

City of Houston, Texas, Ordinance No. 1999- 262

AN ORDINANCE AMENDING THE CODE OF ORDINANCES, HOUSTON, TEXAS, RELATING TO THE SUBDIVISION AND DEVELOPMENT OF PROPERTY; MAKING FINDINGS AND CONTAINING OTHER PROVISIONS RELATING TO THE FOREGOING SUBJECT; PROVIDING FOR SEVERABILITY; CONTAINING A SAVINGS CLAUSE; CONTAINING A REPEALER; AND DECLARING AN EMERGENCY.

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WHEREAS, the City of Houston is a municipal corporation organized under the Constitution and the general and special laws of the State of Texas, and thereby exercises powers granted by the City's Charter and the provisions of Article XI, Section 5 of the Texas Constitution; and

WHEREAS, in the exercise of its lawful authority, the City may enact police power ordinances to promote and protect the health, safety and welfare of the public; and

WHEREAS, the City may, under the provisions of Chapter 212 of the Texas Local Government Code ("Chapter 212"), establish by ordinance general rules and regulations governing plats and subdivisions of land within its corporate limits and area of extraterritorial jurisdiction in order to promote the health, safety, morals or general welfare of the City, and to promote the safe, orderly and healthful development of the City; and

WHEREAS, the City may, under the provisions of Chapter 212, establish by ordinance general rules and regulations governing development plats of land within its corporate limits and area of extraterritorial jurisdiction in order to promote the health, safety, morals or general welfare of the City, and to promote the safe, orderly and healthful development of the City; and

WHEREAS, the City Council finds that, in order to promote the public health, safety, morals and general welfare of the City, it is desirable to adopt this Ordinance in order to:

- (1) Establish general rules and regulations to govern plats and subdivisions of land within the corporate limits;
- (2) Extend the general rules and regulations to govern plats and subdivisions of land to the area of extraterritorial jurisdiction;
- (3) Establish general rules and regulations governing development plats of land within the corporate limits and the extraterritorial jurisdiction of the City;
- (4) Establish procedures for the establishment, promulgation and annual revision of a general plan for the existing and planned extension of roads, highways, streets, and alleys within the corporate limits of the City and its area of extraterritorial jurisdiction; and
- (5) Establish plans and specifications governing extension of water and sewer mains and other infrastructure of public utilities within the City and its area of extraterritorial jurisdiction; and

WHEREAS, beginning in March 1963, the authority of the City over its area of extraterritorial jurisdiction was established by the provisions of the Texas Municipal Annexation Act, now codified in Chapter 42 of the Texas Local Government Code; and

WHEREAS, in March 1963, the Planning Commission of the City established a substantially revised major thoroughfare and freeway plan for the City and its area of extraterritorial jurisdiction; and

WHEREAS, the Planning Commission of the City, since March 1963, has been authorized to approve subdivision plats within the City and its area of extraterritorial

jurisdiction, taking into account the plan for the extension of roads, highways, streets and alleys as reflected in the major thoroughfare and freeway plan within the City and its area of extraterritorial jurisdiction; and

WHEREAS, the City Council finds and determines that certain areas of the City have an adequate street system in place, the number and spacing of which is sufficient to forego a requirement of further widening of streets within these areas; and

WHEREAS, the City Council finds and determines that the central business district of the City, as defined in this Ordinance, has in place an adequate system of streets and thoroughfares and building lines to provide light, air and traffic sight lines; and

WHEREAS, the City Council finds and determines that certain areas of the City have developed in such a manner that they can be characterized as "urban" in nature, as distinct from "suburban," by virtue of a mix of land uses, development density and street patterns; and

WHEREAS, the City Council finds and determines that encouraging development and redevelopment of areas that can be characterized as "urban" by adopting rules and regulations that facilitate more compact development in urban areas is in the best interest of the public health, safety and welfare of the City by encouraging compact land development and efficient use of resources; and

WHEREAS, the City Council finds that the establishment of building lines in areas designated as urban areas that differ from the building lines applicable in areas deemed to be suburban is appropriate to:

(a) Foster a design framework applicable to urban areas that differ from each other and from suburban areas to encourage efficient land development patterns; and

(b) To encourage pedestrian use of sidewalks in urban areas while assuring that such use is not impeded by vehicles blocking sidewalks; and

WHEREAS, the City Council finds and determines that certain residential streets in areas of the City where deed restrictions are not in effect have existing building lines that are greater than those required by this Ordinance, that these existing building lines establish the character of the neighborhood, and that it is appropriate, in certain instances, to maintain these existing building lines to preserve the character of the neighborhood;

WHEREAS, on November 6, 1997, the Planning Commission held a public hearing on the proposed amendments to the regulations governing subdivisions, developments and platting; and

WHEREAS, on February 17, 1999, the City Council held a public hearing on the proposed amendments; and

WHEREAS, the City Council finds that all procedural requirements necessary for the adoption of amendments to the regulations governing subdivisions, developments and platting have been complied with and satisfied; NOW, THEREFORE,

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF HOUSTON, TEXAS:

Section 1. That the findings and recitals contained in the preamble of this Ordinance are declared to be true and correct and are hereby adopted and made a part of this Ordinance.

Section 2. That Chapter 42 of the Code of Ordinances is amended to read as follows:

**"Chapter 42
SUBDIVISIONS, DEVELOPMENTS AND PLATTING**

ARTICLE I. IN GENERAL

Sec. 42-1. Definitions.

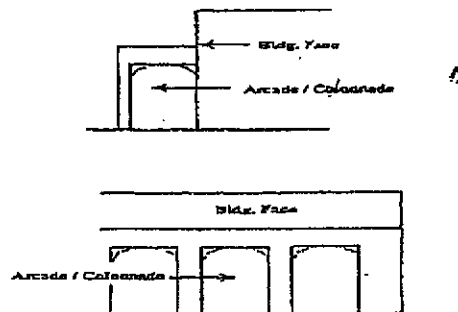
As used in this chapter, the following terms shall have the meanings ascribed in this section unless the context of their usage clearly indicates another meaning:

Alley shall mean a public or private right-of-way that is not used primarily for through traffic and that provides vehicular access to rear entrances to buildings or properties that front on an adjacent street.

Amending plat shall mean an amending subdivision plat prepared and approved under the applicable provisions of chapter 212 and this chapter.

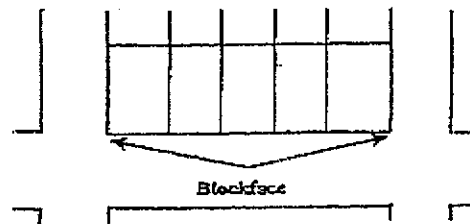
Applicant shall mean the owner of property or the owner's authorized agent who applies for a subdivision plat, development plat, general plan or street dedication plat pursuant to this chapter.

Arcade/colonnade shall mean a series of arches or columns with a roof attached to the face of a building creating an unenclosed covered pedestrian space.



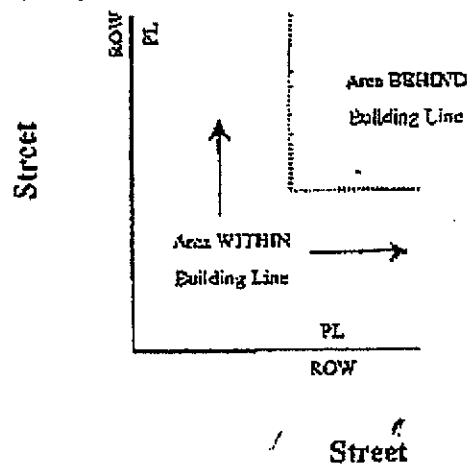
Block shall mean one or more lots, tracts or parcels of land bounded by streets, easements, rights-of-way or other physical features or a combination thereof.

Blockface shall mean that portion of a block that abuts a street between two intersecting streets.



Building shall mean any structure used or intended for supporting or sheltering any use or occupancy

Building line shall mean the line shown on a subdivision plat or development plat establishing the building line requirement. An area is *within* the building line if it lies between the building line and the property line adjacent to a street or private street and is *behind* the building line if it lies to the interior of the property from the building line.



Building line requirement shall mean the minimum required distance from an easement or a property line adjacent to a street or private street in which no improvements requiring a building permit can be constructed on the property.

Building permit shall mean an official document or certificate issued by the building official authorizing performance of a specified activity under the Building Code of the City of Houston.

Central business district shall mean the area beginning at the intersection of the centerline of U.S. 59 and the centerline of I.H. 45; thence

in a northeasterly and northerly direction along the centerline of I.H. 45 to its intersection with the centerline of I.H. 10; thence in an easterly direction along the centerline of I.H. 10 to its intersection with the centerline of U.S. 59; thence in a southwesterly direction along the centerline of U.S. 59 to its intersection with I.H. 45, the point of beginning.

Chapter 212 shall mean Chapter 212 of the Texas Local Government Code, as it may be amended from time to time.

Class I plat shall mean a subdivision plat that meets the applicable requirements of section 42-23 of this Code.

Class II plat shall mean a subdivision plat that meets the applicable requirements of section 42-23 of this Code.

Class III plat shall mean a subdivision plat that is not a Class I plat or a Class II plat.

Collector street shall mean a public street that is not a major thoroughfare or a local street, but that distributes traffic between major thoroughfares and other streets.

Commission shall mean the planning commission of the city.

Compensating open space shall mean one or more areas designated as common open space on a subdivision plat or a development plat that are used to reduce the minimum lot size requirements pursuant to the provisions of article III of this chapter.

Courtyard shall mean a space, open and unobstructed to the sky, located at or above grade level on a lot or parcel and bounded on two or more sides by walls of a building.

Cul-de-sac shall mean a street with only one outlet that terminates in a vehicular turnaround appropriate for the safe and convenient reversal of traffic movement.

Department shall mean the department of planning and development of the city.

Design Manual shall mean the department of public works and engineering Design Manual for Wastewater Collection Systems, Water Lines, Storm Drainage and Street Paving, as it may be amended from time to time.

Develop/Development shall mean any activity for which a development plat is required by this chapter.

Development plat shall mean a site plan prepared and approved pursuant to section 42-22 of this Code.

Director shall mean the director of the department or the director's designees.

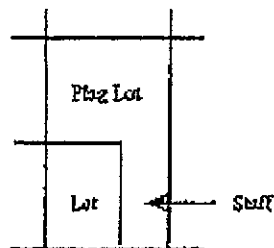
Dwelling unit shall mean a structure, or a portion of a structure, that has independent living facilities including provisions for nontransient sleeping, cooking and sanitation.

Extraterritorial jurisdiction shall mean the unincorporated territory extending beyond the corporate boundaries of the city established pursuant to chapter 42 of the Texas Local Government Code, as may be amended from time to time.

Filing date shall mean the date on which a subdivision plat is formally presented to the commission for its consideration as part of the commission's official meeting agenda, which shall be considered as the initial date of the statutory thirty- day time period in which the commission is required to act upon a subdivision plat submitted to it under the provisions of chapter 212.

Final plat shall mean a map or drawing of a proposed subdivision prepared in a manner suitable for recording in the appropriate county map, plat or real property records and prepared in conformity with the requirements of article II of this chapter.

Flag lot shall mean a lot whose frontage on and access to the street right-of-way is provided by a narrow driveway, access easement or other parcel of land referred to as the 'staff' of the flag lot.



Frontage shall mean that portion of any lot or tract that abuts a street. A lot or tract abutting more than one street shall have frontage on only one

street, which shall be deemed to be the side of the lot or tract with the shortest dimension unless otherwise indicated on the subdivision plat or development plat.

General plan shall mean a map illustrating the general design features and street layout of a proposed development of land that is to be subdivided and platted in sections.

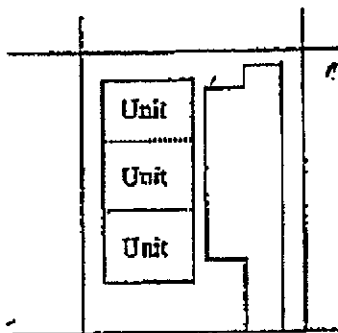
Local street shall mean a type 1 permanent access easement and a public street that is not a major thoroughfare or collector street.

Lot shall mean: (1) in the context of a subdivision plat, an undivided tract of land intended for single-family residential use contained within a block and designated on a subdivision plat by numerical identification; or (2) in the context of a development plat, a parcel intended as an undivided unit for the purpose of development.

Major thoroughfare shall mean a public street designated as a principal thoroughfare or thoroughfare on the latest edition of the major thoroughfare and freeway plan.

Major thoroughfare and freeway plan shall mean the latest edition of the major thoroughfare and freeway plan adopted by the commission and approved by the city council.

Multi-family residential shall mean the use of property with one or more buildings on a parcel designed for and containing an aggregate of three or more dwelling units. Multi-family residential includes apartments, condominiums, boarding houses, triplexes and quadriplexes.



Nonresidential shall mean any use that is not multi-family residential or single family residential.

Off-street parking shall mean vehicular parking that is provided in a location other than in a public right-of-way.

Open space amenities plan shall mean a plan submitted as part of a subdivision plat application that specifies how each area not otherwise eligible to be used as compensating open space will be improved and maintained with amenities such as parks, nature trails, picnic areas or other similar facilities that render the compensating open space accessible to and useable by the owners of lots in the subdivision.

Parcel shall mean any quantity of land capable of being described with such definiteness that its location and boundaries can be established that is designated by its owner as land to be used or developed as a unit or that has been used or developed as a unit. Parcel includes an easement supporting or related to a primary parcel, and a condominium unit.

Permanent access easement shall mean a privately maintained and owned street easement approved by the commission that provides for vehicular access to three or more single-family residential units.

Permeable shall mean a surface that allows water to pass through it and penetrate into the ground.

Preliminary plat shall mean a map or drawing of a proposed subdivision that illustrates the proposed layout and features of the subdivision submitted to the commission for review and approval, but not suitable for recording in the county map, plat or real property records.

Private drive shall mean a privately owned way used for vehicular travel that is not a street or private street and that provides an unobstructed connection between one or more streets or private streets or to any portion of a parking lot, shopping center, institution, commercial area or industrial development. A private drive may provide for access by the general public, but the owner of the private drive shall maintain the right to restrict public access to the private drive.

Private street shall mean a privately maintained and owned vehicular accessway that provides access from a public street to one or more multi-family residential buildings.

Public street shall mean a public right-of-way, however designated, dedicated or acquired, that provides access to adjacent property.

Recorded map return agreement shall mean a written agreement authorizing the county clerk of the county in which a subdivision plat is filed to return the original recorded subdivision plat to the department.

Remainder tract shall mean the undivided acreage tract that remains when a portion of a tract that is comprised of all contiguous land under common ownership is subdivided pursuant to a subdivision plat.

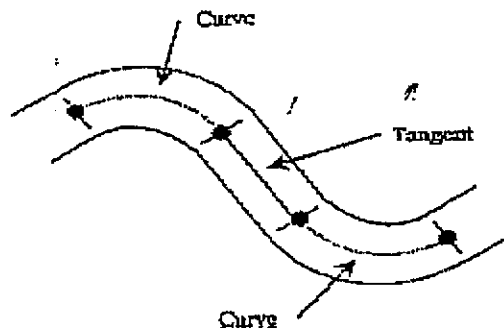
Replat shall mean a subdivision plat prepared and approved under the applicable provisions of chapter 212 and this chapter.

Reserve tract shall mean a parcel of land that is not a lot, but is created within a subdivision plat for other than single family residential use and is established to accommodate some purpose for which a division into lots is not suitable or appropriate.

Residential shall mean pertaining to the use of land for premises that contain habitable rooms for nontransient occupancy and that are designed primarily for living, sleeping, cooking and eating therein. A premises that is designed primarily for living, sleeping, cooking and eating therein will be deemed to be residential in character unless it is actually occupied and used exclusively for other purposes. Hotels, suites hotels, motels and day care centers shall not be considered to be residential.

Retail commercial center shall mean a group of commercial establishments contained or to be contained in a building or buildings encompassing a total building area of not more than 100,000 square feet developed as an integrated unit under common ownership or operating as an integrated unit under reciprocal agreements governing all external, nonbuilding space.

Reverse curve shall mean a curve composed of two curves turning in opposite directions.



Shared driveway shall mean: a private way that (1) is not an extension of any street or private street; (2) has a length not greater than 200 feet from its intersection with the right-of-way of a public street; and (3) provides access to two or more single family residential lots through appropriate cross-access easements.

Single family residential shall mean the use of a lot with one building designed for and containing not more than two separate units with facilities for living, sleeping, cooking and eating therein. A lot upon which is located a free-standing building containing one dwelling unit and a detached secondary dwelling unit of not more than 900 square feet also shall be considered single family residential. A building that contains one dwelling unit on one lot that is connected by a party wall to another building containing one dwelling unit on an adjacent lot shall be single family residential.

Special exception shall mean a commission-approved adjustment to a requirement of article III of this chapter that is issued under section 42-82 of this Code.

Street shall mean a public street or a permanent access easement.

Street dedication plat shall mean a plat that illustrates only the location and right-of-way of one or more public streets to be dedicated by the street dedication plat.

Street width exception area shall mean an area so designated by or pursuant to section 42-123 of this Code.

Subdivide shall mean the act or process of creating a subdivision.

Subdivision shall mean the division of a tract of land, including a lot, into two or more parts to lay out a subdivision of the tract, to lay out suburban, building or other lots, or to lay out streets, alleys, squares, parks or other parts of the tract intended to be dedicated to public use or for the use of purchasers or owners of lots fronting on or adjacent to the streets, alleys, squares, parks or other parts, regardless of whether the division is made by a metes and bounds description in a deed of conveyance or in a contract for deed, by using a contract of sale or other executory contract to convey or by using any other method. A subdivision does not include a division of land into parts greater than five acres, where each part has access to a public street and no public improvement is required to be dedicated. A subdivision includes a replat.

Subdivision plat shall mean (1) a map or plan prepared and approved pursuant to the applicable provisions of division II of this chapter showing the proposed subdivision of land or (2) an instrument recorded in the map, plat or real property records of the appropriate county showing the previous subdivision of property. A subdivision plat includes a replat, an amending plat and a vacating plat.

Suburban area shall mean an area of the city or its extraterritorial jurisdiction that is not an urban area.

Title report shall mean a current report, commitment, opinion or title policy that: (1) is prepared and executed by a title company authorized and in good standing to do business in the state of Texas or by an attorney licensed in the state of Texas; (2) provides a legal description of the property proposed to be subdivided or developed; (3) identifies the owner and lienholder of the property subject to the subdivision plat or development plat and the recording information of each instrument by which each owner or lienholder acquired its respective interest; and (4) describes all encumbrances of record that affect the property and the recording information of each instrument by which each encumbrance was established. A title report shall be current if it certifies that the records were examined not more than 30 days from the date of the application to which it applies. For purposes of a replat, a title report shall also include information regarding any deed restrictions applicable to the property or reflect that no deed restrictions apply.

Tract shall mean a parcel.

Type 1 permanent access easement shall mean a permanent access easement at least 50 feet in width that is designed and constructed like a public street in accordance with the design manual and contains one or more public utilities in an unpaved portion of the easement.

Type 2 permanent access easement shall mean a permanent access easement at least 28 feet in width that is designed and constructed like a private street serving a development that has no public utilities other than a public water line connected only to one or more fire hydrants that provides no domestic water services.

Urban area shall mean the area included within and bounded by Interstate Highway 610 and any other area within the city so designated by the city council pursuant to section 42-101 of this Code.

Utility district shall mean a conservation and reclamation district organized under Article III, Section 52, or Article XVI, Section 59, of the Texas Constitution, the creation or enlargement of which requires the consent of the city.

Vacating plat shall mean a vacating plat prepared and approved under the applicable provisions of chapter 212.

Variance shall mean a commission-approved deviation from the requirements of this chapter issued under section 42-81 of this Code.

Sec. 42-2. Scope.

This chapter shall apply to all development and subdivision of land within the city and its extraterritorial jurisdiction. This chapter establishes the general rules and regulations governing plats, subdivisions and development of land within the city and its extraterritorial jurisdiction to promote the health, safety, morals and general welfare of the city and the safe, orderly and healthful development of the city.

Sec. 42-3. Conflict with county regulations.

This chapter shall not be applied in such a manner as to amend or alter any rules, regulations, procedures or policies lawfully and officially adopted by the governing body of any county in which there exists territory contained within the city's extraterritorial jurisdiction. In the circumstance where any rule, regulation, procedure or policy lawfully and officially adopted by the governing body of any county is less restrictive than that contained herein, the standards of this chapter shall apply; provided, however, to the extent that this chapter conflicts with any provision of the Harris County Road Law (Special Laws of the 33rd Texas Legislature, Regular Session, 1913, Chapter 17, as amended), then the provisions of that law, to the extent of conflict, shall apply.

Sec. 42-4. Enforcement and penalties.

(a) It shall be unlawful for any person to lay out, subdivide or plat any land into lots, blocks, tracts or streets within the city, or sell property therein and thereby, if the land has not been laid out, subdivided and platted in accordance with the requirements of this chapter.

(b) The building official shall not issue a building permit:

- (1) For construction on property that was subdivided after March 15, 1963 unless the property is included in a subdivision plat approved and recorded in accordance with this chapter; or
- (2) For a development unless there is attached to the application a development plat approved by the director or the commission.

Sec. 42-5. Penal provisions applicable.

(a) The violation of any provision of this chapter within the corporate limits of the city, including the failure to do any act or perform any duty that is required herein, shall be punishable as provided by section 1-6 of this Code. Each day a violation continues constitutes a separate offense. Prosecution or conviction under this provision shall never be a bar to any other remedy or relief for violation of this chapter.

(b) The violation of any provision of this chapter outside the corporate limits of the city but within the city's extraterritorial jurisdiction shall not constitute an offense, and no fine shall be applicable to the violation.

(c) In addition criminal prosecution, where applicable, the city shall have the right to seek the judicial remedies provided in section 42-6 of this Code for any violation of this chapter within the city or its extraterritorial jurisdiction.

Sec. 42-6. Judicial provisions applicable.

The city, acting through the city attorney or any other attorney representing the city, may file an action in a court of competent jurisdiction to:

- (1) Enjoin the violation or threatened violation by the owner of land of a requirement of this chapter applicable to the land; or
- (2) Recover damages from the owner of a tract of land in an amount adequate for the city to undertake any construction or other activity necessary to bring about compliance with this chapter.

Sec. 42-7. Denial of utility connections.

(a) The building official shall not issue any building permit or other permits required for the installation of any utility, either public or private, to serve:

- (1) Lots or tracts within the city for which a subdivision plat has not been properly recorded as required by this chapter; or
- (2) A development within the city that is subject to the provisions of this chapter, for which a development plat has not been properly approved as required by this chapter.

(b) The utility official shall not permit any tract of land to receive any service from the city water or wastewater collection systems unless, at the time of the application for service, the applicant provides to the utility official satisfactory evidence that the tract of land was subdivided or developed in compliance with this chapter.

(c) In those areas located within the city's extraterritorial jurisdiction, the utility official shall not approve any plans for the construction of any wastewater collection system or domestic water distribution system and the city engineer shall not approve any plans for the construction of storm drainage system within any utility district for which the city has granted its consent for creation or enlargement, unless and until the provisions of this chapter have been complied with for any tract of land served by utilities provided by the utility district.

Sec. 42-8. Forms authorized.

The director is authorized to promulgate forms to use in the implementation of this chapter, including forms for standardized language to be used on the face of subdivision plats and development plats. Prior to the use of any form, the city attorney or the city attorney's designee shall review the form for legal sufficiency and approve each form the city attorney or the city attorney's designee, in his sole professional judgment, determines to be legally sufficient.

Sec. 42-9. Cumulative effect.

This chapter is cumulative of other requirements imposed by ordinances and regulations of the city. To the extent of any inconsistency, the more restrictive provision shall govern.

Secs. 42-10 - 42-19. Reserved.

ARTICLE II. REQUIREMENTS AND PROCEDURES

DIVISION 1. PLATTING REQUIREMENTS

Sec. 42-20. Subdivision plat required.

(a) Except as provided in section 42-21 of this Code, any subdivision of property in the city and its extraterritorial jurisdiction shall require a subdivision plat approved pursuant to this article. Prior to the subdivision of any property within the city or its extraterritorial jurisdiction, the owner of the property proposed to be subdivided, or the owner's authorized

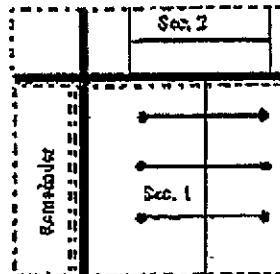
agent, shall obtain approval from the commission or the director, as applicable, of a subdivision plat of the subdivision submitted pursuant to the requirements of this chapter. All property in the city and its extraterritorial jurisdiction that is subdivided shall be laid out under the direction of the commission, and the city will recognize no other subdivisions.

b) The requirement to file and obtain approval of a subdivision plat may be met by filing either a class I plat, a class II plat or a class III plat, as applicable to the property proposed to be subdivided.

Sec. 42-21. Exceptions to subdivision platting requirements:

(a) A subdivision plat shall not be required for a subdivision of a reserve tract that is part of a subdivision plat approved by the commission or pursuant to this article if the reserve tract is not encumbered by a one-foot reserve and will not be used for single family residential purposes.

(b) A subdivision plat shall not be required for a remainder tract that is included in a general plan previously approved by the commission or filed simultaneously with an application for a subdivision plat for any portion of the entire tract.



(c) A subdivision plat shall not be required for the dedication of a public street if the dedication is accomplished through a street dedication plat approved by the commission pursuant to this article.

Sec. 42-22. Development plat required.

Development of property through the new construction or enlargement of any exterior dimension of any building, structure or improvement within the city or its extraterritorial jurisdiction shall require a development plat, except that the following types of development shall be exempt from this requirement:

- (1) Buildings, structures or improvements within the central business district;
- (2) Alterations to any building or improvement, including enclosing an existing canopy or porte-cochere, that do not increase the exterior square footage by more than 100 square feet and that do not result in an encroachment into the building line requirement;
- (3) Construction of a detached single-family residential unit (or enlargement thereto) that meets the requirements of article III of this chapter on a lot that is part of, and in a manner that complies with, a recorded subdivision plat or an unrecorded subdivision plat that is recognized as a plat for the purposes of property conveyance;
- (4) A parking lot or expansion thereof, or
- (5) A retaining wall, masonry wall or fence under eight feet high.

Sec. 42-23. Classes of subdivision plat.

(a) There are hereby established three classes of subdivision plat: a class I plat, a class II plat and a class III plat. Class I plats and class II plats are optional and may be used in lieu of a class III plat if the subdivision plat meets the qualifications of this section.

(b) A class III plat is required for subdivisions that require or propose the creation of any new street or the dedication of any easement for public water, wastewater collection or storm sewer lines. A class III plat is also required for a vacating plat. Subdivisions that do not require or propose the creation of any new street or the dedication of any easement for public water, wastewater collection or storm sewer lines, at the option of the applicant, may be submitted as either a class I plat or a class II plat as determined by the respective applicable criteria, or may be submitted as a class III plat.

(c) A class II plat is a subdivision plat that:

- (1) Does not require or propose the creation of any new street;
- (2) Does not require or propose the dedication of any easement for public water, wastewater collection or storm sewer lines; and

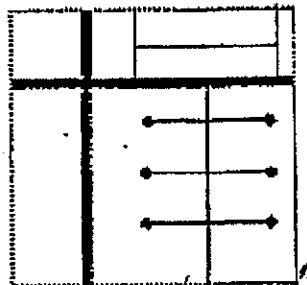
- (3) Is not a replat that requires notification of adjacent property owners pursuant to chapter 212.

(d) A class I plat is a subdivision plat that either meets the four criteria below or is an amending plat:

- (1) Creates no more than four lots each fronting on an existing street;
- (2) Does not require or propose the creation of any new street;
- (3) Does not require or propose the dedication of any easement for public water, wastewater collection or storm sewer lines; and
- (4) Is not a replat.

Sec. 42-24. General plan.

(a) When property is proposed to be subdivided in sections, a general plan illustrating all contiguous property under one ownership, legal interest or common control shall be submitted prior to or simultaneously with the application for the subdivision plat for the first section.



- (b) The general plan shall show:
- (1) The alignment of any major thoroughfares within or adjacent to the property in accordance with the major thoroughfare and freeway plan and all collector streets that are necessary to demonstrate an overall circulation system for the property that will meet the requirements of article III of this chapter;
 - (2) Recorded easements; and
 - (3) At the option of the applicant, one or more local streets, which shall extend into and connect with existing local streets and be

consistent with local streets shown on any general plans for abutting property.

(c) The general plan also may identify the number of sections anticipated to be platted pursuant to the general plan and proposed land uses including single family residential, multi-family residential, restricted and unrestricted reserves, utility plant sites, drainage and detention facilities and proposed easements affecting the subdivision of the property.

(d) Commission approval of a general plan shall be noted on the face of the plan and shall be applicable only to the major thoroughfare, collector street pattern and any local street shown on the general plan.

(e) The general plan may be amended in the same manner required for approval of the initial general plan.

(f) A general plan shall remain in effect for four years from the date of commission approval, subject to extension as provided herein. Any amendment of the general plan shall not result in an extension of the effective period. Recordation of a subdivision plat for a section within the general plan during the effective period of the general plan shall renew the general plan for an additional four years from the expiration date of the general plan if the recorded subdivision plat meets the following requirements:

- (1) The subdivision plat is consistent with the general plan; and
- (2) The subdivision plat represents the lesser of 20 percent of the total acreage in the general plan or 25 acres.

Recordation of a street dedication plat shall not extend the effective period of a general plan; provided, however, that a street dedication plat that dedicates a major thoroughfare or a collector to its points of connection with adjacent properties as shown on the general plan shall extend the general plan for four years. Nothing shall prohibit an applicant from filing an application for a general plan for the same property that was included in an expired general plan.

(g) As long as the general plan remains in effect, the street system approved in the general plan shall form the basis for street system extensions into adjacent properties to be platted, unless the subdivider of such properties demonstrates that the requirements of article III of this chapter can be met without the street extensions.

- (12) Orient the subdivision within the larger area by providing a vicinity map;
- (13) Draw plat boundaries with heavy lines to indicate the subdivided area;
- (14) Identify adjacent areas outside the plat boundaries indicating the name of the adjacent subdivisions, churches, schools, parks, bayous and drainage ways, acreage and all existing streets, easements, pipelines and other restricted uses;
- (15) Identify blocks and lots within a subdivision by consecutive numbers; lot numbering may be cumulative throughout the subdivision so long as the numbering system continues from block to block in a uniform manner; and
- (16) Identify reserves by alphabetical letter.

Sec. 42-42. Additional requirements - class I plat and class II plat.

In addition to the requirements of section 42-41 of this Code, applications for a class I plat or a class II plat shall meet the following requirements so that the subdivision plat is suitable for recordation upon approval by the director or the commission, as applicable:

- (1) The class I plat or class II plat shall be drawn on positive photographic film with black lines and image and shall be suitable for the reproduction of direct positive prints and reproductions;
- (2) The scale shall be one of the following:
 - a. One inch to 20 feet;
 - b. One inch to 30 feet;
 - c. One inch to 40 feet;
 - d. One inch to 50 feet;
 - e. One inch to 60 feet; or
 - f. One inch to 100 feet;

provided that the director may authorize the use of a different scale when the director determines that circumstances warrant a different scale.

- (3) The subdivision plat shall show all engineering and surveying data in a manner and to an extent sufficient to locate all of the features of the subdivision plat on the ground, including the following;
 - a. Full dimensions along all boundaries of the subdivision plat;
 - b. Full dimensions of all shared driveways;
 - c. Full dimensions of all easements, drainageways, gullies, creeks and bayous;
 - d. Full dimensions of all lots, blocks, reserves, out-tracts, compensating open space and any other tracts designated separately within the subdivision plat boundaries; and
 - e. Full dimensions of all fee strips, pipelines and other physical and topographical features necessary to be accurately located by surveying methods.

Full dimensions shall include line dimensions, bearings of deflecting angles, radii, central angles and degrees of curvature and lengths of curves and tangent distances, all of which shall be shown in feet and decimal fractions thereof.

- (4) The subdivision plat shall identify and note the intended use of all lots and reserves. In those instances where the intended use of a reserve has not been determined, the reserve shall be identified as unrestricted and so noted on the subdivision plat;
- (5) All dedication statements and certificates shall be included on the subdivision plat;
- (6) The name of each person who will sign the subdivision plat shall be lettered under a line provided for the signature;
- (7) Materials for recordation as provided in section 42-45 of this Code shall be submitted; and
- (8) A current title report shall be submitted.

Sec. 42-43. Additional requirements - class III plat - preliminary plat.

In addition to the requirements of section 42-41 of this Code, applications for a preliminary class III plat shall:

- (1) Show the location and approximate dimensions of all blocks and reserves and approximate dimensions typical for lots within the subdivision plat boundaries;
- (2) Provide survey dimensions and bearings for the boundaries of the subdivision plat, with lines outside the subdivision plat boundary, if any, drawn as dashed lines;
- (3) Show the location and approximate width of existing and proposed watercourses, ravines and drainage easements within the subdivision plat boundaries; and
- (4) Be accompanied by an affidavit of the owner, or the owner's authorized agent with duty to inquire, identifying all encumbrances on the property inside the subdivision plat boundaries.

Sec. 42-44. Additional requirements - class III plat - final plat.

In addition to the requirements of section 42-41 of this Code, applications for a final class III plat shall:

- (1) Incorporate all of the provisions relating to preliminary plats and reflect the conditions and requirements of final subdivision plat approval previously imposed by the commission;
- (2) Be drawn on positive photographic film with black lines and image and be suitable for the reproduction of direct positive prints and reproductions;
- (3) Use one of the following scales:
 - a. One inch to 20 feet;
 - b. One inch to 30 feet;
 - c. One inch to 40 feet;

- d. One inch to 50 feet;
- e. One inch to 60 feet; or
- f. One inch to 100 feet;

provided that the director may authorize the use of a different scale when the director determines that circumstances warrant a different scale;

- (4) Show all engineering and surveying data in a manner and to an extent sufficient to locate all of the features of the subdivision plat on the ground, including the following:
 - a. Full dimensions along all boundaries of the subdivision plat;
 - b. Full dimensions of all shared driveways;
 - c. Full dimensions of all easements, drainageways, gullies, creeks and bayous;
 - d. Full dimensions of all lots, blocks, reserves, out-tracts, compensating open space and any other tracts designated separately within the subdivision plat boundaries; and
 - e. Full dimensions of all fee strips, pipelines and other physical and topographical features necessary to be accurately located by surveying methods.

Full dimensions shall include line dimensions, bearings of deflecting angles, radii, central angles and degrees of curvature and lengths of curves and tangent distances, all of which shall be shown in feet and decimal fractions thereof;

- (5) The intended use of all lots and reserves ; in those instances where the intended use of a reserve has not been determined, the reserve shall be identified as unrestricted and so noted on the subdivision plat;
- (6) Include all dedication statements and certificates; and
- (7) Include a current title report.

Sec. 42-45. Additional requirements for recordation of subdivision plats.

After approval of a class I plat, a class II plat or a final class III plat, the applicant shall present the following to the department for recordation of the subdivision plat:

- (1) The original subdivision plat drawing prepared on any suitable permanent translucent material of positive photographic film with lines, lettering and signatures in black ink or image, and the names of all persons signing the subdivision plat lettered under the respective signature. The original subdivision plat drawing shall evidence compliance with all conditions of final plat approval;
- (2) A current update of the previously submitted title report that reflects any change in any of the conditions or information required in the title report since the date of the last title report, including that there has been no change, if applicable;
- (3) An executed recorded map return agreement;
- (4) Certification that all current city, county and school district taxes have been paid and that there are no delinquent taxes on the property, which may be provided as part of the title report or in the form of a certificate from the city, if applicable, and from the county and the school district in which the land being subdivided is located.
- (5) For a vacating plat, the original vacation instrument.

Sec. 42-46. Development plat submittal requirements.

An application for the approval of a development plat shall be filed with the department, and shall:

- (1) Be made on an application form provided by the department;
- (2) Provide two copies of a survey sealed and certified by a Texas registered professional land surveyor showing:
 - a. The location of each existing building, structure or improvement;

- b. Each easement and right-of-way within or abutting the boundary of the surveyed property, tied to a street intersection or landmark; and
- c. The dimensions of each sidewalk, alley, square, park or other part of the property intended to be dedicated to public use or for the use of purchasers of property fronting on or adjacent to the sidewalk, alley, square, park or other part.

The survey does not have to be recent so long as it illustrates all contiguous property under one ownership or common control;

(3) Include three copies of a site plan illustrating:

- a. Proposed and existing buildings (where applicable), stairways, fences and adjacent roadways;
- b. Parking that meets the applicable requirements of this chapter and chapter 26 of this Code;
- c. Landscaping that meets the applicable requirements of chapter 33 of this Code; and

(4) Be accompanied by the applicable filing fee.

Sec. 42-47. Plats requesting variance.

(a) The application for a subdivision plat or development plat requesting a variance from any requirement of this chapter shall:

- (1) Identify the specific requirement for which the variance is sought;
- (2) State the extent of the variance sought;
- (3) Provide a detailed explanation of the hardship that justifies the granting of the variance; and
- (4) Provide a statement of facts addressing each of the conditions for commission approval provided in section 42-81 of this Code.

(b) An application may be amended to request one or more variances that were not requested in the initial application.

Sec. 42-48. Plats requesting special exception.

(a) The application for a subdivision plat or a development plat requesting a special exception from any requirement of article III of this chapter shall:

- (1) Identify the specific requirement for which the special exception is sought;
- (2) State the extent of the special exception sought;
- (3) Provide a detailed explanation of the circumstances and facts that justify the granting of the special exception; and
- (4) Provide a statement addressing each of the conditions for commission approval provided in section 42-82 of this Code.

(b) An application may be amended to request one or more special exceptions that were not requested in the initial application.

Sec. 42-49. Replats requiring notification of adjacent property owners.

(a) A subdivision plat that is a replat subject to the provisions of section 212.015 of chapter 212 shall provide the following:

- (1) A written statement indicating the applicant's intention to seek commission approval under the requirements of section 212.015 of chapter 212.
- (2) A list identifying all owners of lots within the subdivision that is being replatted and that are within 200 feet of the lots to be replatted, as shown on the most recently approved ad valorem tax rolls of either the city or, in the case of a replat in the city's extraterritorial jurisdiction, the county in which the property proposed to be replatted is located.
- (3) One stamped envelope addressed to each landowner indicated on the tax roll list as provided above containing a copy of the notice in the form specified by the director and approved by the city attorney.

(b) The applicant shall cause notice of the required public hearing to be published before the 15th day before the date of the public hearing in a newspaper of general circulation in Harris, Fort Bend and Montgomery Counties upon authorization by the director, which shall be given after the commission establishes the date for the public hearing. Prior to commission consideration of the subdivision plat, the applicant shall provide an affidavit of publication to the department.

(c) The applicant shall post at least one sign on the property that is the subject of the replat before the 15th day before the date of the public hearing. A sign shall face each public right-of-way bordering the site and the lettering on the sign shall be legible from the public right-of-way. Each sign shall be a minimum of four by eight feet in size and shall be posted no more than 15 feet from the public right-of-way. The applicant shall use reasonable efforts to maintain each required sign on the site before the close of the public hearing.

Sec. 42-50. General plan submittal requirements.

An application for the approval of a general plan shall be filed with the department, and shall:

- (1) Be made on an application form provided by the department;
- (2) Provide all required materials, in the quantity and manner prescribed by the director, on paper, on a computer disc or on electronic media;
- (3) Be accompanied by an affidavit of the owner, or the owner's authorized agent with duty to inquire, identifying all encumbrances on the property inside the general plan boundary;
- (4) State the proposed name of the general plan, which shall not be a duplicate of any subdivision or development of record within the city or its extraterritorial jurisdiction;
- (5) Provide the legal description of the property in the general plan, including the name of the county, survey and abstract number and a reference to the nearest corner or street right-of-way intersection in the general area;
- (6) Show the location of all collector streets and major thoroughfares, and at the option of the applicant, all local streets, within the general plan boundaries;

- (7) State the total acreage within the general plan;
- (8) Identify the owner of the property; if the owner of the property is not a natural person, state the name of the entity along with the person authorized to execute the general plan on behalf of the entity;
- (9) Identify the person or firm who prepared the general plan;
- (10) Indicate the date on which the general plan was drawn;
- (11) Provide a north arrow;
- (12) Orient the layout of the general plan with north to the top of the drawing;
- (13) Provide a numeric and graphic scale, which shall be a minimum of 1" = 600' and no greater than 1" = 100';
- (14) Orient the general plan within the larger area by providing a vicinity map;
- (15) Have boundaries drawn with heavy lines to indicate the area included in the general plan;
- (16) Identify adjacent areas outside the general plan boundaries, indicating the name of the adjacent subdivisions, and show the location and approximate width of existing and proposed water courses, ravines, drainage easements, streets and pipelines within and adjacent to the general plan boundaries;
- (17) Provide survey dimensions and bearings for the boundaries of the general plan, with lines outside the general plan boundaries, if any, drawn as dashed lines; and
- (18) Be accompanied by the applicable filing fee.

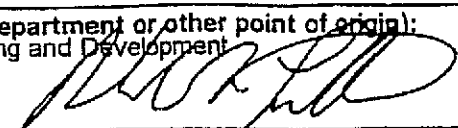
Sec. 42-51. Street dedication plat submittal requirements.

An application for the approval of a street dedication plat shall be filed with the department, and shall:

- (1) Be made on an application form provided by the department;

- (2) Provide all required materials, in the quantity and manner prescribed by the director, on paper, on a computer disc or on electronic media;
- (3) Be accompanied by an affidavit of the owner, or the owner's authorized agent with duty to inquire, identifying all encumbrances on the property inside the street dedication plat boundary;
- (4) State the proposed name of the street dedication plat, which shall not be a duplicate of any subdivision or development of record within the city or its extraterritorial jurisdiction;
- (5) Provide the legal description of the property proposed to be dedicated, including the name of the county, survey and abstract number and a reference to the nearest corner or street right-of-way intersection in the general area;
- (6) State the total acreage within the street dedication plat;
- (7) Identify the owner of the property. If the owner of the property is not a natural person, state the name of the entity along with the name of the person authorized to execute the street dedication plat on behalf of the entity;
- (8) Identify the person or firm who prepared the street dedication plat;
- (9) Indicate the date on which the plat was drawn;
- (10) Provide a north arrow;
- (11) Orient the layout of the street dedication plat with north to the top of the drawing;
- (12) Provide a numeric and graphic scale, which shall be a minimum of 1" = 100' and no greater than 1" = 20';
- (13) Orient the street dedication plat within the larger area by providing a vicinity map;
- (14) Draw plat boundaries with heavy lines;

Adap

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| SUBJECT: Proposed development ordinance admenments | | Category # 1113 | Page 1 of 1 | Agenda Item 34 |
| FROM (Department or other point of origin): Planning and Development  | | Origination Date MAR 24 1999 Feb. 19, 1999 | Agenda Date MAR 03 1999 FEB 24 1999 | |
| DIRECTOR'S SIGNATURE: Robert M. Litke 837-7708 | | Council District affected: All Council Districts | | |
| For additional information contact: Phone: | | Date and identification of prior authorizing Council action: | | |
| RECOMMENDATION: (Summary) <p>Adopt amendments to the Code of Ordinances relating to the subdivision and development of property in the City and its ETJ.</p> | | | | |
| Amount and Source of Funding: - 262 | | | | |
| SPECIFIC EXPLANATION: <p>On February 17, the City Council held a public hearing on the subject ordinance revisions. This was the culmination of three years of intensive effort in working with many diverse interests throughout the community to revise the City's subdivision regulations to make them more user friendly; to make appropriate distinctions between development regulations affecting two distinct parts of the City: the urban area and the suburban area; and to facilitate revitalization in the inner loop (urban) area of the city.</p> <p>The ordinance development process was created via urban and suburban committees set up under the auspices of the Chairman of the Houston Planning Commission. The Commission held public hearings on the ordinance in 1998 and made its recommendations to the Mayor and Council.</p> <p>The draft ordinance was submitted to the Council Committee on Neighborhood Planning and Protection. During the course of Committee meetings and public discussion, the Planning Department made several changes to the initial draft recommendations, including a reduction in a density factor for certain urban area residential developments to 27 units per acre from the initial recommendation of 30 per acre. In its final consideration of the draft ordinance, the Committee voted to reduce the density factor further to 24 units per acre.</p> <p>The 24 unit per acre limitation is not in the best interests of the future development of the inner loop area. It could thwart an otherwise strong movement toward inner city revitalization and does not necessarily protect all neighborhoods equally. The goals of encouraging new growth and redevelopment of the inner city and protecting neighborhoods are not mutually exclusive. The proposals in the revised Chapter 42 are supportive of both goals and should be effective in their implementation. We will revisit the ordinance in one year if changes are necessary. The Administration continues to recommend 27 units per acre, but will present its recommendation and the Committee's amendment as alternatives.</p> <p>cc: Marty Stein, Acting Agenda Director Anna Russell, City Secretary Anthony Hall, City Attorney</p> | | | | |
| REQUIRED AUTHORIZATION | | | | |
| F&A Budget: | Chief Administrative Officer: | | Other Authorization: | |

- (15) Provide survey dimensions and bearings for the boundaries of the street dedication plat, with lines outside the street dedication plat boundaries, if any, drawn as dashed lines; and
- (16) Be accompanied by the applicable filing fee.

