected 12 inches outside the drip line of the tree.

v. The permittee shall be responsible for any damage resulting from the permittee's actions to public or private landscaping and sprinkler systems.

c. Trenchless Technology/Boring Requirements

In using trenchless technology or boring, the following requirements shall be met:

Prior to constriction, the contractor shall obtain utility locates by utilizing one of the three following numbers:

Texas Excavation Safety System	1-800-344-8377
Texas One Call System	1-800-245-4545
Lone Star Notification Center	1-800-669-8344

i. All existing public facilities shall be physically located (pot holed) in the field when crossing over or under water lines, sanitary sewer, or storm drains or where the existing facility is running in the same direction and is within 5 feet of the proposed facility, except when existing public facilities are located under the pavement.

ii. Construction shall be made in such a manner that will minimize interference with vehicular traffic and shall not weaken or damage the existing street.

iii. The location of the boring pits shall be a minimum of three feet from the roadway to prevent undermining of the curb, gutter, or shoulder section, unless otherwise approved by the Director.

iv. The pit shall be dug to a depth sufficient enough to maintain a minimum boring depth of 42 inches below the traffic surface. Jetting types of boring equipment are not allowed.

v. All overcutting shall be remedied by pressure grouting the entire length of the installation.

vi. The pits or trenches excavated to facilitate this operation shall be backfilled and compacted immediately after work is completed,

or the bore pits or trenches shall be secured adequately to protect the public.

vii. The contractor shall be able to locate the bore head at all times in accordance with the latest technologies and provide the location of the bore to the Director upon request.

viii. All directional boring shall have the locator place bore marks and depths while the bore is in progress. Locator shall place a mark at each stem with a paint dot and indicate the depth at every other stem.

ix. The Director shall require the use of trenchless technology or boring based on the following criteria:
1. It is in the best interest of the City; and
2. It is technically, commercially, and economically feasible; and
3. It is not in violation of federal or state regulations or industry safety standards.

E. Backfill

Unless appropriate measures are taken to protect the public from open trenches or bore pits., backfill of all trenches and bore pits within the right-of-way shall begin immediately following installation of the new facility in accordance with the Standard Street Specifications as adopted and amended in a resolution of the El Campo City Council on August 23, 2017.(Appropriate measures include barricades, construction fencing or steel plates, or alternate protections, as approved by the Director.

F. Restoration

The requirements of this section govern the restoration of public right-of-way surfaces within the City.

A permittee performing construction in the public right-of-way shall restore the public right-of-way to a condition that is equal to or better than the condition prescribed in this manual or other applicable City design and construction standards. Restoration work must be performed to the satisfaction of the Director.

Restoration work to the public right-of-way must include, but is not limited to, the following:

1. Except for native trees along roads with no curb and gutter, trees and shrubs damaged greater than 50% based on formulas set by the Society of

Arboriculture shall be mitigated and offset with newly planted trees/shrubs. Mitigation of canopy trees shall be based upon a one to one caliper ratio, of tree inches lost to tree inches planted. The diameter of an existing tree is measured at 4.5 feet above the soil line of the tree's trunk. Mitigation of ornamental trees and shrubs shall be based upon a one to one height ratio.

2. Where lawns are established, sod shall be used for turf replacement and shall match existing adjacent type. Where lawns are not established, seeding may be used. Ruts shall be removed, and the topsoil shall be prepared to provide a smooth surface free of rock and gravel. Irrigation systems shall be repaired to pre-construction condition and extent.

3. Backfilling and compaction of all bore pits, potholes, trenches, or other holes must be performed within 48 hours or with an approved extension by the Public Works Director and provide proper protection in accordance with the requirements of the Occupational Safety and Health Administration shall be provided.

4. All subgrade, streets, sidewalks, and alleys shall be restored.

5. All trenches and disturbed areas shall be leveled.

6. Any damaged traffic control devices, including but not limited to, loop detectors, pavement markings, underground conduits, and signs shall be restored.

7. All location flags must be removed during the cleanup process at the completion of the work.

8. Restoration of special street, sidewalk, or drive approach surfaces must be done so that the restoration reasonably matches the color, texture, and pattern of the surrounding special surfaces.

9. The permittee shall remove any erosion control measures after disturbed soils are adequately stabilized.

10. The Policy and Procedure for the City of El Campo Public Works is to be financial responsible for the maintenance of all city owned curbs, sidewalks and driving lanes located along City owned streets and alleys within the City boundaries. This responsibility does not include the maintenance of driveway aprons or approaches and is the responsibility of the property owner which affords ingress and egress for motor vehicles to access private property.

11. Public Works does not maintain accesses / driveways to private property, which may consist of concrete, asphalt, stone, gravel or other approved materials. The Street Maintenance Department will repair or replace concrete, asphalt and stone driveways within city right-of-way, **only** if it has been damaged by City Public Works personnel/ utility right of way / work activity. This does not include contractors or Contract workers.

Restoration must be made within 30 days to at least the condition which existed prior to the start of construction and to the satisfaction of the Director. If restoration is unsatisfactory or not performed in a timely manner, the Director will notify the permittee to perform the work in an expeditious manner. If no action is taken or not to the satisfaction of the Director, then at the City Manager's discretion further action shall be taken to complete the restoration.

The installation, replacement, repair, or maintenance of any City facility by the permittee shall be subject to inspection and approval by the City. The permittee

agrees to cooperate fully with the City in conducting the inspection. Such inspections shall be conducted concurrent with the installation, replacement, repair, or maintenance affecting the City's facilities and a final inspection shall be made within a reasonable time after completion of the project. The permittee shall promptly perform reasonable remedial action required by the City pursuant to such an inspection.

G. Exceptions

The Director must approve any exceptions to these provisions. Failure to construct facilities in accordance with the ordinance may result in correction of

the defects by the City, with all restoration and repair performed at the permittee's expense.

PUBLIC SERVICE PROVIDER REGISTRATION FOR CONSTRUCTION IN PUBLIC RIGHTS-OF-WAY

In order to protect the public health, safety and welfare, all public service providers desiring to use the public rights-of-way shall register with the City's Public Works Department. Registration in accordance with City Ordinance No. 2017-14 shall be in the name of the public service provider who will own the facilities. When any information provided for the registration changes, the public service provider shall inform the City of the change no more than 30 days after the date the change is made.

Compliance with this registration requirement does not grant the Applicant the right to construct in the public rights-of-way. Applicant must be either a Certificated Telecommunications Provider under Chapter 283 of the Texas Local Government Code or have a franchise, interlocal or license agreement with the City or a statewide cable franchise or be otherwise authorized by law to construct and maintain facilities in the right-of-way. Applicant must obtain a separate construction permit for specific work to be completed in public rights-of-way.

Public Service Provider Information: _____

Company Name: _____

Address: _____

_____

Business, Assumed, or Trade Names used within past 5 years: _____

Contact Person: _____

Address (if different from above): _____

Contact Phone: _____

Has applicant been issued a certificate of convenience and necessity, certificate of operating authority or service provider certificate of operating authority by the Texas Public Utility Commission to offer local exchange telephone service? If so, please attach a copy of such certification.

[ ] Yes [ ] No

Does Applicant have a franchise, license or other agreement to place facilities within the City of El Campo's right-of-way? If so, please attach a copy of the agreement.

[ ] Yes [ ] No

"I hereby certify or affirm that all information provided is true and correct as of the date of this statement, and I have not knowingly withheld disclosure of any information requested; that I am authorized to submit this form by the public service provider on whose behalf this registration is submitted and that supplemental statements will be promptly submitted to the Public Works Director of the City of El Campo, Texas, as changes occur."

Affiant Signature: _____

Affiant Printed Name: _____

Affiant's Title and/or Position: _____

BEFORE ME, the undersigned authority, a Notary Public in and for the State of Texas, on this day personally appeared the oath of or through,

known to me (or proved to me on(description of identity card or other document)) to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he/she executed same for and as the act and deed of thereof, and for the purposes and consideration therein expressed and in the capacity therein stated

Given Under My and Seal of Office this _____ day the_____ of 2019.

Notary Public In and For

The State of Texas

_____ _____
My Commission Expires Notary's Printed Name

2.11 Installation of Network Nodes and Node Support Poles

2.11.1 Purpose and Applicability

The City of El Campo ("City") recognizes that the State of Texas has delegated to the City the fiduciary duty, as a trustee, to manage the public right-of-way for the health, safety, and welfare of the public to Texas municipalities.

Purpose: Loc. Gov. Code, Chapter 284 allows certain wireless Network Providers to install in the public rights-of-way their wireless facilities, described and defined in Tex. Loc. Gov. Code, Chapter 284, Sec. 284.002 as "Micro Network Nodes", "Network Nodes", and "Node Support Poles".

As expressly allowed by Tex. Loc. Gov. Code, Chapter 284, Section 284.108, and pursuant to its police power authority reserved in Sec. 284.301[1], the City enacts these Design Guidelines in order to meet its fiduciary duty to the citizens of the City, and to give assistance and guidance to wireless telecommunications providers to assist such companies in the timely, efficient, safe and aesthetically pleasing installation of technologically competitive equipment.

Applicability: This Design Manual is for siting and criteria for the installation Wireless Facilities, including Micro Network Nodes, Network Nodes, Node Support Poles and related ground equipment being installed pursuant to Loc. Gov. Code, Chapter 284

This section shall apply to any siting's, installations, collocations in, on, over or under the public rights-of-way of Network nodes, Node support poles, Micro

network nodes, Distributed Antenna Systems, microwave communications or other Wireless Facilities, by whatever nomenclature, whether they are installed pursuant to Chapter 284, or installed pursuant to an agreement as agreed to and consented to by the City in its discretion, or installed as may otherwise be allowed by state law.

City Rights-of-Way Management Ordinance: A Network Provider shall comply with the City's Rights-of-Way Management Ordinance except where in conflict with this Design Manual or Chapter 284, Subchapter C.

2.11.2 Definitions

The definitions as used in Tx. Loc. Gov. Code, Chapter 284, Sec. 284.002 shall be used in this Design Manual, unless otherwise noted in this Section 2, below[2].

Abandon and its derivatives means the facilities installed in the right-of-way (including by way of example but not limited to: poles, wires, conduit, manholes, handholes, cuts, network nodes and node support poles, or portion thereof) that have been left by Provider in an unused or non-functioning condition for more than 120 consecutive calendar days with a notice of Intent to Abandon.

Provider has established to the reasonable satisfaction of the City that the applicable facilities, or portion thereof, is still in active use.

Antenna means communications equipment that transmits or receives electromagnetic radio frequency signals used in the provision of wireless services.

Applicable codes means:

A. uniform building, fire, electrical, plumbing, or mechanical codes adopted by a recognized national code organization; and
B. local amendments to those codes to the extent not inconsistent with Chapter 284.

City means the City of El Campo, Texas or its lawful successor.

City Manager shall mean City Manager or designee

Chapter 284 means Tex. Loc. Gov. Code, Chapter 284.

Collocate and *collocation* mean the installation, mounting, maintenance, modification, operation, or replacement of network nodes in a public right-of-way on or adjacent to a pole.

Concealment or Camouflaged means any Wireless Facility or Pole that is covered, blended, painted, disguised, camouflaged or otherwise concealed such that the Wireless Facility blends into the surrounding environment and is visually unobtrusive as allowed as a condition for City advance approval under Chapter 284, Sec. 284.105 in Historic or Design Districts. A Concealed or Camouflaged Wireless Facility or Pole also includes any Wireless Facility or Pole conforming to the surrounding area in which the Wireless Facility or Pole is located and may include, but is not limited to hidden beneath a façade, blended with surrounding

area design, painted to match the supporting area, or disguised with artificial tree branches.

Decorative pole means a streetlight pole specially designed and placed for aesthetic purposes and on which no appurtenances or attachments, other than specially designed informational or directional signage or temporary holiday or special event attachments, have been placed or are permitted to be placed according to nondiscriminatory municipal codes.

Design District means an area that is zoned, or otherwise designated by municipal code, and for which the city maintains and enforces unique design and aesthetic standards on a uniform and nondiscriminatory basis.

Disaster emergency or disaster or emergency means an imminent, impending, or actual natural or humanly induced situation wherein the health, safety, or welfare of the residents of the city is threatened, and includes, but is not limited to any declaration of emergency by city state or federal governmental authorities.

Distributed Antenna System or DAS shall be included as a type of "Network Node."

Easement means and shall include any public easement or other compatible use created by dedication, or by other means, to the city for public utility purposes or any other purpose whatsoever. "Easement" shall include a private easement used for the provision of utilities.

Federal Communications Commission or FCC means the Federal Administrative Agency, or lawful successor, authorized to oversee cable television and other multi-channel regulation on a national level.

Highway right-of-way means right-of-way adjacent to a state or federal highway.

*Historic distric*t means an area that is zoned or otherwise designated as a historic district under municipal, state, or federal law.

Law means common law or a federal, state, or local law, statute, code, rule, regulation, order, or ordinance.

Local means within the geographical boundaries of the City.

Location means the City approved and lawfully permitted location for the Network Node.

Macro tower means a guyed or self-supported pole or monopole greater than the height parameters prescribed by Chapter 284, Section 284.103 and that supports or is capable of supporting antennas.

Mayor means the Mayor for the City.

Micro network node means a network node that is not larger in dimension than 24 inches in length, 15 inches in width, and 12 inches in height, and that has an exterior antenna, if any, not longer than 11 inches.

Municipal park means an area that is zoned or otherwise designated by municipal code as a public park for the purpose of recreational activity.

Municipally owned utility pole means a utility pole owned or operated by a municipally owned utility, as defined by Section 11.003, Utilities Code, and located in a public right-of-way.

MUTCD means Manual of Uniform Traffic Control Devices.

Network node means equipment at a fixed location that enables wireless communications between user equipment and a communications network.
The terms Include:

i. equipment associated with wireless communications;

ii. a radio transceiver, an antenna, a battery-only backup power supply, and comparable equipment, regardless of technological configuration; and

iii. coaxial or fiber-optic cable that is immediately adjacent to and directly associated with a collocation and does not include:

iv. an electric generator;

v. a pole; or

vi. a macro tower.

Network provider means:

A. a wireless service provider; or

B. a person that does not provide wireless services and that is not an electric utility but builds or installs on behalf of a wireless service provider:

i. network nodes; or

ii. node support poles or any other structure that supports or is capable of supporting a network node.

Node support pole means a pole installed by a network provider for the primary purpose of supporting a network node.

Permit means a written authorization for the use of the public right-of-way or collocation on a service pole required from a municipality before a network provider may perform an action or initiate, continue, or complete a project over which the municipality has police power authority.

Pole means a service pole, municipally owned utility pole, a service provider owned pole.

Private easement means an easement or other real property right that is only for the benefit of the grantor and grantee and their successors and assigns.

Provider has the same meaning as "Network Provider."

Public right-of-way means the area on, below, or above a public roadway, highway, street, public sidewalk, alley, waterway, or utility easement in which the municipality has an interest. The term does not include:

A. a private easement; or

B. the airwaves above a public right-of-way with regard to wireless telecommunications.

Public right-of-way management ordinance means an ordinance that complies with Chapter 284, Subchapter C.

Service pole means a pole, other than a municipally owned utility pole, owned or operated by a municipality and located in a public right-of-way, including:

A. a pole that supports traffic control functions;

B. a structure for signage;

C. a pole that supports lighting, other than a decorative pole; and

D. a pole or similar structure owned or operated by a municipality and supporting only network nodes.

Small cell shall be included as a type of "Network Node."

Street means only the paved portion of the right-of-way used for vehicular travel, being the area between the inside of the curb to the inside of the opposite curb, or the area between the two parallel edges of the paved roadway for vehicular travel where there is no curb. A "Street" is generally part of, but smaller in width than the width of the entire right-of-way, while a right-of-way may include sidewalks and utility easements, a "Street" does not. A "street" does not include the curb or the sidewalk, if either is present at the time of a permit application or if added later.

SWPPP shall mean Storm Water Pollution Prevention Plan.

TAS means Texas Accessibility Standards.

Traffic Signal means any device, whether manually, electrically, or mechanically operated by which traffic is alternately directed to stop and to proceed.

Transport facility means each transmission path physically within a public right-of-way, extending with a physical line from a network node directly to the network, for the purpose of providing backhaul for network nodes.

Underground Requirement Area shall be an area where poles, overhead wires, and associated overhead or above ground structures have been removed and buried or have been approved for burial underground pursuant to municipal ordinances, zoning regulations, state law, private deed restrictions, and other public or private restrictions, that prohibit installing aboveground structures in a public right-of-way.

User means a person or organization which conducts a business over facilities occupying the whole or a part of a public street or right-of-way, depending on the context.

Utility pole means a pole that provides:

A. electric distribution with a voltage rating of not more than 34.5 kilovolts; or

B. services of a telecommunications provider, as defined by Chapter 284, Section 51.002, Utilities Code.

Wireless service means any service, using licensed or unlicensed wireless spectrum, including the use of Wi-Fi, whether at a fixed location or mobile, provided to the public using a network node.

Wireless service provider means a person that provides wireless service to the public.

Wireless facilities mean "Micro Network Nodes," "Network Nodes," and "Node Support Poles" as defined in Texas Local Government Code Chapter 284.

2.11.3 Prohibited and Preferred locations of Micro Network Node, Network Node, Node Support Pole and Related Ground Equipment

A. Prohibited or Restricted Areas for Certain Wireless facilities, except with Separate City Agreement or Subject to Concealment Conditions.

1. Municipal Parks and Residential Areas. In accordance with Chapter 284, Sec. 284.104 (a), a Network Provider may not install a Node Support Pole in a public right-of-way without the City's discretionary, nondiscriminatory, and written consent if the public right-of-way is in a Municipal park or is adjacent to a street or thoroughfare that is:
    i. not more than 50 feet wide of paved street surface, being the area measured as the shortest distance between the inside of the curb to the inside of the opposite curb, or the area measured as the shortest distance between the two parallel edges of the paved roadway for vehicular travel where there is no curb; and

    ii. adjacent to single-family residential lots or other multifamily residences or undeveloped land that is designated for residential use by zoning or deed restrictions.

In accordance with Chapter 284, Sec. 284.104 (b), a Network Provider installing a Network Node or Node Support Pole in a public right-of-way described above shall comply with private deed restrictions and other private restrictions in the area that apply to those facilities.

Each permit application shall disclose if it is within a Municipal Park and Residential Areas as described above.

B. Historic District and Design Districts. In accordance with Chapter 284, Sec. 284.105, a Network Provider must obtain advance written approval from the City before collocating Network Nodes or installing Node Support Poles in a Design District with Decorative Poles or in an area of the City zoned or otherwise designated as a Design District or Historic District.

1. As a condition for approval of Network Nodes or Node Support Poles in Design Districts with Decorative Poles or in a Historic District, the City shall require reasonable design or Concealment measures for the Network Nodes or Node Support Poles. Therefore, any request for installations in a Design District with Decorative Poles or in a Historic

District, must be accompanied with proposed Concealment measures in the permit applications.

2. The City request that a Network Provider explore the feasibility of using Camouflage measures to improve the aesthetics of the Network Nodes, Node Support Poles, or related ground equipment, or any portion of the nodes, poles, or equipment, to minimize the impact to the aesthetics in Design Districts or in a Historic District.

3. Network Provider shall comply with and observe all applicable City, State, and federal historic preservation laws and requirements.

4. Each permit application shall disclose if it is within a Design District with Decorative Poles or in an area of the City zoned or otherwise designated as a Design District or Historic District.

C. Historic Landmarks. A Network Provider is discouraged from installing a Network Node or Node Support Pole within 300 feet of a historic site or structure or Historic Landmark recognized by the City, state or federal government (see, for example, and not limited to §442.001(3) of the Texas Government Code, and 16 U.S.C. §470), as of the date of the submission of the permit. It is recommended that each permit application disclose if it is with 300 feet of such a structure.

D. Compliance with Undergrounding Requirements. In accordance with Chapter 284, Sec. 284.107, a Network Provider shall comply with nondiscriminatory undergrounding requirements, including municipal ordinances, zoning regulations, state law, private deed restrictions, and other

public or private restrictions, that prohibit installing aboveground structures in a public right-of-way without first obtaining zoning or land use approval.

E. Areas may be designated from time to time by the City as Underground Requirement

1. Areas in accordance with filed plats, and or conversions of overhead to underground areas, as may be allowed by law.

2. Each permit application shall disclose if it is within an area that has undergrounding requirements.

F. Least preferable locations.

1. Residential Areas and Parks. A Network Provider is discouraged from installing a Network Node on an existing pole in a public right-

of-way without written consent from the City Council if the public right-of-way is located in or adjacent to a street or thoroughfare that is adjacent to a municipal park or single-family residential lots or other multifamily residences or undeveloped land that is designated for residential use by zoning or deed restrictions.

i. In accordance with Chapter 284, Sec. 284.104 (b) a Network Provider installing a Network Node or a Node Support Pole

in a public right-of-way shall comply with private deed restrictions and other private restrictions in the area that apply to those facilities.

2. Historic Districts and Design Districts. A Network Provider is discouraged from installing a Network Node or a Node Support Pole in the public right-of-way in any area designated by the City as a Design Districts or in an area of the City zoned or otherwise designated as a Historic District unless such a Network Node or a new Node Support Pole is camouflaged.

G. Most preferable locations.

1. *Industrial areas* if not adjacent to a Municipal Park, Residential area, Historic District or Design District.

2. *Highway Rights-of-Way* areas if not adjacent to a Municipal Park, Residential area, Historic District or Design District.

3. *Retail and Commercial areas* if not adjacent to a Municipal Park, Residential area, Historic District or Design District.

H. Designated Areas.

1. The City Council may designate an area as a Historic District or a Design District under Chapter 284.105 at any time.

2. The failure to designate an area in this Chapter shall not mean that such an area is not within a defined district, if so designated by the City Council. Future areas may be designated as one of these Districts at any time. Such a designation does not require a zoning case.

3. While not required under Chapter 284 to designate Underground Compliance Areas to prohibit above ground Wireless facilities, the City may also, from time to time, also designate Underground Compliance Areas.

I. Exceptions.

The City by its discretionary consent and agreement may grant an exception to the above prohibited locations and sizes, but only in a non-exclusive, and non- discriminatory manner, as allowed or required by Chapter 284, Sec. 284.109 and Sec. 284.110.

J. Order of Preference regarding Network Node attachment to existing facilities and New Node Support Poles.

The City by its discretionary consent and agreement may grant an exception to the above prohibited locations and sizes, but only in a non-exclusive, and non- discriminatory manner, as allowed or required by Chapter 284, Sec. 284.109 and Sec. 284.110.

1. *Existing telephone or electrical lines between existing utility poles*. Micro Network Nodes shall only be lashed on existing telephone or electrical lines between existing utility poles (electric poles or telephones poles), with notice to the pole owner as required by the Federal Pole Attachment Act (47 U.S. Code § 224 - Pole attachments), and not placed on Utility Poles, Node Support Poles or Service Poles.

2. *Existing Utility Poles* (electric poles or telephones poles), shall be the preferred support facility for Network Nodes and related ground equipment.

3. *Municipal Service Poles*:

   a. *Non-decorative street lights* with a height of more than 20 feet.

   b. *Traffic signal structures* when such installation will not interfere with the integrity of the facility and will not interfere with the safety of public and in accordance with an agreement as allowed by Chapter 284, Sec. 285.056 and Sec. 284.101 (a) (3), and (b).

   c. *Street signage* shall be a low priority use for attachment of a Network Node.

   d. *Other municipal Service pole* use is discouraged.

4. *New node support poles* shall be the least preferred type of allowed facility for attachment of Network Nodes.

5. *Ground Equipment***.** Ground equipment should be minimal and the least intrusive.

