

Chapter 30

FLOODS*

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ARTICLE I. IN GENERAL

Sec. 30-1. Definitions.

The following words, terms and phrases, when used in this chapter, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Appeal means a request for a review of the floodplain administrator's interpretation of any provision of this chapter or a request for a variance.

Area of shallow flooding means a designated AO, AH, or VO zone on a community's flood insurance rate map (FIRM) with a one percent chance or greater annual chance of flooding to an average depth of one to three feet where a clearly defined channel does not exist, where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is characterized by ponding or sheet flow.

Area of special flood hazard means the land in the floodplain within a community subject to a one percent or greater chance of flooding in any given year. The area may be designated as zone A on the flood hazard boundary map (FHBM). After detailed ratemaking has been completed in preparation for publication of the FIRM, zone A usually is refined into zone A, AE, AH, AO, A1-99, VO, V1-30, VE or V.

Base flood means the flood having a one percent chance of being equalled or exceeded in any given year.

Critical feature means an integral and readily identifiable part of a flood protection system, without which the flood protection provided by the entire system would be compromised.

Development means any manmade change in improved and unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations.

Elevated building means a nonbasement building built, in the case of a building in zones A1-30, AE, A, A99, AO, AH, B, C, X and D, to have the top of the elevated floor, or, in the case of a building in zone V1-30, VE, or V, to have the bottom of the

lowest horizontal structural member of the elevated floor, elevated above the ground level by means of pilings, columns (posts and piers) or shear walls parallel to the flow of the water, and adequately anchored so as not to impair the structural integrity of the building during a flood of up to the magnitude of the base flood. In the case of zones A1-30, AE, A, A99, AO, AH, B, C, X, D, elevated building also includes a building elevated by means of fill or solid foundation perimeter walls with openings sufficient to facilitate the unimpeded movement of floodwater. In the case of zone V1-30, VE, or V, elevated building also includes a building otherwise meeting the definition of elevated building, even though the lower area is enclosed by means of breakaway walls, if the breakaway walls meet the standards of CFR section 60.3(e)(5) of the National Flood Insurance Program regulations.

Existing construction means, for the purposes of determining rates, structures for which the start of construction commenced before the effective date of the FIRM or before January 1, 1975, for FIRMs effective before that date. Existing construction may also be referred to as existing structures.

Flood and flooding mean a general and temporary condition of partial or complete inundation of normally dry land areas from:

- (1) The overflow of inland or tidal waters.
- (2) The unusual and rapid accumulation or runoff of surface water from any source.

Flood insurance rate map (FIRM) means an official map of a community, on which the Federal Emergency Management Agency has delineated both the areas of special flood hazard and the risk premium zones applicable to the community.

Flood insurance study means the official report provided by the Federal Emergency Management Agency. The report contains flood profiles and the water surface elevation of the base flood, as well as the flood boundary-floodway map.

Flood protection system means those physical structural works for which funds have been authorized, appropriated, and expended and which have been constructed specifically to modify flooding in order to reduce the extent of the areas

within a community subject to a special flood hazard and the extent of the depths of associated flooding. Such a system typically includes hurricane tidal barriers, dams, reservoirs, levees or dikes. These specialized flood-modifying works are those constructed in conformance with sound engineering standards.

Floodplain and floodprone area mean any land area susceptible to being inundated by water from any source (see definition of flooding).

Floodway (regulatory floodway) means the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Functionally dependent use means a use which cannot perform its intended purpose unless it is located or carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers and shipbuilding and ship repair facilities, but does not include longterm storage or related manufacturing facilities.

Habitable floor means any floor usable for the following purposes: working, sleeping, eating, cooking or recreation, or a combination thereof. A floor used for storage purposes only is not a habitable floor.

Highest adjacent grade means the highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

Levee means a manmade structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control or divert the flow of water so as to provide protection from temporary flooding.

Levee system means a flood protection system which consists of levees and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices.

Lowest floor means the lowest floor of the lowest enclosed area, including basement. An

unfinished or flood-resistant enclosure, usable solely for parking of vehicles, building access or storage in an area other than a basement area is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable nonelevation design requirement of CFR 60.3 of the National Flood Insurance Program regulations.

Manufactured home means a structure transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For floodplain management purposes, the term "manufactured home" also includes park trailers, travel trailers, and other similar vehicles placed on a site for longer than 180 consecutive days. For insurance purposes, the term "manufactured home" does not include park trailers, travel trailers and other similar vehicles.

Mean sea level means, for purposes of the National Flood Insurance Program, the National Geodetic Vertical Datum (NGVD) of 1929 or other datum to which base flood elevations shown on a community's flood insurance rate map are referenced.

New construction means, for floodplain management purposes, structures for which the start of construction commenced on or after the effective date of a floodplain management regulation adopted by a community.

Start of construction, for other than new construction or substantial improvements under the Coastal Barrier Resources Act (PL 97-348), includes substantial improvement and means the date the building permit was issued, provided the actual start of construction, repair, reconstruction, placement or other improvement was within 180 days of the permit date. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slabs or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation, or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading and filling; nor does it include the installation of streets and/or

walkways; nor does it include excavation for basement, footings, piers or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure.

Structure means a walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home.

Substantial improvement means any repair, reconstruction or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either before the improvement or repair is started, or, if the structure has been damaged and is being restored, before the damage occurred. For the purpose of this definition, substantial improvement is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include either any project for improvement of a structure to comply with existing state or local health, sanitary or safety code specifications which are solely necessary to ensure safe living conditions, or any alteration of a structure listed on the National Register of Historic Places or a state inventory of historic places.

