
Town of Westlake

# ENGINEERING STANDARDS

Revised January 24, 2005

# TABLE OF CONTENTS

# ARTICLE I: GENERAL PROVISIONS

A. **General Provisions**. All improvements shall be in conformance with the Town's construction standards and specifications except as may be otherwise provided. The Town's specifications includes Standards as well as Special Specifications. The Town's construction standards consists of those various drawings identified as Town of Westlake Construction Standards and issued by the Town. Public improvements, semi-public improvements, and private improvements constructed in public rights-of-way and easements shall be constructed in conformity with this standard. The requirements of these standards are considered minimum requirements and are not intended to replace sound engineering judgment or practices.

B. **Standard Specifications**. Standard Specifications of the Town of Westlake are the "Standard Specifications for Public Works Construction" as published under the authority of the North Central Texas Council of Governments (NCTCOG). This latest publication, latest edition, along with the amendments and Special Provisions to the document, approved or issued by the Town, shall comprise the Standard Specifications. In the event of conflict, the Standard Specifications shall be superseded by the provisions and requirements of this document. Only the item or items of conflict shall be affected. All other provisions and requirements shall stand.

C. **Construction Specifications**. Construction Specifications are those construction specifications, which are not covered by the Standard Specifications. Special Specifications shall be required for all projects having items of construction not adequately covered by the Standard Specification. All Special Specifications shall be subject to review and approval by the Town.

D. **Pre-Construction Meeting**. The contractor for each project, or for any phase, shall notify the Town of the intent to commence work. Sufficient notice shall be given so that a pre-construction conference may be held. No work shall commence except as specifically authorized at the pre-construction meeting.

D. **Construction Inspection Fee**. Prior to the issuance of any public works construction permit, the Town will collect all applicable fees in accordance with the Town of Westlake Fee Ordinance.

E. **Exception For Utility Companies**. Utility companies are not required to secure a permit for repairs and day-to-day maintenance operations but shall notify the Town prior to commencing construction. Utility companies will be required, by this ordinance, to obtain a permit without fee for new developments and for all utility relocations.

F. **Tree Survey**. A survey locating the species and size of all trees (six) 6 inches in caliper and above and also the limits of thickets shall be required with the preliminary plat submittal.

G. **Tree Protection Plan**. Each set of construction plans submitted to the Town for review and approval shall include a tree protection plan. The plan shall designate the trees to be preserved in accordance with the Town's tree preservation ordinance. Protective fencing shall be installed around designated trees prior to the beginning of any construction and shall remain until all construction activities have been completed. The plan shall also incorporate the boring of utility lines as necessary to preserve trees.

H. **Erosion Control Plan**. Each set of construction plans submitted to the Town for review and approval shall include an erosion control plan in accordance with Article VI of this document and the NCTCOG standards. The plan shall provide methods for reducing erosion and the entrance of sediment into streams and storm systems as a result of construction activities.

I. **Traffic Control Plan**. Each set of construction plans submitted to the Town for review and approval shall include a traffic control plan. The plan shall provide for the safe handling of traffic

through and in the area of construction. Construction, signing, barricades, etc., shall be in conformance with the Manual of Uniform Traffic Control Devices where applicable.

J. **Material Testing**. Testing is required to be performed by a geotechnical testing laboratory company approved by the Town. The procedures and criteria for testing are generally outlined in NCTCOG Standard Specifications. A copy of the test results will be furnished to the Town. The developer is responsible for obtaining the proper tests.

K. **Disposal of Construction Waste**. Contractor shall be responsible for the appropriate disposal of waste generated by the construction activities.

(1) Definitions

Waste. Garbage and other decayable, nondecayable, used up, broken, rejected or worthless materials.

Rubbish. Trash, debris, rubble, stone, useless fragments of building materials and other miscellaneous useless wastes or rejected matter.

(2) Refuse Container Required. Each building permit holder shall be required to provide a refuse container or enclosure for disposal of waster and rubbish upon construction sites. The size of such container or enclosure shall be approved by the building official and shall be of proper design and sufficiently large to hold the rubbish and waste in such a manner that will not blow out or spill over of waste. The location of the refuse container shall be approved by the Chief Building Official.

(3) Disposal of Hazardous or Toxic Materials. Disposal of hazardous or toxic materials shall be in compliance with all state and federal regulations.

(4) Container Requirement Waived. If the proposed improvement for which the permit has been issued is less than $5,000, the Chief Building Official may, at this sole discretion, waive the requirement of a refuse container if he determines that it is not necessary and if other approved means of disposal exist.

(5) Failure to Maintain Container. Upon determination by the Chief Building Official that a permit holder has failed to maintain or use an approved refuse container, an order to correct the offending condition will be issued to the permit holder. Such an order shall be verbally communicated to the permit holder and confirmed by mailing a copy of the order by certified mail, return receipt requested. The order shall specifically describe the offending condition and suggest actions necessary to correct the condition. Failure to properly correct the offending condition within 3 days after the mailing date of the order shall result in an order that the work be stopped immediately.

(6) Debris and Waste. Cut trees, debris, large rocks and stones, junk, rubbish and other waste materials of any kind shall not be buried in any land, or left or deposited on any lot or street at the time of final acceptance by the Town Engineer, and removal of those items and materials shall be required prior to acceptance unless otherwise approved by the Engineer. No items and materials as herein described shall be left or deposited in any area of the subdivision or addition at the time of expiration of any improvement agreement or acceptance of dedication of public improvements, whichever is sooner. However, dirt or topsoil may be stockpiled on a property at a location approved by the Town Engineer.

L. **Final Acceptance**. Final acceptance is the formal approval of the improvements by the Town. Final acceptance shall be made in writing based on the finding that the improvements have been satisfactorily installed and that all administrative requirements have been satisfied.

M. **Partial Acceptance**. The Town may accept any part of any improvement prior to the completion and acceptance of the entire improvement when approved by the Town Engineer.

N. **Conditional Acceptance**. The Town may issue a letter of conditional acceptance upon the determination by the Town that unusual conditions warrant such acceptance and that the Town will not be adversely affected.

O. **Record Drawings**. Prior to final acceptance, the Developer's Engineer shall furnish to the Town the original drawings, revised to depict existing conditions. The plans shall accurately reflect the work as actually constructed. The Engineer will not be responsible for materials used in the construction or workmanship; only the geometrics and elevations of paving, drainage and sanitary sewer improvements, and the horizontal locations of water lines as evidenced by locations of water valves, vaults, fire hydrants, etc.

The record plans shall include a certification that all lot, right-of-way, and easement lines have been marked as evidenced by the setting of iron rods; except that easement lines parallel to staked lot and right-of-way lines are not required to be marked by the iron rods.

P. **Maintenance Bonds**. Prior to final acceptance, the developer shall furnish the Town an acceptable maintenance bond in compliance with the Unified Development Code (UDC).

Q. **Roadway Engineering Standards and Thoroughfare Plan**. Roadway and driveway requirements, cross-sections and design standards depicted in the Town Engineering Standards shall control over elements depicted in the Town Thoroughfare Plan.

R. **Planned Developments and Engineering Standards/Thoroughfare Plan**. In the event of a conflict between existing Planned Development (PD) amendments and the Engineering Standards and Thoroughfare Plan, PD amendments shall take precedence over the Engineering Standards and Thoroughfare Plan.

# ARTICLE II: ROADWAY FACILITIES

## SECTION 1. - INTENT

The arrangement, character, extent, width and location of all streets shall be in conformity with the Township's Thoroughfare Plan and Comprehensive Plan, and should be considered in their relation to existing and planned streets, topographical considerations, scenic views and the land uses proposed to be served by such streets. It is the intent of these standards to assist in developing a transportation infrastructure that will result in minimizing through traffic, internalizing circulation of all but major streets, creating winding and scenic streets with minimal impact on existing topography, minimizing congestion on all Westlake roads, and preserving the rural atmosphere of the Town of Westlake. Any off-site street required by the platting process to provide adequate access to the development shall be the responsibility of the developer. These provisions shall apply in all cases including where there is an existing substandard street.

## SECTION 2. - CLASSIFICATION OF STREETS

A. The Town of Westlake recognizes the following classifications of public streets in the Thoroughfare Plan:

- Freeway
- Major Boulevard Arterial (165' average ROW)
- Minor Arterial, (120' ROW)
- Major Collector (106' ROW)
- Minor Collector (90' ROW**)**.
- Local (60' ROW).

A description of these classifications is given in the Town of Westlake Thoroughfare Plan.

B. Typical cross-sections of these street classifications are illustrated in Town of Westlake Thoroughfare Plan.

B. Please note that when swales or roadside ditches on either side of the paved road are used for drainage; the right-of-way shall be wide enough to contain the swales; due to this, additional right-of-way may be required in some cases as determined by the Board of Aldermen or the Town Engineer.

D. Right-of-way may vary by an additional 15 feet to reflect variations due to topography of the area, intersection design and whether a Hike and Bike Trail runs parallel to the roadway system.

## SECTION 3. - STREET DESIGN SPECIFICATIONS

A. **Town Edge Open Space Zone and Roadway Landscape Zones**.

The purpose of landscape buffers is to both reinforce the rural character of the Town and to screen views from the street of developed areas. Landscape buffers should be planted with hardy native species. Sidewalks or hiking/biking trails may be permitted in these areas with an approved site plan. Driveways are permitted if they are for purposes of crossing the buffer as stated in the Town's access standards. Parking lots and buildings are specifically prohibited within the buffer. Landscape buffers should be shown or otherwise called out on the preliminary plat and the site plan.

Detention basins and retention ponds are specifically allowed within landscape buffers.

Please refer to Article V, Sec, 1.8 of the Westlake Unified Development Code (UDC) for restrictions on fences within landscape buffers.

(1) Town Edge Open Space - An average 150 foot wide landscape buffer shall be provided along State Highways 114 and 170, in those areas south and east of SH 170. In those areas north and west of SH 170 and US Highway 377, this landscape buffer shall be 50 feet in width.

(2) Roadway Landscape Zone - All arterial and collector streets shall have a ten (10) foot wide landscape buffer in residential zoning (R-200, R-40, R-20, R-20C, and MF as described in UDC as may be amended), and a five (5) foot wide landscape buffer in all other zonings.

(3) All local streets shall have a five (5) foot wide landscape buffer in both sides of their right-of-way.

B. **Sidewalks and Bikeways**.

(1) Sidewalks - Sidewalks shall be constructed in accordance with standards set forth below for all lots adjoining dedicated streets, along major thoroughfares where lots do not adjoin the street, along power line easements and in other areas where pedestrian walkways are necessary. Sidewalks shall be identified on all plat submissions to the Town.

a. Residential District Sidewalks. Sidewalks in residential districts shall be required to provide access to schools, local parks and retail centers. The criteria for the determination of sidewalks is as follows:

| Residential Subdivision Lot Size | Sidewalks Required |
|---|---|
| 12,000 square feet or less | Both side of roadway |
| 12,001 B 30,000 square feet | One side of roadway |
| 30,001 and greater | No sidewalks required |

Sidewalk construction may be delayed until development of lots, but in locations not adjacent to lots and across bridges and culverts, the sidewalks shall be constructed with the other improvements to the subdivision or addition. The final determination of the number and location of sidewalks shall be made by the Town when approving a subdivision plat.

b. Commercial Sidewalk District. Sidewalks in commercial districts shall be required on both sides of the street. Other options may be considered for approval by the Board of Alderman.

c. Sidewalk Design Standards. Sidewalks shall be laid out in a manner which minimizes straight lengths parallel to the roadway. In fact, gently curving sidewalks are encouraged. Sidewalks may be adjusted to clear poles, trees or other obstacles. Sidewalks shall be constructed of reinforced concrete and landscaped on both sides. Sidewalks, when required, shall meet the following width standards:

| Roadway Type | Sidewalk Width |
|---|---|
| Local | 4’ |
| Collector | 6’ |
| Arterial | 6’ |
| State Highway | 6’ |
| Frontage Roads | 10’ |

(2) Pedestrian Accesses - As stated in the Subdivision Ordinance 8.2, the Board may require, in order to facilitate pedestrian access from the streets to schools, parks, playgrounds, open space corridors, or other nearby streets, perpetual access easements. In no case shall the easement be less than fifteen (15) feet in width. Easements shall be indicated on the plat.

(3) Hike and Bike trails - As stated in the Subdivision Ordinance, Section 8.3, hike and bike sidewalks shall be constructed along streets designated for hike and bike trails. Such sidewalks shall be built by the owner at the time of site development.

The hike and bike trails shall comply with the nationally accepted standards for the design and construction of trails published by the American Association of State Highway and Transportation Officials (AASHTO) and the hike/bike trail design standards published by the North Central Texas Council of Governments (NCTCOG) unless otherwise approved by the Board of Alderman.

a. Trail Width and Structure. The primary hike and bike trails shall consist of concrete paving with a minimum of 12 feet in width otherwise approved by the Board of Alderman. Three (3) foot grass shoulders shall be constructed on either side of the concrete paving. Secondary and linking trails shall be constructed of concrete and be a minimum of eight (8) feet in width and also have three (3) foot grass shoulders. The trail thickness for Primary, Secondary, Linking, and Local trails shall be 5 inches of reinforced concrete with a non-skid broom and rock-salt finish. All trail surfaces shall be stained with two coats of Scofield Lithachrome stain, giving the trail a light black/walnut mottled color that helps to minimize reflection off the surface and helps to designate trail routes. The subgrade shall be based on recommendations, a certified geotechnical site investigation, and shall be approved by the Town Engineer. The 3 foot wide shoulders on each side of the trail are primarily for joggers, and to ensure proper sight distances to help avoid crashes. The shoulders also serve as a space for bicyclists to use when they are avoiding an accident. The shoulders shall be mowed to keep them in a useful state. To provide interest, the expansion and control joint system shall be a random pattern.

Where the trails run parallel with a linear obstacle, such as a street or drainage ditch, a minimum separation of 5 feet shall be placed between the trail's hard edge and the obstacle. All underpasses and bridges shall have a full trail width including space for shoulders, existing conditions permitting.

Secondary, Linking, and Local Trail may propose alternative paving sections subject to approval by the Board of Alderman.

Warning devices must be used where the combined trail and shoulder cannot be full width. Reference the MUTCD (Manual of Uniform Traffic Control Devices) for signage to use where these exceptions occur.

b. Trail Curves. To help that the trail system is visually pleasing, accessible to all users, safe, and without abrupt turns, curves should be designed with wide and gentle radii. Wide, sweeping curves allow greater visibility and user security by increasing sight distances along trails. Such design also helps to ensure that overly steep slopes and other maneuvering difficulties are avoided, thus improving accessibility for wheelchair users, parents with strollers, older citizens, and bicyclists. In creating a trail system with such curves, design standards based on bicycle design speeds are commonly followed. While very few cyclists can ride at a speed more than 20 mph, a trail that is laid out for a design speed of 25 mph will establish even wider curves, greater sight lines, and reduced slopes.

A design speed of 25 mph shall be used to establish the minimum curve radii, vertical curves, lateral clearance on horizontal curves, and stopping sight distances as per AASHTO standards, however, the trail shall be posted for 20 mph speed limit. Exceptions shall be made for topographical and physical constraints.

c. Trail Marking for Primary Trails. There are several acceptable ways to mark the hike and bike trail. A solid stripe shall be used to indicate a no-passing zone on steep hills, intersections and tight curves. A dashed yellow stripe down the center shall indicate 2-way traffic. The paint used in marking the trail shall be non-skid and reflective for night-time riding visibility in accordance with AASHTO standards. This makes the paint reflective e and gives it a sandpaper like non-skid surface. White stripes at the edges of the trail are not allowed because they have a tendency to visually narrow the usable trail space. Reflectorized tiles are also not allowed due to the fact that they create a hazard by acting as miniature speed bumps and are slippery when wet.

d. Slopes. Trails shall have a cross-slope of 2 percent. Greater cross-slopes make it difficult for bicyclists and wheel chair users to maneuver on the trail. Smaller cross-slopes hinder trail drainage.

The longitudinal slope on a primary trail shall not be greater than 5 percent. When a higher design speed is used and additional trail width is provided, grades greater than 5 percent and running less than 500 feet are acceptable on secondary trails.

e. Drainage. To minimize storm water run-off from flowing across the trail, drainage swales shall placed on the higher side. Swales are used where the sheet flow drainage across the trail surface might be great enough to increase trail maintenance. Using swales in this situation will also require culverts that are designed to handle the water flow, are safe (relative to the trail users), and have low maintenance.

Water fountains, faucets, and other water sources shall be located on the downhill side of the trail. Placing these water sources on the downhill of the trail will help eliminate water flow across the trail which could create a slipping hazard. The hazard develops in the case where uphill drains become blocked and a regular water overflow results in a wet trail surface. A constantly wet trail surface is conducive to algae growth.

f. Water Fountains. Water fountains shall occur at rest areas and trailheads. The water fountains should be freeze-proof with a top spigot and a lower faucet for water bottles and animals. The lower faucet needs to be spring-loaded to ensure that it shuts off after use.

g. Obstacle-Free Area. To provide a safer trail, an obstacle-free area shall be maintained. This zone shall have no signs, trees or light fixtures located within it. Any existing condition (e.g., an overpass) within the 10 foot vertical clear space must be signed as to its height.

Typically, in any place where people will gather (e.g., parking lots, trail maps, bike parking areas, water fountains) should be set back from the trail edge 15 or more feet.

h. Lighting. Lighting the hike and bike trail shall be provided at areas where night-time use is expected. Generally, lighting shall only occur in selected commercial

areas and shall not occur adjacent to residential areas. The horizontal illumination levels should maintain an average between 0.5 and 2 foot candles. Where special security concerns exist (e.g., tunnels, underpasses), a higher illumination is recommended. The light pole and fixture should be in scale with bicyclists and joggers except at trail needed illumination.

i. Railings. Railings for bridges, steep drop-offs, and separation from thoroughfare traffic shall be a minimum of 4.5 feet in height and have a smooth "rub rail" attached to it. The rub rail should be of 2 inch x 6 inch rectangular tubing (12 gauge steel) placed so the railing's center is 3.5 above the surface. The 6 inch rub railing vertical dimension is a minimum. Chain-link fencing is prohibited. Alternative materials may be considered subject to approval of the town engineer.

j. Signage. Adequate signage shall be required on hike and bike trails to indicate to trail users directional information for wayfinding to features such as particular trail routes, open space facilities, view overlooks, recreational features, parking, and nearby neighborhood centers. Signage is also critical in communicating appropriate regulatory messages and warnings of potential conflicts in areas such as trail intersections. Signage shall be sensitively and attractively designed to provide a unifying, maintainable element throughout the open space system. Signage colors, symbols, wording, and quality of materials of materials can greatly influence how successful the signage is in conveying the desired information. Enlightened decisions regarding these elements can also facilitate an image appropriate to Westlake's rural character. The following signage information is intended to describe the required messages and information regarding open space areas. Exact size and shape of sign blade, type and height of pole, and materials to be used are dependent on the circumstances existing at the sign location. There are five basic types of sign groups:

- warning signs
- directional markers
- information signs
- regulatory signs
- identification markers

*Warning Signs.* These signs alert trail users of safety concerns such as abrupt changes in slope that may be necessary, approaching intersections of trail routes, or upcoming trail bridges.

*Directional Markers.* Directional markers use arrows or wording to indicate which direction to travel. These signs are important when multiple trails come together.

*Informational Signs.* These signs can be in any form or style and typically provide the trail user with useful or important information.

*Regulatory Signs.* These signs are usually white and rectangular with black lettering. Regulatory signs give instructions on trail use and etiquette.

*Identification Markers.* These signs identify trails and roadway bridges that cross the trails. Where roadways are nearby, a sign identifying the street for trail users and a sign identifying the trail for road users can prove helpful. Overhead name plates should be located on bridge underpasses and should include the street name and block number.

