CITY OF IOWA COLONY, TEXAS

SUBDIVISION ORDINANCE

August 2002

As Amended December 16, 2002, by Ordinance No. 2002-10

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ARTICLE I. GENERAL

Section 1. Application and Compliance with Ordinance

A. Application:

The rules and regulations of this ordinance shall apply to and govern the approval and requirements of subdivisions and property development within the corporate limits and that portion of the extraterritorial jurisdiction of the City of Iowa Colony over which the City has not ceded jurisdiction to regulate subdivisions pursuant to a written agreement with Brazoria County under the provisions of Chapter 242 of the Local Government Code.

B. Compliance with Ordinance:

Any person who subdivides any tract, lot or parcel of land within the City of Iowa Colony or its extraterritorial jurisdiction must submit to the City for its approval a preliminary, final, amending plat, replat or abbreviated plat, as applicable. No subdivision of any tract, lot or parcel of land shall be lawful until such time that the plat has been approved in accordance with the terms of this Ordinance. Unless and until a preliminary and final plat, abbreviated plat, amending plat or replat of a subdivision shall have been first approved in the manner provided herein by the City, no person shall construct or cause to be constructed any street, utility, facility, building, structure, or any other improvement on any lot, tract, or parcel of land within such subdivision except as specifically permitted in this Ordinance.

No building, plumbing, electrical or mechanical permit shall be issued by the City for the construction or repair of any structure on a lot or tract in a subdivision for which a final plat, abbreviated plat, or amending plat has not been approved by the City and filed for record. No building, plumbing, electrical or mechanical permit shall be issued by the City for the construction or repair of any structure on a lot or tract in a subdivision in

which the required storm drainage improvements have not been constructed and the permanent public improvements have not been approved and accepted by the City.

Section 2. Definitions

A. The following definitions shall apply in the interpretation and enforcement of this Ordinance. The terms not defined herein shall be construed in accordance with the ordinances of the City or their customary usage and meaning in municipal planning and engineering practices.

Abbreviated Plat means a complete and exact subdivision plat prepared by a Registered Professional Land Surveyor registered in the State of Texas, in conformity with the provisions of this Ordinance and in a manner suitable for recording with the County Clerk, Brazoria County, Texas. For the purpose of this Ordinance, an abbreviated plat shall be considered a final plat.

Alley means minor ways which are used primarily for vehicle service access to the back or the side of properties otherwise abutting on a street.

Civil Site Work means any work performed upon the ground of the specific tract of land or property for the purposes of installing, constructing or completing the water lines, sanitary sewer lines, storm sewer lines, the roadways and/or streets and the grading and/or construction of the subdivision lots, detention pond and any other infrastructure work performed within the subdivision.

City means the Planning Commission, City Planning Department, City Building Inspector, Department of Public Works, City Engineer or City Council of the City of Iowa Colony.

Design Criteria means the City=s design criteria manual for wastewater collection systems, water lines, streets, sidewalks and storm drainage, as it may be amended from time to time by the City Council.

Developer means any person who improves or develops land in the City whether or not a subdivision of the land is required by this. The term "developer" shall be synonymous with "subdivider" in cases where the subdivision of land is involved.

Development means the new construction of any building, structure, or improvement or the enlargement of any exterior dimension of any building, structure or improvement.

Extraterritorial jurisdiction (ETJ) means the unincorporated area that is contiguous to and located within one half mile of the corporate boundaries of the City.

Family Member means the following persons related to the individual who proposes to convey land: wife, husband, father, mother, son, daughter, sister, brother, grandfather, grandmother, granddaughter, grandson, whether natural, adopted or related by marriage.

Final Plat means a complete and exact subdivision plat prepared by a Registered Professional Land Surveyor registered in the State of Texas, in conformity with the provisions of this Ordinance and the Texas Board of Professional Land Surveying regulations and in a manner suitable for recording with the County Clerk, Brazoria County, Texas.

Flag-Shaped or Key-Shaped lot means 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.

Governing body means the City Council of the City of Iowa Colony, Texas.

Infrastructure means streets, sidewalks, drainage facilities or improvements, water and sanitary sewer facilities, utilities, parks, and any other improvements for which the City may ultimately assume responsibility for maintenance and operation.

Lot means a physically undivided tract or parcel of land having frontage on a public or private street, which is, or in the future may be offered for sale, conveyance, transfer or improvement and which is designated as a separate and distinct tract and identified by numerical or letter identification on a duly and properly recorded subdivision plat.

Person means an individual, partnership, firm, association, corporation or any other entity howsoever formed and shall include any officer, agent, employee, trustee or servant thereof.

Planned Unit Development (PUD) means a development constructed on a tract of minimum size under single ownership which is planned and developed as an integral unit and consists of a combination of land uses.

Planning Commission means the duly-appointed City Planning Commission of the City of Iowa Colony.

Plat means a map, chart, survey, plat, replat or amending plat containing a description of the subdivided land with ties to permanent landmarks or monuments.

Preliminary Plat means a plat of a proposed subdivision prepared in accordance with the provisions of this chapter illustrating the features of the development for purpose of review and preliminary approval by the Planning Commission and the City Council.

Resubdivision means any change in a map of an approved or recorded subdivision plat that affects any street layout on the map or area reserved thereon for public use or any lot line, or that affects any map or plan legally recorded prior to the adoption of any regulations controlling subdivisions.

Street means a public right-of-way dedicated for public use which provides vehicular access to the adjacent land. Included in this definition are the following general classifications of streets:

(1) **Major thoroughfares or arterial streets** are principal traffic arteries more or less continuous across the City which are intended to connect remote parts of the City and which are used primarily for fast or heavy volume traffic.

(2) **Secondary arterial streets** are those which carry traffic from minor streets to the major system of arterial streets and highways, including the principal entrance streets of a residential development and streets for circulation within such development.

(3) **Minor streets** are those which are used primarily for access to the abutting properties and which are intended to serve traffic within a limited area.

(4) **Marginal access streets** are minor streets which are parallel to and adjacent to arterial streets and highways and which provide access to abutting properties and protection from through-traffic.

(5) **Boulevards** are streets utilizing two 24-foot, minimum width, paved roadway sections divided by a median, which serves to separate traffic moving in opposite directions.

Subdivider means any person who does or participates in the doing of any act toward the subdivision of land within the intent, scope and purview of this ordinance. The terms "subdivider" and "developer" are synonymous and are used interchangeably for purposes of this ordinance in connection with the subdivision of land.

Subdivision or subdivide means the division of any lot, tract or parcel or land by plat, map or description into two or more parts, lots or sites for the purpose, whether immediate or future, of sale, rental or lease, or division of ownership. Any dedication and the laying out (or realignment) of new streets, or other public accessways, with or without subdividing lots, is a subdivision. An "addition" is a subdivision as defined herein. The term "subdivision" shall also include the resubdivison and replatting of land or lots which are part of a previously recorded subdivision. The term "subdivision" or "subdivide" includes the division of land whether by plat or by metes and bounds description, and, when appropriate to the context, shall relate to the process of subdividing or to the land subdivided.

Section 3. Fees

The schedule of fees set forth in Attachment A of this Ordinance shall apply to this Ordinance. Fees and inspection charges shall be paid in advance of any review by the City staff, whether or not the plat is approved or denied. Preliminary plats, final plats, replats, amending plats, abbreviated plats and construction plan reviews will not be accepted or processed until fees are paid.

Section 4. Variances

A developer may request a variance from this Ordinance in writing which shall be presented to the Planning Commission. The Planning Commission shall consider the variance and may make a recommendation for approval to City Council. The City Council may authorize a variance from this Ordinance, based upon or contrary to the Planning Commission recommendation. In granting a variance, the Council shall prescribe those conditions it deems necessary or desirable to the public interest. In making the findings herein above required, the Council shall take into account the nature of the proposed use of the land involved, the existing use of the land in the vicinity, the number of persons who will reside or work in the proposed subdivision, and the probable effect of such variance upon traffic conditions and upon public health, safety, convenience and welfare in the vicinity.

Section 5. Enforcement

The City of Iowa Colony will refuse to issue permits or furnish City services, if applicable, to any person who violates the terms of this Ordinance, and in addition shall have the right to prohibit or correct violation(s) by writs of injunction, prosecution, or other legal process. The City will withhold improvements of any nature whatsoever, including issuance of building permits, the maintenance of streets and furnishing of water and sewer service, if applicable, to all additions until the subdivision plat has been approved by the City Council, all the infrastructure improvements have been formally accepted by the City and final construction

plans have been provided to the City.

Section 6. Compliance with City Thoroughfare Plan

All applications for development, subdivision, or plat approval under this Ordinance shall comply with the City's Thoroughfare Plan.

Section 7. Reserved

Section 8. Offenses

A. It shall be unlawful to construct two (2) single family dwellings which shall be occupied on a continual basis on a single lot, parcel or tract of land.

B. Unless otherwise exempted herein, it shall be unlawful to construct or install or cause to be constructed or installed a building or structure across or over a lot line or property line.

C. Unless otherwise exempted herein, it shall be unlawful to subdivide any tract, lot or parcel of land without complying with the terms of this Ordinance and Local Government Code.

D. Unless otherwise exempted herein, it shall be unlawful to construct or cause to be constructed any street, utility, building, structure or other improvement on any lot, parcel or tract of land without complying with the provisions of this Ordinance.

E. It shall be unlawful for any person to violate a provision of this Ordinance.

Section 9. Penalty

Any person who shall violate any provision of this Ordinance shall be guilty of a misdemeanor and upon conviction shall be fined in an amount not to exceed $500.00 daily. Each day of violation shall constitute a separate offense.

Section 10. Effective Date

All subdivision applications filed for preliminary plat approval on or after the effective date of this Ordinance shall be subject to these regulations. A subdivision application filed or which has received preliminary approval prior to the effective date of this ordinance shall be subject to the subdivision regulations in effect at the time of filing the application for preliminary plat approval.

Section 11. Required Improvements

All of the improvements required under these regulations, improvements specified in the comprehensive plan, and improvements which are necessary for the adequate provision of streets, drainage, utilities, municipal services, and facilities to the subdivision, shall be constructed at the sole expense of the subdivider.

Sections 12-17. Reserved.

ARTICLE II. SUBDIVISION AND DEVELOPMENT PROCESS

Section 18. Subdivision and Development Conferences

A pre-development meeting between the developer and the Planning Commission or its designee, such as the Building Inspector and/or City Engineer, will be held to discuss the

development=s concepts and approval procedures. This is an informal process to allow an exchange of information between the developer and City staff. No approval will be issued for conceptual plans and such plans are not binding on the developer or the City.

Section 19. Preliminary Plat Process

A. Following the meeting with the Planning Commission or its designee, all persons desiring to subdivide a tract of land within the City or its extraterritorial jurisdiction shall prepare or cause to be prepared a preliminary plat according to the following (unless the Abbreviated Plat Provisions of Section 23 or Amending Plat Provisions of Section 26 are applicable and are utilized):

B. The preliminary plat shall be drawn to a scale of one hundred (100) feet to the inch or larger, and shall show at a minimum or be accompanied by the following:

1. The proposed name of the subdivision.
2. The north point, scale and date.
3. The names, addresses and telephone numbers of the subdivider, the owner of record, the Civil Engineer licensed as a Professional Engineer in the State of Texas, responsible for the design and the Registered Professional Land Surveyor registered in the State of Texas, responsible for the land survey.
4. The boundary line (accurate in scale) of the tract to be subdivided.
5. Contours with intervals of five-tenths (0.5) feet, more or less, referred to sea level datum, as required to show at least two (2) contours within the subdivision in addition to those necessary to clearly show outfall drainage including a benchmark on/or adjacent to the property.
6. Proper adjoiner information including the names of adjacent subdivisions with recording information.

7. The location, widths, and names of all existing or platted streets or other public rights-of-way on-site and adjacent to the tract and within 200 feet of the tract as circumstances require.
8. Existing pavement, sewers, water mains, culverts, or other underground structures adjacent to the tract and within 200 feet of the tract with pipe sizes, grades and locations indicated.
9. All parcels of land intended to be dedicated for public use or reserved in deeds for the use of all property owners in the proposed subdivision, together with the purpose of conditions or limitations of such reservations, if any.
10. The layout, names and widths of proposed streets and easements, the radius of all arcs, length of the tangents, and the length of tangents between curves.
11. The layout, numbers, dimensions and size of the proposed lots with building setback lines shown.
12. All other important features such as section lines, political subdivisions or corporation lines and school district boundaries.
13. The draft of any protective covenants whereby the subdivider proposes to regulate the use of the land in the subdivision provided, however, that such restrictive covenants, conditions or limitations shall never be less than the minimum requirements of the City under the terms of this Ordinance. Where infrastructure design criteria is based on a specific type or density of development, the covenants shall require development to conform to the design criteria. The covenants must include language for establishing the person or persons responsible for maintenance of the drainage detention facilities.
14. A preliminary drainage plan which has been approved by both the City and the appropriate Brazoria County Drainage District and meets the requirements as set forth in the Brazoria County Drainage Criteria Manual shall be submitted with each preliminary plat (at the same scale) which shall include the following:

(a) Overall layout of lots or parcels.

(b) Contours.

(c) Any defined water ways on or adjacent to the site.

(d) Drainage area map showing on-site and off-site areas draining across or adjacent to the site with preliminary calculations of flows.

(e) Flood zones and flood ways as determined by the applicable FEMA maps. The Base Flood Elevation (BFE) shall be indicated on the preliminary plat as shall the flood zone.

(f) Proposed drainage improvements including detention areas and depths with preliminary calculations.

(g) Proposed easements which shall include all drainage and maintenance easements.

C. Three (3) copies of the preliminary plat and supporting data required by this Ordinance shall be submitted to the City along with the required fees as set forth in Attachment A. The plat shall be reviewed by the City Engineer for compliance with State law, this Ordinance, and the City=s ordinances, policies, rules and regulations.

D. Upon satisfactory review of the plat by the City Engineer, ten (10) copies of the plat including any necessary corrections and supporting documentation shall be provided to the City Secretary.

E. In cases where the subdivider desires to have the preliminary plat placed on a particular Planning Commission agenda, the preliminary plat and required supporting data must be submitted at least fifteen (15) days prior to the requested agenda date. However, no agenda action will be scheduled until the application is administratively complete. The Planning Commission shall render a decision within thirty (30) days of the City's receipt

of an administratively complete application, provided that the application is not withdrawn prior to Commission review. The Planning Commission's decision shall consist of a recommendation of approval, disapproval or conditional approval.