Variance means a grant of relief to a person from the requirements of this chapter when specific enforcement would result in unnecessary hardship. A variance, therefore, permits construction or development in a manner otherwise prohibited by this chapter. (For full requirements see CFR 60.6 of the National Flood Insurance Program regulations.)

Violation means the failure of a structure or other development to be fully compliant with the community's floodplain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in CFR 60.3(b)(5), (c)(4), (c)(10), (d)(3), (e)(2), (e)(4), or (e)(5) is presumed to be in violation until such time as that documentation is provided.

Water surface elevation means the height, in relation to the National Geodetic Vertical Datum (NGVD) of 1929 or other datum, where specified, of floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas. (Code 1988, § 7-1)

Cross reference—Definitions generally, § 1-2.

Sec. 30-2. Statutory authority.

The state legislature, in R.S. 38:84, has delegated the responsibility to local governmental units to adopt regulations designed to minimize flood losses.

(Code 1988, § 7-2)

Sec. 30-3. Findings of fact.

(a) The flood hazard areas of the city are subject to periodic inundation which results in loss of life and property, health and safety hazards, disruption of commerce and governmental services and extraordinary public expenditures for flood protection and relief, all of which adversely affect the public health, safety and general welfare.

(b) These flood losses are created by the cumulative effect of obstructions in floodplains which cause an increase in flood heights and velocities and by the occupancy of flood hazard areas by uses vulnerable to floods and hazardous to other lands because they are inadequately elevated, floodproofed or otherwise protected from flood damage.

(Code 1988, § 7-3)

Sec. 30-4. Statement of purpose.

It is the purpose of this chapter to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

- (1) Protect human life and health;
- (2) Minimize expenditure of public money for costly flood control projects;
- (3) Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

- (4) Minimize prolonged business interruptions;
 - (5) Minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in floodplains;
 - (6) Help maintain a stable tax base by providing for the sound use and development of floodprone areas in such a manner as to minimize future flood blight areas; and
 - (7) Ensure that potential buyers are notified that property is in a flood area.
- (Code 1988, § 7-4)

Sec. 30-5. Methods of reducing flood losses.

In order to accomplish its purposes, this chapter uses the following methods:

- (1) Restrict or prohibit uses that are dangerous to health, safety or property in times of flood or cause excessive increases in flood heights or velocities.
 - (2) Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction.
 - (3) Control the alteration of natural floodplains, stream channels and natural protective barriers which are involved in the accommodation of floodwater.
 - (4) Control filling, grading, dredging and other development which may increase flood damage.
 - (5) Prevent or regulate the construction of flood barriers which will unnaturally divert floodwater or which may increase flood hazards to other lands.
- (Code 1988, § 7-5)

Sec. 30-6. Lands to which chapter applies.

This chapter shall apply to all areas of special flood hazard within the jurisdiction of the city.
(Code 1988, § 7-6)

Sec. 30-7. Basis for establishing areas of special flood hazard.

The areas of special flood hazard identified by the Federal Emergency Management Agency in the scientific and engineering report with accompanying flood insurance rate maps and flood boundary-floodway maps (FIRM and FBFM) and any revisions thereto are hereby adopted by reference and declared to be a part of this chapter.
(Code 1988, § 7-7)

Sec. 30-8. Compliance.

No structure or land shall hereafter be located, altered or have its use changed without full compliance with the terms of this chapter and other applicable regulations.
(Code 1988, § 7-8)

Sec. 30-9. Abrogation of existing easements, covenants or restrictions; conflicting regulations.

This chapter is not intended to repeal, abrogate or impair any existing easements, covenants or deed restrictions. However, where this chapter and another ordinance conflict or overlap, whichever imposes the more stringent restrictions shall prevail.
(Code 1988, § 7-9)

Sec. 30-10. Interpretation.

In the interpretation and application of this chapter, all provisions shall be:

- (1) Considered as minimum requirements;
 - (2) Liberally construed in favor of the mayor and city council; and
 - (3) Deemed neither to limit nor repeal any other powers granted under state statutes.
- (Code 1988, § 7-10)

Sec. 30-11. Warning and disclaimer of liability.

The degree of flood protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. On rare occasions greater floods

can and will occur and flood heights may be increased by manmade or natural causes. This chapter does not imply that land outside the areas of special flood hazard or uses permitted within such areas will be free from flooding or flood damages. This chapter shall not create liability on the part of the community or any official or employee thereof for any flood damages that result from reliance on this chapter or any administrative decision lawfully made thereunder. (Code 1988, § 7-11)

Secs. 30-12—30-40. Reserved.

ARTICLE II. ADMINISTRATION*

Sec. 30-41. Floodplain administrator.

The appointed floodplain administrator shall administer and implement the provisions of this chapter and other appropriate sections of 44 CFR (the National Flood Insurance Program regulations) pertaining to floodplain management. (Code 1988, § 7-36)

Sec. 30-42. Duties of floodplain administrator.

Duties and responsibilities of the floodplain administrator shall include, but not be limited to, the following:

- (1) The floodplain administrator shall maintain and hold open for public inspection all records pertaining to the provisions of this chapter.
- (2) The floodplain administrator shall review permit applications to determine whether the proposed building site will be reasonably safe from flooding.
- (3) The floodplain administrator shall review, approve or deny all applications for development permits required by the adoption of this chapter.
- (4) The floodplain administrator shall review permits for proposed development to ensure that all necessary permits have been obtained from those federal, state or local

governmental agencies from which prior approval is required (including permits required by section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 USC 1334).