Trail maps and the name of the trail should be located at the beginning and end of each trail. Mile markers should be located every 0.25 miles. The identification markers are important to trail users, maintenance forces, police, and emergency personnel.

k. Mow Pads. To help minimize trimming during the mowing season, mow pads shall be placed around all signage, furniture and water fountains. The pads shall be designed so that a tractor can easily mow around these objects without hitting them. Mow pads shall be poured-in-place, reinforced concrete with a broom or non-skid finish.

l. Road Crossings. Where primary trails cross streets and thoroughfares, the crossing shall be a grade separated crossing with the trail beneath the road, whenever possible.

m. Sight Triangles. It is important to eliminate bind spots at intersections where multi-use paths intersect with streets. Clear zone sight line triangles must be defined to eliminate blind spots. Landscape improvements designed within this zone must be below 2.5 feet and above 9 feet in height to provide unobstructed cross-visibility.

n. Key Trail Spots. Trail map markers, rest stops, overlooks, and creek scenic areas are all examples of trail points of interest. These points shall be integrated into the trail. Trail maps and guides give users directions.

Different materials and forms can be used on special areas such as overlooks and rest stops, depending on its function and location.

Special historical and visual points of interest along the trail shall have spin-off trails for pedestrians and joggers. Cyclists should have parking for bicycles. Spin-off trails shall include appropriate signage to discourage bicycle use on them.

o. Kiosks. Information bulletin boards or kiosks should be located near parking areas, water fountains, and restrooms where people have a reason to stop. Locating them at the beginning or end of the trail and adjacent to the parking areas are effective because people are stretching or unloading bicycles. These locations are also good for placing the Trail Guidelines (which should be brief and clearly posted). Informed trail users are more likely to be courteous and behave safely on multi-use trails.

p. Water Crossings. Where trails cross existing streams or in areas of low elevation, single span bridges are a better solution than low water crossings. Trial bridges are encouraged; however low water crossings may be considered.

C. **Design Requirements for Streets**.

(1) Interpretation of street need classification shall be governed first by the approved thoroughfare plan. If outside the detail of the thoroughfare plan, street classification shall be interpreted on the basis of need as determined from the traffic impact analysis for the development.

(2) It is recommended that street alignments should parallel existing contours as much as feasible.

(3) Roadways should be placed in the center of right-of-way, but may be shifted to avoid free groupings.

(4) Roadways shall meet intersections at 90 degrees (with no more than ten degree variance) so that no street curvature is closer to the point of right-of-way lines by a distance of at least 150 feet.

(5) Centerline curves shall be tangent to the street centerline at either end.

(6) Where there is a natural edge to roadway paving associated with drainage swales, the roadway base shall extend past the edge of paving in accordance with specifications contained in this standard.

(7) Where curbs are allowed, mountable curbs or other less conventional methods are encouraged.

(8) In the case of existing topographic features, which prohibit the reasonable use of the following specified design requirements, a variance should be requested. The procedure for seeking a variance is set out in the Westlake UDC.

(9) Sidewalks associated with Thoroughfare Plan roadways, shall be constructed at the time of roadway construction, except where site construction will damage the sidewalk, in which case a bond shall be posted in accordance with the policies established in the Town=s Unified Development Code.

(10) Landscaping associated with roadway medians must be provided at the time of construction of the roadway and consistent with the requirements of the Town=s Unified Development Code.

(11) All required street improvements shall comply with the “Street Design Specification” as contained in this standard. Right-of-way widths in excess of these specifications shall be required whenever additional width is required to fully contain drainage swales or roadside ditches, or, due to topographic, additional width is necessary to provide adequate earthen slopes to existing grades.

(12) Design requirements shall be in compliance with the latest edition of AASHTO standards.

(13) When not shown in the Town’s Thoroughfare Plan, all proposed streets shall:

a. Provide for the continuation or appropriate projection of existing streets with the exception of local residential streets.

b. Conform to a plan for the neighborhood approved or adopted by the Town to meet a particular situation where topographical or other conditions make continuation of, or conformance to existing streets impractical.

c. Be laid out so that street right-of-way lines intersect at 90 degrees (with no more than ten degree variance) and so that no street curvature is closer to the point of intersection of right-of-way lines than 35 feet on residential streets and 50 feet on collector and arterial streets. Right-of-way intersections with greater than ten degree variance shall require approval of the Town Engineer and Planner.

d. Make use of existing median openings in the thoroughfares without any alterations to them and provide necessary minimum left-turn lanes for entry into subdivisions along both traveled ways, as necessary.

(14) No residential and collector (2-lane) street intersection with arterial streets shall be allowed within 350 feet of a major street intersection (4 lane undivided and above) and/or within proposed right turn lane limits.

(15) Residential streets shall be aligned in a manner to discourage use by through traffic. Jogs and offset at intersections measuring less than 150 feet in residential streets and 200 feet in undivided collector streets, measured between centerlines, are prohibited. This provision shall not apply if the intersecting street is divided and median opening is not provided for either street. Street right-of-way widths shall conform to Section 2B of this Standard.

(16) Half streets shall be prohibited, as stated in Section 7.3E of the Subdivision Ordinance unless otherwise approved by the Board of Alderman.

(17) As stated in Subdivision Ordinance, Section 7.3.D, cul-de-sacs shall not be longer than 600 feet in length, measured from the intersecting centerline to the radius point of the cul-de-sac turnaround. All dead end streets shall terminate with an approved cul-de-sac pavement, having an outside minimum radius of 50 feet and an inside minimum radius of 30 feet. Islands in the cul-de-sac shall not be permitted in commercial and industrial areas. Alternative designs for cul-de-sac turnarounds such as “hammerheads” may be approved by the Town Planner and the Town Engineer. Cul-de-sacs of up to 1,000 feet in length may be approved in low density residential areas, but an emergency access driveway shall be required and must be approved by the Town Planner and Town Engineer. Mailboxes, fire hydrants, and any other above ground structures must be set back a minimum of two feet from the pavement to accommodate emergency vehicles.

(18) At the intersection of street right-of-way lines a triangular area per the street design standard table shall be dedicated for right-of-way as established in Section 4E(2) of this standard. In the event the streets intersect at other than 90 degrees (by more than 10 degrees), as approved by the granting of a variance, the required dimensions may be increased as determined by the Town.

(19) Control of access lines at street intersections for driveways locations shall be shown on all plats and engineering site plans and shall be in accordance with the guidelines shown in Section 4E(2) of this standard. All dimensions are measured to the near radius point(s) of the driveways.

(20) All dimensions of streets are defined as face to face of curb, or edge of pavement to edge of pavement if no curb exists.

(21) Medians in divided roadways shall terminate at the curb return of intersecting streets.

(22) A minimum vertical clearance of 13 feet 6 inches (13’-6”) shall be maintained over all public and private streets.

D. **Turning Lanes**.

Left turn lanes shall be provided on all approaches to intersections when four or six lane streets cross. Left turn lanes shall also be provided along all divided streets where median openings provide access to streets, alleys or driveways.

(1) Right turn/deceleration lanes shall be provided on all approaches to intersections where four or six lane streets cross. Right turn/deceleration lanes may also be required subject to the Traffic Impact Analysis. When multiple entries from different streets are proposed for a commercial development of five acres or more, and based on the projected traffic

patterns of the site, Town Traffic Engineer may waive this requirement at one or more driveways.

(2) The length of left turn lanes, right turn lanes and deceleration lanes subject to the Traffic Impact Analysis (TIA).

(3) The developer shall be responsible for the dedication of all rights-of-way for the construction of all turning lanes.

(4) Turn lanes and geometrics shall be designed for maximum safety and efficiency of the intersection.

E. **Traffic Signals**.

Traffic Signal locations shall be based on a comprehensive Traffic Analysis and must be approved by the Town.

Preference will be given to street intersections for traffic signal location over private development driveways.

F. **Median Openings**. Full median openings shall be at minimum spacings of one-quarter mile except where approved by the Town based on an engineering study.

Mid-block median openings shall be designed to restrict cross-access. (This allows for left turns along the thoroughfare, but not the cross street/driveway.)

G. **Intersections**. Right-turn lanes and traffic islands at intersections shall be provided and designed to allow traffic turning right to enter the cross street after yielding except where approved by the Town based on an engineering study. (A yield sign would be installed and turning traffic would not go through the traffic signal.

H. **Curvilinear Design Requirements**.

One of the objectives set forth in the Town's Comprehensive Plan is the creation of winding and scenic streets. All new streets within the Town of Westlake shall meet these curvilinear street standards, except when the Town determines that the shape or topography of the subdivision or the pattern of adjacent street systems would make the provision of such curvilinear streets unfeasible. The Town's Engineering Standards shall also apply.

(1) All non-residential cul-de-sacs with a length of six hundred (600) feet or less, regardless of centerline geometry, shall be considered to meet the curvilinear street standards, provided that the cul-de-sac terminates at the street end in a tee intersection (i.e., does not cross the intersection).

(2) For residential streets, a total length of one thousand three hundred and twenty (1320) feet or less, regardless of centerline geometry, shall be considered to meet the curvilinear street standards provided that the street terminates (i.e., cul-de-sac, tee intersection) at either end.

(3) If less than fifty percent (50%) of the length of the centerline of the street (or less than fifty percent (50%) of the centerline of the lane bundle for Major Arterial streets) is composed of straight sections then that street shall be considered to meet with the curvilinear street standards.

I. **Vertical Curves**.

The vertical design including curves shall comply with ASSHTO standards as the minimum criteria. The minimum vertical curve length shall be 50 feet for each algebraic percent difference in grade. Lengths that are some multiple of 50 feet are preferred but not required. Intersections shall be on straight slope sections, or near the crest of vertical curves unless otherwise approved by the Town Engineer.

J. **Coordination with Surrounding Streets**.

The street system for each development shall be coordinated with existing, proposed, and anticipated streets within and outside the development, and shall be extended outside the development when necessary, so as to provide for adequate access, the safe and effective movement and circulation of traffic, or for other reasonable traffic considerations. However, thru traffic (i.e., traffic that does not originate or terminate in the Town) shall be discouraged.

(1) Streets shall be in alignment with existing or proposed streets of adjoining properties, except where the thoroughfare plan, topography, requirements for traffic circulation, or other planning considerations make it desirable to depart from the alignment.

(2) The extension of residential or collector streets may be denied if it is determined that the extension would provide for an unacceptable use of the street or would encourage substantial through traffic.

(3) Streets not required to be extended beyond the development, but that are to be connected with proposed or anticipated streets outside the development at a future date, shall be extended to the property line at the point where the connection is expected. If the street is a collector or boulevard, and the distance from the property line to the nearest intersecting street is more than one hundred fifty (150) feet, or there is a building lot which fronts exclusively on the dead-end street, then a temporary turnaround cul-de-sac shall be provided. Otherwise, the street shall be barricaded at the property line until such time as it is extended or connected.

K. **Street Names and Signs**.

Street names shall be in conformance with Section 7.3.J and 7.5 of the Subdivision Ordinance and shall be assigned by the developer, subject to Board of Aldermen approval, by placing the name on the plat. Streets which are in alignment with or continuations of existing streets shall be given the same name. Names shall be sufficiently different in sound and spelling from existing or platted street names within the 911 Service area so as not to cause conflict or confusion. Street signs shall be subject to the approval of the Town Engineer.

L. **Medians**.

When any development is required to provide one-half or more of the right-of-way of any street classification requiring a median, a full median shall be provided in accordance with these design standards.

(1) All portions of the median less than four (4) feet in width shall be installed with a low maintenance surface such as paving stones, living ground cover, or similar landscape material approved by the Town Engineer, but excluding concrete and asphalt.

(2) The maximum cross-slope in a median shall be three horizontal to one vertical (3:1). The use of retaining walls within medians is prohibited unless approved by the Town Engineer.

(3) Spacing between median openings should be at least five hundred (500) feet, measured from the centers of the openings unless otherwise approved by the Town Planner or Transportation Engineer.

M. **Bridges**.

Bridge design shall accommodate below grade and at grade crossings of hike/bike trails and at grade sidewalks on each side of the bridge. Stone facing on all exposed surfaces and bridge lighting shall also be required. Alternative facing and appurtenances may be submitted to the Board for approval.

## SECTION 4. - DRIVEWAY DESIGN STANDARDS

### A. Purpose and Intent

Driveway design standards to ensure that property shall be provided safe and efficient vehicular access to or from the public street system, to protect the capacity for handling peak traffic volumes of public streets, to maintain smooth traffic flow, and to maintain street right-of way and drainage. The intent is to achieve the following:

1. Prohibit the indiscriminate location and spacing of driveways while maintaining reasonable vehicular access to and from the public street system.

2. Reduce conflicting turning movements and congestion thereby reducing vehicular accidents.

3. Maintain and enhance a positive image for the attraction of new, high quality, residential and non-residential development in the Town.

### B. Definitions

As a basis to discussion of driveway standards and design criteria, an overview of key terminology is presented to assist the reader in understanding concepts which will be discussed later.

Acceleration Lane: An auxiliary lane beyond a driveway or public or private street that allows vehicles time to accelerate before turning right to merge onto major street facility.

Applicant: Any owner, authorized agent, lessee, contractor or developer who desires to construct, reconstruct, relocate or in any way alter the design or operation of one (1) or more driveways.

Arterial: Any existing or future roadway classified as a principal or minor arterial in the Thoroughfare Plan, including Major Boulevard Collector or Major Collector.

Auxiliary Lane: A separate lane, including transition areas, in addition to the general travel lanes intended to maintain the free flow of traffic. Examples include free right turn lane, free left turn lane, deceleration lane or acceleration lane.

Board: Board of Alderman of the Town of Westlake.

Collector: Any existing or future roadway classified as a major or minor collector in the Thoroughfare Plan.

Continuous Deceleration Lane: A deceleration lane that serves two (2) or more driveways, public streets or combination thereof.
Deceleration Lane: An auxiliary lane, including transition areas, in advance of a driveway or public or private street that allows vehicles time to slow before turning right from a major street facility.

Design Hour: the one (1) hour period of a typical week with the highest volume of traffic on the roadway.

Driveway: Any approach or access that connects real property to the public street. The driveway is primarily located within public right-of-way but may be considered to extend onto private property when necessary to ensure safe operation of the driveway/street intersection.

Driveway, Commercial: A driveway providing access to commercial property or providing access to administrative or employee parking lots on industrial property. The principal use of commercial driveways will be automobile traffic with incidental use by truck traffic.

Driveway, Circular: A residential driveway that has two connections to public or private street.

Driveway, Common: A driveway constructed to provide access between two (2) or more properties.

Driveway, Divided: A driveway having separate ingress and egress drives divided by a raised median.

Driveway, Industrial: A driveway providing access for substantial truck traffic to industrial property or commercial property. The principle use of industrial driveways will be truck movements to and from loading docks of a commercial or industrial facility.

Driveway, Multi-Family: A driveway which provides access to multi-family property.

Driveway, Residential: A driveway which provides access to a single-family residence, to a duplex or to a multi-family building containing three or fewer dwelling units.

Driveway Throat Width: The shortest distance between the parallel edges of a driveway measured edge of pavement to edge of pavement for driveways without curbs and measured face of curb to face of curb for driveways with curbs.

Free Right Turn Lane: An auxiliary lane.

Free Left Turn Lane**:** An auxiliary lane.

Freeway Frontage Road: Driving lanes within State of Texas R.O.W. that parallel the principle freeway driving lanes and provide access to property adjacent to R.O.W.

Internal Driveway**:** A private road or access way on private property that connects buildings or abutting ground to the driveway.

Major Street Facility: Any of the following: (1) S.H. 114, S.H. 170 and U.S. 377 and corresponding freeway frontage roads, (2) Kirkwood Blvd, Precinct Line Rd., Trophy Club Dr., Sam School Rd., Roanoke Rd., and Henrietta Creek Rd, (3) principal or minor arterial streets, or (4) major or minor collector streets.

Parkway: The area of the R.O.W. between edge of pavement and the corresponding R.O.W. line.

Property, Commercial: Property, regardless of zoning district, which is used wholly or partially for offices or the wholesale or retail sale of goods and services.

Property, Industrial: Property, regardless of zoning district, other than commercial property, multi-family property or industrial property as defined in this ordinance.

Property Multi-Family: Property, regardless of zoning district, that contains four (4) or more dwelling units.

Property, Residential: Property, regardless of zoning district, that contains three (3) or fewer dwelling units.

Street Classification: The functional classification of a street as defined in the Thoroughfare Plan or as defined by the Transportation Planner/Engineer for those streets not shown in the Thoroughfare Plan.

Town Engineer: Person officially designated to serve as the Town of Westlake's Engineer.

Town Planner: Person officially designated to serve as the Town of Westlake's Planner.

Town Transportation Planner/Engineer: Person officially designated to serve as the Town of Westlake's Transportation Planner/Engineer.

Traffic Impact Analysis (TIA): A study prepared and signed by a Registered Professional Engineer in the State of Texas that certifies the existing traffic conditions and determines the projected traffic to be generated by a proposed development.

**C. Driveway Permit Required**

(1) General: No person shall construct, reconstruct, relocate or in any way alter the design or operation of any driveway without a permit issued by the Town Engineer. No work shall be undertaken on a driveway until the executed permit has been received by the applicant. In no event shall a driveway be allowed or permitted if it is determined by the Town Engineer, in consultation with the Town Transportation Planner/Engineer, to be detrimental to the public health, safety and welfare.

(2) Applicability: Driveway permits shall be issued only in compliance with this ordinance and may include terms and conditions authorized by the ordinance. In no event shall a driveway be allowed or permitted if it is determined by the Town Engineer, in consultation with the Town Transportation Planner/Engineer, to be detrimental to the public health, welfare and safety.

(3) Street Reconstruction: Where in the course of public street reconstruction by the Town, County or State of Texas it becomes necessary to revise or eliminate an existing driveway to be in conformance with this ordinance, the property owner shall be notified in writing of the required changes. Said changes shall be implemented at the cost of the appropriate public agency, and will not result in denial of reasonable access from the property to the general street system.

(4) Traffic Impact Analysis Required: For commercial, industrial or multi-family driveways on a major street facility, the Town Engineer, in consultation with the Town Transportation Planner/Engineer, may require an applicant to submit a Traffic Impact Analysis as part of the permit application and review process. This requirement may be waived if the Town Engineer, in consultation with the Town Transportation Planner/Engineer, determines that the driveway has been adequately analyzed in a previous traffic study.

(5) Common Access: A common access easement may be required between adjacent lots fronting on a major street facility in order to minimize the total number of access points along those streets and to facilitate traffic flow between lots. Lots with sufficient frontage to safely meet the design requirements of Section 5.0 may be permitted to have their own driveways. The owner or developer of property required to use common driveways shall be responsible for obtaining easements on adjacent property as necessary. The Town may,

but shall not be required to, assist in the acquisition of off-site easements if the owner is unable to acquire them. With a request for assistance, the owner shall provide the Town with documentation of his efforts, including evidence of a reasonable offer made to the adjacent property owner. Upon such a written request for assistance, the Town may attempt to acquire these easements through negotiations. If the negotiations are unsuccessful, the request may be submitted to the Board for consideration of acquisition through condemnation. In either case, the total cost of the acquisition and the cost of the easements shall be paid by the owner (developer). In the event the Town elects not to acquire the property through condemnation, alternate driveway locations and designs in conformance with this ordinance shall be required.

**D. Revisions of Existing Driveways for Conformance**

Upon application for Building Permit or Certificate of Occupancy, existing driveways that are not in conformance with this ordinance shall be brought into compliance at the expense of the Applicant as a condition of the building permit or certificate of occupancy if one of the following conditions is met:

1. The existing use of the driveway is projected to increase in actual or proposed daily design hour volume by twenty (20) percent or more.

2. The change in the use of the property or modifications to the property restricts the flow of vehicles entering or exiting the property in a manner which is anticipated to disrupt normal traffic flow in the public street, thereby creating a hazard. Change in property use may include but is not necessarily limited to change in type of business, expansion in an existing business, change in zoning, and subdivision which creates new parcels. It does not include modifications in advertising, landscaping, remodeling, general maintenance, or aesthetics that do not affect internal or external traffic flow or safety.

**E. Design Criteria**

The following standards shall be followed in the design and construction of driveways within the Town of Westlake.

(1) Design Standards

The values in Table 4E.1.1 represent minimum and/or maximum standards to be applied in designing and locating driveways on Town streets. For each driveway, the Town Engineer, in consultation with the Town Transportation Planner/Engineer, may require a specific combination of dimensions within these ranges based on the anticipated traffic flow and safety characteristics of the driveway and public street.