F. Upon action by the Planning Commission, City staff shall schedule the preliminary plat for action at a City Council meeting to be held within thirty (30) days of the Planning Commission meeting date at which action was taken on the preliminary plat. A recommendation along with the necessary copies of any corrected plats, plans or supporting documentation will be forwarded to City Council for action at the scheduled meeting date, provided that the meeting is set at least 15 days in advance. The subdivider must submit corrected plats, plans or supporting documentation to the City not less than thirty (30) days prior to such scheduled City Council meeting date. If the Planning Commission requires changes to the preliminary plat, the subdivider shall make the required changes. The City Engineer shall have fifteen (15) days for additional review.

G. Following approval of the preliminary plat and prior to actual construction of any water and sanitary sewer facilities, the Texas Commission on Environmental Quality shall be notified, if required, in accordance with Title 30, Chapter 317 of the Texas Administrative Code.

H. The approval of the preliminary plat does not constitute acceptance of the subdivision, but is merely an authorization to proceed with the preparation of the final plat. The approval of the preliminary plat shall expire twelve (12) months after City Council approval unless the final plat has been submitted for final approval during that time. Upon written request of the subdivider, an extension of time may be given at the discretion of the City Council for a single extension period of six (6) months, provided

the subdivider has shown that he is proceeding in good faith to complete the work necessary before filing the final plat.

Section 20. Master Preliminary Plat Procedure for a Large Tract

A. Where the proposed subdivision constitutes a unit of a larger tract which is intended to be subsequently subdivided as additional units of the same subdivision, the subdivision plat shall be accompanied by a master preliminary plat showing the tentative proposed layout of the streets, blocks and drainage of the entire area. The over-all layout, if approved by the City Council, shall be attached to and filed with a copy of the approved subdivision plat in the permanent files of the City. Thereafter, fractional final plats of subsequent units of such subdivision may be submitted without additional preliminary plat approval provided that no significant changes are made to the master preliminary plat. Any request for change to the over-all layout must be submitted according to the procedures prescribed in Section 19, Preliminary Plat Process.

B. The approval of the master preliminary plat shall expire five (5) years after City Council approval. Such approval may be reinstated after review by the City Council for a maximum of two (2) single extensions of one (1) year with a showing of good cause by the subdivider.

Section 21. Construction Plans

After approval of the preliminary plat, construction plans meeting the requirements of the City=s design criteria and other applicable ordinances, rules, policies and regulations shall be submitted for all improvements proposed on the preliminary plat. Engineering Standards and Standard Details are included herewith as Attachments B and C, respectively. After a final, amending or abbreviated plat has been approved by the City Council and the final

construction plans have been approved by the City Engineer and all required fees have been paid, the subdivider may proceed with construction of the public infrastructure after obtaining all necessary building permits from the City of Iowa Colony.

Section 22. Final Plat Procedure

A. No final plat shall be considered unless and until a preliminary plat has been submitted and approved, unless the abbreviated plat procedure is used, and a set of final construction plans has been approved by the City Engineer for the public infrastructure improvements.

B. After the foregoing procedure has been complied with and the preliminary plat approved by the City Council, the subdivider shall prepare or cause to be prepared a final plat, or plats, together with other supplementary information as specified herein. The final plat shall conform substantially to the preliminary plat as approved and shall reflect any conditions or requirements for final approval imposed by the City Council, together with the following additional requirements which must be shown on or accompany the final plat:

1. Name of the subdivision.
2. North arrow, scale, date, and vicinity map drawn to a scale 1" = 2,640'.
3. Name, address and telephone number of the subdivider.
4. A list showing the names of person(s) to whom notice of hearing shall be sent.
5. A signed certificate of the Registered Professional Land Surveyor registered in the State of Texas, who surveyed, mapped, and monumented the land shall be placed on the face of the plat.

6. A statement of express dedication of all streets, easements, alleys, parks, playgrounds, public places and any other rights-of-way within or outside the subdivision necessary to satisfy the requirements of this Ordinance to the public use forever shall be executed by all persons owning an interest in the property subdivided, resubdivided or platted and shall be acknowledged in the manner prescribed by the laws of the State of Texas for conveyance of real property. Lienholders must execute a subordination agreement subordinating their liens to all public streets, alleys, parks, school sites and other public areas shown on the plat of such subdivision or resubdivision as being set aside for public use and purpose.
7. A field note description of the tract of land subdivided.
8. A statement and express representation on the face of the plat that the parties joining in such dedication are the sole owners of such tract of land.
9. A positive reference and identification of the plat of such subdivision by the name of such subdivision, date of plat and the name of the surveyor.
10. The boundary lines with accurate distance and bearings, the exact location and width of all existing or recorded streets intersecting the boundary of the tract. The names of adjacent subdivisions and/or the names of owners of adjacent land with all recording information shown. All necessary data to reproduce the plat and each lot on the ground must be shown on the plat.
11. Bearings and distances to the nearest established street lines or official monuments, which shall be accurately described on the plat.
12. The exact layout shall include the following:
    a. Streets and street names.
    b. The length of all arcs, internal angles, points of curvature, length and bearing of the tangents, and the length of tangent between curves.
    c. All easements or rights-of-way provided for drainage, public services or

utilities and any limitations of the easements/rights-of-way.

d. All lot and block numbers.

e. All lot lines with accurate dimensions.

f. All alleys.

g. Location and description of monuments.

h. Building setback lines from all adjacent streets.

13. Boundary closure calculations**,** the minimum of which shall be 1:15,000.

14. The draft of any protective covenants whereby the subdivider proposes to regulate the use of the land in the subdivision provided, however, that restrictive covenants, conditions, or limitations shall never be less than the minimum requirements of the City under the terms of this Ordinance or other City Ordinances.

15. A waiver of claim for damage occasioned by the establishment of grades or alterations of the surface of any portion of the streets.

16. An original certificate obtained from the appropriate Brazoria County taxing authority showing that all taxes have been paid on the tract to be subdivided and that no delinquent taxes against the property are outstanding.

17. Such other certificates, data, affidavits, and endorsements or dedications as may be required by the City Council for the enforcement of these regulations.

18. Certificate of approval for both Planning Commission and City Council signatures on face of the plat. Additionally, a certificate of approval signed by the applicable Drainage District shall appear on the face of the plat.

19. Letters from utility companies indicating that the required easements are shown on the plat and indicating the availability of utility service.

20. An updated current Title Policy or Title Commitment from a reputable title company reflecting the current owner of the tract of land.

21. No infrastructure improvements shall be shown on a final plat.

22. A notation on the plat that sidewalks must be constructed as part of the issuance

of a building permit for each tract, if sidewalks are required by the City's Sidewalk Master Plan.

23. A notation on the plat that no building permits will be issued until all the storm drainage improvements, which may include detention, have been constructed.
24. A notation on the plat that the final plat will expire two (2) years after final approval by the City Council if construction of the improvements has not commenced within the two (2) year period or the one (1) year extension period granted by City Council.
25. A one year maintenance bond in the amount of 50% of the cost of the infrastructure improvements valid one year from the date the infrastructure is accepted and/or approved by the City.
26. Construction drawings of the proposed infrastructures improvements must be approved by the City Engineer prior to the City Council approval of the final plat.
27. Two (2) original mylar copies of the final plat and supporting data shall be submitted to the City Secretary after approval by the appropriate Brazoria County Drainage District. The plats shall be submitted to the City Engineer at least twenty one (21) days prior to the scheduled meeting date and shall be reviewed by the City Engineer for compliance with State law, this Ordinance, other City Ordinances, policies, rules and regulations. On receipt by City staff of an administratively complete application, staff shall schedule the plat for action by the Planning Commission at its next available and appropriate meeting. At least seven (7) days prior to the scheduled meeting date the subdivider shall provide to the Planning Commission fifteen (15) copies and two (2) original mylar copies of the final plat, prepared in accordance with the Brazoria County Clerk=s requirements for plat recording, along with supporting documentation. The Planning Commission shall render a decision within thirty (30) days of the City's receipt of an administratively complete application, provided that the application is not

withdrawn prior to Commission review. The decision may consist of a recommendation of approval or disapproval. No final plat shall be processed until final construction plans are approved.

28. Upon action by the Planning Commission, City staff shall schedule the final plat for action at a City Council meeting to be held within the thirty (30) days of the Planning Commission meeting date at which action was taken on the final plat. The Planning Commission recommendation, along with the necessary plats and supporting documentation, will be forwarded to City Council for action at the scheduled meeting date. If the plat conforms to all conditions and requirements established by this Ordinance, City Council may approve the plat. Should the final plat, as submitted, fail to meet the conditions and requirements of City Council, then the Council shall disapprove the plat and note its disapproval thereon and attach thereto a statement of the reasons for disapproval. A disapproved final plat may be resubmitted with correcting changes within thirty (30) days of Council action.
29. The final plat and any applicable restrictions shall be recorded by the City in the Office of the County Clerk, Brazoria County, Texas within a period of thirty (30) days from the date of approval by the City Council. At the time of submission of the final plat, the subdivider must deposit with the City sufficient funds for recording of the plat.
30. Approval of the final plat shall expire two (2) years after City Council approval unless within such two (2) year period the developer has commenced construction of the improvements identified in the final construction plans approved by the City or requests and obtains approval of a one-year extension from the City Council. If a one-year extension is requested and approved by the City Council, the construction of improvements identified in the final approved construction plans must be commenced within the one-year extension period or the final plat will

expire.

31. In the event that the tract of land being subdivided fronts on a street or road which does not meet the City=s design specifications, the subdivider shall be required to improve the street or road to meet those specifications from a street or road that does meet the City=s requirements to the farthermost boundary of the subdivision.

Section 23. Abbreviated Platting Procedure

A. An abbreviated platting procedure may be followed in instances where a simplified plat or replat of a subdivision is proposed and the submission and review of a preliminary plat is not necessary for a complete understanding and evaluation of the development and its needs or impact. When all requirements of this section are satisfied and the written approval of the City Engineer is obtained, the submittal of a preliminary plat may be eliminated from the development and subdivision process in accordance with the provisions of this section and the subdivider shall be required only to comply with the final plat provisions and procedures of this Ordinance.

B. To qualify for the abbreviated platting procedure the proposed subdivision or resubdivision must meet all of the following requirements:

1. All lots of the proposed subdivision must front on a public street or streets that meet the following criteria:

a. The street(s) has/have been previously dedicated to and accepted by the City, County or State, as applicable, is/are being maintained by the entity with jurisdiction, and is/are being traveled by the public.

b. The street(s) exist(s) within a right-of-way of sixty-foot (60) minimum width, or the proposed plat will dedicate the necessary additional rights-of-way to provide a minimum of thirty-foot (30) width from the centerline of the existing or original right-of-way.

2. No additional streets or alleys or extensions of existing streets or alleys are required for the proposed subdivision.
3. A drainage plan covering all land to be improved must be prepared in accordance with the Brazoria County Drainage Criteria Manual and be approved by both the City and the appropriate Brazoria County Drainage District. Construction plans for each improvement must have been approved by the City prior to approval of the plat.
4. All necessary easements and/or public dedications are either existing or will be dedicated by the owner/subdivider. All such easements and/or public dedications must be acceptable in width and configuration.

Section 24. Vacating Plat

A. The developer of the tract covered by a plat may vacate the plat at any time before any lot in the plat is sold. The plat is vacated when a signed, acknowledged instrument declaring the plat vacated is approved and recorded in the manner prescribed for the original plat.

B. If lots in the plat have been sold, the plat, or any part of the plat, may be vacated on the application of all owners of lots in the plat with approval obtained in the manner prescribed for the original plat.

C. The County Clerk will write legibly on the vacated plat the word AVacated@ and will enter on the plat a reference to the volume and page at which the vacating instrument is recorded.

D. On the execution and recording of the vacation instrument, the vacated plat has no effect.

E. The procedure for vacating a plat shall conform to the current Texas Local Government Code and shall be subject to the same approval process as for a final plat.

Section 25. Replatting Without Vacating Preceding Plat

A. A replat is a redesign of all or a part of a recorded plat or subdivision of land which substantially changes the elements of the plat. The same procedures shall be followed as for preliminary, final or abbreviated plat. The replat must be in accordance with the requirements of the current Texas Local Government Code ('212.013, 212.014, 212.015). A replat of a subdivision or part of a subdivision may be recorded and is controlling over the preceding plat without vacation of that plat if the replat:

1. Is signed and acknowledged by only the owners of the property being replatted;
2. Is approved by City Council, after a public hearing on the matter at which parties in interest and citizens have an opportunity to be heard;
3. Does not attempt to amend or remove any covenants or restrictions.
4. Identifies the lots or portions of the lots being replatted and provides a reason for the replat.

B. A replat without vacation of the preceding plat must also conform to the requirements of this subsection if any of the area being replatted was limited by deed restrictions to residential use for not more than two (2) residential units per lot. These requirements are:

1. Notice of the hearing required by this Section 25 shall be given in accordance with Subsection C below.
2. If the proposed replat requires a variance and is protested in accordance with this Subsection B 2, the proposed replat must receive, in order to be approved, the

affirmative vote of at least three-fourths of the members present of both the Planning Commission and City Council. For legal protest, written instruments signed by the owners of at least 20 percent of the area of the lots or land immediately adjoining the area covered by the proposed replat and extending 200 feet from that area, but within the original subdivision, must be filed with the City of Iowa Colony prior to the close of the public hearing. In computing the percentage of land area above, the area of the streets and alleys shall be included. Compliance with this subsection is not required for approval of a replat or part of a preceding plat if the area to be replatted was designated or reserved for other than single or duplex family residential use by notation on the last legally recorded plat.

C. Notice of the hearing required under Section 25 of this shall be given before the 15th day before the date of the hearing by:

1. Publication in the official newspaper of the City; and
2. By written notice, with a copy of Section 25 B attached, forwarded by the City to the owners of lots that are in the original subdivision and that are within 200 feet of the lots to be replatted, as indicated on the most recently approved municipal tax roll or in the case of a subdivision within the extraterritorial jurisdiction, the most recently approved county tax roll of the property upon which the replat is requested. The written notice may be delivered by depositing the notice, properly addressed with postage prepaid, in a post office or postal depository within the boundaries of the City.
3. All costs for these notices and letters shall be paid by the developer.