- (5) Where interpretation is needed as to the exact location of the boundaries of the areas of special flood hazard (for example, where there appears to be a conflict between a mapped boundary and actual field conditions), the floodplain administrator shall make the necessary interpretation.
- (6) The floodplain administrator shall notify, in riverine situations, adjacent communities and the state coordinating agency prior to any alteration or relocation of a watercourse, and submit evidence of such notification to the Federal Emergency Management Agency.
- (7) The floodplain administrator shall ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained.
- (8) When base flood elevation data has not been provided in accordance with section 30-7, the floodplain administrator shall obtain, review and reasonably utilize any base flood elevation data and floodway data available from a federal, state or other source, in order to administer the provisions of article III of this chapter.
- (9) When a regulatory floodway has not been designated, the floodplain administrator must require that no new construction, substantial improvements or other development, including fill, shall be permitted within zones A1-30 and AE on the city's FIRM unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the city.

(Code 1988, § 7-37)

*Cross reference—Administration, ch. 2.

Sec. 30-43. Development permit required.

A development permit shall be required to ensure conformance with the provisions of this chapter.
(Code 1988, § 7-38)

Sec. 30-44. Issuance of development permit.

(a) Application for a development permit shall be presented to the floodplain administrator on forms furnished by him and may include, but shall not be limited to, plans in duplicate drawn to scale showing the location, dimensions and elevation of proposed landscape alterations, existing and proposed structures, and the location of the foregoing in relation to areas of special flood hazard. Additionally, the following information is required:

- (1) Elevation, in relation to mean sea level, of the lowest floor (including basement) of all new and substantially improved structures.
- (2) Elevation, in relation to mean sea level, to which any nonresidential structure shall be floodproofed.
- (3) A certificate from a registered professional engineer or architect that the non-residential floodproofed structure shall meet the floodproofing criteria of this chapter.
- (4) A description of the extent to which any watercourse or natural drainage will be altered or relocated as a result of proposed development.

A record of all such information shall be maintained in accordance with section 30-42(1).

(b) Approval or denial of a development permit by the floodplain administrator shall be based on all of the provisions of this chapter and the following relevant factors:

- (1) The danger to life and property due to flooding or erosion damage.
- (2) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.

- (3) The danger that materials may be swept onto other lands to the injury of others.
- (4) The compatibility of the proposed use with existing and anticipated development.
- (5) The safety of access to the property in times of flood for ordinary and emergency vehicles.
- (6) The costs of providing governmental services during and after flood conditions, including maintenance and repair of streets and bridges and public utilities and facilities such as sewer, gas, electrical and water systems.
- (7) The expected height, velocity, duration, rate of rise and sediment transport of the floodwater and the effects of wave action, if applicable, expected at the site.
- (8) The necessity to the facility of a waterfront location, where applicable.
- (9) The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use.
- (10) The relationship of the proposed use to the comprehensive plan for that area.

(Code 1988, § 7-39)

Sec. 30-45. Variances.

(a) The appeal board as established by the community shall hear and render judgment on requests for variances from the requirements of this chapter.

(b) The appeal board shall hear and render judgment on an appeal only when it is alleged there is an error in any requirement, decision, or determination made by the floodplain administrator in the enforcement or administration of this chapter.

(c) Any person aggrieved by the decision of the appeal board may appeal such decision in the courts of competent jurisdiction.

(d) The floodplain administrator shall maintain a record of all actions involving an appeal and shall report variances to the Federal Emergency Management Agency upon request.

(e) Variances may be issued for the reconstruction, rehabilitation or restoration of structures listed on the National Register of Historic Places or the state inventory of historic places without regard to the procedures set forth in the remainder of this section.

(f) Variances may be issued for new construction and substantial improvements to be erected on a lot of one-half acre or less in size contiguous to and surrounded by lots with existing structures constructed below the base flood level, providing the relevant factors in section 30-44(b) have been fully considered. As the lot size increases beyond the one-half acre, the technical justification required for issuing the variance increases.

(g) Upon consideration of the factors noted in this section and the intent of this chapter, the appeal board may attach such conditions to the granting of variances as it deems necessary to further the purpose and objectives of this chapter.

(h) Variances shall not be issued within any designated floodway if any increase in flood levels during the base flood discharge would result.

(i) Prerequisites for granting variances are as follows:

- (1) Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.
- (2) Variances shall only be issued upon showing a good and sufficient cause, a determination that failure to grant the variance would result in exceptional hardship to the applicant, and a determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, or extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.
- (3) Any applicant to whom a variance is granted shall be given written notice that the structure will be permitted to be built with the lowest floor elevation below the base flood elevation and that the cost of

flood insurance will be commensurate with the increased risk resulting from the reduced lowest floor elevation.

(j) Variances may be issued by a community for new construction and substantial improvements and for other development necessary for the conduct of a functionally dependent use provided that the criteria outlined in subsections (a) through (i) of this section are met and the structure or other development is protected by methods that minimize flood damages during the base flood and create no additional threats to public safety.

(Code 1988, § 7-40)

Secs. 30-46—30-70. Reserved.

ARTICLE III. FLOOD AND DRAINAGE PROTECTION STANDARDS

DIVISION 1. GENERALLY

Sec. 30-71. Purpose; applicability.

In order to promote public safety and protection against flooding and drainage damage within the corporate limits of the city, the city council hereby prescribes that all new developments within the corporate limits of the city after the effective date of the ordinance from which this article is derived shall conform with the applicable codes, regulations and/or specifications as described in this article.

(Ord. No. 2002-017, § 1, 5-20-2002)

Sec. 30-72. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

500-year flood zone, identified as "X" by the light gray area on the Federal Emergency Management Agency flood insurance rate map, means an officially designated land area that is likely to be flooded by a storm equal to or greater in intensity than the 500-year storm event.

Flood hazard area and 100-year flood zone, identified with an "A" with or without a suffix, means an officially designated land area on the latest Federal Emergency Management Agency flood insurance rate map that is likely to be flooded by a storm equal to or greater in intensity than the 100-year storm event.