**Table 4E.1.1 - Driveway Design Standards**

| Criteria | Street Classification | Residential Driveway | Commercial & Multi-Family Driveway | Industrial Driveway |
|---|---|---|---|---|
| Driveway Throat Width* | State Highways & frontage roads | 10-20 ft. | 30-36 ft. | 30-48 ft. |
| | Arterials | 10-20 ft. | 30-36 ft. | 30-48 ft. |
| | Collectors | 10-20 ft. | 24-36 ft. | 30-48 ft. |
| | Local Streets | 10-20 ft. | 24-36 ft | 24-36 ft. |
| Driveway Curb Radius* | State Highways & frontage roads | 15-20 ft. | 20-30 ft. | 20-40 ft. |
| | Arterials | 10-20 ft. | 20-30 ft. | 20-40 ft. |
| | Collectors | 5-10 ft. | 20-30 ft. | 20-30 ft. |
| | Local Streets | 5-10 ft. | | |
| Minimum Centerline Driveway Spacing Along Roadway ** | State Highways & frontage roads | 50 ft. | 500 ft. | 500 ft. |
| | Arterials | 250 ft. | 250 ft. | 250 ft. |
| | Collectors | 50 ft. | 150 ft. | 150 ft. |
| | Local Streets | 20 ft. | 100 ft. | 100 ft. |
| Minimum Distance to Intersection Along Roadway *** | State Highways & frontage roads | 250 ft. | 250 ft. /500 ft. | 250 ft. /500 ft |
| | Arterials | 250 ft. | 250 ft. /500 ft. | 250 ft. /500 ft. |
| | Collectors | 50 ft. | 150 ft. /300 ft. | 150 ft. /300 ft. |
| | Local Streets | 30 ft. | 100 ft. | 100 ft. |

* The requirements for Driveway Throat Width and Driveway Curb Radius are for standard undivided two-way operation and may be varied by the Town Engineer, in consultation with the Town Transportation Planner/Engineer, if traffic volumes, truck usage, common driveways, and other factors warrant such.

** The minimum centerline spacing does not implicitly determine the number of driveways allowed. Driveways served by deceleration lanes may be spaced at closer intervals if approved by the Town Engineer, in consultation with the Town Transportation Planner/Engineer.

*** Distance measured from nearest edge of the driveway throat to the intersecting R.O.W. line.

(2) General Design Criteria

a. Driveways on State and Federal Highways: Driveways along State Highways, including S.H. 114, S.H. 170, and U.S. 377, (and future frontage roads) shall be located in accordance with Texas Department of Transportation (TXDOT) access control guidelines. Driveways will not be allowed within areas indicated as "access denied" as per Figures 4E.2.1 and 4E.2.2. The Town Engineer, in consultation with the Town Transportation Planner/Engineer, may, with the concurrence of TXDOT, allow driveways within the areas indicated as "access denied where practical" as per Figures 4E.2.1 and 4E.2.2. All other driveway access shall be provided in accordance with Figures 4E.2.3 and 4E.2.4.

b. Driveways on Arterial Streets: Driveways on arterial streets with retail zoning within 1000' of another arterial shall be designed in accordance with Figure 4(E).2.5. As per Figure 4(E).2.5, any driveway constructed within 250 feet of an intersection of an arterial with another arterial shall be right turn in and out only, and shall have signs placed at the Applicant's expense indicating right turn in and out only. The minimum distance for a full access driveway is 500 feet from an arterial intersection with another arterial. Driveway access on arterials without retail zoning more than 1000' from another arterial shall be located in accordance with Section 3(F) - median openings.

At the intersection of an arterial with a collector street, the minimum distance on the arterial approach for a full access driveway shall be 500 feet. The minimum distance on the collector approach shall by 300 feet. The minimum distance for a driveway with minor access (right turn in and out only) on the arterial section shall be 250 feet from the intersection. The minimum distance for a driveway with minor access (right turn in and out only) on the collector section shall be 150 feet from the intersection.

c. Driveways on Collector Streets: Driveways on collector streets with retail zoning within 1000' of another collector shall be designed in accordance with Figure 4E.2.6. As per Figure 4E.2.6, any driveway constructed within 150 feet of an intersection of a collector with another collector shall be right turn in and out only, and shall have signs placed at the Applicant's expense indicating right turn in and out only. The minimum distance for a full access driveway is 300 feet from the collector intersection with another collector street. Driveway access on collectors without retail zoning more than 1000' from another collector shall be located in accordance with Section 3(F) - median openings of this standard.

At the intersection of a collector with an arterial street, the minimum distance on the arterial approach for a full access driveway shall be 500 feet. The minimum distance on the collector approach shall by 300 feet. The minimum distance for a driveway with minor access (right turn in and out only) on the arterial section shall be 250 feet from the intersection. The minimum distance for a driveway with minor access (right turn in and out only) on the collector section shall be 150 feet from the intersection.

d. Minimum Throat Length: The driveway for any multi-family, commercial, or industrial property that connects to a major street facility shall extend onto private property a minimum distance of 18 feet from the right-of-way line before intersecting any internal driveway.

e. Common Access Easements: The use of common driveways shall require the dedication of a joint-use private access easement on each affected property. Said dedication shall be provided on the final plat of the subject properties, or be filed by

separate instrument with the recorder of deeds for the county in which the property is located, with a copy forwarded to the Town.

The common access easement shall encompass the entire width of the planned driveway plus an additional width of one (1) foot on both sides of the drive. At a minimum, the size of the access easement must be twelve (12') feet wide and fifteen (15') feet deep for residential driveways or twenty-six (26') feet wide and forty-two (42') feet deep for commercial and industrial driveways. When the center of the easement is offset from the common lot line, the easement must extend past the lot line a minimum distance of one (1') foot.

f. Radius Return Limit: For any driveway, the point of radius return tangency with he street curb shall not extend beyond the property line (projected perpendicular to the street centerline) except as provided in common driveway agreements and as approved by the Town Engineer, in consultation with the Town Transportation Planner/Engineer.

g. Curb Leave-outs: If a street curb is to be left out for later installation of a driveway, the driveway shall be poured within six (6) months of the issuance of a building permit, or the curb shall be replaced.

h. Utility Offset Minimum: No portion of any driveway shall be located within four (4') feet of any fire hydrant, electrical pole, or any other surface public utility. The Applicant, at his expense, may have the surface utility moved, if the public utility agency determines that the move will not detrimentally affect the service.

i. Curb Inlet Drainage Offset: The driveway curb return at the point of tangency with the street curb shall not be located within (a) five (5') feet of the downstream edge, nor ten (10') feet of the upstream edge, of a straight curb inlet or inlet extension, nor (b) within ten (10') feet of recessed inlet, without prior permission of the Town Engineer.

j. Off-Street Maneuvering: All vehicle maneuvering on multi family, commercial, and industrial properties into a parking space or up to a loading dock or into any other area shall be accomplished by off-street maneuvering areas and internal driveways. No back-in or back-out vehicle maneuvering from a driveway shall be allowed to occur on any public street or right-of-way with the exception of residential drives on local streets.

k. Adequate Sight Distance: Driveways may be prohibited where adequate sight distance is not available for the established speed limit, or the design speed of a future street improvement, if higher. Sight distance easements at street and driveway intersections shall be determined in accordance with the following:

1. Applicability: No fence, wall, screen, sign, structure, or foliage of shrub or trees shall be erected, planted or maintained in such a manner as to obstruct of interfere with a clear line of sight for the drivers of approaching motor vehicles within the sight distance easement.

2. Sight Easement: The sight easement shall be kept clear of visual obstructions except tree trunks and municipal or traffic sign posts between 30 inches and 9 feet above the average grade of the street.

3. Dimensions: The sight distance easement shall be a minimum of 5 feet beyond the critical line of sight. The critical line of sight shall be defined as illustrated in Table 4E.2.1 and Figure 4E.2.7. Values of "d" may be

obtained from the table for controlled intersections, or they may be calculated in accordance with AASHTO standards for the critical condition.

**Table 4E.2.1 - Intersection Sight Distance Requirements**

| Design Speed (mph) | 2 Lane Roadway d=(feet) | 4 Lane Roadway d=(feet) |
|---|---|---|
| 30 | 0 | 0 |
| 40 | 610 | 820 |
| 50 | 760 | 1030 |
| 60 | 910 | 1230 |

If a field inspection indicates that driveway sight distance may be insufficient, the Applicant will be required to submit vertical and horizontal information to the Town that verifies adequate sight distance is available for the proposed driveway location.

l. Site Plan Required: A site plan showing all existing right-of-way, easements, curbs, storm drain inlets, flumes, underground and overhead utilities, trees and sidewalks shall be required for each non-residential driveway permit applications. The proposed driveway grades shall also be shown for a minimum distance of fifteen (15') feet past the right-of-way line. All driveways and median openings within 150 feet of the subject property on both sides of each abutting street shall be shown on the site plan. If an adjacent street contains a raised median, showing driveway(s) on the opposite side of the street shall not be required unless a median opening is present or proposed.

m. Temporary Driveways: Temporary driveways shall only be permitted if the public street construction is an interim section and if approved by the Town Engineer, in consultation with the Town Transportation Planner/Engineer.

(3) Residential Standards

a. Circular Drives: Circular drives are allowed on residential lots not fronting on arterial or collector thoroughfares. There shall be 25' minimum distance between the two interior portions of the drives at the R.O.W. line. The minimum lot frontage required to construct a circular drive is 100 feet.

b. Common Drive Width: A residential driveway shared by two or more properties shall have a minimum throat width of twelve (12') feet. A common access easement shall also be required as described in Section 4E.5. Shared residential driveways may be required for adjoining residential lots on major street facilities to reduce the number of access points on those roadways.

c. Access to Major Street Facility: Driveway access to a residential lot from any major street facility shall not be permitted unless that lot has no other public access. If such a driveway is approved on a major street facility, an off-street maneuvering area approved by the Town Engineer, in consultation with the Town Transportation Planner/Engineer, shall be provided to ensure that vehicles will not back into the public street. Driveway access to a residential lot from a minor collector street may be denied if either:

1. The lot has access to a local street, or

2. The proposed access would create a traffic flow or safety problem, unless there is no other access.

(4) Auxiliary Lanes

a. When Required: As a condition of a driveway permit, the Town Engineer, in consultation with the Town Transportation Planner/Engineer, may require the Applicant to provide a deceleration lane for any driveway located on an arterial street if the right turn ingress volume exceeds 50 vehicles in the design hour (150 vehicles if the design hour occurs on a Sunday). If the existing or future speed limit on the street facility exceeds 40MPH, a deceleration lane may be required if 40 right turn ingress vehicles occur in the design hour (100 vehicles if the design hour occurs on a Sunday). such calculation shall be made by the Town Transportation Planner/Engineer unless a Traffic Impact Analysis is provided by the Applicant.

b. Extension of Right turn Lane: When a driveway is approved within the separate right turn lane of a public street intersection, the lane shall be extended a minimum of fifty (50') feet in advance of the driveway. No driveway shall be permitted within the transition area of any separate right turn or deceleration lane.

c. Continuous Deceleration Lane: A continuous deceleration lane may be required as a condition of a driveway permit when two or more deceleration lanes are planned and their proximity necessitates that they be combined for proper traffic flow and safety. The transition taper for a continuous deceleration lane shall not extend into or beyond a public street intersection.

d. Left Turn on Undivided Roads: On undivided arterial roadways, a left turn lane and taper may be required as a condition of the driveway permit when the product of projected left turn ingress volume (50 minimum) and the opposing volume per lane exceeds 25,000 in any design hour. In such cases, the Town Transportation Planner/Engineer will analyze the present and future traffic volumes to verify that the left turn lane is necessary to maintain minimum levels of traffic flow and safety.

e. Left Turn on Divided Roads: On divided arterial roadways, the Town Engineer, in consultation with the Town Transportation Planner/Engineer, may require, as a condition of the driveway permit, construction of a left turn lane at an existing public street median opening when the proposed driveway will be served by such median opening and no left turn lane exists in the median.

f. Temporary Auxiliary Lane: The Town Engineer, in consultation with the Town Transportation Planner/Engineer, may require a temporary auxiliary lane to be constructed on existing arterial roadways that are planned for future improvement. If construction costs for the permanent auxiliary lane for the future street section is greater than that for the temporary auxiliary lane for the existing roadway, the property owner shall place escrow funds with the Town for the difference in the costs.

g. Deceleration Lane Extension: In the even the Applicant is allowed to locate a driveway with deceleration lane within one hundred (100') feet of an arterial intersection, the Applicant may be required to extend the deceleration lane to such intersection. The one hundred (100') feet shall be measured from the nearest edge of the driveway throat to the nearest R.O.W. line of the intersection arterial.

h. Construction Costs: The Applicant shall be responsible for the design, right-of-way adjustment of utilities, and construction costs of any auxiliary lane and street widening required as a condition of the driveway permit. If for any reason an auxiliary lane required under this Ordinance cannot be constructed in conjunction with the driveway by the Applicant, the Applicant may be required to place all necessary funds in escrow with the Town.

(5) Signalized Driveways

a. Driveway Analysis: As a condition of a driveway permit on a major street facility, the Town Engineer, in consultation with the Town Transportation Planner/Engineer, may require the Applicant to submit driveway volume and capacity information when signalization is requested ~~of~~ or expected at the driveway intersection. If a signalized driveway is constructed on an arterial, or on the frontage roads of a State Highway, it shall be no less than 1000 ft. from any adjacent signalized driveway or public street intersection, unless otherwise authorized by the Town Engineer, in consultation with the Town Transportation Planner/Engineer.

b. Signal Construction: If the driveway analysis indicates a signal is required and an overall public benefit is shown, the Town may require as a condition of the permit that the Applicant pay for the traffic signal installation costs necessary to serve the subject driveway.

c. Signal Reconfiguration Costs: If a driveway is permitted and installed at an existing signalized intersection, the applicant shall pay any costs necessary to modify the existing signal to accommodate the new driveway.

(6) Special Driveway Designs

a. High Volume Drives: The Town Engineer, in consultation with the Town Transportation Planner/Engineer, may require the Applicant to submit a Traffic Impact Analysis for any driveway on an arterial projected to serve 1,000 or more vehicles per day, or 100 ingress vehicles in the peak hour. Calculations of driveway ingress volumes will be based on land use type and square footage in accordance with the table in Appendix 4. Based on the need created by such a driveway, the Town Engineer, in consultation with the Town Transportation Planner/Engineer, may require internal driveway improvements, turning movement prohibitions, auxiliary lanes, and traffic control devices to address safety and/or capacity problems with the property which may have a detrimental effect on the adjacent public street system.

b. Left Turn Egress Control Median: All driveway on undivided arterial roadways having a projected exiting left turn volume that will operate at a ~~poor~~ level-of-service “D” or worse as defined in the latest edition of the "Highway Capacity Manual", published by the Transportation Research Board, may be required to be constructed with a left turn egress control median. Likewise, any driveway having a projected ingress left turn volume that will have a level-of-service "D" or worse may be required to have a left turn ingress control median. If both are required, a right in/right out driveway design may be required by the Town Engineer, in consultation with the Town Transportation Planner/Engineer.

c. Required Stacking for High Volume Drives: Driveways having a projected design volume of 5,000 or more vehicles per day shall have a minimum of one hundred (100') feet continuous approach length without adjacent parking stalls or vehicular cross flow.

(7) Drainage Design

In the vicinity of existing or future drainage structures, no driveway shall be permitted which may impair the effectiveness of the existing drainage facilities. Drainage in side ditches shall not be significantly altered or impeded by any driveway.

**F. Modifications, Variances and Appeals**

Modifications and variances are strongly discouraged.

(1) Modifications: Modifications may be granted by the Town Engineer, in consultation with the Town Transportation Planner/Engineer, for the particular area of responsibility controlled by such official under unique circumstances whenever needed to recognize extenuating circumstances or preserve the health, safety and welfare of the public, and provided that the modifications are in conformity with the intent and purpose of this ordinance. The Town Engineer, in consultation with the Town Transportation Planner/Engineer, may defer any request by an applicant to the Board for final determination.

(2) Variances and Appeals: Any applicant who desires a variance or elimination of the requirements herein, or who desires to appeal a decision of the Town Engineer, regarding modifications to this ordinance shall file a written appeal to the Town Engineer, who shall place the request on the agenda for consideration by the Board. The Board shall have the authority to grant a variance to this ordinance. In granting any variance, the Board shall determine that:

a. A literal enforcement of the regulations herein will create an unnecessary hardship or practical difficulty on the applicant.

b. The situation causing unnecessary hardship or practical difficulty is unique to the affected property and is not self-imposed.

c. The variance will not injure and will be wholly compatible with the use and permitted development of adjacent properties.

d. The granting of the variance will be in harmony with the spirit and purpose of this ordinance.

The decision of the Board shall be final.

**G. Enforcement**

(1) Building Permit: No permits for building construction or site work including grading and paving shall be issued for , multi-family, commercial or industrial driveways until a site plan meeting the requirements of this ordinance has been approved by the Town Engineer, in consultation with the Town Transportation Planner/Engineer,. No permits for residential construction shall be issued for residential driveways until a plot plan meeting the requirements of this ordinance has been approved by the Town Engineer or his designee.

(2) Certificate of Occupancy: All drives, parking, auxiliary lanes, drainage work or other requirements of this ordinance shall be completed prior to the issuance of a Certificate of Occupancy.

**SECTION 5. - ENGINEERING AND SUPERVISION**

A. The owner or developer shall employ a civil engineer experienced in street design and duly licensed to practice in the State of Texas for the preparation of the street plans and profiles.

These plans shall be subject to the review and acceptance of the Town Engineer or his authorized designee. Construction shall explicitly follow these approved plans unless specific written concurrence is obtained from the Town Engineer for deviations from said plans.

B. The owner or developer shall employ his own registered public surveyor or civil engineer to provide construction staking for the street facilities. The Town shall provide inspection services during the construction; however, such inspection shall only be for the purpose of insuring that the Town approved plans and specifications are compiled with and that the completed work is obtained as therein described. The owner and his engineer shall retain responsibility for the design and insuring that construction is completed in accordance with the Town approved plans and specifications.

**SECTION 6. - CONTRACTORS**

All streets shall be constructed by an eligible contractor employed by the owner or developer. Eligibility shall be determined by the Town Engineer or his authorized designee based on previous work history and other eligibility requirements as set forth by the Board of Aldermen. All eligibility requirements shall be equally applicable to all contractors. Ineligibility may be appealed to the Board of Aldermen.

A. The contractor shall ensure that the Town Engineer is notified forty-eight (48) hours in advance to the start of any construction on the street facilities. The contractor shall also insure that, when applicable, proper authorities of the Texas Department of Transportation, franchised utility companies, railroads or other affected interests are notified.

B. The paving contractor shall furnish to the Town Engineer, before beginning any of the paving operations, three executed sets of the required three-way contract documents, including payment, performance and maintenance bonds. The form of these contracts shall be provided to the contractor by the Town Engineer.

**SECTION 7. - CONSTRUCTION REQUIREMENTS**

A. The streets, including parkways, shall be excavated to the line and grade shown on the Town approved construction plans.

B. Standard pavement widths and sections shall be constructed on prepared subgrade in accordance with the standard specifications.

C. **Soil Conditions and Paving Design**:

(1) The developer shall employ the services of a Texas registered and qualified soils engineer and laboratory who shall stipulate in his/her report the recommended subgrade preparation and minimum pavement thickness. The Town Engineer reserves the right to request additional test borings.

(2) The design engineer, upon submitting plans for review, shall submit a copy of the soils report and statement that the pavement design is based on the findings of the soil report. The pavement design shall in no case be less than that minimum as required by the Town of Westlake.

D. **Excavation** (NCTCOG Item 3.1 through Item 3.7):

(1) Excavation within the paving right-of-way shall be performed full width in accordance with the improvements to be constructed.

(2) Borrow materials shall be free from all foreign materials such as tree stumps, roots, grass or organic materials.

E. **Subgrade Treatments** (NCTCOG Item 4.6):

(1) A geotechnical investigation shall be performed to determine suitable subgrade treatment.

(2) All pavement subgrade within designated rights-of-way and fire lane easements, where the plasticity index of the natural soil shall be treated with hydrated lime slurry (dry lime placement shall not be allowed). The amount of hydrated lime slurry shall be that which reduces the plasticity index of the treated soil to below 15. The Contractor shall acquire a soils testing laboratory suitable to perform lime series testing to determine the amount of lime slurry needed for each soil encountered.