D. The final replat shall meet the requirements of and be subject to the approval process for final plats.

Section 26. Amending Plat

A. The City Council after action by the Planning Commission may approve and issue an amending plat, which may be recorded and is controlling over the preceding plat without vacation of that plat if the amending plat is signed by the applicants only and is solely for one or more of the following purposes:

1. To correct an error in a course or distance shown on the preceding plat;
2. To add a course or distance that was omitted on the preceding plat;
3. To correct an error in a real property description shown on the preceding plat;
4. To indicate monuments set after the death, disability, or retirement from practice of the engineer or surveyor responsible for setting monuments;
5. To show the location or character of a monument that has been changed in location or character or that is shown incorrectly as to location or character on the preceding plat;
6. To correct any other type of scrivener or clerical error or omission previously approved by the City Council which may include lot numbers, acreage, street names, and identification of adjacent recorded plats;
7. To correct an error in courses and distances of lot lines between two adjacent lots if:
    a. Both lot owners join in the application for amending the plat;
    b. Neither lot is abolished;
    c. The amendment does not attempt to remove recorded covenants or restrictions; and
    d. The amendment does not have a material adverse effect on the property rights of the other owners in the plat;
8. To relocate a lot line to eliminate an inadvertent encroachment of a building or other improvement on a lot line or easement;
9. To relocate one or more lot lines between one or more adjacent lots if:

a. The owners of all those lots join in the application for amending the plat;

b. The amendment does not attempt to remove recorded covenants or restrictions; and

c. The amendment does not increase the number of lots;

10. To make necessary changes to the preceding plat to create six or fewer lots in the subdivision or a part of the subdivision covered by the preceding plat if:

a. The changes do not affect applicable zoning and other City regulations;

b. The changes do not attempt to amend or remove any covenants or restrictions; and

c. The area covered by the changes is located in an area that the City Council has approved, after a public hearing, as a residential improvement area; or

d. To replat one or more lots fronting on an existing street if:

(1) The owners of all those lots join in the application for amending the plat;

(2) The amendment does not attempt to remove recorded covenants or restrictions;

(3) The amendment does not increase the number of lots; and

(4) The amendment does not create or require the creation of a new street or make necessary the extension of municipal facilities.

B. The amending plat procedures shall be in accordance with the current Texas Local Government Code and the approval process set forth in this Ordinance for final plats.

C. The amending plat shall contain all the informational requirements set forth in this Ordinance for a final plat.

Section 27. Planned Unit Developments

A. Where a developer desires to construct a project with a diversification of types of lots and land uses, the Planned Unit Development (PUD) criteria may be used. The intent of this criteria is to maintain the spirit of conformance with this regulation; however, alternative designs can be used. Examples of an alternative design include reducing the lot sizes but providing common areas that result in a similar overall density, developing structures in pods or groups with larger surrounding areas, increasing the landscaping and screening to provide buffering, providing a curvilinear sidewalk system in lieu of sidewalks paralleling the street lines, providing common drives for multiple structures to increase green-space, and reducing the front setbacks but prohibiting driveways and parking in the lot frontage by providing alleys for access.

B. In addition to complying with the requirements for subdivision development set forth in Article III hereof (with the exception of lot dimension requirements set forth in Section 37 B) and the design criteria, the developer of a proposed PUD shall submit an outline development plan with the preliminary plat. This plan at a scale of not less than 1 inch equals 200 feet shall show all the proposed surface features to be developed. This plan shall include all paving and parking areas, proposed landscaping and open space areas with typical layouts, and proposed fencing and screening. The plan shall be accompanied by separate drawing(s) showing the template for building footprints.

C. All PUDs shall have protective covenants that require an owners= association (or other legal entity) to be formed and to be legally responsible for the maintenance of all-common areas and private amenities in the PUD. The covenants shall require that sufficient funds be collected and set aside for the proper maintenance of the facilities. Sale or transfer of properties dedicated for common use shall not be permitted without the replatting of the property according to legal requirements.

D. The minimum size of a PUD shall be 20 acres and not less than 5 percent of the total area shall be set aside as common landscaped areas. Utility easements, drainage easements and detention basins shall not be included in calculating the 5 percent requirement.

E. The minimum lot width of all residential lots to be located within a PUD shall be 60 feet.

F. The developer shall be required to enter into a development agreement detailing the terms and conditions upon which a PUD is approved by the City. The development agreement, restrictive covenants and all required documentation forming the PUD shall be provided to the City of Iowa Colony who will permanently maintain a copy of said documentation.

G. A final plan for each section to be developed with restrictive covenants attached shall be submitted for review and approval of the Planning Commission and the City Council. The approved plan and documents shall be maintained on file by the City Secretary and all future building permits shall be reviewed for conformance with the plan and accompanying documents. The plan which shall have a scale of 1 inch equals 200 feet or larger shall include the following:

1. All proposed streets, alleys, drives, walkways and trails with a clear designation of those to be public and private.
2. All lots or parcels and a clear definition of areas to be retained as common areas with dimensions and bearings.
3. Separate drawing(s) showing the template for building footprints with approximate dimensions of existing and proposed structures with landscaping, amenities and improvements. Indications of the structure heights and elevational features shall be provided.

H. In other than single family areas, details of trash collection areas and permanent screening matching the character of the area shall be provided.

I. Proposed improvements including screening, fencing and landscaping to be placed in all rights-of-way and common areas.

J. Deposit for Legal and engineering Fees.

1. In addition to any other fees to the city, the developmer shall pay the city for all legal and engineering fees incurred by the city in evaluating and/or administering any aspect of a subdivision or a development or an application for approval of a subdivision or development.

2. The Developer shall pay the City a deposit for legal and engineering fees. The deposit must be paid upon filing the request for plat approval. Any additional deposit must be paid upon request by the City. The City may halt the evaluation and processing of a request for approval of a plat or development while any initial amounts or additional amounts hereunder are due and unpaid. No deadlines for approval of a plat or development shall run while such amounts are due and unpaid, and time limits applicable against the City shall be suspended while any amount due from the Developer to the city is unpaid.

3. The mayor may set the amount of the deposit at the amount he estimates the City will incur in legal and engineering fees. Unless the Mayor sets a different desposit for the subdivision or development in question, the deposit for deposit for engineering and legal fees shall be as followa:

Number of Lots or Parcels	Amount of Deposit
1 through 10	$480.00
11 through 20	$600.00

21 through 50	$1,100.00
51 or more	to be set by Mayor

Developments vary greatly in many ways, and the Mayor may set a deposit that varies greatly from the above chart. The Mayor may do so at any time, before or after the payment of a deposit.

4. If the fees actually incurred by the City turn out to be less than the amount of the deposit, then the City shall return the unused balance of the deposit to the Developer

(or to any other person that pays the deposit) upon completion of all legal and engineering services concerning the subdivision or development. Before refunding the unused balance of the deposit, the City shall deduct all amounts of any nature (whether related to the development or not) due to the City from the Developer. If, on the other hand, it appears to the Mayor that the deposit will be insufficient to cover the legal and engineering fees incurred by the City, then the Developer shall deposit an additional amount as determined by the Moyor. The additional deposit shall be paid upon request from the City, even if the previous deposit has not been consumed.

5. The City shall not under any circumstances be considered a fiduciary to the Developer or any other person in connection with the dwposit under this ordinance.

K. Upon approval of a final plat for a PUD, the developer shall file with the City a performance bond to assure that the public facilities and amenities are constructed in a timely manner and a maintenance bond to assure the maintenance of the facilities for the first three (3) years of use. Such bonds shall be executed by a company authorized to do business as a surety in Texas and shall be approved as to form by the City Attorney. The performance and maintenance bonds shall be in the amount of the

estimated construction cost of the public facilities and amenities. No permits may be issued by the City until such bonds have been filed.

Sections 28C31 Reserved

ARTICLE III. MINIMUM REQUIREMENTS FOR SUBDIVISION AND/OR RESUBDIVISION

Section 32. Established Minimum Requirements

The subdivider shall comply with the following minimum requirements before consideration will be given to any final plat of any subdivision or resubdivision within the city limits of the City of Iowa Colony or within the ETJ of the City of Iowa Colony. The provisions of this article that do not conflict with Section 23 shall apply to abbreviated plats.

Section 33. Streets

The following table establishes the minimum right-of-way (ROW) widths for streets:

	Minimum ROW Width (Feet)
Major Thoroughfare	120
Major Arterial Street	100
Collector	80
Minor or Residential	60
Marginal Access	60

A. Major Thoroughfare, Major Arterial Streets and Collector: The arrangement, character, extent, width, grade, and location of all thoroughfare, arterial and collector streets shall

provide for the continuation or appropriate projection to existing and planned streets, for topographical conditions, for public convenience and safety, and for their appropriate relation to the proposed uses of the land to be served by such streets as provided by the City in the Thoroughfare Plan.

B. Minor or Residential Streets: These streets shall be so laid out that their use by through traffic will be discouraged.

C. Marginal Access Streets, Reverse Frontage Streets.: Where a subdivision abuts or contains an existing or proposed arterial street, the City may require marginal access streets, reverse frontage with screen planting contained in a non-cross reservation along the rear property line, deep lots with rear service alleys, or such other treatment as may be necessary for adequate protection of residential properties and to afford separation of through and local traffic.

D. Right-of-way parallel streets: Where a subdivision borders on or contains a railroad right-of-way or a highway right-of-way, the City may require a street approximately parallel to and on each side of such right-of-way, at a distance suitable for the appropriate use of the intervening land, as for park purposes in residential districts, or for commercial or industrial purposes in appropriate districts. Such distances shall also be determined with due regard for the requirements of approach grades and future grade separations.

E. Multiple Access Points: All subdivisions except single dead-end streets shall have a minimum of two access points to existing proposed public streets. This may be a boulevard where a second access is not available.

F. Street jogs: Street jogs with centerline offsets of less than one hundred twenty-five (125) feet shall be avoided.

G. Reverse curves: A tangent at least one hundred (100) feet long shall be introduced between reverse curves on arterial and collector streets.

H. Connecting street lines: When connecting street lines deflect from each other at any one point by more than ten (10) degrees, they shall be connected by a curve with a radius adequate to insure sight distances of not less than sixty (60) feet for minor and collector streets and of such greater radii as the Council shall determine for special cases.

I. Intersections: Streets shall be laid out so as to intersect as nearly as possible at right angles and no street shall intersect any other street at less than sixty (60) degrees.

J. Property lines at street intersections: Property lines at street intersections shall be rounded with a radius of fifteen (15) feet, or of a greater radius where large truck traffic is anticipated.

K. Rights-of-way widths: All street rights-of-way widths shall be not less than sixty (60) feet.

L. Half streets: Half streets shall be prohibited, except where essential to the reasonable development of the subdivision in conformity with the other requirements of this ; and where the Council finds it will be practicable to require the dedication of the other half when the adjoining property is subdivided. Wherever a half street is adjacent to a tract

to be subdivided, the other half of the street shall be dedicated.

M. Dead-end streets: Dead-end streets, designated to be so permanently, shall not be longer than 1200 feet and shall be provided at the closed end with a turn-around having an outside roadway diameter of at least eighty (80) feet and a street property line diameter of at least one hundred (100) feet.

N. Street names: No street names shall be used which will duplicate or be confused with the names of existing streets. Street names shall be subject to the approval of the Council.

O. Street Design: The details of the street design shall conform to the City=s Engineering Standards and Standard Details.

Section 34. Alleys.

A. Generally, alleys may be provided in subdivisions, and in the case of commercial and industrial districts may be required when other definite and assured provisions are not made for service access, such as off-street loading, unloading and parking consistent with an adequate space for the uses proposed.

B. Width of alleys in commercial and industrial districts shall be at least twenty (20) feet. The width of alleys in residential districts shall be twenty (20) feet where possible, however, a minimum width of sixteen (16) feet may be permitted.

C. Alley intersections and sharp changes in alignment shall be avoided, but where necessary, corners shall be cut off sufficiently to permit safe vehicular movement.

D. Dead-end alleys shall be avoided where possible, but when unavoidable, adequate turn-around facilities at the dead end shall be provided.

Section 35. Easements.

A. Generally, easements for utilities shall be provided across lots or centered on rear or side lot lines where necessary and shall be at least eight (8) feet wide so as to create a sixteen (16) foot total width. Where easements are all on one side lot, a minimum of ten (10) feet may be used if only one line is proposed to be installed. Where easements are to be used for multiple purposes the minimum width shall be sixteen (16) feet.

B. Stormwater easements or drainage right-of-way. Where a subdivision is traversed by a watercourse, drainage way, channel, or stream there shall be provided a stormwater easement or drainage right-of-way conforming substantially with the lines of such watercourse, and such further width for maintenance and construction, or both as will be adequate for the purpose. The easement for the maintenance/construction berm should not be less than 20 feet on each side of the watercourse. Parallel streets or parkways may be required in connection therewith.

Section 36. Blocks.

Lengths, widths and shapes. The lengths, widths, and shapes of blocks shall be determined with due regard to the following:

A. Provision of adequate building sites suitable to the special needs of the type of use contemplated.

B. Needs for convenient access, circulation, control and safety of street traffic.

C. Limitations and opportunities of topography.

D. No block shall exceed a length of one thousand two hundred (1,200) feet in residential or commercial developments.

Section 37. Lots. The following minimum requirements shall apply unless a conflict exists between this Section and City's Zoning Ordinance, in which case the more restrictive requirements of the two will control.

A. One Acre and Larger Lots.

1. Minimum front residential building setback lines shall be at least fifty (50) feet. Each corner lot shall have at least the minimum front residential building setback line on both streets. Lots abutting across walkways shall be treated as corner lots. Minimum commercial, business and industrial building setback lines shall be at least twenty five (25) feet, unless otherwise approved. Side lot building lines on interior lots shall be ten (10) feet. Minimum side lot building lines on commercial, business or industrial buildings shall be five (5) feet.

2. Lot dimensions. Lot dimensions shall be a minimum of one hundred twenty (120) feet in width at the building setback line and of a depth so as to provide an area not less than one (1) acre or forty three thousand five hundred sixty (43,560) square feet.

3. Residential lots that are not served by public sewer shall be not less than one hundred twenty (120) feet in width at the building setback line and shall not have an area less than one (1) acre or forty three thousand five hundred sixty (43,560) square feet. Such lots shall be laid out with provision for the possibility of resubdivision at such time as sanitary sewers and/or water service becomes available.

4. Depth and width of properties reserved or laid out for business and industrial purposes shall be adequate to provide for the off-street service and parking facilities required by the type of use and development contemplated.

5. In an approved subdivision, lot sizes may be permitted to be increased in order to secure privacy within such lots or to allow improvement on such lots to conform to the building requirements. However, in no case shall lot size changes be permitted if they result in creating one or more lots of size less than the minimum area requirements of this Ordinance.

6. Access to public streets. The subdividing of the land shall be such as to provide each lot with satisfactory access to a public street.

7. Double and reverse frontage lots. Double frontage and reverse frontage lots should be avoided unless backing up to a major thoroughfare.

8. Side lot lines. Side lot lines shall be substantially at right angles or radial to street lines.

9. Flag and key shaped lots. No flag or key-shaped lots are allowed.

10. The length to width ratio of each lot shall not be greater than 7:1, meaning that the length of the longest side of the overall property cannot be more than seven times the width of the property measured at the building setback line. Each lot shall be a minimum of 120 feet wide at the building setback line. The requirements in this paragraph are in addition to all other requirements of this Subdivision Ordinance.

