

**WALLER COUNTY
SUBDIVISION AND DEVELOPMENT
REGULATIONS**

Revised 8-14-07 - Added Section 3.4.2 N

Resolution and Order

On February 16, 2007, the Commissioners Court of Waller County, Texas, met at the County Courthouse with the following members present:

Owen Ralston, County Judge Presiding,
W.M. (Bill) Eplen, Commissioner Precinct One,
Terry Harrison, Commissioner Precinct Two,
Milton Whiting, Commissioner Precinct Three, and
Glenn Beckendorff, Commissioner Precinct Four,

when among other matters, came for consideration and action the following Resolution and Order:

Whereas, the Commissioners Court of Waller County, Texas, duly convened, and acting in its capacity as the governing body of Waller County, ORDERED that the regulations attached and appended hereto, entitled "**WALLER COUNTY SUBDIVISION AND DEVELOPMENT REGULATIONS**" are made a part of this Order; and

Whereas, all officials and employees of Waller County having duties under said regulations are ordered and directed to perform such duties as required of them under said regulations.;

Therefore be it Resolved, that Commissioners Court adopts the attached document as the "Waller County Subdivision and Development Regulations" and **orders** that it be in effect on and after this day; and

Further Resolved, that County Judge Owen Ralston is authorized to sign this Resolution and Order as the act of Commissioners Court.

The Resolution and Order was moved by Commissioner Beckendorff, seconded by Commissioner Whiting, and adopted by the Commissioners Court on a vote of 5 members for and 0 opposed.

Owen Ralston, Waller County Judge

Index

ITEM	PAGE
1. Purpose	1
2. Definition of Terms	2
3. Platting Procedure	5
4. Replats	15
5. Improvement Construction Security and Acceptance	17
6. Improvement Maintenance Security and Acceptance	19
7. Substandard Subdivisions	20
8. Variances	21
9. Penalties	22
10. Summary of Costs	23
11. Plat Required	25
12. Plat Not Required	26
Appendix A --- Engineering Design Standards	29
Appendix B --- Plat Notes	39
Appendix C --- Infrastructure Development Plan	48
Appendix D --- Engineering Report For Manufactured Home Rental Communities	53
Appendix E --- DRAINAGE CRITERIA MANUAL	56

Waller County Subdivision and Development Regulations

On February 16, 2007, acting pursuant to Chapter 232, Texas Local Government Code, Commissioners Court adopted the following regulations governing the subdivision of land. These regulations shall be known as the "Waller County Subdivision and Development Regulations".

1. Purpose

- 1.1 These regulations have been prepared to aid in the orderly development of Waller County, Texas. Specifically they have been prepared for the following purposes:
- 1.2 To furnish the developer with guidance in the expedient preparation and approval of a plat.
- 1.3 To protect the citizens of Waller County by enacting minimum subdivision standards.
- 1.4 To provide standards for the location, design, and construction of streets, intersections, drainage improvements and other features that provide safety for the public.
- 1.5 To prevent the Waller County Street System from being burdened with substandard local streets.
- 1.6 These rules, regulations and requirements may be revised at any regular session of Commissioners' Court, said amendments or revisions to become effective upon formal adoption by the Court.
- 1.7 The publication "Policies for Subdivisions Created without the Corporate Limits of any Town in Waller County", dated the 15th of June 1981, as amended through the 27th of September 2005, is rescinded, effective the February 16, 2007

2. Definition of Terms

- 2.1 Acceptable Outfall - that point as determined by the developer's Engineer and approved by the County where storm water can be released without causing erosion or resulting sedimentation to the receiving channel or its flood plain. Where necessary, the outlet shall include structural and vegetative measures to assure non-erosive conditions.
- 2.2 Arterial Streets - those streets that are principally regional in nature and are used for through traffic and shall be divided into two classifications:
 - 2.2.1 Streets, which will serve vehicular traffic beyond the limits of the subdivision; and connect one collector or arterial with one or more collectors or arterials.
 - 2.2.2 Streets in this category as shown in the current Thoroughfare Plan.
- 2.3 Building Setback Line - a line of a plat generally parallel to the street right-of-way, indicating the limit beyond which buildings or structures may be erected and the area between the street right-of-way and the building setback line within which no private structure may be permitted.
- 2.4 Collector Streets - those which connect arterial streets with local streets.
- 2.5 County Commissioner - the Waller County Commissioner(s) in whose precinct(s) the subdivision is located.
- 2.6 County Engineer - an Engineer, registered to practice engineering in the State of Texas, representing and/or contracted to represent Waller County.
- 2.7 Cul-de-sac - a short public street having but one (1) opening or access to another public street and terminated by a permanent vehicular turn-around.
- 2.8 Developer - any owner or person representing the interests of the owner of the property to be subdivided.
- 2.9 Final Plat - a drawing of a proposed subdivision prepared in a manner suitable for recording in the County records and in conformance with the conditions of preliminary approval of Commissioners Court and meeting the requirements of Section 3.4.
- 2.10 Flag Lot - for the purposes hereof, a key or flag shaped lot shall mean a lot having gross disparities in width

between side lot lines, sometimes resembling a flag or flag pole, a key, or some other lot shape of comparable irregularity. Key or flag shaped lots shall not be prohibited if otherwise in compliance with the minimum lot size requirements of this and other applicable regulations of the County and, provided that no portion of any such lot is less than sixty feet (60') in width.

- 2.11 Local Streets - those which principally provide direct access to lots within a subdivision.
- 2.12 Lot - any portion of land surface contained within property lines of a specific area, including land within easements and setback lines. The word "lot" includes the word "parcel" and "tract".
- 2.13 Rental Community (including Manufactured Home Rental Communities)- a plot or tract of land that is separated into two or more spaces or lots that are rented, leased, or offered for rent or lease, for a term of less than 60 months without a purchase option.
(See Appendix C and D)
- 2.14 Owner - the person or persons with equitable or legal title to the property to be subdivided.
- 2.15 Parent Tract - the original tract prior to any division.
- 2.16 Preliminary Plat - a drawing of a proposed subdivision meeting the requirements of Section 3.3.
- 2.17 Recreational Vehicle - a unit which contains facilities for either sleeping or temporary living quarters, or both, and which has its own motive power or is designed to be mounted on or towed by another motor vehicle. The term recreational vehicle shall include but not be limited to a motor home, truck camper, travel trailer and camping trailer; provided, however a recreational vehicle shall not include a boat, a mobile home or a manufactured home.
- 2.18 Recreational Vehicle Park - a contiguous development of land which has been planned and improved for the placement of recreational vehicles approved by the County in accordance with applicable codes, laws, rules, and regulations.
- 2.19 Rural Street - any street situated so that the spacing of driveways is greater than 100 feet apart.
- 2.20 Street - a way for vehicular traffic and used to describe all vehicular ways regardless of any other designation, and includes public streets, private streets and easements. The terms "street" and "road" are interchangeable.

- 2.21 Subdivision - the division of a tract into two or more parts with any of the tracts being 10 acres or less in area. Section 232 of the Texas Local Government Code shall control the definition of a subdivision in these Regulations. Any amendment of the Local Government Code shall amend these Regulations, without further action by Commissioners Court.
- 2.22 Texas Department of Transportation (TxDOT) Standards - those current standard specifications set forth in the TxDOT Standard Specifications for Construction of Highways, Streets, and Bridges
- 2.23 Urban Street - any street situated so that the spacing of driveways is less than 100 feet apart for a distance of 1/4 of a mile. This distance does not apply to a subdivision using curb and gutter. Any curb and gutter street will be considered an urban street.

3. Platting Procedure

The platting procedure for subdivisions within Waller County shall be as follows:

3.1 Pre-application Procedure

Before any preliminary plans are prepared, the developer should obtain a copy of these regulations and become familiar with the various requirements to avoid expenditures of time and money, only to find that changes are required to make the plat and plans conform to the regulations.

3.2 Procedure for Rental Communities

Developers shall not begin any construction on a proposed rental community until they comply with Section 232.007 of the Texas Local Government Code and notify Commissioners Court in writing of the intention to develop the subdivision.

3.3 Preliminary Plat

3.3.1 Preliminary Plat Procedure

- A. The Commissioners Court has assigned the duty of approving preliminary plats to the County Engineer. The Commissioners Court retains the right to overrule the County Engineers decision.
- B. Developers shall not begin any construction on a proposed subdivision, until obtaining preliminary plat approval from the County Engineer.
- C. Prior to any subdivision of land, the Developer shall set a meeting with the County Engineer. Based upon the comments from the meeting, the Developer or his representative shall submit four (4) copies of the preliminary plat of the subdivision to the County Engineer's Office for preliminary approval.

- D. The County Engineer shall review plat for compliance with these Regulations, and provide written comments. The County Engineer shall provide the developer with comments and take the following action by issuing a certificate of:
 - 1. Preliminary Approval
 - 2. Preliminary Approval with conditions to be satisfied at the time of Final Plat Approval
 - 3. Denial of Preliminary Plat Approval

- E. Prior to the approval of the preliminary plat, the Developer shall supply the County Engineer with a digital file of the preliminary plat. The digital file shall be in a .DWG format or a format that is readily convertible to .DWG format. The file shall be submitted to County Engineer's Office.

- F. If the property to be subdivided lies within the extraterritorial jurisdiction of a city, this procedure shall be accomplished with the platting procedures as established in individual city interlocal agreements.

3.3.2 Every preliminary plat must include the following:

- A. The lot layout drawn on a scale of 1" = 100' or larger, 1" = 200' or larger for plats with lots greater than 2.5 acres in size, or 1" = 400' or larger for plats with lots greater than 20 acres in size. Sheet size shall be 24" x 36", with a 1" binding margin on all sides. Multiple sheet plats shall have the subdivision name and sheet number located in the lower right hand corner of each sheet. A key map shall be provided showing individual sheet relationships. Provide a scale and North arrow.

- B. Existing topographic contours, which may be obtained from U.S. Geological Survey 7.5 minute quadrangle map.

- C. The location of existing property lines, easements, streets, 100-year Flood Zone, lakes and water courses, utility easements, and drainage culverts within the tract or immediately adjacent within two hundred feet (200').

- D. Proposed lots, blocks, reserves, streets, alleys, building setback lines, easements, and any areas of special use including suggested operations sites for exploration, development and production for minerals.
- E. Lots shall have a minimum of 50 feet in width at the right-of-way line (50 feet in width at building line for lots on cul-de-sacs) and shall front a local street. Single-family residential lots shall not have direct access and shall not front on an urban arterial or an urban collector street.
- F. Flag lots, if allowed, shall have a minimum strip of land (Flag staff) width of 60 feet and staff length no longer than 500 feet + 20 feet for each acre greater than 10 acres. No more than two flag lot strips shall be located side by side. The flag lots main body of land cannot be located behind another flag lot.
- G. Names, and right-of-way dimensions for all proposed and existing streets.
- H. Boundary of the subdivision and scaled dimensions, both linear and angular.
- I. Area of subdivision, total number of lots and blocks and total area of reserves.
- J. Proposed and existing easements, and detention reserves.
- K. Proposed typical property line dimensions and radii.
- L. Front setback lines shall be 25 feet. Side street setback lines shall be 15 feet on local streets, and 35 feet on arterial and 25 feet on collector streets.
- M. A general statement of the proposed uses of the land within the subdivision.
- N. Name, address, telephone number and fax number for the subdivision owner, developer and surveyor and/or engineer.
- O. If the subdivision is to be carried out in two or more phases, a proposed master plan for the entire tract shall be prepared and filed with

the County Engineer's Office prior to the time the first unit is submitted. Requirements of the plat, concerning sheet size and drafting media shall be the same as for the plat to be recorded. Scale of this plat will be left to the discretion of the surveyor or the engineer.