2.11.4 Guidelines on Placement.

A. Generally.

In accordance with Chapter 284.102, a Network Provider shall construct and maintain Network Nodes and Node Support Poles in a manner that does not:

1. obstruct, impede, or hinder the usual travel or public safety on a public right-of-way;

2. obstruct the legal use of a public right-of-way by other utility providers;

3. violate nondiscriminatory applicable codes;

4. violate or conflict with the municipality's publicly disclosed public right-of-way management ordinance or this Design Manual.

5. violate the federal Americans with Disabilities Act of 1990 (42 U.S.C. Section 12101 et seq.).

B. Generally Requirements and Information:

1. Size Limits. Network Providers shall provide detailed drawings, with calculations to show strict conformity to the size limitations as set forth in Chapter 284, in accordance with, but not limited to Chapter 284, Sec. 284.002, size of a Micro Network Node, Sec. 284.003, Size of Network Nodes, and Sec. 284.103, Max. pole height, with each application and with each request for a permit for each location.

2. State and Federal Rights-of-way permit. If the project lies within a Highway Right-of-Way, the applicant must provide evidence of a permit from the State or Federal Government.

3. Confirmation of non-interference with City Safety Communication Networks.

    a. The Network Provider needs to provide analysis that the proposed network node shall not cause any interference with

    City public safety radio system, traffic signal light system, or other city safety communications components in accordance with Chapter 284, Sec. 284.304.

    b. It shall be the responsibility of the Network Provider to evaluate, prior to making application for permit, the compatibility between the existing City infrastructure and Provider's proposed Network Node. A Network Node shall

    not be installed in a location that causes any interference. Network Nodes shall not be allowed on City's public safety radio infrastructure.

4. Improperly Located Network Node facilities, Node Support Poles and related ground equipment:

    a. Improperly Located Network Node facilities, Node Support Poles and related ground equipment shall not impede pedestrian or vehicular traffic in the Right-of-Way. If any Network Node facilities, Node Support Poles or ground equipment is installed in a location that is not in accordance with the plans approved by the City Manager and impedes pedestrian or vehicular traffic or does not comply or otherwise renders the Right-of-Way non- compliant with applicable

Laws, including the American Disabilities Act, then Network Provider shall promptly remove the Network Node facilities, Node Support Poles or ground equipment.

b. Notice to Remove unauthorized facilities and relocate and penalty: After 30 days' notice to remove of Network Node facilities, Node Support Poles or ground equipment that is located in the incorrect permitted location, if not relocated the Network Provider shall be subject to a per day penalty as defined by Sec. 1.01.009 of the City of El Campo Code of Ordinances in accordance with Sec. 54.001 of the State of Texas Local Government Code until the Network Node facilities, Node Support Poles or ground equipment is relocated to the correct area within the permitted Location, regardless of whether or not the Network Provider's contractor, subcontractor, or vendor installed the Network Node facilities, Node Support Poles or ground equipment in strict conformity with the City Rights-of-way management ord., and other applicable ordinances concerning improperly located facilities in the rights-of-way.

C. Underground Requirement Areas:

1. In accordance with Chapter 284.107, a Network Provider shall, in relation to installation for which the City approved a permit application, comply with nondiscriminatory undergrounding requirements, including municipal ordinances, zoning regulations, state law, private deed restrictions, and other public or private restrictions, that prohibit installing aboveground structures in a

   public right-of-way without first obtaining zoning or land use approval.

2. If a location is designated by the City ,to be an Underground Requirement Area, then a Network Provider's permit for the location of the Micro Network Node, Network Node, Node Support Pole, and related ground equipment at such location, the permit will be revoked 180 days after the designation, with removal of said the Micro Network Node, Network Node, Node Support Pole, and related ground equipment at such location within 180 days of such designation, or as otherwise reasonably allowed as determined by the City.

D. Underground Requirement Areas:

1. In Right-of-Way: Network Node facilities, Node Support Poles and related ground equipment shall be placed, as much as possible, within two feet of the outer edge of the Right-of-Way line to minimize any obstruction, impediment, or hindrance to the usual travel or public safety on a public right-of-way.

2. Height above ground. Network Node attachments to a pole shall be installed at least eight (8) feet above the ground in accordance with Chapter 284, Sec. 284.108, and if a Network Node attachment is projecting toward the street, for the safety and protection of the public and vehicular traffic, the attachment shall be installed no less than sixteen (16) feet above the ground.

3. Protrusions. In accordance with Chapter 284, Sec. 284.003 (a) (1) (C), Sec. 284.003 (a) (2) (C) and Sec. 284.003 (a) (3) (B) no protrusion from the outer circumference of the existing structure or pole shall be more than two (2) feet.

4. Limit on number of Network Nodes per Site. There shall be no more than one Network Node on any one Pole.

E. New Node Support Poles

1. New Node Support Poles Spacing. New node support poles shall be spaced apart from existing utility poles or Node Support poles (not to obstruct existing overhead facilities) between utility poles in the immediate proximity, but no less than at a minimum 300 feet from a utility pole or another Node Support Pole to minimize the hazard of poles adjacent to road ways and to minimize effect on property values and aesthetics on the area.

2. Height of Node Support Poles or modified Utility Pole. In accordance with Chapter 284, Sec. 284.103 a Node support pole or modified Utility Pole may not exceed the lesser of:

   i. 10 feet in height above the tallest existing utility pole located within 500 linear feet of the new pole in the same public right-of-way; or

   ii. 55 feet above ground level.

F. Ground Equipment.

1. New *Ground Equipment near street corners and intersections:* Ground equipment should be minimal and the least intrusive. In accordance with Chapter 284.102 (1), to minimize any obstruction,

impediment, or hindrance to the usual travel or public safety on a public right-of-way the maximum line of sight required to add to safe travel of vehicular and pedestrian traffic and in order to maximize that line of sight at street corners and intersections and to minimize hazards at those locations, ground equipment may not be installed within 250 feet of a street corner or a street intersection.

2. *Ground Equipment near Municipal Parks.* For the safety of Municipal park patrons, particularly small children, and to allow full line of sights near Municipal park property, the Network Provider shall not install Ground Equipment in a Right-of-Way that is within a Park or within 250 feet of the boundary line of a Park, unless approved by the City Manager or designee in writing.

3. *Minimize Ground equipment density*:

   In accordance with Chapter 284, Sec. 284.102 (1) to enhance the safety requirements of line of sight of pedestrians, particularly small children, the City's designee may deny a request for a proposed Location if the Network Provider installs Network Node ground equipment where existing ground equipment within 300 feet already occupies a footprint of 25 sq. ft. or more.

G. Municipal Service Poles:

1. New In accordance with Agreement: Installations on all Service Poles shall be in accordance with an agreement as allowed by Chapter 284, Sec. 285.056 and Sec. 284.101 (a) (3), and (b).

2. Required industry standard pole load analysis: Installations on all Service Poles shall have an industry standard pole load analysis completed and submitted to the municipality with each permit application indicating that the Service Pole to which the Network Node is to be attached will safely support the load, in accordance with Chapter 284.108.

3. Height of attachments: All attachments on all Service Poles shall be at least 8 feet above grade, in accordance with Chapter 284, Sec. 285.108 (a) (1) - (2) and if a Network Node attachment is projecting toward the street, for the safety and protection of the public and vehicular traffic, the attachment shall be installed no less than sixteen (16) feet above the ground.

4. Installations on Traffic Signals: Installations on all Traffic signal structures must not interfere with the integrity of the facility in any way that may compromise the safety of the public and must be in accordance with an agreement as allowed by Chapter 284, Sec. 285.056 and Sec. 284.101 (a) (3), and (b). Installation of Network Node facilities on any traffic signal structures shall:

    i. Be encased in a separate conduit than the traffic light electronics;

    ii. Have a separate electric power connection than the traffic signal structure; and

    iii. Have a separate access point than the traffic signal structure; and

5. Installations on Street signage: Installations on all street signage structures must not interfere with the integrity of the facility in any way that may compromise the safety of the public. Installation of Network Node facilities on any street signage structures that has electrics shall:

    i. Be encased in a separate conduit than any City signage electronics;

    ii. Have a separate electric power connection than the signage structure;

    iii. Have a separate access point than the signage structure; and

2.11.5 General Aesthetic Requirements

A. Concealment.

1. Concealment of Network Nodes and Node support poles shall be required by the City in Design Districts with Decorative Poles and in Historic Districts pursuant to Chapter 284.105. All designs subject to approval by the City.

2. It is also the City's preference that all new node support poles be camouflaged, except those located in an area zoned or predominantly industrial area. Companies shall submit their proposal for camouflage with the permit application.

3. The Network Node facilities shall be concealed or enclosed as much as possible in an equipment box, cabinet, or other unit that may

include ventilation openings. External cables and wires hanging off a pole shall be sheathed or enclosed in a conduit, so that wires are protected and not visible or visually minimized to the extent possible, except to the extent not consistent with Chapter 284.

B. New Node Support Pole Spacing.

New node support poles shall be at a minimum 300 feet from a utility pole or another Node Support Pole to minimize the hazard of poles adjacent to road ways and to minimize effect on property values and aesthetics on the area.

C. Minimize Ground Equipment Concentration.

In order to minimize negative visual impact to the surrounding area, and in accordance with Chapter 284, Sec. 284.102 (1) to enhance the safety requirements of line of sight

of pedestrians, particularly small children, the City's designee may deny a request for a proposed Location if the Network Provider installs Network Node ground equipment where existing ground equipment within 300 feet

already occupies a footprint of 25 sq. ft. or more to minimize effect on property values and aesthetics on the area.

D. Allowed Colors.

Colors in Historic Districts and Design Districts must be approved by the City Manager from a palette of approved colors. Unless otherwise provided, all colors shall be earth tones or shall match the background of any structure the facilities are located upon and all efforts shall be made for the colors to

be inconspicuous. Colors in areas other than in Historic Districts and Design Districts shall conform to colors of other installations of telecommunication providers in the immediately adjacent areas.

2.11.6 Electrical Supply

A. Network Provider shall be responsible for obtaining any required electrical power service to the Micro Network Node, Network Node facilities, Node Support Poles and ground equipment. The City shall not be liable to the Network Provider for any stoppages or shortages of electrical power furnished to the Micro Network Node, Network Node facilities, Node Support Poles or ground equipment, including without limitation, stoppages or shortages caused by any act, omission, or requirement of the public utility serving the structure or the act or omission of any other tenant or Network

Provider of the structure, or for any other cause beyond the control of the City.

B. Network Provider shall not allow or install generators or back-up generators in the
Right-of-Way in accordance with Chapter 284, Sec. 284.002 (12) (B) (1).

2.11.7 Insurance, Indemnity, Bonding and Security Deposits

A. Insurance, bonding and security deposits shall be in strict accordance with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284.

B. Indemnity shall be in accordance with Chapter 284, Sec. 284.302, as provided for in Chapter 283, Sec. 283.057 (a) and (b) of the Texas Loc. Gov't Code.

2.11.8 Requirements in regard to removal, replacement, maintenance and repair.

A. Removal or Relocation by Network Provider.

1. If the Network Provider removes or relocates a Micro Network Node, Network Node facilities, Node Support Pole or related ground equipment at its own discretion, it shall notify the City Manager or designee in writing not less than 10 business days prior to removal or relocation. Network Provider shall obtain all Permits required for relocation or removal of its Micro Network Node, Network Node facilities, Node Support Poles and related ground equipment prior to relocation or removal.

2. The City shall not issue any refunds for any amounts paid by Network Provider for Micro Network Node, Network Node facilities, Node Support Poles or related ground equipment that have been removed.

B. Removal or Relocation required for City Project

1. In accordance with Chapter 284, Sec. 284.107, except as provided in existing state and federal law, a Network Provider shall relocate or adjust Micro Network Node, Network Node.

2. Node Support Pole and related ground equipment in a public right-of-way in a timely manner and without cost to the municipality managing the public right-of-way

3. Network Provider understands and acknowledges that the City may require Network Provider to remove or relocate its Micro Network Node, Network Node, Node Support Pole and related ground equipment, or any portion thereof from the Right-of-Way for City construction projects as allowed by state and feral law, including the common-law.

4. Network Provider shall, at the City Manager's or designee's direction, remove or relocate the same at Network Provider's sole cost and expense, except as otherwise provided in existing state and federal law, whenever the City Manager reasonably determines that the relocation or removal is needed for any of the following purposes: Required for the construction, completion, repair, widening, relocation, or maintenance of, or use in connection with, any City construction or maintenance project of a street or public rights-of-way to enhance the traveling public use for travel and transportation.

5. If Network Provider fails to remove or relocate the Micro Network Node, Network Node, Node Support Pole or related ground equipment, or portion thereof as requested by the City Manager or

   designee within 90 days of Network Provider 's receipt of the request, then the City shall be entitled to remove the Micro Network Node, Network Node, Node Support Pole or related ground equipment, or portion thereof at Network Provider's sole cost and expense, without further notice to Network Provider.

6. Network Provider shall, within 30 days following issuance of invoice for the same, reimburse the City for its reasonable expenses

   incurred in the removal (including, without limitation, overhead and storage expenses) of the Micro Network Node, Network Node, Node Support Pole or related ground equipment, or portion thereof.

C. Removal required by City for Safety and Imminent Danger Reasons**.**

1. Network Provider shall, at its sole cost and expense, promptly disconnect, remove, or relocate the applicable Micro Network Node, Network Node, Node Support Pole and related ground equipment within the time frame and in the manner required by the City Manager if the City Manager reasonably determines that the disconnection, removal, or relocation of any part of a Micro Network Node, Network Node, Node Support Pole and related ground equipment (a) is necessary to protect the public health,

safety, welfare, or City property, (b) the Micro Network Node, Network Node, Node Support Pole and related ground equipment, or portion thereof, is adversely affecting proper operation of streetlights or City property, or (c) Network Provider fails to obtain all applicable licenses, Permits, and certifications required by Law for its Micro Network Node, Network Node, Node Support Pole and related ground equipment, or use of any Location under applicable law. If the City Manager reasonably determines that there is imminent danger to the public, then the City may immediately disconnect, remove, or relocate the applicable Micro Network Node, Network Node, Node Support Pole and related ground equipment at the Network Provider's sole cost and expense.

2. The City Manager shall provide 90 days written notice to the Network Provider before removing a Micro Network Node, Network Node, Node Support Pole and related ground equipment under this Section, unless there is imminent danger to the public health, safety, and welfare.

3. Network Provider shall reimburse City for the City's actual cost of removal of Micro Network Node, Network Node, Node Support Pole and related ground equipment within 30 days of receiving the invoice from the City.

2.11.9 Installation and Inspections.

A. Installation.

If Network Provider shall, at its own cost and expense, install the Micro Network Node, Network Node facilities, Node Support Poles and related ground equipment in a good and workmanlike manner in strict accordance

with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284

Network Provider shall, at its own cost and expense, install the Micro Network Node, Network Node facilities, Node Support Poles and related ground equipment in a good and workmanlike manner and in accordance with the requirements promulgated by the City Manager, as such may be amended from time to time. Network Provider's work shall be subject to the regulation, control and direction of the City Manager. All work done in connection with the installation, operation, maintenance, repair, modification, and/or replacement of the Micro Network Node, Network Node facilities, Node Support Poles and related ground equipment shall be in compliance with all applicable laws, ordinances, codes, rules and regulations of the City, applicable county, the state, and the United States ("Laws").

B. Inspections.

The City Manager, or designee, may perform visual inspections of any Micro Network Node, Network Node, Node Support Pole or related ground equipment located in the Right -of- Way as the City Manager or designee deems appropriate without notice. If the inspection requires physical contact with the Micro Network Node, Network Node, Node Support Poles or related ground equipment, the City Manager shall provide written notice to the Network Provider within five business days of the planned inspection. Network Provider may have a representative present during such inspection.

2.11.10 Requirements upon abandonment of obsolete Micro Network Node, Network Node, Node
Support Pole and Related Ground Equipment.

Abandoned or obsolete Micro Network Node, Network Node, Node Support Pole and related ground equipment shall be removed in strict accordance with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284.

Network Provider shall remove Micro Network Node, Network Node, Node Support Pole and related ground equipment when such facilities are Abandoned regardless of whether or not it receives notice from the City. Unless the City sends notice that removal must be completed immediately to ensure public health, safety, and welfare, the removal must be completed within the earlier of 90 days of the Micro Network Node, Network Node, Node Support Pole and related ground equipment being Abandoned or within 90 days of receipt of written notice from the City. When Network Provider removes, or Abandons permanent structures in the Right-of-Way, the Network Provider shall notify the

City Manager or designee in writing of such removal or Abandonment and shall file with the City Manager or designee the location

and description of each Micro Network Node, Network Node, Node Support Pole and related ground equipment removed or Abandoned. The City Manager or designee may require the Network Provider to complete additional remedial measures necessary for public safety and the integrity of the Right-of-Way and restore to its original or better conditions.

2.11.11 General Provisions.

A. As Built Maps and Records. Network Provider's as built maps and records shall be in strict accordance with the City's rights-of-way management ordinance,

and other applicable ordinances, except to the extent not consistent with Chapter 284.

Network Provider shall maintain accurate maps and other appropriate records of its Network Node facilities, Node Support Poles and related ground equipment as they are actually constructed in the Rights-of-Way, including, upon request, the use of Auto CAD/GIS digital format. Network Provider will provide additional maps to the City upon request.

B. Courtesy and Proper Performance. Courtesy and Proper Performance of Network provider's personnel, and contractors shall be in strict accordance with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284.
Network Provider shall make citizen satisfaction a priority in using the Right-of-Way. Network Provider shall train its employees to be customer service-oriented and to positively and politely interact with citizens when dealing with issues pertaining to its Micro Network Node, Network Node, Node Support Pole and related ground equipment in the Right-of-Way. Network Provider's employees shall be clean, courteous, efficient, and neat in appearance and committed to offering the highest quality of interaction with the public. If in the opinion of the City Manager or designee, Network Provider is not interacting in a positive and polite manner with citizens, he or she shall request Network Provider to take all remedial steps to conform to these standards.

C. Drug Policy.
Drug policy of Network provider's personnel and contractors in the rights-of-way shall be in strict accordance with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284.

It is the policy of the City to achieve a drug -free workforce and workplace. The manufacture, distribution, dispensation, possession, sale, or use of illegal drugs

or alcohol by Network Provider's employees, contractors, subcontractors, sub-Network Provider's, or vendors while on City rights-of-way is prohibited.

D. Allocation of Funds for Removal and Storage.
The City has appropriated $0 to pay for the cost of any removal or storage of Micro Network Node, Network Node, Node Support Pole and related ground equipment, as authorized under this Article, and no other funds are allocated.

E. Ownership.
Ownership of Network Node and related equipment shall be in strict accordance with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284.

No part of a Micro Network Node, Network Node, Node Support Pole and related ground equipment erected or placed on the Right-of-Way by Network Provider will become or be considered by the City as being affixed to or a part of, the Right-of-Way. All portions of the Micro Network Node, Network Node, Node Support Pole and related ground equipment constructed, modified, erected, or placed by Network Provider on the Right-of-Way will be and remain the property of Network Provider and may be removed by Network Provider at any time provided the Network Provider shall notify the City Manager prior to any work in the Right-of-Way.

F. Tree Maintenance.

Tree maintenance shall be in strict accordance with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284.

Network Provider, its contractors, and agents shall obtain written permission from the City Manager before trimming trees hanging over its Micro Network Node, Network Node, or Node Support Pole, to prevent branches of such trees from contacting attached Micro Network Node, Network Node, or Node Support Pole. When directed by the City Manager, Network Provider shall trim under the supervision and direction of the Parks Director. The City shall not be liable for any damages, injuries, or claims arising from Network Provider's actions under this section.

G. Signage.

Signage shall be in strict accordance with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284.

Network Provider shall post its name, location identifying information, and emergency telephone number in an area on the cabinet of the Network Node facility that is visible to the public. Signage required under this section shall not

exceed 4" x 6", unless otherwise required by law (e.g. RF ground notification signs) or the City Manager or designee.

Except as required by Laws or by the Utility Pole owner, Network Provider shall not post any other signage or advertising on the Micro Network Node, Network Node, Node Support Pole, Service pole or Utility Pole.

H. Graffiti Abatement.

Graffiti abatement shall be in strict accordance with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284.

As soon as practical, but not later than fourteen (14) calendar days from the date Network Provider receives notice thereof, Network Provider shall remove all graffiti on any of its Micro Network Node, Network Node, Node Support Pole, and related ground equipment located in the Right of Way. The foregoing shall not relieve the Network Provider from complying with any City graffiti or visual blight ordinance or regulation.

I. Restoration.
Network Provider shall restore and repair of the rights-of-way from any damage to the Right-of-Way, or any facilities located within the Right-of-Way, and the property of any third party resulting from Network Provider's removal or relocation activities (or any other of Network Provider's activities hereunder) in strict accordance with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284.

Network Provider shall repair any damage to the Right-of-Way or any facilities located within the Right-of-Way, and the property of any third party resulting from Network Provider's removal or relocation activities (or any other of Network Provider's activities hereunder) within 10 calendar days following the date of such removal or relocation, at Network Provider's sole cost and expense,

including restoration of the Right-of-Way and such property to substantially the same condition as it was immediately before the date Network Provider was granted a Permit for the applicable Location or did the work at such Location (even if Network Provider did not first obtain a Permit), including restoration or replacement

of any damaged trees, shrubs or other vegetation. Such repair, restoration, and replacement shall be subject to the sole, reasonable approval of the City Manager.

J. Network provider's responsibility.
Network Provider shall be responsible and liable for the acts and omissions of Network Provider's employees, temporary employees, officers, directors, consultants, agents, Affiliates, subsidiaries, sub-Network Provider's and subcontractors in connection with the installations of any Micro Network Node, Network Node, Node Support Pole and related ground equipment, as if such acts or omissions were Network Provider's acts or omissions in strict accordance with the City's rights-of-way management ordinance, and other applicable ordinances, except to the extent not consistent with Chapter 284.

Sections 2.11.12 – 2.11.19 Reserved.

2.11.20 Design Manual Updates.

Placement or Modification of Micro Network Node, Network Node, Node Support Pole and related ground equipment shall comply with the City's Design Manual at the time the Permit for installation or Modification is approved and as amended from time to time.

A. Sec. 284.301. LOCAL POLICE-POWER-BASED REGULATIONS.

a) Network Provider shall be responsible and liable for the acts and omissions of Network Provider's employees, temporary employees, officers, directors, consultants, agents, Affiliates, subsidiaries, sub-Network Provider's subject to this chapter and applicable federal and state law, a municipality may continue to exercise zoning, land use, planning, and permitting authority in the municipality's boundaries, including with respect to utility poles.

b) A municipality may exercise that authority to impose police-power-based regulations for the management of the public right-of-way that apply to all person's subject to the municipality.

c) A municipality may impose police-power-based regulations in the management of the activities of network providers in the public right-of-

way only to the extent that the regulations are reasonably necessary to protect the health, safety, and welfare of the public.

B. The definitions as used in Tx. Loc. Gov. Code, Chapter 284, Sec. 284.002 shall be used in this Design Manual.

Tex. Loc. Gov. Code, Chapter 284, Sec. 284.002. DEFINITIONS. In this chapter:

1) "Antenna" means communications equipment that transmits or receives electromagnetic radio frequency signals used in the provision of wireless services.

2) "Applicable codes" means:

A. uniform building, fire, electrical, plumbing, or mechanical codes adopted by a recognized national code organization; and
B. local amendments to those codes to the extent not inconsistent with this chapter.

3) "Collocate" and "collocation" mean the installation, mounting, maintenance, modification, operation, or replacement of network nodes in a public right-of-way on or adjacent to a pole.

4) "Decorative pole" means a streetlight pole specially designed and placed for aesthetic purposes and on which no appurtenances or attachments, other than

   specially designed informational or directional signage or temporary holiday or special event attachments, have been placed or are permitted to be placed according to nondiscriminatory municipal codes.

