



**NOTICE OF REGULAR  
THE PLANNING & ZONING  
Tuesday, February 25, 2025  
5:30 PM**

Marcos Dos Santos  
Pat Hargrave  
Jennifer Hudgens  
Lori Thompson  
Bill Dwyer

AGENDA

Notice is hereby given as required by Title 5, Chapter 551.041 of the Government Code that the Van Planning & Zoning Commission will meet in a Regular Meeting Tuesday, February 25, 2025, at 5:30 PM at Van City Hall, 310 Chestnut St., Van, TX 75790. The items listed below are on the agenda for discussion and/or action.

Notice is hereby given as required by Title 5, Chapter 551.041 of the Government Code that a possible quorum of the Van City Council may be present at this meeting. No official business of the City of Van will be conducted by the City Council at this meeting.


- I. **CALL MEETING TO ORDER**
  - A. Roll Call and Establish a Quorum
- II. **INVOCATION**
- III. **PLEDGE OF ALLEGIANCE**
  - A. US Flag
- IV. **CONSENT AGENDA**
  - A. Minutes from the regular meeting on November 26, 2024.
- V. **PUBLIC HEARING**
  - A. Public hearing regarding the subdivision regulations and design guidelines.
- VI. **ACTION ITEMS**
  - A. Discussion, Consideration, and Possible Action on approving the Van Design guidelines.
  - B. Discussion, Consideration, and Possible Action on approving the Van subdivision regulations.
  - C. Discussion, Consideration, and Possible Action on a replant of a tract of land located within the John Walling Survey, Abstract No. 891, Van Zandt County, Texas, is described as lot 1 of Monds Subdivision at Spruce and Dove Street.
- VII. **ADJOURN**

CERTIFICATION

I hereby certify that the above notice was posted in the bulletin board at Van City Hall, 310 Chestnut. , Van, Texas 75790 by 5:00 pm on Friday, February 21, 2025.

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**NOTE:** If, during the meeting, any discussion of any item on the agenda should be held in a closed meeting, the Council will conduct a closed meeting in accordance with the Texas Open Meetings Act, Texas Government Code, Chapter 551, Subchapters D and E

 *Persons with disabilities who plan to attend this public meeting and who may need auxiliary aid or services are requested to contact the Van City Hall 48 hours in advance, at (903)963-7216, and reasonable accommodations will be made for assistance.*



**NOTICE OF REGULAR  
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Tuesday, November 26, 2024  
5:30 PM**

Marcos Dos Santos  
Pat Hargrave  
Jennifer Hudgens  
Lori Thompson  
Bill Dwyer

MINUTES

**I. CALL MEETING TO ORDER**

The meeting called to order by Marcos Dos Santos.

A. Roll Call and Establish a Quorum

**Present:** Pat Hargrave, Lori Thompson, Marcos Dos Santos, Jennifer Hudgens, Bill Dwyer

**Absent:**

**II. INVOCATION**

Invocation was led by Marcos Dos Santos.

**III. PLEDGE OF ALLEGIANCE**

Led by Marcos Dos Santos.

A. US Flag

**IV. CONSENT AGENDA**

<b>RESULT:</b>	<b>Passed</b>
<b>MOVER:</b>	Bill Dwyer
<b>SECONDER:</b>	Jennifer Hudgens
<b>AYES:</b>	Pat Hargrave, Lori Thompson, Marcos Dos Santos, Jennifer Hudgens, Bill Dwyer
<b>NAYS:</b>	None
<b>ABSTAINED:</b>	None

A. Minutes from October 29, 2024, regular meeting.

**V. INFORMATION AND DISCUSSION**

A. Update on the implementation on the new zoning ordinance.  
Jeff Hudgens gave an update on the approved zoning ordinance.

**VI. ACTION ITEMS**

A. Discussion, Consideration, and Possible Action on amending the zoning ordinance 11-14-2024 to require a sign to be placed on the property that is requesting a zoning change.

<b>RESULT:</b>	<b>Passed</b>
<b>MOVER:</b>	Jennifer Hudgens
<b>SECONDER:</b>	Lori Thompson
<b>AYES:</b>	Pat Hargrave, Lori Thompson, Marcos Dos Santos, Jennifer Hudgens, Bill Dwyer
<b>NAYS:</b>	None

<b>ABSTAINED:</b>	None
<p>Recommendation to the council to amend Zoning Ordinance 11-14-2024 to have the applicant of a proposed zoning change place a sign in the front yard of the property. The sign shall read - Proposed Zoning Change, public hearing dates with the address of city hall on a 18x24 double-sided sign. The applicant is responsible for purchasing and placing the sign within 10ft of the right of way.</p>	

VII. **ADJOURN**

<b>RESULT:</b>	<b>Passed</b>
<b>MOVER:</b>	Jennifer Hudgens
<b>SECONDER:</b>	Pat Hargrave
<b>AYES:</b>	Pat Hargrave, Lori Thompson, Marcos Dos Santos, Jennifer Hudgens, Bill Dwyer
<b>NAYS:</b>	None
<b>ABSTAINED:</b>	None

Attest:

\_\_\_\_\_  
Chairman

\_\_\_\_\_  
City Secretary

# **PROPOSED DESIGN GUIDELINES**

## **Subdivision Improvements**

**1-18-2024**

Chapter 30

Article 10

City of Van

Design Guidelines for

**City of Van**  
**Design Guidelines for Subdivision Improvements**

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**City of Van**  
**Design Guidelines for Subdivision Improvements**

**Chapter 1 - General Information**

**I. Purpose**

The purpose of these Guidelines is to inform Developers and Engineers of the requirements for construction plans for public facilities, which will be owned and maintained by the City of Van, in subdivisions located within the City Limits of the City of Van, as well as within the Extra Territorial Jurisdiction (ETJ) of the City of Van. These requirements are for use as a guideline only, and are not to be construed as a waiver by the City of Van of the right to require a more stringent or lenient design, as conditions warrant.

**II. Designs**

All construction plans for subdivision improvements are to be prepared under the direction and supervision of a qualified Professional Engineer licensed in the State of Texas and such plans shall bear the seal and signature of that Engineer.

**III. Construction Plans**

The following chapters outline the detailed requirements for the preparation of construction plans for water, sanitary sewer, paving and drainage. These various plans may be combined into one complete set, as long as the clarity and usefulness of the drawings is not diminished.

- A. Submittal: Two complete sets of construction plans and specifications shall be submitted to the Development Services Department for review, prior to the submittal of the final plat to the Director of Planning for Planning and Zoning Commission consideration.
- B. Content: Completed plans shall include the following sheets, as needed:
  - 1. Title sheet showing names of subdivision, Developer, Engineer, Managing Director of Utilities and Public Works, City Manager, City Councilmembers, date, location map and any other pertinent information. It should also provide a space for signature of approval from the Development Services Engineer.
  - 2. Overall water and sanitary sewer layout sheet showing street layout, lots and lot dimensions, curve data, and any other pertinent information necessary for surveying all lots and streets. This may be a modified print of the subdivision final plat.
  - 3. Drainage area map and drainage computation sheet showing contours at two foot intervals for the entire drainage basin of all structures planned for

the subdivision and flood plains shown on the plat. Where two foot contour intervals are not available, four foot contour intervals shall be used. See the Design Guideline for Storm Drainage System Improvements for further details.

4. Plan-profile sheets showing all improvements in accordance with the Design Guidelines for those improvements.
5. Detail sheets for special construction and City of Van standard details.

- C. Approval: The Engineer shall provide one set of reproducible plans for final approval by the Development Services Engineer.

#### **IV. Contractor Procurement**

Water and sanitary sewer improvements must be constructed under a 3-way contract using an approved utility contractor and in accordance with City of Van Code of Ordinance Section 19-11 through 19-17.

For paving and drainage improvements, the City of Van is not a party to the contract and the Developer shall secure Contractors by whatever means (sealed bids, price quotes, force account, etc.) that may be deemed appropriate.

When the City of Van is to participate in the cost of improvements in accordance with the City's cost sharing policy, and the City's portion of the cost is 25% of the total costs or greater, the Contractor must be secured by competitive sealed bids.

#### **V. Inspection**

An inspector for the City of Van known as the Project Representative, or other designated agent, will inspect construction of the improvements described herein. Inspection is provided for quality assurance purposes only. The Contractor shall be responsible to provide quality control.

The Engineer shall be available to consult with and assist the Project Representative from time to time as the need arises. No work of any nature shall begin without notification given to the Project Representative. The Contractor shall cooperate with the Project Representative in coordinating construction and inspections, and shall notify the Project Representative so that the Project Representative may be present to inspect construction. Failure to notify the Project Representative properly may result in the City of Van not accepting that work. The Contractor would then be required to remove and reconstruct the improvements. The Project Representative shall not have the authority to approve defective work and acceptance of work will not constitute any waiver of the Contractor's responsibility in adhering to the construction plans and specifications, nor the designing Engineer's responsibility for the inspection of the construction of the Engineer's design.

**City of Van  
Design Guidelines for Subdivision Improvements**

**Chapter 2 - Water System Improvements**

**I. General**

The purpose of this Guideline is to assist the Engineer in design and preparation of plans and specifications for the construction of public water system improvements. All water lines constructed within the City of Van shall be designed and constructed in accordance with the most current guidelines as promulgated by the Texas Commission on Environmental Quality (TCEQ), American Water Works Association (AWWA), United States Health Service, and the Environmental Protection Agency (EPA). All water improvements shall also be designed and constructed in accordance with this Design Guideline, City of Van Standard Specifications and City of Van Standard Details. Where the City of Van Standard Specifications are in conflict with these criteria, the Standard Specifications shall govern. The design and construction shall also be in compliance with current City Ordinances and the most current City of Van Water Master Plan. Where any questions arise as to the interpretation of the standards of design, the decision of the City of Van will be final.

**II. Design Criteria**

- A. Materials for Water Lines: The materials for water line construction shall comply with City of Van Standard Specifications. Material types and pipe class or dimension ratio (DR) rating shall be noted on both the plans and bid proposal. Allowable materials for water lines shall be:
1. Water lines shall be either ductile iron pipe (DIP) or polyvinyl chloride (PVC) pipe.
  2. Water lines may be bar wrapped concrete pressure pipe where approved by the Director of Utilities.
  3. PVC pipe shall be used in cases where the corrosivity factor is 10 or greater.

The type of materials installed is required to be shown on all record drawings.

- B. Location of Water Lines / Easements: Water mains shall be constructed in a dedicated street, alley, or easement to the City of Van which shall be filed in the public records. Water mains shall generally be located in the north one-third and west one-third of street rights-of-way, except where otherwise approved by the Director of Utilities. Water valves and other appurtenances shall not be located within the curb or gutter.

Construction of water lines shall extend to the boundaries of the development.

Easements will be provided for water lines located outside of public rights-of-way in accordance with the City of Van Unified Development Code. In addition, water line easements must be provided by separate easement instrument. A center line description of any off-site easement required for water mains to be constructed in conjunction with said project shall be furnished with the final plans and specifications for water mains. Center line descriptions shall be prepared by a Registered Public Land Surveyor.

- C. Depth of Cover: The minimum cover for all water lines shall be 60" below the finished top of curb elevation when under pavement or the finished grade when not under pavement. Water lines shall be laid higher in elevation than sewer lines, where possible.
- D. Minimum Pipe Size: The minimum inside diameter size requirement for water lines is 8" except where smaller lines are justified (such as cul-de-sac) or recommended by a registered engineer and approved by the Director of Utilities. In no case shall mains be less than 6" in diameter.
- E. Sizing Water Lines: Water lines shall be designed to carry a minimum of 750 gallons per minute while maintaining a minimum of 20 pounds per square inch gauge pressure at any connection (combined fire and drinking water flow conditions). The City of Van's pressure plane datum is 725 feet above mean sea level. The maximum head loss allowable is 10 feet per thousand feet of pipe. In commercial areas, the minimum flow shall be 1,500 gallons per minute and in mercantile or industrial areas the minimum flow shall be 3,000 gallons per minute. Shopping centers with 10 acres or more shall be considered mercantile areas. Assuming a pipe flow coefficient of  $C = 140$  based on the Hazen-Williams Formula and the maximum head loss, the available flows are as shown in the following table:

**Table 1**  
**Available Flow at Maximum Head Loss**

Pipe Size (inches)	Available Flow (gpm)
6	380
8	780
10	1,400
12	2,260

- F. Looping: All lines shall be looped except where lines will enter a future subdivision, in which case a dead end will be allowed. The maximum length of looped 8" water line shall be 3,000 feet. The maximum length of unlooped 8" water line shall be 1,500 feet. An automatic flush valve shall be installed at the end of all dead end lines. Automatic flush valves shall be designed to discharge through a pipe into a nearby drainage system, if available. If a drainage system is

not available, the valve shall be designed to discharge through holes in the valve cover at ground level and the valve shall be installed with a concrete pad around it to minimize erosion. Automatic flush valves shall be as specified in the City of Van Water Standard Specification "Valves for Water Service". The dead end line shall have a gate valve installed on the line and a minimum of one 18' joint of pipe past the valve. The end of the line shall be plugged and blocked with concrete to prevent line and valve blow-off.

- G. Polyethylene Encasement: When used, all ductile iron pipe shall be wrapped in polyethylene.
- H. Water Line Grades: The grades for water lines 12" in diameter and larger shall be set and staked in the ground for construction by the Engineer and the Contractor shall lay them to the proposed grades. Grade stakes for water lines smaller than 12" in diameter are not required. However, the Engineer may include grades in the profile at his option. Water lines shall not be laid to a grade less than 0.2 percent.
- I. Fire Hydrants: In residential areas, fire hydrants shall be spaced at least every 500 feet or closer to provide a maximum distance of 500 feet from any point to the nearest fire hydrant. In commercial areas, fire hydrants shall be spaced at least every 300 feet or closer to provide a maximum distance of 300 feet from any point to the nearest fire hydrant.

Each fire hydrant shall be positively restrained. Fire hydrants shall be equipped with Pentagon operating nuts. Minimum lead size shall be 6". Each fire hydrant shall have an individual 6" gate valve to allow the fire hydrant to be shut off for service.

- J. Isolation Valves: Main lines shall be valved at least every three blocks. However, the maximum distance between valves shall be 1500 feet. In addition, each branch line shall be valved. Valves shall be located in intersections where possible.

Valve boxes for valves used to define controlled pressure zones shall be painted red to designate that they should be closed.

In pipes greater than 30" in diameter, butterfly valves shall be used.

- K. Air Release and Blow-Off Valves: For lines smaller than 12", a 1" corporation stop shall be installed at each low spot and each high point. There shall be a temporary 1" copper tubing and 1" meter stop installed at each of these stops for blowing off air and for testing the lines. After testing, these lines shall be removed. If a service connection is located where a blow-off is needed, the service may be used as a blow-off.

For lines 12" and larger, a 6" diameter blow-off line is required at each low spot and an adequately sized combination vacuum breaker, air release valve is required at each high point.

- L. Development in Areas with High Water Pressure: The City of Van operates its potable water system on a single pressure zone at elevation 725' MSL. In low lying areas (i.e. areas with a static pressure greater than or equal to 80 psi), pressure reducing valves may be required.
- M. Development in Areas with Low Water Pressure: Development above elevations of 610' MSL requires special consideration regarding meeting the State required minimum water pressure. A predevelopment meeting will be required for any development at or above 610' MSL. No building permits will be issued without first consulting Van Water Utilities regarding the plan to meet the State required minimum water pressure.
- N. Service Connections: Service lines may be either copper or polyethylene (PE) pipe. Each service line shall be installed to a point three feet (3') behind the curb at each lot. Construction plans shall show the location of the end of all water service lines.

Each service line shall have a corporation stop on the main line and a curb stop at the end of the service. Each service line shall be permanently marked with a "W" on the curb where the service line crosses the curb and with a ½" diameter x 3' steel rod driven at the end of the service line.

Magnetic tracer wire shall be installed on each service line from the main line to the end of service. The tracer wire shall either be an integral part of the pipe or installed separately and immediately above the pipe.

- O. Erosion and Sediment Control: In the construction plans, the Engineer shall include plans for erosion and sediment control during construction and permanent erosion and sediment control once construction is complete. Plans for erosion and sediment control shall be in accordance with Chapter 10, Article VII, Division E "Erosion and Sediment Control" in the City of Van Unified Development Code, as well as Chapters 6 and 7 of these Design Guidelines.

### III. Plans

- A. Preliminary Plans: The Developer shall submit with the preliminary plat, a plan showing the proposed location and sizes of water lines, prepared, signed, and sealed by a Professional Engineer licensed in the State of Texas. The plan shall include the location of lots, minimum finished floor elevations, streets, water lines, valves, fire hydrants and sewer lines along with the design calculations for the size of the water lines. The preliminary plat should reflect the most current City of Van Water Master Plan for the total area to be developed.

There shall be one copy of the preliminary plan showing the coverage of the area by fire hydrants. For residential areas, this preliminary plan shall have a circle scribed around each fire hydrant with a 500-foot radius. For commercial areas this preliminary plan shall have a circle scribed around each fire hydrant with a 300-foot radius.

The preliminary plans will be on a scale of not more than one hundred feet to the inch (1" = 100').

- B. Construction Plans: The Developer shall submit with the final plat, two sets of the proposed plans complete, prepared, signed and sealed by a Professional Engineer licensed in the State of Texas. The City of Van will review the plans and specifications for conformance with State and City requirements. After the review, the Developer shall incorporate into the plans and specifications any additions or corrections required.

The City of Van may require that the construction plans be submitted to the TCEQ for their review, following staff review.

The construction plans shall include a location map showing the location of proposed water lines, valves, and fire hydrants. The map may be on the same scale as the preliminary plan. The construction plans shall include plan sheets and profile sheets when required showing the location of all water lines, valves, and fire hydrants.

1. Plan Section: The plan section shall be prepared on either combined plan and profile sheets or plan sheets with separate profile sheets. Unless otherwise approved by the City of Van, paper size shall be a minimum of 22" x 34" and the plan section shall be drawn to scale of not more than twenty feet to the inch (1" = 20'). The plan section shall include, but not be limited to, the following items:
  - a. Horizontal control point on datum acceptable to the City of Van
  - b. Stationing of proposed water lines from left to right on sheet
  - c. Streets, side streets, and easements
  - d. Lot lines, lot numbers, subdivision lines and City limit lines
  - e. Existing topographic features such as utility poles, fire hydrants, driveways, culverts, inlets, lakes, watercourses, etc.
  - f. Underground utilities, including but not limited to sanitary sewer lines, water lines, storm sewer lines, gas lines, power lines and poles, telephone lines and television cable lines, located as accurately as possible
  - g. Location of soil borings, if any
  - h. Locations where house service lines are to be installed
  - i. All valves, fire hydrants, any branch line connections and concrete blocking

- j. North arrow
  - k. Graphic scale
  - l. Special notes, if any
  - m. Engineer's seal and signature and firm registration number
2. Profile Section: Profile sections shall be required for water lines greater than or equal to 12" in diameter. Profiles shall have grid increments of less than 1". Unless otherwise approved by the City, paper size shall be a minimum of 22" X 34". Drafting medium, lettering, layout, etc. are all optional except to the extent required herein. The profile section shall be drawn to a scale to match the plan horizontally and not more than five feet to the inch (1" = 5') vertically and shall include, but not be limited to, the following items:
- a. Grade of the water line, the existing ground line, and the proposed ground line where it is different from the existing.
  - b. Proposed and/or existing underground utilities crossing the construction alignment of the proposed water line.
  - c. Benchmark description and elevation on each sheet with temporary bench marks set at intervals of not more than 500 feet. All bench mark and profile elevations shall be tied to the National Geodetic Survey Datum (formerly The U. S. Coastal & Geodetic Survey Datum). Assumed datums will not be allowed.
- C. Record Drawings: The Engineer shall prepare a set of record drawings based on the construction plans. The record drawings shall show any deviations made during construction from the approved construction plans as to the location of valves, fire hydrants, service connections, alignment and/or grade of water lines. In addition, the type of pipe materials installed is required to be shown on all record drawings. The Project Representative will assist the Engineer in procurement of information needed to develop the record drawings. The following shall be provided to the City of Van within thirty (30) days of written final acceptance of the improvements:
- 1. One set of conformed plans in pdf format, to be provided by the Developer.
  - 2. One set of GPS points of all valves, fire hydrants and water service tie-in locations, to be provided by the Project Representative.

**City of Van**  
**Design Guidelines for Subdivision Improvements**

**Chapter 3 - Sanitary Sewer and Reclaimed Water System Improvements**

**I. General**

The purpose of this Guideline is to assist the Engineer in design and preparation of plans and specifications for the construction of public sanitary sewer improvements. All sewer lines constructed within the City of Van shall be designed and constructed in accordance with the most current guidelines as promulgated by the Texas Commission on Environmental Quality (TCEQ), American Water Works Association (AWWA), United States Health Service, and the Environmental Protection Agency (EPA). All sewer improvements shall also be designed and constructed in accordance with this Design Guideline, City of Van Standard Specifications and City of Van Standard Details. Where City of Van Standard Specifications are in conflict with these criteria, the Standard Specifications shall govern. The design and construction shall also be in compliance with current City Ordinances and the most current City of Van Wastewater Master Plan. Where any questions arise as to the interpretation of the standards of design, the decision of the City of Van will be final.

**II. Design Criteria**

- A. Materials for Sewer Lines: The materials for sewer line construction shall comply with City of Van Standard Specifications. Allowable materials for sewer lines shall be:
1. Gravity lines shall be vitrified clay pipe (VCP) with premolded gaskets, polyvinyl chloride (PVC) pipe or cement lined asphaltic coated ductile iron pipe (DIP).
  2. Water line crossings shall be in accordance with TCEQ requirements.
  3. Creek crossings, highway and railroad crossings, shallow lines, lines laid in areas with a high water table and lines laid in unsuitable soil conditions shall be constructed as follows:

	DIP	Encasement	PVC	Encasement
Creek Crossings: (aerial and below ground crossings)	✓	steel	✓	steel
Highway and/or Railroad Crossings	✓	steel		
Shallow Lines:	✓			
High Water Table:	✓			
Unsuitable Soils:	✓	concrete	✓	concrete

The Director of Utilities may require concrete encasement in other circumstances at his or her discretion.

The type of materials installed is required to be shown on all record drawings.

- B. Location of Sewer Lines / Easements: Sanitary sewer mains shall be constructed in a dedicated street, alley, or easement to the City of Van which shall be filed in the public records. Sanitary sewer mains shall generally be located in the south one-third and east one-third of street rights-of-way except where otherwise approved by the Director of Utilities. Manholes and cleanouts shall not be located within the curb or gutter.

Construction of sewer mains shall extend to the boundaries of the development where feasible (i.e., where elevations will allow the main to be extended through the developed parcel to an adjacent parcel while maintaining positive grade).

Easements will be provided for sewer lines located outside of public rights-of-way in accordance with the City of Van Unified Development Code. In addition, sewer line easements must be provided by separate easement instrument. A center line description of any off-site easement required for outfall, interceptor, approach or lateral lines to be constructed in conjunction with said project shall be furnished with the final plans and specifications for sanitary sewer mains. Center line descriptions shall be prepared by a Registered Public Land Surveyor.

- C. Depth of Cover: The minimum cover for sewer lines shall normally be five feet with a minimum clearance of one foot below established flow line of creeks and drainage ways. Sewer lines shall normally be at a lower elevation than any water line at crossings. Refer to pipe material specifications and standard details for bedding requirements.
- D. Depth of Mains: Sewer mains greater than 20 feet deep require the approval of Van Water Utilities.

- E. Minimum Pipe Size: The minimum inside diameter size requirement for gravity sanitary sewer lines is 8" except where smaller lines are justified or recommended by a registered engineer and approved by the Director of Utilities. In no case shall mains be less than 6" in diameter.
- F. Sizing Sewer Lines: In residential development, gravity sewers shall be designed to carry an average daily flow of 140 gallons per capita per day based on 3.3 persons per single family unit. The line shall be designed to carry a peak flow of 4.0 times the average daily flow for 6" lines, and 2.5 times average daily flow for lines 8" and larger. For developments other than residential, the Engineer shall use the recommended design flows as set forth by the TCEQ, unless the City of Van has data to require greater design flows.
- G. Polyethylene Encasement: When used, all ductile iron pipe shall be wrapped in polyethylene except in cases where a single stick of ductile iron pipe is used to cross other utilities.
- H. Sewer Line Grades: Size, velocity and minimum grade requirements shall be in accordance with current TCEQ rules.

The grades for sewer lines shall be set by the Engineer and the Contractor shall lay them to the proposed grades. Grade stakes are required for all sewer lines. The minimum number of grade stakes required will be one stake between every two manholes or one stake between the last manhole and the end of line cleanout. Sewers shall be laid in a straight alignment with uniform grade between manholes.

- I. Manholes: Manholes shall be designed and built in accordance with TCEQ requirements, City of Van Standard Specifications and City of Van Standard Details. Manholes shall be placed at points of changes in alignment, grade or size of sewer. Manholes shall also be placed at all street intersections, at intersections of sewers, and the end of all sewer lines that will be extended at a later date.

Manhole spacing shall be a maximum of 400 feet for 6" and 8" sewer lines. Manhole spacing for lines greater than 8" shall be in accordance with TCEQ requirements. The minimum inside diameter of a manhole shall be 4 feet.

Manholes in floodplains require bolted and gasketed covers and require an alternate means of venting at maximum intervals of 1500'. Vents must be located a minimum of 1 foot above the 100-year flood elevation.

All new manholes shall be fitted with watertight inserts in accordance with City of Van Standard Specifications.

- J. Cleanouts: Cleanouts may be used in lieu of manholes at the end of sewers which are not to be extended in the future.
- K. Lift Stations and Pressure Lines: In general, the City of Van will not permit the construction of lift stations and pressure lines, unless it is impossible to connect to a gravity system. If a lift station is required, complete design, including site work, an all-weather access road, etc. shall be included in the plans and specifications. At the option of the City of Van, the design may include service to an area, in addition to the property being developed, with the City of Van participating in the excess capacity cost in accordance with Chapter 19 of the City Van Code of Ordinances. The lift station shall be designed in compliance with current state and federal requirements and shall have either dual electrical supply or a stand-by generator. The minimum lift station capacity shall be 100 gallons per minute and shall have at least two pumps. The minimum size for a pressure line shall be 4-inches.
- L. Service Connections: A minimum 4" service line shall be installed to a point at least six feet (6') inside the property line of each lot. Construction plans shall show the location of the end of all sewer service lines. Each service line shall have a tapping saddle or wye fitting installed in the branch line for each service. Service connections 6" and larger shall be installed in a manhole.

Each service line shall be permanently marked with an "S" on the curb where the service line crosses the curb and with a ½" diameter x 3' steel rod driven at the end of the service line. The service line shall be at least 4' deep at the curb and, where possible, shall be deep enough to allow a 2 foot per 100 foot drop in the service line from the back of the lot or lowest point in the lot to the property line, plus an adequate depth for the plumbing. Minimum finished floor elevations for sanitary sewer service shall be shown on the plat for lots requiring fill.

Magnetic locator tape shall be installed directly above the sewer service pipe from the main line to the end of the service.

- M. Reclaimed Water Systems: Reclaimed water systems shall be designed in accordance with the City of Van's requirements for potable water systems except that all pipe, valve boxes, etc. shall be purple.
- N. Erosion and Sediment Control: In the construction plans, the Engineer shall include plans for erosion and sediment control during construction and permanent erosion and sediment control once construction is complete. Plans for erosion and sediment control shall be in accordance with Chapter 10, Article VII, Division E "Erosion and Sediment Control" in the City of Van Unified Development Code, as well as Chapters 6 and 7 of these Design Guidelines.

### III. Plans

- A. Preliminary Plans: The Developer shall submit with the preliminary plat, a plan showing the proposed location and sizes of sewer lines, prepared, signed, and sealed by a Professional Engineer licensed in the State of Texas. The plan shall include the location of lots, minimum finished floor elevations, streets, sewer lines, manholes, cleanouts and water lines along with the design calculations for the size of the sewer lines. The preliminary plat should reflect the most current City of Van Wastewater Master Plan for the total area to be developed.

The preliminary plans will be on a scale of not more than one hundred feet to the inch (1" = 100').

- B. Construction Plans: The Developer shall submit with the final plat, two sets of the proposed plans complete, prepared, signed and sealed by a Professional Engineer licensed in the State of Texas. The City of Van will review the plans and specifications for conformance with State and City requirements. After the review, the Developer shall incorporate into the plans and specifications any additions or corrections required.

The City of Van may require that the construction plans be submitted to the TCEQ for their review, following City staff review.

The construction plans shall include a location map showing the location of proposed sewer lines, manholes and cleanouts. The map may be on the same scale as the preliminary plan. The construction plans shall include plan and profile sheets showing the location of all sewer lines, manholes and cleanouts.

1. Plan Section: The plan section shall be prepared on either combined plan and profile sheets or plan sheets with separate profile sheets. Unless otherwise approved by the City of Van, paper size shall be a minimum of 22" x 34" and the plan section shall be drawn to scale of not more than twenty feet to the inch (1" = 20'). The plan section shall include, but not be limited to, the following items:
  - a. Horizontal control point on datum acceptable to the City of Van
  - b. Stationing of proposed sewer lines from left to right on sheet
  - c. Streets, side streets, and easements
  - d. Lot lines, lot numbers, subdivision lines and City limit lines
  - e. Existing topographic features such as utility poles, fire hydrants, driveways, culverts, inlets, lakes, watercourses, etc.
  - f. Underground utilities, including but not limited to sanitary sewer lines, water lines, storm sewer lines, gas lines, power lines and poles, telephone lines and television cable lines, located as accurately as possible
  - g. Location of soil borings, if any
  - h. Locations where house service lines are to be installed

- i. All manholes, cleanouts, ductile iron pipe, concrete encasement and any branch line connections
  - j. North arrow
  - k. Graphic scale
  - l. Special notes, if any
  - m. Engineer's seal and signature and firm registration number
2. Profile Section: Profiles shall have grid increments of less than 1". Unless otherwise approved by the City of Van, paper size shall be a minimum of 22" x 34". Drafting medium, lettering, layout, etc., are all optional except to the extent required herein. The profile shall be drawn to a scale to match the plan horizontally and not more than five feet to the inch (1" = 5') vertically and shall include, but not be limited to the following list:
- a. Grade of the sewer line, the existing ground line, and the proposed ground line where it is different from the existing.
  - b. Proposed and/or existing underground utilities crossing the construction alignment of the proposed sewer line.
  - c. Benchmark description and elevation on each sheet with temporary bench marks set at intervals of not more than 500 feet. All bench mark and profile elevations shall be tied to the National Geodetic Survey Datum (formerly The U. S. Coastal & Geodetic Survey Datum). Assumed datums will not be allowed.
- C. Record Drawings: The Engineer shall prepare a set of record drawings based on the construction plans. The record drawings shall show any deviations made during construction from the approved construction plans as to the location of manholes, cleanouts, service connections, alignment and/or grade of sewer lines. In addition, the type of materials installed is required to be shown on all record drawings. The Project Representative will assist the Engineer in procurement of information needed to develop the record drawings. The following shall be provided to the City of Van within thirty (30) days of written final acceptance of the improvements:
- 1. One set of conformed plans in pdf format, to be provided by the Developer.
  - 2. One set of GPS points of all manholes, cleanouts and sewer service tie-in locations, to be provided by the Project Representative.

## City of Van Design Guidelines for Subdivision Improvements

### Chapter 4 - Paving Improvements

#### I. General

The purpose of this Guideline is to assist the Engineer in design and preparation of plans and specifications for the construction of public paving improvements. All paving improvements shall be designed and constructed in accordance with this Design Guideline, City of Van Standard Specifications and City of Van Standard Details. Materials and construction methods for paving improvements (technical specifications) shall conform to “Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges”, latest revision, except where specifically superseded in this Guideline, City of Van Standard Specifications or City of Van Standard Details. Where any questions arise as to the interpretation of the standards of design, the decision of the City of Van will be final.

#### II. Design Criteria

- A. Roadway Pavement Section Design: The City of Van does not have a typical or standard pavement section. Therefore, this chapter presents the method for the thickness design of roadway pavements. It contains the design requirements for various street widths and traffic conditions, various subgrade support soils, and various types of pavement materials. Pavement design options are based on a combination of the above variables.

Step 1 Determine the structural support of the roadway’s existing subgrade. The subgrade strength is defined by having a California Bearing Ratio (CBR) Test performed in accordance with ASTM D1883 by a geotechnical and construction materials testing lab.

Location of borings to obtain soil samples are to be placed along the proposed roadway to provide a representative view of the existing subgrade. Laboratory tests are to be performed on these representative soil samples to determine natural moisture content, liquid and plastic limits, and percent passing the No. 200 sieve. These tests are to be performed in accordance with ASTM D2216, D4318, and D422, respectively. Additional CBR tests are to be performed where above lab tests on soil samples of the existing subgrade reveal variations in the subgrade soil according to the “Unified Soil Classification”. Unified Soil Classifications are to be determined using procedures in accordance with ASTM D2487. Additional CBR tests are to be performed on soil samples where roadway grades produce cuts into varying subgrade soils.

The existing subgrade shall always be able to provide a stable working platform when the soil is compacted to a density of 95% of standard proctor at optimum moisture content according to ASTM D698. All organic and unstable material is to be removed during construction and replaced with select fill.

Step 2 Identify the class of the street to be built. Street classifications are determined by the following table and by the City of Van “Master Street Plan”, latest edition. Choose the street type which matches the design roadway’s attributes. If a design roadway’s attributes fall between street classes, for example, a street that has both residential and commercial zoning, choose the street class which produces the most stringent pavement design.

**Table 1**  
**Street Classification**

<b>Master Street Plan Classification</b>	<b>Zoning</b>	<b>Maximum Average Vehicle per Day (vpd)</b>
Local	Residential	< 2,500
Collector	Residential	2,500 – 5,000
Major Collector	Commercial/Industrial	5,000 – 8,500
Minor Arterial	All	8,500 - 24,000
Major Arterial	All	24,000 – 36,000

Step 3 Determine the total thickness of the pavement section for each type of pavement design. Three pavement design tables are provided: one for flexible base pavement, one for full-depth hot mix asphaltic concrete pavement, and one for concrete pavement. See Tables 2, 3 and 4, respectively below. Each design table is divided into street classification columns and subgrade CBR% rows. Using the street class identified in Step 2, follow this column down until it intersects the subgrade CBR% row determined in Step 1. This number represents the total thickness of pavement section, in inches, to be used.

Step 4 Determine the thickness of base. The minimum surface thickness is found at the bottom of each street class column. To obtain the thickness of base, subtract the surface thickness from the total thickness of the pavement section. On roadways that have an existing subgrade CBR% greater than 12, step 4 often provides the most economical design and the design process could be stopped (see Example Problem 1). However, for roadways that have subgrade CBR% less than 12, the design process should continue to provide an economical design.

Step 5 Select a suitable subbase material if the process is continued. Subbase material can be the existing subgrade treated with lime, flyash, cement or

other approved material; a select fill material, such as iron ore topsoil; or a native subgrade material recompacted to a density to achieve the design CBR value. The subbase material is sampled and the subbase strength is defined by having a CBR test performed.

- Step 6 Determine the new thickness of base and surfacing. Taking into account the subbase CBR% value and using the pavement design table again, follow the same street class column down until it intersects the subbase CBR% determined in Step 5. This number represents the total thickness in inches of base and surfacing. The base thickness is found by subtracting the surface thickness from the total thickness of base and surfacing.
- Step 7 Determine the thickness of the subbase material selected in Step 5. This is found by subtracting the total thickness of base and surfacing in Step 6 from the total thickness of the pavement section in Step 3. However, the minimum thickness of a subbase material is 6".
- Step 8 Determine the overall pavement section design. Add the surface thickness and base thickness found in Step 6 to the subbase thickness found in Step 7. See Example Problem 2. To determine the most economical and efficient roadway pavement design, the above process should be performed using each pavement design table, varying the subbase materials, and then applying current construction costs.
- Step 9 The design submittal, including the roadway pavement section designs performed and the roadway pavement design recommended to the City for approval, shall be made on the forms provided. See Form 1. The results of the CBR test performed by a geotechnical and construction materials testing lab shall also be submitted to the City.

**Table 2**  
**Flexible Base Pavement Design**  
 Design Period = 20 Years

<b>Total Pavement Thickness</b>					
<b>Subgrade or Subbase CBR%</b>	<b>Local Residential (inches)</b>	<b>Collector Residential (inches)</b>	<b>Collector Commercial (inches)</b>	<b>Major Collector Industrial (inches)</b>	<b>Minor or Major Arterial (inches)</b>
2	32	35	36.5	38	39
3	24	27.5	29	30	31
4	21	23	24	24.5	25
5	18	19.5	20.5	21	21.5
6	16	17.5	18	18.5	19
7	14	16	16.5	17	17.5
8	13	14.5	15	15.5	16
9	12	13.5	14	14.5	15
10	11	12.5	13	13	13.5
12	9.5	10.5	11	11.5	12
15	8	9	9.5	10	10
20	7.5	8	9	9.5	10
25	7.5	8	9	9.5	10
<b>Minimum Surface and Base Thickness</b>					
<b>HMAC</b>	2	2	2	2.5	3
<b>Base</b>	5.5	6	7	7	7
<b>Minimum Stabilized Subbase Thickness</b>					
<b>Subbase</b>	6	6	6	6	6
<b>Flexible Base Specifications</b>					
Texas Department Transportation “Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges”, latest revision, Item 247 shall govern except California Bearing Ratio Tests will replace Triaxial Classes and the maximum PI = 9. The base shall be compacted to a density of 95% of modified proctor at optimum moisture content according to ASTM Method D1557.					
<b>Grade</b>	1, 2, 3	1, 2, 3	1, 2	1, 2	1, 2
<b>Minimum CBR% of Base</b>	60	60	70	70	80

**Table 3**  
**Hot Mix Asphaltic Concrete Pavement Design**  
 Design Period = 20 Years

<b>Total Pavement Thickness</b>					
<b>Subgrade or Subbase CBR%</b>	<b>Local Residential (inches)</b>	<b>Collector Residential (inches)</b>	<b>Collector Commercial (inches)</b>	<b>Major Collector Industrial (inches)</b>	<b>Minor or Major Arterial (inches)</b>
2	12.5	14	15.5	16	16.5
3	10.5	12	13.5	13.5	14
4	9.5	10.5	12	12	12.5
5	8.5	9.5	11	11	11.5
6	8	9	10	10	10.5
7	7.5	8.	9.5	9.5	10
8	7.5	58	9	9	9.5
9	7	7.5	8.5	8.5	9
10	6.5	7.5	8	8.5	9
12	6	7	7.5	8	8
15	5.5	6.5	7	7.5	7.5
20	5.5	6	7	7	7
25	5.5	6	6.5	7	7
<b>Minimum Surface and Base Thickness</b>					
<b>Type “D”</b>	2	2	2	2.5	3
<b>Type “B”</b>	3.5	4	4.5	4.5	4
<b>Minimum Stabilized Subbase Thickness</b>					
<b>Subbase</b>	6	6	6	6	6
<b>Hot Mix Asphaltic Concrete Specifications</b>					
Texas Department of Transportation “Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges” latest revision, Item 340 with coarse aggregate being crushed so that a minimum of 50% of particles retained on # 4 sieve shall have more than one crushed face when tested in accordance with Test Method Tex-460-A (Particle Count).					

**Table 4**  
**Concrete Pavement Design**  
 Design Period = 35 Years

<b>Total Pavement Thickness</b>					
<b>Subgrade or Subbase CBR%</b>	<b>Local Residential (inches)</b>	<b>Collector Residential (inches)</b>	<b>Collector Commercial (inches)</b>	<b>Major Collector Industrial (inches)</b>	<b>Minor or Major Arterial (inches)</b>
2	8	9	10	11	11
3	7	8	9	10	10
4	7	8	9	10	10
5	6	7	8	9	9
6	6	7	8	9	9
7	6	7	8	9	9
8	6	7	8	9	9
9	6	7	8	9	9
10	6	7	8	8	8
12	6	6	7	8	8
15	6	6	7	7	7
20	5	6	7	7	7
25	5	6	6	7	7
<b>Minimum Stabilized Subbase Thickness</b>					
<b>Subbase</b>	6	6	6	6	6
<b>Concrete Specifications</b>					
Texas Department of Transportation "Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges" latest revision, Item 360 with a minimum compressive strength of 4,000 psi at 28 days with #4 rebar on 18" c-c each way. A steel reinforcement design by a licensed professional engineer will be required for Major Collectors and larger.					

### *Example Problem 1*

**Required:** Determine a pavement section for a collector street in a commercial area.

**Solution A: FLEXIBLE BASE PAVEMENT SECTION**

- Step 1 From testing the roadway's existing subgrade, a CBR of 12% was obtained.
- Step 2 From Table 1 and the "Master Street Plan", the street classification was determined to be a major commercial/industrial collector street.
- Step 3 From Table 2, the total thickness of the pavement section was determined to be 11.5".
- Step 4 The thickness of base without a subbase is found by subtracting the minimum surface from the total thickness, i.e.  $11.5" - 2.5" = 9"$ . The design process could stop here with an overall pavement section design of 2.5" HMAC Surface on 9" Flexible Base. However, a treated subgrade may produce a more economical design.
- Step 5 The existing subgrade is treated with lime (say 6%) and testing shows the new subbase material has a CBR of 20%.
- Step 6 From Table 2, the new total thickness of the pavement section is 9.5". The new thickness of base without a subbase is found by subtracting the minimum surface from the new total thickness, i.e.  $9.5" - 2.5" = 7"$ .
- Step 7 The subbase thickness is found by subtracting the total thickness found in Step 6 from the total thickness found in Step 3, i.e.  $11.5" - 9.5" = 2"$ . However, minimum subbase thickness is 6".
- Step 8 The new overall pavement section design is 2.5" HMAC Surface on 7" Flexible Base on 6" Lime Treated Subbase.

**Solution B: FULL DEPTH HMAC PAVEMENT SECTION**

- Step 1 From testing the roadway's existing subgrade, a CBR of 12% was obtained.
- Step 2 From Table 1 and the "Master Street Plan", the street classification was determined to be a major commercial/industrial collector street.

- Step 3 From Table 3, the total thickness of the pavement section was determined to be 8".
- Step 4 The thickness of base without a subbase is found by subtracting the minimum surface from the total thickness, i.e.  $8" - 2.5" = 5.5"$ . The design process can stop here with an overall pavement section design of 2.5" HMAC Surface on 5.5" HMAC Base.

**Solution C: CONCRETE PAVEMENT SECTION**

- Step 1 From testing the roadway's existing subgrade, a CBR of 12% was obtained.
- Step 2 From Table 1 and the "Master Street Plan", the street classification was determined to be a major commercial/industrial collector street.
- Step 3 From Table 4, the total thickness of the pavement section was determined to be 8". The design process can stop here with an overall pavement section design of 8" Concrete Pavement on untreated subgrade.

### *Example Problem 2*

**Required:** Determine a pavement section for a local street in a residential subdivision.

**Solution A: FLEXIBLE BASE PAVEMENT SECTION**

- Step 1 From testing the roadway's existing subgrade, a CBR of 3% was obtained.
- Step 2 From Table 1 and the "Master Street Plan", the street classification was determined to be a local residential street.
- Step 3 From Table 2, the total thickness of the pavement section was determined to be 24".
- Step 4 The thickness of base without a subbase is found by subtracting the minimum surface from the total thickness, i.e.  $24" - 2" = 22"$ . A base thickness of 22" is excessive, and the design process should continue to find a more economical design.
- Step 5 The existing subgrade is treated with lime (say 6%) and testing shows the new subbase material has a CBR of 9%.
- Step 6 From Table 2, the new total thickness of the pavement section is 12". The new thickness of base without a subbase is found by subtracting the minimum surface from the new total thickness, i.e.  $12" - 2" = 10"$ .
- Step 7 The subbase thickness is found by subtracting the total thickness found in Step 6 from the total thickness found in Step 3, i.e.  $24" - 12" = 12"$ .
- Step 8 The new overall pavement section design is 2" HMAC Surface on 10" Flexible Base on 12" Lime Treated Subbase.

**Solution B: FULL DEPTH HMAC PAVEMENT SECTION**

- Step 1 From testing the roadway's existing subgrade, a CBR of 3% was obtained.
- Step 2 From Table 1 and the "Master Street Plan", the street classification was determined to be a local residential street.
- Step 3 From Table 3, the total thickness of the pavement section was determined to be 10.5".

- Step 4 The thickness of base without a subbase is found by subtracting the minimum surface from the total thickness, i.e.  $10.5'' - 2'' = 8.5''$ . A base thickness of 8.5" is excessive, and the design process should continue to find a more economical design.
- Step 5 The existing subgrade is treated with lime (say 6%) and testing shows the new subbase material has a CBR of 9%.
- Step 6 From Table 2, the new total thickness of the pavement section is 7". The new thickness of base without a subbase is found by subtracting the minimum surface from the new total thickness, i.e.  $7'' - 2'' = 5''$ .
- Step 7 The subbase thickness is found by subtracting the total thickness found in Step 6 from the total thickness found in Step 3, i.e.  $10.5'' - 7'' = 3.5''$ . However, minimum subbase thickness is 6".
- Step 8 The new overall pavement section design is 2" HMAC Surface on 5" Flexible Base on 6" Lime Treated Subbase.

### **Solution C: CONCRETE PAVEMENT SECTION**

- Step 1 From testing the roadway's existing subgrade, a CBR of 3% was obtained.
- Step 2 From Table 1 and the "Master Street Plan", the street classification was determined to be a local residential street.
- Step 3 From Table 4, the total thickness of the pavement section was determined to be 7".
- Step 4 The design process could stop here with an overall pavement section design of 7" concrete pavement on untreated subgrade. However, a treated subgrade may produce a more economical design.
- Step 5 The existing subgrade is treated with lime (say 6%) and testing shows the new subbase material has a CBR of 9%.
- Step 6 From Table 4, the new total thickness of pavement is 6".
- Step 7 The subbase thickness is found by subtracting the total thickness found in Step 6 from the total thickness found in Step 3, i.e.  $7'' - 6'' = 1''$ . However, minimum subbase thickness is 6".
- Step 8 The new overall pavement section design is i.e. 6" Concrete Pavement on 6" lime treated subbase.

- B. Width: Pavement widths shall conform to the requirements of the City of Van “Master Street Plan”, latest edition, but shall in no case be less than the widths shown in the following table:

**Table 5**  
**Paving Widths**

Type Street	Minimum Paving Width <sup>1</sup>
Local - Residential:	28' or 24' <sup>2</sup>
Collector - Residential	32'
Major Collector - Commercial/Industrial:	40'
Minor Arterial - All:	77' or 87' w/bike lane
Major Arterial - All:	101'
Alley - Residential:	15'
Alley - other than residential:	20'

- Notes:**
1. Dimensions are from face of curb to face of curb or edge of pavement to edge of pavement, centered in right of way.
  2. In subdivisions with all lots greater than 2 acres.

Cul-de-sacs shall be designed in accordance with current City of Van ordinances. The minimum radius shall be 46 feet from center to face of curb.

- C. Grades: Street profile grades shall be set on top of curb for all streets. Profile grades shall not be less than 0.5' rise or fall in 100 feet (0.5%). Profile grades shall not be greater than 12' rise or fall in 100 feet (12%) on local streets, not greater than 9' rise or fall in 100 feet (9%) on collector streets, and not greater than 6' rise or fall in 100 feet (6%) on arterial streets. Grade changes exceeding 1' rise or fall in 100 feet (1%) shall be made with vertical curves. To satisfy requirements of minimum sight distance, comfort and appearance, calculate the minimum vertical curve length as follows:

$$L = K \times A$$

- Where:
- L = minimum vertical curve length, feet (ft)
  - K = Factor from Table 6, below
  - A = Algebraic difference of grades, in percent

**Table 6**  
**Minimum K Values**

Design Speed <sup>1</sup>	30	35	40	45	50	55	60	65
Crest Vertical Curve	30	40	60	80	110	150	190	230
Sag Vertical Curve <sup>2</sup>	40	50	60	70	90	100	120	130

- Notes:**
1. The design speed shall be established by the City of Van.
  2. Length of sag vertical curve may be shortened by the City of Van to reduce siltation.

Unless otherwise allowed by the City of Van, top of curb grades shall be set low enough below the adjacent land to facilitate proper drainage from the residential lot to the street. Curb separation shall not exceed crown height except in situations of super elevated curves, divided roadways, cul-de-sacs or intersections. Divided roadways shall have a straight cross slope downward from median to outside curb rather than a parabolic crown on each lane. Divided roadways shall not be designed, unless approved by the City of Van.

Superelevation is required for all street classifications except for local residential streets and alleys. Superelevated street sections shall be in accordance with AASHTO design criteria based on design speed and degree of horizontal curvature.

- D. Street Alignment: Street alignment design shall consider not only the best use of the land, but also traffic safety. The maximum degree of horizontal curvature for an arterial shall be 7 degrees. The maximum degree of curvature on a collector shall be 22.9 degrees (minimum radius shall be 250'). The horizontal curvature on commercial or residential streets shall be designed so as to eliminate sharp reverse curves that are hazardous. The minimum tangent length between reverse curves shall be 50'. All horizontal curve lengths, degree of curvature, curve super elevations and other elements of traffic safety must be approved by the City of Van during the approval of the subdivision plans.
- E. Intersections: All intersections should intersect at an angle of 90 degrees. Intersections at angles less than 90 degrees shall be approved by the City. In no case shall the angle of the intersection be less than 70 degrees.

When intersecting a street in a horizontal or vertical curve, sight distance shall be in accordance with the City of Van Unified Development Code. Curb returns at intersections on residential streets shall have a minimum radius of 20' measured to the face of curb.

At the intersections of collectors and collectors; collectors and arterials; and arterials and arterials, the radius will be a minimum of 30' measured to the face of curb, unless otherwise approved by the City of Van. A larger radius may be required by the City of Van to accommodate traffic movement.

- F. Concrete Headers: Concrete headers shall be installed at the termination of all asphalt pavements, unless otherwise approved by the City of Van.
- G. Curb and Gutter: Concrete curb and gutter is required on all streets constructed within the City of Van and its Extra Territorial Jurisdiction (ETJ), except in subdivisions with all lots 2 acres and greater in size. All curb and gutter will be designed in accordance with the Design Guideline for Storm Drainage System Improvements and City of Van Standard Details.

- H. Concrete Valley Gutters: Where water runoff conditions dictate, all valley gutters crossing streets or intersections within a subdivision shall be constructed of reinforced concrete, unless otherwise approved by the City of Van, to prevent asphalt pavement deterioration.
- I. Subsurface Drainage: Ground water is prevalent in Van and its surrounding ETJ. The Engineer will design and provide for the construction of underdrain systems in the construction plans. Even if the Engineer provides no underdrain, the City of Van may require the installation of underdrain.
- J. Erosion and Sediment Control: In the construction plans, the Engineer shall include plans for erosion and sediment control during construction and permanent erosion and sediment control once construction is complete. Plans for erosion and sediment control shall be in accordance with Chapter 10, Article VII, Division E “Erosion and Sediment Control” in the City of Van Unified Development Code, as well as Chapters 6 and 7 of these Design Guidelines.
- K. Testing Frequency: The City of Van recommends testing frequencies as shown in the City of Van Standard Detail “Testing Requirements for Paving”.

### III. Plans

- A. Construction Plans: Following approval of final plat and the incorporation of changes required by the City of Van, six complete sets of construction drawings shall be submitted to the City of Van for distribution.
  - 1. Plan Section: The plan section shall be prepared on either combined plan and profile sheets or plan sheets with separate profile sheets. Unless otherwise approved by the City of Van, paper size shall be a minimum of 22" x 34" and the plan section shall be drawn to scale of not more than twenty feet to the inch (1" = 20'). The plan section shall include, but not be limited to, the following items:
    - a. Horizontal control point on datum acceptable to the City of Van
    - b. Right of way, easements, and street pavement widths
    - c. Stationing of proposed street from left to right on sheet and stationing of intersecting streets
    - d. Angles and stations of intersections
    - e. Street names
    - f. Horizontal curve data
    - g. Existing topographic features such as utility poles, fire hydrants, driveways, culverts, inlets, lakes, watercourses, etc.
    - h. Lot lines, lot numbers, subdivision lines and City limit lines
    - i. Curb radii, and special curb grade points such as end of radius returns and mid-points and top of inlet, etc.
    - j. Underground utilities, including but not limited to sanitary sewer lines, water lines, storm sewer lines, gas lines, power lines and

- poles, telephone lines and television cable lines, located as accurately as possible
  - k. Location of soil borings, if any
  - l. Limits of significant cut or fill
  - m. Directional arrows showing direction of drainage in gutters
  - n. Crown transition in intersections
  - o. North arrow
  - p. Graphic scale
  - q. Special notes, if any
  - r. Engineer's seal, signature and firm registration number
2. Profile Section: Profiles shall have grid increments of less than 1". Unless otherwise approved by the City of Van, paper size shall be a minimum of 22" x 34". Drafting medium, lettering, layout, etc., are all optional except to the extent required herein. The profile shall be drawn to a scale to match the plan horizontally and not more than five feet to the inch (1" = 5') vertically and shall include, but not be limited to the following list:
- a. Existing ground profiles along the centerline and each right of way line.
  - b. Proposed top of curb and existing top of curb line where curb has previously been built. If the new street does not have curb and gutter, proposed top of pavement profile along centerline and flowline of ditches on both sides.
  - c. Vertical curve data including the K value, curve length, vertical point of intersection station and elevation, high point or low point station and elevation. Percent grades shall be shown on all tangents.
  - d. Top of curb grades shall be shown at not more than 50 foot intervals in tangents and 25 foot intervals in vertical curves. The PC, PT and PI shall be shown in profile with station and elevation.
  - e. Benchmark description and elevation on each sheet with temporary bench marks set at intervals of not more than 500'. All bench mark and profile elevations shall be tied to the National Geodetic Survey Datum (formerly The U. S. Coastal & Geodetic Survey Datum). Assumed datums will not be allowed.
  - f. Proposed (if available) and/or existing storm sewer, sanitary sewer, water, electrical, gas and telephone lines.
- B. Record Drawings: The Engineer shall prepare a set of record drawings based on the construction plans. The record drawings shall show any deviations made during construction from the approved construction plans. The Project Representative will assist the Engineer in procurement of information needed to develop the record drawings. The following shall be provided to the City of Van within thirty (30) days of written final acceptance of the improvements:
- 1. One set of conformed drawings in pdf format, to be provided by the Developer.

*Form 1*

**CITY OF VAN  
ROADWAY PAVEMENT SECTION DESIGN**

**Subdivision/Project**

**Name:** \_\_\_\_\_

**Street Name:** \_\_\_\_\_

Step 1 California Bearing Ratio Test (CBR) of Existing Subgrade:

<b>Boring #</b>	<b>Station #</b>	<b>Offset Distance</b>	<b>Depth of Material Tested</b>	<b>CBR%</b>

Step 2 Street Classification:

Street Classification: \_\_\_\_\_

Step 3 Total Thickness of Pavement Section:

Flexible Base

Full Depth HMAC

Concrete

Step 4 Thickness of Base:

Flexible Base

Full Depth  
HMAC

Total Thickness of Pavement Section (Step 3):

Minimum Surface Thickness:

(-)

(-)

Base Thickness:

=

=

Step 5 Subbase Material (if used):

Flexible Base

Full Depth HMAC

Concrete

Type of Subbase  
Material:

CBR% of Subbase:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Step 6 Thickness of Base and Surfacing (if a Subbase is used):

	Flexible Base	Full Depth HMAC	Concrete
Total Thickness of Base and Surfacing:	_____	_____	_____
Surface Thickness:	(-) _____	(-) _____	(-) _____
Base Thickness:	= _____	= _____	= _____

Step 7 Thickness of Subbase Material (if a Subbase is used):

	Flexible Base	Full Depth HMAC	Concrete
Total Pavement Section Thickness (Step 3):	- _____	_____	_____
Total Thickness of Base and Surfacing (Step 6):	(-) _____	(-) _____	(-) _____
Subbase Thickness (minimum 6"):	= _____	= _____	= _____

Step 8 Overall Pavement Section Design:

	Flexible Base	Full Depth HMAC	Concrete
Surface Thickness:	_____	_____	_____
Base Thickness:	_____	_____	_____
Subbase Thickness:	_____	_____	_____

<b>RECOMMENDATION:</b>	Thickness	Material
Surface:	_____	_____
Base:	_____	_____
Subbase:	_____	_____

Signature: \_\_\_\_\_  
 Title: \_\_\_\_\_  
 Date: \_\_\_\_\_

Seal

**City of Van**  
**Design Guidelines for Subdivision Improvements**  
**Chapter 5 - Storm Drainage System Improvements**

**I. General**

The purpose of this Guideline is to assist the Engineer in design and preparation of plans and specifications for the construction of public storm drainage improvements. All drainage improvements shall be designed and constructed in accordance with these Design Guidelines, City of Van Standard Details and City of Van Code of Ordinances. Materials and construction methods for drainage improvements (technical specifications) shall conform to “Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges”, latest revision, except where specifically superseded in this Guideline, City of Van Standard Specifications or City of Van Standard Details. Where any questions arise as to the interpretation of the standards of design, the decision of the City of Van will be final.

**II. Development Criteria**

- A. Platting of Drainage Improvements: Drainage facility needs caused by the development or use of property must be identified and provided for in appropriate stages of development. During the platting process, the flood hazard areas shall be identified and drainage easements dedicated to the public on the final plat. The objectives of drainage planning and facilities are twofold: (a) to protect the uses of the platted property and the safety of the citizens of Van who use the platted property in the future, and (b) to prevent development and usage of the platted property from adversely affecting others. The owners and Developers of property have the duty to accommodate ultimate development conditions for upstream and adjacent drainage areas and to study the effect of each runoff from each new development on existing downstream drainage facilities. In cases where existing downstream capacity is not available, the owner and/or the Developer must provide adequate storm drainage facilities to mitigate the deficiency.
- B. Improvements in Small Watersheds: Drainage improvements required for tracts impacted by drainage systems having a contributing watershed area of less than one square mile or which are upstream from the Limit Of Detailed Study as shown on the most current “Flood Insurance Rate Map” for Van Zandt County and Incorporated Areas, prepared by the Federal Emergency Management Agency, shall be provided in accordance with these Design Guidelines and with Chapter 10, Article VII, Division A “Drainage and Water Utility Improvements” of the City Van Code of Ordinances.

Permanent improvements shall be constructed in drainage easements dedicated to the public. When the construction is approved by the City of Van, the City will assume maintenance of the portion of such improvements that are within the City

limits of the City of Van. Exceptions to the minimum standards may be granted by the Planning and Zoning Commission on recommendation by the Development Services Engineer when such improvements are not warranted.

- C. Improvements in Large Watersheds: For drainage improvements required for a tract impacted by drainage systems having a contributing watershed area one square mile or greater, the control of drainage, erosion and flooding shall be in accordance with Chapter 10, Article VII, Division A “Drainage and Water Utility Improvements” of the City Van Code of Ordinances. A tract will be considered to be impacted when part of the property lies within the flood plain of a stream or watershed area one square mile or greater, or where the bed or banks of such a stream touches or crosses part of the tract.
- D. Development in Floodplains: Any development within a designated 100-year floodplain must be permitted through the City’s Development Services Department. To develop property within a designated 100-year floodplain, the Developer must submit documentation to the Floodplain Administrator that proves the development of the lot will not encroach into the 100-year floodway.

If channel modifications are to be done to recover land in the floodplain, the Developer must submit documentation to the Floodplain Administrator to send to FEMA that proves the proposed modifications will revise the floodplain accordingly. The Floodplain Administrator will request a Conditional Letter of Map Revision (CLOMR). This CLOMR must be received prior to approval of channel modifications. Upon completion of channel modifications, documentation must be submitted to the Floodplain Administrator to send to FEMA showing that modifications have been completed and the Floodplain Administrator will request a Letter of Map Revision (LOMR) which actually revises the floodplain maps.

- E. Development in Jurisdictional Waters: When development occurs in an area that impacts jurisdictional waters, the Developer shall provide a copy of the section 404 permit. The City may, at its discretion, require a letter of concurrence from the USACE indicating no jurisdictional waters are present.

### III. Calculation of Runoff

- A. Rational Method: The Rational Method is recommended for small urban and rural watersheds of less than 200 acres. This includes all watersheds in the City of Van and its Extra Territorial Jurisdiction (ETJ). However, for any sized development it is incumbent upon the Engineer to determine the hydrologic method that seems best suited for the specific situation and to provide sufficient justification for the use of a different method.

The Rational Method estimates the peak rate of runoff at any point in a watershed as a function of drainage area, runoff coefficient and average rainfall intensity at a duration equal to the time of concentration. The rational formula is expressed as:

$$Q = C \times I \times A$$

Where: Q = peak runoff rate, cubic feet per second (cfs)  
 C = runoff coefficient  
 I = average rainfall intensity, inches per hour (in/hr)  
 A = drainage area, acres (ac)

The methods of determining values for the runoff coefficient and the rainfall intensity are as follows.

