Chapter 13.04
STORMWATER DRAINAGE CONTROL

Sections:

13.04.005 Purpose.

A. To Reduce or Prevent Flood Hazard. To reduce the hazard to public health and safety caused by excessive stormwater runoff which may result when land use changes from agricultural and other nonurban land uses to more urbanized land uses.

B. To Reduce or Prevent Flood Damage. To reduce or prevent damage to public and private property, including existing streams, drainage channels, and stormwater drainage facilities which may be caused by excessive stormwater runoff resulting during and after land development.

C. To Protect and Conserve Resources. To protect and conserve water and land resources by implementing beneficial design features and conservation techniques.

D. To Promote Economic Development. To promote orderly economic development and resource use.

(Ord. dated 10/31/94 § 100)

13.04.010 Policy.

A. Drainage Plan Required. It is the policy of the board of county commissioners of Vanderburgh County, Indiana, hereinafter referred to as the commissioners, that an engineered drainage plan be submitted to the Vanderburgh County drainage board, hereinafter referred to as the drainage board, for any new development, redevelopment, new construction, addition to existing construction, or other land disturbing activity located within the commissioners' and/or the drainage board's jurisdiction which shall result in the addition of impervious surfaces exceeding a total of ten thousand (10,000) square feet.

B. Subject Development Defined as Project. Any new development, redevelopment, new construction, additional construction, or other land disturbing activity which shall result in the addition of impervious surfaces totaling over ten thousand (10,000) square feet, hereinafter shall be called a project. The Drainage Board may also declare as a project any combination of new development, redevelopment, new construction, addition to existing construction, or other land disturbing activity (hereafter "Activity" or "Activities") in which (i) a series of Activities were performed which any single Activity of itself did not result in submittal of a Drainage Plan due to the result of a single Activity resulting in the addition of impervious surfaces less than ten thousand (10,000) square feet (ii) no previous single Activity as a result of its size required submittal of a drainage plan and (iii) the addition of an Activity combined with previous Activities that have been constructed within a period of 3 years results in the addition of impervious surfaces totaling over ten thousand (10,000) square feet.

C. Drainage Plan Submittal. The engineered drainage plan for a project shall be submitted, in triplicate, to the Vanderburgh County surveyor, Room 325 Civic Center Complex, 1 Martin Luther King Blvd., Evansville, IN 47708, no later than two full weeks prior to the drainage board meeting at which the engineered drainage plan is to be presented.

D. Drainage Plan Review Route. The Vanderburgh County surveyor, hereinafter referred to as the surveyor, will determine the route of review, in accordance with this chapter, for an engineered drainage plan, hereinafter referred to as the drainage plan submitted for a project.

(Ord. 12-15-013 § 1, amended, 12/22/2015; Ord. dated 10/31/94 § 200)

13.04.015 Storage and controlled release of stormwater runoff.

A. It is the policy of the drainage board that the drainage plan for certain projects shall include provisions for the storage and controlled release of excess stormwater runoff, unless such controlled release specifically is waived due to the direct discharge of stormwater into a major waterway such as Pigeon Creek, or the Ohio River; or into a secondary waterway at a point of study where direct discharge has been determined to be of benefit to the tributary watersheds, and tributary waterways.

B. Projects which shall be subject to the requirement for storage and controlled release of excess stormwater runoff include:

1. Major Subdivisions. All new major subdivisions as defined in Title 16 of this code, which major subdivisions are shown to discharge an amount of stormwater in addition to that which is discharged prior to new development.

2. Minor Subdivisions-C-0 Through M-3. All new minor subdivisions as defined in Title 16 of this code, which minor subdivisions are zoned for commercial use, or for industrial use.

3. Certain Residential Parcels. Any new “parcelization” as defined in Title 16 of this code, on which parcel residential development will disturb five acres or more of land surface, and/or add a total of one acre or more of impervious surfaces.

4. All Commercial and Industrial parcels. All “parcelizations” as defined in Title 16 of this code, which parcels are zoned for commercial use, or are zoned for industrial use.

5. Certain Other Projects. Any project for which the drainage board, the commissioners, or the Vanderburgh County surveyor shall require or recommend storage and controlled release of stormwater runoff due to the project’s location within:

a. The East Side Urban Drainage Watershed;

b. The watershed of a regulated drain;

c. An impacted drainage area;

d. The North U.S. 41 Industrial Corridor.