Sec. 42-52. Initial review by director.

The director initially shall review each application for subdivision plat, development plat, general plan and street dedication plat for completeness. If the director determines that the application is complete, the application shall be acted upon as further provided in this article. If the director determines that the application is incomplete, he or she shall return the application with an explanation of the deficiency.

Sec. 42-53. Time for submittal.

(a) Complete applications that require approval by the commission and that are submitted to the department by 11:00 a.m. on the Monday of the week before the next regularly scheduled meeting of the commission shall be placed on the agenda for consideration by the commission at that meeting. If the Monday of the week preceding a regularly scheduled commission meeting is a city holiday, complete applications that are submitted to the department on the first city business day following the Monday holiday shall be placed on the agenda for consideration by the commission at that meeting.

(b) Complete applications for a class I plat or a development plat shall be reviewed and approved, where appropriate, or referred to the commission by the director not later than ten days from the date the complete application was submitted. Applications referred to the commission under this subsection shall be placed on the commission agenda for the next meeting for which proper notice can be given.

(c) Replats that require notice to property owners pursuant to chapter 212 shall be placed on the commission agenda for consideration on the date established for the public hearing required by chapter 212.

Sec. 42-54. Application fees.

The director shall, from time to time, prepare and submit for approval by motion of the city council a schedule of fees that shall be paid by an applicant for a subdivision plat, development plat, general plan and street

dedication plat. Payment of any applicable fees when due is a condition of the processing of any application under this article.

Sec. 42-55. Private easement holder's consent.

Prior to recordation of the subdivision plat, the applicant shall submit a written instrument from the owner of any privately owned easement or fee strip within the plat boundaries that is proposed to be crossed by a street, private street, shared driveway or public utility or drainage easement. The instrument must state that the owner of the easement or fee strip consents to each crossing for the purposes intended and depicted upon the subdivision plat. In those instances where the applicant submits an instrument of record in lieu of a letter or statement from the owner of the private easement or fee strip, the department shall then refer the recorded instrument to the city attorney for determination of whether the conditions contained in the recorded instrument adequately provide or accommodate the crossing of the private easement or fee strip by the proposed street, private street, shared driveway or public utility or drainage easement depicted on the plat. If the city attorney determines that the recorded instrument is not adequate, the applicant shall then submit evidence of the consent of the owner of the private easement or fee strip.

Secs. 42-56 - 42-69. Reserved.

DIVISION 3. REVIEW PROCEDURES

Sec. 42-70. In general.

This division establishes the procedures for the review of applications for subdivision plats, development plats, general plans and street dedication plats. As provided in this division, the director is authorized to approve class I plats and development plats that meet the requirements of this chapter. Only the commission is authorized to approve class II plats, class III plats, general plans, street dedication plats and any class I plat or development plat that the director refers to the commission. The following chart is a summary of the approval process intended for illustrative purposes only. In case of conflict between the chart and the text, the text shall prevail.

| | Class I plat | Class II plat | Class III plat | Dev. plat |
|------------------------------------------------|--------------|---------------|----------------|-----------|
| Administrative Approval | Yes | No | No | Yes |
| Planning Comm'n Approval Required | | | | |
| • Always | No | Yes | Yes | No |
| • For plat with variance or special exceptions | Yes | Yes | Yes | Yes |
| • For replat | N/A | Yes | Yes | N/A |
| Preliminary approval required | No | No | Yes | N/A |

Sec. 42-71. Commission consideration and action.

(a) The commission shall consider and act on each class III plat submitted to it on a preliminary basis and upon a final basis. The commission shall consider and act on each class II plat submitted to it on a final basis. The commission shall consider and act on each subdivision plat or development plat that requests a variance or special exception. The commission also shall consider and act on each class I plat or development plat that is referred to the commission by the director.

(b) The commission shall approve each subdivision plat that complies with the provisions of this chapter and other applicable laws and requirements.

(c) The approval of any subdivision plat that is encompassed by a general plan approved by the commission shall reflect a determination that the subdivision plat is consistent with that general plan.

Sec. 42-72. Commission consideration and action - class I plat.

(a) The commission shall consider and act on each class I plat for which a variance or special exception is requested as provided in this subsection. Upon consideration of a class I plat for which a variance to or special exception from the requirements of article III of this chapter is requested, the commission shall:

- (1) Approve the class I plat, with or without conditions, if the commission finds that it meets the applicable requirements of this chapter and other applicable law;
- (2) Grant one or more requested variances or special exceptions in whole or in part, with or without conditions, upon satisfaction of the requirements of section 42-81 or section 42-82 of this Code, as applicable, and approve the class I plat with the variance or special exception so granted;
- (3) Deny any requested variance or special exception, if the commission is unable to make the findings necessary for granting a variance or a special exception pursuant to sections 42-81 or 42-82 of this Code and approve the class I plat without the variance or special exception so denied;
- (4) Defer action until the next regular meeting, but not to exceed 30 days from the filing date; or
- (5) Disapprove the class I plat upon finding that it fails to comply with all the applicable requirements of this chapter or other applicable law.

(b) The commission shall consider and act on each class I plat referred to it by the director, as provided in this subsection. Upon consideration of a class I plat referred to it by the director, the commission shall:

- (1) Approve the class I plat upon finding that it complies with the applicable requirements of this chapter and other applicable law;
- (2) Disapprove the class I plat upon finding that it fails to comply with the applicable requirements of this chapter or other applicable law; or
- (3) Defer action until the next regular meeting, but not to exceed 30 days from the filing date.

Sec. 42-73. Commission consideration and action - class II plat.

The commission shall consider and act on each class II plat as provided in this section. Upon consideration of a class II plat, the commission shall:

- (1) Grant final approval of the class II plat, with or without conditions, if the commission finds that it meets the requirements of this chapter and other applicable law;
- (2) Grant one or more requested variances or special exceptions in whole or in part, with or without conditions, upon satisfaction of the requirements of section 42-81 or section 42-82 of this Code, as applicable, and approve the class II plat with the variance or special exception so granted;
- (3) Deny any requested variance or special exception, if the commission is unable to make the findings necessary for granting a variance or a special exception pursuant to sections 42-81 or 42-82 of this Code and approve the class II plat without the variance or special exception so denied;
- (4) Defer action until the next regular meeting, but not to exceed 30 days from the filing date; or
- (5) Disapprove the class II plat upon finding that it fails to comply with all the applicable requirements of this chapter or other applicable law.

Sec. 42-74. Commission consideration and action - class III plat.

(a) The commission shall consider and act on each preliminary class III plat and each final class III plat as provided in this section.

(b) Upon consideration of a preliminary class III plat, the commission shall:

- (1) Grant approval of the preliminary class III plat, with or without conditions, upon finding that it meets all the applicable requirements of this chapter and other applicable law;
- (2) Approve one or more requested variances or special exceptions, in whole or in part, with or without conditions, pursuant to section 42-81 or section 42-82 of this Code, as applicable, and approve the preliminary class III plat with the variance or special exception so granted;
- (3) Deny any requested variance or special exception, if the commission is unable to make the findings necessary for granting a variance or a special exception pursuant to sections

42-81 or 42-82 of this Code and approve the preliminary class III plat without the variance or special exception so denied;

- (4) Defer action until the next regular meeting, but not to exceed 30 days from the filing date; or
 - (5) Disapprove the preliminary class III plat upon finding that it fails to comply with all the applicable requirements of this chapter or other applicable law.
- (c) Upon consideration of a final class III plat, the commission shall:
- (1) Grant final approval, with or without conditions, if the final class III plat complies with all the applicable requirements of this chapter and other applicable law and with the conditions of preliminary approval;
 - (2) Defer final action until the next regular meeting, but not to exceed 30 days from the filing date; or
 - (3) Disapprove the final class III plat upon finding that it fails to comply with the applicable requirements of this chapter or other applicable law or with any conditions of approval of the preliminary plat.

Sec. 42-75. Commission consideration and action - development plat.

(a) The commission shall consider and act on each development plat for which a variance or special exception is requested as provided in this subsection. Upon consideration of a development plat for which a variance or special exception is requested, the commission shall:

- (1) Approve the development plat, with or without conditions, if the commission finds that it meets the applicable requirements of this chapter and other applicable law;
- (2) Grant one or more requested variances or special exceptions in whole or in part, with or without conditions, pursuant to section 42-81 or section 42-82 of this Code, as applicable, and approve the development plat with the variance or special exception so granted;
- (3) Deny any requested variance or special exception, if the commission is unable to make the findings necessary for

granting a variance or special exception pursuant to sections 2-81 or 42-82 of this Code and approve the development plat without the variance or special exception so denied;

defer action until the next regular meeting, but not to exceed 30 days from the date of initial commission consideration; or

disapprove the development plat if the commission finds that it fails to comply with all the requirements of this chapter or other applicable law.

The commission shall consider and act on each development plat referred to it by the director as provided in this subsection. Upon the referral of a development plat referred to it by the director, the commission shall:

1. Approve the development plat if the commission finds that it complies with the applicable requirements of this chapter and other applicable law;

2. Disapprove the development plat if the commission finds that it fails to comply with the applicable requirements of this chapter or other applicable law; or

3. Defer action until the next regular meeting, but not to exceed 30 days from the initial commission consideration.

Commission consideration and action - general plan.

The commission shall consider and act on applications for a general plan as provided in this section. Approval of a general plan by the commission shall be limited to the location and alignment of major collector streets and any local streets shown on the general plan. Upon the referral of a general plan the commission shall:

1. Approve the general plan if the commission finds that the general plan complies with the applicable requirements of this chapter with respect to the location of major thoroughfares, collector streets and any local streets shown on the general plan; or

2. Disapprove the general plan if the commission finds that the general plan does not comply with the applicable requirements of this chapter with respect to the location of major

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Sec. 42-77. Commission consideration and action - street dedication plat.

The commission shall consider and act on applications for street dedication plats as provided in this section. Upon consideration of a street dedication plat the commission shall:

- (1) Approve the street dedication plat if the commission finds that the street dedication plat is consistent with a previously approved general plan encompassing each street to be dedicated by the street dedication plat; or
- (2) Disapprove the street dedication plat if the commission finds that the street dedication plat is not consistent with a previously approved general plan encompassing each street to be dedicated by the street dedication plat.

Sec. 42-78. Director consideration and approvals.

(a) The director shall consider applications for class I plats and development plats as provided in this section. Upon consideration of a class I plat or a development plat the director shall:

- (1) Approve the class I plat or the development plat if it complies with the requirements of this chapter; or
- (2) Refer the class I plat or the development plat to the commission if the director finds that it does not comply with the requirements of this chapter.

(b) If the director refers a class I plat or a development plat to the commission as provided in this section, the director shall promptly notify the applicant that the class I plat or the development plat has been referred to the commission and will be considered by the commission at the next meeting for which proper notice can be given.

(c) An applicant for a class I plat or development plat that the director refers to the commission pursuant to this section shall be entitled to amend the application for the class I plat or development plat to seek one or more variances or special exceptions. The commission shall consider and act on a class I plat or development plat amended as provided by this

subsection pursuant to the standards of sections 42-72(a) or 42-75(a) of this Code, as applicable.

(d) If an applicant does not amend an application for a class I plat or development plat, the director shall refer the application to the commission for consideration at the first commission meeting for which proper notice can be given. The commission shall consider and act on a class I plat or development plat referred as provided by this subsection pursuant to the standards of sections 42-72(b) or 42-75(b) of this Code, as applicable.

Sec. 42-79. Reconsideration of subdivision plat approval conditions.

(a) At the request of the owner of a proposed subdivision, at any time during the period a previous commission approval of a subdivision plat remains valid, but prior to the time that the subdivision plat is filed of record, the commission may reconsider any requirement or condition of approval imposed by it. A request for reconsideration shall:

- (1) Be made in writing;
- (2) Be submitted to the director in conformance with the provisions of section 42-53 of this Code regarding the submittal of subdivision plats;
- (3) State the specific requirement or condition of approval requested to be reconsidered and the reasons for reconsideration; and
- (4) Be accompanied by the applicable fee.

(b) Upon consideration of a request for reconsideration, the commission shall reaffirm its previous actions or shall approve the request for reconsideration, with or without conditions, as the commission finds the merits of the situation warrant. The director shall not calendar a request to reconsider the same requirement or condition of approval once the commission has rendered a decision upon a request for reconsideration unless the applicant presents new information that was not known by the applicant at the time of the original reconsideration.

(c) If the relief requested by the applicant requires a variance or special exception, the applicant shall submit a complete amended application for the subdivision plat that contains all of the information required by section 42-47 or 42-48 of this Code, as applicable, and the commission shall make the findings necessary for the granting of a variance or special exception, as applicable, in considering the request for reconsideration.

(d) Each request for reconsideration shall be subject to all public hearing and notification requirements that applied to the subdivision plat for which the request for reconsideration is made or that apply to the request for reconsideration. The applicant shall be responsible for providing current information pursuant to section 42-49 of this Code.

Sec. 42-80. Expiration of subdivision plat and development plat approval; extension of approval.

(a) Approval of a preliminary or final class III plat or a class II plat shall be valid for a period of 12 months from the date on which the commission approved the preliminary or final subdivision plat. The commission shall extend the period of validity of an unrecorded class II plat or class III plat for not more than 12 months from the original expiration date upon the written request of the owner of the land subject to the subdivision plat.

(b) Approval of a class I plat shall be valid for a period of 12 months from the date on which the director or commission, as applicable, approved the class I plat. The director shall extend the period of validity of an unrecorded class I plat approved by the director or the commission for not more than 12 months from the original expiration date upon the written request of the owner of the land subject to the class I plat.

(c) Approval of a development plat shall be valid until the completion of the project for which the development plat was approved.

(d) An applicant shall submit a request for extension of approval of a class II plat or a class III plat to the department pursuant to the subdivision plat submittal requirements of section 42-53(a) of this Code to allow the request for extension of time to be considered and acted upon before the expiration date of the subdivision plat. An applicant shall submit a request for extension of approval of a class I plat to the department not later the tenth day before the expiration date of the class I plat to allow the request for the extension of time to be considered and acted upon before the expiration date of the class I plat. Neither the commission nor the director shall consider any request for extension of approval after the original expiration date of a subdivision plat.

(d) When a subdivision plat approval expires, the applicant must submit a new subdivision plat and pay all applicable fees.

Sec. 42-81. Variances.

(a) The commission is authorized to consider and grant variances from the provisions of this chapter, other than those provisions required by state law, by majority vote of those members present and voting, except as required by subsection (d), for any subdivision plat or development plat when the commission finds that each of the following conditions exist:

(1) Either:

- a. The imposition of the terms, rules, conditions, policies and standards of this chapter would create an undue hardship by depriving the applicant of the reasonable use of the land; or
- b. Strict application of the requirements of this chapter would make a project infeasible due to the existence of unusual physical characteristics that affect the property in question, or would create an impractical development or one otherwise contrary to sound public policy; or

(2) The circumstances supporting the granting of the variance are not the result of a hardship created or imposed by the applicant;

(3) The intent and general purposes of this chapter will be preserved and maintained;

(4) The granting of the variance will not be injurious to the public health, safety or welfare; and

(5) Economic hardship is not the sole justification for the variance.

In granting a variance, the commission is authorized to impose any condition on the subdivision plat or the development plat for which the variance is requested that the commission determines is reasonably related to the variance requested and that furthers the intent and purpose of this chapter. The findings of the commission, together with the specific facts upon which such findings are based, shall be incorporated into the official minutes of the commission meeting at which a variance was granted.

(b) Any variance granted under the provisions of this chapter shall apply only to the specific property for which the commission approved the variance, and shall not constitute a change of this chapter, or any part

hereof, or establish any policy, rule or regulation contrary to the provisions of this chapter.

(c) The commission shall not grant or deny any request for a variance on which a public hearing is required by the applicable provisions of chapter 212 until after the hearing has been conducted.

(d) Approval of a variance requested for a replat that is subject to the protest provisions of chapter 212 shall be by the affirmative vote of three-fourths of the commission members present, or such other number as may be established by state law.

(e) The commission shall grant a variance from the building line requirement of division 3 of article III of this Code to an applicant who presents a certificate of appropriateness issued pursuant to article VI, chapter 33, of this Code, relating to historic preservation, evidencing approval of a building line other than the setback required by division 3 of article III of this chapter. In addition, the commission shall grant the applicant a variance from one or more requirements of this chapter when the commission determines that the granting of the variance is consistent with a certificate of appropriateness issued pursuant to article VI, chapter 33, of this Code, relating to historic preservation.

(f) The commission shall grant a variance to an owner of property that is subject to a prevailing building line requirement established under the provisions of section 42-163 of this Code upon determining that the owner has established a vested right to the building line otherwise applicable under article III of this chapter. The commission shall determine that the owner has established a vested right upon the owner's demonstration that:

- (1) The owner, in good faith and in material reliance on building line otherwise applicable under article III of this chapter, expended a substantial sum of money prior to the effective date of the establishment of the prevailing building line requirement for the property pursuant to section 42-163(j) of this Code that cannot be recovered; or
- (2) That the applicant, in good faith and in material reliance on building line otherwise applicable under article III of this chapter, has irreversibly changed position prior to the effective date of the establishment of a prevailing building line requirement for the property pursuant to section 42-163(j) of this Code that will require the expenditure of substantial sums of money in the future.

It shall be a rebuttable presumption that the existence of a contract to purchase, or option contract on, property subject to a prevailing building line requirement is not the expenditure of a substantial sum of money.

Sec. 42-82. Special exceptions.

(a) The commission is authorized to consider and grant special exceptions to the provisions of article III of this chapter other than those specified in subsection (e), by majority vote of those members present and voting, except as required by subsection (d), when the commission finds that each of the following conditions exist:

- (1) Special circumstances exist that are unique to the land or the proposed subdivision or development and that are not generally applicable to all other land, subdivisions or developments in the city or its extraterritorial jurisdiction that justify modification of the standards that otherwise would apply;
- (2) The proposed special exception will achieve a result contemplated by the standards in article III of this chapter;
- (3) The modification of the standard requested is not disproportionate to the requirement of the standard, provided however that the commission shall not be authorized to grant a special exception if the modification of the standard is 33 percent or greater. A modification of a measurable standard by 10 percent or less shall be presumed to be not disproportionate;
- (4) The intent and general purposes of this chapter will be preserved and maintained; and
- (5) The granting of the special exception will not be injurious to the public health, safety or welfare.

If a provision of article III of this chapter requires more specific findings with respect to the consideration and granting of a special exception, the more specific findings shall control. In granting a special exception, the commission is authorized to impose any condition on the subdivision plat or the development plat for which the special exception is requested that the commission determines is reasonably related to the special exception requested and that furthers the intent and purpose of this chapter. The findings of the commission, together with the specific facts upon which such

findings are based, shall be incorporated into the official minutes of the commission meeting at which a special exception was granted.

(b) Any special exception granted under the provisions of this chapter shall apply only to the specific property for which the commission approved the special exception and shall not constitute a change of this chapter, or any part hereof, or establish any policy, rule or regulation contrary to the provisions of this chapter.

(c) Solely for the purpose of complying with the notice and hearing requirements of chapter 212 with respect to replats, a special exception shall be deemed a 'variance' as that term is used in chapter 212, and all notice and hearing provisions applicable to the granting of a variance pursuant to the preceding section shall apply to the consideration and granting of a special exception. The commission shall not grant or deny any request for a special exception on which a public hearing is deemed required under chapter 212 until after the hearing has been conducted.

(d) Approval of a special exception requested for a replat that is deemed subject to the protest provisions of chapter 212 shall be by the affirmative vote of three-fourths of the commission members present, or such other number as may be established by state law.

(e) The commission shall not grant a special exception to any of the following requirements:

- (1) Lot size requirements;
- (2) Compensating open space requirements;
- (3) Building line requirements; or
- (4) Criteria for designating an urban area.

Secs. 42-83 -- 42-99. Reserved.

ARTICLE III. PLANNING STANDARDS

DIVISION 1. GENERAL

Sec. 42-100. Applicability.

The standards established in this article shall apply to all subdivision plats and development plats required by this chapter. Notwithstanding the

foregoing, land use regulations adopted by a tax increment reinvestment zone created by the city pursuant to chapter 311 of the Texas Tax Code, and to which the city has delegated the authority to adopt land use regulations, shall govern all property in the tax increment reinvestment zone to the extent of a conflict with these requirements.

Sec. 42-101. Urban area designation.

(a) The city council may designate any area within the city that meets each of the criteria of subsection (c) of this section as an urban area.

(b) An application for the designation of an urban area shall be filed with the department and shall:

- (1) Be made on an application form provided by the department; and
 - (2) Be signed by one or more owners of property within the area proposed for designation.
- (c) An area is eligible for designation as an urban area if:
- (1) The area is bounded by one or more major thoroughfares or other defining physical features, such as railroad tracks or rights-of-way, major overhead power transmission lines contained in fee strips or easements of at least 80 feet in width, bayous, flood control drainageways, parks or schools;
 - (2) At least 80 percent of the parcels within the boundaries of the area, exclusive of parcels designated as public parks or open space, are developed with improvements;
 - (3) At least 25 percent of the parcels within the boundaries of the area are developed for or deed restricted to single family residential or multi-family residential use;
 - (4) At least 30 percent of the parcels within the area are developed with nonresidential uses;
 - (5) Single family residential development within the boundaries of the area is at an average density of at least five units per acre, exclusive of public street rights-of-way;
 - (6) At least 25 percent of the streets within the boundaries of the area do not exceed 1000 feet between intersections; and

(7) The area comprises at least one-half of a square mile of land.

(d) The commission shall receive the recommendation of the director regarding the application and hold a public hearing on the application before recommending to the city council the designation of any urban area pursuant to this section. The director shall give notice of the public hearing before the commission to each owner of property in the proposed urban area as shown on the most recently certified tax roll of the county in which the area proposed for designation is located by letter deposited into the United States postal service, postage paid, no later than 30 days before the date of the public hearing. The director also shall give notice of the public hearing before the commission by posting, no later than 30 days before the date of the public hearing, at least two signs within the boundaries of the proposed urban area at locations selected by the director as reasonably calculated to be seen by residents of, and occupants of property within, the proposed urban area. The signs shall be placed so that each sign will be visible, and the writing on the sign will be legible, from at least one public right-of-way. Each sign shall be a minimum of four by eight feet in size, and shall contain at a minimum the following items of information:

- (1) That the area is being considered for designation as an urban area;
- (2) A general description of the area being considered for designation;
- (3) The date of the public hearing on the designation, and
- (4) The name and telephone number of a person within the department who can be contacted for additional information.

If the director, in his sole discretion, determines that the size, configuration, traffic patterns or other characteristics of the proposed urban area warrant the placement of additional signs, the director shall cause an appropriate number of additional signs to be posted.

At the public hearing before the commission, the director shall maintain a register upon which interested persons may place their names and mailing addresses. At the public hearing before the commission, any owner of property within the proposed urban area and any other interested person shall be entitled to make comments, in person or in writing, on the proposed designation.

(e) After the close of the public hearing, the commission shall recommend to the city council the designation of a proposed urban area that

meets the criteria of subsection (c). If the commission, by majority vote of members present, votes to recommend the designation of the proposed urban area, the director shall forward the recommendation to the city council for consideration. If the commission does not vote to recommend the designation of the proposed urban area, the action of the commission with respect to the application is final. If the commission does not recommend designation of an area as an urban area, the department shall not accept an application for designation of the same or substantially the same area for one year following the date of the commission action.

(f) Upon receipt of the recommendation of the planning commission, the city council shall hold a public hearing on the recommendation. The director shall give notice of the public hearing before the city council by mail to each person on the register established under subsection (d) not less than 30 days prior to the date of the public hearing before the city council. After the close of the public hearing the city council shall consider the recommendation of the commission and, consistent with the criteria of subsection (c), approve or deny the proposed designation. The decision of the city council with respect to a designation shall be final. If the city council does not designate an area proposed as an urban area, the department shall not accept an application for designation of the same or substantially the same area for one year following the date of the city council action.

Sec. 42-102 -- 42-119. Reserved.

DIVISION 2. STREETS

Sec. 42-120. General layout and arrangement of street systems.

(a) The street system proposed within any subdivision plat or general plan shall comply with the design standards of this section and shall provide:

- (1) A sufficient number of continuous streets to accommodate the traffic generated by the development of the subdivision;
- (2) A system serving properties to be developed for residential purposes that discourages through traffic while maintaining adequate access and traffic movement for convenient circulation within the subdivision and access for fire, police and other emergency services;

- (3) Adequate vehicular access to all properties within the subdivision plat boundaries;
 - (4) Connections to adjacent properties to ensure adequate traffic circulation within the general area; and
 - (5) The dedication of rights-of-way, including the rights-of-way for major thoroughfares in accordance with the major thoroughfare plan.
- (b) One or more alleys may be included within a subdivision plat provided that:
- (1) Each alley will be drained in accordance with the design manual; and
 - (2) The alley shall not provide access to any property outside the subdivision plat boundaries unless the alley was part of an earlier subdivision plat.

Sec. 42-121. Dedication of rights-of-way.

(a) The applicant shall dedicate to the public the right-of-way for any street or alley designated in a subdivision plat as a public right-of-way in accordance with the requirements of this chapter and applicable state law.

(b) When an existing public street with a right-of-way width that does not meet the requirements of section 42-122 of this Code is adjacent to and forms a boundary of a subdivision plat or development plat, the owner of the property within the proposed subdivision or development shall dedicate sufficient additional right-of-way within the proposed subdivision or development adjacent to the existing right-of-way to provide one-half of the total right-of-way width necessary to meet the requirements of section 42-122 of this Code. In the case of a subdivision plat, the dedication shall be made by plat. In the case of a development plat, the dedication shall be made by separate instrument. The commission shall waive the requirement to dedicate right-of-way upon finding that the applicant has made a satisfactory showing that the proposed subdivision or development will not contribute to a significant increase in traffic on the street.

(c) When the commission finds that it is necessary for the proper subdivision of land and it is in the public interest to locate a new public street right-of-way centered on a property line, the commission shall approve the dedication of one-half of the land needed for the right-of-way. Any subdivision plat that provides for a partial street dedication pursuant to this

subsection shall include a one-foot reserve along the proposed centerline with appropriate notations restricting access from any right-of-way so dedicated to adjacent property until the required additional adjacent right-of-way is dedicated.

Sec. 42-122. Right-of way widths.

The minimum right-of-way required for each of the following types of streets or public alleys shall be as follows, subject only to the street width exception areas established pursuant to section 42-123 of this Code:

| | |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Major thoroughfares | (1) The lesser of 100 feet or the right-of-way specified by the street hierarchy classification established by the major thoroughfare and freeway plan; or (2) 100 feet for streets designated on the major thoroughfare and freeway plan for which a street hierarchy classification is not established |
| Collector streets designated on the major thoroughfare and freeway plan | The right-of-way width established by the major thoroughfare and freeway plan |
| Other collector streets | (1) 60 feet; or (2) 50 feet if all properties on both sides of the collector street consist of single-family residential lots that do not have driveway access to the collector street. |
| Local streets | (1) 50 feet if adjacent to exclusively single-family residential lots; or (2) 60 feet if adjacent to any other development |
| Public alleys | 20 feet |
| Type 1 permanent access easement | The width required if the permanent access easement were a public street |

| | |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type 2 permanent access easement | <p>28 feet</p> <p>The right-of-way width of a type 2 permanent access easement is coterminous with the pavement width and the terms are used interchangeably. The width shall be measured from edge to edge across the surface of the pavement.</p> |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Sec. 42-123. Street width exception areas.

(a) Except as provided in this section, subdivision plats and development plats for subdivisions and developments within a street width exception area shall not be required to dedicate additional right-of-way for an existing public local street that does not meet the standards of the preceding section unless the existing right-of-way is less than 50 feet.

(b) The following are street width exception areas:

(1) The central business district;

(2) The area beginning at the intersection of I.H. 610 (North Loop West) and Yale Street, then south along Yale Street to its intersection with W. 20th Street; thence east along W. 20th Street to its intersection with Oxford Street, thence south along Oxford Street to its intersection with West I.H. 10 Frwy.; thence west along West I.H. 10 Frwy. to its intersection with N. Shepherd Drive; thence north along N. Shepherd Drive to its intersection with the MKT R.R.; thence northwest along the MKT R.R. to its intersection with Washington Avenue; then southeast along Washington Avenue to its intersection with a line projected and extended from E. Memorial Loop Drive; thence westerly, southwesterly and easterly following the curve of E. Memorial Loop Drive to its intersection with Crestwood Street; thence south along Crestwood Street to its intersection with Memorial Drive; thence east along Memorial Drive to its intersection with Westcott Street; thence south along Westcott Street to its intersection with Buffalo Bayou; thence east along Buffalo Bayou to its intersection with Shepherd Drive; thence south along Shepherd Drive to its intersection with San Felipe Street; thence west along San Felipe Street to its intersection with Kirby Drive; thence south along Kirby Drive to its intersection with W. Holcombe Boulevard; thence east along W. Holcombe Boulevard to its intersection with Main Street; thence south along Main Street to its intersection with Hermann Drive; thence east along Hermann Drive to its intersection with Alameda Road;

thence south along Alameda Road to its intersection with N. MacGregor Parkway; thence east along N. MacGregor Parkway to its intersection with the H.B. & T.R.R.; thence northeast along the H.B. & T.R.R. to its intersection with Elgin Street; thence east along Elgin Street to its intersection with Dietz Street; thence north along Dietz Street and in a line projected to its intersection with I.H. 45 Frwy.; thence northwest along I.H. 45 Frwy. to its intersection with West I.H. 610 (North Loop West); thence west along West I.H. 610 to the point of beginning; with the exception of the portions of the following streets within this area:

- a. Bayland from Studewood to Houston Avenue;
- b. Birdsall Street from Maxie to Memorial Drive;
- c. Cleburne from San Jacinto to Jackson;
- d. W. Clay Street from McDuffie to Taft;
- e. Enid Street from IH 610 (North Loop West) to North Main;
- f. Fairview Street from Shepherd to Tuam;
- g. Feagan Street from Westcott to Waugh;
- h. E. 14th Street from Oxford to North Main;
- i. Garrot Street from Hawthorne to Milam;
- j. Gibbs from W. 23rd Street to Link;
- k. Hawthorne from Woodhead to Spur 527;
- l. Hazard Street from Peden to Rice;
- m. Link Street from Airline to IH 45;
- n. Mandell from Fairview to Sunset;
- o. McGowen from W. Gray to Scott;
- p. Michaux Street from E. 23rd Street to Usener;
- q. Patterson Street from IH 10 to Washington;

- r. Sampson Street from Leeland to Holman;
- s. Stanford Street from Allen Parkway to US 59 South;
- t. Taft Street from Allen Parkway to Hawthorne;
- u. Tuam Street from Fairview to Sauer;
- v. E. 23th Street from Rutland to Gibbes;
- w. Usener from Studemont to Sawyer;
- x. Watson Street from Pecore to Usener; and
- y. Woodhead from W. Clay to Bissonet.

(c) The commission is authorized to designate additional areas as street width exception areas as provided in this subsection. An area that has block lengths that are generally 600 feet or less measured centerline to centerline and paved public streets with rights-of-way of not less than 50 feet wide with equivalent levels of vehicular traffic, as determined after a study by the director of public works and engineering, is eligible for designation as a street width exception area. The commission, after a public hearing on the study of the director of public works and engineering, shall designate an eligible area as a street width exception area upon finding that the area has an adequate system of streets in place, the number and spacing of which is sufficient to forego requirements of a right-of-way width of greater than 50 feet. In designating a street width exception area, the commission shall exclude any street within the area that it determines does not have an adequate right-of-way.

Sec. 42-124. Right-of way transition.

Where a transition from one right-of-way width for any type of street to a different right-of-way width is proposed, the transition shall conform to the geometric design guidelines of the design manual or to other geometric design guidelines that are approved by the director of public works and engineering if in his professional opinion the proposed transition is warranted by the circumstances and achieves the intent and purpose of this section.

Sec. 42-125. Location and alignment of major thoroughfares.

(a) The location and alignment of a major thoroughfare shall conform to the major thoroughfare and freeway plan. The commission shall

not approve a change in the location or alignment of any major thoroughfare unless the city council first adopts a major thoroughfare and freeway plan incorporating the change. For purposes of this section, an alignment shown on a subdivision plat that occurs completely within the boundaries of the proposed subdivision, that does not change any intersecting points and that does not affect properties outside the proposed subdivision that were shown as adjacent to the major thoroughfare on the major thoroughfare and freeway plan shall not be considered a 'change in the location or alignment of a major thoroughfare.' Any other proposed location or alignment shall be a 'change in the location or alignment of a major thoroughfare.'

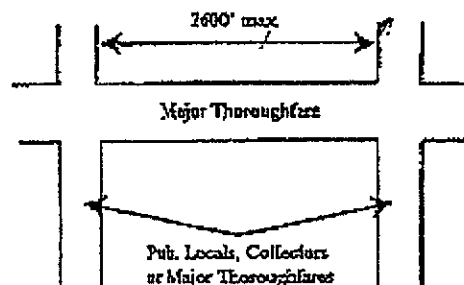
(b) The location and alignment of a collector street designated on the major thoroughfare and freeway plan shall conform to the major thoroughfare and freeway plan. The commission shall not approve a change in the location or alignment of any collector street designated on the major thoroughfare and freeway plan unless the city council first adopts a major thoroughfare and freeway plan incorporating the change.

Sec. 42-126. Intersections.

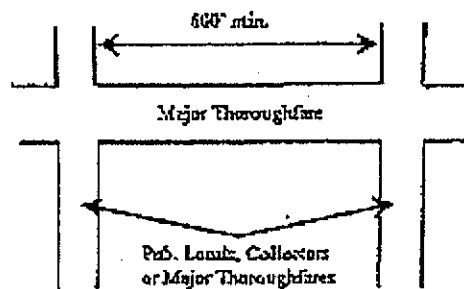
The design of each intersection shall conform to the geometric design guidelines of the design manual and the standards of this article. All intersection distances shall be measured along the centerline from blockface to blockface.

Sec. 42-127. Intersections of major thoroughfares.

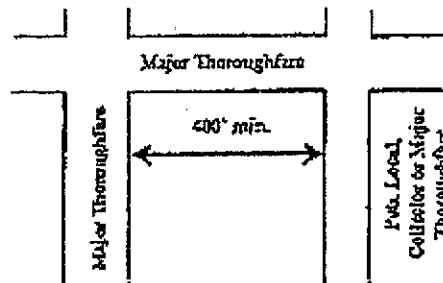
(a) A major thoroughfare shall intersect with a public local street, a collector street or another major thoroughfare at least every 2600 feet.



(b) Intersections along a major thoroughfare shall be spaced a minimum of 600 feet apart.



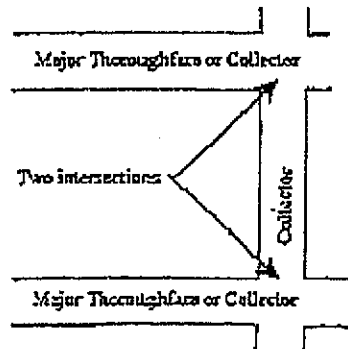
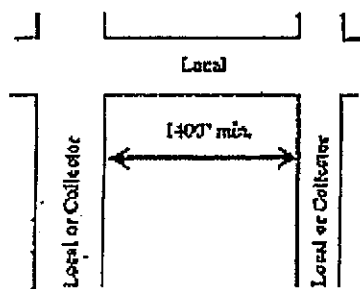
(c) An intersection with a major thoroughfare shall not be within 400 feet of the intersection of two major thoroughfares.



Sec. 42-128. Intersections of local streets.

(a) Each class III plat and each general plan that shows local streets shall provide for internal circulation by meeting either of the following requirements:

- (1) Each local street shall intersect with a street that meets the requirements of subsection (b) at least every 1400 feet; or
- (2) One or more collector streets within the class III plat or general plan shall connect with another collector street or major thoroughfare at a minimum of two points.



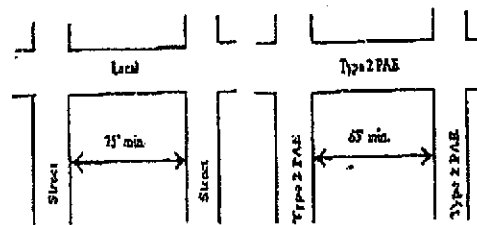
(b) A street that intersects with a local street will satisfy the intersection length requirement of item (a)(1) of this section if the street:

- (1) Is a public street that intersects with two different public streets; and
- (2) Is not a permanent access easement.

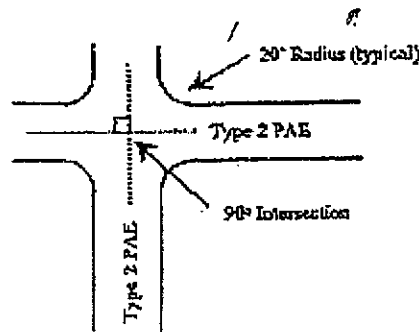
(c) Intersections along local streets shall be spaced a minimum of 75 feet apart.

Sec. 42-129. Intersections of type 2 permanent access easements.

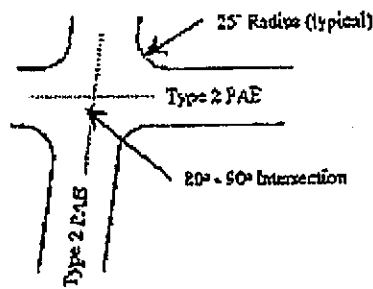
(a) Intersections along type 2 permanent access easements shall be spaced a minimum of 65 feet apart and shall not intersect at less than an 80 degree angle.



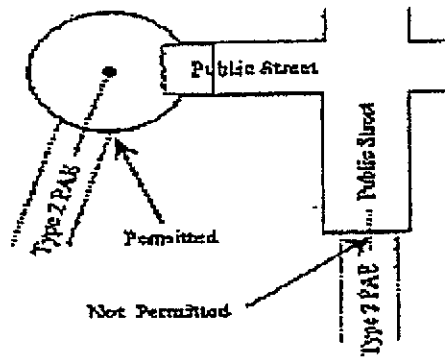
(b) When a type 2 permanent access easement intersects with another type 2 permanent access easement at a 90-degree angle, the type 2 permanent access easement shall provide a 20-foot radius at the intersection.



(c) When a type 2 permanent access easement intersects with another type 2 permanent access easement at an angle of between 80 and 90 degrees each acute angle shall have a 25-foot radius at the intersection.



(d) A type 2 permanent access easement may not be a direct straight-line extension of a public street.



Sec. 42-130. Intersection exceptions.

(a) Nothing in the intersection standards established by sections 42-127 through 42-129 of this Code shall require:

- (1) The crossing of a single existing pipeline by a street more than every 2000 feet;
- (2) The crossing of multiple existing pipelines by a street more than once every one-half mile;
- (3) The crossing of an existing railroad track (other than an industrial lead) or an existing major creek or bayou in a drainage easement having a width of 300 feet or more by any street other than a major thoroughfare;
- (4) The crossing of a drainage channel required by a governmental entity with flood control jurisdiction to be located in a recorded drainage easement having a required width of 220 feet or more by a street more than every one-half mile;

- (5) The crossing of an drainage channel required by a governmental entity with flood control jurisdiction to be located in a recorded drainage easement having a required width of less than 220 feet and more than 100 feet by a street more than every 2000 feet;
- (6) The crossing of a stormwater detention facility required by a governmental entity with flood control jurisdiction by a street more than once every 2000 feet;
- (7) The crossing by any street other than a major thoroughfare of any portion of Addicks Reservoir, Barker Reservoir, Sheldon Reservoir, the Houston Ship Channel or Lake Houston that is wider than 100 feet; or
- (8) The crossing of any portion of a golf course by a local street more than once every 2800 feet, provided that the golf course provides 60 feet of frontage at the location where each street intersection would otherwise occur.

(b) Nothing in the intersection requirements established by sections 42-127 through 42-129 of this Code shall require the creation of a street that stubs into:

- (1) Publicly owned airport property;
- (2) Property owned or leased by the United States for use by the National Aeronautics and Space Administration for the Johnson Space Center;
- (3) Any grade-separated freeway that does not have a frontage road; or
- (4) Any portion of Addicks Reservoir, Barker Reservoir, Sheldon Reservoir, the Houston Ship Channel or Lake Houston that is wider than 100 feet.

Sec. 42-131. Cul-de-sacs.

(a) A cul-de-sac shall not serve a single-family residential development that will generate more than 350 vehicle trips a day at the intersection of the cul-de-sac with a through street. A cul-de-sac that exclusively serves a single-family residential development and that has a length of not more than 350 feet from the centerline of its intersection with the nearest street shall have a paving width of at least 24 feet and shall not

be used to serve single-family residential development that will generate more than 350 vehicle trips a day at the intersection of the cul-de-sac with a through street. For purposes of the foregoing requirements, each dwelling unit type shall be deemed to generate the following trips per day:

Detached units 10 trips per unit

Attached units 8 trips per unit

(b) A cul-de-sac shall comply with the applicable terminus design as specified in the design manual.

Sec. 42-132. Curves.

(a) Curves for the right-of-way of a major thoroughfare shall have a centerline radius of at least 2000 feet. Reverse curves shall be separated by a tangent distance of not less than 100 feet.

(b) Reverse curves with a tangent distance of 100 feet or less along collector streets and local streets shall have a centerline radius of at least 300 feet. Reverse curves shall be separated by a tangent distance of not less than 50 feet.

(c) Curves along a type 2 permanent access easement or a private street may have any centerline radius except that the centerline radius of a reverse curve shall not be less than 65 feet. Reverse curves shall be separated by a tangent of not less than 25 feet.

(d) At the request of an applicant, the commission shall approve a lesser curve radius upon certification by the director of public works and engineering that the lesser radius meets nationally accepted standards set forth in either the 'Guidelines for Urban Major Streets Design' of the Institute of Transportation Engineers or 'A Policy on Geometric Design of Highways and Streets' of the American Association of State Highway and Transportation Officials.

Sec. 42-133. Public street names.

All public streets contained in any subdivision plat approved by the commission shall be named in conformance with the following policies and procedures:

(1) The name of a new street that is not an extension of an existing street shall not duplicate the name of any existing

street located within the city or the city's extraterritorial jurisdiction.

- (2) The name of a new street that is a direct extension of an existing street shall be the name of the existing street, except in those instances where the existing street name is a duplicate street name.
- (3) Street name prefixes such as 'North', 'South', 'East', and 'West' may be used to clarify the general location of the street, provided that these prefixes must be consistent with the existing and established street naming and numbering system of the general area in which the street is located.
- (4) Street name endings shall be used as follows:
 - a. 'Court,' 'Circle' and 'Loop' shall be limited to streets that terminate at a cul-de-sac or are configured as a loop street.
 - b. 'Boulevard,' 'Speedway,' 'Parkway' and 'Expressway' shall be limited to major thoroughfares or other streets designed to handle traffic volumes in excess of normal neighborhood traffic generation or that are divided streets with at least two lanes of traffic in each direction separated by a median.
 - c. 'Highway' and 'Freeway' shall be used only to designate highways or freeways falling under the jurisdiction of the state department of transportation.
- (5) Alphabetical and numerical street names must not be used to name any new street on any subdivision plat except in those instances where the street is a direct extension of an existing street with an alphabetical or numerical name that is not a duplicate street name.

Sec. 42-134. Private street and permanent access easement names and markers.

- (a) Names proposed to be assigned to private streets or permanent access easements shall conform to the standards of section 42-133 of this Code and shall also be subject to the following criteria:

- (1) The suffix 'PRIVATE' or 'PVT' shall be a part of all names established for private streets and permanent access easements and shall be an integral part of any street name marker installed. (Example of sign letter: LOG JAM LN. PRIVATE or LOG JAM LN. PVT.
- (2) The street name markers erected on private streets shall conform to the standards and specifications approved by the director of public works and engineering. In no instance shall the color of the background of a street name marker to be installed on a private street or a permanent access easement be the same as the background color of street name markers used to identify public streets.
- (3) A private street or permanent access easement that is a direct extension of a local public street shall not have the same name as the local public street.

(b) Upon the establishment of the name of any private street or permanent access easement pursuant to this section, the owners of the property adjacent to the private street or permanent access easement shall be responsible for the installation, erection and continued maintenance of appropriate street name markers at the intersections of all streets, including public streets, private streets and permanent access easements. Installation of a private street or permanent access easement name marker shall not be authorized without the approval of the director of public works and engineering and shall conform with the standards of the public works and engineering department for street name markers. The director of public works and engineering may declare as a nuisance or a traffic hazard any private street or permanent access easement name marker indicating a name not established in conformance with this section and installed in the public right-of-way and may remove the marker from the right-of-way without notice upon determining that the marker is misleading, confusing or is located so as to create a traffic hazard.

Secs. 42-135 - 42-149. Reserved.

DIVISION 3. BUILDING LINES

Sec. 42-150. Building line requirement.