Floodway means land identified on the Federal Emergency Management Agency flood insurance rate map or a floodway map as a floodway. Development, fill, overlays, etc., shall not occur on land identified as a floodway unless hydrologic and hydraulic HEC-2 data or other model acceptable to the applicable regulatory agency prepared by a state licensed engineer is presented certifying that no adverse flooding will occur upstream, downstream or on the development site as a result of the proposed improvements. The data must be reviewed and subsequently approved by the Federal Emergency Management Agency, the local floodplain administrator prior to development, and other applicable regulatory agencies. (Ord. No. 2002-017, § 2, 5-20-2002)

Cross reference—Definitions generally, § 1-2.

Secs. 30-73—30-90. Reserved.

DIVISION 2. STANDARDS FOR ALL PROPOSED DEVELOPMENT

Sec. 30-91. Applicability.

The general standards in this division shall apply in addition to any other stated provisions for all proposed development within the city, both within and outside the currently designated 100-year flood hazard area. (Ord. No. 2002-017, § 3, 5-20-2002)

Sec. 30-92. General standards.

The following shall apply in addition to any other stated provisions for all development proposals which contain land located in a designated flood hazard area within the city:

- (1) No development, fill, or obstruction of any type on or over any portion of a floodway shall be permitted which, alone or cumulatively with other such development, fill or obstruction, would cause or result in an

obstruction which would adversely affect the efficiency of or restrict the flow or capacity of a designated floodway so as to cause foreseeable damage to others, wherever located. Any such development application shall include hydrologic and hydraulic HEC-2 data, or other models acceptable to the applicable regulatory agency, confirming that no adverse flood effects will result from a proposed development in the floodway. This certification is subject to review and approval or denial by the floodplain administrator and/or the Federal Emergency Management Agency. In no event shall the development receive final plat approval or a certificate of occupancy until such time as the required submittal has been made and approved in writing by the appropriate regulatory body.

- (2) Development proposals shall have public utilities and facilities such as water, sewer, gas, and electrical systems located and constructed to minimize flood damage.
- (3) New and replacement sanitary sewage systems shall be designed to minimize infiltration of floodwater into the system and discharges from the system into floodwater. New and replacement water distribution systems shall be designed to eliminate infiltration of floodwater into the system and discharge from the system into floodwater.
- (4) Fill or other materials placed within a known flood hazard or floodplain shall be protected against erosion. Acceptable means of protection include but are not limited to riprap, vegetation covers, hydro-mulch, erosion control matting or bulkheading. See subsection (1) of this section for information on proposed fill in floodways as defined by the latest Federal Emergency Management Agency flood insurance rate map.
- (5) All developments shall comply with the provisions of the flood damage prevention ordinance of the applicable governing authority.

- (6) The city shall not permit the development of any land in a flood hazard area where such land is found to be incompatible with its proposed use due to poor drainage, flooding or other factors which would make the area vulnerable to flood damages that could pose a potential hazard to public health and safety. A development proposed within a floodplain being identified as such by the latest edition flood insurance rate maps shall be in accordance with the applicable regulatory agencies. (Ord. No. 2002-017, § 3(A), 5-20-2002)

Sec. 30-93. Floor elevations for residential developments.

(a) Lots within subdivisions designed for residential developments which are located in the 100-year flood zone, according to the latest Federal Emergency Management Agency flood insurance rate map, shall have the standard flood note information statements on the plat and the 100-year flood zone line shall be delineated or noted on the plat in accordance with the Federal Emergency Management Agency flood insurance rate map.

(b) The lowest level in a residence shall have its floor at 12 inches or more above the base flood elevation height, and in accordance with other applicable regulations. (Ord. No. 2002-017, § 3(B), 5-20-2002)

Sec. 30-94. Floor elevations for mobile home developments.

The requirements of this section shall apply to subdivisions designed for mobile home development or use. Topographic contours shall be shown on the plat at one-foot elevation changes so that it can be determined if mobile homes, when set in place, shall have their floors at 12 inches or more above the base flood elevation height and in accordance with other applicable regulations. When the foregoing cannot be established, the mobile home owner shall take the necessary precautions and certify to the city, through the floodplain administrator having authority, that the mobile home has been set to the required elevation to meet the base flood elevation flood program reg-

ulations. The foregoing shall be required prior to provision of utilities or equipment integral to the occupancy of the mobile home, e.g., air conditioning equipment, water heater, electrical panels, etc.

(Ord. No. 2002-017, § 3(C), 5-20-2002)

Sec. 30-95. Floor elevations for nonresidential developments.

The requirements of this section shall apply to all commercial, industrial and other nonresidential developments with the exception of land proposed for agricultural use. Lots within developments proposed for commercial, industrial or other nonresidential development shall be designated as being in or out of the 100-year flood zone or floodway as per the latest Federal Emergency Management Agency flood insurance rate map. The plat shall state the following:

- (1) Any structure, enclosed on three or more sides, built on property in the 100-year flood zone shall be elevated so as to ensure the lowest floor is located at 12 inches or more above the base flood elevation height for that area at that time.
- (2) If the property is in a floodway, no development is allowed in the floodway.
- (3) Any utility and sanitary facilities shall be installed so as to minimize the effect on such facilities by floodwater.

The plat may state that, in lieu of elevating the structure on a site that falls within the 100-year flood zone to an elevation equal to 12 inches or more above the base flood elevation, the building may be floodproofed as certified by a state licensed engineer or land surveyor and approved by the floodplain administrator.

(Ord. No. 2002-017, § 3(D), 5-20-2002)

Sec. 30-96. Approved drainage systems.

All new subdivisions, rather commercial or residential, in the city shall install a drainage system in accordance with the City of Carencro Ordinance. Roadside drainage shall be provided using a closed culvert system as described below.