(3) When a satisfactory subgrade cannot be constructed in soils with a plasticity index below fifteen (15), cement stabilization may be required by the Town Engineer.

(4) Where the plasticity index of the natural soil is less than fifteen (15), and with the approval of the Town Engineer, the subbase may be prepared without lime, if, in the opinion of the Town Engineer, it is not necessary in order to achieve a proper subgrade.

(5) The subbase shall be shaped to conform to the typical cross sections and thoroughly scarified to a depth of six (6) inches. Material shall not contain rocks with any dimension greater than four (4) inches.

(6) The material shall be brought to optimum moisture density and compacted to minimum of ninety-five percent (95%) of standard Proctor. The Town Engineer may require re-compaction if any density test is below 95%.

(7) Areas requiring compacted fill shall be clear of all grass, roots, stumps, etc., to a depth of at least six (6) inches below existing grade. This material shall be scarified to depth of six (6) inches, sprinkled as required, and re-compacted to a minimum of ninety-five percent (95%) of Standard Proctor. Fill areas shall be brought to grade in not deeper than six (6) inch lifts. Fill material shall not contain rocks with any dimension greater than four (4) inches. Fill material may not contain roots, stumps, bricks, or other debris.

(8) Areas requiring excavation shall be cleared of all grass, roots, stumps, etc. Over excavation may be required to remove said debris or to remove unsuitable material. If over excavation is required, the area shall be brought to grade with approved material as specified for compacted fills.

F. **Hot Mix Asphaltic Concrete (H.M.A.C.) Pavement**.

The H.M.A.C. pavement shall comply with the standard specifications of the North Central Texas Council of Governments and the following specifications:

(1) All asphalts, oils and emulsions shall conform to Item 300, Asphalts, Oils and Emulsions, of the Texas State Department of Highways and Public Transportation Standard Specifications for Construction of Highways, Streets, and Bridges.

(2) H.M.A.C. shall conform to Item 340, Hot Mix Asphaltic Concrete Pavement, of the Texas State Department of Highways and Public Transportation Standard Specifications for Construction of Highways, Streets, and Bridges, and to the following requirements:

The hot mix base courses shall be THD Type “C”.

The hot mix surface coat shall be THD Type “D”.

(3) The developer shall furnish the Town Engineer with a mix design prepared by an independent testing laboratory. The pavement design shall be prepared by an independent geotechnical engineer and shall be subject to the approval of the Town Engineer.

G. **Concrete Pavement**.

All concrete for paving of streets, alleys and fire lane shall meet or exceed these minimum requirements for workability, strengths, and finish.

(1) All sampling and testing of materials shall be in accordance with applicable American Society for Testing and Materials (ASTM) test procedures paid for by the contractor unless otherwise specified.

(2) All concrete design mixes shall be generated by a certified laboratory. Concrete design mixes used successfully on recent projects that meet the specifications for use may be reviewed by a certified laboratory providing current testing data is available, as approved by the Town Engineer.

(3) All concrete paving design mixes shall have a minimum cement content of five and one half (5-1/2) sacks per cubic yard. Fly ash substitution of twenty (20) percent or less of cement content by weight, may be approved on a specific project basis by the Town Engineer if not specified in the project plans or contract. Concrete for all surfaces constructed by handwork shall have a minimum cement content of six (6) sacks per cubic yard.

(4) The use of air entraining admixtures shall conform to ASTM Designation C-260.

(5) All concrete for paving shall include the use of water reducing admixtures conforming to ASTM Designation C-494, Types A, D, F, and G.

(6) All concrete for paving shall be designed to meet or exceed the flexural strength requirement of six hundred and fifty (650) p.s.i. at 28 days as tested with center point loading of the test specimens as per ASTM standard testing procedures. If samples fail to meet the flexural strength specifications, the additional samples shall be tested for a compressive strength of thirty six hundred (3,600) p.s.i. at 28 days. Samples are to be tested per ASTM standard testing procedures.

(7) The maximum time interval between the addition of cement to the batch, and the placing of concrete in the forms shall not exceed the following:

| Air or Concrete Temperature (Whichever is Higher) | Maximum Time (Addition of Water or Cement to Placing in Forms) |
|---|---|
| Non-Agitated Concrete | |
| Over 80 F | 15 Minutes |
| 35 F to 79 F | 30 Minutes |

| | Agitated Concrete |
|---|---|
| *90 F | 45 Minutes |
| 75 F to 89 F | 60 Minutes |
| 35 F to 74 F | 90 Minutes |

The use of an approved retarding agent in the concrete will permit the extension of each of the above temperature-time maximums by 30 minutes for bridge decks, top slabs of direct traffic culverts and cased drilled shafts, and one hour for all other concrete except that the maximum time shall not exceed 30 minutes for non-agitated concrete. *The temperature for all concrete shall not exceed ninety-five degrees (95°) Fahrenheit. Any concrete exceeding this condition will be rejected.

(8) Reinforcing:

a. The minimum reinforcing bar for all fire lanes and concrete paving within the Town right-of-way shall be #3 bars and shall conform to ASTM Designation A-615, with the spacing to be a maximum of twenty-four (24) inches on center in each direction.

b. Steel welded wire fabric (WWF) shall not be acceptable. Steel bar reinforcement shall be required in commercial, industrial and/or multi-family parking areas that are outside of the right-of-way areas and fire lanes.

c. All reinforcing shall be supported on bar chairs or supports designed for the specific purpose of reinforcement support.

d. All placement of reinforcing shall be in a good workmanlike manner and shall conform to current C.R.S.I. standards. All bars, laps, and splices shall be secured with ties at 50% of mat steel and 100% at all ends. All reinforcing in concrete which is in contact with the ground shall have a minimum clearance of three (3) inches and two (2) inches from any formed surface. All dimensions are clear dimensions. In no case shall the reinforcing mat clearance exceed “T” (thickness) divided by 3.

e. Only new billet steel will be acceptable for field bending, and rust or oil contamination will be cause for rejection.

H. **Final Grading**.

After all concrete work has been completed, final grading will be complete to elevations established on the approved engineering plans. The contractor shall sod all areas behind the edge of pavement and the right-of-way line on all major thoroughfares and collectors. The Contractor shall make the necessary arrangements to provide water to get the sod established.

I. **Designated Fire Lanes**.

The fire lanes shall comply with the following standards:

(1) The minimum width for drive aisles in parking lots shall be 24 feet. All fire lanes shall have a minimum width of 24 feet unless otherwise approved by the Fire Marshall. All fire lanes shall have a minimum inside radii of 20 feet. All street approaches to fire lanes shall have a minimum radii of 20 feet. A pavement design shall be prepared by a registered engineer in Texas. The pavement design shall be adequate to support the Town’s emergency vehicles.

(2) The maximum algebraic grade differential in percent, for fire lanes when vertical curves are not required shall be 10 for crests and 5 for sags.

(3) Fire lane pavement shall be marked with the appropriate striping and the following designation:

a. Six (6) inch wide red stripe with four (4) inch high white letters stating “FIRE LANE - NO PARKING” at fifteen (15) foot spacings. See General Design Standards for details.

J. **Designated Trash Receptacle Sites**.

A ten foot by ten foot (10′ x 10′) area shall be designated as a trash receptacle site (when required by Town code). An additional area shall be provided for recycling bin with the size and location to be approved by the Town Engineer. The minimum thickness shall be six (6) inches of reinforced concrete or, 12″ of hot mix asphaltic concrete. Pavement subgrade shall be hydrated lime treated in accordance with the pavement subgrade specifications.

(1) Trash receptacle sites shall be located at a forty-five (45) degree angle to and located off of the right of the traffic lane, and shall face the same direction when possible.

(2) All trash receptacle sites shall be screened as per the Unified Development Code, and shall be outside of the building pad area.

(3) Trash receptacle sites shall not contain any overhead obstruction above the pad, nor within thirty (30) feet in front of said pad. No pipes, curbs, or obstructions of any type is to be allowed within the 10′ x 10′ area.

(4) Because of the numerous criteria associated with commercial establishments, each commercial account property plan will be evaluated on an individual basis.

K. **Jointing of Concrete Surfaces, Sawing, and Sealing**.

The placement of concrete for paving shall be in accordance with the standard detail drawings, unless otherwise detailed on the approved project plans.

(1) All construction joints shall run parallel to the driving lanes (all concrete placement shall end in an expansion joint of street header).

(2) Expansion joints shall be installed a maximum distance of four hundred (400) feet apart, and at intersection radii and tie-ins to existing pavement. Expansion joints shall be as per standard details, full depth, and full width of the pavement cross section, and shall be perpendicular to the grade. Expansion joint materials shall be redwood strips with approved joint sealing compound and shall be free of open knots, splinters, or breaks.

(3) Transverse and longitudinal sawn contraction joints shall be as in the standard detail drawings, and shall be performed within five to twelve hours following the placement of concrete.

(4) Sealing of concrete pavement with hot poured rubber joint sealing compound shall be performed immediately following the cleaning of joints, and shall be performed prior to opening the pavement to any traffic.

L. **Quality of Workmanship and Materials**.

Concrete pavement surfaces shall be thoroughly finished and straight edged with a ten foot finishing tool prior to applying the final finish. The final finish shall consist of a rough broom (baker or astroturf) finish parallel with the edge of pavement. Inconsistent finish is grounds for removal. Finishing of the surface shall be performed without added water. The application of an acceptable curing compound (white in color), or wet curing process shall begin immediately following the dissipation of surface sheen, or in accordance with the manufacturer's recommendations.

M. **Record Drawings**.

The contractor shall be responsible for providing record drawings to the Engineer for the Project. The Engineer will make the required corrections and submit the "as-builts" to the Town of Westlake. Record drawings shall be 24″ x 36″ in size and shall consist of one (1) mylar sepia, three (3) mils in thickness or greater, and three (3) blueline prints printed from said submitted mylar sepia prints shall be legible. The developer will be charged $1.00 per sheet of approved Engineering plans for micro-fiche reproduction.

N. **Testing Procedures**.

See detailed testing procedures in the latest edition of the North Central Texas Council of Government's Standard Specifications. The Contractor shall be responsible for the coordination of the testing.

O. **Variance to Location of Median Openings**.

Variances to the median opening standards may be considered by the Town pursuant to the UDC. These variances may be considered under the following conditions:

(1) Conditions where a physical impossibility prevents use of the median opening at its required location, and

(2) It can be demonstrated by the applicant that safety, based on the proper design speed of the roadway, is not compromised and that the average number of median openings is not exceeded.

(3) Financial hardship shall not constitute physical impossibility. For those median openings located away from major intersections, safe design and the speeds along the given street segment shall be considered as a major part of the Commission's deliberations. Use of directional islands, elimination of turn lanes and left turn prohibitions and other reasonable restrictions related to the requested variance, may be required.

P. **Concrete Pavement**.

All testing associated with paving improvements will be conducted by a certified laboratory selected by the contractor, and approved by the Town Engineer. All tests performed will be paid for by the contractor unless noted on the plans and specifications.

(1) Upon completion of the work and before final acceptance/final payment shall be made, pavement thickness tests will be conducted. The number of cores required for thickness verification will be based on three (3) cores for every two thousand (2000) square yards of pavement surface area. A minimum of three (3) cores per project will be required, unless otherwise authorized by the Town Engineer or his appointed representative.

Pavement deficient in thickness shall be governed by the NCTCOG standards.

(2) During the progress of the work, the contractor shall cast test beams to maintain a check on the flexural strength of the concrete being placed. Sampling and molding of test specimens shall meet the applicable ASTM guidelines. Concrete pavement testing shall comply with NCTCOG standards. Deficiency in pavement strength shall be governed by the NCTCOG standards.

## SECTION 8. – TEMPORARY PARKING FACILITIES

**A. GENERAL:** Temporary parking facilities may be considered by the Board of Aldermen subject to the following conditions:

1. Temporary parking facilities may be granted for a period not to exceed one (1) year from the date of approval by the Board of Aldermen.

2. Temporary facilities must be completely removed and the area restored to its natural state at the end of one (1) year or once the facility is no longer needed, whichever comes first.

3. The request for temporary facilities must be accompanied by a completed Temporary Parking Facility permit form.

4. The Town Manager or his designee must review and approve the plans and specifications to assure that the lot meets minimum requirements prior to consideration by the Board.

# ARTICLE III: DRAINAGE FACILITIES

## SECTION 1. - INTENT

The intent of these drainage policies and standards is to protect the general health, safety, and welfare of the public by reducing flooding potential; controlling excessive runoff; minimizing erosion and siltation problems; and eliminating damage to public facilities resulting from uncontrolled stormwater runoff. It is also the intent of these standards and policies that the rural character of Westlake be maintained by avoiding the necessity for hard surface erosion control such as concrete channel lining.

Hydraulic design in the Westlake environment requires an approach not normally encountered in urban development. Appearance must be an integral part of the design process, and the finished drainage structures must preserve the natural rural character of the Town.

In an effort to maintain the natural, rural aesthetics of the existing creeks and floodplains, the Town of Westlake requires the preservation of these areas as open space greenbelt areas. The design of drop structures and other hydraulic structures shall blend with the natural surroundings as much as possible to maintain the aesthetics of the natural channel. The use of landscaped detention basins is encouraged.

## SECTION 2. - SUBMITTAL REQUIREMENTS

A. **Regional Stormwater Management**.

(1) The Town of Westlake's Comprehensive Plan and Article XIII, Westlake Unified Development Code (UDC) indicates that a regional approach to detention facilities is much preferred over a tract-by-tract method of controlling the changes in run-off patterns as development occurs. The Comprehensive Plan envisions a system of lakes and flood control measures incorporated into the open space plan, which will function to mitigate adverse impacts to the drainage system that full development of Westlake may cause.

(2) The developer shall submit with the preliminary plat, a site-specific preliminary drainage study for the review and concurrence of the Town Engineer as required per the Subdivision Ordinance. The preliminary drainage design study will address in concept how the proposed development impacts the regional stormwater management system and outline what steps should be taken to eliminate any damage potential from development of the said project.

(3) During the final plan process, a detailed hydraulic/hydrologic analysis of the entire drainage basin affected by the proposed development shall be provided. That portion of the drainage basin that is undeveloped land will be considered to be fully developed in accordance with the Town's approved land-use plan and the floodplain analysis shall be based on that assumption. This detailed analysis shall show regional stormwater management facilities, which will be needed to mitigate the adverse impacts of stormwater runoff due to development. Increases in peak flows may be allowed if appropriate freeboard to existing structures are maintained and runoff velocities remain at non-erosion levels. Fee in lieu of construction may be approved based on the results of the interim study.

(4) Detention/retention facilities will be located and sized so that discharges from the facilities are at peak rates and durations to minimize stream bed erosion.

(5) All drainage plans shall assume (1) fully developed conditions within the entire basin in which the proposed development is located; (2) that all portions of the basin that are located outside the proposed development but within the corporate limits or ETJ of the Town will be required by the Town to be developed in accordance with drainage policies that are at least as restrictive as the policies contained in this policy, and (3) that all

portions of the basins that are located outside the proposed development and outside the corporate limits or ETJ of the Town will discharge unattenuated peak flows into the basin (unless such portions of the basin are governed by drainage policies of another governmental entity, in which case such portions of the basin will be assumed to be developed in accordance with the policies of such other governmental entity). If, for any reason, the anticipated uses of any land within the basin are unknown, the drainage plans shall assume a coefficient of runoff of 0.65 for such land. Except as hereinafter provided, all storm water drainage improvements must be designed and constructed to consider and take into account storm water runoff within the entire basin above such improvements. For the purposes of this policy, storm water management facilities shall be defined as facilities (such as detention ponds, retention areas, and infiltration and sedimentation ponds) which provide temporary, long-term and/or permanent storage of storm water runoff. Storm water drainage improvements shall be defined as all storm water drainage improvements through which, into which storm water flows including, but not limited to, streets, alleys, storm sewers, channels, culverts, bridges, swales and any other similar land or facilities, but specifically not including storm water management facilities.

(6) This section shall not preclude the Town from requiring regional detention facilities and the cost allocation shall be proportionate to the drainage impacts of the development.

B. **Preliminary Drainage Study Requirements**.

(1) General: The owner shall be required to provide, at owner's expense, a preliminary drainage study of the area proposed for development, in conjunction with any preliminary plat submittal.

(2) Preparation: The study shall be prepared by a civil engineer licensed to practice in the State of Texas.

(3) Submittal: Three copies of the preliminary drainage study shall be submitted to the Town Engineer for review and concurrence prior to approval of the preliminary plat by the Planning and Zoning Commission.

(4) The study shall include:

a. Contour Map: A contour map of the entire drainage area contributing runoff to the subdivision equivalent to the currently approved contour maps of the Town, and ten (10) foot contours for drainage area outside of the Town. Drainage areas greater than 400 acres may be shown on the map at the scale smaller than 1 inch = 200 feet, subject to the concurrence of the Town Engineer.

b. Design Calculations: Sufficient design calculations showing preliminary sizes and locations of drainage facilities.

C. **Final Plan Requirements**.

(1) General: The owner shall, at the owner's expense, provide one (1) reproducible copy and three (3) complete sets of the final plans and specifications for the drainage facilities associated with a final plat.

(2) Preparation: The plans and specifications shall be prepared by a civil engineer licensed to practice in the State of Texas.

(3) Submittal: The plans and specifications shall be submitted to the Town Engineer for review and concurrence prior to final plat approval.

D. **Responsibility for Plans and Specifications**.

The Owner and the Owner's engineer shall be responsible for the accuracy of the information furnished in the design of the storm drainage facilities.

**SECTION 3. - POLICIES**

**A. Design Policies**

(1) Development cannot produce any increase in 5, 10, 50 or 100 year water surface elevations outside of the project boundaries.

(2) If the peak discharge from any area proposed for development would increase downstream flooding from 5, 10, 50 or 100 year storm, then such peak discharge must be regulated to the extent necessary to eliminate the increased flooding regulation of peak discharge may be achieved using storm water management facilities (either on-site or off-site) subject to the approval of the Town Engineer.

(3) Development shall have no net loss in valley storage (100 year storm) as a result of the proposed development. The developer shall not be required to compensate for the loss of valley storage outside the corporate limits and extra territorial jurisdiction of the town.

(4) Development shall not discharge erosive velocities downstream.

B. **Types of Drainage Features**.

(1) Swales and Other Open Channels, either improved or natural (preferably natural)

(2) Closed Systems, i.e., storm sewers

(3) Detention Basins

C. **Swales and Other Open Channels**.

(1) Swales are broad, shallow waterways lined with vegetation. Their use is preferred in the Town of Westlake over more conventional storm sewers as a runoff collections system. Swales are components of natural drainage systems which direct runoff out of developed areas by using existing topography as much as possible. Channel design techniques may be used in extreme conditions to carry peak flows. Lined channels or low-flow pilot channel lining of vegetative channels shall be permitted on a case-by-case basis when conditions are not suitable for vegetative-only channels. Concrete linings are prohibited except with the express approval of the Board of Aldermen.

(2) Swales shall minimize the changes in runoff patterns that accompany development. The construction of swales rather than storm sewers shall reduce the volume and the velocity of runoff from developed areas. Volume is reduced because the swale allows percolation of runoff, and velocity is reduced due to the natural roughness of these vegetated channels. These reductions in velocity and capacity also benefit water quality by resulting in a reduction in pollutant load associated with erosion.

(3) Swales also help preserve the rural character of Westlake.

(4) Velocities in vegetation channels shall be kept below erosive velocities based on geotechnical investigation. A site specific geotechnical investigation performed by the Developer shall determine the limit of the velocities the soil can withstand.

(5) In general, if flows and velocities entering the existing floodway are not increased then no improvements shall be required. Conservation of existing channels in their natural condition is required, unless otherwise approved by the Board of Aldermen.

(6) The following criteria shall be used in determining the nature of the open channel:

a. An improved channel may be approved by the Town Engineer under the following conditions.

1. The channel shall reduce destruction to natural resources such as reducing impact to trees.

2. A diversion or bypass channel to reduce discharge in natural creek.

3. In areas where natural resources shall not be destroyed subject to the approval of the Board of Alderman.

b. For channels with a contributing drainage area of less than 320 acres:

1. If the natural channel is to be replaced by an improvement channel, the flow from the one hundred (100) year return frequency storm must be contained within the improved channel while allowing for one foot of freeboard.