(a) An improvement that requires a building permit shall not be constructed within the building line requirement established by this article. Each subdivision plat and development plat shall show all applicable building lines and the following note:

'Unless otherwise indicated, the building lines [b.l.], whether one or more, shown on this subdivision plat are established to evidence compliance with the applicable provisions of Chapter 42, Code of Ordinances, City of Houston, Texas, in effect at the time this plat was approved, which may be amended from time to time.'

(b) The building line requirements established by this chapter are minimum standards. Where deed restrictions provide for a greater building line or setback, the deed restrictions shall control over the provisions of this division.

(c) The following chart is a summary of certain of the building line regulations of this division and is intended for illustrative purposes only. In case of any conflict between the chart and the text of this division, the text shall control.

| MINIMUM BUILDING LINE REQUIREMENTS | | |
|-------------------------------------------------------------|--------------------------------------------|--------------------------------------------|
| | URBAN AREA | SUBURBAN AREA |
| Central Business District | 0 feet | NA |
| Abutting Major Thoroughfare | 25 feet | 25 feet |
| Single Family Lot Backing on Major Thoroughfare | 10 feet, if meets standards of Sec. 42-153 | 10 feet, if meets standards of Sec. 42-153 |
| Abutting Major Thoroughfare with Planned ROW of 80' or less | | |
| • General | 15 feet, if meets standards of Sec. 42-154 | NA |

| | | |
|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| • Retail Commercial Center | 5 feet, if meets standards of Sec. 42-155(a) | NA |
| | 0 feet, if meets standards of Sec. 42-155(b) | NA |
| Collector and Local Streets - Not Single Family Residential | 10 feet | 10 feet |
| • Nonresidential Across from Single Family Lots with Platted Building Line Greater than 10' | Lesser of 25 feet or Greatest Building Line on Single Family Lots | Lesser of 25 feet or Greatest Building Line on Single Family Lots |
| Collector Streets - Single Family Residential | 10 feet, Principal Structure 17 feet, Garage or Carport Facing Street | 25 feet Front 10 feet Side and Back, if adjacent to local street |
| | 5 feet, if meets standards of Sec. 42-159(c) | |
| Local Streets - Single Family Residential | 10 feet, Principal Structure 17 feet, Garage or Carport Facing Street | 20 feet Front 10 feet Side and Back, if adjacent to local street |
| | 5 feet, if meets standards of Sec. 42-159(c) | 10 feet Front 10 feet both sides of corner lots, standards of Sec. 42-158(b) |
| | | 0 feet, if vehicular access is from public alley (except corner lot) |
| Private Streets | 5 feet for habitable structure | 5 feet for habitable structure |
| Type 2 Permanent Access Easement | 5 feet for habitable structure | 5 feet for habitable structure |

| | | |
|---------------------------------------------------|---------------------------------|---------------------------------|
| Undefined easement for flammable product pipeline | 15 feet from center of pipeline | 15 feet from center of pipeline |
|---------------------------------------------------|---------------------------------|---------------------------------|

Sec. 42-151. Exceptions to building line requirement.

(a) Property within the central business district shall not be subject to a building line requirement.

(b) The commission, after public hearing, shall exempt other areas within the city from the building line requirement upon determining that the area has:

- (1) Blockfaces of 300 feet or less;
- (2) Public rights-of-way not less than 80 feet wide; and
- (3) Levels of vehicular traffic equivalent to the central business district as determined after a study by the traffic engineer.

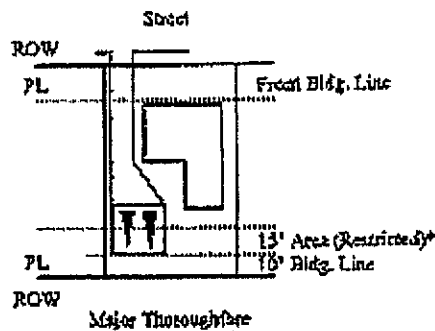
Sec. 42-152. Building line requirement along major thoroughfares - general requirement.

The portion of a lot or tract that is adjacent to a major thoroughfare shall have a building line requirement of 25 feet unless otherwise authorized by this article.

Sec. 42-153. Lot backing on major thoroughfare.

A building line requirement of 10 feet is authorized for that portion of a single family residential lot that backs onto a major thoroughfare, provided that the subdivision plat contains a notation that:

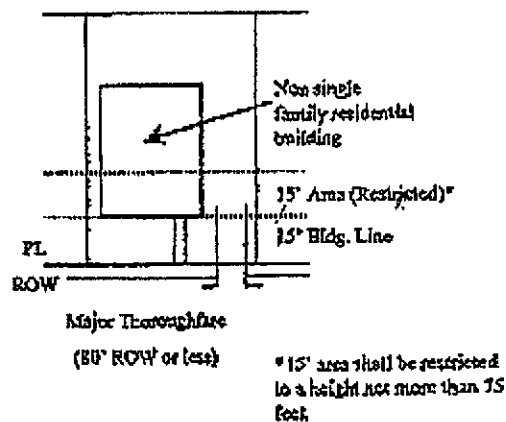
- (1) The area 15 feet behind the building line along the major thoroughfare is restricted to use as a one-story, uninhabited garage; and
- (2) Vehicular access cannot be taken from the major thoroughfare.



* 1) 15' area shall be restricted to one-story, unimhabited garage and 2) vehicular access to major thoroughfare shall be denied.

Sec. 42-154. Urban area - major thoroughfares with planned right-of-way of 80 feet or less.

A building line requirement of 15 feet is authorized for parcels in an urban area that have frontage on a major thoroughfare with a planned right-of-way of 80 feet or less if an applicant submits a subdivision plat or development plat that demonstrates compliance with each of the following standards, if applicable:



- (1) The subdivision plat does not provide for lots adjacent to the major thoroughfare and the development plat does not provide for single-family development adjacent to the major thoroughfare, as applicable;

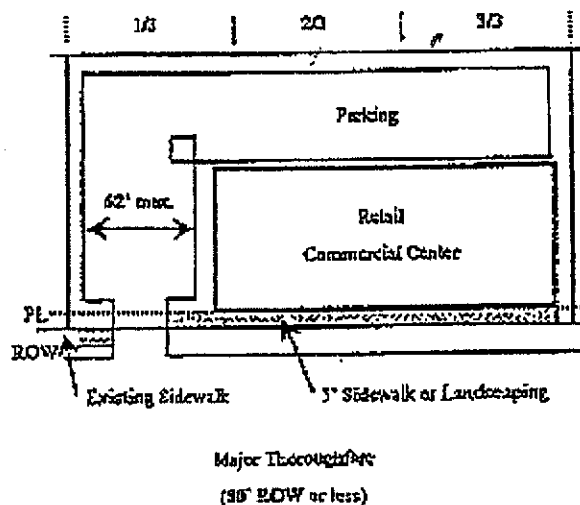
- (2) Any private street or private drive crossing the building line is substantially perpendicular to the adjacent major thoroughfare and the building line;
- (3) The area within the building line is not used for parking, driveways or any other auto-related uses such as access to a drive-in window;
- (4) A clearly-defined pedestrian walkway that is separate from any private street or private drive is established across the building line perpendicular to the sidewalk providing a connection from a public sidewalk along the major thoroughfare to an entrance to a building or the project;
- (5) Provision is made for a sidewalk that is at least five feet wide to be constructed by the applicant within the right-of-way of the major thoroughfare;
- (6) The height of any building within 15 feet behind the building line is restricted to not more than 75 feet, as measured in accordance with the Building Code;
- (7) Trees that are within 25 feet of the property line adjacent to the major thoroughfare are protected as corridor trees pursuant to article V of chapter 33 of this Code;
- (8) The building line conforms to the visibility triangle required by Section 42-162 of this Code at the intersection of a major thoroughfare and any other street;
- (9) For any property used for nonresidential purposes, the maximum height of any fence, wall, berm or combination thereof within the building line is 36 inches in height measured from mean grade;
- (10) For multi-family residential uses, any fence, wall, berm or combination thereof within the building line that is more than 36 inches high, but less than eight feet high, measured from mean grade is at least two feet from the property line adjacent to the major thoroughfare and the space created thereby is used and maintained for landscape plantings; and
- (11) For purposes of Section 33-127(b) of this Code, the number of required shrubs shall be equal to the number of required street trees multiplied by five, which required shrubs shall be

distributed along the street frontage of the property in the landscape strip.

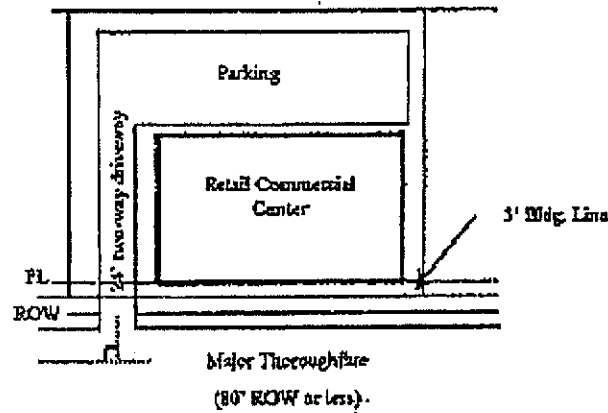
Sec. 42-155. Urban area - major thoroughfares with planned right-of-way of 80 feet or less - retail commercial center.

(a) Except as provided in subsection (c), a building line requirement of five feet is authorized for a parcel in an urban area used for a retail commercial center with frontage on a major thoroughfare with a planned right-of-way of 80 feet or less if an applicant submits a development plat that demonstrates compliance with each of the following standards:

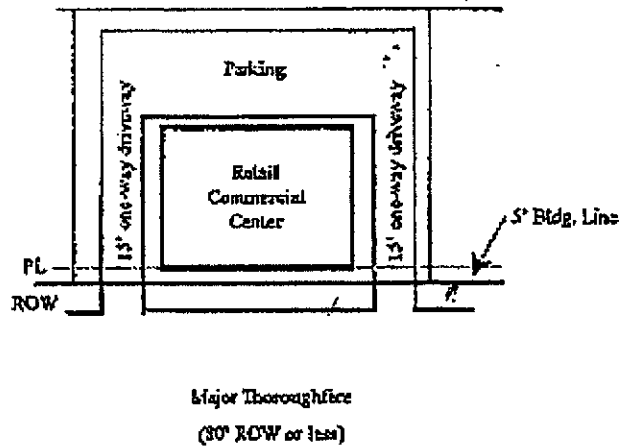
- (1) The development plat incorporates a five foot area within the building line that the applicant will improve with a sidewalk or landscaping if the sidewalk is provided in the right-of-way;
- (2) All off-street parking is provided to the rear or side of any improvements on the property;
- (3) If any driveway is provided from the major thoroughfare to the side of any improvements on the property, the driveway shall meet one of the following standards:
 - a. Not more than one driveway with two bays of parking comprising a maximum of 62 feet in width is placed to the side of any improvements, provided that the combination of parking and driveway does not exceed $\frac{1}{3}$ of the total frontage of the retail commercial center; or



- b. Not more than one two-way driveway of not more than 24 feet in width is provided from the major thoroughfare to parking at the rear of the improvements; or



- c. Not more than two one-way driveways of 15 feet each is provided from the major thoroughfare to parking at the rear of the improvements;

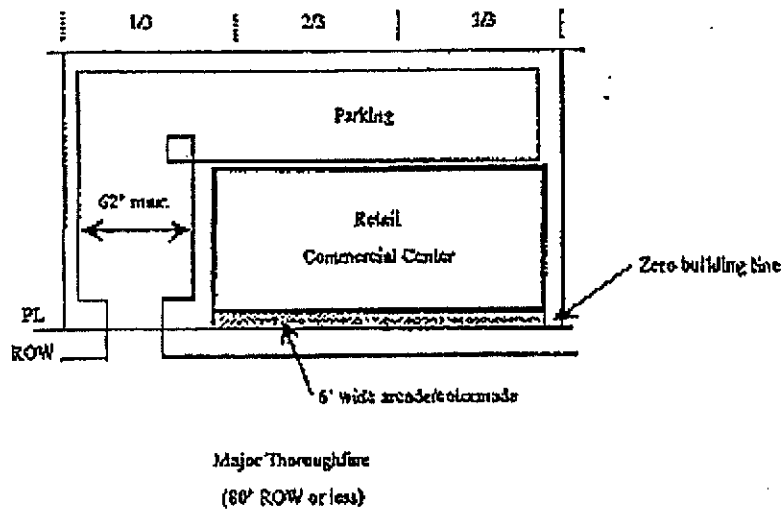


- (4) If the applicant proposes to locate the sidewalk within the building line, the applicant presents evidence that the director of public works and engineering has waived the requirement for a sidewalk within the right-of-way in exchange for the commitment of the owner of the adjacent property to install and maintain landscaping in a ten foot strip within the right-of-way adjacent to the property;

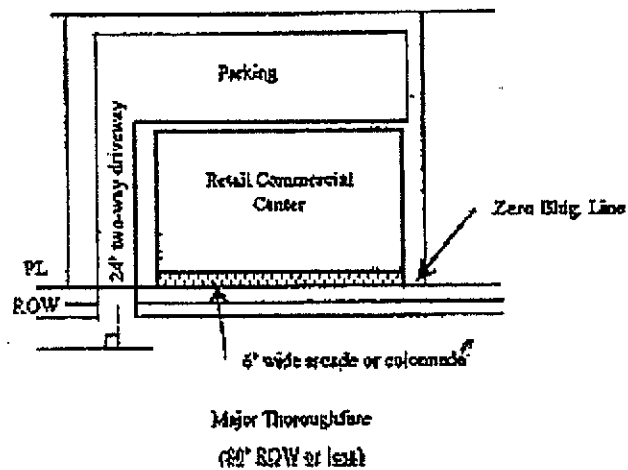
- (5) The improvement that will be located along the reduced building line contains 90 percent of the gross floor area of all improvements located on the parcel;
- (6) Trees that are within 25 feet of the property line adjacent to the major thoroughfare are protected as corridor trees pursuant to article V of chapter 33 of this Code; and
- (7) For purposes of Section 33-127(b) of this Code, the number of required shrubs shall be equal to the number of required street trees multiplied by five, which required shrubs shall be distributed along the street frontage of the property in the landscape strip.

(b) Except as provided in subsection (c), a building line requirement of zero feet is authorized for a parcel in an urban area used for a retail commercial center with frontage on a major thoroughfare with a planned right-of-way of 80 feet or less if an applicant submits a development plat that demonstrates compliance with each of the following standards:

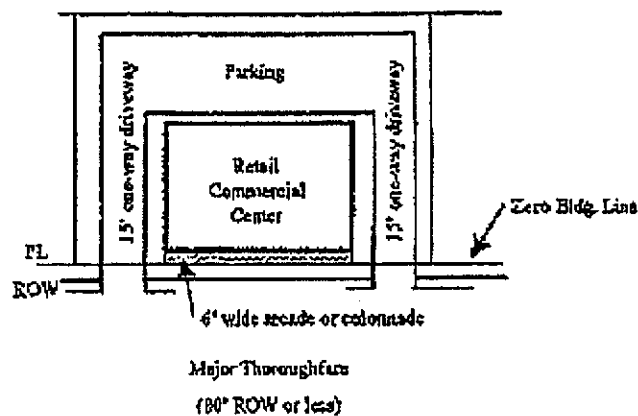
- (1) The development plat provides for an arcade or colonnade at least six feet wide along the full face of the retail commercial center parallel to the major thoroughfare;
- (2) All off-street parking is to the rear or side of any improvements on the property;
- (3) Any driveway from the major thoroughfare to the side of any improvements on the property shall meet one of the following standards:
 - a. Not more than one driveway with two bays of parking comprising a maximum of 62 feet in width is placed to the side of any improvements, provided that the combination of parking and driveway does not exceed 1/3 of the total frontage of the retail commercial center;



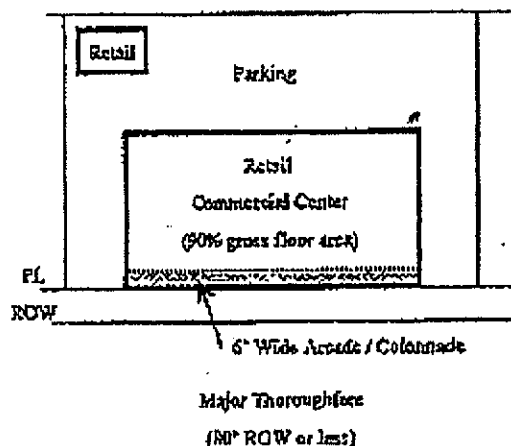
- b. Not more than one two-way driveway of not more than 24 feet in width is provided from the major thoroughfare to parking at the rear of the improvements; or



- c. Not more than two one-way driveways of 15 feet each is provided from the major thoroughfare to parking at the rear of the improvements;

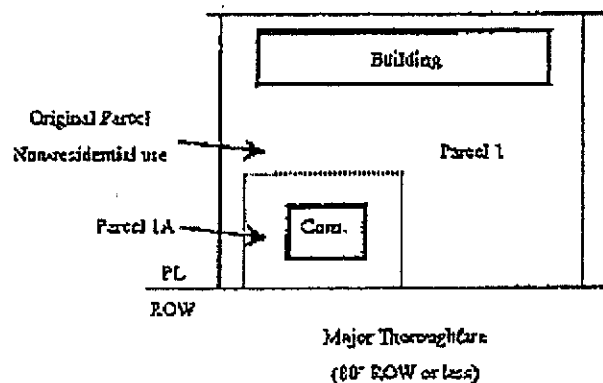


- (4) The applicant presents evidence that the director of public works and engineering has waived the requirement for a sidewalk within the right-of-way in exchange for the commitment of the owner of the adjacent property to install and maintain landscaping in a ten foot strip within the right-of-way adjacent to the property. The plantings in the ten-foot landscaping strip shall comply with the requirements of article V of chapter 33 of this Code;
- (5) The improvement that will be located along the reduced building line contains 90 percent of the gross floor area of all improvements located on the parcel; and



- (6) Trees that are within 25 feet of the property line adjacent to the major thoroughfare are protected as corridor trees pursuant to article V of chapter 33 of this Code.

(c) Subsections (a) and (b) do not apply to any retail commercial center that is located on a parcel that has been created from a larger parcel or reserve, either by subdivision or lease agreement, if the remaining portion of the original parcel or reserve is used for nonresidential purposes.



Sec. 42-156. Streets other than major thoroughfares.

(a) The building line requirement for property used or to be used for other than single family residential purposes adjacent to a street that is not a major thoroughfare shall be 10 feet unless otherwise required or authorized by this article.

(b) The building line requirement for property used or intended for use for nonresidential purposes adjacent to a street that is not a major thoroughfare and across which street are located single family residential lots having platted building lines greater than 10 feet shall be the lesser of 25 feet or the greatest building line on the single family residential lots directly across the street from the property.

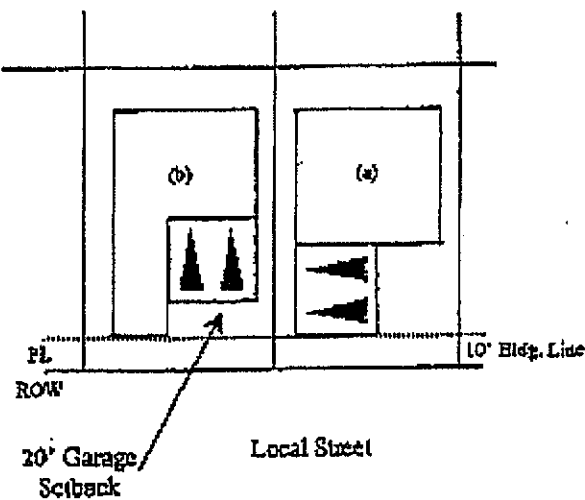
Sec. 42-157. Collector streets - suburban.

The building line requirement for property in a suburban area restricted to detached single family residential use shall be 25 feet along the front of a lot and 10 feet along the back and sides of a lot adjacent to a collector street unless otherwise required or authorized in this article.

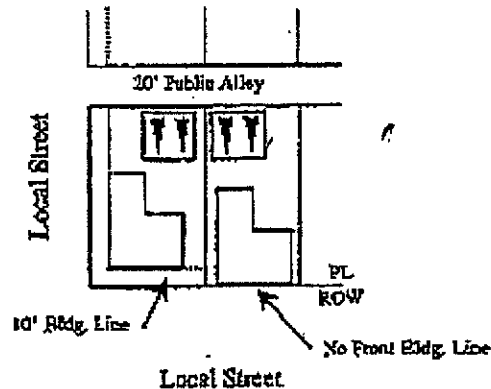
Sec. 42-158. Local streets - suburban.

(a) The building line requirement for property in a suburban area restricted to single family residential use shall be 20 feet along the front of a lot and 10 feet along the back and side of a lot adjacent to a local street, unless otherwise authorized by this article.

(b) A front building line requirement of 10 feet for property otherwise subject to the requirements of subsection (a), and a building line requirement of 10 feet on both sides of a corner lot adjacent to a street, are authorized for a subdivision where the face of the plat contains a typical lot layout and notes that restrict the placement of any garage or carport facing the street to no closer to the property line adjacent to the street than 20 feet.



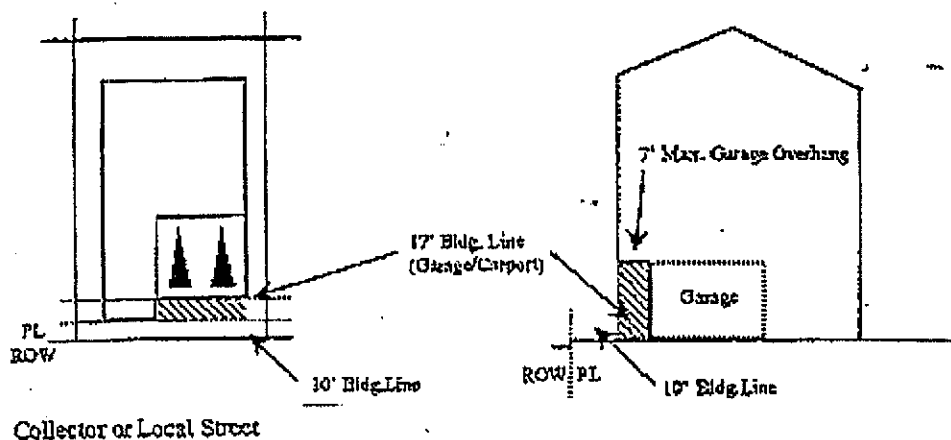
(c) When the plat contains a typical lot layout and notes that restrict vehicular access to an approved public alley, then no front building setback line shall be required, except for corner lots as provided herein.



Sec. 42-159. Collector streets and local streets - urban area.

(a) The standards for building lines in an urban area are intended to:

- (1) Foster a design framework applicable to urban areas that differ in character from each other and from suburban areas; and
 - (2) Assure that pedestrian use of sidewalks is not impeded by vehicles blocking the sidewalks.
- (b) The building line requirement for a subdivision or development in an urban area restricted to single family residential use adjacent to a collector street or a local street shall be:
- (1) 10 feet for the principal structure; and
 - (2) 17 feet for any carport or garage facing the collector street or local street unless otherwise required or authorized by this article. A building above the garage or carport may overhang the building line up to 10seven feet.



(c) A front building line requirement of 5 feet is authorized for all or a portion of the lots in a subdivision or development in an urban area that is restricted to single family residential use adjacent to a collector street or a local street that meets one of the following standards:

- (1) Vehicular access to a driveway, garage or carport is available only from the rear of each lot through an alley or shared driveway;
- (2) The subdivision or development includes a separate common parking facility containing an adequate number of parking spaces; or

- (3) Vehicular access to each lot is provided by a shared driveway and the subdivision meets each of the following standards:
- a. The shared driveway intersects only with one or more public streets and is designed as a one-way loop that is a minimum of 12 feet wide or as a two-way shared driveway that is a minimum of 16 feet wide;
 - b. The garage portion of each single family residential unit is set back from the edge of the shared driveway at least four feet;
 - c. The garage entry door is perpendicular to the public street; and
 - d. The plat contains a note that restricts the locations of any fence or wall up to eight feet high to at least two feet from the property line along the collector street or local street, which two-foot area shall be planted and maintained with landscaping.

(d) A front building line requirement of 0 feet adjacent to a collector street or a local street is authorized for a subdivision restricted to single family residential use in an urban area and that meets the following standards:

- (1) The subdivision is solely a replat of a lot on a corner at the intersection of two public streets; and
- (2) Each lot in the replat provides for one or more shared driveways so that every dwelling unit will share a shared driveway with at least one other dwelling unit.

Sec. 42-160. Private streets; type 2 permanent access easement.

The building line requirement for habitable structures along the right-of-way of a private street or type 2 permanent access easement shall be 5 feet.

Sec. 42-161. Pipelines.

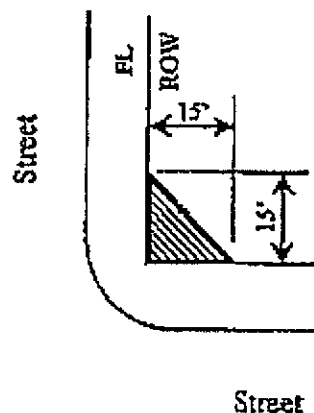
(a) The building line requirement for property adjacent to an undefined easement for a pipeline that carries flammable material under

pressure through or over properties within a subdivision or development shall be 15 feet from the centerline of the pipeline.

(b) A subdivision plat may contain a notation that the building line established pursuant to this section will no longer be applicable upon the abandonment or termination of the respective easement or right-of-way.

Sec. 42-162. Visibility triangles.

The building line for property adjacent to two intersecting streets shall not encroach into any visibility triangle, the triangular area adjacent to the intersection of any street established by measuring a distance of 15 feet from the point of intersection of two streets along the right-of-way of each of the intersecting streets and connecting the ends of each measured distance, to assure adequate visibility sight lines for vehicular traffic approaching the intersection.



Sec. 42-163. Preservation of prevailing building lines.

(a) To preserve the character of existing blockfaces in residential neighborhoods in urban areas that do not have building lines established by deed restrictions, the building line requirement may be established pursuant to this section through the creation of a special building line requirement area, and a special building line requirement so created will prevail over any more lenient building line requirement established by this article. A building line requirement established pursuant to this section shall not be established that is greater than the prevailing building line of the blockface. A blockface qualifies for establishment of a special building line requirement pursuant to this section unless all lots on the blockface are subject to a deed restriction establishing a uniform front building line for the blockface.

(b) The establishment of a special building line requirement area shall be initiated by application to the director in the form prescribed by the department. The application shall include the following:

- (1) The proposed boundaries of the special building line requirement area, which shall be no less than one blockface;
- (2) A map or sketch showing the address and land use for all lots within the proposed special building line requirement area;
- (3) Data for each lot within the proposed special building line requirement area showing the distance from the front property line to each building on the lot;
- (4) A petition signed by at least one owner of property proposed to be included within the special building line requirement area; and
- (5) Evidence of support from the owners of property within the proposed special building line requirement area.

(c) Within 10 days after receipt of a complete application for the creation of a special building line requirement area, the director shall give notice of the application for the creation of a special building line requirement to the owners of property within the proposed special building line requirement area as shown on the most recent tax rolls for the county in which the proposed area is located. Notice shall be given by letter deposited into the United States postal service, postage paid.

(d) A property owner within the proposed special building line requirement area may protest the application for special building line requirement area by filing a protest with the department within 15 days of the date of the notice letter.

(e) The director shall approve the application for establishment of a special building line requirement area upon determining that each of the following conditions exist:

- (1) The application satisfies each of the criteria of subsection (g);
- (2) The petition was signed by the owners of 51 percent or more of the lots or tracts within the area proposed for special building line requirement area; and
- (3) A timely protest of the establishment of the special building line requirement area was not filed by any property owner within the proposed special building line requirement area.

Upon approval of an application, the director shall take the appropriate steps to refer the application to the city council.

(f) The director shall promptly refer an application to the commission if he cannot approve the application pursuant to subsection (e) of this section. Within 30 days after the director refers the application for the creation of a special building line requirement area, the commission shall conduct a public hearing on the application at a regularly scheduled meeting of the commission. The director shall give notice of the public hearing to each owner of real property within the proposed special building line requirement area by letter deposited into the United States postal service, postage paid, no later than 15 days before the date of the public hearing. The owners of property within the proposed special building line requirement area and any other person may present comments in person or in writing at the public hearing.

(g) After the close of the public hearing, the commission shall consider whether to recommend that the city council establish the special building line requirement area. The commission shall recommend the establishment of a proposed special building line requirement area if it finds that the application satisfies each of the following criteria:

- (1) The boundaries of the proposed special building line requirement area will include all properties within at least one blockface;
- (2) More than 50 percent of the lots to be included within the proposed special building line requirement area are developed with single family residential units;
- (3) That the applicant has demonstrated sufficient support for the establishment of the proposed special building line requirement area to warrant the establishment of the area;
- (4) That the establishment of the proposed special building line requirement area will further the goal of preserving the prevailing building line character of the area; and
- (5) That the proposed special building line requirement area has a prevailing constructed building line. If department analysis demonstrates that less than 25 percent of the single family residential properties within the proposed special building line requirement area have a constructed building line measured from the property line to the closest point of any building on the property, including garages and carports, that varies by more

than five feet from the most frequent constructed building line, the proposed special building line requirement area shall be deemed to have a prevailing building line, which shall be the most frequently occurring constructed building line.

The director shall forward to the city council each commission recommendation for the establishment of a special building line requirement area. If the commission does not recommend the establishment of a special building line requirement area, the decision of the commission shall be final.

(h) In determining whether to establish the proposed special building line requirement area, the city council shall consider the recommendations of the commission and the criteria in subsection (g). The city council shall establish each proposed special building line requirement area by ordinance, which shall specify that the prevailing constructed building line shall be the building line requirement for the special building line requirement area. The director shall file for recordation in the real property records of the county or counties in which the special building line requirement area is located the ordinance designating the special building line requirement area.

(i) The special building line requirement area shall terminate 20 years after the effective date of the ordinance establishing the area, unless earlier terminated by an ordinance adopted by the city council.

(j) The following rules shall govern the issuance of building permits and the approval of subdivision plats and development plats before and after an application for establishment of a special building line requirement area is filed with the department.

- (1) If a complete, valid building permit, subdivision plat or development plat application is filed before the time an application for the establishment of a special building line requirement area is filed with the department, the application shall not be subject to the special building line requirement;
- (2) If a complete, valid building permit, subdivision plat or development plat application is filed after the time an application for the establishment of a special building line requirement area is filed with the department, the application will be subject to the special building line requirement unless:
 - a. The director determines that the application for the establishment of a special building line requirement area is not complete; or

- b. The department analysis pursuant to item (5) of subsection 42-163(g) of this Code demonstrates that the proposed special building line requirement area does not have a prevailing constructed building line.
- (3) If a complete, valid building permit, subdivision plat or development plat application is filed after the time a complete application for the establishment of a special building line requirement area is filed with the department, the building permit, subdivision plat or development plat shall not be approved pending completion of action on the application unless it meets the prevailing building line determined by the department pursuant to paragraph (5) of subsection 42-163(g) of this Code.

Sec. 42-164. Reconstruction after casualty.

(a) Reconstruction of a building after fire, damage or other casualty not intentionally caused by the owner of the building or the owner's agent shall comply with the requirements of this division if the estimated cost to rebuild the damaged portion of the building exceeds 75 percent of the estimated replacement cost of the entire building, exclusive of the replacement cost of the building foundation.

(b) Reconstruction of a building after fire, damage or other casualty not intentionally caused by the owner of the building or the owner's agent shall not require compliance with the provisions of this division if:

- (1) The estimated cost to rebuild is 75 percent or less of the estimated replacement cost of the entire building, after subtracting the estimated replacement cost of the building foundation; and
- (2) The reconstruction would not result in an increase in the floor area of the building or a change in the use of the property.

(c) For purposes of this section, the determination of the estimated cost to rebuild and the estimated replacement cost of a building shall be based on a certified cost estimate provided by an architect or contractor and approved by the building official.

Secs. 42-165 - 42-179. Reserved.

EXHIBIT A
DESIGN MANUAL

DIVISION 4. LOTS AND RESERVES

Sec. 42-180. General lot design standards.

Each lot in a subdivision plat shall be of sufficient size and shape to:

- (1) Allow for the construction of a single family residential building that can meet the requirements of city codes and ordinances and the design manual;
- (2) Accommodate an easement for all public and private utilities necessary to serve the single family residential building constructed thereon;
- (3) Ensure that direct vehicular access is provided from a street or alley; and
- (4) Ensure that two vehicles per dwelling unit can be parked entirely on the lot in compliance with chapter 26 of this Code.

Sec. 42-181. Lots without wastewater collection service.

Lots that will not be served by a wastewater collection system shall meet the minimum requirements of the Texas Natural Resource Conservation Commission. The applicant shall provide a letter from the Texas Natural Resource Conservation Commission evidencing compliance with the minimum requirements. In addition, lots without wastewater collection service that are platted in a special flood hazard area, as determined under the National Flood Insurance Program, shall meet the applicable requirements of the Texas Natural Resource Conservation Commission, the city and the county engineer of the county in which the lots are located with respect to the location of the onsite sewage system.

Sec. 42-182. Lot sizes - single family residential - suburban area.

The minimum lot size for a single family residential lot in a suburban area shall be:

- (1) 5000 square feet for lots with wastewater collection service;
- (2) Less than 5000 square feet for lots with wastewater collection service, but in no event less than 1400 square feet, if the subdivision plat meets the standards of sections 42-184 and 42-185 of this Code; or

- (3) The minimum requirement of section 42-181 of this Code for lots without wastewater collection service.

Sec. 42-183. Lot sizes - single family residential - urban area.

(a) The minimum lot size for a single family residential lot in an urban area shall be:

- (1) 3500 square feet for lots with wastewater collection service;
- (2) Less than 3500 square feet for lots with wastewater collection service, but in no event less than 1400 square feet, if the subdivision plat meets the standards of
 - a. subsection (b); or
 - b. Sections 42-184 and 42-185 of this Code; or

- (3) The minimum requirement of section 42-181 of this Code for lots without wastewater collection service.

(b) A subdivision in an urban area may provide for a single family lot size of less than 3500 square feet, but not less than 1400 square feet, if the subdivision plat meets the following development standards:

- (1) For a subdivision that is not the replat of a lot on a corner at the intersection of two public streets:
 - a. Buildings do not cover more than 60% of the area of each lot that is less than 3500 square feet in size;
 - b. The subdivision plat provides for permeable area in an amount equal to 150 square feet per lot ;
 - c. The number of single family residential dwelling units that can be constructed within the proposed subdivision does not exceed an equivalent density of 29 units to the gross acre of all land within the boundaries of the subdivision plat; and
 - d. All lots have adequate wastewater collection service; or

* City Secretary to insert number after City Council action.

(2) For a subdivision that is solely a replat of a lot on a corner at the intersection of two public streets:

- a. Buildings do not cover more than 75% of the area of each lot that is less than 3500 square feet in size, on average of the lots in the subdivision;
- b. The subdivision plat provides for permeable area in an amount equal to 150 square feet per lot ;
- c. The number of single family residential dwelling units that can be constructed within the proposed subdivision does not exceed an equivalent density of 27* units to the gross acre of all land within the boundaries of the subdivision plat;
- d. All lots in the subdivision have adequate wastewater collection service.

Sec. 42-184. Reduction in lot size; compensating open space.

Lot sizes less than the otherwise applicable minimum prescribed in sections 42-182 and 42-183 of this Code are permitted in subdivisions where compensating open space is provided within the boundaries of the subdivision plat in accordance with the following schedule and in conformance with the design standards of section 42-185 of this Code:

* City Secretary to insert number after City Council action.

| Average lot size may be reduced to this square footage | Upon providing this amount of compensating open space per lot | |
|--------------------------------------------------------|---------------------------------------------------------------|------------|
| | Suburban Area | Urban Area |
| 4,999 - 4,500 | 100 | None |
| 4,499 - 4,000 | 200 | None |
| 3,999 - 3,500 | 300 | None |
| 3,499 - 3,000 | 400 | 240 |
| 2,999 - 2,500 | 500 | 360 |
| 2,449 - 2,000 | 600 | 480 |
| 1,999 - 1,400 | 720 | 600 |

Sec. 42-185. Standards for compensating open space.

(a) Compensating open space shall be used to reduce the minimum lot size requirement only to the extent that the area proposed to be dedicated to compensating open space meets the requirements of this section.

(b) The following areas shall not be used for or considered compensating open space:

- (1) Areas designated or used as lots or building sites for dwelling units, utility or storage purposes, carports or garages;
- (2) Driveways or streets;
- (3) Private medians less than 12 feet wide; or

- (4) Detention ponds, drainageways, water areas including flood plains and flood ways, or ravines unless they are developed as amenities pursuant to an open space amenities plan approved by the commission.

(c) Compensating open space shall be reasonably dry and flat, unless the area is within an open space amenities plan approved by the commission.

(d) The ground floor square footage of a building used for recreational purposes, at the option of the applicant, may be included in calculating compensating open space to be provided that the recreational use of the building is shown on the subdivision plat.

(e) The minimum size of any area used for compensating open space shall be 240 square feet, with dimensions of 20 feet by 12 feet.

(f) Any area used for compensating open space:

- (1) Shall be restricted for the use of owners of property in and residents of the subdivision;
- (2) Shall be owned, managed and maintained under a binding agreement among the owners of property in the subdivision; and
- (3) Shall be accessible to all of the residents of the subdivision.

(g) Compensating open space can be used to provide courtyard access from groups or clusters of lots adjacent to one or more streets provided that the minimum distance between the opposing faces of the buildings forming the courtyard is 20 feet.

Sec. 42-186. Minimum lot width.

The minimum width of any lot shall be 20 feet.

Sec. 42-187. Parking for single family residential uses.

Each subdivision plat or development plat providing for single family residential uses shall provide at least two off-street parking spaces per dwelling unit on each lot except that, in those instances where a secondary dwelling unit of not more than 900 gross square feet is provided, only one

additional off-street parking space shall be required for the secondary dwelling unit.

Sec. 42-188. Flag lots.

(a) Each flag lot shall provide for vehicular access to the principal portion of the lot through the staff.

(b) If a flag lot derives access solely from its own staff, the minimum width of the staff shall be 20 feet.

(c) If a flag lot derives its access in common with another lot, the combined common access shall have a minimum width of 20 feet.

(d) Any area required to be used for vehicular access purposes shall be depicted by a note on the subdivision plat that restricts the portions of the lots for ingress and egress only and that precludes construction of any building, structure, wall or fence within those portions. If the vehicular access is to be shared, the plat note shall clearly indicate the joint or shared nature of the access.

Sec. 42-189. Lot access to streets.

(a) Each lot shall have access to a street that meets the requirements of this chapter and the design manual, subject to the limitations of this section.

(b) A single family residential lot shall not have direct vehicular access to a major thoroughfare unless:

(1) The lot is greater than one acre in size; and

(2) The subdivision plat contains a notation adjacent to the lot requiring a turnaround on the lot that prohibits vehicles from backing onto the major thoroughfare.

(c) Lots that front on or take access from a permanent access easement must be a part of a unified development scheme where the owners of all lots within the subdivision are legally bound together by deed restriction, contract or any other constituted and binding homeowners association, corporation, or other organization with, as one of its purposes, the continued care and maintenance of all commonly owned properties within the subdivision, particularly the areas established as permanent access easements, and the authority and means to impose binding assessments upon the lot owners for that purpose. Each subdivision plat that

contains a permanent access easement shall contain the following notation on the face of the plat:

'THIS SUBDIVISION CONTAINS ONE OR MORE PERMANENT ACCESS EASEMENTS THAT HAVE NOT BEEN DEDICATED TO THE PUBLIC OR ACCEPTED BY THE CITY OF HOUSTON OR ANY OTHER LOCAL GOVERNMENT AGENCY AS PUBLIC RIGHTS-OF-WAY. THE CITY OF HOUSTON HAS NO OBLIGATION, NOR DOES ANY OTHER LOCAL GOVERNMENT AGENCY HAVE ANY OBLIGATION, TO MAINTAIN OR IMPROVE ANY PERMANENT ACCESS EASEMENT WITHIN THE SUBDIVISION, WHICH OBLIGATION SHALL BE THE SOLE RESPONSIBILITY OF THE OWNERS OF PROPERTY IN THIS SUBDIVISION.'

Sec. 42-190. Points of access.

Any subdivision that includes more than 150 lots shall have at least two points of access separated from each other by a distance of at least 250 feet to a public street outside the boundaries of the subdivision.

Sec. 42-191. Tracts for non-single family use.

A tract of land that is not restricted to single family residential use shall not be designated on a subdivision plat as a lot, but shall be designated as a reserve and shall be subject to those provisions of this chapter pertaining to reserves.

| | |
|---------------------------------------------------|------------------------------------------------------------------------------------|
| Unrestricted Reserve A ____ ac. ____ sq. | Restricted Reserve B Restricted to Commercial Use ____ ac. ____ sq. |
|---------------------------------------------------|------------------------------------------------------------------------------------|

Public Street

Sec. 42-192. Reserves.

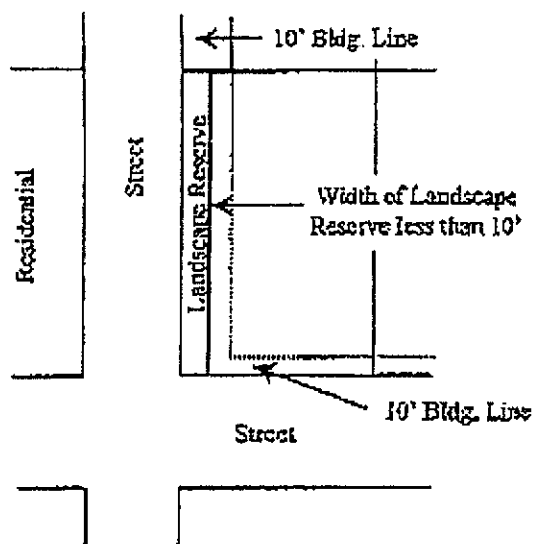
(a) A subdivision plat shall identify each reserve by alphabetical letter and shall show the total acreage of the reserve within the delineated reserve boundaries. The use intended for each reserve shall be noted. A reserve tract for which a use has not been determined shall be identified on the plat as an unrestricted reserve.

(b) A parcel that is served by wastewater collection service and is not restricted to residential use shall:

- (1) Have a minimum size of 5,000 square feet; and
- (2) Have frontage along at least one public street that has a right-of-way width of not less than 60 feet unless:
 - a. The parcel is located on a public local street in a street width exception area; or
 - b. The parcel abuts property that is used for or restricted to the provision of drainage, detention, wastewater collection service, wastewater treatment, or other utility-related purposes and is restricted to the abutting use.

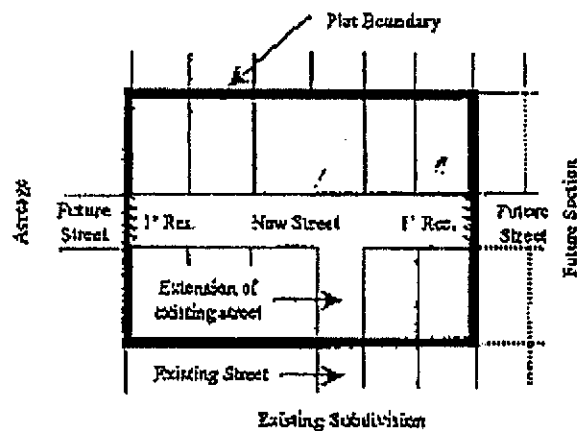
(c) Except as otherwise limited by one foot reserve strips in the city's extraterritorial jurisdiction as set forth in section 42-193 of this Code, a reserve that is not restricted to landscaping use shall have at least 60 feet of frontage on a public street. A reserve restricted to a lift station site shall have a minimum of 20 feet of frontage on a public street. Reserves restricted to landscaping and open space, other than compensating open space use, shall not have a minimum square footage or frontage requirement, provided, however, that landscape and open space reserves that are located directly across the street from single family residential lots shall:

- (1) Be a minimum of ten feet in depth along the street frontage; or
- (2) If less than 10 feet in depth along the street frontage, any adjacent lot shall be deemed a corner lot for purposes of establishing the building line requirement on the adjacent lot.



Sec. 42-193. One foot reserves.

(a) Subdivision plats shall provide a one-foot reserve within the street right-of-way as a buffer strip dedicated to the public to prevent access to public streets when a proposed public street stub ends into adjacent acreage or where the proposed public street is adjacent to the plat boundary and abutting acreage.



The following notation shall be placed upon the face of the subdivision plat:

'ONE-FOOT RESERVE DEDICATED TO THE PUBLIC IN FEE AS A BUFFER SEPARATION BETWEEN THE SIDE OR END OF STREETS WHERE SUCH STREETS ABUT ADJACENT PROPERTY, THE CONDITION OF THIS DEDICATION BEING THAT WHEN THE ADJACENT

PROPERTY IS SUBDIVIDED OR RE-SUBDIVIDED IN A RECORDED SUBDIVISION PLAT, THE ONE-FOOT RESERVE SHALL THEREUPON BECOME VESTED IN THE PUBLIC FOR STREET RIGHT-OF-WAY PURPOSES AND THE FEE TITLE THERETO SHALL REVERT TO AND REVEST IN THE DEDICATOR, HIS HEIRS, ASSIGNS OR SUCCESSORS.'