- P. City limits boundaries, extraterritorial jurisdiction boundaries, and county boundaries.
- Q. The title block in the lower right hand corner shall contain the proposed subdivision name preceded by the words "Preliminary Plat of _____" and the abstract and survey in which the property is located.
- R. Vicinity map in the upper right hand corner showing location of subdivision in relation to existing streets and highways, and railroads within one (1) mile.
- S. Approval of the appropriate jurisdiction when the subdivision is within the extraterritorial jurisdiction (ETJ) of that city.
- T. A preliminary plat review fee (section 10) shall be paid with the submission of the preliminary plat for review.

3.4 Final Plat

3.4.1 Final Plat Procedure

- A. The final plat procedure will be the same as the preliminary plat procedure with the following additions.
- B. Final plat and construction document review fee (See section 10) shall be paid with the submission of the final plat for review.
- C. Commissioners Court shall not grant final approval on any subdivision until the Developer meets every subdivision requirement, including signature, Construction securities, blue-lined copies, paper copies, preliminary plat and fees. In addition, if the project is located within the Brookshire-Katy Drainage District, the Developer shall obtain written approval from the District of the development plans, and a copy of said approval shall be submitted to the County Engineer as a

requirement of final plat approval.

- D. The Developer shall submit to the County Engineer the specified number of original plats on 4 mil mylar and four identical blue-line copies of a size of either 22" x 34" or 24" x 36", at least fourteen (14) days before the date of the Commissioners Court meeting at which approval is requested. All text shall be on the front of the mylar. Photocopies are not acceptable. The specified number of original plats may vary but will generally be understood as one original for the developer, one for filing by the County Clerk, and one additional for cities when platted within an ETJ

Originals Needed:

- (3) 8½"x14" - Blue Line, Black line or Mylar
- (3) Mylar Plat - 22"x34" or 24"x36"
- (2) Black Line copies - 22"x34" or 24"x36"

- E. The County Engineer shall review plat and plans for compliance with these Regulations, and provide written comments. The County Engineer shall recommend the Commissioners Court to take the following action:

- 1. Final Approval
- 2. Denial of Final Plat Approval
- 3. Table Final Plat Approval to resolve outstanding issues.

- F. Prior to placement of the approval of the final plat on the Commissioners Court agenda, the Developer shall supply the County Engineer with a digital file of the final plat. The digital file shall be in a .DWG format or a format that is readily convertible to .DWG format. A check made payable to the County Clerk for handling and processing shall also be submitted with the final plat along with a check for the filing fee.

- G. Following final approval of the subdivision, the County Clerk will record the plat in the Plat Records of Waller County, Texas, and distribute the originals with the recording information. The Clerk will retain a copy of the plat for the County's records.

- H. Unless the preliminary plat is followed by final plat approval within one year, the

preliminary plat lapses and the subdivision must be resubmitted.

- I. The final plat must be approved at a meeting of Commissioners Court.
- J. The developer shall provide a letter clarifying the procedure he chooses for construction acceptance and final maintenance acceptance. In connection with this letter the developer must provide the securities as needed for construction per Section 5 and for maintenance per Section 6.

3.4.2 Final Plat Criteria

- A. Owners' and any lien holders' dedication, and restrictions, if any, shall be duly acknowledged in the manner required for acknowledgment of deeds. For street widening and drainage purposes, the Developer may dedicate either the fee interest in the property or a right-of-way easement for street widening and drainage improvements at the County's option. Right-of-way easements for widening streets or improving drainage must be accompanied by a plat note as found in Appendix B.1. The plat must also contain the note as found in Appendix B.2. All streets and easements for utilities, street easements, street widening easements and street widening dedications shall be created by a notarized statement executed by all property owners and any lien holders or their legal representatives.
- B. Easements shall be provided for existing utility lines located on the property. Easements for proposed utility improvements shall be identified on the face of the plat. Existing undefined or "blanket" easements shall be defined prior to final plat approval. If no agreement can be reached on a defined easement, then building setback lines shall be shown at a minimum distance of 25 feet from and parallel to the nearest pipeline or facility.
- C. The plat shall show the location of the 100-year floodplain as identified on the most current Waller County Flood Insurance Rate Map (FIRM) published by the Federal Emergency Management Agency. In addition, the plat shall show the location of special flood hazard areas identified by an engineering

study(if required), under the seal of a Texas Professional Engineer. Additionally, the plat shall designate all easements of public record and shall include the plat note as found in Appendix B.8.

The placement of an elevation benchmark with the location, description and elevation of the benchmark shall be identified on the face of the plat. The elevation of this benchmark shall be tied into the closest benchmark with the latest USGS datum. Minimum first floor elevations for buildings shall be identified.

- D. The standard note for lien holders acceptance that dedication of all public streets and easements shall be accomplished free of liens shall be as found in Appendix B.4. Any required release of liens shall be provided to the Commissioners Court.
- E. A form on the plat as found in Appendix B.5 for Commissioners Court approval, including authorization for the County Clerk to file the plat for record as found in Appendix B.6.
- F. A copy of a title report commitment or plat letter for the specific tract of land dated within 60 days of the plat approval date.
- G. Approval of the appropriate jurisdiction when the subdivision is within the ETJ of that city.
- H. A letter of serviceability from an entity or entities providing water service or a letter from the Developer stating that no service is available within 1000 feet of the subdivision and certifying that the lots are suitable for private wells.
- I. A copy of the tax certificate from each taxing unit with jurisdiction of the real property indicating that no delinquent taxes are owed on the real property as well as payment of all other property taxes and assessments pertinent to the subdivision.
- J. A letter from the Developer acknowledging that it is the responsibility of the Developer, not the County, to ensure compliance with the provisions of all applicable state, federal, and local laws and regulations relating to the environment, including (but not limited to)

the Endangered Species Act, State Aquifer Regulations, surface water and/or ground water district regulations, and municipal watershed ordinances.

- K. Certification by a Texas Professional Engineer under seal that all engineering, for streets and drainage, within the subdivision is in compliance with these Regulations (including the Engineering Design Standards incorporated as Appendix A) and with all generally accepted engineering standards. If the Developer elects to proceed with plat recordation under the provisions of Section 5.3, the Developer shall provide upon completion of the construction an additional certification by a Texas Professional Engineer under seal that all construction for streets and drainage within the subdivision was completed in compliance with these Regulations (including the Engineering Design Standards incorporated as Appendix A) and with all generally accepted engineering standards.
- L. The following plat notes are located in Section B.11:

Certificate(s) Of Tax Collector
Legal Description
Certificate Of Surveyor

- M. When any public street is established by plat and where such public street forms either a stub street into adjacent acreage or where such public street lies along and parallel with the subdivision boundary and adjacent to acreage, a one (1) foot wide reserve shall be established within the street right-of-way to form a buffer strip, dedicated to the public, between the public street right-of-way and the adjacent unsubdivided acreage to prevent access to this public street from the adjacent unsubdivided acreage unless and until a plat of the adjacent property is duly recorded. The conditions associated with the establishment of a one (1) foot reserve on a plat are contained in the following note that shall be placed upon the face of any plat where a one (1) foot reserve is to be established.

"One (1) foot reserve dedicated to the public in fee as a buffer separation between the side and end of streets where such streets abut

adjacent property. The condition of such dedication being that when the adjacent property is subdivided or replatted in a recorded plat, the one (1) foot reserve shall thereupon become vested in the public for street right-of-way purposes and the fee title thereto shall revert to and re-vest in the dedicator, his heirs, assigns or successors."

- N. "Any plat or master plan may make reasonable accommodation for a specific surface site(s) for extraction of oil and gas. If a surface site is to be designated, the developer shall provide proof from the mineral owner, geologist or other professional that the site designated for such extraction is a reasonable solution for the mineral owner, in accordance with the usual and customary practice of the oil and gas industry. After such a site is designated, and the plat is approved, no oil or gas extraction activity may take place except utilizing the designated surface site."

3.5 Amending Plat

3.5.1 This section is applicable only if the applicable city regulations allow an amending plat and the amended plat is approved by the city. After approval by the City, the amended plat must be submitted for review and approval of the County Engineer and Commissioners' Court prior to recording with the County Clerk.

4. Replats

- 4.1 A person who owns real property in a tract that has been subdivided and that is subject to the subdivision controls of the county in which the property is located may apply in writing to the County Engineer for permission to revise the subdivision plat that applies to the property and that is filed for record with the county clerk. After review by the County Engineer, consideration of the replat will be placed on the next Commissioners Court agenda to set a public hearing on the proposed replat.
- 4.2 Prior to placement of the consideration of the replat on the Commissioners Court agenda, the Owner shall supply the County Engineer with Copies of the proposed plat (prepared in accordance with the platting procedure outlined in Section 3.) and a digital file of the proposed plat. The digital file shall be in a .DWG format or a format that is readily convertible to .DWG format. A check made payable to the County Clerk for handling and processing shall also be submitted with the final plat along with a check for the filing fee.
- 4.3 After the application is filed with Commissioners Court and a public hearing date is set The County Engineer shall publish a notice of the application in a newspaper of general circulation in the county. The notice must include a statement of the time and place at which the court will meet to consider the application and to hear protests to the revision of the plat. The notice must be published at least three times during the period that begins on the 30th day and ends on the seventh day before the date of the meeting; and
- 4.4 If all or part of the subdivided tract has been sold to nondeveloper owners, the County Engineer shall also give notice to each of those owners by certified or registered mail, return receipt requested, at the owner's address in the subdivided tract. (This notice is not required if the proposed plat only combines existing tracts.)
- 4.5 If the replat is within the ETJ of any city, the owners must also obtain approval of the affected city.
- 4.6 If the Court finds after the public hearing that the replat will not interfere with the established legal rights of any owner of a part of the subdivided land or each owner whose rights may be interfered with has agreed to the revision, it will enter an order partially vacating the original plat and approving the plat of the replat. If the Court finds that the replat will affect established legal rights, it shall not

approve the replat without the written consent of all affected owners of a part of the subdivided land.

- 4.7 In addition to the normal handling and processing fees, the person requesting the replat shall reimburse Waller County for the actual cost of the newspaper notice and postage expenses required by the replat process.

5. Improvement Construction Security and Acceptance

- 5.1 The developer of any tract that desires to obtain approval of a plat for recording in the county records shall construct all streets and drainage in the subdivision to the standards and specifications set forth in the Engineering Design Standards incorporated as Appendix A of these Regulations before offering the plat for approval, unless exempted by Section 5.2.
- 5.2 Improvement plans shall be approved by the County Engineer who shall certify that the plan is in conformance with these regulations. Variance from the requirements shall be permitted only by, Commissioners Court Order.
- 5.3 The Developer shall give a good and sufficient bond, cash, or letter of credit. This will be referred to as the construction security. The improvements shall be completed within 12 months of the plat date and the security shall reflect this 12 months. With court approval, an extension of up to one year may be granted. This construction security must be payable to the County Judge of Waller County, in an amount equal to the estimated cost of construction, according to the calculations of a Texas Professional Engineer and approved by Commissioners Court. The security shall be conditioned on the completion (in compliance with the Engineering Guidelines) of all the streets and drainage shown on the plat.
- 5.4 In areas within the ETJ of a city, the city's letter of credit policy may apply if the Commissioners Court finds that the city's policy provides adequate protection of the County's interest in the land development and construction of infrastructure, and the County is named with the City on the financial document.
- 5.5 The developer shall be entitled to partial reductions of his security requirement with written approval by the County Commissioner's Court.
- 5.6 The Developer shall submit construction plans for streets and drainage, traffic signage, landscaping (within the public Right-of-way), irrigation (within the public Right-of-way), and utilities within a platted subdivision to the County Engineer's Office for approval prior to final plat approval being granted by Commissioners Court. These plans shall show the location of all underground utilities, including water, sewage, and storm sewers. These plans shall include the design issues as described in Appendix A Engineering Design Standards.