- B. **Runoff Coefficient:** The determination of the runoff coefficient, or C, is somewhat subjective, depending on topography, land use and vegetal cover, among other factors. Values should be determined from Table 1, below, according to the future planned uses of the land. Future land uses may be determined by zoning designations or the City’s current “Future Land Use” map. Zoning and future land use information may be obtained from the City of Van Planning and Zoning Department.

In the event the watershed includes areas not shown on the zoning and “Future Land Use” maps, generally such areas are to be considered as residential land. If other development is anticipated within the reasonable future in these areas, the engineer shall make a rough estimate of such uses.

**Table 1**  
**Runoff Coefficients**

<b>Land Use</b>	<b>Runoff Coefficient, C</b>
Lawns	0.05 – 0.35
Pasture	0.05 – 0.30
Unimproved Areas	0.10 – 0.30
Forest	0.10 – 0.15
Parks and Cemeteries	0.10 – 0.25
Playgrounds (except asphalt or concrete)	0.20 – 0.35
Railroad Yard Areas	0.20 – 0.35
Gravel Areas	0.50
Driveways, Walkways and Roofs	0.75 – 0.95

**Table 1**  
**Runoff Coefficients (cont'd)**

Land Use	Runoff Coefficient, C
Streets:	
- Asphalt and Concrete	0.70 – 0.95
- Brick	0.70 – 0.85
Residential:	
- Single Family, lots < 1 acre	0.50 – 0.65
- Single Family, lots > 1 acre	0.30 – 0.45
- Apartments	0.50 – 0.70
- Multiplexes, detached	0.40 – 0.60
- Multiplexes, attached	0.60 – 0.75
Downtown Areas	0.70 – 0.95
Commercial / Industrial:	
- Light	0.50 – 0.80
- Heavy	0.60 – 0.90

When the watershed contains more than one land use, a weighted average runoff coefficient for the watershed is to be estimated by determining the C value and area for each different land use. The formula for calculating the weighted average runoff coefficient is as follows:

$$C_{avg} = \frac{(C_1A_1 + C_2A_2 + \dots + C_nA_n)}{(A_1 + A_2 + \dots + A_n)}$$

Where:  $C_{avg}$  = the weighted average runoff coefficient for the watershed  
 $n$  = the number of different kinds of land use within watershed  
 $C_n$  = the runoff coefficient for each of the different land uses  
 $A_n$  = the area of each of the different land uses which corresponds with the runoff coefficient for that particular area, acres (ac)

- C. **Time of Concentration:** Use of the rational formula requires the time of concentration for each design point within the watershed. The time of concentration is assumed to be equal to the duration of rainfall and is used to estimate the rainfall intensity, which is discussed in more detail below.

The time of concentration is defined as the time at which the entire watershed begins to contribute to runoff. It is calculated as the time taken for runoff to flow from the most hydraulically remote point of the drainage basin to the point of investigation. Determining the path that results in the longest travel time is a matter of trial and error, as there may be more than one possible path.

There are generally three components that characterize the progression of runoff along a travel path: 1) overland flow, such as across open paved or grassed areas, 2) shallow concentrated flow, such as in gutters and swales, and 3) concentrated channel flow, such as in conduits and open channels.

Figure A-1, presented in Appendix A, shall be used to estimate the overland and shallow concentrated flow times in order to determine the velocity for a chosen path length.

Flow time for pipes and open channel can be determined by the use of Manning's equation. The Manning's equation is presented in Section IV.A, below. For open channels, velocity should be based on the assumption that the main channel is flowing full without flow in the overbanks. For pipe flow in a proposed storm drain system, velocity should be calculated at a uniform depth based on the computed upstream discharge. For existing storm drain systems, velocity should be calculated based on full flow conditions.

Once the velocity for each component along the travel path is calculated, the travel time for each component is determined by dividing the component path length by the velocity.

$$t = \frac{L}{60 \times V}$$

Where: t = travel time over the component, minutes (min)  
 L = length of component along the flow path, feet (ft)  
 V = flow velocity for the component, feet per second (fps)

The time of concentration,  $t_c$ , is the sum of the travel times for each component along the travel path.

The time of concentration should be found for the path with the longest travel time, which may result in an iterative process. The minimum time of concentration that should be used is 10 minutes. Therefore, if the maximum calculated time of concentration is less than 10 minutes, then use 10 minutes. Otherwise, use the actual maximum calculated time of concentration.

- D. **Rainfall Intensity:** Rainfall intensity is the average rainfall rate for a specific duration and selected frequency. The rainfall duration is assumed to be equal to the time of concentration. Rainfall intensity is calculated using the following formula:

$$I = \frac{b}{(t_c + d)^e}$$

Where: I = rainfall intensity, inches per hour (in/hr)  
 $t_c$  = time of concentration, minutes (min)  
 e, b, d = Rainfall Intensity-Duration-Frequency Coefficients, as presented in Table 3 below

**Table 2**  
**Rainfall Intensity-Duration-Frequency Coefficients**

Storm Frequency	e	b	d
2-yr	0.865	82.6	14.7
5-yr	0.782	70.7	13.8
10-yr	0.747	68.7	13.5
25-yr	0.714	69.7	13.2
50-yr	0.695	71.6	13.0
100-yr	0.680	73.9	12.8

*Source: Derived from the City of Van "Master Drainage Study", April 2008*

Solutions for rainfall intensity, I, based on the above coefficients are given in Table C-1 in Appendix C.

- E. Master Drainage Study: As an alternative to the method outlined above, the Engineer may use the City of Van "Master Drainage Study", latest revision, in locations where areas of detailed study are provided.

#### IV. Design of Storm Flow Structures

- A. Manning's Equation: The Manning's equation shall be used to calculate the flow in all drainage structures. The Manning's equation is given by the following:

$$V = \frac{1.49}{n} \times R^2 \times S$$

Where: V = velocity, feet per second (fps)  
 n = Manning roughness coefficient  
 R = hydraulic radius, feet (ft), which is defined as the ratio of the area to the wetted perimeter =  $\frac{A}{P}$   
 S = slope of the hydraulic elevation, feet of fall per horizontal foot (ft/ft)

Values for the Manning's roughness coefficient, n, shall be as provided in Table 3 or as stated hereinafter for each type of structure.

**Table 3**  
**Manning Roughness Coefficient**

Channel Material	Manning Roughness Coefficient, n
Plastic (PVC and ABS)	0.009
HDPE	0.012
Concrete	0.013
Brick	0.016
Rubble Masonry	0.017
Corrugated Metal Pipe	0.024
Natural Channels (good condition)	0.025
Riprap	0.035
Natural Channels (with stones and weeds)	0.035
Natural Channels (poor condition)	0.060

Use of charts and/or tables for flow based on Manning's equation with the proper value of "n" in handbooks, text books, or other reference works is acceptable in lieu of making mathematical calculations where practical. A nomograph to solve Manning's equation for the velocity, V, is presented as Figure B-1 in Appendix B.

The flow rate can then be found as follows:

$$Q = A \times V$$

Where: Q = volumetric flow rate, cubic feet per second, (cfs)  
 A = cross-sectional area, square feet (ft<sup>2</sup>)  
 V = velocity, feet per second, (ft/sec)

- B. Streets: Sufficient means of diverting water from streets shall be provided so that there is a minimum 10 foot wide traffic lane left unflooded with a 10-year frequency storm and so that the water is not more than curb deep with a 100-year frequency storm. The requirement for a 10 foot wide traffic lane does not apply to streets less than 40 feet wide. The method of calculating the flow of the water in streets shall be Manning's equation, using a value of 0.013 for "n". The standard dimension of streets shall be in accordance with the City of Van "Master Street Plan", latest edition.
- C. Storm Sewers:

1. Materials for Storm Sewers: All pipe used in the storm sewer system shall be reinforced concrete pipe conforming to ASTM C76, latest revision, or high density polyethylene (HDPE) pipe conforming to ASTM F2306, latest revision. Reinforced concrete pipe is required under public pavement (e.g. public roadways). HDPE may be used in locations outside of pavement and under private pavement (e.g. private roadways, parking lots, driveways, etc.). Upon approval by the City of Van, storm sewer pipe running parallel to the roadway (i.e. from inlet box to inlet box) may be HDPE depending on the proximity of the box to the pavement. Changes in pipe material must be made at an inlet or junction box.

The type of materials installed is required to be shown on all record drawings.

2. Location of Storm Sewers / Easements: All storm sewer pipe located outside of public rights-of-way shall be placed in a drainage easement, except where pipe is carrying storm water runoff solely from one property that likely will not be subdivided or where approved by the City of Van. Easements will be provided in accordance with the City of Van Unified Development Code.

Where not dedicated by plat, a center line description of any off-site easement required for storm sewer mains to be constructed in conjunction with said project shall be furnished with the final plans and specifications for storm sewer mains. Center line descriptions shall be prepared by a Registered Public Land Surveyor.

3. Discharge of Storm Sewers: Storm sewers should discharge into natural streams or into other storm sewers. No new unimproved channels may be constructed to carry storm water runoff, although existing channels may be improved and realigned per applicable City Ordinance(s).

Proposed storm sewer systems may be connected into existing systems as long as the proposed combined discharge will not exceed the capacity of the existing system. Where two or more storm sewers intersect, a storm sewer manhole or junction box shall be used. Additional drainage areas shall not be directed into a watershed from another watershed.

4. Depth of Cover: Unless otherwise authorized by the City of Van, the top of storm sewer pipes must have at least 18 inches of earth cover over the top of the barrel of the pipe. Wherever practical, the hydraulic water level is to be kept at or below the top of the storm sewer pipe. Where the hydraulic water elevation is above the top of storm sewer pipes, it shall be kept at least 6-inches below ground level. Where the hydraulic water elevation is above the top of a storm sewer pipe, the flow in the pipe shall be calculated by the hydraulic grade rather than the pipe grade.

5. Pipe Size: Minimum pipe size, regardless of materials used, shall be 18-inches in diameter for storm sewer systems to be dedicated to and maintained by the City.

Maximum allowable pipe size for HDPE pipe for both public and private storm sewer systems shall be 24" inside diameter.

6. Access Points: Access points shall be provided at a maximum spacing of 400 feet. Access points include curb inlets, junction boxes or storm sewer manholes.
7. Sizing Storm Sewers: Storm sewer pipes shall be designed in accordance with the State Department of Highways and Public Transportation Hydraulic Manual, December 1985 edition, as provided in Appendix D, except as otherwise stated herein. Storm sewers shall be designed to handle a 100-year frequency flood flow. The value of "n" to be used shall be in accordance with Table 3, above. However, if the Engineer can show evidence from the pipe manufacturer or other sources that a different value of "n" is justified, such will be accepted.

If the Engineer wishes to use a flow chart from a handbook, text book, manufacturer's brochure, or other suitable reference work rather than calculating the flow, such flow charts are acceptable as long as the value of "n" used in preparing the chart is acceptable. Trenching, backfill, method of making pipe joints, and minimum cover (if more than 18 inches) shall be in accordance with the pipe manufacturer's recommendations.

8. Storm Sewer Line Grades: All storm sewer pipe shall be laid on a uniform grade which will produce a minimum velocity of 2 feet per second when the pipe is flowing full. The minimum grade for storm sewer pipe shall be as follows:

**Table 4**  
**Minimum Grade for Selected Pipe Diameters, %**

Size of Pipe, inches	Concrete Pipe	HDPE Pipe
18	0.11	0.10
24	0.08	0.07
27	0.07	n/a
30	0.06	n/a
36	0.05	n/a
42	0.05	n/a
48	0.05	n/a
54	0.05	n/a
60	0.05	n/a

In no case shall the minimum grade be less than 0.05 percent.

- D. Catch Basins and Area Sumps: Catch basins and area sumps shall be designed in accordance with the State Department of Highways and Public Transportation Hydraulic Manual, December 1985 edition, as provided in Appendix D, except as otherwise stated herein. Generally, catch basins are to be of the side drop inlet type. Side drop inlets on grade which are not depressed are not allowed. Grate inlet catch basins are to be used only in special cases in which they are more suitable for the location than a standard catch basin. The size of the catch basin inlets shall be adequate to pass a 100-year frequency flood. Area sumps (Y-inlets) are to be installed where needed to drain water from a median strip or other area without the storm water passing into a street. Catch basins with multiple inlets and storm sewer pipe between multiple catch basins shall have adequate means for transferring the water from the various inlets to the main storm sewer or receiving stream. All catch basins and area sumps shall be in accordance with City of Van Standard Details and the Texas Department of Transportation Standard Details, latest revision.
- E. Culverts: Culverts under all streets shall be designed to carry a 100-year frequency flood without the water level on the upstream side of the culvert exceeding a level at least two foot below the top of the curb in the adjacent street.

Calculations for head loss across culverts shall include three types of losses which must be added together to determine the total head loss:

1. Velocity Head Loss:

$$H_v = \frac{V^2 - V_1^2}{64.4}$$

Where:  $H_v$  = velocity head loss due to the increase in velocity of the water passing through the culvert, feet (ft)  
 $V_2$  = velocity of the water inside of the culvert, feet per second (fps)  
 $V_1$  = velocity of the water approaching the culvert, feet per second (fps)

2. Entrance Loss:

$$H_e = \frac{KV^2}{64.4}$$

Where:  $H_e$  = entrance loss due to the increase in velocity of the water passing through the culvert, feet (ft)  
 $V_2$  = velocity of the water inside of the culvert, feet per second (fps)  
 $K$  = coefficient for type of entrance

The value of the entrance coefficient,  $K$ , depends on the type of inlet to the culvert. Typical values of the entrance coefficient are:

**Table 5**  
**Entrance Coefficient, K**

<b>Pipe Structures:</b>	<b>K</b>
Projecting from fill, socket end (groove end)	0.2
Projecting from fill, square cut end	0.5
Headwall or headwall and wingwalls:	
- Socket end of pipe (groove end)	0.2
- Square edge	0.5
- Rounded (radius 1/12 D)	0.2
Mitered to conform to fill slope	0.7
End section conforming to fill slope	0.5
Beveled edges, 33.7° or 45° bevels	0.2
Side- or slope-tapered inlet	0.2
<b>Box Structures:</b>	
Headwall parallel to embankment (no wingwalls):	
- Square-edged on 3 edges	0.5
- Rounded on 3 edges to radius of 1/12 barrel dimension, or beveled edges on 3 sides	0.2
Wingwalls at 30° to 75° to barrel:	

- Square-edged at crown	0.4
- Crown edge rounded to radius of 1/12 barrel dimension, or beveled top edge	0.2
Wingwall at 10° to 25° to barrel, square-edged at crown	0.5
Wingwalls parallel (extension of sides), square-edged at crown	0.7
Side- or slope-tapered inlet	0.2

### 3. Friction Loss:

$$H_f = \frac{\left[ \frac{Q \times n}{1.49 \times A \times R^3} \right]^2 \times L}{1}$$

Where:  $H_f$  = friction loss due to water passing through the culvert, feet (ft)

$Q$  = volumetric flow rate inside culvert, cubic feet per second (cfs)

$n$  = Manning roughness coefficient

$A$  = cross-sectional area of culvert, square feet (ft<sup>2</sup>)

$R$  = hydraulic radius, feet (ft), which is defined as the ratio of the area to the wetted perimeter =  $\frac{A}{P}$

$L$  = length of culvert, feet (ft)

In using this formula, the value of “n”, the roughness coefficient, shall be suitable for the type of culvert to be used.

For the purposes of these Design Guidelines, it is assumed that all culverts will be flowing full at their peak design storm flow.

In general, the upstream water elevation should be determined by calculating both inlet and outlet flow conditions and the highest water level of the two calculations should be used. Culverts are sized properly when the upstream water elevation is maintained at least two feet or more below the top of the curb in the adjacent street.

- F. Open Channels: Open channels shall be designed to carry a 100-year frequency flood with at least 12 inches of freeboard in the channel. Lining of open channels shall extend across the bottom of the channel and up the sides to the maximum flood flow from a 100-year frequency storm.

The depth of flow in open channels is to be calculated by the Manning’s equation, using an appropriate “n” from Table 3.

- G. Bridges: Bridges and channels under all bridges shall be so designed that the maximum flood water elevation from a 100-year frequency storm is at least 12 inches below the lowest part of the bridge deck.
- H. TxDOT Standard Details: Reinforced concrete bridges, box culverts, headwalls, wingwalls, safety end treatments, piers and bents shall conform to the latest revision of Texas Department of Transportation standard details for such structures, except as may be noted elsewhere in these Design Guidelines or in the City of Van Standard Details. Headwalls or wingwalls are required on all culverts and on the discharge point of storm sewer pipe.
- I. Erosion and Sediment Control: In the construction plans, the Engineer shall include plans for erosion and sediment control during construction and permanent erosion and sediment control once construction is complete. Energy dissipating devices such as concrete or rock riprap, splash basins, baffles and other structures to minimize erosion shall be incorporated into the design of storm drainage facilities. Plans for erosion and sediment control shall be in accordance with Chapter 10, Article VII, Division E “Erosion and Sediment Control” in the City of Van Unified Development Code, as well as Chapter 6 of these Design Guidelines.
- J. Private Facilities: Storm drain facilities which will be privately owned and maintained, including but not limited to driveway culverts and storm sewer laterals and mains, are exempt from the requirements of this Design Guideline. Tying in privately owned storm drain systems to those systems that are owned and maintained by the City of Van shall not be done without prior authorization.

## V. Plans

- A. Construction Plans: Following approval of final plat and the incorporation of changes required by the development engineer, six complete sets of construction drawings shall be submitted to the City of Van for signature prior to commencing construction.
  - 1. Drainage Area Map: An overall drainage area contour map with 2 foot contour intervals of the subdivision shall be shown divided into sub-basins for each structure or floodplain. Each sub-basin shall be marked with an identifying number or letter and the acreage. Runoff computations, curb inlet design computations, and storm sewer design computations shall all be shown in a tabular format in the construction plans.
  - 2. Plan Section: The plan section shall be prepared on either combined plan and profile sheets or plan sheets with separate profile sheets. Unless

otherwise approved by the City of Van, paper size shall be a minimum of 22" x 34" and the plan section shall be drawn to scale of not more than twenty feet to the inch (1" = 20'). The plan section shall include, but not be limited to, the following items:

- a. Horizontal control point on datum acceptable to the City of Van
- b. Stationing of proposed drainage improvements from left to right on sheet
- c. Right of way, easements, and street pavement widths
- d. Lot lines, lot numbers, subdivision lines and City limit lines
- e. Existing topographic features such as utility poles, fire hydrants, driveways, culverts, inlets, lakes, watercourses, etc.
- f. Underground utilities, including but not limited to sanitary sewer lines, water lines, storm sewer lines, gas lines, power lines and poles, telephone lines and television cable lines, located as accurately as possible
- g. Location of all proposed or existing inlets, pipe, culverts, manholes, headwalls and wingwalls
- h. Location of all channels and streams to be filled, improved, or used as discharge points for the system
- i. Curve data, angle points, or other survey data necessary to install the storm sewer facilities or to locate the facilities and easements after installation
- j. Location of soil borings, if any
- k. Typical cross sections for improved earthen or concrete lined channels
- l. Limits of significant cut or fill
- m. Directional arrows showing direction of drainage in gutters
- n. Minimum finished floor elevation for each lot within or adjacent to a 100 year floodplain or drainage easement
- o. North arrow
- p. Graphic scale
- q. Special notes, if any
- r. Engineer's seal and signature and registration number

3. Profile Section: Profiles shall have grid increments of less than 1". Unless otherwise approved by the City of Van, paper size shall be a minimum of 22" x 34". Drafting medium, lettering, layout, etc., are all optional except to the extent required herein. The profile shall be drawn to a scale to match the plan horizontally and not more than five feet to the inch (1" = 5') vertically and shall include, but not be limited to the following list:
  - a. Existing surface profile above centerline of storm sewer pipe, culverts, and existing high bank and flowline profiles for open drainage channels.
  - b. Water surface profile for the one hundred year flood for open channels within the subdivision and hydraulic grade line for storm sewer pipe.

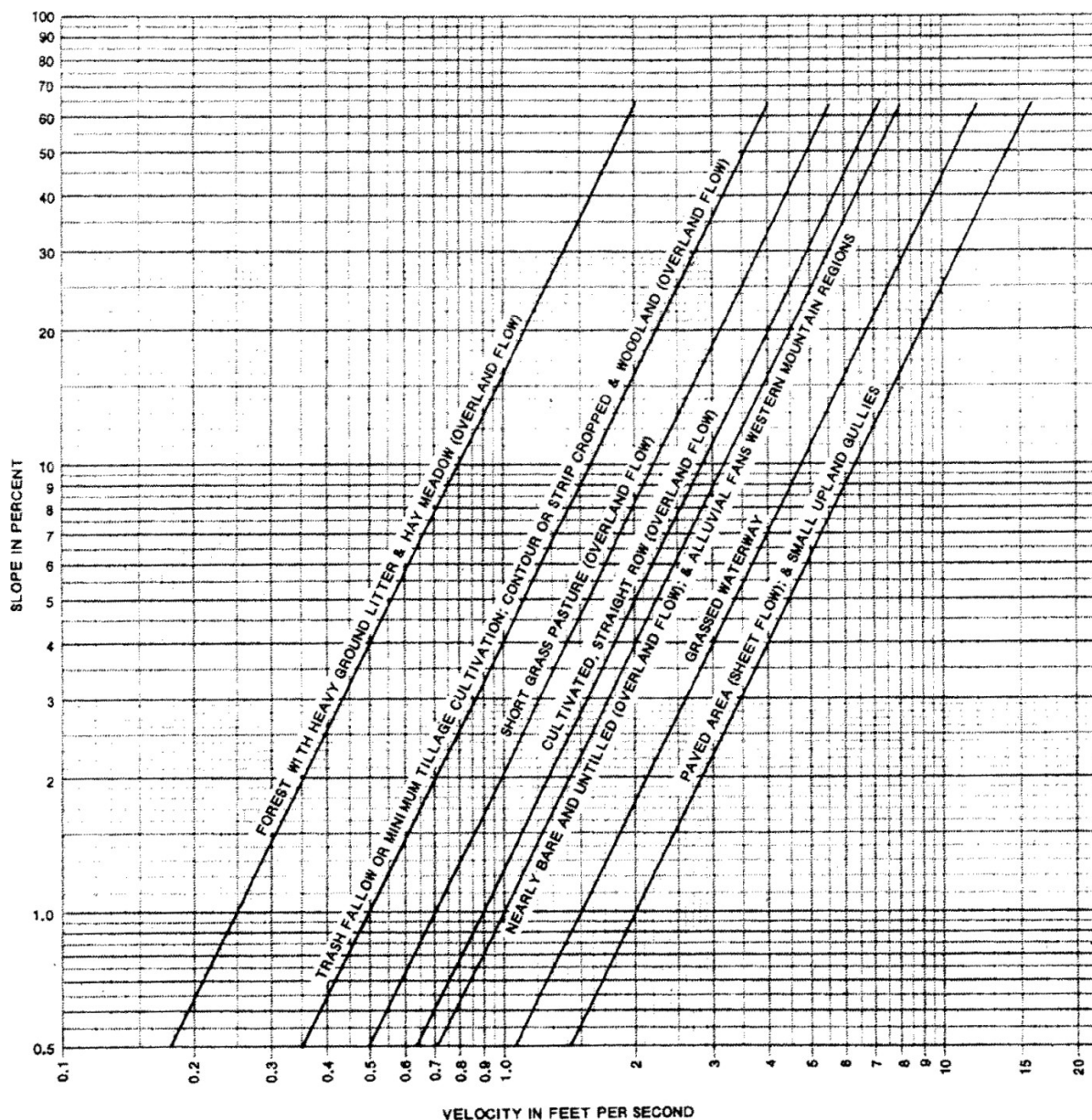
- c. Proposed drainage structures with flowline (invert) elevation at not more than fifty foot intervals.
- d. Proposed top of curb profile.
- e. Proposed and/or existing underground utilities crossing the construction alignment of the proposed storm drainage improvements.
- f. Vertical curve data for flowline including the curve length and the vertical point of intersection station and elevation.
- g. Benchmark description and elevation on each sheet with temporary bench marks set at intervals of not more than 500 feet. All bench mark and profile elevations shall be tied to the National Geodetic Survey Datum (formerly The U. S. Coastal & Geodetic Survey Datum). Assumed datums will not be allowed.

B. Record Drawings: The Engineer shall prepare a set of record drawings based on the construction plans. The record drawings shall show any deviations made during construction from the approved construction plans as to the location of storm sewers, inlets, culverts or bridges, or to changes in finished grades or elevations. In addition, the type of materials installed is required to be shown on all record drawings. The Project Representative will assist the Engineer in procurement of information needed to develop the record drawings. The following shall be provided to the City of Van within thirty (30) days of written final acceptance of the improvements:

- 1. One set of conformed plans in pdf format, to be provided by the Developer.
- 2. One set of GPS points of all inlets, culverts, bridges and locations of discharge points for the system, to be provided by the Project Representative.

APPENDIX A

**Figure A-1**  
**Velocities for Upland Method of Estimating  $T_c$**   
*(from National Engineering Handbook, Section 4 Hydrology, August 1972)*

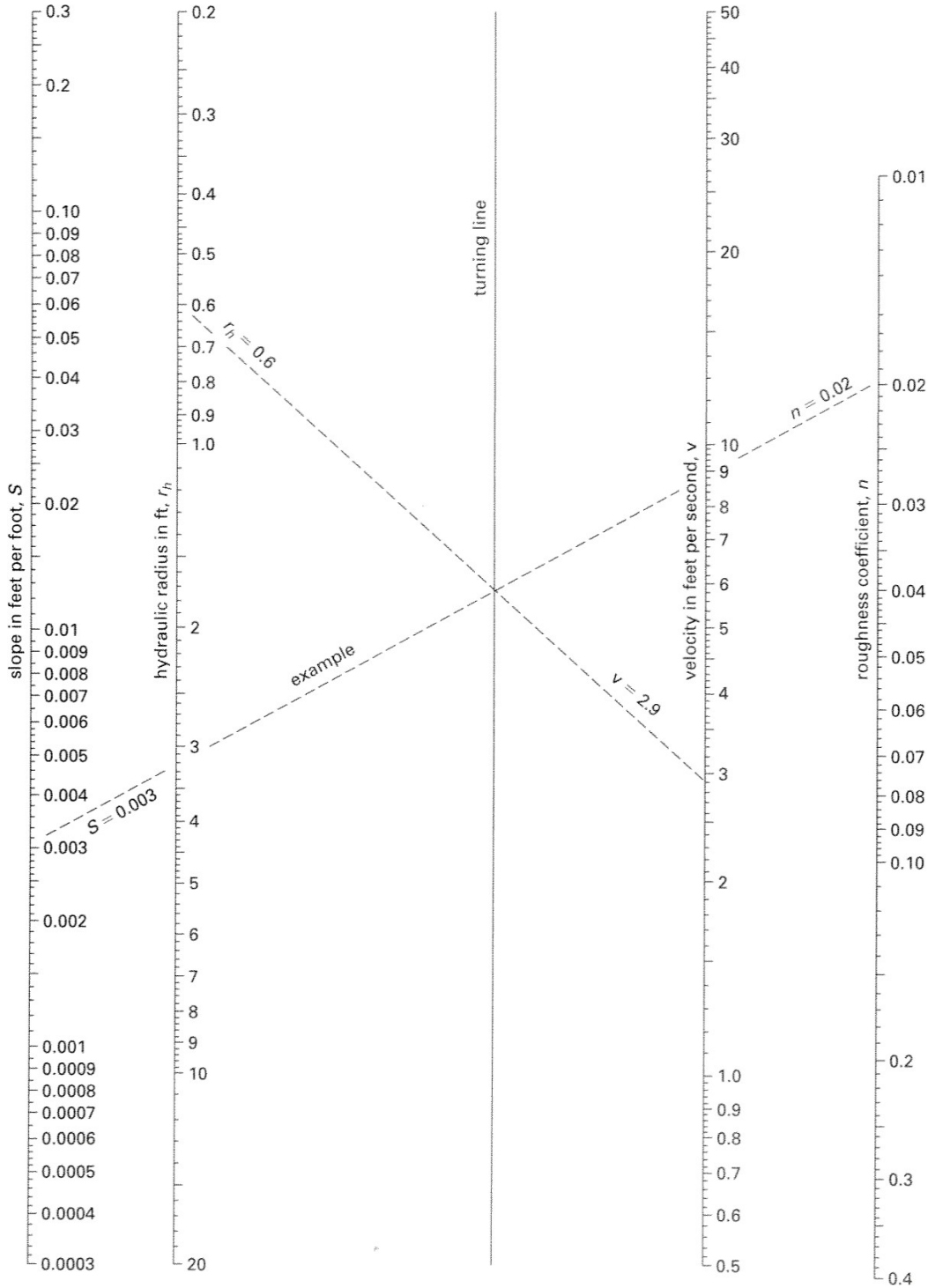


**APPENDIX B**

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**Figure B-1**  
**Manning Equation Nomograph**  

$$V = \frac{1.49}{n} \times R^{2/3} \times S^{1/2}$$
 (solves  $V = \frac{1.49}{n} \times R^{2/3} \times S^{1/2}$ )



APPENDIX C

**Table C-1**  
**Rainfall Intensity, inches per hour (in/hr)**

$$(solves \ I = \frac{b}{(t_c + d)_e})$$

<b>T<sub>c</sub></b> <b>Hrs:Min</b>	<b>2-yr</b>	<b>5-yr</b>	<b>10-yr</b>	<b>25-yr</b>	<b>50-yr</b>	<b>100-yr</b>
0:10	5.15	5.92	6.50	7.40	8.10	8.80
0:11	4.97	5.73	6.31	7.18	7.86	8.55
0:12	4.81	5.55	6.12	6.97	7.64	8.31
0:13	4.66	5.39	5.95	6.78	7.44	8.09
0:14	4.52	5.24	5.78	6.60	7.24	7.89
0:15	4.39	5.10	5.63	6.43	7.06	7.69
0:16	4.27	4.96	5.49	6.27	6.89	7.51
0:17	4.15	4.84	5.35	6.13	6.73	7.34
0:18	4.04	4.72	5.23	5.98	6.58	7.17
0:19	3.93	4.60	5.11	5.85	6.44	7.02
0:20	3.84	4.50	4.99	5.72	6.30	6.87
0:21	3.74	4.40	4.88	5.60	6.17	6.74
0:22	3.65	4.30	4.78	5.49	6.05	6.60
0:23	3.57	4.21	4.68	5.38	5.93	6.48
0:24	3.49	4.12	4.59	5.28	5.82	6.36
0:25	3.41	4.04	4.50	5.18	5.71	6.24
0:26	3.34	3.96	4.41	5.08	5.61	6.13
0:27	3.27	3.88	4.33	4.99	5.51	6.03
0:28	3.21	3.81	4.25	4.91	5.42	5.93
0:29	3.14	3.74	4.18	4.82	5.33	5.83
0:30	3.08	3.67	4.11	4.74	5.24	5.74
0:31	3.02	3.61	4.04	4.67	5.16	5.65
0:32	2.97	3.55	3.97	4.59	5.08	5.56
0:33	2.91	3.49	3.91	4.52	5.00	5.48
0:34	2.86	3.43	3.84	4.45	4.93	5.40
0:35	2.81	3.38	3.79	4.39	4.86	5.32
0:36	2.76	3.32	3.73	4.32	4.79	5.25
0:37	2.72	3.27	3.67	4.26	4.72	5.18
0:38	2.67	3.22	3.62	4.20	4.66	5.11
0:39	2.63	3.17	3.57	4.14	4.59	5.04
0:40	2.59	3.13	3.52	4.09	4.53	4.98
0:41	2.55	3.08	3.47	4.03	4.47	4.91
0:42	2.51	3.04	3.42	3.98	4.42	4.85
0:43	2.47	3.00	3.38	3.93	4.36	4.79

**Table C-1**  
**Rainfall Intensity, inches per hour (in/hr)**  
*(cont'd)*

<b>Time Hrs:Min</b>	<b>2-yr</b>	<b>5-yr</b>	<b>10-yr</b>	<b>25-yr</b>	<b>50-yr</b>	<b>100-yr</b>
0:44	2.43	2.96	3.33	3.88	4.31	4.73
0:45	2.40	2.92	3.29	3.83	4.26	4.68
0:46	2.36	2.88	3.25	3.79	4.21	4.62
0:47	2.33	2.84	3.21	3.74	4.16	4.57
0:48	2.30	2.81	3.17	3.70	4.11	4.52
0:49	2.27	2.77	3.13	3.66	4.06	4.47
0:50	2.24	2.74	3.10	3.61	4.02	4.42
0:51	2.21	2.70	3.06	3.57	3.98	4.37
0:52	2.18	2.67	3.02	3.53	3.93	4.33
0:53	2.15	2.64	2.99	3.50	3.89	4.28
0:54	2.12	2.61	2.96	3.46	3.85	4.24
0:55	2.10	2.58	2.92	3.42	3.81	4.20
0:56	2.07	2.55	2.89	3.39	3.77	4.16
0:57	2.05	2.52	2.86	3.35	3.74	4.12
0:58	2.02	2.50	2.83	3.32	3.70	4.08
0:59	2.00	2.47	2.80	3.29	3.66	4.04
1:00	1.98	2.44	2.77	3.25	3.63	4.00
1:01	1.95	2.42	2.75	3.22	3.59	3.96
1:02	1.93	2.39	2.72	3.19	3.56	3.93
0:03	1.91	2.37	2.69	3.16	3.53	3.89
1:04	1.89	2.34	2.67	3.13	3.50	3.86
1:05	1.87	2.32	2.64	3.10	3.46	3.82
1:06	1.85	2.30	2.62	3.08	3.43	3.79
1:07	1.83	2.28	2.59	3.05	3.40	3.76
1:08	1.81	2.25	2.57	3.02	3.37	3.73
1:09	1.79	2.23	2.55	3.00	3.35	3.69
1:10	1.77	2.21	2.52	2.97	3.32	3.66
1:11	1.75	2.19	2.50	2.94	3.29	3.63
1:12	1.74	2.17	2.48	2.92	3.26	3.61
1:13	1.72	2.15	2.46	2.90	3.24	3.58
1:14	1.70	2.13	2.44	2.87	3.21	3.55
1:15	1.69	2.11	2.42	2.85	3.19	3.52
1:16	1.67	2.10	2.40	2.83	3.16	3.49
1:17	1.65	2.08	2.38	2.80	3.14	3.47

**Table C-1**  
**Rainfall Intensity, inches per hour (in/hr)**  
*(cont'd)*

<b>Time Hrs:Min</b>	<b>2-yr</b>	<b>5-yr</b>	<b>10-yr</b>	<b>25-yr</b>	<b>50-yr</b>	<b>100-yr</b>
1:18	1.64	2.06	2.36	2.78	3.11	3.44
1:19	1.62	2.04	2.34	2.76	3.09	3.42
1:20	1.61	2.03	2.32	2.74	3.07	3.39
1:21	1.59	2.01	2.30	2.72	3.04	3.37
1:22	1.58	1.99	2.28	2.70	3.02	3.34
1:23	1.57	1.98	2.26	2.68	3.00	3.32
1:24	1.55	1.96	2.25	2.66	2.98	3.30
1:25	1.54	1.94	2.23	2.64	2.96	3.27
1:26	1.53	1.93	2.21	2.62	2.94	3.25
1:27	1.51	1.91	2.20	2.60	2.91	3.23
1:28	1.50	1.90	2.18	2.58	2.89	3.21
1:29	1.49	1.89	2.16	2.56	2.87	3.18
1:30	1.48	1.87	2.15	2.55	2.86	3.16
1:32	1.45	1.84	2.12	2.51	2.82	3.12
1:34	1.43	1.82	2.09	2.48	2.78	3.08
1:36	1.41	1.79	2.06	2.45	2.75	3.04
1:38	1.38	1.77	2.03	2.41	2.71	3.01
1:40	1.36	1.74	2.01	2.38	2.68	2.97
1:42	1.34	1.72	1.98	2.35	2.64	2.93
1:44	1.32	1.69	1.95	2.32	2.61	2.90
1:46	1.30	1.67	1.93	2.30	2.58	2.87
1:48	1.29	1.65	1.91	2.27	2.55	2.83
1:50	1.27	1.63	1.88	2.24	2.52	2.80
1:52	1.25	1.61	1.86	2.22	2.50	2.77
1:54	1.23	1.59	1.84	2.19	2.47	2.74
1:56	1.22	1.57	1.82	2.17	2.44	2.71
1:58	1.20	1.55	1.80	2.14	2.42	2.69
2:00	1.19	1.53	1.78	2.12	2.39	2.66
2:02	1.17	1.52	1.76	2.10	2.37	2.63
2:04	1.16	1.50	1.74	2.08	2.34	2.60
2:06	1.14	1.48	1.72	2.06	2.32	2.58
2:08	1.13	1.47	1.70	2.04	2.30	2.55
2:10	1.11	1.45	1.68	2.02	2.27	2.53
2:12	1.10	1.43	1.67	2.00	2.25	2.51

**Table C-1**  
**Rainfall Intensity, inches per hour (in/hr)**  
*(cont'd)*

<b>Time Hrs:Min</b>	<b>2-yr</b>	<b>5-yr</b>	<b>10-yr</b>	<b>25-yr</b>	<b>50-yr</b>	<b>100-yr</b>
2:14	1.09	1.42	1.65	1.98	2.23	2.48
2:16	1.08	1.40	1.63	1.96	2.21	2.46
2:18	1.06	1.39	1.62	1.94	2.19	2.44
2:20	1.05	1.38	1.60	1.92	2.17	2.42
2:22	1.04	1.36	1.59	1.90	2.15	2.39
2:24	1.03	1.35	1.57	1.89	2.13	2.37
2:26	1.02	1.33	1.56	1.87	2.11	2.35
2:28	1.01	1.32	1.54	1.85	2.09	2.33
2:30	1.00	1.31	1.53	1.84	2.08	2.31
2:32	0.99	1.30	1.51	1.82	2.06	2.30
2:34	0.98	1.28	1.50	1.80	2.04	2.28
2:26	0.97	1.27	1.49	1.79	2.02	2.26
2:38	0.96	1.26	1.47	1.77	2.01	2.24
2:40	0.95	1.25	1.46	1.76	1.99	2.22
2:42	0.94	1.24	1.45	1.74	1.98	2.20
2:44	0.93	1.23	1.44	1.73	1.96	2.19
2:46	0.92	1.22	1.42	1.72	1.94	2.17
2:48	0.91	1.21	1.41	1.70	1.93	2.15
2:50	0.90	1.20	1.40	1.69	1.91	2.14
2:52	0.89	1.19	1.39	1.68	1.90	2.12
2:54	0.89	1.18	1.38	1.66	1.89	2.11
2:56	0.88	1.17	1.37	1.65	1.87	2.09
2:58	0.87	1.16	1.36	1.64	1.86	2.08
3:00	0.86	1.15	1.35	1.63	1.85	2.06
3:10	0.83	1.10	1.30	1.57	1.78	1.99
3:20	0.79	1.06	1.25	1.52	1.72	1.93
3:30	0.76	1.03	1.21	1.47	1.67	1.87
3:40	0.73	0.99	1.17	1.42	1.62	1.81
3:50	0.71	0.96	1.13	1.38	1.57	1.76
4:00	0.68	0.93	1.10	1.34	1.53	1.72
4:10	0.66	0.90	1.07	1.30	1.49	1.67
4:20	0.64	0.88	1.04	1.27	1.45	1.63
4:30	0.62	0.85	1.01	1.24	1.41	1.59
4:40	0.60	0.83	0.99	1.21	1.38	1.55

**Table C-1**  
**Rainfall Intensity, inches per hour (in/hr)**  
*(cont'd)*

<b>Time Hrs:Min</b>	<b>2-yr</b>	<b>5-yr</b>	<b>10-yr</b>	<b>25-yr</b>	<b>50-yr</b>	<b>100-yr</b>
4:50	0.59	0.81	0.96	1.18	1.35	1.52
5:00	0.57	0.79	0.94	1.15	1.32	1.48
5:10	0.55	0.77	0.92	1.13	1.29	1.45
5:20	0.54	0.75	0.90	1.10	1.26	1.42
5:30	0.53	0.73	0.88	1.08	1.24	1.39
5:40	0.51	0.72	0.86	1.06	1.21	1.37
5:50	0.50	0.70	0.84	1.04	1.19	1.34
6:00	0.49	0.69	0.82	1.02	1.17	1.32
6:20	0.47	0.66	0.79	0.98	1.13	1.27
6:40	0.45	0.63	0.76	0.95	1.09	1.23
7:00	0.43	0.61	0.74	0.91	1.05	1.19
7:20	0.41	0.59	0.71	0.89	1.02	1.15
7:40	0.40	0.57	0.69	0.86	0.99	1.12
8:00	0.38	0.55	0.67	0.83	0.96	1.09
8:20	0.37	0.54	0.65	0.81	0.94	1.06
8:40	0.36	0.52	0.63	0.79	0.91	1.03
9:00	0.35	0.50	0.61	0.77	0.89	1.01
9:20	0.34	0.49	0.60	0.75	0.87	0.98
9:40	0.33	0.48	0.58	0.73	0.85	0.96
10:00	0.32	0.47	0.57	0.71	0.83	0.94
10:20	0.31	0.45	0.56	0.70	0.81	0.92
10:40	0.30	0.44	0.54	0.68	0.79	0.90
11:00	0.29	0.43	0.53	0.67	0.77	0.88
11:20	0.29	0.42	0.52	0.65	0.76	0.86
11:40	0.28	0.41	0.51	0.64	0.74	0.85
12:00	0.27	0.41	0.50	0.63	0.73	0.83
12:20	0.27	0.40	0.49	0.62	0.72	0.82
12:40	0.26	0.39	0.48	0.60	0.70	0.80
13:00	0.26	0.38	0.47	0.59	0.69	0.79
13:20	0.25	0.37	0.46	0.58	0.68	0.78
13:40	0.24	0.37	0.45	0.57	0.67	0.76
14:00	0.24	0.36	0.44	0.56	0.66	0.75
14:20	0.23	0.35	0.44	0.55	0.65	0.74
14:40	0.23	0.35	0.43	0.55	0.64	0.73

**Table C-1**  
**Rainfall Intensity, inches per hour (in/hr)**  
*(cont'd)*

<b>Time Hrs:Min</b>	<b>2-yr</b>	<b>5-yr</b>	<b>10-yr</b>	<b>25-yr</b>	<b>50-yr</b>	<b>100-yr</b>
15:00	0.23	0.34	0.42	0.54	0.63	0.72
15:20	0.22	0.34	0.42	0.53	0.62	0.71
15:40	0.22	0.33	0.41	0.52	0.61	0.70
16:00	0.21	0.32	0.40	0.51	0.60	0.69
16:20	0.21	0.32	0.40	0.51	0.59	0.68
16:40	0.21	0.31	0.39	0.50	0.58	0.67
17:00	0.20	0.31	0.39	0.49	0.57	0.66
17:20	0.20	0.31	0.38	0.48	0.57	0.65
17:40	0.20	0.30	0.37	0.48	0.56	0.64
18:00	0.19	0.30	0.37	0.47	0.55	0.63
18:20	0.19	0.29	0.36	0.47	0.55	0.63
18:40	0.19	0.29	0.36	0.46	0.54	0.62
19:00	0.18	0.28	0.35	0.45	0.53	0.61
19:20	0.18	0.28	0.35	0.45	0.53	0.60
19:40	0.18	0.28	0.35	0.44	0.52	0.60
20:00	0.18	0.27	0.34	0.44	0.51	0.59
20:20	0.17	0.27	0.34	0.43	0.51	0.58
20:40	0.17	0.27	0.33	0.43	0.50	0.58
21:00	0.17	0.26	0.33	0.42	0.50	0.57
21:20	0.17	0.26	0.33	0.42	0.49	0.57
21:40	0.17	0.26	0.32	0.41	0.49	0.56
22:00	0.16	0.25	0.32	0.41	0.48	0.55
22:20	0.16	0.25	0.31	0.41	0.48	0.55
22:40	0.16	0.25	0.31	0.40	0.47	0.54
23:00	0.16	0.25	0.31	0.40	0.47	0.54
23:20	0.15	0.24	0.30	0.39	0.46	0.53
23:40	0.15	0.24	0.30	0.39	0.46	0.53
24:00	0.15	0.24	0.30	0.39	0.45	0.52

APPENDIX D

through the storm drain from the upper end of the storm drain to the point in question. This is true unless the time for another branch or inlet at that point is greater. Each component of the time of concentration may be estimated by the relation:

$$t_c = \frac{L}{(V \times 60)} \quad (6-2)$$

where:  $t_c$  = time of concentration (in minutes),  $L$  = length of water course over which runoff must travel (in feet), and  $V$  = estimated or calculated velocity (in feet per second) of runoff movement. [This velocity is based upon normal depth of flow for design discharge in a run of pipe].

In municipal areas, the time of concentration is seldom less than five minutes nor more than twenty minutes. A minimum time of concentration of ten minutes is recommended for general use.

#### 6-202. OTHER HYDROLOGIC METHODS

There may be instances when the specific urban area under consideration will have its own, region-specific hydrologic method. Because of some funding arrangements, it may be necessary for the Department designer to use a special (and specified) hydrologic method. For example, if a city is funding the surface drainage facilities, that city may insist upon the use of its own specific hydrologic method. Usually, such special methods are very similar to the ordinary Rational method with some minor variations.

Some situations may lend themselves to the use of some variation of SCS hydrologic estimating methods. Others may involve the use of the SCS TR-55 procedure or the USGS Urban Hydrology procedure. In still other situations, the use of a unit hydrograph procedure will be in order. Refer to Chapter 2 for detailed information on the USGS Urban Hydrology procedure. Contact the D-5 Hydraulic Section for information on the SCS TR-55 procedure.

#### 6-203. DETENTION

Detention is accommodated, to some extent, by the process of building a design flow through the storm drain as described in Section 6-500. By recalculating the time of concentration and, in

sequence, a new intensity and discharge, the significant effects of detention by the carrier pipe itself are reflected in the design. A more direct application of detention, however, involves the use of 'holding ponds', usually in the contributing watersheds, and often immediately upstream of the entrance to the storm drain system. A proper accommodation of such 'holding ponds' requires a reservoir routing procedure such as is presented in Chapter 8 of this manual. By introducing detention ponds, the designer is able to attenuate the peak of the runoff hydrograph, thus reducing the immediate discharge rate for which he is designing. The same approach for peak flow attenuation is valid and particularly useful in a storm drain system in which there are substantial lengths of large diameter pipes. In such systems, the storage capacity of the pipes can have a substantial effect on the final shape of the runoff hydrograph. Consultation with the D-5 Hydraulic Section is recommended in such cases.

#### 6-300. PAVEMENT DRAINAGE CONSIDERATIONS

##### 6-301. PONDING REQUIREMENTS/CONSIDERATIONS

As a general rule, inlets should be placed at all low points in the roadway surface and at suitable intervals along extended gutter slopes as necessary to prevent excessive ponding on any section of the roadway.

The flow of water in the gutter should be restricted to a depth and corresponding width which will not cause the water to spread out over the travelled portion of the roadway in such amount and depth as to obstruct or cause a definite hazard to traffic. The depth of flow naturally depends upon the quantity of water involved, the gutter gradient, the coefficient of roughness or frictional coefficient of the gutter and paving material, the cross slope of the roadway, and inlet spacing.

The following limiting widths are recommended for use:

For Interstate and Controlled Access Highways: Limit ponding to one-half the width of the outer lane.

For Major Highways: Limit ponding to the width of the outer lane.

For Minor Highways: Limit ponding to a width and depth which will allow passage of one lane of traffic with safety.

6-302. HYDROPLANING

As precipitation falls on the roadway surface, the water accumulates to some depth before overcoming surface tension and running off. In the process of runoff, water becomes concentrated in its flow. When a vehicle encounters this accumulation of water in either or both forms, a phenomenon called hydroplaning occurs. The vehicle tires tend to plane on top of the accumulated water and slide across the water surface with the water itself acting as a sort of lubricant for that sliding process. The phenomenon of hydroplaning is a function of the water depth, the speed of the vehicle, the air pressure and the condition of the vehicle tires, and the condition and character of the pavement. Once the vehicle is hydroplaning, because tire contact with the pavement is lost, the driver has little or no control over the vehicle operation and is at the mercy of the basic laws of motion and inertia. While the general public is typically unaware of the technicalities of hydroplaning, very few drivers have not experienced the unnerving and, sometimes catastrophic, effects of the phenomenon on rain-slickened roadways.

Hydroplaning of vehicles is the single most important cause of accidents in wet weather. Therefore, a basic aim of the highway drainage designer, particularly in urban areas, is to avoid or eliminate physical characteristics which might be a cause of hydroplaning. The following sections cover some of the aspects of pavement and drainage design which are useful in avoiding situations which can cause hydroplaning.

In the general area of hydroplaning, there are some effective measures that may be taken by the use of slotted drain pipe (See also Section 6-401.). If there are large expanses of pavement, sheet flow may be a serious problem (as opposed to concentrated, gutter flow). Sheet flow may be accommodated by strategically placed slotted pipe installations (with appropriate

outfalls) to intercept that flow. These types of installations may occur within the travelled way, either transversely or longitudinally. Where drainage is to the inside of lanes and against median barriers, an installation of slotted pipe with appropriate outfall can be effective in removing accumulated runoff. Where such slotted pipe installations are made, the designer should insure structural integrity either by adequate structural characteristics of the pipe or encasement in concrete such as illustrated in Figure 1.

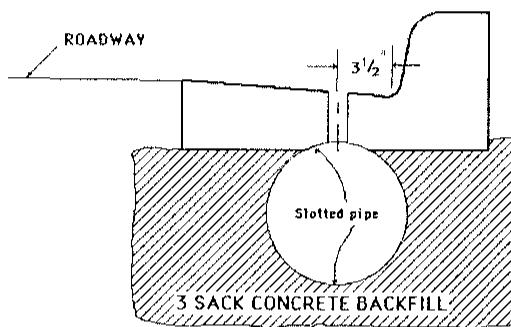


Figure 1

6-303. PAVEMENT GEOMETRIC EFFECTS ON DRAINAGE

6-303.1 CROSS-SLOPES

Except in cases of super-elevation for horizontal roadway curves, pavement cross slope is usually a compromise between the need for cross slopes adequate for proper drainage and relatively flat cross slopes amenable to driver comfort. Generally, cross slopes of no steeper than 2 percent have little effect on driver effort or vehicle operation.

If the cross slope is too flat, more depth of water accumulation is necessary to overcome surface tension and, once water accumulates into a concentrated flow, the spread of the flow is

very wide. These characteristics are the chief causes of hydroplaning situations (See Section 6-302.). Therefore, an adequate cross slope is a very important countermeasure against hydroplaning. Water depth on pavements can be effectively reduced by increasing the cross slope for each successive lane in a multi-lane facility. In very wide multi-lane facilities, the inside lanes may be sloped toward the median, however, median areas should not be drained across traveled lanes. In transitions into horizontal curve super-elevation, flat cross slopes should be minimized.

#### 6-303.2 LONGITUDINAL SLOPES/CHARACTERISTICS

Gutter grades should not be usually less than 0.3 percent for curbed pavements. There may be some locations in Texas where such a minimum is difficult to maintain. In such situations, a rolling profile may be necessary or the cross slope may be warped to achieve a rolling gutter profile.

Extremely long sag vertical curves are discouraged since they incorporate relatively long flat grades at the sag.

#### 6-303.3 SURFACE TEXTURE

The pavement texture is an important consideration for roadway surface drainage. Hydroplaning (See Section 6-302.) may be forestalled to some extent where the pavement is of a rough texture. Cross cutting (grooving) of the pavement is useful for removing small amounts of water such as in a light drizzle. Longitudinal grooving is discouraged because it usually causes problems in vehicle handling. A very rough pavement texture is beneficial to inlet interception but, in a contradictory sense, unfavorable because it causes a wider spread of water in the gutter with the associated unfavorable effects on vehicular traffic.

#### 6-304. MEDIAN/MEDIAN BARRIER CONSIDERATIONS

Medians are commonly used to separate opposing lanes of traffic on divided highways. It is preferable to slope median areas and inside shoulders to a center depression to prevent drainage from the median area from running across the travelled pavement. Where median barriers are used and, particularly on horizontal curves

with associated super-elevations, it is necessary to provide for some relief for the water which accumulates against the barrier. This can be done with 'weep' holes in the barrier. In order to minimize flow across traveled lanes, a more preferred method of relief is to collect the water into a subsurface system which ultimately connects with the main storm drain system.

#### 6-400. INLETS AND MANHOLES

##### 6-401. GENERAL

Either curb opening inlets (Figure 2), slotted drain inlets (Figure 3), grate inlets (Figure 4), or a combination of curb opening and grate inlets (Figure 5) may be used for intercepting run-off. Curb opening inlets are often preferred because of their self-cleansing ability. From the standpoint of economy and adaptability, the slotted drain inlet is a useful choice. It is esthetically pleasing, requires no depression in the gutter, can be overlaid with successive thicknesses of pavement without affecting its hydraulic characteristics, and can infringe on driveway areas without unfavorable effects. Since the slotted drain inlet is a type of grate inlet, it is prone to catch debris (although, on-grade slotted drain inlets have excellent self-cleaning properties). For this reason, it is recommended that slotted drain inlets not be used in sag configurations. Many other types of grate inlets clog with debris easily. In some instances however, the use of grates will be found necessary either with or without curb openings in combination. Where grates are used, the design and placing of the grates should be such that the grate bars will be parallel to the direction of flow of the water rather than perpendicular to the flow. Experiments have shown that this minimizes the clogging by small debris and increases the capacity of the grate. Use of recessed curb inlets (where the face of the inlet is set back from the normal curb line) is discouraged in this Department because the hydraulic characteristics of such inlets is suspect and generally, unproven by controlled inlet studies. Some municipalities in the state prefer recessed curb inlets because of their non-interference with traffic flow. If the design must include recessed inlets, it is recommended that the D-5 Hydraulic Section be consulted.



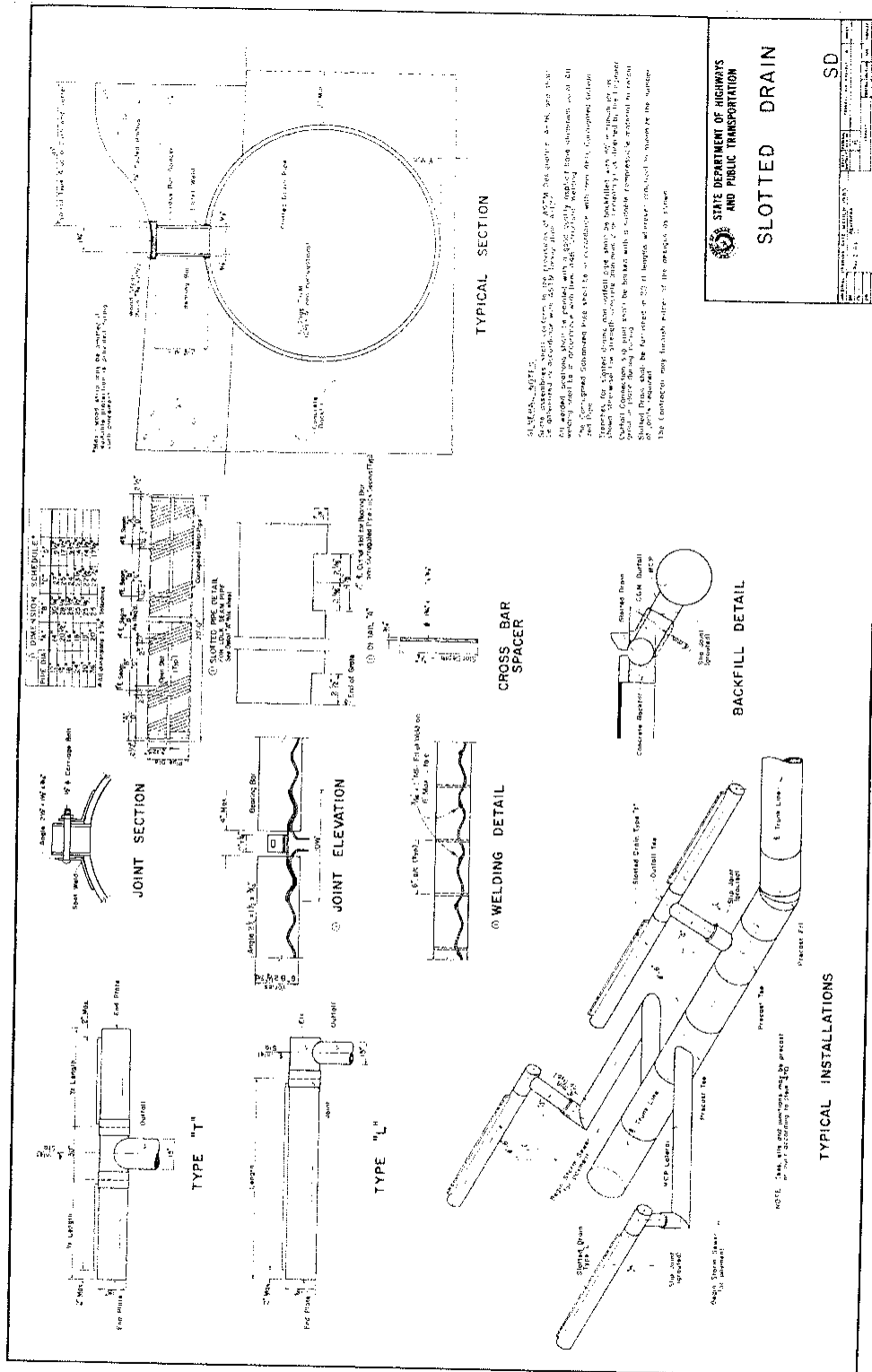


Figure 3

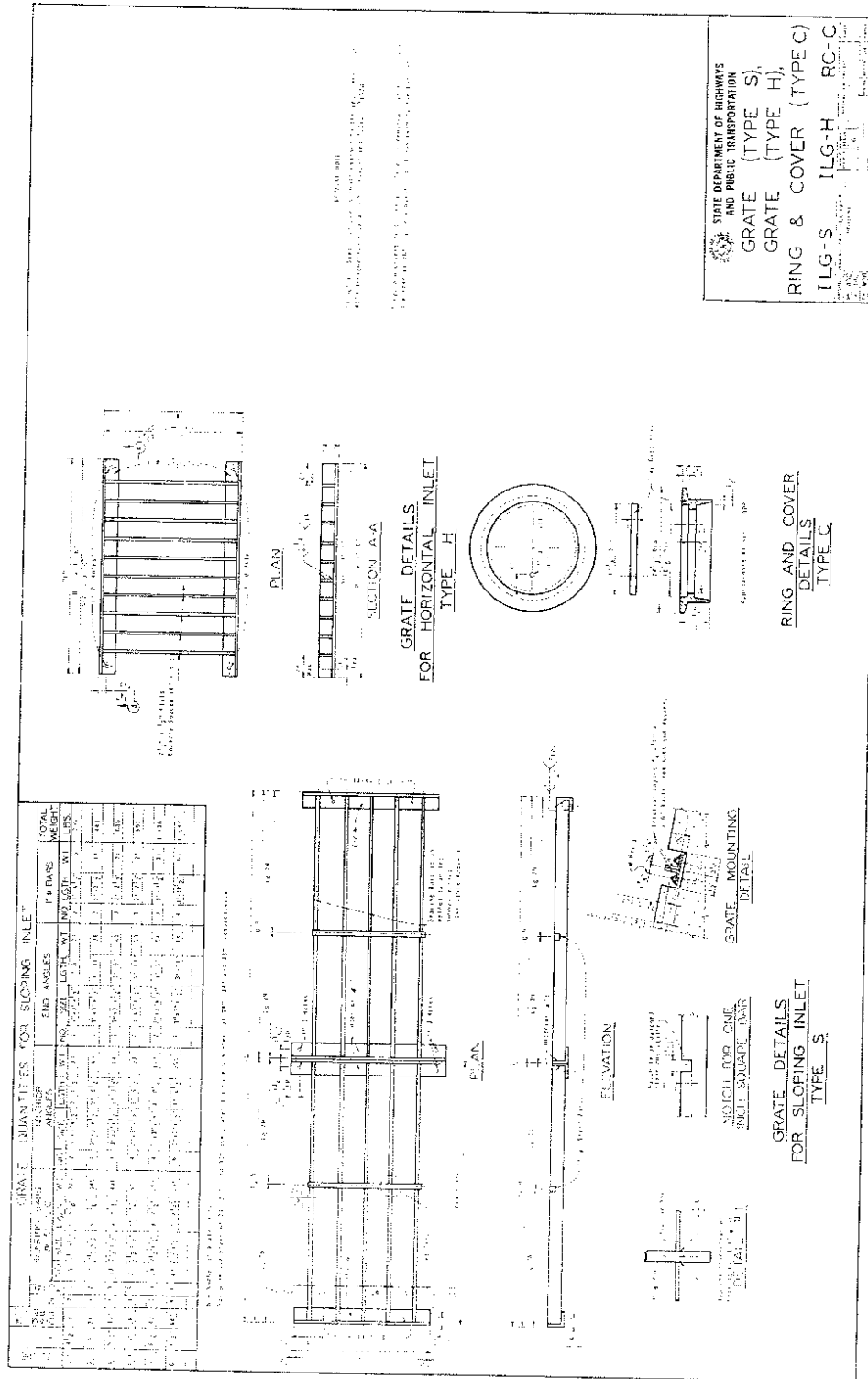


Figure 4



6-402. INLETS ON GRADE

For slotted drain inlets, the amount of water which will be intercepted by the Inlet may be estimated by the following process.