- (1) *Open drainage ditch.* No new subdivision within the city will be allowed to be con-

structed with open drainage ditches adjacent to the roadway. Open ditches which are the extension of an existing drainage feature or the relocation of an existing drainage feature shall be designed in accordance with the applicable sections of this article. Under no circumstance will any existing open drainage ditch be allowed to remain as an open ditch if it is adjacent to any proposed roadway in the subdivision.

- a. Subdivisions which were designed as open ditch, and are so designated on the recorded plat for the subdivision shall remain as open ditches.
 - b. Other subdivisions with open ditches may not be converted to open ditches.
- (2) *Closed culvert system.* The term closed culvert system shall be interpreted to mean a system of curb and gutter along with a constant slope above the buried culverts with no ditches or swales apparent which utilizes catch basins adjacent to the roadway to provide water flow into the system as approved by the city.
- a. Curbs may be one of two types, "mountable" or "barrier", and shall be constructed of a material and having a dimension acceptable to the city.
 - b. All catch basins for the curb and gutter system shall be submitted for approval by the city.
 - c. Curb side detention areas shall be utilized, curb to curb, and the spacing of the inlets on a curb and gutter system shall be such that the flood depth shall not exceed one inch above centerline of the roadway during the design storm.
 - d. Other design options formulated by the developer may be submitted for approved by the City of Carencro.

(Ord. No. 2002-017, § 3(E), 5-20-2002; Ord. No. 2008-010, § 1, 6-16-2008; Ord. No. 2012-003, § 2, 2-20-2012)

Sec. 30-97. Plat submittal requirements.

Where any part of the proposed development is located within an identified flood hazard area, the following additional information shall be provided at a scale sufficient to determine compliance with this article:

- (1) The preliminary or final plats must clearly delineate areas of the development which are in the 100-year frequency flood hazard area as identified by the Federal Emergency Management Agency flood insurance rate map in effect at the time of submittal.
- (2) Base flood elevation data shall be included on plats having any portion of proposed property within an identified flood hazard zone. The plat submittal shall delineate limits of flood hazard zones identified in the Federal Emergency Management Agency flood insurance rate map.
- (3) The preliminary and final plats shall delineate all streams and channels and watercourses in the designated flood hazard zone.
- (4) The final plat submittal shall include a declaration that development is not allowed in floodway areas unless technical data is submitted to and approved by the

director of public works or his designee, the local floodplain administrator and other applicable regulatory agencies.
(Ord. No. 2002-017, § 3(F), 5-20-2002)

Sec. 30-98. Drainage design standards.

(a) *Drainage impact analysis required; waivers.* Drainage studies shall be required pursuant to the following requirements:

- (1) A comprehensive drainage impact analysis of the development and surrounding affected areas shall be submitted to the city engineer. The development construction plans shall not be approved until a favorable written certification of the drainage impact analysis has been made by the city engineer or his designee.
- (2) Should the planning commission grant preliminary plat approval contingent upon later submission of the drainage analysis and should this drainage impact analysis indicate that improper drainage may occur as a result of development, then the plat shall be returned to the planning commission for reconsideration at its next scheduled meeting.
- (3) A developer may submit in writing a request to waive the drainage impact analysis to the city engineer. If the city engineer or his designee grants the request (only upon a favorable evaluation of the conditions), the mayor or his designee, shall issue a written approval of the request. The waiver authorization shall be forwarded to the city planner and the drainage impact analysis shall not be required in order to obtain preliminary and/or final plat approval for the development.

(b) *Specifications for drainage impact analysis; design standards.* Every required drainage impact analysis shall comply with the following specifications:

- (1) An area drainage map shall be submitted which identifies:
 - a. The various drainage areas involved/affected.

- b. The acreage in each drainage area.
 - c. The slope of each drainage area to the entry point and/or exit point of the development.
- (2) The drainage impact analysis shall indicate:
- a. The cubic feet per second (cfs) of stormwater resulting at each development entry point from a designated storm. This determination shall be based on the existing land use of the upstream drainage areas.
 - b. The cubic feet per second (cfs) of stormwater at each development exit point resulting from a designated storm. This determination shall be based on the existing land use of the upstream drainage areas whether inside or outside the development. This calculation shall take into account expected construction within the development that will change the grades, direction of flow, runoff factors or other existing conditions.
 - c. The maximum capacity, expressed in cubic feet per second, of existing and proposed drainage structures within the development based on the designated storm event.
 - d. The capacity of all ditches, culverts, and subsurface and surface drainage structures that will be utilized by new or relocated outfall points downstream of the development in allowing passage of stormwater to the first outfall, coulee, canal or river. In no case shall a developer be required to evaluate the capacity of first outfall, coulee, canal or river in excess of 1,000 feet downstream of the development.
- (3) The drainage impact analysis shall consist of three distinct and designated parts as follows:
- a. **Summary:** The effect of the proposed construction on upstream and downstream areas.

- b. Design criteria: Description of methodology, data and assumptions used.
 - c. Calculations: Clear, concise, step-by-step calculations performed to support the drainage system design.
- (4) The subdivision drainage impact analysis and the development drainage design shall be based on the five-year storm event for residential developments and the ten-year storm event for commercial developments.
 - (5) Subsurface drainage of drainage outfalls serving more than the development shall be designed to convey at a minimum the 25-year storm event.
 - (6) Open channel drainage serving more than the development shall be based on a ten-year storm event with one foot of freeboard existing in the channel above the ten-year water surface elevation.
 - (7) If the drainage impact analysis and development drainage design is based on rainfall intensity, the rainfall intensity data contained in the most recent edition of the state department of transportation and development's Hydraulics Manual shall be used.
 - (8) Ponding, retention or detention of stormwater shall be evaluated in the drainage impact study in accordance with division 4 of this article.
 - (9) All open ditch or subsurface drainage systems shall be designed in accordance with the most recent edition of the state department of transportation and development's Hydraulics Manual unless otherwise approved by the city engineer.
 - (10) The development drainage plans shall give the location, description and elevation of all permanent and temporary benchmarks used for the drainage study and to be used for the development construction.
 - (11) Hydraulic calculations, plan profile sheets and area drainage maps shall be submitted for review and shall be approved by

the city engineer or his designee, before any development improvement work begins.