6. Impacted drainage area defined. An impacted drainage area is an area defined, declared, and mapped by the drainage board which area is unlikely to be easily drained because of one or more factors including but not limited to history of flooding, soil type, topography, land use, lack of adequate drainage outlet, location in a floodplain, location within seventy-five (75) feet either side of a regulated drain, or location within a watershed of an overburdened waterway, drain or system of drains. (Ord. dated 10/31/94 § 201)

a. Being the Boundary of Lands lying generally within one and one half mile either side of North U.S. Highway 41 and draining into the Pond Flat System of Regulated Drains of Vanderburgh County, Indiana; and more particularly described as follows:

1. Beginning on the South Line of Section Six (6), Township Five (5) South, Range Ten (10) West at a point approximately Six Hundred Seventy (670.0) feet East of the Southwest Corner thereof and in the intersection of Inglefield Road and Darmstadt Road;

2. Thence Northwardly along Darmstadt Road approximately Two Thousand (2,000.0) feet to its intersection with Princeton Road;

3. Thence continuing Northwardly along Princeton Road to the Vanderburgh/Gibson County Line and the North Line of Section Nineteen (19), Township Four (4) South,

Range Ten (10) West at a point approximately Fifteen Hundred Fifty (1,550.0) feet East of the Northwest Corner thereof;

4. Thence East and along said County Line to its intersection with Old State Road on the North Line of Section Twenty-one (21), Township Four (4) South, Range Ten (10) West a point approximately Twenty-three Hundred (2,300.0) feet West of the Northeast Corner thereof;

5. Thence Southwardly and Southwestwardly along Old State Road to its intersection with Inglefield Road and the South Line of Section Five (5), Township Five (5) South, Range Ten (10) West at a point approximately Fourteen Hundred (1,400.0) feet West of the Southeast Corner thereof.

6. Thence West along Inglefield Road and the Point of Beginning; and containing lands draining into the Pond Flat System of Regulated Drains in Vanderburgh County, Indiana which lands are experiencing rapid industrial and commercial development causing accelerated and greater cumulative storm water runoff into said Regulated Drains.

i. Projects as defined in Section 13.04.010 of the Vanderburgh County Code and subject to the requirement for storage and controlled released of storm water as defined in Sections

13.04.015 (B) 1-5 of the Vanderburgh County Code, and which Projects lie within or partially within the boundaries of the North U.S. Highway 41 Industrial Corridor Impacted Drainage Area as declared herein by the Vanderburgh County Drainage Board on November 23, 1998, shall be limited to a post development controlled peak release rate of storm water runoff during a one hundred (100) year return period storm to a rate equal to or less than the peak release rate during a ten (10) year return period storm from the same land area prior to its development.

ii. Projects exempted from the requirements of this Section include projects which have had final drainage plan approval prior to December 1, 1998.

iii. A project for which the primary plat and development plans have expired unimplemented with the Area Plan Commission (APC) by virtue of APC's codes, requirements and policies, and which project requires newly initiated submittal of plats and development plans through APC's procedures shall be considered a new project subject to the requirements of this Section. (Amended 11/30/98)

b. The boundary description of the designated Impacted Drainage Area in the rapidly developing unincorporated eastern part of Vanderburgh County, Indiana, is as follows:

1. Beginning at the intersection of Burkhardt Road and Russell Lloyd Expressway;

2. Thence North along the centerline of Burkhardt Road to its intersection with Old Boonville Highway;

3. Thence Northeasterly along the centerline of Old Boonville Highway to its intersection with Telephone Road;

4. Thence East along the centerline of Telephone Road to the Warrick County line;

5. Thence South along said County line to the center of said Lloyd Expressway;

6. Thence West along the center of said Lloyd Expressway to its intersection with Burkhardt Road at the Point of Beginning; and containing lands draining into the Eastside Urban System of Regulated Drains in Vanderburgh County, Indiana, which lands are experiencing rapid industrial and commercial development causing accelerated and greater cumulative storm water runoff into said Regulated Drains.

i. Projects as defined in Section 13.04.010 of the Vanderburgh County Code and subject to the requirement for storage and controlled release of storm water as defined in Sections 13.04.015(b)1-5 of the Vanderburgh County Code, and which Projects lie within or partially within the boundaries of the unincorporated eastern part of Vanderburgh County Impacted Drainage Area as declared herein by the Vanderburgh County Drainage Board on the 20th day May, 2002, shall be limited to a post development controlled peak release rate of storm water runoff during a one hundred (100) year return period storm to a rate equal to or less than the peak release rate during a ten (10) year return period storm from the same land area prior to its development.