The length required for interception of all of the water in the gutter is calculated by the equation:

$$L_r = \frac{0.706Q_D^{0.442} E^{0.849}}{n^{0.384} S^z} \quad (6-3)$$

where:

$L_r$  = length required for total interception of gutter flow

$Q_D$  = discharge in gutter (cfs)

$S$  = gutter slope (ft/ft)

$z$  = reciprocal of cross slope (ft/ft)

$n$  = roughness coefficient (usually about 0.015)

$E$  = an exponent to  $S$  (function of  $S$  and  $z$  and found in Table 1. Also see 6-600., Column 15.)

The proposed length of inlet ( $L$ ) is divided by  $L_r$  and the amount of discharge not intercepted by the Inlet (called "carryover") may be estimated by the equation:

$$C.O. = 0.918Q_D (1 - L_a/L_r)^{1.769} \quad (6-4)$$

or estimated from Figure 6.

Slotted drain systems may be optimized for economy by providing actual lengths ( $L_a$ ) to required lengths ( $L_r$ ) in a ratio of about 0.65. This implies a usual design with carryover for on-grade inlets. Slotted drain inlets at sags are not recommended. The process described above for the design of slotted drains is valid for most types of slotted drain fabrication and particularly for the type illustrated by Figure 1. Since a contractor may bid any of several types of slotted drain pipe inlets, it is recommended that, if a system of slotted drain inlets comprises a significant total amount, the D-5 Hydraulic Section be consulted.

The amount of water which will be intercepted by a curb inlet for a given configuration may be determined directly from the charts included in this chapter in Figures 9 and 10. The illustrative problem explains the use of these charts. It should be noted that it is not always necessary or desirable to intercept all the water in the gutter at any given point. As with

TABLE 1 - EXPONENT FOR SLOTTED DRAIN

		RECIPROCAL OF TRANSVERSE SLOPE (z)											
		24	28	32	36	40	44	48	52	56	60	64	68
	0.002	0.320	0.327	0.331	0.331	0.328	0.322	0.313	0.301	0.285	0.266	0.244	0.219
	0.004	0.323	0.329	0.332	0.332	0.329	0.323	0.313	0.301	0.285	0.265	0.243	0.217
	0.006	0.325	0.331	0.334	0.334	0.330	0.323	0.313	0.300	0.284	0.264	0.242	0.216
	0.008	0.328	0.333	0.336	0.335	0.331	0.324	0.313	0.300	0.283	0.263	0.240	0.214
	0.010	0.330	0.335	0.337	0.336	0.332	0.324	0.313	0.299	0.282	0.262	0.238	0.212
	0.012	0.332	0.337	0.338	0.337	0.332	0.324	0.313	0.299	0.282	0.262	0.238	0.212
	0.014	0.334	0.338	0.339	0.338	0.332	0.324	0.313	0.298	0.281	0.260	0.236	0.209
S	0.016	0.336	0.340	0.340	0.338	0.333	0.324	0.312	0.297	0.280	0.259	0.234	0.207
	0.018	0.337	0.341	0.341	0.338	0.333	0.323	0.311	0.296	0.278	0.257	0.232	0.204
L	0.020	0.339	0.342	0.342	0.339	0.332	0.323	0.310	0.294	0.277	0.255	0.230	0.201
	0.022	0.340	0.343	0.342	0.339	0.332	0.322	0.309	0.293	0.275	0.253	0.227	0.199
O	0.024	0.341	0.343	0.343	0.339	0.332	0.321	0.308	0.293	0.273	0.251	0.225	0.196
	0.026	0.342	0.344	0.343	0.339	0.331	0.320	0.306	0.291	0.271	0.248	0.222	0.192
P	0.028	0.343	0.344	0.343	0.338	0.330	0.319	0.305	0.289	0.269	0.246	0.219	0.189
	0.030	0.343	0.345	0.343	0.338	0.329	0.318	0.303	0.287	0.267	0.243	0.216	0.186
E	0.032	0.344	0.345	0.342	0.337	0.328	0.316	0.301	0.285	0.264	0.240	0.213	0.182
	0.034	0.344	0.345	0.342	0.336	0.327	0.315	0.299	0.283	0.262	0.237	0.209	0.178
	0.036	0.344	0.345	0.341	0.335	0.326	0.313	0.297	0.281	0.259	0.234	0.206	0.174
ft.	0.038	0.344	0.344	0.341	0.334	0.324	0.311	0.295	0.278	0.256	0.230	0.202	0.170
/	0.040	0.344	0.344	0.340	0.333	0.323	0.309	0.293	0.276	0.253	0.227	0.198	0.166
ft.	0.042	0.344	0.343	0.339	0.331	0.321	0.307	0.290	0.273	0.250	0.223	0.194	0.161
	0.044	0.344	0.342	0.338	0.330	0.319	0.305	0.287	0.270	0.246	0.220	0.190	0.157
	0.046	0.343	0.341	0.336	0.328	0.317	0.302	0.284	0.267	0.243	0.216	0.185	0.152

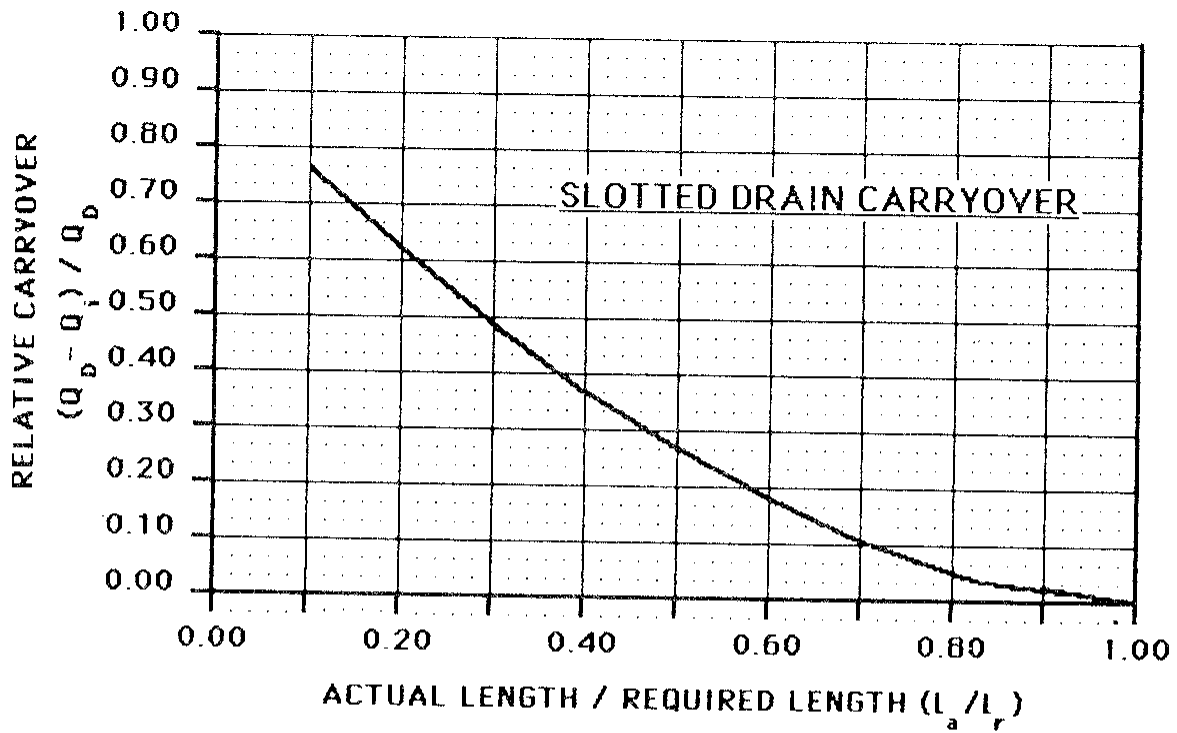


Figure 5

slotted drain inlets, it will often be satisfactory, efficient, and economical to allow a portion of the water (carryover) to flow past an inlet to succeeding inlets. The proper handling of carryover is covered in the illustrative problem included in Section 6-600.

The calculation process for grate inlets on grade is highly variable due to the wide variety of grate inlets in use. The calculations are rather tedious but adaptable to the specific type of grate inlet to be used. The designer is advised to contact the D-5 Hydraulic Section for assistance and guidance in the analysis/design of grate inlets on grade.

Use of combination inlets is generally discouraged but design procedures and considerations are covered in Section 6-405.

#### 6-403. INLETS IN SAGS

Use of slotted drain inlets in sag configurations is generally discouraged because of the propensity of such inlets to intercept debris in sags.

Under all ordinary conditions, the flow of water through a curb opening inlet located at a sag or low point in the grade may be computed by the weir formula:

$$Q = 3.087Lh^{(3/2)} \quad (6-5)$$

where

Q = the discharge in cubic feet per second

L = the length of opening in feet, and

h = the head or depth of water at the opening in feet

Where the depth of water is such that the curb inlet is completely submerged, the proper orifice formula should be used in computing the discharge rather than the weir formula. This is an unlikely condition, since the sizing of inlets should be such as to preclude ponding in sufficient depth to submerge the inlet. It is also not a desirable condition since adjacent property may be inundated and traffic flow would be stopped.

#### 6-404. GRATE INLETS IN SAGS

The flow of water through grate openings may be treated in the same manner as flow of water through rectangular orifices. The formula in most general use for flow through orifices is as follows:

$$Q = CA\sqrt{2gh} \quad (6-6)$$

where

Q = the discharge in cubic feet per second

C = the coefficient of discharge (usually 0.7)

A = the area of orifice (the net area of the openings in the grate) in square feet

g = acceleration due to gravity (32.2 feet per second per second)

h = head on grate in feet

This formula gives the theoretical capacity of the grate inlet. Since the grate inlets are subject to considerable clogging it is recommended that, for practical purposes, the capacity of the grate inlet be taken as 1/2 of the value given by this formula; or conversely, that the net area of the grate be twice as large as the theoretical area required when calculated by the above formula.

#### 6-405. COMBINATION INLETS

Combinations of curb slots and grate inlets may be used to advantage under certain special conditions. Combination inlets are generally not a good buy for the highway dollar because experience and many studies indicate that the additional cost of such inlets is rarely justified due to the relatively small additional capacity afforded. The theory commonly advanced by proponents of combination curb slot-grate inlets is that floating debris will be carried on the surface of the water. Investigations conducted by various hydraulic research laboratories, however, have not revealed any substantial gain resulting from such combinations. Authentic data concerning the true capacities of such combinations are insufficient to allow the establishment of any very accurate

factors for determining the true capacity of a combination inlet. For design purposes, however, it is believed reasonable to assume that the capacity of the combination inlet will be about 50% of the sum of the individual capacities of the grate and the curb slot, computed in the manner described in the preceding paragraphs. In other words, it is recommended that the capacity of the curb inlet and the grate inlet (without reduction) be computed separately, added together, and the working capacity of the combination be taken as 50% of this sum.

Whenever either the slotted drain or curb opening type of inlet can be used it will generally prove to be more economical and more desirable than the grate type of inlet, and the use of grates should ordinarily be confined to those instances where it is impractical to provide any curb opening at all or where the length of opening which can be provided is not sufficient to intercept all the water which must be accommodated.

#### 6-406. MANHOLES

Manholes or combination manholes and inlets should be placed wherever necessary for clean-out and inspection purposes. It is good engineering practice to place manholes at changes in direction, junctions of pipe runs, and at intervals of 300 to 500 feet in long pipe runs where the size or direction is not changed. The invert of the manhole section should be rounded to match the inverts of the pipes entering the manhole in order to reduce eddying and resultant head losses. For manholes which are larger than the incoming or outgoing pipes, expansion losses can sometimes be significant. Consult the D-5 Hydraulic Section for further information. At junctions of pipe lines, right angle intersections should be avoided if possible and the two lines should be brought together at an acute angle to minimize head losses. (See Figure 7 for standard manhole details.)

#### 6-500. DESIGNING PIPE RUNS

After the tentative specific locations of inlets, pipe runs, and outfalls with tailwaters have been determined and the inlets sized, the next logical step is the computation of the rate of discharge to be carried by each pipe run and the determination of the size and gradient of pipe required to care for this discharge. This is done by proceeding in steps from upstream of a

line to downstream to the point at which the line connects with other lines or the outfall, whichever is applicable. The discharge for a run is calculated, the pipe serving that discharge is sized, and the process is repeated for the next run downstream. This process is illustrated by the example in Section 6-600. It should be recognized that the rate of discharge to be carried by any particular section of pipe is not necessarily the sum of the inlet design discharge rates of all inlets above that section of pipe, but as a general rule is somewhat less than this total. It is useful to understand that the time of concentration is most influential and as the time of concentration grows larger, the proper rainfall intensity (presumably with the same  $e$ ,  $b$ , and  $d$  factors) to be used in the design grows smaller. In determining the rate of flow in the design of any particular run of pipe, the time required for the water to flow from the most remote point on the drainage area should be computed and the corresponding value of rainfall intensity derived. The discharge rate is then calculated by the Rational method.

$$Q = CIA \quad (6-7)$$

For all ordinary conditions, pipe runs should be sized on the assumption that they will flow full or practically full under the design discharge but will not be placed under pressure head. Manning's formula is recommended for use. (Nomographs B and F, Chapter 4.) If a pressure run is necessary (all sides wetted, with the hydraulic gradient above the top of the pipe or box), then Nomograph B in this chapter is applicable for boxes, and Nomograph F, Chapter 4 is applicable for circular pipes (use full flow point on  $d/D$  ratio line when solving for full pipe flow friction slope).

#### 6-501. HYDRAULIC GRADIENT

The hydraulic gradient is the locus of elevations to which the water would rise in successive piezometer tubes if the tubes were installed along a pipe run. The difference in elevation for the water surfaces in the successive tubes would represent the friction loss for that length of pipe, and the slope of the line between water surfaces would be the friction slope. Therefore, if a pipe run were placed on a calculated friction slope corresponding to a certain rate of discharge, cross-section, and roughness

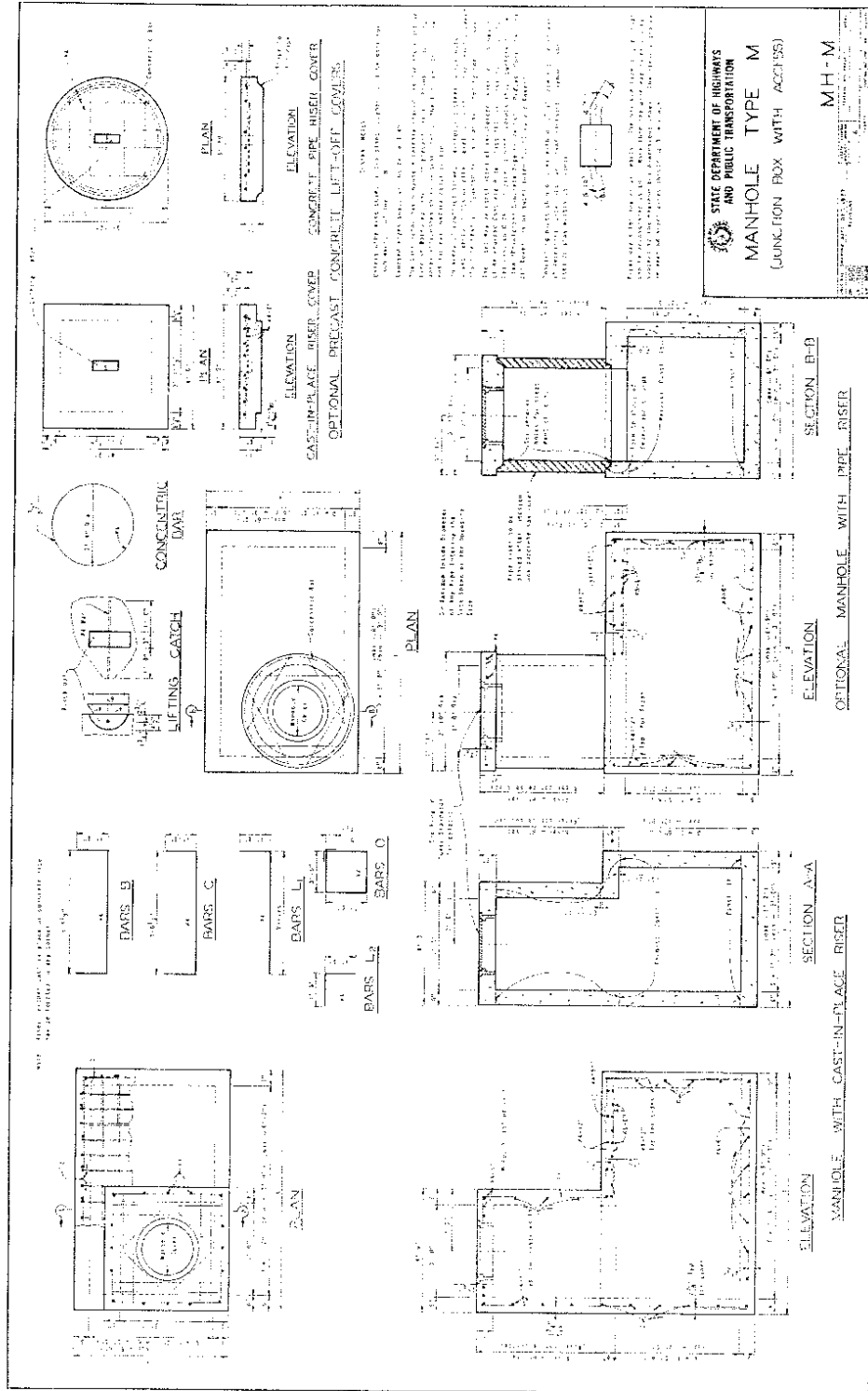


Figure 7

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coefficient, the surface of flow (hydraulic gradient) would be parallel to the top of the conduit, and the pipe run would not be under pressure. From the standpoint of design, this is desirable. If there is reason to place the pipe run on a slope less than friction slope, then the hydraulic gradient would be steeper than the slope of the pipe run. Depending on the elevation of the hydraulic gradient at the downstream end of the run in question, it is possible to have the hydraulic gradient rise to above the top of the conduit; which would mean the conduit is under pressure until, at some point upstream, the hydraulic gradient is once again at or below the top of the conduit.

It will not be necessary to compute the hydraulic gradient of a pipe run where the slope and the run sizes are chosen such that: (1) the slope is equal to or greater than friction slope, (2) the top surfaces of successive runs are lined up at changes in size rather than the inverts, (3) the surface of the water at the point of discharge is not above the top of the outlet. In such cases, the pipe will not operate under pressure at design discharge and the slope of the water surface under that discharge will be approximately parallel to the slope of the invert of the pipe. There will be small head losses at inlets, manholes, etc., but if these appurtenances are properly designed, these losses will be minor and may usually be neglected.

Whenever all of these conditions do not exist, however, and particularly in those instances where the inverts in the pipes are placed on the same grade at changes in pipe size (thus forcing the smaller pipe to discharge against a head) or when it is desired to analyze the pipe system with a larger flood than that used in the sizing of the pipes, it will be necessary to compute the hydraulic grade line of the entire pipe system. This is done by starting with the tailwater elevation at the point where the water exits the pipe system and working back up along the entire pipe system, computing the friction loss for each run, and plotting the elevation of the total head thus computed at each manhole and inlet.

A realistic tailwater elevation should be used as the basis for the hydraulic gradient calculation. If the outfall tailwater is a function of a relatively large watershed area, such as in a large stream, and the contribution from the storm drain system is based on a relatively small total watershed area, it would not be realistic to use

a tailwater elevation based upon the same frequency as the storm drain design frequency. Such situations occur often and the designer should consult with the D-5 Hydraulic Section for assistance and guidance when they are encountered.

If the plotted hydraulic grade line does not rise above the top of any manhole or above the gutter invert of any inlet, the pipe system is considered satisfactory. Wherever it does rise above any of these points, however, "blow-outs" through inlet slots and manhole covers will probably occur during a design storm. Pipe sizes or gradients should be increased as necessary to eliminate such "blow-outs".

Note that any hydraulic gradient must have an original base elevation no lower than the outlet tailwater elevation. Therefore, the backwater effects of a significant tailwater elevation should be checked very carefully.

#### 6-502. GENERAL RULES FOR SIZING PIPE RUNS

- a. Do not use pipe sizes less than 18" diameter for main trunk lines or for long laterals and not less than 12" diameter for short laterals.
- b. Place all pipes or boxes on such a slope that the velocity of flow when full will not be less than 2' per second. Where slopes are comparatively flat, it is desirable that the pipe sections and slopes be so designed that the velocity of flow will increase progressively, or at least will not appreciably decrease, in passing from the first inlet to the outlet of the pipe system. This is so that solids washed into the system and transported by the flow will be carried on through and out of the system and will not be dropped at some point due to a sharp decrease in velocity.
- c. Do not use non-standard sizes of pipe. Stockpiled metal pipe will ordinarily be in standard sizes, however, metal pipe can usually be fabricated to any size specified.
- d. The roughness coefficient ( $n$  value) recommended for Department use for reinforced concrete pipe or smooth-flow metal pipe is  $n = 0.012$ . For corrugated metal pipe, the value should be 0.024. If helically corrugated pipe is used, some improvement in

the n value is possible. This improvement is discussed in Chapter 4 and further information and assistance is available through the D-5 Hydraulic Section.

- e. Avoid discharging the flow of a larger pipe or box into a smaller one even though the capacity of the smaller pipe or box may technically be greater due to a steeper slope.
- f. At changes in size of pipe or box, attempt to place the soffits or top inside surfaces of the two pipes at the same level rather than placing the flow lines at the same level. Where flow lines are placed at the same level, the smaller pipe often must discharge against a head and it will be necessary to plot hydraulic grade lines in order to determine the effects of that head on the system operation. It may not be feasible to follow this rule in every instance, but the effort should be made whenever practicable.
- g. Laterals should be analyzed to compare critical depth with uniform depth. If the critical depth is greater than uniform depth, (technically defined as a steep slope regime) the unit will probably be operating under entrance control instead of the originally assumed uniform flow. If so, it may be found that the headwater caused at the upstream inlet for the lateral in question is unacceptable. The headwater may be determined by the use of the proper entrance control nomograph in Chapter 4. It may be necessary to resize the lateral or, in some way, improve the inlet characteristics to overcome any unfavorable effects of entrance control. Usually, steep units in the trunk lines are not affected by entrance control as the velocity head loss and associated entrance loss are relatively negligible.
- h. Losses due to junctions, bends, manholes, and other common features of a storm drain system which represent an interference or interruption of smooth flow characteristics are usually minor and negligible. In a very large system, however, their combined effect may be significant. Methods are available for the estimation of these losses if they appear to be important. The hydraulic effects of these storm drain features may be minimized to some extent by careful design (e.g., severe bends may be replaced by

gradual curves in the pipe run where ROW is sufficient and cost is not a problem.) Consult with the D-5 Hydraulic Section for further information on the subject.

- i. Determine a tailwater depth (TW) for the outfall channel by means of procedures discussed in Chapter 3. Always calculate the hydraulic gradient when the tailwater surface at the outlet is greater than the height of the outlet pipe or boxes. If the system is designed as a non-pressure system, the hydraulic gradient will eventually fall below the soffit of the pipe somewhere in the system, at which point the hydraulic gradient calculation is no longer necessary.

#### 6-600. EXAMPLE PROBLEM

Given: The drainage area map (See Figure 8) shows the layout of the highway and cross streets to be drained, the typical cross-sections of the highway and the cross streets, as well as the type and area of the surfaces to be drained.

Design Frequency: 5 years (20% chance of exceedance)

Minimum time of concentration: 10 minutes

Minimum curb inlet length: 5 feet

Minimum slotted drain inlet length: 20 feet

Allowable gutter depression on Monroe Avenue: 3 inches

Allowable gutter depression, cross streets: 3 - 5 inches

Permissible width of ponding:

10 feet on Monroe Ave. (business)

15 feet on Monroe Ave. (residential)

Full roadway width on cross streets

Required: Design a storm drain system which will adequately dispose of the design discharge.

Solution:

Step 1 - Prepare a carefully considered system plan as discussed in Section 6-102. Assure that there are no 'dead' spots where water has no outlet. Establish the general location of inlets, laterals, and trunk-lines.

Step 2 - Runoff computations: The runoff computations are tabulated on Figure 8. The

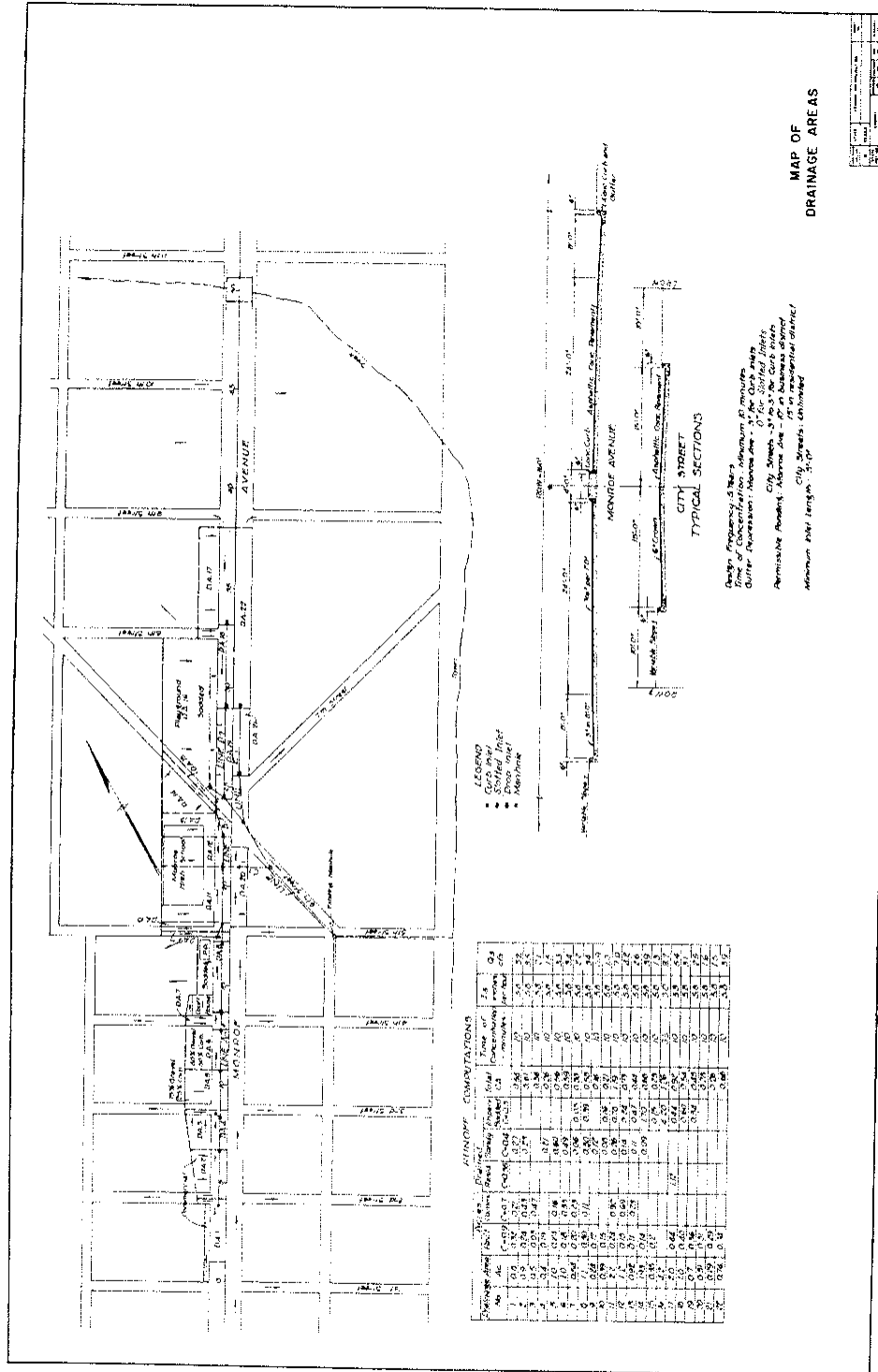


Figure 8

first six columns of this tabulation are self-explanatory. The total CA as shown in the 7th column is computed by multiplying each incremental area by its corresponding coefficient of runoff and totaling the sum of these incremental products. As an example, the total CA for drainage area No. 1 is computed as follows:

Type	Acreege	C	CA
Paved	0.32	X 0.9	= 0.288
Commercial	0.21	X 0.7	= 0.147
Gravel	0.27	X 0.4	= 0.108
Total			0.543

use 0.54

The time of concentration is computed by dividing the distance from the most remote point of the drainage area by the assumed velocity of approach flow. Since it has already been established that a minimum time of concentration will be used, this value should be inserted in the table. Whenever this time is greater than 10 minutes, the derivation of the time should be shown in the same manner as for drainage area No. 16 in the sample tabulation.

The intensity of rainfall is based upon the equation (6-1) where  $e = 0.78$ ,  $b = 55$ , and  $d = 8.2$ .

The total runoff  $Q$  is determined by multiplying CA by  $I$ .

Step 3 - Inlet computations: The inlet computations are shown in Table 2. A detailed explanation of this tabulation follows.

Column 1. All inlets should be properly classified and given a designated number as follows:

- CI-3 - Curb Inlet No. 3
- DI-1 - Drop (grate) Inlet No. 1
- SI 2 - Slotted drain inlet No. 2

Column 2. The location of the inlets as established on the plan-profile sheets should be listed for cross reference and ready identification.

Columns 3 and 4. The respective drainage area numbers and corresponding discharges are taken

from the runoff computation tabulation which appears on the drainage area map.

Column 5. The carry-over in this column is the rate of discharge which has passed by the last upstream (gutter) inlet. The rate of carry-over from any inlet should never be neglected and should always be accounted for. Unaccommodated carry-over rates can be very troublesome items and can cause severe traffic interruption problems. If any carry-over rate is not picked up by another inlet, then some explanation of its disposal should appear in the "Remarks" column. (See remark for inlet SI-8)

Column 6. The total runoff  $Q$  is the sum of the runoff from the subject drainage area and any applicable carry-over.

Column 7. The reciprocal of the cross slope "z" is determined from the roadway cross-sections and is illustrated by the following examples:

- Transverse slope 1/4 inch per foot:  
 $z = 12/(1/4) = 48$
- Transverse slope 3 inches in 8 feet:  
 $z = (8 \times 12)/3 = 32$
- Transverse slope 6 inches in 15 feet:  
 $z = (15 \times 12)/6 = 30$

For circular or parabolic roadway crowns, use the average slope for the desired width of ponding in the determination of z.

Column 8. The ratio  $z/n$  is self-explanatory and is used for entry into Figure 1 to determine depth of gutter flow "y" (See column 10). In the example problem, a roughness coefficient "n" of 0.015 is used. This is a usual value, however, it may vary from 0.012 to 0.025, depending upon the pavement surface and gutter texture.

Column 9. The gutter slope "S" is expressed in feet per feet and is obtained from established grade lines as indicated on the plan-profile sheets.

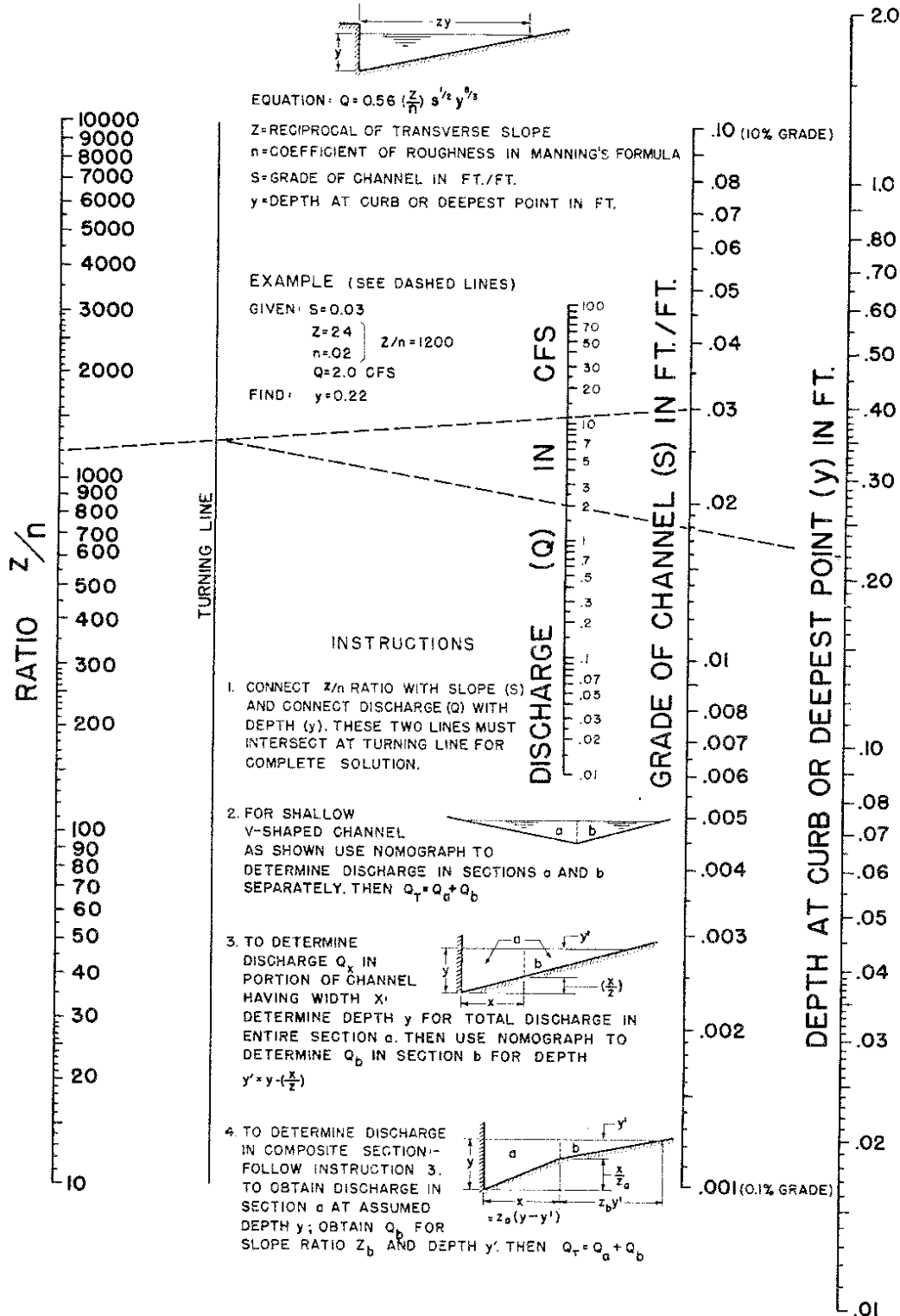
Column 10. The value of y is the depth of flow in feet in the gutter for the configuration of Q, S, and  $z/n$  and may be determined from Nomograph A. If two z values are indicated when the pavement slope changes, a composite calculation for y is necessary.

The value of y is not necessary for the direct

Inlet ID	Location	D.A. No	Q cfs	C0 cfs	Qq cfs	Z	z/n	S f/ft	Y ft	P ft	d ft	QL cfs	LR Curb ft	*E' Slot ft	LR Slot ft	Lat. Cr ft	%y	OK Curb Slot	OK Slot	Q1 cfs	Q1-0a cfs	Carry over for	Remarks
CI-1	3+80 Lt.	3	3.1	5	3.10	32	2133	0.0125	0.24	7.80	0.25	0.402	7.71	0.339	21.56	20	0.93	0.99	2.18	0.07	SI-2		
CI-2	6+70 Lt.	2	3.5		3.50	32	2133	0.0125	0.26	8.17	0.25	0.412	8.50	0.339	26.21	25	0.95	1.00	3.41	0.01	SI-3		
CI-3	8+31 Lt.	4	1.5	1.02	2.52	32	2133	0.0125	0.19	5.94	0.25	0.355	7.11			5	0.70	0.54	1.98	0.54	CI-4		
CI-4	8+60 Lt.	3	2.1	0.54	2.64	30	2000	0.0025	0.29	8.76	0.33	0.581	4.54			5	1.10	0.78	2.78				
CI-5	10+75 Lt.	5	3.3		3.30	32	2133	0.0125	0.25	7.99	0.25	0.407	8.10			10	1.23	1.00	3.64				
CI-6	12+80 Lt.	6	3.4		3.40	32	2133	0.0125	0.25	8.08	0.25	0.410	8.30			10	1.20	0.99	3.72				
SI-1	13+68 Lt.	7	2.2		2.20	32	2133	0.0125	0.21	6.86				0.339	21.56	20	0.93	0.99	2.18	0.07	SI-2		
SI-2	17+31 Lt.	8	3.4	0.02	3.42	32	2133	0.0125	0.25	8.08				0.339	26.21	25	0.95	1.00	3.41	0.01	SI-3		
SI-3	17+60 Lt.	9	0.9	0.01	0.91	30	2000	0.0050	0.19	5.60				0.332	10.50	15	1.43						
CI-7	18+18 Lt.	10	1.3		1.30	32	2133	0.0125	0.18	5.63	0.25	0.347	3.75			5	1.33	1.42	1.75				
CI-8	22+60 Lt.	5	2.6	0.13	2.73	48	3200	0.0030	0.26	12.30	0.25	0.413	6.62			5	0.93	0.75	3.77	0.13	CI-8		
CI-9	23+15 Lt.	14	3.9		3.90	30	2000	0.0010	0.44	13.12	0.33	0.725	5.38			5	0.75	0.98	2.31	0.42	DI-2		
CI-10	24+18 Lt.	15	1.3	0.09	1.39	30	2000	0.0010	0.29	8.69	0.33	0.579	2.40			5	2.08	1.14	1.75				
CI-11	21+00 Rt.	20	1.6		1.60	48					0.04	0.390	4.28			10	2.34					Drop inlet - 4 grate	
SI-6	33+18 Lt.	17	5.4		5.40	48	3200	0.0050	0.31	14.70				0.313	37.93	30	0.79	0.94	5.09	0.31	SI-5		
SI-5	29+00 Lt.	18	3.1	0.31	3.41	48	3200	0.0050	0.25	11.94				0.313	30.96	25	0.81	0.95	3.24	0.17	SI-4		
SI-4	24+35 Lt.	19	2.5	0.17	2.67	48	3200	0.0030	0.25	12.12				0.313	23.70	20	0.84	0.97	2.58	0.09	CI-10		
DI-1	25+00 Lt.	16	3.7		3.70																		
SI-7	29+00 Rt.	22	3.9		3.90	48	3200	0.0050	0.27	13.01				0.313	32.85	30	0.91	0.99	3.85	0.05	CI-8		
SI-8	25+60 Rt.	21	1.5	0.05	1.55	48	3200	0.0030	0.21	10.01				0.313	18.62	15	0.81	0.95	1.47	0.08		Drain along 7th str.	

Form 1020  
Revised 1-86 3310ERT.DGN  
INLET CALCULATIONS

Table 2



NOMOGRAPH FOR FLOW IN TRIANGULAR CHANNELS

Nomograph A

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determination of  $L_r$  (length required for total interception) for slotted drains. However, it must be calculated in order to check the width of ponding.

Column 11. The width of ponding "P" should not exceed the limits as given in the design criteria. In the example problem, the maximum permissible ponded width is 10 feet for the section of Monroe Avenue within the business area and 15 feet for the section which is within the residential area.

If the width of ponding criterion is exceeded, the usual adjustment is to space the inlets closer together. This effectively removes the water from the surface more often and limits the accumulated discharge causing the unacceptable ponding. On the other hand, if the width of ponding is significantly less than the allowable, it may be economical to reduce the number of inlets in the system.

The ponded width is the product of  $y$  and  $z$  (columns 10 and 7). If two values of "z" are indicated to describe a transverse slope, the ponded width for such a situation is calculated as illustrated in the following example:

The total depth of water in the gutter " $y$ " = 0.30 feet. In the eight feet of width nearest the curb, there is a rise of 3 inches. This leaves a remaining depth of flow of  $y' = 0.30 - 0.25 = 0.05$  feet. The width of ponding beyond this point is  $0.05 \times 64 = 3.2$ . The total width of ponding is  $8.0 + 3.2 = 11.2$  feet.

Column 12. The dimension "a" is the gutter depression (the vertical distance from the normal gutter line to the throat of the curb inlet) expressed in feet. As the value of "a" increases in curb inlets, the rate of gutter flow interception at the inlet increases. However, a very large value of "a" is objectionable to traffic flow moving near the gutter line. Therefore, a compromise is in order when selecting an appropriate value for "a". As a general guide, the depth of depression "a" should vary from 0 to 1 inch where the gutter is within the theoretical traffic lane; from 1 inch to 3 inches where the gutter is outside the traffic lane or in the parking lane; and up to a maximum

of about 5 inches for lightly travelled city streets not on a highway route.

Since slotted drain inlets do not require an inlet depression for their proper hydraulic function, no "a" is considered.

Column 13. The value " $q_a$ " is the rate of flow per lineal foot of inlet for a given depth " $y$ " and depression "a". This value is determined directly from Figure 9 and is applicable to curb inlets only.

Column 14. The value of  $L_r$ , length of curb inlet necessary to intercept all of the discharge, is equal to  $Q/q_a$ . The curb inlet CI-2 will be used as an example. Its length, for total interception, is  $3.50/0.412 = 8.50$  feet.

Column 15. This is the value of an exponent "E" to be used in the required length equation for slotted drain inlets. It is a function of  $z$  and  $S$  and is defined by the following equation:

$$E = 0.207 - 19.084S^2 + 2.613S - 0.0001z^2 + 0.007z - 0.049Sz \quad (6-8)$$

A tabulation of E values is also given in Table 1.

Column 16. The value " $L_r$ " is the length of slotted drain inlet in feet which is necessary to intercept all of the gutter flow "Q". For slotted drain inlets, SI-2 will be used as an example. The design of slotted drain inlets requires the use of the equation (6-3). The exponent "E" is defined for Column 14.

Care should be exercised when using equations (6-3) and (6-8). The range of the parameters legitimately applicable are as follows:

$$\begin{aligned} Q_d &\leq 5.5 \text{ cfs} \\ S &\leq 0.09 \\ 16 &\leq z \leq 64 \\ 0.011 &\leq n \leq 0.017 \end{aligned}$$

$L_r$  values based upon values of these parameters outside the above-indicated limits are suspect.

The length for total interception for SI-2 is computed to be 26.21 feet (using an exponent "E" of 0.339.)

If it were necessary to intercept all of the water in the gutter flow at this inlet, at least 26.21 feet of inlet would be required. Likewise, the total required curb inlet length for CI-2 is 8.50 feet. In this case, however, a small carry-over is allowable and a standard 5 feet long inlet is used for CI-2 and 25 feet for SI-2.

Column 17. The dimension "L" is the actual length of inlet which is to be provided. For curb inlets, it is recommended that no less than 5 feet of length be used with standardized increments of 5 feet. (e.g., 5 feet, 15 feet, etc.) For slotted drain inlets, because of standard pipe lengths of 20 feet, it is recommended that no less than 20 feet of length be used with standardized increments of 5 feet. (e.g., 20 feet, 35 feet, 45 feet, etc.)

Column 18. The ratio of the length of inlet provided to the length of inlet required for total interception is used for the determination of the amount of water actually intercepted. For example, at inlet CI-2, the value of the ratio is:  $5.0/8.5 = 0.59$ . At inlet SI-2, the ratio is  $25.0/26.21 = 0.95$ .

Column 19. The gutter depression at the inlet divided by the depth of flow in the gutter "a/y" is another ratio which is used in determining the percent of interception for curb inlets. For inlet CI-2, this value  $a/y = 0.25/0.26 = 0.98$ . For slotted drain inlets, this computation is not necessary.

Column 20. This column shows the relative percentage of runoff which is intercepted by the inlet. For curb inlets, that percentage is determined from Figure 10, using the values from Columns 18 and 19. For inlet CI-2, the  $L/L_r$  ratio (from Column 18) is 0.59, and the  $a/y$  ratio (from Column 19) is 0.98. By entering the chart in Figure 10 with these values it is found that the relative percentage of interception,  $Q_i/Q_a$ , is 0.71.

Column 21. For slotted drain inlets, the chart on Figure 6 or equation (6-3) may be used to determine the relative percentage of interception. For inlet SI-2, the value of  $L/L_r$  is 0.95 and the associated relative percentage of interception is 0.995.

Column 22. The value  $Q_i$  shown in this column is the rate of discharge which the inlet actually

intercepts. It is the product of  $Q_a$  from Column 6 and the relative percentage of interception from Column 20 or 21. For inlet CI-2, as an example, the value of  $Q_i$  equals  $0.71 \times 3.50 = 2.48$  cfs. For inlet SI-2, the value of intercepted  $Q_i$  is 3.41 cfs.

Column 23. The carry-over is the amount of water which passes an inlet, and is the difference between the total gutter flow "Q" (Column 6), and the intercepted flow " $Q_i$ " (Column 22). For inlet CI-2, the carry-over is  $Q_a - Q_i = 3.50 - 2.48 = 1.02$  cfs. For inlet SI-2, the carryover is 0.01 cfs. The rate of carry-over should never be neglected and should always be accounted for. If it is not picked up by a succeeding inlet, some explanation of its disposal should be made in the "Remarks" column. See the comment in the Remarks column for Inlet SI-8.

The preceding method of proportioning inlets applies only to inlets in gutters which have a longitudinal grade. For low point inlets the method previously described for "Inlets in Sags" should be applied. As an example, consider the inlet CI-11 which is to carry 1.60 cfs of water. Reference is made to Figure 11, "Low Point Inlets". Furthermore, assume that, for this location, a gutter depression of only 1.75 inches is allowed.

Using the allowable ponding width of 10 feet and  $z = 48$ , it is found that the allowable depth of water above the normal gutter line will be 2.50 inches, which, when added to the allowable gutter depression of 1/2 inch, gives a total head of the curb opening of 3.00 inches.

From Figure 11, it is found that the curb slot will carry about 0.39 cfs of water per foot length of opening. Therefore, the length of curb inlet required for this location is  $L_r = 1.60/0.39 = 4.28$  feet. Since a low point inlet such as this can not clean itself (accumulated debris in the water has no other place to go), it is recommended that a safety factor be applied to design lengths for such inlets. Usually a safety factor of about 2 is sufficient. Therefore, multiply  $L_r$  by 2 ( $4.28 \times 2 = 8.56$  feet) and round to the nearest standard incremental size. In this case, a 10 feet inlet would be appropriate.

Because of the inherent debris-catching characteristics of slotted drain inlets, their

use is discouraged in low point or sag gutter configurations.

As an example of the use of a grate inlet, consider DI-1 at Station 25+00 left. This inlet is to be designed to carry 3.70 cfs of water.

$$Q_a = 3.70 \text{ cfs.}$$

Grate Opening: 14 slots, 15-3/8" x 1-1/4"  
 Gross Area One Grate = 1.87 sq. ft.  
 Assumed Efficiency of Grate = 50%  
 Effective Net Area One Grate = .50 x 1.87 = 0.93 sq. ft.  
 Assumed Allowable Head = 4" = .33'

$$Q = CA\sqrt{2gh} \text{ (Orifice Formula)}$$

$$A = Q/C/\sqrt{2gh} = 3.70/.7/((64.4 \times 0.33)^{.5}) = 1.15 \text{ sq. ft.}$$

Use two grates. Effective area = 2 x 0.93 = 1.86 sq. ft.

Additional columns (24 and 25) may be in order for full documentation of inlet design. These may be a column indicating the destination of carry-over rates and a column for "Remarks".

Step 4 - Proportioning drain pipes: The computations involved in the proportioning of the various runs of drain pipe are summarized in the tabulation sheet titled "Drain Pipe Calculations", (Table 3). A detailed explanation of this tabulation follows:

Columns 1 through 5. Figures shown in these columns are self-explanatory.

Column 6. The length of each run as shown in this column is the length from center to center of inlets or manholes. This length is used in determining the time of flow from one inlet or manhole to another. (Note that these lengths are not to be used as pay lengths of pipe since the standard specifications provide that pay lengths shall include only the actual net length of pipe and shall not include the distance across inlets or manholes where no pipe actually is placed.)

Columns 7, 8, and 9. The time of concentration is the time required for water to flow from the most remote part of the drainage area or areas involved to the upper end of the pipe run under consideration. For the first run, the time of

concentration is the inlet time for the first inlet. For all succeeding runs, the time of concentration may be either the time as computed along the drain line or the inlet time of the inlet at the beginning of the run under consideration, whichever time period is longer. Accordingly, both times are shown in the tabulation for purposes of comparison and the larger of the two is used in determining intensity and then, discharge. If this larger value is less than 10 minutes (the minimum time of concentration), the established minimum time of 10 minutes is used.

The time of concentration shown in column 7 is computed by summing the time of concentration for the preceding run and the time required for water to flow through the preceding run to the beginning of the run under consideration. At junctions of lines, the larger value of the time of concentration is used. In the tabulation, for example, lines A and B join to discharge into line C. Since the time of concentration for line A is greater than that for line B, this larger value is carried through in calculating times of concentration for line C.

Columns 10 and 11. Intensity and discharge are computed in the same manner as explained under "inlet Computations."

Columns 12, 13, and 14. The size and slope of pipe as shown in columns 12 and 13 must be chosen in such manner that the pipe, when flowing full but not under head, will carry a rate of flow approximately equal to or greater than the computed discharge,  $Q$ . In other words, the "Capacity" shown in column 14 must be approximately equal to or greater than the value of discharge shown in column 11. This is known as a "non-pressure flow design". Obviously, drain pipe lines may be designed as "pressure flow" but this is discouraged due to a certain loss of any built-in safety factor. If pipe lines are to be designed as "pressure flow", the D-5 Hydraulic Section should be consulted.

The capacity may be calculated by Manning's formula

$$Q = \frac{1.486AR^{(2/3)}S^{0.5}}{n}$$

or the capacity can be taken directly from the appropriate uniform flow nomograph in Chapter 4. If the pipe run is to be designed to flow under

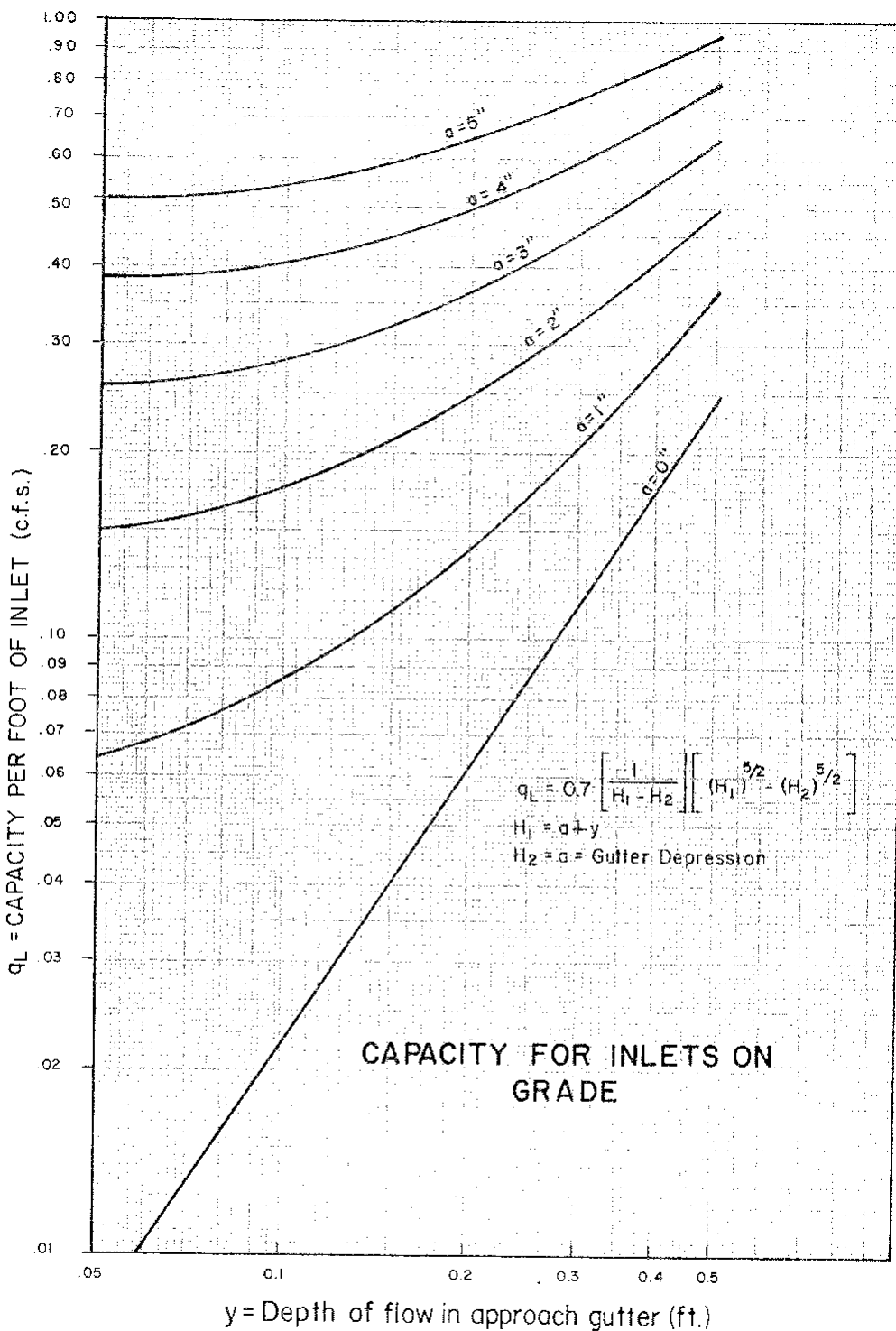


Figure 9

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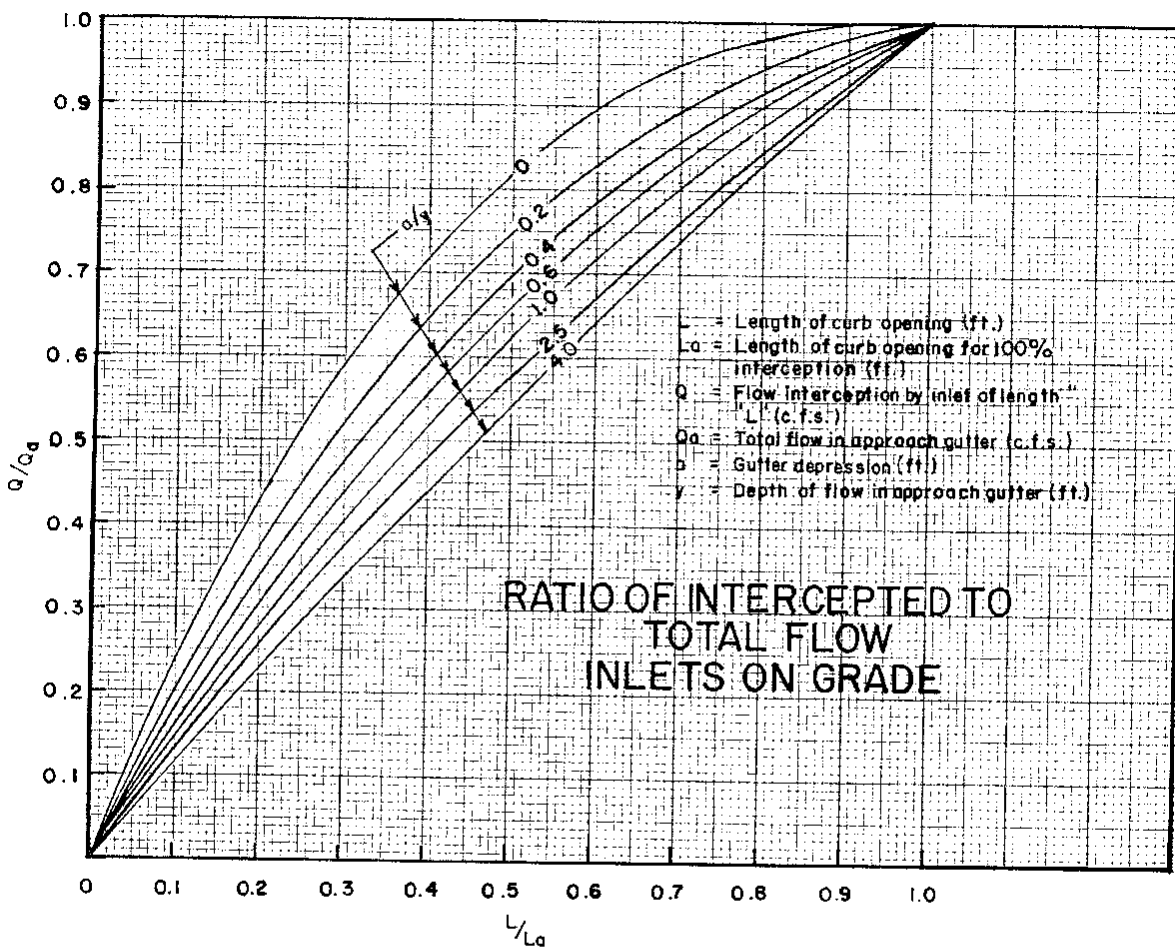
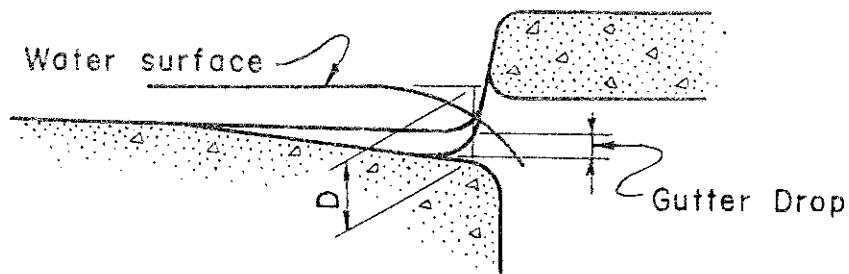
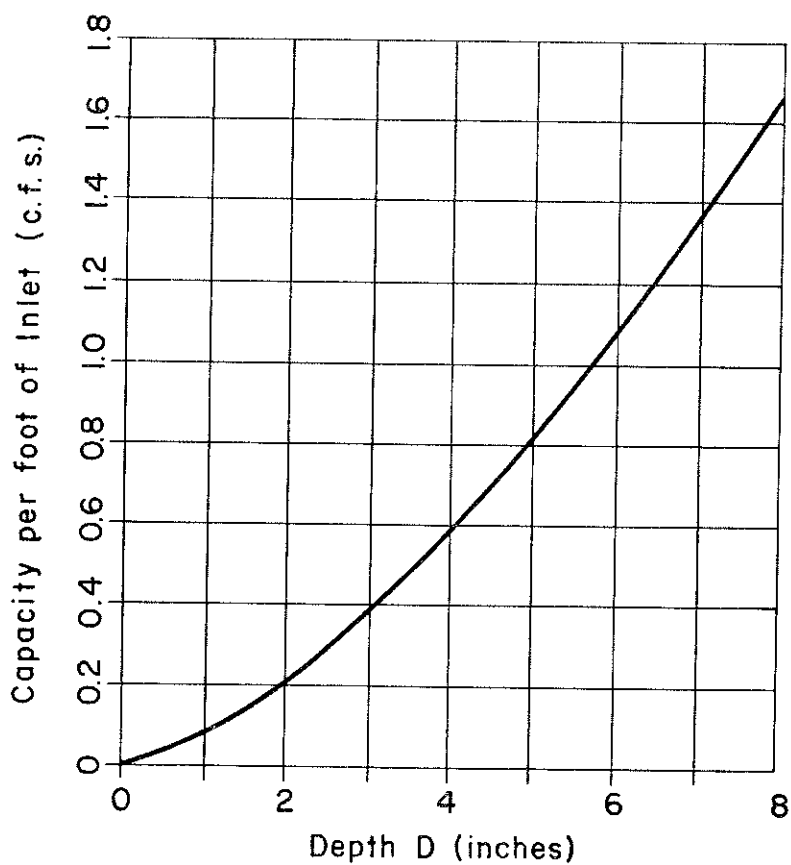


Figure 10



SECTION



**INLET CAPACITY  
FOR  
LOW POINT INLETS**

Figure 11

From	To	Drainage Area No.	Total D.A. Ac.	Total CA	Length ft.	Time of Concentration - Minutes		I In./Hr.	Q cfs	Design			Remarks		
						Along Drain Line	Inlet Time Design			Di. In.	Slope ft/ft	Cap. cfs		Vel. ft/sec.	
CI-1	CI-2	1	0.80	0.54	290	*470/60 = 7.8	10.0	5.8	3.1	18.00	0.0250	2.72	5.9	Lateral A	
CI-2	CI-3	1 & 2	1.70	1.15	161	7.8 + 290/(5.9X60) = 8.6	10.0	5.8	6.7	18.00	0.0250	2.72	7.5		
CI-4	CI-3	3	0.50	0.36	44	*	10.0	5.8	2.1	12.00	0.00350	2.28	3.2		
CI-3	CI-5	1 to 4	2.60	1.77	244	8.6 + 161/(7.5X60) = 8.9	10.0	5.8	10.3	18.00	0.0250	2.72	8.0		
CI-5	CI-6	1 to 5	3.60	2.34	205	8.9 + 244/(8.0X60) = 9.4	10.0	5.8	3.6	21.00	0.0250	3.19	9.1		
CI-6	SI-1	1 to 6	4.60	2.93	88	9.4 + 205/(8.5X60) = 9.8	10.0	5.8	17.1	21.00	0.0250	3.19	9.1		
SI-1	SI-2	1 to 7	5.14	3.31	363	9.8 + 88/(9.1X60) = 10.0	10.0	5.8	19.3	24.00	0.0250	27.39	9.5		
SI-2	CI-7	1 to 9	6.48	4.05	87	10 + 363/(9.5X60) = 10.6	10.0	5.7	23.0	24.00	0.0250	27.39	9.7		
CI-7	CI-7	9	0.24	0.16	68	*	10.0	5.8	0.9	12.00	0.00200	1.73	2.3		Lateral B
CI-7	DI-2	1 to 10	6.87	4.27	282	10.6 + 87/(9.7X60) = 10.7	10.0	5.7	24.2	24.00	0.0250	27.39	9.9		
CI-10	CI-9	15	0.35	0.23	46	*200/(0.5X60) = 6.7	10.0	5.8	1.3	12.00	0.00197	1.71	2.3		
CI-9	CI-8	15 & 14	2.28	0.90	125	6.7 + 46/(2.3X60) = 7.0	10.0	5.8	5.2	18.00	0.00255	5.74	3.7		
CI-8	DI-2	13 to 15	3.20	1.35	160	7.0 + 125/(3.7X60) = 7.6	10.0	5.8	7.9	18.00	0.00550	8.44	5.5		
DI-2	CI-11	1 to 15	13.47	7.55	70	10.7 + 282/(9.9X60) = 11.2	10.0	5.5	41.9	30.00	0.01100	46.60	10.7		
CI-11	MH-2	20, 1-15	13.78	7.83	145	11.2 + 70/(10.7X60) = 11.3	10.0	5.5	43.2	30.00	0.01150	47.64	11.0		
MH-2	MH-3	1 to 22	22.71	11.91	480	34.0 + 240/(7.3X60) = 34.5	-	34.5	35.7	36.00	0.00400	45.69	5.5		
SI-6	SI-5	17	2.00	0.92	418	*620/(1.0X60) = 10.3	10.0	5.8	5.3	18.00	0.00255	5.74	3.7		
SI-5	SI-4	17 & 18	3.00	1.46	465	10.3 + 418/(3.7X60) = 12.2	10.0	5.3	7.8	18.00	0.00570	8.59	5.5		
DI-1	SI-4	16	4.20	1.26	100	*1000/(0.5X60) = 33.3	33.3	33.3	3.9	12.00	0.01750	5.10	7.0	Lateral C	
SI-4	MH-1	16 to 19	7.90	3.15	160	33.3 + 100/(7.0X60) = 33.5	10.0	33.5	9.6	21.00	0.00500	12.13	5.8		
MH-1	MH-2	16 to 22	9.24	4.36	240	33.5 + 160/(5.8X60) = 34.0	-	34.0	13.2	21.00	0.00820	15.54	7.3		
SI-7	SI-8	22	0.74	0.67	340	*450/(1.0X60) = 7.5	10.0	5.8	3.9	18.00	0.00570	8.59	4.8		
SI-8	MH-1	21 & 22	1.03	0.93	250	7.5 + 340/(4.8X60) = 8.7	10.0	5.8	5.4	18.00	0.00570	8.59	5.2		

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\*Overland flow

DRAIN PIPE CALCULATIONS

Table 3

pressure, use Nomograph F, Chapter 4, or Nomograph B (for box conduits) in this chapter.