- 5.7 If landscaping and/or irrigation is proposed within the right-of-way, the Developer shall create an entity (municipal utility district, homeowners' association, neighborhood association, or other entity approved by Commissioners Court) that will be responsible for the maintenance and liability of the landscaping and/or irrigation. This entity shall have assessment authority to ensure proper maintenance.
- 5.8 When construction has been completed, the Developer shall provide the County Engineer with a set of "Record Drawings". These plans are to show the improvements as they were actually built. The digital file shall be in a .DWG format or a format that is readily convertible to .DWG format. After the "Record Drawings" plans are received, the County Engineer will provide the Developer a letter approving the construction of the subdivision.
- 5.9 The County may determine plats containing "flag lots" to be a detriment to the public interest, welfare and/or safety, and may require internal street construction at the sole discretion of the Commissioners Court.
- 5.10 When traffic signal lights and additional turn lanes are required for traffic generated by subdivisions, these items shall be the responsibility of the Developer and the construction cost shall be included in the security.

6. Improvement Maintenance Security and Acceptance

- 6.1 By accepting a subdivision plat for filing, the Commissioners Court does not accept streets in the subdivision for ownership or maintenance by the County. The owner of the platted lots is responsible for maintenance of all streets within a subdivision until such time as the streets have been accepted for maintenance by the County. This holds true even though the County has approved the construction of the improvements.
- 6.2 The County will not accept a street for maintenance without the following:
- 6.2.1 A dedication to the public of an easement or fee interest in the entire street;
- 6.2.2 Written certification from a Texas Professional Engineer that the street was constructed in accordance with the Engineering Guidelines in effect when the subdivision was legally platted (or has been upgraded to those standards). The letter from the County Engineer as noted in Section 5.8 may be used to meet this requirement. If the subdivision where the street is located was never legally platted, it must meet the current Guidelines;
- 6.2.3 Written certification from a Texas Professional Engineer that the street is currently in compliance with the applicable Guidelines. The cost of any improvements, maintenance, or repairs required to reach that standard shall be borne by the developer or current owners;
- 6.2.4 Agreement by the County Commissioner's Court that the street should be accepted, following an inspection by the County Engineer; and
- 6.2.5 The expiration of one year from the date that all streets, drainage and other improvements in the subdivision are completed, inspected by the County Engineer, and approved by Commissioners Court;
- 6.3 This section is required in order to provide security for the maintenance under section 6.2.4.
- 6.3.1 With the approval of Commissioners Court, the Developer shall give a surety bond, cash or letter of credit in an amount equal to 25% of the cost of construction for the streets and drainage in the subdivision. This will be referred to as the maintenance bond.

6.3.2 Commissioners Court must approve each bond or letter of credit. This security is to be conditioned upon the Developer's maintenance of the streets in a state of good repair until the time as they are accepted. The security shall be made payable to the County Judge of Waller County, and shall remain in effect until released by Commissioners Court.

6.3.3 Security will be released when the street qualifies for final acceptance under Section 6.2. Before release of the security, the County Engineer shall final inspect the streets, and the Developer shall remedy all deficiencies. If the deficiencies are not promptly remedied, the County shall make the repairs and draw on the security for payment.

6.4 The enforcement of plat restrictions is the responsibility of the developer and other owners in the subdivision; however, in an ETJ, both the city and the County shall have the authority to enforce plat restrictions to prohibit the construction or connection of utilities, or issuing of permits unless the requirements of the plat restrictions have been achieved.

6.5 The County will assume no responsibility for drainage facilities in the subdivision, other than those running on or along the streets or in approved drainage easements until they are formally accepted by the County Commissioners Court for maintenance. Maintenance and liability of landscaped areas within the right-of-way will be the responsibility of the developer, the municipal utility district, neighborhood association, or other Developer entity.

7. Substandard Subdivisions

7.1 The County may accept maintenance of any street located in a subdivision in existence prior to June 15, 1981 (whether that subdivision was lawfully platted or not), provided that the streets meet all the criteria in Paragraphs 6.2 and 6.3 of these Regulations. The County will assume no part of the cost of bringing the streets into compliance before acceptance.

8. Variances

8.1 The Commissioners Court of Waller County, may by written order passed in court grant variances from these Regulations.

8.2 Any person who wishes to receive a variance must apply to the County Engineer, who will request it be placed on

the agenda of the Court with a recommendation whether the variance should be granted or not.

- 8.3 If the variance affects a city's ETJ, the person must contact the appropriate jurisdiction as stated in interlocal agreements under Local Government Code 242.001 (c) (d) (4).
- 8.4 The decision of the County Commissioners Court to grant or deny a variance is at its sole discretion.

9. Penalties

- 9.1 Section 232.005 of the Texas Local Government Code provides for the enforcement of these Regulations.
- 9.2 Under Chapter 7 of the Texas Penal Code, a person may be responsible as a party to an offense if the person (acting with intent to promote or assist the commission of the offense) solicits, encourages, directs, aids, or attempts to aid another person to commit the offense. Thus, a real estate agent or broker, a lender, an attorney, a surveyor, an engineer, a title insurer, or any other person who assists in violating these Regulations may also face criminal penalties.
- 9.3 Besides prosecuting a criminal complaint, the District Attorney may file a civil action to enjoin any violation or threatened violation of these Regulations, and to recover damages.

10. Summary of Costs

10.1 Excluding any required bonds or letters of credit, a developer will pay the county the costs per the following sections:

a. Preliminary Plat Review 3.3.2.S

A preliminary plat review fee of \$350 for the first 50 acres plus \$175 for each additional increment of 50 acres or less. (Plats less than 10 acres will be charged a review fee of \$50) Fees shall be paid with the submission of the preliminary plat for review. Payable to: Waller County

b. Final Plat Review 3.4.1.B

Final plat and construction document review fee of \$350 for the first 50 acres plus \$175 for each additional increment of 50 acre or less. (Plats less than 10 acres will be charged a review fee of \$50) Fees shall be paid with the submission of the final plat for review.
Payable to: Waller County

c. Handling and Processing Fee (Final Plats)3.4.1.F
(Replats)

A charge of \$50.00 will be assessed for handling and processing Final subdivision plats for approval in Commissioners Court. In the event a subdivision is developed in sections, a charge of \$50.00 will be assessed for each section platted. This fee, in the form of a Check, made out to the Treasurer, Waller County, Texas, will accompany the plat at time of submission to the Court for approval.

d. Filing Fee (Final Plat) 3.4.1.F
(Replats)

File (1) 8 ½ x 14 in the Official Public Records, filing fee is \$50.00 per plat plus \$11.00 for the first page and \$4.00 for each additional page.

EX: 1 Page plat = \$61.00, 2 Page plat = \$65.00)

e. Infrastructure Development Plan Review

Infrastructure Development Plan Review fee of \$100 plus \$10.00 per rental space will be charged. Fees shall be paid with the submission of the Infrastructure Development Plan for review.
Payable to: Waller County

f. Variance Requests:

A charge of \$50.00 per Request will be assessed

for handling and processing of Variance Requests for approval in Commissioners Court. This fee, in the form of a Check, made out to the Treasurer, Waller County, Texas, will accompany the Variance at time of submission to the Court for approval.

11. Plat Required

- 11.1 Commissioners Court adopts the following as a guide to the public in determining when a plat is necessary:
- 11.2 A plat is required for any subdivision as defined by Chapter 232, Local Government Code and as defined by these Regulations.
- 11.3 It is immaterial that the sale of a subdivision lot is by contract or lease-purchase rather than by deed, or that the lots are described by metes and bounds rather than lot and block.
- 11.4 A plat is required to divide a parent tract which is already located within a subdivision.
- 11.5 If the tract of land is located within the extraterritorial Jurisdiction of a municipality but outside the limits of said municipality, a plat must still be prepared and submitted to Waller County.
- 11.6 The owner of a tract of land located outside the limits of a municipality shall have a plat of the subdivision prepared if the owner divides the tract into two or more parts to lay out:
 1. a subdivision of the tract, including an addition; or
 2. lots; or
 3. streets, alleys, squares, parks or other parts of the tract intended to be dedicated to public use or for the use of purchasers or owners of lots fronting on or adjacent to the streets, alleys, squares, parks, or other parts.

12. Plat Not Required: The following exemptions may allow a division of property without the preparation of a subdivision plat. Under these exemptions, a property owner may not be required to prepare a subdivision plat for their division of their property, but the division of property must still meet the minimum lot size requirements set forth in the Waller County On-Site Sewage Facility Order, if applicable. A Certificate of Plat Exemption shall be issued by the County Engineer or Road Administrator for presentation to the County Clerk stating that the division of Land is exempt from the subdivision plat requirements.

Commissioners Court adopts the following as a guide to the public in determining when a plat is not necessary:

12.1 Family Provision: The County shall not require the owner of an unplatted tract of land located outside the limits of a municipality who divides the tract into two or more parts to have a plat of the subdivision prepared if:

1. each of the lots is sold, given, or otherwise transferred to an individual who is related to the owner within the third degree of consanguinity or affinity, as determined by Chapter 573, Government Code; and
2. the owner does not lay out a part of the tract as described in Section 11.6.3
3. If any lot is sold, given, or otherwise transferred to an individual who is not related to the owner within the third degree consanguinity or affinity, the platting requirements apply.

12.2 10 Acre Provision: The County shall not require the owner of an unplatted tract of land located outside the limits of a municipality who divides the tract into two or more parts to have a plat of the subdivision prepared if:

1. all of the lots in the subdivision are more than 10 acres in area; and
2. the owner does not lay out a part of the tract as described in Section 11.6.3.

12.3 Veterans Provision: The County shall not require the owner of an unplatted tract of land located outside the limits of a municipality who divides the tract into two or more parts to have a plat of

the subdivision prepared if:

1. the owner does not lay out a part of the tract as described in Section 11.6.3; and
2. all of the lots are sold to veterans through the Veteran's Land Board Program.

12.4 State Provision: The County shall not require the owner of an unplatted tract of land located outside the limits of a municipality who divides the tract into two or more parts to have a plat of the subdivision prepared if:

1. The tract is owned by the state or other state agency, board, or commission or owned by the permanent school fund or any other dedicated funds by the state; or

12.5 Floodplain Dissolution Provision: The County shall not require the owner of an unplatted tract of land located outside the limits of a municipality who divides the tract into two or more parts to have a plat of the subdivision prepared if:

1. The owner of the land is a political subdivision of the state, the land is situated in a flood plain, and the lots are sold to adjacent landowners; or

12.6 Single Division Provision: The County shall not require the owner of an unplatted tract of land located outside the limits of a municipality who divides the tract into two or more parts to have a plat of the subdivision prepared if:

1. the owner does not lay out a part of the tract as described in Section 11.6.3; and
2. one new part is to be retained by the owner, and the other new part is to be transferred to another person who will further subdivide the tract subject to the plat approval requirements of these regulations.

12.7 Undivided Interest Provision: The County shall not require the owner of an unplatted tract of land located outside the limits of a municipality who divides the tract into two parts to have a plat of the subdivision prepared if:

1. the owner does not lay out any part of the tract as described in Section 11.6.3; and

2. all parts are transferred to persons who owned undivided interest in the original tract and a plat is filed before any further development of any part of the tract.

12.8 Mortgage Provision: The County shall not require the owner of an unplatted or platted tract of land located outside the limits of a municipality who divides the tract into two parts to have a plat of the subdivision prepared if:

1. the owner does not lay out any part of the tract described in Section 11.6.3; and
2. the subdivision is the result of the owner dividing a tract by granting a security interest in property to secure indebtedness.