ii. Projects exempted from the requirements of this Section shall include all subdivisions recorded prior to adoption of this Ordinance CO.05.02.006 and commercial and industrial projects which have had final drainage plan approval prior to June 1, 2002.

iii. A project for which the primary plat and development plans have expired unimplemented with the Area Plan Commission (APC) by virtue of APC's codes, requirements and policies, and which project requires newly initiated submittal of plats and development plans through APC's procedures shall be considered a new project subject to the requirements of this Section.

(13.04.015, Amended, 05/20/2002; Manual, Amended, 12/10/1998)

13.04.020 Controlled release rate required.

Projects required to store excess stormwater runoff shall be required to release the stored stormwater at a controlled release rate equal to or less than that established in this section.

A. Release Rate Established. The post development controlled peak release rate of stormwater runoff during a twenty-five (25) year return period storm from a project required to detain excess stormwater runoff shall not exceed the peak release rate during a ten (10) year return period storm from the same land area prior to its development.

B. Storage and Release Rate Calculations.

1. The predevelopment release rates and post development storage rates and controlled release rates of stormwater runoff shall be calculated using the methods, factors, and charted data specified by, supplied as a part of, attached to, or referenced by this chapter.

2. Methods, factors, and data other than those referred to in subsection (B)(1) of this section shall have prior approval of the drainage board before submittal as a part of a proposed drainage plan.

C. Storage Calculation Form Provided.

1. Form 800, which shall be used to determine storage volumes, is provided in Section 13.04.505, at the end of this chapter.

2. Form 800 shall be completed and submitted with the drainage plan, using the rainfall data and runoff coefficients contained in Section 13.04.205 of this chapter, and/or addenda hereto.

(Ord. dated 10/31/94 § 202)

13.04.025 The boards' rights to discretionary decisions.

Because topography, soil types, field conditions, and the availability and adequacy of outlets for stormwater runoff vary with almost every site, the requirements for stormwater drainage tend to be a unique matter for each project; therefore, the drainage board and the county commissioners retain the right to make discretionary decisions on an individual basis.

A. Discretionary Decisions. Discretionary decisions may include, but shall not be limited to, the exemption of certain projects from the requirements to detain excess stormwater runoff, in part or totally, and other decisions within the parameters of this chapter, based upon the purpose and the policy of this chapter as stated in Sections 13.04.005 and 13.04.010.

B. Technical Advisors to the Boards. The drainage board and the county commissioners shall authorize and empower certain technical advisors including:

1. The Vanderburgh County surveyor;

2. The Vanderburgh County highway engineer;

3. The Vanderburgh County soil and water conservation district.

C. Technical Advisors' Powers. The drainage board and the county commissioners shall empower their technical advisors as follows:

1. To make reviews of submitted plans and supporting data;

2. To make recommendations to the drainage board and the county commissioners with regard to such reviews; and to make other reports when so ordered by the boards;

3. To make periodic inspections before, during, and after completion of a project; and to report findings to the drainage board and the county commissioners;

4. To act on behalf of the drainage board and the county commissioners when so authorized, or by ordinance.

The drainage board encourages and advises anyone with an interest in a project to contact the technical advisors named above at the earliest possible time during the planning stage of the project.

(Ord. dated 10/31/94 § 203)

13.04.030 Record of board decisions.

A. Decisions by the drainage board and the county commissioners with regard to this chapter shall be made only during regular or special meetings of the drainage board, or during regular or special meetings of the county commissioners.

B. Records of actions taken by the drainage board, and/or the county commissioners with regard to this chapter shall be made in the appropriate edition of the minutes of each board's meetings.

(Ord. dated 10/31/94 § 204)

13.04.035 Special or emergency decisions.

A. In special or emergency circumstances where actions must be taken quickly in order to enforce the purposes, the policies, or other requirements of this chapter, the drainage board, the county commissioners, or their duly authorized representatives may make decisions, or take actions outside of board meetings.

B. Special or emergency decisions and actions of the drainage board, the county commissioners, and/or their authorized representatives shall be recorded in the appropriate edition of the minutes of each board's meetings.