5) "Design district" means an area that is zoned, or otherwise designated by municipal code, and for which the city maintains and enforces unique design and aesthetic standards on a uniform and nondiscriminatory basis.

6) "Historic district" means an area that is zoned or otherwise designated as a historic district under municipal, state, or federal law.

7) "Law" means common law or a federal, state, or local law, statute, code, rule, regulation, order, or ordinance.

8) "Macro tower" means a guyed or self-supported pole or monopole greater than the height parameters prescribed by Section 284.103 and that supports or is capable of supporting antennas.

9) "Micro network node" means a network node that is not larger in dimension than 24 inches in length, 15 inches in width, and 12 inches in height, and that has an exterior antenna, if any, not longer than 11 inches.

10) "Municipally owned utility pole" means a utility pole owned or operated by a municipally owned utility, as defined by Section 11.003, Utilities Code, and located in a public right-of-way.

11) "Municipal park" means an area that is zoned or otherwise designated by municipal code as a public park for the purpose of recreational activity.

12) "Network node" means equipment at a fixed location that enables wireless communications between user equipment and a communications network. The term:

   A. includes:

      i. equipment associated with wireless communications;

ii. a radio transceiver, an antenna, a battery-only backup power supply, and comparable equipment, regardless of technological configuration; and

iii. coaxial or fiber-optic cable that is immediately adjacent to and directly associated with a particular collocation; and

B. does not include:

i. an electric generator;

ii. a pole; or

iii. a macro tower.

13) "Network provider" means:

A. a wireless service provider; or

B. a person that does not provide wireless services and that is not an electric utility but builds or installs on behalf of a wireless service provider:

i. network nodes; or

ii. node support poles or any other structure that supports or is capable of supporting a network node.

14) "Node support pole" means a pole installed by a network provider for the primary purpose of supporting a network node.

15) "Permit" means a written authorization for the use of the public right-of-way or collocation on a service pole required from a municipality before a network provider may perform an action or initiate, continue or complete a project over which the municipality has police power authority.

16) "Pole" means a service pole, municipally owned utility pole, node support pole, or utility pole.

17) "Private easement" means an easement or other real property right that is only for the benefit of the grantor and grantee and their successors and assigns.

18) "Public right-of-way" means the area on, below, or above a public roadway, highway, street, public sidewalk, alley, waterway, or utility

easement in which the municipality has an interest. The term does not include:

A. a private easement; or

B. the airwaves above a public right-of-way with regard to wireless telecommunications.

19) "Public right-of-way management ordinance" means an ordinance that complies with Subchapter C.

20) "Public right-of-way rate" means an annual rental charge paid by a network provider to a municipality related to the construction, maintenance, or operation of network nodes within a public right-of-way in the municipality.

21) "Service pole" means a pole, other than a municipally owned utility pole, owned or operated by a municipality and located in a public right-of-way, including:

A. a pole that supports traffic control functions;

B. a structure for signage;

C. a pole that supports lighting, other than a decorative pole; and

D. a pole or similar structure owned or operated by a municipality and supporting only network nodes.

22) "Transport facility" means each transmission path physically within a public right-of-way, extending with a physical line from a network node directly to the network, for the purpose of providing backhaul for network nodes.

23) "Utility pole" means a pole that provides:

A. electric distribution with a voltage rating of not more than 34.5 kilovolts; or

B. services of a telecommunications provider, as defined by Section 51.002, Utilities Code.

24) "Wireless service" means any service, using licensed or unlicensed wireless spectrum, including the use of Wi-Fi, whether at a fixed location or mobile, provided to the public using a network node.

25) "Wireless service provider" means a person that provides wireless service to the public.

C. The definitions as used in Tx. Loc. Gov. Code, Chapter 284, Sec. 284.002 shall be used in this Design Manual.

Sec. 284.002. DEFINITIONS (8) “Micro network node" means a network node that is not larger in dimension than 24 inches in length, 15 inches in width, and 12 inches in height, and that has an exterior antenna, if any, not longer than 11 inches.
Sec. 284.003. LIMITATION ON SIZE OF NETWORK NODES. (a) Except as provided by Section 284.109, a network node to which this chapter applies must conform to the following conditions:

1) each antenna that does not have exposed elements and is attached to an existing structure or pole:
   A. must be located inside an enclosure of not more than six cubic feet in volume;

   B. may not exceed a height of three feet above the existing structure or pole; and

   C. may not protrude from the outer circumference of the existing structure or pole by more than two feet;
2) if an antenna has exposed elements and is attached to an existing structure or pole, the antenna and all of the antenna's exposed elements:

   A. must fit within an imaginary enclosure of not more than six cubic feet;

   B. may not exceed a height of three feet above the existing structure or pole; and

   C. may not protrude from the outer circumference of the existing structure or pole by more than two feet;

3) the cumulative size of other wireless equipment associated with the network node attached to an existing structure or pole may not:

   A. be more than 28 cubic feet in volume; or

   B. protrude from the outer circumference of the existing structure or a node support pole by more than two feet;

4) ground-based enclosures, separate from the pole, may not be higher than three feet six inches from grade, wider than three feet six inches, or deeper than three feet six inches; and

5) pole-mounted enclosures may not be taller than five feet.

a) The following types of associated ancillary equipment are not included in the calculation of equipment volume under Subsection a):
1) electric meters;

2) concealment elements;

3) telecommunications demarcation boxes;

4) grounding equipment;

5) power transfer switches;

6) cut-off switches; and

7) vertical cable runs for the connection of power and other services.

b) Equipment attached to node support poles may not protrude from the outer edge of the node support pole by more than two feet.

c) Equipment attached to a utility pole must be installed in accordance with the National Electrical Safety Code, subject to applicable codes, and the utility pole owner's construction standards.

2.12 Bench Mark

2.12.1 The bench mark elevation and location must be certified by a Texas Registered Professional Land Surveyor in accordance with the Texas Society of Professional Surveyors" Standards and Specifications" for Category 8, Condition II, TSPS Second Order Vertical Control Survey. All elevations will be based on the North American Vertical Datum of 1988 (NAVD 88).

2.12.2 The bench mark horizontal positions must be certified by a Texas Registered Professional Land Surveyors "Standards and Specifications" for Category 7, Condition II, Second Order Horizontal Control. All horizontal control will be based on the North American Datum of 1983 (NAD 83).

2.12.3 All bench mark locations must be provided with ties to existing monuments including coordinates using Texas State Plane Coordinate System, South Central Zone 4204 (NAD83), in grid format and provide scale factor to revert back to surface coordinates.

2.12.4 Proposed bench marks are constructed of a 3 ½ "brass disc set in concrete as approved by the City. The concrete footing for the bench marks is eight inches (8") in diameter and three feet (3') deep. Concrete to be reinforced with two number four (2 - #4) rebar.

2.12.5 The construction plans must clearly identify the location of the bench mark and include a complete description, coordinates, and elevation, with adjustment date, of the bench mark
and must be referenced on every layout and profile sheet.

2.12.6 If the site is located within a regulatory flood area, the bench mark information should include nearest base flood elevation and description of floodplain boundary, with reference to latest FEMA DFIRM Panel.

2.13 Residential Lots and Improvements

2.13.1 All residential lots must drain to a public right-of-way directly adjoining the lot. Drainage from a residential lot to a public right-of-way at the rear or side of a lot may be permitted provided the drainage system has been properly designed to accept the flow.

2.13.2 A lot grading plan showing proposed minimum slab elevations will be included in the construction plans. If slab elevations do not change, a notice of minimum elevation will suffice. The minimum slab elevations should be noted on the subdivision plat.

2.14 Flood Plain Management

2.14.1 All development must conform to the requirements of the National Flood Insurance Program, as required by the regulations of the local governing authority having jurisdiction.

2.14.2 Amendments to the published flood maps, map revisions and all requests for changes to the base flood elevation within the El Campo city limits must be submitted to the City of El Campo for approval. Technical data required by the Federal Emergency Management Agency (FEMA) and justification for the proposed change must be included with all requests. All fees associated with

FEMA approval of said amendments will be paid by the party requesting the amendments.

2.14.3 A freeboard of one foot (1FT') above base flood elevation will be required.

2.15 Storm Water Pollution Prevention

2.15.1 All construction projects must conform to the requirements of the Texas Pollutant Discharge Elimination System (TPDES), General Permit No. TXR150000 or latest requirements set by the TCEQ.

2.15.2 Construction plans should include a storm water pollution prevention plan for review and approval detailing Best Management Practices (BMPs) to prevent or reduce the discharge of pollutants.

2.15.3 Stabilized construction exits are used on all construction sites with a disturbed area of one acre or larger and are a recommended practice for smaller construction sites. A stabilized exit is used on individual residential lots until the driveway is placed. Stabilized construction exits may be used in conjunction with wheel cleaning systems as described in *Section 5.8*

CHAPTER 3 - WATER SYSTEM DESIGN REQUIREMENTS

3.1 General

Water system design requirements are established based on standards in this section.

3.1.1 Construction and sizing of all water mains and appurtenances must meet or exceed the requirements of the Texas Commission on Environmental Quality (TCEQ). The TCEQ's Water Supply Division must review and approve engineering plans and specifications before construction begins for any project defined by TAC §290.39(j)(1)(D) as a significant change to the existing distribution system that would add more than 10% of the existing capacity or 250 connections, whichever is smaller.

3.1.2 The Public Water System does not extend beyond the water meter. All private construction beyond the meter should conform to the requirements of the codes and ordinances of the City.

3.1.3 Obtain approval from the Department of Public Works for exceptions or deviations from these requirements.

3.1.4 Approved Water Product List

All Products must conform to NSF/ANSI standards 60 or 61, if available.

1. Fire Hydrants (Flushing Valves, AWWA C 502) (Pumper Nozzle 4.125-inch, Hose Nozzle 2.5 inch)
    a. Mueller - Model: Super Centurion 250, Option 110
    b. Clow – 5 ¼" Medallion - with grade 304 stainless steel bolts
    c. East Jordan Iron Works -Water Master – Model: 5CD250
    d. American – USA- American Darling 5 ¼ "
2. Gate Valves (3/4 inch thru 2 inch, AWWA Approved, Bronze)
    a. Hammond Valve
    b. Watts
    c. Matco Norca
    d. Cambridge
    e. Mueller
    f. Municipal Valve & Equipment Company
    g. American -USA

3. Gate Valves (6 inch and larger, AWWA C 509, Resilient Wedge Type)
    a. Mueller
    b. M & H Valve Company
    c. Clow Product Reinstated 11/2011
    d. American - USA

4. Butterfly Valves (16-inch and Lager)
    a. Pratt
    b. Crispin Valve
    c. Municipal Valve & Equipment Company

5. PVC Pipe (AWWA C 900, C 905, C909)
    a. All manufacturers compliant with AWWA and/or ASTM standards.

6. Restraint Joint Pipe
    a. CertainTeed – Certa-Lok C905/RJ Certa-Lok
    b. APS Casing Spacer and Insulators

7. Ductile Iron Fittings For C 900, C 905 or C 909 Pipe (AWWA C110, C153 or C151)
    a. All manufacturers compliant with AWWA and/or ASTM standards.
        i. SIP Industries
        ii. Star Pipe – DI Compact MJ Fittings 2”-64”
        iii. Sigma Corp - DI Compact MJ Fittings 2”-64”
        iv. Sigma Corp - DI Compact Flanged Fittings 2”-64”
        v. Smith Blair – Camlock 111 4”-24”

8. Pipe & Fitting Restraints
    a. EBAA Iron Inc—Megalug Series
    b. Star Pipe – Pipe Restraints Stargrip Series 1100 for PVC
    c. Star Pipe – PVC Stargrip Series 4000 MJ Wedge Restraint
    d. Cape Fear – EZ PVC Wedge Restraint
    e. Smith Blair – Camlock 111 – 4”-24”
    f. Sigma – One-Lock Series SLCE For PVC Pipe
    g. Sigma – One-Lock Series SLDE for Ductile Iron Pipe
    h. SIP Industries – EZ Grip Joint Restraint For PVC Pipe
    i. Star Pipe – Ductile Iron Mechanical Wedge Restraint Joint

j. RTC - Flange Adaptor RCT DI C900
k. RTC – Flex-Tite Bends (90, 45, 22.5, 11.25)
l. RTC – Flex-Tite Tees/Reducing Tees
m. RTC – Flex-Tite Reducers/Wyes
n. RTC – Flex-Tite Caps
o. RTC – Flex-Tite Tees

9. Steel Pipe (AWWA C 200, TCEQ, NSF 61)
    a. All manufacturers compliant with AWWA, NSF 61 and/or ASTM standards.

10. Steel Pipe Coatings, Exterior (AWWA C 203, TCEQ, NSF 61)
    a. All manufacturers compliant with AWWA, NSF 61 and/or ASTM standards.

11. Steel Pipe Coatings, Interior (AWWA C 210, D 102, TCEQ, NSF 61)
    a. All manufacturers compliant with AWWA, NSF 61 and/or ASTM standards. Bituminous interior coatings are not allowed.

12. Curb Stop - (1" - 2", Ball Valve, Full Port, 360 turn, Locking Wing, Pack Joint CTS O.D. tubing x FIP)
    a. Ford Meter Box Company
    b. Jones Brand (James Jones)
    c. McDonald
    d. Cambridge
    e. Mueller

13. Curb Stop - (3/4", Ball Valve, Full Port, 360 turn, Locking Wing, FIP x FIP)
    a. Ford Meter Box Company
    b. Cambridge
    c. Mueller

14. Compression Coupling (1”-2”, Pack Joint for CTS O.D. tubing connections)
    a. Cambridge
    b. Ford Meter Box Company
    c. Mueller

15. Service Saddles (Single Wide-Band Strap, Stainless Steel Band, Epoxy Coated)
    a. Romac 101 NS or Pre-approved equivalent.

16. Corporation Stop – Bronze
    a. Ford Meter Box Company - Model: F1000
    b. Mueller - Model: H-15008 or H-15013
    c. Jones Product (James Jones)
    d. McDonald
    e. Cambridge

17. Service Saddle - Dual Strap, Stainless Steel, Epoxy Coated Saddle
    a. Romac
    b. Ford Meter Box Company
    c. Mueller Company
    d. Clow – A Division of McWane Corporation
    e. Jones Product (James Jones)
    f. McDonald
    g. JCM Industries Inc
    h. Pipeline Products Incorporate (Power Seal)
    i. Dresser
    j. Smith & Blair

18. Service Saddle - Single Wide-Band Strap, Stainless Steel, Epoxy Coated Saddle
    a. Romac or pre-approved equal

19. Water Meters (AWWA Approved)
    a. Neptune

20. Service Tubing (3/4 inch thru 2-inch Type "K" Annealed, Seamless Copper Tubing, AWWA B 88)
    a. Cerro Flow Products
    b. Great Lakes Copper Inc (Formerly Wolverine Tube)
    c. Muller Industries Inc (Mueller-Streamline)
    d. Holstad

21. Service Tubing (3/4 inch thru 2-inch HDPE Cross Linked Pex-A or B) (ASTM D3350, ASTM NS61-G Pex-A or B PW-G Color Coded Blue Compression only, ASTM F2023)

22. Air Release Valve, 2 inch
    a. APCO - No. 200
    b. GA Industries – Fig. 2-AR
    c. Val-matic, 2 inch
    d. ARI Model D-040, D-040-C, D-060-C HF, D-062HF
    e. Crispin Valve PL, AR, UL Series (7/20)

23. Combination Air Valves (Air Release-Air/Vacuum)
    a. APCO – 145-C
    b. Crispin Valve C Series
    c.

24. Meter Boxes
    a. Plastic
        i. DFW Plastic Inc.
        ii. Gross
    b. Concrete
        i. Brooks Products
        ii. Southern Precast & Concrete Products Inc (Southern Precast)

25. Pipe Casing Spacers & End Seals for Bored Crossings
    a. Pipeline Seal and Insulator (PSI)

26. Tapping Sleeves & Valves
    a. Tapping Sleeves – All Stainless-Steel w/ Full Circumference Gasket
        i. JCM - Stainless Steel Tapping Sleeve 432 & 462
        ii. Ford Meter Box Company
        iii. TPS 4" – 16" (7/2015)
    b. Tapping Valve
        i. All Approved Gate Valve Manufacturers in Section 3
        ii. East Jordan Iron Works 2" – 16"

NOTE:

Materials and manufactured items utilized for construction of public infrastructure in public rights-of-way and easements within the corporate limits and

extraterritorial jurisdiction of City of El Campo, Texas shall comply in all respects with those listed above in this Approved Products List.

Materials and manufactured items not listed herein may be submitted to the Public Works Director for review and consideration on a case-by-case basis. In no instance shall such items be installed without specific approval having been granted by the Public Works Department prior to construction.

3.2 Water Main Sizing and Materials

3.2.1 Minimum size water mains as follows:

A. Pipe with 2-inch diameter is allowed only in rehabilitation projects where tie-ins to existing 2-inch lines are necessary.

B. Pipe with 4-inch diameter may be used within cul-de-sacs (permanent dead end) less than or equal to 200 feet in length and should be terminated with an automatic flushing device. Fire hydrants are not allowed on a four inch (4") main.

C. Six-inch (6") mains should be a maximum of one thousand five hundred feet (1,500') long when supported on both ends by eight-inch (8") mains or larger and have no more than three (3) intermediate fire hydrants. If unavoidable, dead-end six-inch (6") mains should not be more than six hundred feet (600') in length and terminate at a fire hydrant. Six-inch (6") fire hydrant leads cannot exceed two hundred feet (200') in length.

D. Eight-inch (8") mains are required for mains over one thousand five hundred feet (1,500') long, or when more than three (3) intermediate fire hydrants are required. The maximum length of an eight-inch (8") main should be three

thousand five hundred feet (3,500') and be terminated with a fire hydrant, or if approved by the Department of Public Works, an automatic flushing device.

E. Twelve-inch (12") and larger mains will be required at locations established by the Department of Public Works.

3.2.2 Water mains in commercial, industrial, and multi-family developments have a minimum sizing as follows:

A. Minimum size of main is eight-inch (8"). Maximum length of a dead-end eight-inch (8") main is three hundred fifty feet (350'). A dead-end main should be

terminated with a fire hydrant or is approved by the Department of Public Works, an automatic flushing device.

B. Twelve-inch (12") and larger mains will be required at locations established by the Department of Public Works.

3.2.3 Dead-end lines within public right-of-way:

A. In temporary dead-end situations, the water line should be 6-inch diameter or larger, should not exceed more than 200 feet in length from the closest interconnection water line, and terminated with an automatic flushing device.

B. In permanent dead ends situations approved by the Department of Public Works, the water line should be 6-inch diameter or larger, should not exceed more than 500 feet in length from the closest interconnection water line and be terminated with an automatic flushing device.

3.2.4 Water lines within cul-de-sac:

A. Reduce pipe sizes successively. Carry 8-inch and/or 6-inch and/or 4-inch diameter pipe in accordance with requirements found in paragraph 3.2.1. Place last service meter as near as possible to the end of water line.

3.2.5 Water mains must be constructed using the following materials:

A. Poly Vinyl Chloride (PVC) Pressure Pipe, four-inch (4") through sixteen-inch (16"), shall conform to the requirements of ANSI/AWWA C900, current revision, Class 150 (or higher) DR 18. Pipe shall be designed and constructed in conformance with the minimum requirements of the "Manual of Water Supply Practices", AWWA Manual No. M23.

B. Ductile-Iron Pipe (D.I.P.), four-inch (4") through fifty-four-inch (54"), conforming to the requirements of "Ductile-Iron Pipe, Centrifugally Cast in

Metal Molds for Sand-Lined Molds, for Water and Other Liquids", AWWA C151, (ANSI A21.51), current revision. Pipe thickness being the minimum specified in C151. Under special conditions, the Department of Public Works may require thickness design in conformance with the minimum requirements of "Thickness Design for Ductile- Iron Pipe", AWWA C150 (ANSI A21.51), current revision. Pipe shall be installed in conformance with the minimum requirements of AWWA C600, "Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances". Ductile-Iron Pipe shall be furnished with bituminous or cement mortar lining, AWWA C104 (ANSI A21.4). Polyethylene tube encasement shall be provided as required in Section 3.8.6 of these Standards.

C. Steel Water Pipe, four-inch (4") and larger shall conform to the requirements of "Standard for Steel Water Pipe Six Inches and Larger", AWWA C200. Steel pipe, minimum wall thickness shall conform to the thickness shown on the City of El Campo Construction Details. All steel pipe shall have coal tar exterior coating in accordance with "Standard for Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape-Hot Applied", AWWA C203, liquid epoxy interior coating in accordance with" Liquid Epoxy Coating System for the Interior and Exterior of Steel Water Pipelines", AWWA C210 and/or" Painting for Steel Water Storage Tanks" AWWA D102. All material used for internal coating of steel carrier pipe must be NSF61 listed as suitable for contact with potable water as required in Chapter 290, Rules and Regulations for Public Systems, TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, latest revised.

3.2.5 Water mains and appurtenances are not allowed in the following sizes: three-inch (3"), ten-inch (10"), and fourteen-inch (14").

3.3 Location of Water Mains

3.3.1 Water mains should be placed along a uniform alignment with the right-of-way. When necessary, the water main may be deflected at a fire hydrant location to accommodate proper installation of the fire hydrant. At all locations where a water main changes alignment, the location of the water main should be clearly shown on the construction plans. A minimum distance of two feet (2') should be maintained from the right-of-way line to the outside edge of the water line.

3.3.2 When necessary, water mains may be located within the esplanade section of boulevard type streets. Mains should be located as near the centerline as possible to avoid conflicts with future pavement widening.

3.3.3 Along streets with open ditch drainage, all twelve-inch (12") and smaller water mains may be located five feet (5') from the right-of-way line.

3.4 Clearance of Water Lines from Other Utilities

Water mains are to be designed and located to conform to the regulations of the Texas Commission on Environmental Quality.

3.4.1 Proposed Water Lines Parallel to Gravity Sanitary Sewers and Force Mains: Locate water lines a minimum of 9 feet horizontally apart, measured from outside wall to outside wall, when parallel to gravity sanitary sewers and force mains. Use the following procedure when stated separation cannot be achieved:

A. The existing sanitary sewer shall be replaced with lined ductile iron pipe or PVC pipe meeting ASTM specifications, having a minimum working pressure rating of 150 psi or greater and equipped with pressure-type joints.

B. The water lines, gravity sanitary sewers, or force mains, shall be separated by a minimum vertical distance of 2 feet, and a minimum horizontal distance of 4 feet, measured between the nearest outside walls of the pipes. Locate 20-inch diameter and smaller water lines above gravity sewer lines.

C. Water line shall be constructed with approved restrained joints in an approved casing with at least two nominal sizes larger than the carrier pipe. The carrier pipe shall be supported at five-foot intervals with spacers or be filled to the spring line with washed sand.

3.4.2 Proposed Water Lines crossing gravity Sanitary Sewers and Force Mains. Conform to requirements of TAC §290.44 Paragraph (e).