12.9 Adjacency Provision: The County shall not require the owner of an unplatted tract of land located outside the limits of a municipality who divides the tract into parts to have a plat of the subdivision prepared if:

1. the owner does not lay out any part of the tract described in Section 11.6.3; and
2. the subdivision is the result of the owner dividing a tract to convey property to an adjacent property owner.

Appendix A - Engineering Design Standards

A1. Improvement Plans:

The Developer shall employ a Texas Professional Engineer to prepare the "Improvement Plans" in conformance with these regulations. Utility companies and other affected public agencies should be consulted before plans are prepared. Improvement Plans shall be submitted to the County Engineer for approval prior to construction.

1.1 Construction Drawings: Two (2) white background prints of the drawings shall be submitted, and the sheet size shall be 24" x 36" or 22" x 34". The drawings shall be referenced to the name and unit number of the proposed subdivision, shall show elevations based on mean sea level datum plan, and shall be in compliance with the following information:

1.1.1 Street Plan Profile: The plan of each proposed street (indicating the existing ground elevations and proposed street grade surface including existing street grade for a distance of one hundred feet (100') beyond the tract boundary), at a scale of not more than twenty feet (20') per inch.

1.1.2 Street Typical Sections: A typical-section of each proposed street if all are not the same, not to scale, but having horizontal and vertical measurements showing width of proposed stabilization, base, wearing surface, curbs, shoulders, ditches, etc.

1.1.3 Water Supply and Sanitary Sewer System: The plans and profiles proposed and existing water distribution systems and sanitary sewer if submitted to the required State agencies for approval, shall be submitted to the County Engineer's Office to be approved by County Engineer prior to commencement of construction.

1.1.4 Drainage: The size, location and typical sections of drainage ditches (or storm sewer, if used) including easements shall be shown. All drainage plans, profiles and computations shall be submitted to the County Engineer's Office for approval by County Engineer prior to construction.

1.1.5 Existing Utilities: Plans and profiles of existing utilities shall be shown where applicable.

- 1.1.6 Bench Marks: Shall be provided at convenient points, with description, location and Mean Sea Level elevations indicated on the improvement plans. Tie to FEMA Benchmarks

A2. Lot Size

- 2.1 Minimum lot size shall be one (1) net acre for lots which have a private water well and septic system. All easements are to be excluded from the one-acre calculation. The Waller County On-Site Sewage Facility Regulations or other Federal, State, or Local laws or regulations may impose further lot restrictions.

A3. Street Alignments

- 3.1 Streets shall be laid out so as to align with existing streets in adjoining or nearby subdivisions, leaving the possibility of connecting the subdivisions with a minimum of street construction. No voids shall be left within the subdivision with the intent of avoiding responsibility for constructing streets or bridges, nor along the subdivision boundary to avoid connecting with adjacent subdivisions or streets. Arterials shall be placed and designed in accordance with any arterial street plan that contains the subdivision. Collectors will be placed in accordance with the plan of the County Thoroughfare Plan and the County Engineer.

- 3.2 Maximum block length shall be based on the average lot size fronting on the subject street in accordance with the following:

<u>Average Lot Size Not Greater Than (Ac.)</u>	<u>Block Length Length (Ft.)</u>
0.5	1,500
1.0	1,500
2.0	1,500
5.0	2,000
10.0	2,500
20.0	3,500
40.0	5,000

- 3.3 Dead-end streets which end at property that may be developed may remain as Dead End streets, but must be extended to the property lines. Dead End streets which shall remain as Dead End streets shall end on a temporary cul-de-sac with a minimum radius of right-of-way 70 feet (minimum base 50 foot radius) with Dead End street signs placed on these streets.

- 3.4 County may require an internal street system that minimizes street cuts to existing County streets.

A4. Minimum Street Requirements

- 4.1 Arterial streets shall be designed as follows:

- 4.1.1 If the arterial is included in the transportation plan, the right-of-way and pavement shall be as required in the plan.
- 4.1.2 The minimum right-of-way (easement) shall be 100 feet.
- 4.1.3 The pavement cross section in a rural subdivision shall be 36 feet of paved surface travel-way.
- 4.1.4 The pavement cross section in an urban subdivision shall be two 24-foot travel-ways with a 19-foot median.
- 4.1.5 The minimum design speed shall be 55 MPH. A minimum centerline radius of 2,000 feet shall be used.

- 4.2 Collector streets shall be designed as follows:

- 4.2.1 If the collector is included in a transportation plan, the right-of-way and pavement cross section shall be as required in the plan.
- 4.2.2 The minimum right-of-way (easement) shall be 80 feet.
- 4.2.3 The pavement cross section in a rural subdivision shall be 28 feet of paved surface travel-way.
- 4.2.4 The pavement cross section in an urban subdivision shall be a 32-foot paved travel-way.
- 4.2.5 The minimum design speed shall be 45 MPH. A minimum centerline radius of 1200 feet shall be used.

- 4.3 Local streets shall be designed as follows:

- 4.3.1 The minimum right-of-way (easement) shall be 70 feet in a rural subdivision and 60 feet in an urban subdivision.
- 4.3.2 The pavement cross section in a rural subdivision shall be 22 feet of paved surface

travel-way, or 28 feet back of curb to back of curb.

4.3.3 The pavement cross section in an urban subdivision shall be a 28 feet, back of curb to back of curb.

4.3.4 Cul-de-sacs shall have a minimum right-of-way of 70 feet (radius) with a rural paving section of 50-foot radius paved travel-way, or a 50-foot radius to back of curb.

4.3.5 The minimum design speed shall be 35 MPH. A minimum centerline radius of 650 feet shall be used.

4.4 The following standards apply to all streets:

4.4.1 Concrete streets with curbs shall have a back of curb to back of curb width equal to those sections with curb and gutter sections.

4.4.2 Concrete Curb and gutter sections where used with non-concrete pavement shall be a minimum of 24 inches in width.

4.5 Additional Right-of-Way for Existing Streets

4.5.1 Where the subdivision affects a county street, the Commissioners Court shall determine the right-of-way width which will be necessary for the maintenance and improvement of the street.

4.5.2 Where the subdivision affects only one side of a county street, adequate right-of-way shall be provided to obtain one-half the total proposed width to provide right-of-way as prescribed by Commissioners Court.

4.5.3 Where the development is on both sides of the existing county street, right-of-way for the total prescribed width shall be provided.

4.5.4 Any improvements proposed by the developer along an existing county streets shall:

4.5.4.1 Comply with the standards set in Paragraph 4.1;

4.5.4.2 Be included in the construction plans as approved by the County Engineer; and

4.5.4.3 Where it is an improved facility, it must be equal to the existing street, in sole discretion of Commissioners

Court.

- 4.6 Unless otherwise stated in these regulations, all streets shall be designed in accordance with the latest version of AASHTO (American Association of State Highway and Transportation Officials) "A Policy on Geometric Design of Highways and Streets". All references to "mountainous terrain" shall not apply to Waller County.
- 4.7 Private streets shall be allowed at the discretion of the Commissioners Court. Private streets shall be constructed to County standards in all matters. County shall not be obligated in the future to accept any private street into the County road maintenance system.

A5. Construction: General

- 5.1 A preconstruction meeting shall be scheduled prior to the start of construction. The Design Engineer, Developer, Contractor, Subcontractors and County Engineer or his designated representative shall attend this meeting. All streets are to be constructed according to specifications found in the current version of the TxDOT Manual Standard Specifications for Construction of Highways, Streets, and Bridges unless otherwise stated in these standards.
- 5.2 All streets, and concrete structures shall be tested by an Independent Testing Laboratory. The subgrade will be tested for Plasticity Index (PI), percent of lime if lime is added, and compaction. Each base course will be tested for compaction and depth. The two course surface treatment will have certification of distribution of AC-5 or HFRS-2 asphalt and of the cover stone. The HMAC course will be tested for compaction and depth. All compaction test reports will include a copy of the work sheet showing 100% Design Proctor Standard. Pavement concrete will be tested for Compressive strength. A test specimen will be taken at intervals no greater than 500 feet. The developer shall pay for all testing and will furnish the County Engineer's Office with certified copies of these tests.
- 5.3 All underground nonferrous utilities within an easement or street must be accompanied by ferrous metal lines to aid in the location of the utilities through the use of a metal detector except for electrical lines.
- 5.4 All pavement to be designed by a professional engineer. The design is to be based upon a soil report of samples taken along the proposed streets. Test holes will be placed at a maximum spacing of 1000 feet of proposed roadway. The County Engineer shall review the report

along with the street and drainage construction plans for the subdivision.

- 5.5 Iron Rods and caps shall be placed at all points of curvatures and tangencies for all rural streets.

A6. Subgrade

- 6.1 The preparation of the subgrade shall follow good engineering practices as directed by the Design Engineer. When the P.I. is greater than 20, then a sufficient amount of lime shall be in accordance with TxDOT Item 260 - Lime Treatment For Materials Used As Subgrade (Road Mixed) and Item 264 Lime and Lime Slurry until the P.I. is less than 20. Subgrades such as sand, with low plasticity (P.I. less than 5) shall be cement stabilized. The subgrade will be prepared and compacted to 95% Standard Proctor density. The subgrade shall be watered, rolled and bladed to a depth of 6 inches before any flexible base material is placed on it.
- 6.2 The subgrade must be inspected and approved by an Independent Testing Laboratory and a certified copy given to the County Engineer's Office.
- 6.3 The subgrade shall extend 24 inches outside of the base width on each side of the base material.

A7. Base Material

- 7.1 Base material shall conform to TxDOT Item 247 "Flexible Base". The base material shall be Type A Grade 2.
- 7.2 The base will be prepared and compacted to 95% Standard Proctor Density, +1-2% optimum moisture. The base must be inspected and approved by an Independent Testing Laboratory and a certified copy of all tests given to the County Engineer's Office for approval. All streets must have a flexible base. The flexible base shall have a minimum thickness of six (6) inches after compaction of the authorized base material on local streets and a minimum thickness of eight (8) inches after compaction of the authorized base on collector and arterial streets.
- 7.3 The base shall extend 24 inches outside the paving width on each side of the pavement material.

A8. Wearing Surface

- 8.1 Urban streets require a minimum 2" layer of HMAC Type D. Compact to 95% Standard Proctor density. Aggregate used in the mix shall be on the TxDOT Quality

Monitoring Schedule. The County Engineer's Office shall be provided with a copy of the HMAC design.

8.2 Rural streets require a minimum 2" layer of HMAC Type D. Compact to 95% Standard Proctor density. Aggregate used in the mix shall be on the TxDOT Quality Monitoring Schedule. The County Engineer's Office shall be provided with a copy of the HMAC design.

8.3 Paving material shall be applied only as directed in the TxDOT Manual.

8.4 The asphalt surface must be inspected and approved by an Independent Testing Laboratory and a certified copy given to the County Engineer's Office for approval by the County Engineer.

A9. Concrete

9.1 Design Engineer shall determine class of concrete for each structure. Aggregate used in the mix shall be on the TxDOT Quality Monitoring Schedule. Batch design will be required for each class of concrete. Test specimens will be required for each 500 SY or a minimum of cylinder for each class of concrete. For structural concrete, test cylinders will be required for each 50 CY. A slump test will be required for each set of test beams or cylinders. Air entraining and retarding agents used shall be from approved TxDOT list. Fly ash is allowed in the mix. Concrete pavement shall be a 5 ½ sack mix and a 28-day compressive strength of 3500 PSI. Structural concrete shall have a 28-day compressive strength of 4000 PSI.