(b) In addition to the requirements set forth in subsection (a), subdivision plats within the city's extraterritorial jurisdiction shall provide a one-foot reserve adjacent to the public street right-of-way as a buffer strip dedicated to the public to prevent access to public streets when a reserve is to be established adjacent to a dedicated public street and the average depth of the reserve is more than 300 feet, unless the reserve is restricted to prohibit any single family or multi-family residential development. The following notation shall be placed upon the face of the subdivision plat:

'ONE-FOOT RESERVE DEDICATED TO THE PUBLIC IN FEE AS A BUFFER SEPARATION BETWEEN THE PUBLIC STREET AND THE ADJACENT RESERVE, THE CONDITION OF SUCH DEDICATION BEING THAT WHEN THE ADJACENT RESERVE IS REPLATTED AND APPROVED BY THE COMMISSION, THE ONE-FOOT RESERVE SHALL AUTOMATICALLY BE VACATED AND THE FEE TITLE THERETO SHALL REVERT TO AND REVEST IN THE DEDICATOR, HIS HEIRS, ASSIGNS OR SUCCESSORS.'

Sec. 41-194 - 42-209. Reserved.

DIVISION 5. EASEMENTS

Sec. 42-210. Public utility easements.

(a) An easement for one or more public utilities shall meet the standards of this section and the location, design and width requirements of the design manual and of the respective utility companies.

(b) A public utility easement located along the boundary of a subdivision plat or a development plat shall contain the full width required for the easement, except that one-half of the required width may be shown and dedicated when one of the following conditions is satisfied:

- (1) The property adjacent to the proposed public utility easement is within a recorded subdivision plat as the property that is the subject of the application and which provided for the dedication of a public utility easement contiguous to the proposed easement; or

- (2) The additional public utility easement width is or was previously dedicated by the owner of the adjacent property by separate instrument.

Sec. 42-211. Drainage easements.

Each drainage easement shall be located in conformity with the requirements of the design manual and all other governmental agencies with jurisdiction over surface water drainage or flood control within the area in which the proposed subdivision or development is located. Each subdivision plat or development plat that contains a drainage easement shall contain a restriction on the plat that:

- (1) Prohibits all properties abutting the easement from the construction of fences or buildings, whether temporary or permanent, and the installation or maintenance of plantings or other obstructions to the operation and maintenance of the drainage facility within the drainage easement; and
- (2) Prohibits any property abutting the drainage easement from draining directly into the drainage easement except by means of a drainage structure approved by the director of public works and engineering or the authorized public drainage or flood control official.

Sec. 42-212. Private easements; fee strips.

All easements or fee strips created prior to the subdivision or development of any tract of land shall be shown on the subdivision plat or development plat with appropriate notations indicating the name of the holder of the easement or fee strip, the purpose of the easement, the dimensions of the easement or fee strip tied to all adjacent lot lines, street rights-of-way and plat boundary lines and the recording reference of the instruments creating and establishing the easement or fee strip. If an easement has not been defined by accurate survey dimensions, such as an 'over and across' easement, the subdivider shall request the owner of the easement to define the limits and location of the easement through the property within the plat boundaries. If the holder of an undefined easement does not define the easement involved and the applicant certifies to the director the owner's refusal to define the easement, the subdivision plat or the development plat shall provide accurate information about the centerline location of all existing pipelines or other utility facilities placed in conformance with the easement owners' rights.

Secs. 42-213 - 42-229. Reserved.

DIVISION 6. MULTI-FAMILY RESIDENTIAL DEVELOPMENTS

Sec. 42-230. Application requirements.

(a) In addition to the information otherwise required to be submitted for a development plat, a development plat that provides for the development of one or more multi-family residential buildings shall provide the following information:

- (1) The number of separate buildings that will contain multi-family residential dwelling units;
- (2) The location of the principal entrance to each multi-family residential building;
- (3) The total number of dwelling units;
- (4) An itemized listing of multi-family residential dwelling units indicating the number of bedrooms in each dwelling unit; and
- (5) The number, location and dimensions of off-street parking spaces required to serve the dwelling units pursuant to section 42-234 of this Code.

(b) When property is replatted to remove a one-foot restricted reserve, the subdivision plat shall additionally provide all of the information required for a development plat and required by subsection (a) of this section and shall be deemed a development plat for the purposes of this division.

Sec. 42-231. Private streets - general standards.

(a) A development plat that contains a multi-family residential building shall provide at least one private street. The private street shall remain clear at all times for emergency vehicle access. No parking shall be allowed within the private street. Except as provided in section 42-235 of this Code, a private street shall comply with the requirements of this section:

- (b) Width:
 - (1) The minimum right-of-way width for a private street shall be 28 feet, which is coterminous with the pavement width measured from edge-to-edge across the surface of the pavement.
 - (2) At the option of an applicant, for a distance of not more than 100 feet from the intersection of the private street and the

right-of-way of a public street, the right-of-way width of the private street may be comprised of two paving sections of not less than 20 feet each, separated by a curbed section of not less than 5 feet and not more than 20 feet in width.

(c) Intersections:

- (1) Intersections along private streets shall be a minimum of 65 feet apart.
- (2) When a private street intersects with another private street at a 90-degree angle, the private street shall provide a 20-foot radius at the intersection.
- (3) When a private street intersects with another private street at an angle less than 90 degrees, but more than 80 degrees, the private street shall provide a 25-foot radius at the intersection.

(d) The centerline radius of a reverse curve on a private street shall not be less 65 feet. Reverse curves shall be separated by a tangent of not less than 25 feet.

Sec. 42-232. Points of access; termination.

(a) Except as otherwise provided in this section, the private street system serving each multi-family residential development shall form a loop that provides more than one point of access to the development from the public streets adjacent to the boundaries of the development. A divided entrance shall not constitute two separate points of access.

(b) When two points of access are provided from the same public street, the private street shall not be deemed to have a second point of access unless the private street connecting the two points of access extends into the property one-third of the depth of the property.

Sec. 42-233. Fire protection.

(a) Fire hydrants shall be located along each private street in a manner that will allow fire fighting apparatus to park and connect by hose to a hydrant not more than 300 feet away and reach any part of any building within the development with a 200-foot long hose extending from the equipment. The hose distance shall be measured as laid on the ground, around buildings, fences and other obstacles, and not as an aerial radius from a hydrant or parked equipment. Notwithstanding the foregoing, fire hydrants shall be located not more than 600 feet apart, unless the fire chief approves a different configuration where, in his professional judgement, fire protection needs can be adequately provided.

(b) If a multi-family residential building will be constructed over and across a private street, the unobstructed overhead clearance of the multi-family residential building shall be not less than 14 feet measured between the highest point of the private street paving under the building and the lowest part of the building or associated parts thereof.

(c) The fire chief shall review and approve each development plat that provides for one or more multi-family residential buildings and shall provide the director with recommendations regarding the adequacy of the design of the development to provide sufficient emergency access to all buildings by firefighters and fire fighting equipment, considering the kinds of equipment and methods of fire-fighting in use by the fire department of the city, the location of buildings in the proposed development and their relationship to existing and proposed fire hydrants and any other factors that may affect the safety and general welfare of the public and the occupants of the buildings to be constructed.

Sec. 42-234. Parking.

(a) Each development plat containing a multi-family residential development shall provide off-street parking spaces in accordance with the following schedule:

| UNIT SIZE | PARKING SPACES REQUIRED PER UNIT |
|------------------------|-------------------------------------|
| Efficiency | 1.25 |
| One bedroom | 1.333 |
| Two bedrooms | 1.666 |
| Three or more bedrooms | 2 |

In determining the total number of spaces required, any fraction of one-half or less shall be counted as the next smaller whole number and any fraction in excess of one-half shall be counted as the next higher whole number.

(b) Parking space arrangements, sizes of spaces and driveway openings shall be in conformance with the building code. A parking space shall not be in tandem unless the tandem parking space is reserved for use by occupants of the same residential unit to which the space is in tandem.

Sec. 42-235. Performance standards

A multifamily residential development with a density of 30 dwelling units or more per acre that meets each of the performance standards of this section shall be exempt from the requirements of sections 42-231, 42-232(a), 42-232(b), 42-233(a), and 42-233(b) of this Code:

- (1) Each building in the development, except for open carports, detached garages, free standing mail rooms and multi-level parking garages, shall have an automatic sprinkler system that satisfies the specifications of the building code for an automatic sprinkler system for multi-family residential structures and each multi-level parking garage shall have a standpipe system that satisfies the specifications of the building code;
- (2) A fire hydrant is located within 50 feet of each building;
- (3) Fire protection can be provided around all buildings with a hose lay length of 300 feet measured as the hose lays on the ground from the closest fire hydrant around all obstacles, including but not limited to fences, walls, buildings, structures and trees; and
- (4) Each building has a fire hose connection that is tied to a fire hydrant that is not less than 50 feet from the building to ensure adequate fire protection.

Sec. 42-236. Open space.

(a) Except as otherwise provided in this section, each multi-family residential development shall provide open space in accordance with the following schedule:

| DWELLING UNIT SIZE | SQUARE FEET OF OPEN SPACE REQUIRED PER DWELLING UNIT |
|--------------------|------------------------------------------------------|
| Efficiency | 200 |
| 1 Bedroom | 240 |
| 2 Bedrooms | 320 |
| 3 Bedrooms | 440 |
| 4 Bedrooms | 500 |

For purposes of this section, 'open space' shall mean land within the development plat boundary that is not covered by buildings, covered walkways, parking spaces, private streets or driveways.

(b) In lieu of the requirements of subsection (a), a multi-family residential development may provide for open space by complying with each of the following conditions:

- (1) At least ten percent of the total land area in the multi-family residential development, exclusive of land within the building line requirement area, shall be provided as open space;
- (2) Enclosed amenities, such as an exercise or game room, shall constitute no more than 10 percent of the open space provided;
- (3) Each area provided as open space is at least 20 feet wide by 60 feet long;
- (4) Any street trees required to be planted to comply with city ordinance are located in the street right-of-way; and
- (5) The development plat provides for the construction of sidewalks that are a minimum of five feet in width within the right-of-way of each street that is adjacent to the development.

(c) The aggregate open space requirement of subsection (a) may be reduced by 15 percent if the development meets each of the following conditions:

- (1) At least 25 percent of the dwelling units have individual enclosed garages within the buildings where the dwelling units are located; and

- (2) Areas within the building line requirement are not used for parking.

(d) The aggregate open space requirement of subsection (a) may be reduced according to the following schedule if the development meets each of the following conditions:

- (1) Any street trees required to be planted to comply with city ordinance are located in the street right-of-way; and
- (2) The development plat provides for the construction of sidewalks that are a minimum of five feet in width within the right-of-way of each street that is adjacent to the development.

| Development Density | Reduction in Aggregate Open Space |
|---------------------------|-----------------------------------|
| 30 - 39 units per acre | 15% |
| 40 - 49 units per acre | 30% |
| 50 - 59 units per acre | 45% |
| 60 units per acre or more | 60% |

(f) A multi-family residential development with five or more stories shall not be required to provide open space.

Secs. 42-237 - 42-249. Reserved."

Section 3. That the Code of Ordinances, Houston, Texas, is hereby amended by adding new Sections 33-24 and 33-25, which read as follows:

"Sec. 33-24. Commission meetings.

(a) The commission shall adopt a regular meeting schedule and shall give public notice of the meeting schedule by publication for three consecutive days in a daily newspaper of general circulation within the city and the area of extraterritorial jurisdiction. The commission may change this meeting schedule by the adoption of a new schedule, the effective date of which shall not be less than ten days after publication of the new schedule

for three consecutive days in a daily newspaper having general circulation within the city and the area of extraterritorial jurisdiction. The commission may, by rule, designate the times and places for holding meetings as it deems proper.

(b) The commission may hold a special meeting for any purpose except for the filing of any plats or replats pursuant to chapter 42 of this Code.

(c) The commission shall hold at least one public hearing prior to the adoption of the major thoroughfare and freeway plan or any amendments thereto. The commission may establish rules governing the circumstances under which it will call public hearings and the reservation of time for speaking. All such rules shall grant reasonable opportunity for the public to be heard on matters within the jurisdiction of the commission.

Sec. 33-25. Annual major thoroughfare and freeway plan review.

Each year, on or before the first day of September, the commission shall prepare and submit to the city council a major thoroughfare and freeway plan adopted with the concurrence of the public works and engineering department. The commission may, from time to time, and shall upon the petition of any interested property owner, consider an amendment to any portion of the major thoroughfare and freeway plan relating to deleting, realigning or reclassifying streets designated on the major thoroughfare and freeway plan or adding one or more streets to the plan. An amendment approved by the commission shall not be effective unless and until approved by the city council."

Section 4. That the design manual for Wastewater Collection Systems, Water Lines, Storm Drainage and Street Paving (the "design manual") attached to and made a part of this Ordinance as Exhibit "A" is hereby approved and authorized as a regulation of the Department of Public Works and Engineering. The City Engineer is hereby authorized to promulgate regulations amending the design manual from time to time as the City Engineer deems appropriate.

Section 5. That the City Council hereby approves the initial schedule of application fees for subdivision plats and development plats that is attached to and made a part of this Ordinance as Exhibit B.

Section 6. That any variance granted on a plat recorded before June 22, 1982, is hereby recognized as continuing to be valid and compliance with Chapter 42 of the Code of Ordinances, Houston, Texas as amended by this Ordinance shall not be required.

Section 7. That Sections 41-3, 41-4, 41-5, 41-6, 41-7, 41-37 and 41-38 of the Code of Ordinances, Houston, Texas, are hereby repealed.

Section 8. That the Code of Ordinances, Houston, Texas, is hereby amended by adding a new Section 10-2, which reads as follows:

"Sec. 10-2. Code compliance review.

The building official shall forward each application for the issuance or amendment of a building permit to the director of the department of planning and development or the director's designee to determine compliance with Chapters 26, 33 and 42 of this Code and Section 418A of the City of Houston Building Code, if the scope of the work involves one or more of the following:

- (1) The construction of any new structure or building;
- (2) An addition to any structure or building;
- (3) A change in occupancy designation of a structure or building or portion thereof;
- (4) The construction of any driveway or curb cut;
- (5) The construction or expansion of any parking lot;
- (6) The construction of any fence over eight feet high;
- (7) The construction of any retaining wall; or
- (8) The construction of any masonry wall.

There is hereby imposed a fee of \$25.00 for the review under this section. The building official shall collect this fee from the applicant at the time of the issuance of the building permit or amendment. The fee shall not be refundable and shall be in addition to any other fee imposed by law."

Section 9. That Section 418A.8.1 of the City of Houston Building Code - General Provisions shall be amended by adding a semi-colon and the word "or" and deleting the period at the end of subsection 3 and adding a new subsection 4, which reads as follows:

"4. The property is located in an 'urban area' designated pursuant to Chapter 42 of the Code of Ordinances, Houston, Texas."

Section 10. That each of the following shall be processed and considered by the Director of the Planning and Development Department or the Planning Commission, as appropriate, pursuant to the provisions of Chapter 42, Code of Ordinances, Houston, Texas, in effect prior to the effective date of this Ordinance, and the former provisions of Chapter 42 are saved for that limited purpose:

1. Any complete application for a subdivision plat or development plat that is filed with the Department of Planning and Development prior to the effective date of this Ordinance;
2. Any final plat and subsequent recorded plat that are based on a preliminary plat approved by the Planning Commission prior to the effective date of this Ordinance;
3. Any plat to be recorded based on a final plat approved by the Planning Commission prior to the effective date of this Ordinance; or
4. For a period of 90 days following the effective date of this Ordinance, any application for a subdivision plat or development plat whose applicant satisfactorily demonstrates to the Director of the Planning and Development

Department that the development plat or subdivision plat reflects a project for which design or engineering work resulting in the application had commenced and was in process prior to the effective date of this Ordinance. The Director of the Planning and Development Department, with the advice of the City Attorney, is hereby authorized to promulgate a form upon which an applicant can utilize the provisions of this paragraph.

Notwithstanding the foregoing, an applicant may withdraw any complete application for the approval of a subdivision plat or a development plat that has not been approved by the Director of the Planning and Development Department or the Planning Commission, as appropriate, before the effective date of this Ordinance and may resubmit the application after the effective date of this Ordinance without the requirement of paying any additional application fee. An applicant may withdraw any general plan, subdivision plat or development plat that would be subject to the provisions of this Section at any time and submit a new application for a general plan, subdivision plat or development plat after the effective date of this Ordinance.

With respect to a subdivision plat, the applicability of the former provisions of Chapter 42 as authorized by this Section shall continue until the earlier of the recordation of the subdivision plat for which the application was made or four years after the effective date of this Ordinance. With respect to a development plat, the applicability of the former provisions of Chapter 42 as authorized by this Section shall continue until the earlier of the issuance of the last building permit required for the project or two years after the effective date of this Ordinance if no building permit is issued within the two-year period.

Section 11. That the Director of the Department of Planning and Development is hereby required to evaluate the amendments effected by this Ordinance and to report the results of the evaluation to the Mayor and the City Council as soon as practicable after the first anniversary of the effective date of this Ordinance.

Section 12. That if any provision, section, subsection, sentence, clause or phrase of this Ordinance, or the application of same to any person or set of circumstances is for any reason held to be unconstitutional, void or invalid, the validity of the remaining portions of this Ordinance or their applicability to other persons or sets of circumstances shall not be affected thereby, it being the intent of the City Council in adopting this Ordinance that no portion hereof or provision or regulation contained herein shall become inoperative or fail by reason of any unconstitutionality, voidness or invalidity of any other portion hereof, and all provisions of this Ordinance are declared to be severable for that purpose.

Section 13. The City Council officially finds, determines, recites and declares that a sufficient written notice of the date, hour, place and subject of this meeting of the City Council was posted at a place convenient to the public at the City Hall of the City for the time required by law preceding this meeting, as required by the Open Meetings Law, Chapter 551, Texas Government Code Annotated; and that this meeting has been open to the public as required by law at all times during which this ordinance and the subject matter thereof has been discussed, considered and formally acted upon. The City Council further ratifies, approves and confirms such written notice and the contents and posting thereof.

Section 14. There exists a public emergency requiring that this Ordinance be passed finally on the date of its introduction as requested in writing by the Mayor; therefore,

this Ordinance shall be passed finally on that date and shall take effect at 12:01 a.m. on the 10th day next following the date of its passage and approval by the Mayor.

PASSED AND APPROVED this 24th day of March 1999


Mayor of the City of Houston

Prepared by Legal Dep't DEBORAH F. ALDRIDGE
DFM:dfm February 22, 1999 Senior Assistant City Attorney
Requested by Robert M. Litke, Director
Planning & Development Department
L.D. File No. 61-97044-01

| AYE | NO | |
|---------|---------|-----------------|
| ✓ | | MAYOR BROWN |
| •••• | •••• | COUNCIL MEMBERS |
| ✓ | | TATRO |
| ✓ | | YARBROUGH |
| ✓ | | WONG |
| ✓ | | BONEY |
| ✓ | | TODD |
| ✓ | | DRISCOLL |
| ✓ | | KELLEY |
| ✓ | | FRAGA |
| ✓ | | CASTILLO |
| ✓ | | PARKER |
| ✓ | | ROACH |
| | ✓ | SANCHEZ |
| ✓ | | BELL |
| ✓ | | ROBINSON |
| CAPTION | ADOPTED | |

CAPTION PUBLISHED IN DAILY COURT
REVIEW
DATE: MAR 30 1999

CITY OF HOUSTON

DESIGN MANUAL

CHAPTER 10

Street Paving Design Requirements

SEPTEMBER 1996

CHAPTER 10

Street Paving Design Requirements

PART 1 GENERAL

1.01 CHAPTER 10 INCLUDES

Geometric design guidelines for streets, criteria for street paving, and standard paving notes for drawing call outs.

1.02 REFERENCES

- A. AASHTO - American Association of State Highway and Transportation Officials
- B. ASTM - American Society for Testing and Materials

1.03 DEFINITIONS

- A. Geotechnical Engineer - An engineer certified by the American Association for Laboratory Accreditation (A2LA).
- B. HMAC - Hot Mix Asphaltic Concrete
- C. Curb and gutter sections - Full width concrete pavement with doweled on 6-inch curbs or monolithic curb and gutter sections for asphaltic concrete pavement. Curb and gutter sections require inlets and underground storm sewers.
- D. Roadside ditch sections - Ditch sections adjacent to either full width reinforced concrete pavement or asphaltic concrete pavement. Roadside ditch sections do not require underground storm sewers; however, the ditch sections must be designed to accommodate the storm runoff.

1.04 DESIGN REQUIREMENTS

The following design requirements are applicable to all pavements within City of Houston street rights-of-way:

- A. Width Requirements for Roadways - Refer to "Divided Roadway Cross Sections - Urban", and "Undivided Roadway Cross Sections - Urban", of the "Geometric Design Guidelines for Subdivision Streets" of this Chapter.

- B. Minimum Thickness and Reinforcement Requirements for Concrete Pavement: The following requirements are the minimum allowable. Pavement thickness and reinforcement shall be designed by a Professional Engineer based on a current soils analysis, roadway use, traffic loadings, and life span of the proposed pavement.
1. For pavement widths less than or equal to 27 feet face-to-face (F/F) of curb:
 - a. Minimum concrete slab thickness shall be 6 inches with $f_c' = 3,000$ psi. and reinforcement with $f_y = 60,000$ psi. Refer to standard drawings for reinforcement details. Expansion joints shall be placed at the end of each curb return and at a maximum spacing of 80 feet.
 - b. Minimum stabilized subgrade thickness shall be 6 inches.
 2. For major thoroughfares:
 - a. Minimum concrete slab thickness shall be 8 inches with $f_c' = 3,000$ psi. and reinforcement with $f_y = 60,000$ psi. Refer to standard drawings for reinforcement details. Expansion joints shall be placed at the end of each curb return and at a maximum spacing of 80 feet.
 - b. Minimum stabilized subgrade thickness shall be 6 inches.
 3. For all streets other than 1.04 B.1. and 1.04 B.2. given above (i.e., streets greater than 27 feet F/F of curb and not major thoroughfares):
 - a. Minimum concrete slab thickness shall be 7 inches with $f_c' = 3,000$ psi. and reinforcement with $f_y = 60,000$ psi. Refer to standard drawings for reinforcement details. Expansion joints shall be placed at the end of each curb return and at a maximum spacing of 80 feet.
 - b. Minimum stabilized subgrade thickness shall be 6 inches.
- C. Minimum Thickness of Asphaltic Concrete Pavement: Minimum thickness of HMAC surfacing and flexible base shall be as shown on standard drawings.
- D. Subgrade Treatment: Treatment of subgrade shall be determined by a Geotechnical Engineer. The Geotechnical Engineer shall base depth of subgrade stabilization on structural number (SN) in conjunction with flexible pavement thickness design.
- E. Requirements for Intersections, Turnouts, and Transitions:
1. At a "T" intersection with a street that has not been improved to its ultimate width, concrete pavement should be stopped either at the right-of-way line or the end of the curb return, whichever would require less concrete removal at a future date.
 2. For roadway turnouts placed at an existing cross street intersection, the turnout should be designed to fit the ultimate pavement width of the intersecting cross street and then transitioned to the existing roadway.
 3. The usual transition length for meeting a roadside ditch street is 50 feet for street widths less than or equal to 27 feet F/F of curb; 75 feet for 36 feet F/F of curb; and 100 feet for 40 feet F/F of curb.

- a. Transition sections for streets other than concrete shall consist of a minimum thickness of 1-1/2 inches of Type "D" HMA surfacing on a flexible base. Flexible base shall be a minimum thickness of 6 inches of HMA Base Course, 8 inches of crushed concrete, or 8 inches of cement stabilized shell. The subgrade shall be stabilized to a minimum thickness of 6 inches.
 - b. Transitions for concrete streets shall consist of concrete and equal the existing pavement thickness with a minimum thickness of 6 inches on 6 inches of stabilized subgrade.
 4. When meeting existing concrete streets at right angles, the existing street should be saw cut in a V shape extending from the curb returns to a point where the centerline of the proposed pavement intersects the quarter point of the existing concrete street to create a crowned intersection. In the event this construction creates a situation in which the traffic on the existing street, at design speed, will bottom out when crossing the proposed street intersection, a special design will be allowed to eliminate this dangerous condition.
- F. Requirements for Roadway Ditches
1. Ditch capacity shall be designed to handle stormwater runoff in accordance with Chapter 9, "Storm Drainage Design Requirements."
 2. Minimum ditch grades and maximum ditch side slopes shall conform to the requirements of Chapter 9, "Storm Drainage Design Requirements."
 4. Culverts shall be designed to accommodate the ditch flow and shall be constructed of reinforced concrete. Wall thickness shall be Wall B as given in ASTM C 76. Refer to standard drawings for minimum culvert size.
- G. Requirements for Roadways with Curb and Gutter Sections
1. Inlet spacing
 - a. City Funded Projects - Spacing shall be determined by Manning's Formula using parameters (e.g., limits of pavement flooding allowed, etc.) As specified by the City Engineer.
 - b. Non-City Funded Projects: The maximum allowable curb run to an inlet shall be as provided in Chapter 9 - Storm Drainage Design Requirements.
 2. Minimum grade line shall be 0.25 percent.
 3. Minimum grade line shall be 1 percent for radii of 35 feet or less around intersection turnouts. Grades for larger radii shall be determined on an individual basis.
 4. Vertical curves shall be installed when algebraic difference in grades exceed 1 percent. Elevations shall be shown at 10-foot intervals through vertical curves. Maintain a minimum of 0.03-foot elevation change at 10-foot intervals by altering the calculated elevations.

5. Radii around cul-de-sacs shall be 42 feet for single family areas and 50 feet for all others.
6. When a curb and gutter street intersects a drainage ditch, the gutter elevation shall be above the designed water surface elevation of the ditch.
7. Minimum grade line around a cul-de-sac shall be 0.60 percent.
8. Major thoroughfares shall be superelevated in accordance with recommendations of AASHTO.
9. Cross slopes for pavement shall be as shown on standard drawings. The minimum cross slope for left-turn lanes and esplanade openings shall be 1/8-inch per foot.
10. Minimum grade line around the longest radius on a L-Type street shall be 0.40 percent.
11. When meeting an existing curb and gutter street, top of curb elevations shall be designed to meet an elevation 6 inches above the existing gutter. At existing inlets, top of curb elevations shall be designed to match existing top of curb elevations.
12. When the curb grades are not established below the natural ground, fill lines shall be shown on the drawings and shall be of sufficient height to insure a minimum of 3/8-inch per foot transverse slope toward the curb from the property line between a point 2 feet outside the right-of-way line and the top of curb. If this type fill is required and the pavement is adjacent to a nonparticipating property owner, fill easements shall be obtained, filed, and a copy of the easements shall accompany the final drawings. Construction of this nature will require back-slope drainage design to prevent trapping storm runoff.
13. The maximum desirable tangent grade to vertical curves at railroad crossings is 8 percent for local streets and 3.5 percent for major thoroughfares.
14. All top of curb grades for the outside lanes shall be labeled except at railroad crossings where gutter grades shall be labeled. Centerline grades are acceptable for streets with roadside ditch sections.
15. Roadway grades at railroad crossings shall be 0 percent from the centerline of the track to 10 feet either side of the track's centerline, and should not cause a drop of more than 6-inches from the top of rail elevation at a distance of 30 feet either side of the track's centerline.
16. For concrete roadways, the roadway shall terminate at a railroad header, 6 feet from the centerline of the track and the roadway cross slope shall be zero from the railroad header to four feet before the railroad header.

H. Requirements for Inlets with Curb and Gutter Sections

1. City of Houston approved inlets shall be used on all curb and gutter sections within the city limits and the ETJ of the City.
2. Attempt to keep the proposed inlets away from esplanade openings and out of major thoroughfare intersections. For intersections between a major

thoroughfare and a minor street, locate the inlets at the end of return (E/R) of the side street.

3. Inlets shall be placed at the end of pavement in order to eliminate drainage from the pavement gutter into a roadside ditch.
 4. When curb and gutter streets connect to roadside ditch streets, place inlets at end of curb and gutter streets with reinforced concrete pipe stubs with ring grates to collect the ditch stormwater. See City of Houston Standard Drawing "Side Street Ditch Reception."
 5. Use only standard City of Houston cast iron grates for curb inlets.
- I. Requirements for Curbs, Sidewalks, and Driveways
1. Standard curb height is 6 inches.
 2. At railroad track approaches, decrease curbs from 6 inches to 0 inches in 2 feet.
 3. Reinforced concrete sidewalks and driveways shall be in accordance with City of Houston standard drawings.
 4. Reinforced concrete sidewalks in esplanades: Reinforced concrete sidewalks, 6 inches thick, shall be constructed in all esplanades when curbs are 10 feet F/F of curb and less in width with a minimum length of 6 feet measured from the face of curb of the esplanade nose. Reinforced concrete sidewalks in esplanades shall be colored black for concrete roadways and uncolored for asphaltic concrete roadways.
- J. Requirements for Thoroughfares
1. When the full section of a thoroughfare is located within the City limits and is dedicated on a final plat, the esplanade and all lanes of the thoroughfare shall be constructed at the time of initial construction of the roadway.
 2. If approved by the City Engineer, lanes contained within a plat, left-turn lanes and the esplanade to the center line of the right-of-way shall be constructed at the time of initial construction of the roadway when only one side of a thoroughfare is located on a final plat. The remaining lanes, left-turn lanes and esplanade shall be constructed at the time the final plat containing the opposite side of a half constructed thoroughfare is approved.
 3. Permanent barricades, conforming to the requirements of the Texas Manual of Uniform Traffic Control Devices, shall be constructed at the termination of lanes on partially constructed thoroughfares. The barricades shall contain a sign reading "FUTURE ROADWAY EXTENSION".
- k. Requirements for Miscellaneous Items
1. The type and depth of subgrade treatment shall be as determined by the Geotechnical Engineer.
 2. For all proposed driveways, call out centerline stations, widths, and radii.

3. Private streets should be treated as if they were driveways. See standard drawings for construction details for private street intersections and for driveways.
4. Paving headers shall be placed at the end of all concrete pavements.
5. All concrete to be removed shall be removed either to an existing joint or a sawed joint. The groove of the sawed joint shall be cut to a minimum depth of 2 inches along the line designated by the Professional Engineer.
6. Determine minimum vertical curve lengths based on AASHTO design criteria using a minimum design speed of 45 miles per hour for thoroughfares and collector streets and 35 mph for residential streets.
7. Standard City of Houston barricades shall be placed at the end of all dead-end streets not terminating in a cul-de-sac.
8. If discharging stormwater into a HCFCD ditch, HCFCD approval must be obtained before City approval.
9. A letter of agreement between the City and the pipeline company approving the construction plan crossing is required when paving is placed over a transmission pipeline.
10. When meeting existing concrete pavement, horizontal dowels shall be used if no exposed reinforcing steel exists. Horizontal dowels shall be Grade 60, # 6 bars, 24 inches long, drilled and embedded 8 inches into the center of the existing slab with "PO ROC" or approved equal. Dowels shall be 24 inches center to center, unless otherwise specified.
11. When concrete is removed for connection with proposed concrete pavement, the pavement shall be saw cut and existing concrete removed to expose a minimum of 15 inches of reinforcing steel. If no reinforcing steel exists, use horizontal dowels per Paragraph J.10 above.
12. Adjust existing manhole frames and covers within the limits of the proposed pavement to meet the proposed top of slab elevation.
13. Adjust existing manhole frames and covers outside the limits of the pavement to conform to the final grading plan.
14. Type 1 permanent access easement shall be designed according to public street standards as identified in this chapter.
15. Type 2 permanent access easement shall be designed to provide a turn-around in accordance with the geometric design guidelines in this chapter.

1.05 QUALITY ASSURANCE

- A. All construction drawings and specifications shall be prepared by or under the supervision of a Professional Engineer, and all documents shall be sealed, dated, and signed by the responsible Professional Engineer.
- B. All geotechnical work shall be performed by or under the supervision of a Professional Engineer. All reports and documents shall be sealed, dated, and signed by the responsible Professional Engineer.

PART 2 EXECUTION

2.01 DESIGN ANALYSIS

- A. Pavement thickness and reinforcement shall be designed by a Professional Engineer based on a current soils analysis, roadway use, traffic loadings, and life span of the proposed pavement.
- B. The number and location of storm sewer inlets shall be designed to accommodate stormwater runoff. A graphical plot and calculations of the hydraulic gradient shall be furnished by the design engineer. The hydraulic gradient shall be in accordance with Chapter 9, "Storm Drainage Design Requirements."
- C. Roadside ditch drainage and culverts shall be designed in accordance with Chapter 9, "Storm Drainage Design Requirements."

2.02 DRAWINGS


- A. Construction drawings shall be prepared in compliance with Chapter 3, "Graphic Requirements."

2.03 GEOMETRIC DESIGN GUIDELINES FOR SUBDIVISION STREETS, HARRIS COUNTY AND CITY OF HOUSTON.

GEOMETRIC DESIGN GUIDELINES FOR SUBDIVISION STREETS

HARRIS COUNTY
CITY OF HOUSTON

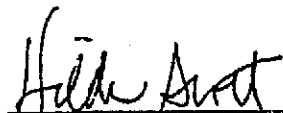
THE GUIDELINES IN THIS DOCUMENT ARE HEREBY APPROVED
AS BASIC REQUIREMENTS FOR FUTURE STREET PLANNING
AND DEVELOPMENT - DECEMBER 1998.



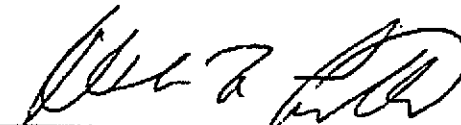
DIRECTOR
DEPARTMENT OF PUBLIC WORKS &
ENGINEERING, CITY OF HOUSTON



EXECUTIVE DIRECTOR
PUBLIC INFRASTRUCTURE DEPARTMENT,
HARRIS COUNTY



DEPUTY DIRECTOR
DEPARTMENT OF PUBLIC WORKS &
ENGINEERING, CITY OF HOUSTON



DIRECTOR
DEPARTMENT OF PLANNING & DEVELOPMENT
CITY OF HOUSTON

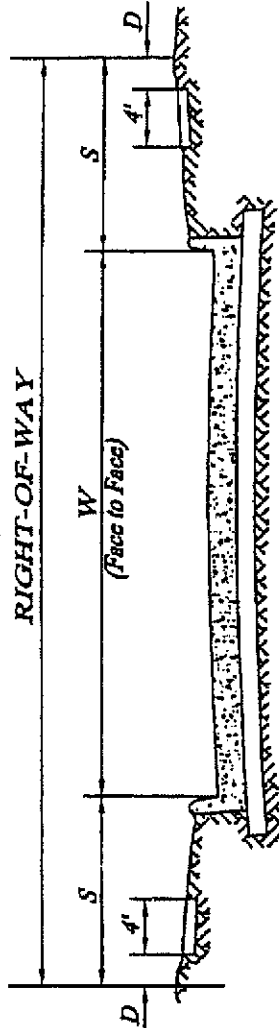
THE GUIDELINES PRESENTED IN THIS DOCUMENT INCLUDE THE MOST OFTEN REQUESTED INFORMATION REGARDING GEOMETRIC DESIGN OF SUBDIVISION STREETS. DESIGNATED MAJOR THOROUGHFARES¹, AND COLLECTOR STREETS¹ WITHIN SUBDIVISIONS, SHALL BE CONSIDERED FOR SPECIAL DESIGN FEATURES AND MAY REQUIRE HIGHER DESIGN CRITERIA THAN SHOWN HEREIN. ALSO, DESIGN FEATURES NOT SHOWN IN THESE GUIDELINES SHOULD BE CONSIDERED SPECIAL DESIGN FEATURES.

IT IS ADVISABLE TO CONSULT WITH THE APROPRIATE AGENCIES AND REVIEW THE MOST RECENT EDITION OF THE FOLLOWING PUBLICATIONS TO DETERMINE ADEQUATE THOROUGHFARE REQUIREMENTS AND SPECIAL DESIGN FEATURES.

- RECOMMENDED GUIDELINES FOR SUBDIVISION STREETS, INSTITUTE OF TRANSPORTATION ENGINEERS.
- GUIDELINES FOR URBAN MAJOR STREETS DESIGN, INSTITUTE OF TRANSPORTATION ENGINEERS.
- A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS.
- TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD), TEXAS DEPARTMENT OF TRANSPORTATION.

¹DESIGNATED ROADWAY APPEARING ON THE MAJOR THOROUGHFARE AND FREEWAY PLAN, HOUSTON CITY PLANNING COMMISSION.

UNDIVIDED ROADWAY CROSS SECTION-URBAN



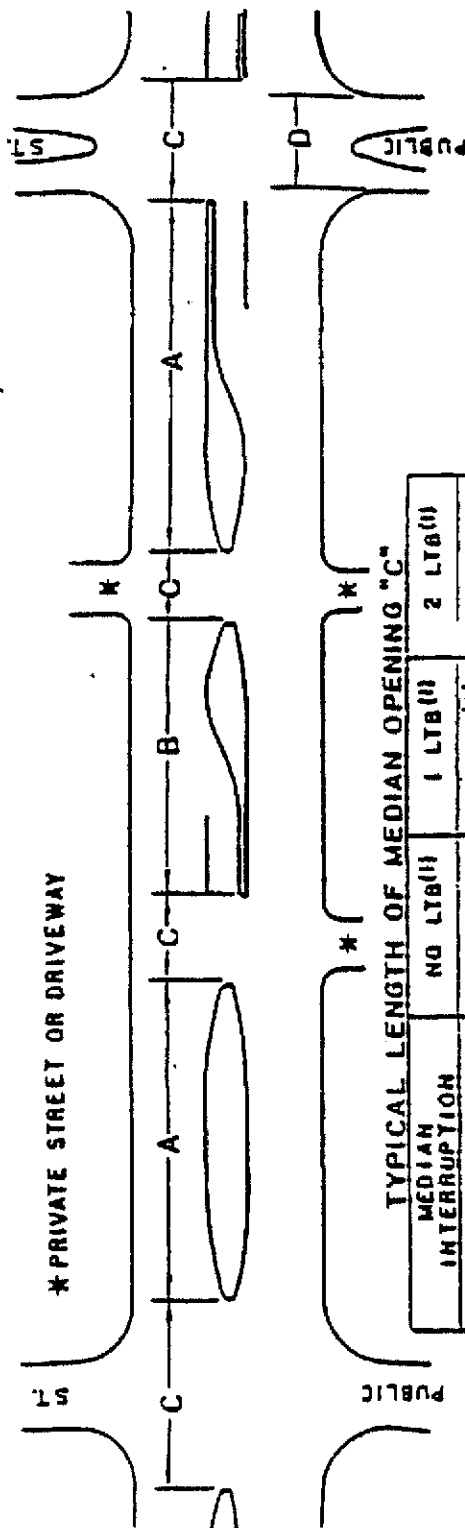
UNDIVIDED ROADWAY DIMENSIONS (In Feet)

| ABUTTING LAND USE | SINGLE FAMILY | | | ALL OTHER | |
|----------------------|---------------|-------------------|-------------------------|--------------------|--------------|
| | STANDARD LOT | (1)(5) LOT (2) | HIGH DENSITY LOT (2) | APT./ (3) COMM. | (4) MAJOR |
| R.O.W. | 50 | 60 | 55 | 60 | 60 |
| W | 27 | 27 | 36 | 40 | 44 |
| S | 11.5 | 16.5 | 9.5 | 10 | 8 |
| D | 2 | 2 | 2 | 2 | 1 |

NOTE: This design shows presence of typical curb and gutter and does not imply or recommend drainage design.

- (1) Standard lot: Lot widths 40 feet or greater along street right-of-way line.
- (2) High density lot: Lot widths less than 40 feet along street right-of-way line.
- (3) Apartment/commercial: Any property use other than single family.
- (4) Major: Any roadway within City of Houston designated as an express street on the major thoroughfare and freeway plan.
- (5) Width: 24' permissible for cul-de-sac length \leq 350'.

TYPICAL LENGTH OF MEDIAN AND MEDIAN OPENING



TYPICAL LENGTH OF MEDIAN OPENING "C"

| MEDIAN INTERRUPTION | NO LTB (1) | 1 LTB (1) | 2 LTB (1) |
|---------------------------------|------------|-----------|-----------|
| PRIVATE DRIVE | 45' | 52.5' (2) | 60' |
| UNDIVIDED STREET (40' - 44') | 45' | 52.5' (2) | 60' |
| DIVIDED STREET ALL | 0+10' | 0+10' | 0+10' |

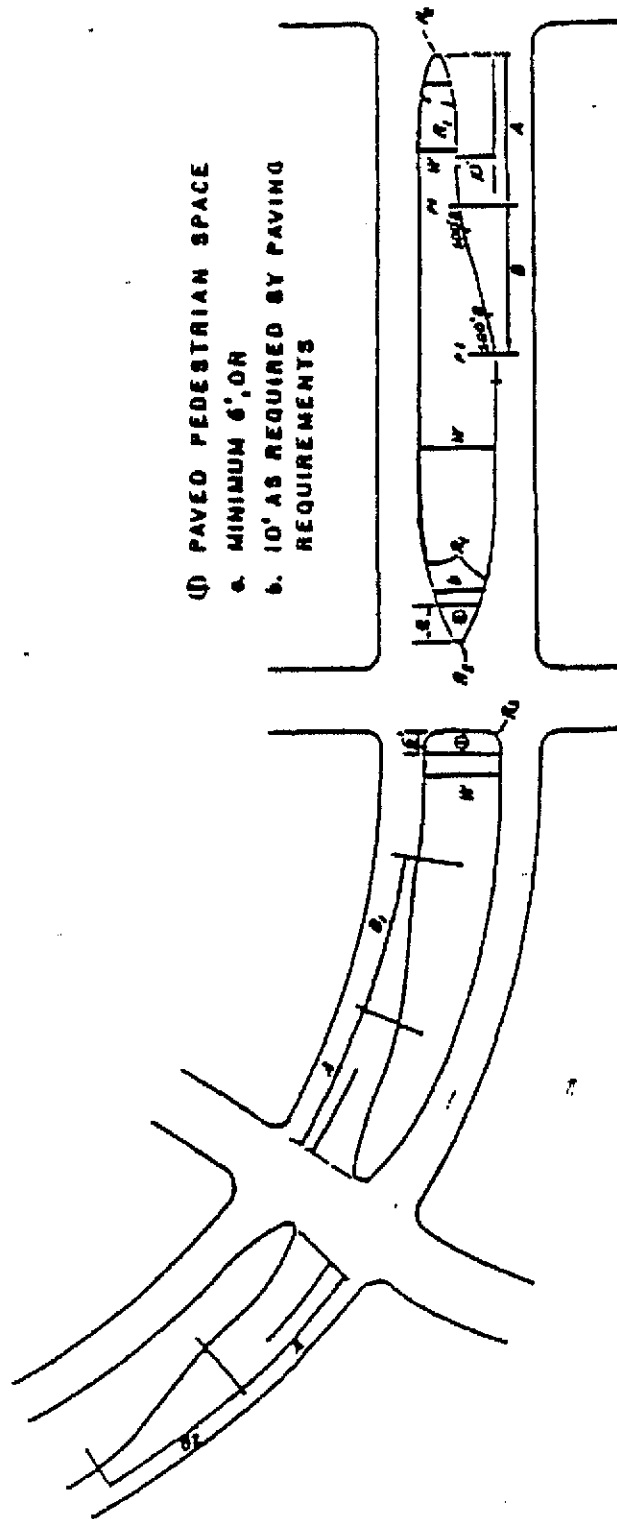
NOTES:

- (1) LEFT TURN BAY.
- (2) DISTANCE FROM CENTERLINE OF OPENING TO MEDIAN NOSE WITH LEFT TURN LANE MUST BE 30'.
- (3) SEE PAGE 9 FOR ROADWAY AND MEDIAN TAPENS
- (4) OPENING MAY BE ALLOWED, CONTACT HCD AND/OR DOT.

MINIMUM ACCEPTABLE MEDIAN LENGTH FOR TYPE OF STREET (3)

| IF PLANNED DIVIDED STREET IS: | PURPOSE OF MEDIAN INTERRUPTION | | | |
|-------------------------------|--------------------------------|----------------------|------------------|--------------------------------|
| | MAJOR STREET/THOROUGHFARE (A) | COLLECTOR STREET (A) | LOCAL STREET (A) | PRIVATE STREET OR DRIVEWAY (B) |
| MAJOR STREET/THOROUGHFARE | 350' | 300' | 300' (4) | (4) |
| COLLECTOR STREET | 300' | 250' | 250' | 250' |
| LOCAL STREET | 250' | 250' | 250' | 200' |

MEDIAN NOSE AND LEFT TURN BAY DESIGN



- (D) PAVED PEDESTRIAN SPACE
a. MINIMUM 6', OR
b. 10' AS REQUIRED BY PAVING REQUIREMENTS

LEFT TURN BAY DIMENSIONS

- A = 180° MINIMUM AT INTERSECTION OF TWO MAJOR STREETS.
B = 100° MINIMUM AT ALL OTHER INTERSECTIONS.
C = 100° MINIMUM ON STRAIGHT ROADWAY.
D = TAPER LENGTH; MAY BE SHORTER IF IT IS ON A HORIZONTAL CURVE TO THE LEFT.
E = TAPER LENGTH MAY BE LONGER IF CURVE IS TO THE RIGHT.
NOTE: DIMENSIONS MAY BE ADJUSTED AS DETERMINED BY ICED OR DOT.