B. Lots Smaller Than One Acre.

1. Minimum front setback lines shall be at least twenty-five (25) feet. Each corner lot shall have at least the minimum front residential building setback line on both streets. Lots abutting across walkways shall be treated as corner lots. Minimum commercial, business and industrial building setback lines shall be at least twenty five (25) feet, unless otherwise approved. An exception to this requirement is minimum setback lines shall be increased to a total of thirty-five (35) feet from a sixty (60) foot right-of-way where a minor or major thoroughfare is planned in the Thoroughfare Plan of the City of Iowa Colony. Side lot building lines on interior lots shall be five (5) feet

2. Lot dimensions. Regardless of any other provisions of this Ordinance, lot dimensions shall be a minimum of sixty (60) feet in width at the building setback line and of a depth so as to provide an area not less than six thousand three hundred (6,300) square feet.

3. Depth and width of properties reserved or laid out for business and industrial purposes shall be adequate to provide for the off-street service and parking facilities required by the type of use and development contemplated.

4. In an approved subdivision, lot sizes may be permitted to be increased in order to secure privacy within such lots or to allow improvement on such lots to conform to the building requirements. However, in no case shall lot size changes be permitted if they result in creating one or more lots of size less than the minimum area requirements of this ordinance.

5. Access to public streets. The subdividing of the land shall be such as to provide each lot with satisfactory access to a public street.

6. Double and reverse frontage lots. Double frontage and reverse frontage lots should be avoided unless backing up to a major thoroughfare.

7. Side lot lines. Side lot lines shall be substantially at right angles or radial to street lines.
8. Flag and key shaped lots. No flag or key-shaped lots are allowed.

Section 38. Public Sites and Open Spaces.

In conformity with the master plan of the City of Iowa Colony where a proposed park, school, playground or other public facility is located in whole or in part in a subdivision, the subdivider may dedicate such land to public use or shall provide the appropriate political subdivision a one-year purchase option on such land.

Section 39. Monuments.

A. Monuments set as exterior boundary markers shall be a minimum of 5/8 inch iron

rod or 3/4 inch iron pipe at least thirty six (36) inches long, encased in concrete for a minimum of eighteen (18) inches below the surface of the ground.

B. Permanent reference monuments ("PRM") shall be set at all boundary line angle points, block corners, angle points, points of curvature, and at intervals not to exceed one thousand (1000) feet. Permanent reference monuments shall conform to the Texas Professional Land Surveying Practices Act and the General Rules of Procedures and Practices.

C. All monuments shall be set to the standard of the Texas Society of Professional Land Surveying Practices Act and the General Rules of Procedures and Practices of the Texas Board of Professional Land Surveying and shall bear reference caps as indicated.

D. Interior lot corner monuments shall be a minimum of 5/8 inch iron rod at least thirty six (36) inches in length.

Section 40. Additional Street Requirements.

A. All streets shall be constructed in accordance with the City=s design criteria.

B. The developer shall be responsible for the construction of all roadways in the development according to minor street standards. Where the Thoroughfare Plan requires street widths over and above local street requirements, the developer shall dedicate the right of way required for the larger street and construct up to a thirty eight (38) foot wide pavement. If the City requires a pavement wider than the thirty

eight (38) feet, the City will provide funding for the increased width subject to the availability of funds and within legal limitations.

C. The developer shall be responsible for the construction of necessary improvements on perimeter streets to bring the pavement and curbing to minor street standards for the street abutting the development.

Section 41. Water and Wastewater Facilities.

A. Water and wastewater facilities shall conform to the City=s design criteria.

B. If the City=s Master Plan requirements dictate a larger line size or a greater sewer line depth than that required for the subdivision, the City will pay the difference between the subdivision requirement and the Master Plan requirements subject to the availability of funds and the legal requirements.

Section 42. Sidewalks.

In large subdivisions four (4) foot wide sidewalks shall be required and shall be constructed in accordance with the City's design criteria. If not constructed prior to issuance of a building permit, any sidewalks required by this must be constructed as part of the issuance of the building permit for each tract.

Section 43. Street Lighting and Signage.

The developer shall provide a layout of the proposed street lights and provide easements for power lines where such are required. The City will arrange for installation through the power company for those subdivisions within the City limits. The developer shall provide street name

signs and traffic control devices in accordance with the requirements of the Texas Manual on Uniform Traffic Control Devices.

Section 44. Drainage and Drainage Structures.

The subdivider shall furnish and install all necessary drainage improvements in accordance with the Brazoria County Drainage Criteria Manual and the appropriate Brazoria County Drainage District's drainage criteria.

Sections 45.-56. Reserved.

ARTICLE IV. REQUIRED IMPROVEMENTS FOR OPEN DITCH DRAINAGE SYSTEMS

Section 57. Exception to Storm Drainage Requirements.

While the requirement for the City of Iowa Colony is to have enclosed storm water drainage systems, City Council will consider a subdivision with an open ditch drainage system on a case by case basis. A subdivider may develop a subdivision and construct an open ditch drainage system as part of the subdivision within the City and its extraterritorial jurisdiction (ETJ) under the conditions set forth in this article and the City=s design criteria.

A. The lot configuration shall conform to the following minimum requirements:
    1. Minimum lot size shall be one (1) acre or 43,560 square feet.
    2. Minimum lot width, measured at the right-of-way shall be one hundred twenty (120) feet.
    3. Tangential or curved right-of-way with radius greater than eighty (80) feet: one hundred forty (140) feet.
    4. Curved right-of-way with radius of eighty (80) feet or less: fifty (50) feet.

5. No flag or key-shaped lots will be allowed.

B. The roadway section shall conform to the requirements of the City=s Engineering Standards and Standard Details. The right-of-way shall be adequate to contain the pavement and ditches with the minimum width of sixty (60) feet.

Section 58. Replat of an Existing Subdivision with an Open Roadside Drainage System

In all cases where a request is made to replat a subdivision with an open roadside drainage system in existence on the date of enactment of this Ordinance, the following requirements shall apply:

A. The subdivision must have been legally platted and recorded according to the ordinances and criteria in effect at the time of the subdivision;

B. The open roadside drainage system must be in existence at the time of enactment of this ordinance;

C. The replatting of existing lots cannot result in the reduction of lot sizes if the size of the existing lots are already smaller than this allows;

D. The criteria set forth in Section 23 for abbreviated plats must be met;

E. The resulting reconfiguration of lots will not affect the approved drainage plan for the original subdivision on file with the City or, with minor modification(s) to existing drainage plans, it can be demonstrated to the City Engineer that the reconfiguration of existing lots will not have an adverse impact on drainage; and

F. The procedure set forth for replats in Section 25 are met.

Sections 59 B 65. Reserved.

CITY OF IOWA COLONY, TEXAS

SUBDIVISION ORDINANCE

ATTACHMENT A

FEE SCHEDULE

CITY OF IOWA COLONY, TEXAS

ATTACHMENT A

FEE SCHEDULE

TABLE OF CONTENTS

ATTACHMENT A
CITY OF IOWA COLONY, TEXAS
FEE SCHEDULE
April 1, 2002

I. Preliminary Plats

A. Subdivision with roads, streets or public systems

1. Minor subdivision (four or fewer lots) $ 420

2. Major subdivisions (five or more lots) $ 350 plus $10/lot

II. Final Plats

A. Subdivision without streets, public water or sewer systems

1. Minor subdivision (four or fewer lots) $ 500

2. Major subdivisions (five or more lots) $ 500 plus $25/lot

B. With roads, streets and/or public systems

1. Minor subdivisions (four or fewer lots) $ 750

2. Major subdivisions (five or more lots) $ 750 plus $20/lot

III. Abbreviated Plat

Sum of Preliminary Plat and Final Plat Fee

IV. Planned Unit Development: Actual Costs of the City's Initial $10,000 Deposit Required. Additional deposits required as necessary.

V. Recording Fees

Recording fees will be due and payable at actual cost plus $50.00. Fees are payable once plats are approved.

VI. Recheck Fees

Recheck of plat $ 350.00

ATTACHMENT A
CITY OF IOWA COLONY, TEXAS
FEE SCHEDULE
April 1, 2002

VII. Building Fees

A. Civil Site Work Permit

1. Fee Amount: Percent of construction value - $15.00 for first $1,000.00; $5.00 for each $1,000.00 or fraction thereof thereafter;

Plan Review Fee - $600.00 + $60.00 per sheet.

Plan Recheck Fee –no charge.

2. Payment Deadline: Due prior to issuance of Site Work Permit.

B. Building Permit

1. Fee Amount: See Appendix VII A

2. A application fee of $50.00 on all permits $10,000 or more.

3. Construction value based upon min $63.04 per square foot for commercial or residential;min $33.04 per square foot for detached garage. Nationally Recognized Cost Estimating Book may be used in lieu of construction cost.

4. Payment Deadline: Due prior to issuance of Building Permit.

C. Re-Inspection Fee

1. Fee must be paid prior to re-inspection. Re-inspection fee is $50.00.

D. On-Site Septic Permit

1. Fee payable when plans are submitted.

ATTACHMENT A
CITY OF IOWA COLONY, TEXAS
FEE SCHEDULE
April 2, 2002

VIII. SCHEDULE OF BUILDING PERMIT, RE-INSPECTION AND PLAN REVIEW FEES

A. Building Permit Fees * $50.00 min on all permits

SECTION A-1: BUILDING PERMIT FEES	
TOTAL VALUATION	PERMIT FEE
200 Square Feet or Less	No fee unless inspection is required, in which case a $15 fee for each inspection shall be charged.
Greater than $1,000 to and including $50,000	$15 for the first $1,000 plus $5 for each additional $1,000 or fraction thereof.
Greater than $50,000 to and including $100,000	$260 for the first $50,000 plus $4 for each additional $1,000 or fraction thereof.
Greater than $100,000 to and including $500,000	$460 for the first $100,000 plus $3 for each additional $1,000 or fraction thereof.
Greater than $500,000	$1,660 for the first $500,000 plus $2 for each additional $1,000 or fraction thereof.

B. Re-Inspection Fees

SECTION A-2: RE-INSPECTION FEES	
Minimum Re-Inspection Fee	$50 per Re-Inspection payable prior to each Re-Inspection

C. Plan Review Fees

SECTION A-3: PLAN REVIEW FEES
When the valuation of the proposed construction exceeds $1,000 and a plan is required to be submitted by City Ordinances, a plan review fee shall be paid to the City Secretary at the time of submitting the plans and specifications for checking. Such plan review fee is in addition to the building permit fee.

ATTACHMENT A
CITY OF IOWA COLONY, TEXAS
PERMIT FEE SCHEDULE
APRIL 1, 2002

IX. Permits

Valuation	Fee
$ 1,000	$15.00
2,000	20.00
3,000	25.00
4,000	30.00
5,000	35.00
6,000	40.00
7,000	45.00
8,000	50.00
9,000	55.00
10,000	60.00
11,000	65.00
12,000	70.00
13,000	75.00
14,000	80.00
15,000	85.00
16,000	90.00
17,000	95.00
18,000	100.00
19,000	105.00
20,000	110.00
21,000	115.00
22,000	120.00
23,000	125.00
24,000	130.00
25,000	135.00
26,000	140.00
27,000	145.00
28,000	150.00
29,000	155.00
30,000	160.00
31,000	165.00
32,000	170.00
33,000	175.00
34,000	180.00
35,000	185.00
36,000	190.00
37,000	195.00
38,000	200.00
39,000	205.00
40,000	210.00
41,000	215.00
42,000	220.00
43,000	225.00
44,000	230.00
45,000	235.00
46,000	240.00
47,000	245.00
48,000	250.00
49,000	255.00
50,000	260.00

Valuation	Fee
$ 51,000	$ 264.00
52,000	268.00
53,000	272.00
54,000	276.00
55,000	276.00
56,000	284.00
57,000	288.00
58,000	292.00
59,000	296.00
60,000	300.00
61,000	304.00
64,000	316.00
65,000	320.00
66,000	324.00
67,000	328.00
68,000	332.00
69,000	336.00
70,000	340.00
71,000	344.00
72,000	348.00
73,000	352.00
74,000	356.00
75,000	360.00
76,000	364.00
77,000	368.00
78,000	372.00
79,000	376.00
80,000	380.00
81,000	384.00
82,000	388.00
83,000	392.00
84,000	396.00
85,000	400.00
86,000	404.00
87,000	408.00
88,000	412.00
89,000	416.00
90,000	420.00
91,000	424.00
92,000	428.00
93,000	432.00
94,000	436.00
95,000	440.00
96,000	444.00
97,000	448.00
98,000	452.00
99,000	456.00
100,000	460.00

THRU $500,000.00 ADD $3/THOUSAND
OVER $500,000.00 ADD $2/THOUSAND

ATTACHMENT B
CITY OF IOWA COLONY, TEXAS
ENGINEERING STANDARDS

SECTION I
GRAPHIC REQUIREMENTS

1.0 GENERAL

1.01 CHAPTER INCLUDES

A. Graphic requirements for construction drawings.

1.02 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.

1.03 DESIGN REQUIREMENTS

A. Provide a cover sheet for all projects involving three or more design drawings (excluding standard detail sheets). Plan sheet numbers shall be shown on the cover sheet . Include a vicinity map to identify project locations. Also provide approval block for the City Engineer with a note stating that approval is valid for 1 year only from date of signatures.

B. Drawings shall be prepared on nominal 24 inch x 36 inch overall drawings.

C. Show service area on cover sheet or area map.

D. Final drawings shall be India ink on mylar or produced by CADD on reproducible medium. The engineer shall also submit, at the time of plan approval, a CADD drawing on diskette of the development showing all lot lines and associated lot information, rights-of-way, easements, contours, utilities, and all drainage and paving improvements. Two identical reproducibles shall be provided with a location for an approval signature by the City Engineer on the cover and initials on all other sheets.

E. Final plats shall be prepared only on mylar, minimum of 3 mil.

F. 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.

G. 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.

H. Draw key overall layouts to a minimum scale of 1 inch = 100 feet.

I. 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 street.

J. 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 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.

K. 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 inch = 20 feet horizontal, 1 inch = 2 feet vertical

2. Minor or residential single family streets:

   1 inch = 20 feet horizontal, 1 inch = 2 feet vertical
   1 inch = 40 feet horizontal, 1 inch = 4 feet vertical
   1 inch = 50 feet horizontal, 1 inch = 5 feet 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 special approval.

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 Registered 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 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, surface 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 streets and/or roadway alignments on all 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 feet 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, centerline 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 Iowa Colony projects, provide natural ground profiles for each right-of-way line. Easement profiles shall also conform to Item T below.

T. Basic plan and profile sheets shall contain the following information:

1. Identify all lot lines, property lines, easements, right-of-way, and drainage 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 four inches or larger within the rights-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 flowline elevations and direction of flow for all existing ditches.

5. Label proposed top of curb grades except at railroad crossings. Centerline grades are acceptable only for paving without curbs and gutters.