Wherever a pipe run is designed in such a manner that the capacity of a pipe as shown in column 14 is less than the computed discharge shown in column 11, a check of the hydraulic gradient above this run should be made to insure that the backwater head created by such a design is not large enough to cause "blowouts" at inlets or manholes upstream of the run. The same is true for pipe runs of larger diameter discharging into runs of smaller diameter or in instances where it is impossible to line up the soffits of pipe runs at changes of pipe size.

In our example, it will be noted on the plan profile sheet, (Figure 12), that line C is to be connected to an existing 54" pipe drain and will theoretically discharge against a 4.5' head. Analyzing the pipe run from manhole 3 to manhole 2, it is found that an effective slope of 0.24% will be required to pass the design discharge of 35.7 cfs. Projecting this grade from elevation 84.0, the soffit of the 54" diameter pipe, and also the level of the hydraulic gradient in the 54" pipe, a backwater elevation 85.15 feet at manhole 2 is determined. This procedure should be repeated in an upstream direction, until the hydraulic gradient elevation drops below the top of a pipe run. This occurs in this instance between SI-1 and SI-2 on line A. Since the backwater elevations are well below the throats of the inlets, the system as designed is satisfactory.

The above method of evaluating the hydraulic gradient does not take into account all items such as head losses in inlets, head losses or gains due to changes in velocity, etc., but it is considered accurate enough for all practical purposes so long as the hydraulic gradient is kept well below the throats of inlets. The Department conventionally ignores these minor losses as negligible. If their consideration is necessary because of involvement with other governmental entities, consult with the D-5 Hydraulic Section for technical guidance.

Column 15. The velocities shown in this column are based upon the design flow and its associated normal depth of flow (uniform depth) and can be obtained from the appropriate nomograph in Chapter 4 or calculated. They are used in column 7 in determining the time of flow through each run of pipe.

Column 16. In a usual tabulation of storm drain design notes, a "Remarks" column can be very useful. It is used in this example to identify three remote laterals.

#### 6-700. UNDERDRAINS

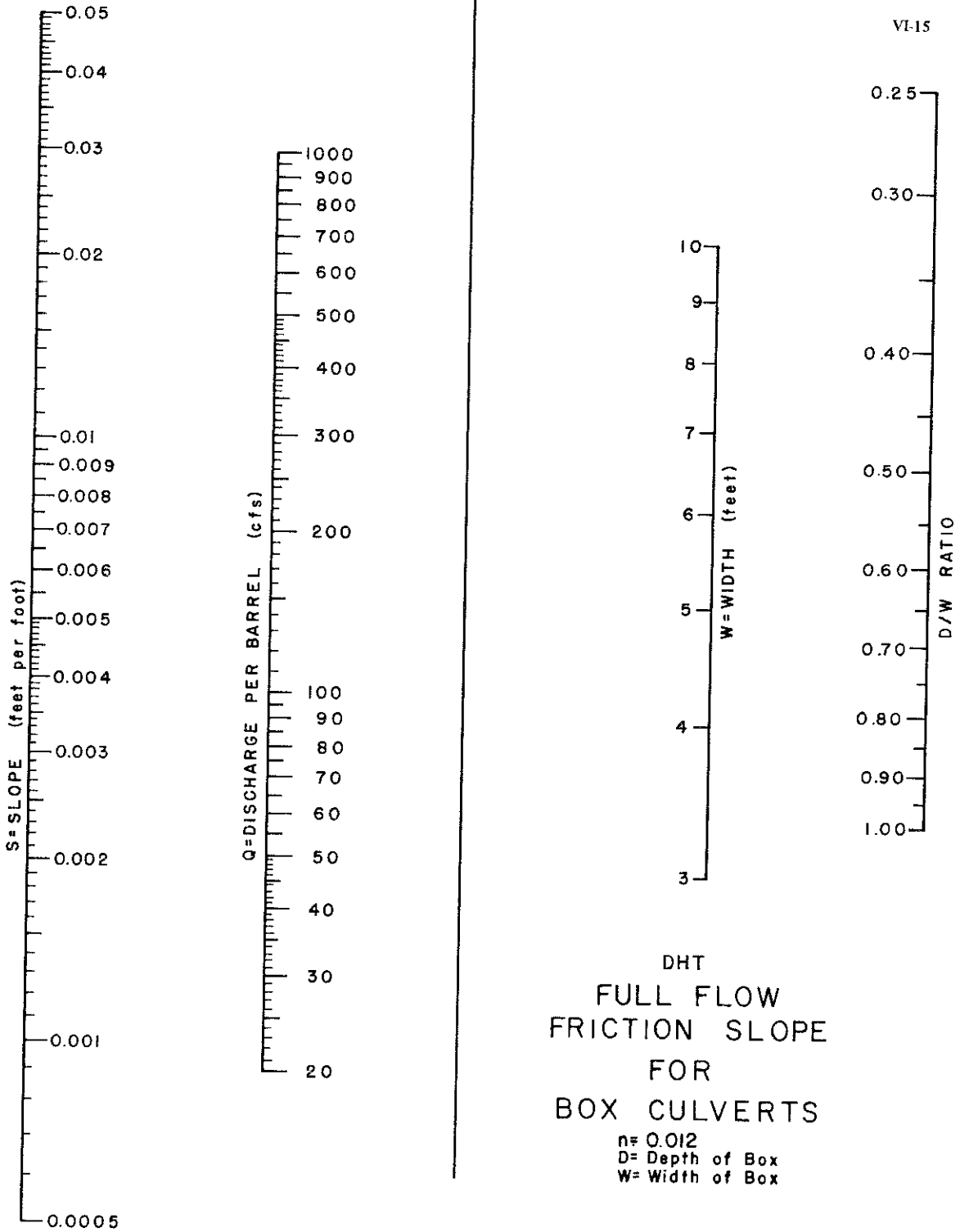
In certain areas of the state, ground water can be a significant problem as it attacks foundations, substructures, subgrades, and other aspects of highway components. In most soils where ground water is a problem, a system of underdrains, installed for the removal of excess moisture, can be a very useful feature in the overall roadway design. Underdrains may take the form of networks of perforated (or otherwise permeable) pipe, French drains, or collector fields. Where such appurtenances are needed, the additional expense in their installation is usually fully justified in terms of future savings in roadway and structure maintenance costs.

Percolation rates for ground water may be obtained from Soil Conservation Service offices, measured, or simply estimated. Collector pipe sizes and networks may then be established for the removal of that water. French drains can be very useful where the unwanted ground water percolation rates are relatively high. See Figure 13 for a typical French drain detail. Collector fields may be useful where reasonable outfalls for ground water are not available. All of the above appurtenances may be enhanced by the use of some type of geo-textile filter material. Consult with the D-5 Hydraulic Section for assistance and further information on this subject.

#### 6-800. THYSYS

The Texas Hydraulic System (THYSYS) of computer routines dealing with highway drainage includes a stand-alone subsystem SEWER which deals with the analysis and design of storm drain systems according to the general principles of storm drain design discussed in this chapter. Included in the options are sections dealing with runoff, inlets (surface drainage), and pipe systems. Hydraulic and geometric documentation and graphical outputs represent thorough documentation for reference and plans application by the user.

The rational method is used for runoff computations and is capable of accommodating up



Nomograph B

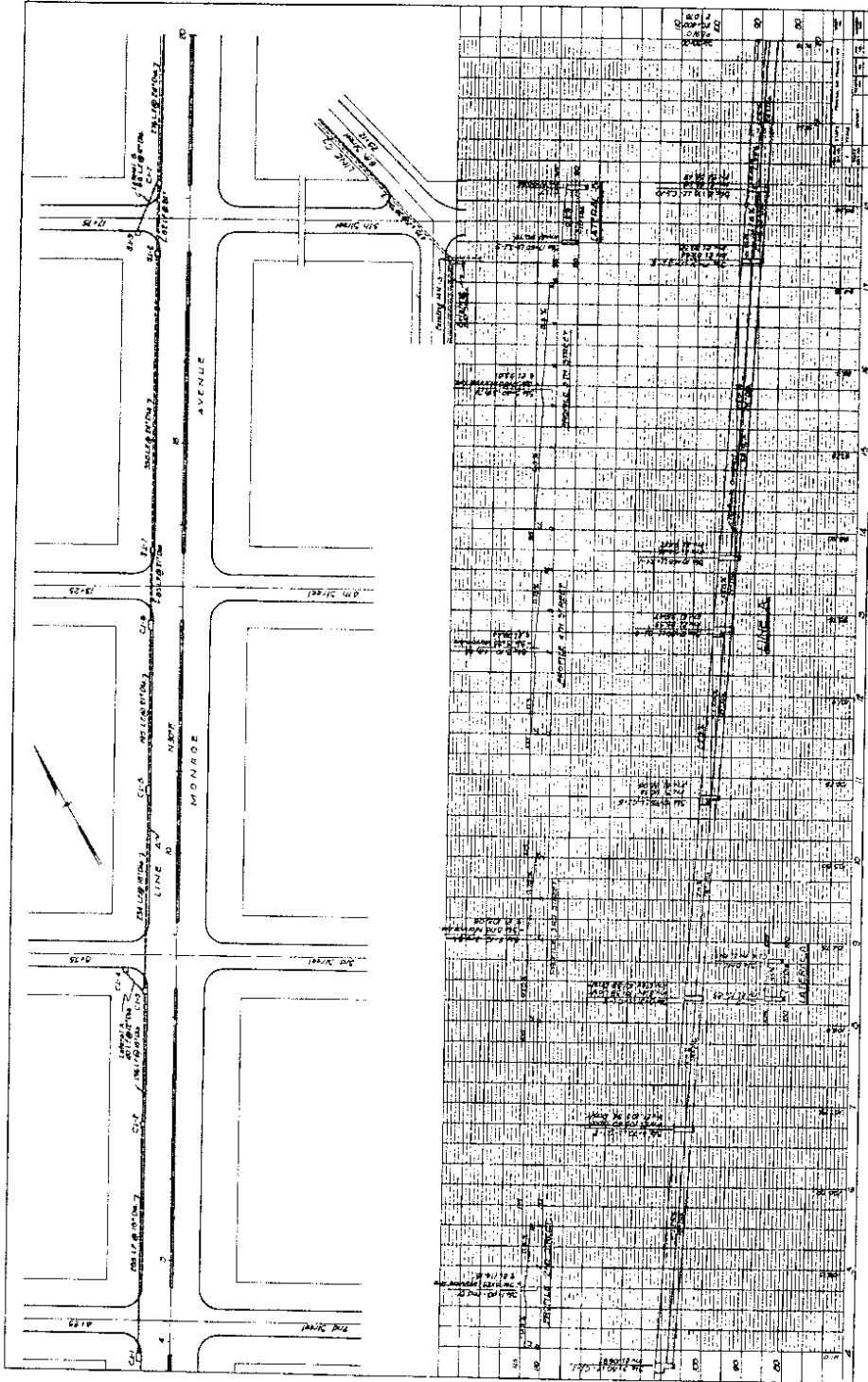


Figure 12a

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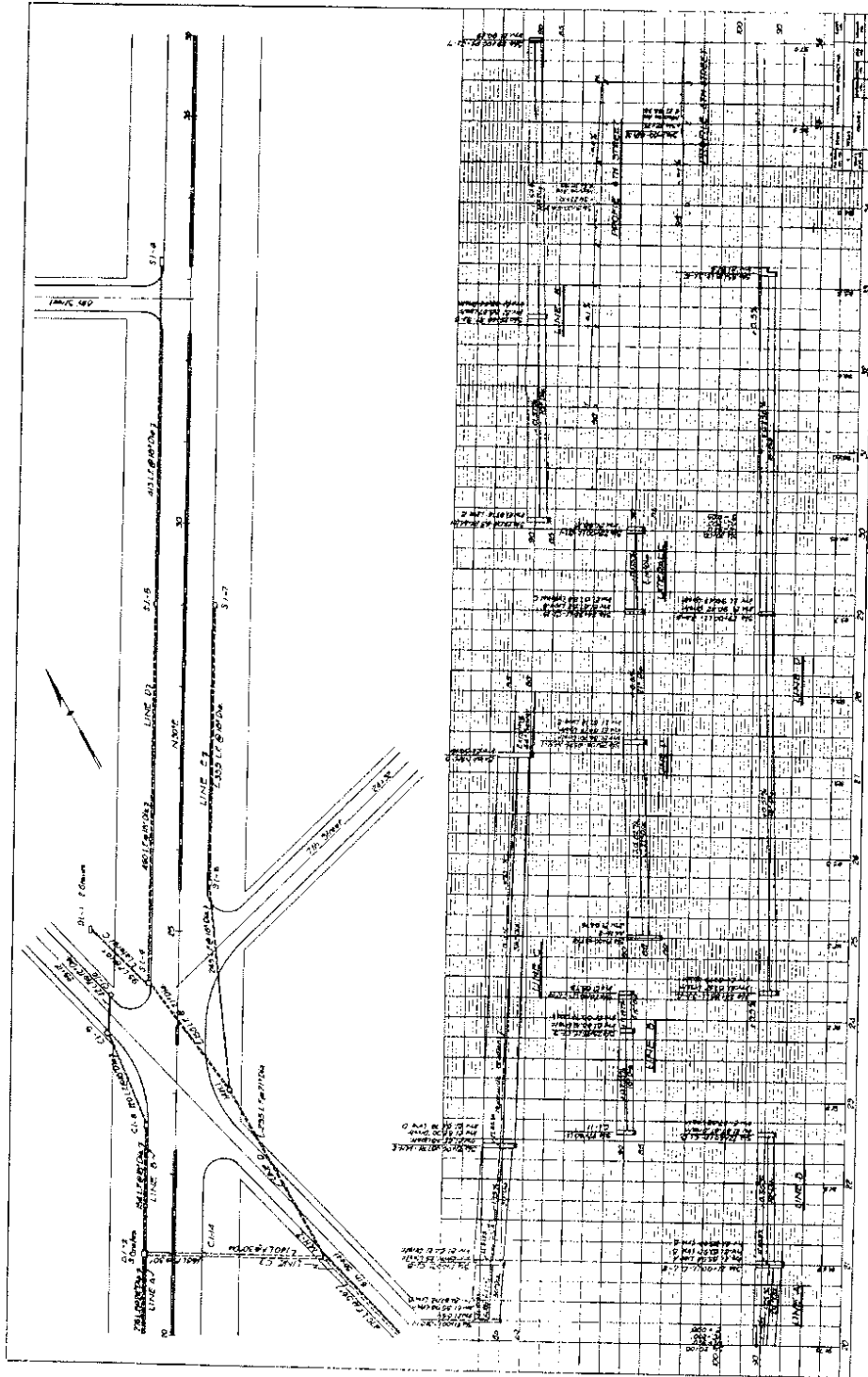
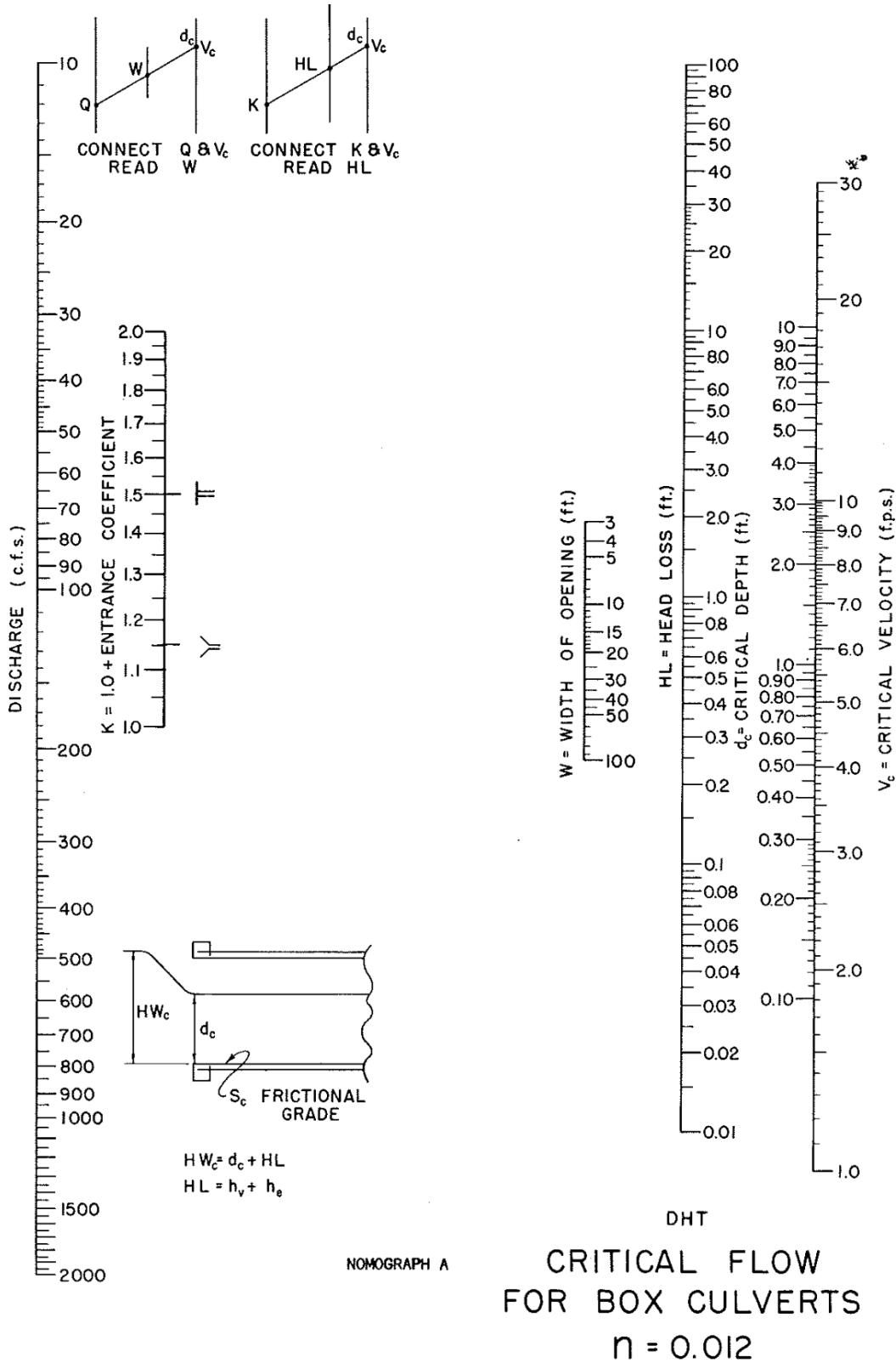


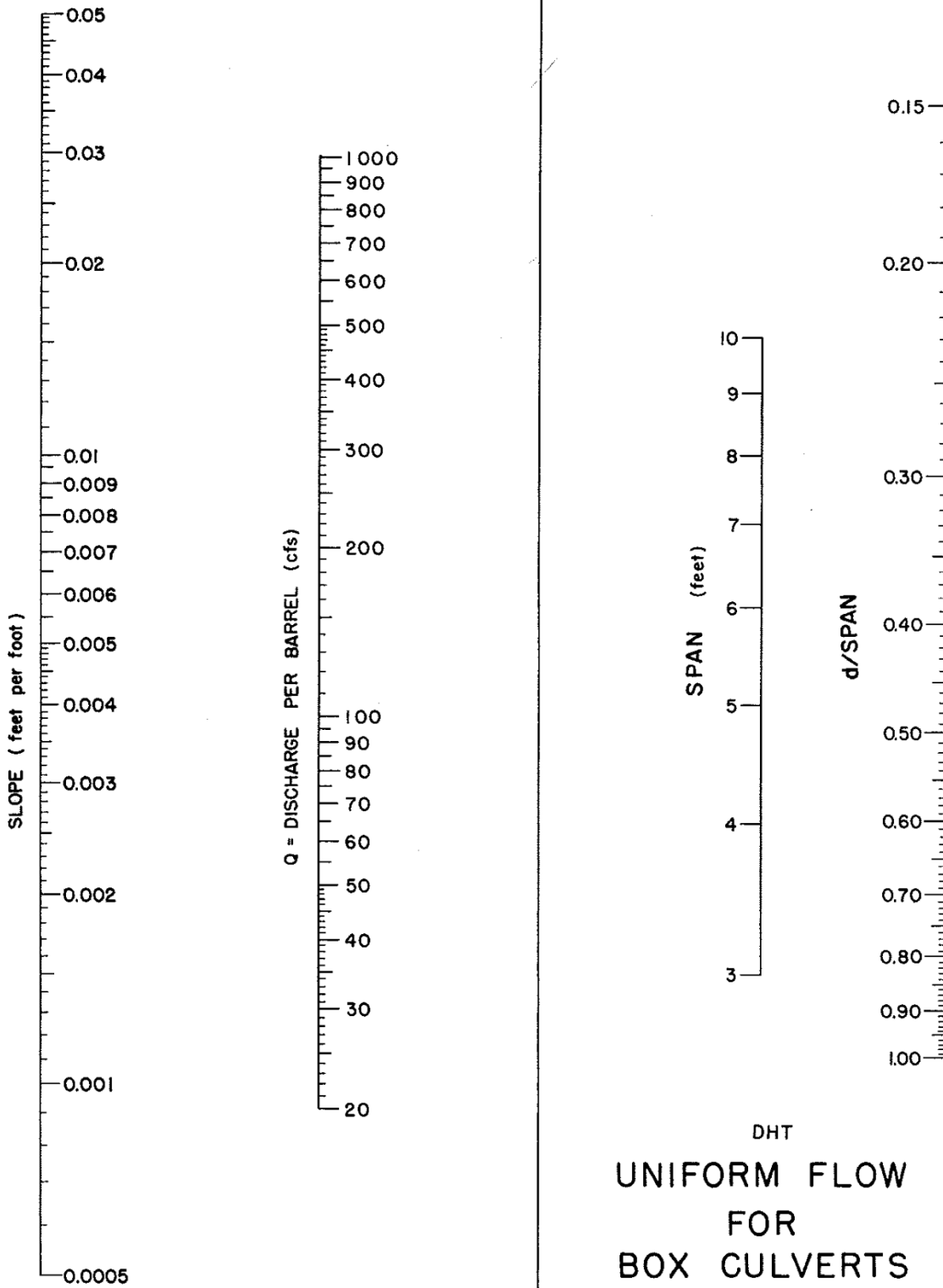
Figure 12b



BRIDGE DIVISION HYDRAULIC MANUAL

12-85

4 - 19



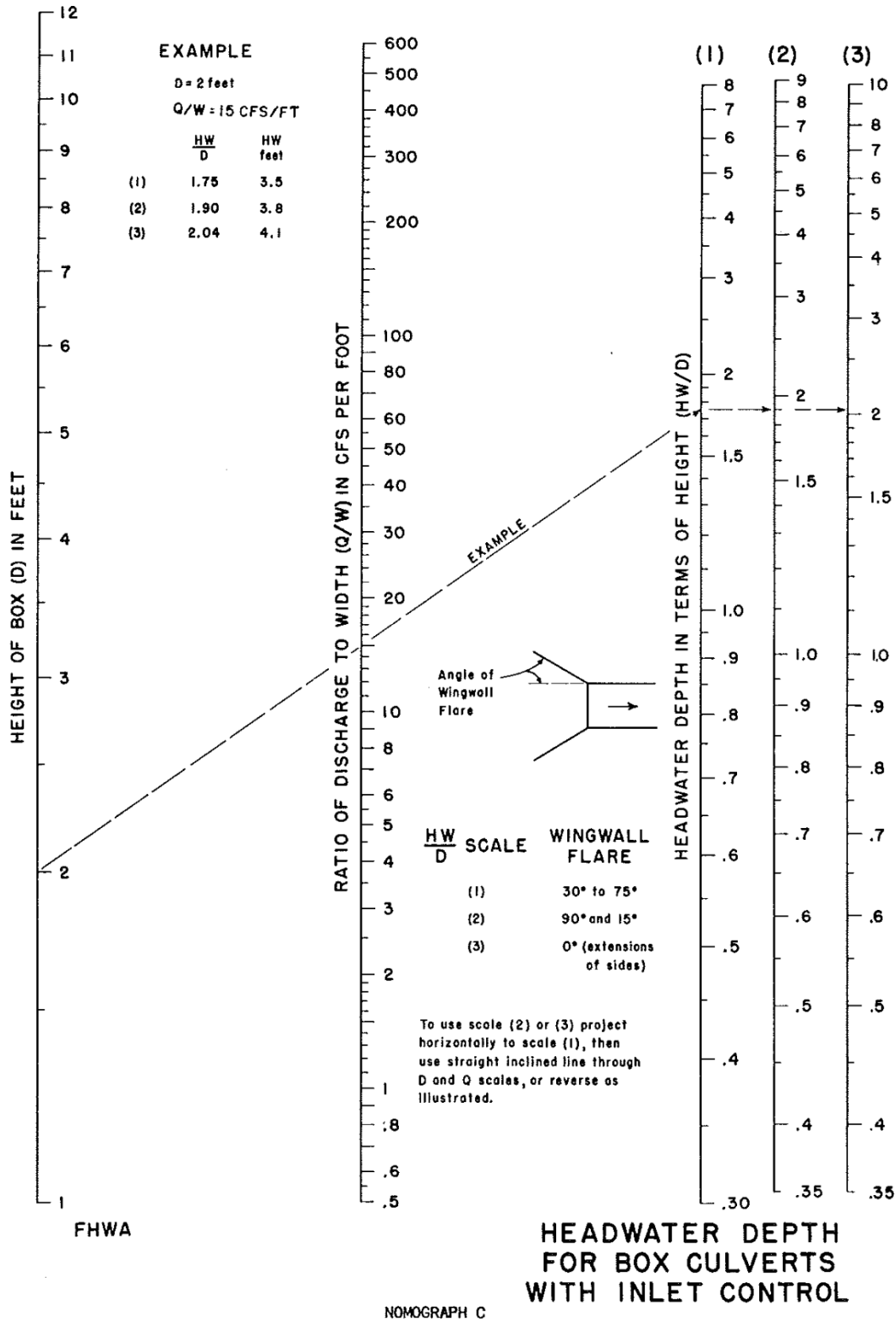
3 Sides Wetted

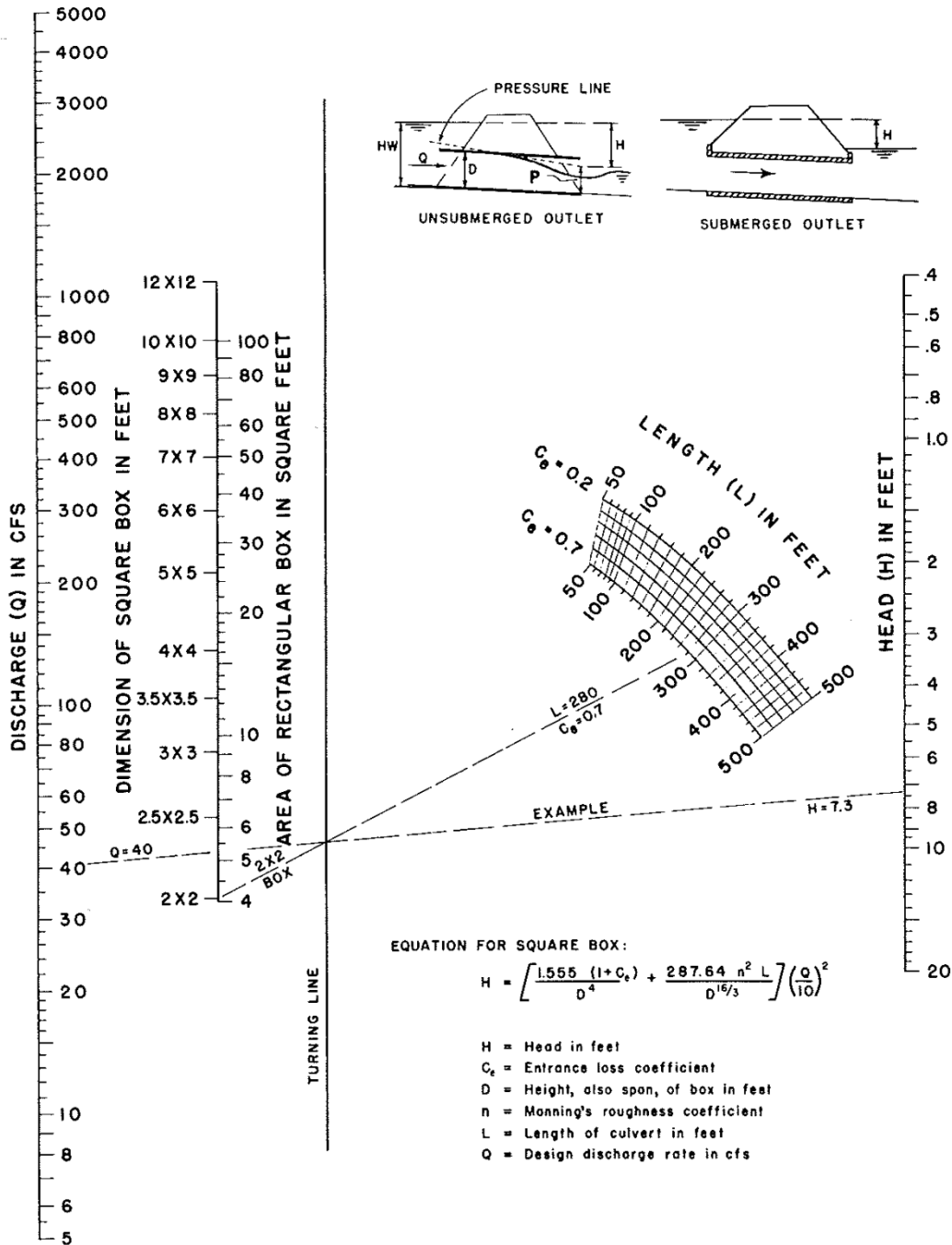
NOMOGRAPH B

BRIDGE DIVISION HYDRAULIC MANUAL

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4 - 21





EQUATION FOR SQUARE BOX:

$$H = \left[ \frac{1.555 (1+C_e)}{D^4} + \frac{287.64 n^2 L}{D^{16/3}} \right] \left( \frac{Q}{10} \right)^2$$

- H = Head in feet
- $C_e$  = Entrance loss coefficient
- D = Height, also span, of box in feet
- n = Manning's roughness coefficient
- L = Length of culvert in feet
- Q = Design discharge rate in cfs

**HEAD FOR  
CONCRETE BOX CULVERTS  
FLOWING FULL  
n = 0.012**

FHWA

NOMOGRAPH D

BRIDGE DIVISION HYDRAULIC MANUAL  
4 - 25

12-85

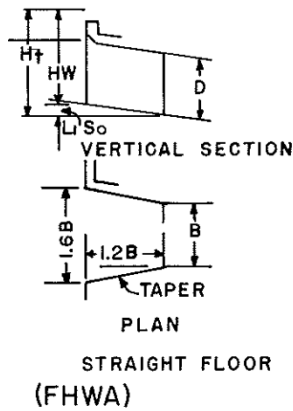
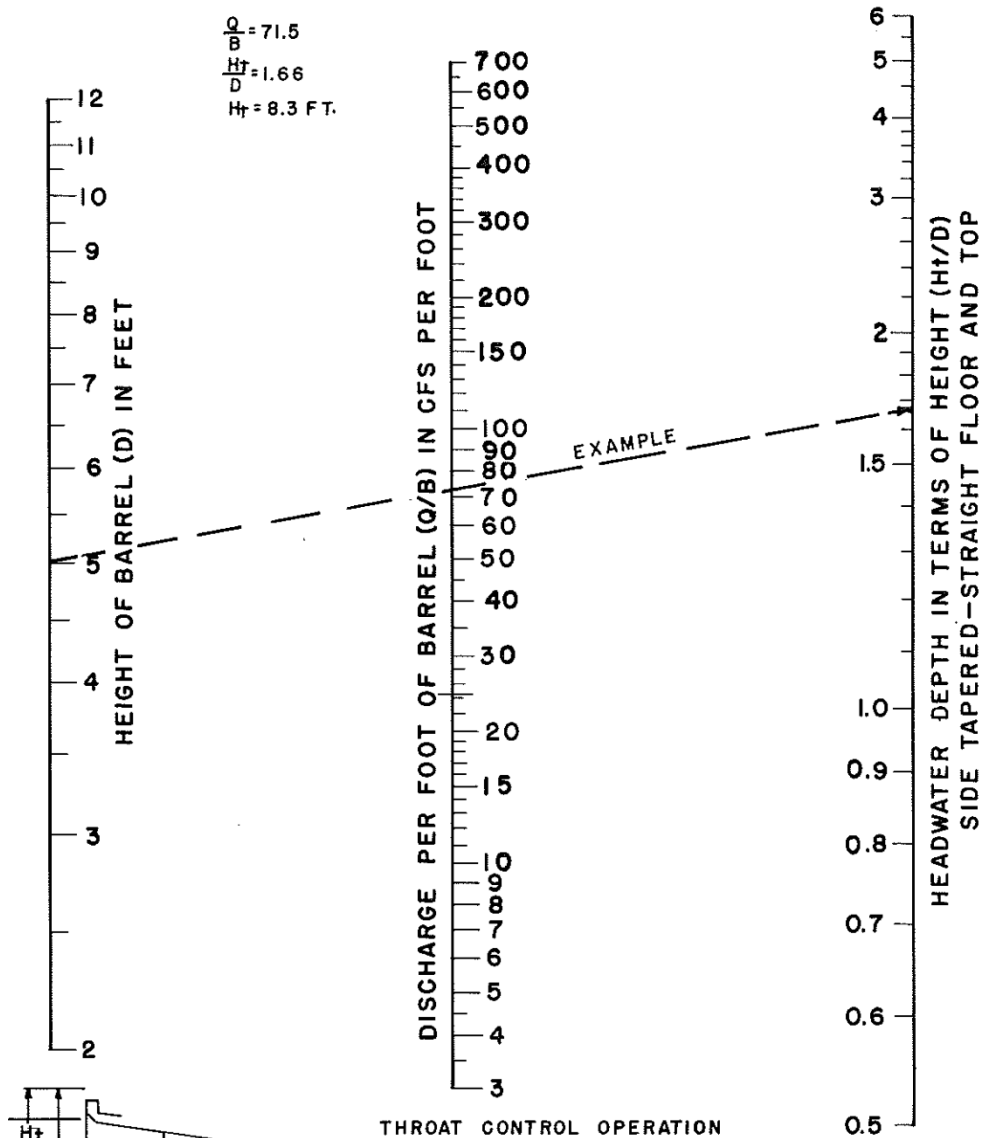
**EXAMPLE**

B=7FT. D=5FT. Q=500CFS

$$\frac{Q}{B} = 71.5$$

$$\frac{H_f}{D} = 1.66$$

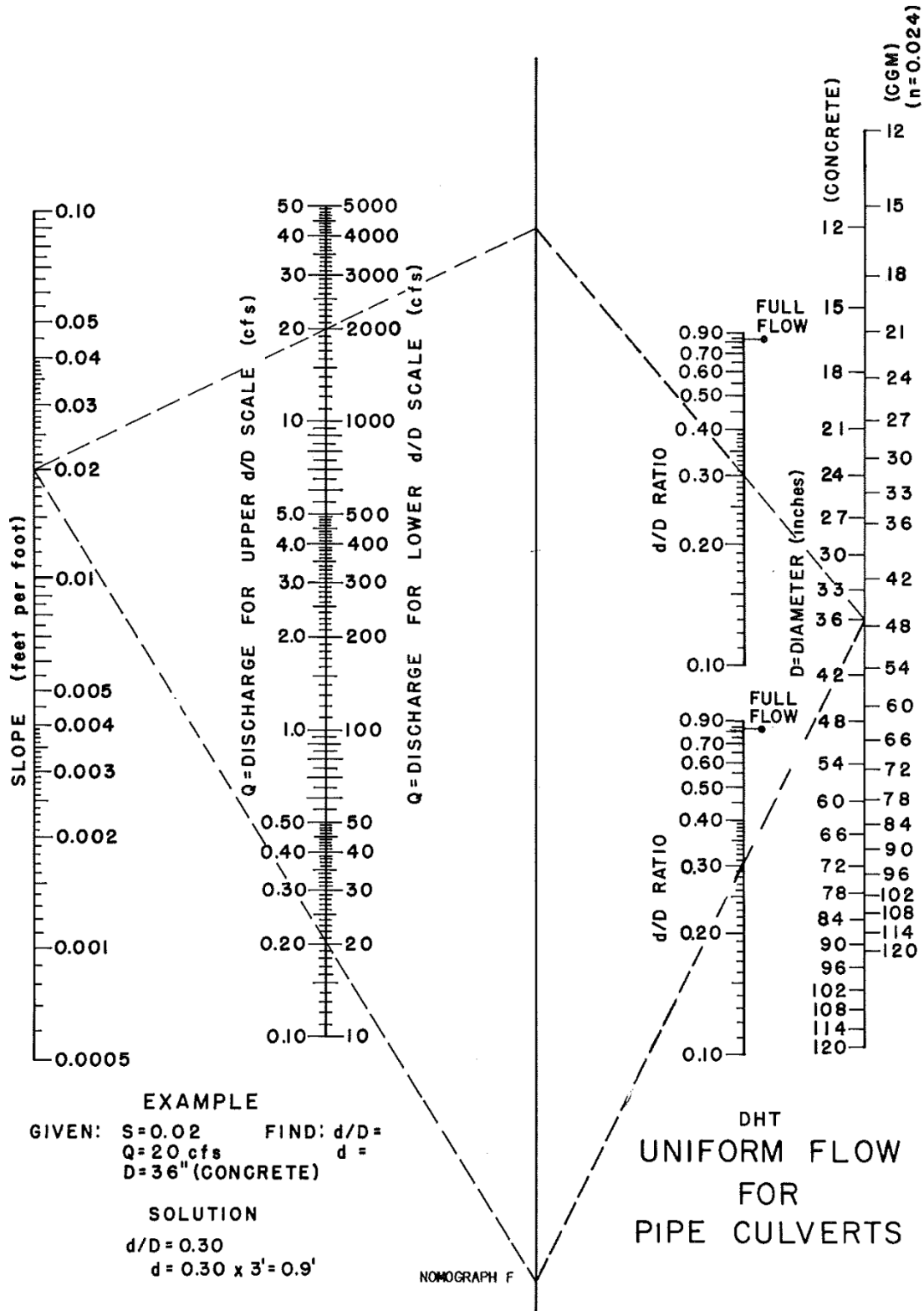
$$H_f = 8.3 \text{ FT.}$$



THROAT CONTROL OPERATION OF A TAPERED INLET OCCURS ONLY FOR DIMENSIONS AND DISCHARGE RATES FOR WHICH  $H_f - L_i S_o$  OR  $H_f - \text{FALL}$  EXCEEDS HW FOR THE FACE SECTION. USE THE SPECIAL INSTRUCTIONS FOR DESIGN OF TAPERED INLETS.

**TAPERED-SIDE INLETS ON BOX CULVERTS**

NOMOGRAPH E



**City of Van**  
**Design Guidelines for Subdivision Improvements**

**Chapter 6 - SWPPP Design and Implementation**

**I. General**

The purpose of this Guideline is to assist the Engineer in the preparation of a construction Storm Water Pollution Prevention Plan (SWPPP), the primary tool for minimizing erosion and sediment loss from a construction site along with the control of construction related chemicals and wastes.

**II. Design & Implementation**

For projects requiring permit coverage, it is recommended that the storm water pollution prevention plan be developed in accordance with Chapter 10, Article VII, Division E “Erosion and Sedimentation Control” of the City Van Code of Ordinances and the TPDES Construction General Permit.

**III. BMP Selection Guide**

In preparing the SWPPP, the Engineer can first use the BMP selection guide below to determine BMPs applicable to the site. The Efficiency Ratings listed for the BMPs are the assumed efficiencies in reducing erosion or trapping sediment for the BMP, assuming the BMPs are designed, installed, and maintained in accordance with acceptable practices and based on accommodating the flow and volumes from the applicable design storm.

Additional information to help in the selection, design, installation and maintenance of BMPs can also be found at the EPA website.

**Table 1**  
**Construction BMP Selection Guide**

<b>BMP Type</b>	<b>BMP</b>	<b>Primary Purpose</b>	<b>Efficiency Rating</b>
Construction Site Planning and Management	Construction Sequencing	Stabilizing on one part of the site before grading and construction commence at another part	Effective
	BMP Inspection and Maintenance	Provide routine inspections, inspections performed before rain events, and inspections performed after rain events to ensure effectiveness of BMPs	Varies
	Land Grading	Provide suitable topography for buildings, facilities, and other land uses while controlling surface runoff, soil erosion, and sedimentation during and after construction	Varies
	Preserving Natural Vegetation	Protecting desirable trees, vines, bushes, and grasses from damage during project development to provide erosion control, stormwater detention, biofiltration, and aesthetic values to a site during and after construction activities	Effective
Erosion Prevention and Control	Interceptor Swale	Route flows around areas of disturbance	1.00
	Diversion Dike	Route flows around area of disturbance	1.00
	Pipe Slope Drain	Route overland flow on a slope into a pipe to protect slope	Varies
	Chemical Stabilization	Provide soil stabilization by spraying soil binders or soil palliatives such as vinyl, asphalt, or rubber	0.70 - 0.90
	Seeding/Sodding/Hydromulching	Provide natural soil protection through seeding, hydromulch or phasing	0.90
	Mulching	Protect disturbed soil with a layer of hay, straw or other material	0.90
	Compost Blanket	Protect disturbed soil with a layer of loosely applied composted material	0.75
	Erosion Control Blanket	Protect disturbed soil with a layer of hay, straw or other material	0.90
	Geotextiles	Protect disturbed soil with a layer of porous fabric	Varies
Erosion Prevention and Control	Soil Retention	Structures or practices, such as grading or reshaping the ground to lessen steep slopes or shoring excavated areas with wood, concrete, or steel structure, that hold soil in place or keep it contained within a site boundary	Varies
	Soil Roughening	A temporary erosion control practice often used in conjunction with grading	Moderately effective for short term use
	Channel Protection/Riprap	Protects soil through the use of grass-lining, turf reinforcement or riprap	Varies
	Dust Control	Techniques to limit wind erosion and airborne soil particles from leaving site	Varies
	Temporary Stream Crossing	Provide a safe, stable way for construction vehicle traffic to cross a watercourse	Varies
	Wind / Sand Fence	Barriers erected to reduce wind velocity and to trap blowing sand	Effective

**Table 1**  
**Construction BMP Selection Guide**  
(cont'd)

BMP Type	BMP	Primary Purpose	Efficiency Rating
Sediment Controls	Brush Barrier	Perimeter sediment control structures constructed of material such as small tree branches, root mats, stone, or other debris left over from site clearing and grubbing	Effective
	Silt Fence	Slow and filter runoff to retain sediment	0.75
	Organic Filter Berm	Slow and filter runoff to retain sediment	0.75
	Organic Filter Sock	Slow and filter runoff to retain sediment	0.75
	Triangular Sediment Filter Dike	Similar to silt fence but more portable, reusable and sturdy with high flows	0.75
	Fiber Roll	Slow and filter runoff to retain sediment	0.75
	Filter Berm	Slow and filter runoff to retain sediment	0.75
	Inlet Protection	Intercept sediment at curb and field inlets. Should be used in conjunction with other onsite techniques	Varies
	Stone Outlet Sediment Trap	Intercept and filter small concentrated flows such as small creeks and defined waterways	0.85
	Sediment Basin	Large pond with controlled outflow which allows sediment to settle out of runoff	0.90
	Check Dam	Provide minor detention and retention of sediment for small swales and concentrated flows	0.50
	Sediment Filter / Chamber	Sediment-trapping devices typically used to remove pollutants (mainly particulates) from stormwater runoff	0.60 - 0.85
	Sediment Trap	Small impoundments that allow sediment to settle out of construction runoff	0.60
	Straw or Hay Bale	Slow and filter runoff to retain sediment	Not Recommended
	Good Housekeeping / Materials Management	Stabilized Construction Entrance	Reduce offsite sediment tracking from trucks and construction equipment
Wheel Wash		Reduce offsite sediment tracking from trucks and construction equipment	N/A
Vegetated Buffer		Areas of natural or established vegetation maintained to protect the water quality of neighboring areas	0.90
Debris and Trash Management		Techniques for management of paper, packaging, general building materials, etc.	Very effective
Chemical Management		Techniques for management of paints, chemicals, fertilizer, oil and grease, etc.	Very effective
Concrete Waste Management		techniques for disposal of concrete washout, demolished concrete, etc.	Very effective
Concrete Sawcutting Waste Management		Techniques for disposal of concrete cuttings from concrete sawing	Effective
Sandblasting Waste Management	Techniques for disposal of sandblasting waste and containment of wastes during operations	Effective	
Lime Stabilization Management	Concrete lime runoff from areas being stabilized with hydrated or quicklime	Effective	
Sanitary Facilities	Techniques for control of sanitary waste	Effective	

## City of Van Design Guidelines for Subdivision Improvements

### Chapter 7 - Storm Water Controls

#### I. General

The purpose of this Guideline is to assist the Engineer in the design of structural storm water controls - engineered facilities intended to treat storm water runoff and/or mitigate the effects of increased storm water runoff peak rate, volume, and velocity due to urbanization.

A structural storm water control, or set of structural controls, must meet the following objectives:

- **Water Quality:** Remove pollutants in storm water runoff to protect water quality;
- **Streambank Protection:** Regulate discharge from the site to minimize downstream bank and channel erosion; and
- **Flood Control:** Control conveyance of runoff within and from the site to minimize flood risk to people and properties.

The requirements of this chapter shall be in accordance with Chapter 10, Article VII, Division F “Control of Post Construction Stormwater Runoff” in the City of Van Unified Development Code.

#### II. Storm Water Control Categories

Chapter 10, Article VII, Division F “Control of Post Construction Stormwater Runoff” in the City of Van Unified Development Code provides a list of storm water control practices, which are generally divided in to two categories:

- A. Primary Controls: Primary structural storm water controls have the ability to fully address one or more of the objectives stated above if designed appropriately. Structural controls are recommended for use with a wide variety of land uses and development types. These structural controls have a demonstrated ability to effectively treat the Water Quality Volume (WQ<sub>v</sub>) and have been shown to be able to remove 70% to 80% of the annual average total suspended solids (TSS) load in typical post-development urban runoff when designed, constructed, and maintained in accordance with recommended specifications. Several of these structural controls can also be designed to provide primary control for downstream streambank protection (SP<sub>v</sub>) and flood control (Q<sub>f</sub>). These structural controls are recommended storm water management facilities for a site wherever feasible and practical.
- B. Secondary Controls: A number of structural controls are recommended only for limited use or for special site or design conditions. Generally, these practices either: 1) do not have the ability on their own to fully address one or more of the stated objectives, 2) are intended to address hotspot or specific land use

constraints or conditions, and/or 3) may have high or special maintenance requirements that may preclude their use. These types of structural controls are typically used for water quality treatment only. Some of these controls can be used as a pretreatment measure or in series with other structural controls to meet pollutant removal goals. Such structural controls should be considered mostly for commercial, industrial, or institutional developments.

- C. Using Other or New Structural Storm Water Controls: Innovative technologies are encouraged provided there is sufficient documentation as to their effectiveness and reliability. Engineers and designers may propose controls not included in this Guideline at their discretion, but should not do so without submitting independently derived information concerning performance, maintenance, application requirements, and limitations.

### III. Suitability of Storm Water Controls

- A. Water Quality: Pollutant removal capabilities for a given structural storm water control practice are based on a number of factors including the physical, chemical, and/or biological processes that take place in the structural control and the design and sizing of the facility. In addition, pollutant removal efficiencies for the same structural control type and facility design can vary widely depending on the tributary land use and area, incoming pollutant concentration, flow rate, volume, pollutant loads, rainfall pattern, time of year, maintenance frequency, and numerous other factors.

Where the pollutant removal capabilities of an individual structural storm water control are not deemed sufficient for a given site application, additional controls may be used in series in a “treatment train” approach.

- B. Streambank Protection: These controls have the ability to detain the volume and regulate the discharge of the 1-year, 24-hour storm event to protect natural waterways downstream of the development. Controls that provide streambank protection include detention, energy dissipation, storm water ponds, storm water wetlands, and pipe systems.
- C. Flood Control:
1. On-Site: These controls have the ability to safely convey storm water through a development to minimize the flood risk to persons and property on-site. On-site flood control structures include channels, culverts, detentions, enhanced swales, open conveyance channels, storm water ponds, conveyance components (inlets and pipe systems), and storm water wetlands.
  2. Downstream: These controls have the ability to detain the volume and regulate the discharge from the controlling storm event, as determined by

downstream assessment and to minimize flood risk to persons and property downstream of the development. Downstream flood controls include open channels, pipe systems, detention, storm water ponds, and storm water wetlands.

#### IV. Storm Water Control Selection

- A. Site Design Feasibility: Stormwater management practices for a site shall be chosen based on the physical conditions of the site. Among the factors that should be considered:
1. Topography
  2. Maximum Drainage Area
  3. Depth to Water Table
  4. Soils
  5. Slopes
  6. Terrain
  7. Head
  8. Location in relation to environmentally sensitive features or ultra-urban areas
- B. Conveyance Issues: All stormwater management practices shall be designed to convey stormwater to allow for the maximum removal of pollutants and reduction in flow velocities. This shall include, but not be limited to:
1. Maximizing of flowpaths from inflow points to outflow points.
  2. Protection of inlet and outfall structures.
  3. Elimination of erosive flow velocities.
  4. Providing of underdrain systems, where applicable.
- C. Pretreatment Requirements: If used, the stormwater treatment practice shall have an acceptable form of water quality pretreatment. Certain stormwater treatment practices are prohibited even with pretreatment in the following circumstances:
1. Stormwater is generated from highly contaminated source areas known as “hotspots”.
  2. Stormwater is carried in a conveyance system that also carries contaminated, non- stormwater discharges.
  3. Stormwater is being managed in a designated groundwater recharge area.
  4. Certain geologic conditions exist (e.g., karst) that prohibit the proper pretreatment of stormwater.
- D. Treatment/Geometry Conditions: All stormwater management practices shall be designed to capture and treat stormwater runoff.
- E. Location and Permitting Considerations: The checklist included as Table A-1 in Appendix A provides a condensed summary of current restrictions as they relate to common site features that may be regulated under local, state, or federal law. These restrictions fall into one of three general categories:

1. Locating a structural control within an area when expressly prohibited by law.
2. Locating a structural control within an area that is strongly discouraged, and is only allowed on a case by case basis. Local, state, and/or federal permits shall be obtained, and the applicant will need to supply additional documentation to justify locating the storm water control within the regulated area.
3. Structural storm water controls must be setback a fixed distance from a site feature.

The checklist is only intended as a general guide to location and permitting requirements as they relate to siting of storm water structural controls. Consultation with the appropriate regulatory agency is the best strategy.

APPENDIX A

**Table A-1**  
**Location and Permitting Checklist**

<b><u>Site Feature</u></b>	<b><u>Location and Permitting Guidance</u></b>
<p><b>Jurisdictional Wetland (Waters of the US)</b></p> <p>U.S. Army Corps of Engineers Regulatory Permit</p>	<ul style="list-style-type: none"> <li>• Jurisdictional wetlands should be delineated prior to siting structural control.</li> <li>• Use of natural wetlands for storm water quality treatment is contrary to the goals of the Clean Water Act and should be avoided.</li> <li>• Storm water should be treated prior to discharge into a natural wetland.</li> <li>• Structural controls may also be restricted in local buffer zones. Buffer zones may be utilized as a non-structural filter strip (i.e., accept sheet flow).</li> <li>• Should justify that no practical upland treatment alternatives exist.</li> <li>• Where practical, excess storm water flows should be conveyed away from jurisdictional wetlands.</li> </ul>
<p><b>Stream Channel (Waters of the US)</b></p> <p>U.S Army Corps of Engineers Section 404 Permit</p>	<ul style="list-style-type: none"> <li>• All Waters of the U.S (streams, ponds, lakes, etc.) should be delineated prior to design.</li> <li>• Use of any Waters of the U.S. for storm water quality treatment is contrary to the goals of the Clean Water Act and should be avoided.</li> <li>• Storm water should be treated prior to discharge into Waters of the U.S.</li> <li>• In-stream ponds for storm water quality treatment are highly discouraged.</li> <li>• Must justify that no practical upland treatment alternatives exist.</li> <li>• Temporary runoff storage preferred over permanent pools.</li> <li>• Implement measures that reduce downstream warming.</li> </ul>
<p><b>Stream Channel (Waters of the State)</b></p> <p>Texas Parks and Wildlife Mussel Survey and Aquatic Resource Relocation Plan</p>	<ul style="list-style-type: none"> <li>• All Waters of the State (streams, ponds, lakes, etc.) should be delineated prior to design.</li> <li>• Review by TPWD is required for all construction or maintenance activities that take place in or near Public Waters.</li> <li>• Includes but is not limited to: pipelines, boring, trenching, road or bridge construction, dam work, boat ramp work, dewatering, coffer dams, stream bank restoration, etc.</li> </ul>
<p><b>Groundwater Management Areas</b></p> <p>Texas Commission on Environmental Quality</p>	<ul style="list-style-type: none"> <li>• Conserve, preserve, protect, recharge, and prevent waste of groundwater resources through Groundwater Conservation Districts.</li> <li>• Detailed mapping available from Texas Alliance of Groundwater Districts.</li> </ul>

**Table A-1**  
**Location and Permitting Checklist**

<b>Site Feature</b>	<b>Location and Permitting Guidance</b>
<p><b>Surface Water Quality Standards</b></p> <p>Texas Commission on Environmental Quality</p>	<ul style="list-style-type: none"> <li>• Specific stream and reservoir buffer requirements.</li> <li>• May be imperviousness limitations.</li> <li>• May be specific structural control requirements.</li> <li>• TCEQ provides water quality certification - in conjunction with 404 permit.</li> <li>• Mitigation will be required for impacts to existing aquatic and terrestrial habitat.</li> </ul>
<p><b>100 Year Floodplain</b></p> <p>Local Storm Water Review Authority</p>	<ul style="list-style-type: none"> <li>• Grading and fill for structural control construction is generally discouraged within the 100 year floodplain, as delineated by FEMA flood insurance rate maps, FEMA flood boundary and floodway maps, or more stringent local floodplain maps.</li> <li>• Floodplain fill cannot raise the floodplain water surface elevation by more than limits set by the appropriate jurisdiction.</li> </ul>
<p><b>Stream Buffer</b></p> <p>Check with appropriate review authority whether stream buffers are required</p>	<ul style="list-style-type: none"> <li>• Consult local authority for storm water policy.</li> <li>• Structural controls are discouraged in the streamside zone (within 25 feet or more of streambank, depending on the specific regulations).</li> </ul>
<p><b>Utilities</b></p> <p>Local Review Authority</p>	<ul style="list-style-type: none"> <li>• Call appropriate agency to locate existing utilities prior to design.</li> <li>• Note the location of proposed utilities to serve development.</li> <li>• Structural controls are discouraged within utility easements or rights of way for public or private utilities.</li> </ul>
<p><b>Roads</b></p> <p>TxDOT</p>	<ul style="list-style-type: none"> <li>• Consult TxDOT for any setback requirement from local roads.</li> <li>• Consult DOT for setbacks from State maintained roads.</li> <li>• Approval must also be obtained for any storm water discharges to a local or state-owned conveyance channel.</li> </ul>
<p><b>Structures</b></p> <p>Local Review Authority</p>	<ul style="list-style-type: none"> <li>• Consult local review authority for structural control setbacks from structures.</li> <li>• Recommended setbacks for each structural control group are provided in the performance criteria in this manual.</li> </ul>
<p><b>Septic Drain Fields</b></p> <p>Local Health Authority</p>	<ul style="list-style-type: none"> <li>• Consult local health authority.</li> <li>• Recommended setback is a minimum of 50 feet from drain field edge or spray area.</li> </ul>
<p><b>Water Wells</b></p> <p>Local Health Authority</p>	<ul style="list-style-type: none"> <li>• 100-foot setback for storm water infiltration.</li> <li>• 50-foot setback for all other structural controls.</li> </ul>

# **PROPOSED SUBDIVISION ORDINANCE**

**1-18-2024**

**DRAFT**

## CHAPTER 30 SUBDIVISION REGULATIONS

### Article 1 Generally

#### 30.001 **Authority; extension to extraterritorial jurisdiction.**

- (a) Authority. The following rules and regulations (sometimes referred to herein as “subdivision regulations”), adopted and codified as Chapter 30 of the Van Code, are adopted under the authority of the constitution and laws of the State of Texas, including chapter 212, Texas Local Government Code, being adopted after a public hearing on the matter and in a duly noticed meeting open to the public as required by law.
- (b) Application in the ETJ. The city council hereby extends the application of these subdivision regulations to the extraterritorial jurisdiction (“ETJ”) of the city, as that area may exist from time to time. These subdivision regulations shall be applicable to the filing of plats and the subdivision of land, as those terms or activities are defined herein and in chapter 212 of the Texas Local Government Code, within the corporate limits of the city and its extraterritorial jurisdiction as they may be from time to time adjusted by annexation, disannexation, or otherwise. The city shall have all remedies and rights provided by said chapter 212 with regard to the control and approval of subdivisions, plats, and other development both within the city and within its extraterritorial jurisdiction.
- (c) Interlocal agreement with Van Zandt County. The city has executed an interlocal cooperation agreement with Van Zandt County as authorized under chapter 242 of the Texas Local Government Code. Van Zandt County has assigned the city its respective authority to approve subdivision plats in the city’s ETJ. The agreement generally provides for the city to enforce its subdivision regulations, within the applicable areas of the ETJ. These subdivision regulations will therefore be enforced to the fullest extent possible in the ETJ as agreed upon with Van Zandt County.