MEDIAN DIMENSIONS

| W | R ₁ | R ₂ | R ₃ |
|------------|----------------|----------------|----------------|
| ≤ 8' | NONE | $\frac{W}{2}$ | NA |
| > 8' ≤ 36' | 90' | $\frac{W}{3}$ | NA |
| > 36' | NONE | NONE | 15' |

NA - NOT APPLICABLE

INTERSECTION CORNER CUTBACK AND CURB RETURN DESIGN

CURB RETURN REQUIREMENTS

RIGHT-OF-WAY CORNER CUTBACK REQUIREMENTS

| TYPE OF INTERSECTION | 90° | 85° - 90° | 80° - 85° |
|----------------------|-----|-----------|-----------|
| M - M | 30' | 35' | 35' |
| M - D | 30' | 35' | 35' |
| M - UD | 30' | 30' | 30' |
| M - UDR | 25' | 30' | 30' |
| D - D | 30' | 30' | 35' |
| D - UD | 30' | 30' | 35' |
| D - UDR | 25' | 30' | 30' |
| UD - UD | 25' | 30' | 30' |
| UD - UDR | 25' | 30' | 30' |
| UDR - UDR | 25' | 30' | 30' |

1. RIGHT ANGLE INTERSECTION - 25 FT. RADIUS.(*)

2. SKEWED ANGLE INTERSECTION:

ACUTE ANGLE - 25 FT. RADIUS.

OBTUSE ANGLE - 25 FT. RADIUS.(*)

(*) SKETCH SHOWS ACCEPTABLE 15' PROPERTY CUTBACK AS SUBSTITUTE FOR 25' RADIUS.

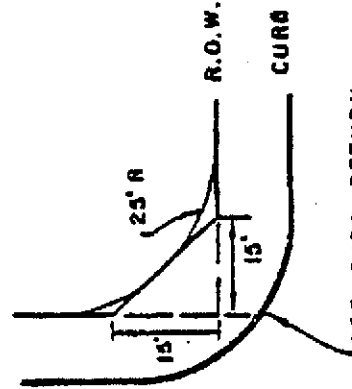
TYPE OF INTERSECTION:

M - DESIGNATED MAJOR THOROUGHFARES, DESIGNATED EXPRESS STREETS WITHIN CITY OF HOUSTON, AND FREEWAY SERVICE ROADS.

D - DIVIDED ROADWAYS OTHER THAN STREETS WITH MAJOR DESIGNATION (M).

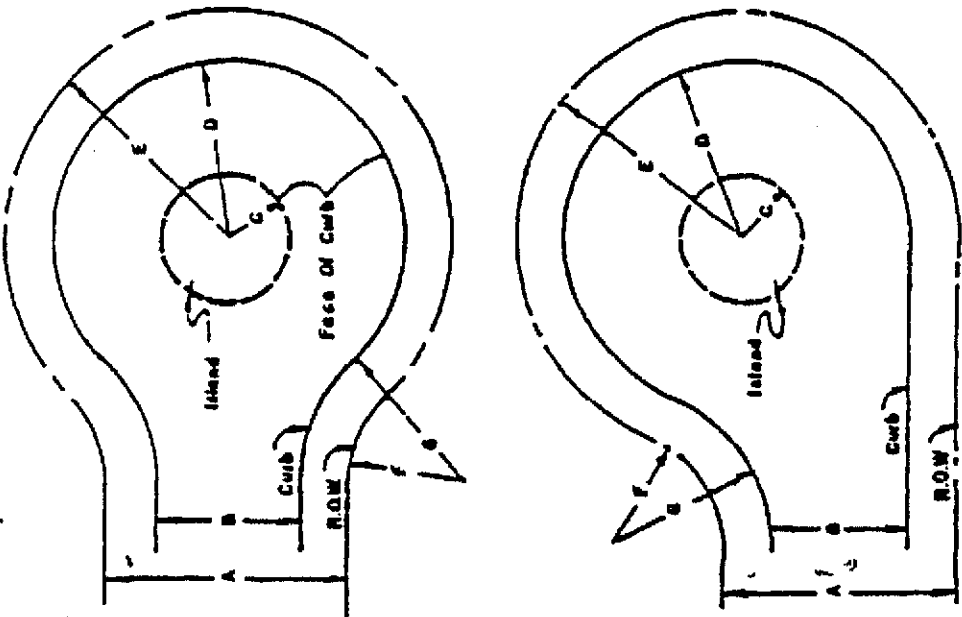
UD - UNDIVIDED ROADWAYS OTHER THAN SINGLE FAMILY RESIDENTIAL STREETS.

UDR - UNDIVIDED SINGLE FAMILY RESIDENTIAL ROADWAY.



SEE CURB RETURN REQUIREMENTS FOR CURB RETURN RADIUS

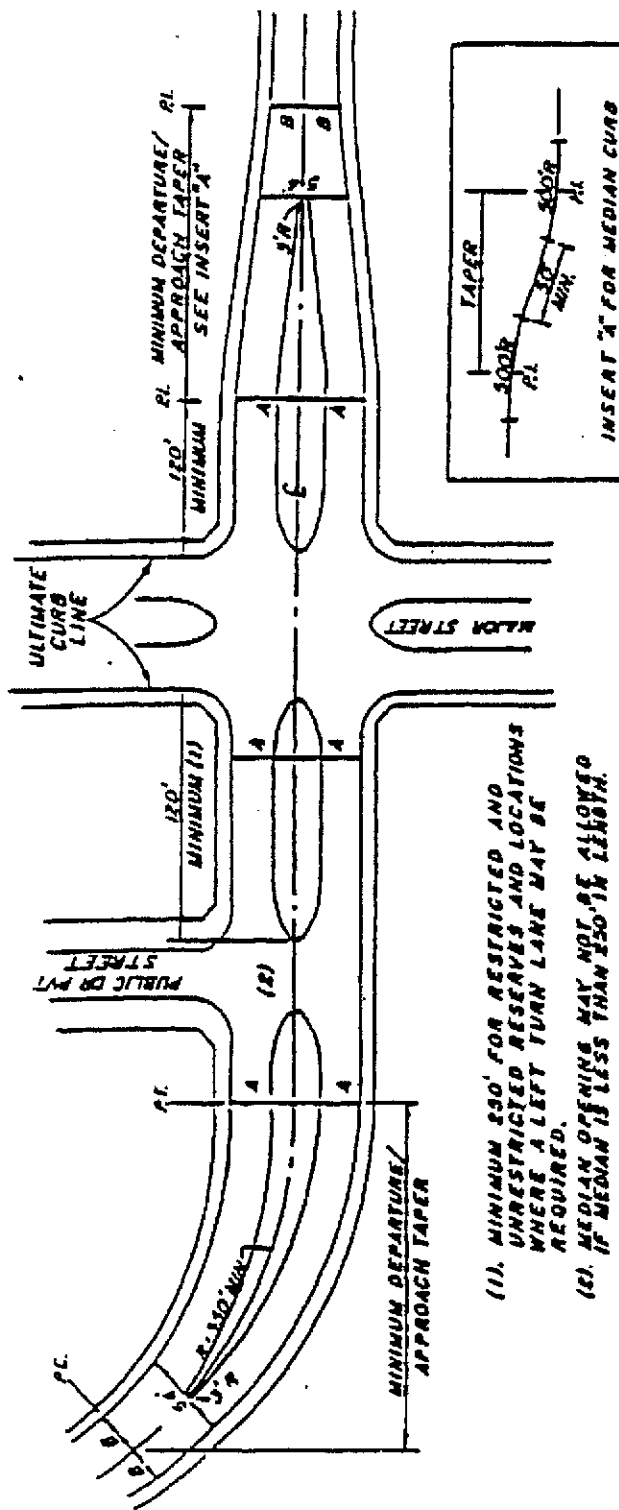
CUL-DE-SAC DESIGN FOR STREET TERMINATION



| | ABUTTING LAND USE | |
|---------|-------------------|-----------|
| | SINGLE FAMILY | ALL OTHER |
| A | ALL WIDTHS | 60' |
| B | ALL WIDTHS | 40' |
| C (MIN) | 0 | 0 |
| C (MAX) | 20' | 15' |
| D | 42' | 50' |
| E | 50' | 60' |
| F | 25' | 25' |
| G | 35' | 35' |

ALL DIMENSIONS MEASURED
IN FEET TO FACE OF CURB

ROADWAY TAPERS FOR SUBDIVISION STREETS



- (1). MINIMUM 250' FOR RESTRICTED AND UNRESTRICTED RESERVES AND LOCATIONS WHERE A LEFT TURN LANE MAY BE REQUIRED.
- (2). MEDIAN OPENING MAY NOT BE ALLOWED IF MEDIAN IS LESS THAN 150' IN LENGTH.

NOTE:

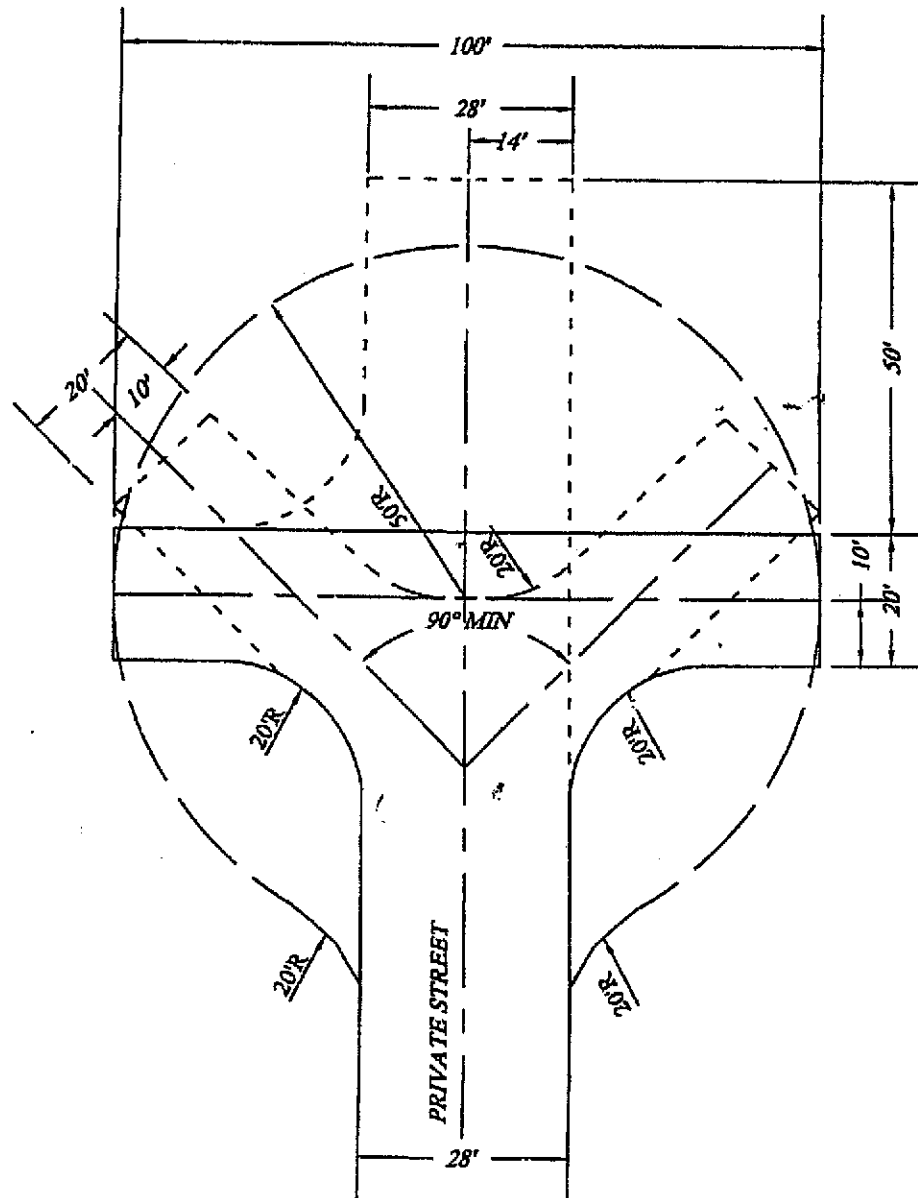
- a. APPROACH AND DEPARTURE TAPER REQUIREMENT:
 $L = \frac{W^3}{S^2}$ WHERE L = LENGTH IN FEET
 S = SPEED IN MPH.
 W = LATERAL OFFSET IN FEET
 $S = 30$ MPH. MINIMUM DESIGN SPEED FOR SUBDIVISION STREETS
 $W = A + B$
- b. 350' MINIMUM CENTERLINE RADIUS FOR HORIZONTAL CURVE WITH APPROACH OR DEPARTURE TAPERS

QUICK REFERENCE GUIDE

| ROADWAY CROSS SECTION (FEET) | | TAPER |
|------------------------------|-----|---------------------------------|
| A+B | B+B | $L = \frac{W^3}{S^2}$ (FEET) |
| 80 | 60 | 150 |
| 80 | 40 | 300 |
| 80 | 27 | 400 |
| 70 | 40 | 225 |
| 70 | 27 | 325 |
| 60 | 40 | 150 |
| 60 | 27 | 250 |
| 40 | 27 | 100 |

TYPE II PERMANENT ACCESS EASEMENT * - TERMINUS STANDARD

* As defined in
 Chapter 42 of
 The Code of Ordinances -
 most current edition.



2.04 STANDARD PAVING NOTES FOR DRAWING CALL OUTS

- A. The following notes or phrases are specific to paving improvements and may be included in all sets of construction drawings containing paving improvements. The plan and profile sheets may reference the notes or phrases in the plan view by note number as listed below:
1. Proposed concrete pipe stub with ring grate as shown on Standard Drawing - "Storm Sewer-Ring Grate for Open End of 18" to 72" RCP Stubs to Ditch", at a minimum of 0.5 feet below the existing ditch flow line. Realign ditch as directed by the Engineer.
 2. Proposed flexible base with 2-inch Hot Mix Asphaltic Concrete surfacing. Flexible base shall be 6-inches of Hot Mix Asphaltic Concrete base course, 8-inches of crushed concrete, or 8-inches of cement stabilized shell.
 3. Proposed sawed joint and expose 15-inches of reinforcing steel. If no reinforcing steel exists, use horizontal dowels per Note No. 11.
 4. Proposed esplanade curb.
 5. Proposed standard monolithic curb and gutter.
 6. Dowel on 6-inch curb after asphaltic surfacing is in place, or into existing concrete pavement as applicable.
 7. Rack over existing manhole to miss proposed curb, if conflict exists. Maximum rack of 1-inch per course of brick.
 8. Remove and replace sidewalk as directed by the Engineer.
 9. Proposed 1-inch board expansion or premolded non-extruding joint between walk and curb.
 10. Remove a sufficient length of concrete pipe, as determined by the Engineer, and connect to proposed inlet with reinforced concrete pipe of like diameter.
 11. Horizontal dowels shall be No. 6 bars, 24-inches long, drilled and embedded 8 inches into the center of the existing slab with "PO ROC" or equal. Dowels shall be 24 inches, center to center, unless otherwise specified.
 12. The contractor shall notify the City of Houston, Traffic Signal Division, ten working days in advance for relocation of existing traffic signal poles.
 13. Adjust existing inlet to fit new grade and alignment.
 14. Decrease curb exposure from 6-inches to 2-inches in 1 foot.
 15. Decrease curb exposure from 6-inches to 2-inches in 4 feet.
 16. Decrease curb exposure from 6-inches to 0-inches in 2 feet.
 17. Proposed reinforced concrete sidewalk shall be colored black for concrete roadways and uncolored for asphaltic concrete roadways.
 18. Riprap shall be placed on slopes and ditches as directed by the Engineer.
 19. Convert existing inlet or manhole with inlet top to manhole.
 20. Remove existing culvert.
 21. Remove and replace pipe culvert as directed by the Engineer.
 22. Existing structure to be removed.

23. Break into barrel of monolithic reinforced concrete storm sewer. Cost to be included in the unit price bid for storm sewer or lead as applicable.
24. Proposed doweled on 12-inch wide mountable curb.
25. Shaded area denotes approximate limits of proposed asphalt overlay.
26. Remove existing inlet. Plug and abandon lead.
27. Remove existing concrete pavement, concrete base, and/or cement stabilized shell base course with or without asphalt surfacing.
28. Proposed asphalt overlay.
29. Remove inlet and extend lead.
30. Meet existing curb or curb and gutter for grade and alignment.
31. Proposed wheelchair ramp, as shown on Standard Drawing - "Wheelchair Ramp Details".
32. Adjust existing manhole frame and cover to fit new grade.
33. Remove curb or curb and gutter as applicable.
34. Adjust existing water valve boxes to new paving grade. Replace all missing or damaged valve boxes and covers.
35. Replace Type "B" inlet with Type "BB" inlet or Type "C-1" inlet.
36. Remove mountable curb.
37. Proposed pavement markings as shown on Standard Drawing "Standard Pavement Marking".
38. Proposed white plastic marker as shown on Traffic and Transportation Drawing "Standard Elongated Word and Arrow Symbol Design Details for Pavement Markings".
39. Proposed plastic marker, as shown on Traffic and Transportation Drawing "Standard for Left Turn Channelization."
40. Proposed standard concrete paving header.

END OF CHAPTER

**CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS
AND ENGINEERING**

**DESIGN MANUAL
FOR
WASTEWATER COLLECTION SYSTEMS,
WATER LINES, STORM DRAINAGE, AND STREET PAVING**



JERRY KING, P.E.
Director

SEPTEMBER 1996*

* As amended December 1, 1998

CITY OF HOUSTON

INTEROFFICE CORRESPONDENCE

JERRY KING, P.E., DIRECTOR

Department of Public Works & Engineering

To Jerry King, P.E.
Director

From Hilda Garza Scott, P.E. Deputy Director
Capital Projects Division

Date November 30, 1998

Subject Design Manual Additions to
augment Chapter 42 amendments

The Department of Public Works and Engineering *Design Manual for Wastewater Collection Systems, Water Lines, Storm Drainage and Street Paving* is on schedule for it's yearly up-date in January. The Planning and Development Department has created a need for us to accelerate changes to Chapters 9 and 10 of the manual. We have addressed only their Chapter 42 references at this time. The established review timeline will remain.

I propose the following be approved and adopted as part of the *Design Manual for Wastewater Collection Systems, Water Lines, Storm Drainage and Street Paving* effective the date approved.

Chapter 9 - Storm Drainage Design Requirements

- 1.05.B.6.k All alleyway drainage, public or private, shall be conveyed to an inlet prior to entering the public street drainage system.

Chapter 10 - Street Paving Design Requirements

- 1.04.K.14. Type 1 permanent access easement shall be designed according to public street standards as identified in this chapter.
- 1.04.K.15. Type 2 permanent access easement shall be designed to provide a turn-around in accordance with the geometric design guidelines in this chapter.

Geometric Design Guidelines

Undivided Roadway Cross Sections - Urban (attached)

note (5) width - 24-feet permissible for cul-de-sac length less than or equal to 350 feet.

Type 2 Permanent Access Easement Terminus, Standard "(attached)

This is a new standard detail.

Approved: _____

Director

Date: _____

12/1/98

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CITY OF HOUSTON
DESIGN MANUAL

CHAPTER 1

General Procedure Requirements

SEPTEMBER 1996

CHAPTER 1

General Procedure Requirements

PART 1 GENERAL

1.01 CHAPTER INCLUDES

Research and submittal requirements for projects inside the city limits of Houston or within Houston's extraterritorial jurisdiction (ETJ).

1.02 REFERENCES

The following references should be reviewed in conjunction with this manual:

- A. City of Houston Flood-Prone Areas, Chapter 19 of the Code of Ordinances.
- B. City of Houston platting requirements as defined under Chapter 42 of the Code of Ordinances.
- C. City of Houston Standard Drawings.
- D. City of Houston Standard Specifications.
- E. Rules and Regulations published by Texas Natural Resource Conservation Commission (TNRCC) relating to drinking water (potable water) and wastewater.
- F. State of Texas Engineering Practice Act.
- G. State of Texas Professional Land Surveying Practices Act.
- H. Storm Water Management Handbook for Construction Activities, Latest Edition as Prepared by Harris County, Harris County Flood Control District (HCFCD), and City of Houston.
- I. Harris County Engineering Department's Rules and Regulations.

1.03 DEFINITIONS

- A. City Engineer - The authorized representative of the City, or his designated representative, having approval authority for privately-funded projects, or having authority for administration of design contracts for the City.
- B. Review Authorities - The authorized representatives of City departments, groups, divisions, or sections responsible for reviewing and approving

calculations and drawings for privately - funded projects and for design contracts with the City.

- C. Drawings - Plan, profile, detail, and other graphic sheets to be used in a construction contract which define the character and scope of the project.
- D. Design Analysis - Narratives and calculations necessary to support the design of the project.
- E. Professional Engineer - An engineer currently registered and in good standing with the State of Texas Board of Registration for Professional Engineers.
- F. Professional Land Surveyor - A surveyor currently registered and in good standing by the State of Texas Board of Professional Land Surveying.
- G. Specifications - Standard City of Houston specifications plus special narrative description specifications outlining specific procedures, requirements, and material for a particular project.

1.04 PLAT AND CONSTRUCTION DRAWING REVIEW PROCESS

- A. The review of plat and construction drawings by the Department of Public Works and Engineering is a required part of the overall platting process under the purview of the City Planning Commission and the Planning and Development Department of the City of Houston.
- B. The process to be followed in submitting documents for review and approval of water, wastewater, storm drainage and street paving is described by the flowchart depicted in Chapter 4 of this manual.
- C. Utility and paving construction in projects requiring subdivision plats is not permitted until the final plat has been released. Plat release by Department of Public Works and Engineering is signified by signature of the Director, or his designee, on the final construction drawings.
- D. Construction of utilities and paving in projects not requiring a subdivision plat is not permitted until the design drawings are approved and signed by the Director, Department of Public Works and Engineering, or his designee.
- E. The signature of the Director, Department of Public Works and Engineering, or his designee, on construction drawings for utilities which are intended to remain private, does not infer acceptance of the City for ownership or maintenance or operation of the facilities indicated on the drawings.

1.05 SUBMITTALS

A. General

1. The review of all construction drawings for both publicly-funded and privately-funded projects must initially be submitted to the Public Works and Engineering Plan Review Center for assignment of a log number before review will commence. The log number will remain in effect for one year.
2. Once a log number is assigned, all correspondence relating to that project must reference the log number.
3. Plan review application forms must be obtained and filled out for each review phase at the time the project is logged in. The same log number will be used for all review phases of each project unless the review of a subsequent phase is delayed by over one year.
4. Plan Review Center personnel will process all reviews through appropriate review sections in the Department of Public Works and Engineering.
5. In the event a project that had started the review process had become inactive for a period of 12 months from the date of the last correspondence, the project will be considered stopped, and the log number inactivated. Upon submittal of a document following the 12-month inactivity period, a new log number will be assigned and the review process re-initiated.
6. The City has a weekly one-day walk through procedure for the signature stage of small projects. Instruction sheets for this procedure can be obtained in the Plan Review Center.
7. Projects involving construction of privately owned facilities will still require review and approval of any connection to any public water, wastewater, or storm drainage facility or street using the process defined herein.

B. Preliminary Design

1. Privately-Funded Projects
 - a. Submit 3 sets of the preliminary overall design concept with supporting evidence as described in Section 2.0 of this chapter.
2. Design Contracts with the City
 - a. Submit documents in accordance with the requirements of the professional engineering services contract.

C. Final Design

1. Privately-Funded Projects
 - a. Submit 3 sets of the final design drawings with prints containing preliminary review comments.
 - b. For complex projects, it is recommended that a copy of the City review comments on the preliminary drawings be returned with the revised final design drawings.

2. Design Contracts with the City
 - a. Submit documents in accordance with the requirements of the professional engineering services contract.
 - b. Submit a copy of the City review comments on the preliminary drawings.
- D. Signature Stage
 1. Submit original tracings with prints containing previous review comments.
 2. If required by City, submit final design specifications for review.
 3. On City projects, submit final computer generated drawing files in acceptable electronic media including pertinent maps, right-of-way drawings, construction drawings, or other information pertinent to the specific project.

1.06 QUALITY ASSURANCE

- A. All surveying and platting must be accomplished under the direction of a Professional Surveyor.
- B. All recordable documents shall be sealed, signed, and dated by a Professional Surveyor.
- C. All calculations must be prepared by or under the direct supervision of a Professional Engineer trained and licensed in the disciplines required by the drawings.
- D. The final construction drawings must be sealed, signed, and dated by the Professional Engineer responsible for the development of the drawings.

PART 2 EXECUTION

2.01 RESEARCH REQUIREMENTS

- A. Discuss the concept of the project and research all existing utility and right-of-way information with the following City departments:
 1. Aviation Department
 2. Department of Public Works and Engineering
 - a. Engineering, Construction and Real Estate Group
 - (1) Water Engineering Section
 - (2) Storm Sewer Engineering Section
 - (3) Street and Bridge Engineering Section
 - (4) Wastewater Engineering Section
 - c. Maintenance and Right-of-Way Group
 - (1) Traffic Management and Maintenance Division
 - d. Public Utilities Group
 - (1) Utility Analysis Section
 3. Planning and Development Department

4. Parks and Recreation Department

- B. Research existing utilities and rights-of-way or easements for conflicts with the following public and private organizations:
1. Texas Department of Transportation
 2. Harris County Engineering Department
 3. Harris County Flood Control District
 4. Harris County Toll Road Authority
 5. Entex
 6. Houston Lighting and Power Company
 7. Southwestern Bell Telephone
 8. Cable Television and Data Companies
 9. Other Utility Companies
 - a. Utility Districts
 - b. Private Utilities/Franchises
 - c. Railroad Companies
 - d. Pipeline Companies
- C. Verify that no restrictions or conflicts exist that will prevent the approval and permitting of the project.

2.02 DESIGN REQUIREMENTS

- A. Preliminary Design
1. Privately-Funded Projects
 - a. Prior to preliminary design submittal, City reviewers are available to discuss alternate solutions for areas of the project where alternate designs may be considered.
 - b. Provide the City Engineer with drawings in sufficient detail to describe the proposed improvements. Include proposed materials, if different than approved City materials, and identify any problems or conflicts associated with the project. Information furnished must be in sufficient detail for the City Engineer to assess whether the design meets current City design standards.
 - c. Provide rights-of-way and easement requirements for the project.
 2. Design Contracts with the City
 - a. Participate in preliminary conferences with the City Engineer outlining the scope of work and extent of the preliminary report.
 - b. Prepare preliminary engineering studies and designs based upon the scope of work and as outlined in the professional engineering services contract with the City.
 - c. Prepare the contractual specified number of copies of preliminary layouts, sketches, reports, and calculations supporting the preliminary layouts. Prepare alternate solutions, where applicable to the project, with the engineer's specific recommendations.

- d. Prepare preliminary cost estimates for the primary and alternate solutions of the proposed construction.
- e. Participate in conferences with the City to determine the final design.
- f. When required by the professional services contract, provide detailed soils and geotechnical investigations to support the proposed construction of utilities and paving.
- g. Provide required real estate, rights-of-way, and easement requirements for the projects.

B. Final Design

1. Privately-Funded Projects

- a. Provide sufficient soils and geotechnical information to support the proposed construction of utilities and paving.
- b. Revise design to reflect comments of the City Engineer and review authorities. Include design calculations to support the proposed improvements.
- c. Provide review prints, along with the final design, to the City Engineer and review authorities for verification and compliance with review comments.
- d. Obtain required signatures from governmental agencies (other than the City of Houston) and all private utility companies prior to requesting final approval by the City.
- e. Include the following note on construction drawings - "Contractor shall notify the City of Houston, Department of Public Works and Engineering, Engineering Construction and Real Estate Group (telephone no. 754-0700) 48 hours before starting work on this project".

2. Design Contracts with the City

- a. Furnish City, where applicable, the engineering data necessary for applications for routine permits required by local, state, and federal authorities.
- b. Prepare detailed construction drawings and specifications in compliance with comments received from the City subsequent to the review of the preliminary design.
- c. Prepare detailed cost estimates and proposal forms for the authorized project.

C. Original Tracings

- 1. All approved drawings within the city limits will be assigned a City drawing number and must be filed in the City file room prior to issuance of a permit for construction. The tracings will become the property of the City and will remain on file in the file room for the use of any person who may be interested in the project.

END OF CHAPTER

CITY OF HOUSTON
DESIGN MANUAL

CHAPTER 2
Survey Requirements

SEPTEMBER 1996

CHAPTER 2

Survey Requirements

PART 1 GENERAL

1.01 CHAPTER INCLUDES

Suggested guidelines for use by engineers in development of construction drawings and rights-of-way maps inside the Houston City Limits and outside the Houston City Limits within the ETJ. Use of these guidelines is not a requirement for construction drawings where the City is not responsible for construction staking.

1.02 REFERENCES

A. Article IV, Chapter 33, City Surveys, of the Code of Ordinances.

1.03 DEFINITIONS

- A. Survey Field Books - shall be 7¼-inch by 4¾-inch bound standard engineer's field books for transit and level.
- B. Data Collection Base - shall be a database printout file reflecting station occupied, backsight, point number, angle, distance, elevations, and identification code; or station and offset left and right from a centerline or control line (transit, baseline, traverse, survey, etc.).
- C. City Surveyor - An authorized representative of the City having approval authority for privately-funded projects or having authority for administration of contracts for the City.

1.04 DESIGN REQUIREMENTS

- A. Adhere to these guidelines, where the City of Houston is responsible for construction staking.

1.05 SUBMITTALS

- A. For work performed through an engineering service contract with the City, deliver all field books and database printout files to the City Engineer. Photocopies or carbon copies of field books will not be acceptable. The field books and database printouts will be retained in the City's permanent files.

- B. For rights-of-way drawings identifying or describing the acquisition of new or additional rights-of-way, deliver all field books and database printout files to the City Surveyor or a designee of the City Surveyor. Additional documents to be submitted as follows:
 - 1. Overall map(s) of rights-of-way with individual drawings of parcels identified on overall maps. Map or drawing media shall be mylar or approved equal.
 - 2. Computer printouts of coordinate computations.
 - 3. Abstract information and copies of all instruments used (i.e., deed, etc.) in preparation of the rights-of-way map(s).

1.06 QUALITY ASSURANCE

- A. All field surveying and work used in the development of construction drawings, all calculations and preparation of rights-of-way map(s), and all field note descriptions shall be accomplished under the direct supervision of a Professional Surveyor.
- B. All surveys shall comply with the latest revision of the Professional Land Surveying Practice Act of the State of Texas.
- C. All field notes, descriptions and rights-of-way map(s) shall have the imprinted or embossed seal of the responsible Professional Surveyor and shall be dated and signed by the Professional Surveyor.

PART 2 EXECUTION

2.01 FIELD WORK

- A. For engineering contracts with the City, all field work shall be recorded in field books or on total station database printouts. Obtain a field book number from the Survey Section or City Engineer and record this identification in the title block on all sheets of the drawings.
- B. The control line must be monumented at its beginning, end, and at all angle points with markers of a permanent nature such as iron rods, spikes, or other lasting identification. Set swing ties for all monuments on the control line to allow easy recovery. Set markers at a maximum of 1,000 feet on all long lines.
- C. Make ties of the found right-of-way monuments and property corners to the control line according to the existing City of Houston survey system, as required by Article IV, Chapter 33, City Surveys, of the Code of Ordinances.

- D. Use city datum for elevations when available. Set temporary bench marks within 200 feet of the beginning and end of the project and at intervals not to exceed 1,000 feet throughout the project.
- E. Record the center lines and angles of intersections of side streets with the main roadway center line station.
- F. Record all topographic features within the public right-of-way, proposed right-of-way, any contiguous easements to the right-of-way, and any construction right-of-way of the project and on all intersecting streets for a distance of 20 feet beyond the intersection of the right-of-way lines. Identify all underground structures with size, depths, inlets—type and depth, manholes, and junction boxes.
- G. Cross sections shall be taken at intervals of 100 feet. For levels recorded in field books, record rod readings or elevations as numerator and distance right or left of the base or center line as the denominator. Data collector of a total station can be used to acquire necessary elevations at required interval. Record elevation of all driveways at intersection of driveway center line with existing or proposed right-of-way line.
- H. For acquisition of new or additional rights-of-way
 - 1. Tie all points of commencing (POCs) or points of beginning (POBs) for each parcel to the city survey monuments, if within 2,000 feet of the parcel. In the event any one parcel in the right-of-way is within 2,000 feet of a city monument, tie all parcels to the monument.
 - 2. For all projects more than 2,000 feet from a city survey monument, "Job Coordinates" will be permitted with the origin of coordinates shown and monumented on the map. The assumed coordinate system must leave no question as having any relationship to true "x," "y" using the Texas State Plane Coordinate System.
 - 3. Set iron rods or permanent markers at the intersections of the proposed right-of-way and property lines of all parcels to be acquired.
 - 4. Identify all monuments, corners, angle points, points of curve (PCs), points of intersection (PIs), points of tangency (PTs), and other points as either "found" or "set." Describe each point such as 3/8-inch iron rod, 3/4-inch iron pipe, Ford axle, concrete marker, disk, etc.
 - 5. Locate all improvements, buildings, fences, permanent signs, and other structures within the parcel or within 10 feet of the proposed right-of-way that will influence the value of the parcel to be acquired.

2.02 CALCULATIONS

- A. Calculate coordinates of proposed right-of-way parcels, control points, found or set monuments, curve data, lengths, stations and offsets to monuments, and

proposed improvement features. Calculate areas, cross sections, and volumes associated with construction drawings.

- B. Computer printouts of the coordinate calculations should be submitted to the City with field books and database printout files.

2.03 CONSTRUCTION DRAWINGS

- A. Found existing right-of-way monuments or property corners must be plainly shown on the drawings and located by station and distance, right or left from the control line; or construction center line. Monuments used to establish the control line must be identified as "Control Points," and their relationship to the construction center line and to the proposed or existing right-of-way lines must be shown. If the project is dimensioned from a control line which is different than the control line referenced in paragraph 2.01, it must be established and monumented in accordance with the requirements of paragraph 2.01.
- B. Show location and identification of existing City of Houston survey monuments, right-of-way monuments, and found property corners by station and distance, right or left of control line or center line. Show swing ties set for control or center line control.
- C. Show and identify location of the city datum monuments and temporary bench marks used for elevation control with year of the city datum.
- D. Show center line angles of intersection of side streets with main roadway center line. Where bearings are used, identify source of bearings and show bearings on both control line and project center line when they are not the same line.
- E. Identify locations of manholes, angle points, bends, etc. for proposed wastewater, storm sewers, water lines, and pavement features such as radius returns and center lines of boulevard openings, etc. Show relationship of proposed improvements to the right-of-way line.
- F. For bridges, overpasses and underpasses, show top of pavement at gutter line and center line for the following locations:
 - 1. Construction joints
 - 2. Armor or expansion joints
 - 3. At intervals between bents that correspond to the increments used for dead load deflection calculations.
- G. For bridges and grade separations, drawings must incorporate "Layout Sheets" which identify all proposed center line and curve information plus:
 - 1. Surface coordinates for control points so that an inverse between coordinates reflects a surface distance. Identify origin of coordinate system used.

2. Show coordinates of center line or control line at all PIs.
3. Show coordinates of all curb lines at their intersection with the center line of bents and abutments for irregular structures.

2.04 RIGHT-OF-WAY MAPS

- A. Show true "x," "y" values on all monuments based on the city survey control and the scale factor used to determine the "x," "y" values. All distances shown shall be surface distances and plainly marked "Map Distance." Show ties to the POC or POB of each right-of-way parcel from the city survey monuments using the Texas Plain Coordinate System bearings and surface distances.
- B. Where no city survey monuments exist within 2,000 feet of the project, "Job Coordinates," using surface or map distances may be used. Show location of monuments used as origin of job coordinates. The assumed coordinate values must leave no question as to their relationship with the true "x," "y" using the Texas State Plain Coordinate System.
- C. All distances on proposed right-of-way lines shall be continuous from beginning to end of the job. Show either straight line or arc distance across intersecting streets.
- D. Where a parcel is taken from a larger tract, show dimensions, distances, and area of the remainder of the tract based on recorded information.
- E. Identify the evidence used to decide the final placement or establishment of the proposed right-of-way line such as angle points, corner monuments, etc. as either "set" or "found." The description of each point used shall be shown on the drawing as identified in the field survey.
- F. Coordinate values of "x," "y" shall be shown for all PCs, PTs, and PIs of all curves on the proposed right-of-way lines.
- G. Coordinate values of "x," "y" must be given on the POB of at least one tract in each block. Where the proposed right-of-way is to be acquired from a large tract of land, coordinate values should be given for the POB of field note description of said tract.
- H. Other information to be shown on right-of-way maps:
 1. Improvements such as buildings, fences, permanent signs, and other structures located on the property or within 10 feet outside the right-of-way line that will influence the value of the parcel to be acquired.
 2. Abstract information used in preparation of the right-of-way map.
 3. Field book numbers obtained from the City Surveyor.

4. Real estate numbers obtained from the City Surveyor, right-of-way engineer, or Real Estate Division.

2.05 DOCUMENTS

- A. Where new construction will damage, destroy, or alter existing survey markers, include in specifications a requirement for installation of survey marker boxes by construction contractor; cost to be incidental to project. The City Surveyor will determine the number and location of boxes to be furnished and installed by the contractor.
- B. All maps and metes and bounds field notes shall have the Professional Surveyor's seal imprinted or embossed thereon and have his/her signature and date affixed to the instrument.

END OF CHAPTER

CITY OF HOUSTON

DESIGN MANUAL

CHAPTER 3

Graphic Requirements

SEPTEMBER 1996

CHAPTER 3

Graphic Requirements

PART 1 GENERAL

1.01 CHAPTER INCLUDES

Graphic requirements for construction drawings.

1.02 REFERENCES

- A. City of Houston monument ties in compliance with Article IV, Chapter 33, City Surveys, of the Code of Ordinances.

1.03 DEFINITIONS

- A. CADD (Computer Aided Drafting Design) - The preparation of documents utilizing computer facilities for the production of drawings, plans, prints, and other related documents.

1.04 DESIGN REQUIREMENTS

- A. Provide a cover sheet for all projects involving three or more design drawings (excluding standard City of Houston detail sheets). Plan sheet numbers shall be shown on the cover sheet or area key map. Include a vicinity map to identify project location.
- B. Drawings shall be prepared on 23" x 36" Federal Aid Sheets, 22" x 34" ANSI standard, or nominal 24" x 36" overall drawings, as appropriate.
- C. Show service area on cover sheet or area map.
- D. Final drawings shall be india ink on mylar, linen, or produced by CADD on mylar.
- E. Details of special structures (not covered by approved standard drawings, such as stream or gully crossings, special manholes, or junction boxes, etc.) shall be drawn with vertical and horizontal scales equal to each other.
- F. Each set of construction drawings shall contain paving and utility key drawings indexing specific plan and profile sheets. Standard City drawings, where

applicable, shall be included. All sheets shall have standard title blocks. Where applicable, show HCFC key drawings and numbers.

- G. Draw key overall layouts to a minimum scale $1" = 200'$.
- H. Plan stationing must run from left to right, except for short streets or lines originating from a major intersection, where the full length can be shown on one sheet.
- I. A north arrow is required on all sheets and should be oriented either toward the top or to the right. This requirement is waived under the following conditions:
 - 1. A storm or wastewater sewer whose flow is from the west to east or from south to north.
 - 2. A primary outfall ditch drainage facility whose flow is from west to east or from south to north.
 - 3. It is the intent of this requirement that all stationing should start from the cardinal points of the compass and proceed in the direction of construction.
- J. Standard scales permitted for plans and profiles of paving and utility construction drawings are as follows:
 - 1. Major thoroughfares, streets with esplanades over 400 feet in length, or special intersections/situations.
 $1" = 20'$ Horizontal, $1" = 2'$ Vertical
 - 2. Minor or residential single-family streets.
 $1" = 20'$ Horizontal, $1" = 2'$ Vertical
 $1" = 50'$ Horizontal, $1" = 5'$ Vertical, or
 $1" = 40'$ Horizontal, $1" = 4'$ Vertical
 - 3. Scales of Paragraph No. 2 above are minimum; larger scales may be used to show details of construction.
 - 4. Deviation of specified scales can only be permitted with the special approval of the project or section head.
- K. Show ties on drawings to the City of Houston monuments when applicable; otherwise, a statement shall be made on the cover sheet referencing control.
- L. Each sheet of the plan and profile shall have a bench-mark elevation and description defined.
- M. The seal, date, and original signature of the Professional Engineer responsible for the drawings shall be required on each sheet developed by the engineer. The engineer may use a stamped or embossed imprint for his/her seal; however, the embossed imprint must be shaded such that it will reproduce on prints.

- N. A copy of the final plat for new developments shall be included with the final drawings when submitted for final approval.
- O. If a roadway exists where drawings are being prepared to improve or construct new pavement or a utility, label the existing roadway width, surfacing type, and thickness, if available without destruction of pavement. Pavement thickness can be ascertained by coring with the core hole grout filled to protect pavement prior to construction.
- P. Show all street and/or road alignment on drawings.
- Q. Develop drawings to accurate scale showing proposed pavement, typical cross sections, details, lines and grade, and all existing topography within street right-of-way, and any easement contiguous with the right-of-way. At the intersection, the cross street details shall be shown at sufficient distance (20-foot minimum distance outside the primary roadway right-of-way) in each direction along cross street for designing adequate street crossings.
- R. Match lines between plan and profile sheets shall not be placed or shown within cross street intersections including cross street right-of-way.
- S. Natural ground profiles shall be shown as follows:
 - 1. For privately-funded projects, center line profiles are satisfactory except where a difference of 0.50 feet or more exists from one right-of-way or easement line to the other, in which case, dual profiles are required.
 - 2. For the City of Houston projects, provide natural ground profiles for each right-of-way line. Easement profiles shall conform to T-1 below.
- T. Basic plan and profile sheets shall contain the following information:
 - 1. Identify all lot lines, property lines, easements, rights-of-way, and HCFCF outfalls.
 - 2. Label each plan sheet as to street/easement widths, pavement widths, pavement thickness where applicable, type of roadway materials, curbs, intersection radii, curve data, stationing, existing utilities (type and location), and any other pertinent feature affecting design.
 - 3. Show all utility lines 4 inches in diameter or larger within the right-of-way or construction easement in profile view. Show all utility lines, regardless of size, in the plan view including fiber optic cables.
 - 4. Graphically, show flow line elevations and direction of flow for all existing ditches.
 - 5. Label proposed top of curb grades except at railroad crossings. Center line grades are acceptable only for paving without curb and gutters.
 - 6. Curb return elevations for turnouts shall show in profile.
 - 7. Gutter elevations are required for vertical curves, where a railroad track is crossed.

8. The center line elevation at the property line of all existing driveways shall be shown in profile.
9. Station all esplanade noses or the center line of all esplanade openings with esplanade width shown—both existing and proposed.
10. The design of both roadways is required on all paving sections with an esplanade.
11. Station all PCs, PTs, radius returns, and grade change PIs in plan view. Station all radius returns and grade change PIs in profile with their respective elevations.

PART 2 EXECUTION

2.01 GRAPHIC STANDARDS

- A. The following graphic standards for plan and profile shall apply to all drawings of 1" = 20' scale. For smaller scale drawings, use proportionally smaller line sizes.
- B. Existing Improvements - The following are standards to be adopted by all sections and designing personnel for existing improvements on all base drawings. Use all lower case letters with a No. 0 reprographic pen or equal line weight unless otherwise shown in the pen/line weight table. Smaller pen sizes for lettering may be used for clarity.