(Ord. dated 10/31/94 § 205)

13.04.037 Petition filing fee.

A. That I.C. 36-9-27.4-1, et seq. governs what action the drainage board may take with respect to petitions filed with the drainage board concerning the removal of an obstruction from a drain or natural surface watercourse.

B. That pursuant to I.C. 36-9-27.4-11, a $100.00 filing fee shall be paid to county by a Petitioner who files a petition with the drainage board seeking the removal of an obstruction under I.C. 36-9-27.4-1, et seq. Such filing fee shall be submitted to the Drainage Board located in Room 208 Civic Center Complex, 1 N.W. Martin Luther King, Jr. Blvd., in Evansville, Indiana at the time of the filing of the Petition.

(Ord. 12-15-013 § 2, amended, 12/22/2015; 04/07/1997, Added, 04/07/1997)

13.04.040 Conflicting ordinances.

The provisions of this chapter shall be deemed as additional requirements to minimum standards required by other ordinances of Vanderburgh County, Indiana; and in the case of conflicting requirements, the most restrictive requirements shall apply.

(Ord. dated 10/31/94 § 300)

13.04.045 Compliance with other ordinances.

In addition to the requirements of this chapter, compliance with the requirements set forth in other applicable ordinances with respect to submission and approval of preliminary and final subdivision plats, improvement plans, building and zoning permits, inspections, appeals, variances, and similar matters; and compliance with applicable state and federal laws and regulations shall be required.

(Ord. dated 10/31/94 § 400)

13.04.050 Notification of the floodplain management ordinance.

The Floodplain Management Ordinance of Vanderburgh County, Indiana contains certain requirements applicable to projects subject to this chapter.

(Ord. dated 10/31/94 § 401)

13.04.055 Definitions.

As used in this chapter:

“Adjoining Landowner” the surface owner of any property that shares a common property line or corner with the parcel(s) in which the Drainage Plan is being applied or any property that would share a common line or corner and is only separated by a road, street, alley, highway, easement or right-of-way.

“Applicant” means the person, persons, partnership, corporation, or other private entity, their heirs or assigns who shall apply to the board for drainage plan approval.

“Board” or “drainage board” means the Vanderburgh County drainage board; except where “boards” refers to both boards.

“County commissioners” or “commissioners” means the board of county commissioners of Vanderburgh County, Indiana.

“Detention basin” means a facility constructed to restrict the flow of stormwater to a prescribed maximum rate, and to detain concurrently the excess waters that accumulate behind the controlling outlet.

“Drainage area” or “watershed area” means the land area which stormwater is collected from, conveyed through, and/or carried off from by a drainage system.

“Dry bottom detention basin” or “dry basin” means a basin designed to drain completely dry after providing its planned stormwater storage function.

“Duration” or “storm duration” means the time period, given in hours or minutes, of a rainfall event.

“Engineer” or “county engineer” means the Vanderburgh County highway engineer, or duly appointed representative(s).

“Flood elevation” means the vertical limits of elevation at all locations delineating the maximum level of high waters for a flood of a given return period.

“Floodplain” means the area adjoining a river or stream which has been or may be covered by flood-waters; and comprising the regulatory floodway and floodway fringe.

“Floodway” or “regulatory floodway” means the channel of a river or stream plus those portions of the floodplain adjoining the channel which are required to efficiently carry and discharge the peak flow of the one hundred (100) year flood.

“Impervious surface” are impenetrable by water and therefore refers to anything which prevents water from soaking into the ground. Examples include but are not limited to paved surfaces such as roads, sidewalks, driveways, parking lots, house and other structures. For the purpose of this Chapter, an impervious surface will be considered as any surface, which has a Runoff coefficient greater or equal to 0.85.

“Outfall” or “outlet” means the point or structure at which the stormwater discharges from the system or a part thereof.

“Peak flow” means the maximum rate of flow of water at a given point in the system from a predetermined storm.

“Project” means any new development, redevelopment, new construction, reconstruction, or land disturbing activity which creates an additional ten thousand (10,000) square feet of impervious surface, or disturbs five acres or more of land surface, and is regulated by this drainage chapter.

“Rainfall intensity” means the cumulative depth of rainfall occurring over a given duration expressed in inches per hour.

“Registered Neighborhood Association” shall mean a neighborhood association which registers with the Board of Commissioners as hereinafter provided under Vanderburgh County Code Section 02.06.20.