#### 30.002 **Interpretation and purpose.**

- (a) Minimum requirements. In the interpretation and application of the provisions of these subdivision regulations, it is the intention of the city that the principles, standards and requirements provided for herein shall be minimum requirements for the platting and developing of subdivisions within the city and its ETJ.
- (b) Purpose.
  - (1) The subdivision and platting of land is one of the first steps in the process of development. The distribution and relationship of residential, nonresidential and agricultural uses throughout the community, along with the system of improvements for streets, utilities, public facilities and community amenities, determine, in large measure, the quality of life enjoyed by the residents of the city.
  - (2) Health, safety, economy, amenities, environmental sensitivity, and convenience are all factors which influence and determine a community’s quality of life and overall character. A community’s quality of life is of the public interest. Consequently, the subdivision of land, as it affects a community’s quality of life, is an activity where regulation is a valid function of municipal government.
  - (3) The regulations contained herein are intended to encourage the development of a quality municipal

environment by establishing standards for the provision of adequate light, air, open space, storm water drainage, transportation, public utilities and facilities, and other needs necessary for ensuring the creation and continuance of a healthy, attractive, safe and efficient community that provides for the conservation, enhancement and protection of its human and natural resources.

- (4) Through the application of these regulations and procedures, the interests of the public, as well as those of public and private parties, both present and future, having interest in property affected by these subdivision regulations, are protected by the granting of certain rights and privileges. By establishing a fair and rational procedure for developing land, these subdivision regulations provide for stability in the regulatory system governing development of land for its most beneficial and safest use in accordance with existing social, economic and environmental conditions and in furtherance of the public health, safety and welfare.
- (c) **Minimum standards.** Minimum standards for development are contained in the city design standards, the building regulations in chapter 4 of this code, and the other development regulations in this chapter. In addition, the comprehensive plan (including the future land use plan, thoroughfare plan, parks master plan, and other related plans, and amendments) contains policies designed to achieve an optimum quality of development in the city and its extraterritorial jurisdiction. If only the minimum standards are followed, as expressed by the various ordinances regulating land development, a standardization of development will occur. This will produce a monotonous municipal setting and physical environment within the community. Subdivision design shall be of a quality that will carry out the purpose and spirit of the policies expressed within the comprehensive plan and within this article, and shall be encouraged to exceed the minimum standards required herein.

### 30.003 Compliance with regulations.

- (a) Recordation of subdivision plat.
  - (1) No subdivision plat shall be recorded until a final plat, accurately describing the property, has been approved by the city council in accordance with these subdivision regulations and:
    - (A) All improvements required by these subdivision regulations have been constructed and accepted by the city; or
    - (B) Adequate security for completion of improvements has been provided in accordance with division 6 of this article.
  - (2) Except as otherwise specifically authorized in these subdivision regulations, no building permit or floodplain development permit shall be issued by the city for any parcel of land until a final plat—or development plat, as applicable—of the land has been recorded.
  - (3) Compliance with the comprehensive plan and all city ordinances pertaining to the subdivision of land shall be required prior to approval of any development application governed by this article. It is the developer's responsibility to be familiar with, and to comply with, city ordinances and the comprehensive plan. Applicable ordinances and other requirements include, but are not limited to, the following:
    - (A) The comprehensive plan, which includes the future land use plan, thoroughfare plan, park master plan, and all other associated maps and plans;
    - (B) The building regulations in chapter 6 of this code;
    - (C) The development regulations in chapter 36 of this code;

- (D) All applicable design standards; and
- (E) Other applicable sections in this code and any other applicable ordinances.

#### 30.004 Adequate public facilities policy.

- (a) Adequate service for areas proposed for development, generally.
  - (1) Land proposed for development in the city and in the city's extraterritorial jurisdiction must be served adequately by essential public facilities and services, including water facilities, wastewater facilities, streets and pedestrian facilities, drainage facilities and park facilities consistent with the requirements of these subdivision regulations. Where the development of land requires the submission and approval of a preliminary plat, final plat, or development plat under these subdivision regulations, such land shall not be approved for recording unless and until adequate public facilities necessary to serve the development exist or provision has been made for the facilities, whether the facilities are to be located within the property being developed or off-site.
  - (2) New development must be supported by adequate levels of public facilities and services.
  - (3) It is necessary and desirable to provide for dedication of rights-of-way and easements for capital improvements to support new development at the earliest stage of the development process.
  - (4) Requirements for dedication and construction of public infrastructure improvements to serve a proposed new development should be attached as conditions of approval of any development application that contains a specific layout of the development.
  - (5) There is an essential nexus between the demand on public facilities systems created by a new development and the requirement to dedicate rights-of-way and easements and to construct capital improvements to offset such impacts.
  - (6) The city desires to assure both that development impacts are mitigated through contributions of rights-of-way, easements and construction of capital improvements, and that a development project contribute not more than its proportionate share of such costs.
- (b) Conformance to plans. Proposed capital improvements serving new development shall conform to and be properly related to the public-facilities elements of the city's adopted comprehensive plan, other adopted master plans for public facilities and services, and applicable capital improvements plans, and shall meet the service levels specified in such plans.
- (c) Adequacy of facilities, generally.
  - (1) Water. All lots, tracts or parcels shown on a preliminary or final plat and on which development is proposed shall be connected to a public water system which has capacity to provide water for domestic use and emergency purposes, including adequate fire protection. The city may require the phasing of development and/or improvements in order to maintain adequate water system capacity.
  - (2) Wastewater. All lots, tracts or parcels shown on a preliminary or final plat and on which development is proposed shall be served by an approved means of wastewater collection and treatment. The city may require the phasing of development and/or improvements in order to maintain adequate wastewater system capacity.

- (3) Streets. Proposed streets serving new development shall provide a safe, convenient and functional system for vehicular, bicycle and pedestrian circulation and shall be properly related to the applicable master thoroughfare plan and any amendments thereto, and shall be appropriate for the particular traffic characteristics of each proposed subdivision or development. New developments shall be supported by a thoroughfare network having adequate capacity, and safe and efficient traffic circulation. Each development shall have adequate access to the thoroughfare network.
- (4) Drainage. Drainage improvements serving new developments shall accommodate potential runoff from the entire upstream drainage area and shall be designed to prevent overloading the capacity of the downstream drainage system. The city may require the phasing of development, the use of control methods such as retention or detention, or the construction of off-site drainage improvements in order to mitigate the impacts of the proposed development. All drainage shall further comply with the city's floodplain damage prevention ordinance (article 4.12 of this code) and related regulations.
- (d) City options. In order to maintain prescribed levels of public facilities and services for the health, safety and general welfare of its citizens, and in accordance with these subdivision regulations, the city may require the dedication of easements and rights-of-way for or construction of on-site or off-site public infrastructure improvements for water, wastewater, street, drainage or park facilities to serve a proposed development, or require the payment of fees in lieu thereof. If adequate levels of public facilities and services cannot be provided concurrently with the schedule of development proposed, the city may deny the development until the public facilities and services can be provided, or require that the development be phased so that the delivery of facilities and services coincides with the demands for the facilities created by the development. The city may impose any conditions relating to the provision of public improvements specified by an ordinance or regulation establishing or amending the zoning for the property.
- (e) Property owner's obligation.
- (1) Dedication and construction of improvements. In accordance with these subdivision regulations, and other applicable ordinances and regulations, the property owner shall dedicate all rights-of-way and easements for, and shall construct, capital improvements within the rights-of-way or easements for those water, wastewater, street or drainage improvements needed to adequately serve a proposed development consistent with the applicable master facilities plans, whether the facilities are located on, adjacent to or outside the boundaries of the property being developed.
- (A) Adjacent road improvements. In the case of adjacent or abutting streets, the city may require that the entire right-of-way be dedicated and improved to city design standards, depending on factors such as the impact of the development on the street, the timing of development in relation to need for the street, and the likelihood that adjoining property will develop in a timely manner.
- (B) Substandard road improvements. Where an existing street that does not meet the city's right-of-way or design standards abuts a proposed development, the city may require the property owner to dedicate the right-of-way for a standard width, and to improve the street according to the dimensions and specifications in the applicable thoroughfare plan, depending on factors such as the impact of the development on streets and traffic, the timing of development in relation to the need for the thoroughfare, and the likelihood that adjoining property will develop in a timely manner.
- (2) Acquisition. Where acquisition of any real property for right-of-way or easement purposes (or other public purposes) is necessary to serve the development and the real property is not owned or controlled by the developer, the developer must make a reasonable effort to negotiate the acquisition or purchase of the property, right-of-way or easement on behalf of the city.

- (A) A reasonable effort must at a minimum include an offer to secure the property, right-of-way or easement where the offer amount is equal to or greater than the appraised value of the property, right-of-way or easement to be acquired as determined in a written appraisal performed by a Texas certified general real estate appraiser.
  - (B) If the owner of the property sought to be acquired does not accept a the [sic] developer's offer within 30 days, the developer may request in writing, on a form prepared by the city attorney, that the city council exercise available legal remedies to acquire the property. The city council may take any action it deems appropriate in accordance with federal and state law.
  - (C) The developer must pay for any necessary appraisal, all acquisition costs, and all legal fees necessary to acquire the property, and any eminent domain procedures shall be prosecuted by the city attorney or the city attorney's designee.
- (3) Facilities impact studies. The city may require that a property owner prepare a comprehensive traffic impact study, drainage study or other public facilities study in order to assist the city in determining whether a proposed development will be supported with levels of public facilities and services necessary to meet the demand and offset the impact created by the development. The study shall identify at a minimum the adequacy of existing facilities and the nature and extent of any deficiencies, and the capital improvements needed to meet the adopted level of service assuming development at the intensity proposed in the development application. The study shall be subject to approval by the city engineer. The city also may require, at the time of consideration of the approval of any subsequent permit that is part of the series of permits that is required for completion of a project, an update of a public facilities study approved.
- (f) Timing of dedication and construction.
    - (1) Initial provision for dedication or construction. The city shall require an initial demonstration that a proposed development shall be adequately served by public facilities and services at the time for approval of the first development application that portrays a specific plan of development, including but not limited to a petition for establishing a planned development zoning district, or other overlay zoning district; a petition for an annexation agreement or a subdivision development agreement; an application for a preliminary or final subdivision plat, or a preliminary or final development plat. As a condition of approval of the development application, the city may require provision for dedication of property, rights-of-way or easements for, and construction of, capital improvements to serve the proposed development in a manner consistent with federal and state law.
    - (2) Deferral of obligation. The obligation to dedicate rights-of-way for or to construct one or more capital improvements to serve a new development may be deferred until approval of a subsequent phase of the subdivision, at the sole discretion of the city manager, upon written request of the property owner, or at the city's own initiative. As a condition of deferring the obligation, the city may require that the developer enter into a subdivision improvement agreement, specifying the time for dedication of property, rights-of-way, easements or construction of capital improvements serving the development.

### 30.005 Jurisdiction.

- (a) Applicability. The provisions of these subdivision regulations shall apply to the following forms of land subdivision and development activity within the city limits and its extraterritorial jurisdiction:
  - (1) The division of land into two or more tracts, lots, sites or parcels;
  - (2) All subdivisions of land whether by metes and bounds division or by plat, which were outside the

jurisdiction of these subdivision regulations in Van Zandt County, Texas and which subsequently came within the jurisdiction of these subdivision regulations through annexation, or extension of the city's extraterritorial jurisdiction;

- (3) The combining of two or more contiguous tracts, lots, sites or parcels for the purpose of creating one or more legal lots in order to achieve a more developable site, except as otherwise provided herein;
  - (4) When a building permit or other permit is required for the following uses:
    - (A) Construction of a new single-family or two-family dwelling unit(s);
    - (B) Additions that increase the square footage of an existing single-family or two-family home by more than 20% of its gross floor area;
    - (C) Construction of a new nonresidential or multiple-family structure;
    - (D) Additions, that increase the square footage of an existing nonresidential or multiple-family building;
    - (E) Moving a residential dwelling unit or nonresidential structure onto a piece of property;
  - (5) Tracts where any public improvements are proposed;
  - (6) Whenever a property owner proposes to divide land lying within the city or its extraterritorial jurisdiction into two or more tracts, and claims exemption from subchapter A of chapter 212 of the Texas Local Government Code for purposes of development, that results in parcels or lots all greater than five acres in size (in the event that development of any such tract is intended, and where no public improvement is proposed to be dedicated, the property owner shall first obtain approval of a development plat that meets the requirements of Texas Local Government Code chapter 212, subchapter B, Regulation of Property Development, sections 212.041 through 212.050, as may be amended);
  - (7) Development that requires a development plat to be submitted; and
  - (8) Development that is governed by other city ordinances or regulations that reference and make applicable these subdivision regulations.
- (b) Exemptions. The provisions of these subdivision regulations shall not apply to the following:
- (1) Development of land legally platted and approved prior to the effective date of these subdivision regulations, except as otherwise provided for herein (construction of facilities and structures shall conform to design and construction standards in effect at the time of construction) and for which no re-subdivision is sought; or
  - (2) Existing cemeteries complying with all state and local laws and regulations; or
  - (3) Divisions of land created by order of a court of competent jurisdiction; or
  - (4) Divisions of land created solely by the erection of one or more fences on otherwise undivided land; or
  - (5) When a permit is requested for parcels, whether or not previously platted, for one or more of the following activities:
    - (A) Additions, that increase the square footage of an existing single-family or two-family home by less than 20% of its gross floor area; or

- (B) Construction of agricultural accessory buildings and residential accessory buildings smaller than 300 square feet, fences, and outdoor swimming pools; or
- (C) Remodel or repair of a building which involves no expansion of the building footprint; or
- (D) Moving a structure off a lot or parcel, or demolition of a structure; or
- (E) Construction of a temporary field or sales office not exceeding 600 square feet, and located within the same property or development as the site under construction; or
- (6) Divisions of land created by the acquisition of property by the State of Texas or the city.

### 30.006 **Pending applications.**

All applications for plat approval, including for final plats, that are pending on the effective date of these subdivision regulations and which have not lapsed or expired shall be reviewed under the regulations in effect immediately preceding the effective date of these subdivision regulations.

### 30.007 **Determination of vested rights.**

(a) Purpose, application and effect.

- (1) Purpose. The purpose of a vested rights petition is to determine whether one or more standards of these subdivision regulations should not be applied to a preliminary or final plat application by operation of state law, or whether certain plats are subject to expiration.
- (2) Applicability. A vested rights petition may be filed with an application for a preliminary or final plat application. A vested rights petition also may be filed to prevent or determine the date of the expiration of certain plats.
- (3) Effect. To the extent that a vested rights petition is granted, and as applicable, the plat application shall be decided in accordance with the standards specified in the order granting the petition based on prior subdivision requirements or development standards, or the approved plat otherwise subject to expiration shall be extended.

(b) Petition requirements.

- (1) Who may petition. A vested rights petition may be filed by a property owner or the owner's authorized agents, including the applicant, with a preliminary or final plat application, or by the holder of a plat subject to expiration.
- (2) Form of petition. The vested rights petition shall allege that the petitioner has a vested right for some or all of the land subject to the plat application under Texas Local Government Code, chapter 245 or successor statute, or pursuant to Texas Local Government Code, section 43.002 or successor statute, that requires the city to review and decide the application under standards in effect prior to the effective date of the currently applicable standards. The petition shall include the following information and documents:
  - (A) A narrative description of the grounds for the petition;
  - (B) A copy of each approved or pending development application which is the basis for the contention that the city may not apply current standards to the plat application which is the subject of the petition;
  - (C) The submission date of the plat application, or of a development plan pursuant to which the plat was

subsequently filed, if different from the completion filing date;

- (D) The date the project for which the application for the plat was submitted was commenced;
  - (E) Identification of all standards otherwise applicable to the plat application from which relief is sought;
  - (F) Identification of the standards which the petitioner contends apply to the plat application;
  - (G) Identification of any current standards which petitioner agrees can be applied to the plat application at issue;
  - (H) A copy of any prior vested rights determination by the city involving the same land; and
  - (I) Where the petitioner alleges that a plat subject to expiration should not be terminated, a description of the events, including any plat or other development applications on file that should prevent such termination.
- (3) Time for filing petition. A vested rights petition shall be filed with a plat application for which a vested right is claimed, except that the petition may be filed at any time before the date of expiration of a plat subject to expiration to prevent expiration or determine the date of expiration.
- (c) Processing of petition and decision.
- (1) Delivery of petition. The petitioner shall file the petition with the planning director, who shall assess same for compliance with subsection **(b)** of this section. A copy of the petition shall be forwarded to the city attorney following acceptance.
  - (2) Decision by city council. The city council shall decide the vested rights petition. The request must be accompanied by a waiver of the time for decision on the plat application imposed under these subdivision regulations pending decision by the council, which shall stay further proceedings on the application. The council shall decide the petition, after considering the planning director's report, within 30 calendar days of receipt of the notice of appeal.
- (d) Action on petition and order.
- (1) Action on the petition. The city council may take any of the following actions on the vested rights petition:
    - (A) Deny the relief requested in the petition, and direct that the plat application shall be reviewed and decided under currently applicable standards;
    - (B) Grant the relief requested in the petition, and direct that the plat application shall be reviewed and decided in accordance with the standards contained in identified prior subdivision regulations;
    - (C) Grant the relief requested in part, and direct that certain identified current standards shall be applied to the plat application, while standards contained in identified prior subdivision regulations also shall be applied; or
    - (D) For petitions filed to prevent or determine the date of the expiration of an approved plat, determine whether the approved plat should be terminated, or specify the expiration date or the conditions of expiration for such plat.

- (2) Order on the petition. Each decision on the vested rights petition shall be memorialized in an order
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issued by the city council identifying the following:

- (A) The nature of the relief granted, if any;
- (B) The approved or filed plat application(s) or other development application(s) upon which relief is premised under the petition;
- (C) Current standards which shall apply to the plat application for which relief is sought;
- (D) Prior standards which shall apply to the plat application for which relief is sought, including any procedural standards;
- (E) The statutory exception or other grounds upon which relief is denied in whole or in part on the petition;
- (F) For petitions filed to prevent or determine the date of the expiration of an approved plat, determine whether the approved plat should be terminated, and specify the expiration date or the conditions of expiration for the plat.
- (e) Criteria for approval. The city council shall decide the vested rights petition based upon the following factors:
  - (1) The nature and extent of prior plat or other development applications filed or approved for the land subject to the petition;
  - (2) Whether any prior vested rights determinations have been made with respect to the property subject to the petition;
  - (3) Whether any prior approved applications for the property have expired or have been terminated in accordance with law;
  - (4) Whether any statutory exception applies to the standards in the current subdivision regulations from which the applicant seeks relief;
  - (5) Whether any prior approved plat or other development applications relied upon by the petitioner have expired;
  - (6) For petitions filed to prevent or determine the date of the expiration of an approved plat, whether any of the events preventing expiration have occurred.
  - (f) Application following relief order. Following the city council's final decision on the vested rights petition, the property owner shall conform the plat application for which relief is sought to such decision. If the plat application on file is consistent with the relief granted on the vested rights petition, no revisions are necessary. Where proceedings have been stayed on the plat application pending a decision by the city council on the vested rights petition, proceedings on the application shall resume after the council's decision on the vested rights petition.
  - (g) Expiration. Relief granted on a vested rights petition shall expire on occurrence of one of the following events:
    - (1) The petitioner or property owner fails to submit a required revised plat application consistent with the relief granted within 30 days of the final decision on the petition;
    - (2) The plat application for which relief was granted on the vested rights petition is denied under the criteria

made applicable through the relief granted on the petition; or

- (3) The plat application for which relief was granted on the vested rights petition expires.

**30.008 Interpretation; conflict; severability.**

- (a) Interpretation. In their interpretation and application, these subdivision regulations shall be held to be the minimum requirements for the promotion of the public health, safety and general welfare and shall be construed broadly to promote the purposes for which they are adopted.
- (b) Conflict with other laws. To the extent that these subdivision regulations promulgate standards or impose restrictions or duties that differ from those imposed by other city ordinances, rules or regulations, the regulations that are most stringent or restrictive shall prevail.
- (c) Severability. If any part or provision of these subdivision regulations, or the application of these subdivision regulations to any person or circumstance, is adjudged invalid by any court of competent jurisdiction, the judgment shall be confined in its operation to the part, provision, or application directly involved in the controversy in which the judgment shall be rendered, and it shall not affect or impair the validity of the remainder of these regulations or the application of them to other persons or circumstances. The city council hereby declares that it would have enacted the remainder of these regulations even without any such part, provision, or application which is judged to be invalid.

**30.009 Saving provision.**

These subdivision regulations shall not be construed as abating any action now pending under, or by virtue of, prior existing subdivision regulations, or as discontinuing, abating, modifying or altering any penalty accruing or about to accrue, or as affecting the liability of any person, firm or corporation, or as waiving any right of the city under any section or provision existing at the time of adoption of these subdivision regulations, or as vacating or annulling any rights obtained by any person, firm or corporation, by lawful action of the city except as shall be expressly provided in these subdivision regulations.

**30.010 Waivers/suspensions.**

- (a) Generally.
- (1) Where the city council finds that undue hardships will result from strict compliance with a certain provision(s) of these subdivision regulations, or where the purposes of these regulations may be served to a greater extent by an alternative proposal, the city council may approve a waiver/suspension from any portion of these regulations so that substantial justice may be done and the public interest is secured, provided that the waiver/suspension shall not have the effect of nullifying the intent and purpose of these regulations, and further provided that the city council shall not approve a waiver/suspension unless it shall make findings based upon the evidence presented to it in each specific case that:
- (A) Granting the waiver/suspension will not be detrimental to the public safety, health or welfare, and will not be injurious to other property or to the owners of other property, and the waiver/suspension will not prevent the orderly subdivision of other property in the vicinity;
- (B) The conditions upon which the request for a waiver/suspension is based are unique to the property for which the waiver/suspension is sought, and are not applicable generally to other property;
- (C) Because of the particular physical surroundings, shape and/or topographical conditions of the specific property involved, a particular undue hardship to the property owner would result, as distinguished from a mere inconvenience or increased expense, if the strict letter of these regulations is carried out;

- (D) The waiver/suspension will not in any manner vary the provisions of the zoning ordinance, comprehensive plan (as amended), or any other adopted plan(s) or ordinance(s) of the city; and
  - (E) An alternate design will generally achieve the same result or intent as the standards and regulations prescribed herein.
- (2) Such findings of the city council, together with the specific facts upon which such findings are based, shall be incorporated into the official record of the city council meeting at which a waiver/suspension is considered.
- (b) Procedures.
    - (1) A petition for a waiver/suspension shall be submitted in writing to the city manager or the city manager's designee by the property owner before the plat is officially filed and submitted for the consideration by the planning and zoning commission. The petition shall state fully the grounds for the application, and all of the facts relied upon by the petitioner.
    - (2) All waivers/suspensions shall be considered by the planning and zoning commission. The planning and zoning commission shall recommend that the city council either approve or deny the waiver/suspension.
    - (3) All waivers/suspensions shall have final approval or disapproval by the city council.
  - (c) Criteria for waivers/suspensions from development dedications. Where the city council finds that the imposition of any development dedication pursuant to these regulations exceeds reasonable benefit to the property owner, or is so excessive as to constitute confiscation of the tract to be platted, it may approve a full or partial, at its discretion, waiver/suspension to such requirements, so as to prevent such excess. In order to qualify for such a waiver/suspension, the property owner shall demonstrate that the costs of the dedication imposed pursuant to these subdivision regulations substantially exceeds the proportionality standards as outlined in section **30.011** of these subdivision regulations.
  - (d) Criteria for waivers/suspensions for street dedications. Where the city council finds that the imposition of any dedication or construction requirement for streets pursuant to these regulations exceeds reasonable benefit to the property to be platted, it may approve waivers/suspensions for such requirements so as to prevent such excess. In order to qualify for such a waiver/suspension, the property owner shall demonstrate that the costs of right-of-way dedication and construction of streets other than streets classified as local streets imposed pursuant to these regulations substantially exceeds the proportionality standards as outlined in section **30.011** of these subdivision regulations.
  - (e) Conditions on approved waiver/suspension. In approving a waiver/suspension, the city council may require such conditions as will, in its judgment, secure substantially the purposes described in section **30.002** of these subdivision regulations.

### **30.011 Proportionality appeal.**

- (a) Definitions. For the purposes of this section, the following terms, phrases, words, and their derivatives shall have the meanings given herein. Definitions not expressly prescribed herein are to be determined in accordance with customary usage in municipal planning and engineering practices. Words used in the present tense include the future, words in the plural number include the singular number, and words in the singular number include the plural. The words "shall" and "must" are deemed as mandatory. The word "may" is deemed as permissive.

### **Public facilities system**

means the collection of water, wastewater, street, drainage or park facilities owned or operated by or on

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behalf of the city for the purpose of providing services to the public, including existing and new developments.

### **Public infrastructure improvement**

means a water, wastewater, street, drainage or park facility that is a part of one or more of the city's public facilities systems.

- (b) Purpose, applicability and effect.
- (1) Purpose. The purpose of a proportionality appeal is to assure that a requirement to dedicate, construct or pay a fee for a public infrastructure improvement imposed on a proposed plat as a condition of approval does not result in a disproportionate cost burden on the property owner, taking into consideration the nature and extent of the demands created by the proposed development on the city's public facilities systems.
- (2) Applicability. An appeal under this section may be filed by a property owner to contest any requirement to dedicate land, to construct improvements or to pay development fees (other than impact fees adopted under Texas Local Government Code chapter 395), for a public infrastructure improvement, which requirement is imposed under the city's subdivision regulations to a plat application pursuant to these subdivision regulations, whether the requirement is applicable under uniform standards, or is imposed pursuant to an individual evaluation of the proposed subdivision.
- (c) Proportionality determination by city engineer. Prior to a decision by the planning and zoning commission on a preliminary plat application, or if no preliminary plat application is required, on a final plat application, the city engineer (who for the purposes of this subsection (c) must be a licensed professional engineer) shall affirm that public infrastructure improvements being imposed as a condition of plat approval is roughly proportionate to the demand created by the development on the city's public facilities systems, taking into consideration the nature and extent of the development proposed.
- (1) In making his proportionality determination, the city engineer may rely upon categorical findings pertaining to on-site improvements; the proposed or potential use of the land; the timing and sequence of development in relation to availability of adequate levels of public facilities; impact fee studies or other studies that measure the demand for services created by the development and the impact on the city's public facilities systems; the function of the public infrastructure improvements in serving the proposed development; the degree to which public infrastructure improvements to serve the subdivision are supplied by other developments; the anticipated participation by the city in the costs of such improvements; any reimbursements for the costs of public infrastructure improvements for which the proposed development is eligible; or any other information relating to the mitigating effects of the public infrastructure improvements on the impacts created by the development on the city's public facilities systems.
- (2) Based upon his proportionality determination, the city engineer shall affirm that the public infrastructure improvement requirements of the subdivision regulations do not impose costs on the developer for such improvements that exceed those roughly proportionate to those incurred by the city in providing public facilities to serve the development.
- (3) The city engineer may promulgate any application requirements that may assist in making the proportionality determination required by this subsection (c).
- (d) Commission and city council determination. The planning and zoning commission and city council shall take into account the city engineer's report concerning the proportionality of public infrastructure

improvement requirements to be applied to a proposed preliminary or final plat application, as the case may be, in making its decision on the plat application, and shall identify any variation to the requirements that are to be included as conditions to plat approval.

(e) Appeals.

- (1) Who may appeal. An appeal to the city council under this subsection **(e)** may be filed by a property owner or the applicant for a preliminary or final plat, in which a requirement to dedicate land for, construct or pay a fee, other than an impact fee, for a public infrastructure improvement has been applied or attached as a condition of approval, or as grounds for denying the plat application.
- (2) Time for filing and request for extension of time. The appeal shall be filed in writing within 10 days of the date the planning and zoning commission takes action to recommend applying the public infrastructure improvement requirement to the plat application. The appeal shall be filed with the city manager or the manager's designee and shall be forwarded to the city council for consideration in conjunction with its deliberations on the plat application. The applicant may request postponement of consideration of the plat application by the city council pending preparation of the study required by subsection **(4)** below, in which case the applicant must officially withdraw the plat application from consideration.
- (3) Form of appeal. An appeal under this subsection **(e)** shall allege that application of the standard or the imposition of conditions relating to the dedication, construction or fee requirement (other than impact fees adopted under Texas Local Government Code chapter 395) is not roughly proportional to the nature and extent of the impacts created by the proposed development on the city's public facilities systems, or does not reasonably benefit the proposed development.
- (4) Study required. The appellant shall provide a study in support of the appeal that includes the following information within 30 days of the date of appeal, unless a longer time is requested:
  - (A) Total capacity of the city's water, wastewater, street, drainage or park system to be utilized by the proposed development, employing standard measures of capacity and equivalency tables relating the type of development proposed to the quantity of system capacity to be consumed by the development. If the proposed development is to be developed in phases, such information also shall be provided for the entire development proposed, including any phases already developed.
  - (B) Total capacity to be supplied to the city's water, wastewater, street, drainage or park facilities system by the dedication of an interest in land, construction of improvements or fee contribution. If the plat application is proposed as a phased development, the information shall include any capacity supplied by prior dedication, construction or fee payments.
  - (C) Comparison of the capacity of the city's public facilities system(s) to be consumed by the proposed development with the capacity to be supplied to such system(s) by the proposed dedication of an interest in land, construction of improvements, or fee payment. In making this comparison, the impacts on the city's public facilities system(s) from the entire development shall be considered.
  - (D) The amount of any city participation in the costs of oversizing the public infrastructure improvement to be constructed in accordance with the city's requirements.
  - (E) Any other information that shows the alleged disproportionality between the impacts created by the proposed development and the dedication, construction or fee requirement imposed by the city.
- (f) Land in extraterritorial jurisdiction. Where the subdivision or the public infrastructure improvements are

located in the extraterritorial jurisdiction of the city and are to be dedicated to a county under an interlocal agreement under Texas Local Government Code chapter 242, an appeal or study in support of the appeal shall not be accepted as complete for filing by the city manager unless the appeal or study is accompanied by verification that a copy has been delivered to Van Zandt County.

- (g) Decision. The city council shall decide the appeal in conjunction with its decision on the plat application. The council shall base its decision on the criteria listed in subsection **(h)** of this section, and may take one of the following actions:
- (1) Deny the appeal, and impose the standard or condition on the plat application in accordance with the city engineer's recommendation or the planning and zoning commission's recommendation on the plat; or
  - (2) Deny the appeal, upon finding that the proposed dedication, construction or fee requirements are inadequate to offset the impacts of the subdivision on the public facilities system for water, wastewater, street, drainage or park improvements, and either deny the plat application or require that additional public infrastructure improvements be made as a condition of approval of the application; or
  - (3) Grant the appeal, and waive in whole or in part any dedication, construction or fee requirement for public infrastructure improvements to the extent necessary to achieve proportionality; or
  - (4) Grant the appeal, and direct that the city participate in the costs of acquiring land for or constructing the public infrastructure improvement under standard participation policies.
- (h) Criteria for approval. In deciding an appeal under this section, the city council shall determine whether the application of the standard or condition requiring dedication of an interest in land for, construction of, or payment of a fee for public infrastructure improvements is roughly proportional to the nature and extent of the impacts created by the proposed subdivision on the city's public facilities systems for water, wastewater, street, drainage or park facilities, and reasonably benefits the development. In making such determination, the council shall consider the evidence submitted by the appellant, the city engineer's report and recommendation, considering in particular the factors identified in subsection **(c)** of this section, and, where the property is located within the city's extraterritorial jurisdiction, any recommendations from the county.
- (i) Action following decision. If the relief requested under the proportionality appeal is granted in whole or in part by the city council, the dedication, construction or fee requirement initially recommended by the planning and zoning commission as a condition of plat approval shall be modified accordingly, and the standards applied or the conditions attached to commission's recommendation on the plat application shall be conformed to the relief granted. Thereafter, the appellant shall re-submit the plat application to the city council within 90 days of the date relief under the appeal is granted, in whole or in part, showing conformity with the city council's decision on the appeal.
- (j) Expiration of relief. If an applicant for plat approval prevails on a proportionality appeal, but fails to conform the plat to the relief granted by the city council with the 90-day period provided, the relief granted by the city council on the appeal shall expire and:
- (1) The council may extend the time for filing the revised plat application for good cause shown, but in any event, the expiration date for the relief granted shall not be extended beyond one year from the date relief was granted on the appeal.
  - (2) If the plat application is modified to increase the number of residential units or the intensity of nonresidential uses, the responsible official may require a new study to validate the relief granted by the

city council.

- (3) If the plat application for which relief was granted is denied on other grounds, a new petition for relief shall be required on any subsequent application.

**30.012 Payment of all indebtedness attributable to a specific property.**

No person who owes delinquent taxes, delinquent paving assessments, delinquent fees, or any other delinquent debts or obligations to the city, and which are directly attributable to a piece of property, shall be allowed to receive approval for any plat or replat until the taxes, assessments, debts or obligations directly attributable to said property and owed by the property owner or a previous owner thereof shall have been first fully discharged by payment, or until an arrangement satisfactory to the city manager has been made for the payment of such debts or obligations. It shall be the applicant's responsibility to provide evidence or proof that all taxes, assessments, debts or obligations have been paid at the time of submission for any application for approval under these subdivision regulations. A tax certificate shall also be provided as required by section 12.002 of the Texas Property Code.

**30.013 Right to deny hearing and plat.**

The city may deny a hearing and any application pursuant to these subdivision regulations if the applicant does not submit all information and fees required by these subdivision regulations.

**30.014 Misrepresentation of facts.**

It shall be a violation of these subdivision regulations for any person to knowingly or willfully misrepresent, or fail to include, any information required by these subdivision regulations in any plat application or during any public hearing or meeting of the planning and zoning commission or city council. Such a violation shall constitute grounds for denial of the plat.

**30.015 Diversity of ownership.**

Where the desirable development of a residential neighborhood, business park, commercial center, or other planned development is dependent upon coordination of diverse land ownership (i.e., separate tracts of land owned by more than one person), the planning director may require that an overall area or neighborhood study be prepared prior to and as an additional requirement and condition of the submission of any plat application so that individual subdivisions may be developed in harmony with one another and their environs in accordance with the comprehensive plan.

**30.016 Definitions.**

For the purpose of these subdivision regulations, the following terms, phrases, words and their derivations shall have the meaning given herein. When not inconsistent with the context, words used in the present tense shall include the future tense; words in the plural number shall include the singular number (and vice versa); and words in the masculine gender shall include the feminine gender (and vice versa). When words and terms are defined herein, and are also defined in another city ordinance, they shall be read in harmony unless there exists an irreconcilable conflict, in which case the definition contained in these subdivision regulations shall control. Definitions not expressly prescribed herein are to be determined in accordance with customary usage in municipal planning and engineering practices. If no such customary usage exists, the definition found within the latest edition of Webster's Dictionary shall be used. The word "shall" is always mandatory, while the word "may" is merely directory.

**Addition**

means a lot, tract or parcel of land lying within the corporate boundaries or extraterritorial jurisdiction of the city which is intended for the purpose of subdivision or development.

**Administrative officers or officials.**

Any officer of the city referred to in these subdivision regulations by title—including but not limited to the planning director, city manager, city engineer, city secretary, fire chief, police chief, public works director and chief building official—shall be the person so retained in that position by the city, or his or her duly authorized representative.

**Alley**

means a minor public right-of-way not intended to provide the primary means of access to abutting lots, which is used primarily for vehicular service access to the back or sides of properties that derive primary access from a street. The length of an alley segment is to be measured from the right-of-way lines of the streets from which the alley is provided access, or from the centerpoint of an intersection with another alley which connects to a street.

**Amended or amending plat**

means a revised plat correcting errors or making minor changes to a recorded plat pursuant to section 212.016 of the Texas Local Government Code.

**Amenity**

means an improvement to be dedicated to the public or to the common ownership of the lot owners of the subdivision and providing an aesthetic, recreational or other benefit, other than those prescribed by these subdivision regulations.

**Van Code**

means the Van City Code of Ordinances.

**Applicant**

means a person or entity who submits an application for an approval required by these subdivision regulations. Also sometimes referred to as “owner,” “owner’s agent,” “developer,” “subdivider,” or other similar term.

**Application or development application**

means a written request for an approval required by these subdivision regulations.

**Approach street**

means a street other than a perimeter street that provides access to and from an improved street.

**Assurance**

means any form of a security that is submitted to the city for the purposes of ensuring that adequate monies are available for the construction of improvements in relation to an approved plat, an approved construction plan or both.

**Base flood**

means the flood having a 1% chance of being equaled or exceeded in any given year.

**Block length or street length**

means, for a residential subdivision, that distance measured along the centerline of the street from the intersection centerpoint of one through street to the intersecting centerpoint of another street, or to the midpoint of a cul-de-sac. The through street referred to above shall not be a cul-de-sac, a dead-end street, or a looped street, but shall be a street which clearly has two points of ingress from two different directions.

**Bond**

means any form of an obligation undertaken by a surety acceptable to the city and in an amount and form satisfactory to the city.

**Building setback line**

means the line within a property defining the minimum horizontal distance between a building or other structure and the adjacent street right-of-way line, property line, a creek, or some other specific feature.

**Capital improvements program (CIP)**

means the official proposed schedule, if any, of all future public projects listed together with cost estimates and the anticipated means of financing each project, as adopted by city council.

**City**

means the City of Van, Texas unless otherwise expressly stated.

**City attorney**

means such attorney, or firm of attorneys, that has been specifically retained by the city to assist in legal matters. This term shall also apply if the city retains a person to perform the functions of city attorney as an official city employee.

**City council**

means the duly elected governing body of the City of Van, Texas.

**City engineer**

means such licensed professional engineer, or firm of licensed professional consulting engineers, that has been specifically employed by the city to assist in engineering-related matters. The city manager may assign the duties of the city engineer (as described in these subdivision regulations) to another city official whether or not licensed as a professional engineer.

**City manager**

means the person holding the position of the city's chief executive officer (e.g., city manager), as appointed by the city council.

**City standard street**

means a street that meets or exceeds the minimum specifications for construction, street size and right-of-way width in the city's subdivision regulations and design standards, and which is constructed to the ultimate configuration for the type of street it is designated for on the city's thoroughfare plan.

**Commission**

means the planning and zoning commission of the city.

**Completion filing date**

means the date upon which a submitted application is determined or deemed completed, with all necessary forms, fees, plans, information and copies submitted to the city in accordance with the city's application requirements for the purposes of a development application and is accepted by the city for filing. The completion filing date is not necessarily the same as the submission date (see "Submission date").

**Comprehensive plan or master plan**

means the comprehensive plan of the city and adjoining areas as adopted by the city council, including

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all its revisions and plan elements (including, but not limited to, the future land use plan, thoroughfare plan, parks master plan, etc.). This plan indicates the general locations recommended for various land uses, transportation routes, public and private buildings, streets, parks, water and wastewater facilities, and other public and private developments and improvements.

**Contiguous.**

Lots are contiguous when at least one boundary line or point of one lot touches a boundary line, or lines, or point of another lot.

**County plat records**

means the plat records of Van Zandt County.

**Cul-de-sac**

means a street having only one outlet to another street, and which terminates on the opposite end by a vehicular turnaround or “bulb.” The length of a cul-de-sac is to be measured from the intersection centerpoint of the adjoining through street to the midpoint of the cul-de-sac bulb.

**Curvilinear street**

means a street that is not straight and that intersects other streets at an angle that is less than or greater than 90 degrees (i.e., a right angle); a street that follows the topography or curvature of the land.

**Dead-end street**

means a street, other than a cul-de-sac, with only one outlet.

**Design standards**

means the collection of rules, regulations, criteria, standards, specifications, construction drawings, and general notes, including but not limited to those promulgated under the authority of these subdivision regulations, and other existing ordinances including the design standards in article 10 of this chapter any applicable design standards and requirements in chapter x of this code.

**Developer**

means the owner of land proposed to be developed as a residential or nonresidential subdivision, or the owner’s authorized representative.

**Development**

means any activity that requires the submission of a subdivision plat or the securing of a building permit.

**Development plat**

means a plat governed by these subdivision regulations in accordance with subchapter B of chapter 212 of the Texas Local Government Code, as amended.

**Easement**

means any area within, on, over, and/or under real property in which the city (and/or another entity, such as a franchised utility) has an interest involving a right of use of the property and/or right to exclude uses of the property—such as requiring removal of all or any part of any buildings, fences, trees, shrubs, or other improvements or uses that interfere with the lawful purpose of the holder of the easement—including but not limited to those required for provision of sidewalks, utility services, or access to property or equipment owned and/or maintained by the city.

**Engineer**

means a person duly authorized and licensed under the provisions of the Texas Engineering Registration Act to practice the profession of engineering.

**Engineering plans or drawings**

means the maps or drawings accompanying a plat and showing the specific location and design of public improvements to be installed in the subdivision in accordance with the requirements of the city as a condition of approval of the plat.

**Escrow**

means a deposit of cash with the city in accordance with these subdivision regulations.

**Extraterritorial jurisdiction (ETJ)**

means the area of land lying outside and adjacent to the corporate limits of the city over which the city has legal control as set forth in chapter 42 of the Texas Local Government Code.

**FEMA**

means the Federal Emergency Management Agency of the U.S. government.

**Final plat**

(also “record plat” or “as-built plat”) means the one official and authentic map of any given subdivision of land prepared from actual field measurement and staking of all identifiable points by a registered professional land surveyor (RPLS), with the subdivision location referenced to a survey corner, and with all boundaries, corners and curves of the land division, and with all streets, rights-of-way, easements, dedications and other pertinent features, sufficiently described so that they can be reproduced without additional references. An amending plat and a replat are also final plats.

**Frontage**

means that side of a lot, parcel, or tract abutting a street right-of-way.

**Governing body**

means the city council of the City of Van, Texas.

**Improved street**

means a street constructed to city standards or a city standard street.

**Land planner**

means persons, including registered professional land surveyors (RPLS) or engineers, who possess and can demonstrate a valid proficiency in the planning of residential, nonresidential and other related developments, such proficiency often having been acquired by education in the field of landscape architecture or other specialized planning curriculum, or by actual experience and practice in the field of land planning, and who may be certified as a member of the American Institute of Certified Planners (AICP).

**Lot or lot of record**

means a divided or undivided tract or parcel of land having frontage on a public or private street, and which is, or which may in the future be, offered for sale, conveyance, transfer or improvement; which is designated as a distinct and separate tract; and which is identified by a tract or lot number or symbol in a duly approved subdivision plat which has been properly filed of record at the county.

**Major plat**

means any plat not classified as a minor plat, including but not limited to subdivisions of more than four lots, or any plat that requires the construction of a new street (or portion thereof) or the extension of a municipal facility as required by this article or any other city ordinance.

**Major subdivision**

means a subdivision that cannot be approved by means of an application for a minor plat.

**Median width**

means the width of the portion of a street median including the entire width of the median's curbs.

**Minor plat**

means a subdivision resulting in four or fewer lots, provided that the plat does not create any new street or the extension of any municipal facilities to serve any lot within the subdivision.

**Minor subdivision**

means a subdivision that may be approved by means of an application for a minor plat.

**Off-site facilities or improvements**

means the facilities or improvements that are required to serve the site but that are not located within the boundaries of the plat or immediately adjacent to the property, and which may or may not be immediately required to serve the development to serve the development. These include oversizing for streets, sewer lines, water lines and storm drainage facilities, as well as the excess capacity of facilities such as water storage tanks and wastewater treatment plants available for new development.

**On-site facilities or improvements**

means the existing or proposed facilities or improvements constructed within the property boundaries of the plat, and the existing or proposed facilities required to be constructed or improved immediately adjacent to the property that are needed to serve the development. Facilities and improvements include, but are not limited to, streets, alleys, water lines, sewer lines, storm drainage facilities, sidewalks, screening devices, and curbs and gutters.

**Overlength street (or alley)**

means a street segment, or a cul-de-sac or alley segment, which exceeds the maximum length allowed by these subdivision regulations, as measured along the centerline of the street from the intersection centerpoint of one through street, which shall not be a cul-de-sac or dead-end or looped street, to the intersecting centerpoint of another through street or, in the case of a cul-de-sac, to the midpoint of the cul-de-sac. For an alley segment, the measurement shall be to the right-of-way lines of the streets from which the alley is provided access, including any alley turnouts, or from the centerpoint of an intersection with another alley which connects to a street.

**Pavement width**

means the width of the portion of a street that is available for vehicular traffic, combined with the width of any paved shoulder and—for streets with curbs—the width of the entire curb.

**Perimeter street**

means any existing or planned street which is adjacent to the subdivision or addition to be platted.

**Person**

means any individual, association, firm, corporation, governmental agency, political subdivision, or

legal entity of any kind.

**Planning and zoning commission**

means the planning and zoning commission of the City of Van, Texas.

**Planning department**

shall refer to the city's department, and related employees, that has been specifically created and maintained by the city to assist in planning and zoning related matters. This term shall also apply to any official city employee in the planning department, including any practicing, professional land planner, administrative support, and/or firm of professional land planners.

**Planning director**

means a person hired or designated by the city manager to supervise or oversee the planning department of the city, and to exercise the authority of the planning director as mentioned in these subdivision regulations.

**Plat**

means a preliminary plat of a subdivision, a final plat of a subdivision, a development plat, or an amending plat or replat, as determined by the context.

**Preliminary plat**

means the graphic expression of the proposed overall plan for subdividing, improving and developing a tract, showing in plain view the proposed street and lot layout, easements, dedications and other pertinent features, with such notations as are sufficient to substantially identify the general scope and detail of the proposed development.

**Private street**

means a private vehicular access way, including an alley, that is shared by and that serves two or more lots, which is not dedicated to the public, and which is not publicly maintained.

**Property owner**

(may also be known as "subdivider" or "developer") means any person or firm, association, syndicate, general or limited partnership, corporation, trust or other legal entity, or any agent thereof, that has sufficient proprietary interest in the land sought to be subdivided to commence and maintain proceedings to subdivide the same under these subdivision regulations. In any event, the term "property owner" shall be restricted to include only the owner(s) or authorized agent(s) of such owner(s), such as a developer, of land sought to be subdivided.

**Public improvements**

means facilities, infrastructure and other appurtenances, typically owned and maintained by the city (but not necessarily located upon city-owned property or right-of-way). Public improvements can be located upon public property or upon private property in a public easement. Public improvements serve a public purpose in providing a needed service or commodity, such as wastewater collection and treatment and water storage and distribution, and protect the general health, safety, welfare and convenience of the city's citizens, including efficiency in traffic circulation and access for emergency services. The term "public improvements" shall not include facilities or infrastructure of private providers of utility services other than water and wastewater, but shall be deemed to include facilities and infrastructure that the city would normally require of a development but which will be owned and maintained by an entity such as a homeowners' association, as in the case of private streets.

**Recorded final plat**

means a final plat that has been duly recorded in the property records of Van Zandt County, Texas.

**Replating or replat**

means the re-subdivision of any part or all of a block or blocks of a previously platted subdivision, addition, lot or tract.

**Right-of-way**

means a parcel of land occupied, or intended to be occupied, by a street or alley. Where appropriate, “right-of-way” may include other facilities and utilities such as sidewalks; railroad crossings; electrical, communication, oil and gas facilities; water and sanitary and storm sewer facilities; street improvements; and any other special use. The use of right-of-way shall also include parkways and medians outside of the paved portion of the street. The usage of the term “right-of-way” for land platting purposes shall mean that every right-of-way hereafter established and shown on a final plat is to be separate and distinct from the lots or parcels adjoining such right-of-way, and shall not be included within the dimensions or areas of such lots or parcels.

**RPLS**

is an acronym for registered professional land surveyor.

**Sign, subdivision identification**

means a permanent sign which identifies a single-family residential subdivision.

**Standard street.**

(See “City standard street.”)

**Street**

means that part of a right-of-way, whether public or private and however designated, which provides vehicular access to adjacent land and other streets and may include additional facilities for transportation of persons, utilities, drainage and other street improvements. Streets may be of the following categories:

**(1) Freeway or expressway**

means a street classification that devotes total emphasis to the movement of traffic with little or no access to adjacent land. It is characterized by some degree of access control and normally is used for longer trip lengths at higher speeds. It serves the major centers of activity and high-volume traffic corridors. The network formed is integrated and generally offers connections to areas outside the city and its extraterritorial jurisdiction. I.H 20 is an expressway.

**(2) Arterial street**

means a street classification that serves major movements of traffic within an urbanized area while still providing some degree of access to adjacent property. These streets generally move high volumes of traffic through the city and provide access to the freeway/expressway network. FM 16, CR 314 (South Oak Street), State Highway 110 (N. Maple Street), and State Highway 10 (East Main Street) are arterial streets.

**(3) Major collector street**

means a street classification that receives traffic from other collectors and distributes it to major activity

centers. It may also feed through traffic to arterial streets, freeways or expressways. Uses served include but are not limited to major educational facilities, concentrations of high density commercial, regional commercial facilities, other concentrated commercial facilities, and industrial complexes. Some major collector streets are also arterial streets.

(4) **Minor collector street**

means a street classification that carries traffic from residential streets to major collector streets. It typically serves uses such as medium and high density residential, limited commercial facilities, elementary schools, offices and direct access to industrial parks.

(5) **Residential collector street**

means a street classification that carries traffic from local streets to other collector streets. It typically serves low and medium [density] residential, limited commercial facilities, elementary schools, some small offices and direct access within industrial parks.

(6) **Local street**

means a street classification that functions primarily to provide property access. They are normally short in length and compose the highest percentage of total street miles within the city. Local streets are designed to serve low traffic volumes. Through traffic movement should be discouraged. Depending upon the type of area served, and the service demands placed upon them, local streets may be subcategorized as residential, industrial and business.

(7) **Private street**

means a classification of streets which are owned and maintained by a homeowners' association or property owner's association, and which are not dedicated to the public.

**Street improvements**

means any street, together with all appurtenances required by city regulations to be provided with such street, and including but not limited to curbs and gutters, walkways (sidewalks), drainage facilities to be situated in the right-of-way for such street or thoroughfare, traffic-control devices, streetlights and street signs, for which facilities the city will ultimately assume the responsibility for maintenance and operation.

**Street length**

means the same as "Block length."

**Subdivider**

means a person who having an interest in land, causes it, directly or indirectly, to be divided into a subdivision; directly or indirectly, sells, leases, or develops, or offers to sell, lease or develop, or advertises for sale, lease or development, any interest, lot, parcel, site, unit, or plot in a subdivision; or engages directly or through an agent in the business of selling, leasing, developing, or offering for sale, lease, or development, a subdivision or an interest, lot, parcel, site, unit, or plot in a subdivision.

**Subdivision**

(also known as "addition") means a division or re-division of any tract of land situated within the city's corporate limits or its extraterritorial jurisdiction into two or more parts, lots or sites, for the purpose, whether immediate or future, of sale, division of ownership, or building development. "Subdivision"

includes re-subdivisions of land or lots which are part of a previously recorded subdivision.

**Subdivision improvement agreement**

means a contract entered into by the applicant and the city, by which the applicant promises to complete the required public improvements within the subdivision or addition within a specified time period following final plat approval, and which may to the extent expressed in the agreement modify or alter the application of these subdivision regulations.

**Submission date**

means the date when forms, fees, plans, information and copies have been submitted to the planning director (or other employee authorized to received applications) for the purposes of meeting requirements for a development application. The submission date is not the same as the completion filing date (see “Completion filing date”).

**Substandard street**

means an existing street that does not meet the minimum specifications in the city’s standard street specifications, and which is not constructed to the ultimate configuration for the type of street it is designated for on the city’s thoroughfare plan.

**Surveyor**

means a registered professional land surveyor (RPLS), as authorized by state statutes to practice the profession of surveying.

**SWPPP**

is an acronym for a storm water pollution prevention plan (as in a set of engineering construction plans).

**TCEQ**

means the Texas Commission on Environmental Quality or any successor agency of the State of Texas.

**Temporary improvements**

means improvements built and maintained by the developer that are needed to remedy a circumstance that is temporary in nature, such as a temporary drainage easement or erosion control device, that will be removed upon completion of the subdivision or shortly thereafter.

**Thoroughfare**

means a street classified as an expressway, arterial, or any type of collector street.

**U.S. Army Corps of Engineers**

means the civil engineering branch of the U.S. government.

**Yard**

means the open area between building setback lines and lot lines.

**Zoning ordinance**

means the city’s zoning regulations as codified in Chapter 36 of this code as amended as well as zoning ordinances not codified in this code that zone or rezone particular tracts of property.

30.017 through 30.040. (Reserved)

Article 2

## Procedures

### 30.041 General requirements for plats.

- (a) Zoning requirements.
- (1) A property within the city's corporate limits that is being proposed for platting or development must be properly zoned by the city prior to submission of a development application. In addition, the proposed development layout or subdivision design shown on the proposed plat must be in conformance with all standards and requirements prescribed in the zoning ordinance and these subdivision regulations.
  - (2) Noncompliance with the requirements of the zoning district in which the subject property is located, or lack of the proper zoning, shall constitute grounds for denial of a development application.
  - (3) Any development application submitted for approval by the city shall be in accordance with the city's zoning ordinance, if the property is located within the city's corporate limits. For property located within the city's corporate limits or extraterritorial jurisdiction, any development application shall be in accordance with the city's comprehensive plan, including all adopted water, sewer, storm drainage, future land use, park, recreation, open space and thoroughfare plans. All plats shall be prepared by a registered professional land surveyor (RPLS).
- (b) Classification of subdivisions and additions.
- (1) Before a plat relating to any tract of land is filed for record with the county clerk, the property owner shall apply for and secure approval of the required subdivision plat from the planning and zoning commission and city council, in accordance with the following procedures, unless otherwise provided within these subdivision regulations.
  - (2) Minor subdivisions may be approved for residential or nonresidential properties. Minor plat approval requires the submission of a final plat drawing and other submission materials required by the city. Lots may be conveyed or sold only when the plat has been approved by the city and the plat has been filed with Van Zandt County.
  - (3) Major subdivisions may be approved for residential or nonresidential properties. The procedure for approval of a major subdivision typically involves two steps: the submission of a preliminary plat and final plat as required in these subdivision regulations. All major subdivision plats must be reviewed and approved by the planning and zoning commission and city council. If the land is required to be platted, no conveyance or sale of any portion or lot of the property may occur until after the final plat is approved by the planning and zoning commission and city council and filed with Van Zandt County.
- (c) Submission requirements for all types of plat applications. In addition to the requirements outlined herein for each type of development application, the city may maintain separate policies and procedures for the submission and processing of applications including, but not limited to, application forms, checklists for information to be shown on plats, language blocks for plats, and other similar items. The forms and paperwork are available in the planning department. These policies and procedures may be amended from time to time by the planning director, and it is the applicant's responsibility to be familiar with, and to comply with, these policies and procedures.
- (d) Application processing for all types of plats.
- (1) Review of plat for completeness. Every application for approval of a preliminary plat, final plat, or development plat shall be subject to a determination of completeness by the planning director. No application shall be accepted for processing unless it is accompanied by all materials and information

required by and prepared in accordance with the requirements of these subdivision regulations. The planning director from time to time may identify additional requirements for a complete application that are consistent with the application content requirements and related standards set forth in these subdivision regulations. The planning director may also promulgate a reasonable fee for review of the application for completeness not to exceed \$500.00.

- (2) Incompleteness as grounds for denial. The processing of an application by any city official or employee prior to the time the application is determined to be complete shall not be binding on the city as the official acceptance of the application for filing, and the incompleteness of the application if not cured in accordance with this section shall cause the application to expire. A determination of completeness shall not constitute a determination of compliance with the substantive requirements of these subdivision regulations.
  - (3) Pre-application conference. A property owner may request a pre-application conference with the planning director for purposes of identifying requirements that are applicable to a proposed plat. The request shall be made in writing on a form prepared by the director of planning and shall state that any proposed development concept discussed at the pre-application conference is not intended as a plan of development or application for any type of approval.
  - (4) Time for making determination. Following submission of a plan of development or plat application, the planning director shall make a determination in writing whether the plan or application constitutes a complete application for a preliminary plat or a final plat not later than the 10th business day after the date the application is submitted. If the planning director determines that an application is incomplete, the written determination shall specify the documents or other information needed to complete the application and shall state the date the application will expire if the documents or other information is not provided.
  - (5) When deemed complete. An application for approval of a plat application filed shall be deemed complete on the 11th business day after the application has been received if the applicant has not been notified that the application is incomplete in accordance with this section.
  - (6) Time for completing application. If an applicant is timely notified that an application is incomplete, and the applicant fails to submit all materials and any other information specified in the planning director's written determination on or before the 45th day after the application is submitted to the planning director for processing the application in accordance with his or her written notification, the application will be deemed to have expired and it will be returned to the applicant together with any accompanying documents. Thereafter, a new application for approval of the preliminary plat or final plat must be submitted. The city may retain any fee paid for reviewing the application for completeness.
  - (7) Sequence of applications. Notwithstanding any other provision of these subdivision regulations to the contrary, an application for a preliminary plat or final plat shall not be considered complete unless accompanied by a copy of the zoning ordinance or other certification verifying that the proposed use, lot sizes and lot dimensions for which the application is submitted are authorized by the zoning district in which the property is located.
  - (8) Vested rights. No vested rights accrue solely from the filing of an application that has expired pursuant to this section, or from the filing of a complete application that is subsequently denied. No vested rights accrue based on a filing that does not provide fair notice of the project and the nature of the permit sought.
- (e) Submission procedures and city review process for all types of plats.

- (1) Submission timing. In order to provide the city with adequate time to review plat applications for compliance with these subdivision regulations, an application for approval of any plat shall be submitted to the planning director during an application submission window that is at least 20 calendar days, but no more than 40 calendar days prior to the planning and zoning commission regular meeting at which it is to be considered. The planning director may establish a deadline for the submission of plat applications that falls within the application submission window. Submission of an application outside the application submission window or after the application submission deadline, shall be grounds for denial of approval of the plat, unless the applicant agrees in writing that the date of filing of the plat shall be deemed to have occurred not more than 29 days prior to the next regular meeting of the planning and zoning commission that follows a determination by the planning director that the application is complete.
- (2) Submission materials. The application shall include the following materials which shall be submitted to the planning director (or such persons authorized by the planning department to accept applications) for review in order for the application to be deemed complete.
  - (A) A written application form which bears the original signature(s) of the property owner(s) of the subject property.
  - (B) The appropriate submission fee.
  - (C) The appropriate number of full-size sets as stated on the application form (available at the planning department) of full-size folded prints of the plat, as required by the city's current development review policies and requirements, and one black-and-white reduction of the plat. The size and number of these prints and reductions shall be determined by the planning director.
  - (D) A copy of any applicable development agreement pertaining to the subject property.
  - (E) If an application for approval of a final plat, a tax certificate from the Van Zandt County tax assessor-collector showing that all taxes have been paid on the subject property, and that no delinquent taxes exist against the property, as shown in the Van Zandt County deed records. Documentation shall also be included that shows no delinquent assessments, fees, or other debts or obligations to the city and which are directly attributable to the subject property.
  - (F) An engineer's summary report which describes, in as much detail as necessary, the following:
    - (i) The overall nature and scope of the proposed development, including zoning of the property, proposed use(s) and acreage of each proposed use, minimum lot sizes, average lot size, widths and depths, number of lots to be created, and special amenities or facilities that will be included in the development;
    - (ii) How the property will be served with required utilities and services;
    - (iii) How storm water drainage will be handled; and
    - (iv) An itemization and description of any waivers/suspensions from provisions of these subdivision regulations that will be sought.
  - (G) Construction plans prepared by a professional engineer for all of the infrastructure and site improvements required to serve the development (required only with the final plat application).
  - (H) If located within the city's ETJ, letters shall also be provided from each of the applicable utility service providers, including water, wastewater, gas, electricity, telephone, cable TV and solid waste, verifying

their ability to provide an adequate level of service for the proposed development.

- (I) If the development will involve 50 or more living units; a copy of a letter previously sent to Van Independent School District which contains information relative to the size (with respect to the anticipated number of homes and/or school-age children), location and timing of the proposed development, and which includes an invitation to express any desire they may have to obtain a future school site within any portion of the subject property.
  - (J) Proof of land ownership as required in subsection **(f)** of this section.
- (3) Other submission requirements.
- (A) All plat drawings and other corresponding plans and drawings, including engineering plans and landscape and screening plans, shall be drawn to a standard engineering scale of no more than 100 feet to the inch (1" = 100'). In cases of large developments which would exceed the dimensions of the sheet at 100-foot scale, plats may be on multiple sheets and in a format that will be acceptable for eventual filing at Van Zandt County. If there are multiple sheets, then a key sheet is required.
  - (B) Other applicable information and materials may be deemed appropriate by the city, and therefor may be required by the city. Such materials must also be submitted for an application to be determined as complete.
  - (C) All of the materials and plans specified within this subsection **(e)** shall be submitted to the planning director for review in order for the application to be deemed complete.
- (4) City staff review. Upon official submission of an application for plat approval, the city shall commence technical review of the development proposal by forwarding a copy of the application and plat to the city's development review committee which shall include representatives of the franchised utility companies, TXDOT, VISD and appropriate personnel from various city departments.
- (A) City development review committee members shall review the plat application and shall ascertain its compliance with these and other applicable city regulations.
  - (B) Following city staff review of the plat and supporting documents, and following discussions with the applicant on any revisions deemed advisable and the kind and extent of improvements to be installed, the applicant shall re-submit additional copies of the corrected plat (and engineering plans, if applicable) to the planning department no later than seven days prior to the planning and zoning commission meeting (or other deadline established by the planning department) for final staff review.
- (5) Re-submission and scheduling.
- (A) Failure to re-submit corrected copies of the plat and other application materials (including engineering plans, if applicable) back to the city in time for adequate review prior to the planning and zoning commission [meeting] shall be cause for the planning department to forward the plat application to the commission as it was originally submitted rather than the corrected version of the plat unless the applicant agrees in writing that the date of filing of the plat application shall be deemed to have occurred not more than 29 days prior to the next regular meeting of the planning and zoning commission that follows a determination by the planning director that the application is complete.
  - (B) If, upon re-submission of the corrected plat to the city, the planning director determines that the application does not comply with the technical requirements of the subdivision regulations, the plat application may be subject to expiration or denial in accordance with these subdivision regulations.