EXISTING IMPROVEMENTS.
PLAN VIEW

TEXT FOR EXISTING IMPROVEMENTS SHALL NOT BE SMALLER THAN 60 LEROY

| | | WT | LC |
|---------------------------|--|----|----|
| ROW LINE | | 3 | 0 |
| PROPERTY LINE | | 3 | 0 |
| THEORETICAL PROPERTY LINE | | 3 | 0 |
| LOT LINES | | 1 | 0 |
| EASEMENT LINE | | 0 | 2 |
| CENTER LINE OF ROW | | 0 | 4 |
| TRANSIT LINE | | 0 | 0 |
| EDGE OF DITCHES | | 0 | 0 |
| CENTER LINE OF DITCHES | | 0 | 2 |
| EDGE OF DITCHES | | 0 | 0 |
| FENCE LINE, WOOD | | 0 | 0 |
| FENCE LINE, CHAIN LINK | | 0 | 0 |
| FENCE LINE, BARBED WIRE | | 0 | 0 |
| FENCE LINE, HOG WIRE | | 0 | 0 |
| EDGE OF CONCRETE | | 0 | 0 |
| CURB LINE | | 0 | 0 |
| EDGE OF ASPHALT | | 0 | 0 |
| EDGE OF SHELL OR GRAVEL | | 0 | 2 |
| DIMENSION LINE | | 0 | 0 |
| HL&P AERIAL LINE | | 0 | 0 |
| HL&P UNDERGROUND LINE | | 0 | 6 |
| GAS LINE | | 0 | 1 |
| MISC UNDERGROUND LINES | | 0 | 8 |

| WT | K & E PEN NO | LINE WEIGHT/WIDTH | METRIC |
|----|--------------|-------------------|--------|
| 0 | 0 | 0.014" | 0.35mm |
| 1 | 1 | 0.020" | 0.50mm |
| 2 | 2 | 0.024" | 0.60mm |
| 3 | 3 | 0.031" | 0.80mm |
| 6 | 6 | 0.055" | 1.40mm |

LEGEND:

WT LINE WEIGHT
LC LINE CODE

EXISTING IMPROVEMENTS PLAN VIEW

TEXT FOR EXISTING IMPROVEMENTS SHALL NOT BE SMALLER THAN 60 LEROY

| | | WT | LC |
|--------------------------------------|--------------------|----|----|
| PIPELINE OR WESTERN UNION CONDUIT | (IDENTIFY CONDUIT) | 0 | 1 |
| SWBT CONDUIT | | 0 | 2 |
| CABLE TV | | 0 | 2 |
| MATCH LINE | | 3 | 0 |
| RAILROAD LINE | | 0 | 0 |
| WATER LINE | | 0 | 7 |
| WASTEWATER SEWER LINE | | 0 | 3 |
| STORM SEWER LINE | | 0 | 0 |
| IRON PIPE OR IRON ROD MONUMENTS | | 0 | 0 |
| POINT OF INTERSECTION (PI) | | 0 | 0 |
| POINT OF CURVE (PC) | | 0 | 0 |
| POINT OF TANGENCY (PT) | | 0 | 0 |
| POWER POLE | | 0 | 0 |
| POWER POLE W/DOWN GUY | | 0 | 0 |
| GAS METER | | 0 | 0 |
| GAS VALVE | | 0 | 0 |
| MISC UNDERGROUND PIPELINE LABEL | | 0 | 0 |

| WT | K & E PEN NO | LINE WEIGHT/WIDTH | METRIC |
|----|--------------|-------------------|--------|
| 0 | 0 | 0.014" | 0.35mm |
| 1 | 1 | 0.020" | 0.50mm |
| 2 | 2 | 0.024" | 0.60mm |
| 3 | 3 | 0.031" | 0.80mm |
| 6 | 6 | 0.055" | 1.40mm |


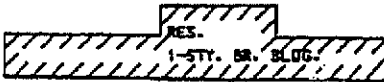
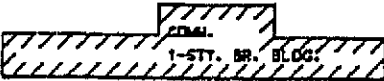



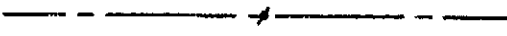







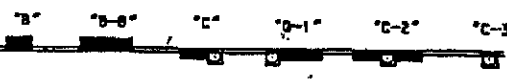


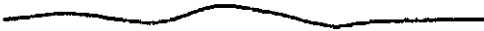
LEGEND:

WT LINE WEIGHT
LC LINE CODE

EXISTING IMPROVEMENTS

PLAN VIEW

TEXT FOR EXISTING IMPROVEMENTS SHALL NOT BE SMALLER THAN 60 LEROY

| KEY FOR EXISTING IMPROVEMENTS SHALL NOT BE SMALLER THAN 60' LENGTH | | WT | LC |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------|----|----|
| PAVING HEADER |  | 0 | 0 |
| BUILDING, RESIDENTIAL |  | 0 | 0 |
| BUILDING COMMERCIAL |  | 0 | 0 |
| TREE |  | 0 | 0 |
| HEDGE |  | 0 | 0 |
| WATER METER |  | 0 | 7 |
| WATER VALVE (GATE) |  | 0 | 7 |
| WATER VALVE (BUTTERFLY) |  | 0 | 7 |
| FIRE HYDRANT/FLUSHING VALVE |  | 0 | 7 |
| TAPPING SLEEVE & VALVE |  | 0 | 7 |
| REDUCER |  | | |
| ROUND CONNECTION |  | 0 | 7 |
| WASTE WATER SEWER CLEANOUT AND MANHOLE |  | 0 | 0 |
| STORM SEWER MANHOLE |  | 0 | 0 |
| STORM SEWER INLETS |  | | |
| CULVERT PIPE |  | 0 | 2 |
| TOP OF CURB OR GUTTER LINE ELEV. |  | 0 | 2 |
| CONTOUR LINE |  | 0 | 0 |

| WT | K & E PEN NO | LINE WEIGHT/WIDTH | METRIC |
|----|--------------|-------------------|--------|
| 0 | 0 | 0.014" | 0.35mm |
| 1 | 1 | 0.020" | 0.50mm |
| 2 | 2 | 0.024" | 0.60mm |
| 3 | 3 | 0.031" | 0.80mm |
| 6 | 6 | 0.055" | 1.40mm |

LEGEND:

WT LINE WEIGHT
LC LINE CODE

EXISTING IMPROVEMENTS PROFILE VIEW

TEXT FOR EXISTING IMPROVEMENTS SHALL NOT BE SMALLER THAN 60 LEADY

| | | WT | LC |
|-----------------------------|-------------------------------|----|----|
| NORTH OR EAST PROPERTY LINE | ----- | 1 | 5 |
| SOUTH OR WEST PROPERTY LINE | ----- | 1 | 6 |
| NORTH OR EAST CURB | ----- | 1 | 7 |
| SOUTH OR WEST CURB | ----- | 1 | 3 |
| NORTH OR EAST DITCH | ----- | 1 | 7 |
| SOUTH OR WEST DITCH | ----- | 1 | 3 |
| NORTH OR EAST CULVERT | [-----RCP-----] | 1 | 2 |
| SOUTH OR WEST CULVERT | [-----RCP-----] | 1 | 2 |
| CENTERLINE OF ROW | ----- | 1 | 0 |
| HL&P CONDUIT | [-----HL&P CONDUIT-----] | 1 | 6 |
| | | 1 | 0 |
| GAS LINE | [-----GAS LINE-----] | 1 | 1 |
| | | 1 | 0 |
| WESTERN UNION | [-----WESTERN UNION-----] | 1 | 1 |
| | | 1 | 0 |
| SWBT CONDUIT | [-----SWBT CONDUIT-----] | 1 | 2 |
| | | 1 | 0 |
| WATER LINE | [-----WATER LINE-----] | 1 | 7 |
| | | 1 | 0 |
| WASTEWATER SEWER LINE | [-----24" (AND SMALLER)-----] | 1 | 3 |
| | | 1 | 0 |
| | [-----30" (AND LARGER)-----] | 1 | 3 |
| | | 1 | 0 |
| STORM SEWER LINE | [-----24" (AND SMALLER)-----] | 1 | 0 |
| | | 1 | 0 |
| | [-----30" (AND LARGER)-----] | 1 | 0 |
| | | 1 | 0 |

| WT | K & E PEN NO | LINE WEIGHT/WIDTH | METRIC |
|----|--------------|-------------------|--------|
| 0 | 0 | 0.014" | 0.35mm |
| 1 | 1 | 0.020" | 0.50mm |
| 2 | 2 | 0.024" | 0.60mm |
| 3 | 3 | 0.031" | 0.80mm |
| 6 | 6 | 0.055" | 1.40mm |

LEGEND:

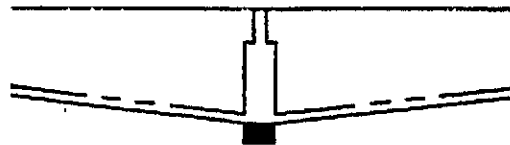
WT LINE WEIGHT
LC LINE CODE

EXISTING IMPROVEMENTS PROFILE VIEW

TEXT FOR EXISTING IMPROVEMENTS SHALL NOT BE SMALLER THAN 60 LEADY

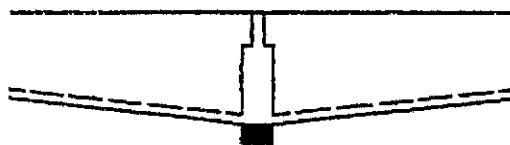
WT LC

HL&P MANHOLE

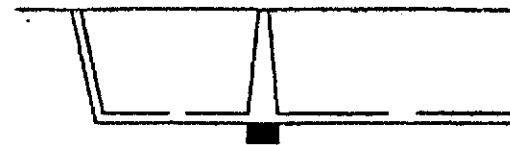


1 6

SWBT MANHOLE



1 2

SANITARY SEWER MANHOLE
& CLEANOUT

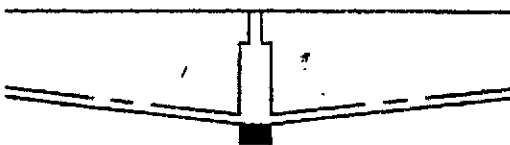
1 3

STORM SEWER MANHOLE



1 0

WATER LINE MANHOLE



1 7

| WT | K & E PEN NO | LINE WEIGHT/WIDTH | METRIC |
|----|--------------|-------------------|--------|
| 0 | 0 | 0.014" | 0.35mm |
| 1 | 1 | 0.020" | 0.50mm |
| 2 | 2 | 0.024" | 0.60mm |
| 3 | 3 | 0.031" | 0.80mm |
| 6 | 6 | 0.055" | 1.40mm |

LEGEND:

WT LINE WEIGHT
LC LINE CODE

- C. Proposed Improvements - The following are standards to be adopted by all sections and designing personnel for proposed improvements on all base drawings. Use all upper case letters with a No. 3 reprographic pen or equal line weight unless shown otherwise in the pen/line weight table. Smaller pen sizes for lettering may be used for clarity.

PROPOSED IMPROVEMENTS - WATER LINES PLAN VIEW

TEXT FOR PROPOSED IMPROVEMENTS SHALL NOT BE SMALLER THAN 100 LEROY

| | | WT | LC |
|-----------------------------|-------------------|----|----|
| WATER LINE | 24" (AND SMALLER) | 3 | 7 |
| | 30" (AND LARGER) | 3 | 7 |
| WATER VALVE (GATE) | WV | 3 | 7 |
| WATER VALVE (BUTTERFLY) | BFV | 3 | 7 |
| TAPPING SLEEVE & VALVE | TS&V | 3 | 7 |
| FIRE HYDRANT/FLUSHING VALVE | FHT/FV | 3 | 7 |
| | WV | 3 | 7 |
| REDUCER | 12" 8" | 3 | 7 |
| ROUND CONNECTION | | 3 | 7 |

PROPOSED IMPROVEMENTS - WATER LINES PROFILE VIEW

TEXT FOR PROPOSED IMPROVEMENTS SHALL NOT BE SMALLER THAN 100 LEROY

| | | WT | LC |
|------------|-----------|----|----|
| WATER LINE | ALL SIZES | 3 | 7 |
| | | 3 | 0 |




| WT | K & E PEN NO | LINE WEIGHT/WIDTH | METRIC |
|----|--------------|-------------------|--------|
| 0 | 0 | 0.014" | 0.35mm |
| 1 | 1 | 0.020" | 0.50mm |
| 2 | 2 | 0.024" | 0.60mm |
| 3 | 3 | 0.031" | 0.80mm |
| 6 | 6 | 0.055" | 1.40mm |

LEGEND:

 WT LINE WEIGHT
 LC LINE CODE

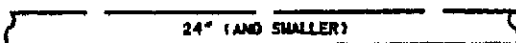
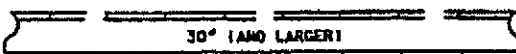

PROPOSED IMPROVEMENTS - SANITARY SEWER LINES PLAN VIEW

TEXT FOR PROPOSED IMPROVEMENTS SHALL NOT BE SMALLER THAN 100 LEROY

| | | WT | LC |
|---------------------|------------------------------------------------------------------------------------|----|----|
| | 24" (AND SMALLER) | | |
| |  | 3 | 3 |
| SANITARY SEWER LINE | | | |
| | 30" (AND LARGER) | | |
| |  | 3 | 3 |
| | | | |
| MANHOLE |  | 3 | 3 |

PROPOSED IMPROVEMENTS - SANITARY SEWER LINES PROFILE VIEW

TEXT FOR PROPOSED IMPROVEMENTS SHALL NOT BE SMALLER THAN 100 LEROY

| | | WT | LC |
|---------------------|--------------------------------------------------------------------------------------|----|----|
| | 24" (AND SMALLER) | | |
| |  | 3 | 3 |
| | | 3 | 0 |
| SANITARY SEWER LINE | | | |
| | 30" (AND LARGER) | | |
| |  | 3 | 3 |
| | | 3 | 0 |
| | | | |
| MANHOLE |  | 3 | 3 |
| | | 3 | 0 |


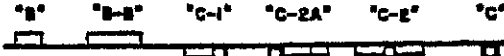
| WT | K & E PEN NO | LINE WEIGHT/WIDTH | METRIC |
|----|--------------|-------------------|--------|
| 0 | 0 | 0.014" | 0.35mm |
| 1 | 1 | 0.020" | 0.50mm |
| 2 | 2 | 0.024" | 0.60mm |
| 3 | 3 | 0.031" | 0.80mm |
| 6 | 6 | 0.055" | 1.40mm |

LEGEND:

WT LINE WEIGHT
LC LINE CODE

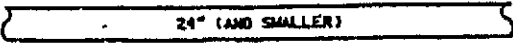

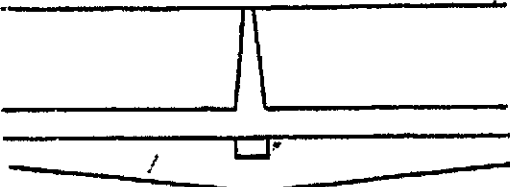
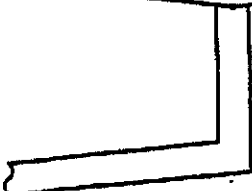
PROPOSED IMPROVEMENTS - STORM SEWER LINES PLAN VIEW

TEXT FOR PROPOSED IMPROVEMENTS SHALL NOT BE SMALLER THAN 100 LEROY

| | | WT | LC |
|-------------------|------------------------------------------------------------------------------------|----|----|
| STORM SEWER LINES | 24" (AND SMALLER) | 3 | 0 |
| | 30" (AND LARGER) | 3 | 0 |
| MANHOLE |  | 3 | 0 |
| INLETS |  | 3 | 0 |

PROPOSED IMPROVEMENTS - STORM SEWER LINES PROFILE VIEW

TEXT FOR PROPOSED IMPROVEMENTS SHALL NOT BE SMALLER THAN 100 LEROY

| | | WT | LC |
|-------------------|--------------------------------------------------------------------------------------|----|----|
| STORM SEWER LINES |  | 3 | 0 |
| |  | 3 | 0 |
| MANHOLE |  | 3 | 0 |
| INLETS |  | 3 | 0 |



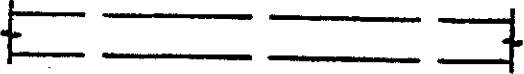
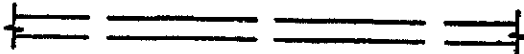
| WT | K & E PEN NO | LINE WEIGHT/WIDTH | METRIC |
|----|--------------|-------------------|--------|
| 0 | 0 | 0.014" | 0.35mm |
| 1 | 1 | 0.020" | 0.50mm |
| 2 | 2 | 0.024" | 0.60mm |
| 3 | 3 | 0.031" | 0.80mm |
| 6 | 6 | 0.055" | 1.40mm |

LEGEND:

WT LINE WEIGHT
LC LINE CODE

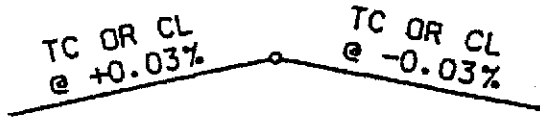
PROPOSED IMPROVEMENTS - PAVEMENTS PLAN VIEW

TEXT FOR PROPOSED IMPROVEMENTS SHALL NOT BE SMALLER THAN 100 LEROY

| | | WT | LC |
|-----------------------------------------|------------------------------------------------------------------------------------|-------------|-------------|
| FACE OF CURB |  | 6 | 3 |
| EDGE OF PAVEMENT |  | 6 | 0 |
| CONCRETE WALK |  | 3 2 3 | 3 0 3 |
| CONCRETE HEADER |  | 3 | 3 |
| TOP OF CURB OR GUTTER LINE ELEVATION | <div>TC=76.56</div> <div>G=76.06</div> | 2 | 0 |

PROPOSED IMPROVEMENTS - PAVEMENTS PROFILE VIEW

TEXT FOR PROPOSED IMPROVEMENTS SHALL NOT BE SMALLER THAN 100 LEROY

| | | WT | LC |
|----------------------------------------------------------|--------------------------------------------------------------------------------------|--------|--------|
| TOP OF CURB OR CENTERLINE FOR OPEN DITCH PAVING |  | 2 3 | 3 0 |

| WT | K & E PEN NO | LINE WEIGHT/WIDTH | METRIC |
|----|--------------|-------------------|--------|
| 0 | 0 | 0.014" | 0.35mm |
| 1 | 1 | 0.020" | 0.50mm |
| 2 | 2 | 0.024" | 0.60mm |
| 3 | 3 | 0.031" | 0.80mm |
| 6 | 6 | 0.055" | 1.40mm |

LEGEND:
 WT LINE WEIGHT
 LC LINE CODE

LINE CODE DEFINITIONS ALL LENGTHS IN INCHES

SOLID LINE

LINE CODE "0" 

.1" LINE, .08" SPACE, .025" LINE, .025" SPACE, .025" LINE, .025" SPACE, .025" LINE, .08" SPACE, .1" LINE

LINE CODE "1" 

.1675" LINE, .08" SPACE, .1675" LINE

LINE CODE "2" 

.1" LINE, .125" SPACE, .1" LINE

LINE CODE "3" 

1.25" LINE, .125" SPACE, .030" LINE, .125" SPACE, 1.25" LINE

LINE CODE "4" 

.1" LINE, .1" SPACE, .1" LINE, .1" SPACE, .1" LINE, .1" SPACE, .1" LINE, .1" SPACE, .1" LINE

LINE CODE "5" 


.1" LINE, .1" SPACE, .1" LINE, .1" SPACE, .1" LINE, .1" SPACE, .1" LINE

LINE CODE "6" 

.1" LINE, .1" SPACE, .1" LINE, .1" SPACE, .1" LINE

LINE CODE "7" 

.1" LINE, .2" SPACE, .1" LINE

LINE CODE "8" 

CITY OF HOUSTON
DESIGN MANUAL

CHAPTER 4
Platting Requirements

SEPTEMBER 1996

CHAPTER 4

Platting Requirements

PART 1 GENERAL

1.01 CHAPTER INCLUDES

Coordination of platting requirements with the preparation and review and approval processing of project drawings and specifications.

1.02 GENERAL PLATTING REQUIREMENTS

- A. Refer to the attached flow chart entitled "City of Houston Department of Public Works and Engineering, Plat and Construction Drawing Review and Approval Process" for the process in which plats and related documents are submitted, reviewed, and approved by the Department of Public Works and Engineering.
- B. Platting requirements are found in Chapter 42 of the Code of Ordinances.
- C. All plats submitted to the Planning and Development Department will be routed to Department of Public Works and Engineering for review.
- D. Construction plans (when required) shall be submitted to Department of Public Works and Engineering with the name of the proposed plat clearly identified on the cover sheet of the plans.
- E. Planning and Development Department may record plats after Department of Public Works and Engineering approval of construction drawings.
- F. Planning and Development Department may sign construction drawings prior to plat recordation.

1.03 DESIGN REQUIREMENTS

A. Preliminary Plat

- 1. The level of investigation to be performed for a preliminary plat is to identify major development impediments to the water, wastewater collection and treatment, or storm drainage system that are primarily the result of constraints external to the plat itself. Such constraints include, but are not limited to
 - a. Water Lines
 - (1) Long dead-end water lines.
 - (2) Single feed water lines.
 - (3) Capacity and pressures to site may be a problem.

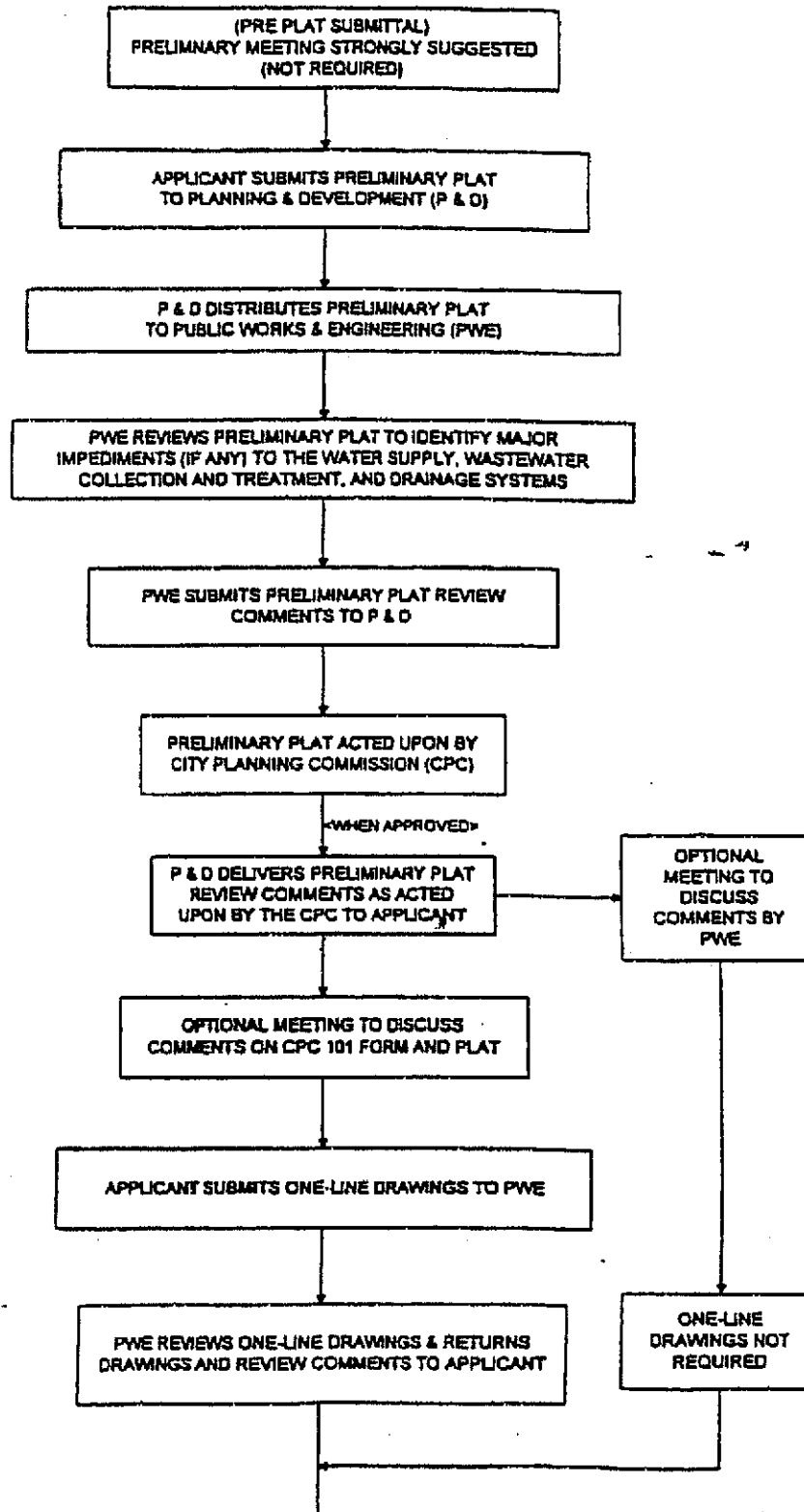
- (4) City intends to construct major facilities that will impact the site.
 - b. Wastewater Collection System
 - (1) Inadequate right-of-way or wastewater easements.
 - (2) Limited wastewater service capacity for the area.
 - (3) City intends to construct major facilities that will impact the site.
 - c. Storm Drainage System
 - (1) Drainage outfall severely under capacity.
 - (2) Encroachment into flood-prone areas or floodway.
 - (3) Storm water detention or diversions of watershed drainage that impact the property.
 - (4) City intends to construct major facilities that will impact the site.
 2. Department of Public Works and Engineering will review all preliminary plats and take one or more of the following actions.
 - a. Pose no objection to the plat.
 - b. Request a meeting with the applicant to discuss design and construction requirements,
 - c. Request specific additional information, easements, or improvements to the plat or the land within the purview of the department, or
 - d. Request one-line drawings be submitted prior to detailed Engineering Drawings and final plat submittal.
 3. Approval of a preliminary plat by Department of Public Works and Engineering does not infer approval of proposed infrastructure. Review of infrastructure will take place upon submittal of one-line drawings, if required, which may occur after preliminary plat approval and must occur prior to final plat approval.
- B. Final Plat
 1. Department of Public Works and Engineering will review all final plats and required construction drawings, easement documents, and other data.
 2. Compliance with standards contained in this Design Manual.
 3. Adequacy of service availabilities for
 - a. Water,
 - b. Wastewater, and
 - c. Storm sewer or storm water detention.
 4. Other Department of Public Works and Engineering Standards.
- C. Comments resulting from subparagraphs A and B of this section will be reported to Planning and Development Department for inclusion in the CPC Form 101.

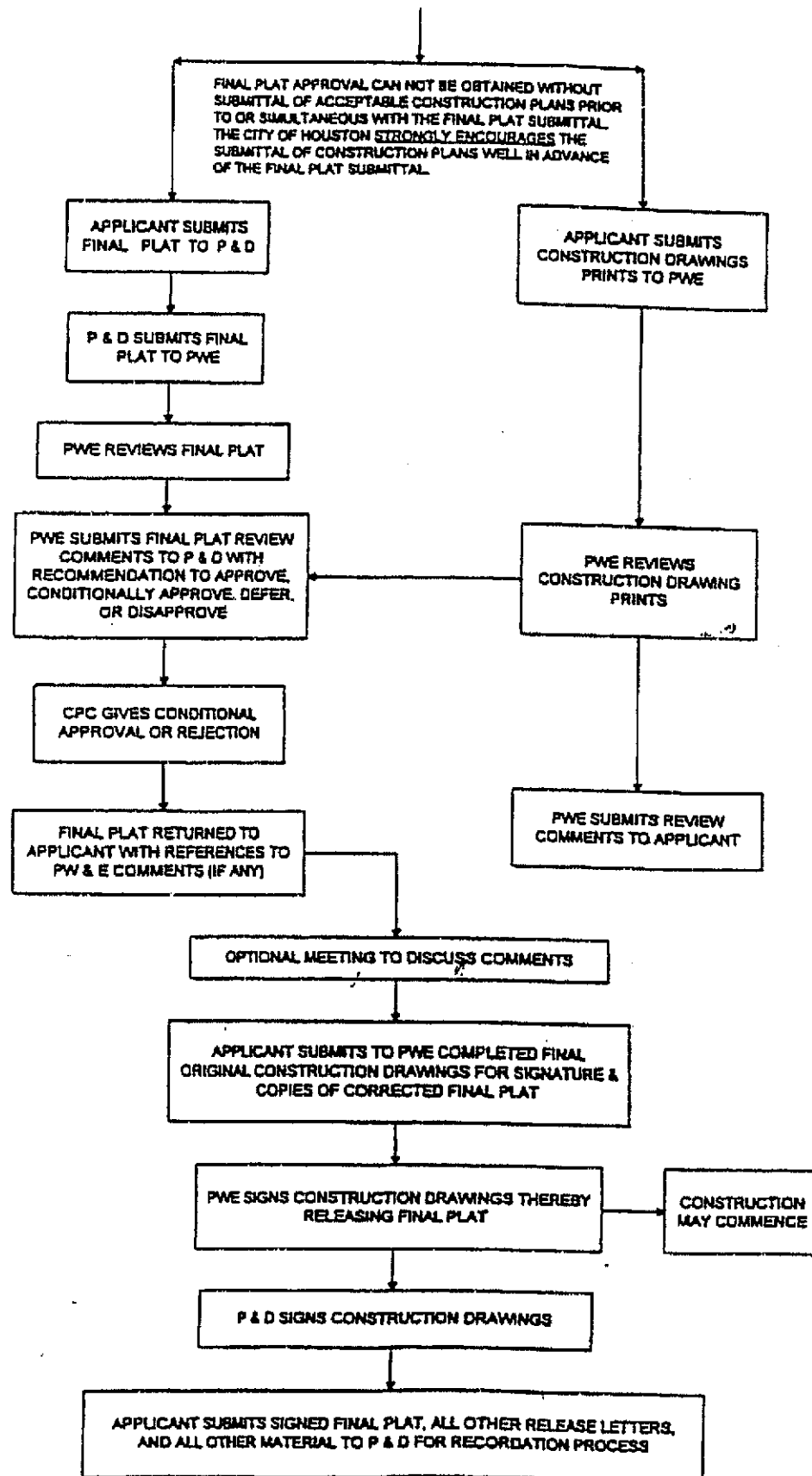
PART 2 EXECUTION

2.01 DESIGN ANALYSIS

- A. For plats of land located inside the city limits, review of construction plans and other documents required by Department of Public Works and Engineering for final plat approval will address the following:
 - 1. Resolution of conflicts with existing and proposed utilities.
 - 2. Layout of water lines shall be such that maximum circulation of water will be maintained. The pattern shall allow at least two sources of water to be constructed within the public right-of-way or permanent easement. Side lot easements shall meet the requirements of Chapters 5 and 7.
 - 3. Adequacy of capacity in water and wastewater facilities to be utilized. The City may require a current letter of utility commitment prior to the approval of a plat.
 - 4. Adequacy of drainage facilities.
 - 5. Sizing and identification/designation of easements within the plat and required easements outside the plat boundary.
 - 6. Recordation of required off-site easements or lift station sites, their depiction on the plat, and submittal to the City of record documents.
- B. For plats of land located outside the city limits, review of construction plans and other documents required by Department of Public Works and Engineering for final plat approval will address all of the above plus the following:
 - 1. When appropriate, a letter from the municipal utility district's president or board or from the property owner stating that all off-site easements that are not immediately obtainable (for example: those crossing fee strips, rail roads, or other areas under eminent domain) are in progress and that it is the intention of the municipal utility district or property owner to complete the acquisition of such easements. The letter will be accompanied by a certified survey plat and legal description of such easements.
 - 2. That all separately platted tracts requiring service are or will be directly served by public utilities located in or abutting public rights-of-ways or permanent access easements with overlapping public utility easements.
 - 3. That all necessary contracts and documents for inside the city limit and outside the city limit are approved and signed.
 - 4. Utility Analysis may require evidence of a current letter of utility commitment prior to the approval of the inside the city limits portion of outside city limits plats submitted by the end user with an immediate service need.

**CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS & ENGINEERING
PLAT & CONSTRUCTION DRAWING REVIEW AND APPROVAL PROCESS**





CITY OF HOUSTON
DESIGN MANUAL

CHAPTER 5
Easement Requirements

SEPTEMBER 1996

CHAPTER 5

Easement Requirements

PART 1 GENERAL

1.01 CHAPTER INCLUDES

Requirements for allocating and recording easements for water, wastewater and storm drainage facilities located outside of public rights-of-way.

1.02 REFERENCES

- A. Utility Coordination Committee (UCC) for the Metropolitan Area - "Typical utility location in 10- and 14-foot wide easement back-to-back lots and perimeter lots."

1.03 DEFINITIONS

- A. Easements - Easements are defined as areas set aside for installation and maintenance of utilities by public and private utility companies.

1.04 DESIGN REQUIREMENTS

- A. Whenever practical, all storm sewer, wastewater collection lines, water mains, and all appurtenances will be located within public rights-of-way in the manner described by Chapter 6 of this manual.
- B. Where public utilities are located in, along, across or adjacent to private drives, private streets or permanent access easements in platted single family residential lot subdivisions; such drives, streets or easements shall have an overlapping public utility easement to provide access and maintenance rights. The public utility easement rights shall be superior to the permanent access easement rights allowing the City ingress and egress for purpose of maintaining the utilities.
- C. Easements for electrical and gas lines must comply with the requirements as defined by the UCC and are not covered under this design manual.
- D. All easements are to be defined and submitted as part of the recordable plat either shown on the plat or by metes and bounds description. The process for recording the plat is described in Chapter 4 of this manual.

1.05 QUALITY ASSURANCE

- A. Recordable plats and metes and bounds descriptions of easements must be prepared under the direction of a Professional Surveyor. The surveyor must seal, sign, and date all documents prepared under his supervision.

PART 2 EXECUTION

2.01 PLAT AND EASEMENT REQUIREMENTS

- A. Requirements for Platted Easements
 - 1. For construction inside the city limits of Houston, submit a copy of the final plat accompanied by a CPC Form 101 together with the originals of the engineering drawings for approval and signatures.
 - 2. For construction outside the city limits of Houston within Houston's ETJ
 - a. Where no easements are required outside the plat boundary, follow the instructions in paragraph 2.01A.1 above for plats inside the city limits.
 - b. Where easements are to be dedicated outside the plat boundary or through property under different ownership, follow the instructions in paragraph 2.01A.1 above for plats inside the city limits and the additional requirements in items (1) and (2) below as appropriate.
 - (1) Submit a copy of the recorded instrument creating the easement or a metes and bounds description and a map of the easement, along with a letter from the Municipal Utility District Board or property owner stating the intent to obtain or dedicate the necessary easements. The instrument shall be recorded prior to or simultaneously with the plat.
 - (2) All off-site easements necessary to serve a proposed development must be shown on the face of the plat, or an acceptable tie between the plat and easements must be established between the two documents. Off-site easements must be recorded prior to or simultaneously with recordation of the plat.
- B. Requirements for Easements Deeded to the Public or to the City
 - 1. All easements required for construction of a proposed project must be approved and accepted prior to the approval of the construction drawings or the issuance of a permit for the proposed construction.

- C. Additional Requirements for Easements Deeded to the City
 - 1. Easements shall be either a part of the dedication on the plat of a subdivision, deeded to the City on standard forms provided by the City for that purpose, or on forms approved by the City Attorney.
 - 2. It is the responsibility of the person seeking to deed an easement to the City to furnish the City with a reproducible map showing the easement and its location.
 - 3. A construction permit will be granted upon acceptance by the City of recordable instruments dedicating the easements.

2.02 DESIGN REQUIREMENTS

A. Easements for Water Lines and Appurtenances

1. Water Lines

- a. When outside of a public street right-of-way or permanent access easement with overlapping public utility easements, easements must be dedicated and restricted for water lines only.
- b. When possible, easements should be contiguous with public rights-of-way.
- c. Except for side lot easements, water line easements shall be contiguous to a paved access.
- d. For water lines 12 inches and smaller located outside of the street right-of-way, the minimum width of the easement shall be 10 feet.
- e. For water lines 16 inches and larger, located outside of the street right-of-way, the minimum easement shall be 20 feet.
- f. For water mains located less than 5 feet from right-of-way lines, the outside edge of a water line easement shall be located from the right-of-way line as follows:
 - 12" and Smaller Pipe - 5 feet
 - 16" and Larger Pipe - 10 feet
- g. Water lines along State rights-of-way shall be installed outside of the right-of-way in a separate 10-foot minimum contiguous easement.
- h. No backlot easements will be allowed for the installation of water lines.
- i. Commercial developments inside the City and in the ETJ requiring on-site fire hydrants must provide a minimum 20-foot water line easement for the water lines and fire hydrants.
- j. The center line of any water line shall be no closer to a building line, building foundation or building slab than 10 feet for water lines 12" and smaller and no closer than 15 feet for water lines 16" and larger.
- k. In new developments, water lines shall be centered in water line easements.

1. When using side lot easements, such easements shall be a minimum of 20 feet in width, located on one lot or centered between two lots. If centered between two lots, the water line may be centered within the ten feet of one lot, or centered in the easement.
 2. Fire Hydrants
 - a. Use a minimum 10' by 10' easement for fire hydrants located outside of public rights-of-way.
 - b. Do not locate fire hydrants in 10-foot wide water line or water meter easements.
 3. Meters and Valves
 - a. Two-inch and smaller meters and shut-off valves (stop boxes) shall be set within public rights-of-way if possible. Otherwise, they shall be set in 5' by 5' water meter easements.
 - b. Meters larger than two inches and less than three inches shall be set in 5' by 5' water meter easements.
 - c. Three-inch and larger meters shall be set in a minimum of 10' by 20' water meter easements.
 - d. Water meter easements shall be located contiguous with public rights-of-way unless approved by the City. Fifteen foot wide minimum access easements will be required when not contiguous with a public right-of-way.
- B. Easements for Wastewater Lines and Appurtenances
1. Wastewater Collection Lines
 - a. Easements for wastewater sewers 10 inches or less in diameter shall have a minimum width of 15 feet or a minimum width equal to the depth of the proposed sewer, whichever is greater.
 - b. Easements for wastewater sewer mains and trunks of 12 inches or greater in diameter shall have minimum width of 20 feet or a minimum width equal to the depth of the proposed sewer, whichever is greater.
 - c. Wastewater sewer easements or other combined easements for wastewater sewers which
 - (1) Run through commercial reserves or across open country (acreage);
 - (2) Serve other existing or proposed platted commercial reserves or non-platted acreage tracts; and
 - (3) Are not immediately adjacent to public rights-of-way or easements or fee strips including those owned by HCFCO, Houston Lighting & Power Company, and pipeline companies:shall have a minimum width equal to twice the sewer's diameter plus the flow line depth of the sewer from natural

ground, proposed fill elevation, or 100-year Flood Plain Fill Elevation, whichever is greater; but not less than 25 feet.

- d. Wastewater sewers which cannot be located in the center of easements shall be located at least half of the minimum required easement width from the nearest side of the easement as determined by the depth and size of pipe.
- e. Wastewater sewers or force mains, installed in easements separated from public or semi-public rights-of-way by other private or utility company easements, shall be extended along or across the private utility company easement to provide access for maintenance of the sewer or force main.
- f. Easements described in 2.02.B.1.a through 2.02.B.1.e shall be "Open-Ended" easements in conformance with City Codes, Ordinances and Planning Requirements. All such "Open-Ended" Wastewater easements shall be extended if necessary and shall be fully connected at both ends to public facilities including:
 - (1) Existing or proposed Public Road Rights-of-Way,
 - (2) Existing or proposed Wastewater Treatment Plant Sites,
 - (3) Existing or proposed Wastewater Pump Station Sites, and
 - (4) Existing or proposed Public Utility Easement of adequate size for maintenance access.

2. Force Mains

- a. Force mains of all sizes shall have a minimum easement width of 20 feet for single lines which are not located adjacent to public or semi-public rights-of-way.
- b. Force mains located in easements adjacent to public or semi-public rights-of-way shall have a minimum easement width of 10 feet subject to the location and depth of the force main.

3. Service Leads

- a. The minimum easement for building service leads shall be 6 feet.

C. Storm Drainage Lines and Appurtenances -

1. Storm Sewer Lines

- a. To the extent practical, storm sewers shall be placed in public road rights-of-way or permanent access easements with overlapping public utility easements in accordance with Chapter 6-Utility Locations.
- b. Storm sewers shall have a minimum 20-foot wide easement. In the event of extreme depth or large sewers, additional width may be required to allow for proper maintenance operations.
- c. Pipes shall be centered within the limits of the easement.

2. Storm Water Detention Basins
 - a. Easements for storm water detention basins shall be dedicated by plat or by separate instrument filed in conjunction with plat approval. Such easements shall be dedicated to the developer, owner, or water district when within the ETJ or to the developer or owner when within the City limits.
 - b. Such easements shall have a minimum 20-foot width surrounding the perimeter of the detention basin as measured from top of bank unless adjacent to a street right-of-way.
- D. Combined Storm and Wastewater Sewer Easements
 1. Combined storm and wastewater sewer easement widths shall be as specified in 2.02.C.1.b., storm sewer lines. The center lines of wastewater sewer mains, trunks, or force mains shall be located in at least half the width of the easements defined in 2.02.B.1. but not less than 10 feet from the edge of the easement.
 2. The center line of wastewater sewers on the outside of combined storm and wastewater sewer easements adjacent to public or semi-public rights-of-way, shall be located in at least half the width of the easement defined in 2.02.B.1.d. but not less than 10 feet from the outside edge of the easement.

END OF CHAPTER

CITY OF HOUSTON
DESIGN MANUAL

CHAPTER 6
Utility Locations

SEPTEMBER 1996

CHAPTER 6

Utility Locations

PART 1 GENERAL

1.01 CHAPTER INCLUDES

Location of Utilities in rights-of-ways and easements.

1.02 REFERENCES

- A. Typical utility location in 10- and 14-foot wide easement back to back lots and perimeter lots as detailed in the most current drawing prepared by the UCC.

1.03 DEFINITIONS

- A. Easements - Easements are defined as areas set aside for ingress and egress by utility companies—public and/or private.
- B. Water Lines - Water lines are defined as closed conduits designed to distribute potable water for human consumption and to provide fire protection. Line size and fire protection accessory locations are dependent on distance from primary source and quantity demand.
- C. Wastewater Sewer Lines - Wastewater sewer lines are defined as closed conduits designed to collect and transport wastewater from generating source to plant sites for treatment prior to discharge into open conduits. Wastewater lines may be designed as gravity (non-pressure) flow lines or force (pressure) lines. Gravity flow lines usually fall into three categories in ascending size from "service line" to "lateral line" to "main line." Service lines (source of wastewater) may discharge into a lateral line or main line.
- D. Storm Sewer Lines - Storm sewer lines are defined as closed gravity (non-pressure) conduits designed to collect and transport storm water from inlet locations to an open conduit outfall—ditch, creek, stream, bayou, holding pond, or bay/ocean. Inlets are surface mounted basins designed to collect and funnel stormwater to the collection system. Storm sewers from the inlets to the collection system are usually defined as "Inlet Leads."

1.04 DESIGN REQUIREMENTS

- A. Research and resolve all known conflicts of proposed utilities with existing utilities.
- B. Back lot utilities shall be located in compliance with requirements as defined by the UCC's recommendations.
- C. Water lines are defined as to the size, location, depth, and material on construction drawings. Water line accessories such as bends, valves, fittings, and fire hydrants are to be identified as to type on the drawings.
- D. Wastewater sewer lines are defined as to the size, location, depth, grade for gravity service, and material on construction drawings. Wastewater sewer line accessories such as manholes, cleanouts, fittings, and material are to be identified on the drawings.
- E. Storm sewer lines are defined as to the size, location, depth, grade, and material on construction drawings. Storm sewer line accessories such as manholes, headwalls, and inlets are to be identified as to the size and material on the drawings.

1.05 SUBMITTALS

- A. Easements and rights-of-way are clearly identified for location and width on recorded plats. Off-site easements and rights-of-way shall be described by metes and bounds descriptions with accompanying drawings to clearly identify location and width. Construction drawings shall identify easements and rights-of-way as shown on recorded plats or by recorded metes and bounds descriptions.
- B. Water lines shall be identified on construction drawings with specific graphics and dimensioned from edge of easements and rights-of-way. The primary source of potable water shall be identified.
- C. Wastewater sewer lines shall be identified on construction drawings with specific graphics and dimensioned from edge of easements and rights-of-way. The outfall or discharge location shall be identified.
- D. Storm sewer lines shall be identified on construction drawings with specific graphics and dimensioned from edge of easements and rights-of-way. The outfall or discharge location shall be identified.
- E. In all cases where the criteria for location of the utility is the clear distance between the outside edge of the conduit to the easement or right-of-way line, this controlling dimension must be shown.

1.06 QUALITY ASSURANCE

- A. All recorded metes and bounds descriptions and plats shall be prepared by or under the supervision of a Professional Surveyor, and all recordable instruments shall be sealed, dated, and signed by the Professional Surveyor responsible for the preparation.
- B. Prepare calculations and construction drawings under the supervision of a Professional Engineer trained and licensed under the disciplines required by the drawings. The final construction drawings must be sealed, signed, and dated by the Professional Engineer responsible for the development of the drawings.

PART 2 EXECUTION

2.01 DESIGN ANALYSIS

A. Back Lot Utilities

Identify the type of electrical service and select the appropriate width of the easement. For mixed overhead and underground service select the 14-foot wide easement to provide versatility.

B. Water Lines

- 1. Water lines shall be located within a public right-of-way, within a permanent access easement with overlapping public utility easements, within a dedicated easement adjacent to and contiguous with the right-of-way, or within separate dedicated water line easements. The location of the main shall be as outlined in Chapter 7.
- 2. Water lines shall not be located in combination easements without the specific approval of the City. Water line easements shall not be combined with wastewater sewer easements.