2. Improved channels with design velocities of less than six (6) feet per second may be earthen (i.e. vegetative) if the channels have a natural form and are revegetated properly.

3. Improved channels may be lined if the design velocity is greater than six (6) feet per second. Linings shall consist of natural stone. Alternatives must be subject to approval of Town Planner and Engineer.

4. The developer or owner shall use low maintenance vegetation for vegetative cover, as approved by the Board of Aldermen prior to planting.

c. For channels with a contributing drainage area of greater than 320 acres:

1. The channel may be left in its natural, unimproved state, and all land within the floodway and any required maintenance access shall be dedicated to the Town of Westlake as a permanent drainage right-of-way and open space corridor. An easement may be approved to accommodate localized drainage and other areas not part of the Town's Open Space Plan.

2. Alternatively, if the property owner so desires, the Town of Westlake may in its sole discretion allow an improved channel capable of carrying the one hundred (100) year return frequency flood while maintaining a freeboard of one foot. An improved channel draining more than 320 acres shall only be allowed if it is in conformance with the Master Drainage Plan.

D. **Closed Conduit Systems**.

(1) Storm water runoff shall be carried in storm sewer pipe, only when approved by the Town Engineer, and when one of the following conditions exist:

a. Where it is necessary for the protection of adjacent facilities that the storm water be carried in an enclosed facility; or

b. A culvert may be needed to pass storm water from the upstream side of a roadway or driveway to the downstream side without submerging the roadway or driveway or causing excessive backwater and flooding of upstream property.

(2) Headwalls and erosion protection shall be constructed at the outfall of all storm sewer systems where allowed, and shall be faced with natural stone or as approved by the Town Planner.

(3) Culverts for driveways shall be designed for a five-year storm; and roadway culverts shall be designed for a one-hundred year storm.

**E. Detention Basins**

Detention basins are encouraged to reduce the discharge, and allow diverse and multiple uses. Please refer to Section 6, dealing with detention basins.

**SECTION 4. - DESIGN STANDARDS OF CLOSED CONDUIT SYSTEM**

A. **General Provisions**.

Drainage and storm sewer systems shall be designed and constructed in conformance with the provisions of the North Central Texas Council of Governments Standard Specifications with the following additions:

(1) The use of “valley gutters” or unusually warped pavement sections to convey storm water runoff across a street intersection is prohibited unless otherwise approved by the Town Engineer.

(2) An adequate storm sewer system (5 year design frequency with positive overflow for 100 year storm at low points) consisting of inlets, pipes and/or excavated channels or natural creeks and other underground drainage structures with approved outlets shall be constructed where run-off of storm water and the prevention of erosion cannot be accomplished satisfactorily by surface drainage facilities. Areas subject to flood conditions as established by the Town will not be considered for development until adequate drainage has been provided. Any necessary drainage easements shall be a minimum of 20 feet in width.

(3) If approved by the Town Engineer, the Developer may provide, at his own expense, a right-of-way easement of sufficient width to permit excavation and maintenance of an open channel of satisfactory depth and width. The Developer shall complete all necessary excavation on the channel and shall install erosion control geotextile fabric, (if necessary) which does not deteriorate rapidly and permits or promotes the growth of grasses or sod. Any fabric meeting those requirements may be considered, if approved by the Town Engineer. Unless the excavated channel bottom is in Austin Chalk, Limestone, or other similar acceptable rock, erosion protection shall be required by the Town to prevent erosion. All weather driveway access shall be provided to the channel bottom with adequate surface texture to insure tire traction for maintenance vehicles.

Location and type of construction of open channels shall be approved by the Town Engineer.

(4) Natural creeks shall remain in open natural condition when possible. Excavated channels shall be landscaped with flood compatible vegetation. Trees shall be provided along both sides of the channel at a minimum ratio of one tree for every 40 feet of length of channel/drainage way. Shrubs and ground cover should be incorporated into the landscaping design for this portion of the drainage way. Within this landscaped area, all headwalls for either pipe or box culverts shall be faced with either brick or stone. The drainageway shall be landscaped in a compatible manner. However, the overall intensity of landscaping treatment may be reduced upon approval of the Town Engineer and the Board of Aldermen. Unless the floodplain is dedicated to the Town, maintenance shall be performed by a land owner's or a home owner's association where an owners agreement has been approved by the Board of Aldermen during the subdivision plat approval process.

(5) When a creek or excavated channel is to remain open, or in its natural condition, it shall meet one of the following requirements:

a. Where creeks or excavated channels with side slopes of 4:1 or flatter from bottom of channel to top of bank may be platted as part of individual lots Adequate access, maintenance and drainage easements (minimum 15 feet in width) shall be provided to insure protection of these areas for maintenance purposes.

b. Responsibility for maintenance shall be determined during the platting process.

(6) The area of the 100 year floodplain shall be dedicated to the Town in accordance with Section 11.3.D of the Subdivision Ordinance.

(7) Creeks or drainage ways in any areas which serve as private common areas shall have private maintenance provisions. However, the requirements of Paragraph 4 above, shall apply. The creek or drainage ways in these areas shall not be maintained by the Town, but adequate access and drainage easements (minimum 15 feet in width) shall be provided to insure protection of these areas for maintenance purposes.

(8) Lakes, detention ponds and retention ponds may be constructed in all areas provided they are approved by the Town Engineer. The Town will not assume maintenance responsibilities for this type of facility; however, easements (minimum 15 feet in width) shall be provided to assure protection of these areas for maintenance purposes.

(9) Other innovative drainage concepts shall be considered by the Board of Alderman if recommended by the Town Engineer.

B. **Engineering Design**.

The Engineering design shall conform to the criteria set forth in the City of Fort Worth Drainage Design Manual. The increase in runoff resulting from the development must be detained to result in no increase in runoff downstream of the project unless a regional detention basin is approved. In addition, no loss in valley storage based on the 100 year storm shall be allowed. Technical Paper 40 should be used to compute rainfall intensities. Upon approval of the Town Engineer, Technical Paper Hydro-35 may be used to compute rainfall intensities. The time of concentration used to compute rainfall intensity shall be as determined by an analysis of the proposed topography but shall not be less than 10 minutes.

(1) Minimum Size:

a. Mains: Mains are to be sized for full flow using Manning's Equation.

b. Laterals: Minimum sizes of a lateral are to be:

1. Eighteen (18) inch diameter for eight foot inlets.

2. Twenty-one (21) inch diameter for ten (10) inlet or larger, and all drop inlets. Engineer will verify flow capacity of all lateral lines.

c. Minimum Velocity: Minimum velocities in conduit shall be 2.5 feet per second.

d. Maximum Velocity: Maximum velocities shall not exceed the erosive levels as determined by the existing soil conditions upon exiting the developer's property.

**SECTION 5. - CONSTRUCTION STANDARDS**

A. **General**. All work and materials shall be in accordance with the Town of Westlake Engineering Standards and North Central Texas Council of Government's Standard Specifications.

B. **Pipe Materials, Reinforced Concrete (RCP) Pipe**.

(1) Pipe: Pipe shall conform to the following ASTM Designations:

a. Circular Pipe ASTM Designation C76;
b. Arch Pipe ASTM Designation C506.
c. Elliptical Pipe ASTM Designation C507.

(2) Fittings: The design and manufacture of all special fittings shall be governed by the same requirements as the connecting pipe.

(3) Joint Materials:

a. Gasket Material: ASTM C443. The polymer shall be synthetic rubber; natural rubber will not be acceptable.

b. Flexible Joint Sealant: Performed butyl rubber sealant; Hamilton-Kent-Seal N. 2″ Stik", or K.T. Snyder "RUB'R-NEK".

c. Mastic: Trowel grade sewer sealing compound; J.P. Petroleum Products "Tex-Mastic 726" or Grahn "Anchor-Tite Plastic Mastic".

d. Joints: Joints shall conform to ASTM Designation C76 and shall be suitable for the joint sealing material to be used. Joints with flexible sealant shall be positioned in accordance with the manufacturer's recommended adhesive, and the joint sealant shall be positioned in accordance with the manufacturer's installation instructions. Joints shall be pulled together with sufficient force to uniformly fill and seal the annular space in the joint. The application of mastic to the inside of the joint will not be considered to be acceptable joint sealing practice. Joints shall not be made when adverse weather conditions may prevent proper sealing, nor when temperature of the pipe and sealing materials is too low to achieve proper sealing.

e. Lift Holes: Lift holes will be allowed if they are precast into the pipe wall. All lift holes shall be plugged with precast concrete plugs and shall be sealed with elastic joint compound.

f. Cause for Rejection of Pipe: Defective workmanship and materials will be a cause for rejection of delivered pipe and fittings. Broken pipe joints where the sealant is exposed on the spigot end of the last laid pipe joint will be cause for rejection.

C. **Offsite Installation**.

(1) All relative specifications for storm drain improvement materials shall apply to offsite installations.

(2) Installation: As per approved drawings and specification.

(3) Manhole Markers: The contractor shall, at the direction of the Town Engineer or his appointed representatives, furnish and install two manhole markers at each off-site manhole.

D. **Excavation**.

Excavation, in general, shall be made in open cut from the surface of the ground and shall be no greater in width and depth than necessary to permit the proper construction of the work. When the trench depth exceeds four (4) feet in depth, a “trench safety” plan shall be prepared. The amount of trench excavation to grade shall not exceed 100 (one hundred) feet from the end of the pipe laying operations and no excavation shall be 300 (three hundred) feet in advance of the completed pipe operations (includes backfilling). At the end of the work day, all trench excavation shall be backfilled.

E. **Installation**.

(1) Bedding: A compacted crushed stone or pea gravel cushion, three (3) inches minimum in thickness, shall be required on the trench bottom unless otherwise stated on the project plans.

(2) Embedment: All installations shall conform to the latest NCTCOG Specifications.

(3) Backfill Compaction:

a. Mechanical Method: Compaction and consolidation of the backfill materials shall meet NCTCOG Specification Item 6.2.9 for any utility trench under existing or proposed roadways and/or alley sections. Trenches will be either sand backfilled up to within two (2) feet of the top of the subgrade and the remaining two (2) feet will be compacted to 95 percent of Test Method TEX-113E in one (1) foot lifts at optimum moisture content (to plus 4 percent above optimum moisture content) using the native material or the entire trench will be compacted to 95 percent of Test Method TEX 113E in one (1) foot lifts at optimum moisture content (to plus 4 percent above optimum moisture content) using the native material.

b. Water Jetting Method: Water jetting will not be allowed for any trench within the existing or proposed right-of-way. During jetting operations, jets must be used at close intervals along the trench in such a manner that sufficient water to lubricate and consolidate the fill reaches all parts of the backfill, and all the backfill material is saturated. The jet pipe should be kept at least two (2) feet away from the pipeline to prevent the eroding of the embedment. Only that amount of water

should be used which is necessary to consolidate the backfill. The jet ordinarily will consist of a pipe to which a two-inch diameter hose is attached at its upper end, utilizing conventional pipe fittings or swivel fittings. The jet pipe should not be less than1-1/2 inch steel pipe and its length should be approximately two feet shorter than the depth of the lift of backfill to be compacted. It should be used with a continuous supply of water with a pressure sufficient to cause backfill displacement.

F. **Miscellaneous Appurtenances**.

(1) Manholes: Manholes shall be rectangular and as detailed in the Town of Westlake General Design Standards. Manholes shall be spaced at a maximum of 500 feet apart.

(2) Storm Drainage Curb Inlets: The size of drainage inlet shall be as shown on the approved engineering plans. Curb inlets shall be a minimum of 8′-0′ in length. The type of inlet shall be as follows:

a. For Secondary and Major street sections, a recessed type of inlet is to be used.

b. For industrial and residential streets, a curb line inlet is to be used, unless otherwise approved by the Town Engineer.

(3) Storm Drainage Inlet and Junction Boxes:

a. The size and type of drainage inlet or junction box shall be as shown on the approved engineering plans in accordance with the Town of Westlake General Design Standards.

(4) Storm Drainage Wyes:

All storm sewer wyes shall be factory made unless authorized by the Town Engineer or his representative.

(5) Stone faced Headwalls: Headwalls constructed in public road rights-of-way shall have stone facing unless otherwise approved by the Town Planner. Safety grates shall be provided on all storm sewers above 24 inches in diameter. Sloped headwalls (in conformance with AASHTO standards) using stone facing over a concrete base shall be encouraged, where appropriate, for pipe culverts. Stone facings are required on box culverts and other drainage structures unless otherwise approved by the Town Engineer.

G. **Subsurface Drainage Systems**.

(1) Design Criteria: Where a contractor encounters underground water, or the design engineer's subsurface investigations indicate the presence of underground water of a flow rate judged by the Town Engineer to be detrimental to the adjoining Town maintained structures or property, a subsurface drainage system shall be installed. The minimum pipe diameter is to be six (6) inches with cleanouts located at a maximum distance of 300 feet.

(2) French Drain System: A french drain system, composed of a minimum four inch diameter perforated pvc pipe, will be installed between the back of curb and right-of-way line whenever adjoining lot elevations necessitate the use of retaining walls to maintain lot grades. French drain system shall be connected to the storm sewer system unless otherwise approved by the Town Engineer.

(3) Pipe Materials: The perforated pipe shall be Type PS 46, or approved equal, PVC pipe conforming to ASTM 758 and ASTM D-1784 with a minimum of four (4) hole rows of ¼ inch diameter perforations on four (4) inch maximum centers. The perforated pipe and conducting pipe shall be white in color.

(4) Installation: Installation shall comply with NCTCOG specifications.

H. **Record Drawings**. The contractor shall be responsible for providing "as-built" drawings to the Engineer for the Project. The Engineer will make the required corrections and submit the "as-builts" to the Town Engineer. Record drawings shall be 24″ x 36″ in size and shall consist of one (1) mylar sepia, three (3) mils in thickness or greater, and three (3) blueline prints printed from said submitted mylar sepia. All information on the submitted mylar sepia prints shall be legible. The developer will be charged $1.00 per sheet of approved Engineering plans for micro-fiche reproduction.

I. **Testing Procedures**. Testing shall be in accordance with the testing requirements outlined in the latest edition of the Public Works Specifications of the North Central Texas Council of Governments. The Contractor shall be responsible for the cost and procurement of all required tests. Two copies of all test reports shall be submitted to the Town.

## SECTION 6. - DETENTION FACILITIES

A. **Intent**.

The Town of Westlake encourages the use of detention basins based on the multi-faceted benefits to the community outlined below:

(1) Control of Flood Discharges:

The intent of detention basin (storage) design shall be to reduce flood discharges for the ultimate watershed development conditions without increasing peak discharges above the peak discharges for undeveloped watershed conditions. This storage method serves as a key strategy for the stormwater management plan.

(2) Environment:

As development occurs, there is a loss of wildlife and bird life habitat. It is possible to create a natural micro-environment around ponds that can offset this loss of habitat. These "natural" environmental pockets in conjunction with natural open space areas can help maintain the rustic setting of the Town.

Detention Ponds also benefit downstream water quality by allowing the sedimentation of pollutants.

(3) Recreation:

Detention basins offer many recreational opportunities in an urban setting; for example, a normally dry detention basin could be used for athletic fields or picnic areas, while the banks of the pond offer valuable park space.

(4) Aesthetics:

As an integral part of the Town of Westlake, a detention basin needs to blend into the landscape and into the community. Simple yet inexpensive measures, such as gentle side slopes, planting of trees and shrubs, and other landscaping features can transform the detention facility into an attractive amenity for the neighborhood.

B. **Requirements**.

(1) Detailed engineering studies of the entire basin utilizing the Master Drainage Plan shall be required to evaluate the timing of hydrographs from regional and on-site facilities, as well as backwater calculations to determine the effect of the detention/retention facilities on upstream water surface elevations.

(2) All detention facility designs shall be performed by a professional engineer registered in the State of Texas and shall meet the requirements of Permanent Rule 31, Texas Administration Code (TAC) Chapter 299, and other requirements, as applicable.

(3) The minimum amount of storage volume of the detention basin shall be that volume required to reduce runoff rate to the undeveloped condition rate. Dedicated detention basins shall also include an additional one foot of freeboard and two feet of sediment storage. The volume of runoff storage for drainage areas greater than 160 acres shall be compared using unit hydrograph procedures. Acceptable unit hydrograph procedures include the Soil Conservation Service Dimension less Unit Hydrograph and Snyder's Unit Hydrograph. Manual methods or use of the computer programs TR20, HEC-1, and NUDALLAS are allowed for runoff hydrograph computation and flood routings. The criteria contained in this section shall serve as the minimum requirements for detention basin design. For drainage areas less than 160 acres, the above methods are recommended; however, an approximate routing method may be used subject to approval of the Town Engineer.

(4) The maximum allowable release rate from any site shall be equal to the 100-year peak runoff rate prior to site development. The maximum design release rate may be less.

(5) Where storm water management improvements are required in the natural floodway or a permanent greenbelt or open space area, they should be incorporated into existing lakes, or they should be designed in as small an area as feasible to create natural contours. Note, however, that detention basins or retention ponds shall be a minimum of one acre in size to allow for proper maintenance, side slopes and outlet work operation.

(6) Retention/Detention ponds shall resemble natural ponds; in addition:

a. The pond should expand gradually from the inlet towards the outlet, insuring that there are no "dead zones". That is, water entering the pond gradually spreads out and uniformly displaces the water already present in the pond.

b. The length-to-width ratio should be 3 to 1 or greater, to provide a long flow path.

c. The average permanent pond depth should be greater than five (5) feet.

d. A ten (10) to twenty (20) foot wide shallow bench shall be provided along the shores of the permanent pond for safety and to encourage the development of bottom growth in these areas. This vegetation will enhance the biologic treatment characteristics of the pond and also enhance the "natural" appearance of the pond.

(7) If several ponds are required, they should vary in size and shape, and be separated by tree groves, vegetated berms, or similar screening of a natural appearance.

(8) Landscape materials should enhance wildlife habitat where feasible.

(9) Where slope erosion protection is needed for the side slopes of a pond, rock or geotextiles are required as approved by the Town Landscape Architect and Engineer. Exposed concrete surfaces shall be faced with embedded rock or masonry. Bare concrete shall only be permitted with the express written permission of the Board of Aldermen. Side slopes should be no steeper than 4:1 where feasible for reasons of public safety and maintenance.

(10) Detention facilities of less than 10 acre-feet of flood storage shall have outlet structures designed for the 100-year frequency storm. Facilities greater than 10 acre-feet of flood storage shall have outlet structures designed for the 10-year and 100-year frequency storms. The release rates shall be such that the flows after land development are no larger than the flows before land development.

(11) Outlets should be provided with a trash rack to prevent plugging with debris and to provide safety to the public. Due to unique design considerations, the Town Engineer may approve alternative outlet design.

(12) All Federal, State and County laws pertaining to the impoundment of surface water shall have been compiled with, including the design, construction and safety of the impounding structure. Copies of any Federal, State or County permits issued for the proposed impoundments shall be submitted to the Town Engineer.

(13) All detention/retention facilities shall include an additional one foot of freeboard and two feet of sediment in determining the design flood elevation.

(14) Provisions (such as emergency spillways or reinforcing of embankments) shall be made for the occurrence of overtopping or failure of the outlet structure. Under no circumstances should the emergency overflow have a direct path to any buildings or other structures used for human occupancy, commerce, or industry. Details of these provisions shall be supplied to the Town Engineer for approval.

(15) The flood storage volume of detention/retention facilities shall be designed to empty in a maximum of 12 hours if said facilities are to be considered an erosion/pollution control facility.

(16) Consideration should be given to the stocking of retention ponds with fish to control algae growth.

(17) Inlet structures shall be designed to both dissipate the flow energy and drop the inflow elevation to below that of the pond's water surface or basin's flowline.

**SECTION 7. - MINIMUM ELEVATIONS**

A. **Lots** shall have a minimum finished floor elevation of two (2) feet above the 100-year water surface elevation based on a fully developed watershed.

B. **Streets or alleys** in crossing or adjacent to the 100 year floodplain shall be designed with a top of curb (or crown) elevation not lower than two (2) feet above the 100-year water surface elevation based on a fully developed watershed where possible.