A. No protection is required if the sanitary sewer is 9 feet below the water line.

B. For all other cases, use the following Table.

PROTECTION REQUIREMENTS AT WATER LINE (WL) - SANITARY SEWER (SS) CROSSINGS

	PROPOSED WATER LINE				PROPOSED SANITARY SEWER			
	OVER		UNDER		OVER		UNDER	
	EXISTING SS	PROP SS	EXISTING SS	PROP SS	EXISTING WL	PROP WL	EXISTING WL	PROP WL
Minimum 2 feet vertical clearance	√ [1]	√ [1]	√	√	Allowed	√	√ [1]	√ [1]
Place 1 full section (min 18 ft) of WL centered at SS Crossing. Provide restrained joints on WL, spaced at least 9 ft horizontally from centerline of SS	√	√	√	√		√		√
Place 1 full section (min 18 ft) of SS centered at WL Crossing. Provide restrained joints on SS, spaced at least 9 ft horizontally from centerline of WL		√					√	√
Replace 1 full section of existing SS with pressure-rated DIP or pressure-rated PVC pipe with adapters and restrained joints centered at WL crossing	√ [2, 3]		√ [3]		Not			
Provide DIP for small diameter WL (less than 24 inches), PVC pipe is only allowed if encased as per TAC § 290.44, and use restrained joints for both DIP and PVC pipe			√	√		√		
Embed SS with CSS for the total length of 1 pipe segment plus 1 foot beyond the joints on each end.	√ [2, 3]	√ [4]	√ [3]	√ [4]		√ [4]	√ [4]	√ [4]
Place 1 full section (min 18 ft) of min 150 psi SS centered at WL crossing. Provide restrained joints on SS, spaced at least 9 ft horizontally from centerline of WL or encase in a joint of 150 psi pressure pipe (min 18 ft) two nominal sizes larger with spacers at 5 ft interval.				√		√		

1. Minimum clearance is 2 feet for non-pressure rated SS and 1 foot for pressure rated SS.
2. Required if existing SS is disturbed and /or there is evidence of leakage.
3. Not required for augered WL unless there is evidence of leakage; completely fill augered hole with bentonite/clay mixture.
4. Not required for augered SS; completely fill augered hole with bentonite/clay mixture.

Note:

a. Both water lines and wastewater main or lateral must pass a pressure and leakage test as specified in AWWA C600 standards.
b. Sanitary sewers (SS) is applicable to both gravity sanitary sewers and force mains.

3.4.3 Sanitary Sewer Manholes: Provide a minimum 9-foot clearance from outside wall of existing or proposed manholes unless manholes and connecting sewers can be made watertight and tested for no leakage.

3.5 Depth of Cover

Minimum depth of cover for water mains shall be as follows:

3.5.1 Twelve-inch (12") and smaller mains should have a minimum cover of four feet (4') from the top of curb. For open ditch roadway sections, twelve-inch (12") and smaller mains should be installed at least three feet (3') below the ultimate flow line of ditch or six feet (6') below natural ground at the right-of-way line, whichever is deeper.

3.6 Valves

3.6.1 All water system valves must conform to AWWA standards and be designed as follows:

A. Two-inch (2") through sixteen-inch (16") valves shall be resilient seated gate valves, AWWA C509, counter-clockwise opening with mechanical joints. Valves must have a complete coating on all iron parts in the valve interior to eliminate corrosion.

B. Cast iron valve boxes are required on all gate valves except as noted below. Valve vaults are required on all valves larger than sixteen-inch (16").

C. All valves to be sized equal to the size of the main on which it is located.

3.6.2 Spacing - valves should be set at maximum distances along the main as follows:

A. Four-inch (4") through and including twelve-inch (12") mains - one thousand feet (1,000').

B. All main intersections must have a minimum of one (1) less valve than the number of mains at the intersection.

3.6.3 Location - valves shall be located as follows:

A. All mains shall be valved within the street right-of-way. Valves shall not be placed under or within two feet (2') of ultimate pavement, except as specifically approved by the City.

B. Valves are normally located on the projection of intersecting street right-of-way lines or at the curb return adjoining a paved street across the main. Tapping sleeves and valves are excluded from this requirement.

C. All fire hydrants shall be isolated from the service main with a valve located in the fire hydrant lead.

D. Intermediate valves not located on the projection of intersecting street right-of-way lines may be located at lot line projections or five feet (5') from fire hydrants.

E. Valves shall be placed at the end of all mains that are to be extended in the future and extend main a minimum of forty feet (40') past valve.

3.7 Fire Hydrants

3.7.1 Fire hydrants shall have three-way nozzle arrangement, five and one-quarter-inch (5-1/4") compression type main valve, mechanical joint boot, and conform to the requirements of AWWA C502. The pumper nozzle shall be four and one-half inch (4-1/2") NST and the hose nozzles shall be two and one-half-inch (2-1/2") NST threads. Fire hydrants shall be listed on the Approved Water Products List found online or at the office of the Director of Public Works.

3.7.2 Spacing - fire hydrants shall be spaced along all mains six inches (6") and larger as follows:

A. A maximum of five hundred foot (500') spacing.

B. A maximum of three hundred foot (300') spacing in commercial and industrial developments.

3.7.3 Location - In or along street right-of-way; fire hydrants shall be located as follows:

A. Fire hydrants should be set primarily at street intersections or near residential side lots if needed.

B. Fire hydrants shall be located three feet (3') behind the back of curb or projected future curb and be set at the point of curvature (PC) of the intersection curb radius. A parallel tee may be used for a fire hydrant lead at the water main when specifically approved by the City.

C. On all State Highways and open-ditch roadways, set the fire hydrants within three feet (3') of the right-of-way.

D. All fire hydrants shall be located in protected, but easily accessible, areas behind the pavement.

Outside and adjacent to street rights-of-way; fire hydrants shall be located as follows:

A. The City Fire Marshall will establish and approve the location of fire hydrants in apartment complexes, platted private street developments, and other multi-family developments within the City.

B. For fire hydrants which are located adjacent to water lines for fire protection constructed in 10-foot wide water line easements, the fire hydrant shall be centered in a minimum 10-foot by 10-foot separate easement.

C. For commercial developments inside the City and ETJ, provide isolation valves at each end of fire loops requiring on-site fire hydrants.

3.7.4 Depth of Bury - the depth of bury for all fire hydrants shall be established such that the bury line on the fire hydrant is installed at the ground line at each location or at the finished ground after pavement construction is completed. The depth of bury for fire hydrants shall be shown on the construction plans. Minimum cover for fire hydrant leads shall be four feet (4').

3.7.5 Fire hydrants shall not be installed within nine feet (9') of a sanitary sewer system under any conditions.

3.7.6 Fire hydrants shall be color coded on the fire hydrant bonnet and caps. The color-coded paint shall be as follows:

COLOR	Water Flow in GPM
AA Blue	> 1500 GPM
A Green	1000 – 1499 GPM
B Orange	500 – 999 GPM
C Red	< 500 GPM

The body of the fire hydrant will be painted red in accordance with specifications from the City of El Campo Fire Department.

3.8 Fittings and Appurtenances

3.8.1 Fittings shall be Ductile-Iron Compact Fittings Three-Inch (3") - Twelve-Inch (12"), AWWA C153/A21.53.84, conforming to the minimum requirements of "Gray-Iron and Ductile-Iron Fittings, Twelve-Inch (12") through Forty-Eight-Inch (48"), for Water and Other Liquids", AWWA C110 (ANSI 21.10), current revision. Fittings shall be furnished with bituminous or cement mortar lined, AWWA C104 (ANSI A21.4).

3.8.2 All fittings shall be identified and described on the construction plans.

3.8.3 Fittings are not permitted in fire hydrant leads, except as approved by the City.

3.8.4 All water main fittings shall have mechanical joints. Push on joints may be used at special locations if specifically approved by the City.

3.8.5 All plugs shall be provided with retention clamps.

3.8.6 Polyethylene tube encasement shall conform to the minimum requirements of "Polyethylene Encasement for Gray and Ductile Cast-Iron Piping for Water and Other Liquids", ANSI/AWWA C105, current revision. Soils within the project shall be tested in accordance with Appendix A of ANSI/AWWA C105 to adequately determine the requirements for encasement.

3.8.7 Concrete thrust blocks shall be required on all bends, tees, plugs, and combinations thereof. Refer to the City of El Campo Construction Details for specifications.

3.9 Crossings

Installation of a water main across a proposed or existing highway, county road, public street, railroad, pipeline, or drainage way shall conform to the requirements of Section 2.7.

3.10 Water Meter Service

3.10.1. Water meter service for lines in or along street rights-of-way. Locate in areas with easy access and with protection from traffic and adjacent to rights-of-way

whenever possible. Do not locate meters in areas enclosed by fences. Meters shall be located in public rights-of-way or water line easements.

A. Where possible, locate domestic water meters at common lot lines and place two domestic meters on one service tap and 1-inch service lead. Meter, line size, and appurtenances shall conform to the latest edition of the Uniform Plumbing Code.

B. Meters 2 inches and smaller and shut-off valves (stop boxes): Locate in rights-of-way, water line easements, or in a minimum 5-foot by 5-foot separate water meter easement contiguous with public right-of-way. Provide concrete meter boxes for meters located under sidewalks.

C. Meters 3 inches to 6 inches: Locate in minimum 10-foot by 20-foot separate water meter easement contiguous with public right-of-way.

D. Meters 8 inches and larger: Locate in minimum 15-foot by 25-foot separate water meter easement contiguous with public right-of-way.

E. All water meters must have the same size as of the service lines except 4-inch and 12-inch diameter service lines shall be installed for 3-inch and 10-inch water meters.

F. Meters larger than 6 inches for applications in potential hazardous chemical environs must be installed in an above ground meter installation assembly.

3.10.2. Water service lines shall be placed at a minimum depth of thirty-six inches (36") below final paving elevation. Service lines shall be installed as a part of all new single-family development.

3.10.3 All water service fittings and appurtenances for all projects shall be approved by the City and shall be listed on the Approved Water Products List found online or at the office of the Department of Public Works.

3.10.4. City maintenance shall end at the water meter. The water meter box or vault shall be constructed to meet the City's requirements and will be maintained by the City.

3.11 Overall System Layout

3.11.1 Layout and size of all water mains shall be consistent with the overall layout of the existing water system. Layout of the overall system and of all water mains within the City's extraterritorial jurisdiction shall be approved by the

City. The overall water system shall be designed to maintain adequate pressure throughout the system. In special cases, specific water pressure and flow analysis and study may be required.

3.11.2 The layout of the water mains should provide maximum circulation of water to prevent future problems of odor, taste, or color due to stagnant water. Some factors to be considered are as follows:

A. Provide a source of fresh water at each end or at multiple points in a subdivision.

B. Provide adequate circulation and place valves and fire hydrants, so that flushing of all mains will be simplified.

C. Dead-ends should be avoided. All dead-ends should be isolated with a line valve, be as short as possible, and be terminated with an automatic flushing device.

3.12 Additional Standards

3.12.1 Construction Features - In conjunction with the design, the Design Engineer shall determine the extent of, and fully exemplify on the plans, all special construction features required to complete the project in a manner of safety, convenience, and economics.

3.12.2 Bore and Jack - Bore and jack sections shall be clearly shown on plans by location and footage. The following criteria are generally used as a basis for setting bore and jack sections.

A. Public Streets - All public streets are to be bored and jacked regardless of surface. Bore and jack length shall be computed as roadway width at proposed bore plus five feet (5') to either side.

B. Driveways - Whenever it is cost-effective, concrete driveways in good condition shall be bored and jacked. Bore and jack length shall be computed as driveway width at bore plus one foot (1') to either side. Where driveways cross culvert pipe sections along open ditch streets and the proposed water main is in close

proximity and parallel to the culvert pipe, the length of bore shall be the same as the length of culvert pipe.

C. Sidewalks - When the water line crosses under a sidewalk four feet (4') or more in width and in good condition, the sidewalk shall either be bored and jacked, or the sidewalk shall be removed and replaced to the City of El Campo criteria, whenever it is cost effective. Bore and jack length shall be at least the width of the sidewalk. The proposed type of construction shall be noted on the plans.

D. Trees - When saving trees and shrubs are a consideration, all trees six inches (6") and larger in diameter within ten feet (10') of the centerline of the water main must be noted on the plans. The water main should be bored and jacked within the drip line of any tree larger than six inches (6") in diameter.

E. Bore Pits - Bore pits shall be at least three feet (3') from back of curb and five feet (5') from back of curb on a major thoroughfare. Bore pits in highway, county road, or railroad right-of-way shall conform to these requirements and to the requirements of the crossing permit and/or use agreement. All bore pits shall be in accordance with OSHA requirements. Bore pits and/or receiving pits to be located in street or driveway paving shall be shown on plans.

3.12.3 Open Cuts - Where open cuts are required in street paving, plans should call for steel plate covers to be installed and maintained over the cut during periods when contractor is not actively engaged in work at the site. Streets that are open cut shall be "saw cut".

3.12.4 All existing developed areas shall be restored to original condition after construction.

3.12.5 Proper barricading and signage, conforming to the Texas Manual of Uniform Traffic Control Devices, must be required on all projects. Adequate signage for vehicular and pedestrian traffic will be installed.

CHAPTER 4 - SANITARY SEWER DESIGN REQUIREMENTS

4.1 General

4.1.1 Sanitary sewers within the City of El Campo's jurisdiction shall allow for orderly expansion of the system.

4.1.2 Sewers shall be sized to the minimum requirements set out in this standard and the standard wastewater flow rates as established by the City of El Campo.

4.1.3 All sewers shall conform to the minimum requirements of the Texas Commission on Environmental Quality, "Design Criteria for Sewerage Systems".

4.1.4 Sewers shall be separated from water lines by a minimum of nine feet (9'). Where the minimum separation is not maintained, refer to Section 3.4 for allowable clearances.

4.1.5 The public sanitary sewer, as maintained by the City of El Campo, shall be defined as all sewers, including stacks and service leads, which serve more than one sewer connection, that are located in public easements or street rights-of-way, and that is installed in accordance with these Standards.

4.1.6 This Chapter addresses the design of the wastewater collection systems within the public Right-of-Way or a dedicated public easement. Sanitary sewers located on private property that are not in such a dedicated easement, are under the jurisdiction of the Plumbing Code and will be reviewed by the Inspections Department.

4.1.7 Public sewers and force mains shall be located in either the public Right-of-Way or easements. Side lot easements may be used only with special approval. Back lot easements shall not be utilized except in the case of preexisting conditions or as approved by the Department of Public Works.

4.1.8 There shall be no closed-end easements for public sanitary sewers and force mains.

4.1.9 Manholes located within the 100-year floodplain shall be sealed and vented per TCEQ requirements Engineering judgment and aesthetics should be considered.

4.1.10 Manholes located within driveways shall be sealed and vented per TCEQ requirements.

4.1.11 New manholes shall not be located within ditches, swales, unless approved by the City.

4.1.12 Wastewater lines along State Right-of-Way shall be installed outside of the right-of-way in a separate contiguous easement; width of easement shall be as provided in Chapter 2.

4.2 Sewer Size and Materials

4.2.1 Minimum design criteria for determining the size of a sewer shall be as follows:

A. Wastewater flows shall be based on the current projected requirements for the area. The average day flow for the design of sanitary sewers shall be based on a minimum of three hundred fifty (350) gallons per day per single family connection for residential areas. Commercial, industrial, and office areas shall be designed for an average day flow that can be anticipated from the contributing area.

B. The peak design flow for sewers shall be four (4) times the average day flow of the fully developed service area. Sewers larger than eighteen-inch (18") may be sized using a peaking factor of less than four (4) with approval of the City. The minimum allowable values for the design peak factor are presented in Appendix C of these Standards.

C. Minimum size public sewer shall be eight-inch (8").

D. Service leads 6-inches in diameter shall not serve more than the equivalent of 2 single-family lots or other types of small land tracts.

E. Service leads of 6-inch and 8-inch diameter for single-family residential lots shall have a minimum grade of 0.70 percent and 0.44 percent respectfully.

F. Commercial sewer service lead shall be six-inch (6") pipe or larger and shall not serve more than one (1) commercial connection.

G. Sewer lines shall be laid at a size and depth to conform to designs permitting an orderly expansion of the sewer system of the City and so as to avoid a duplication of lines in the future.

H. The City shall be the final judge as to size and depth required and any exception to service leads as previously defined.

4.2.2 Sewers will be constructed of materials specified in the City of El Campo Approved Product List.

4.2.3 Cement Stabilized Sand for Bedding and Backfill:

A. Portland Cement, Type I, ASTM C150.

B. Clean, durable sand, with less than 0.5 percent clay lumps, ASTM C142; with less than 0.5 percent lightweight pieces, ASTM C123; with organic impurities, ASTM C40, not showing a color darker than standard color and a plasticity index of less than six (6) when tested in accordance with ASTM D423 and ASTM D424.

C. Compact to ninety-five percent (95%) Standard Proctor Density (ASTM D698) in lifts of eight inches (8") thick. Actual testing may be required as deemed necessary by the City.

D. The cement-sand mixture shall consist of at least one and one-half (1-1/2) sacks of cement per cubic yard of sand. The cement-sand mixture shall have a minimum unconfined compressive strength of one hundred pounds per square inch (100 psi) in forty-eight (48) hours, when compacted to ninety-five percent (95%) of Standard Proctor Density (ASTM D698), without additional moisture control, cured and tested in accordance with ASTM C31, and placed to the spring line on sewer lines shallower than 8-feet and 6-inches over pipe for sewer lines 8-feet deep or greater, prior to backfilling the trench. In water-bearing sands, crushed shell or other approved granular material will be required with geotextile fabric wrap. When water-bearing sands are encountered, the City shall be notified immediately.

4.2.4 Approved Sanitary Sewer Products List

1. Gravity Flow Pipes -- Fusible C900/C905/PVC (All manufactures meeting the following specifications)

a. PVC, 12 inch and smaller to max.depth of 12 feet – SDR 26, min. 160 PSI rating, ASTM 2241 pipe, D3212 joint with F477 rubber gasket, F679 fittings
b. PVC, 12 inch and smaller exceeding 12 feet in depth – AWWA C 900, DR 18, Class 150 pipe, joined per ASTM 3139 with F477 rubber gasket
c. PVC, Larger than 12 inch and smaller than 24 inch to max. depth of 12 feet – DR 25, min. 165 PSI rating, D3212 joint with F477 rubber gasket

d. PVC, Larger than 12 inch and smaller than 24 inch exceeding 12 feet in depth - AWWA C 905, DR 18, Class 235 pipe, joined per ASTM 3139 with F477 rubber gasket
e. PVC, 24 inch and larger at all depths – AWWA C 905, DR 18, Class 235 pipe, joined per ASTM 3139 with F477 rubber gasket
f. Fiberglass Reinforced Polyester (FRP) sewer pipe (Transmission only – No service leads allowed) – ASTM D 3262, ASTM D 3517, ASTM 3754 or AWWA C 950 – Depths per Manufacturers Recommendations.

2. Force Mains-- Fusible C900/C905/PVC (All manufactures meeting the following specifications)
    a. PVC, 12 inch and smaller at all depths – AWWA C 900, DR 18, Class 150 pipe, joined per ASTM 3139 with F477 rubber gasket
    b. PVC, Larger than 12 inch at all depths - AWWA C 905, DR 18, Class 235 pipe, joined per ASTM 3139 with F477 rubber gasket
    c. Fiberglass Reinforced Polyester (FRP) sewer pipe – ASTM D 3517, ASTM 3754 or AWWA C 950 – Depths per Manufacturers Recommendations

3. Ductile Iron Fittings For C 900, C 905 Pipe (AWWA C 110, AWWA C 153)
    a. All manufacturers compliant with AWWA and/or ASTM standards.

4. PVC Drainage Pattern Fittings For SDR 26 and DR 25 Pipe (ASTM D 3034)
    a. GPK
    b. JM Eagle
    c. Vassallo
    d. Plastic Trends

5. Pipe Connectors / Adapters / Flexible Couplings
    a. Fernco Inc.
    b. Indiana Seal
    c. Flow Control
    d. Flow Seal
    e. DFW

6. Manhole & Lift Station Coatings (Reformatted to Address Various Applications)
    a. New Manhole Installations – H2S Corrosion Prevention
        i. IPA Systems (Ipagard Epoxy)
        ii. Thane Coat FE 100
        iii. Polyurea Coatings and Linings Industry (Polyurea)
        iv. Aquatapoxy A-6
        v. Tnemec Series 66 epoxy coating
        vi. Aegis Coating Technologies epoxy coating

vii. Lotus Chemicals epoxy coating
viii. Raven 405
ix. Quadex Structure Guard Epoxy

b. Manhole Rehabilitation –Inflow/Infiltration Only
   i. Quadex Aluminaliner calcium aluminate sewer rehabilitation mortar (min. 1 inch/ max. 3-inch thickness)
   ii. Strong Seal MS-2
   iii. Kernos Sewpercoat
   iv. Standard Cement – Reliner MSP or Maximum CA Cement
   v. ECO Cast GeoSpray

c. Manhole Rehabilitation – H2S Corrosion & Inflow/Infiltration
   i. Kernos Sewpercoat
   ii. Standard Cement - Reliner MSP or Maximum CA Cement w/Standard Shield Epoxy (Acropoxy 4582)
   iii. Quadex Aluminaliner calcium aluminate sewer rehabilitation mortar (min. 1 inch/ max. 3-inch thickness) w/ Quadex Structure Guard Expoxy or Raven 405

d. New Lift Station Wet Well Installation
   i. Standard Cement Materials, Inc (Acropoxy 4582 epoxy coating)
   ii. Poly-Triplex Technologies, Inc. (Poly-Triplex Liner System)
   iii. Kernos Sewpercoat
   iv. Raven 405 Epoxy
   v. Quadex Structure Guard Epoxy

e. Lift Station Wet Well Rehabilitation
   i. Kernos Sewpercoat
   ii. Standard Cement - Reliner MSP or Maximum CA Cement w/Standard Shield Epoxy (Acropoxy 4582)
   iii. Quadex Aluminaliner calcium aluminate sewer rehabilitation mortar (min. 1 inch/ max. 3-inch thickness) w/ Quadex Structure Guard Expoxy

7. Lift Station Submersible Pumps
   a. Flyght
   b. ABS
   c. Gorman Rupp
   d. PACO

8. Lift Station Dry Pit Pumps
   a. Pacific Pumps
   b. Crown

c. Gorman-Rupp
d. PACO

9. Lift Station Plug Valves
   a. Pratt
   b. Crispin Valve
   c. Municipal Valve & Equipment Company

10. Check Valve
   a. Stockman
   b. Sepco
   c. Mission
   d. Val-matic
   e. Crispin Valve
   f. Municipal Valve & Equipment Company

11. Lift Station Control Panels – Various Manufacturers

Motor Control Components as Follows:

Duplex Controller

QTY	Part Number	Description
1	A48H3612SSLP	Enclosure Nema 4X 48x36x12 Stainless Steel, Hoffman (OR EQUIVALENT)
1	A48P36	Backplane, Hoffman
1	Shof.lMade	Inner Door Painted Medium Blue
1	63133	Power Distribution Block, Gould-Shawmut
1	63131	Power Distribution Block, Gould-Shawmut
1	30323	3-Pole Fuse Block, Gould-Shawmut
3	DFC3M	Safety Fuse Puller, Gould-Shawmut
1	Q08-16L100F	8-Space Lightning Panel, Sq. D
1	PK7-GTA	Ground Bar Kit, Sq. D
1	00230	2-Pole Circuit Breaker, Sq. D
6	00120	Single-Pole Circuit Breaker, Sq.D
1	PBD-230-ALE	Phase Monitor Relay, Diversified
1	ARB-120-AEA	2-Pump Alternator, Diversified
2	HJL36030-71M	Motor Circuit Protector, Sq. D
2	8536SC03V02S	Starters Nema Size 1, Sq. D
2	S04	Overload Module, Sq. D
2	9066 RA1	Starter Reset Pushbutton, Sq. D
11	RR3-PUL-120VAC	Blade Base Relays 120V, Idee
2	RR2-PUL-24VAC	Pin Base Relay 24VAC, Idee
16	SR3B05	Blade Base Relay, Idee
2	SR3P06	Pin Base Relay, Idee
3	SR2P06	Pin Base Relay, Idee
4	RTE-B1AF20	Time Delay Relays with Sockets, Idee
1	EDAW-N1-E1-02-TO	Pressure Switch, Mercoid
2	HR10WB3	Air Compressor, Ingram
1	MPL-502	Air Switch, Micromatic
2	2963860	Single receptacle, Phoenix Contact
AR		Miscellaneous Fittings and piping for pressure switch