“Regulated drain” or “legal drain” means a drain maintained by the county surveyor and the drainage board under Indiana Drainage Code, IC 36-9-27.

“Release rate” means the amount of stormwater let go from a given land area or release point in cubic feet per second.

“Retention basin” or “wet bottom retention basin” means a basin designed to hold a permanent pool of water after providing its planned detention of stormwater runoff.

“Return period” means the average interval of time within which a given rainfall event will be equaled or exceeded once; expressed in years. Expressed as a percentage of chance, a one hundred (100) year return period storm has a one percent chance of occurring in any one-year period.

“Runoff coefficient” or “C-factor” means a decimal fraction relating the amount of rain which runs off a parcel of land to the total amount of rain falling. So expressed as a percentage, a C-factor of .25 means that twenty-five (25) percent of the rain falling on a parcel of land can be expected to discharge from that parcel of land.

“Stormwater drainage facility” means any single part or any combination of parts of a system designed and/or constructed to gather, convey, store and discharge rainfall.

“Stormwater drainage system” means a complete combination of facilities designed and constructed to gather, convey, store, and discharge rainfall in an orderly fashion.

“Surveyor” or “county surveyor” means the Vanderburgh County surveyor, or duly appointed representative.

“SWCD” means the Vanderburgh County soil and water conservation district.

“Tributary” as an adjective means contributing stormwater from upstream land areas into the storm drainage system.

“Tributary” as a noun means a stream, waterway, channel, or other conduit of stormwater contributing upstream drainage into the drainage system of a project.

(Ord. 12-15-013 § 3, amended, 12/22/2015; Ord. dated 10/31/94 § 500)

13.04.060 Prior approval required for projects.

No person, partnership, corporation, or other private entity shall undertake or accomplish a project without prior drainage board approval of a final drainage plan as defined and required by this chapter.

(Ord. dated 10/31/94 § 601)

13.04.065 Exemptions from plan approval.

The approval of a final drainage plan shall not be required by the provisions of this chapter for the following:

A. Excavation of cemetery graves;

B. Ordinary cultivation or use of agricultural land including tilling, terracing, construction of drains, and construction of tool storage or harvest storage facilities, all so long as such activities do not adversely affect drainage facilities, and so long as such activity shall not change land contours greater than two feet in elevation;

C. The planting or tilling of gardens, shrubs, trees, or other common agricultural or landscaping activities so long as such activities do not reduce the conveying or holding capacity of waterways, ponds, and basins; nor interfere with the proper operation and maintenance of regulated, public, or private drainage facilities;

D. Filling and grading a basement site after demolition of a structure, to conform to the adjacent terrain;

E. A fill less than one foot in depth placed on natural terrain with a slope flatter than four percent, not intended to support a structure, and which does not exceed one thousand (1,000) cubic yards per acre, and does not obstruct the existing drainage pattern;

F. Construction of permitted structures within the limits of a project with an approved drainage plan, so long as the construction fully complies with, and does not alter or the approved drainage plan for that project or adversely affect the project’s storm drainage system.

(Ord. dated 10/31/94 § 602)

13.04.070 Exemptions are subject to statutes and regulations.

The above exemptions are subject to statutory provisions with regard to regulated drains, and applicable local, state, or federal laws, ordinances, and regulations.

(Ord. dated 10/31/94 § 603)

13.04.075 Plan approval required to start construction.

Final drainage plan approval shall be obtained before physical activity is undertaken to construct the project with the exception of such testing as typically is required to determine procedures or materials to be used.

(Ord. dated 10/31/94 § 604)

13.04.080 Plan approval required to record a plat.

Final drainage plan approval shall be obtained prior to the recording of a plat of a major subdivision, as defined and required by Title 16.

(Ord. dated 10/31/94 § 605)

13.04.085 Request by applicant for plan review and approval.

A. All requests for drainage plan approval shall be made by the applicant to the drainage board through the county surveyor's office by the presentation to the surveyor of the drainage plan and the supporting data, all in duplicate, by the close of the business day two full weeks prior to the meeting at which approval of the drainage plan shall be sought.

B. The two copies of Drainage Plans and supporting data, shall be distributed by the surveyor as follows:

1. To the surveyor's drainage plan records;

2. To the county engineer;

C. Included with the Drainage Plan shall be the following information regarding the applicant that shall be provided on FORM 801.

1. For an individual(s), legal name, current mailing address, email address, name of project and general location of the project. The application must be signed by the individual(s) making such application.