6. Curb return elevations for turnouts shall be shown in profiles.

7. The centerline elevation at the property line of all existing driveways shall be shown in profile.

8. Station all esplanade noses or the centerline of all esplanade openings with esplanade width shown - both existing and proposed.

9. The design of both roadways is required on all paving sections with an esplanade.

10. Station all point of curvatures (PC) and point of tangency (PT), radius returns, and grade change point of intersection (PI) in plan view. Station all radius returns and grade change PIs in profile with their respective elevations.

ATTACHMENT B
CITY OF IOWA COLONY, TEXAS
ENGINEERING STANDARDS

SECTION II
WASTEWATER COLLECTION SYSTEM

1.0 GENERAL

1.01 CHAPTER INCLUDES

A. Criteria for the design of wastewater collection systems.

1.02 REFERENCES

A. Texas Commission on Environmental Quality (TECQ) - "Design Criteria for Sewerage Systems" - Texas Administration 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 sewer service lines serving a single building located on private property, that are not in a dedicated easement, are under the jurisdiction of the Plumbing Code. 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. Private sewers shall be located on private property. Private sewers are subject to the design and construction requirements of the Plumbing Code.

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. 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.

F. 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. It will be owned and maintained by the owner of the property being served by said sewer.

G. 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 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.

H. Stack - A riser pipe constructed on main or lateral sewers which are deeper than 5 feet to facilitate construction of service leads or service connections.

I. 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.

J. Pressure Sewer Systems - A wastewater collection system using a pump at each 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, pavement, major landscaping, and other structures affecting construction.

C. Main and Lateral Sewers:

1. Sewers must be shown both in detailed plan and profile views. Lines shall change grade or alignment only at manhole.

2. 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 elevation 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 and bedding shall comply with the City of Iowa Colony Standard Specifications and Standard Details where available or, if not available, the standards of the City of Houston. Where the lines are parallel to a ditch, the flowline of the ditch shall be shown.

3. Where sewers are to be placed between existing pavement and the street right-of-way (or interior easement line), or under existing pavement, show the existing ground line at both sides (or the closest side or 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 residential subdivisions should use a horizontal scale of 1 inch = 40 feet and vertical scale of 1 inch = 4 feet. In congested areas, a horizontal scale of 1 inch = 20 feet and a vertical scale of 1 inch = 2 feet will be acceptable. 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 at points of size change; 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 flowlines 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 mach 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 average to nearby major thoroughfare and boulevard streets. The scale of the location map shall be 1 inch = 2,000 feet or less.

2. 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 and proposed utilities (i.e. water, gas, power, 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. Drawings for subdivisions shall show the proposed location, by stations, or all service leads, service connections, and stacks. The distance from the sewer 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 inch = 100 feet.

3. 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 sewers or which cross the proposed sewers.

   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. The 100-year flood elevations where applicable with manhole lids scaled when below the 100-year flood elevation.

   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 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 is to be installed for waterline crossings.

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 at the property line between two (2) adjoining lots, or as directed by the City. A single 6 inch service lead located at the property line between two (2) adjoining lots would service 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 is 24 inches or greater above the flowline of the manhole, provide a standard drop to the manhole:

a. Service leads shall be provided to serve each lot within proposed development inside the City limits.

b. Service leads with a diameter of 6 inches shall utilize “full body” fitting (extruded or factory-fabricated) for connection to the proposed public sewer or an approved saddle-type connector for connection to an existing public sewer.

c. Saddle-type connectors shall be installed with the “stub” oriented between the “spring line” (3:00 and 9:00 positions) and 45 degrees from the “spring line” (“1:30" and 10:30" positions). Tees (aka, “full body fittings”) shall be oriented in the same manner.

d. The service lead shall be designated to minimize the use of bends as site conditions will permit.

F. General Requirements:

1. Sanitary sewers within the City of Iowa Colony jurisdiction shall allow for orderly expansion of the system and shall conform with the comprehensive sewer plan for the City of Iowa Colony.

2. Sewers shall be sized based on the minimum requirements set out in this standard and the standard wastewater flow rates as established by the City of Iowa Colony.

3. All sewers shall conform to the minimum requirements of the Texas Natural Resource Conservation Commission (TNRCC) - “Design Criteria for Sewage Systems.”

4. Sewers shall be separated from water lines by a minimum of nine (9) feet. Where the minimum separation is not maintained, refer to Section III, 1.09 for allowable clearances. Sewers crossing utilities other than water, a minimum of six (6) inches of clearance must be maintained.

5. 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 it is the responsibility of the City Inspector to determine that such saddle is watertight and properly installed.

6. Materials and construction to conform to latest City of Iowa Colony Engineering Specifications with all amendments thereto, including standard leak test.

7. Unless noted otherwise, all public sewers and service leads shall be embedded in cement stabilized sand; to 6 inches below the pipe, 12 inches above the pipe to 6 inches on each side. All such bedding shall be compacted to 95% standard proctor density. The cross-section so described herein shall be termed the “embedment zone.”

8. Backfill all excavation 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.

9. The location of all special backfill and of proposed stacks shall be shown by stations in the drawings.

10. Construction notes shall designate the type, kind, and class of pipe with exceptions to the construction notes to be shown on the plan and profile sheets.

11. Non-sanitary sewer easements or fee strips such as pipeline, power company, drainage district, railroad, etc., are in and of themselves insufficient and unacceptable to permit laying to sanitary sewers and/or force mains across or along the underlying private property or restricted non-sanitary use type of public property.

12. 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 City Engineer will take into consideration existing, planned and proposed facilities such as manholes, pavement, pipe/conduits, along with existing trees, shrubs, or other unique surface conditions when arriving at a decision.

13. 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 as 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., waterline and storm sewers).

14. 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.

15. All sanitary sewer mains shall be constructed utilizing, SDR-26, PVC pipe unless specifically approved by the City Engineer.

16. Where a sanitary sewer line could be extended to serve an adjacent development, the public sewer main shall be extended across the full length of the development or to the edge of the property where streets may be extended.

17. In subdivisions platted or created after January 1, 1988, for single family dwellings where each lot maintains an individual water well supply and an on-site sewage facility (OSSF) the sewage disposal plan shall show the approved water well location and sanitary control easement around the well within a 100 feet radius in which no subsurface sewage system may be constructed.

G. Line Size:

1. The minimum pipe diameter for a public sanitary sewer shall be 4 inches.

2. 4 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. 6 inch service leads shall not serve more than the equivalent of two (2) single family lots or other types of small land tracts.

4. 4 inch and 6 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 shall be 6 inches.

6. All main and lateral sewers will end in manholes, except for special and/or unusual situations and shall be 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 finished grade or top of curb, whichever is lower. In areas with open ditches, the lines and leads shall be 3 feet below the flowline of the ditches or

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 the 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 5 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 in Class 150 (150 psi) pressure pipe or rigid factory made pipe with cement stabilized sand as shown in standard detail. Ductile iron pipe (DIP) shall be lined with either a polyethylene or polyurethane coating as approved by the pipe manufacturer and shall be applied by either the pipe manufacturer or in an approved application as directed by the City Engineer. The minimum liner thickness shall be 40 mil.

I. Line Grades:

1. The following table lists the minimum and maximum grades for 6 inch - 27 inch public sewers.

Inside Dimension (I.D. of Pipe in Inches	Minimum Slope
6	0.70
8	0.33
10	0.25
12	0.20
15	0.15
18	0.11
21	0.09
24	0.08
27	0.06

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 2.5 fps.

J. Manholes:

1. All manholes to be precast concrete, unless the Professional Engineer submits a “cast-in-place” manhole design for review and approval by the City. All precast manholes to incorporate a “boot” type connector for sewer diameters up to 24 inches. For sewer diameters greater than 24 inches, 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 easement shall have a manhole in each street crossed by the sewer.

   b. The maximum distance between manholes shall be 500 feet for 8 inches to 48 inches pipe diameters. Spacings for larger diameter

mains than 48 inches shall be determined on an individual project basis and approved by the City Engineer.

c. Sewers with the same, or approximate flowline elevation shall intersect each other at a 90 degree or greater 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, one or more manholes shall be utilized to maintain a minimum angle of 80 degrees at the point of intersection. Inverts shall be shaped to gentle curves and shall have a depth not less than 70% of the pipe diameter. Abrupt changes in alignment at pipe entrances that limit access of t.v. inspection will not be accepted.

(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) Manholes shall be placed at all dead-end mains and laterals exceeding 150 feet in length. Short lines may end with a cleanout.

d. 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 shall be approved as a special case by the City.

(b) A standard drop connection is required when the difference in elevation between discharging sewer flowline and receiving flowline is greater than 24 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.

(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 cored and sealed using grout as approved by the Standard Wastewater Products Committee. A pipe gasket shall be embedded in the grout.

(5) When routing an approved service connection to a manhole (see Item 3), the connection 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 (core) shall be sealed using a "grout" as approved by the City.

(6) All public sewers shall terminate in a manhole. Clean-outs will not be utilized except at the end of each service lead or with lines less than 150 feet in length.

K. Lift Stations:

1. Lift station shall comply with the City of Iowa Colony's specifications and/or approved by the City Engineer, with a storage minimum volume in the west well equal to 1.5 times the peak design flow to the lift station. Add 10% to account for volume displaced by pumps.

2. Minimum site size shall be 40 feet by 40 feet. Smaller sites, that are adjacent to public rights-of-way, are contiguous to green space or similar land use areas, may be approved when adequate odor control provisions are provided.

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

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

5. Wet well working volume should be sized to allow for the maximum of six (6) tarts per hour with one pump out of service.

6. Controls and equipment shall be approved by the Department of Public Works.

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

8. The inlet structure shall be designed to minimize turbulence.

9. The velocity in the force main and riser pipes shall be less than 8 fps and greater than 2 fps.

10. The wet well shall be sized to provide adequate clearance between the pumps (refer to manufacturer's recommended clearances).

11. A peak factor of 4 shall be used for Lift Station design.

12. A minimum of 2 feet of clearance shall be provided between pumps and between pump and wall.

13. Low water level shall be at least 6 inches above impeller, higher if required by manufacturer. Complete immersion of submersible pump motor at low water level is preferred, if possible.

14. Tie steel in lift station bottom to wall (includes caisson construction situation) to provide watertight wet well.

15. Nuts, bolts, chains, and all other metal components within wet well shall be stainless steel, not carbon steel.

16. Vent pipe shall be 8 inches minimum diameter and shall be equipped with odor control system.

17. The following Hazen-Williams Coefficient shall be used for various pipe types:

PVC	New	C=160
	10-year	C=140
DIP	New	C=140
	10-year	C=100

18. Provide a board fence (either CCA cedar or heart redwood) with steel posts in concrete around all lift stations. Fence shall be at least 6 feet high.

19. Entrance drive to be at least 14 feet wide. Drive shall terminate adjacent to the station with a parking space such that a truck mounted hoist can remove pumps.

20. Indicate method of drainage of site on site plan. Internal drainage, sheet flow, and valley gutter driveways are acceptable. Drain to street or storm sewer, never onto adjacent private property.

21. Locate control panel and wet well hatch 1 foot above 100-year flood plain minimum. Call out the 100-year flood plain elevation on the plans.

22. Dual stainless steel guide rails (or other pump removal method that avoids entering wet well) are required for submersible pumps.

23. A tee, plug valve, and blind flange assembly are required on the force main on the downstream side of the discharge valves and header. This is required so truck-mounted pumps can bypass the lift station pumps and piping while work is being done.

24. Bedding for PVC force main is bank sand a minimum of 6 inches from all sides of pipe.

25. PVC force mains shall be SDR 16 PVC pipe or;

26. DIP bedded bank sand and polyethylene wrapped.

27. Backfill structural excavations (wet well, etc.) with cement stabilized sand.

28. Lift station site plans shall be submitted in scales of 1 inch = 5 feet or 1 inch = 10 feet.

29. Provide a protective coating to interior walls of wet well. The Engineering Department shall approve coating or additive used.

30. Lift station shall be equipped with a telephone dialer, approved by City and a red alarm light. A float or transducer system shall be installed and shall be connected to telemetry system to monitor the status of the lift station.

31. Power supply to lift station shall be 3 phase (and 480 volts where possible).

32. A system of floats or Engineering Department approved transducer system shall be provided to control pumps.

1.05 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.

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.

1.06 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 being prepared. The final construction drawings must be sealed, signed, and dated by the Professional Engineer responsible for the development of the drawings.

ATTACHMENT B
CITY OF IOWA COLONY, TEXAS

ENGINEERING STANDARDS
SECTION III
WATERLINE DISTRIBUTION SYSTEM

1.0 GENERAL

1.01 CHAPTER INCLUDES:

A. Criteria for the design of waterlines.

1.02 REFERENCES

A. Texas Commission on Environmental Quality (TCEQ)., Water Utilities Division "Rules and Regulations for Public Water Systems," latest revision.

B. American Water Works Association (AWWA).

C. National Sanitation Foundations (NSF).

D. Texas Department of Health.

E. Texas State Board of Insurance.

1.03 DEFINITIONS

A. Waterline: Closed conduits designed to distribute potable water for human consumption to various areas and provide fire protection. Line size and fire protection accessory locations are dependent on distance from primary source and quantity of demand.

1.04 DESIGN REQUIREMENTS

A. Approval must be obtained from the City of Iowa Colony for exceptions or deviations from these requirements. Exceptions or deviations may be granted on a project by project basis only by the City and/or the City Engineer.

B. Easements for Waterlines:

1. Lines shall be located within street right-of-way, permanent access easements with overlapping public utility easements, easements adjacent to street rights-of-way, or recorded waterline easements.

2. When outside of a public street right-of-way or permanent access easement with an overlapping public utility easement, easements must be dedicated and restricted for waterlines only.

3. When possible, easements should be contiguous with public rights-of-way.

4. Except for side lot easements, waterline easements shall be contiguous to a paved access.

5. For waterlines 12 inches or smaller located outside of street rights-of-way, the minimum width of easement shall be 10 feet. Where the easement is located across lots or centered between lots the easement shall be at least 8 feet wide so as to create a 16 feet total width.

6. For waterlines 16 inches or larger located outside of street rights-of-way, the minimum width of easement shall be 15 feet.

7. For water mains located less than 5 feet from the right-of-way line, the outside edge of a waterline easement shall be located from the right-of-way line as follows:

14 inches and smaller pipe	- 5 feet
16 inches and larger pipe	-10 feet

8. Waterlines along State rights-of-way shall be installed outside of the right-of-way in a separate 10 feet minimum contiguous easement.

9. No back lot easements will be allowed for the installation of waterlines, unless specifically approved by the City.

10. Commercial Developments inside the City requiring on-site fire hydrants must provide a minimum 15 feet waterline easement for the waterline and fire hydrant.

11. In new developments, waterlines shall be centered in waterline easements.

12. When using side lot easements for waterlines 12 inches or smaller, such easements shall be a minimum of 8 feet in width, located on one lot or centered between lots. If centered between lots, the waterline may be centered within 4 feet of one lot or centered in the easement.