- (12) Subsurface storm sewers shall be designed for the five-year storm event (minimum). Outfall structures and outfall channels shall be designed for the ten-year storm event (minimum). Collector street crossings shall be designed for the ten-year storm event (minimum). Arterial street crossings shall be designed for the 25-year storm event (minimum) unless otherwise approved by the city engineer or his designee.
 - (13) Only drainage pipe constructed of materials approved by the city engineer may be used in storm sewer construction in the public rights-of-way or servitudes.
- (Ord. No. 2002-017, § 3(G), 5-20-2002; Ord. No. 2008-010, § 1, 6-16-2008)

Secs. 30-99—30-120. Reserved.

DIVISION 3. SUBDIVISIONS*

Sec. 30-121. General standards.

The following general standards shall apply in addition to any other stated provisions for development proposals:

- (1) *Required drainage studies and improvements.* The developer's design engineer shall make provision in the drainage improvements for each development to accommodate potential runoff from its entire upstream drainage area, whether inside or outside of the development. Additionally, the design engineer shall study the effect of each development on existing downstream drainage facilities or roadside ditches outside the area of the development. This portion of the study shall be limited to the effluent channel only. Where it is anticipated that the runoff incident of the development will overload an existing downstream drainage facility or roadside ditch, the design engineer shall indicate

*Cross reference—Subdivisions, ch. 66.

this fact in the drainage impact analysis, and make provision to prevent the overloading of downstream facilities or roadside ditch. Streets and lots of a proposed development shall be arranged so as to minimize artificial drainage channel relocation.

(2) *Drainage plan submittal requirements.* The design engineer shall submit the development drainage plans detailing the runoff flowing into, flowing through and exiting the development. The drainage plans shall contain the following information:

- a. The location, description and elevation of permanent or temporary benchmarks to be used in the construction of the improvements. A minimum of two temporary benchmarks shall be shown on the plans and shall be maintained by the developer for use by the city for the project until the final plat is accepted.
- b. All elevations, which shall be NAVD88 measured to at least second order accuracy or better. A note shall be placed on the drainage plan sheet indicating the benchmark, elevation, location, and description utilized in construction of the development.
- c. The floodplain elevation, if applicable, and the area within the 100-year flood boundary. A note shall be made on the drainage plan sheet and the final subdivision plat if any portion of the development, lot or street is within the 100-year flood.
- d. Culvert sizes for road crossings and for driveways (open ditch construction) with a notation of the flow rate shall be shown.
- e. All developments reviewed by the planning commission shall be consistent with the ordinances or regulations of the applicable governing authority.

- f. Hydraulic calculations, plan-profile sheets and drainage area maps may also be required to be submitted. (Reference section 30-151 et seq.)

(Ord. No. 2002-017, § 4(A), 5-20-2002; Ord. No. 2008-010, § 1, 6-16-2008)

Sec. 30-122. Runoff determination methods.

For drainage areas less than 200 acres, the design engineer shall use the Rational Method ($Q = ciA$) procedure for determining runoff rates. For drainage areas between 200 and 2,000 acres, the design engineer shall use the most recent Soil Conservation Service (SCS) method, as modified by the state department of transportation and development procedure for determining runoff rates. For drainage areas greater than 2,000 acres, the design engineer shall use the most recent USGS regression procedure for determining runoff rates.

(Ord. No. 2002-017, § 4(B), 5-20-2002)

Sec. 30-123. Drainage design criteria.

Subsurface storm sewer systems for developments shall be designed for a minimum storm of five years. Storm sewers for outfall channels shall be designed for a ten-year storm (minimum). Developments with open ditch drainage systems shall be designed for a storm of five-year occurrence interval except that cross drains for drainage channels within developments shall be designed for a ten-year storm. Channel crossings in excess of 100 square feet shall be designed, if feasible, for a 25-year storm. Drainage designs shall be in conformance with the latest edition of the state department of transportation and development's Hydraulics Manual.

(Ord. No. 2002-017, § 4(C), 5-20-2002)

Sec. 30-124. Determination of rainfall intensity and duration.

Rainfall intensity and duration shall be taken from the latest edition of the state department of transportation and development's Hydraulics Manual.

(Ord. No. 2002-017, § 4(D), 5-20-2002)

Sec. 30-125. Runoff coefficients.

The runoff coefficients to be used in the Rational Method shall be those indicated in tables 1 and 2. In lieu of providing average block calculations, the engineer for the subdivision may use the table 7.19.3 as applicable. In addition, for any drainage analysis performed using the SCS method, the designer shall select curve numbers in accordance with Urban Hydrology for Small Watersheds Technical Release 55 (TR55) and tables 7.19.4 and 7.19.5.