- (C) After the plat has been scheduled on an agenda (or at any time prior), the applicant may request, in writing, to withdraw official filing of the plat in order to allow the applicant more time to correct deficiencies, address concerns, or otherwise improve the plat pursuant to these subdivision regulations. After receipt of the request, the city may delay action on the final plat until 30 days after the applicant officially re-files the plat.
- (6) Action by the planning and zoning commission. All plat applications that have not expired shall be reviewed by the planning and zoning commission and upon finding that the plat is in complete conformance with the provisions of these subdivision regulations and with all other applicable regulations of the city, the planning and zoning commission shall approve the plat.
- (A) The commission shall review each plat application and shall take action to either approve the plat application or approve the plat application subject to certain conditions, or vote to deny the plat application, within 30 calendar days following the completion filing date.
- (B) The planning and zoning commission shall approve or deny the plat application by a simple majority vote of the commission members present and voting.
- (C) If the commission denies a plat application, the commission shall state such disapproval and the reasons therefor. The commission's decision to deny a plat may be appealed to the city council by the applicant or by the city manager.
- (7) Action by the city council. All plat applications that have been approved by the planning and zoning commission shall be forwarded to the city council.
- (A) A plat application is not considered approved by the city until the application has been approved by the city council, unless otherwise expressly set forth in these subdivision regulations. An approval of a plat application by the planning and zoning commission shall be deemed a recommendation to the city council for approval. The city council may reject the recommendation and deny the plat application if same is not in complete conformance with the provisions of these subdivision regulations and with all other applicable regulations of the city.
- (B) The city council shall act on the plat within 30 days after the date the plat is recommended for approved [approval] by the planning and zoning commission or is deemed approved by the inaction of the commission.
- (C) A denial of a plat application by the planning and zoning commission shall be deemed a recommendation to the city council for denial. When the planning and zoning commission recommends denial of a plat application the city council may reject the recommendation and approve the plat application if same is in complete conformance with the provisions of these subdivision regulations and with all other applicable regulations of the city.
- (f) Proof of land ownership. The city requires proof of land ownership prior to approval of any development application involving real property. Along with the application submission, the applicant shall provide evidence that he or she is the owner of record of the subject land parcel or parcels, or is the property owner's authorized agent. The planning development department shall have the authority to determine what document(s) the city will require to prove ownership, such as a letter of title guarantee from a licensed attorney, title policy, title commitment, or some other documentation that is acceptable to the city attorney. If ownership cannot be conclusively established prior to the meeting date on which the development application will be heard, the city shall have the authority to deny the application on the basis of protecting the public interest. All owners and other persons, including any lienholders, whose consent is necessary to the effective dedication of the plat shall sign the owner's certificate

before a final plat is filed for record with the county clerk.

(g) Preliminary plat expiration and extension.

- (1) Expiration. An approved preliminary plat shall expire and shall thereafter be deemed null and void if a final plat application for all the land subject to the preliminary plat has not been approved within two years from the date of the city council's approval of the preliminary plat. Any subsequent expiration of the final plat shall also result in expiration of the preliminary plat for the same land. Upon expiration, or upon denial of a timely submitted request for extension of plat approval, a new preliminary plat application shall be required to be submitted, subject to requirements in effect at the time the new application is filed with the city.
- (2) Extension. The city council may extend a preliminary plat for a period not to exceed one year on the written request of the applicant. The request must be filed before the preliminary plat expires and must document the reasons for the extension. In determining whether to grant a request, the council shall take into account the reasons for the requested extension, the ability of the applicant to comply with any conditions attached to the original approval, whether extension is likely to result in timely completion of the project, and the extent to which any newly adopted regulations should be applied to the proposed development. In granting an extension, the council may impose such conditions as are needed to assure that the land will be developed in a timely fashion and that the public interest is served, including compliance with one or more newly adopted development standards.

(h) Construction plans expiration and extension.

- (1) Expiration. Approved construction plans (and engineering plans, if required) for public improvements shall be valid for a period of two years from the date of final plat approval after which they shall expire and shall be deemed null and void. Upon expiration, or upon denial of a timely submitted request for extension of the approval of the construction plans, new construction plans shall be submitted, subject to requirements in effect at the time the construction plans are filed with the city.
- (2) Extension. The city council may extend the approval of construction plans (and engineering plans, if required) for public improvements for a period not to exceed one year on the written request of the applicant. The request must be filed before the construction plans expire and must document the reasons for the extension. In determining whether to grant a request, the council shall take into account the reasons for the requested extension, the ability of the applicant to comply with any conditions attached to the original approval, whether extension is likely to result in timely completion of the project, and the extent to which any newly adopted regulations should be applied to the proposed development. In granting an extension, the commission may impose such conditions as are needed to assure that the land will be developed in a timely fashion and that the public interest is served, including compliance with one or more newly adopted development standards.

(i) Final plat expiration and extension.

- (1) Expiration. An approved final plat shall expire and shall thereafter be deemed null and void if the final plat has not been recorded as required in section **30.044(g)** within two years from the date of the city council's approval of the final plat. Upon expiration, or upon denial of a timely submitted request for extension of plat approval, a new preliminary plat application shall be required to be submitted, subject to requirements in effect at the time the new application is filed with the city.
- (2) Extension. The city council may extend a final plat for a period not to exceed one year on the written request of the applicant. The request must be filed before the final plat expires and must document the reasons for the extension. In determining whether to grant a request, the council shall take into account

the reasons for the requested extension, the ability of the applicant to comply with any conditions attached to the original approval, whether extension is likely to result in timely completion of the project, and the extent to which any newly adopted regulations should be applied to the proposed development. In granting an extension, the council may impose such conditions as are needed to assure that the land will be developed in a timely fashion and that the public interest is served, including compliance with one or more new adopted development standards.

**30.042 Expiration of permits, generally, dormant projects, and exemptions from vesting.**

- (a) Expiration of individual permits. If, after approval of any individual permit, no progress has been made towards completion of the project within two years of the approval of the permit, the permit shall expire and become null and void except to the extent otherwise expressly provided for in these subdivision regulations.
- (b) Dormant project. A project shall become dormant and expire and all permits previously issued in connection with the project shall be null and void if, on the fifth anniversary of the date the first permit application was filed, no progress has been made towards completion of the project. The phrase “progress towards completion of the project” or similar phrase as used in this section includes the activities constituting such progress as set forth in Texas Local Government Code section 245.005.
- (c) Effect of expiration or dormant project. Following the expiration of a permit or a project, any new application shall be a wholly new and separate permit or project as compared with the dormant project that expired, and shall be subject to the regulations, rules, ordinances, and other laws in effect at the time of filing of the new application and shall further be subject to the assessment of new fees to the fullest extent permitted by law.
- (d) Projects, permits and other activities that never vest rights. Notwithstanding any other provision of these subdivision regulations or other city rules, regulations or ordinances, the following are exempt from and not affected by any claim to vested rights:
  - (1) A permit that is at least two years old, is issued for the construction of a building or structure intended for human occupancy or habitation, and is issued under laws, ordinances, procedures, rules, or regulations adopting only:
    - (A) Uniform building, fire, electrical, plumbing, or mechanical codes adopted by a recognized national code organization; or
    - (B) Local amendments to those codes enacted solely to address imminent threats of destruction of property or injury to persons;
  - (2) The city’s zoning regulations that do not affect landscaping or tree preservation, open space or park dedication, property classification, lot size, lot dimensions, lot coverage, or building size or that do not change development permitted by a restrictive covenant required by the city;
  - (3) Regulations for sexually oriented businesses;
  - (4) Fees imposed in conjunction with development permits, including but not limited to impact fees;
  - (5) Regulations for annexation that do not affect landscaping or tree preservation or open space or park dedication;
  - (6) Regulations for utility connections;

- (7) Regulations to prevent imminent destruction of property or injury to persons from flooding that are effective only within a floodplain established by a federal flood control program and enacted to prevent the flooding of buildings intended for public occupancy;
- (8) Construction standards for public works located on public lands or easements; or
- (9) Regulations to prevent the imminent destruction of property or injury to persons if the regulations do not:
  - (A) Affect landscaping or tree preservation, open space or park dedication, lot size, lot dimensions, lot coverage, building size, residential or commercial density, or the timing of a project; or
  - (B) Change development permitted by a restrictive covenant required by a municipality.

### 30.043 **Procedures and submission requirements for preliminary plat approval.**

- (a) Generally. The applicant shall prepare a preliminary plat which shall include a utility layout and conceptual plans for the construction of the subdivision and all associated public improvements, together with other supplementary materials as required by these subdivision regulations or by the city.
- (b) Preliminary plat contents, generally.
  - (1) The preliminary plat shall constitute only that portion of the property or subdivision which the applicant proposes to construct and record prior to the expiration of the plat; provided, however, that such portion conforms to all the requirements of these subdivision regulations and with any other applicable regulations and codes of the city.
  - (2) The preliminary plat shall include all contiguous property under the ownership or control of the applicant unless otherwise approved by the planning director.
  - (3) The contiguous property may contain more than one phase which, if so, shall be clearly identified on the preliminary plat.
  - (4) If not all of the contiguous property is intended to be developed, prior to the expiration of the plat, the portion that is not intended to be developed may be identified and treated as a remainder tract, if permitted by the planning director.
  - (5) With respect to remainder tracts, the following shall apply:
    - (A) A remainder tract is deemed to be that portion of a contiguous property that is not included within the boundaries of a preliminary plat.
    - (B) A remainder tract shall not be considered a lot or tract of the subdivision that is shown on the preliminary plat.
    - (C) Approval of the related preliminary plat shall not constitute approval of development on a remainder tract.
    - (D) Information accompanying the preliminary plat application for a remainder tract shall be deemed to be an aid to the planning and zoning commission and city council in taking action on the preliminary plat and may be used to determine whether development of the land subject to the preliminary plat will be adequately served by public facilities and services and is otherwise in compliance with these subdivision regulations, taking into account the development of the property as a whole. Information concerning the

remainder tract, including topography, drainage, and existing and planned public improvements, may be considered in formulating conditions to approve the plat application.

- (6) Based upon information submitted contained in a preliminary plat, including information related to a remainder tract, the planning and zoning commission or city council may require that additional or less land be included as part of the preliminary plat in order to satisfy the standards applicable to the plat.
- (c) Approval, generally. Approval of a preliminary plat by the planning and zoning commission and city council shall be deemed general approval of the street and lot layout shown on the preliminary plat, and shall not constitute acceptance or approval of the final plat.
- (d) Standards for approval.
  - (1) No preliminary plat shall be approved by the planning and zoning commission or city council unless the plat conforms to these subdivision regulations, the comprehensive plan, and applicable zoning and other city regulations.
  - (2) Conditional approval shall be considered to be the approval of a plat only when such conditions imposed by the planning and zoning commission and city council are complied with. Conditional approval shall expire within 30 days of action by the city council unless all conditions imposed are satisfied.
- (e) Information required upon or with preliminary plat. The director of development services may establish—not inconsistent with this article—forms and mandatory standards with regard to the content, format, and graphics for preliminary plats. The proposed preliminary plat shall show information as specified on a form or packet provided by the planning department.
- (f) Revisions to approved preliminary plat.
  - (1) Minor revisions to the preliminary plat are commonly required before the final plat is approved. Such minor revisions may include slight enlargement or shifting of easements or lot lines, addition of private or franchise utility easements, correction of bearings or distances, correction of minor labeling errors, addition of erroneously omitted informational items and labels, etc., and such revisions may be delineated on the final plat without having to re-approve the preliminary plat. Whether or not revisions are “minor” in nature shall be determined by the planning director.
  - (2) Major revisions, if required, such as obvious reconfiguration of lot lines or easements, relocation of driveways or access easements or fire lanes, any modification to the perimeter or boundary of the property, and relocation or addition or deletion of any public improvement (including corresponding easement), shall necessitate re-submission and re-approval of the plat as a “revised preliminary plat” unless otherwise approved by the planning director. The procedures for such re-approval shall be the same as for a preliminary plat. If an application for a revised preliminary plat expires due to failure to submit a complete application, or if the revised preliminary plat is complete, and considered by the planning and zoning commission and the city council and is denied, the previously submitted preliminary plat(s) shall also be deemed to have been denied thus necessitating submission of a new application governed by the regulations, rules and other laws in effect at the time of the submission of the new application.

#### **30.044 Procedures and submission requirements for final plat approval.**

- (a) The final plat shall be in accordance with the preliminary plat, as approved, and shall incorporate all applicable conditions, changes, directions and additions imposed by the planning and zoning commission and city council upon the preliminary plat. The final plat shall not be submitted prior to

approval of the preliminary plat (when required).

- (b) Only final plat applications which include the required data, completed application form, submission fee, number of copies of the plat, record drawings, approved engineering construction plans, and other required information will be considered complete, shall be accepted for filing by the city, and shall be scheduled on a planning and zoning commission agenda. Incomplete final plat applications will not be accepted for filing and will not be scheduled on a planning and zoning commission agenda until the proper information is provided to city staff.
- (c) Information required upon or with final plat. The director of development services may establish—not inconsistent with this article—forms and standards with regard to the content, format, and graphics for final plats. The proposed final plat shall show information as specified on a form or packet provided by the planning department.
- (d) Engineering plans. As part of the final plat application, the applicant shall submit the required number of sets of the complete engineering or construction plans that have been approved by the city engineer for all streets, alleys (if any), storm sewers and drainage structures, water and sanitary sewer facilities, screening and retaining walls, landscaping and irrigation, and any other required public improvements for the area covered by the preliminary plat. Engineering plans shall be in conformance with the design standards and with the requirements set forth within these subdivision regulations. The engineering plans shall also contain any plans deemed necessary to show or document compliance with any other applicable codes and ordinances of the city that are related to development of a land parcel. The engineering plans shall show information as specified on an application form or packet provided by the planning department.
- (e) Standards for approval. No final plat shall be approved by the planning and zoning commission or city council unless the following standards have been met:
  - (1) The plat substantially conforms with the approved preliminary plat, as revised if revisions were a necessary condition for approval, and other studies and plans, as applicable; and
  - (2) The plat and accompanying documents conform to these subdivision regulations, the comprehensive plan, and to applicable zoning, subdivision and any other applicable codes or ordinances of the city that are related to development of a land parcel.
- (f) Timing of public improvements.
  - (1) After approval of the final plat by the planning and zoning commission and city council, and following procurement of all applicable permits from other appropriate agencies (such as TxDOT, railroad authorities, TCEQ, U.S. Army Corps of Engineers, FEMA and/or Van Zandt County), the applicant shall cause a contractor(s) to install or construct the public improvements in accordance with the approved plans and the city's design standards and at the applicant's expense.
  - (2) The applicant shall employ professional engineers, professional registered land surveyors or other professionals as necessary to design, stake, supervise, perform and complete the construction of such improvements, and shall cause his or her contractor to construct the said improvements in accordance with these subdivision regulations, any approved construction plans and engineering plans, and with the city's design standards, and any other applicable agency's design standards. To the extent of any direct conflict between the foregoing requirements, the approved construction plans and engineering plans shall prevail.
  - (3) If the project will require a FEMA revision to a flood insurance rate map or other submittal required

under the National Flood Insurance Program, or if the project otherwise triggers review under the city's flood damage prevention regulations set forth in this code at article **4.12**, then the application must be reviewed for compliance with said standards and requirements prior to approval of the final plat and prior to any construction activities (including but not limited to grading, clearing, grubbing, brush removal, etc.) on the site.

- (4) When all of the public improvements have been constructed and a request is made for acceptance of same by the city, the planning director shall confirm that the public improvements have been completed in accordance with the approved plans and specifications and with all applicable city standards and regulations, and shall confirm receipt by the city of the required maintenance bond. In determining compliance, the planning director shall obtain from the applicant: one sealed set of "as-built" or "record drawing" and a digital copy of all plans (in a format as determined by the city engineer); a signed letter bearing sealed certification by the design engineer confirming the contractors' compliance with these subdivision regulations, and with all city construction standards set forth in the design standards and other applicable city design documents; and certification signed by the property owner before a notary that all dedications required for the public improvements have been fully conveyed. After said materials are received, and the planning director confirms compliance as set forth above, the planning director shall inform the city manager of same and the city manager shall receive and accept for the city the title, use, and maintenance of the public improvements, and shall provide written notice to the applicant that its request for approval to record the final plat has been granted. No such approval shall be granted until compliance has been verified as set forth in this subsection.
- (g) Effect of approval and acceptance of improvements. As soon as is practical after the final plat has been approved by the city for recordation in accordance with subsection **(f)(4)** of this section, or, alternatively, approved for recordation because the subdivider has provided sufficient security in accordance with division 6 of this article, the director of development services or designee shall direct the applicant to file the final plat to be recorded with the Van Zandt County clerk. No conveyance or sale of any portion or lot of the property may occur until after the final plat is approved by the planning and zoning commission and city council and duly recorded by the applicant. It is the applicant's responsibility to confirm that the final plat has been duly recorded, and an applicant's failure to confirm same is at the applicant's sole risk.
- (h) Revisions to approved final plat prior to filing at the county.
- (A) Occasionally, minor revisions are needed before the final plat can be recorded. Minor revisions such as correction of bearings or distances, correction of minor labeling errors, addition of erroneously omitted informational items and labels, etc., may occur on the record plat prior to filing it without the planning and zoning commission and city council having to re-approve the final plat. Whether or not revisions are "minor" in nature shall be determined by the planning director. Major revisions, such as obvious corrections or reconfiguration of lot lines or easements, relocation of driveways or access easements or fire lanes, any modification to the perimeter or boundary of the property, and relocation or addition or deletion of any public improvements (including corresponding easement), shall necessitate re-submission and re-approval of the plat as a "revised final plat" unless otherwise approved by the planning director, as applicable. The procedures for such re-approval shall be the same as for a final plat. If an application for a revised final plat expires due to failure to submit a complete application, or if the revised final plat is complete, and considered by the planning and zoning commission and the city council and is denied, the previously submitted final plat and any preliminary plat(s) shall also be deemed to have been denied thus necessitating submission of a new application governed by the regulations, rules and other laws in effect at the time of the submission of the new application.
- (B) Subsequent to final plat approval by the planning and zoning commission and city council, the applicant

shall return signed and notarized copies of the final plat, as approved, along with any other required documents and fees necessary for filing the plat with the county clerk, to the planning department within 45 calendar days following approval, in accordance with requirements established by the city; or if construction of any public improvement is required prior to the filing of a final plat, the owner or developer shall return signed and notarized copies of the final plat, as approved, along with any other required documents and fees necessary (including current documents required to show proof of ownership as outlined in section **30.041(f)**) to the planning department before said public improvements will be accepted by the city and before said final plat will be recorded with the county clerk.

- (2) All easements shall be included on the final plat, including the recording information for those easements that are filed or recorded as separate instruments, as required by utility companies and the city prior to filing the final plat.
- (3) If the required copies and materials are not returned to the city within the specified 45-day time frame, the approval of the final plat shall be null and void unless an extension is granted by the city council.
- (4) The city shall cause the final plat to be filed at the office of the county clerk of Van Zandt County in accordance with subsection **(g)** of this section.

#### **30.045 Development plats.**

- (a) Authority. This section is adopted pursuant to the Texas Local Government Code, chapter 212, subchapter B, sections 212.041 through 212.050, as amended.
- (b) Applicability. For purposes of this section, the term “development” means the construction of any building, structure or improvement of any nature (residential or nonresidential), or the enlargement of any external dimension thereof. This section shall apply to any land lying within the city or within its extraterritorial jurisdiction in the following circumstances:
  - (1) The development of any tract of land which has not been platted or replatted prior to the effective date of these subdivision regulations, unless expressly exempted herein; or
  - (2) The development of any tract of land for which the property owner claims an exemption from the city’s subdivision regulations, including requirements to replat, which exemption is not expressly provided for in such regulations; or
  - (3) The development of any tract of land for which the only access is a private easement or street; or
  - (4) The division of any tract of land resulting in parcels or lots each of which is greater than five acres in size, and where no public improvement is proposed to be dedicated or constructed.
- (c) Exceptions. No development plat shall be required, where the land to be developed has received final plat or replat approval prior to the effective date of these subdivision regulations or a final plat or replat has been filed in accordance with these subdivision regulations.
- (d) Prohibition on development. No development shall commence, nor shall any building permit [be issued], for any development or land division subject to this section, until a development plat has been approved by the planning and zoning commission and city council.
- (e) Standards of approval. The development plat shall not be approved until the following standards have been satisfied:
  - (1) The proposed development conforms to all city plans, including but not limited to, the comprehensive

plan, utility plans and applicable capital improvements plans;

- (2) The proposed development conforms to the requirements of the zoning ordinance (if located within the city's corporate limits) and these subdivision regulations;
- (3) The proposed development is adequately served by public facilities and services, parks and open space, to the extent necessary based on the nature of the development, and in conformance with city regulations;
- (4) The proposed development will not create a safety hazard on a public street (such as by not providing adequate on-site parking or vehicle maneuvering space for a restricted-access/gated entrance);
- (5) Appropriate agreements for acceptance and use of public dedications to serve the development have been tendered; and
- (6) The proposed development conforms to the design and improvement standards contained in these subdivision regulations and in the city's design standards, and to any other applicable codes or ordinances of the city that are related to development of a land parcel.
- (f) Conditions. The planning and zoning commission and city council may impose such conditions on the approval of the development plat as are necessary to insure compliance with the standards in subsection (e) of this section.
- (g) Approval procedure. The application for a development plat shall be submitted to the city in the same manner as a final plat, and shall be approved, conditionally approved, or denied by the planning and zoning commission and the city council in a similar manner as a final plat.
- (h) Submittal requirements. In addition to all information that is required to be shown on a final plat, a development plat shall:
  - (1) Be prepared by a registered professional land surveyor;
  - (2) Clearly show the boundary of the development plat;
  - (3) Show each existing or proposed building, structure or improvement or proposed modification of the external configuration of the building, structure or improvement involving a change therein;
  - (4) Show all easements and rights-of-way within or adjacent to the development plat;
  - (5) Be accompanied by the required number of copies of the plat, a completed application form, the required submission fee (per the city's current fee schedule), and a certificate or some other form of verification from the Van Zandt County Appraisal District showing that all taxes have been paid on the subject property and that no delinquent taxes exist against the property in accordance with section **30.012** of this article; and
  - (6) Be submitted to the planning department for review simultaneously with the plat application in the same manner as for a final plat, or the application shall be determined to be incomplete and shall be subject to expiration in the same manner as other plats under these subdivision regulations.

#### **30.046 Replatting.**

- (a) Replat required. Unless otherwise expressly provided for herein, a property owner who proposes to replat any portion of an already approved and filed final plat, other than to amend or vacate the plat,

must first obtain approval for the replat under the same standards and by the same procedures prescribed for the final platting of land by these subdivision regulations. All improvements shall be constructed in accordance with the same requirements as for a construction or final plat, as provided herein.

- (b) Replatting without vacating preceding plat. A replat of a final plat or portion of a final plat may be recorded and is controlling over the preceding plat without vacation of that final plat if the replat:
  - (1) Is signed and acknowledged by only the owners of the property being replatted;
  - (2) Is approved, after a public hearing on the matter at which parties in interest and citizens have an opportunity to be heard by the city council; and
  - (3) Does not attempt to amend or remove any covenants or restrictions previously incorporated in the final plat.
- (c) Previous requirements or conditions of approval which are still valid. In addition to compliance with subsection **(b)** of this section, a replat without vacation of the preceding plat must conform to the requirements of this subsection **(c)** if: (i) during the preceding five years, any of the area to be replatted was limited by a zoning classification to residential use for not more than two residential units per lot; or (ii) any lot in the preceding plat was limited by deed restrictions to residential use for not more than two residential units per lot.
  - (1) Notice of the public hearing required under subsection **(b)** of this section shall be given before the 15th calendar day before the date of the hearing by publication in an official newspaper or a newspaper of general circulation in Van Zandt County. Notice of the public hearing shall also be given by written notice before the 15th calendar day before the date of the hearing, with a copy or description of any requested waivers/suspensions, sent to the property owners, as documented on the most recently approved ad valorem tax roll of the city, of lots that are in the original subdivision and that are within 200 feet of the lot(s) to be replatted. In the case of a subdivision in the extraterritorial jurisdiction, the most recently approved county tax roll shall be used. The written notice may be delivered by depositing the notice, properly addressed with appropriate postage paid, in a post office or postal depository within the boundaries of the city.
  - (2) If the replat requires a waiver/suspension as defined in section **30.010** of this article, and if the property owner(s) of 20% or more of the total land area of lots to whom notice is required to be given under subsection **(1)**, above, file with the city a written protest of the replatting before or at the public hearing, then approval of the replat will require the affirmative vote of at least 3/4 of the members present of the city council. For a legal protest, written instruments signed by the owners of at least 20% of the total land area of the lots or land immediately adjoining the area covered by the proposed replat and extending 200 feet from that area, but within the original subdivision, must be filed with the city prior to the close of the public hearing. In computing the percentage of land area subject to the “20% rule” described above, the area of streets and alleys shall be included.
  - (3) Compliance with subsection **(2)** above is not required for approval of a replat for any part of a preceding plat if the area to be replatted was designated or reserved for other than single- or two-family (i.e., duplex) residential use by notation on the last legally recorded plat or in the legally recorded restrictions applicable to the plat. For example, for a replat involving nonresidential property, a public hearing must be held, pursuant to subsection **(2)** above, but notice of the hearing does not have to appear in the newspaper and written notices do not have to be mailed to individual property owners within 200 feet of the subject property.
- (d) Adding or deleting lots. Any replat which adds or deletes lots must include the original subdivision and

lot boundaries. If a replat is submitted for only a portion of a previously platted subdivision, the replat must reference the previous subdivision name and recording information, and must state on the replat the specific lots which have changed along with a detailed “purpose for replat” statement.

- (e) Vacation of plat. If the previous plat is vacated as prescribed in section 212.013 of the Texas Local Government Code, as amended, and as provided in section **30.048** of this article, a public hearing is not required for a replat of the area vacated. It would, instead, be submitted as a new subdivision plat and reviewed accordingly.
- (f) Approval requirements. The replat of the subdivision shall meet all the requirements for a final plat for a new subdivision that may be pertinent, as provided for herein, including requirements that pertain to infrastructure, such as streets and utilities. Approval of a revised preliminary plat may be required prior to the approval of a replat if the replat necessitates the construction of public infrastructure or requires amendments to previously approved infrastructure construction plans.
- (g) Title of replat. The title shall identify the document as a “Final Plat” of the “\_\_\_\_\_ Addition, Block \_\_\_\_\_, Lot(s) \_\_\_\_\_, Being a Replat of Block \_\_\_\_\_, Lot(s) \_\_\_\_\_ of the \_\_\_\_\_ Addition, an Addition to the City of Van, Texas, as recorded in Volume/Cabinet \_\_\_\_\_, Page/Slide \_\_\_\_\_ of the Plat Records of Van Zandt County, Texas”.
- (h) Application for replat. An application submittal for a replat shall be the same as for a final plat, and shall be accompanied by the required number of copies of the plat, a completed application form, the required submission fee (per the city’s current fee schedule), and a certificate showing that all taxes have been paid on the subject property and that no delinquent taxes exist against the property. The replat shall also bear a detailed “purpose for replat” statement which describes exactly what has been changed on the plat since the original (or previous) plat was approved by the city and filed at the county. A copy of all application materials for a replat shall be simultaneously submitted to the planning department for review in the same manner as for a final plat, or the application shall be deemed incomplete.
- (i) Recording of replat. The replat shall be recorded at the county in the same manner as prescribed for a final plat, and approval of a replat shall expire if all filing materials are not submitted to the planning department and if the replat is not recorded within the time period specified for a final plat.

#### **30.047 Amending plats.**

- (a) An amending plat shall meet all of the informational, procedural, and relevant submission requirements set forth for a final plat.
- (b) Submittal. A copy of all application materials for an amending plat shall be simultaneously submitted to the planning director for review in the same manner as for a final plat, or the application shall be deemed incomplete.
- (c) Permitted purposes. An amending plat may be recorded and is controlling over the preceding or final plat without vacation of that plat, if the plat being amended is signed by the applicants only and if the plat being amended is for one or more of the purposes set forth in this section. The procedures for amending a plat shall apply only if the sole purpose of amending the plat is to achieve at least one of the following:
  - (1) Correct an error in a course or distance shown on the preceding plat;
  - (2) Add a course or distance that was omitted on the preceding plat;
  - (3) Correct an error in a real property description shown on the preceding plat;

- (4) Indicate monuments set after the death, disability, or retirement from practice of the engineer or RPLS responsible for setting monuments;
- (5) Show the location or character of a monument that has been changed in location or character or that is shown incorrectly as to location or character on the preceding plat;
- (6) Correct any other type of scrivener or clerical error or omission previously approved by the municipal authority responsible for approving plats, including lot numbers, acreage, street names, and identification of adjacent recorded plats;
- (7) Correct an error in courses and distances of lot lines between two adjacent lots if:
  - (A) Both lot owners join in the application for amending the plat;
  - (B) Neither lot is abolished;
  - (C) The amendment does not attempt to remove or modify recorded covenants or restrictions or easements; and
  - (D) The amendment does not have a material adverse effect on the property rights of the owners in the plat;
- (8) Relocate a lot line to eliminate an inadvertent encroachment of a building or other improvement on a lot line or easement;
- (9) Relocate one or more lot lines between one or more adjacent lots if:
  - (A) The owners of all those lots join in the application for amending the plat;
  - (B) The amendment does not attempt to remove or modify recorded covenants or restrictions or easements; and
  - (C) The amendment does not increase the number of lots; or
- (10) Make necessary changes to the preceding plat to create six or fewer lots in the subdivision or a part of the subdivision covered by the preceding plat if:
  - (A) The changes do not affect applicable zoning and other regulations of the city;
  - (B) The amendment does not attempt to remove or modify recorded covenants or restrictions or easements; and
  - (C) The area covered by the changes is located in an area that the planning and zoning commission has approved, after a public hearing, as a residential improvement area;
- (11) Replat one or more lots fronting on an existing street if:
  - (A) The owners of all those lots join in the application for amending the plat;
  - (B) The amendment does not attempt to remove or modify recorded covenants or restrictions or easements;
  - (C) The amendment does not increase the number of lots; and
  - (D) The amendment does not create or require the creation of a new street or make necessary the extension

of municipal facilities.

- (d) No requirement for notice or public hearing. Notice, a public hearing, and the approval of other lot owners are not required for the approval and issuance of an amending plat.
- (e) Title. The amending plat shall be entitled and clearly state that it is an “Amending Plat,” and it shall include a detailed “Purpose for Amending Plat” statement which describes exactly what has been changed on the plat since the original (or previous) plat was approved by the city and filed at the county. It shall also state the specific lots affected or changed as a result of the amending plat, and shall include the original subdivision plat boundary.
- (f) Procedure. Other than noted above, the procedure for approval of plat amendment(s) shall be the same as for final plat.
- (g) Recordation. The amending plat shall be recorded with the county clerk in the same manner as prescribed for a final plat, and approval of an amending plat shall expire if all required recording filing materials are not submitted to the city and if the amending plat is not recorded within the time periods specified for a final plat.

#### 30.048 Plat vacation.

- (a) By property owner. The property owner of the tract covered by a plat may vacate, upon approval by the planning and zoning commission and city council, the plat at any time before any lot in the plat is sold. The plat is vacated when a signed, acknowledged instrument declaring the plat vacated is approved and recorded in the manner prescribed for the original plat.
- (b) By all lot owners. If some or all of the lots covered by the plat have been sold, the plat, or any part of the plat, may be vacated on the application of all the owners of lots in the plat with approval obtained in the manner prescribed for the original plat.
- (c) Criteria. The planning and zoning commission and city council shall approve the petition for vacation on such terms and conditions as are in accordance with section 212.013 of the Texas Local Government Code (as amended), and as are reasonable to protect the public health, safety and welfare. As a condition of vacation of the plat, the planning and zoning commission may direct the petitioners to prepare and seek approval of a revised final plat in accordance with these subdivision regulations such that the property is not without a plat.
- (d) Effect of action. On the execution and recording of the vacating instrument, the vacated plat shall have no effect. Regardless of the commission’s and council’s action on the petition, the property owner will have no right to a refund of any monies, fees or charges paid to the city nor to the return of any property or consideration dedicated or delivered to the city except as may have previously been agreed to by the commission and city council.
- (e) City-initiated plat vacation.
  - (1) General conditions. The city council, on its motion and following a public hearing on the matter, may vacate the plat of an approved or recorded subdivision or addition when:
    - (A) Construction on the improvements required for the development have not been completed within two years following the date the plat was approved by the city;
    - (B) No lots within the approved plat have been sold within five years following the date that the plat was approved by the city;

- (C) The property owner has breached a subdivision improvement agreement (see division 6) and the city is unable to obtain funds with which to complete construction of public improvements, except that the vacation shall apply only to lots owned by property owner or its successor; or
  - (D) The plat has been of record for more than five years and the city determines that the further sale of lots within the subdivision or addition presents a threat to public health, safety or welfare, except that the vacation shall apply only to lots owned by the property owner or its successors.
- (2) Procedure. After review and recommendation by the planning and zoning commission, and upon any motion of the city council to vacate the plat of any previously approved subdivision or addition, in whole or in part, the city shall publish notice in a newspaper of general circulation in the city before the 15th day prior to the date of the public hearing at which the plat vacation shall be heard by the city council. The city shall also provide written notice to all property owners within the subdivision or addition. The notice shall state the time and place for a public hearing before the council on the motion to vacate the subdivision or addition plat. The council shall approve the plat vacation only if the criteria and conditions cited above are satisfied.
- (3) Record of plat vacation. If the city council approves vacating a plat, the city shall cause a copy of the plat vacation instrument to be recorded in the office of the county clerk of Van Zandt County along with an exhibit showing a drawing of the area or plat vacated. The county clerk shall write legibly on the vacated plat the word “Vacated” and shall enter on the plat a reference to the volume and page at which the vacating instrument is recorded. If the city council vacates only a portion of a plat, it shall cause a revised final plat drawing to also be recorded which shows that portion of the original plat that has been vacated and that portion that has not been vacated. Upon the execution and recording of the vacating instrument the vacated plat (or the vacated portion of the plat) has no effect.

#### 30.049 **Minor plats.**

- (a) Submission requirements. A minor plat shall meet all of the informational, procedural, and relevant submission requirements set forth for a final plat.
- (b) Application materials. A copy of all application materials for a minor plat shall be simultaneously submitted to the planning department for review in the same manner as for a final plat, or the application shall be deemed incomplete.
- (c) No requirement for notice and public hearing. Notice, a public hearing, and the approval of other lot owners are not required for the approval a minor plat.
- (d) Title. The minor plat shall be entitled and clearly state that it is a “Minor Plat.”
- (e) Recordation. The minor plat shall be recorded in the same manner as prescribed for a final plat, and approval of a minor plat shall expire if all required recording filing materials are not submitted to the city and if the minor plat is not recorded within the time periods specified for a final plat.

#### 30.050 through 30.080. (Reserved)

### Article 3 Subdivision Design Standards

#### 30.081 **Streets.**

- (a) Conformance with city’s policies and regulations. The construction, arrangement, character, extent, width, grade and location of all streets shall conform to the city’s comprehensive plan and design standards, and shall be considered in their relation to the following, whether the streets are within the

city, [or] within its ETJ area:

- (1) Existing and planned streets or driveways;
  - (2) Topographical conditions (the street layout shall, to the greatest extent possible, be sited and aligned along natural contour lines, and shall minimize the amount of cut and fill on slopes in order to minimize the amount of land area that is disturbed during construction);
  - (3) Public safety; and
  - (4) Their appropriate relation to the proposed uses of the land to be served by such streets.
- (b) Residual strips. Reserve or residual strips of land controlling access to or egress from other property, or to or from any street or alley, or having the effect of restricting or damaging the adjoining property for subdivision purposes, or which will not be taxable or accessible [assessable] for improvements shall not be permitted in any subdivision unless such are required by the city in the public interest (such as to enhance public safety or other public interest). All streets shall be constructed in accordance with these subdivision regulations and with the city's design standards.
- (c) Adequacy of streets and thoroughfares.
- (1) Responsibility for adequacy of streets and thoroughfares. The property owner shall ensure that the subdivision is served by adequate streets and thoroughfares, and shall be responsible for the costs of rights-of-way and street improvements, in accordance with the following policies and standards, and subject to the city's cost participation policies on oversized facilities.
  - (2) General policy. Every subdivision shall be served by improved streets and thoroughfares adequate to accommodate the vehicular traffic to be generated by the development. Proposed streets shall provide a safe, convenient and functional system for traffic circulation; shall be properly related to the city's thoroughfare plan, other portions of the comprehensive plan and any amendments thereto, and any street classification system.
  - (3) Street network. New subdivisions shall be supported by a street network having adequate capacity, ingress/egress, and safe and efficient traffic circulation.
  - (4) Approach streets and access. All subdivisions must have at least two points of vehicular access, and must be connected via improved streets (streets that meet the city standards) to the city's improved thoroughfare and street system by one or more approach streets of such dimensions and improved to such standards as required herein. All residential subdivisions shall provide no less than one entrance for each 50 lots including stubs for future development and in no case shall have more than 150 lots for each connection to an existing street.
- (A) Required improvements. Requirements for dedication of right-of-way and improvement of approach streets shall comply with section **30.082** of this article.
- (B) Points of access defined and related requirements. "Two points of vehicular access" shall be construed to mean that the subdivision has at least two improved street entrances accessing the subdivision from the city's improved thoroughfare system.
- (i) For nonresidential subdivisions, cross access provided through an existing or future adjacent lot may count as one entrance if approved by the planning director.

- (ii) The planning and zoning commission and the city council may, at their discretion and upon a finding that such will not compromise public safety or impede emergency access, accept a single, median-divided entrance from the city's improved thoroughfare system provided that the median extends into the subdivision for an unbroken length of at least 100 feet to an intersecting internal street which provides at least two routes to the interior of the subdivision. For example, the entrance street is not a dead-end or cul-de-sac, and it does not create a "bottleneck" allowing only one emergency route into the interior of the subdivision. Residential lots may not front onto any median-divided arterials, and residential driveways may not be located in front of a median.
- (iii) All subdivisions will designate a primary entrance which must meet the base requirements listed below in addition to meeting a required 20-point total from the list of approved, additional point features located in table 2 and table 3 of division 9 of this article. (See diagram B for examples.)
  - a. The primary entrance for a subdivision must have a divided entryway and have a minimum entryway length of one typical, residential lot depth from the community. In terms of subdivisions with a range of lot sizes, the median, typical lot depth will be required.
  - b. Primary subdivision entrances are prohibited from terminating at a "T-intersection" unless it terminates on an approved option from table 2 in division 9 of this article, or on the base requirement of green space equal to one typical (or median) residential lot. It is prohibited for the T-intersection to terminate into a residential home lot.
- (iv) Secondary subdivision entrances are required to have subdivision signage. An additional 15-point total must be met by adding upgraded secondary entrance features or features within the subdivision found in table 4 of division 9 of this article.
- (C) Street openings to adjoining properties. Subdivision design shall provide for a reasonable number and reasonable locations of street openings to adjoining properties. Such an opening shall occur at least every 1,000 feet or in alignment with abutting subdivision streets along each boundary of the subdivision.
- (D) Adequate emergency access. The subdivision shall be designed to provide adequate emergency access for public safety vehicles.
- (5) Off-site and adjacent improvements based on traffic impact analysis (TIA).
  - (A) If in the opinion of the city engineer or planning director, sufficient vehicular access and street capacity approaching and adjacent to the subdivision is not available to serve the proposed subdivision, the city may require the developer provide a traffic impact analysis of the proposed development. Such TIA when required shall be submitted to the city as part of the preliminary plat application.
  - (B) Where a traffic impact analysis demonstrates the need for off-site facilities or improvements to existing adjacent facilities, the developer shall make such improvements to adjacent streets, off-site collector and arterial streets and intersections as are necessary to mitigate traffic impacts generated by the development consistent with section **30.082** of this article.
- (6) Street dedications.
  - (A) Dedication of right-of-way. The developer shall dedicate all rights-of-way required for existing or future streets, and for all required street improvements, including perimeter streets and approach streets, as shown in the comprehensive plan and as required by the design standards or by other valid development plans approved by city council.

- (i) In the case of perimeter streets, 1/2 of the total required right-of-way width for such streets shall be dedicated, unless the proposed development is on both sides of the street, or unless there is some other compelling reason to require dedication of more than half of the right-of-way width (such as avoiding the infringement upon or demolition of existing structures, avoiding crossing a creek or floodplain or some other obstacle, or other similar circumstance).
- (ii) When the proposed development is on both sides of the street, the full right-of-way width shall be dedicated.
- (iii) In cases where construction of only one-half the street is deemed impractical or unsafe, more than 1/2 of the required width shall be dedicated and the full street shall be constructed by the developer.
- (B) Perimeter streets. Where an existing improved half-street is adjacent to a new subdivision or addition, the other half of the right-of-way shall be dedicated and improved by the developer of the new subdivision or addition in accordance with section **30.082** of this article.
- (C) Slope easements. The dedication of easements, in addition to dedicated rights-of-way shall be required whenever, due to topography, additional width is necessary to provide adequate earth slopes. Such slopes shall be no steeper than three feet horizontal run to one foot vertical height, or a 3:1 slope.
- (7) General construction. All improvements required to be constructed by these subdivision regulations shall be constructed to city standards and within rights-of-way as required by the thoroughfare plan and these subdivision regulations, and in accordance with the design standards and other city standards as may be from time to time amended or adopted.
- (8) Intersection improvements and traffic-control devices. Intersection improvements and traffic-control devices shall be installed as may be required by the city for traffic safety and efficiency.
- (9) Phased development. Where a subdivision is proposed to occur in phases, the applicant, in conjunction with submission of the preliminary plat, shall provide a schedule of development.
- (A) Intended plan of development and dedication of rights-of-way. The schedule shall set forth the intended plan of development and dedication of rights-of-way for streets and street improvements, whether on-site or off-site, intended to serve each proposed phase of the subdivision.
- (B) City determination. The city shall determine whether the proposed streets and street improvements are adequate pursuant to standards herein established, and may require that a traffic impact analysis be submitted for the entire project or such phases as the city determines to be necessary to decide whether the subdivision will be adequately served by streets and thoroughfares.
- (10) Private streets. New subdivisions may be constructed with private streets that meet or exceed the specifications set forth in the design standards for similar public streets. The construction of private streets shall be subject to standard city inspections. Any private street subdivisions that were in existence (i.e., platted of record at the county) on the effective date of these subdivision regulations shall be allowed to remain as private street subdivisions provided that the conditions of the private streets and the maintenance thereof continues to meet or exceed city standards, and provided that a viable homeowners' association (HOA) or other similar organization continues to exist to maintain the private streets and all appurtenances. The city will not assist in enforcing deed restrictions. The city may periodically inspect private streets, and may require the HOA or other responsible organization to make any repairs necessary to ensure efficient emergency access and to protect the public health, safety, convenience and welfare.

- (A) Private streets: Construction and maintenance cost. The city shall not pay for any portion of the cost of constructing or maintaining a private street.
- (B) Private streets: Traffic-control devices. All private traffic-control devices and regulatory signs shall conform to the Texas Manual of Uniform Traffic Control Devices, as amended, and to city standards.
- (C) Private streets: Restricted access. The entrances to all private streets shall be clearly marked with a sign, placed in a prominent and visible location, stating that the streets within the subdivision are private, and that they are not maintained nor regularly patrolled by the city. All restricted access entrances shall be manned 24 hours every day, or they shall provide a reliable, alternative means of ensuring access into the subdivision by the city, by emergency service providers, and by other utility or public service providers, such as postal carriers and utility companies, with appropriate identification. The method to be used to ensure city and emergency access into the subdivision shall be approved by the city's fire department and by any other applicable emergency service providers. If the homeowners' association (HOA) fails to maintain reliable access as required herein, the city may enter the private street subdivision and remove any gate or device which is a barrier to access at the sole expense of the HOA.
- (D) Private streets: Waiver of services. Certain city services may not be provided for private street subdivisions. Among the services which may not be provided include routine law enforcement patrols, enforcement of traffic and parking regulations, and preparation of accident reports. Depending upon the characteristics of the development and upon access limitations posed by the design of entrances into the subdivision, other services (such as sanitation) may also not be provided.
- (E) Private streets: Petition to convert to public streets. The homeowners' association (HOA) may petition the city to accept private streets and any associated property as public streets and right-of-way upon written notice to all association members and upon the favorable vote of a majority of the membership. However, in no event shall the city be obligated to accept said streets as public. Should the city elect to accept the streets as public, then the city has the right to inspect the private streets and to assess the lot owners for the expense of needed repairs concurrent with the city's acceptance of the streets. The city shall be the sole judge of whether repairs are needed. The city may also require, at the association's or the lot owners' expense, the removal of any guard houses, access control devices, landscaping or other aesthetic amenities located within the street right-of-way or within any other common area. The city may also require the dedication of additional street right-of-way.
- (F) Private streets: Hold harmless. The homeowners' association (HOA), as owner of the private streets and appurtenances, shall release, indemnify, defend and hold harmless the city, any other governmental entity, and any public utility entity for damages to the private streets that may be occasioned by the reasonable use of the private streets by same, and for damages and injury (including death) arising from the condition of the private streets, out of any use of access gates or cross-arms, or out of any use of the subdivision by the city or governmental or utility entity.
- (d) Required components of traffic impact analysis (TIA). Whenever a TIA is conducted, the following elements shall be included:
  - (1) General site description. The TIA shall include a detailed description of the street network within one mile of the site, a description of the proposed land uses, the anticipated states of construction, and the anticipated completion date of the proposed land development. This description, which may be in the form of a map, shall include the following items:
    - (A) All major intersections;
    - (B) All proposed and existing ingress and egress locations;

- (C) All existing street widths and rights-of-way; and
  - (D) All existing traffic signals and traffic-control devices.
- (2) Proposed capital improvements. The TIA shall identify any changes to the street network within one mile of the site that are proposed by any government agency or other developer. This description shall include the above items as well as any proposed construction project that would alter the width or alignment of streets affected by the proposed development.
- (3) Street impact analysis.
- (A) Trip generation. For the proposed use, items required to determine trip generation shall be based upon the trip generation rates contained in the most recent edition of the Institute of Transportation Engineers' Trip Generation book, or shall be based upon data generated by actual field surveys of area uses comparable to the proposed use and approved by the city. The following items shall be required to determine trip generation:
- (i) Average weekday trip generation rates (trip ends);
  - (ii) The average weekend trip generation rates (for uses other than residential or institutional);
  - (iii) The highest average a.m. and p.m. hourly weekday trip generation rates; and
  - (iv) The highest hourly weekend generation rates (for uses other than residential or institutional).
- (B) Trip distribution. Within the study area identified in subsection **(d)(1)** of this section (General site description), the distribution of trips to arterial and collector streets shall be in conformity with accepted traffic engineering principles, taking into consideration:
- (i) The land use categories of the proposed development;
  - (ii) The area from which the proposed development will attract traffic;
  - (iii) Competing developments (if applicable);
  - (iv) The size of the proposed development;
  - (v) Development phasing;
  - (vi) Surrounding existing and anticipated land uses, population and employment;
  - (vii) Existing and projected daily traffic volumes; and
  - (viii) Existing traffic conditions identified pursuant to subsection **(d)(1)** of this section.
- (4) Adequacy determination. The street network included within the TIA shall be considered adequate to serve the proposed development if existing streets identified as arterials and collectors are basically satisfactory to good progression of traffic and can accommodate the following:
- (A) The existing service volume; and
  - (B) The service volume of the proposed development; and

- (C) The service volume of approved but un-built developments holding valid, unexpired building permits.
- (5) Intersection analysis.
- (A) Level of service analysis. For intersections within the street TIA area described in subsection **(d)(1)** of this section (General site description), a level of service analysis shall be performed for all arterial-to-arterial, arterial-to-collector, collector-to-arterial, and collector-to-collector intersections, and for any other pertinent intersections identified by the city. Also, level of service analyses will be required on all proposed site driveway locations for all nonresidential developments.
- (i) The city may waive analysis of minor intersections and site driveway locations within the TIA's one-mile radius.
- (ii) The level of service analysis shall be based upon the highest hourly average a.m. or p.m. peak weekday volume or highest average hourly peak weekend volume as determined from a two-day survey of weekday volumes and, where necessary, a one-day survey of weekend volumes.
- (iii) The level of service analysis shall take into consideration:
- a. Lane geometry;
  - b. Traffic volume;
  - c. Percentage of right-hand turns;
  - d. Percentage of left-hand turns;
  - e. Percentage (and typical size) of trucks;
  - f. Intersection width;
  - g. Number of lanes;
  - h. Signal timing and progression;
  - i. Street grades;
  - j. Pedestrian and bicycle flows;
  - k. School routes;
  - l. Number of accidents; and
  - m. Peak hour factor.
- (B) Adequacy analysis. The intersections included within the TIA shall be considered adequate to serve the proposed development if existing intersections can accommodate:
- (i) The existing service volume;
  - (ii) The service volume of the proposed development; and
  - (iii) The service volume of approved but un-built developments holding valid, unexpired building permits.

- (e) Arrangement of streets not shown on the thoroughfare plan. For streets that are not shown on the city's comprehensive plan, such as local residential streets, the arrangement of such streets within a subdivision shall:
- (1) Provide for the continuation or appropriate projection of existing streets from or into surrounding areas;
  - (2) Conform to a plan for the neighborhood approved or adopted by the city to meet a particular situation where topographical or other conditions make continuance or conformity to existing streets impractical;
  - (3) Provide for future access, such as by stubbing streets for future extension, to adjacent vacant areas which will likely develop; and
  - (4) Not conflict in any way with existing or proposed driveway openings, including those on the other side of an existing or planned median-divided arterial, in which case new streets shall align with such driveway openings such that median openings can be shared.
- (f) Discouraging through traffic in residential development.
- (1) Residential collector streets and minor residential streets shall be laid out such that their use by through traffic will be discouraged, such as via circuitous routes or multiple turns or offsets, but such that access is provided to adjacent subdivisions.
  - (2) Wherever the right-of-way width of a collector or residential street must transition to a greater or lesser width, such transition shall occur along the front, side or rear lot lines of adjacent lots (for a reasonable distance) and shall not occur within the street intersection itself. In other words, the right-of-way width shall be the same on both sides of the street intersection.
  - (3) Direct vehicular access from single-family or two-family residential lots onto any type of street other than a local street is prohibited, except for residential collector streets provided that neither side of the street runs along the vehicle-accessible side(s) of a lot(s) for a combined linear distance exceeding 20% of the total centerline length of the street. Such calculations shall be submitted with the preliminary plat application, thereby verifying that lots fronting onto a collector street do not exceed this allowed percentage.
  - (4) At least 40% of the total centerline length of all streets (including collector streets) within a residential subdivision containing 30 lots or more—or within each phase of a residential subdivision, unless otherwise approved by the city to apply to the subdivision in its entirety rather than each individual phase—shall be curvilinear in design except the minimum centerline radius for residential streets shall be 150 feet. Calculations shall be submitted with the preliminary plat application, thereby verifying that this requirement is being met. To be considered curvilinear in design, a 200' centerline radius must have an arc length of 200'. For larger centerlines, the arc length shall increase by 70' for every 100' increase in centerline radius or fraction thereof (i.e., 1,000' radius = 760' arc length). Reference diagram C in division 9 of this article.
- (g) Residential subdivision abutting or containing an existing or proposed arterial street. Where a residential subdivision abuts or contains an existing or proposed arterial street, the city may require marginal access streets, reverse frontage lots (lots which back onto the arterial), or such treatment as may be necessary for adequate protection of residential properties and to afford separation of through and local traffic.
- (h) Reserve strips prohibited. Reserve strips controlling access to streets shall be prohibited, except where their control is required by the city.

- (i) Centerline offsets. Intersecting, undivided streets with centerline offsets of less than 150 feet shall be prohibited. Intersecting streets onto an existing or future divided street shall be configured such that the centerline offset will accommodate the appropriate median opening and left-turn lanes (with required transition and stacking distances) on each divided street, and shall be aligned with any existing or proposed streets or driveways on the opposite side of the divided street (in order to share the median opening).
- (j) Degree required for intersections. A street intersection with a major thoroughfare shall be at a 90-degree angle and shall be tangent for at least 100 feet. All other street intersections shall be laid out so as to intersect as nearly as possible at a 90-degree angle or radial to the centerline of the intersecting street for the full right-of-way width of the intersecting street, and tangent to the intersecting street for at least 50 feet. No street shall intersect at an angle that is less than 80 degrees.
- (k) Spacing of intersections. Intersections of arterial streets shall be at least 800 feet apart.
- (l) Street section requirements.
  - (1) Typical street sections shall be based upon projected traffic volume, existing soil conditions, and drainage condition and requirements. Street right-of-way widths, pavement widths, and median widths shall be as shown on the comprehensive plan, in the city's design standards, and shall specifically be as specified in division 9, table 1.
  - (2) Open-ditch streets shall have a right-of-way width and pavement width as required in the design standards. Open-ditch streets may be approved only within a single-family subdivision where all lots within the subdivision are one acre or larger. Approval by the planning and zoning commission and city council of open-ditch streets is not mandatory but rather discretionary.
- (m) Street loading requirements. Refer to the city's design standards.
- (n) Half-streets.
  - (1) Unless otherwise provided within these subdivision regulations, only full-width streets shall be constructed. If the exceptions outlined herein are applicable, the construction of half-streets shall comply with section **30.082** of this article.
  - (2) Construction of half-streets shall be prohibited, except:
    - (A) When essential to the reasonable development of the subdivision in conforming with the other requirements of these subdivision regulations and the thoroughfare plan;
    - (B) Where the city makes a determination that there is no immediate need to be gained by constructing the full street section since no access from the street will be needed by the subdivision in question; or
    - (C) Where the city determines that it would be more practical, or cost effective, to delay construction of the other half of a street until the adjoining property is developed.
  - (3) Whenever a partial street has been previously platted along a common property line, the other portion of the street right-of-way shall be dedicated such that the right-of-way is increased to the street's ultimate planned width.
- (o) Maximum and minimum length of block or street segments. The maximum length of any block or street segment, including a looped street, shall be 1,200 feet and the minimum length of any block or street

segment shall be 400 feet, as measured along the street centerline and between the point(s) of intersection with other through streets. A cul-de-sac or dead-end street shall not be considered a through street. The block length is not measured along the side of a block that does not include the front of any lot.

- (p) Maximum length of cul-de-sac streets. A cul-de-sac street shall not be longer than 600 feet, and at the closed end shall have a turnaround bulb with an outside pavement diameter of at least 80 feet and a right-of-way diameter of at least 100 feet. The length of a cul-de-sac shall be measured from the centerline of the intersecting street to the centerpoint of the cul-de-sac bulb.
- (q) City council waivers/suspensions of overlength streets or cul-de-sacs. The city council may approve waivers/suspensions (procedures for which are outlined in section **30.010** of this article) for overlength streets or cul-de-sacs, whether temporary or permanent, upon considering the following:
  - (1) Alternative designs;
  - (2) The effect of overlength streets upon access, congestion, delivery of municipal services, and upon convenience to residents of the subdivision in traveling to and from their homes; and
  - (3) Means of mitigation, including additional mid-block street connections, limitation on the number of lots to be served along an overlength street segment or cul-de-sac, points of emergency access, and additional fire protection measures.
- (r) Dead-end streets.
  - (1) No dead-end streets shall be approved, except where no other alternative is available, and unless such dead-end streets are provided to connect with future streets on adjacent land (i.e., the dead-end street is a stub-out street).
  - (2) In the case of dead-end streets which will eventually be extended into the adjacent subdivision, no more than one lot (per side) can front onto the dead-end street stub unless a temporary turnaround bulb (with the appropriate temporary street easement) is provided at the end.
  - (3) A temporary dead-end street shall not exceed the maximum allowed length of a normal cul-de-sac and the temporary turnaround bulb must be constructed like a cul-de-sac, as provided in subsection **(p)** of this section. The city engineer may authorize the use of asphalt or other durable paving material than concrete for the arc, or “wing,” portions of the temporary turnaround bulb in order to minimize the cost of removing those portions when adjacent development occurs.
  - (4) A note shall be placed on the final plat clearly labeling any temporary dead-end streets (if any) that will at some point be extended into the adjacent property.
  - (5) Signage shall be placed at the end of the constructed street stub, such as on the barricade, also stating that the street will be extended in the future. Signage and related lettering must be large enough to be legible by a person with normal vision at a 20-foot distance.
  - (6) Any required temporary turnaround easements shall be shown on the final plat along with their appropriate recording information, if they are off-site or are established by separate instrument.
- (s) New streets extending existing streets. New streets which extend existing streets shall bear the names of the existing streets, and shall be dedicated at equal or greater right-of-way widths than the existing streets for an appropriate transition length, if applicable.

- (t) Driveway access - Residential and nonresidential.
- (1) Residential driveways. Residential driveway cuts shall not be allowed on streets that are larger than a neighborhood or residential collector street (60-foot right-of-way). Residential driveways shall be at least 30 feet from any intersection. Rear and side driveway access to collector and thoroughfare streets shall be prohibited.
- (2) Nonresidential driveways - Number. The maximum number of nonresidential driveway cuts permitted shall not exceed the following, according to the nonresidential lot size:
- (A) One driveway cut for lot frontages of 100 feet or less;
- (B) Two driveway cuts for lot frontages of 101 feet to 400 feet or less;
- (C) Three driveway cuts for lot frontages of 401 feet to 600 feet;
- (D) Four driveway cuts for lot frontages greater than 600 feet.
- (3) Nonresidential driveways - Separation. The minimum separation between driveways shall not be less than the following distances:
- (A) Fifty (50) feet on local streets;
- (B) Ninety (90) feet on neighborhood collector streets;
- (C) One hundred (100) feet on divided and undivided collector streets.
- (D) One hundred and twenty (120) feet on arterial streets;
- (E) One hundred (100) feet or a distance equal to 60% of the lot frontage (whichever is less) on any type of street from a through-street intersection.
- (4) Nonresidential driveways - Shared access. Shared access driveways may be required by the city in order to ensure public safety access by providing mutual/common access to a median opening, to minimize the number of driveway cuts on streets, thereby maintaining street mobility, and to facilitate traffic flow between adjacent lots. (See division 9, diagram A.)
- (A) A shared mutual access easement(s) for a driveway(s) may be required between adjacent lots fronting on an arterial or collector street, as designated on the comprehensive plan (as the street exists or is planned to be improved in the future).
- (B) The location and dimensions of such easement(s) shall be determined by the planning director.
- (C) Such easements shall be noted on the preliminary plat and final plat.
- (5) Nonresidential driveways - Cross access internal driveways. Cross access easements for internal driveways may be required by the city in order to minimize the number of driveway cuts on streets, thereby maintaining street mobility, and to facilitate traffic flow between adjacent lots. (See division 9, diagram A.)
- (A) A cross access easement(s) for an internal driveway(s) may be required between adjacent lots.
- (B) The location and dimensions of such easement(s) shall be determined by the planning director.

- (C) Such easements shall be noted on the preliminary plat and final plat.
- (6) Driveways (residential and nonresidential) on TxDOT streets. All driveway cuts on streets and highways maintained by the Texas Department of Transportation (TxDOT) (e.g., state roads, highways) shall meet the requirements of TxDOT's Access Management Manual (as may be amended) and roadway design manual (as may be amended), as applicable for the spacing and design of the driveway, unless city standards are more stringent, in which case city standards shall be met.
- (7) Maintenance agreements. An agreement that provides for the perpetual maintenance of a shared driveway, cross access internal driveway, or any other common facility is required and must be filed at the time of final plat approval. All agreements are subject to review and approval by the city attorney.
- (8) Driveway construction. All driveways that access streets or highways owned or maintained by the city shall be constructed in accordance with the driveway design standards outlined in the city's design standards. Notwithstanding any other provisions of this article or the design standards, rear and side residential driveway access to expressways, arterials and any type of collector streets shall be prohibited.