13. Location of a water main in an easement not adjoining a public right-of-way shall be prohibited, except as specifically approved by the City Engineer. When approved, these water mains will be centered in a 15 feet wide exclusive easement.

C. Location of Waterlines:

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

2. Location of waterlines within an easement - locate waterlines in the center of a 10 feet minimum width dedicated waterline easement. Within a

commercial development inside the City, center waterlines within a 15 feet easement. Obtain approval for lines to be located in wider or multi-use easements.

3. When a waterline is placed parallel to another utility line or storm sewer, other than a sanitary sewer, the waterline shall have a minimum of 4 feet horizontal clearance from outside wall of the waterline to the outside wall of the existing utility or storm sewer.

D. Waterline Size:

1. 6 inch lines may be used on dead-end lines within cul-de-sacs, or if the line is less than 1,500 feet in length, and interconnected between two lines which are 8 inches in size or larger. The maximum number of fire hydrants or flushing valves on a dead end line is one. Two hydrants will be permitted on a looped 6 inch line.

2. 8 inch lines may be used for lines over 1,500 feet long or when two or more fire hydrants or flushing valves are required.

3. In areas anticipating commercial development, the minimum line sizes shall be 8 inches or larger, based on anticipated required fire-flows in accordance with Insurance Service Office (ISO) requirements.

4. 12 inches and larger lines - lines to be determined by the Professional Engineer (P.E.) and the City of Iowa Colony.

E. Dead-End Lines:

1. Dead-End Lines within a 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 800 feet in length from the closest interconnection main line and shall terminate with a fire hydrant or flush valve.

b. In permanent dead-end situations within cul-de-sacs, reduce pipe size successively. Carry 8 inch pipe to the next to last hydrant, then use 6 inch pipe to the line's end. Place the last service as near as possible to the end and install a fire hydrant at he end of the 6 inch line. The maximum length of this reduced line size configuration should not exceed 800 feet.

F. Depth of Cover:

1. 14 inches and smaller mains shall have a minimum cover of 4 feet from top of curb. For open ditch roadway sections, 12 inches and smaller shall be installed at least 3 feet below the ultimate flowline of the ditch or 6 feet below natural ground at the right-of-way line, whichever is deeper.

2. 16 inches and larger mains shall have minimum cores of 5 feet from top of curb. For open ditch roadway sections, 16 inches and longer mains shall be installed at last 3 feet below the flowline of the ditch or 7 feet below natural ground at the right-of-way line, whichever is deeper.

G. Waterline Crossings:

1. Public and Private Utility Crossings Other than Sanitary Sewer:

a. Where a waterline crosses another utility other than a sanitary sewer, a minimum of 6 inches of clearance must be maintained between the outside wall of the waterline and the outside wall of the utility.

2. Stream and Ditch Crossings:

a. Elevated Crossings:

(1) All waterlines 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 inches and larger waterlines unless otherwise approved by the City. Locate the structure a minimum of 10 feet from any existing or proposed structure.

(4) Support waterlines on existing or proposed bridges meeting the following criteria may be used for 12 inches and smaller lines when approved in advance by the City.

(a) Have adequate structural capacity.

(b) Have sufficient clearance above the bent cap elevation for installation under the bridge.

(5) Design elevated crossings with the elevation of the bottom of the waterline above the low chord of the nearest adjacent bridge or a minimum of 1½ feet above the 100-year floodplain elevation, whichever is higher.

(6) Extend pipe from right-of-way to right-of-way for crossings.

(7) Provide sufficient span length to accommodate the cross section of future widening of the stream or ditch, if available.

(8) Support the line on columns spaced to accommodate the structural capacity of the pipe considering deflection and loading.

(9) Base column support design on soil capacity, spacing, loading, and structural requirements.

H. Underground Crossings:

1. Provide a minimum 3-foot clearance above the top of the pipe to the ultimate flowline of the ditch.

2. Provide sufficient length to exceed the ultimate future development of the stream or ditch.

3. All waterlines 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, whichever is greater, and shall have valves located on both sides of the crossing.

I. State Highway and County Road Crossings:

1. Extend carrier pipe from right-of-way to right-of-way.

2. Use steel casing under existing and future roadways from a point 12 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 the casing from right-of-way to right-of-way.

3. State highway crossings shall be constructed fully in conformance with the requirements of the Texas Department of Transportation and the appropriate permits obtained.

4. When additional right-of-way has been acquired or will be required for future widening, the casing, where required, should be carried to within 10 feet of each future right-of-way line.

J. Street Crossings:

1. All water mains and sprinkler line crossings under major thoroughfare boulevards shall be encased using a minimum of PVC pipe, SDR-18.

2. Crossings under existing concrete streets, other than major thoroughfares, shall be constructed by boring and jacking. PVC pipe shall be jacked into place with equipment designed for that purpose. Water may be used to facilitate boring and jacking operations. Jetting the pipe main into place will not be permitted. When conditions exist that warrant open-cut across an existing street, the City Engineer shall specifically approve the crossing.

3. All open-cut installations under existing or proposed streets shall be backfilled as shown in the construction details.

4. All street crossings shall be constructed in accordance with construction plans approved by the City. All street crossings shall be inspected by the City Engineer. All street crossings shall meet the requirements of these standards.

K. Oil and Gas Pipeline Crossings:

1. Do not use metallic pipe when crossing oil or gas transmission lines unless a properly designed cathodic system is implemented with City approval. Other pipe may be used, regardless of depth, subject to approval by the City. Maintain a minimum 2 foot separation between the pipeline and waterline.

L. On-Site Fire Loops within Commercial and Multifamily Developments:

1. For commercial and multifamily developments inside the City requiring on-site fire hydrants, comply with the following requirements to allow maintenance and future repair operations:

a. Do not allow placement of structures or equipment pads over the easement.

b. Provide 10 feet wide longitudinal pavement joint along easement lines where the waterline is located under driveway or street pavement.

M. Additional Requirements: Pipe shall be Class 150 PVC conforming to AWWA C-900 with integral bells.

N. Auger (Bore) 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 the street regardless of surface. Auger length shall be computed as roadway width at proposed bore location plus 5 feet to either side of the roadway, where applicable.

c. Sidewalks - When the waterline crosses under a sidewalk 4 feet or more in width and in good condition, the sidewalk shall either be bored and jacked or the sidewalk shall be removed and replaced to the City of Iowa Colony criteria, whichever is cost effective. Bore and jack length shall be at least the width of the sidewalk. The proposed type of construction shall be noted on the plans.

d. Bore Pits - Bore pits shall be at least 3 feet from back of curb and 5 feet from back of curb on a major thoroughfare. Bore pits and/or receiving pits to be located in street or driveway paving, shall be shown on plans.

1.05 SUBMITTALS

A. General: Conform to the following submittal requirements in addition to those of the general procedure of the City of Iowa Colony.

B. Water Line Sizes: Submit justification, calculations, and locations for proposed 6 inch lines and for lines 12 inches and larger, for approval by the City of Iowa Colony, unless sizes are provided by the City.

C. Valves: Submit information for approval by the City of Iowa Colony 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 meter sprinkler connections, to the Building Inspections Division, prior to construction.

2. Submit requests for more than one service meter in proposed private street or multifamily developments to the Department of Public Works.

E. Elevated Stream or Ditch Crossings: Submit design calculations for support columns and column spacing.

F. Master Development Plan: For multiple phase developments, submit a master development plan.

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.

1.07 APPURTENANCES

A. Do not place appurtenances under pavement. Approval must be obtained from the City of Iowa Colony and/or the City Engineer for variances.

B. Valves:

1. Set at maximum distances along line as follows:

a. 6 inch through 12 inches - 1000 feet.

b. 16 inches through 20 inches - 2000 feet.

c. Valves shall be on all branches of intersecting water mains.

C. Location:

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

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

3. 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.

4. Intermediate valves, not located on the projection line of the right-of-way line, shall be located on lot lines or 5 feet from fire hydrants but not set in driveways.

5. Locate valves a minimum of 9 feet horizontally from sanitary sewer crossings.

6. Valve Type (all valves shall open counterclockwise and shall have mechanical joints):

a. 6 inches through 12 inches - resilient seat gate valves.

b. 16 inches through 20 inches - butterfly valves (gate valves may be used with approval from the Public Works Department).

7. All valves shall be provided with a two (2) piece iron box labeled “water.”

D. Fire Hydrants and Flushing Valves:

1. Spacing:

a. Fire hydrants shall be placed to locate a hydrant within 100 feet of all commercial, retail, and/or office buildings.

b. Commercial and Multifamily Developments - 300 foot maximum spacing and at all street intersections.

c. Residential subdivisions - 400 foot maximum spacing and at all street intersections.

2. Location In or Along Street Rights-of-Way:

   a. Fire hydrants shall be primarily located at street intersections where possible.

   b. Locate fire hydrants at P.C.s of the intersection curb radius, 3 feet behind the curb or projected future curb.

   c. On all State highways and roadside ditch roadways, set the fire hydrants within 3 feet of right-of-way lines. Fire hydrants lead valves shall not be located in the slopes or flowlines of ditches.

   d. 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 non-curbed driveways.

   e. Fire hydrants and flushing valves shall not be installed within 9 feet of a sanitary sewer system under any condition.

3. Location of Fire Hydrants or Flushing Valves Outside Street Right-Of-Way:

   a. The City Fire Marshal will establish and approve the location of fire hydrants and flushing valves in apartment complexes and platted private street developments within the City.

   b. Locate fire hydrants and flushing valves in protected, easily accessible areas behind curb lines.

   c. For fire hydrants or flushing valves which are located adjacent to waterlines constructed in 10 feet wide waterline easements, the fire hydrant or flushing valve shall be centered in a minimum 10'x10' separate easement.

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

E. Fittings:

1. All fittings shall be identified as described on the construction plans.

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

3. Normally, all water main fittings shall be ductile iron <u>mechanical joints only</u>.

4. All plugs shall be provided with retention clamps.

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

6. Concrete thrust blocking shall be required on all bends, tees, plugs, and combinations thereof.

7. All fittings and fire hydrants to be tied together with ¾ inch stainless steel all threads and I-bolts or with restrained joint fittings.

F. Water Main Service:

1. In new developments, water service lines shall be provided for all lots on the opposite side of the street. Services shall normally be at lot lines with a ¾ inch minimum size to serve a single lot and 1 inch minimum for two lots. Lines shall be SDR-9 polyethylene or copper.

2. Water Main Service for Lines In or Along Rights-Of-Way:

a. Meters 2 inches and smaller: Meters shall be placed at the property line. Meters shall be located in areas with easy access and protection from traffic and adjacent to right-of-way whenever possible.

b. Meters 3 inches and larger: Locate in minimum 10'x20' 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 leads shall be designed for each meter.

3. For proposed apartments, provide one master meter sized for the entire development. Exceptions may be granted by the City for unusual circumstances only. If an exception is approved, do not interconnect multiple meters.

G. All water facilities shall be flushed, pressure tested, and bacterial tests shall be run and approved prior to acceptance.

1.08 WATER QUALITY - OVERALL SYSTEM LAYOUT

A. Circulation and Flushing: The layout of the overall water distribution system shall provide the maximum circulation of water to prevent future problems of odor, taste, or color due to stagnant water:

1. Provide a source of fresh water at each end of at multiple points of a subdivision. Provide ways to create circulation and place valves and fire hydrants to allow simple flushing of all lines.

2. Avoid dead ends whenever possible. When necessary, isolate dead ends with a line valve, keep as short as possible, and equip with a fire hydrant near the line's end.

3. Where stubs are provided 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.

B. Layout and size of all water mains shall be consistent with the overall layout and phasing plan of the City's water system. The overall water system shall be designed to maintain adequate pressure throughout the system.

C. In an unavoidable permanent dead end situation, reduce the sizes of pipe successively. Carry an 8 inch pipe to the next to last fire hydrant, use a 6 inch PVC to the end of the line. Provide a fire hydrant at the end of the main.

1.09 CLEARANCE OF WATER LINES FROM OTHER UTILITIES (New Water Lines Constructed near Sanitary Sewers and Force Mains):

A. New Waterlines Parallel to Sanitary Sewers and Force Mains:

1. Locate waterlines 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 feet separation cannot be achieved:

a. When a new waterline is parallel on existing sanitary force main or gravity sanitary sewer and the 9 feet 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 waterlines 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 pipe and, in all cases, the waterline shall be located above the sewer. When a water main crosses a utility other than sanitary sewer, a minimum of 6 inches of clearance must be maintained, and the water main shall have one joint of pipe, a minimum of 18 feet long, centered on the other utility.

2. Where a sanitary sewer crosses the water main and that portion of the sewer within 9 feet of the water is constructed as described in Section 290.44 (e) of the TNRCC Rules and Regulations, the waterline may be placed no closer than 6 inches from the sewer. The separation distance must be measured between the nearest outside pipe diameters. The waterline shall be located at a higher elevation than the sewer, wherever possible, and one joint a minimum of 18 feet long, of the new pipe must be centered on the existing line.

B. When waterlines are installed in areas which have existing sanitary sewers, every effort should be made to maintain 9 feet of separation between the outside pipe diameters of the two lines. Where this separation cannot be achieved because of local conditions, which must be fully documented in any planning material submitted, the following spaces shall be observed:

1. Where a new waterline is to cross or be installed in parallel with an existing sanitary sewer, and the sewer is constructed as described in Section 290.44(3) of the TNRCC Rules and Regulations, the separation distances specified in those rules shall apply as though the sewer was new.

2. Where a new waterline is to be installed in parallel with an existing clay, truss, or concrete gravity sewer showing no evidence of leakage vertically and 4 feet horizontally, the sanitary sewer need not be disturbed. Should excavation for the waterline produce evidence that the sewer is leaking, then the sewer must be repaired.

3. Where a new water main is to cross an existing clay, truss, or concrete gravity sewer showing no evidence of leakage, the sewer need not be disturbed if the waterline is to be installed at least 24 inches above the existing sewer. A full joint of the waterline, at least 18 feet long, should be centered over the sewer crossing, in this case, so as to provide maximum protection against contamination.

4. Existing clay, truss, or concrete sewer pipe which shows no evidence of leakage and because of physical limitations must remain at a higher elevation than the proposed intersecting waterline or closer than 2 feet may remain undisturbed if the waterline is inserted in a joint of pressure-type encasement pipe at least 18 feet long and two nominal sizes larger the waterline. The encasement pipe should be centered on the sewer crossing and both ends sealed with cement grout. In lieu of this procedure, that portion of the sewer within 9 feet of the waterline may be replaced with cast iron or ductile iron pipe with watertight joints as described in Section 290.44(e) of the TNRCC Rules and Regulations above.