1	010100C1	Heater 50W 120V, Watlow
1	FLZ520	Thermostat, Pfannenberg
.2	635G	Elasped Time Meter, Cramer
2	9001 K43B	Hand/Off/Auto Switch, Sq. D
2	KN260	Legend Plate, Sq. D
4	9001 KS11	2-Position Switch, Sq. D
4	9001 KR1U	Pushbutton, Sq. D
3	9001KA1	Contact Blocks for Switches and Pushbuttons, Sq. D
5	9001KA2	Contact Blocks for Switches and Pushbuttons, Sq. D
3	9001KA3	Contact Blocks for Switches and Pushbuttons, Sq. D
7	ALD29911NR120V	Push-To-Test Pilot Light 30MM Full Voltage, Idee
3	ALD29911NA120V	Push-To-Test Pilot Light 30MM Full Voltage, Idee
2	ALD29911NG120V	Push-To-Test Pilot Light 30MM Full Voltage, Idee
1	7599-1	GFCI, Leviton
1	52R-N5-40W	Rotating Alarm Beacon, Edwards
1	504-120	Alarm Bell, Federal Signal Vibratone
1	LA303	Lightning Protector 480V, Delta
1	CA603R	Surge Protector 480V, Delta
2	9421LJ4	Door Operator, Sq. D
2	9421LH3	Door Operator Handle, Sq. D
1	9070T1OOD23	Transformer 120-24V 100VA, Sg, D
1	9070SF25A	Transformer Fuse Kit, Sq. D
1	SDP06-24-1OOT	Power Supply, Sola
56	UT6	Terminals, Phoenix Contact

Shipped Separately

	SHOP MADE	Sunshield (shipped loose)

Supplied by Vendor

2		Mini Cas Relay, Flygt
2		Float Relay Switches
1	SHOP MADE	PVC Air Cell

Triplex Lift Station

QTY	Part Number	Description
1	SHOP MADE	Inner Door Painted Medium Blue
1	63133	Power Distribution Block, Ferraz Shawmut
1	63131	Power Distribution Block, Ferraz Shawmut
1	30323	3-Pole Circuit Breaker, Sq. D
3	DFC3M	Safety Fuse Puller, Ferraz Shawmut
1	Q08-16L100F	8-Space Lightning Panel, Sq. D
1	PK7-GTA	Ground Bar Kit, Sq. D
1	00230	2-Pole Circuit Breaker, Sq. D
6	00120	Single-Pole Circuit Breaker, Sq. D
1	PBD-230-ALE	Phase Monitor Relay, Diversified
2	ARA-120-AHE	3-Pumps Alternator, Diversified
3	HJL36100M73	Motor Circuit Protector, Sq. D
3	8536SC03V02S	Starters Nema Size 1, Sq. D
2	S04	Overload Module, Sq. D
2	9066 RA1	Starter Reset Pushbutton, Sq. D
14	RR3-PUL-120VAC	Blade Base Relays 120V, Idee
16	SR3B05	Blade Base Relay, Idee
2	SR3P06	Pin Base Relay, Idee
3	SR2P06	Pin Base Relay, Idee
3	RTE-B1AF20	Time Delay Relay with Sockets, Idee

2	EDAW-N1-E1-02-TO	Pressure Switch, Mercoid
2	HR10WB3	Air Compressor, Ingram
1	MPL-502	Air Switch, Micromatic
2	2963860	Single Receptacle, Phoenix Contact
AR		Miscellaneous Fittings and Piping for Pressure Switch
1	010100C1	Heater SOW 1OV, Watlow
1	FLZ520	Thermostat, Pfannenberg
3	635G	Elapsed Time Meter, Cramer
3	9001KS43B	Hand/Off/Auto Switch, Sq. D
2	KN260	Legend Plate, Sq. D
4	9001KS11B	2-Position Switch, Sq. D
9	9001KR1U	Pushbutton, Sq. D
3	9001KA1	Contacts Blocks for Switches and Pushbuttons, Sq. D
5	9001KA2	Contacts Blocks for Switches and Pushbuttons, Sq. D
3	9001KA3	Contacts Blocks for Switches and Pushbuttons, Sq. D
10	ALD29911NR1OV	Push-To-Test Pilor Light 30MM Full Voltage, Idee
4	ALD29911NA120V	Push-To-Test Pilor Light 30MM Full Voltage, Idee
3	ALD29911NG120V	Push-To-Test Pilor Light 30MM Full Voltage, Idee
1	7599-1	GFCI, Leviton
1	52R-N5-40W	Rotating Alarm Beacon, Edwards
1	504-120	Alarm Bell, Federal Signal Vibratone
1	LA303	Lightning Protector 480V, Delta
1	CA603R	Surge Protector 480V, Delta
3	9421LJ4	Door Operator, Sq. D
3	9421LH3	Door Operator, Sq. D
1	9070T100D23	Transformer 120-24V 100VA, s_q. D
1	9070SF25A	Transformer Fuse Kit, Sq. D
1	SDP06-24-1OOT	Power Supply, Sola
56	UT6	Terminals, Phoenix Contact

Shipped Separately

	SHOP MADE	Sunshield (shipped loose)

Supplied by Vendor

2		Mini Cas Relay, Flygt
2		Float Relay Switches
1	SHOP MADE	PVC Air Cell

AR: As Required

12. Air Release Valves
    a. ARI Model D-025, D-020 (Stainless Steel)
    b. Crispin Valve (7/2015) All Sizes
    c. Municipal Valve & Equipment Company

13. Manhole Covers and Rings, Specs, (ASTM A 48, AASHTO H-20 Load Rating, Ductile Iron ring and cover – 32-inch diameter)
    a. Vulcan Foundry – 32-inch diameter, Model V-2420
    b. Neenah Foundry – 32-inch diameter, Model R-1741-F
    c. East Jordan Iron Works, Inc. - 32-inch diameter, Model V-1420

d. Star Pipe Products – 32-inch diameter, COMC Spec.
e. SIP – 32 Diameter Manhole cover – Item 2250

14. Manhole Inserts (No Flow/In-Flow Protector)
    a. Various Mfg..

15. Manholes (Precast Concrete, Specifications)
    a. More-Tex
    b. Southern Precast
    c. Calvert
    d. Gifford Hill
    e. Old Castle Pre-cast (Formerly Brooks Products)
    f. Concrete Products, Inc. (Dalworth)
    g. Old Castle Pre-cast (Precast Systems, Inc.)
    h. Koastal Precast, Inc.
    i. Hanson Pipe & Products
    j. JS Concrete Products – 48" Pre-cast concrete manholes all types
    k. Rinker

16. Manholes (Corrosion-Resistant Polymer, Specifications - Requires Specific Approval)

17. Geotextile Fabric Wrap
    a. Trevira S1114

18. Pipe Casing Spacers & End Seals for Bored Crossings
    a. Pipeline Seal and Insulator (PSI)

NOTE:
Materials and manufactured items utilized for construction of public infrastructure in public rights-of-way and easements within the corporate limits and extraterritorial jurisdiction of **City of El Campo**, Texas shall comply in all respects with those listed above in this Approved Products List.

Materials and manufactured items not listed herein may be submitted to the Public Works Director for review and consideration on a case-by-case basis. In no instance shall such items be installed without specific approval having been granted by the Public Works Department prior to construction.

4.3 Sewer Depth

4.3.1 The depth and location of a sanitary sewer line shall be as follows:

A. Sanitary sewers with a maximum depth of ten feet (10'), measured from finished grade, shall be placed within the right-of-way at least five feet (5') from the right-of-way line, except as provided herein. All sewers that are deeper than ten feet (10') shall be located in an easement parallel and adjoining the right-of-way. Where required in accordance with Section 2.4.5, additional easement shall be provided adjoining the right-of-way to provide required clearances.

B. Sewer line shall be laid with the top of the pipe a minimum of 4-feet below the surface of the natural ground.

C. Where the minimum cover as specified above is not possible, the sewer shall be laid with Class 150 (150 psi) pressure pipe with cement-stabilized sand backfill as shown in Standard Details.

D. Maximum depth for 8-inch, through 12-inch diameter collection lines, shall be 20-feet from average ground surface of the trench width to pipe invert. Depths greater than 20-feet are subject to approval by the Department of Public Works if justified for site-specific reasons during the preliminary engineering phase of the project design.

4.3.2 Easements: Sanitary sewers placed in easements shall conform to the requirements of Section 2.4.5.

4.4 Sewer Grades

A. The following table lists the minimum grades for 6-inch to 27-inch diameter public sewers. (6-in. diameter is for service leads only). The minimum grade is based on a minimum full pipe velocity of 2.3 feet per second (fps). The maximum grade is based on a maximum full pipe velocity of 4.5 fps. In both cases, the Manning Formula has been used with an n coefficient of 0.013. The use of different pipe materials will not alter the use of 0.013 for the purposes of the Design Manual. Where sewers are anticipated to flow less than one-half full, consideration should be given to increasing the slope of sewer to provide two feet (2') per second velocity in the pipe for the anticipated flow rate.

NOMINAL INTERNAL PIPE DIAMETER (INCHES)	MINIMUM GRADE TO DEVELOP V= 2.3 FPS (PERCENT)	MAXIMUM GRADE TO DEVELOP V=4.5 FPS (PERCENT)
6	0.70	2.46
8	0.44	1.73
10	0.33	1.21
12	0.26	0.97
15	0.19	0.72
18	0.15	0.57
21	0.13	0.46
24	0.11	0.38
27	0.09	0.33

B. Slopes below minimum grade may be allowed with specific approval of the City.

C. Sewers are to be designed so that the crowns of the pipes are matched at manholes. The upstream sewer may be designed so that the flow line of the upstream sewer is higher than the flow line of the downstream sewer. When the flow line of the upstream sewer is raised more than three feet (3') above the flow line of the downstream sewer, a drop manhole connection is required, except as specifically approved by the City.

4.5 Alignment

Gravity sewers shall be laid in straight alignment with uniform grade between manholes. Deviations from straight alignment shall be justified by complying with the TCEQ requirements and approved by the City. Deviations from uniform grade without manholes shall not be allowed.

4.6 Appurtenances

4.6.1 Manholes

A. Manholes should be placed at points of changes in, grade, or size of sewers, at the intersection of sewers and at the end of all sewers (clean-outs will not be permitted).

B. Manholes should be spaced at a maximum distance of four hundred feet (400') apart.

C. The elevation of the crown of the discharging sewer shall either match the elevation of the crown of the receiving sewer or be approved as a special case by the City.

D. Sewers laid in easements shall have a manhole in each street crossing.

E. Manholes should be located to eliminate the inflow of storm water into the sanitary sewer.

F. Manholes shall be constructed in accordance with the City of El Campo Standard Details.

G. A drop manhole should be constructed for any sewer twelve-inches (12") in diameter or less that enters a manhole of greater than thirty-six inches (36") above the invert of the manhole. Sewers larger than twelve inches

(12") shall be designed to accommodate a drop at the manhole using standard pipe fittings.

H. Steps in manholes will not be permitted.

I. Fiberglass manholes with precast, gasketed, concrete bottoms shall be required for manholes that are less than eight feet (8') deep and are located within an easement, upon specific approval by the city. Unless approved by the Department of Public Works, all other manholes shall be pre-cast or poured in place.

J. Manhole covers shall be cast iron, traffic bearing type ring and cover with the words "Sanitary Sewer" and if within the City, the words “City of El Campo” cast into the cover.

K. All manhole covers shall be minimum 32-inch diameter.

4.6.2 Stacks: Stacks shall be constructed for connections to sewers that are more than eight feet (8') below finished grade. Stacks shall be provided during the initial construction of the sewer.

4.6.3 Lift Stations

Lift stations shall be designed in conformance with the "Texas Commission on Environmental Quality Design Criteria for Sewerage Systems". Lift stations should be considered only when a gravity system cannot be achieved. All lift stations shall be specifically approved by the City. The Design Engineer shall provide design requirements and pertinent data with construction plans for

review. A preliminary design meeting with the Department of Public Works is recommended. Lift stations shall be designed as follows:

A. Pumps shall be sized to operate at optimum efficiency. Minimum acceptable efficiency at the operating point will be sixty percent (60%) unless specifically approved by the City.

B. Operation and maintenance should be considered in the design of the station and the location of the station.

C. Wet well working volume should size to allow for the recommended pump cycle time of fifteen (15) minutes for each pump.

D. Controls and equipment shall be approved by the City.

E. Emergency operations should be considered. Provide fittings and a blind flange that will be readily accessible for emergency bypass pumping.

4.7 Service Connections

4.7.1 Sewer service leads shall not exceed 100 feet in length.

4.7.2 Single-Family Residential Lots, Multi-Family Residential, Commercial, and Office Development

A. All service connections shall be installed at the time of construction of the sewer.

B. Service connections shall be constructed of materials as described in Section 4.2.2.

C. Service connections should be installed at a manhole, when possible.

4.7.3 Service Connections at Manholes

A. Service connections at manhole should be made when possible. When a service connection stub-out is not provided, an opening shall be neatly cut out of the manhole at the required elevation. The service connection shall be extended into the manhole

B. Service connection at a concrete manhole shall be grouted in place using non- shrink grout. When a hole for a service connection in a brick manhole exceeds 18 inches, the manhole shall be rebuilt above the disturbed area.

C. Service connections at fiberglass manholes shall be drilled, uniformly, through the manhole wall. A neoprene gasket shall be installed around the pipe to provide a water-tight seal through the wall. Where required, fiberglass matte and resin shall be used, in accordance with the manufacturer's recommendations, to repair wall openings.

D. Service connections entering a manhole 3 feet or more above the flow line of the manhole shall include a drop pipe with fittings outside the manhole. The drop shall be installed adjoining and anchored to the wall of the manhole unless specifically approved otherwise.

4.7.4 Provide adequate markings on site and accurate as-built locations so that the service connection stub-out can be recovered at the time that the connection to the service is made.

4.7.5 All connections to the public sewer system shall be approved by the Department of Public Works prior to construction. Actual connections to the public sewer system within the City Limits shall be inspected by a representative of the City.

4.7.6 Service connections that are installed after initial construction of a sewer shall be constructed using a P.V.C. saddle with gasket and stainless-steel straps as approved by the City.

4.8 Unsewered Building Site

4.8.1 Sanitary sewer shall be extended to all building sites prior to development. Septic systems are not allowed, except as specifically approved by the City.

4.9 Testing Installed Pipe

A. An infiltration, exfiltration or low-pressure air test shall be performed. All tests shall be in accordance with the TEXAS COMMISSION ON ENVIRONMENTAL QUALITY Design Criteria for Sewage Systems and ASTM C828, C924, F141, or other appropriate procedures. Testing times are outlined in the TEXAS COMMISSION ON ENVIRONMENTAL QUALITY design criteria.

B. Deflection testing shall be performed on all flexible pipes. The test shall be conducted after the final backfill has been in place at least thirty (30) days. Testing shall be done in accordance with the TEXAS COMMISSION ON ENVIRONMENTAL QUALITY Design Criteria for Sewerage Systems. The mandrel must move freely inside the pipe and will be pulled by hand from the

upstream end of the pipe to the downstream end. Test equipment shall conform to the requirements set out in Appendix D. A second mandrel test after settlement has occurred, may be required by the City to determine long term deflections. Deflections in flexible pipe shall not exceed five percent (5%).

CHAPTER 5 – STORMWATER DESIGN REQUIREMENTS

5.1 General

5.1.1 Drainage Principles and Policy

A. Drainage criteria administered by the City of El Campo and complemented by Wharton County for newly designed areas provide protection from Structural Flooding from a 100-year storm event. This is accomplished through application of various drainage enhancements, such as storm sewers, roadside ditches, open channels, detention and overland (sheet) run-off.

B. Recognizing that each site has unique differences that can enhance the opportunity to provide proper drainage, the intent of these criteria is to specify minimum requirements that can be modified provided that the objective for drainage standards is maintained. For projects which require a site-specific approach and where unique engineering solutions will achieve drainage objective, a request for consideration of alternative standards (pipe flow, overland sheet flow, and detention storage) shall be submitted to the Department of Public Works for review and approval.

C. Street Drainage: Street ponding of short duration is anticipated and designed to contribute to the overall drainage capability of the system. Storm sewers and roadside ditch conduits are designed as a balance of capacity and economics. These conduits are designed to convey less intense, more frequent rainfalls with the intent of allowing for traffic movement during these events. When rainfall events exceed the capacity of the storm sewer system, the additional run-off is intended to be stored or conveyed overland in a manner that reduces the threat of flooding to structures.

D. Overland Run-off: Proposed New Development, Redevelopment, or In-fill Development shall not adversely impact existing overland flow patterns and shall not increase or redirect existing sheet flow to adjacent private or public property. Sheet flow from the developed property shall discharge only to the abutting public right-of-way or drainage easement. Where the existing sheet flow pattern is blocked by construction (i.e. raising the site elevation) of the Development, the sheet flow shall be re-routed within the developed property to return flow to original configuration or to the public right-of-way. Except under special circumstances dictated by natural drainage patterns, no sheet flow from the developed property will be allowed to drain onto adjacent private property.

E. Flood Control: The City of El Campo recognizes and is seeking participation with the National Flood Insurance Program (NFIP). The flood insurance program makes insurance available at low cost where the municipal entity implements measures that reduce the likelihood of Structural Flooding. The design criteria in this chapter are provided to support the NFIP. All development shall comply with Chapter 10, Buildings and Building Regulations, of the Code of Ordinances if located within the City limits or Extraterritorial Jurisdiction (ETJ).

F. Relationship to the Platting Process: Approval of storm drainage is a part of the review process for planning and platting of a New Development. Review and approval of plats are conducted by the Building Code Enforcement Department. Review of storm drainage is conducted by the Department of Public Works.

G. The criteria in this Chapter apply to all projects located in the City limits and the City's Extraterritorial Jurisdiction (ETJ). If the criteria conflicts with Wharton County, or other jurisdictions the most restrictive criteria shall govern.

5.1.2 All storm sewers shall meet or exceed the requirements of the City of El Campo and the requirements of the "Drainage Criteria Manual for Wharton County, Texas".

5.1.3 All drainage systems that are to become a maintenance responsibility of the City of El Campo shall be enclosed storm sewers, except as specifically approved by the Director of Public Works.

5.1.4. All drainage systems shall take into account any storm drainage from multi-phased subdivision or project areas planned to contribute to the system. No existing system shall have flows added (or directed to it) that will exceed its theoretical design capacity.

5.1.5 Public storm sewers are defined as sewers and appurtenances that provide drainage for a public right-of-way or easement. Private storm sewers provide internal drainage for a reserve or other tract. Private storm sewer connections to public storm sewers shall occur at a manhole or at the back of an inlet as approved by the City.

5.1.6 All new construction shall convey public or private drainage to an inlet prior to entering the public drainage system.

5.1.7 All construction shall conform to the City of El Campo Standard Details.

5.2 Storm Sewer Materials for Public Drainage System

5.2.1 Storm sewer and culvert pipe shall be precast reinforced concrete pipe or PP (high-performance polypropylene) for all gravity-flow storm drainage applications unless specifically approved by the City. Concrete pipe shall be manufactured in conformance with the requirements of ASTM C 76, "Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe", current revision. Reinforced concrete pipe shall be Class III or stronger. The Design Engineer shall provide for increased pipe strength when conditions of the proposed installation exceed the allowable load for Class III pipe. All concrete pipe constructed in water-bearing soil or forty-two inches (42") in diameter or larger, shall have rubber gasket joints meeting the requirements of ANSI/ASTM C 443, "Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets", current revision. Concrete pipe with a diameter of less than forty-two inches (42") may be installed using pipe with tongue and groove type joint and Ram-neck, or approved equal, as joint filler. When specifically approved by the City, reinforced concrete arch and elliptical pipe conforming to ASTM C506 and C507, respectively, current revision may be installed in lieu of circular pipe. Reinforced concrete box culverts shall meet the minimum requirements of ASTM C789, "Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers", current revision.

High performance polypropylene pipe (gray) shall meet or exceed ASTM F2881" standard specifications for 12" to 60" Polypropylene dual wall pipe and fittings for Non-pressure Storm Sewer Applications" The design engineer shall provide for increased pipe strength when conditions of the proposed installation exceed the allowable load for Class III pipe. The requirements of this specification are intended to provide pipe and fittings suitable for underground use for non-pressure storm sewer systems. Pipe and fittings produced in accordance with this specification shall be installed in compliance with Practice D2321. All PP culvert shall be installed with reinforced integral bell and gasketed spigot according to manufacturer's recommendations. Unless otherwise specified, all joints of all drainage pipes are generally required to be soil tight. Bedding shall be granular structural grading following the requirements of ASTM D 2321 – "Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications" on undisturbed natural ground. Compacted granular material over a flat trench foundation should be spread evenly and compacted uniformly to a firm, but not hard, support. Bedding materials may be Class I,

II or III, except that AASHTO Section 30 limits the maximum particle size for bedding material to 1.25 in. (32 mm). Class IA materials should not be used where groundwater flow is anticipated unless a geotextile trench wrap is used to

prevent soil migration. Class III materials are suitable when moisture content is controlled. A minimum of 12 “of finish backfill cover is required.

5.2.2 Storm sewer outfalls shall have slope protection to prevent erosion. Slope protection may be constructed of slope paving or rip rap. Slope paving shall be four-inch (4") five (5) sack concrete with six-inch by six-inch (6" X 6") welded wire mesh (W3 X W3) or three-eighths-inch (3/8") steel rebar on twenty-four-inch (24") centers, each way. Rip rap shall be a minimum of six-inch (6") broken concrete rubble with no exposed steel or well-rounded stone and shall be a minimum of eighteen inches (18") thick. Slope protection texturing shall be required where public access is likely.

5.3 Construction Plan Requirements

5.3.1 A drainage area map and proposed drainage characteristics shall be included in the construction plans. The drainage area map shall include:

A. Existing Contours.

B. Drainage areas, including areas draining from off-site onto or adjoining the project.

C. Flow quantities draining to each inlet and pipe segment from manhole to manhole.

D. Delineate extreme event (100-year) sheet flow direction to the primary drainage outlet.

E. Elevation and location of maximum 100-year ponding elevation.

5.3.2 Detailed drainage calculations for the 2-year and 100-year Hydraulic Grade Line of each line or ditch, and for detention facilities, if any, shall be submitted with the construction plans.

5.3.3 The drawing(s) shall include a profile of the roadway from the upper reach of the drainage area to the primary drainage outlet. The drawing(s) shall be exaggerated vertical scale and shall include roadway profile at the gutter, ground profile at the right-of-way, and the hydraulic gradient for the 2-year and 100-year design storm.

5.3.4 Elevations for the 10-year, 25-year and 100-year storms in the outfall channel at the proposed outfall location shall be shown on the profile drawing.

5.3.5 If project lies below the base flood level, the flood plain must be delineated graphically on all plan sheets.

5.3.6 Benchmark description shall include nearest base flood elevation with reference to latest FEMA DFIRM Panel if the site is within a regulatory flood hazard area.

5.4 Design Requirements for Closed Conduits

5.4.1 Design Storm Runoff: shall be calculated in accordance with the "Drainage Criteria Manual for Wharton County, Texas".

5.4.2 Storm sewers shall be designed using the Manning Equation in combination with Continuity Equation. The calculated water surface elevation (HGL) must be at least one foot below the intake of drop inlets and at least two feet below the top of manhole covers. If these criteria are not met, appropriate adjustments in conduit size and or structure depth are made until the water surface elevations are within allowable limits.

5.4.3 Design Considerations of Overland Flow: The parameters stated below are independent measures that shall be evaluated for each project. The limiting parameter will depend on project-specific conditions, and the most restrictive condition shall govern.