C. **Bridges** shall be designed with the low point (bottom side of girders or stringers) being two feet above the water elevation of a design storm whose frequency is 100 years.

# ARTICLE IV: WATER UTILITY FACILITIES

## SECTION 1. - GENERAL REQUIRMENTS

A. **General Provisions**. This section deals with general requirements for water line construction in the Town of Westlake. All water lines shall be sized and designed in accordance with the Town's Master Plan for Water Facilities. All construction shall be in accordance with the Standard Specifications for Public Works Construction published by the North Central Texas Council of Governments. All regulations of the Texas Department of Health, Texas Natural Resource Conservation Commission, and the Environmental Protection Agency shall be complied with.

B. **Water Main Categories**. Water lines in the Town of Westlake are categorized as:

(1) Distribution Lines - sizes 6 inches through 14 inches (nominal diameter).

(2) Transmission Lines - sizes 16 inches through 48 inches or over (nominal diameter).

(3) Distribution lines shall be of sufficient size to provide adequate water for potable and fire protection needs. Transmission line sizes are as shown on the Town Water Distribution Master Plan for Water Utilities.

(4) The Town Water Distribution System Plan may be periodically revised to meet the current demands as well as future needs as development occurs.

(5) The minimum water line size shall be 8" (nominal diameter). All references in these engineering standards to 6" water lines shall be amended to be 8" water lines.

C. **Water Line Requirements**. The Waterline Requirements Table of this article provides the basic water line requirements. These requirements are considered minimum.

(1) The owner/developer shall be required to install at his own expense, all water lines up to and including twelve (12) inches size, including all engineering costs. It shall be the developer's responsibility to determine the demand of the subject development. All off-site water mains required to connect service to the subdivision shall be installed at the expense of the developer up to twelve (12) inches. The owner shall also be responsible for obtaining easements, when required, from other property owners for off-site water main extensions and connections.

(2) All water lines shall be designed to complete a looped system to avoid dead-end lines. Valves shall be placed at or near the ends of mains in such a manner that a shut down can be made for a future main extension without causing a loss of service on the existing main.

(3) Valve and fire hydrant spacing as shown on the Waterline Requirements Table is considered minimum. Additional valves and fire hydrants may be required as determined by the Town.

(4) All water lines shall be installed within rights-of-way or water line easements. All water lines shall be shown on plan and profile sheets to the same scales as required for paving improvements. Should a water line exist in an easement prior to rezoning of the property for residential use or prior to development of the property for residential use, then the existing line shall be either relocated to rights-of-way at the developer's cost or the existing easement shall be dedicated to the Town as right-of-way.

(5) Valves may be required at both ends at street crossings, if the crossing is utilized for both domestic service and fire protection needs.

(6) Waterline crossings at existing streets in an established neighborhood would be required to be dry-bored with encasement requirements at street intersections and none at mid-block or between intersections.

(7) All service lines shall be installed for each lot, with a suitable marker placed at the point of stubout for reference in advance of street paving, sidewalk construction or any other item of street or drainage construction. Service lines shall be provided with a corporation stop at the main and an angle meter stop at the property line.

(8) Service connections will not be permitted on transmission mains or fire hydrant leads unless authorized by the Town.

D. **Water Line Materials**. All water line materials (pipes and fittings) shall conform with American Waters Works Association (AWWA) standards.

(1) Water lines of twelve (12) inches (nominal) or less in diameter shall be one of the following:

a. Ductile iron pipe, cement lines, bituminous coated, class 50 with polyethylene encasement.

b. P.V.C. AWWA standard C900 class 150 (D.R. 18).

(2) Water lines fourteen (14) inches nominal diameter or above shall be one of the following:

a. Ductile iron pipe, cement lined, or bituminous coated, class 50, with polyethylene encasement.

b. Reinforced concrete cylinder pipe (RCCP) AWWA standards C303.

c. Pre-stressed concrete pressure pipe, AWWA standard C301.

(3) Fittings shall be either gray or ductile cast iron and shall be cement lined inside and bituminous coated on the outside. Fittings for reinforced concrete cylinder pipe shall be specially manufactured in accordance with AWWA standards.

E. **Backflow Devices**. Approved Double Check Detector Check Valves must be installed on all privately maintained fire lines, at locations approved by the Town.

(1) All fire lines shall be designated for fire service only and not for domestic or irrigation service.

(2) An approved testable backflow prevention, double check assembly with flow indicator shall be installed on all domestic lines and shall be located at the connections of the service line and the water meter. The water meter and backflow preventer shall be a maximum of 8 feet from the back of curb or edge of pavement.

F. **Oversizing and Extensions**.

(1) The Town of Westlake may elect to oversize certain mains as required or as depicted in the current Town's Master Plan for Water Utilities. Subject to the provisions of Article XIII, Section 16 of the Unified Development Code (UDC), the Town of Westlake may participate on lines greater than 12 (inches) if the demand of the project is less than or equal to a 12 inch lines capacity, and the line is depicted on the Town's Master Plan for Water Utilities.

(2) Water extensions outside the Town of Westlake will not be granted to private entities. Water extensions outside the Town of Westlake may be granted to neighboring municipalities or governmental entities as approved by the Town of Westlake Board of Alderman.

G. **Meter Requirements**. Each connection to service individual or multiple spaces or structures shall be metered by an approved device.

(1) Meters shall be purchased by the developer, builder, owner, or applicant and dedicated to Town of Westlake. Installation of meters greater than 2″ shall be approved by the Town of Westlake.

(2) All meters shall be dedicated to the Town of Westlake except devices classified as private and utilized for sub-metering.

(3) All meters, backflow device boxes, and valves shall must be and approved by the Town Engineer prior to installation.

(4) All temporary water services shall be metered by a Temporary Meter, excluding the water necessary for flushing and disinfection purposes.

H. Each residential lot shall have a 2” water service line from the water main. The 2” service shall serve two separate lines to the residence. One line shall be a 1” line which is designated for domestic use, with a 1” meter and meter box, and will require an acceptable backflow preventer, which is testable, to be installed by the homebuilder’s plumber at the property line.

Also, a 2” line shall also be installed from the 2” service line, which shall be designated for the fire sprinkler system (if required). The line shall have a monitoring device and box to be installed at the curb stop.

Each residential lot needs a 1” meter and service line for domestic use, and a 2” line designated for the fire sprinkler system, if the Fire Marshall determines that a sprinkler system is required. A backflow preventer is required on domestic service, and a monitoring device is required on the designated fire line to assure that no other systems are connected to this line.

## WATERLINE REQUIREMENTS

| Water Line | Minimum Depth of Cover | Maximum Depth of Cover | Minimum Domestic Tap Size | Maximum Domestic Tap Size | Maximum Valve Spacing | Maximum Residential Hydrant Spacing | Maximum Commercial Hydrant Spacing |
|---|---|---|---|---|---|---|---|
| 6″ | 42″ | * | 3/4″ | 1″ | 500′ | 500′ | N/A |
| 8″ | 42″ | * | 3/4″ | 2″ | 500″ | 500′ | 300′ |
| 10″ | 42″ | * | 3/4″ | 3″ | 500′ | 500′ | 300′ |
| 12″ | 42″ | * | 3/4″ | 6″ | 500′ | 500′ | 300′ |
| 14″ | 42″ | * | 3/4″ | 6″ | 500′ | 500′ | 300′ |
| 16″ | 48″ | * | 6″ | - | 750′ | 500′ | 300′ |
| 20″ | 48″ | * | 6″ | - | 750′ | 500′ | 300′ |
| 24″ | 54″ | * | 12″ | - | 1,000′ | 500′ | 300′ |
| 30″ | 54″ | * | 12″ | - | 2,000′ | 500′ | 300′ |
| 36″ | 54 | * | 12″ | - | 2,000′ | 500′ | 300′ |
| 42″ or larger | 54″ | * | 12″ | - | 2,000′ | 500′ | 300′ |

* NOTE: Developer shall endeavor to maintain the water line as close to the minimum depth as possible.

I. **Fire Protection**. The Town of Westlake will review all plans and specifications of all proposed commercial and residential developments in the Town and will determine whether or not adequate fire protection may be afforded the building or buildings situated or proposed to be situated on such property with existing or proposed fire hydrants and water lines.

If, in the opinion of Town, adequate fire protection requires additional fire hydrants and water lines to serve proposed developments, the Town Engineer shall direct the owner of the property, in writing, to locate at pre-designated positions on the property a fire hydrant or hydrants and adequate water lines to provide adequate fire protection at the owner's own expense. The location and number of fire hydrants and water lines shall be situated as to afford adequate fire protection to all buildings located or proposed to be located on the property. Such installation to be completed in such reasonable period of time as the Fire Chief may direct.

(1) Fire Hydrant Specifications and Coverage Requirements are outlined in Section 9.5 of the Subdivision Ordinance. All fire hydrants must meet required Town of Westlake Standard Fire Hydrant Specifications.

a. All fire hydrants shall have one (1) 4.5″ pumper nozzle and two (2) 2.5″ hose nozzles; shall have a main barrel valve opening of not less than 5.25″; shall be placed on mains of not less than 6″ in diameter. Six inch (6″) gate valves shall be placed on all fire hydrant leads. All fire hydrants shall have a valve at the main with flange to flange fittings.

b. All fire hydrants shall be of a "break-away" design approved by the Town.

c. See Section 2.H.5 for painting requirements.

(2) Fire Protection Distribution Systems. Water distribution systems shall be of sufficient size to provide adequate water for fire protection to the development and shall conform to the Town's Master Plan for Water Utilities.

a. Residential.

1. Sizes and Allowable Dead End Lengths. In residential areas the minimum water line size shall be 6″. Dead end lines over 300′ and up to 600′ in length shall be 8″ minimum. Dead end lines over 600′ in length will not be allowed. Dead end lines shall terminate at a fire hydrant which shall be installed for maintenance purposes and may not necessarily be considered for fire hydrant density as required.

2. Valves. Additional isolation valves may be required to be installed depending upon the configuration of the system as determined by the Town.

3. Construction Standards. All water line construction shall conform to construction standards located elsewhere in this ordinance.

b. Commercial Areas.

1. Sizes and Allowable Dead End Lengths. In commercial areas the minimum water line size shall be 8″. Dead end lines over 300′ and up to 600′ in length shall be 10″ minimum. Dead end lines over 600′ in length will not be allowed. Dead end lines shall terminate at a fire hydrant which shall be installed for maintenance purposes and may not necessarily be considered for fire hydrant density as required.

2. Perpendicular crossings of underground public water lines may be allowed under driveways and sidewalks to provide protection/domestic service to the site. All crossings shall meet construction standards applicable with all provisions of this ordinance.

3. Valves. Additional isolation valves may be required to be installed depending upon the configuration of the system as determined by the Town.

**SECTION 2. - CONSTRUCTION STANDARDS**

A. **General**. All work and materials shall be in accordance with Town Standard Specifications, General Design Standards, and North Central Texas Council of Government's Specifications.

B. **Water pipe materials**.

(1) Ductile Iron

a. Pipe: American National Standard for ductile-iron AWWA Standard C151 (ANSI A21.51) Class 51.

b. Fittings: ANSI/AWWA C111/A21.11, except gaskets shall be neoprene or other synthetic rubber. Natural rubber will not be acceptable.

c. Joints:

1. Push on Joint: ANSI/AWWA C111/A21.11, except gaskets shall be neoprene or other synthetic rubber. Natural rubber will not be acceptable.

2. Flanged Joint: ANSI/AWWA C115/21.15.

3. Mechanical Joints: ANSI/AWWA C11/A21.11 except gaskets shall be neoprene or other synthetic rubber. Natural rubber will not be acceptable.

4. All bolts and nuts shall be ASTM A325 ASTM A325 Type III Enhanced Corrosion Resistant steel, or stainless steel Grade or 316.

5. Polyethylene Tube Wrap: ANSI/AWWA C105/A21.5 ASTM Designation D1248.

(2) Polyvinyl Chloride (PVC) pipe

a. Pipe: American National Standard for PVC pipe, AWWA Standard C900, Class 200 (SDR14).

a. Color: Blue in color.

b. Fittings: Cast iron ANSI/AWWA-C110/A21.10 and ANSI/AWWA-C111/A21.11 Standards.

c. Joints: Push on joints, ASTM D-3139

d. Gaskets: ASTM F477 Standards.

C. **Valves**.

(1) Gate valves, 12″ and under (resilient seated): AWWA C509 standard

a. General Description: Valves shall be full opening, iron body, non-rising stem, resilient seated wedge type so designed to have insignificant leakage with flow in either direction at pressures up to two hundred (200) psi. The valves shall be designed for throttling if required.

b. Coating: Valves shall have all internal ferrous metal surfaces coated with an approved epoxy coating to provide a corrosion resistant barrier. The epoxy coating shall be holiday free with a minimum thickness of not less than four (4) mils. The coating shall be non-toxic after application and shall impart no taste to water.

c. Operating stems: Valves shall have two (2) “0” ring stem seals. Valves shall have the thrust collar and bearing surfaces isolated from the waterway and be provided with continuous lubrication, or they shall be provided with non-corrosive thrust bearings above and below the thrust collar. Where the operating nut exceeds forty-eight (48) inches, in depth (below finish grade), a permanently attached extension shall be attached to the valve stem to bring it above the maximum depth of forty-eight (48) inches. All valves shall open by turning to the left and shall have a two (2) inch operating nut or be handwheel operated as shown on the plans.

d. Approved Manufacturers:
1. Mueller
2. Waterous
3. Approved equal

(2) Butterfly valves, greater than 12″

a. Approved manufactures AWWA Standard C504, Class 150B, or approved equal.

1. Mueller
2. Pratt
3. Dresser Industries

D. **Fittings**.

(1) Mechanical Joint: ANWI/AWWA-C110/A21.10 Standards

(2) Flange Joint: ANSI/AWWA-C111/A21.11 Standards

(3) Push-on Joint: ANSI/AWWA-C11/A21.10 Standards

E. **Bolts, Bolt-studs and “T” Head Bolts**.

(1) Length: Shall be such that the ends project ¼ to ½ inch beyond surface of nuts.

(2) Ends: Chamfer or rounded.

(3) Threading: ANSI B1.1 coarse thread series, class 2A Fit. Bolt-studs may be threaded full length. Studs for tapped holes shall be threaded to match threading in holes.

(4) Materials: All bolts, bolt-studs and "T" head bolts (ANSI/AWWA C111/A21.11-80) shall be either A242 high strength low allow steel with enhanced atmospheric corrosion resistance (ASTM A325 Type III) or Stainless Steel Grade 304 or 316 high strength bolts. All nuts are to be A563 carbon alloy steel. Grade and finish to be C3. **Exception**: All-thread rod to be used in a thrust harness only, shall be high strength, corrosion-resistant alloy (ASTM A325 Type II) with hexagonal nuts. Where all-thread rods, nuts and washers are used, they are to be painted with the following rubberized mastic coating.

a. "ROYSTON ROSKOTE MASTIC R28" Rubberized mastic as manufactured by ROYSTON LABORATORIES, INC. of Pittsburg, Pennsylvania.

b. Or as approved by Town of Westlake Engineer.

F. **Reaction Anchorage and Blocking**.

(1) Anchorage and thrust blocking: All piping with mechanical coupling, push-on or mechanical joints or similar joints subject to internal pressure shall be blocked, anchored, or harnessed to preclude separation of joints.

G. **Installation**.

(1) Excavation:

A. Excavation in general, shall be made in open cut from the surface of the ground and shall be no greater in width and depth than is necessary to permit the proper construction of the work. When the trench depth exceeds four (4) feet, a trench safety plan shall be prepared in compliance with applicable federal and state standards. At the end of the work day, all trench excavation shall be backfilled or properly protected as per OSHA standards.

B. In order to protect existing mature trees, the Town may require horizontal boring below the canopy of such trees.

(2) Minimum Bury depth: Minimum bury depth shall be forty-two (42) inches from finished grade to the top of the pipe.

(3) North Central Texas Council of Governments: All installations shall conform to the latest NCTCOG Specifications, as amended by the Town of Westlake and as detailed under "embedments" in this manual.

(4) Polyethylene tube wrap: Where ductile-iron pipe is to be used, the Contractor shall furnish and install polyethylene tube wrap around the ductile-iron pipe and/or ductile iron fittings. The tube wrap shall be installed in accordance with AWWA C105, Method A as follows: The wrap shall be 8 mil in thickness and seamless. Seams shall be wrapped and held in place by 2″ wide (minimum) plastic adhesive backed tape, Polyken No. 900, Scotch wrap no. 50, or an approved equal with approximate two (2) foot laps on the polyethylene tube, allowing the film to shift with the soil. The wrap shall be installed without breaks, tears, or holes in the film. The cost of the polyethylene wrapping and complete installation shall be included in the unit price bid for the furnishing and the installation of ductile iron pipe and related fittings and valves.

(5) Cathodic Protection: A cathodic protection system must be provided and installed on any water main system composed of ductile iron pipe. It shall be the responsibility of the project design engineer to determine the size and type of anodes necessary for adequate protection of the system

(6) Backfill Compaction:

a. Mechanical Method: Compaction and consolidation of the backfill materials shall meet the North Central Texas Council of Governments NCTCOG Specification Item 6.2.9 as amended by Town of Westlake for any utility trench under existing or proposed roadways and/or alley sections. Trenches will be and compacted to 95 percent of Test Method TEX-113E in one (1) foot lifts at optimum moisture content (to plus 4 percent above optimum moisture content) using the native material or the entire trench will be compacted to 95 percent of Test Method 113E in one (1) foot lifts at optimum moisture content (to plus 4 percent above optimum moisture content) using the native material.

b. Water Jetting Method: Water jetting will not be allowed for any trench within the existing or proposed right-of-way. During jetting operations, jets must be used at close intervals along the trench in such a manner that sufficient water to lubricate and consolidate the fill reaches all parts of the backfill, and all of the backfill material is saturated. The jet pipe should be kept at least two (2) feet away from the pipeline to prevent the eroding of the embedment. Only that amount of water should be used which is necessary to consolidate the backfill. The jet ordinarily will consist of a pipe to which a two-inch diameter hose is attached at its upper end, utilizing conventional pipe fittings or swivel fittings. It should be used with a continuous supply of water with a pressure sufficient to cause backfill displacement.

H. **Fire Hydrants** (installed at indicated locations).

(1) Manufacturers and models or approved equal

a. Models shall comply with AWWA C-502

b. Approved manufactures and models

1. Mueller (Centurion)
2. Waterous (Pacer)
3. Approved equal

(2) Installation:

a. Installation shall be a type as detailed in these standards. The usage of anchoring fittings shall be required as detailed.

b. Spacing:

1. Non-residential and multifamily (apartment) zones - three hundred (300) foot centers.

2. One and two family residential zones - five hundred (500) foot centers.

3. Fire hydrants shall be located no more than 12’ or less than 2' behind the curb or from edge of pavement. All fire hydrants shall have a 3' radius

clearance around hydrants, which prohibits any obstructions from being placed within this clearance area.

(3) Valves:

a. All valves shall be resilient seat gate valves (restrained) AWWA Standard C509.

(4) Markers: Approved manufacturers:

a. Approved manufactures:

1. Stemonsite Model 88-SSA
2. Approved equal

a. Location:

1. Fire hydrant marker shall be placed by Town of Westlake. The location of the markers shall be perpendicular to the curb, and at the center of the driving lane closest to the fire hydrant.

b. Installation:

1. As per manufacturer instructions.

(5) Painting:

a. All fire hydrants are to be primed at the factory and painted with two (2) coats of "Fire Green" paint as manufactured by Sherwin Williams or approved equal.

I. **Miscellaneous Appurtenances**.

(1) Water Services line: The Utility Contractor shall install the water service line at the center of the residential lot, terminating in a curb stop two (2) feet behind the curb. See detail drawings for burial depths and types of materials for each particular service size.

(2) Water meter box: A water meter box with locking lid shall be installed a clear distance of two (2) feet behind the curb. All meter boxes shall be located within a R.O.W. or dedicated easement and within a protected area. See detail drawings for type and size requirements. The meter box shall be furnished and installed by the Contractor after the Paving Contractor has completed the fine grading back of the curb.