9.2 Minimum pavement requirements shall be as follows:

9.2.1 Subgrade - in accordance with A6.1

9.2.2 Arterial Street - minimum thickness is seven (7) inches with #4 bars on 18-inch centers, each way.

9.2.3 Collector Street - minimum thickness is seven (7) inches with #4 bars on 18-inch centers, each way.

9.2.4 Local Street - minimum thickness is six (6) inches with #4 bars on 24-inch centers, each way.

9.2.5 All reinforcing steel shall be a minimum Grade 60, ASTM A615

A10. Street Names and Markers

- 10.1 All streets to be dedicated to the public with a subdivision shall be named, with prior approval for the name from the 911 County System, and the Commissioners Court. The street names shall be displayed on standard intersection street markers erected by the Developer at each street intersection. All houses shall be numbered. Where rural route mail boxes are in use, the boxes shall be set behind curbs 3 ft. from the edge of the pavement when used. All mailboxes within county right-of-way shall meet the current TxDOT standards.
- 10.2 Traffic control signs (such as stop, yield, and speed limit signs) as approved by Commissioners Court, shall be installed by the Developer of the subdivision at all intersections. Other traffic control signs shall be installed to indicate any unusual traffic or street hazard or conditions that may exist. All traffic control devices shall be placed in compliance with the current standards of the TxDOT and the construction cost shall be included in the security. The placement of these signs shall be shown in the construction plans.
- 10.3 A speed limit of 30 MPH for local streets, 40 MPH for collector streets, and 50 MPH for arterial streets within all platted subdivisions is required. This limit may be changed only by Commissioners Court upon a finding that the prima facia maximum reasonable and prudent speed for a particular street (or part of a street) should be different, based on an engineering study.
- 10.4 All of the requirements regarding street names, street signs and traffic control signs must be fulfilled prior to being accepted for final maintenance by the Commissioners Court, under Section 6.
- 10.5 All street signs shall adhere to the Texas Manual of Uniform Traffic Control Devices (TMUTCD).

A11. Drainage - see Appendix E

A12. Driveways

- 12.1 Minimum driveway spacing on arterial streets without curb and gutter shall be 100 feet.
- 12.2 The use of concrete "dip type" driveways is encouraged. The maximum grade break at each vertical point of intersection shall be 15%. Concrete will be 3000 PSI with a minimum thickness of five inches. Minimum reinforcement shall be #3 at 18" on center each way (ocew).

A13. Pipelines

13.1 Petroleum Pipe Line Crossing

13.1.1 When new streets are constructed over pipe lines, the pipe lines must meet the following requirements:

13.1.1.1 Encased pipe must be at least 3 feet below the deepest proposed ditch grade.

13.1.1.2 Non-cased pipe (of extra wall thickness meeting Federal Regulations) must be at least 4 feet below the deepest proposed ditch.

13.2 No street will be accepted for maintenance by Waller County which contains a petroleum pipe line within the right-of-way, other than crossing pipe lines. The exact horizontal and vertical location of pipe must be shown as determined in the field. The note from Section B.10 must be shown on the face of the plat.

Appendix B --- Plat Notes

B1. Street Widening Easements

Right-of-way easements for widening streets or improving drainage shall be maintained by the landowner until all street or drainage improvements are actually constructed on the property. The County has the right at any time to take possession of any street widening easement for construction, improvement or maintenance.

B2. Owner's Responsibilities

The building of all streets, bridges or culverts is the responsibility of the owners in accordance with the plans prescribed by Commissioners Court. Commissioners Court assumes no obligation to build or maintain any of the streets shown on the plat or constructing any of the bridges or drainage improvements. Upon completion of all obligations by the Developer and written approval from the Commissioners Court, the County will assume full responsibility for maintenance of the streets. The County will assume no responsibility for the drainage ways or easements in the subdivision, other than those draining or protecting the streets.

The County assumes no responsibility for the accuracy of representations by other parties on the plat. Flood plain data, in particular, may change depending on subsequent development.

The owners of land covered by this plat must install at their own expense all traffic control devices and signage that may be required before the streets in the subdivision have finally been accepted for maintenance by the County.

B3. Owner's Release

The standard format for owner's approval of the plat restrictions and dedication of easements shall be as follows:

For Corporations (Face of Plat)

We, **(Name of President)** and **(Name of Secretary)**, President and Secretary respectively, of **(Name of Company)**, owner of the property subdivided, in this plat of **(Name of Subdivision)**, make subdivision of the property on behalf of the corporation, according to the lines, lots, building lines, streets, alleys, parks and easements as shown and dedicated for public use, the streets, all alleys, parks and easements shown, and waive all claims for damages occasioned by the establishment of grades as approved for the streets and drainage easements dedicated, or occasioned by the alternation of the surface, or any portion of the streets or drainage easements to conform to the grades, and bind ourselves, our heirs successors and assigns to warrant and defend the title to the land so dedicated.

In Testimony, hereto, the **(Name of Company)**, has caused to be signed by **(Name of President)**, its President, attested by its Secretary, **(Name of Secretary)**, and its seal, this ____ day of _____, 20____.

Name of Company

By: _____
President

Attest: _____
Secretary

Notary Public (for Corporation)

STATE OF TEXAS }

COUNTY OF }

BEFORE ME, the under signed authority, on this day personally appeared **(Name of President)**, President, and **(Name of Secretary)** Secretary of **(Name of Company)**, known to me, to be the persons whose names are subscribed to the foregoing instruments, and acknowledged to me that the same was the act of the corporation, for the purposes and considerations expressed, and in the capacities stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, THIS ____ DAY OF _____20____.

Notary Public

In and for _____County, Texas

For Individual(s) (Face of Plat)

I, (or we), (Name of owner or names of owners), owner, (or owners) of the property subdivided in the above map of the (Name of Subdivision), make subdivision of the property, according to the lines, streets, lots, alleys, parks, building lines and easement as shown, and dedicate for public use, the streets, alleys, parks and easements shown, forever, and waive all claims for damages occasioned by the establishment of grades, as approved for the streets and drainage easements indicated, or occasioned by the alteration of the surface, or any portion of the streets or drainage easements to conform to the grades, and bind ourselves, our heirs, successors and assigns, to warrant and defend the title to the land so dedicated.

WITNESS MY (or our) hand in (City), _____,
County, Texas, this ___ day of _____, 20__.

(Signature of Owner)

(Signature of Owner)

Notary Public [For Individual(s)]

STATE OF TEXAS }

COUNTY OF }

BEFORE ME, the undersigned authority, on this day personally appeared [Name(s) of Owner(s)], known to me to be the person(s), whose name(s) is (or are) subscribed to the foregoing instrument, and acknowledged to me that he (she) (they) executed it for the purposes and consideration set forth.

Given under my hand and seal of office, this ___day of _____, 20__.

Notary Public
In and For _____County, Texas

B4. Lien Holder's Release

(The following phrase is to be included only if there is a lien against the property) (Face of Plat)

I (or we), [Name(s) of Mortgage(s)], Owner and Holder (or owners and holders) of a lien (or liens) against the above-described property, the lien (or liens), being evidenced by an Instrument of Record in Volume _____, Page _____, of the Mortgage Records of Waller County, Texas subordinate to the subdivision and dedication the lien (or liens), and I (or we) confirm that I am (or we are) the present owner (or owners) of the lien (or liens) and have not assigned the same, nor any part.

NOTE: All lienholder signatures shall be acknowledged by a Notary Public.

B5. CERTIFICATE OF COMMISSIONERS COURT

APPROVED by Commissioners Court of Waller County, Texas, this ____ day of _____, 20____.

County Judge

Commissioner, Precinct 1

Commissioner, Precinct 2

Commissioner, Precinct 3

Commissioner, Precinct 4

B6. CERTIFICATE OF COUNTY CLERK

(Face of Plat)

Provide box for County Clerk's Statement - 6 inches (right to left) and 2 inches (top to bottom), and adjacent to bottom margin

APPROVAL BY PLAT ROOM RECORDER (Face of Plat)

_____ Plat Book Recorder

Date _____

Volume _____, Page _____

B7. CERTIFICATE OF CITY COUNCIL

(If Subdivision is located within Extraterritorial Jurisdiction) (Face of Plat)

The certificate must follow the city's regulations.

B8. FLOOD PLAIN CERTIFICATION

The following note shall appear on the face of the Plat, "Structures built on lots in the designated Flood Plain shall be elevated to the Base Flood Elevation. No building permits will be issued in a Flood Hazard Area below the base flood elevation (B.F.E.). Contact the County Engineer's Office for specific information."

B9. PIPELINES

(Face of Plat)

(Show all existing oil and gas pipe lines and/or plus pipe line easements or statement that:) No pipe line or pipe line easement exist within the boundaries of this plat.

If pipe lines do exist within the proposed subdivision, written "crossing" approvals must be submitted from each owner.

B10. ADDITIONAL PLAT NOTES AND RELEASES

A. CERTIFICATE OF SURVEYOR (Face of Plat)

This is to certify that I (Name), a Registered Professional Land Surveyor of the State of Texas, have platted the above subdivision from an actual survey on the ground; and that all block corners, lot corners and permanent referenced monuments have been set, that permanent control points will be set at completion of construction and that this plat correctly represents that survey made by me.

Surveyor
State Registration No. _____
(Seal)

B. LEGAL DESCRIPTION (Face of Plat)

(Herein, provide a legal description [metes and bounds description] of the property platted, tied to an original corner of the original survey.)

C. CERTIFICATE OF COUNTY ENGINEER (Face of Plat)

I, (Name of County Engineer), County Engineer of Waller County, certify that the plat of this subdivision complies with all existing rules and regulations of Waller County.

Date

County Engineer

D. CERTIFICATE(S) OF TAX COLLECTOR

(This document does not appear on the face of the Plat, but is a separate document. A Certificate from each Tax Collector of a Political Subdivision in which the property is located must accompany the Plat to be recorded, showing that all taxes owing to the State, County, School District, Drainage District and/or other Political Subdivision, have been paid in full to date.)

E. DRAINAGE DISTRICT APPROVAL (Face of Plat)

(If subject property lies within the boundaries of a Drainage District.)

Date

(Commissioner)

(Commissioner)

The owner who intends to use the land for any type of rental community including (a manufactured home rental community) must have an infrastructure development plan prepared that complies with the minimum infrastructure standards established in Appendix C.

Appendix C --- Infrastructure Development Plan

C1. Infrastructure Development Plan

1.1 The Rental Community Infrastructure Development Plan (IDP) shall show at minimum the following:

- 1.1.01 The development shall have a minimum of sixty (60) feet fronting a street or roadway which has been previously dedicated to the public for the public's use and benefit as a street or roadway. Access roads to be the individual rental spaces must be constructed and paved to a minimum width of 20 feet with a 1 ½ inch thick Hot Mixed Asphaltic Concrete (HMAC) paved surface, 8 inch thick crushed stone base, and, if located in clay or sandy soils, a 10 inch thick treated subgrade.
- 1.1.02 No space may contain more than one single family residential unit or Commercial Unit. No common driveways shall be allowed. Each space shall have separate and individual access.
- 1.1.03 A survey of the property shall be submitted to the County Engineer's Office prior to the request by the owner or occupier of the lot for any permit and/or utility services.
- 1.1.04 The owner shall submit a letter of application, signed by the owner, that stipulates the intention of the owner; name, address, phone number of the owner; names of water and electricity providers; and name of wastewater provider or type and usage of onsite sewage facilities.
- 1.1.05 Only 22" x 34" or 24" x 36" sheets will be acceptable and at a maximum scale of 1"=200' (1" = 100' preferred), or as approved by the County Engineer. An index on the first sheet is required when more than two sheets are required for the IDP.