A. The design frequency for consideration of overland sheet flow will consider extreme storm events, 100-year design frequency. The events which exceed the capacity of the underground storm sewer and result in ponding and overland sheet flow shall be routed to drain along street right-of-way or open areas and through the development to a primary outlet.

B. Streets shall be designed so that consecutive high points in the street will provide for a gravity flow of drainage to the ultimate outlet.

C. The maximum depth of ponding at low points shall be 18 inches above the gutter line. This condition shall not be higher than the natural ground elevation at the right-of-way line.

D. Provide a minimum 20-foot easement to accommodate sheet flow that is routed between lots or across reserve tracts in accordance with Chapter 2.4.6 of the City of Infrastructure Design Manual. Fence lines and other improvements are prohibited from extending across dedicated drainage easements.

E. In areas where ponding occurs, and no Sheet Flow path exists, then a calculation shall be provided showing that run-off from the 100-year event can be conveyed within an underground conduit and remain in compliance with the other requirements of this paragraph.

F. Maximum Ponding Elevation

(1) The maximum ponding elevation for the 100-year event at any point along the street shall not be higher than the natural ground elevation at the right-of-way line. Where existing topographic conditions, project location within a special flood hazard area, and/or other site conditions preclude achieving this objective, the City will waive this requirement upon submittal of documentation and analysis prepared, signed, and sealed by a professional engineer, registered in the State of Texas. Analysis shall demonstrate that structural flooding will not occur.

(2) For new subdivisions along local or collector street, the maximum allowable ponding elevation for the 100-year event shall be the lowest of the following; 12 inches below the lowest proposed finished slab elevation or 18 inches above the gutter line. The maximum ponding elevation for the 100-year event at any point along the street shall not be higher than the natural ground elevation at the right-of-way line. The maximum allowable ponding elevation along a major thoroughfare is the lowest of the following: 12 inches below the lowest proposed finished slab elevation or 6 inches above the gutter line (low side).

G. All structures shall be higher than the highest level of ponding anticipated resulting from the extreme event analysis.

5.4.4 Design Frequency:

A. New Development: The 2-year rainfall and 100-year rainfall design storm event shall be evaluated for sizing storm sewers in newly developed areas.

B. Redevelopment or In-fill Development with Increased Rate of Runoff: The existing storm drain (sewer, ditch) will be evaluated using the 2-year and 100-yr design storm, assuming no development takes place. The storm drain will then be evaluated for the 2-year and 100-yr design event with the Development in place.

(1) If the proposed Development results in the hydraulic gradient of the existing storm drain below the gutter line and no structures are

threatened by the project, then no improvements to the existing storm drain are required.

(2) If the 100-year rainfall indicates that structures are threatened by flooding, the applicant has the option of either making improvements to the existing storm sewer drain, providing detention or improving the receiving stream and not impacting downstream conditions. Detention and flow discharged to the storm drain shall be in compliance with Paragraph 5.7.

5.4.5 Velocity Considerations

A. Storm sewers should be constructed to flow in subcritical hydraulic conditions if possible.

B. Minimum velocities should not be less than 3 feet per second with the pipe flowing full, under the design conditions. Manning's formula should be used to compute the size of the storm sewer. Manning's coefficient, n, is 0.013 for concrete pipe and 0.024 for corrugated metal pipe.

C. Maximum velocities should not exceed 8 feet per second without use of energy dissipation downstream.

D. Maximum velocities should not exceed 12 feet per second.

5.4.6 Hydraulic Requirements.

A. The 2-year storm event hydraulic gradient shall be calculated throughout the conduit system assuming the top of the outfall pipe as the starting water surface. The hydraulic gradient shall at all times be below the gutter line.

B. At drops in pipe invert, should the upstream pipe be higher than the hydraulic grade line, then the hydraulic grade line shall be recalculated assuming the starting water surface to be at the top of pipe at that point.

C. The 100-year storm event hydraulic gradient shall be calculated from the 25-year water surface elevation of the receiving outfall channel or top of the outfall pipe as the starting water surface, the most restrictive starting water surface shall govern.

D. The 100-year storm event hydraulic gradient should be calculated throughout the conduit system. Maximum allowable hydraulic gradient elevation at any inlet location shall conform to requirements of 5.4.3.F.

E. Drainage calculations, along with 2-year and 100-year water surface or hydraulic grade line profiles shall be included on the plans and submitted to the Department of Public Works for approval.

5.4.7 Pipe Sizes and Placement

A. Public storm sewers shall be located within a public street right-of-way or a storm sewer easement, dedicated to the public and adjoining a public street right-of-way. Back lot easements are discouraged and will require a variance from the City design standards.

B. Use storm sewer and inlet leads with at least 12-inch inside diameter or equivalent cross section. Box culverts shall be at least 2 feet by 2 feet.

C. Larger pipes upstream should not flow into smaller pipes downstream unless construction constraints prohibit the use of a larger pipe downstream, or the improvements are outfalling into an existing system, or the upstream system is intended for use in detention.

D. Match crowns of pipe at any size change at manholes unless severe depth constraints prohibit.

E. Minimum depth of a storm sewer (measured to the top of pipe) shall be twenty-four inches (24") below top of curb or finished grade, whichever is lower. Minimum size storm sewer for main and inlet lead shall be twenty-four inches (24").

G. Storm sewers shall be bedded using cement stabilized sand or approved granular materials (See specification in Section 4.2.3.).

H. Storm sewers shall have a minimum clearance of six inches (6") from all other utilities. The clearance shall be measured from the outside wall of the pipe.

I. Minimum acceptable slopes in reinforced concrete pipe storm sewers shall be:

PIPE DIAMETER (INCHES)	MINIMUM SLOPE (%)
12	0.440
15	0.320
18	0.260
24	0.170
30	0.130
36	0.100
42	0.080
48	0.070
54	0.060
60	0.050
66	0.045
72	0.040

5.4.8 Manholes

A. Manholes shall be placed at all:

(1) Size or cross section changes.

(2) Inlet lead and conduit intersections.

(3) Change on pipe grade.

(4) Street intersections.

(5) A maximum spacing of 600-feet measured along the conduit run.

B. Do not place manholes in driveways or in the street in front of or immediately adjacent to a driveway

C. Manhole covers shall be cast iron, traffic bearing, type ring and cover with the words "Storm Sewer", and if within the City, “City of El Campo” cast into the cover.

D. All manhole covers shall be minimum 32-inch diameter.

5.4.9 Inlets

A. Locate inlets at low points in the gutter. In no case shall inlets be placed in the curved portion of curbs connection intersecting streets.

B. Where storm sewer is collected on one side of the street and must be conveyed to the other side, it shall be accomplished via inlet and underground conduit.

C. Valley gutters across intersections are not permitted.

D. Curb inlets shall be spaced and sized to intercept the calculated runoff. Minimum inlet capacity for residential subdivisions shall be 5 cubic-feet per second.

E. Inlet spacing is a function of gutter slope. The minimum gutter slope shall comply with Chapter 6, Street Paving Design Requirements. For minimum gutter slopes, the maximum spacing of inlets shall result from a gutter run of 350 feet from high point in pavement or the adjacent inlet on a continuously graded street section, with a maximum of 700 feet of pavement draining towards any one inlet location.

F. Place curb inlets on side streets intersecting major thoroughfare streets.

G. Grated inlets will not be permitted in an open ditch.

H. Back slope swale interceptors shall be placed in accordance with the requirements of Wharton County.

I. Backfill around inlets with cement stabilized sand (section 4.2.3) to the top of first stage of the inlet, or to within 6 inches of bottom of pavement, whichever is higher.

5.5 Design Requirements for Open Channels and Outfalls

5.5.1 Open channels shall be designed according to methods described in the Wharton County Drainage Criteria Manual.

5.5.2 Design standards for outfalls into channels shall conform to those in the Wharton County Drainage Criteria Manual.

5.5.3 Water surface elevations shall be calculated using Manning's Equation and the Continuity Equation. The water surface must be calculated to remain within the banks and include 1-foot of freeboard. The calculated water surface elevation (HGL) must be at least one foot below the intake of drop inlets and at least two feet below the top of manhole covers. If these criteria are not met, appropriate adjustments in conduit size and or structure depth are made until the water surface elevations are within allowable limits.

5.6 Design Requirements for Roadside Ditches

5.6.1 Design Frequency.

A. Roadside ditch design is permissible only for single-family residential lots or commercial areas equal to or larger than 0.5 acres.

B. The 2-year rainfall and 100-year rainfall design storm event shall be evaluated for sizing roadside ditches.

C. Design capacity for a roadside ditch shall be to a minimum of 0.5 feet below the edge of pavement or 0.5 feet below the natural ground at right-of-way line, whichever is lower.

D. The design must include an extreme event analysis to indicate that structures will not be flooded, and maximum ponding elevation for the extreme event complies with Paragraph 5.4.3-F.

5.6.2 Velocity Considerations.

A. For grass-lined sections, the maximum design velocity shall be 3.0 feet per second during the design event.

B. A grass-lined or unimproved roadside ditch shall have side slopes no steeper than three horizontal to one vertical (3:1), or as soil conditions will permit.

C. Minimum grades for roadside ditches shall be 0.1-foot per 100 feet.

D. Calculation of velocity will use a Manning's roughness coefficient (n) of 0.045 for earthen sections and 0.025 for ditches with paved inverts.

E. Use erosion control methods acceptable to the City when design velocities are expected to be greater than 3 feet per second.

5.6.3 Culverts.

A. Culverts will be designed assuming inlet control and shall be designed according to methods described in the Wharton County Drainage Criteria Manual.

B. The size of roadside culverts is to be based upon drainage area. Notwithstanding this requirement, the minimum culvert size shall be twelve inches (12”) for residential and commercial driveways. Culvert shall be placed to be a minimum of 2 inches and no more than 6 inches below the ditch flow line. Existing roadside ditch on both sides of the proposed culvert shall

be regraded for positive drainage to the nearest intersection or up to 500 linear feet whichever is smaller.

C. Culvert length shall be determined by measuring the width of the crossing and adding a one-foot (1‟) shoulder to each edge of radius of the crossing and the intersection length from the edge of the shoulder to the flow line of the ditch. The slope will not be steeper than a three (3) horizontal to one (1) vertical (3:1) at each end.

D. Safety End Treatments (SET) may be required on drainage culverts for commercial driveways on major thoroughfares, public streets, and residential driveways that cross open ditches located in the public right-of-way that is adjacent to and parallel to a major thoroughfare on public streets. Approval by Public Works. Safety End Treatments (SET) specifications shall meet Texas Department of Transportation requirements.

5.6.4. Depth and Size Limitations.

A. Maximum depth shall not exceed 4-feet from adjacent edge of pavement.

B. Roadside ditch bottoms shall be at least 2 feet wide unless design analysis will support a narrower width.

C. Ditches in adjoining and parallel easements shall have top of bank not less than 2 feet from the outside easement line.

5.7 Design Requirements for Stormwater Detention

5.7.1 The intention of stormwater detention is to mitigate the effect of the New Development, Redevelopment, or In-fill Development on an existing drainage system. Stormwater detention volume is based on increased impervious cover and is calculated at the minimum rates set forth in Paragraph 5.7.3.

5.7.2 Application of Detention.

A. The use of on-site detention is required for all Developments within the City and within the City’s ETJ. Detention will not be required if the City has developed detention capacity or developed capacity of the receiving outfall facilities for a drainage watershed, and/or infrastructure improvements, to serve the drainage watershed in compliance with the requirements of this Chapter.

B. If Redevelopment occurs without increasing the overall impervious character of the site, then no detention will be required by the City.

C. A waiver of detention requirements may be requested if the following conditions are satisfied:

(1) Development is located in an area determined by the City to not need detention due to the geographic location in the watershed, the Development's proximity to the capacity of the receiving outfall facilities. Such conclusion by the City shall be supported by submittal of a Hydraulic Report as described below.

(2) Hydraulic Report: Submit a hydraulic analysis prepared, signed, and sealed by a professional engineer, registered in the state of Texas, to demonstrate compliance with the conditions stated in this Chapter. The hydraulic analysis shall consider (1) the current developed condition of the watershed of the stormwater conveyance system, and (2) the fully developed condition of the watershed. The probable land use for the fully developed condition will be determined by the Design Engineer for review and approval by the City. The hydraulic analysis shall demonstrate no negative impact to upstream or downstream conditions and shall demonstrate that a positive impact will be achieved.

5.7.3 Calculation of Detention Volume.

A. Detention volume for Development areas is calculated on the basis of the amount of area of increased impervious cover. Impervious cover includes all structures, driveways, patios, sidewalks, etc.

B. Existing single-family residential (SFR) lots are exempt from detention (not applicable to master planned residential subdivisions).

C. Areas less than 1 acre: Detention will be required at a minimum rate of 0.20-acre feet per acre of increased impervious cover, unless a hydrologic and hydraulic analysis, as defined by the Wharton County Drainage Criteria Manual, shows a lower rate and volume is acceptable. The discharge rate shall be limited to the existing storm sewer capacity allocated to the tract.

D. Areas between 1 acre and 50 acres: Detention will be required at a minimum rate of 0.50-acre feet per acre of increased impervious cover, unless a hydrologic and hydraulic analysis, as defined by the Wharton County Drainage Criteria Manual, shows a lower rate and volume is

acceptable. The discharge rate shall be limited to the existing storm sewer capacity allocated to the tract.

E. Areas greater than 50 acres: Reference Wharton County Drainage Criteria Manual.

F. Private parking areas, private streets, and private storm sewers may be used for detention provided the maximum depth of ponding does not exceed 9 inches directly over the inlet and paved parking areas.

5.7.4 Calculation of Outlet Size shall be designed according to methods described in the Wharton County Drainage Criteria Manual.

5.7.5 Ownership and Maintenance Responsibilities.

A. Private Facilities:

(1) Pump discharges into a roadside ditch requires the submittal of pump rate specifications on the design drawings.

(2) All private properties being served by a detention pond shall have drainage access to the pond. Dedicated easements may be required. The City requires a maintenance work area of 30-foot width surrounding the extent of the detention area. If approved by the City, public rights-of-way or permanent access easements may be included as a portion of this 30- foot width.

(3) Owner provides 'Notice of Detention Requirements' indicating operation and maintenance responsibilities of the detention facility, recorded in the Wharton County Official Records prior to final approval of construction plans, except with specific approval of the City.

B. Public Facilities:

(1) Facilities will only be accepted for maintenance by the City within the City limits in cases where public drainage is being provided.

(2) The City requires a maintenance work area of 30-foot width surrounding the extent of the detention area. Public rights-of-way or permanent access easements may be included as a portion of this 30- foot width.

(3) A dedication of easement shall be provided by plat or by separate instrument.

(4) Proper dedication of public access to the detention pond must be shown on the plat or by separate instrument. This includes permanent access easements with overlapping public utility easements.

(5) Backslope drainage systems are required where the natural ground slopes towards the drainage basin and must comply with criteria provided in the Wharton County Drainage Criteria Manual.

5.8 Design Criteria for Construction Entrances

5.8.1 Primary Use

Stabilized construction exits are used to remove soil, mud and other matter from vehicles that drive off a construction site onto public streets. Stabilized exits reduce the need to remove sediment from streets. When used properly, they also control traffic by directing vehicles a single (or two for larger sites) location. Controlling traffic onto and off the site reduces the number and quantity of disturbed areas and provides protection for other sediment controls by decreasing the potential for vehicles to drive over the control.

5.8.2 Application.

Stabilized construction exits are used on all construction sites with a disturbed area of one acre or larger and are a recommended practice for smaller construction sites. A stabilized exit is used on individual residential lots until the driveway is placed. Stabilized construction exits may be used in conjunction with wheel cleaning systems

5.8.3 Design Criteria.

1) Limit site access to one route during construction, if possible; two routes for linear and larger projects.
2) Prevent traffic from avoiding or shortcutting the full length of the construction exit by installing barriers. Barriers may consist of silt fence, construction safety fencing, or similar barriers.
3) Design the access point(s) to be at the upslope side of the construction site. Do not place construction access at the lowest point on the construction site.
4) Stabilized construction exits are to be constructed such that drainage across the exit is directed to a controlled, stabilized outlet onsite with provisions for storage, proper filtration, and removal of wash water.

5) The exit must be sloped away from the paved surface so that stormwater from the site does not discharge through the exit onto roadways.
6) Minimum width of exit shall be 15 feet.
7) The construction exit material shall be a minimum thickness of 6 inches. The stone or recycled concrete used shall be 3 to 5 inches in size with little or no fines.
8) Rock by itself may not be sufficient to remove clay soils from wheels, particularly in wet conditions. When necessary, vehicles must be cleaned to remove sediment prior to entering paved roads, streets, or parking lots.
9) Using water to wash sediment from streets is prohibited.

5.8.3.1 Minimum dimensions for the stabilized exit shall be in accordance with the following table:

Minimum Exit Dimensions		
Disturbed Area	Min. Width of Exit	Min. Length of Exit
< 1 Arce	15 feet	20 feet
≥ 1 Arce but < 5 Acres	25 feet	50 feet
≥ 5 Acres	30 feet	50 feet

Design Guidance and Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – Stabilized Construction Entrance and in the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges (TxDOT 2014) Item

CHAPTER 6 - PAVING AND STREET DESIGN REQUIREMENTS

6.1 General

6.1.1 Streets and Right-of-Ways shall be aligned and designated to conform to the City of El Campo Major Thoroughfare Plan.

6.1.2 All paving plans and construction shall be approved by the City of El Campo Public Works Director for all public streets within the City and its extraterritorial jurisdiction. All streets designated to be private are subject to the same requirements stipulated within.

6.1.3 All streets shall be either reinforced concrete with integrated concrete curb and gutter on a dense compacted stabilized subgrade, or a compacted flexible base with an asphaltic concrete surface course. Flexible base pavement shall be provided with a monolithic curb and gutter section sitting on stabilized subgrade and compacted flexible base conforming to curb and gutter specifications in this chapter. Base material shall conform to TxDOT Item 247 “Flexible Base” The base material shall be Type A- Grade 2 limestone densely graded to specifications and compacted using pneumatic and vibratory rollers.

6.1.4 Fire lane easements shall be specified on all multi-family and non- residential plats. All fire lane easements must have access to public roadways. Location, alignment width, and construction specifications shall be reviewed and approved by the City.

6.1.5 All streets and easements are required to have geotechnical testing to have appropriate stabilization. Subgrade and Base materials must be proof rolled before acceptance.

6.2 Pavement Width

6.2. 1 The minimum width shall be in accordance with the following table:

Land Use on Both Sides of Right-of-Way (R.O.W.)	Roadway Classification	Single Paving Section			Divided Paving Section		
		Right-of-Way Width	Pavement Width	Curb	Right-of-Way Width	Pavement Width	Curb
Urban/Non-Residential >20 MPH No on street parking	Local	60'	24’ (B-B)*	6” or 4” x 12	--	--	--
Single Family Residential >20 MPH Limited on street parking	Local	60'	29’ (B-B)	6”	80'	2 - 25’ (B-B)	6”
Multi-family Residential On street parking	Local	60'	33’ (B-B)	6”	80'	2 - 25’ (B-B)	6”
Commercial or Industrial >35 MPH Turning land and delineator markings	Collector	60'	39’ (B-B)	6”	80'	2 - 25’ (B-B)	6”
Residential, Commercial or Industrial	Major Thoroughfare	100'	51’ (B-B)	6”	100'	2 - 25’ (B-B)	6”
Alleys >10 MPH	Access	20’	18’ (E-E)	--	--	--	--

*(B-B)- Back of the curb to the back of opposite curb, **(E-E) edge of pavement or driving width to opposite edge

6.3 Concrete Pavement

6.3.1 Concrete Pavement Structure Requirements

A. Expansion joint shall be placed at the end of each curb return and at maximum 80’ spacing. Expansion joints shall be continuous across pavement and curb.

B. Local residential streets shall have a minimum thickness of six (6") inches with number four (#4) rebar spaced at twenty-four inches (24") measured center to center of the rebar, each way.

C. Residential collector streets and all streets in multi-family residential, commercial, or industrial areas shall have a minimum thickness of seven inches (7") with number four (#4) rebar spaced at Sixteen inches (16”) measured center to center of the rebar, each way.

D. Major thoroughfares shall have a minimum thickness of seven inches (7") with number four (#4) rebar spaced at Sixteen inches (16”) measured center to center of the rebar, each way.

E. The pavement structure for each roadway shall be designed based on soil data from the site and based on the anticipated traffic volume, loading and service life of the proposed pavement structure. The Design Engineer is responsible to insure that the pavement structure is designed to withstand the anticipated loads that are expected on the roadway.

F. Alleys for commercial and industrial districts shall have a minimum thickness of seven inches (7") with number four (#4) rebar spaced at Sixteen inches (16”) measured center to center of the rebar, each way.

G. Residential alleys shall have a minimum thickness of six inches (6") with number four (#4) rebar spaced at twenty-four inches (24”) measured center to center of the rebar, each way.

H. Twelve-inch (12”) paving headers shall be placed at the end of all concrete pavements

6.3.2 Materials

A. Concrete - five and one-half (5-1/2) sacks cement per cubic yard concrete, with a minimum twenty-eight (28) day compressive strength of 3,500 psi.

B. A mix design containing more than 25% Fly Ash of cement material is not allowed.

C. Reinforcing steel - Grade 60, ASTM A615, current.

6.3.3 Subgrade

A. The preparation of the sub-grade shall follow good engineering practices as directed by the Design Engineer. When the PI is greater than 20, then a sufficient amount of lime shall be added as described in TxDOT Item 260 "Construction Methods for Lime Treated Sub-grade" until the PI is less than 20. If Item 260 is not feasible, an alternate stabilizing design will be required. The sub- grade will be prepared and allowed to reach a Proctor Density of 95% (standard). The sub-grade shall be watered, rolled and bladed to a depth of 6 inches.

B. The sub-grade must be inspected and approved by an Independent Testing Laboratory and a certified copy given to the Department of Public Works, who must approve the report prior to application of the concrete.

C. The stabilized sub-grade shall extend 12-inches outside the paving width, each way.

6.4 Hot-Mix Asphaltic Concrete Pavement (HMACP)

6.4.1 This section of the Specifications covers the HMACP street design for minor residential streets at the locations and to the dimensions shown on the drawings when specifically approved by The City of El Campo Public Works Director.

Collector street, thoroughfares, and arterial streets shall require additional construction materials as approved by the Director of Public Works. Earthwork, preparation, and stabilization of sub-base material shall conform to the 2004 Texas Department of Transportation Standard Specifications for construction of highways, streets, and bridges. Flex base asphalt Roads shall consist of stabilized subgrade, flex base materials and asphalt surface courses. Base material shall conform to TxDOT Item 247 "Flexible Base." The base material shall be Type A Grade 2 limestone.

6.4.2 Subgrade

A. The preparation of the sub-grade shall follow good engineering and construction practices using proper equipment as directed by the Design Engineer or Public Works Director. Geotechnical testing is required to investigate subsurface conditions and materials, determine the physical and chemical properties of the existing materials. When the Plasticity Index (PI) is greater than 20, then enough lime shall be added as described in TxDOT Item 260 "Construction Methods for Lime Treated Sub-grade" until the PI is less than 20. If Item 260 is not feasible, an alternate stabilizing design will be required.

B. The stabilized sub-grade will be prepared and allowed to reach a Proctor Density of 95% (standard). The sub-grade shall be watered, compacted, and bladed to a depth of 8 inches before any flexible base material is placed on it.

C. The sub-grade must be inspected and approved by an Independent Testing Laboratory and a certified copy given to the Department of Public Works, who must approve the report prior to application of the base.

D. The sub-grade shall extend 12-inches outside the paving width, each way.

E. Stabilized subgrade shall be proof rolled as a compliment to standard lab acceptance testing. with a minimum 40-ton pneumatic tire roller or loaded dump truck with a minimum gross weight of 20 tons.