(3) Location Marking:

a. Each individual service location shall be marked on the face of the curb with a four (4) inch high blue letters "W" painted by the Utility Contractor.

b. Valves located within a right-of-way shall be indicated on the face of the curb, or where curbs do not exist, on a conspicuous location adjacent to the valve location. Markings are to be the cutting of a four (4) inch high letter "V" with the point of the "V" pointing towards the valve location. The "V" shall be cut into the curb or paving using an approved motor driven concrete saw.

c. After cutting the letter "V" on the curb, it shall receive a coating of blue paint which shall coat the interior and exterior of the cut to a width of one (1) inch.

d. Offsite valve locations shall be marked by the installation of an "Offsite Utilities Control Marker." See standard detail drawing.

(4) Double strap service clamps: Service clamps shall be installed on all P.V.C. pipe taps as per standard detail drawing and material lists. Where taps are to be provided on ductile iron pipe, tapping saddles are to be used wherever wall thickness minus the foundry tolerance at the topped connection is less than that required for four (4) thread engagement as set forth in Table A.1, Appendix A of ANSI/AWWA C151/A21.51.

(5) Three piece adjustable valve boxes: Adjustable valve boxes shall be furnished and set on each valve in accordance with the detail drawings. After the final clean-up and alignment has been completed, the Contractor shall cast in place a concrete block, 24″ x 24″ x 6″ around all valve box tops at the finish grade.

J. **Connections with Existing Lines**.

(1) Existing line connections: Where connections are to be made between new pipe and existing pipe, such connections shall be made using fittings suitable for the conditions encountered. Each connection with an existing pipe shall be made with mechanical joint tapping sleeve and resilient seat gate valve. The tapping sleeve shall be a ductile or cast iron casting of the split sleeve type. The gaskets shall be neoprene or other synthetic rubber, conforming to ASTM D2000 BA508. Natural rubber will not be acceptable **Exception**: In some cases where the size of the tap approaches the size of the main, as judged by the Town Engineer, the use of a cutting-in sleeve and tee will be required.

(2) Alternative Casting: An alternative to the ductile or cast iron casting will be a fabricated steel tapping sleeve with special corrosion protection as follows:

a. Body - Shall be welded 3/8″ inch test plug and a flat-faced flange recessed for the tapping valve, conforming to AWWA C207 Class D-ANSI 150 pound drilling.

b. Finish - Shall be fusion-applied epoxy coating approximately 12 mils thick.

c. Bolts and Nuts - All bolts shall be Grade 18-8, Type 304 Stainless steel with heavy hex nuts. Bolts will be fluorocarbon coated to prevent galling.

d. Gasket - Shall be Buna-N rubber, conforming to ASTM D2000, BA508, with resistance to water, oil and hydrocarbon fluids. The gasket shall be of a hydraulically loaded design to provide a positive seal against the pipe surface.

(3) Tapping: Tapping is to be accomplished with no interruption of service. Facilities shall be provided for proper dewatering and for disposal of all water removed from the dewatered lines and excavations without damage to adjacent property. Special care shall be taken to prevent contamination of the existing potable water line when dewatering, cutting into, and making connections with existing pipe. No trench water, mud, or other contaminating substances shall be permitted to enter into the existing lines. The interior of all tapping sleeves, tapping machine cutter assemblies, and tapping gate valves installed in such connections, and the surface of the existing pipe at these connections, shall be thoroughly cleaned and then swabbed with a solution having a chlorine content of 200 milligrams per liter.

K. **Testing Procedures**. Testing shall be in accordance with NCTCOG specifications.

L. **Record Drawings**. The contractor shall be responsible for providing "as-built" drawings to the Engineer for the Project. The Engineer will make the required corrections and submit the "as-

builts" to the Town of Westlake. "As-Built" drawings shall be 24″ x 36″ in size and shall consist of one (1) mylar sepia, three (3) mils in thickness or greater, and three (3) blueline prints printed from said submitted mylar sepia. All information on the submitted mylar sepia prints shall be legible. The developer will be charged $1.00 per sheet of approved Engineering plans for micro-fiche reproduction.

# ARTICLE V: WASTEWATER FACILITIES

## SECTION 1. - GENERAL REQUIREMENTS

A. **General Provisions**. The design, size, type and location of all sanitary sewer lines shall be in accordance with the Town's Master Plan for Wastewater Facilities. In addition, the design and construction methods shall meet or exceed Texas Department of Health, Texas Natural Resource Conservation Commission and Environmental Protection Agency regulations.

All sanitary sewer lines shall be installed within rights-of-way or sanitary sewer easements. Sanitary sewer lines may not be located in easements in the yard of any residential lot. Should a line exist in an easement prior to the rezoning of the property for residential use or prior to development of the property for residential use, then the existing line shall be either relocated to Town right-of-way at developer expense, or the existing easement shall be dedicated to the Town as right-of-way.

B. **Materials**. Sanitary sewer lines 12 inches in diameter and less shall be PVC SDR-35 or cement-lined ductile iron with polyethylene wrapping. Materials for lines larger than 12 inches diameter shall be approved by the Town Engineer. Manholes shall be poured-in-place or pre-cast.

C. **Manhole Spacing**. The maximum distance between manholes shall be 500 feet for line sizes up to 12 inches and 1000 feet for line sizes greater than 12 inches. Manholes shall be provided at all points of directional change, including the P.C. and P.T. on horizontal curves. Manholes shall be provided at vertical points of intersection (vertical curve are generally not allowed).

D. **Manhole Size Criteria**. Wastewater manhole size criteria are established based on depth/diameter/maximum allowable pipe connection/pipe size relationship. The criteria are given in a table at the end of this Article.

E. **Minimum Pipe Size**. The minimum size of sanitary sewer lines shall be 6 inches in diameter for lines, which are to be maintained by the Town.

F. **Parallel Wastewater Collection Systems**. Residential or commercial wastewater collection lines shall be designed to not exceed maximum depths of 20′-0′ measured from finished grade to the bottom of the pipe. Depths greater than 20′-0′ will only be permitted when parallel wastewater collection lines to serve properties on both sides of the street are provided. The office of the Town Engineer shall be consulted to determine the location and design criteria of the parallel lines prior to final design.

G. **Oversizing and Extensions**. The Town of Westlake may elect to oversize certain mains as required or as depicted in the most recent Master Plan for Wastewater Facilities. The Town will participate on lines greater than 12 inches if, (1) the demand of the project is less than or equal to a twelve (12) inch line capacity; and, (2) the line is shown on the Master Plan for Wastewater Facilities.

If a project involves Town participation and if the Town funds are available, the developer, owner, builder, or applicant shall design the project and submit the approved plans for bidding by the Town. If the Town funds are not available, the developer shall design and construct the project subject to an agreement for connection and reimbursement. If a development requires lines exceeding twelve (12) inches to serve the area, the Town will participate in the oversizing above the size needed to supply the development.

During the process of development, the owner(s) of the subject property shall extend sanitary sewer mains by constructing the necessary sewer line within proper easements, at their sole expense, to serve the adjacent property, when the adjacent property or any portion thereof, are

considered to be in the same sewer basin. The construction of the lines shall extend along the frontage or through the property to the furthest point possible, where the adjacent property can readily tie into the system.

Sanitary sewer extensions outside the Town of Westlake will not be granted to private entities, but may be granted to neighboring municipalities or governmental entities as approved by the Town of Westlake Board of Alderman.

H. **Clean Outs**. All sanitary sewer lines shall terminate at a manhole except that a clean out may be approved on eight (8) inch lines when a manhole is located within five hundred (500) feet from the end of the line. A clean out, directed toward the main, shall be provided on all services at the property line or easement line unless the service line connects to the main at a manhole and the service line is no longer than fifty (50) feet from the manhole to the property or the easement line.

I. **Additional Easements**. If needed, additional easements for sanitary sewer lines shall be dedicated along State controlled routes and along other routes when the right-of-way is not sufficient to adequately provide for the orderly construction and maintenance of the sanitary sewer improvements.

J. **Emergency Maintenance**. When conditions warrant, the Town may perform maintenance operations during the warranty period. The cost of such maintenance shall be paid for by the developer/contractor.

K. **Television Inspection**.

(1) The developer or contractor shall, at its own expense, perform a television inspection of all sanitary sewer gravity lines prior to acceptance by the Town. Repairs shall be made if required and the television inspection repeated as many times as needed until the line is deemed acceptable.

(2) The developer or contractor shall use color video tape in all television inspections.

(3) The developer or contractor may employ a firm qualified in the type of work to make the television inspections, or if qualified and acceptable to the Town, he may perform the inspection himself.

(4) The Town of Westlake Inspector must be present during the television inspection, unless specifically otherwise authorized in writing.

(5) The visual inspection by photographic means of the sanitary sewer mains shall commence after the backfill, the air test, and the mandrill test are completed.

(6) The jet ball technique may be used to remove all foreign debris and silt, prior to photographic inspection.

(7) A second visual inspection by the developer or contractor shall be made no sooner than the $10^{th}$ month and no later than the $12^{th}$ month after the date of the Letter of Acceptance of the subdivision by the Town. Prior to final acceptance, the developer or its contractor shall escrow funds as specified in the Town of Westlake Fee Ordinance to cover the cost of a second television inspection. If the developer or its contractor performs the second television inspection in accordance with the terms stated hereinafter, the escrow shall be refunded less administrative costs. In the event the developer or contractor shall refuse or fail to complete the second inspection within time permitted, the Town shall use the escrowed funds previously described to cause completion of the inspection. Such inspection shall be made no later than 11 months after acceptance of the subdivision.

(8) All television equipment used shall have a minimum of 600 lines of horizontal resolution.

(9) All information gathered must be legible, clearly understandable, and of good picture quality.

(10) A run sheet shall be made, and it shall be compatible with the tape in noting deficiencies.

(11) By audio on the tape, the operator must note the date and time the recording is made, note the developer or contractor's name, project name, and contract number, note the name of company performing the inspection, if other than the developer or contractor, and the operator's name, note the location, line, designation, main size, and direction of run, identify every 50-foot station, identify the station of each manhole and deficiency and include station number.

(12) The sewer mains must be televised from manhole to manhole downstream and manhole to clean-out upstream.

(13) All sanitary sewer mains must be laced with water. The television inspection must be done immediately following the lacing of the main with no water flow.

(14) Two tapes per visual photographic inspection shall be furnished to the Town of Westlake.

(15) Tapes must be VHS and shall be one-half (1/2) inch size.

(16) All tapes and run sheets shall be submitted to the Town Inspector for storage and inspection by the Town. All tapes and run sheets shall become the property of the Town of Westlake.

L. **Criteria For Repair**. The developer shall make repairs if the Town Inspector notes problems, including but not limited to the following:

(1) Pulled or slipped joints.

(2) Water infiltration.

(3) Cracked or damaged pipe.

(4) If standing water is found in pipes of gradients equal to or greater 0.7 percent.

(5) In pipes or gradients less than 0.7 percent, a maximum one-half (1/2) inch of standing water will be allowed in six (6) inches through twelve (12) inches diameter pipes; and a maximum ten (10) percent of pipe size or three (3) inches, whichever is less in pipes greater than twelve (12) inches diameter.

(6) Structural damage to pipe.

The Town Engineer shall make the final determination for repairs and shall review the visual photographic tape for additional data. A letter must be transmitted to the developer or contractor for needed repairs within five (5) working days after the inspection. (All verbal repair requests shall be valid and noted in the letter.)

If repairs are required, another television inspection of the required area may be made after the repairs are complete if deemed necessary by the Town Inspector, at the developer or contractor's expense. Repairs shall be made to the satisfaction of the Town of Westlake.

M. **Lift Stations and Force Mains**. The Town of Westlake will operate and maintain only those lift stations and force mains which serve the public. Lift stations and force mains serving private developments shall be privately maintained.

N. **Sanitary Sewer Services**. No private sanitary sewer service of less than 4 inches in diameter shall be connected to a Town maintained sanitary sewer line. Private services of 6 inches in diameter or larger shall connect to sanitary sewer lines only at manholes. An "S" shall be cast, painted, or chiseled on the face of the curb to identify the exact location of the sanitary sewer service. A sanitary sewer service shall be stubbed out to all residential lots to a point 5 feet minimum within the lot. The elevation of all services shall be shown on the plans and shall be established such that the lot will be adequately served.

**SECTION 2. - CONSTRUCTION STANDARDS**

A. **General**. All work and materials shall be in accordance with Town Standard Specifications, General Design Standards and NCTCOG's Specifications.

B. **Design Criteria**.

(1) Minimum Size

a. Mains: six (6) inches in diameter

b. Service Laterals: Four (4) inches in diameter w/ property line cleanouts.

(2) Minimum flow velocity: two (2) feet per second.

(3) Minimum Depth:

All sanitary sewer mains are to have a minimum cover of four (4) feet from the top of the pipe to the top of ground or proposed pavement.

Whenever a proposed sanitary sewer pipe crossing a channel or creek has less than four (4) feet of cover between the top of pipe and flowline of the channel or creek, the proposed pipe will be supported by a pier system approved by the Town.

C. **Pipe Materials**.

(1) Polyvinyl Chloride (PVC) Pipe:

Mains are to be a minimum six (6) inches in diameter conforming to current ASTM designation D 3034, SDR 35 or ASTM Designation F 780 for 4 through 15 inch diameter and ASTM designation F 679 or ASTM designation F 794 for greater than 15 inch diameter. All SDR 35 PVC pipe shall be green in color.

(2) Reinforced Concrete (RCP) Pipe:

a. Pipe: ASTM Designation C76, Wall "B"

b. Fittings: The design and manufacture of all special fittings shall be governed by the same requirements as the connecting pipe.

c. Gaskets: ASTM C443. The polymer shall be synthetic rubber; natural rubber will not be acceptable.

(3) Lateral Sewer Services:

a. Connect to tee or wye fitting to be installed on the main.

b. Minimum of four (4) inches in diameter, polyvinyl chloride (PVC) pipe, SDR 35, green in color.

c. Locate the lateral ten (10) feet downstream of the water service for the lot (water service to be located at the centerline of the lot), at a maximum depth of six (6) feet and plugged suitable for testing. Contractor shall install a cleanout at the property line for each lot. See standard details for required residential cleanout or other required assemblies.

After curb and paving has been completed, contractor shall paint a four (4) inch high red letter “S” on the curb above the location of the sewer service.

D. **Offsite Installation**.

(1) Materials: All relative specifications for sanitary sewer improvements material shall apply to offsite installation.

(2) Excavation: In general, all excavation shall be made in open cut from the surface of the ground and shall be no greater in width and depth than is necessary to permit the proper construction of the work. Where the trench exceeds four (4) feet in depth see Standard Procedures section regarding “trench safety” requirements. The amount of excavation to grade shall not exceed 100 (one-hundred) feet from the end of the pipe laying operations and no excavation shall be more than 300 (three-hundred) feet in advance of the completed pipe operations (includes backfilling). At the end of the work day, all trench excavation shall be backfilled or protected as per OSHA standards. However, the Town may require horizontal boring under the canopy of mature trees.

(3) Installation: As per approved drawings.

(4) Manhole Markers: The contractor shall furnish and install two manhole location markers as per Town of Westlake Standard Specifications.

(5) Testing: All relative specifications for sanitary sewer system improvement testing shall apply to offsite installations. See testing sections for details.

E. **Installation**.

(1) All installations shall conform to the latest NCTCOG Specifications: (as amended by the Town of Westlake): See details under Embedments in the NCTCOG specifications.

(2) Backfill Compaction:

a. Mechanical Method: Compaction and consolidation of the backfill materials shall meet NCTCOG Specification Item 6.2.9 as amended by Town of Westlake for any utility trench under existing or proposed roadways and/or alley sections. Trenches will be compacted to 95 percent of Test Method TEX-113E in one (1) foot lifts at optimum moisture content (to plus 4 percent above optimum moisture content) using the native material or the entire trench will be compacted to 95 percent of Test Method TEX 113E in one (1) foot lifts at optimum moisture content (to plus 4 percent above optimum moisture content) using the native material.

b. Water Jetting Method: Water jetting will not be allowed for any trench within the existing or proposed right-of-way. During jetting operations, jets must be used at close intervals along the trench in such a manner that sufficient water to lubricate and consolidate the fill reaches all parts of the backfill, and all of the backfill material is saturated. The jet pipe should be kept at least two (2) feet away from the pipeline to prevent the eroding of the embedment. Only that amount of water should be used which is necessary to consolidate the backfill. The jet ordinarily will consist of a pipe to which a two-inch diameter hose is attached at its upper end, utilizing conventional pipe fittings or swivel fittings. It should be used with a continuous supply of water with a pressure sufficient to cause backfill displacement.

F. **Testing Procedures**. Testing shall be in accordance with NCTCOG Specifications.

G. **Miscellaneous Appurtenances**.

(1) Manholes:

a. Precast concrete shall conform to ASTM designation C 478 (C 478M) as amended by the NCTCOG Specifications.

b. Poured-in-place concrete manholes shall conform to Town of Westlake Standard Details.

c. No other manhole construction materials will be allowed without written permission of the Town Engineer.

d. Manhole rings and covers as per Town of Westlake Standard Specifications.

e. Manhole rings and covers shall be adjusted by the use of precast concrete grade rings only. Bricks and broken concrete are not acceptable.

f. All manholes shall contain an internal manhole chimney seal as produced by Cretex Specialty Products or equal.

g. Manholes shall be spaced at a maximum of 500 feet apart. A manhole is required when a six-inch (6”) or larger service line is connected to the main line.

(2) Cleanouts:

a. Cleanouts are to be located and installed as per approved drawings and Town of Westlake Standard Specifications.

H. **Record Drawings**. The contractor shall be responsible for providing record drawings to the Engineer for the Project. The Engineer will make the required corrections and submit the record to the Town of Westlake Engineer. Record drawings shall be 24” x 36” in size and shall consist of one (1) mylar sepia, three (3) mils in thickness or greater, and three (3) blueline prints printed from said submitted mylar sepia. All information on the submitted mylar sepia prints shall be legible. The developer will be charged $1.00 per sheet of approved Engineering plans for micro-fiche reproduction.

## SANITARY SEWER MANHOLE SIZE

| PIPE SIZE | DEPTH OF COVER (AVERAGE) | DIAMETER OF MANHOLE | CONSTRUCTION OPTIONS | MAXIMUM NUMBER OF PIPE CONNECTIONS ALLOWED IN MANHOLE |
|---|---|---|---|---|
| 12″ & UNDER | 5′ - 6′<br>7′ -10′<br>11′ - 15′ | 4′<br>4′<br>5′ | CAST- IN- PLACE OR PRE-CAST<br>CAST- IN -PLACE OR PRE-CAST<br>CAST- IN- PLACE OR PRE-CAST | 3<br>3<br>4 |
| 15″ - 21″ | 5′ - 9′<br>10′ - 15′<br>(SEE NOTE #1 BELOW) | 5′<br>6′ | CAST-IN-PLACE OR PRE-CAST<br>PRE-CAST ONLY | 3<br>4 |
| 24″ - 36″ | 5′ - 9′<br>10′ - 20′<br>(SEE NOTE #1 BELOW) | 5′<br>6′ | CAST-IN-PLACE OR PRE-CAST<br>PRE-CAST ONLY | 3 (24″ - 27″)<br>2 (30″ - 36″)<br>3 (24″ - 27″)<br>2 (30″ - 36″) |
| 39″ - 48″ | 5′ - 9′<br>10′ - 20′<br>(SEE NOTE #1 BELOW) | 6′<br>7′ | PRE-CAST ONLY<br>PRE-CAST ONLLY | 2<br>2 |

NOTES:

1. IF THE PROPOSED SYSTEM DESIGN REQUIRES LINES TO BE CONSTRUCTED TO DEPTHS GREATER THAN SHOWN ABOVE, THE TOWN ENGINEER SHALL BE CONSULTED FOR ADDITIONAL REQUIREMENTS.
2. WHERE THE ABOVE REQUIREMENTS CANNOT BE MET, A JUNCTION STRUCTURE MAY BE UTILIZED.
3. WHERE DROP CONNECTIONS ARE PROPOSED, THE TOWN ENGINEER SHALL BE CONSULTED FOR PROPER SIZING.

# ARTICLE VI: EROSION CONTROL

A. **General Provisions**. Private property owners, developers, or builders shall comply with all applicable federal, state and local regulations and be accountable for any erosion of their property or construction site which results in measurable accumulation of sedimentation in dedicated streets and alleys. Any accumulation deeper than one (1) inch in dedicated streets, alleys, or offsite private property constitutes a violation of this policy.