TABLE 1. RATIONAL METHOD RUNOFF COEFFICIENTS

<i>Development/Subdivision Type</i>	<i>Runoff Coefficient</i>
Residential:	
Single-family detached	0.30 to 0.50
Two-family (duplex)	0.40 to 0.60
Single-family and multifamily attached	0.60 to 0.75
Commercial, retail and office:	
Downtown area	0.70 to 0.95
Neighborhood and outlying areas	0.50 to 0.70
Industrial:	
Light industry	0.50 to 0.80
Heavy industry	0.60 to 0.90
Parks and cemeteries	0.10 to 0.25
Playgrounds	0.20 to 0.40
Railroad yard areas	0.20 to 0.40
Vacant, open space and unimproved areas	0.10 to 0.30

TABLE 2. RUNOFF COEFFICIENTS FOR AVERAGE BLOCK CALCULATIONS

<i>Type</i>	<i>Runoff Coefficient</i>
Asphalt surfaces	0.95
Concrete surfaces	0.95
Roof areas	0.85
Lawns:	
Flat (less than 2% grade)	0.20
Average (2% to 7% grade)	0.25
Steep (greater than 7% grade)	0.30

(Ord. No. 2002-017, § 4(E), 5-20-2002; Ord. No. 2008-010, § 1, 6-16-2008)

Secs. 30-126—30-150. Reserved.

DIVISION 4. ENGINEERING REQUIREMENTS

Sec. 30-151. Generally.

All residential and commercial development that results in increased stormwater runoff exceeding the predevelopment runoff rate shall be required to mitigate the increase through drainage improvements. The drainage improvements shall be based on the design criteria of this division in addition to any other stated provision. The development drainage design shall be based on the five-year storm event for residential developments and the ten-year storm event for commercial developments.

(Ord. No. 2002-017, § 5, 5-20-2002)

Sec. 30-152. Information to be submitted for review.

(a) The following information shall be submitted for development drainage review:

- (1) Existing drainage area map.
- (2) Design drainage area map.
- (3) Hydraulic analysis of the five-year storm event for residential development, the ten-year storm event for commercial development and the 100-year storm event for both types of development.
- (4) Typical sections and stage/storage information of the detention facility.
- (5) Outlet structure details.
- (6) If a detention facility is within a parking lot, parking lot grades, curb grades, areas identifying ponding limits and depths.
- (7) Typical sections, cross sections, and such other details as required by the review engineer for review of the proposed development.
- (8) All hydrographs and routing curves.
- (9) Inflow/outflow results highlighted for the reviewer's ease of identification.
- (10) All other applicable forms, tables, charts, etc.

- (11) Detailed explanation of predevelopment analysis, post-development analysis, routing conclusion, and engineer's evaluation of whether the development has satisfied all the hydraulic requirements.
- (12) Detail of construction access entrance.
- (13) Detail of construction silt fencing and erosion control plan. These items shall be in place prior to construction of the form work for the building improvements and/or site improvements.
- (14) Any development shall provide sufficient access servitude, as well as sufficient drainage servitude around detention facilities as required by the city for the purpose of maintenance of said facility in accordance with this division.
- (15) The signed and sealed completed drainage checklist.

(b) The information required by subsection (a) of this section shall be submitted in a "bound" booklet form with dividers separating predevelopment and post-development outputs for each design storm event as well as the conclusion of the analysis.

(Ord. No. 2002-017, § 5(1), 5-20-2002; Ord. No. 2008-010, § 1, 6-16-2008)

Sec. 30-153. Detention requirements for commercial developments.

Detention requirements for commercial developments are as follows:

- (1) *Permissible detention basins.* The following are permissible detention basins:
 - a. Pond.
 - b. Parking lot; depth of ponding is not to exceed seven inches.
 - c. Underground storage.
 - d. Perimeter swale ditches.
 - e. Detention within required green areas.
 - f. Other methods only with prior approval of the city engineer or his designee.

- (2) *Outlet structures.*
 - a. Design shall be based on the ten-year storm event with analysis of the 100-year storm event.
 - b. Emergency spillways shall be in an area that will least affect traffic flow and not cause flooding of structures intended for occupancy.
- (3) *Plan requirements.* Plan requirements are as follows:
 - a. Existing topographic plan with elevations.
 - b. Grading plan with elevations.
 - c. Minimum of two grading sections of entire site (i.e., one east/west and one north/south). A sufficient number of grading sections shall be provided to adequately evaluate site drainage patterns as required by the city engineer.
 - d. Profile of outlet structure connecting to existing outfall depicting utility crossings and identifying conflicts, if any.
- (4) *Maintenance of stormwater management facility.*
 - a. The owner of the proposed development or any successor who acquires title to the stormwater management facility shall at all times maintain the design section of the stormwater management facility as indicated on the site drainage plan and in the drainage impact analysis report. If the city engineer determines that the stormwater management facility has not been maintained, the owner shall make the necessary modifications to conform to the original approved design sections, requirements, etc., within a 30-day period from written notification from the city. If the owner does not act within this timeframe to remedy the situation, the city may perform the necessary modification, improvements, etc., and

bill the owner for the work at its operating cost, at such rates as have been set by the city.

- b. Compliance with this subsection shall be mandatory and shall be included on the site drainage plan as well as within the drainage impact analysis report and shall be acknowledged in writing by the owner of the development. The developer shall provide the city engineer with an agreement or other contractual arrangement evidencing that adequate provision has been made for future maintenance of the facility in those instances where the facility is to be acquired by an owners' association or other similar entity.

(5) *Waivers.*

- a. Reserved.
- b. No detention requirement shall be made for developments of three-fourths acre or less. Runoff to the adjacent roadway, outfall or other properties for these sized developments shall not be allowed as a single point discharge unless approved by the city engineer or his designee. A drainage site and grading plan shall be submitted for review and approval.
- c. Other methods may be utilized with prior approval of the city engineer or his designee.

(Ord. No. 2002-017, § 5(2), 5-20-2002; Ord. No. 2007-005, § 1 a., 4-16-2007)

Sec. 30-154. Detention requirements for residential subdivisions.