6.4.3 Base

The Contractor shall not place flexible base until the subgrade has cured to the satisfaction of the Engineer or designated representative, regardless of whether the subgrade has been successfully proof rolled. As a minimum, this will be after the surface displays no damp spots and there is no evidence of "sponginess" in the subgrade.

A. The base will be densely graded, prepared, rolled using approved construction equipment and allowed to reach a specified Proctor Density of +/-2% optimum moisture. The base must be inspected and approved by an Independent Testing Laboratory and a certified copy given to the Public Works Director for approval. The flexible base shall have a minimum thickness of 6-inches after compaction of the authorized base material.

B. The flexible base shall be compacted to not less than 100% density as determined by Tx Dot Test Method Tex-113-E. Field density determination shall be made in accordance with Tx Dot Test Method Tex-115-E unless otherwise approved by the Engineer or designated representative. Each lift of the flexible base shall also be tested by proof rolling with a minimum 40-ton pneumatic tire roller or a loaded tandem axle dump truck with a minimum gross weight of 20 tons.

6.4.4 Surface Courses

Surface course shall consist of a minimum compacted thickness of two inches (2") Type D HMACP and shall conform to the requirements of Item 340 “Dense-Graded Hot-Mix Asphalt” of the Texas Department of Transportation Standard Specifications for Road and Bridge Construction or other asphalt or Bitumen surfacing with approval from the Director of Public Works.

6.5 Curb and Gutters

6.5.1 Standard curb height for residential streets is either standard 6-inch Type II-A, B, or C curb, or curb and gutter combination or a 4-inch Type I Mountable curb or curb and gutter combination, configuration not to be used as a driveway entrance. Islands, esplanades shall be constructed only with 6-inch standard curb height.

6.5.2 Curbs to decrease to different size shall transition over 3-feet to tie into existing curb height or existing roadway without curbs.

6.5.3 Curbs shall not extend through the sidewalk within a driveway.

6.5.4 Materials and Construction

All materials and construction methods shall conform to Item 529 "Concrete Curb, Gutter, and Combined Concrete Curb and Gutter" of the Texas Department of Transportation Standard Specifications for the construction of highways, streets and bridges with the following modifications:

A. General. Concrete curbs, gutters and sidewalks shall be constructed by the conventional use of forms or may be constructed by means of an appropriate machine when approved by the Director of Public Works. All curbs and gutters shall be constructed of 3,600 psi concrete conforming to Item 420 "Concrete Structures" and shall be of the thickness, width, and at the locations and elevations shown on the drawings. Saw cutting is required when the existing matching edge is not a straight vertical edge. The subgrade shall be constructed and compacted true to grade. All soft or unsuitable material shall be removed to a depth of not less than 6 inches below subgrade elevation and replaced with 6" of aggregate type 2 material and compacted to 95%. Forms shall be of wood or metal and shall be straight and of sufficient strength to resist springing, tipping, or other displacement during the process of depositing and consolidating the concrete. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at 4 ft center to center.

B. Finish. Curbs and gutters shall be finished true to line, grade, and cross section with the aid of a straight edge, steel trowel and steel "gooseneck" to give the work the appearance of a trowel finish, then edged and jointed.

C. Joints. Joints shall be provided where shown on the drawings, and as hereinafter specified. Edges of joints shall be rounded to a one-eighth (1/8) inch radius with an edging tool. Expansion joints must be no more than 80 ft apart, doweled and slip jointed in uniform direction

D. Dummy Joints. Dummy groove joints shall be formed at 8-foot intervals in curbs and gutters. Dummy groove joints shall not be less than one half inch in depth.

E. Expansion. The expansion joint material shall extend fully through the concrete and one inch into the subgrade with the top of the expansion joint material one-quarter inch below the top surface. Expansion joint material shall be secured in place prior to placement of concrete.in curbs and gutters at intervals not exceeding 80 feet and at edges abutting other concrete. The filler shall extend the full depth of the concrete but shall be held down ¼ inch below the finish surface of the slab.

F. When the grade of existing dirt, gravel or iron ore driveways must be altered to conform to proposed construction, in the opinion of the Director of Public Works, the work shall be performed by the contractor so as to produce a driveway equal to that removed. All driveways along curb and gutter shall be concrete to the property line no more than 14% grade.

6.5.5 Curb and gutter replacement will be designed and constructed per the above requirements. The curb will have a smooth trowel finish. If concrete exists in the street, dowel rods must be installed in the street and a slip form placed on the end of the steel in the gutter. No deviation from this design will be allowed without permission of the Director of Public Works.

6.6 Grading and Layout Requirements

6.6.1 Minimum gradient on gutter shall be 0.33 percent.

6.6.2 Inlet spacing as defined in Section 5.4.9.

6.6.3 Maximum cut measured from finished grade at the right-of-way line to top of curb shall be

1.75 feet. The recommended maximum slope for driveways shall be ten (10) to one (1) slope.

6.6.4 Minimum one percent (1%) fall around intersection turnout for a minimum radius of twenty-five feet (25').

6.6.5 Cul-de-sac pavement:

A. Single family, residential - pavement radius measured to the back of curb shall be forty-eight and half feet (48.5').

B. Multi-family, residential, commercial, and industrial - radius measured to the back of curb shall be fifty and half feet (50.5').

C. Curb radii at the transition to the cul-de-sac shall have a minimum radius of twenty-five feet (25') in single-family residential areas and thirty-five feet (35') in other areas.

D. Maximum lengths of cul-de-sac streets for residential subdivision shall be five-hundred feet (500'). Maximum length of cul-de-sac streets for commercial or industrial developments shall be six hundred feet (600'). A

traffic analysis may be required in commercial or industrial areas to determine high traffic volumes that may be generated from the development, reducing the maximum length of cul-de-sac allowed.

6.6.6 Minimum slope for the gutter of a cul-de-sac or of the long radius of an L-type Street shall be
0.60 percent.

6.6.7 Major thoroughfares with a centerline radius of the right-of-way less than two thousand feet (2,000') shall be designed considering recommendations for super elevation in accordance with the American Association of State Highway and Transportation Officials, "A Policy on Geometric Design of Highways and Streets", 1984, or latest addition. Signage and design speed shall be considered for all curved thoroughfares. A maximum rate of super elevation should be 0.04 for urban conditions.

6.6.8 The amount of cross slope over the pavement section should be shown on the plans (the usual cross slope is three-eighths-inch (3/8") per foot from the curb line to quarter point, and one -fourth-inch (1/4") per foot from quarter point to centerline, and one-eighth- inch (1/8") per foot for left turn lanes).

6.6.9 Proposed top of curb elevations should be designed to match the top of the curb at an existing inlet.

6.6.10 Top of curb elevations shall be shown on the construction plans.

6.6.11 Gutter elevations are required for vertical curves where a railroad track is being crossed.

6.6.12 Vertical curves shall be designed when algebraic difference in grades exceeds one percent (1%). Elevations shall be shown on the construction plans at ten-foot (10') intervals through vertical curves. The gradient for tangents to vertical curves at railroad crossings shall be a maximum of 3.5 percent. All crest

vertical curves shall be determined by sight distance requirements for the design speed. The minimum design speed on any vertical curve shall be based on the street classification.

6.6.13 Intersections:

A. Curb radii shall be twenty-five feet (25') minimum in residential areas and thirty-five feet (35') minimum in commercial or industrial areas or on major thoroughfares.

B. Streets and traffic lanes shall be properly aligned across an intersection. Proposed streets centerlines shall be aligned with existing streets centerlines. Off-set street intersections are prohibited.

C. Intersection Distances: All intersection distances shall be measured along the right-of-way line from blockface to blockface.

(1) A local street shall intersect with another public street at least every 1,400’ but not less than 75’.

(2) A major thoroughfare shall intersect with a public local, collector, or another major thoroughfare at least every 2,600’ but not less than 600’.

6.6.14 Left turn lanes shall conform to Appendix F of the Design Standards. Minimum bay storage lengths may need to be calculated as per traffic analysis. The referenced standards are minimum requirements. Middle block left turns may be permitted when approved by the City.

6.6.15 Median openings for major thoroughfares shall conform to Appendix F of the Design Standards. When areas adjoining the right-of-way are not planned for immediate
development, esplanade opening may be spaced one thousand feet (1,000') apart when specifically approved by the City.

6.6.16 Horizontal dowels are required when making a connection of a proposed street to an existing concrete street that has no exposed steel. Dowels should be number four (#4) bars, sixteen inches (16") long, eighteen inches (18") center-to-center, embedded eight inches (8") and epoxied.

6.6.17 Dead-end streets designed to be extended in the future shall have fifteen inches (15") of reinforcing steel exposed beyond the pavement, coated with asphalt and wrapped with burlap for future pavement tie. A temporary turnaround

shall be constructed within the standard right-of-way at the end of any dead-end street.

6.6.18 Twelve inch (12") paving headers shall be placed at the end of all concrete slabs.

6.6.19 All concrete to be removed shall be removed either to an existing joint or a sawed joint.

6.7 Sidewalks

6.7.1 Sidewalks are required a shall be installed at the expense of the developer on each side of all public residential streets. Sidewalks shall not be less than five feet (5')

in width, and four inches in depth and of concrete construction in accordance with city specifications and are required on a collector street and a major thoroughfare. Construction of a sidewalk along a single-family residential local street may be deferred until a lot is improved, provided there is a note regarding sidewalk construction on the recorded subdivision plat.

6.7.2 Sidewalk wheelchair ramps shall be required at all intersections. All sidewalks must meet the Americans With Disabilities Act requirements. Sidewalk wheelchair ramps shall be required at all intersections and driveways. Sidewalks and ramps shall be located within the right-of-way at the crosswalk area.

6.7.3 Sidewalks shall be as nearly parallel to the street as possible.

6.8 Traffic Control Devices and Street Signs

6.8.1 Traffic and street signage, striping, channelization devices, etc. shall be shown on the paving site plan in the construction plans and shall conform to the requirements of the Texas Manual of Uniform Traffic Prior to final approval of a construction project, all devices shall be installed in accordance with the approved construction plans.

6.8.2 Type III barricades shall be permanently installed at the end of all dead-end streets not terminating in a cul-de-sac and at all turnouts. Barricades must meet the requirements of the Texas Manual of Uniform Traffic Control Devices for Type III barricades. Type III barricades must be high intensity sheeting on a nominal two-by-eight inch (2" x 8") non-pressured treated #2 pine wood, painted white with latex enamel paint.

6.8.3 Traffic Signs

A. Standard sign blanks shall be aluminum conforming to ASTM B209; alloy 5052-H38. Preparation of aluminum sign blanks must conform to

specification MIL-C-5541C. The coating material must be included on the OPL-871706-10 list or subsequent additions thereto. Sheeting for signs must be Scotchlite or approved equal. Visual Impact Performance (VIP) Diamond Grade Sheeting shall be used on all signs on all roadways classified as Collector or greater. Scotchlite brand, or approved equal, High Intensity Sheeting shall be used on all other road signs. Signs shall be mounted on a 2- 3/8 inch diameter by twelve foot (12') long galvanized tubular post with vandal proof mounting brackets.

B. The nine-inch (9") street name sign blanks shall be aluminum conforming to ASTM B209; alloy 5052-H38 or 2154-H38. Preparation of aluminum sign

blanks must conform to specification MIL-C-5541C. The coating material must be included on the QPL-81706-10 list or subsequent additions thereto. The sign blanks shall be extruded aluminum and shall be installed on tubular sign supports with a minimum sign length of twenty-four inches (24") and a maximum length of forty-eight inches (48"). When a "No Outlet" is included, the maximum sign length is fifty-four inches (54"). Letters shall be white six inch (6") upper case with Helvetica Medium, font #H0907 letter style. The six-inch (6") letters shall have a stroke width of 1-1/4 inch. To accommodate longer street names, alternative stroke widths may be approved.

C. All posts shall be Poz-Loc Sign Post Anchor System with galvanized 2-3/8" diameter (O.D.) post. All sign posts and signs shall remain in their natural condition with no painting or coating allowed.

6.8.4 Pavement markings shall be shown on the approved construction plans. All pavement markings shall be retro-reflective material applied to the road surface in a molten state by screed/extrusion, suspend extrusion or spray means, with a surface application of glass beads. For lane delineation, reflectors shall be used on all roadways classified as Collectors or greater. The Public Works Director may approve variations of types of materials due to phasing, temporary construction, etc. All pavement markings shall comply with the Texas Manual of Uniform Traffic Control Devices and Texas Department of Transportation standards, latest revision.

6.8.5 Developer shall install traffic control devices as warranted by a traffic study approved by the City.

6.9 Roadway Geometric Design

6.9.1 Right-of-Way Width

A. Right-of-way width is generally determined by the pavement section (roadway type/classification) required to perform the function and carry the traffic. Other considerations of right-of-way may include the provisions of vehicle safety areas, sidewalks, bus turnouts, bicycle paths, and utility locations. Right-of-way widths shall be determined from the major thoroughfare plan or applicable planning tool for classifications and other width considerations.

B. Street right-of-way shall be dedicated by a subdivision plat or street dedication plat.

6.9.2 Street Access

A street system shall be provided within the development with at least one (1) point of access to a public street adjacent to the development; provided, however, that development containing one hundred and fifty (150) dwelling units or more shall provide at least two (2) points of access to adjacent public streets.

6.9.3 Horizontal Curvature and Vertical Curves

Horizontal curvature and vertical curve criteria for roadways are referenced to and shall conform to the major thoroughfare study for additional design criteria when special traffic hazards exist.

6.9.4 Storage Length

Storage lengths provided in turning lanes should be sufficiently long to store the maximum number of vehicles likely to accumulate during a critical period. A storage length which is too short could cause vehicles to undesirably back up into through traffic lanes.

Storage lengths should be calculated if turning volumes are known or may be accurately estimated. The formula for calculating storage length is:

$$L = 25N$$

Where:

L = Length of storage lane in feet and,

N = Number of vehicles expected in the queue during the peak thirty (30) minute traffic period, using a Poisson Distribution, ninety percent (90%) confidence level, and a ninety (90) second arrival period.

Where analysis indicates that dual left- turn lanes are needed, a lane distribution of fifty-five percent (55%) in the leftmost lane and forty-five percent (45%) in the rightmost lane should be used for calculations.

Unless a longer storage length is indicated by the calculation, the minimum length of a left-turn storage lane for collector level or lower streets is one-hundred feet (100') from the nose to the point of transition. On major streets (collectors and thoroughfares), the minimum length is one-hundred fifty feet (150').

6.9.5 Intersection Sight Distance:

Each intersection design should consider the required sight distances before establishing corner right-of-way clips. Unless larger clips are indicated at a particular intersection, a twenty foot by twenty foot (20' X 20') triangular public open space corner clip, measured at the property line, is required on corner lots at the intersection of two public streets. A fifteen foot by fifteen foot (15' X 15') triangular corner clip or easement is required at the intersection of a public street and a dedicated alley. Traffic and street signage, striping, channelization devices, etc. shall be shown on the paving site plan in the construction plans and shall conform to the requirements of the Texas Manual of Uniform Traffic Prior to final approval of a construction project, all devices shall
be installed in accordance with the approved construction plans. Intersection sight distance requirements shall conform to the major thoroughfare study for criteria.

6.10 Driveway Design

6.10.1 Public Works responsibility does not include the maintenance of private driveway aprons, approaches or sidewalks and is the responsibility of the property owner which affords ingress and egress for motor vehicles and pedestrians to access private property.

A. Vehicle access from the public street pavement to private or public property may be allowed only over an approved driveway or ramp constructed under the conditions described in this section.

B. No person shall install any curb and gutter or lower the curb on any street, or create, repair or modify any driveway or ramp, either temporary or permanent, within the right-of-way lines of the city, without first obtaining a permit. All such curb and gutter, driveways or ramps shall be constructed, and curbs lowered according to plans approved by the director of public works. All driveways or ramps shall be fully constructed according to city standards over their entire width between the edge of the pavement of the

street and the property line of the property to be served by such driveway or ramp. All driveway, ramp or sidewalk construction, reconstruction, replacement and repairs, where necessary, shall be done at the expense of the owner of the property being served by such driveway and it shall be such owner's responsibility at all times to keep the driveway or ramp and the sidewalk crossed by such driveway or ramp in good repair at such owner's own expense.

6.10.2 Construction of Driveways

In accordance with city code driveways are considered private access across and to properties and not the responsibility of Public Works Department.

Public Works does not install driveways to private property, which may consist of concrete, asphalt, stone, gravel, or other approved materials. The Public Works Department will repair or replace concrete, asphalt, and stone driveways within city right-of-way, only if it has been damaged by City Public Works personnel work activity. This does not include contractors or Contract workers. Proper connection to the street right of way is the contractor responsibility using approved materials and design as approved by Public Works. Backfill and Restoration of the roadway connection to as good as or better using acceptable materials as approved by the Public Works Department. Contractor or user is responsible for traffic control devices and cleaning up the area of debris and connection to the roadway. All connections shall be a neat and uniform appearance.

A. Driveway Types

1. A residential driveway provides access to a single-family residence, duplex, or multi-family building containing three or fewer dwelling units. For lots 50 feet or greater in width, residential driveways shall access only residential streets or alleys. For lots less than 50 feet in width, residential driveways shall access only alleys. Residential driveways shall not access collectors or arterials. Residential driveways shall have a minimum length of 20 feet measured from the street/alley right-of-way line or pedestrian easement, whichever is closer, to the face of building.
2. A commercial/Industrial driveway provides access to office, retail, institution, or a multifamily building having more than three dwelling units. Industrial plant driveways which serve administrative or employee parking lots shall be considered commercial driveways. Commercial drives shall access arterial or collector streets only.

B. Driveway Widths

1. The width of a driveway refers to the width of pavement at the ends of the interior curb returns. The full drive width and access pavement to the property built for the development shall be constructed with the initial project.
   a) Residential drives onto streets shall have a minimum width of 11 feet and a maximum width of 30 feet (up to a two-car garage or each additional driveway) or 38 feet (greater than two car garage) with approval from Public Works.
   b) Commercial drives shall have a minimum width of 24 feet and a maximum width of 40 feet.
   c) Industrial drives shall have a minimum width of 36 feet and a maximum width of 40 feet.
   d) Commercial and industrial drives located at existing or future median openings shall have a minimum width of 36 feet to allow for separate exit lanes for left and right turns. Additional lanes may be required by the Director based on existing or planned signalization of a driveway or based on the findings of a Traffic Impact Analysis. *The City reserves the right to require a TIA for land developments that do not meet the threshold requirements but may impact a sensitive area with traffic issues or may be a known public concern.*
   e) Commercial and industrial drives with one-way operation shall have a width of 20 feet for ingress and 24 feet for egress. The separation median width shall be a minimum of 4 feet and a maximum of 10 feet.

2. All driveways intersecting dedicated streets shall be built with a circular curb radius connecting the 6-inch raised curb of the roadway to the design width pavement of the driveway. Driveway radii shall begin at the street curb, end as a projection of the property line, and fall entirely within the subject property.
   a) The curb radii for a residential drive shall be 5 feet.
   b) The curb radii for a commercial/ Industrial drive shall be 30 feet.
   c) To maintain the location of the edge of the pavement for the roadway, driveway radii shall be designed to become tangent to the street curb line.
   d) Drainage inlets shall maintain a minimum 10-foot clearance on upstream side and 5-foot clearance on downstream side from all drive radii.
   e) Encroachment of commercial or industrial drives shall not occur on an adjacent property without a mutual access easement being executed between both property owners.

6.10.3 Streets with an existing curb.

A. Concrete Driveway Approaches

1. **Commercial:**

Subbase: Minimum 2" flexible base material, cement treated base, or asphaltic concrete base on stable subgrade. Recycled concrete will not be accepted as subbase material for driveways.

Reinforcement Supports: Reinforcement shall **NOT** be supported by pebbles, pieces of broken stones or brick, metal pipe or wooden blocks. **ONLY** Precast concrete blocks or manufactured supports, chairs, bolsters, spacers, or dobies are acceptable.

Reinforcement: Concrete reinforcement must be # 4 rebar 12" on center both ways with no splices with all intersections tied with wire.

Concrete: 3,000 psi minimum compressive strength @ 28 days (5 sack mix, 2" - 5" slump, 7% maximum water-cement ratio).

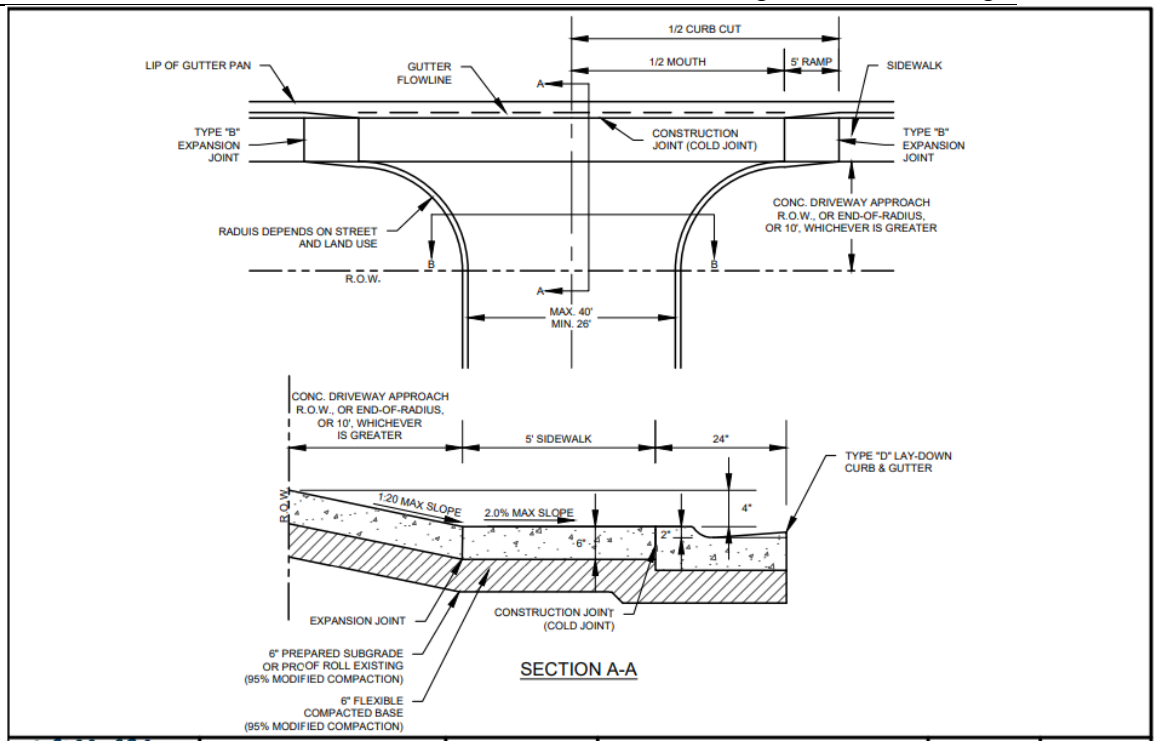
Minimum Slab thickness: 7"

Finish: Broom Finish with troweled rounded edges (no other finish or coatings will be allowed).

Typical Sections and Profiles: Refer to the latest Concrete Driveway standard drawings posted on the City of El Campo Design Standards.

2. Residential

Applicability: All residential driveways on curbed streets must have a concrete driveway. Concrete driveways on uncurbed sections of roadway shall have a Type D gutter swale to prevent runoff from driveway or roadway from pooling at the edge of the roadway. Restoration of the roadway connection to as good as or better using acceptable materials as approved by the Public Works Department. Contractor or user is responsible for cleaning up the area of debris and connection to the roadway.