- 1.1.06 Names, locations, dimensions (bearings and distances), and layouts of existing and proposed streets, alleys easements, and other public right-of-way and public street right-of-way easement, alley, park, or other public dedication.
- 1.1.07 Dimensions, bearings and distances, of the proposed rental spaces.
- 1.1.08 Signatures and date of approval and certifications on the IDP. These approval signatures shall be not more than six (6) months prior to the submission. Examples of the required acknowledgments and certifications are as contained in the exhibits attached hereto.
- 1.1.09 Legal description, acreage, and name of the proposed Development. The Development's name shall not be spelled or pronounced similarly to the name of any existing Development or Subdivision located within the County.
- 1.1.10 The boundary of the Development indicated by a heavy line and described by bearings and distances.
- 1.1.11 Scale, legend, north arrow, spot elevations on 100' or an appropriate grid, with two foot (2.0') contour lines. Alternate contour intervals may be submitted, based on terrain, with approval from Commissioners Court and County Engineer.
- 1.1.12 Deed record, name of owner, volume and page number of adjoining properties.
- 1.1.13 Dates of survey and preparation of IDP.
- 1.1.14 Identification code, location, description, and elevation of the USGS or appropriate benchmark used in the survey.
- 1.1.15 Front building setback lines. Back and side building setback lines by note.
- 1.1.16 Location of any City's corporate limit line or extraterritorial jurisdiction line.
- 1.1.17 Vicinity map with streets, ditches, general drainage flow directions to the ultimate outfall,

city limits and ETJs, and other major land features.

- 1.1.18 Net area (gross area less easements) of rental spaces and/or units to the nearest 1/100 of an acre for lots using On-Site Sewage facilities and/or well water.
- 1.1.19 Limits of flood hazard areas as defined by the appropriate FEMA FIRM panel and the proposed finished floor elevation of buildings within these flood hazard areas on each space.
- 1.1.20 A certification by a Surveyor or Engineer describing any area of the Development that is in a Flood Plain or stating that no area is in a Flood Plain, as delineated by the appropriate FEMA FIRM panel and date.
- 1.1.21 A surveyor's signature and seal on the IDP for certification.
- 1.1.22 The description of the water and sewer facilities, electricity and gas utilities, and roadways and easements dedicated for the provision of water and sewer facilities that will be constructed or installed to serve the Development and a statement of the date by which the facilities will be fully operable, prepared by an Engineer (may be included in an attached document). A certification must be included that the water and sewer facilities described by the IDF, or document attached to the IDP, are in compliance with these Regulations.
- 1.1.23 Approvals by other regulatory and governing bodies, as required.
- 1.1.24 Letters signed and dated from water, wastewater, and electric utilities of service commitment and availability and statement of approval of existing and proposed utility easements.
- 1.1.25 A tax certificate showing that all taxes currently due with respect to the original tract have been paid.
- 1.1.26 Results of soil analysis certified by a qualified site evaluator (as defined by 30 TAC Chapter 285) for on-site sewage facilities (OSSF).
- 1.1.27 Engineering Design Construction Plans for roadway access to each rental space for fire and emergency

vehicles.

1.1.28 Drainage design plans to ensure adequate drainage off of the rental spaces and/or units to drainage channels and out of the Development, including the design of drainage structures, culverts, and/or systems using a 10 year storm frequency, such that the drainage out of the Development does not have a negative drainage impact on neighboring properties. If additional right-of-way (ROW) is required for existing County road drainage and access as determined by the County Engineer to achieve a 60 foot wide right-of-way, the owner shall dedicate the right-of-way to the County.

1.1.29 The Engineering Report, as described in Appendix D of these regulations.

2.1 Inspection of Improvements. Construction of a proposed Rental Community may not begin before the date the County Engineer and Commissioners Court approves the IDP. Periodic inspection of improvements may be required, as directed by the County Engineer. If the County Engineer directs that a final inspection is required, it must be completed not later than the second business day after the date the County Engineer receives a written confirmation from the owner that the construction of the infrastructure is complete. If the inspector determines that the infrastructure improvements comply with the IDP, then the County Engineer shall issue a Certificate of Compliance no later than the fifth business day after the date the County Engineer receives written confirmation from the owner that the infrastructure has been completed and in compliance with the IDP.

3.1 Utilities. A Utility may not provide utility services, including water, sewer, gas, and electric services, to a Manufactured Home Rental Community subject to an IDP or to a manufactured home in the community unless the owner provides the utility with a copy of the Certificate of Compliance issued by the County Engineer. This requirement applies to:

3.1.01 A municipality that provides utility services;

3.1.02 A municipality owned or municipality operated utility that provides utility services

3.1.03 A public utility that provides utility services;

3.1.04 A nonprofit water supply or sewer service corporation organized and operating under Chapter 67, Water Code, that provides utility services;

3.1.05 A county that provides utility services; and

3.1.06 A special district or authority created by state law that provides utility services.

4.1 Timely Approval of Infrastructure Development Plans. No later than the 60th day after the date the owner of a proposed manufactured home rental community submits an infrastructure development plan for approval, the County Engineer will reject the plan, if it is deficient, or request the IDP be placed on the agenda for Commissioners Court and recommended an action. If the plan is rejected, the written rejection must specify the reasons for the rejection and the actions required for approval of the plan. The failure to reject a plan within the period prescribed herein constitutes approval of the plan.

Appendix D --- Engineering Report for Manufactured Home Rental Communities

D1. Engineering Report - This report, which shall be signed, dated, and sealed by a licensed professional engineer registered in Texas, shall contain detailed and definitive information on the following:

1.1 Water Supply Facilities

1.1.01 Public Water Systems

- a. If the water supplier is a political subdivision of the state: a city, municipality, utility district, water control and improvement district, nonprofit water supply corporation, etc., the Developer shall furnish a signed letter of service availability from the water supplier to provide the state's minimum requirements of quality and quantity of water to the proposed Development.
- b. Water service must be extended into the Development to each lot or rental space if the existing water lines are located within 300 feet of the Development and if there is sufficient water available by the water supplier.

1.1.02 Private Wells or Non-public Water Systems - Quantitative and qualitative results of sampling test wells in accordance with requirements promulgated by the TCEQ and the Texas Department of Health shall be included where individual wells are proposed for the supply of drinking water to residences and other establishments. The results of the analyses shall be made available to the prospective property owners or renters.

1.1.03 Prior to IDP approval, plans and specifications for the proposed water facilities system shall have been approved by all entities having jurisdiction over the proposed project, including TCEQ. Evidence of the approvals shall be included in the

Engineering Report.

2.1 Wastewater Disposal Facilities

2.1.01 Centralized Sewerage Facilities

- a. If wastewater treatment is provided by a political subdivision of the state (city, municipality, utility district, water control and improvement district, nonprofit water supply corporation or an existing investor-owned water supply corporation, etc.) the Developer shall furnish a signed letter of service availability to provide the state's minimum wastewater treatment standard for the proposed Development from the utility.
- b. Prior to IDP approval, an appropriate permit to treat and/or dispose of wastes for the ultimate build-out of the Development shall have been obtained from the TCEQ and plans and specifications for the proposed wastewater collection and treatment facilities shall have been approved by all entities having jurisdiction over the proposed project, including TCEQ. Evidence of the approvals shall be included in the Engineering Report.
- c. Wastewater disposal service must be extended into the Development to each lot or rental space if the existing wastewater lines are within 200 feet of the Development and there is sufficient wastewater capacity available from the wastewater service provider.

2.1.02 On-Site Sewage Facilities - The engineering report shall include soil analysis results as required under the Waller County Regulations for On-Site Sewage Facilities.

3.1 Roadways. The Engineering Report shall include a description of the roadways within the Community, and include information on the roadway cross section, pavement width and thickness, base thickness, subgrade treatment, material specifications, and other information as required in these Regulations. Plans and specifications for these improvements shall also be submitted to the County

Engineer's Office for approval by the County Engineer prior to construction.

- 4.1 Signage Plan. A signage plan for the streets to be constructed, if any, is to be included that shows an overall street layout depicting the location and description of signs and traffic control devices to be installed. The traffic control devices will include street name signs, stop signs, yield signs, speed limit signs, directional controls, striping, and delineators, etc.
- 5.1 Traffic Impact Study. For Manufactured Home Rental Communities of 100 spaces or greater, the Engineering Report may, at the request of the County Engineer, be required to include a Traffic Impact Study in accordance with the requirements of the County to assess the effects of additional traffic on the existing and proposed transportation system.
- 6.1 Drainage. The Engineering Report shall include information on the Development and roadway drainage, culverts, conveyances, outfalls, and other information as required to properly convey storm water within and away from the Development. Plans and specifications for these improvements shall also be submitted to the County Engineer's Office for approval by the County Engineer prior to construction.
- 7.1 Electronic Submission. An electronic file in AutoCAD format (.dwg) of the layout of the lots and streets (to scale and with state plane coordinates) within the Development shall be submitted for incorporation to the County-wide map.

Appendix E --- DRAINAGE CRITERIA MANUAL

I. INTRODUCTION

Purpose

This DRAINAGE CRITERIA MANUAL (the Manual) provides design guidance for use by developers and engineers in preparation of drainage plans for development within the unincorporated areas of Waller County. It establishes rules and regulations that must be consistently followed and will be enforced throughout the unincorporated areas of the County. The design methods presented in this manual are intended to provide guidance for determination of runoff rates; methods of storm water collection, conveyance, and detention; and design standards for facilities (ditches, ponds, detention basins, etc.).

Methods of design and analysis other than those included in this Manual may be considered in certain cases where there may be inherent problems with the traditional methods. However, any deviation from this Manual will require consideration and acceptance by the County Engineer before approval will be granted for any work based on these alternatives.

Policy

Due to the nature of the watershed hydraulics within Waller County and the prevalent existence of flood plains that exceed the banks of the creeks, it shall be the policy of Waller County to maintain zero net increase in storm water runoff rates and to insure no negative impacts attributable to new development. Although it is Waller County's long-term goal to construct and maintain facilities (i.e., channels and regional detention facilities) that will contain 100-year storm flows within drainage rights-of-way, it is recognized that further impacts cannot be tolerated in the interim period. It is further recognized that impacts to other land owners and jurisdictions outside of Waller County's boundaries are unacceptable, and Waller County is dependent and supportive of the action of others to construct upstream and downstream facilities to accommodate 100-year flows.

Individual developers must provide infrastructure required to meet Waller County's stated objective of zero net increase in runoff rates and no negative impacts. Practically, this will mean that developers will provide adequate on-site detention volume to off-set increased runoff rates and must provide compensating storage volume for all fill placed in the floodplain. Development in the delineated 100-year floodway will be restricted by Waller County. Waller County prefers separate off-line detention facilities, but in-line facilities will be considered on a case-by-case basis and will only be approved after Waller County is satisfied that there will be no negative impacts to adjacent property owners.

Waller County recognizes that a portion of the County lies within the jurisdiction of the Brookshire-Katy Drainage District. A developer shall obtain approval from the District for all development projects within the District. In case of a conflict between the requirements of the County and the District, the more stringent of the two shall apply.

II. ADMINISTRATION

Submittal

Waller County has authority for review and approval of development plans for projects within its jurisdiction. Prior to commencing construction on proposed improvements, two (2) copies of plans, plats, reports, and calculations shall be submitted for review at least two weeks prior to the meeting at which the item will be considered. Proposed plats and plans shall be submitted for each development unless an overall master drainage plan for the development has been previously approved, in which case the applicant must demonstrate compliance with the approved master plan. All plans and reports must be prepared and sealed by a Professional Engineer licensed to practice in the State of Texas.

In addition, if the project is located within the Brookshire-Katy Drainage District, the Developer shall obtain written approval from the District of the development plans, and a copy of said approval shall be submitted to the County Engineer as a requirement of final plat approval.

Site Visit

Waller County may require a representative of the property owner or developer to meet with Waller County Representative at the project site prior to drainage plan approval. This meeting shall be for Waller County's benefit and allow the Waller County Engineer to better understand the developer's intentions.

Datum

All topographic information shown on plans must be on the same vertical datum as the current FEMA FIRM Map showing the project area.