### 30.082 Perimeter and approach streets.

- (a) Policy and purpose.
    - (1) It is the policy of the city that the developer or subdivider of a subdivision within the city or its extraterritorial jurisdiction shall be responsible for the dedication of right-of-way and the construction or improvement of appropriate portions of perimeter and approach streets which are necessitated by and attributable to that subdivision. The policy is based on the view that the developer of a subdivision should provide access and transportation facilities necessary to serve the new subdivision and that the perimeter and approach streets will provide access to and from the subdivision, thus increasing the marketability, utility, and ultimately the value of the property within the subdivision. The developer may be reimbursed for part of the cost of providing this access in accordance with this section.
    - (2) The purpose of this section is to establish responsibilities for the dedication of rights-of-way and the construction of street improvements on streets directly abutting and/or providing access to property undergoing the process of subdivision under laws and regulations of the city. This section is designed to be used in conjunction with the comprehensive plan to ensure an orderly development plan for the growth of the community and to ensure compatibility of street systems and the development of public works infrastructure necessary to support new growth and development.
  - (b) Requirement for dedication and construction of perimeter streets.
    - (1) Dedication requirement.
      - (A) A subdivider shall dedicate a portion of the right-of-way for perimeter streets sufficient for the type of street that is reflected in the city's comprehensive at that location.
      - (B) The subdivider shall dedicate those portions of the right-of-way lying between the centerline of the perimeter street and the nearest property line of the subdivided property. If a subdivision borders only one side of a perimeter street, the subdivider is responsible for dedicating right-of-way needed for the one-half of the street right-of-way that is contiguous to the subdivider's property. If a subdivider owns a tract of land that is bordered by a perimeter street on more than one side, the subdivider is responsible for dedicating appropriate right-of-way for the entire width of the perimeter street.
    - (2) Additional right-of-way. When a subdivider is required to dedicate right-of-way for a perimeter street or
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to construct perimeter street improvements, the city may require the subdivider to dedicate right-of-way for ancillary drainage improvements and to construct necessary supporting drainage improvements.

- (3) Required paving/construction. Minimum width of a two-lane thoroughfare section shall be 25 feet.
- (c) Specific perimeter street requirements.
  - (1) Local streets. When development occurs adjacent to a perimeter street that is not designated as an arterial or collector street on the comprehensive plan, the developer shall comply with the following requirements:
    - (A) Existing street. If the local street adjacent to the subdivision is not already built to city standards, the developer shall, at the option of the city, prior to acceptance of the subdivision by the city:
      - (i) Dedicate any additional right-of-way or easements needed for the street and other public improvements directly adjacent to the developer's side of the existing street and right-of-way; and
      - (ii) Install, reinstall, or upgrade any street paving curb, gutter, drainage, sidewalks, signage, lighting, or other improvements as determined necessary by the planning director or city engineer.
    - (B) Perimeter street fee for existing street. If the perimeter street was constructed by a prior developer under the provisions of a subdivision improvement agreement that allows for reimbursement (see section **30.202(i)**), then the current developer shall be charged a perimeter street fee equal to the reimbursement amount described in the prior subdivision improvement agreement. The current developer shall pay this fee to the city before acceptance of the subdivision by the city.
    - (C) No existing street; developer responsibility for construction. If the local street adjoining the development has not been constructed, or is in such condition that complete reconstruction is, in the opinion of the city engineer or as determined by a traffic impact analysis necessary, the developer must construct a complete city standard street with curb, gutter, drainage facilities, sidewalks, and signage in conformance with city standards. The initial developer is required to construct a complete street because it is impractical and unsafe to build only one-half of a two-lane street. The developer is responsible for all construction, engineering, testing, and inspection costs.
  - (2) Collector streets. When development occurs adjacent to a perimeter street, which is designated as a major collector or minor collector street in the comprehensive plan, the developer shall comply with the following requirements:
    - (A) Existing street. If the minor or major collector street adjacent to the subdivision is not already built to city standards, the developer shall:
      - (i) Dedicate any additional right-of-way or easements needed for other public improvements directly adjacent to the developer's side of the existing street surface and right-of-way; and
      - (ii) Install, reinstall, or upgrade any street paving, curb, gutter, drainage, sidewalks, signage, lighting, or other improvements as determined by the necessary by the planning director or city engineer.
    - (B) Perimeter street fee for existing street. If the perimeter street was constructed by a prior developer under the provisions of a subdivision improvement agreement that allows for reimbursement (see section **30.202(i)**), then the current developer shall be charged a perimeter street fee equal to the reimbursement amount described in the prior subdivision improvement agreement. The current developer shall pay this fee to the city before acceptance of the subdivision by the city.

- (C) No existing street; developer responsibility for construction. If the perimeter street adjoining the development is proposed to be a major or minor collector street, and the street has not been constructed or is in such condition that complete reconstruction is, in the opinion of the city engineer or as determined by a traffic impact analysis necessary, the developers along each side of the street must construct at least two complete lanes with curb, gutter, signage, drainage and sidewalk facilities in conformance with city standards. The developer is responsible for all construction, engineering, testing, and inspection costs. Construction of the street or portion of the street, as required by the city, must be completed prior to acceptance by the city of the subdivision adjacent to the perimeter street.
- (d) Requirement for dedication and construction of approach streets.
- (1) Non-availability of approach street access. If sufficient vehicular access approaching the subdivision is not available to serve the proposed subdivision as determined by the city engineer or a traffic impact analysis, the developer must:
- (A) Discontinue development until an adequate approach street has been installed providing access to and from an improved street/thoroughfare;
- (B) Petition the city council to expedite the construction or expansion of an approach street serving the proposed subdivision under its regular capital improvement program; or
- (C) Construct or expand the approach street in order to provide required access to the proposed subdivision. The developer will be responsible for all costs associated with the construction of necessary approach streets, including, but not limited to engineering, surveying, testing, easement preparation easement and right-of-way acquisition, and inspection.
- (e) Escrow funds.
- (1) Established. The city shall establish an escrow fund for the deposit of all perimeter street fees. A separate escrow fund shall be established for each street constructed by the developer. All monies received from subsequent developments or subdivisions for pro-rata reimbursements shall be deposited into the specific escrow fund established. Funds in a specific escrow account shall be used only for the project for which the particular escrow fund was established.
- (2) When city may take possession of funds. In the event that the city collects a perimeter street fee under the terms of this section and the original developer no longer exists or cannot reasonably be located, the city may, after a period of six months, take possession of the funds and use them to make general street improvements in the city.
- (f) Deadlines and adjustments.
- (1) Time for payment or construction. All construction or escrow and payment of funds by a developer as required in this section shall be due and payable prior to acceptance of the subdivision by the city. Fees or construction requirements shall be paid for all property that is final platted at time of construction of the subdivision.
- (2) Adjustment. The city council may, in appropriate cases and based upon specific facts presented, authorize an adjustment, offset or waiver of any construction or fee payment requirements under this section where it is determined that such requirements place an unreasonable burden on the development, [or] do not bear a rough proportionality to the requirements necessary to serve the development or offset the impact of the development. All such requests for adjustments shall comply with the requirements in section **30.011** of this article.

**30.083 Alleys.**

- (a) Application of standards. The standards for alleys within this section shall be applicable to any alleys provided or constructed by a developer in any development in the city or its ETJ.
- (b) Residential alleys. In residential districts, alleys shall be parallel, or approximately parallel, to the frontage of the street. Alleys in residential districts shall provide a minimum of 15 feet of right-of-way and 10 feet of pavement.
- (c) Nonresidential alleys. Service alleys in nonresidential districts shall have a minimum right-of-way width of 20 feet and a pavement width of 15 feet.
- (d) General design standards for alleys.
  - (1) Pavement. Alleys shall be paved in accordance with the city's design standards and construction standards that are in effect at the time the preliminary plat application is officially submitted and deemed a complete application.
  - (2) Turnouts and street entrances. Alleys shall have adequate turnouts and street entrances such that vehicular traffic flow is continuous and efficient. Where a temporary dead-end alley situation is unavoidable, a temporary turnaround bulb having a minimum radius of 40 feet or a turnout onto a street, either of which will need a temporary easement for street or alley purposes, shall be provided as determined by the planning director; in such case, the developer shall pay for and post a sign that meets city specifications at the entrance denoting the dead-end alley.
  - (3) Maximum length and waivers/suspensions. Alleys shall not exceed a maximum length of 800 feet, as measured along the centerline of the alley and between intersections with other alleys or entrances onto streets (at the right-of-way line of the street at the alley entrance). The city council may approve waivers/suspensions for overlength alleys upon consideration of the following:
    - (A) Alternative designs;
    - (B) The effect of overlength alleys upon access, congestion, delivery of municipal services, and upon convenience to residents of the subdivision in accessing rear driveways and in driving around to the front of their homes; and
    - (C) Means of mitigation, including but not limited to additional mid-block alley turnouts, limitation on the number of lots to be served along a single alley segment, points of access, and additional fire protection measures.
  - (4) Intersections. Alley intersections shall be perpendicular and at a 90-degree angle or radial to the intersecting alley centerline for the full alley right-of-way width. Intersection pavement design shall be of sufficient width and inside radius to accommodate waste collection and emergency vehicles. Intersections shall be three-way wherever possible, and four-way intersections shall be avoided. No alley intersection serving more than four directions shall be allowed.

**30.084 Easements.**

- (a) Width of easements.
  - (1) Utility. The minimum width for utility easements shall be in accordance with the standards outlined in the design standards and shall be adequate for the installation and maintenance of utilities that are likely to be located in the easement.

- (2) Drainage. The minimum width for city drainage easements shall be as required by the planning director and city engineer.
- (3) Storm drainage or floodway. Where a subdivision is traversed by a watercourse, drainageway or channel, there shall be provided a storm drainage easement or right-of-way conforming substantially with such course and of such additional width as may be designated by the planning director and city engineer, subject to determination according to proper engineering considerations. The required width shall conform to the requirements set forth by the Federal Emergency Management Agency (FEMA), the U.S. Army Corps of Engineers, and/or the city. Parallel streets or parkways are encouraged adjacent to certain portions of creeks or drainageways to provide maintenance access and/or public access and visibility into public open space or recreation areas. Utilities may be permitted within a drainage or floodway easement only if approved by the planning director and city engineer and any other applicable entity requiring the drainage or floodway easement.
- (4) Other. The width of easements for other utility providers, such as for gas, electric, telephone or cable television, shall be as required by that particular entity. It shall be the developer's responsibility to determine appropriate easement widths required by other utility companies.
- (b) Location of easements. Easements shall be located to accommodate the optimal design (as determined by the city) of the various utility and drainage systems that will serve the subdivision, and shall be provided in locations to accommodate any public purpose deemed necessary to protect the public health safety and welfare. In residential subdivisions, where alleys are not provided, a minimum 10-foot wide utility easement shall be provided along the front of all lots, adjacent to and flush with the street right-of-way line for the potential placement of utility facilities.
- (c) Computation of lot and buildable area. A lot's area shall be computed inclusive of all easements. However, there shall be a minimum buildable area, exclusive of required easements, buffer zones and setbacks for each lot. The minimum buildable area shall be an area 1/2 of the required minimum lot size. If the city disputes the buildable area of any lot, the developer shall submit verification in writing that the buildable area is adequate for the type of housing product (or nonresidential building) proposed for that lot. Final approval of the allowed buildable area for any lot shall be by the city.
- (d) On-site easements shown on plat. For new development, all necessary on-site easements shall be established on the plat and not by separate instrument, and they shall be labeled for a purpose, such as for franchised public utilities. Other examples include, but are not limited to, the following: a drainage easement, which is dedicated to the city for a drainage structure; an access easement, which is dedicated to the public for unrestricted access purposes; a fire lane easement, which is dedicated to the city and its fire suppression and emergency medical service providers for access purposes; and an electrical, gas, or telephone easement which is dedicated to the specific utility provider that requires the easement.
- (e) Visibility easements.
- (1) Type of intersection. Whenever an intersection of two or more public rights-of-way occurs, a triangular visibility area shall be created. The visibility easement for each type of intersection shall be as follows:
- (A) Intersection of two arterial streets: 40 feet from the intersection right-of-way;
- (B) Intersection of a collector or local street onto an arterial street: 25 feet from the intersection right-of-way;
- (C) Intersection of two collector or local streets (or one of each): 25 feet from the intersection right-of-way;
- and

- (D) Intersection of two alleys: 20 feet from the intersection right-of-way.
- (2) Fixed items. The maximum height of fences, walls, signs, and other similar fixed items shall be 30 inches (2-1/2 feet) within the visibility easement.
- (3) Landscaping. All landscaping (and any other fixed feature) within the triangular visibility area shall be designed to provide unobstructed cross-visibility at a level between 30 inches (2-1/2 feet) and ten feet (10'). Trees adjacent to this visibility area shall be trimmed in such a manner that no limbs or foliage extend into the cross-visibility area. Landscaping, except grass and low ground cover, shall not be located closer than three feet from the edge of any street pavement.

### 30.085 Blocks.

- (a) Determination. The length, width and shapes of blocks shall be determined with due regard to the following:
- (1) Provision of adequate building sites suitable to the special needs of the type of use contemplated;
  - (2) Zoning requirements as to lot sizes, setbacks and dimensions (if within the city's corporate limits); and
  - (3) Needs for convenient access, circulation, control and safety of street traffic and for pedestrians or bicyclists traveling to a public park or school site or other facility within or close to the neighborhood.
- (b) Lengths and widths. Intersecting streets, which determine the lengths and widths of blocks, shall be provided at such intervals as to serve cross-traffic adequately, to provide adequate fire protection, and to conform to customary subdivision practices. Where no existing subdivision or topographical constraints control, block lengths shall be in accordance with section **30.081(o)** of this article. However, in cases where physical barriers or property ownership creates conditions where it is appropriate that these standards be varied, the length may be increased (through issuance of a waiver/suspension by the city council) or decreased to meet the existing conditions having due regard for connecting streets, circulation of traffic and public safety.

### 30.086 Sidewalks.

- (a) Provided in residential and nonresidential areas.
- (1) Pedestrian concrete walkways (sidewalks) not less than the following width shall be provided along both sides of newly constructed streets as follows:

Street Type	Sidewalk Width
Arterial	5 feet
Divided and undivided collector	5 feet
Neighborhood collector	5 feet
Local residential	5 feet

- (2) Construction standards for sidewalks shall be as set forth in the city's design standards.
- (b) Provided along perimeter streets.

- (1) All sidewalks along a perimeter street are considered part of the overall development's required public improvements. A certificate of occupancy will not be issued for any lot within the subdivision until the required sidewalks are in place or appropriate surety is provided.
- (2) The cost and provision of any perimeter sidewalks, such as along major thoroughfares, may be escrowed as a part of a subdivision improvement agreement, if approved by the city council. The city has the right to refuse escrow and to require paving of the sidewalks if, in its sole opinion, immediate provision of the sidewalks is necessary for safe pedestrian circulation or if it would otherwise protect the public health, safety, convenience or welfare.
- (c) Pedestrian access. The city may require, in order to facilitate access from the streets and streets to schools, parks, playgrounds or other nearby streets, perpetual unobstructed easements of up to 15 feet in width. The improved pedestrian surface that provides such access must be within the easement.

### 30.087 Lots.

- (a) Requirements of the zoning district if applicable. Lots shall conform to the minimum requirements of the established zoning district, if located within the city's corporate limits.
- (b) Minimum frontage on a public street. Each lot on a subdivision plat shall front onto a dedicated, improved public street, unless platted as an approved private street subdivision in accordance with these subdivision regulations. All lots shall have a minimum of 40 feet of frontage along the property line of a dedicated, improved street unless other provisions have been authorized under article 9.04 or an approved planned development district.
- (c) Irregularly shaped lots. Irregular-shaped lots shall have sufficient width at the building line to meet lot width and frontage requirements of the appropriate zoning district (if within the city's limits). Such lots shall also provide a reasonable building pad without encroachment into front, side or rear yard setbacks or into any type of easement. Also, the rear width shall be sufficient to provide access for all necessary utilities, including access for driveways when alleys are present (minimum 20-foot alley frontage). In general, triangular, severely elongated or tapered, "flag" or "panhandle" lots shall be avoided, and the city reserves the right to disapprove any lot which, in its sole opinion, will not be suitable or desirable for the purpose intended, which is an obvious attempt to circumvent the purpose and intent of lot configuration or lot width minimums, or which is so oddly shaped as to create a hindrance to the logical lot layout of surrounding properties.
- (d) Side lot lines. Side lot lines shall be at 90-degree angles or radial to street right-of-way lines to the greatest extent possible. The city reserves the right to disapprove any lot which, in its sole opinion, is shaped or oriented in such a fashion as to be unsuitable or undesirable for the purpose intended, or which is not appropriately oriented toward its street frontage.
- (e) Double frontage lots. Double frontage lots shall be avoided, except where they may be essential to provide separation of residential development from arterial or collector streets, or to overcome a specific disadvantage or hardship imposed by topography or other factors. Where lots have double frontage, appropriate building setback lines shall be established for each street side, and rear yard screening shall be provided in accordance with section 30.167 of this article. Except as provided within this subsection, residential lots shall not back onto any residential street or collector street within a residential area or neighborhood, and shall not have more than 1/2 of their perimeter boundaries along streets.
- (f) Corner lots.
  - (1) Corner lots with a width less than 65 feet are to be at least five feet wider than the average of interior

lots in the block. Corner lots with a width less than 75 feet adjacent to a major collector or thoroughfare shall be at least 15 feet wider than the average of interior lots in the block.

- (2) Where corner lots are key lots, the corner lot shall have a front building line on both streets, unless said key lot is separated from other lots by a dedicated street or alley.
- (3) Where corner lots are also double frontage lots, consideration shall be given to providing adequate width and depth to ensure that adequate site visibility is provided at the rear corner intersection.
- (g) Lot depth.
  - (1) No lot shall be platted less than 100 feet in depth.
  - (2) Lots facing or backing on major streets shall be at least 10 feet deeper than the average depth of lots facing on the minor streets.
- (h) Computation of lot and buildable area. A lot's area and buildable area shall be computed as outlined in section **30.084(c)**.

#### **30.088 Building lines.**

- (a) Platting. Front building lines shall be shown on all plats (i.e., all types) for all lots.
- (b) Requirements in city. For property that is within the city, building lines shall be consistent with the zoning ordinance requirements for the district in which the development is located and with any other applicable city ordinance.
- (c) Requirements in extraterritorial jurisdiction. For property that is within the city's extraterritorial jurisdiction, the minimum front building line for all lots (residential or nonresidential) shall be 25 feet.

#### **30.089 Utility services not provided by city.**

- (a) Meanings. For the purposes of this section of the code, the following terms, phrases, words, and their derivatives shall have the meanings given herein. Definitions not expressly prescribed herein are to be determined in accordance with customary usage in municipal planning and engineering practices. Words used in the present tense include the future, words in the plural number include the singular number, and words in the singular number include the plural. The word "shall" is deemed as mandatory. The word "may" is deemed as permissive.

#### **Feeder or feeder/lateral line**

means high voltage supply electric lines carrying more than 69,000 volts that emanate from substations used to distribute power through an area to an unspecified number of customers.

#### **Lateral lines**

means those electric or telephone lines used to distribute service from a feeder line to a single subdivision. These electric lines are normally connected to a feeder line through a sectionalizing device such as a fuse.

#### **Service lines**

means those lines used to connect between the utility's system or lateral lines and the end user's meter box.

#### **Utility services**

means the facilities of any person, firm or corporation providing electric, natural gas, telephone, cable television, internet, or any other such item or service for public use approved but not provided by the city.

(b) Provision for utility services.

(1) All subdivision plats and engineering plans submitted to the city for approval shall provide for utility services such as electrical, gas, telephone and cable television utility lines, including lateral or service distribution lines, and wires to be placed underground. Feeder and other major transmission lines may remain overhead within the appropriate easements. There shall be provided at street intersections underground conduits as approved by the city engineer for utility public road right-of-way crossings. There shall be no other utility road crossings except as authorized by the director of public works or city engineer. No utilities except those of the city may be installed in the rights-of-way of public roads .

(2) Feeder lines.

(A) An applicant shall endeavor and, whenever practical, the city shall require that feeder lines are placed away from major or minor collectors or arterials, as shown on the comprehensive plan.

(B) Whenever practical, feeder lines which are to be placed overhead shall not be placed along both sides of the street right-of-way.

(3) Utility companies.

(A) The locations, widths and configurations of easements for any utility service provider other than the general utility easements dedicated to the city shall be determined, approved and acquired (if necessary) by the applicable utility service provider.

(B) Each of the utility companies shall be responsible for developing administrative policies, criteria for easement size, and cost reimbursement procedures for the installation and extension of their underground utilities.

(C) Nothing herein shall prohibit or restrict any utility company from recovering the difference in cost of overhead facilities and underground utilities from the developer in accordance with the provisions of such utility's approved tariff.

(D) No utility company shall be required or permitted to begin construction of underground facilities unless and until the developer of the subdivision has made arrangements satisfactory to the specific utility company for the payment of such difference between the cost of overhead facilities and underground facilities.

(c) Electrical and telephone support equipment. All electrical and telephone support equipment, including amplifiers and switching devices necessary for underground installations, shall be pad- or ground-mounted, or shall be placed underground and not overhead, unless the subdivision is served from perimeter overhead electrical facilities.

(d) Temporary overhead lines and facilities. Temporary construction service may be provided by overhead electric lines and facilities without obtaining a waiver/suspension or special exception, provided that when the underground utility service to any portion of a subdivision is completed, such overhead electric lines and facilities are promptly removed.

(e) Existing facilities. Nothing in this section shall be construed to require any existing facilities in place

prior to the effective date of these subdivision regulations to be placed underground.

- (f) Metering. The metering for utilities such as water, gas and electricity shall be located on the individual lots to be served, not grouped together in a centralized location(s), such as “gang-box” style metering stations, unless specifically authorized by the director of public works.
- (g) Inspection by the city and conformance with city standards. All utility installations shall be subject to inspection by the city, and shall be in conformance with any applicable city ordinance (including the design standards and management of public rights-of-way) related to their placement within public rights-of-way, within easements, or elsewhere in the city (including on private property).
- (h) Location of utilities within easements and rights-of-way. The city may designate or assign locations for the installation of utilities within easements or rights-of-way dedicated to the city.
- (i) Required utilities. No building permit shall be issued until all lots within any subdivision shall have readily available electricity, and telephone service.

### 30.090 **Water and wastewater facility design.**

- (a) Connections for water. All new subdivisions shall be connected with the city’s water system or other public water supply system approved by TCEQ. The water system shall be capable of providing water for health and emergency purposes, including fire protection. The design and construction of water system shall comply with the following standards:
  - (1) Applicable regulations of the Texas Commission on Environmental Quality (TCEQ).
  - (2) Standards in the city’s design standards.
  - (3) Fire protection and suppression standards in accordance with the city’s policies and ordinances including fire code adopted by the city.
- (b) Connections for wastewater.
  - (1) All new subdivisions shall be served by a wastewater collection and treatment system authorized and permitted by the TCEQ, except as provided below. The design and construction of the wastewater system improvements shall be in accordance with the standards in the city’s design standards, and in accordance with TCEQ standards.
  - (2) On-site sewage facilities such as septic or aerobic systems may be permitted by the planning and zoning commission and city council in subdivisions where each lot is one acre or more in area, if the subdivision is 1,000 feet or more from a connection to a wastewater collection system. The approval of an on-site sewage disposal facility by the planning and zoning commission and city council is not mandatory but rather discretionary.
  - (3) Exceptions to the lot size regulations in subsection (2) above may be approved by the planning and zoning commission and city council for properties existing on the effective date of these subdivision regulations that are less than one acre, and for residential cluster or conservation developments that group residential properties in the proposed subdivision closer together and that preserve at least 1/2 of the land in the subdivision for open space, recreation or agriculture.
- (c) Subdivider responsibilities. The subdivider shall be responsible for the following:
  - (1) Phasing of development or improvements in order to maintain adequate water and wastewater services;

- (2) Extensions of utility lines (including any necessary on-site and off-site lines) to connect to existing utility mains of adequate capacity;
  - (3) Providing and/or procuring all necessary easements for the utilities (whether on-site or off-site);
  - (4) Providing proof to the city of adequate water and wastewater service;
  - (5) Providing for future expansion of the utilities if such will be needed to serve future developments, subject to the city's oversize participation policies (refer to sections **30.004** and **30.011** and section **30.202(c)** of this article for information on adequate facilities and proportionality of developer participation), if applicable;
  - (6) Providing all operations and maintenance of the private utilities, or providing proof that a separate entity will be responsible for the operations and maintenance of the utilities;
  - (7) Providing all fiscal security required for the construction of the utilities;
  - (8) Obtaining approvals from the applicable utility providers if other than the city; and
  - (9) Complying with all requirements of the utility providers, including the city.
- (d) Location of lines. Extension of water and wastewater lines shall be made along the entire frontage of the subdivision adjacent to a street or thoroughfare in rights-of-way or dedicated easements.
- (1) If the subdivision is not adjacent to a thoroughfare, the extension of utilities shall be accomplished in such a manner as to allow future connections to said utilities by new subdivisions.
  - (2) If new subdivisions are not likely to be developed beyond the proposed subdivision (due to physical constraints), the planning director and city engineer may waive the requirement for adjacent utility line construction at the time of preliminary plat approval and prior to construction of the subdivision.
  - (3) The city shall determine the location and routing of water and sewer extensions and shall retain the authority to reject any extension not deemed to be in the best interest of the city.
- (e) Utilities not specified. Installation, operations and maintenance of utilities not specifically referenced herein shall comply with regulations of the TCEQ and with any other applicable state rules and regulations, whichever is the most stringent.
- (f) Dead-end water lines.
- (1) Dead-end water lines should be avoided, but when deemed necessary, they should be extended to, and then through, the property sought to be subdivided.
  - (2) All dead-end water lines shall be valved and provided with a valve and fire hydrant located at the extreme end of the line instead of the blow-off mechanism for their flushing, in accordance with current city standard specifications.
- (g) Payment of pro-rata charges. Where the proposed subdivision would abut and utilize an existing water main and/or sanitary sewer main of the city, the developer shall pay to the city any applicable "pro-rata" charge per requirements of the city or previous pro-rata agreement.

**30.091 Storm water collection and conveyance systems.**

- (a) Drainage system generally.
  - (1) Drainage improvements shall accommodate runoff from the upstream drainage area and shall be designed to prevent overloading the capacity of the downstream drainage system or adversely impacting either upstream or downstream properties.
  - (2) The city may require the phasing of development, the use of control methods such as retention or detention, or the construction of off-site drainage improvements in order to mitigate the impact of the proposed development.
  - (3) No storm water collection system shall be constructed unless it is designed in accordance with this section and with the city's design standards by a licensed professional engineer, and unless it is reviewed and approved by the city engineer.
  - (4) All plans submitted to the city engineer for approval shall include a layout of the drainage system together with supporting calculations for the design of the system.
- (b) Drainage easements clear. Drainage easements shall be kept clear of all obstructions, such as but not limited to, fences, buildings, trees and shrubs, or other structures or improvements which in any way endanger or interfere with the construction, maintenance, or operation of any drainage system.
- (c) Off-site drainage.
  - (1) The property owner to be developed shall be solely responsible for all storm drainage flowing on or from the property owner's property. This responsibility includes the drainage directed to that property by prior development as well as drainage naturally flowing through the property by reason of topography.
  - (2) Adequate consideration shall be given by the property owner in the development of property to determine how the discharge leaving the proposed development will affect downstream property. As part of any application by a property owner for development that will affect downstream property, the property owner shall furnish the city with a letter signed by a Texas professional engineer stating that the development as designed will not damage downstream property due to the development's impact on off-site drainage.
  - (3) On lots or tracts of three acres or more where storm water runoff has been collected or concentrated, it shall not be permitted to drain onto adjacent property except in existing creeks, channels or storm sewers, unless proper drainage easements or notarized letters of permission from the affected property owner are provided.
- (d) Cross-lot drainage prohibited. Drainage between residential lots is the responsibility of the affected property owner(s). Property owners are required to drain surface runoff from an individual lot to a public right-of-way or to an underground drainage system contained in a public easement and will not be allowed to surface drain onto another lot. The city manager shall have the discretion to allow modifications to the lot-to-lot drainage requirements where adherence to these requirements would be in conflict with other city ordinances and/or regulations.
- (e) Erosion and sedimentation control. All erosion and sedimentation controls shall conform to the design standards and the current National Pollution Discharge Elimination System (NPDES) regulations.
- (f) Changing existing ditch, channel, stream or drainageway. No person, individual, partnership, firm or

corporation shall deepen, widen, fill, reclaim, reroute or change the course or location of any existing ditch, channel, stream or drainageway without first obtaining written permission of the city engineer and any other applicable agency (such as FEMA or the U.S. Army Corps of Engineers) having jurisdiction. The city engineer may require preparation and submission of a CLOMR, LOMR, other appropriate map revision or flood study for a proposed development if there are concerns regarding storm drainage on the subject property or upstream or downstream from the subject property. The costs of such study, if required, shall be borne by the developer.

- (g) Siting of lots and building sites. In order to help reduce storm water runoff, and resulting erosion, sedimentation and conveyance of nonpoint source pollutants, the layout of the street network, lots and building sites shall, to the greatest extent possible, be sited and aligned along natural contour lines, and shall minimize the amount of cut and fill on slopes in order to minimize the amount of land area that is disturbed during construction.
- (h) Approval. Lots in any proposed subdivision shall not be approved until drainage facilities adequate to prevent flooding have been installed or necessary arrangements made for such installation as required under these subdivision regulations.
- (i) Issuance of building permits. On any lot designated by the city engineer as requiring completion or partial completion of drainage improvements prior to building construction, no building permits shall be issued prior to a release authorized by the planning director.

#### 30.092 Extension of service of utilities and pro-rata agreements.

- (a) Definitions. For the purposes of this section, the following definitions shall apply unless the context clearly indicates or requires a different meaning:

##### **Associated facility.**

An apparatus or improvement that is used in conjunction with a water or wastewater line that provides water or wastewater service to a tract of land, regardless of where the associated facility is located. The term includes but is not limited to a lift station, a force main, a pump station, a storage tank, or an addition to an existing facility that increases the capability of the existing facility to provide water or wastewater service.

##### **Developer.**

The person, business, corporation or association responsible for the development of a lot, parcel or tract, and includes the property owner or subdivider.

##### **Oversize or oversizing.**

With reference to a water or wastewater line or an associated facility, means an increase in the size or capacity of the line or associated facility above the standard size, including fire flow requirements, that is necessary to provide complete utility service to a particular development. With respect to any associated facility, “oversize” or “oversizing” means the size or capacity in excess of the size or capacity that would otherwise be necessitated by the particular development as determined by the city engineer.

##### **Pro-rata fee.**

A charge made against a lot, tract or parcel for the purpose of reimbursing the city or a developer a proportionate share of the service extension costs for extending a water or wastewater line and associated facilities that serve the property against which the charge is made.

##### **Service extension.**

City of Van  
Subdivision Ordinance

A water or wastewater line or an associated facility that is necessary to extend water or wastewater service from a major city transmission main or collection main to a tract of land and across the tract or frontage of the tract to a point determined by the city engineer to be consistent with further service extensions of the city, provided that the extension does not extend beyond the property boundaries of the tract.

**Service extension application.**

A request in writing to the city for extension of water or wastewater service to a development.

**Service extension contract.**

A legal document that defines the responsibilities and requirements of the entity requesting a service extension and the city with regard to the service extension. A service extension contract may be required at the sole discretion of the city.

**Service extension costs.**

The total costs of any off-site service extension, as initially determined by the city's engineer, including but not limited to costs of land/easement acquisition, design and construction costs, and any permitting or administrative fees required for such extension, but not including amounts expended solely for oversizing.

**Standard size.**

With respect to a water or wastewater line, the standard size means an eight-inch diameter line. With respect to any associated facility, the standard size is the size or capacity needed to serve a particular development as determined by the city engineer.

**Water or wastewater line.**

A necessary appurtenance to a water distribution or wastewater collection system. The term includes a valve, manhole, connection, air release, diversion, and other equipment necessary to make the water distribution or wastewater collection system operable in compliance with the design criteria and standards of the city.

- (b) Responsibilities of developer; application.
  - (1) The developer shall extend all water and wastewater lines and associated facilities needed to connect the development or land use with the city's approved water distribution system and wastewater collection system. The developer shall further extend all lines across the property currently being developed or to the point on such property from which such lines will be extended to serve adjoining land as determined by the city. As a condition of acceptance of water or wastewater lines, the city may require conveyance of an easement across the property currently being developed as well as other contiguous property owned by the developer for purposes of future extension of the water or wastewater lines. All initial service extension costs and all initial costs of oversizing, shall be borne by the developer or property owner, subject to reimbursement from proceeds of pro-rata fees or cost participation pursuant to subsections (j) and (k) of this section. Requests for extension of water and wastewater lines shall be as provided for in this section.
  - (2) A service extension application is required to:
    - (A) Connect a tract of land to the existing city system; or
    - (B) Provide utility service to a tract of land if an existing line or associated facility is unsuitable or insufficient to provide service to the tract.

- (3) A developer or property owner must submit an application for a service extension to the city engineer.
- (4) An application for a service extension must:
  - (A) Include a general description of the location, size, and capacity of the service extension; and
  - (B) If within the city's ETJ, be accompanied by an irrevocable petition to the city for voluntary annexation at such time and under such conditions as deemed appropriate by the city.
- (5) If either water or wastewater service is to be provided by an entity other than the city, the application must be accompanied by evidence of a commitment from the other entity to provide the other required service. The evidence must be in the form of:
  - (A) A contract with the entity;
  - (B) A letter from the entity; or
  - (C) The minutes of the relevant meeting of the governing body of the entity.
- (c) Administrative approval.
  - (1) The city manager may approve an application or contract for a service extension if:
    - (A) The requested service extension does not include a request for establishment of pro-rata fees or cost participation by the city; and
    - (B) The city manager determines that sufficient capacity exists or will be available to meet the projected demands of the development or land use to be served.
  - (2) If a requested service extension includes a request for establishment of pro-rata fees or cost participation by the city, or if the city manager does not determine that sufficient capacity exists or will exist, the application must be processed under subsections **(l)** and **(m)** of this section and requires a service extension contract.
- (d) Construction standards; submission of construction plans.
  - (1) After a service extension application or service extension contract has been approved, an applicant must submit the construction plans for needed improvements to the city engineer for review and approval of the size, capacity, and routing of the improvements.
  - (2) The city engineer may approve the size, capacity, or routing of an improvement only if it complies with generally accepted engineering practices and each applicable city requirement.
  - (3) Water and wastewater lines shall be oversized where needed to provide capacity to other existing or new developments in the area to be served in order to avoid duplication of facilities, in conformity with the city's generally accepted engineering practices.
  - (4) The location and size of all water and wastewater lines necessary to serve land to be developed shall be in accordance with the city's generally accepted engineering practices and in accordance with the city's subdivision regulations.
  - (5) When an existing water or wastewater line provides service to a proposed development, the developer shall pay all applicable pro-rata fees pursuant to subsection **(m)** or **(o)** of this section for the water line

or wastewater line before extension of or connection to such main is made.

- (e) Submission of additional information. An applicant for a service extension shall provide information determined by the city engineer to be necessary to demonstrate that construction of the service extension complies with the requirements of the city.
- (f) Expiration of approval.
  - (1) Unless extended under subsection **(2)** or **(3)**, the approval of a service extension application remains valid until the latest of:
    - (A) The date on which the preliminary plat expires for the property to be served by the service extension; or
    - (B) The second anniversary of the date on which the service extension application was approved, if on or before that date:
      - (i) A preliminary plat for the property to be served has not been approved; and
      - (ii) Construction of the service extension has not begun; or
    - (C) The date established in the service extension contract.
  - (2) If construction of a service extension begins before the approval expires under subsection **(1)**, the city manager may extend the approval of a service extension for the period of time estimated to be necessary to complete construction of the service extension.
  - (3) Under this section, if the approval of a service extension requires a service extension contract:
    - (A) Construction of the service extension shall not begin until fiscal security is posted or money is deposited in compliance with subsection **(g)** of this section; and
    - (B) The service extension approval is extended until construction of the service extension is complete and the city accepts the lines and associated facilities constructed under the contract.
- (g) Fiscal security.
  - (1) For construction contracts administered by the city, fiscal security in an amount approved by the city engineer to be equal to 100% of the estimated service extension costs and 100% of the costs of any oversizing, must be deposited in cash with the city prior to entering into a construction contract.
  - (2) For construction contracts administered by a party other than the city, the fiscal security must be posted prior to the execution of a construction contract and must be in the form of:
    - (A) An irrevocable letter of credit that has a minimum term of three years and is acceptable to the city;
    - (B) A performance bond; or
    - (C) A cash deposit.
- (h) Hardship policy for extension to single dwelling unit.
  - (1) The city may, at its expense and in its sole discretion, upon written request of a property owner, extend a water or wastewater line of a size determined by the city to serve a single dwelling unit if funds are

available to pay the cost of installing the line and the extension meets the standards in subsection (2).

- (2) The person requesting the extension must demonstrate that:
  - (A) A substantial hardship would result if the extension is not made;
  - (B) Denial of the extension would result in potential water quality degradation; and
  - (C) The extension is necessary to provide like benefits as normally provided to similarly served property.
- (3) The city may require that the property owner making the request share in the service extension costs, and that the property owner grant all necessary easements to continue line extensions to serve adjoining land.
- (4) This policy has no application to circumstances in which multiple connections are requested or necessary to serve existing or proposed development, or in which the city determines to initiate construction of a water or wastewater line or associated facility that serves multiple users. This policy may not be invoked to finance serial connections to lots in an existing subdivision.
- (i) Eligibility for pro-rata fees. A developer that agrees to construct a water or wastewater line or an associated facility that on acceptance will become part of the city's water and wastewater system and which supplies capacity to other existing or new developments, and that is not a facility or a portion of a facility included on the capital improvements plan for water or wastewater facilities, may apply to the city to establish pro-rata fees to be paid by other users of the facilities and to reimburse the developer a proportional amount of the service extension costs. The developer also may apply for cost participation by the city for the costs of oversizing water or wastewater lines or associated facilities in excess of the standard size.
- (j) Calculation of pro-rata fees.
  - (1) The amount of the cost reimbursement for an extension, if any, shall be computed as the off-site length of a water or wastewater line that has been extended by a developer multiplied by the then-current average cost, per linear foot, of the service extension costs, as determined by the city engineer. The amount of the pro-rata fee based upon such computation shall be established for each side of the line to which connections are to be made. For mains that can be connected to from both sides, the fee for each side shall be equivalent to 1/2 of the average linear foot cost referenced above, multiplied by the length of the water or wastewater line on or abutting the property being charged. For mains that can be connected to from one side only, the fee shall be equivalent to the average linear foot cost referenced above, multiplied by the length of the line on or abutting the property being charged.
  - (2) In the alternative, the developer may apply for a different cost reimbursement formula, based upon engineering cost estimates of the service extension costs agreed upon in writing by the city manager and the applicant, and verified in a study provided by the applicant approved by the city engineer. The study shall aggregate the costs of associated improvements where feasible. The city may establish guidelines for eligible costs to administer the policy in this section. The amount of the pro-rata fee shall be that calculated in the approved study. The study shall contain the following minimum elements:
    - (A) Identification of the area and all properties to be served by the water or wastewater lines or associated facilities to be installed;
    - (B) Identification of the costs of the facilities to be installed;

- (C) Apportionment of the costs of the facilities to be installed among lots, tracts or parcels to be served by the improvements, based upon capacity to be utilized by such properties, using accepted engineering standards and practices;
  - (D) Calculation of the maximum amount of the costs which are to be reimbursed to the developer or property owner, net of costs attributable to the developer's or property owner's utilization of capacity of the lines or associated facilities; and
  - (E) Calculation of a pro-rata fee to be charged per unit of land that is to be connected to the water or wastewater lines or associated facilities.
- (3) In making the initial determination of appropriate pro-rata fees under subsection (1) or (2), above, the city engineer shall certify in writing that the amount of the pro-rata fee is roughly proportionate to the impact that the properties to be charged will have on the city's water and wastewater utility system.
  - (4) After construction of off-site improvements by a developer that are subject to reimbursement from pro-rata fees, but before the city's acceptance of such improvements, the city engineer may request, and the developer shall be required to promptly supply, verifiable proof of the actual costs expended as to all such off-site improvements. If the actual costs to complete such improvements—including but not limited to costs of land/easement acquisition, design and construction costs, and any permitting or administrative fees required for such extension, but not including amounts expended solely for oversizing—are less than the city engineer's initial determination of the service extension costs under subsection (1) or (2), above, then the amount of pro-rata fees as relates to those improvements shall be decreased to correspond to said actual costs.
- (k) Cost participation for oversized lines. The city may participate in the reasonable construction costs of oversizing water or wastewater lines that exceed the standard size of a water or wastewater line, and/or associated facilities. The developer initially shall be responsible for the entire cost of the oversized facilities. City oversize participation shall be in accordance with this section and any applicable provisions of the city's subdivision or other regulations. The city in its sole discretion shall determine the amount of any cost participation based on engineering estimates of the costs attributable to the increase in the size of lines exceeding the standard size, taking into consideration the degree to which the need for such oversizing is created by the development for which service extension is being requested. In no event may the city be required to participate in the costs of oversize facilities pursuant to this section if there are no funds available for such purposes.
- (l) Contract required.
    - (1) The applicant for approval of a service extension must request the establishment of pro-rata fees or cost participation in writing at the time the applicant applies to the city manager for approval of the service extension. If the applicant for approval of a service extension requests establishment of pro-rata fees or cost participation, a written service extension contract is required.
    - (2) The service extension contract shall include at a minimum the pro-rata fee and cost participation, if any, approved by the city, the duration of the right to collect pro-rata fees, and provisions for forfeiture of such fees to the city in the event they are not collected by the contracting party, his or her successor-in-interest, or assignee.
    - (3) An executed service extension contract may be assigned by the party requesting service extension with the written consent of the city, which shall not be unreasonably withheld.
  - (m) Review and approval; collection of pro-rata fees.

- (1) The city manager shall review each request for cost reimbursement from pro-rata fees or cost participation for oversizing lines.
- (2) The city manager shall formulate his or her recommendation concerning the cost reimbursement from pro-rata fees or cost participation for oversizing lines, which shall address each of the following minimum criteria:
  - (A) The line to be extended has not been included on the impact fee capital improvements plan for that category of capital improvement;
  - (B) The size of each proposed line or facility complies with the generally accepted engineering practices and other planning criteria of the city and final design and routing will comply with the technical standards;
  - (C) Any alternative study proposing pro-rata fees fairly apportions the extension costs among prospective users of the facilities to be installed;
  - (D) The proposed line or facility is a reasonable extension or addition to the water and wastewater utility system; and
  - (E) Funds for participation in the costs of oversizing lines are available from an identified source of funds or funds will be available to meet the proposed payment schedule.
- (3) The city manager shall forward his recommendation on pro-rata fees and cost participation, together with the proposed service extension contract, for decision by the city council.
- (4) Upon approval of the request for reimbursement from pro-rata fees, any developer or user of property with frontage along the off-site portion of the water or wastewater line or of property that is identified in the approved fee study thereafter that connects to or utilizes the capacity of the water or wastewater line or associated facility for which a pro-rata fee has been established shall pay the applicable fee. Pro-rata fees shall be collected by the city from the developer or user before approval of the engineering plans for the development required to pay the fee, or before connection to the water or wastewater line for which the fee has been established, whichever first occurs.
- (n) Conditions.
  - (1) A developer constructing a water or wastewater line or an associated facility that is eligible for cost reimbursement from pro-rata fees or cost participation for oversizing may not receive cost reimbursement payment for the line or facility unless the entity complies with each requirement or regulation of the city relating to:
    - (A) The public advertising of the line or facility;
    - (B) The bidding on the line or facility;
    - (C) A performance or payment bond for the line or facility; and
    - (D) A warranty on the line or facility.
  - (2) The developer constructing the line or facility is not entitled to receive a cost reimbursement payment from pro-rata fee proceeds or cost participation for oversizing lines until the entity submits documentation showing the entity's compliance with each requirement described by subsection (1) and the line or facility is accepted in writing by the city.

- (o) Payments to developer.
- (1) For projects subject to a service extension contract approved by the city by April 1 of any year, the city shall pay the developer holding the extension contract any eligible cost reimbursement for oversizing, without interest, within 60 days of completion and acceptance of the project by the city, but no earlier than the following September 1.
  - (2) For projects for which a service extension contract is approved by the city after April 1 of any year, the city shall pay the developer holding the extension contract any eligible cost reimbursement for oversizing, without interest, for a completed and accepted project within 60 days of completion and acceptance of the project by the city but no earlier than September 1 of the next calendar year.
  - (3) For a period of 15 years following the city's acceptance of the water line, wastewater line, or associated facility, the developer shall be entitled to reimbursement from the proceeds of the pro-rata fees established pursuant to this section, up to the maximum amount of the reimbursement established in the approved extension contract. The city may deduct 2% of the amount of pro-rata fees collected from the amount of the fees reimbursed to the developer as an administration fee.
  - (4) Pro-rata fees which have been collected pursuant to the service extension contract shall be paid to the developer annually no later than October 1 of each year, until the term of the agreement expires.
  - (5) The city may establish one or more pro-rata fee accounts for purposes of administering the policies of this code. The city shall deposit all pro-rata fees collected pursuant to this division into such account(s). Expenditures from such accounts shall be earmarked solely for reimbursement of developers for the installation of water lines or wastewater lines or associated facilities for which pro-rata fees have been established pursuant to this division.
  - (6) It shall be the responsibility of the service extension contract holder or his assignee to provide to the city in writing current contact information. The city will mail reimbursement payments to the last contact of record reflected on its books. In the event that the service extension contract holder or his assignee has not collected pro-rata payments or cost participation in oversize lines sent to the contact of record for a period of one year from the date such payments are due pursuant to this section, such accrued amounts shall become the funds of the city for purposes of expenditure on cost participation for oversizing lines or other system improvements in the city's sole discretion.
- (p) Pro-rata fees for city projects.
- (1) The city may initiate capital projects from time to time involving construction of water or wastewater lines or associated facilities, and may seek to recoup its costs through establishment of pro-rata fees.
  - (2) Prior to establishing fees, the city shall either compute fees based upon a per average linear foot formula similar to the formula described in subsection **(j)(1)** of this section or pursuant to a study that satisfies the requirements of subsection **(j)(2)** of this section. The city council shall establish pro-rata fees based upon the front footage formula or alternative study.
  - (3) Following establishment of pro-rata fees by the city council, the developer or user of property with property frontage on the extended water or wastewater line or of property that was identified in the approved pro-rata fee study thereafter that connects to or utilizes the capacity of the water or wastewater line or associated facility for which a pro-rata fee has been established shall pay the applicable fee. Pro-rata fees shall be collected by the city from the developer or user before approval of the engineering plans for the development required to pay the fee, or before connection to the water or wastewater line for which the fee has been established, whichever first occurs.

- (4) Pro-rata fees established under this section may be collected for a period of 15 years following final construction by the city of the water line, wastewater line, or associated facility.

**30.093 through 30.130. (Reserved)**

**Article 4  
Public Sites and Open Spaces**

**30.131 Areas for public use.**

- (a) The applicant shall give consideration to suitable and adequate sites for schools, parks, playgrounds, and other areas for public use or service so as to conform with the recommendations contained in the city's comprehensive plan, including the park master plan, and other applicable plans. Any provision for parks or other public facilities shall require approval by the city council.
- (b) A minimum of five (5) parking spaces will be required at major, neighborhood focal points that are for public use (such as but not limited to pools, amenity centers, parks, and playgrounds). If the major features are adjacent to each other, they can share a parking lot with a minimum of eight (8) parking spaces instead of ten (10).

**30.132 Protection of drainage and creek areas.**

- (a) Natural preservation required. All creeks and drainage channels shall be preserved and protected in their natural condition wherever possible, unless significant storm drainage improvements are required by the city in these areas. All development adjacent to creeks and drainage channels shall be in accordance with the city's design standards, and with any other city policies or ordinances related to aesthetics or public access or enjoyment of creeks and waterways.
- (b) Definitions and methodology for determining the floodway management area (FMA).
- (1) The definitions for "floodway" and "floodway fringe" shall correspond to those set forth by the Federal Emergency Management Agency (FEMA).
- (2) For the purposes of these subdivision regulations, the floodway management area (FMA) will correspond to the floodway, as defined by FEMA, or as may be modified pursuant to a flood study that is approved by FEMA.
- (3) For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist the local community in the aspect of floodplain management. Under this concept, the area of the 100-year flood is divided into a floodway and floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights as defined by FEMA. The area between the floodway and boundary of the 100-year flood is termed the floodway fringe. The floodway fringe is the area which can be reclaimed for development in accordance with rules and regulations established by FEMA and the city's flood damage prevention regulations set forth in article 4.12 of this code.
- (c) Areas where an FMA is required.
- (1) The FMA is intended to apply to a creek or channel which is to remain open or in its natural condition unless otherwise approved by the city. East Fork Trinity River, Whites Creek, Hurricane Creek, Throckmorton Creek, Slayter Creek, Sweetwater Creek, Brinlee Creek, Sister Grove Creek, Wolf Run Creek, Elm Creek, Pilot Grove Creek and their related tributaries and streams and all other drainage areas or regulated floodways as referenced on the applicable floodway and flood boundary map (flood

insurance rate map, or FIRM) shall be included in the FMA.

- (2) If FEMA does not specify a floodway and a base flood elevation in a regulated zone in any of the creeks or their tributaries, it shall be the developer's responsibility to establish and identify the FMA. The determination shall be made by a licensed professional engineer and approved by the city engineer or the designated floodplain administrator.
- (3) Where improvements to a drainage area are required by other ordinances of the city for the purpose of safety or other reasons related to drainage, those ordinances shall also be observed.
- (4) The creek shall remain in its natural state unless improvements are permitted or required by the city due to the pending development of properties adjacent to or upstream of the required improvements.
- (d) Ownership and maintenance of the FMA.
  - (1) The area determined to be the FMA shall be designated on the preliminary plat. Accurate locations of the FMA, both horizontally and vertically, shall be established on the preliminary plat and prior to site construction. At the city's option, the FMA shall be protected by one of the following methods:
    - (A) Dedicated to the city subject to approval by the city council.
    - (B) As easement(s). Creeks or drainageways on tracts which have private maintenance provisions, can be designated as the FMA by an easement to the city on the preliminary plat (with the appropriate plat language, as required by the city). Subdivisions with platted single-family or two-family lots may designate the FMA by easement provided there are adequate maintenance provisions (such as by a mandatory homeowners' association or a public improvement district), but no lots or portions of lots may be platted in the easement unless specifically allowed by the city. The area designated as FMA may be identified by a tract number.
    - (C) Certain recreational uses normally associated with or adjacent to flood prone areas (no structures allowed in the FMA), such as golf courses or certain types of parks. The uses allowed shall be in conformance with the zoning ordinance, if the subdivision is located within the city, and shall require approval by the city council.
  - (2) Prior to acceptance of any drainage way as an FMA by the city, the area shall be cleared of all debris and brush (except for trees) and placed in a maintainable state. Floodway management areas dedicated to the city shall be left in a natural state except those areas designated for active recreational purposes and unless storm drainage requirements do not permit this to occur.
- (e) Design criteria. The following design criteria shall be required for development adjacent to the FMA:
  - (1) Adequate access shall be provided to and along the FMA for public and/or private maintenance. An unobstructed area a minimum of 20 feet wide with a maximum 5:1 slope (five feet horizontal to one foot vertical), the length of the floodway shall be provided adjacent to or within the FMA. On the opposite side of the drainage area, an unobstructed area a minimum of five feet in width shall be provided. If ownership is to the centerline of the drainage channel, then the subdivider shall only be required to provide adequate access to one side.
    - (A) Lots in a single-family, PD single-family, or duplex residential zoning district shall not be platted within the FMA.
    - (B) If lots back or side onto an FMA, at least two reasonable points of access to the FMA, each a minimum

of 20 feet in width, shall be provided. Streets, alleys and open-ended cul-de-sacs may qualify as access points if designed such that they are navigable by maintenance vehicles (e.g., alleys must be 20-foot width).

- (2) All areas of the FMA shall be accessible from the access points.
- (3) Lots used for multifamily dwellings may be platted in the FMA if the FMA is identified as an easement and is maintained as open space for use by the residents, and provided that access to the FMA is possible by city maintenance vehicles, should that need arise.
- (4) If the FMA is to be public park land, then adequate public access and good public visibility shall also be provided to all portions of it.
- (5) Public streets may be approved in the FMA by the city if they conform to applicable engineering standards.
- (6) Linear public streets may be required to be constructed adjacent to some (or all) portions of the FMA to allow access for maintenance or recreational opportunities, and/or to allow increased visibility into creek areas for public safety and security purposes.
- (7) Alternate designs to facilitate equal or better access may be permitted if approved by the city.
- (f) Altered drainage channels. Drainage channels which have been previously altered and are not in a natural condition can be exempted from an FMA and this section at the discretion of the planning and zoning commission and city council and upon recommendation by the city staff except that any such alteration shall cause the developer to prepare an application for any appropriate letter of flood map revision.
- (g) Conflicts. In the event of any conflict between any regulation or requirement in this section and any regulation or requirement in the city's flood damage prevention regulations set forth in this code at article 4.12, or other applicable regulation or requirement, the most restrictive regulation or requirement shall govern.

### 30.133 Public improvement districts.

- (a) Applicability. When a proposed subdivision includes public improvements, such as screening walls, recreation facilities, open space, flood management areas, landscaped entry features and/or medians, or other public amenities that primarily benefit the properties within the subdivision, the developer shall submit with the preliminary plat application, a petition for the creation of a public improvement district (PID) that meets the criteria outlined in chapter 372 of the Local Government Code.
- (b) Petition.
  - (1) The PID petition shall include all properties within the subdivision and may include additional properties similarly benefited by the public improvements.
  - (2) The city council may approve or deny or take any other lawful action related to a petition requesting creation of a public improvement district.
  - (3) The city council may deny any plat or development plan or application that proposes to designate, create, or construct public improvements such as screening walls, recreation facilities, open space, flood management areas, landscaped entry features and/or medians, or other public amenities that primarily benefit the properties within the subdivision, that are not included in a public improvement district.

(c) Assessments. Any PID or PID assessment shall:

- (1) Include funding to cover any administrative and legal cost incurred by the city related to the creation and general administration of the PID.
- (2) Include funding to pay for the perpetual maintenance of the public improvements.

**30.134 Property owners' or homeowners' associations.**

(a) Applicability.

- (1) When a subdivision contains either common private property or other private improvements which are not intended to be dedicated to the city for public use, such as private streets, a private recreation facility or open space, or other private amenities, a property owners' or homeowners' association agreement, consistent with state and other appropriate laws, must be submitted with the preliminary plat application and approved by the city attorney.
- (2) The conditions, covenants and restrictions (CCRs) and the association documents, such as the articles of incorporation and association bylaws, shall be submitted to the city for review and approval along with the preliminary plat application, and shall be filed of record at the county prior to final plat approval in order to ensure that there is an entity in place for long-term maintenance of these improvements.
- (3) Said documents must, at a minimum, include provisions which allow the city to take over the maintenance of common property using association funds, including private streets and private recreation facilities, if such action becomes necessary for any reason, including nonperformance or inaction by the association.
- (4) Provisions shall also be included which would convey ownership of the private streets (if any) and all other common areas to the city, and which would allow the city to remove any improvements or amenities from the common areas and sell any buildable land area, as residential lots, to recoup the city's expenses for maintenance or demolition of the improvements.
- (5) Any monies that remain after the city has recovered all of its expenses shall be retained for future maintenance or upgrading of the streets, common areas (if any remain), screening walls, or other improvements within the subdivision.
- (6) These provisions are not intended to allow the city to profit in any way from taking over the association's responsibilities or funds; they are only intended to allow the city to recoup its actual incurred expenses such that the general public, the taxpayers of the city, does not have to bear these costs.

(b) Membership. A property owners' or homeowners' association shall be an incorporated nonprofit organization operating under recorded land agreements through which:

- (1) Each lot owner within the described land area is automatically a mandatory member; and
- (2) Each lot is automatically subject to a charge for a proportionate share of the expenses for the property owners' or homeowners' association's activities, such as maintenance of common open spaces or private streets, or the provision and upkeep of common recreational facilities.

(c) Legal requirements.

- (1) In order to ensure the establishment of a proper property owners' or homeowners' association, including

its financing, and the rights and responsibilities of the property or home owners in relation to the use, management and ownership of common property, the plat, dedication documents, covenants, and other recorded legal agreements must:

- (A) Legally create an automatic membership, nonprofit property owners' or homeowners' association;
- (B) Place title to the common property in the property owners' or homeowners' association, or give definite assurance that it automatically will be so placed within a reasonable, definite time;
- (C) Appropriately limit the uses of the common property;
- (D) Give each lot owner the right to the use and enjoyment of the common property;
- (E) Place responsibility for operation and maintenance of the common property in the property owners' or homeowners' association;
- (F) Place an association charge on each lot in a manner which will both ensure sufficient association funds and which will provide adequate safeguards for the lot owners against undesirable high charges;
- (G) Give each lot owner voting rights in the association; and
- (H) Identify land area within the association's jurisdiction including the following:
  - (i) Property to be transferred to public agencies;
  - (ii) The individual residential lots;
  - (iii) The common properties to be transferred by the developer to the property owners' or homeowners' association; and
  - (iv) Other parcels.
- (2) Any governmental authority or agency, including the city and the county, their agents, and employees, shall have the right of immediate access to the common elements at all times if necessary for the preservation of public health, safety and welfare. Should the property owners' or homeowners' association fail to maintain the common elements to city specifications for an unreasonable time, not to exceed 90 days after written request to do so, then the city shall have the same right, power and authority to enforce the association's rules and to levy assessments necessary to maintain the common elements. The city may elect to exercise the rights and powers of the property owners' or homeowners' association or its board, or to take any action required and levy any assessment that the property owners' or homeowners' association might have taken, either in the name of the property owners' or homeowners' association or otherwise, to cover the cost of maintenance (or the possible demolition, if such becomes necessary to preserve public safety or to ease maintenance burden) of any common elements.
- (3) The property owners' or homeowners' association must register a contact person with the planning department and shall notify the city of any change in said contact person. Such contact person must be authorized to receive and distribute information to the board of directors of the property owners' or homeowners' association.
- (d) Protective covenants.

- (1) Protective covenants shall be developed which, among other things, shall make the property owners' or homeowners' association responsible for the following:
  - (A) The maintenance and operation of all common property;
  - (B) The enforcement of all other covenants;
  - (C) The administration of architectural controls (if included); and
  - (D) Certain specified maintenance of exterior improvements of individual properties (if included).
- (2) The city is not responsible (i.e., has no jurisdiction) for enforcing protective covenants or deed restrictions.
- (e) Dissolution. The association may not be dissolved without the prior written consent of the city council.
- (f) Amendment of documents. No portion of the association documents pertaining to the maintenance of screening walls, private streets and alleys, and associated assessments, may be amended without the written consent of the city council.

### 30.135 **Park land and public facility dedication.**

- (a) Consideration of areas for public use. The applicant shall give consideration to suitable sites for parks, playgrounds and other areas for public use so as to conform to the recommendations of the city's comprehensive plan. Any provision for parks and public open space areas shall be indicated on the preliminary and final plat, and shall be subject to review by the city's parks advisory board and approval by the city council.
- (b) Park land dedication.
  - (1) Purpose. The purpose of this section is to provide recreational areas and amenities in the form of neighborhood parks as a function of subdivision development in the city. This section is enacted in accordance with the home rule powers of the city, granted under the Texas Constitution and statutes of the State of Texas, including, without limitation, Texas Local Government Code, section 51.071 et seq. and section 212.001 et seq.
  - (2) Necessary procedure. It is hereby declared by the city council that recreational areas, in the form of neighborhood parks and related amenities and improvements, are necessary and in the public welfare, and that the only adequate procedure to provide for this is by integrating such a requirement into the procedure for planning and developing property of a residential subdivision in the city, whether such development consists of new construction on previously vacant land or rebuilding and redeveloping existing residential areas.
  - (3) Park purposes. Neighborhood parks are those parks providing for a variety of outdoor recreational opportunities and within convenient distances from a majority of the residences to be served thereby, the standards for which are set forth in the city's comprehensive plan including the parks master plan. The neighborhood parks shown on the official city parks master plan shall be prima facie evidence that any park located therein is within such a convenient distance from the majority of residences to be served thereby. The cost of the neighborhood parks should be borne by the ultimate residential property owners who, by reason of the proximity of their property to such parks, shall be the primary beneficiaries of such facilities. Therefore, the following requirements are adopted to effect such purposes.
- (c) General requirement: Dedication of land and payment of park development fee.