Maximum Width: 30 feet (up to a two-car garage or each additional driveway) or 38 feet (greater than two car garage) with approval from Public Works.

Modification to existing curb: Existing curb in acceptable condition as approved by Public Works may remain in place and may be shaved to the appropriate size and shape of the driveway opening. If rebar is exposed, the rebar must be removed, and the impression or hole must be filled in using an epoxy grout. Unacceptable curb must be removed and replaced with Type 2A curb and gutter with Class A concrete. Connection to the roadway must have safe traffic control devices in the construction area.

Subgrade: Excavated grade must be stable and compacted to support a subbase material.

Subbase: Minimum 2" flexible base material, cement treated base, or asphaltic concrete base. Recycled concrete will not be accepted as subbase material for driveways.

Reinforcement Supports: Reinforcement shall **NOT** be supported by pebbles, pieces of broken stones or brick, metal pipe or wooden blocks. **ONLY** precast concrete blocks or manufactured supports, chairs, bolsters, spacers, or dobies are acceptable.

Reinforcement: Concrete reinforcement must be # 4 rebar 16" on center both ways with no splices with alternating intersections tied with wire.

Concrete: 3,000 psi minimum compressive strength @ 28 days (5 sack mix, 2" - 5" slump, 7% maximum water-cement ratio).

Minimum Slab thickness: 5"

Finish: Broom Finish with troweled rounded edges (no other finish or coatings will be allowed).

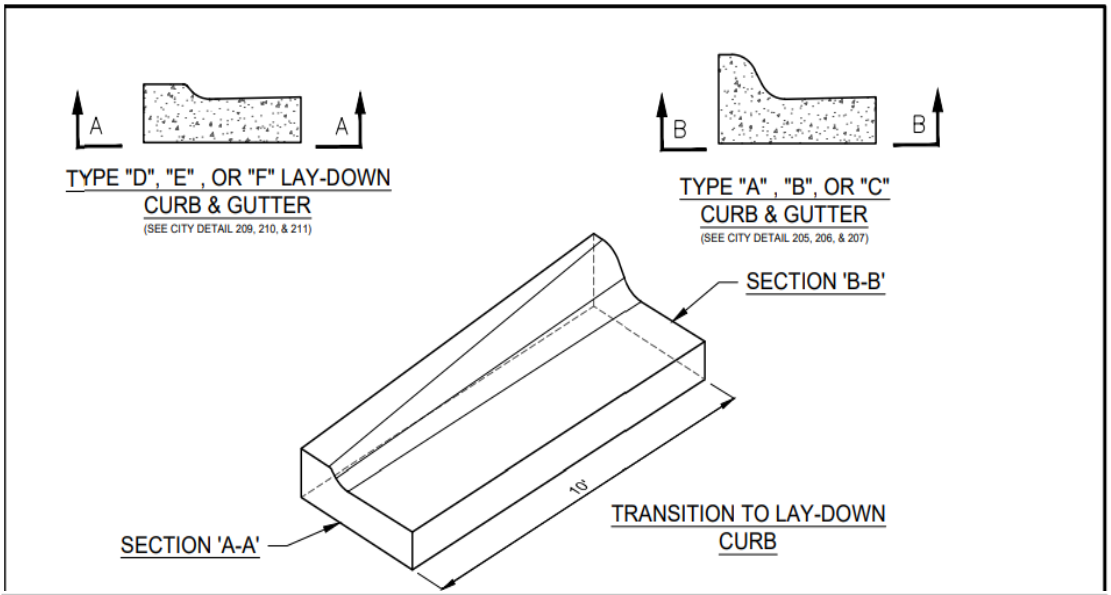
Typical Sections and Profiles: Refer to the latest Concrete Driveway Standards standard drawings posted on the City of El Campo Design standards. If there is a conflict between the City's details and this specification, this specification shall apply.

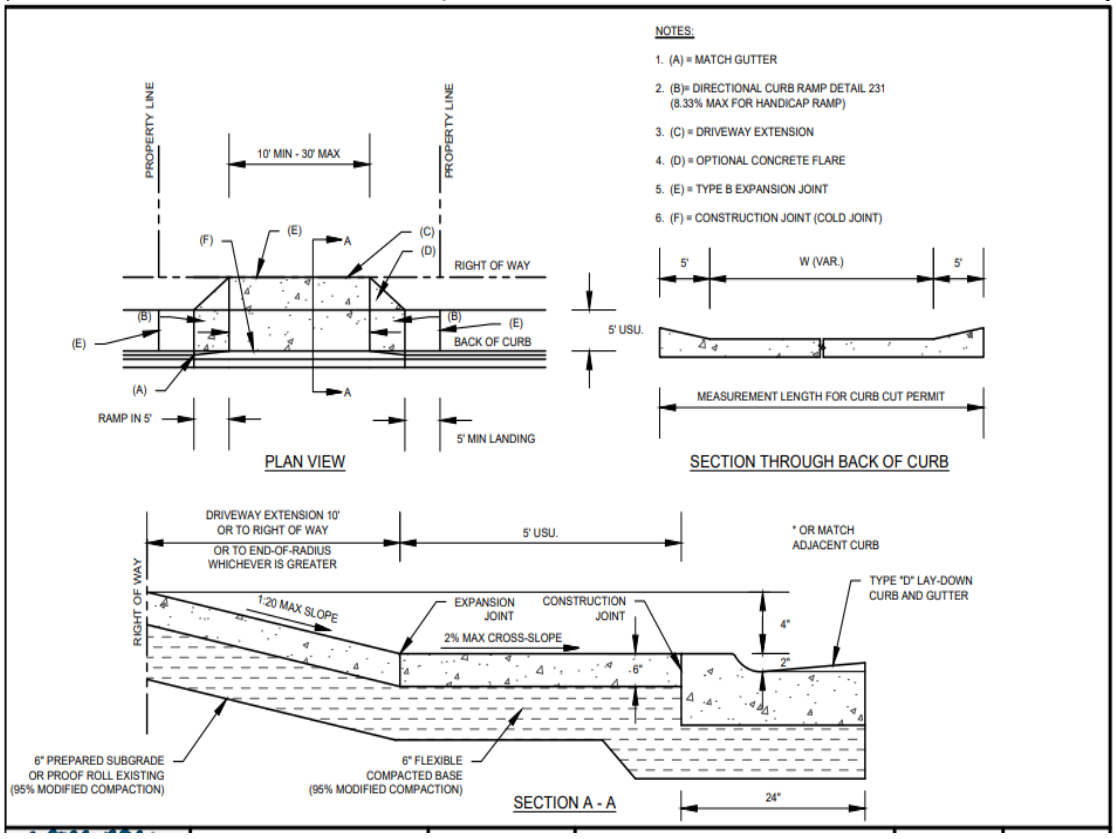
Expanding Existing Driveway Approach or Adding a Driveway Approach: The expansion of a driveway approach or the addition of a driveway will only be permitted when all the following have been approved by Public Works:

1) Existing curb in acceptable condition as approved by Public Works may remain in place and may be shaved to the appropriate size and shape of the driveway opening. If rebar is exposed, the rebar must be removed, and the impression or hole must be filled in using an epoxy grout. Unacceptable curb must be removed and replaced according to integrated Type D, E or F curb and gutter designs for driveway approaches.
2) Driveway approach and slope must meet design standards of no more than 14% Slope. Driveway penetration may be necessary to comply with a maximum driveway slope.

6.10.4 Curb Designs new construction

All curb and gutter combinations shall be TX Dot Type II 6" curb "A"," B" or "C" or Type I Mountable 4" curb. Type I mountable curbs shall not be used as a driveway entrance, Type "D," E" or "F" should be used, see driveway specs. Curb and gutter shall be attached to inlet basins with thru joints. Curb ramps shall have a slope of no more than 8.3% and shall have detectable warnings.





A. Concrete

Pavement concrete placed and consolidated by hand methods may have a recommended slump not exceeding 3 inches. Slump tests of concrete shall be made in accordance with the Method of Test for Slump of Portland Cement Concrete, AASHO Designation: T 119.

The above mix is designed to produce a minimum 28-day compressive strength of 3600 P.S.I. to conform to Item 420 "Concrete structures" If the test cylinders show strengths inconsistent with the desired strength, the City reserves the right to alter the design mix to achieve such results. The City shall continuously or intermittently inspect the batch plant or concrete supplier to see that the design mix is adhered to and if the correct proportions are not used, the work may be suspended, and the Contractor charged with any costs resulting therefrom. Fiber reinforced concrete is acceptable.

B. Forms

Forms shall be of wood or metal and shall be straight and of sufficient strength to resist springing, tipping, or other displacement during the process of depositing and consolidating the concrete. The forms shall be of the full depth of the required curb, gutter, or combination curb and gutter sections, and shall be of such design as to permit secure fastening. The subgrade shall be a min 6" aggregate base class II 95% compaction within two inches of proper elevation before the forms are set.

Forms shall be set upon the prepared subgrade to proper line and grade and firmly staked in position. The fine grading shall then be completed, and the subgrade thoroughly compacted by hand tamping. Before placing any concrete, the subgrade shall be thoroughly moistened, and the contact surfaces of the forms shall be oiled.

C. Reinforcement

Reinforcement bars shall be 3- #4 bars set continuous along the length of the curb and gutter with expansion joints not to exceed 80 ft. doweled and slip jointed in a uniform direction. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at 4 ft center to center. All reinforcement bars shall be 3" set back from the finished edges. Ends of curbs shall transition from full to zero height in 36".

D. Expansion Joints

Expansion joints shall be placed at the end of all radii, i.e., street intersections, private or alley driveways and adhere to driveway reinforcement standards, but in no case shall the distance between expansion joints exceed 80 feet.

E. Finishes

Curb, curb and gutter, or combination curb and gutter shall have dummy joints installed no more than eight (8) feet apart and no less than ½ in depth. The grooving shall be done as soon as practicable after the concrete has set sufficiently to preclude raveling during the grooving process and before shrinkage cracking takes place in the concrete. Finished work shall not vary more than 1/8" in grade and ¼" in alignment. Curb ramps shall have

The face surfaces of the curb, gutter, and combination curb and gutter shall be thoroughly troweled and brushed. Unless otherwise provided, the back edge of the curbs, the edge of the gutter adjacent to the pavement, and edges adjacent to expansion joints shall be rounded with an edger of ¼" radius. Any honeycombed areas occurring along forms shall be pointed with mortar. Areas containing excessive honeycombed areas shall be removed and replaced by order of the Director of Public Works.

After finishing operations have been completed ,all exposed surfaces shall be sealed by spraying thereon an impervious membrane that shall conform to the requirements of the Standard Specifications of Liquid Membrane-Forming Compounds for Curing Concrete AASHO Designation M 148, Type 2 White Pigmented. The Contractor shall protect the new work from traffic damage at his expense. This includes erection and maintenance of barricades, warning lights or signs, and watchmen to direct traffic. Traffic shall be excluded from the new construction for not less than 7 days when the temperatures are generally 70 degrees F. or higher and not less than 10 days when temperatures are generally not lower than 60 degrees F. If the temperatures are lower than 60 degrees F, traffic shall be kept off for any length of time and may require up to 21 days. Forms shall not be removed until the concrete has set for at least 24 hours.

CHAPTER 7 - SITE DEVELOPMENT REQUIREMENTS

7.1 General

7.1.1 Site development plans for all site developments within the City of El Campo and it extraterritorial jurisdiction shall conform to the requirements of these standards and be approved by the City prior to construction.

7.1.2 Site developments, not including single family residential, shall include any project that affects public water, wastewater, storm drainage, or paving facilities.

7.2 Design Review Requirements for Site Development Plans

7.2.1 All site development plans for proposed developments shall be submitted to the City for approval prior to construction. Site development plans shall show all proposed water, wastewater, paving, parking, drainage, and flood protection facilities.

7.2.2 One (1) copy of the site development plans shall be submitted for review. The City will respond within fourteen (14) days with an approval letter and/or with plans showing the required changes.

7.2.3 When plan changes are requested, two (2) copies of the revised site development plans shall be resubmitted to the City for final review and issuance of an approval letter.

7.2.4 Site development plans for projects located within the City shall be submitted to the Building Code Enforcement Department, with the approval letter attached, and construction plans, for issuance of a permit prior to construction.

7.3 Building Slab Elevations

Minimum building slab elevations within the City Limits shall be set at or above the elevation shown on the recorded plat, twelve inches (12") above the 100-year flood plain elevation and maximum ponding elevation, or eighteen inches (18") above natural ground or twelve inches (12") above the top of curb at the front of the lot, whichever is higher. Minimum building slab elevations within the extraterritorial jurisdiction of the City of El Campo shall conform to the requirements of Wharton County.

7.4 Water Service

Water service lines and meters shall be sized in accordance with requirements set out in Chapter 3 of these Standards (3.11).

7.5 Sanitary Sewer Service

Sanitary sewer service leads are normally installed during construction of the public sanitary sewer. When a sanitary sewer service lead is to be installed for a site development, refer to requirements set out in Division 4 of these Standards. All lots, tracts, or reserves shall be connected directly to a public sanitary sewer by a single lead, except as specifically approved by the City.

7.6 Site Drainage Requirements

All commercial, industrial, office, recreational, and multi-family tracts deeper than one hundred feet (100') measured from the right-of-way line shall have an internal drainage system. The internal drainage system shall collect all site runoff beyond one hundred feet (100') from the right-of-way line into a storm sewer system that shall connect to the public drainage facilities in the area, except with specific approval. The one hundred-foot (100') area adjacent to the right-of-way may sheet flow to the roadway drainage system if the roadway system is designed to accommodate the additional sheet flow from development.

7.6.1 The internal site storm sewer shall be connected to a public storm sewer at a manhole or at an inlet adjoining the site. The site drainage outfall shall be connected to the nearest existing drainage system with adequate capacity to serve the drainage area. Where extension of the existing drainage system is required, all costs for extension shall be the responsibility of the development. Any development that has existing curb and gutter adjacent to developed property shall tie in and continue with curb and gutter for the entire width or length of developing property.

7.6.2 All storm sewers extended into a public right-of-way or easement shall be reinforced concrete pipe or High-performance polypropylene pipe (PP) ASTM F2881 pipe at least Twelve inches (12") in diameter. Storm sewers shall be reinforced concrete pipe, ASTM C-76, Class III or High-performance polypropylene pipe (gray) shall meet or exceed ASTM F2881" standard specifications for 12" to 60" Polypropylene dual wall pipe and fittings for Non-pressure Storm Sewer Applications."

7.6.3 All internal facilities shall be designed by a registered professional engineer and shall be sized to drain the site in accordance with these Standards.

7.6.4 Drainage calculations shall be submitted with all site development plans.

7.6.5 When the site drains directly into a Wharton County drainage facility and/or into a highway right-of-way, the appropriate governmental entity (entities) shall approve the site development connection to public facilities.

7.7 Traffic Impact Analysis for Driveway and Roadway Access

7.7.1 The location and width of all driveways that will connect to a public street must be reviewed and approved by the City prior to construction and may be required to be identified at the time of platting, prior to the submission of a building permit, or at the time a land plan or site plan is submitted. This includes replats where relocating or shared access may be required or denial of an additional driveway on the newly formed lot.

7.7.2 All driveways are required to first obtain a permit through the City. In addition, if the driveway is located on a state roadway, the City requires the applicant to obtain a driveway access permit from the Texas Department of Transportation (TxDOT). No permit from the City shall be released until a permit has been approved by TxDOT and delivered to the City. The City will adhere to the guidelines, rules adopted and approved by TxDOT on all TxDOT controlled roadways.

7.7.4 Residential – specific. No residential driveway shall be allowed on a major thoroughfare. If it is an existing lot, access will be allowed if there is no adjacent side street or rear street in which safer access is available. When located on a major thoroughfare, if possible, a circle driveway will be designed in which the driveway width will be a minimum twenty feet wide, the driveway entrances are to be thirty feet (30') apart from outside turning radii at curb line and turning radii at curb line shall be a minimum of twenty feet (20'). If not possible, every effort should be made to create space on the lot to provide a turnaround maneuver and turning radius at the curb line of twenty feet (20'). All other streets, residential driveways shall be a minimum of ten feet (10') and maximum of thirty feet (30') wide at the right-of-way line with a turning radius of five (5) feet on local streets and ten (10) feet on collectors. No lot shall have more than one driveway (circle drive is considered two drives) on a local street unless it has at least one hundred (100) feet of frontage or the additional drive is on another street. No turn radius with the curb return shall extend beyond the property line of the property when extended in a straight line from the right-of-way to the curb line.

7.7.5 A traffic impact study may be required as a part of the approval process for driveways and other roadway access. A traffic impact analysis (TIA), when required, shall be prepared by an individual, group, firm or corporation having demonstrated professional emphasis and experience in transportation planning, engineering and in the preparation of similar analyses. The TIA document shall bear the seal and signature of a Texas Registered Professional Engineer.

A. A TIA shall include the following information:

(1) Study purpose and objectives.

(2) Description of the site and study area – to include entire property or master plan, not just portion submitted for building permit or plat approval.

(3) Existing conditions in the area of the development.

(4) Recorded or approved nearby development.

(5) Trip generation and trip distribution.

(6) Projected future traffic volumes.

(7) An assessment of the change in roadway operating conditions resulting from the development traffic.

(8) Recommendations for site access and transportation improvements needed to maintain traffic flow to, from, within, and past the site at an acceptable and safe level of service.

B. Prior to preparation of a TIA, the Design Engineer is required to meet with the Public Works Director to identify the study area, define the area of influence, non-site impacts, and determine or define essential elements such as but not limited to study area, design year, trip generation rates, trip assignments, non-site traffic estimates, etc.

C. The TIA shall be presented in the following manner:

(1) Straightforward and in a logical sequence; step by step toward conclusions and identifying recommendations and alternatives.

(2) It shall allow the reviewer to duplicate the calculations.

(3) Recommendations shall specify the time period within which the improvements should be made, particularly if the improvements are associated with various phases of the development.

(4) Recommendations shall also specify the time period for any monitoring of operating conditions.

(5) Data shall be presented in tables, graphs, maps, and diagrams wherever possible for clarity and ease of review.

(6) A brief executive summary of one or two pages be provided, concisely summarizing the purpose, conclusions, recommendations, and alternatives.

7.7.6 Large speed differentials shall be minimized to prevent unsafe conditions. Every attempt should be made to have driveway designs that create no more than 20 mph maximum speed differential on roadways. Driveway approaches accessing major thoroughfares should be situated in a manner that minimizes the number of potential conflict points. Use of deceleration lanes, acceleration lanes, turning lanes, turning bays, shared driveways, access easements for adjoining properties, cross driveway easements (an easement allowing two or more properties to share a common drive(s).), traffic signals and traffic control devices, special lanes for pedestrians, crosswalks,

medians and median markings, special signage, and other internal and external designs, signage, devices, markings, etc. shall be considered on all driveway requests.

7.7.7 Anyone planning on developing a site, parcel of land, or preparing a parcel of land or site for such shall be prepared to submit a driveway plan for the entire property. If the parcel to be platted is a portion of a larger tract, the city may require all driveways be identified or at a minimum the number, general location and access easements identified to allow joint use of driveway(s) located on separate tracts or parcels on the larger tract before the platting of the smaller tract or sub-parcel. A TIA may be required to take into consideration a larger section of roadway or other roadways other than the roadway immediately adjoining the tract(s) of land under consideration.

7.7.8 An individual may be required to negotiate driveway access on an adjacent property prior to or instead of being granted a driveway access on a tract or parcel of land.

7.7.9 Driveways serving non-residential and multi-family tracts that connect to a street classified as a thoroughfare or collector street or has a speed limit exceeding 35 mph must be a thirty- five (35) feet to forty-five (45') wide at the right-of-way line. Non-residential and multi-family tracts fronting on all other streets shall be twenty-five (25) to thirty-five (35) feet wide at the right-of-way line.

7.7.10 It is the City's policy to minimize whenever practical the number of non-single-family residential driveways on all arterial and collector streets in order to reduce the number of conflict points and facilitate traffic flow. To facilitate that policy, driveways shall be placed no closer than the following distances from adjacent streets and driveways (measured from the turn radius at the curb line to the nearest turn radius at the curb line). More than one driveway may be allowed as long as it meets the following criteria:

Roadway Classification	Minimum Separation
Major Highway	200 ft. or greater as determined by a TIA
State Highway	200 ft. or greater as determined by a TIA
Thoroughfare	165 feet
Collectors	165 feet
Local streets	75 feet

7.7.11 If the separation requirements for non-single-family residential driveways cannot be met because of the location of existing driveways on adjoining tracts, joint access driveways, access easements, or cross driveway easements, across adjoining tracts should be used.

When minimum separation requirements cannot be met with the existing private driveway on the adjacent property and joint access cannot be obtained, the controlling factor shall be to maximize the distance between the subject property's private driveway and the public cross street.

7.7.12 On streets classified as collectors, thoroughfares (arterials), and highways that do not contain medians, non-residential driveways must align with driveways on the opposite side of the street the minimum separation requirements.

7.7.13 At signalized intersection in which one public street terminates at the intersection of a connecting cross street, a driveway should be avoided in the area of the signal at a spacing outlined above and not be placed on the cross street as to be in alignment with the terminating street. If the requirements for driveways otherwise allow the placement of a driveway within the area due to size or a TIA, then the driveway width must match the cross-section of the intersection public street and be properly aligned. Non -residential driveway connections to the public street shall be approved and inspected by the City of El Campo.

7.7.14 Driveways shall be located and designed so as to have adequate sight distances along the intersecting street.

7.8 Fire Lanes

7.8.1 Fire lane easements shall be created on all multi-family and non-residential tracts. Fire lane easements shall be an all-weather driving surface capable of supporting the imposed loads of fire apparatus and subject to the approval of the Fire. All fire lane easements must have access to public-access streets.

7.8.2 Fire lanes shall be of an unobstructed width of not less than twenty feet (20'), with adequate turning radius capable of supporting the imposed loads of fire apparatus and shall extend for the minimum length necessary to provide access for emergency vehicles as determined by the Fire Official in accordance with accepted fire safety standards. A ninety (90) degree intersection is acceptable with prior approval of the Fire Official. All fire lanes have a minimum vertical clearance of thirteen feet six inches (13' 6").

7.8.3 Fire lanes shall be designed to drain in compliance with the site development requirements.

7.9 Dumpster and Refuse Storage Containers

All proposed dumpsters and refuse storage containers shall be located within an enclosure providing screening by means of combining the following elements.

7.9.1 Decorative masonry wall. If the wall includes a gate, the gate shall be constructed with an opaque non-masonry material. The construction materials of the wall shall match material used on the principal building located on the same lot; and

7.9.2 All service areas (e.g., garbage and recycling rooms, mechanical areas, outdoor storage, utility and meter rooms, etc.) must be architecturally integrated within the body of the building or architecturally screened from all public areas.

7.9.3 The dumpster service area shall be solid screened on three sides, with an optional personnel gate on the third side for access to the dumpster. Sidewalk access shall be provided to the personnel entry. This optional personnel entry gate shall not be visible from the street. Screening shall be a minimum height of six (6) feet, constructed with quality masonry, brick, stone, stucco or split-face concrete block with cap. The builder will provide details with building plans and submit a list of materials at the time of permitting for City approval. In residential area only, western red cedar with a capped top rail is permitted.

7.9.4 If six (6) foot height does not provide a solid screen, City approval is required at the time of Site Development Review.

7.9.5 The opening for removal of the dumpster for collection shall be a minimum of 12 feet to allow for proper access when it is serviced. For every dumpster added, an additional 10 feet in width is required.

7.9.6 The opening for removal of the dumpster for collection shall be located away from the sidewalk.

7.9.7 The property owner shall make every reasonable effort to incorporate appropriate landscaping to make the screen more effective and attractive. Refer to the City's Landscape Design Standards for recommended minimum plant varieties, size, and quantities.