Drainage Plan Review

The drainage plan shall present the applicant's overall approach to collecting and conveying rainfall runoff to the appropriate drainage artery. It is recommended that prior to preparation of the plan a meeting be arranged between the applicant and the Waller County Engineer to discuss the proposed concept for drainage of the project. The design submittal shall contain the following items:

1. Name, address, and phone number of engineer that prepared the plan including contact person.
2. Scale of drawing with a minimum scale of 1"=100'.
3. Benchmark and reference benchmark with datum and year of adjustment.
4. A detailed location or vicinity map drawn to a scale. The project site shall be accurately located on the map.
5. Date on all submittals with date of all revisions with month, day, and year.
6. Signature lines for The County Engineer.
7. Contour lines at 1 foot where slopes do not exceed 2.0% and 5 foot intervals for slopes exceeding 2.0% intervals covering the entire development and extended beyond the development boundaries at least 50 feet on all sides. At least two contours are required for each project.
8. Preliminary scheme for the passage of sheet flow from adjacent properties.
9. Drainage area divides for project area, with peak run-off rates for each drainage area.
10. Locations of all planned drainage improvements proposed for moving run-off water from the development to the principle drainage artery, i.e., creek, stream, bayou, ditch etc., and their point(s) of entry into the drainage artery.
11. Points at which structures or pipelines will cross drainage ditches, streams etc., within the development.
12. Locations of structures or other physical features on the development area to provide orientation as required during field inspection of the site.
13. Location of all existing drainage structures, utility lines, pipelines, and other underground features on the property and adjacent rights-of-way.
14. Location and dimensions of all proposed drainage easements and rights-of-way.
15. Location of major drainage arteries adjacent to or crossing the development.
16. Cross-section of detention facility.
17. Detention calculations in accordance with SECTION VI including volumetric calculations of detention provided.
18. Drainage area map of receiving system, if discharging to existing storm sewer system. Drainage area of receiving channel if discharging to open ditch or stream. Include calculations to prove capacity is available.
19. Copy of approved permit from TxDOT if draining to or impacting their system.
20. Copies of documents and letters of request for permission to cross privately held easements or rights-of-way and their approvals to do so.
21. Limits of 100-year flood plain.

Drainage Plan Approval

The Waller County Engineer shall provide comments to the applicant as soon as possible after submittal.

At least seven working days prior to Waller County

Commissioner's Court regularly scheduled meeting, revised plans/Reports addressing all comments must be submitted to the Waller County's Engineer. If all comments have been addressed, the plan will be placed on that agenda.

At Waller County Commissioner's Court meeting at which drainage plan approval is being considered, the original and one (1) copy of the plan must be submitted (the original will be returned for inclusion in the construction plans).

Time Limits of Approvals

Approvals shall expire within one (1) year if a construction has not commenced within that time. In cases where approval is given for a master plan and only certain sections are built immediately, the master plan approval will be valid for five (5) years.

Upon written request, the County Engineer may grant extensions of approval for up to one (1) year. All requests for extensions must be approved prior to the expiration of the original approval. No more than one (1) extension will be granted.

Revisions to Drainage Plans and Reports

All revisions to either the approved drainage plan or plat must be approved by the County Engineer. The County Engineer may require a re-submittal of a drainage plan or Report dependent upon the character and extent of the changes made as determined by Waller County.

III. HYDROLOGY

Hydrology is the study of precipitation. Policy makers and engineers must study and understand hydrology because they are interested in designing and building structures and systems to safely convey and discharge precipitation runoff while minimizing the potential of flooding. They must determine how much water should be collected and conveyed or stored, how fast this process must take place, how much can be safely discharged without adversely impacting surrounding properties, and what are other effects of the development being considered. The following sections discuss specific parameters and methods to be used in analyzing proposed developments in the unincorporated areas of Waller County.

Storm Frequency

All drainage improvements shall, at the minimum, be designed for the following storm frequencies. The return intervals listed here are minimums, and the individual design engineer or Waller County may chose to exceed these minimums given site specific requirements or constraints.

Type of Facility	Return Interval Storm
Closed Conduit Storm Sewers (for new developments)	2-year
County Ditch Culverts (serving less than 100 acres)	5-year
County Ditch Culverts (serving 100 to 250 acres)	25-year
County Ditch Culverts (serving 250 acres or more)	50-year
Bridges crossing County Ditches	100-year
Major Ditches and County Channels	100-year
Detention Facilities	100-year

Peak Storm Runoff Rates

The Rational Method can be used for determining peak runoff flow rate for both existing and proposed conditions. These peak runoff rates are used to estimate the impact of development and the conveyance requirements for drainage improvements. This method is applicable for small to medium drainage areas (generally less than 640 acres) where the flow domain is typically overland sheet flow or shallow surface ditch flow. Other methods should be used to estimate peak runoff rates for larger areas or those served by well defined channels where flow routing in defined channels may be significant. The Rational Method takes the following form:

$$Q = C_f * (C * I * A)$$

Where:

- Q = Peak Runoff Flow Rate (cfs)
- C = Runoff Coefficient, See TABLE A
- C_f = Frequency factor (the product of C_f and C should not exceed 1.0)
- A = Area of drainage basin being studied (acres)
- I = Rainfall Intensity of the design storm (inches/hour)

Frequency Factor (C_f)

The Frequency Factor is used in the Rational Method to scale the magnitude of the peak runoff in relationship to the return interval of the storm consistent with observed runoff data. This adjustment factor is used to account for the effects of antecedent moisture conditions that are generally associated with the less frequent storms. Appropriate values of C_f are presented in the following table.

Storm Frequency	Frequency Factor (C_f)
10	1.00
25	1.10
100	1.25

The product of C_f and C used in the Rational Method should not exceed 1.0.

Basin Time of Concentration (T_c)

The storm rainfall Intensity used in Rational Method will be selected based upon the return interval of the storm to be used (specified in the Storm Frequency Table above), and the duration of the storm to be used (based on the study basin's time of concentration). Time of Concentration (T_c) is defined as the length of time it takes a drop of water to travel from the most hydraulically remote portion of the drainage basin to its outlet.

T_c is a property of the drainage basin reflective of its area, shape, surface gradient, land use, land cover, and soil type. T_c (in minutes) may be estimated from the following equation:

$$T_c = \text{Length}/(\text{Velocity} * 60) + 10$$

Where:

Length = Flow distance (feet)

Velocity = Flow velocity (fps) [see following table]

Flow Condition	Representative Velocities
Shallow overland flow in undefined channels	0.25 to 0.50 fps
Flow in street curb & gutter or road ditches	0.75 to 1.25 fps
Flow in shallow ditches	1.5 to 3.0 fps
Flow in defined channels	2.0 to 4.0 fps
Flow in closed conduit storm sewers	3.0 to 5.0 fps

The constant value of 60 in this equation is used to convert seconds to minutes and 10 is used as an estimate of initial delay between the start of rainfall and development of actual surface runoff. This method can be applied fairly accurately to large and small basins with either undeveloped or developed surfaces. However, the designer must specify the flow condition and estimated flow velocities for each flow domain on the site (i.e., the first 100' is overland flow followed by 250' in a gutter followed by 400' in closed conduit, etc.) and estimate time of concentration as the sum of all these individual flow conditions.

The flow path used as the basis of this calculation should be clearly denoted on the plans with the associated design calculations.

Another method that can be used to estimate time of concentration for developed areas (i.e., storm sewer projects) is in the following form:

$$T_c = 10 * (A)^{0.1761} + 15$$

Where:

A = Drainage Basin area (acres)

This method accurately estimates T_c for sewer projects, however it tends to underestimate actual T_c for basins with significant overland flow or open ditch flow, and therefore may overestimate peak runoff flow rates for these basins.

Alternative methods for estimating the basin's time of concentration will be accepted for reviewed by Waller County, and may be allowed for use if the method's applicability to a specific situation warrants its use over the methods presented.

Storm Intensity (I)

For small watersheds and individual developments, the storm intensity should be based upon the time of concentration of the basin being analyzed. For example, in the design of a detention facility serving a basin with a 2-hour time of concentration, an Intensity for a 100-year, 2-hour storm should be selected for use in the analysis.

For large watersheds and regional studies, use a 24-hour duration storm for the analysis and design. Appropriate design storm intensities are shown in TABLE C for various return interval storms.

V. HYDRAULICS

Hydraulics is the study of fluid flow behavior. Policy makers and engineers must study and understand hydraulics because they are responsible for designing and constructing conveyance and storage facilities capable of managing storm water runoff in a safe and effective manner while reducing the potential for flooding. The following sections discuss specific methods and parameters to be used in analyzing proposed developments in Waller County's service area.

Open Channel Flow

The vast majority of conveyance capacity within Waller County's service area is located in the network of open channels that Waller County builds and maintains. The Chezy-Manning equation will be used to estimate a ditch's conveyance capacity. This equation is in the following form:

$$Q = 1.486/n * A * R^{2/3} * S^{1/2}$$

Where:

n = Manning's Roughness Coefficient (unitless)
A = Flow Cross-sectional area (sf)
R = Hydraulic Radius (ft)
S = Slope of the Hydraulic Grade Line (ft/ft)

Typical values for Manning's 'n' are included in TABLE B. The flow area (A) is estimated from the ditch cross-section, and is the area that will be conveying water (also called the wet area). The hydraulic radius is calculated as the wetted area divided by the wetted perimeter. The wetted perimeter is defined as the length of water/surface interface around the perimeter of the wetted area (does not include the water/air interface length). For open channels, the slope of the hydraulic grade line is estimated to be the same as the ditch slope.

Closed Conduit (Pipe) Flow

The Chezy-Manning equation presented earlier is also applicable for estimating flow capacity for closed conduits (i.e., pipes). There are some important distinctions to remember, including:

- Manning's 'n' for pipe materials are significantly different (i.e., smaller) than those for bare earth or vegetative surfaces. See TABLE B for appropriate 'n' values.
- The assumption of hydraulic grade line slope being approximately equal to the pipe slope is only valid under free flow conditions. Once the pipe is full and experiences surcharge conditions, the hydraulic grade line slope will increase as flow increases.

VI. DETENTION FACILITIES

To meet Waller County's requirements for zero net increase in runoff rates and no negative impacts due to new development, most projects will need to provide on-site detention facilities. Each detention facility should be designed based upon site specific parameters and constraints using accepted engineering methods. Waller County will not allow in-line storage within County ditches, channels, or streams. No approvals will be given by Waller County for any proposed development until the County Engineer has been satisfied that the proposed design meet Waller County's requirements. The following paragraphs describe general design requirements and allowable methods for generating appropriate designs.

The characteristics of an individual development may be such that additional calculations, plans, and details may be required both for proper review and for construction. The County Engineer shall notify the Developer or the Engineer as this need becomes evident.

General Requirements

As shown in the storm frequency table earlier, detention facilities will be designed to provide enough storage to accommodate a 100-year event for the sub-area it is intended to serve. Detention facilities may be designed to be wet (constant level ponds) or may be designed to drain completely. They must be designed and constructed with stable slopes (4:1), they must provide adequate access and maintenance berms around the entire perimeter (30' minimum), and they must have erosion control elements (i.e., backslope swales, drop pipes, slope pavement, etc.) as necessary to ensure a stable, low maintenance facility.

All detention facilities less than 2 acres in size must provide for 6 inches of freeboard between the projected 100-year water surface elevation and the top of the berm. All detention facilities over 2 acres must provide 1 foot of freeboard. Outfall structures must be designed to restrict outflow from the detention facility at a rate not to exceed the pre-developed conditions, and must include a controlled release mechanism to safely discharge runoff from storm events in excess of the 100-year design storm.

Detention storage may not be placed in road-side ditches or in curb-and-gutter streets in public or private easements and rights-of-way.

Volume Requirements

The following paragraphs describe allowable methods for use in determining storage volume requirements. This is not an exhaustive discussion of all methods, but will provide developers and engineers with a variety of tools for use in the unincorporated area of Waller County.