C. Sanitary Manholes: Provide a minimum 9 feet 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 feet clearance cannot be obtained, the waterline may be located closer to the manhole when prior approval

has been obtained from the City of Iowa Colony by using one of the procedures below; however, in no case shall the clearance be less than 4 feet.

1. Waterline may be encased in a carrier pipe. Encasement shall be a steel waterline in a steel carrier pipe; open-cut and backfilled with cement stabilized sand compacted backfill.

2. The waterline may be augered past the manhole with one 20 feet section of C-900 PVC pipe 150 psi, installed centered about the existing sanitary manhole with pressure grout using a bentonite/clay mixture.

D. Fire Hydrants: Do not install fire hydrants within 9 feet vertically or horizontally of sanitary sewer mains, service leads, and force mains regardless of construction.

2.0 EXECUTION

2.01 DESIGN ANALYSIS

A. Waterline Sizes: Prepare narrative justification and calculations for proposed lines 12 inches and larger unless sizing is provided by the City.

B. Elevated Stream or Ditch Crossings: Prepare design calculations for support columns and column spacing for waterline crossing.

ATTACHMENT B
CITY OF IOWA COLONY, TEXAS

ENGINEERING STANDARDS
SECTION IV
STREET PAVING

1.0 GENERAL

1.01 CHAPTER INCLUDES

A. 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 Materials.

C. ACI - American Concrete Institute.

D. TxMUTCD - Texas Manual on Uniform Traffic Control Devices.

1.03 DEFINITIONS

A. Geotechnical Engineer: An engineer certified by the American Association for Laboratory Accreditation (AALA).

B. Curb Sections: Full width concrete pavement with doweled-on 6 inch high vertical curbs or 4"x12" curbs. Curb and gutter sections require inlets and underground storm sewers.

C. Roadway Ditch Sections: Ditch sections adjacent to either full width reinforced concrete pavement. Roadside ditch sections do not require underground storm sewers; however, the ditch sections must be designed to accommodate storm runoff.

1.04 DESIGN REQUIREMENTS

A. The following design requirements are applicable to all pavement within right-of-way limits within the City of Iowa Colony:

1. General:

a. All paving plans and construction shall be approved by the City of Iowa Colony for all streets within the City.

b. Street design should conform to all applicable planning tools, such as the Texas Manual on Uniform Traffic Control Devices, major thoroughfare plans, master plans, etc. Other considerations for design should include street function, street capacity, service levels, traffic safety, pedestrian safety, and utility locations. These additional considerations may affect the minimum requirements set forth herein. Refer to the City Thoroughfare Plan.

c. Design shall conform to the City of Iowa Colony's Construction Details where applicable or, if not available, the standards of the City of Houston.

d. Approval must be obtained from the City of Iowa Colony for exceptions or deviations from these requirements. Exceptions or deviations may be granted on a project by project basis only by the City and/or the City Engineer.

B. Minimum Width Requirements for a Right-of-Way:

1. Marginal Access Streets: 60 feet.

2. Local or Minor Streets: 60 feet.

3. Collector Streets: 80 feet.

4. Major Arterial Streets: 100 feet.

5. Major Thoroughfare: 120 feet.

C. Minimum Width Requirements and Paving:

1. Curb and Gutter sections for low-density residential developments: 27 feet back-to-back of curb (B/B).

2. Pavement for open ditch sections for low density residential developments: 24 feet edge-to-edge of pavement. A thickened edge is required for this type of pavement. The thickened edge should be 8 inches decreasing to 6 inches at a point 4 feet from the edge of the pavement. Use only when approved by the City in large lot residential developments.

3. Curb and gutter sections of medium density residential, industrial, secondary and collector streets: 38 feet B/B of curb minimum.

4. Pavement of major arterial thoroughfares: Two divided traffic lanes, each way, of 25 feet B/B four (4) lane divided roadways or 34 feet B/B of curb for six (6) lane divided roadways.

D. Minimum Thickness and Reinforcement Requirements for Concrete Pavements: The following requirements are the minimum requirements allowable. Pavement

thickness and reinforcement shall be designed by the Professional Engineer responsible for the project based on a current soils analysis and recommendations by a qualified geotechnical engineer. All concrete shall have a minimum compression strength of 3,000 psi. The design requirements in special cases may dictate a greater strength. Pavement design based on soils analysis, use, loading, and life span may require greater thickness and more reinforcement than the minimums give, but City Engineer may determine that additional thickness is warranted:

1. For pavement widths less than or equal to 28 feet B/B of curb:

    a. Minimum concrete slab thickness shall be 6 inches with F_c = 3,000 psi and reinforcement shall be Grade 60, f_y = 60,000 psi, #4 deformed reinforcing bars spaced at 18 inches center-to-center both ways and minimum lap lengths of 18 inches. Expansion joints shall be placed at the end of each curb return and at a maximum spacing of 50 feet 6 inches. Expansion joints shall include a ¾ inch redwood header, ¾ smooth dowel bar (18 inches length) and a 26 gauge hard plastic tube. The expansion joint shall include a standard steel wing plate.

    b. Minimum stabilized subgrade thickness shall be 8 inches.

2. For pavement widths greater than 28 feet B/B and for major arterial thoroughfares:

    a. Minimum concrete slab thickness shall be 7 inches with f_c = 3,000 psi and reinforcement shall be Grade 60, f_y = 60,000 psi, #4 deformed reinforcing bars spaced at 18 inches center-to-center both ways and minimum lap lengths of 18 inches. Expansion joints shall be placed at the end of each curb return and at a maximum spacing of 50 feet.

    b. Minimum stabilized subgrade thickness shall be 8 inches.

E. Subgrade Treatment: The Geotechnical Engineer shall base depth of subgrade stabilization on structural number (SN) in conjunction with pavement thickness design. Following is a general guidance for subgrade treatment:

1. For subgrade soil conditions with a plasticity index (PI) of 20 or more, the subgrade shall be stabilized with lime. Subgrade shall be stabilized with the recommended percent of lime by weight as determined by the Geotechnical Engineer.

2. For subgrade soil conditions containing a clean sand with no clay content, the subgrade shall be stabilized with cement.

3. For subgrade soil conditions containing silt, the subgrade shall be stabilized with lime fly ash.

F. Requirements for Intersections, Turnouts, Transitions, and Thoroughfares:

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 at the end of the curb return, whichever would require less concrete removal at a future date.

2. For roadway turnouts placed at an existing 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 an open ditch street is 50 feet for street widths less than or equal to 28 feet B/B; 75 feet for up to 38 feet B/B width, and 100 feet for 41 feet B/B width.

   a. Concrete streets shall have transitions of a minimum thickness of 6 inches of stabilized subgrade and 6 inches of concrete pavement.

4. When paving only one roadway of a proposed two roadway thoroughfare (boulevard section) all left turn lanes and esplanade crossovers shall be paved to the centerline of the street right-of-way.

G. Requirements for Roadway Pavement with Open Ditch Sections:

1. Minimum grade on ditches shall be 0.20 percent.

2. Ditch capacity shall be designed to handle runoff as determined by the City drainage design requirements.

3. Maximum side slopes of ditches shall be 3 feet horizontally to 1 foot vertically (3:1). Sides may be sloped to 4:1 or 5:1 for easier maintenance by property owner.

4. Culverts for roadside ditch only shall be designed to carry ditch discharge but not less than 15 inches diameter pipe constructed of reinforced concrete. The maximum length shall be 24 feet.

5. The radius for cul-de-sac pavement shall be 40 feet, if the cul-de-sac is located on the interior of a residential subdivision, and is 600 feet or less in length. If the cul-de-sac opens onto a thoroughfare or exceeds 600 feet in length, the pavement radius shall be 45 feet.

H. Requirements for Roadway Pavement with Curb and Gutter Sections:

1. Minimum gutter gradient shall be 0.20 percent.

2. Maximum cut from finished grade at property line to top of curb shall be 1.50 feet. The recommended maximum slope for driveways shall be 10:1 slope.

Variations of this requirement may be allowed with specific approval of the City.

3. Minimum grade shall be 0.5 percent fall around intersection turnout for a maximum radius of 25 feet. Grades for larger radius shall be determined on an individual basis.

4. Vertical curves shall be installed when algebraic differences in grades exceed 1 percent. Elevations shall be shown at 10 feet intervals through vertical curves. Maintain a minimum of 0.02 feet elevation change at 10 feet intervals by altering the calculated elevations.

5. When a curb and gutter intersects a drainage ditch, the grade of gutter shall be above the designed water surface of the ditch.

6. Major thoroughfares shall be super-elevated in accordance with AASHTO whenever the centerline radius of lanes or right-of-way is less than 2,000 feet.

7. The amount of cross-slope over the pavement section should be shown on the drawings. The usual cross-slope is d inch per foot.

8. A minimum gradient of 0.20 percent around the longest radius is required on an L-Type street intersection or cul-de-sac.

9. 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 d inch per foot transverse slope toward the curb from the property line between a point 2 feet outside the right-of-way and the top of the curb. If this type fill is required and the pavement is adjacent to a nonparticipating property owner, fill easements from this property owner shall be obtained and 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.

10. Grades should be labeled for all tops of curb. Centerline grades are acceptable for open-ditch sections only.

I. Requirements for Curbs and Sidewalks:

1. Standard height of a curb is 6 inches and 12 inches wide for curbs located along outside edges of residential streets. Curb height for streets other than residential shall be 6 inches. The curb height for all esplanades shall be 6 inches.

2. Sidewalk wheelchair ramps shall be required at all intersections and driveways.

3. All sidewalks are to be 4 feet in width and are to be constructed in accordance with the City of Iowa Colony details.

J. Requirements for Miscellaneous Items:

1. The type and amount of subgrade treatment shall be shown on the drawings.

2. Paving headers shall be placed at the end of all concrete pavements.

3. All concrete to be removed shall be removed either to an existing joint or to a sawed joint.

4. Sight distance requirements based on a design speed of 40 mph shall be used for determining lengths of crest vertical curves for all pavements except boulevard sections which shall be designed for 45 mph.

5. Standard City barricades shall be placed at the end of all dead-end streets not terminating in a cul-de-sac.

6. A letter of agreement from the affected pipeline company approving the construction plan crossing is required when paving is placed or construction work occurs over a transmission pipeline.

7. When meeting existing concrete pavement, horizontal dowels shall be used if no exposed reinforcing steel for interconnection with new pavement exists. Horizontal dowels shall be Grade 60, #6 rebars, 24 inches long, drilled and embedded 12 inches into the center of the existing slap and epoxies. Dowels shall be 24 inches center-to-center, unless otherwise specified.

8. When concrete is removed for interconnections, 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 as previously described.

9. Dead-end streets or ends of concrete slabs designed to be extended in the future shall have paving headers and 15 inches of reinforcing steel exposed beyond the pavement, coated with asphalt and wrapped with burlap or paving headers and dowel type expansion joint for future pavement tie.

10. Pavement extensions shall connect to the existing pavement with a pavement undercut and a minimum steel overlap of 18 inches.

11. Concrete pavement thickness design is required for all pavement within industrial areas and on major thoroughfares. Concrete pavement thickness design shall be based on AASHTO design procedures for rigid pavements.

12. Adjust manhole frames and covers within the limits of the pavement to meet the proposed final top of slab.

13. Adjust manhole frames and covers outside the limits of the pavement to conform to the final grading plan.

1.05 QUALITY ASSURANCE

A. All construction drawings and specifications shall be prepared by or under the supervision of a currently Registered Professional Engineer of the State of Texas, and all documents shall be sealed, dated, and signed by the engineer responsible for the preparation.

B. A geotechnical report shall be performed by or under the supervision of a currently Registered Professional Engineer of the State of Texas disciplined in the science of soils analysis. All reports and documents shall be sealed, dated, and signed by the engineer responsible for the preparation.

2.0 EXECUTION

2.01 DESIGN ANALYSIS

A. All pavement design shall be supported by calculations to establish the required thickness and reinforcement.

B. The current soils report shall be the basis for design considering the use, loading, and life span of the proposed pavement.

ATTACHMENT B
CITY OF IOWA COLONY, TEXAS

ENGINEERING STANDARDS
SECTION V
STORM WATER DRAINAGE

1.0 GENERAL

1.01 CHAPTER INCLUDES

A. Criteria for the design of storm drainage improvements.

1.02 REFERENCES

A. City of Iowa Colony Flood Damage Prevention Ordinance and subsequent revisions.

B. Brazoria County Drainage District Criteria Manual (for development in Conservation and Reclamation District No. 3 and Drainage District No. 5).

C. TxDOT Bridge Division Hydraulic Manual, Third Edition, 1985.

D. National Weather Service Documents: TP-40 Rainfall Frequency Atlas of the United States.

1.03 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 of either the same type or another type, and takes advantage of the existing infrastructure in place as 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. Public Storm Sewers: Defined as sewers and appurtenances that provide drainage for a public right-of-way, or more than one private tract, and are located in public right-of-way or easement and officially accepted by the City for maintenance. Private storm sewer connections public storm sewers shall occur at a manhole or at

the back of an inlet, as approved by the City. All private storm sewers shall be constructed in conformance with these standards.

G. Rational Formula: A method for calculating the peak runoff for a storm drain system using the following equation:

$Q = CIAC_f$

where:
- Q = flow rate in cfs
- C = runoff coefficient
- C_f = frequency factor, the product of C_f and C should not exceed 1.0.
- I = rainfall intensity in inches/hour, for a given storm frequency (typically 5 year, 25 year, 50 year and 100-year).
- A = area in acres
- t_c = time of concentration in minutes, time required for peak runoff from entire upstream contributing area to reach the point of interest.
- $t_c = \frac{D_f}{60V}$ + 10 minutes initial
- D_f = flow distance, feet
- V = flow velocity of runoff flow, feet/sec.

Storm Frequency	Frequency Factor
$\leq$ 10	1.00
25	1.10
50	1.20
100	1.25

For purposes of calculating t_c the following velocities are recommended.

- V = 1 fps for overland flow.
- V = 1.5 fps for flow across paved surfaces or along gutter flowlines.
- V = 2 fps for flow in ditch or channel
- V = 3 fps for flow in storm sewer

H. Sheet Flow: Overland storm runoff that is not conveyed in a defined conduit, and is typically in excess of the capacity of the conduit.