C. Wastewater Sewer Lines

- 1. All wastewater sewer lines shall be located in a public right-of-way, within a permanent access easement with overlapping public utility easements or within a dedicated easement adjacent to the public right-of-way. Side lot easements may be used when required. Backlot easements shall not be utilized except in cases of pre-existing conditions and with specific approval.
- 2. All new developments will be required to comply with the requirement to locate the wastewater sewer lines in compliance with 2.01.C.1 above.
- 3. Wastewater sewer trunk or collector mains shall not be located in side lot easements without the specific approval of the City.
- 4. Wastewater sewer trunk or collector mains are usually located within the right-of-way between the property line and the back of curb or in a dedicated

easement adjacent and contiguous with the right-of-way on the opposite side of the right-of-way from the water main.

D. Storm Sewer Lines

1. All storm sewer lines shall be located within public rights-of-way, permanent access easements with overlapping public utility easements or approved easements. Approval of the Storm Sewer Engineering Section should be obtained prior to plan preparation.
2. Storm sewer lines are usually located within the parkway on the opposite side of the right-of-way from the water main. Do not locate storm sewer trunk lines under the pavement section. For boulevards with esplanades, the storm sewer may be located within the esplanade (coordinate with water line location and future pavement widening).

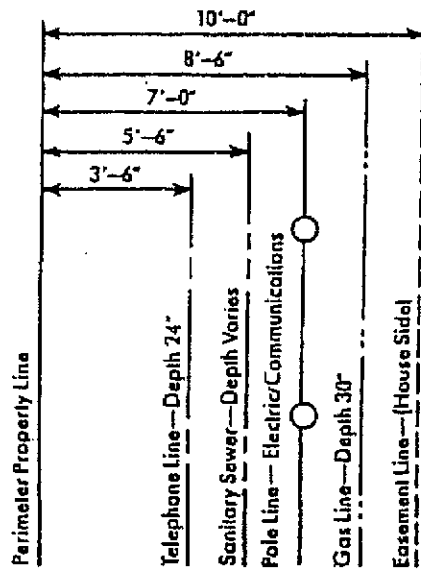
2.02 OPEN-CUT CONSTRUCTION IN STREET PAVEMENT

- A. Construction documents shall require that one lane of traffic be open at all times with a flagman at both ends of the construction unless otherwise provided on an approved traffic control plan.
- B. For open-cut construction in street paving, the drawings shall call for steel plate covers to be placed over open-cut sections whenever the contractor is not working within the open-cut area so that traffic will have full use of the roadway.
- C. Concrete and asphalt pavements shall be "saw cut" with a minimum 1 1/2-inch depth of cut.

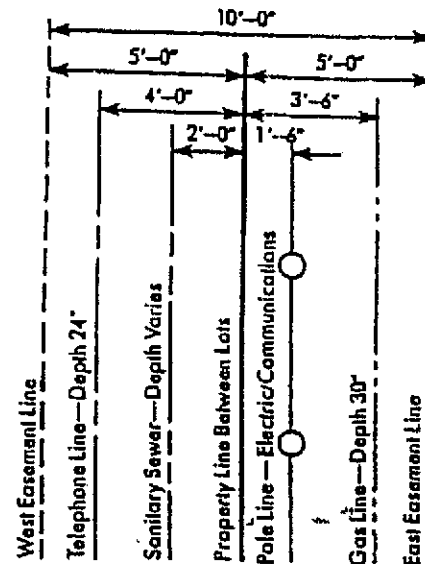
2.03 BACK LOT UTILITY LOCATIONS

- A. The basic utility locations for a 10-foot-wide back lot as outlined in the most current revision of "Typical Utility Location in 10- and 16-foot-wide Easement Back to Back Lots and Perimeter Lots" drawing prepared by the UCC for metropolitan area. A portion of the drawing is reproduced here for reference. The basic utility locations for 14-foot-wide back lot easement is as presented in the May 15, 1996 UCC "Memo of Understanding" and is reproduced here for reference.

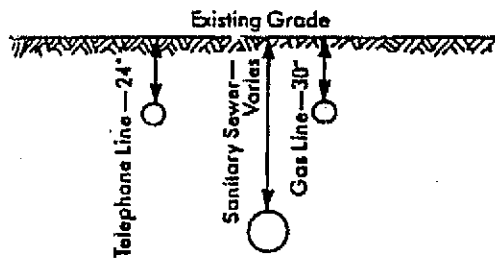
TYPICAL UTILITY LOCATIONS IN 10 FT. WIDE RESIDENTIAL EASEMENT



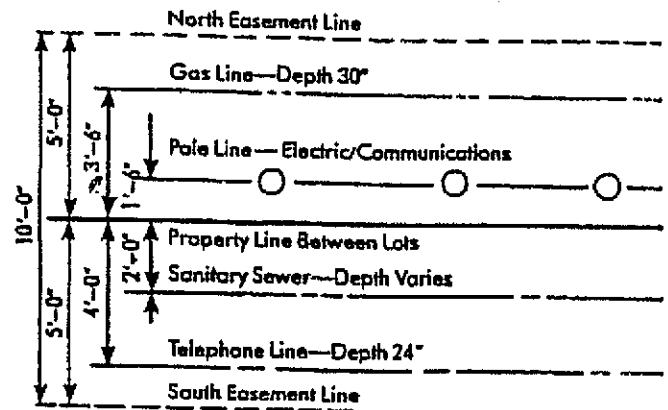
PERIMETER EASEMENT



BACK TO BACK EASEMENT



TYPICAL INSTALLATION
DEPTHS

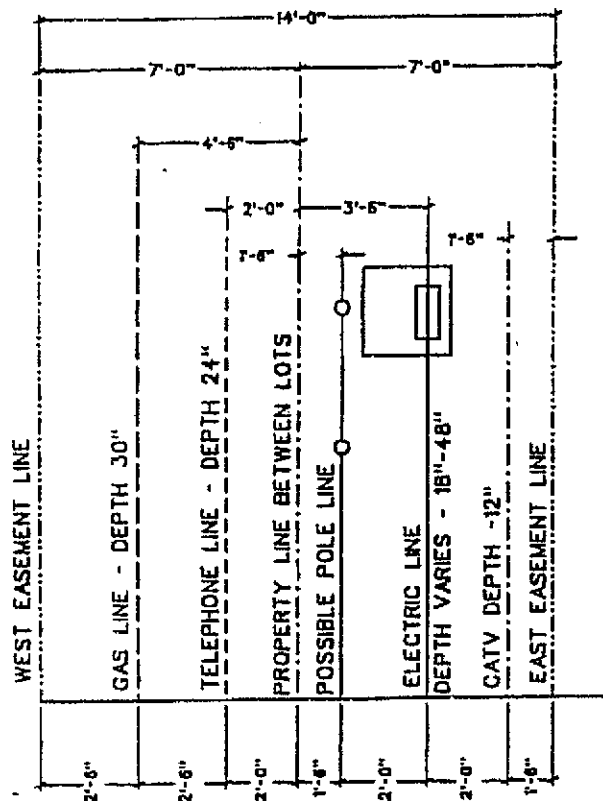


BACK TO BACK EASEMENT

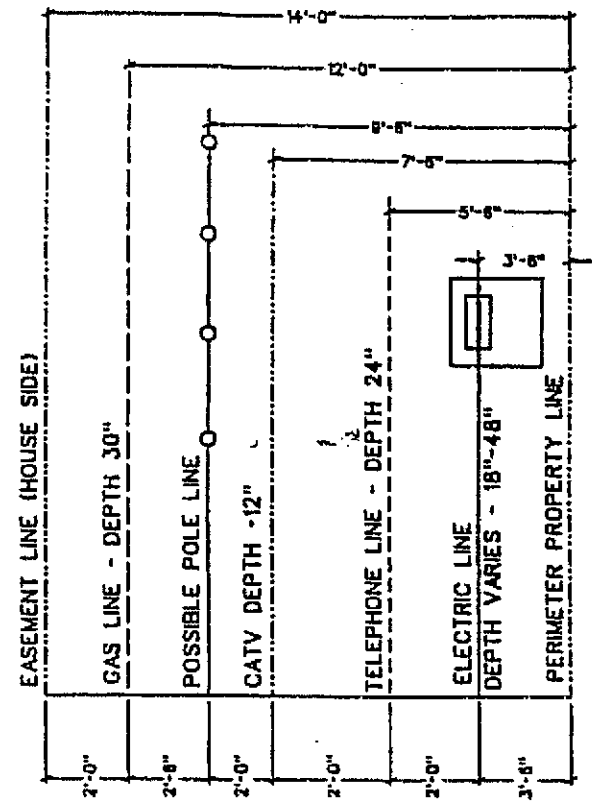
Utilities are normally installed as shown but depth may vary
due to fill or cut by others.

Maintain minimum 4" clearance between all utility lines
extending from easement to house/building.

TYPICAL UTILITY LOCATIONS IN 14 FT. WIDE RESIDENTIAL BACKLOT EASEMENT (NO BACKLOT SEWER)



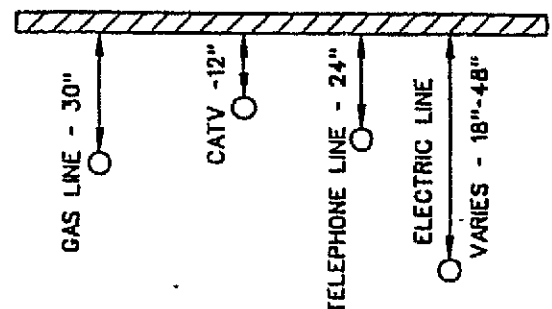
BACK TO BACK EASEMENT



PERIMETER EASEMENT

Utilities are normally installed as shown, but depth may vary due to grade fill or cut by others.

Maintain minimum 4" clearance between all utility lines extending from easement to house/building.



1. Always exercise extreme caution when digging in utility easements and on or across customer's property, because service lines extend from easement to house.
2. 10' Utility Easements may be granted if approved by the Utilities and City Council.

CITY OF HOUSTON

DESIGN MANUAL

CHAPTER 7

Water Line Design Requirements

SEPTEMBER 1996

CHAPTER 7

Water Line Design Requirements

PART 1 GENERAL

1.01 CHAPTER INCLUDES

Criteria for the design of water lines.

1.02 REFERENCES

- A. TNRCC, Water Utilities Division "Rules and Regulations for Public Water Systems," latest revision.
- B. American Water Works Association (AWWA).
- C. National Sanitation Foundation (NSF).

1.03 DEFINITIONS

- A. Water Lines - Water lines are defined as closed conduits designed to distribute potable water for human consumption to various areas and provide fire protection. Line sizes and fire protection accessory locations are dependent on distance from primary source and quantity of demand.

1.04 DESIGN REQUIREMENTS

- A. Obtain approval from Water Engineering Section for exceptions or deviations from these requirements. Exceptions or deviations may be granted on a project-by-project basis only.
- B. Lines
 - 1. Located within street rights-of-way, permanent access easements with overlapping public utility easements, easements adjacent to street rights-of-way or recorded water line easements:
 - a. Two-inch lines - Are only allowed in rehabilitation projects where tie-ins to existing two inch lines are necessary.
 - b. Four-inch lines - May be used on dead-end lines within cul-de-sacs supplying a maximum of 16 lots.
 - c. Six-inch lines - May be used if the line is less than 1,000 feet in length and interconnected between two lines which are 8-inch in size or larger. The maximum number of fire hydrants or flushing valves on any length of 6-inch lines is one.

- d. Eight-inch lines - May be used for lines over 1,000 feet long or when two or more fire hydrants or flushing valves are required.
- e. Twelve-inch lines and larger - Lines to be determined by the Professional Engineer and verified by the City of Houston Water Engineering Section.
- f. Dead-end lines:
 - (1) Dead-end lines within public right-of-way
 - (a) On permanent dead ends, other than cul-de-sacs, the line shall be 6 inches and shall not exceed more than 500 feet in length from the closest interconnection main line and shall terminate with a fire hydrant or flushing valve.
 - (b) In permanent dead-end situations within cul-de-sacs, reduce pipe sizes successively. Carry 6-inch pipe to the last hydrant, then use 4-inch pipe to the line's end. Place the last service as near as possible to the end and install a standard 2-inch blowoff and box at the end of the 4-inch line. The maximum length of this reduced line size configuration should not exceed 800 feet.
 - (2) Dead-end lines with one on-site fire hydrant or flushing valve
 - (a) Six-inch lines - May be used for lengths less than 200 feet provided domestic service is taken from end of line.
 - (b) Eight-inch lines - May be used for lengths greater than 200 feet but less than 500 feet, provided domestic service is taken from end of line.
 - (3) On-site lines with two or more fire hydrants or flushing valves: 8-inch with interconnection to at least two supply line sources when possible (sizeable domestic service shall be taken from on-site lines).
- g. Water lines located in side lot easements shall be installed in a continuous steel casing pipe. Casing shall extend uninterrupted from building line to building line. No horizontal or vertical deflections or connections shall be allowed. Water line shall be constructed of steel or restrained joint bell and spigot pipe to prevent lateral movement. Provide casing spacers and end seals in accordance with City standard specifications.

C. Location and Depth of Cover

- 1. Location within a street right-of-way.

| RIGHT-OF-WAY WIDTH & EXISTING OR ANTICIPATED CURB F/F PAVING WIDTH | | 8" & SMALLER (1) (2) | 12" & LARGER (1) (2) |
|--------------------------------------------------------------------|---------|-------------------------|-------------------------|
| 100-FOOT R-O-W ALL STREETS: | | 8 feet | 7 feet |
| 80-FOOT R-O-W ALL STREETS: | | 7 feet | 6 feet |
| 60-FOOT R-O-W: | | | |
| MAJOR THOROUGHFARE: | 44 feet | 5 feet | 5 feet |
| COMMERCIAL, SCHOOL, PARK: | 40 feet | 7 feet | 6 feet |
| RESIDENTIAL: | 27 feet | 12 feet (3) | 12 feet (3) |
| 50-FOOT R-O-W: | | | |
| ALL STREETS: | 35 feet | 5 feet | 5 feet |
| ALL STREETS: | 27 feet | 7 feet | 7 feet |

- (1) The number listed below is the maximum allowable distance from the right-of-way to the center line of the proposed water line.
- (2) The minimum distance from the right-of-way to the center line of the proposed water line shall be 5 feet without a water line easement adjacent to the rights-of-way (see easements for requirements less than 5 feet).
- (3) Investigate the possibility of a future 35-foot F/F curb and gutter section to replace existing roadside ditch streets.

2. Boulevard Streets - When necessary, water lines may be located within the esplanade. The lines should be located as near the center line of street rights-of-way as possible to avoid conflicts with future pavement widening.
3. Locations within an easement - Locate water lines in the center of a 10-foot minimum width dedicated water line easement. Within a commercial development inside the City and in the ETJ, center water lines within a 20-foot easement. For location within side lot easements, see paragraph 2.02.A.1.1 of Chapter 5. Obtain approval from the Water Engineering Section for lines to be located in wider or multi-use easements.
4. When a water line is placed parallel to another utility line, other than a sanitary sewer, the water line shall have a minimum of 4 feet horizontal clearance from outside wall of the water line to outside wall of the existing utility.
5. Depth of cover
 - a. Provide the following minimum depths of cover from the top of curb for curb and gutter streets or from mean elevation of the nearby ditch bottom and the nearby right-of-way for open-ditch section:

| SIZE OF LINE | DEPTH OF COVER | | ABSOLUTE MINIMUM |
|-------------------|----------------|--------------------|-----------------------|
| | TOP-OF-CURB | OPEN-DITCH SECTION | |
| 12-INCH & SMALLER | 4 FEET | 5 FEET | 3 FEET ⁽¹⁾ |
| 16-INCH & 20-INCH | 5 FEET | 6 FEET | 3 FEET ⁽¹⁾ |

⁽¹⁾ Restrained joint pipe may be used for 20-inch and smaller lines with less than 4 feet of cover or more than 8 feet of cover.

- b. Whenever possible, all changes in grade or alignment to clear utilities or underground features should be accomplished by deflecting the pipe joints. The use of regular bends for any change or grade will not be allowed without prior approval from the Water Engineering Section for variance.

D. Appurtenances

1. Do not place appurtenances under pavement. Obtain approval from the Water Engineering Section for variances.
2. Valves
 - a. Spacing - set at maximum distances along line as follows:
 - (1) Four-inch through 12-inch - 1,000 feet.
 - (2) Sixteen-inch and 20-inch - 2,000 feet.
 - (3) The total number of valves at any water line intersection shall equal the total number of lines leading out from the intersection point minus one, three valves for a cross, and two valves for a tee.
 - b. Location
 - (1) Normally, at street intersections locate along the street right-of-way lines projected across the water line. Tapping sleeves and valves are excluded from this requirement.
 - (2) Isolate fire hydrants and flushing valves from the service line with a valve located in the fire hydrant or flushing valve branch. This valve shall not be located in the slope or flowline of ditches on roadside ditch roadways.
 - (3) Intermediate valves, not located on the projection of the right-of-way line, shall be located on lot lines or 5 feet from fire hydrants but not set in driveways.
 - (4) Locate valves a minimum of 9 feet horizontally from sanitary sewer crossings.
 - c. Valve Type
 - (1) Two-inch through 12-inch - gate valves.
 - (2) Sixteen-inch and twenty-inch - butterfly valves. Gate valves may be used.
3. Fire Hydrants and Flushing Valves
 - a. Spacing
 - (1) Single-family residential development - 500-foot spacing.
 - (2) All other developments - 350-foot spacing.

- b. Location in or along street right-of-way
 - (1) Fire hydrants shall be primarily located at street intersections where possible.
 - (2) Locate fire hydrants at PCs of the intersection curb radius, 3 feet behind curb or projected future curb.
 - (3) On roadside ditch roadways, set the fire hydrants within 5 feet of rights-of-way lines. Fire hydrant lead valves shall not be located in the slopes or flow lines of ditches.
 - (4) Set intermediate fire hydrants on lot lines, as extended to pavement, when located between right-of-way intersections. These locations may be adjusted 5 feet either way to miss driveways or other obstructions. In either case, do not locate fire hydrants closer than 3 feet from curbed driveways or 5 feet from noncurbed driveways.
 - (5) Fire hydrants may be set in esplanade section of city streets when locations at back of curbs are not feasible. In such cases, the preferred location is 7 feet behind back of curb to provide access for parkway mower. In no instance shall the fire hydrant be closer than 3 feet from back of esplanade curb.
 - c. Location of fire hydrants or flushing valves outside street rights-of-way
 - (1) The City Fire Marshall will establish and approve the location of fire hydrants and flushing valves in apartment complexes, platted private street developments, and other multi-family developments within the City and within the City's ETJ.
 - (2) Locate fire hydrants and flushing valves in protected, easily-accessible areas behind curb lines.
 - (3) For fire hydrants or flushing valves which are located adjacent to water lines constructed in 10-foot wide water line easements, the fire hydrant or flushing valve shall be centered in a minimum 10' x 10' separate easement.
 - (4) For commercial developments inside the City and ETJ, provide isolation valves at each end of fire loops requiring on-site fire hydrants.
 - d. Bends or offsets in fire hydrant branch will not be allowed.
4. Fittings
- a. Normally use "all bell" (designated AB) for fittings. Properly designed thrust blocks shall be provided for each AB fitting.
 - b. All plugs shall have retention clamps and be designated as "plug and clamp." No thrust blocking will be required unless otherwise specified.

E. Water Meter Service

1. Water meter service for lines in or along street rights-of-way
 - a. Meters 2-inch and smaller - Locate in rights-of-way, water line easements, or in a minimum 5' x 5' separate water meter easements. Meters shall be located in areas with easy access and protection from traffic and adjacent to rights-of-way whenever possible.
 - b. Meters 3-inch and larger - Locate in minimum 10' x 20' separate water meter easements.
 - (1) Meters shall be located in areas with easy access and protection from traffic and adjacent to rights-of-way whenever possible.
 - (2) Meters shall not be located in areas enclosed by fences.
 - c. Separate tap and service lead shall be designed for each meter. Meter, line size, and appurtenances shall be as per the latest edition of the Uniform Plumbing Code.
2. Refer to Part 1.05 Submittals, and Part 2.02 Drawings, for approval and drawing requirements for 4-inch and larger meter service leads and metered sprinkler connections.
3. For proposed apartments or townhomes in private street developments, provide one master meter sized for the entire development. Exceptions may be granted by the Water Engineering Section for unusual circumstances only. If an exception is approved, do not interconnect multiple meters.
4. For commercial developments inside the City and in the ETJ requiring on-site fire hydrants, provide AWWA C703 proportional type fire service meters adjacent to public right-of-way. If a dual feed is desired, both feeds shall be metered. An above ground reduced pressure zone type backflow preventor shall be installed on the water line downstream from the meters.

F. Water Line Crossings

1. Public and Private Utility Crossings other than Sanitary Sewer
 - a. Where a water line crosses another utility other than a sanitary sewer, a minimum of 6 inches of clearance must be maintained between the outside wall of the water line and the outside wall of the utility.
2. Stream or Ditch Crossings
 - a. Elevated Crossings
 - (1) All water lines shall be steel or restrained joint metallic pipe and shall extend a minimum of 15 feet beyond the last bend or to the right-of-way line, whichever is greater.
 - (2) Elevated crossings are preferred to underground crossings.
 - (3) Use a separate elevated supporting structure for 16-inch and larger water lines unless otherwise approved by Water Engineering Section. Locate structures a minimum of 10 feet from any existing or proposed structure.

- (4) Supporting water lines on existing or proposed bridges meeting the following criteria may be used for 12-inch and smaller lines, when approved in advance by the Water Engineering Section.
 - (a) Have adequate structural capacity.
 - (b) Have sufficient clearance above bent cap elevation for installation under the bridge.
- (5) Design elevated crossings with the elevation of the bottom of the water line above the low chord of the nearest adjacent bridge or a minimum 1½-foot above the 100-Year Flood Plain elevation, whichever is greater.
- (6) Extend pipe from right-of-way to right-of-way for crossings.
- (7) Provide air release valves at the highest point of the water line.
- (8) Provide sufficient span length to accommodate the cross section of future widening of the stream or ditch, if available.
- (9) Support the line on columns spaced to accommodate the structural capacity of the pipeline considering deflection and loading.
- (10) Base column support design on soil capacity, spacing, loading, and structural requirements (see Part 2, 2.01B Design Analysis for Submittals).
- (11) Provide pedestrian pipe guards on all elevated crossings.
- b. Underground Crossings
 - (1) Provide a minimum 5-foot clearance above the top of the pipe to the ultimate flow line of the ditch.
 - (2) Provide sufficient length to exceed the ultimate future development of the stream or ditch.
 - (3) All water lines shall be steel or restrained joint pipe and shall extend a minimum of 15 feet beyond the last bend or to the right-of-way line, whichever is greater.
3. State Highway and County Road Crossings
 - a. Extend carrier pipe from right-of-way to right-of-way.
 - b. Use welded steel pipe or restrained joint pipe in steel casing under existing and future roadway from a point 5 feet outside of the service road or outside of pavement toward the right-of-way, to a similar point on the other side of the highway across the right-of-way. For highway or roadway crossings with open-ditch sections, extend casing from right-of-way to right-of-way.
 - c. Where additional right-of-way has been acquired for future widening, the casing shall extend to within 10 feet of each right-of-way line.

4. Railroad Crossings
 - a. For mainline and spurline railroad crossings, the water line shall be welded steel or restrained joint pipe within a steel casing which extends from right-of-way to right-of-way. Any deviation must be approved by the railroad companies.
 - b. Where there is a non railroad right-of-way, extend casing 15 feet either side from the center line of the outside rails.
 5. Additional Requirements
 - a. Use electrically isolated flange joints for transitions between two dissimilar metallic pipes. Water lines shall be electrically isolated from casing pipe and supports.
 - b. The carrier pipeline shall extend a minimum of 1-foot beyond the end of the casing to allow flanged joints to be constructed.
 - c. For welded steel bends, extend steel pipe a minimum of 5 feet beyond the bend.
 6. Oil and Gas Pipeline Crossings
 - a. Do not use metallic pipe when crossing oil or gas transmission lines unless a properly designed cathodic system is implemented with Water Engineering Section approval. Other pipe may be used, regardless of depth, subject to approval by Water Engineering Section. Maintain a minimum 2-foot separation between the pipeline and water line.
 7. On-Site Fire Loops within Commercial Developments
 - a. For commercial developments inside the City and in the ETJ requiring on-site fire hydrants, comply with the following requirements to allow maintenance and future repair operations:
 - (1) Do not allow placement of structures, paved parking or equipment pads over the easement.
 - (2) Provide 20-foot wide longitudinal pavement joints along easement lines where the water line is located under driveway or street pavement.
- G. Auger Construction
1. Use the following general criteria for establishing auger or bore sections:
 - a. Auger or bore sections shall be clearly shown on drawings.
 - b. Improved streets - Use auger construction to cross street regardless of surface. Auger length shall be computed as roadway width at proposed bore location plus 5 feet to either side of roadway, where applicable.
 - c. Driveways - Use auger construction to cross all active driveways. Compute auger length as driveways width plus 1-foot to either side. Where proposed lines are in close vicinity and parallel to culvert pipes along roadside ditch streets, the length of bore shall be the same as the length of existing culvert.
 - d. Trees - Use auger construction to cross under trees 6 inches and larger in diameter located within 10 feet of center line of proposed

lines. Use a minimum of 8-foot auger length centered about the tree.

- e. See Part 2, 2.02 C-2 for auger construction drawing standards.

H. Water Quality

1. Circulation and flushing - The layout of the overall water distribution system shall provide maximum circulation of water to prevent future problems of odor, taste, or color due to stagnant water.
 - a. Provide a source of fresh water at each end or at multiple points of a subdivision. Provide ways to create circulation and place valves and fire hydrants to allow simple flushing of all lines.
 - b. Avoid dead ends whenever possible. When necessary, isolate dead ends with a line valve, keep as short as possible, and equip with a blowoff, fire hydrant or flushing valve near the line's end (see paragraphs 1.04.B.1.f.1. and 1.04.B.1.f.2).
 - c. Where stubs are provide for future extensions, isolate the stubs with a valve and do not allow service connections to stubs until extended. Place one full pipe joint between the valve and plug.

I. Interconnections

1. For interconnections between utility districts outside the city, written approval must be given by the TNRCC.
2. A written agreement between the districts must be approved by the City and recorded in the county records and furnished to the City.
3. A meter shall be set at the point of connection in a separate 10' x 20' easement and shall conform to the requirements set forth in the City of Houston specifications and standard drawing.
4. Requirements for the installation of a meter may be waived by the City, if provisions are made in the agreement between the districts. In this event, a separate 10' x 20' easement and valves shall be provided for future meter installation.
5. Agreement between districts shall provide for the annexation of one district and shall require the installation of a meter. The installation and full cost shall be provided by the district not annexed.
6. For connection to City of Houston water lines serving districts or areas outside the city, written approval must be obtained from the TNRCC. No customer may take pump suction directly from City lines. If a customer has his own well or other supply, an appropriate backflow preventor must be installed to prevent water from flowing through his premises and returning to City lines.

- J. New Water Lines Constructed near Sanitary Sewers and Force Mains
 - 1. New water lines parallel to Sanitary Sewers and Force Mains

Locate water lines a minimum of 9 feet horizontally, outside wall to outside wall, when parallel to sanitary sewers or force mains. Use the following procedure when 9-foot separation cannot be achieved:

When a new water line is to parallel an existing sanitary sewer force main or gravity sanitary sewer and the 9-foot minimum separation distance cannot be maintained, the existing sanitary sewer shall be replaced with lined ductile iron or PVC pipe meeting ASTM specifications, having a minimum working pressure rating of 150 psi or greater and equipped with pressure type joints. The water lines and sanitary sewer shall be separated by a minimum vertical distance of 2 feet, and a minimum horizontal distance of 4 feet, measured between the nearest outside walls of the pipes, and in all cases, the water line shall be located above the sewer.
 - 2. New Water Lines Crossing Sanitary Sewers and Force Mains
 - a. No protection is required if the sanitary sewer is 9 feet below the water line.
 - b. Use the protective requirements given in the following charts for all other crossings.

**PROTECTION REQUIREMENTS AT
WATER LINE - SANITARY SEWER CROSSINGS**

| PRIMARY CONDITION | PROPOSED WATER EXISTING SANITARY | | | | PROPOSED WATER PROPOSED SANITARY OR EXISTING WATER PROPOSED SANITARY | | | |
|----------------------------|-------------------------------------|-------------------------------------------|-------------------------|-------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|-------------------------|-------------------------------------------|
| SECONDARY CONDITIONS | WATER OVER SANITARY | | WATER UNDER SANITARY | | WATER OVER SANITARY | | WATER UNDER SANITARY | |
| IF THE CLEARANCE IS | Less than 2' | Greater than 2' but less than 9' | Less than 2' | Greater than 2' but less than 9' | Less than 2' | Greater than 2' but less than 9' | Less than 2' | Greater than 2' but less than 9' |
| *Protection Requirement | 1 | 2 | 3 | 4 | 5 | 6a | 3 | 6 |

*** PROTECTION REQUIREMENTS FOR SANITARY SEWER CROSSINGS**

(Unless Variance is Granted by the TNRCC)

(All clearances shall be measured from outside wall to outside wall)

1. One, 20-foot joint, C-900 PVC, 150 psi centered over sanitary sewer; 6-inch absolute minimum clearance.
2. If no evidence of sanitary sewer leakage, center one joint of water line over sanitary sewer; 24-inch absolute minimum clearance. If the sewer line is leaking, the sewer line shall be replaced with 150 psi lined ductile iron or PVC pipe with appropriate adapters on all portions of the sanitary sewer within 9 feet of the water line.
3. Not allowed.
4. Auger 9 feet minimum each side of sanitary sewer. Place one 20-foot joint of C-900 PVC/C, 150 psi, centered under sanitary sewer. Fill bored hole with bentonite/clay mixture; 2-foot absolute minimum clearance or replace the existing sanitary sewer with 150 psi lined ductile iron or PVC pipe with appropriate adapters on all portions of the sanitary sewer within 9 feet of the water line.
5. Minimum 18-foot joint of sanitary sewer, 150 psi lined ductile iron or PVC pipe centered at the water line; 6-inch absolute minimum clearance.
6. If clearance is between 2 to 9 feet.
 - a. Center a minimum 18-foot joint of 150 psi lined ductile iron or PVC pipe at water line, or
 - b. Use cement-stabilized sand backfill for the wastewater line (minimum 2.5 sacks cement per cubic yard of sand) starting at a point 6 inches below the bottom of sanitary sewer to 6 inches above the top of sanitary sewer. Center one joint of sanitary sewer pipe about the water line.

**PROTECTION REQUIREMENTS AT
WATER LINE - FORCE MAIN CROSSINGS**

| PRIMARY CONDITION | PROPOSED WATER EXISTING FORCE MAIN | | | | PROPOSED WATER PROPOSED FORCE MAIN OR EXISTING WATER PROPOSED FORCE MAIN | | | |
|----------------------------|---------------------------------------|-------------------------------------------|---------------------------|-------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------|---------------------------|-------------------------------------------|
| SECONDARY CONDITIONS | WATER OVER FORCE MAIN | | WATER UNDER FORCE MAIN | | WATER OVER FORCE MAIN | | WATER UNDER FORCE MAIN | |
| IF THE CLEARANCE IS | Less than 2' | Greater than 2' but less than 9' | Less than 2' | Greater than 2' but less than 9' | Less than 2' | Greater than 2' but less than 9' | Less than 2' | Greater than 2' but less than 9' |
| *Protection Requirement | 1 | 2 | 3 | 4 | 5 | 6 | 3 | 3 |

*** PROTECTION REQUIREMENTS FOR FORCE MAIN CROSSINGS**
(Unless Variance is Granted by the TNRCC)
(All clearances shall be measured from outside wall to outside wall)

1. Construct water line with a 20-foot steel section with all related appurtenances centered above the force main; 6-inch absolute minimum clearance.
2. Construct water line with one 20-foot joint of C-900 PVC centered above the force main.
3. Not allowed.
4. Auger 9 feet minimum each side of force main. Place one 20-foot joint of C-900 PVC, 150 psi, centered under force main. Fill bored hole with bentonite/clay mixture; 2-foot absolute minimum clearance or replace the existing force main with 150 psi lined ductile iron or PVC pipe with appropriate adapters on all portions of the force main within 9 feet of the water line.
5. Minimum 18-foot joint of force main, 150 psi lined ductile iron or PVC pipe centered at the water line embedded in cement stabilized sand for the total length plus 12 inches beyond the joint on each end; 6-inch absolute minimum clearance. Use cement-stabilized sand backfill for the wastewater line (minimum 2.5 sacks cement per cubic yard of sand) starting at a point 4 inches below the bottom of force main to six inches above the top of force main. Center one joint of force main pipe about the water line.
6. If clearance is between 2 to 9 feet, center a minimum 18-foot joint of 150 psi lined ductile iron or PVC pipe at water line.

3. Sanitary Sewer Manholes - Provide a minimum 9-foot horizontal clearance from outside wall of existing or proposed manholes unless manholes and connecting sewers can be made watertight and tested for no leakage. If a 9-foot clearance cannot be obtained, the water line may be located closer to the manhole when prior approval has been obtained from the Water Engineering Section by using one of the procedures below; however, in no case shall the clearance be less than 4 feet.
 - a. Water line may be encased in a carrier pipe. Encasement shall be a steel water line in a steel carrier pipe. Open cut and backfill with cement stabilized sand compacted backfill.
 - b. The water line may be augered past the manhole with one 20-foot section of C-900 PVC pipe, 150 psi, installed centered about the

existing sanitary manhole with pressure grouting using a bentonite/clay mixture.

4. Fire Hydrants - Do not install fire hydrants within 9 feet vertically or horizontally of sanitary sewers and force mains regardless of construction.
5. TNRCC "Rules and Regulations for Public Water Systems" including any approved City of Houston variances shall apply if they are stricter or not covered above.

1.05 SUBMITTALS

- A. General - Conform to the following submittal requirements in addition to those of Chapter 1 - General Procedure Requirements.
- B. Water Lines Sizes - Submit justification, calculations, and locations for proposed 2-inch lines and for lines 12-inch and larger, for approval by the Water Engineering Section, unless sizes are provided by the Water Engineering Section.
- C. Valves - Submit information for approval by the Water Engineering Section with justification and locations for use of 16-inch and 20-inch gate valves proposed as substitutes for butterfly valves.
- D. Water Meter Service
 1. For construction inside city limits, submit an application for meter services and metered sprinkler connections, to the Taps and Meters Group, prior to construction.
 2. Submit requests for more than one service meter for townhomes in proposed private street developments to the Water Engineering Section.
- E. Elevated stream of ditch crossings - Submit design calculations for support columns and column spacing.
- F. Master Development Plan - For multiple phase developments, submit a master development plan. If within the ETJ, submit an overall district plan prior to the drawings being submitted for the first phase construction.
- G. Interconnections
 1. Submit requests for written approval of interconnections to the TNRCC for
 - a. Connection of City of Houston lines to serve districts or areas outside city limits.
 - b. Interconnections of districts.
 2. Submit copies of approvals received from TNRCC to the Water Engineering Section.

- H. Sewer Manholes - Submit justification for approval for use of water line encasement carrier pipe to minimize required clearance from sanitary sewer manholes.

1.06 QUALITY ASSURANCE

- A. Prepare calculations and construction drawings under the supervision of a Professional Engineer trained and licensed under the disciplines required by the drawings. The final construction drawings must be sealed, signed, and dated by the Professional Engineer responsible for the development of the drawings.

PART 2 EXECUTION

2.01 DESIGN ANALYSIS

- A. Water Line Sizes - Prepare narrative justification and calculations for proposed 2-inch lines and for lines 12-inch and larger, unless sizing is provided by the City of Houston Water Engineering Section in advance.
- B. Elevated Stream or Ditch Crossings - Prepare design calculations for support columns and column spacing.

2.02 DRAWINGS

- A. General: Conform to the following drawing requirements in addition to those of Chapter 3 - Graphic Requirements and the City's standard water line details and standard specifications.
- B. Appurtenances - Identify, describe, and enclose in rectangular box on drawings.
 - 1. Valves
 - a. Designate 2-inch through 12-inch gate valves with box as GV&B.
 - b. Provide complete description and size for other valves.
 - 2. Water meters, service leads, and unmetered sprinkler connections.
 - a. Show the location of service line tees, tapping sleeve and valves, valve boxes, and temporary plugs to be installed to serve future 3-inch or larger meters.
 - b. Develop plan and profile sheets for 4-inch and larger leads and connections that cross public rights-of-way or other public utilities.
- C. Construction Features
 - 1. Show all special construction features required to complete the project in a safe, convenient, and economical manner.

2. Auger Construction
 - a. If the construction is predominately open cut, all portions of the street that must be augered shall be clearly shown on drawings by location and length. Include designation for sections at trees with 6 inches or larger diameters located within 10 feet of water line.
 - b. Show locations of auger pits and receiving pits which are to be located in street or driveway paving.
3. Curbs - Include a requirement on drawings for construction of wheelchair ramps at street intersections where curbs are to be removed or are damaged by water line construction. Conform to latest edition of City of Houston standards for ramps.

END OF CHAPTER

CITY OF HOUSTON
DESIGN MANUAL

CHAPTER 8

Wastewater Collection System Design Requirements

SEPTEMBER 1996

CHAPTER 8

Wastewater Collection System

PART 1 GENERAL

1.01 CHAPTER 8 INCLUDES

Criteria for the design of wastewater collection systems.

1.02 REFERENCES

- A. Texas Natural Resource Conservation Commission - "Design Criteria for Sewerage Systems" - Texas Administrative Code - Chapter 317 (current revision)

1.03 DEFINITIONS

This Chapter addresses the design of the wastewater collection systems within the public right-of-way or a dedicated public easement. Sanitary sewers located on private property, that are not in a dedicated easement, are under the jurisdiction of the Plumbing Code, and will be addressed/reviewed by the Department's Code Enforcement Division. Where used in these regulations, the following terms shall be construed to carry the meanings given below:

- A. Public Sewer - A closed conduit which conveys wastewater flow and which is located within the public right-of-way or dedicated public easement. A public sewer (or public sewer system) is intended to serve more than one (1) "owner."
- B. Private Sewer - A closed conduit which conveys wastewater flow and is constructed and maintained by a private entity(ies) (i.e., homeowner's association). Private sewers may be located in areas such as a private street or common area. Private sewers are subject to the design and construction requirements of the Plumbing Code and must discharge to a public sewer.
- C. Sewer Main - A sewer which receives the flow from one or more lateral sewers.
- D. Lateral Sewer - A sewer running laterally down a street, alley, or easement which receives only the flow from the abutting property.
- E. Building Connection Easement - An easement dedicated to the City of Houston which allows a property owner to extend a private sewer or "service connection" across adjacent property, or properties, to facilitate connection to a "Public Sewer." A "Building Connection Easement" shall be 6-feet in width (minimum).

- F. Service Lead - A sewer which branches off a public sewer and extends to the limits of the public right-of-way. It shall be construed as having reference to a public sewer branching off from a main or lateral sewer to serve one or more houses, single-family lots, or other types of small land tracts situated in the same block with the said main or lateral sewer, but not directly adjacent thereto. Such a line, shall never exceed 150 feet in length. If the sewer is designed to serve more than two houses, or the equivalent of two single-family residences along a street, a lateral sewer as defined above shall be constructed.
- G. Service Connection - A private sewer from a single source to the main or lateral sewer in the street, alley, or easement adjacent thereto. Service connections are covered by the building code. If routed through another tract of land, it shall be located in a "Building Connection Easement". If located within a private easement, the City of Houston must be included as a third (3rd) party in the easement documents. It will be owned and maintained by the owner of the property being served by said Sewer.
- H. Project Area - The area within the immediate vicinity of the public sewer to be constructed. If, as an example, a public sewer is to be constructed within the public right-of-way, the project area would extend 10 feet to either side of the public right-of-way. If, as an example, a public sewer is to be constructed within a dedicated easement adjacent to the public right-of-way, the project area would extend 10 feet to either side of the dedicated easement; depending upon the existing topographical elements, unless impacted by a permanent structure (i.e., telephone pole, trees, drainage ditches, etc.) If, as an example, a public sewer is to be constructed within a side lot easement (if approved by the City), the same criteria would apply as for a dedicated easement adjacent to public right-of-way.
- I. Stack - A riser pipe constructed on main or lateral sewers which are deeper than 8 feet to facilitate construction of service leads or service connections.
- J. Force Main - A pressure-rated conduit (i.e., ductile iron pipe, pressure-rated PVC, etc.) which conveys wastewater from a pump station to a discharge point.

1.04 DESIGN REQUIREMENTS

A. Drawings to be Furnished

Before any main or lateral sewer is constructed and before a permit will be issued for the construction of same, plans and profiles of the proposed sewer shall be prepared and submitted to the City for approval. On projects within the city limits, the tracing shall become the property of the City and shall remain on file in the City for the use of any person who may be interested in same.

B. Details to be Shown on Drawings

The detailed plan view will show the exact location of the proposed line in the street, alley, or easement with respect to the edge of the particular right-of-way, the transit base line, and any nearby utilities, major landscaping, and other structures affecting construction.

C. Main and Lateral Sewers

1. Sewers shall be identified by number, letter, or other identification as shown on the sanitary key sewer layout sheet and manholes identified by letter or number.
2. Sewers in curved easements, easements defined by property lines and combined easements containing other public utilities must be shown both in detailed plan and profile views.
3. The profile should show other underground and surface utilities and facilities, both in parallel and at crossings; the size, grade of the proposed line, the elevations of same to hundredths of a foot at all manholes, changes of grade and dead ends; and the proposed finished grade over the sewer. It should show the actual ground line as it exists prior to construction of the sewer. Where proposed fill or cut is contemplated, the proposed new ground line should be shown as a separate line from the actual ground line. Type of pipe & bedding shall comply with City of Houston Standard Specifications and Standard Details.
4. Where sewers are to be placed between existing pavement and the street right-of-way line (or interior easement line) or under existing pavement or topping, show the existing ground line at both sides (or the closest side for sewers near the edge) of the right-of-way or adjacent sewer easement.

D. Sewer Mains - Plan and Profile Required

1. Sanitary sewer layouts for single-family residential subdivisions should use a scale of 100 feet or less per inch. A scale of 200 feet per inch may be used provided the following information is shown on the layout:
 - a. All easements containing or buffering sanitary sewers are shown and labeled both as to width and type; sewer sizes are shown at points of size changes; all manhole locations are shown.
 - b. The sewer alignment shall accurately reflect the relative location of the sewer as shown on the detailed plan view.
 - c. All service leads that cross street pavement or serve adjacent property are to be shown on the layout. The detail plans and profiles shall show the flow lines of all service leads at the street or easement right-of-way.
 - d. The number and size of the lots depicted on both the overall sewer layout sheet and the individual plan and profile sheets shall match the number and size of the lots depicted on the final plat after recordation.

- e. On the overall sanitary sewer layout sheet the size and direction of flow for all existing and proposed sewers shall be shown.
 - f. The location of the proposed sewer within either the public right-of-way, a dedicated easement adjacent to the public right-of-way, or side lot easement (if allowed by the City).
 - g. The overall sanitary sewer layout sheet shall show the area, in acres, which the proposed sewer(s) is(are) designed to serve. Include a location map which references the acreage to nearby major thoroughfares and boulevard streets. The scale of the location map shall be 1"=2,000' or less.
2. Commercial subdivision sanitary sewer layouts for large areas and with a scale of 400 feet or more per inch must have an additional set of layouts at not more than 200 feet per inch, with match lines and a small index map showing which portion of the overall layout that each sheet's layout represents.
3. Acceptable horizontal scales for the detailed plan and profile views are 10 feet, 20 feet, 40 feet, and not more than 50 feet maximum per inch. Horizontal scale for major thoroughfares and boulevard streets shall be 1" = 20' or less.
4. Acceptable vertical scales for detailed profile views are 2 feet, 4 feet, and not more than 5 feet maximum per inch unless otherwise approved. Vertical scale for major thoroughfares and boulevards shall be 1" = 2' or less.
5. The plan view shall show, at a minimum, the following information for the project area:
 - a. All topographical features;
 - b. Stationing for the proposed sewers.
 - c. All existing utilities (i.e., telephone, gas, HL&P, etc);
 - d. Any significant landscaping and/or other structures which might impact construction and/or construction-related activities;
 - e. The width and type of all existing and proposed easements;
 - f. All proposed service leads;
 - g. The limits of bore and/or tunnel; "
 - h. Locations where pressure pipe is to be installed for water line crossings;
 - i. Drawings for single-family residential subdivisions shall show the proposed location, by stations, of all service leads, service connections, and stacks. The distance from the sewer or transit base line station to the nearest existing manhole shall be shown in the plan view or on an additional sewer layout sheet with a scale no more than 1"-100'.
6. The profile view shall show, at a minimum, the following information for the project area:
 - a. Underground and/or surface utilities/facilities which are either parallel to the proposed sewer or cross the proposed sewer;

- b. The proposed sewer's diameter and grade for each manhole section;
- c. The flowline elevation for all sanitary sewers at each manhole;
- d. The rim elevation of all existing and proposed manholes;
- e. The flowline elevation at each sheet "break" (i.e., from one sheet to another);
- f. Type of pipe bedding/backfill shall be noted on each plan/profile sheet;
- g. The finished grade for proposed and existing pavement. Where "fill" and/or "cut" is proposed, the proposed new ground line should be shown as a separate line from the existing ground line;
- h. The existing ground line for the "near side" of the public right-of-way where a sewer is to be placed between the edge of existing pavement and the edge of the public right-of-way;
- i. The existing ground line at the centerline of the proposed sanitary sewer where a sanitary sewer is to be placed within an existing easement. Show any proposed "cut" and/or "fill" as described above. Show the finished grade of any proposed and/or existing pavement;
- j. The flowline elevation of all service leads where same crosses the edge of the public right-of-way or the dedicated easement adjacent to the public right-of-way;
- k. The limits of bore and/or tunnel;
- l. Locations where pressure pipe to be installed for water line crossings; and
- m. The location of special backfill and/or proposed stacks shall be identified by "stations" indicated on the design plans.