Coefficient Method

For small developments (less than 5 acres for commercial or 10 acres for residential), the developer may chose to use this simplified method for detention volume estimation. Using this method, the developer would provide detention storage using the following equation:

$$\text{Storage} = 0.65 * A_{\text{dev}}$$

Where:

Storage = Detention volume required (ac-ft),
 A_{dev} = The area of the site that will have modified cover (acres).

Using this method, storage is only provided for the portion of the site that is being developed. For example, on a 4 acre commercial tract with 2.5 acres of building, parking and landscape areas, the developer would be required to provide (2.5 acres)*(0.65 ac-ft/ac) = 1.63 ac-ft of detention storage. This method will not be allowed where the total developed area (either proposed or in the future) will exceed 5 acres for commercial or 10 acres for residential developments. The outfall structures will be designed separately as discussed in later paragraphs.

Small Watershed Method

The storage requirements for detention ponds can be determined using the Small Watershed Method (also called Malcom's Method). This method is a hydrograph based method that compares an expected inflow hydrograph to an allowable outflow hydrograph to determine required storage volume. Using this method, the required volume of storage is equal to the maximum cumulative difference between the inflow and outflow runoff curves.

DETENTION FACILITY INFLOW HYDROGRAPH

The inflow hydrograph is constructed by calculating instantaneous flow rates using the following equations:

$$Q_i = Q_p/2(1-\cos(\bullet t_i/T_p)) \quad \text{for } t_i \bullet 1.25 T_p$$

And

$$Q_i = 4.34*Q_p*\exp(-1.3*t_i/T_p) \quad \text{for } t_i > 1.25 T_p$$

Where: Q_i = instantaneous flow rate at time "i"
[cfs]

Q_p = peak flow rate (Rational Method) [cfs]
 t_i = time interval "i" [minutes]
 T_p = time to peak [minutes]

In the equations listed above, the time to peak (T_p) is calculated by:

$$\text{Time to peak } (T_p \text{ in minutes}) = V / (1.39 * 60 * Q_p)$$

Where: V = volume of runoff [ft³]

The total volume of runoff generated by the design storm event is the amount of rain that falls upon the watershed minus losses attributable to surface storage, soil infiltration, evaporation & transpiration, etc. For the purposes of projects within County jurisdiction, designers shall use a cumulative depth of excess rainfall of 9.7 inches when considering a 100-year event. Therefore, the total runoff volume is calculated by multiplying the cumulative depth of excess rainfall for the design storm event (9.7") by the watershed area.

DETENTION FACILITY OUTFLOW HYDROGRAPHS

Outflow hydrographs are constructed by determining the capacity of the outfall structure under incremental surcharge conditions. A table is generated that contains the estimated outfall rate for the proposed structure given increasing depths of ponding in the detention facility. To determine appropriate detention design, the engineer will provide a mass-balance for water in the detention facility (i.e. change in storage of the system equals the volume of water flowing in minus the volume of water flowing out) for several incremental time steps covering the duration of the storm event. The minimum storage requirement will equal the maximum cumulative storage determined in the time step analysis.

The Small Watershed Method is dependent upon the Rational Method for estimation of the peak flow rate, so it should only be used for basins of less than 200 acres where there is no well defined channel and any flow routing can be considered negligible.

HEC-1 / HEC-2 Computer Modeling

For basins over 640 acres in size, Waller County will require a HEC-1 hydrograph analysis covering the site and the adjacent parts of the watershed. This analysis should verify that the proposed improvements will not increase runoff rates anywhere in the system and therefore will have no negative impacts on adjacent properties. The engineer must submit a complete design report with sufficient detail (program input, program output and discussion of methods and assumptions used) for Waller County staff to review. Before beginning this type of analysis, please check with Waller County to receive the most current baseline HEC-1 model of the area for development (if one is available).

Outfall Restrictor Design

The outfall structure is an important design component of the detention facility. The design of the outfall structure can be as simple as a single pipe segment, and can be as complex as multiple pipes with differing diameters at staggered elevations with overflow weirs and flow orifices. The following paragraphs describe ways to estimate flow conveyance of several flow control structures.

Outflow Rate and design

To comply with Waller County policy to avoid increasing flood risks or flood hazards, maximum allowable outflow rates from detention basins are restricted to the pre-development flows from the 100-year, 25-year and 10-year Storm , 24-hour events.

If a downstream channel has less capacity than a 10 year event, also restrict the outflow to the amount the pre-development project site contributes to the channel when it is flowing full or at its flooding threshold.

When detention basin modifications are necessary to accommodate a proposed storm sewer outfall or a proposed development, design the modifications such that the 100-year, 25-year and 10-year Storm , 24-hour events water surface profiles in the detention basin and downstream channels are not increased above existing conditions.

If the outflow is into a roadside ditch or storm sewer, restrict the maximum allowable outflow to the rate allowed from the proposed site development using criteria adopted by the jurisdiction responsible for the roadside ditch or storm sewer.

Orifice

One of the most simple flow control structures is an orifice. An orifice is a two-dimensional flow structure (i.e., a drilled hole in a concrete wall, a hole in plate steel or a very short section of pipe) with an estimated conveyance capacity dependent upon the difference in water elevations from one side of the orifice to the other and the orifice opening area. The general equation for estimating flow through an orifice is as follows:

$$Q = C * A * (2 * g * H)^{1/2}$$

Where:

Q = Orifice flow capacity (cfs)
C = Orifice coefficient (unitless) [use 0.8]
A = Orifice opening area (sf)
g = Gravitational acceleration constant (32.2 ft/s²)
H = Differential head across the orifice (ft)

For the design head differential (H) use the 100-year water surface elevation in the detention facility minus the 25-year water surface elevation in the receiving ditch (if known). If discharging directly into a roadside ditch or a storm sewer, use the difference between the 100-year water surface elevation at the entrance and the centroid of the orifice in feet when orifice is partially submerged

. The orifice should generally be greater than 6" diameter to reduce problems with clogging and blockage.

Outfall Pipe

The engineer may use one or more a pipe sections as flow control devices. The conveyance capacity of the pipe(s) can be estimated using the Chezy-Manning equation discussed earlier. In using this method, the slope of the hydraulic grade line is equal to the head differential across the structure divided by the length of the pipe section. For the design head differential use the 100-year water surface elevation in the detention facility minus the 25-year water surface elevation in the receiving ditch (if known). If discharging directly into a roadside ditch or a storm sewer, use the difference between the 100-year water surface elevation at the entrance and the centroid of the orifice in feet when orifice is partially submerged. The restrictor pipe shall not be less than 6" in diameter.

Overflow Weir

An overflow weir can be used on an outfall structure to restrict and regulate outflow. One of the biggest advantages of this outfall structure is that they do not have a finite conveyance capacity, and can therefore be used for emergency overflows to control larger than 100-year flows.

There are many types of weir designs to chose from when designing an outfall structure, and each has a slightly different equation for estimating flow capacity. One of the simplest to design and construct is a Cipoletti weir consisting of a horizontal weir (of width B) with triangular weirs on either side (at 4:1 slopes) and a depth of flow of H feet. Capacity of a Cipoletti weir can be estimate by the following equation:

$$Q = 3.367 * B * H^{3/2}$$

Where:

Q = Weir capacity (cfs)
B = Weir length (ft)
H = Depth of flow across weir (ft)

VII. DESIGN PARAMETERS

The proper hydraulic design of channels is of primary importance to insuring that nuisance drainage conditions, flooding, sedimentation and erosion problems do not occur or the frequency of their occurrence is at an acceptably low rate. The following minimum design standards shall be applied to construction of new or reconstruction of facilities.

Design Frequency

New facilities shall be designed and constructed to contain and safely convey runoff from the 100-year frequency storm when at all feasible to do so. Consideration must be made for the capacity of existing channels downstream, and no improvement shall be made that increase the frequency of downstream flooding.

Design Flow Velocities

Excessive flow velocity can cause erosion problems, may pose a threat to bank stability and may create safety problems. Additionally, velocities that are too low may allow sediment deposition resulting in loss of channel capacity. Generally, design flow velocities in unlined open channels (for 100-year flows) should be between 2 and 5 fps. Flow velocities in concrete lined channels may increase to be between 5 and 8 fps.

Ditch Channel Slope

Ditches shall have a minimum constructed channel slope of 0.05% to provide for the minimum velocities noted earlier. Excessive slopes may unnecessarily increase the potential for erosion of banks and undermining of bridge and culvert structures, therefore maximum slopes should generally not exceed 1.00%. In areas of steep topography, channel drop structures may be required to limit channel invert slopes.

Ditch Side Slopes

In grass lined channels, maximum side slopes shall be 4:1 (horizontal:vertical). Variance from this criteria may be granted by the County Engineer to accommodate site specific issues, but 3:1 slopes should be the absolute steepest unlined slope proposed. Side slopes for concrete lined channels shall be based on field conditions and shall be site specific.

Ditch Bottom Width

The bottom width for ditches should generally be no less than 2 feet. A larger bottom width may be required to meet other issues including ditch capacity, design velocity, etc.

Ditch Horizontal Curves

In general, centerline curves for grass channels should be as gradual as possible and should have a radius greater than three times the ultimate ditch top width. Smaller curvature radii can be allowed with adequate slope paving as approved by the County Engineer.

Ditch Confluences

The angle of intersection between the tributary and main channel should be between 15° and 45° (with an optimal value of 30°). Angles in excess of 90° will not be permitted.

Ditch Transitions

Expansions and contractions should be designed to create minimal flow disturbance and thus minimal energy loss. Design consideration must be given to reducing erosion potential and turbulent flow characteristics at ditch transitions.

Ditch Drop Structures

When introducing flow into ditch main channel from shallow surface swales, the designer must include drop pipes to reduce the erosion potential at the confluence. Drop structures shall be appropriately sized for the area being served; with a discharge elevation of 12" above the main channel flowline.

Concrete Lined Channels

As field conditions necessitate, concrete lined channels may be required to provide adequate capacity or erosion protection for less than optimum drainage easement widths. Design of concrete lined channels will be considered by Waller County on a case-by-case basis.

Detention Facilities

Detention facilities shall have:

- Minimum 30-foot wide maintenance berm on all sides.
- Maximum side slopes no steeper than 4:1(h:v).
- Bottom of facility shall have a Minimum 1% cross slope.
- Facility shall have a concrete pilot channel.

Variance from this criteria may be granted by the County Engineer to accommodate site specific issues, but 3:1 side slopes should be the absolute steepest unlined slope proposed.

Table A

Rational Method 'C' Values

Land Use or Land Cover	Rational Coefficient 'C'
Raw, undeveloped acreage	0.20
Improved, undeveloped acreage (i.e., mowed, filled, graded, etc.)	0.30
Park Land	0.40
Residential - 1 acre lots or larger	0.40
Residential - ½ to 1 acre lots	0.45
Residential - less than ½ acre lots	0.55
Multi-Family	0.75
Commercial/Industrial	0.90

Table B

Manning's 'n' Values

Channel/Pipe Material	Manning's 'n'
Plastic Pipe (PVC & HDPE)	0.013
Clean Cast Iron	0.014
Concrete	0.013
Corrugated Metal	0.025
Smooth Bare Earth	0.018
Natural Channels (good condition)	0.025
Natural Channels (stones & weeds)	0.035
Natural Channels (poor condition)	0.060
Rip-rap	0.035

Table C

Design Intensity Values for Use in Waller County
 $I = b / (T_c + d)^e$

Storm Frequency	e	b	d
2-year	0.809	70	8
5-year	0.785	77	8.1
10-year	0.757	80	8.1
25-year	0.736	84	8.1
50-year	0.729	91	8.1
100-year	0.714	92	8