I. Manning's Equation: $V = (1.486/n) R^{2/3} S_f^{1/2}$

where
- V = velocity (ft./sec)
- R = hydraulic radius (area/wetted perimeter in feet)
- S_f = slope of energy line in feet/feet and the rate at which energy is lost

due to channel resistance, (same as conduit bottom slopes for uniform flow)

n = coefficient of roughness
n = 0.013 for concrete pipes
n = 0.012 for smooth interior wall polyethylene pipe

J. Continuity Equation: $Q = VA$

where
Q = discharge (cfs)
V = velocity (ft/sec)
A = cross-sectional area of conduit in square feet

K. FEMA: Federal Emergency Management Agency.

L. C&R No. 3: Brazoria County Conservation and Reclamation District No. 3.

M. DD No. 5: Brazoria County Drainage District No. 5.

1.04 DESIGN REQUIREMENTS

A. All designs of drainage facilities should meet the requirements of the City of Iowa Colony Standard Specifications and Standard Drawings:

1. Determination of Runoff:

a. Design storm Events - All drainage improvements shall be designed for the following storm frequencies:

Roadside Ditches	5 years
Storm Sewers	5 years
Open Drainage Channels serving less than 100 acres	25 years
Secondary Arterials	25 years
Bridges	100-years
Creeks/Channels	100-years
Detention Facilities	100-years

2. Intensity-Duration Curves: Table 2-1 of the Brazoria County Drainage Criterion Manual provides intensity-duration values to be used for storm sewer and roadside ditch design in the City of Iowa Colony. These intensities are derived from the formula:

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

Values are as listed below:

	Rainfall Frequency					
Duration	**2-yr.**	**5-yr.**	**10-yr.**	**25-yr.**	**50-yr.**	**100-yr.**
5 minute	0.57	0.64	0.69	0.78	0.84	0.91
15 minute	1.21	1.38	1.51	1.71	1.86	2.02
60 minute	2.35	2.87	3.24	3.78	4.20	4.62
2 hour	2.85	3.75	4.35	5.00	5.60	6.20
3 hour	3.30	4.10	4.90	5.60	6.30	7.15
6 hour	3.70	5.00	5.85	6.85	7.80	8.75
12 hour	4.40	6.00	7.25	8.50	9.60	10.75
24 hour	5.10	7.00	8.55	9.95	11.50	13.00

3. The Rational Method shall be used for determining the peak flow rate in the sizing of all local drainage improvements with drainage areas less than 200 acres.

4. Coefficients for the Rational Method:

   a. Calculation of Run-Off Coefficient: The values for the run-off coefficient "C" in the Rational Method formula will vary based on the land use. Land use types and "C" values which can be used are as follows:

Land Use Type	Run-Off Coefficient
Raw Undeveloped Acres	0.20
Improved Undeveloped Acres (i.e. mowed filled, regraded, etc.)	0.30
Park Land	0.40
Residential:	
Single Family Lots greater than 1 acre	0.30
Single Family Lots 0.5 acre to 1.0 acre	0.35
Single Family Lots 0.25 acre to .50 acre	0.40
Single Family Lots less than 0.25 acre	0.50
Commercial/Industrial/Industrial Multifamily	
50% impervious	0.60
75% impervious	0.75
95% impervious	0.85
Business Districts	
Downtown Areas	0.85
Neighborhood Areas	0.75

   b. Determination of Time Concentration: Time of concentration shall be calculated based upon an analysis of the actual travel time from the

most remote point in the drainage area. The travel path should be clearly denoted and a sketch included in the design calculations.

B. Design Frequency:

1. Design Frequency:

a. Newly Developed Areas: The design storm event for sizing storm sewers in newly developing areas will be a 5-year rainfall. Detention shall be provided and in accordance with drainage district standards. Calculations shall show that water surface elevations are not increased upstream and downstream of the tract.

b. Redevelopment or In-Fill Development: The existing storm drain will be evaluate using a 5 year storm, assuming no development takes place. The storm drain will 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 impervious cover is increased, detention shall be provided to prevent a change in runoff or water surface elevations. The detention required shall be based on a ratio of pre-development to post-development imperviousness.

c. Private Drainage Systems: Storm sewers for private drainage systems should conform to the City of Iowa Colony standards for public drainage systems.

2. Velocity Considerations:

a. All storm drains shall be designed by the application of the Continuity Equation and Manning's Equation.

b. Design velocities shall be a minimum of 2 feet per second (fps) with the pipe flowing full.

c. Maximum velocities should not exceed 7 feet per second.

d. Minimum Storm Sewer Pipe Slopes:

Pipe Diameter	% Slope
15	0.16
18	0.10
24	0.07
30	0.05
36	0.04
42	0.032
48	0.027
54	0.023
60	0.020

For pipe sizes not listed above, the minimum slope should be determined utilizing a design velocity of 2 fps.

3. Pipe Sizes and Placement:

a. Use the storm sewer and inlet leads with at least 24 inch inside diameter or equivalent cross-section. Box culverts shall be at least 2'x2'. 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 upstream system is intended for use in detention.

c. Match crowns of pipe at any size change unless severe depth constraints prohibit.

d. Locate public storm sewers in public street rights-of-way or in parallel and adjoining easements or in approved easements. Side and back lot easements for storm sewers will require an exception to City design standards; however, if approved, the easement must be at least 20 feet wide with the storm sewer centered in the easement. Side and back lot easements are discouraged.

e. Follow the alignment of the right-of-way or easement when designing cast-in-place concrete storm sewer easements.

f. A straight line shall be used for inlet leads and storm sewers.

g. Center culverts in side-lot storm sewer easements.

h. Provide 4 feet minimum from edge of pipe to edge of easement.

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 and conduit intersections.

(3) Changes in pipe grade.

(4) A maximum spacing of 500 feet measured along the conduit run.

(5) Manholes shall be placed so as not to be located in the driveway area.

6. Inlets:

a. Locate inlets at all low points in gutter.

b. Valley gutters across intersections are not permitted.

c. Inlet spacing is generally a function of gutter slope. For minimum gutter slopes, the maximum spacing of inlets shall result from a gutter run of 500 feet from high point in pavement or the adjacent inlet on a continuously graded street section, with a maximum of 1000 feet of pavement draining towards any one inlet location.

d. Use only Standard Inlets:

Inlet	General Application	Capacity
Type A	Parking Lots/Small Areas	2.5 cfs
Type B-B	Residential	5.0 cfs
Type C	Streets	1.5 cfs
Type D	Parking Lots	2.0 cfs
Type E	Roadside Ditches	20.0 cfs

e. Do not use grate top inlets in unlined roadside ditch.

f. Place inlets at the end of the proposed pavement, if drainage will enter or leave pavement.

g. Do not locate inlets adjacent to esplanade openings.

h. Place inlets on side streets intersecting major streets, unless special conditions warrant otherwise.

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 Structure to Street: All structures will be higher than the highest level of ponding anticipated resulting from the 100-year 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 the top of curb or centerline of roads without curb on the 5 year storm event.

c. The maximum depth of ponding at low points will be 10 inches above top of curb or centerline of roads without curb on the 5 years storm event.

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 shall 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 method described in the C&R No. 3 or DD No. 5 Criteria Manuals for their respective areas.

b. Design standards for channel construction should follow the requirements specified in the Criteria Manuals.

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 Design Division Hydraulics Manual, Chapter 7 - Culverts.

b. Culverts shall be Class III RCP conforming to ASTM C-76 or smooth interior wall corrugated polyethylene pipe conforming to AASHTO M252.

4. Channels shall be seeded or sodded and a grass stand obtained prior to project approval.

E. Design of Roadside Ditches:

1. Design Frequency:

a. Roadside ditch design is permissible only for single family residential lots having widths larger than or equal to, 140 feet.

b. 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.

c. The design must include an extreme event analysis to indicate that structures will not be flooded.

2. Velocity Considerations:

   a. A grass lined or unimproved roadside ditch shall have side slopes no steeper than 3:1.

   b. Minimum grades for roadside ditches shall be 0.1 foot per 100 feet.

   c. Calculation of velocity will use a Manning's roughness coefficient of 0.040 for earthen sections and 0.025 for ditches with paved inverts.

   d. Use erosion control methods acceptable to the City when design velocities are expected to be greater than 4 feet per second.

3. Culverts:

   a. Culverts will be placed at all driveway and roadway crossings, and other locations where appropriate. Low water crossings are not permitted

   b. Culverts will be designed assuming outlet control.

   c. Roadside culverts are to be sized based on drainage area. Calculations are to be provided for each block based on drainage design criteria presented in this manual.

   d. Cross open channels with roadside culverts no smaller than 15 inches in 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. Flow from roadside ditches must be conveyed to the channel through a roadside ditch interceptor structure and pipe.

4. Depth and Size Limitations:

   a. All roadside ditches shall be fully contained in the right-of-way or a recorded drainage easement.

   b. Ditches in adjoining and parallel easements shall have the top of bank not less than 2 feet from the outside easement line.

   c. Roadside ditch bottoms should be at least 1 foot wide.

   d. Roadside ditch side slopes shall not exceed 3:1.

F. Storm Water Detention:

1. Application of Detention:

a. As a normal consideration, storm water detention is required. The use of on-site detention is required in order to mitigate potential damage to existing structures unless participation in regional detention facilities is available that will provide equivalent protection to downstream property owners.

b. Design calculations for sizing the detention basin and related structures must be performed by the applicable method described in the following sections.

c. All calculations shall be sealed, signed, and dated by a registered professional engineer.

d. A parking lot may be used as part of the detention system, provided that the maximum depth of water over the inlet does not exceed nine inches (9") and the maximum depth in the parking stall does not exceed six inches (6").

e. All detention basins shall be maintained by the property owners except regional detention facilities that are owned and operated by the City of Iowa Colony, C&R District No. 3, or DD No. 5.

2. Calculation of Detention Volume:

a. For developments located within drainage areas of more than 100 acres, a detailed hydrologic analysis utilizing the HEC-1 Flood Hydrograph method will be required following the procedure on the Brazoria County Drainage Criteria Manual for areas served by the C&R District No. 3 or the DD No. 5 Criteria Manual for their service area.

b. In the areas served by C&R District NO. 3 and DD No. 5, the acre-feet of flood control storage, S< to be provided by the facility for the 100-year storm event is:

$$S = I^{½} \times A$$

Where I = the average percent imperviousness of the area draining into the facility (÷ 100), and A = the drainage area of the facility in acres.

The size of the outlet pipe is required to pass the maximum allowable release rate during the 100-year storm is to be computed assuming outlet control by establishing a maximum ponding level in the detention facility during the 100-year storm and assuming a tailwater at the top of the downstream end of the outlet pipe or at a depth in the outlet channel associated with the maximum release flow rate, whichever is higher. 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 overlapped.

3. Detention Pond Structural Requirements:

   a. Side slopes shall not exceed a slope of 3 feet horizontally to one 1 vertically (3:1).

   b. Detention ponds shall have a concrete pilot channel to aid drainage.

   c. Concrete pilot channels shall have a minimum width of 4 feet and a minimum thickness of 4 inches with #3 rebar spaced at 12 inches on center each way. The concrete channels shall be constructed of 5 sack cement concrete with a minimum compressive strength of 2500 psi at 28 days. Provide a 2 inch minimum depression per every 1 foot of transverse slope with redwood headers spaced every 40 feet.

   d. Appropriate covering (grass, slope paving, etc.) shall be established on side slopes and pond bottom to prevent erosion during periods of maximum water velocity.

   e. A concrete spillway, set at the maximum ponding elevation, shall be provided at the detention pond outfall structure.

4. Ownership and Easements:

   a. Private Facilities:

      (1) Responsibility for maintenance of the detention facility must be indicated on the plat or construction plans.

      (2) All private properties being served shall have drainage access to the pond.

      (3) A private recorded maintenance agreement with a specific responsible party shall be provided when multiple tracts are being served.

      (4) The maintenance berms shall be at least 20 feet on each side of the water course.

   b. Public Facilities:

      (1) Facilities may be accepted for maintenance by the City but only in cases where public drainage is being provided.

      (2) The City will require a maintenance work area 30 feet wide surrounding the extent of the detention area. Public rights-of-way or permanent access easements may be included as a portion of this 30 feet width.

(3) A dedication of the maintenance easement or reserve must be provided by plat.

(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.

1.05 SUBMITTALS

All plat and construction drawing submittals shall comply with and fully follow the procedures outlined in the City of Iowa Colony's Subdivision Ordinance.

A. Preliminary Submittals: Submit for review and comment:

1. Lot and street layout.

2. The approximate drainage areas for each system.

3. The proposed drainage system.

4. The proposed pipe diameters.

5. Proposed detention areas with approximate volumes and depths.

6. Any proposed drainage easements.

7. Floodplain boundary, if applicable.

8. Floodway boundary, if applicable.

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.

3. Design calculations for the hydraulic grade line of each line or ditch, and for detention facilities. Calculations shall show that the water surface elevations will not be increased upstream or downstream of the property on a 5 year and 100-year event.

4. Contour map of the project and drainage area map for the project and the upstream.

5. Plan and profile sheets showing storm water design.

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. Show the floodway boundary, if applicable.

C. Additional Submittals: Submit the following for approval:

1. Review prints.

2. Original drawings.

3. Storm water detention maintenance agreement letters.

4. Pipeline company agreements.

5. Any and all applicable permits and agreements.

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 being prepared. 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. Drawings shall contain the following statement “Based on these plans and calculations and minimum building elevations prepared under my direction, no structure will be subject to flooding in the 100-year storm and the upstream and downstream water surface elevations will not be increased.”

B. A geotechnical report shall be performed by, or under the supervision of, a currently registered Professional Engineer in the State of Texas, pertaining to the Site Drainage Design requirements contained within this section. All reports and documents shall be sealed, dated, and signed by the Engineer responsible for the preparation thereof.

1.07 DRAINAGE POLICY

A. Design Requirements: This drainage criteria is administered by the City of Iowa Colony and complemented by Conservation and Reclamation District No. 3 and the Brazoria Drainage District No. 5, in their respective service areas. Although the City of Iowa Colony is not actually located within the boundary of C&R No. 3 a portion of the outfall drainage from the City enters the C&R No. 3 channels and, therefore, their criteria and standards are to be considered where applicable. The goal is to provide protection in 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) runoff. The combined system is intended to prevent structural flooding from extreme events up to a 100-year storm. In order to protect existing properties, water levels, due to runoff, shall not be increased upstream or downstream of a development due to the improvement.

B. Street Drainage: Street ponding of short duration in significant storms 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 5 year storms with the intent of allowing for traffic movement during these events. When rainfall events exceed the capacity of storm sewer system, the additional runoff 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 Iowa Colony 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 Permitting Process: Approval of storm drainage is a part of the review process for platting and permitting of the new development. All plans for plats and proposed new construction shall include drainage improvements in the plans submitted to the Planning and Development Department.

2.0 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 benchmarks, 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 shall contain all storm sewer drainage calculations.

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. Plan sets shall include the 5 year Hydraulic Grade Line for storm sewers and roadside ditches on the plan and profile sheets.

CITY OF IOWA COLONY, TEXAS

SUBDIVISION ORDINANCE

ATTACHMENT C

STANDARD DETAILS

CITY OF IOWA COLONY, TEXAS
ATTACHMENT C
STANDARD DETAILS
TABLE OF CONTENTS

SHEET NO.

STANDARD DETAILS