E. Service Leads

- 1. Service Leads shall be located either at the property line between two (2) adjoining lots, or every 100 feet; whichever is less or as directed by the City. A single 6" service lead located at the property line between two (2) adjoining lots would serve two (2) single-family residences with a wye placed at the end of the service lead. Do not extend the wye clean-outs beyond the edge of either the public right-of-way or dedicated easement.
- 2. Any service lead extension of more than 50 feet parallel to the street right-of-way shall be treated as a lateral sewer.
- 3. Service leads from developments with more than 17,500 gallons-per-day flow shall discharge into a proposed or existing manhole. Where the flow line of the service lead is 30" or greater above the flow line of the manhole, provide a standard City of Houston drop to manhole.
 - a. Service leads shall be provided to serve each lot within proposed development, whether inside the city limits or in the ETJ.
 - b. Service Leads shall be 6 inches in diameter (minimum). If the length of a service lead exceeds 100 feet or the width of the public right-of-way by more than 20 feet, the minimum diameter shall be 8 inches and a manhole shall be utilized for connection to the public sewer.

- c. Service Leads with a diameter of 6 inches shall utilize "full body" fitting (extruded or factory-fabricated) for connection to a proposed public sewer or an approved saddle-type connector for connection to an existing public sewer.
- d. Saddle-type connectors shall be installed with the "stub" oriented between the "springline" (3 o'clock and 9 o'clock positions) and 45 degrees from the "springline" ("1:30" and "10:30" positions). Tees (aka, "full body fittings") shall be oriented in the same manner.
- e. The Service Lead shall be designed to minimize the use of bends as site conditions will permit.
- f. Service Leads exceeding the limits defined in 1.04.E.2. shall have a manhole at each end; as well as, a plan/profile drawing for each right-of-way crossing. All, or part, of these service leads which are located in a public right-of-way, alley or dedicated sanitary sewer or public utility easement may be treated as a public sewer; depending upon the location of the terminal manhole and any intermediate manholes.
- g. For all existing lots (which are not served in accordance with these guidelines) that need a service lead, if the distance to the nearest existing sewer is less than 50 feet, the service lead is under the jurisdiction of the Plumbing Code.
- h. The location where the service lead crosses the property line shall be determined using one of the following methods listed in order of City's preference:
 - (1) Utilize field survey ties to a sufficient number of existing physical surface features or lot corners to permit future re-establishment of location where service lead crosses the property line. Such survey ties will be placed on one or more drawings as necessary to show all tie-in information to physical features;
 - (2) Place a clean-out plug in a meter box at each stub-out location at the property line; or
 - (3) Utilize Global Positioning System (GPS) technology to identify City coordinates where the service lead crosses the property line. This data shall be included in the plan & profile submittal.

F. General Requirements

- 1. Place stacks and wyes or tees as shown. Where no stacks are shown, it is the responsibility of the licensed plumber to place a City approved saddle for connection to the line and the responsibility of the City Inspector to determine that such saddle is watertight and properly installed.
- 2. Materials and construction to conform to latest City of Houston specifications with all amendments thereto, including standard leak test.
- 3. Unless noted otherwise, all public sewers and service leads shall be embedded in cement-stabilized sand; to wit, 6 inches below the pipe, 12 inches above the pipe and to the full trench width. All such bedding shall

be compacted to 95 % standard proctor density. Cement-stabilized sand to have a 48-hour compressive strength of 100 psi. The cross-section so described herein shall be termed the "embedment zone."

4. Backfill all excavated areas/trenches under or within 1-foot of existing or proposed pavement with cement-stabilized sand from the top of the pipe "embedment zone" up to 1-foot below paving subgrade. Cement-stabilized sand must develop 100 psi compression at 48 hours. Backfill shall be compacted to 95 % standard proctor density.
5. The actual location of all special backfill and of proposed stacks shall be shown by stations in the drawings.
6. Construction notes shall designate the kind and class of pipe with exceptions to the construction notes to be shown on the plan and profile sheets.
7. Public sewers and force mains shall be located in either the public right-of-way or easements. Side lot easements may be used only with special approval. Backlot easements shall not be utilized except in cases of pre-existing conditions as approved. The location of the public sewer within a combined easement shall be as indicated by the latest standard of the Metropolitan Utility Coordinating Committee or as indicated on the plans when approved under the "hardship" ruling. Generally, the location of the public sewer within a dedicated easement shall be along the centerline of the easement. However, in those instances where the easement is adjacent to the public ROW, the location of the sanitary sewer shall be approved on a case-by-case basis by the Director, Department of Public Works and Engineering. Required easement widths are addressed in Chapter 5. Additional information regarding the location of sanitary sewers is contained in Chapter 6.
8. Non-sanitary sewer easements or fee strips such as pipeline, Houston Lighting and Power, drainage district, railroad, etc. are in and of themselves insufficient and unacceptable to permit laying of sanitary sewers and/or force mains across or along the underlying private property or restricted non-sanitary use type of public property.
9. The final determination as to that portion of a street, alley, or easement to be occupied by a proposed sewer rests within the City. The Director will take into consideration existing, planned and proposed facilities such as manholes, pavement, pipes/conduits, along with existing trees, shrubs, or other unique surface conditions when arriving at a decision.
10. Where an easement for a public sewer ends at a public right-of-way, the last manhole shall be extended into the public right-of-way a minimum of 2 feet beyond the property line; or as close to the public right-of-way as possible due to acceptable clearances required for other utilities (i.e., water line and storm sewers).
11. The drawings for the sewer shall show the location of any existing known pipe or duct that might interfere with the construction of the sewer and call to the attention of the City any known obstacles that might be encountered

in constructing the sewer in any location under consideration. The Professional Engineer shall determine the existence of pipes, ducts and/or obstacles from a visual survey on the ground plus research of all public records and private records when available.

G. Line Size

1. The minimum pipe diameter for a public sanitary sewer shall be 8 inches.
2. Four-inch service leads shall be confined to the limits of the lot which they serve and shall serve only the equivalent of one single-family lot. No 4-inch sewer shall be laid in any street, alley, or right-of-way.
3. Six-inch service leads shall not serve more than the equivalent of two single-family lots or other types of small land tracts.
4. Six-inch and 8-inch service leads for single-family residential lots shall have a minimum grade of 0.70 percent.
5. For commercial service leads such as street bores, submit a copy of the approved plumbing drawings to establish the required size of the line. The minimum size lead shall be 8 inches downtown and 6 inches elsewhere.
6. All main and lateral sewers will end in manholes, except for special and/or unusual situations and subject to specific approval of same.
7. All sewer lines shall be laid at a size and depth to conform to designs permitting an orderly expansion of the sewer system of the City and so as to avoid a duplication of lines in the future.
8. The City shall be the final judge as to sizes and depths required and exceptions to "lateral service leads" as previously defined.

H. Line Depth

1. The sewer should be laid with the top of the pipe a minimum of 3 feet below the surface of the ground.
2. Sewers laid in street rights-of-way with curb and gutter paved streets shall have a minimum cover of 4 feet from the top of the pipe to top of the curb to anticipate future sewer extension.
3. Sewers laid in street rights-of-way with crowned roads and side ditches shall have a minimum cover of 6 feet from the average ground line at the adjacent street right-of-way to the top of pipe.
4. Where the minimum cover as specified in paragraphs H, 1, 2, and 3 above is not possible, the sewer shall be laid with Class 150 (150 psi) pressure pipe or rigid factory made pipe with Cement Stabilized Sand as shown in standard detail. Ductile iron pipe shall be lined with either a polyethylene or polyurethane coating as approved by the pipe manufacturer and applied by either the pipe manufacturer or an approved applicator. The minimum liner thickness shall be 40 mil.
5. Maximum depth for 8 inch, 10 inch, and 12 inch collection lines shall be 20 feet from average ground surface to pipe invert. Depths greater than 20 feet are subject to approval by the City Engineer if justified for site specific reasons during the preliminary engineering phase of the project design.

I. Line Grades

1. The following table lists the minimum and maximum grades for 6" - 27" public sewers. The minimum grade is based on a minimum full pipe velocity of 2.3 feet per second (fps). The maximum grade is based on a maximum full pipe velocity of 10.0 fps. In both cases, the Manning Formula has been used with an "n" of 0.013. The use of different pipe materials will not alter the use of 0.013 for the purposes of the Design Manual.

| Nominal Internal Pipe Diameter (Inches) | Minimum Grade to Develop V=2.3 fps (Percent) | Maximum Grade to Develop V=10.0 fps (Percent) |
|-----------------------------------------------|----------------------------------------------------|-----------------------------------------------------|
| 6 | 0.650 | 12.350 |
| 8 | 0.440 | 8.400 |
| 10 | 0.330 | 6.230 |
| 12 | 0.260 | 4.880 |
| 15 | 0.190 | 3.620 |
| 18 | 0.150 | 2.830 |
| 21 | 0.120 | 2.300 |
| 24 | 0.100 | 1.930 |
| 27 | 0.087 | 1.650 |

For sewers larger than 27 inches in diameter, the Professional Engineer of record shall determine the appropriate grade utilizing the Manning Formula, $n=0.013$ and a full pipe velocity of 3.0 fps.

J. Manholes

1. All manholes to be either precast concrete, fiberglass or polyethylene; unless the Professional Engineer submits a "cast in place" manhole design for review and approval by the City. The Professional Engineer of Record shall determine the need for a liner or coating on concrete manholes. All liner or coatings will be in accordance with the approved products as determined by the Standard Wastewater Products Committee. The use of cement additives such as silicafume or fly ash do not eliminate the requirement for an approved liner or coating. All precast manholes to incorporate a "boot" type connector for sewer diameters up to 24". For sewer diameters greater than 24", utilize either the "boot" type connector (if available) or an integral gasket. All precast manholes to conform to the latest ASTM requirements.

2. For all public sewers, manholes shall be placed at all changes in alignment, changes in grade, junction points, and either at street, alley, or easement intersections as designs may require.
 - a. Sewers laid in easements shall have a manhole in each street crossed by the sewer.
 - b. The maximum distance between manholes shall be determined from the following table for 8" - 48" pipe diameters. Spacings for larger diameter mains than 48" installed by tunneling methods or "open cut" methods shall be determined on an individual project bases.

| Pipe Diameter (I.D.) in Inches | Manhole Maximum Spacing in Feet |
|-----------------------------------|---------------------------------------|
| 8-15 | 400 |
| 18-48 | 800 |
| over 48 | as approved by the City |

- c. It is the City's policy that sewers with the same, or approximate, flowline elevation intersect each other at a 90 degree angle. However, where a true perpendicular intersection cannot be obtained, and where the "entering" sewer intersects the receiving sewer at, or about, the same flowline elevation, one or more manholes shall be utilized to maintain a minimum angle of 80 degrees at the point of intersection. When the "entering" sewer is on the upstream side of the manhole, the minimum angle between the sewers may be reduced to a 45 degree angle; provided:
 - (1) A distinct flow channel can be maintained within the manhole when the flowline elevations of the sewers are at, or within, one (1) pipe diameter of the smaller pipe; or
 - (2) When the flowline elevation of the "entering" pipe is above the crown of the "primary" sewer and clearance can be provided between the sewers.
- d. Manholes shall be placed at all dead-end mains and laterals.
- e. The existing manholes shall be identified by the alphanumeric system established by the Department; unless otherwise directed by the City.
- f. Criteria for Connections to, and Utilization of, Manholes
 - (1) Where manholes are utilized to facilitate connections between public sewers, when possible the sewers shall either match the manhole's flowline, match the elevation of each other's crown or utilize an "outside" manhole drop.

- (2) Connections between public sewers at the manhole shall adhere to the following criteria when possible:
 - (a) The elevation of the crown of the discharging sewer shall either match the elevation of the crown of the receiving sewer or be approved as special cases by the City.
 - (b) A standard drop connection is required when the difference in elevation between discharging sewer flowline and receiving sewer flowline is greater than 30 inches.
- (3) The routing of service connection directly to manholes will be allowed only where the flowline elevation of the existing sanitary sewer is more than 10 feet below grade and there is no available stack and either:
 - (a) The lot to be so connected is a single-family, owner-occupied, single lot residence connection to an existing manhole; or
 - (b) The lot to be so connected is a single-family, owner-occupied, single lot residence connecting to a proposed manhole at the end of a cul-de-sac.
- (4) When routing an approved service connection to a manhole (see Item "3"), the wall penetration shall not be greater than 10 inches in diameter and shall be sealed using a grout as approved by the Standard Wastewater Products Committee.
- (5) When routing an approved service connection to a manhole (see Item "3"), said connections shall utilize a "drop" (either inside or outside) and shall adhere to the following criteria:
 - (a) The manhole wall penetration shall be a minimum of 10 feet below the manhole rim elevation and shall not be greater than 10 inches in diameter;
 - (b) The drop shall be 6 inches in diameter and shall be constructed of SDR 26 PVC pipe (ASTM D 3034-94);
 - (c) The drop shall be located 45 degrees from the upstream side of the main sewer;
 - (d) An internal drop shall be affixed to the manhole wall utilizing stainless steel bands and anchor bolts;
 - (e) An internal drop shall terminate with a 45 degree bend. Said 45 degree bend shall not extend below the "top of pipe" elevation of receiving sanitary sewer; and
 - (f) The wall penetration shall be sealed using a "grout" as approved by the Standard Wastewater Products Committee.
- (6) All public sewers shall terminate in a manhole. Clean-outs will not be utilized except at the end of each service lead.

K. Lift Station

1. Lift station design shall comply with the City of Houston "Engineering Design Manual for Submersible Lift Stations" & "Design Guideline Drawings for Submersible Lift Stations" dated January, 1996. Provide level I controls. Wet wells smaller than required by the design manual may be approved if:
 - a. Geotechnical and other design data verify that additional wet well depth can be attained which will provide an equivalent effective volume; and
 - b. Adequate distance between pumps can be provided.
2. Minimum site size shall be 50 feet by 50 feet. Smaller sites, that are adjacent to public rights-of-way and are contiguous to green space or similar land use areas, may be approved when adequate odor control provisions are provided.

1.05 UNSEWERED BUILDING SITES

A. Lot Size and Requirements

1. All lot sizes shall be determined by the projected use of the property considering people density, sewage requirements, soil tests (percolation tests performed and certified to by the Professional Engineer) and public or private water supply, all in accordance with the requirements of the latest edition of Chapter 285 of TNRCC regulations.
2. The location of the individual lot sewage treatment facilities and the location of the private water well, if required, shall be shown on the individual buildings drawings.
3. Platted subdivisions served by public water supply should provide for individual lots having surface areas of at least 15,000 square feet.
4. Platted subdivisions served by individual water systems should provide for individual lots having surface areas of at least 20,000 square feet.
5. Engineer shall conform to county criteria for subparagraphs 1.05A.3. and 1.05A.4. above if more stringent.

- B. Commercial establishments require a septic system design prepared by a Professional Engineer in accordance with the latest edition of Chapter 285 of TNRCC regulations. Building permits for commercial buildings shall require a sewer availability letter approving a septic system designed and sealed by a Professional Engineer.**

1.06 SUBMITTALS

A. Preliminary Design - Submit the following for review and comment:

1. Copies of any documents which show approval of exceptions to the City design criteria.
2. Design calculations for line sizes and grades.
3. Contour map for overall area.

4. Plan and profile sheets showing proposed improvements (City projects only).
5. Geotechnical soils report for the project (City projects only).

B. Final Design - Submit the following for approval:

1. Final documents of the above plus plan and profile sheets and geotechnical soils reports for non-City projects.
2. Review prints.
3. Original drawings.

1.07 QUALITY ASSURANCE

- A. Prepare calculations and construction drawings under the supervision of a Professional Engineer trained and licensed under the disciplines required by the drawings. The final construction drawings must be sealed, signed, and dated by the Professional Engineer responsible for the development of the drawings.

PART 2 EXECUTION

2.01 RESEARCH REQUIREMENTS

- A. Discuss project concepts outlining proposed features and usage with City of Houston Department of Public Works and Engineering.
- B. Research existing utility and right-of-way information.
- C. Verify that no restrictions exist that will deny approval of the project concept.

2.02 DESIGN ANALYSIS

- A. Calculations of design flows for overall development project.
- B. Calculations for design of any treatment plant required for the development.
- C. Calculations for effect of the 25-year storm outfall from any proposed treatment plant.

2.03 DRAWINGS

- A. Drawings shall include layout sheet(s) with contours, plan and profile sheets, and detail sheets for special items and treatment plants.

END OF CHAPTER

CITY OF HOUSTON
DESIGN MANUAL

CHAPTER 9

Storm Drainage Design Requirements

SEPTEMBER 1996

CHAPTER 9

Storm Drainage Design Requirements

PART 1 GENERAL

1.01 CHAPTER INCLUDES

Criteria for the design of storm drainage improvements.

1.02 DRAINAGE POLICY

A. Design Requirements

1. The drainage criteria administered by the City of Houston and complemented by Harris County and the Harris County Flood Control District for newly designed areas provides protection from structural flooding from a 100-year storm event. This is accomplished with the application of various drainage enhancements such as storm sewers, roadside ditches, open channels, detention and overland (sheet) run-off. The combined system is intended to prevent structural flooding from extreme events up to a 100-year storm.
2. Recognizing that each site has unique differences that can enhance the opportunity to provide proper drainage, the intent of these criteria are to specify minimum requirements that can be modified provided that the objective for drainage standards is maintained.

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

C. Flood Control - The City of Houston is a participant in the National Flood Insurance Program. The intent of the flood insurance program is to make insurance available at low cost by providing for measures that reduce the likelihood of structural flooding.

D. Relationship to the Platting Process - Approval of storm drainage is a part of the review process for planning and platting of new development. The review of storm drainage is conducted by the Storm Sewer Engineering Section of the Public Works and Engineering Department.

1.03 REFERENCES

- A. City of Houston Flood-Prone Areas, Chapter 19, of the Flood-Prone Areas, Code of Ordinances
- B. National Weather Service Documents.
 - 1. TP-40 Rainfall Frequency Atlas of the United States.
 - 2. Hydro-35; 5-to-60-Minute Precipitation Duration for the Eastern and Central United States.

1.04 DEFINITIONS

- A. Conduit - Any open or closed device for conveying flowing water.
- B. Drainage Area Map - Area map of watershed which is subdivided to show each area served by each subsystem.
- C. Hydraulic Grade Line - A line representing the pressure head available at any given point within the drainage system.
- D. Redevelopment - A change in land use that alters the impervious cover from one type of development to either the same type or another type, and takes advantage of the existing infrastructure in place as a drainage outlet.
- E. In-Fill Development - Development of open tracts of land in areas where the storm drainage infrastructure is already in place and takes advantage of the existing infrastructure as a drainage outlet.
- F. Rational Formula - A method for calculating the peak run-off for a storm drain system using the following equation for run-off:

$$Q = \text{Sum}(CA)I$$

Where C = watershed coefficient

A = area in acres

I = rainfall intensity (inches per hour)

- G. Design Storm Event - The rainfall intensity upon which the drainage facility will be sized.

- H. Rainfall Frequency - The probability of a rainfall event of defined characteristics occurring in any given year. Information on rainfall frequency is published by the National Weather Service. For the purpose of storm drainage design, the following frequencies are applicable:
1. 2-year frequency - a rainfall intensity having a 50% probability of occurrence in any given year, or nominally likely to occur once every two years.
 2. 3-year frequency - a rainfall intensity having a 33% probability of occurrence in any given year, or nominally likely to occur once every three years.
 3. 5-year frequency - a rainfall intensity having a 20% probability of occurrence in any given year, or nominally likely to occur once every five years.
 4. 10-year frequency - a rainfall intensity having a 10% probability of occurrence in any given year, or nominally likely to occur once every ten years.
 5. 25-year frequency - a rainfall intensity having a 4% probability of occurrence in any given year, or nominally likely to occur once every twenty five years.
 6. 100-year frequency - a rainfall intensity having a 1% probability of occurrence in any given year, or nominally likely to occur once every one hundred years.

- I. Sheet Flow - Overland storm run-off that is not conveyed in a defined conduit, and is typically in excess of the capacity of the conduit.

- J. Manning's Equation: $V = (K/n)R^{2/3}S_f^{1/2}$

Where K = 1.49 for english units,
1.00 for metric units

V = velocity (ft./sec or m/sec)

R = hydraulic radius (ft. or m) (area/wetted perimeter)

S_f = friction slope (headloss/length)

n = 0.013 for concrete pipes,

0.028 for CMP pipes

- K. Continuity Equation: $Q = VA$

Where Q = discharge (cfs)

V = velocity (ft/sec or m/sec)

A = cross sectional area of conduit in square feet or square meters

- L. FEMA - Federal Emergency Management Agency

- M. HCFCDD - Harris County Flood Control District

1.05 DESIGN REQUIREMENTS

All designs of drainage facilities should meet the requirements of the City of Houston Standard Specifications and Standard Drawings.

A. Determination of Run-off

1. Design Storm Events

a. Rainfall Duration

- (1) For design purposes, the rainfall duration for drainage areas less than 200 acres will be no less than 3 hours in duration.
- (2) For design purposes, the rainfall duration for drainage areas more than 200 acres will be no less than 6 hours in duration.

b. Intensity-Duration Curves

Figure 9.1 depicts the intensity-duration curves to be used for storm sewer and roadside ditch design in the City of Houston and extraterritorial jurisdiction. These curves were derived from the National Weather Service publications referenced above.

2. Application of Run-off Calculation Models

a. Rational Method

The rational method will be used for design on all storm sewered areas up to 600 acres in size. The Rational Method will be considered applicable for all storm sewered areas up to 1,200 acres and for areas served by roadside ditch up to 500 acres in size.

b. Rainfall Run-off Modeling

Rainfall run-off modeling will be applied to areas greater than 500 acres in size that are drained by an open channel. Rainfall-run-off modeling can be used for modeling of storm sewer areas greater than 600 acres provided the model takes in account the storage and ponding in streets. If the modeling is associated with establishing a flood-prone area for purposes of a FEMA submittal, the models to be used must be acceptable to that agency.

3. Coefficients for the Rational Method

a. Calculation of Run-off Coefficient

- (1) The run-off coefficient "C" values in the Rational Method formula will vary based on the land use. Land use types and "C" values which can be used are as follow:

| Land Use Type | Run-off Coefficient |
|-------------------------|---------------------|
| Residential Districts | |
| Lots more than 1/2 acre | 0.35 |
| Lots 1/4 - 1/2 acre | 0.45 |
| Lots less than 1/4 acre | 0.55 |
| Multi-Family areas | |
| Less than 20 DU/AC | 0.65 |
| 20 DU/AC or Greater | 0.80 |
| Business Districts | 0.80 |
| Industrial Districts | |
| Light Areas | 0.65 |
| Heavy Areas | 0.75 |
| Railroad Yard Areas | 0.30 |
| Parks/Open Areas | 0.18 |

- (2) Alternatively, the run-off coefficient "C" in the Rational Method formula can be calculated from the equation:

$$C = 0.6I_a + 0.2$$

Where C = watershed coefficient

I_a = percent impervious area

- 3) If the alternate form is to be submitted, a calculation of the computation of C is to be provided as part of the drainage calculations.
- b. Determination of Time of Concentration
Time of concentration can be calculated from the following formula.

$$TC = 10A^{0.1761} + 15 \text{ (in minutes)}$$

Where A is the subarea in acres

- c. Sample Calculation Forms

- (1) Figure 9.2 represents a sample calculation form for storm sewer systems.
- (2) Figure 9.3 represents a sample calculation form for roadside ditch systems.

B. Design of Storm Sewers

1. Design Frequency

- a. Newly Developed Areas

The design storm event for sizing storm sewers in newly developing areas will be a 2-year rainfall.

b. **Redevelopment or In-fill Development**

The existing storm drain will be evaluated using a 2-year storm, assuming no development takes place. The storm drain will then be evaluated with the development in place.

- (1) If the proposed redevelopment has a lower or equal impervious cover, no modifications to the existing storm drain are required.
- (2) If the hydraulic gradient of the existing storm drain is below the top of curb, no improvements to the existing storm drain are required.
- (3) If the hydraulic gradient is above the top of curb, and no structures are threatened, the applicant must check with the City to see if a Capital Improvement Project is proposed that will require a capital contribution. If no Capital Improvement Project is in place for the subject system and no structural flooding is threatened by the project then no improvements to the existing storm drain are required.
- (4) If the hydraulic gradient indicates that structures are threatened by flooding, the applicant has the option of either making improvements to the existing storm drain or providing on-site detention.

c. **City Projects (Capital Improvement Programs)**

Proposed City capital improvements may indicate a larger diameter storm sewer is planned in the area proposed for drainage improvements. The City Storm Sewer Engineering Section has information on proposed improvements and should be consulted as to its impact on new development.

d. **Private Drainage Systems**

Storm sewers for private drainage systems should conform to the City of Houston Uniform Building Code.

2. **Velocity Considerations**

- a. Storm sewers should be constructed to flow in subcritical hydraulic conditions if possible.
- b. Minimum velocities should not be less than 3 feet per second with the pipe flowing full, under the design conditions.
- c. Maximum velocities should not exceed 8 feet per second without use of energy dissipation downstream.
- d. Maximum velocities should not exceed 12 feet per second.

3. **Pipe Sizes and Placement**

- a. Use storm sewer and inlet leads with at least 24-inch inside diameter or equivalent cross section. Box culverts shall be at least 2' x 2'. Closed conduits; circular, elliptical, or box, shall be selected based on hydraulic principals and economy of size and shape.

- b. Larger pipes upstream should not flow into smaller pipes downstream unless construction constraints prohibit the use of a larger pipe downstream, or the improvements are outfalling into an existing system, or the upstream system is intended for use in detention.
 - c. Match crowns of pipe at any size change unless severe depth constraints prohibit.
 - d. Locate storm sewers in public street rights-of-way or in approved easements. Back lot easements are discouraged and will require a variance from the City design standards.
 - e. Follow the alignment of the right-of-way or easement when designing cast in place concrete storm sewers.
 - f. A straight line shall be used for inlet leads and storm sewers.
 - g. Center culverts in side lot storm sewer easements.
- 4. Starting Water Surface and Hydraulic Gradient
 - a. The hydraulic gradient shall be calculated assuming the top of the outfall pipe as the starting water surface.
 - b. At drops in pipe invert, should the upstream pipe be higher than the hydraulic grade line, then the hydraulic grade line shall be recalculated assuming the starting water surface to be at the top of pipe at that point.
 - c. For the design storm, the hydraulic gradient shall at all times be below the gutter line for all newly developed areas.
- 5. Manhole Locations
 - a. Use manholes for precast conduits at the following locations:
 - (1) Size or cross section changes.
 - (2) Inlet lead and conduit intersections.
 - (3) Changes in pipe grade.
 - (4) Street intersections.
 - (5) A maximum spacing of 700 feet measured along the conduit run.
 - (6) Manholes shall be placed so as not to be located in the driveway area.
 - b. Use manholes for monolithic-concrete storm sewers at the same locations as above with the following permitted exception:
 - (1) At intersections of inlet leads unless needed to provide maintenance access.
- 6. Inlets
 - a. Locate inlets at all low points in gutter.
 - b. Valley gutters across intersections are not permitted.
 - c. Inlet spacing is a function of gutter slope and should be designed to conform with 1.05.C.3.b and 1.05.C.3.c of this chapter. For minimum gutter slopes, the maximum spacing of inlets shall result from a gutter run of 700 feet from high point in pavement or the adjacent inlet on a continuously graded

street section, with a maximum of 1400 feet of pavement draining towards any one inlet location.

d. Use only City of Houston Standard Inlets:

| Inlet | Application | Capacity | Dwg. Nos. |
|-----------|--------------------------|----------|------------|
| Type A | Parking Lots/Small Areas | 2.5 cfs | 02637-01 |
| Type B-B | Residential/Commercial | 5.0 cfs | 02637-05 |
| Type C | Residential/Commercial | 5.0 cfs | 02637-06 |
| Type C-1 | Commercial | 10.0 cfs | 02632-06 |
| Type C-2 | Commercial | 15.0 cfs | 02632-06 |
| Type C-2A | Commercial | 20.0 cfs | 02632-06 |
| Type D | Parking Lots | 2.0 cfs | 02632-07 |
| Type D-1 | Small Areas | 2.5 cfs | 02602-08 |
| Type E | Roadside ditches | 20.0 cfs | 02632-9,10 |
| Type H-2 | Residential Commercial | 5.0 cfs | 02633-01 |

- e. Do not use "Beehive" grate inlets or other "specialty" inlets.
- f. Do not use grate top inlets in unlined roadside ditch.
- g. Do not place inlets in circular portion of cul-de-sac streets unless special conditions warrant otherwise.
- h. Place inlets at the end of proposed pavement, if drainage will enter or leave pavement.
- i. Do not locate inlets adjacent to esplanade openings.
- j. Place inlets on side streets intersecting major streets, unless special conditions warrant otherwise.
- k. All alleyway drainage, public or private, shall be conveyed to an inlet prior to entering the public street drainage system.

C. Consideration of Overland Flow

1. Design Frequency

The design frequency for consideration of overland sheet flow will consider extreme storm events which exceed the capacity of the underground storm sewer system resulting in ponding and overland sheet flow through the development to the primary outlet.

2. Relationship of Structures to Street

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

3. Calculation of Flow

- a. Streets will be designed so that consecutive high points in the street will provide for a gravity flow of drainage to the ultimate outlet.
- b. The maximum depth of ponding at high points will be 6 inches above top of curb.
- c. The maximum depth of ponding at low points will be 18 inches above top of curb.

- d. Sheet flow between lots can be provided only through a defined drainage easement.
- e. A map shall be provided to delineate extreme event flow direction through a proposed development and how this flow is discharged to the primary drainage outlet.
- f. In areas where ponding occurs and no sheet flow path exists, then a calculation showing that run-off from the 100-year event can be conveyed and remain in compliance with the other terms of this paragraph must be provided.

D. Design of Open Channels

- 1. Design Frequency
 - a. Open channels shall be designed according to methods described in the HCFCF Criteria Manual.
 - b. Design standards for channel construction should follow the requirements specified in the HCFCF Criteria Manual.
 - c. Design standards for outfalls into channels should conform to those in the HCFCF Criteria Manual.
- 2. Determination of Water Surface Elevation
 - a. Water surface elevations shall be calculated using Manning's Equation and the Continuity equation.
 - b. For the design storm event, the water surface should be calculated to remain within banks.
- 3. Design of Culverts
 - a. Head losses in culverts shall conform to *TxDOT Hydraulics Manual*, Chapter 4 - *Culverts*.
 - b. Generally, corrugated metal pipe will not be approved for permanent installation of culverts in City of Houston right-of-way except at railroad crossings.

E. Design of Roadside Ditches

- 1. Design Frequency
 - a. Roadside ditch design is permissible only for single family residential lots or commercial areas equal to or larger than 0.5 acres.
 - b. The design storm event for the roadside ditches shall be a 2-year rainfall.
 - c. Design capacity for a roadside ditch shall be to 0.5 feet below the edge of pavement or the natural ground at the right of way line, whichever is lower.
 - d. The design must include an extreme event analysis to indicate that structures will not be flooded.
- 2. Velocity Considerations
 - a. For grass lined sections, the maximum design velocity shall be 3.0 feet per second during the design event.

- b. A grass lined or unimproved roadside ditch shall have side slopes no steeper than three horizontal to one vertical.
 - c. Minimum grades for roadside ditches shall be 0.1-foot per 100-foot.
 - d. Calculation of velocity will use a Manning's roughness coefficient of 0.040 for earthen sections and 0.025 for ditches with paved inverts.
 - e. Use erosion control methods acceptable to the City when design velocities are expected to be greater than 3 feet per second.
 - 3. Culverts
 - a. Culverts will be placed at all driveway and roadway crossings, and other locations where appropriate.
 - b. Culverts will be designed assuming inlet control.
 - c. Roadside culverts are to be sized based on drainage area. Calculations are to be provided for each block based on drainage calculations.
 - d. Cross open channels with roadside culverts no smaller than 18 inches inside diameter or equivalent. The size of culvert used shall not create a head loss of more than 0.20' feet greater than the normal water surface profile without the culvert.
 - e. Storm water discharging from a ditch into a storm sewer system must be received by use of an appropriate structure (i.e., stubs with ring grates or type "E" manholes).
 - 4. Invert Protection
 - a. Ditch invert protection shall be used when velocities exceed 3 feet per second.
 - b. Ditch invert protection will be used at the upstream and downstream ends of all culverts.
 - 5. Depth and Size Limitations
 - a. Residential streets - the maximum depth will not exceed 4 feet from center-line of pavement.
 - b. Commercial and thoroughfare areas - the maximum depth will not exceed 4 feet.
 - c. Roadside ditch bottoms should be at least 2 feet wide, unless design analysis will support a narrower width.
 - d. Ditches in adjoining and parallel easements shall have the top of bank not less than 2 feet from the outside easement line.
- F. Design of Outfalls
- 1. Outfall design shall conform to HCFCD Standards.

G. Storm Water Detention

1. Application of Detention

- a. As a normal consideration, storm water detention is not required. The use of on-site detention is required when reported incidence of structural flooding exist, or when in-fill or redevelopment will result in a potential threat to existing structures unless the current infrastructure is improved, or the City has developed a plan for a detention facility to serve the overall area.
- b. If development, redevelopment, or in-fill development has the opportunity to drain directly into a channel maintained by HCFCFCD, then HCFCFCD criteria prevails.
- c. If the drainage system outfalls directly into a channel maintained by HCFCFCD, and the requirements of HCFCFCD include payment of an impact fee, then no further impact fee will be required by the City.
- d. If redevelopment occurs without increasing the overall impervious character of the site, then no detention will be required.

2. Calculation of Detention Volume

- a. Detention volume for redevelopment areas, is calculated on the basis of the amount of area of increased impervious cover.
- b. For areas less than 5 acres, 0.2 acre-ft per acre.
- c. For areas greater than 5 acres and less than 50 acres, 0.32 acre-ft per acre.
- d. For areas greater than 50 acres, reference Harris County Flood Control District Criteria Manual.
- e. Private parking areas, private streets, and private storm sewers may be used for detention provided the maximum depth of flooding does not exceed 9 inches directly over the inlet and paved parking areas are clearly marked.

3. Calculation of Outlet Size

- a. Detention pond discharge pipe into an existing storm sewer line or existing City of Houston ditch:
 - (1) Maximum pool elevation at or below the design hydraulic grade at the outfall - The discharge line shall be sized for the Design Storm with the outfall pipe flowing full. The pond will float on the drainage system to provide maximum benefit.
 - (2) Maximum pool elevation at or above the hydraulic grade at the outfall - Provide a reducer or restrictor pipe to be constructed inside the discharge line. The discharge line shall be sized for the Design Storm with the outfall pipe flowing full.

- b. Reducer or Restrictor Pipes shall be sized as follows:
- (1) The reducer or restrictor will be sized for undeveloped rate of discharge at no greater than 0.5 cfs per acre.
 - (2) Use the following equations to calculate the required outflow orifice:

$$Q = CA 2 \sqrt{gh}$$
$$D = Q^{1/2} / 2.25 h^{1/4}$$

Where Q = outflow discharge in cfs

C = 0.8

A = orifice area

h = water surface differential in feet = head

D = orifice diameter

- (3) Restrictor shall be either of the required diameter or of the equivalent cross-sectional area. The orifice diameter D shall be a minimum of 6 inches.
- c. In addition to a pipe outlet, the detention basin should be provided with a gravity spillway that will protect structures from flooding should the detention basin be overtopped.

4. Ownership and Easements

a. Private Facilities

- (1) Pump discharges into a roadside ditch requires the submittal of pump specifications on the design drawings.
- (2) The City reserves the right to prohibit the use of pump discharges where their use may aggravate flooding in the public right-of-way.
- (3) Responsibility for maintenance of the detention facility must be indicated by letter submitted to the City as part of the design review.
- (4) All private properties being served have drainage access to the pond.
- (5) No public properties drain into the detention area.
- (6) A private maintenance agreement is provided when multiple tracts are being served.

b. Public Facilities

- (1) Facilities will only be accepted for maintenance by the City in cases where public drainage is being provided.
- (2) The City will require a maintenance work area of 20-foot width surrounding the extent of the detention area. Public rights-of-way or permanent access easements may be included as a portion of this 20-foot width.
- (3) A dedication of easement must be provided by plat or by separate instrument.

- (4) Proper dedication of public access to the detention pond must be shown on the plat or by separate instrument. This includes permanent access easements with overlapping public utility easements.

1.06 EASEMENT AND RIGHTS-OF-WAY

Storm sewer easement and right-of-way requirements are described in Chapter 5, Easement Requirements, of this Design Manual.

1.07 SUBMITTALS

- A. Preliminary Submittals - Submit for Review and Comment
 1. One line drawings are recommended and may be required as part of the platting process. One line drawings should include:
 - a. Approximate definition of lots and street patterns.
 - b. The approximate drainage areas for each system.
 - c. A definition of the proposed drainage system by single line.
 - d. The proposed pipe diameters.
 - e. Any proposed drainage easements.
 - f. Floodplain boundary, if any.
- B. Final Design - Submit the Following for Approval
 1. Copies of any documents which show approval of exceptions to the city design criteria.
 2. Design calculations for storm line sizes and grades, and for detention facilities, if any.
 3. Design calculations for the hydraulic grade line of each line or ditch, and for detention facilities, if any.
 4. Contour map and drainage area map of the project.
 5. Plan and profile sheets showing storm water design (public facilities only).
 6. Projects located within a Flood Plain boundary or within a Flood Plain Management area shall:
 - a. Show the Flood Plain boundary or Flood Plain area, as appropriate, on the one-line drawing or drainage area map.
 - b. Comply with all applicable submittal requirements of Chapter 19, Code of Ordinances.
 7. Soil boring logs.
- C. Signature Stage - Submit the Following for Approval
 1. Review prints.
 2. Original drawings.
 3. Storm water detention maintenance agreement letters.

1.08 QUALITY ASSURANCE

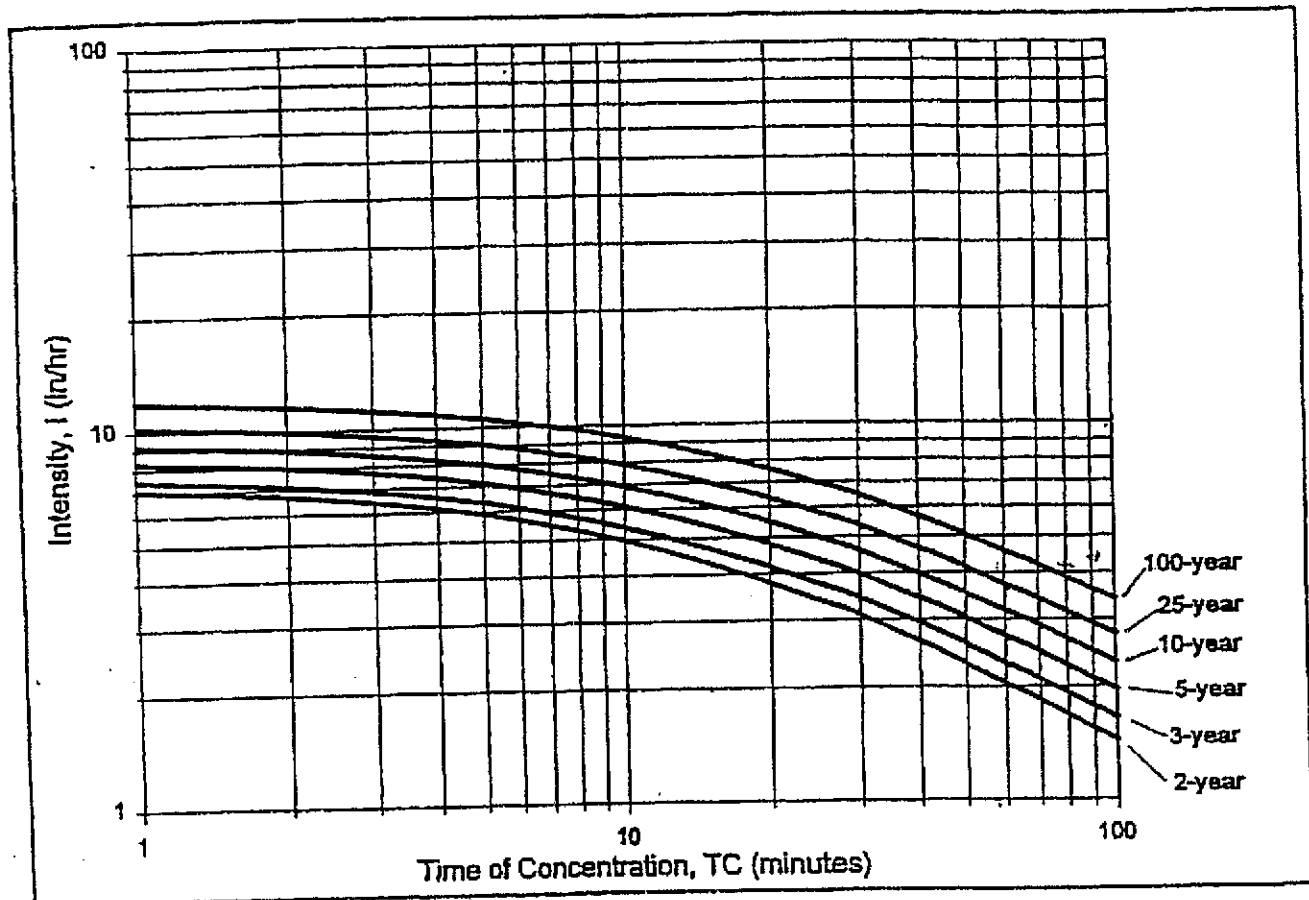
- A. Prepare calculations and construction drawings under the supervision of a Professional Engineer trained and licensed under the disciplines required by the drawings. The final construction drawings and all design calculations must be sealed, signed, and dated by the Professional Engineer responsible for the development of the drawings.

PART 2 EXECUTION

2.01 DESIGN ANALYSIS

- A. All projects shall be tied to National Geodetic Survey (NGS) Datum adjustment which matches the Federal Emergency Management Agency (FEMA) rate maps or the most current NGVD which matches the FEMA rate maps. In the event GPS surveying is used to establish bench marks, at least two references to bench marks relating to the FEMA rate maps must be identified. Equations may be used to translate other datum adjustments to the required adjustment.
- B. Plan sets will include a drainage area map, which will contain calculations of flow by the rational method.
- C. All drainage systems for curb and gutter pavements shall be underground closed conduits; individual residential lot drainage is exempt. Drainage systems for pavements without curb and gutter shall be roadside open-ditch sections.
- D. Soil boring with logs shall be made along the alignment of all storm sewers having a cross section equal to or greater than 72 inches in diameter or equivalent cross section area. Boring should be taken at intervals not to exceed 500 linear feet and to a depth not less than 3 feet below the flow line of the sewer. The required bedding will be determined from the soil boring.

Figure 9.1 City of Houston IDF Curves
 Intensity vs. Time of Concentration vs. Rainfall Frequency
 Source: Hydro 35/TP-40



$$Intensity, i = \frac{b}{(d + TC)^e}$$

| Rainfall Frequency | b | d | e |
|--------------------|-------|------|--------|
| 2-year | 75.01 | 16.2 | 0.8315 |
| 3-year | 77.27 | 17.1 | 0.8075 |
| 5-year | 84.14 | 17.8 | 0.7881 |
| 10-year | 93.53 | 18.9 | 0.7742 |
| 25-year | 115.9 | 21.2 | 0.7808 |
| 100-year | 125.4 | 21.8 | 0.7500 |

EXHIBIT B
SCHEDULE OF FEES

Base Fees

| | |
|--------------------------------------------------------|-------|
| Development Plat | \$250 |
| Class 1 Plat | \$250 |
| Class 2 Plat | \$400 |
| Class 3 Plat | \$400 |
| General Plan filed separately from subdivision plat | \$400 |
| Street Dedication plat | \$400 |
| Extension of Plat Approval | \$150 |
| Plat Name Change | \$150 |
| Vacating Plat | \$400 |

Additional Fees

Preliminary Plat

1. 8.50 per lot; and
2. \$50.00 per acre or any fraction thereof for each area platted as a reserve

Final Plat

1. \$8.50 per lot; and
2. \$50.00 per acre or any fraction thereof for each area platted as a reserve

Vacating Plat

\$80.00 per acre or any portion thereof of the gross area of the subdivision being vacated

Street Dedication Plat

\$106 per acre or any fraction thereof of the gross area of the street right-of-way being dedicated