Detention requirements for residential subdivision developments are as follows:

- (1) *Reserved.*
- (2) *Closed culvert system subdivisions.* Permissible residential subdivision detention basins for closed culvert system subdivisions are as follows:
 - a. Curb side; detention area shall be curb to curb but flood depth is not to exceed three inches above the centerline of the roadway.

- b. Curb to curb and underground storm drainage system.
- c. Curb to curb, underground storm drainage system and detention pond.
- d. Pond.
- e. Other design options developed by the developer and approved by the city engineer.

(3) *Outlet structures.* Outlet structures shall be designed for the ten-year storm event and analyzed for the 100-year event.

(4) *Maintenance of stormwater management facility.*

- a. The owner of the detention facility or any successor who acquires title to the stormwater management facility shall at all times maintain the design section of the stormwater management facility as indicated on the site drainage plan and in the drainage impact analysis report. If the city engineer determines that the stormwater management facility has not been maintained, the owner shall make the necessary modifications to conform to the original approved design sections, requirements, etc., within a 30-day period from written notification from the city. If the owner does not act within this timeframe to remedy the situation, the city may perform the necessary modification, improvements, etc., and bill the owner for the work at its operating cost, at such rates as have been set by the city.

- b. Compliance with this subsection shall be mandatory and shall be included on the site drainage plan as well as within the drainage impact analysis report and shall be acknowledged in writing by the owner of the development. The developer shall provide the city with an agreement or other contractual arrangement evidencing that adequate provision has been made for future maintenance of the

facility in those instances where the facility is to be acquired by an owners' association or other similar entity.

- (5) *Wet detention pond.* Wet detention/retention systems are those that under nonstorm conditions are designed to have a standing pool of water. The design shall be in accordance with this division. All wet systems shall incorporate a vegetated littoral shelf (shallow sloping area) over 35 percent of the areal cover of the pond under normal conditions. In lieu of the littoral shelf, the developer may enclose the pond within a fence, approved by the city with a minimum height of eight feet. A complete set of details, including locking/latching mechanisms shall be submitted if this option is selected.
- (6) [*Vertical walls.*] The use of vertical walls on the sides of detention ponds or side slopes steeper than 4:1, are discouraged and will not be permitted except as may be specifically approved, due to reason of undue hardship to the developer. In no circumstance will vertical walls on detention ponds be permitted adjacent to rights-of-way, along the boundaries of adjacent parcels of land, or on more than two sides of a detention pond.

(Ord. No. 2002-017, § 5(3), 5-20-2002; Ord. No. 2007-005, § 1 b., 4-16-2007; Ord. No. 2008-010, § 1, 6-16-2008)

Sec. 30-155. Work within public rights-of-way.

The following shall apply to work within public rights-of-way:

- (1) Areas disturbed between the back of curb or edge of pavement and any right-of-way shall be either sodded or hydro-mulched upon completion of the pavement for roadway construction.
- (2) Silt fencing or other preapproved erosion control measures shall be mandatory along backs of curbs or back sides of roadside ditches along the entire length of roadway. The developer shall be responsible

for maintaining streets and roadside ditches clean and free of large silt deposits.

- (3) Any construction/excavation adjacent to a natural watercourse, coulee, ditch, or other drainage facility shall include silt fencing installed along the full length of the watercourse within the confines of the property being developed.
- (4) Should it become necessary to realign or relocate an existing outfall, the developer shall utilize erosion control methods approved by the city engineer to ensure stabilization of the disturbed soils. This may include but not be limited to the use of hydro-mulch or soil stabilization blankets.
- (5) Embankment slopes of coulees and drainage ditches shall have slopes which are not in excess of 2:1 (H:V) and shall have appropriate erosion control as approved by the city engineer. End of pipe treatments shall be for both the upstream and downstream end of pipe. Utilization of filter fabric in conjunction with riprap may be required. Slope requirements around the pipe terminus shall be the same as the side slope of the channel. Side slopes shall be protected.

- (6) Pipe joints shall be wrapped with an approved filter fabric and banded on each end with a noncorroding plastic strap secured by self-sealing buckles.

(Ord. No. 2002-017, § 5(4), 5-20-2002)

Sec. 30-156. Certification of improvements.

The engineer of record responsible for design of the site plan, drainage plan, or detention facility of commercial development shall provide a letter of certification to the city. The letter shall certify that the improvements were constructed in accordance with the approved construction plans and specifications.

(Ord. No. 2002-017, § 5(A), 5-20-2002)

Sec. 30-157. Drainage culverts.

(a) *Size and type.* The minimum size pipes for any culvert shall be 15-inch diameter, unless otherwise approved by the city engineer. Pipe shall be concrete or other material approved by the city engineer.

(b) *Additional requirements.* Culverts shall be designed and installed in accordance with the state department of transportation and development's EDSM II 2.1.1 and II 2.1.6 except as follows:

- (1) The minimum design service life shall be:
 - a. Twenty years for all side drains;
 - b. Fifty years for all cross drains; and
 - c. Seventy-five years for all subsurface sewer systems.
- (2) The predicted design service life for metal culverts shall be determined by calculating the net effect of corrosion from both interior and exterior conditions concurrently.
- (3) Metal culverts will only be approved for driveways and outfall termini at channels or as otherwise approved by the city engineer.
- (4) Storm sewers shall be constructed in accordance with city design standards and with approved materials.
- (5) Lateral drainage ditches from the street to an outfall channel which traverse lots shall be provided by subsurface pipe drain with a minimum 15-foot permanent drainage servitude. Actual width of drainage servitude required will be determined by the department of public works based upon pipe diameter, invert elevations, and maintenance issues.
- (6) All roadway cross drains shall be reinforced concrete. No other material (i.e., plastic, metal, etc.) will be accepted unless otherwise approved by the department of public works.

(Ord. No. 2002-017, § 5(B), 5-20-2002)