(1) Maximum use shall be made of vegetation to minimize soil loss.

(2) Natural vegetation should be retained wherever possible.

(3) Where inadequate natural vegetation exists, or where it becomes necessary to remove existing natural vegetation, temporary controls should be installed promptly to minimize soil loss and insure that erosion and sedimentation does not occur.

(4) Erosion control plan shall be submitted to Town Engineer for approval prior to actual construction.

(5) Wastes or disposal areas and construction roads should be located and constructed in a manner that will minimize the amount of sediment entering streams and Town storm sewers.

(6) When work areas or material sources are located in or adjacent to streams, such area shall be separated from the stream by a dike or other barrier to keep sediment from entering a stream. Care shall be taken during the construction and removal of such barriers to minimize the sediment transport into a stream.

(7) Should preventative measures fail to function effectively, the applicant shall act immediately to bring the erosion and/or siltation under control by whatever additional means are necessary.

(8) Runoff shall be diverted away from construction areas as much as possible.

(9) Developers, builders, or owners of property shall permanently stabilize all disturbed areas prior to final acceptance of the subdivision, project, and/or structure. Stabilization shall be accomplished through the use of perennial vegetative cover or other permanent means, such as channel lining, retaining wall, etc.

B. **Performance**. Erosion from construction sites can be a significant water quality problem. Developing areas are cleared of vegetation during construction leaving the soil exposed and susceptible to erosion. Runoff then transports eroded sediment from these areas and deposit it downstream. The accumulation of silt in streams and ponds is a form of water pollution that is unattractive and impedes drainage.

(1) Prevention is a key aspect of erosion control. Many of the control methods presented herein can be placed in a manner that will protect highly erodible areas such as steep slopes. The prevention of erosion requires prior planning to ascertain the placement of selected control methods. The rewards of this planning will be significant reduction in soil loss. Not only can soil loss be prevented, but eroded soil can be recovered on the construction site and used for fill.

(2) The particulate material in construction site runoff is generally heavier and larger than particulates in urban runoff. These attributes facilitate the removal of the material whether the removal is by settling in a sediment trap or by filtration through a filter fence. Temporary sediment traps, filters, and routing devices can effectively control erosion for

construction sites if properly applied. These methods are used in an effort to control temporary increases in sediment loads.

(3) A quantifiable assessment of performance is difficult because the nature of erosion control is more preventative than corrective. A rough assessment of performance can be conducted by comparing the soil loss from a site with controls to the loss from a comparable site without controls.

C. **Permanent Erosion Control**. Permanent erosion controls are installed at or near end of the construction project when no further disturbance of the area will occur. The purpose of these controls is to permanently minimize soil loss by such methods as restoring ground cover, building retaining walls for steep slopes, or reducing the effects of wave or water action by geotextiles, vegetation, or similar materials. Examples of typical permanent measures are vegetation cover using perennial plants, headwalls, stilling basins, tree wells, lakes, terracing, and retaining walls.

D. **Temporary Erosion Control**. Temporary erosion control methods are used to abate sediment runoff from construction sites. The application of control devices can yield significant water quality and drainage benefits at a minimal cost to the developer. The erosion control measures can be grouped as barriers, filter devices, or routing devices.

1. **Temporary of Erosion Control Barriers**. The temporary erosion control methods that can be classified as barriers include:

   - Straw Bale Sediment Barrier;
   - Sandbag Sediment Barrier;
   - Check Dam; and
   - Sediment Trap.

   These measures trap sediment and prevent high runoff velocities which cause erosion.

   The straw bale and the sandbag sediment barriers can reduce sediment loads significantly. A sandbag barrier is more durable and should be used to withstand more intense storm events.

2. **Temporary of Erosion Control Filters**. Filtering methods can be used in place of barriers. Filter devices allow runoff to pass through but retain sediment by filtration. The types of filters available are:

   - Filter Berm;
   - Filter Fence;
   - Filter Inlet; and
   - Vegetation Filter Strip.

   Excellent sediment removal can be achieved using a filter berm, fence, or inlet. The filter beam is constructed of rock and therefore is capable of withstanding heavier storm events than the filter fence or filter inlet. In general, the vegetation filter strip will operate less effectively than the other devices.

3. **Temporary of Routing Devices**. Only one method, the flexible downdrain, is classified strictly as a routing device. The purpose of the device is to convey waters down steep slopes or across highly erodible soils.

   Some of the methods classified under Erosion Control Barriers can be used as routing devices to protect erodible areas. Sandbag sediment barriers and straw bale sediment barriers are both suitable for this purpose.

A routing device is an erosion prevention tool that can eliminate erosion problems on steep slopes and other critical areas. It is not designed to capture any solids already moving with the water.

E. **Design Considerations**. Sediment traps and flexible drains are flow collection devices that will require hydraulic design. An estimate of the peak design flow rate and runoff volume is necessary for proper sizing of these management methods. Runoff volume and peak flow are calculate based on the design storm. Design storms for temporary erosion control structures shall be used on the ten (10) year return frequency.

The design storm frequency for construction sites should consider several factors including:

- The length of time and size of construction activity;
- The severity of damage that could result to downstream waters if the design storm is exceeded; and,
- Local concerns toward environmental protection.

F. **Enforcement**. Should proper erosion controls fail or become inoperative, the Town shall notify the owner, builder, or developer of the violation in writing. The owner, builder, or developer has five (5) days after being notified to begin correcting the problems. If no corrections are started, the Town may revoke the development permit, building permit, or withhold issuance of a certificate of occupancy or final acceptance.

# ARTICLE VII: GRADING

**A.** **Purpose**. The purpose of this ordinance is to provide for grading/excavation activities with due regard to topography and existing vegetation with the objective being that the natural beauty of the land shall be preserved as far as is feasible. Furthermore, the grading shall avoid creating drainage problems, floods, erosion, landslides, or other menaces to the health, safety, and general welfare of the community.

**B.** **Specifications**. Grading and excavation shall be in accordance with the NCTCOG Standard Specifications of the North Central Texas Council of Governments substantially contained in Division 3.

**C.** **Administration.** A completed application form and review fee must be submitted to the Town of Westlake for approval prior to any grading or excavation activities. The permit shall be reviewed by the Town Engineer for approval. The Contractor shall notify the Town and franchise utility companies 48 hours prior to commencement of construction.

(1) The grading contractor shall apply for a grading/excavation permit at the Town Hall. The applicant shall complete the application and submit the following:

a. Proof of insurance meeting the Town's requirements.

b. Three (3) copies of the Contractor's contract applicable to the work being released and three copies of the cost estimate of the work to be performed; and

c. Payment of the Inspection Fee ( 3% of the cost of grading).

**D.** **Enforcement**. The Town shall not allow any grading and/or tree removal until the Developer has an (1) approved site plan for non-single family project; or (2) approved preliminary plat for a single family project and the Grading/Excavation Permit is approved. Violators shall be subject to fines and/or restoration of site to the original condition. The Town shall inspect the site for conformance with the permit.

**E.** **Requirements of Permit Application**

(1) Completed application form.

(2) Scaled drawings showing location, dimensions, elevations of existing and proposed topographic alterations, existing and proposed structures, location relative to floodplain area (if floodplain exists on project site).

(3) Extent to which watercourse of natural drainage will be altered or relocated.

(4) Erosion Control Plan.

(5) Excavation safety plan prepared by a Registered Professional Engineer, for excavation exceeding a five-foot depth.

(6) Traffic Control Plan if working in street right-of-way.

(7) Tree protection plan including scaled drawing showing location, thickets, caliper and species of all existing trees above six (6) inch caliper within project limits, proposed tree protection and preservation in accordance with the Tree Preservation Ordinance.

# ARTICLE VIII: UTILITY DUCT BANK FACILITIES

## SECTION 1. - GENERAL REQUIREMENTS

**A.** **GENERAL PROVISIONS**. This Article deals with general requirements for duct bank construction to be used for electric, cables, traffic, communications, water and sewer metering, low-watt lighting, telephone, Internet, "smart house" facilities serving any subdivision, development or addition which may be located within the Town's utility duct bank. The utility duct banks placed within the private or public street rights-of-way or public utility easements shall be sized and located as per the Town's Master Plan for Utility Duct Banks and in accordance with this Article, and as shown on attached Illustration "A", or as approved by the Town Engineer. All construction shall be in accordance with the latest edition of the Standard Specifications for Public Work Construction published by the North Central Texas Council of Governments (NCTCOG). All applicable stated and federal regulations shall be complied with.

**B.** **UTILITY DUCT BANK REQUIREMENTS**. The following requirements are considered minimum:

1) The owner/developer of a subdivision, development or addition shall be required to install the utility duct bank at its own expense including engineering costs. The owner/developer shall also be responsible for obtaining all utility easements, if required.

2) The owner/developer may be required by the Town to perform a study to determine the specific size and location of the duct bank based on the proposed subdivision, development or addition.

3) All utility duct banks shall be shown on plan and profile sheets to the same scales as required for paving improvements. Proposed and existing utility crossings shall be shown on the plans along with adjacent road profile, if applicable. The plans shall be prepared by a registered engineer in the State of Texas.

4) The owner/developer shall extend all utility duct banks necessary to connect the subdivision, development or addition with the Town's utility duct bank system. The developer shall also extend utility duct banks to all property lines of the subdivision, development or addition to allow connection to these facilities by adjacent property owners in accordance with approved plans.

5) The construction for all utility duct banks must be reviewed and approved by the Town Engineer to assure compliance with these requirements prior to receiving permits and commencing construction.

## SECTION 2 - DUCT BANK MATERIAL

A. All duct bank materials (pipes and fittings) shall conform with the latest edition of the Public Works specifications as published by the NCTCOG.

B. The duct bank materials shall be Poly Vinyl Chloride (PVC). The pipe and fittings shall meet the requirements of ASTM D1785 and D2466, schedule 40, of the nominal size shown on the plans. The pipe shall conform to UL 651.ANSI/NEMA T-2 specification. The pipe shall be 90° wire rated and sunlight resistant.

C. The owner/developer shall furnish the Town Engineer a manufacturer's certification that the material was manufactured, sampled, tested and inspected in accordance with and meets the requirements of the pertinent ASTM specification.

D. Pipe and fittings shall be free from defects.

E. The dimensions of the PVC pipe shall be as shown on the plans. The fittings shall properly fit the pipe supplied.

**SECTION 3 - CONSTRUCTION METHODS.** The duct bank materials shall be installed at the locations and to the line grades and dimensions as shown on the plans or as revised by the Town Engineer.

A. The utility duct bank shall have a minimum cover of thirty-six (36) inches from the ground level to the top of the pipe.

B. The backfill shall comply with Class B+ as shown in the specifications published by NCTCOG.

C. The installation of the duct bank shall comply with Item 6.7.3, Underground Conduit Construction of the NCTCOG specifications.

D. The construction shall be inspected by the Town. The owner/developer is responsible for coordination with the Town for inspection.

E. The owner/developer shall be responsible for providing "as-built" drawings to the Engineer for the Project. "As-built" drawings shall be 24" x 36" in size and consist of one mylar and an electronic file of the drawings in the DXF format. The duct bank must be vertically and horizontally tied to the Town's GPS monuments as it is constructed. This information shall be shown on the "as-built" plans."

**SECTION 4 – DUCT BANK SYSTEM**

**A. Coordination**

1. General Conditions:

   The duct bank is fully within the Public Right of Way or designated duct bank easement ("ROW"), and is subject to all regulations adopted by the Town of Westlake, Texas ("Westlake"). The infrastructure of the duct bank system including ducts, manholes, other access points, and other associated appurtenances are referred to as the System. The System is indexed for location coordination. The location coordination consists of vertical control, horizontal control, and includes major crossings of other utilities indexed by type.

2. General Responsibilities:

   Each user of the System is hereafter referred to as a "Tenant". Tenant shall include all employees, officers, owners, officials, agents, affiliates, contractors and subcontractors of the Tenant. Each Tenant is required to fully comply with the Regulations, Policies, and Standard Operating Procedures (SOPs) of the System. Each Tenant is responsible to tag and otherwise identify that medium (i.e., fiber, coax, etc.) pulled through the System.

## B. Access

1. Each Tenant will be required to file an access request with the Town each and every time entrance to a System access point is required, including emergency conditions. The purpose of the access request is not to cause a time delay to the users of the System but to log and manage access. All access requests and access requirements will be controlled by the Town's Network Operations Center (NOC). The access request form shall include the following:

    a. Name and Company of requestor.
    b. Name of Company representing if requestor is a subcontractor.
    c. Authorizing contact for Tenant.
    d. Date and time of request.
    e. Date and time access is needed.
    f. Reason for access.
    g. Traffic control plan where access points are in or near roadways.
    h. Where there is restricted entry, a safety and emergency plan shall be included.

2. All access by a Tenant will be under the supervision of the NOC, including on site presence of a Town representative. Under no circumstances will any Tenant have authorized single access without on site presence of a Town representative. This includes emergency access requirements.

3. All Tenants have access to the System at any time provided Tenant shall comply with provisions of section B1 above. Emergency access is available 24 hours per day, 7 days per week, unless inclement weather and/or other catastrophic condition prevents such access.

4. The following access procedures shall be followed:

    a. Town personnel are not authorized to enter manholes. Town personnel will monitor work in manholes from the surface.
    b. Tenant's representatives may enter manholes and handholes with only those tools necessary to un-rack cable and bring it to the surface. Work on cables such as splicing, repairing, etc., may NOT be performed in manholes. Repair work may be performed in handholes as long as the Town's representative can clearly observe the work.
    c. Upon bringing to the surface, the Town' representative shall identify the cable, log the cable information, and authorize work. A cable work log shall be filled in and filed at the NOC.
    d. Upon completion of the work, the Tenant's representative shall return the cable to the racking system within the manhole or handhole.
    e. The Town's representative shall log all personnel involved, start time, end time and any other information that may be deemed necessary.

## C. Security

1. The Town is committed to providing for the physical security and maintenance of the System. The System will be controlled similar to other right of way utilities, with assurance of service as the top priority. This assurance is partially dependent upon each Tenant's compliance with the regulations, policies, and procedures governing the

System.

2. Physical Security: Basic physical protection measures are inherent in the design of the System. These measures include geographic positioning, vertical depth, width and type of cover (i.e., encasement), slope profile, and other information including proximity to other utilities.

3. Tenant Medium Security: Each Tenant is required to furnish metal tags attached to the medium at all required points per specifications (attached) as discussed above. All Tenant information is considered confidential to include the name of the tenant, except for the physical location of the tenant's medium.

4. Restricted Entry: In accordance with State and Federal Occupational and Safety Laws, access to manholes within the System is considered Restricted Entry. As such, Tenant's representatives shall follow all State and Federal requirements for Restricted Entry. The granting of access by the Town also grants restricted access. However, the Town does not assume responsibility or liability for Tenant's representative's health and welfare. Job safety is the responsibility of the Tenant's representative.

**D. Liability**

1. Not withstanding the above, the Town is not responsible or liable for damages caused to any Tenant, Tenant's facilities, or Tenant's customers, as a result of the operation and ownership of the System.

## SECTION 5 SMART HOUSE TECHNOLOGY INFRASTRUCTURE REQUIREMENTS

**A. GENERAL PROVISIONS.**

The infrastructure described herein and shown on the attached Illustrations "A" and "B" are the minimum requirements to be used in the construction of new residential structures by the property owner or building contractor. All required appurtenances and associated hardware shall also be included for a complete and functioning system. The Smart House infrastructure requirements are designed to allow maximum flexibility with minimum aesthetic impact for telecommunications access to newly-constructed residential structures. The basic infrastructure requirements apply to each newly constructed residential structure even though service providers may not utilize each and every component at each location.

**B. SMART HOUSE REQUIREMENTS**. The following requirements are considered minimum:

1. A 3' x 3' x 4" depth concrete housekeeping pad (the "Pad") shall be attached to the newly-constructed residential structure, preferably in the rear portions of the structures nearest to public utility easements. The Pad shall be complete and integral to the associated residential structure slab.

2. Two (2) 4" low-voltage and one (1) 4" 250 V conduits (the "Conduits") shall be stubbed up to heights as shown on attached Illustration "A". The Conduits shall be securely strapped to the newly-constructed residential structure's exterior as required by the National Electrical Code.

3. The empty low-voltage 4" conduit with multi duct shall be capped at a minimum 6" above the finished residential structure slab.

4. The 4" conduit with multi duct and low-voltage/fiber optic cables shall be stubbed up to the associated pull box. The pull box shall be nominally sized at 18" W x 24" T x 12" deep, and shall be secured to newly-constructed residential structure's exterior.

5. One (1) 120V/20A duplex receptacle (wp/gfci) shall be mounted between pull box and adjacent electrical power disconnect. The source of power to the duplex shall be from an independent system specific to the residential subdivision. The source of power shall not be from the residential system, and shall be labeled as such. This shall be coordinated with all service providers.

6. The 4" 250V conduit shall be extended to height required by the electrical contractor for connection to the newly-constructed residential structure's electrical distribution system. The electrical contractor shall terminate conduit inside service entrance disconnect.

7. The property owner or General Contractor shall coordinate installation of the Pad with the electrical contractor to insure a nominal 2" sleeve is provided for the National Electric Code required ground rod. The ground rod shall be adjacent to the service entrance disconnect, and driven to a nominal depth of 10' (feet).

8. The property owner or general contractor shall bond the telecommunications pull box to the ground rod with minimum #6 AWG insulated (green/THHN) conductor. Bonding from the service entrance disconnect to the ground rod shall be as shown on specific residential plans.

9. At each Pad there will be an assortment of active and passive devices furnished and installed by telecommunication service providers. Active devices may include but are not limited to: amplifiers, transceivers, and local power supplies. Passive devices may include but are not limited to: couplers, ports, splitters, line-powered amplifiers, pedestals, and bridges. Each residential subdivision shall have a specific telecommunications distribution system which will further define specific requirements at each residential location. The property owner or general contractor shall submit plans to the Town for coordination to site-specific design prior to installing any equipment.

10. The developer shall coordinate all utility easements to allow service provider access to the pad.

# ARTICLE IX: RESIDENTIAL LOT GRADING

**A. Purpose.** The purpose of this Article is to provide for grading/elevation activities that are in compliance with the overall subdivision grading and drainage plans. Furthermore, the grading shall avoid creating drainage problems on the lot or adjoining properties.

**B. Requirements.**

(1) A scaled drawing shall be prepared showing the house footprint, driveways, sidewalks, existing and proposed contours, finish floor elevations, and flowline grades on driveway and sidewalk crossings.

a. The proposed lot grading shall be in compliance with the grading and drainage plan for the overall subdivision approved by the Town.

b. The proposed grading shall not impede or destroy any drainage swales or any other existing drainage features.

(2) A tree survey of the lot along with a tree preservation and protection plan in accordance with Town standards shall be submitted with the site plan.

(3) Prior to laying the foundation, the Contractor shall provide a survey, certified by a licensed professional surveyor, of the location of the concrete forms and showing existing and proposed grades at the building edges and property lines.

(4) An as-built topographic survey of the lot, certified by a licensed professional surveyor, shall be submitted to the Town prior to a Certificate of Occupancy being issued by the Town.

**C. Administration.** A completed site plan, tree survey, and tree protection plan and review fee must be submitted to the Town of Westlake for approval prior to any grading or excavation activities. The permit shall be reviewed by the Town Engineer for approval. The Contractor shall notify the Town and franchise utility companies 48 hours prior to commencement of construction.

(1) The grading contractor shall apply for a grading/excavation permit at the Town Hall. The applicant shall complete the application and submit the following:

a. Proof of insurance meeting the Town's requirements.

b. Three (3) copies of the Contractors contract applicable to the work being released and three copies of the cost estimate of the work to be performed; and

c. Payment of the Inspection Fee (3% of the cost of grading).

**D. Enforcement.** The Town shall not allow any grading and/or tree removal until the Developer or Builder has an (1) approved site plan for the single family project; or (2) approved tree protection plan. Violators shall be subject to fines and/or restoration of site to the original condition. The Town shall inspect the site for conformance with the permit.

# ARTICLE X

# APPENDIX