- (1) Dedication of land based on dwelling units. Prior to a plat being filed with the county clerk of Van Zandt County, Texas for a development of a residential area within the city and in accordance with city ordinances, such plat shall contain a clear fee simple dedication of one acre of land for each 50 proposed dwelling units. As used in these subdivision regulations, a “dwelling unit” means each individual residence, including individual residences in a multifamily structure, designed and/or intended for inhabitation by a single family.
  - (2) Plat requirement. Any proposed plat submitted to the city for approval shall show the area proposed to be dedicated under this section. The required land dedication of this section may be met by a payment in lieu of land where permitted by the city or required by other provisions in these subdivision regulations.
  - (3) Impractical size. The city council declares that development of an area of less than five acres for neighborhood park purposes is impractical. Therefore, if fewer than 250 dwelling units are proposed by a plat filed for approval, the city council may require the developer to pay the applicable cash in lieu of land amount, as provided in subsection **(d)** below.
  - (4) Park development fee. In addition to the required dedication of land, as set forth above, there shall also be a park development fee paid to the city as a condition of Plat approval. Such park development fee shall be set from time to time by ordinance of the city council and shall be sufficient to provide for the development of amenities and improvements on the dedicated land to meet the standards for a neighborhood park to serve the area in which the Subdivision is located. Park development fees are found in appendix A of this code. Such fee shall be paid at the time of application for a building permit.
  - (5) Option to construct. In lieu of payment of the required park development fee, a developer shall have the option to construct the neighborhood park amenities and improvements. All plans and specifications for the construction of such amenities and improvements must be reviewed and approved by the city manager, or applicable designees. The developer shall financially guarantee the construction of the amenities and improvements, and the city must approve same, prior to the filing of a plat in the case of platted subdivisions. Once the amenities and improvements are constructed, and after the city has accepted such amenities and improvements, the developer shall dedicate by plat such amenities and improvements to the city.
  - (6) Right to accept, reject or require payment. In instances where land is required to be dedicated, the city shall have the right to accept or reject the dedication after consideration of the recommendation of the board of parks and recreation and to require a cash payment in lieu of land in the amount provided herein, if the city determines that sufficient park area is already in the public domain for the area of the proposed development, or if the recreation potential for that area would be better served by expanding or improving existing neighborhood parks.
  - (7) Siting of parks. When two or more developments will be necessary to create a neighborhood park of sufficient size in the same area, the planning director, at the time of preliminary plat approval, will work with the developers to define the optimum location of the required dedication within the respective plats. Once a park site has been determined, adjacent property owners who develop around the park site shall dedicate land and cash to the existing site unless otherwise determined by the city council.
- (d) Cash in lieu of land.
- (1) Requirement. A developer responsible for land dedication under these subdivision regulations shall be required, at the city council’s option, to meet the dedication requirements in whole or in part by a cash payment in lieu of land, in the amount set forth below. Such payment in lieu of land shall be made prior to filing of the final plat for record.

- (2) Fee. The cash payment in lieu of land dedication shall be met by the payment of a fee set from time to time by ordinance of the city council sufficient to acquire neighborhood park land. Cash payment fees in lieu of land dedication are found in the fee schedule in appendix A of this code. Such fee shall be paid by the developer prior to filing of the final plat for properties located within the ETJ.
- (3) Park development fee. A cash payment in lieu of land dedication, as set forth in this section, does not relieve the developer of its obligation to pay the park development fee set forth in subsection (c)(4) above. The cash payment in lieu of land dedication is in addition to the required park development fee.
- (4) City purchase of land. The city may from time to time decide to purchase land for parks in or near the area of actual or potential development. If the city does purchase park land in a park service area, subsequent park land dedications for that zone shall be in cash only, the calculation of which is set forth above. (Such cash payment is in addition to the payment of the required park development fee.)
- (e) Park development fund.
- (1) All funds collected by this dedication process or collected under subsection (c)(4) above will be deposited into the city's park development fund and used for parks and recreation purposes related to the following:
- (A) Land acquisition;
  - (B) Capital improvements;
  - (C) Planning, engineering and design of parks and recreation facilities;
  - (D) Construction of new parks and recreation facilities;
  - (E) Rehabilitation and modernization of existing park and recreation facilities;
  - (F) Maintenance and equipment for new parks and recreation facilities;
  - (G) Maintenance and equipment for existing, and recently rehabilitated and modernized parks and recreation facilities;
  - (H) Long-range planning for land, facilities, recreation, and related programs;
  - (I) Feasibility studies, market studies and economic impact analysis relating to parks and recreation projects and programs; or
  - (J) Creation, planning, management, administration, operation, marketing and promotion of events and recreational activities.
- (2) Except as may relate to the staffing of the parks and recreation department or the creation, planning, management, administration, operation, marketing and promotion of parks, park facilities, park amenities, park funding and development, events and recreational activities, amounts deposited into the parks development fund shall not be used for staffing and daily operation. All expenditures from said fund will adhere to the city's procurement policies and practices.
- (f) Additional requirements, definitions.
- (1) Any land dedicated to the city under these subdivision regulations must be suitable for park and recreation uses. The following characteristics of a proposed area, which may be grounds for refusal of

any plat, are generally unsuitable:

- (A) Any area primarily located in the 100-year floodplain unless the area is part of the trail system shown on the city's most current trail master plan.
- (B) Any areas of unusual topography or slope which renders same unusable for organized recreational activities.
- (2) Drainage areas may be accepted as part of a park if the channel is to remain, more or less in its natural state or constructed in accordance with city engineering standards, if:
  - (A) No significant area of the park is cut off from access by such channel;
  - (B) Not less than five acres of the site is above the 100-year floodplain; or
  - (C) The dedication is in excess of 10 acres, not more than 50% of the site should be included in the 100-year floodplain.
- (3) Each park must have ready access to a public street.
- (4) Unless provided otherwise herein, an action by the city shall be by the city council, after consideration of the recommendations of the parks advisory board.

**30.136 through 30.160. (Reserved)**

## Article 5

### **Improvements Required Prior To Acceptance of Subdivision**

#### **30.161 Improvements, in general.**

- (a) Purpose. The requirements as set forth below are designed and intended to ensure that, for all subdivisions of land within the scope of these subdivision regulations, all improvements as required herein are installed properly and:
  - (1) The city can provide for the orderly and economical extension of public facilities and services;
  - (2) All purchasers of property within the subdivision shall have a usable, buildable parcel of land; and
  - (3) All required public improvements are constructed in accordance with city's design standards.
- (b) Adequate public facilities policy. The land to be divided or developed must be served adequately by essential public facilities and services. No plat shall be recorded unless and until adequate public facilities exist or provision has been made for water facilities, wastewater facilities, drainage facilities, electricity and street facilities which are necessary to serve the development proposed, whether or not such facilities are to be located within the property being platted or off-site. Wherever the subject property adjoins undeveloped land, or wherever required by the city to serve the public good, utilities shall be extended to adjacent property lines to allow connection of these utilities by adjacent property owners when such adjacent property is platted and/or developed.
- (c) Public improvements required. Public improvements that are required by the city for the acceptance of the subdivision by the city shall include the following:
  - (1) Water and wastewater facilities;

- (2) Storm water drainage, collection and conveyance facilities;
  - (3) Water quality, erosion and sedimentation controls;
  - (4) Streets;
  - (5) Streetlights;
  - (6) Street signs;
  - (7) Alleys (if provided);
  - (8) Sidewalks, including ADA approved ramps at street intersections and other appropriate locations;
  - (9) Screening and/or retaining walls (where required);
  - (10) Traffic-control devices required as part of the project; and
  - (11) Appurtenances to the above, all designed and constructed in accordance with ADA standards, if applicable, and any other public facilities required as part of the proposed subdivision.
- (d) Compliance required. All aspects of the design and implementation of public improvements shall comply with the city's current design standards and any other applicable city codes and ordinances, including preparation and submittal of engineering plans and construction inspection. The construction of all of the improvements required in these subdivision regulations shall conform to the city's design standards, and to any other applicable city ordinance, rule, policy, or regulation.
  - (e) Utility lines. All utility lines that pass under a street or alley shall be installed before the street or alley is paved. When it is necessary that utility lines pass under the street or alley pavement, they shall be installed to a point at least three feet beyond the edge of the pavement.

### 30.162 Monuments.

- (a) Block corner monuments. Monuments consisting of 3/4" diameter steel rods 24" long and set flush with the top of the ground shall be placed at all corners of block lines, the point of intersection of alley and block lines, and at points of intersections of curves and tangents of the subdivision. Each block corner monument shall be marked in a way that is traceable to the responsible RPLS or associated employer.
- (b) Lot corner monuments. Lot corner monuments shall be placed at all lot corners (except corners which are also block corners), consisting of iron rods or pipes of a diameter of not less than 1/2 inch and 24 inches in length, and set flush with the top of the ground.
- (c) Curve point markers. In addition, curve point markers shall be established of the same specifications as lot corners.
- (d) View between monuments obstructed. Where, due to topographic condition, permanent structures, or other conditions, the view is obstructed between any two adjacent monuments, intermediate monuments shall be so set as to assure a clear view between adjacent monuments.
- (e) Installed prior to acceptance and filing. All required block, lot, and curve monuments shall be installed prior to the final acceptance of the subdivision by the city and prior to filing the plat at the county.
- (f) Precision and error of closure. All survey work around the boundary area, as well as within the

subdivision, [shall] satisfy the following precision requirements and otherwise comply with 66 Texas Admin. Code section 663.13 [title 22, chapter 663], as applicable:

- (1) The actual relative location of corner monuments found or set within the corporate limits of the city shall be reported within a positional tolerance of 1:10,000 + 0.10 feet.
- (2) The actual relative location of corner monuments found or set within the extraterritorial jurisdiction of the city shall be reported within a positional tolerance of 1:7,500 + 0.10 feet.
- (3) The actual relative location of corner monuments found or set in all rural areas outside the corporate limits and extraterritorial jurisdiction of the city shall be reported within a positional tolerance of 1:5,000 + 0.10 feet.
- (4) Areas, if reported, shall be produced, recited, and/or shown only to the least significant number compatible with the precision of closure.
- (5) Survey measurement shall be made with equipment and methods of practice capable of attaining the tolerances specified by these standards.
- (6) Positional tolerance of any monument is the distance that any monument may be mislocated in relation to any other monument cited in the survey.
- (g) Subdivisions containing 5 acres or more. A subdivision containing five acres or more shall have at least two monuments set by the RPLS, if not already existing, for two corners of the subdivision, and such monuments shall be located at opposite ends (or at widely separated corners) of the subdivision and clearly shown on the final plat prior to filing at the county. The final plat shall also show clear ties to existing monuments in the vicinity of the subdivision.

#### 30.163 Streetlights.

- (a) Streetlights. Streetlight locations and installations shall be coordinated by the subdivider with the power company and the city. Street lighting shall conform to the latest edition of the Illuminating Engineering Society Handbook. Streetlights shall be as manufactured by Kim Standards or a comparable streetlight approved by the director of public works. Streetlights shall be installed a maximum distance of 600 feet apart, at intersections, and at the ends of cul-de-sacs. The subdivider shall pay for the electricity used by the streetlights until building permits are issued for 80% of the lots, after which time the city shall pay for the cost of electricity used.

#### 30.164 Street names and signs.

- (a) Review and approval required. Street names must be submitted to the city for review and approval in accordance with the city's guidelines for the naming of streets.
  - (1) Preliminary plat. Proposed street names shall be submitted for review as a part of the preliminary plat application, and shall become fixed at the time of approval of the preliminary plat.
  - (2) Final plat. On the final plat, street names shall not be changed from those that were approved on the preliminary plat unless special circumstances have caused the major realignment of streets or a proposed street name(s) is discovered to have already been used elsewhere in the city (or some other similar eventuality). If additional street names are needed for the final plat, then they must be submitted for review and approval by the city, along with the final plat application. A fee may be established by the city for the changing of street names after approval of the preliminary plat.

- (b) Streets named for corporations/businesses prohibited. The names of corporations or businesses shall not
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be used as street names, unless approved by the city council.

- (c) List of street names maintained. The city will maintain a list of existing street names that are essentially “reserved” names that have been previously been approved on a preliminary plat, and will update the list as new streets are platted.
- (d) Duplication and similarities prohibited. New street names shall not duplicate existing street names either literally or in a subtle manner (for example, Smith Street vs. Smythe Street; Oak Drive vs. Oak Place vs. Oak Court vs. Oak Circle; Lantern Way vs. Land Tern Way; Cascade Drive vs. Cascading Drive); shall not be so similar as to cause confusion between names (for example, Lakeside Drive vs. Lake Side Drive vs. Lake Siding Drive).
- (e) New streets extending existing street. Any new street that extends an existing street shall bear the name of the existing street.
- (f) Street names related to intersections. Streets crossing other streets shall bear the same name on both sides of the intersection, wherever practical, unless otherwise approved by planning and zoning commission and city council.
- (g) Street sign installation. Street signs shall be installed by the subdivider at all intersections within or abutting the subdivision. Such signs shall be of a type approved by the city and shall be installed in accordance with standards of the city. Traffic signs shall be furnished in accordance with the latest Texas Manual on Uniform Traffic Control Devices.
- (h) Timing of installation. Street name signs shall be installed in accordance with the city’s guidelines before final acceptance of the subdivision by the city.

### 30.165 Street and alley improvements.

- (a) Facilities constructed by developer. All facilities, such as internal streets and alleys, existing or proposed streets located immediately adjacent to the property, perimeter streets, and approach streets that are required to be constructed or improved in order to adequately serve the development, shall be constructed by the developer at the developer’s expense, unless otherwise allowed by these subdivision regulations.
- (b) Construction and design. All streets and alleys shall be constructed using reinforced concrete paving with integral curb and gutter, unless otherwise approved by the city, and shall conform in width and section to the thoroughfare plan of the city. All street design and construction shall conform to the city’s design standards.
- (c) Paving standards. The developer shall construct all streets and alleys according to the minimum street and alley paving standards contained within the design standards.
- (d) Accessibility for physically challenged persons. In addition to the above-mentioned minimum standards, barrier-free ramps for physically challenged persons shall be constructed at all street corners, driveway approaches, appropriate mid-block crosswalks, and in locations where accessible parking spaces are provided. All barrier-free ramps and other accessibility considerations shall comply with the Highway Safety Act, as currently amended, and with the Americans With Disabilities Act (ADA), as amended.
- (e) Signs and barricades. All signs and barricades shall be in conformity with the design standards, with ADA standards, and with specifications for uniform traffic-control devices, as adopted by the city, by Van Zandt County, by the Texas Department of Transportation, and by the Texas Department of Public Safety, as applicable.

**30.166 Retaining wall requirements, construction regulations, and design criteria.**

- (a) Retaining wall requirements. In general, the use of retaining walls shall be minimized, wherever possible, through minimal and balanced cut and fill on property. When property within or directly adjacent to a subdivision contains changes in elevation exceeding 2.5 feet and the slope exceeds one unit vertical in two units horizontal, a retaining wall shall be required at the following locations prior to the acceptance of the subdivision:
- (1) Follows a side or rear property line. The grade change roughly follows a side or rear lot line.
  - (2) Adjacent to a building site boundary. The grade change is adjacent to a proposed building site boundary.
  - (3) Adjacent to a watercourse or drainage easement. The grade change is adjacent to a watercourse or drainage easement.
- (b) Retaining wall design and construction. All retaining wall design and construction shall be in compliance with the provisions of the design standards of the city, and shall be approved by the planning director and city engineer.
- (c) Retaining wall maintenance. Retaining walls shall be maintained by the owner of the property where such retaining wall is located or HOA as designated by the recorded final plat and/or applicable declarations, covenants and/or deed restrictions. If an HOA is designated and is later dissolved ownership reverts back to the owner of the property.
- (d) Not in a utility or drainage easement. Retaining walls shall not be constructed within any portion of a utility or drainage easement, unless approved by the city engineer or planning director.

**30.167 Screening and landscaping construction regulations, requirements, and design criteria.**

- (a) Screening.
- (1) Required. Screening shall be required where subdivisions are platted so that the rear yards of single-family or two-family residential lots meet the following:
    - (A) Lots are adjacent to a street with a right-of-way width greater than a residential neighborhood collector street (greater than 60 feet in right-of-way width on the comprehensive plan);
    - (B) Lots are adjacent to a four-lane collector street;
    - (C) Lots are separated from a street by an alley; or
    - (D) Lots back up to a collector or residential street.
  - (2) Developer provided screening. The developer shall provide (at his/her expense) a minimum six-foot tall masonry screening wall, or some other alternative form of screening, if approved by planning and zoning commission and city council, according to this section.
  - (3) All screening shall be adjacent to the right-of-way or property.
  - (4) All forms of screening shall conform to the requirements of city ordinances and policies that govern visibility easements.
  - (5) Any required screening device that is wholly or partially destroyed or damaged shall be replaced or repaired with the same materials and shall be finished such that its appearance is restored to how it was

before being destroyed or damaged.

- (6) Screening alternatives. Screening shall be provided in accordance with, and shall be constructed to, standards and criteria as set forth in the city’s design standards and other related city code(s) and policy(s).
- (A) An alternative form of screening, in lieu of the six-foot tall masonry wall, may be approved by the planning and zoning commission and city council along with the preliminary plat. The developer shall submit drawings/renderings with the preliminary plat sufficient for the planning and zoning commission and city council to make a decision to approve or deny the proposed alternative.
- (B) Such possible alternatives include the following:
  - (i) Living/landscaped screen with decorative metal (e.g., wrought iron) fence sections with masonry columns;
  - (ii) A combination of embankments and living/landscaped screening, either with or without a decorative metal or “WoodCrete” type of fence with masonry columns;
  - (iii) A combination of embankments, decorative masonry retaining walls (no taller than six feet in height where facing or visible to a public street) and living/landscaped screening, either with or without a decorative metal or “WoodCrete” type of fence with masonry columns; or
  - (iv) Some other creative screening alternative may be approved if it meets the spirit and intent of this section, if it is demonstrated to be long-lasting and generally maintenance-free, and if the planning and zoning commission and city council finds it to be in the public interest to approve the alternative screening device.
- (C) Any required screening device shall be, or shall achieve, at least six feet in height and at least 90% opacity within three years of initial installation/planting.
- (D) Any landscaping used to achieve the purpose of required screening shall be equipped with an underground irrigation system with appropriate double-check valve(s), automatic controller(s), and automatic moisture and freeze sensors. Trees used for overstory screening shall be on a separate bubbler irrigation system that can be programmed to provide deep-watering of trees at intervals that may differ from the rest of the irrigation system.
- (E) The use of wood or other privacy fences immediately behind or abutting an alternative screening device that utilizes living screening elements (i.e., landscaping), embankments, retaining walls and/or open (i.e., non-opaque) fence sections shall not be permitted due to the creation of a “no man’s land” and subsequent maintenance nuisance in the area between the two devices/fences, and due to the detrimental visual appearance of this type of arrangement.
- (F) Any alternative form of screening in lieu of the masonry wall shall be located in a maintenance easement and shall be included in a public improvement district in accordance with section **30.133** of this article.
- (7) Maintenance easement required. A wall/screening maintenance easement at least five feet in width shall be dedicated on the private lot side and adjacent to the entire length of the screening wall or device.
- (8) Timing of installation. The screening wall/device shall be installed prior to final acceptance of the subdivision (or appropriate surety shall be provided, per division 6 of this article).

- (9) Landscape screening. All plants (e.g., trees, shrubs and ground cover) shall be living and in sound, healthy, vigorous and growing condition, and shall be of a size, fullness and height that is customary for their container or ball size, as per the latest edition of the “American Standard for Nursery Stock,” by the American Association of Nurserymen, as may be amended.
- (10) Properly engineered. All masonry, wrought iron, steel or aluminum screening wall or fence plans and details must be designed and sealed by a licensed professional engineer, and must be approved by the city engineer.
- (A) Masonry walls shall be in accordance with the city’s design standards within the design standards [sic].
- (B) Decorative metal fencing shall be solid stock, not tubular, and shall have masonry columns at a minimum spacing of 40 feet on center unless otherwise approved.
- (11) Height. The height of required screening devices, including spans between columns, shall be a minimum of six feet and shall be no more than eight feet tall. Decorative columns, pilasters, stone caps, sculptural elements, and other similar features may exceed the maximum eight-foot height by up to two feet for a total maximum height of 10 feet for these features, provided that such taller elements comprise no more than 10% of the total wall length in elevation view. Features that are taller than 10 feet in height shall require planning and zoning commission and city council approval on the landscaping/screening plans submitted with the preliminary plat.
- (12) Maintenance. All screening walls shall be maintained by a homeowners’ association as described in section **30.134** or included in a public improvement district in accordance with section **30.133** of this article.
- (b) Subdivision identification signs.
- (1) Subdivision identification signs are permitted at the entrance of single-family residential subdivisions which are bisected by one or more streets. Such subdivisions must have 10 or more platted lots.
- (2) Subdivision identification signs may be free-standing or may be incorporated on a screening wall located in an appropriate easement. Any screening wall on which a subdivision identification sign has been incorporated shall also meet the requirements of this section, as well as general screening wall requirements located in other sections of these subdivision regulations.
- (3) The maximum size of a subdivision identification sign shall be 32 square feet per sign with a maximum height of six feet unless an alternative design is otherwise approved by the city council.
- (4) A subdivision identification sign shall be included in a public improvement district in accordance with section **30.133** of this article.
- (5) Signs may be located at each corner of an intersection of an entrance street or within the median of a divided street, but shall not be located in within visibility easements.
- (6) The design of the subdivision identification sign shall be in accordance with the city’s design standards, as applicable.
- (7) The design of the subdivision identification sign (including any related screening wall) shall be reflected on materials/plans submitted along with the preliminary plat and the engineering plans, and shall be approved by the city.

- (c) Landscaping. All landscaping shall be in conformance with the city's landscape regulations, as amended.
- (d) Signage. All signage shall be in conformance with the city's sign regulations as amended.

### 30.168 **Water and wastewater requirements.**

- (a) Installation. The installation of all water and wastewater lines shall be in conformance with section **30.090** of this article. The design and construction of the water system and sanitary sewer system shall be in conformance with the city's master plans for water and wastewater facilities, the design standards, and construction plans, and shall be approved by the city engineer.
- (b) Provision for water and wastewater required. No final plat shall be approved for any subdivision within the city or its extraterritorial jurisdiction until the applicant has made adequate provision for a water system and a sanitary sewer system of sufficient capacity to adequately provide service to all tracts and lots within the area to be subdivided.
- (c) Safe water supply and fire protection. Water system mains of sufficient size and having a sufficient number of outlets to furnish adequate and safe domestic water supply and to furnish fire protection to all lots shall be provided.
- (d) Water and wastewater mains to property line. Water and wastewater mains shall extend to the property line in order to allow future connections into adjacent undeveloped property unless otherwise authorized by these subdivision regulations.
- (e) Utilities to property line of each lot. Services for utilities shall be made available to the property line of each lot in such a manner as will minimize the necessity for disturbing the street pavement and drainage structures when connections are made.
- (f) Fire protection. Fire protection shall be provided in accordance with sections **30.089** and **30.090** of this article, with the city's design standards, and with any other city policy or ordinance pertaining to fire protection or suppression.
  - (1) The fire chief or his/her designee shall have the authority to approve the locations and placement of all fire hydrants, fire lanes, and easements in accordance with the adopted fire code. He or she may, at his or her discretion, modify fire hydrant spacing or fire lane placement based upon special design or distance circumstances.
  - (2) Vertical construction (i.e., any building construction above foundation/slab level) shall not commence until all required fire lanes are properly installed and accepted by the city, nor until all fire hydrants have been installed, inspected, tested and accepted by the city.

### 30.169 **Storm drainage and water quality controls.**

- (a) Adequate storm sewer system required. An adequate storm sewer system consisting of inlets, pipes and other underground structures with approved outlets shall be constructed where runoff of storm water and the prevention of erosion cannot be accomplished satisfactorily by surface drainage facilities.
- (b) Areas subject to flood conditions or storm water retention. Areas subject to flood conditions or inadvertent storm water retention, such as standing or pooling water, as determined by the city engineer, will not be considered for development until adequate drainage has been provided.
- (c) Design. The criteria for use in designing storm sewers, culverts, bridges, drainage channels, and other drainage facilities shall conform to sections **30.090** and **30.091**, as applicable, of this article and the

design standards.

- (d) Proper functioning required prior to expiration of maintenance bond. The developer shall ensure that all drainage improvements within public easements or rights-of-way are functioning properly prior to the expiration of the maintenance bond.
- (1) Responsibility. The developer shall be responsible for removing any significant build-up of sediment or debris from drainage improvements, with the exception of back-lot and side-lot drainage swales, through the 24th month of the required two-year maintenance bond for the applicable facilities.
- (2) City inspection. The city shall inspect the improvements to determine any maintenance or correction of deficiencies at the conclusion of this period.
- (e) Storm water pollution prevention plan (SWPPP). An SWPPP shall be provided for storm water discharge in accordance with Texas Pollutant Discharge Elimination System (TPDES) general permit, TXR150000, and/or Environmental Protection Agency (EPA) regulations. This shall include the assumption of responsibility of said pollution prevention system, including the design and implementation of said system, complete in place. Moreover, when it comes to SWPPP, the contractor has the sole authority, responsibility and control over plans and specifications of the said SWPPP only and can make changes to those specifications for the entire project as he deems necessary or needed to remain in compliance with the Texas Commission on Environmental Quality (TCEQ) and/or EPA regulations. When site stability is achieved in accordance with the SWPPP, the developer shall remove the control apparatuses, devices, and systems and remove accumulated silt and debris.

30.170 through 30.200. (Reserved)

## Article 6

### Requirements for Acceptance of Subdivisions by City

**30.201 Withholding city services and improvements until acceptance.**

- (a) General policy. The city hereby defines its policy to be that the city will withhold all city services and improvements of any type until all required improvements are properly constructed according to the approved engineering plans and to city standards, and until such public improvements are dedicated to and accepted by the city. This policy of withholding includes subdivision improvements as well as lot improvements.
  - (1) Subdivision improvements. Subdivision improvements include street maintenance, extension of city services from any subdivision or property, and all street, utility, storm drainage and other public improvements.
  - (2) Lot improvements. Lot improvements include retaining walls, grading, and improvements required for proper lot drainage and prevention of soil erosion.

**30.202 Guarantee of public improvements.**

- (a) Developer's guarantee. Before final acceptance of a subdivision located all or partially within the city or its extraterritorial jurisdiction, the city must be satisfied that all required public improvements have been constructed in accordance with the approved engineering plans and with the requirements of these subdivision regulations.
- (b) Subdivision improvement agreement and guarantee. The city manager may waive the requirement that the applicant complete and dedicate all public improvements prior to final acceptance of the subdivision, and may permit the developer to enter into a subdivision improvement agreement by which the

developer covenants to complete all required public improvements no later than two years following the date upon which the remainder of the subdivision is accepted. The city manager may also require the developer to complete or dedicate some of the required public improvements prior to final acceptance of the subdivision, and to enter into a subdivision improvement agreement for completion of the remainder of the required improvements during such two-year period. The subdivision improvement agreement shall contain such other terms and conditions as are agreed to by the developer and the city.

- (c) Subdivision improvement agreement required for oversize reimbursement. The city may participate in the oversizing of water and sewer facilities required to serve the land areas and improvements beyond the subdivision. The city shall require a subdivision improvement agreement pertaining to any public improvement for which the developer shall request reimbursement from the city for oversize costs. The city manager, subject to available funds in the budget approved by the city council, has the authority to approve such an agreement. The city manager is authorized to sign a subdivision improvement agreement on behalf of the city under this subsection (c).
- (d) Security. Whenever the city permits an applicant to enter into a subdivision improvement agreement, it shall require the applicant to provide sufficient security, covering the completion of the public improvements. The security shall be in the form of cash escrow or, where authorized by the city, a performance bond or letter of credit or other security acceptable to the city manager and the city attorney, as security for the promises contained in the subdivision improvement agreement. Security shall be in an amount equal to 110% of the estimated cost of completion of the required public improvements and lot improvements. The city engineer shall review and approve the cost estimates provided by the developer. Any security instrument, including a bond, letter of credit, or escrow agreement shall be subject to the review and approval of the city engineer and the city attorney.
- (e) Performance bond.
  - (1) Requirements. If the city council authorizes the applicant to post a performance bond as security for its promises contained in the subdivision improvement agreement, the performance bond shall comply with the following requirements:
    - (A) All performance bonds must be in the forms acceptable to the city engineer and the city attorney;
    - (B) All performance bonds must be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies," as published in Circular 570, as may be amended, by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury;
    - (C) All performance bonds must be signed by an agent, and must be accompanied by a certified copy of the authority for him or her to act;
    - (D) All performance bonds shall be obtained from surety or insurance companies that are duly licensed or authorized in the State of Texas to issue performance bonds for the limits and coverage required.
  - (2) Additional surety .If the surety on any performance bond furnished by the applicant is declared bankrupt, or becomes insolvent, or its right to do business is terminated in the State of Texas, or the surety ceases to meet the requirements listed in Circular 570, the developer shall, within 20 calendar days thereafter, substitute another performance bond and surety, both of which must be acceptable to the city.
  - (3) Withholding until improvements or other surety. The city may withhold building permits, certificate of occupancy permits or utility connections until such improvements are completed or other surety is

provided to the city.

- (f) Letter of credit. If the city manager authorizes the applicant to post a letter of credit as security for its promises contained in the improvement agreement, the letter of credit shall:
  - (1) Be irrevocable;
  - (2) Be for a term sufficient to cover the completion, maintenance and warranty periods, but in no event less than two years; and
  - (3) Require only that the city present the issuer with a signed draft and a certificate signed by an authorized representative of the city certifying to the city's right to draw funds under the letter of credit.
- (g) Reducing amount of surety. As portions of the public improvements are completed in accordance with the design standards and the approved engineering plans, the applicant may make written application to the city to reduce the amount of the original security. If the city is satisfied that such portion of the improvements has been completed in accordance with city standards, the city manager (or designee) may cause the amount of the security to be reduced by such amount that he or she deems appropriate, so that the remaining amount of the security adequately insures the completion of the remaining public improvements.
- (h) Escrow policies and procedures for streets.
  - (1) Request for escrow. Whenever these subdivision regulations require a property owner to construct a street or thoroughfare, the property owner may petition the city to construct the street or thoroughfare, usually at a later date, in exchange for deposit of escrow as established in this section.
  - (A) The basis of such petition shall be the existence of unusual circumstance(s), such as a timing issue due to pending street improvements by another agency such as TxDOT or Van Zandt County that would present undue hardships or that would impede public infrastructure coordination or timing.
  - (B) If more than one street or thoroughfare must be constructed in order to meet adequacy requirements for streets, the city manager (or designee) may prioritize streets for which escrow is to be accepted and require the deposit of all funds attributable to the development in escrow accounts for one or more of such affected streets.
  - (C) The city council shall review the particular circumstances involved, and shall determine, at its sole discretion, whether or not provision of escrow deposits will be acceptable in lieu of the property owner's obligation to construct the street or thoroughfare with his or her development.
  - (2) Escrow deposit with the city. Whenever the city council agrees, under these subdivision regulations, to accept escrow deposits in lieu of construction by the property owner or developer of the street or thoroughfare, the property owner or developer shall deposit in escrow with the city an amount equal to costs of the following:
    - (A) Administration;
    - (B) Advertisements;
    - (C) Bidding;
    - (D) Contingency;

- (E) Testing;
  - (F) Design;
  - (G) Construction;
  - (H) Permits;
  - (I) Reviews and approvals;
  - (J) Inspections;
  - (K) Any additional land acquisition; and
  - (L) An appropriate (and realistic) inflation factor to ensure that the actual “future dollar” costs will be covered when actual construction occurs in the future.
- (3) Determination of escrow amount. The amount of the escrow shall be determined by using the maximum comparable “turn-key” bid price of construction of the street or thoroughfare improvements (including the items listed in subsection (2) above). Such determination of the escrow amount shall be made as of the time the escrow is due hereunder, and shall be subject to the review and approval of the city manager (or designee) and the city engineer. The escrow amount shall be paid prior to release (approval) of engineering plans by the city engineer. The obligations, responsibilities, and related liability of the property owner shall become those of the property owner’s transferees, successors and assigns.
  - (4) Use of escrow. Escrowed amounts, along with any interest accrued on such amount, may be used for the purposes outlined in subsection (2) above in order to undertake construction of the facilities that are required as part of the development for which the escrow was submitted.
  - (5) Termination of escrow. Escrows, or portions of escrowed amounts, which have been placed with the city under this section and which have been held for a period of 10 years from the date of such payment or agreement, in the event that the city has not authorized the preparation of plans and specifications for construction of such street facilities for which the escrow was made, shall, upon written request, be returned to the property owner, along with its accrued interest. Such return does not remove any obligations of the property owner for construction of the required facilities if a building permit has not been issued on the subject lot or if a new building permit is applied for.
  - (6) Refund. If any street or highway for which escrow is deposited is constructed by a party other than the city, or is reconstructed by another governmental authority at no cost to the city, the escrowed funds and accrued interest shall be refunded to the property owner or applicant who originally paid the escrow amount after completion and acceptance of the public improvements. In the event that a portion of the cost is borne by the city and the other portion of the cost by another party or governmental authority, the difference between the property owner’s actual proportionate cost and the escrowed funds, including accrued interest, if any, shall be refunded after completion and acceptance of the improvements.
  - (7) Interest limitation. If money is refunded within six months of deposit, only the principal shall be refunded. Monies returned after this date will be refunded with 1/2 of its accrued interest.
- (i) Subdivision improvement agreements for perimeter and approach streets.
  - (1) Perimeter and approach streets. If a perimeter or approach street is required to be constructed under section 30.082 of this article, the developer and the city may enter into a subdivision improvement

agreement that provides for the future reimbursement to the developer as new development occurs along the section of the perimeter or approach street constructed by the developer. Such reimbursement shall not exceed one-half the cost per linear foot of constructing the perimeter or approach street and related improvements multiplied by the number of linear feet of the perimeter or approach street adjacent to the new development. The developer who constructed the street shall submit copies of contracts to the city to establish the cost of the project that is subject to reimbursement.

- (2) Time period for reimbursement. If the city collects a perimeter street fee as provided for in section **30.082** of this article, within 10 years of the acceptance of the street by the city, it shall pay the collected amount to the developer who originally constructed the street as soon as practicable after receipt of the funds as required under the terms of a subdivision improvement agreement authorized by this subsection (i). At the expiration of the 10th year, a developer is no longer entitled to receive reimbursement.
- (3) Impact fee credit. Unless otherwise agreed to in a written agreement concerning impact fees or other development fees, a developer who installs an approach street under the provisions of a subdivision improvement agreement may pursuant to the provisions of the agreement, receive credit for costs associated with the installation of the approach street against any street impact fees that may be lawfully assessed against the developer for that portion of the approach street constructed.
- (4) Oversizing. When required for the proper and orderly growth of the city, the city council may require a developer to install an approach street larger than necessary to support the specific development subject to the terms of a subdivision improvement agreement. If the developer is required to install an approach street larger than necessary to serve the specific development, the developer may, subject to the provisions of a subdivision improvement agreement, be reimbursed by the city for the difference in cost between the cost of installing the oversized street and the cost of installing a street meeting minimum city standards required for the type of street required to serve the development.
- (A) Credit for development fees. The city may, pursuant to the terms of a subdivision improvement agreement, compensate the developer for the difference in cost mandated by oversizing by crediting up to 50% of development fees charged against any portion or phase of the development.
- (i) Transfer of credit. Upon written request from the developer, credit for development fees may be transferred from the current development project to subsequent development projects, subdivisions or phases undertaken by the developer. Such transfers must be approved by the city council.

### **30.203 Temporary improvements.**

- (a) Responsibility. The applicant shall build and pay for all costs of temporary improvements required by the city, and shall maintain those temporary improvements for the period specified by the city. Prior to construction of any temporary facility or improvement, the applicant shall file with the city a separate improvement agreement and escrow or, where authorized, a letter of credit, in an appropriate amount for temporary facilities, which agreement and escrow or letter of credit shall ensure that the temporary facilities will be properly constructed, maintained and removed.
- (b) Temporary easement. Any temporary public improvement (e.g., a temporary cul-de-sac, alley turnout, drainage swale, erosion control device, etc.) shall be placed within an easement established specifically for that purpose. The recording information of the instrument establishing the temporary easement shall not be shown on the final plat unless the easement is a permanent easement for the subdivision prior to approval of the final plat. A temporary easement for a required public improvement shall not be abandoned without the city manager's written consent.

**30.204 Failure to complete improvements.**

- (a) Improvement agreement executed and security posted. In those cases where an subdivision improvement agreement has been executed and security has been posted, and the required public improvements have not been installed within the terms of the agreement, the city may:
- (1) Declare the agreement to be in default and require that all the public improvements be installed regardless of the extent of completion of the development at the time the agreement is declared to be in default;
  - (2) Suspend any previously authorized building construction activity within the subdivision until the public improvements are completed, and record a document to that effect for the purpose of public notice;
  - (3) Obtain funds under the security and complete the public improvements itself or through a third party;
  - (4) Assign its right to receive funds under the security to any third party, including a subsequent owner of the subdivision for which public improvements were not constructed, in whole or in part, in exchange for that subsequent owner's promise to complete the public improvements on the property; or
  - (5) Exercise any other rights or remedies available under the law.

**30.205 Acceptance of dedication offers.**

- (a) Acceptance. Acceptance of formal offers for the dedication of streets, public areas, easements or parks shall be by written authorization of the city manager. The approval by the planning and zoning commission and city council of a preliminary or final plat shall not, in and of itself, be deemed to constitute or imply the acceptance by the city of any public improvements required by the plat. The city may require the plat to be endorsed with appropriate notes to this effect.

**30.206 Maintenance guarantee.**

- (a) Maintenance bond.
- (1) A subdivider shall furnish a good and sufficient maintenance bond issued by a reputable and solvent corporate surety, in favor of the city, to indemnify the city against and guarantee the costs of any repairs which may become necessary to any part of the construction work performed in connection with the subdivision, arising from defective workmanship or materials used therein, for a full period of **two years** from the date of final acceptance of the entire project or a phase of the project if the city elects to accept a particular phase before the entire project is completed. A separate maintenance bond must be furnished for work done under each contract for each part of such construction work unless otherwise authorized by the city. Final acceptance will be withheld until said maintenance bond is furnished to and approved by the city attorney. The maintenance bond shall have attached thereto a copy of the construction contract for such improvements and such other information and data necessary to determine the validity and enforceability of such bond. When the bond has been examined and approved, the city attorney shall so specify in writing to the city's development department. No permits shall be issued by the building inspector of the city on any piece of property other than an original or a re-subdivided lot in a duly approved and recorded subdivision or on a lot of separate ownership of record prior to the approval of any required maintenance bond.
  - (2) The city manager may waive the requirement for a maintenance bond for projects with a construction cost of \$5,000.00 or less.

**30.207 Construction procedures.**

- (a) Site development permit. A site development permit is required from the city prior to beginning any site

development-related work in the city or its extraterritorial jurisdiction which affects erosion control, storm drainage, vegetation or tree removal, or a floodplain.

- (b) Pre-construction conference prior to affecting grading, vegetation and/or trees. The city shall require that all contractors participating in the construction meet for a pre-construction conference to discuss the project prior to release of a site development permit and before any filling, excavation, clearing or removal of vegetation and any trees that are larger than six-inch caliper. All contractors shall be familiar with, and shall conform with, applicable provisions of the city's landscape and tree preservation regulations and any other applicable ordinances or regulations.
- (c) Conditions prior to authorization. Prior to issuing a site development permit, the planning director shall be satisfied that the following conditions have been met:
  - (1) The final plat has been approved by the planning and zoning commission (and any conditions of such approval have been satisfied);
  - (2) All required engineering plans and documents are completed and approved by the city's engineer;
  - (3) All necessary off-site easements and dedications required for city-maintained facilities and not shown on the plat have been conveyed to the city, such as by filing of a separate instrument, with the proper signatures affixed;
  - (4) All contractors participating in the construction shall be presented with a set of approved plans bearing the stamp of approval of the director of public works, and at least one set of these plans shall remain on the job;
  - (5) A complete list of the contractors, their representatives on the site, and telephone numbers where a responsible party may be reached at all times must be submitted to the city; and
  - (6) All applicable fees must be paid to the city.
- (d) Nonpoint source pollution controls and tree protection. All nonpoint source pollution controls, erosion controls, and tree protection measures and devices shall be in place, to the city engineer's satisfaction, prior to commencement of construction on any property.

### **30.208 Inspection and acceptance of public improvements.**

- (a) General procedure.
  - (1) The subdivider shall provide inspection service through his/her engineer to ensure that construction is being accomplished in accordance with the plans and specifications approved by the city engineer.
  - (A) The subdivider shall notify the public works director 48 hours prior to commencement of construction. This notice shall give the location and date of the start of construction.
  - (B) The city shall have the right to inspect any construction work being performed to ensure that it is proceeding in accordance with the intent of the provisions of these subdivision regulations.
  - (C) Any change in design that is required during construction should be made by the licensed professional engineer whose seal and signature are shown on the plans. Another engineer may make revisions to the original engineering plans if so authorized by the owner of the plans, and if those revisions are noted on the plans or documents. All revisions shall be approved by the city engineer.

- (D) If the city engineer finds, upon inspection, that any of the required public improvements have not been constructed in accordance with the approved construction plans, the city's standards and/or the design standards, then the developer shall be responsible for completing and correcting the deficiencies (at his/her expense) such that they are brought into conformance with the applicable standards.
- (2) Testing laboratory services will be arranged by the city and paid for by the developer. It shall be the responsibility of director of public works (or designee) to coordinate the scheduling of all required tests with the testing laboratory. Testing shall be conducted in accordance with the procedures set forth in design standards for like work at the frequency specified thereon as directed by the city engineer.
- (b) Letter of satisfactory completion.
- (1) The city will only deem required public improvements satisfactorily completed when the applicant's engineer or RPLS has certified to the city engineer (through submission of detailed sealed "as-built," or record, drawings of the property) drawings that indicate all public improvements and their locations, dimensions, materials and other information required by the city engineer, and when all required public improvements have been completed.
- (A) The "as-builts" shall also include a complete set of sealed record drawings of the paving, drainage, water, sanitary sewer and other public improvements, showing that the layout of the lines and grades of all public improvements are in accordance with engineering plans for the plat, and showing all changes made in the plans during construction, and containing on each sheet an "as-built" stamp bearing the signature and seal of the licensed professional engineer and the date.
- (B) One reproducible drawing of the utility plan sheets containing the as-built information shall also be submitted.
- (C) The developer's engineer and/or RPLS shall also furnish the city with a copy of the approved final plat and "as-built" engineering plans, in such a digital format (on disk) that is compatible with the city CAD system.
- (2) When the requirements of subsection (1) above have been met to the planning director's and city engineer's satisfaction, and when a maintenance bond has been received and approved as required in section 30.206 of this article, the city manager shall issue a letter of satisfactory completion.
- (c) Effect of acceptance. Acceptance of the development shall mean that the developer has transferred all rights to all the public improvements to the city for use and maintenance, subject to the two-year maintenance bond (see section 30.206 of this article).

### 30.209 Issuance of building permits and certificates of occupancy.

- (a) Building permit.
- (1) A building permit shall only be issued for a lot, building site, building or use after the lot or building site has been officially recorded by a final plat approved by the planning and zoning commission and city council and filed for record at Van Zandt County, and after all public improvements, as required by these subdivision regulations, have been completed.
- (2) Notwithstanding the above, a permit may be issued as outlined below, provided that an agreement providing sufficient security (see section 30.202 of this article) is approved by the city manager for the completion of all remaining public improvements.
- (A) Building "foundation-only" permit. A building "foundation only" permit may be issued for a

nonresidential or multifamily development. However, the building permit shall not be issued and building construction shall not be allowed to surpass the construction of fire protection improvements. In other words, the building shall not proceed above the slab level until all required fire lanes have been completed, and until all water lines serving fire hydrants have been completed, inspected and tested.

- (B) Possible release of lots. The city manager may release some residential building permits for not more than 10% of the lots within a new residential subdivision, provided that all public improvements have been completed for that portion of the development including those required for fire and emergency protection. No lot may be sold nor title conveyed until the final plat has been recorded with the Van Zandt County clerk.
- (b) Certificate of occupancy. A certificate of occupancy shall only be issued for a building or the use of property after a final plat has been approved by the planning and zoning commission and city council and recorded with the Van Zandt County clerk, and after all subdivision improvements have been completed. Notwithstanding the above, a certificate of occupancy may be issued provided that an agreement providing sufficient security (see section 30.202 of this article) is approved by the city manager for the completion of all remaining public improvements, and provided that the structure is safely habitable in accordance with the city's building codes. No lot may be sold nor title conveyed until the final plat has been recorded with the Van Zandt County clerk.

30.210 through 30.240. (Reserved)

## Article 7

### Filing Fees; Plat Re-Submission and Construction Inspection Fees

#### 30.241 Schedule of fees and re-submission requirements.

- (a) Fee schedule. All submissions required under these subdivision regulations shall be accompanied by the payment of fees in accordance with the current development fees schedule as set forth Appendix A of this code and any other applicable fees. The development fee schedule shall be as approved by the city council and may be changed from time to time by the city council. It is the applicant's responsibility to obtain and comply with the city's current fee schedule and submission requirements.
- (b) Purpose. Such fees shall be collected for the purpose of defraying the costs of administrative, clerical, engineering, review, inspections, and testing necessary to properly review and investigate plats and subdivision construction.
- (c) No refund. Such fees shall be imposed and collected on all applications for approval of any type of plat, regardless of the action taken by the planning and zoning commission and city council thereon. The commission shall take no action until all required fees have been paid. The required fees shall not be refunded should the plat be disapproved.
- (d) Re-submission fees. Re-submission of revised applications (such as preliminary plats) having substantial changes shall, at the discretion of the director of planning, require complete reapplication and payment of fees.
- (e) Expiration of application. Should a development application expire, or should it be denied by the commission or the city council, then that application ceases "pending" status and the application, and its corresponding series of development approvals and permits, shall be deemed null and void. Any future application for any type of development approval for that property shall be considered a new application, and shall be accompanied by new application materials, including new submission fees, and shall conform to all applicable city ordinances in effect at the time of submission of the new application.

- (f) Recordation fees. Recordation of plats with the Van Zandt County clerk shall be the responsibility of the applicant.
- (g) Construction inspection fee.
- (1) A construction fee as provided in the fee schedule in appendix A to this code shall be paid to the city prior to the construction of any facilities. The subdivider shall submit to the city engineer an estimate of construction costs. The city engineer shall either approve or disapprove the estimate and send a copy of said approval or disapproval to subdivider and city. If the estimate is disapproved, the city engineer shall consult with subdivider and attempt to negotiate an acceptable estimate. If such negotiations are unsuccessful, the subdivider may appeal to the city council to resolve the dispute. Construction shall not begin until the city engineer has approved the estimate or in the alternative the city council has approved the estimate, and the associated fees have been paid.
- (2) The subdivider shall submit to city documentation showing actual cost of construction when construction is completed. If actual cost is less than the original estimate, the city shall refund the appropriate amount. If the actual construction cost is greater than the original estimate, the subdivider shall pay to the city the appropriate amount, based on the amount established in the fee schedule in appendix A to this code.

30.242 through 30.260. (Reserved)

## Article 8

### Enforcement; Violations; Penalties

#### 30.261 Enforcement; violations; penalties.

In addition to all other remedies and relief available to the city by law or in equity for a violation of these subdivision regulations, the following non-exclusive forms of relief shall be available to the city:

- (1) Violations and penalties. Any person who violates any of these regulations for lands within the corporate boundaries of the city shall be subject to a fine in accordance with the general penalty provided in section **1.01.009** of this code per day, or the highest amount authorized under law, whichever is lower, with each day constituting a separate violation.
- (2) Civil enforcement. Appropriate civil actions and proceedings may be maintained in law or in equity to prevent unlawful construction, to recover damages, to impose additional penalties, [or] to restrain, correct or abate a violation of these regulations, whether such violation occurs with respect to lands within the corporate boundaries of the city or within the city's extraterritorial jurisdiction. These remedies shall be in addition to the penalties described above.
- (3) Withholding of subdivision acceptance. Pursuant to the provisions of division 6 of this article, the city may refuse to grant final acceptance of a subdivision that does not fully and completely comply with all terms and conditions of these subdivision regulations including, but not limited to, the refusal to issue building permits and certificates of occupancy, and the refusal to connect the property to city utilities and services.

Article 9  
Tables & Design Criteria

## 30.262 Tables

TABLE 1				
Type	Designation	R.O.W.	Pavement Width	Median Width
Expressway	E	150' - 500'	NA	NA
Arterial	A	120'	2 @ 36'	26'
Major or minor collector, divided	C2D	90'	2 @ 24'	20'
Major or minor collector, undivided	C2U	80'	48'	None
Residential collector	C	60'	36'	None
Residential local	R	50'	31'	None



CITY OF VAN
PLAT APPLICATION

- Plat \$300.00 For new subdivisions or large scale development
Amended plat \$150.00 Revised plat correcting errors or making minor changes to original recorded final plat
Replat \$200.00 Resub dividing of any part or all of a block or blocks of a previously platted subdivision, additional lot, or tract
Minor Plat \$150.00 A subdivision resulting in four or fewer lots provided that the plat is for conveyance purposes only...

Name of Applicant: Phil Ayers

Company Name: Ayers Enterprises, Inc.

Address: PO. Box 145

Name of Owner: Same

Address:

Name of Addition: Mond's Subdivision Current Zoning: SF

Number of Acres: 0.775 Number of Lots: 2 Proposed Zoning: Residential

Address or Legal Description of Property: Spruce St., Dove St.

SEE A Hatched

Reason for Request: To add a single family Residence

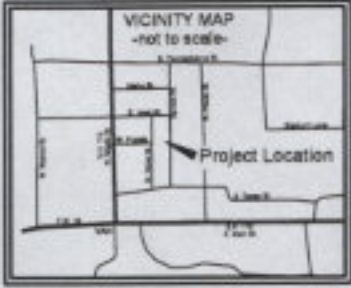
I certify that I am the owner, or duly authorized agent of the owner for the purpose of this application; all information submitted herein is true and correct; and the application of \$200.00 to cover the cost of this application, has been paid the City of Van on this the 3rd day of Feb, 2025

I further certify that there are no deed restrictions or covenants that will restrict, alter or affect the plat or replat.

Signature: [Handwritten Signature]

Date: 02-03-2025

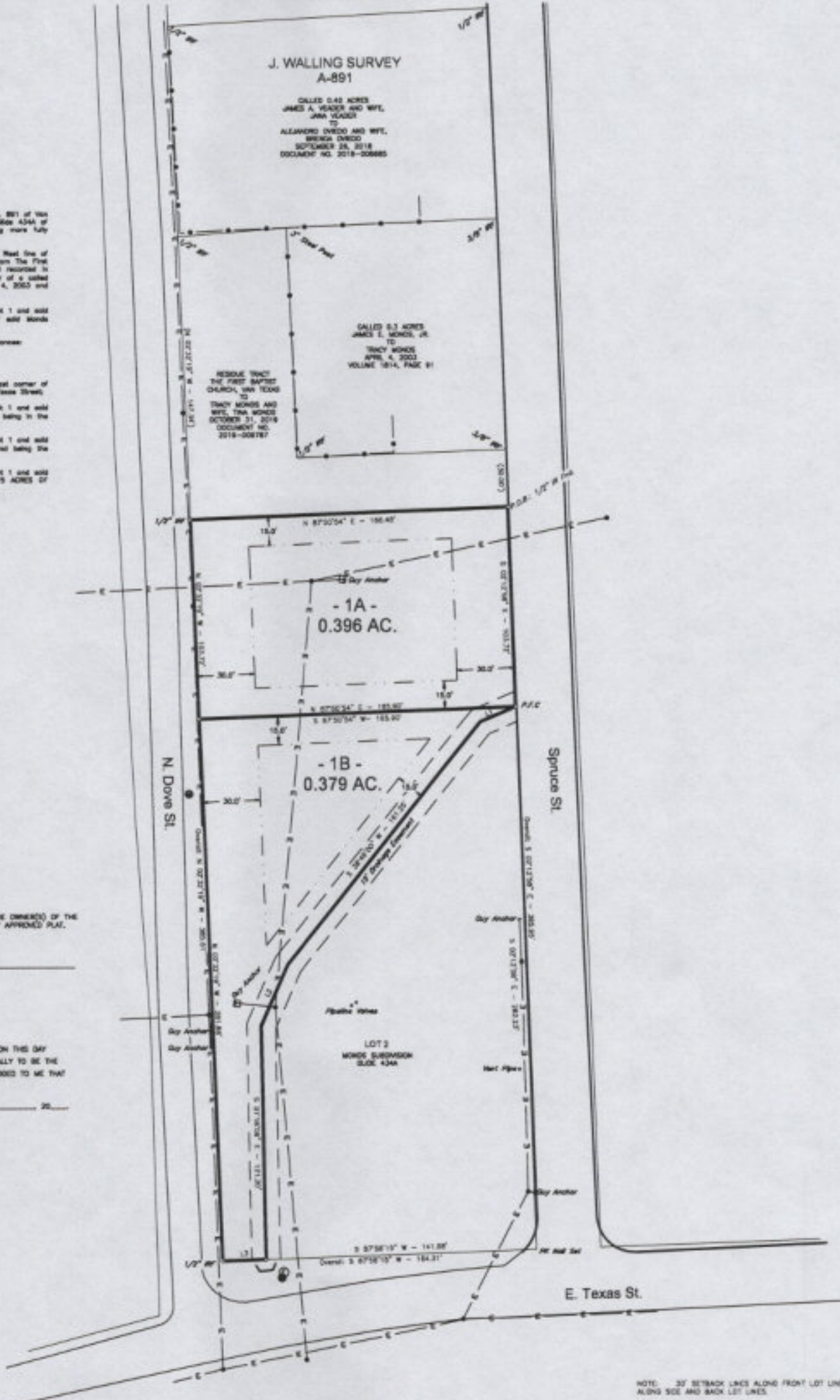
VAN ZANDT COUNTY, TEXAS



**Legal Description:**  
 All that certain lot, tract or parcel of land located within the J. Walling Survey, Abstract No. 891 of Van Zandt County, Texas, being all of Lot 1 of Monds Subdivision as shown on plat filed in Case 434A of the Official Plat Records of Van Zandt County, Texas, and 0.775 acre tract being more fully described as follows:  
 BEGINNING at a 1/2" Iron Rod Found for the Northeast corner of said Lot 1, being in the West line of Spruce Street, and being the Southeast corner of a residue tract described in a deed from The First Baptist Church, Van Zandt to Tracy Monds and Tracy Monds, dated October 31, 2018 and recorded in Document No. 2018-008705, from which a 3/4" Iron Rod Found for the Southeast corner of a called 0.3 acre tract described in a deed from James E. Monds, Jr. to Tracy Monds, dated April 4, 2003 and recorded in Volume 1814, Page 81 bears North 02°12'58" West, a distance of 30.00 feet;  
 THENCE South 02°12'58" East, a distance of 103.72 feet along the common line of said Lot 1 and said Spruce Street to a 1/2" Iron Rod Set in some of the Northeast corner of Lot 2 of said Monds Subdivision;  
 THENCE along the common line of said Lot 1 and said Lot 2 the following courses and distances:  
 South 88°44'38" West, a distance of 20.28 feet to a Point For Corner;  
 South 28°46'00" West, a distance of 140.25 feet to a Point For Corner;  
 South 27°28'11" West, a distance of 35.13 feet to a Point For Corner;  
 South 01°18'08" East, a distance of 121.25 feet to a 1/2" Iron Rod Set for the Southeast corner of said Lot 1, being the Southeast corner of said Lot 2, and being in the North line of East Texas Street;  
 THENCE South 87°58'15" West, a distance of 22.84 feet along the common line of said Lot 1 and said East Texas Street to a 1/2" Iron Rod Found for the Southeast corner of said Lot 1 and being in the East line of North Dove Street;  
 THENCE North 02°32'19" West, a distance of 395.01 feet along the common line of said Lot 1 and said North Dove Street to a 1/2" Iron Rod Found for the Northwest corner of said Lot 1 and being the Southwest corner of said The First Baptist Church residue tract;  
 THENCE North 87°58'34" East, a distance of 188.48 feet along the common line of said Lot 1 and said The First Baptist Church residue tract to the POINT OF BEGINNING AND CONTAINING 0.775 ACRES OF LAND.

STATE OF TEXAS  
 CITY OF VAN ZANDT  
 APPROVED BY THE CITY COUNCIL  
 ON THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_  
 CHAIRPERSON  
 \_\_\_\_\_  
 STATE OF TEXAS  
 COUNTY OF VAN ZANDT  
 APPROVED BY THE PLANNING AND ZONING COMMISSION ON THIS  
 \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_  
 CHAIRPERSON  
 \_\_\_\_\_

STATE OF TEXAS  
 COUNTY OF VAN ZANDT  
 KNOW ALL MEN BY THESE PRESENTS  
 OWNER DESCRIPTION:  
 Replat of a tract of land located within the John Walling Survey, Abstract No. 891, Van Zandt County, Texas, being described Lot 1 of Monds Subdivision recorded in Case 434A of the Official Plat Records of Van Zandt County, Texas.  
 I, \_\_\_\_\_ THE OWNER(S) OF THE LAND SHOWN ON THIS PLAT, HEREBY ACKNOWLEDGE THIS DOCUMENT AS THE OFFICIALLY APPROVED PLAT.  
 OWNERS  
 \_\_\_\_\_  
 STATE OF TEXAS  
 COUNTY OF VAN ZANDT  
 BEFORE ME, THE UNDERSIGNED, A NOTARY PUBLIC IN AND FOR THE STATE OF TEXAS, ON THIS DAY PERSONALLY APPEARED \_\_\_\_\_ KNOWN TO ME PERSONALLY TO BE THE PERSON WHOSE NAME IS SUBSCRIBED TO THE FOREGOING INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE CREDITED THE SAME FOR THE PURPOSE AND CONSIDERATION THEREIN EXPRESSED.  
 GIVEN UNDER MY HAND AND SEAL OF OFFICE, THIS THE \_\_\_\_\_ DAY OF \_\_\_\_\_, 20\_\_\_\_  
 \_\_\_\_\_  
 NOTARY PUBLIC IN AND FOR \_\_\_\_\_ COUNTY, TEXAS.  
 MY COMMISSION EXPIRES: \_\_\_\_\_



**SURVEYOR'S STATEMENT:**  
 I, Jack D. Scarbrough, do hereby state that this plat represents a survey made on the ground under my supervision during the month of August, 2023.  
 GIVEN UNDER MY HAND & SEAL, this the 14th day of January, 2025.



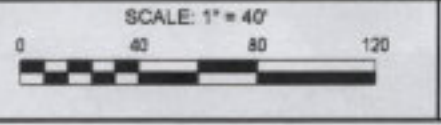
JACK D. SCARBROUGH - R.P.L.S. No. 6289

NOTE: 30' SETBACK LINES ALONG FRONT LOT LINES. 15' SETBACK LINES ALONG SIDE AND BACK LOT LINES.  
 NOTE: "O" DENOTES 1/2" IRON ROD SET WITH BLUE CAP STAMPED "JDS 10194118" UNLESS OTHERWISE NOTED.  
 NOTE: 1/2" IRON ROD SET WITH BLUE CAP STAMPED "JDS 10194118" SET AT ALL LOT CORNERS UNLESS OTHERWISE NOTED.  
 NOTE: NO ATTEMPT WAS MADE TO LOCATE UNDERGROUND PIPELINES OR UTILITIES.  
 NOTE: THE BEARINGS HEREON WERE OBTAINED TO AGREE WITH GRID NORTH AND WERE DERIVED BY THE USE OF G.P.S. EQUIPMENT (TRIM 55 - TX NORTH CENTRAL ZONE).  
 NOTE: THIS SURVEY WAS COMPLETED WITHOUT THE BENEFIT OF AN ABSTRACT OF TITLE. THERE MAY BE EASEMENTS OR OTHER MATTERS OF RECORD NOT SHOWN.  
 NOTE: SELLING A PORTION OF THIS ADDITIONAL BY METES AND BOUNDS IS A VIOLATION OF THE CITY ORDINANCES AND/OR STATE LAW AND IS SUBJECT TO FINES AND WITHOLDING OF UTILITIES AND BUILDING PERMITS.  
 NOTE: THIS PROPERTY IS LOCATED WITHIN THE CITY LIMITS OF VAN, TEXAS.  
 NOTE: THIS PROPERTY IS LOCATED WITHIN A ZONE LABELED "OTHER AREAS" AS SHOWN ON FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FIRM MAP NO. 4860C0303C, EFFECTIVE DECEMBER 13, 2010 FOR VAN ZANDT COUNTY, TEXAS AND INCORPORATED AREAS.



**LEGEND**

City Limits	— X —	Iron Rod Found	⊙
Chalk Line Fence	— S —	Water Valve	⊙
Powerline	— I —	Power Pole	⊙
Building Setback	— L —		
3/4" Iron Rod Found	⊙		
1/2" Iron Rod Set	⊙		



REPLAT OF LOT 1  
 MONDS SUBDIVISION  
 JOHN WALLING SURVEY, A-891  
 VAN ZANDT COUNTY, TEXAS

LINE	BEARING	LENGTH
1-1	S 87°58'15" W	22.84
1-2	S 28°46'00" W	140.25
1-3	S 27°28'11" W	35.13
1-4	S 01°18'08" E	121.25

DRAWN BY: JI	SCALE: 1" = 40'
SURVEYED BY: JI	REP: TRACY MONS
DATE: 1-14-2025	FILE NO: 0863206