2. For a partnership, corporation or other private entity the legal name of the partnership, corporation or other private entity, mailing address, email address, name of project and general location of the project. For a partnership, the application must be signed by the managing or senior partner or if none exists by all partners. For a Limited Liability Company (LLC), the application must be signed by the manager, or senior member or if one does not exist, by all members. For a corporation, the application must be signed by;

i) the President or Vice-President of the corporation or

ii) by a person whose authority has been delegated to sign such application. If the signature is by a person with a delegation of authority, a copy of such delegation must be included with the application.

D. In all cases the person signing the application will affirm that;

i) the information provided on the application FORM 801 is true and correct and

ii) that the applicant is committing with their signature that an as built plan or record drawing or certification statement will be provided upon completion of the project and that failure to provide an as built plan or record drawing or certification could result in fines under Section 13.04.110 and/or declaring the applicant ineligible for future drainage plan approvals for any project within the County Drainage Board's jurisdiction until such time as an as built drawing or certification is submitted. The County Surveyor or other Technical Advisors to the Board will inform the Drainage Board of any applicants that are not in compliance with submittal of an as built drawing or certification statement prior to any action being taken against such applicant.

(Ord. 12-15-013 § 4, amended, 12/22/2015; Ord. dated 10/31/94 § 606)

13.04.090 Board approval of drainage plan recorded.

Drainage plan approval, or disapproval of a drainage plan shall be expressed in a regular meeting or special meeting of the drainage board, and such approval or disapproval shall be recorded in the minutes of the board's meeting.

(Ord. dated 10/31/94 § 607)

13.04.095 Conditions of drainage plan approval.

In order for an applicant to obtain approval of a final drainage plan, the following requirements must be met:

A. The applicant shall be eligible under the terms of this chapter to apply for and obtain drainage plan approval.

B. The drainage plan and supporting submittals required by this chapter shall have been prepared and submitted in a timely and proper manner in accordance with the provisions of this chapter.

C. The drainage plan and supporting submittals shall reflect compliance with the requirements of this chapter, and compliance with any conditions of approval applied to the plan by the drainage board.

D. The submitted data shall be gathered, analyzed, assembled into the drainage plan and supporting submittals; and shall be certified in accordance with 864 IAC 1.1-7-3 Application of seal; signature, and presented to the drainage board all by a civil engineer or land surveyor regularly engaged in stormwater drainage design, and registered to practice in the state of Indiana.

E. An easement has been dedicated to house any off-site drainage facilities if such facilities are required to serve the project's stormwater drainage system.

F. The person, persons, partnership, corporation, or other entity to whom approval of the drainage plan is granted must be the person, persons, partnership, corporation, or entity who will be responsible for accomplishing the project for which the drainage plan is developed. Should the person, persons, partnership, corporation, or other entity to which approval of the Drainage Plan is granted is no longer responsible for accomplishing the project for which the Drainage Plan is developed, then the person, persons, partnership, corporation or other entity that assumes or acquires a project with an approved Drainage Plan must immediately apply to the Drainage Board for approval to transfer the obligations of the previously approved Drainage Plan by submitting to the Drainage Board a FORM 801 with the information required under Section 13.04.085.

(Ord. 12-15-013 § 5, amended, 12/22/2015; Ord. dated 10/31/94 § 608)

13.04.100 Conditions of plan approval remaining in force.

A. In order for the approval of the final drainage plan to remain in force, the following conditions shall be met:

1. The applicant shall notify the surveyor and the APC site review committee prior to making any modification of the approved drainage plan.

2. The applicant shall obtain approval of the drainage plan when making a major modification of the plan.

B. Materials Change Constitutes Major Modification. A change from the materials designated in the approved drainage plan or an addition, relocation, or elimination of a retention/detention basin shall constitute a major modification requiring approval by the board.

C. Detailed “As-Built” Plans or “Record Drawings” Required. The applicant shall agree to submit, and shall submit within thirty (30) days of completion of the drainage facilities of a project, one complete set of as-built plans or record drawings to the surveyor and one complete set of as-built plans to the county engineer which shall show every detail of the finished installation of all storm water drainage facilities for the completed project. In lieu of a complete set of As Built plans or Record Drawings, should the project be completed essentially as designed the applicant may submit a certification statement to the County Surveyor and County Engineer on the approved County Certification Form 803.

D. Final Inspection After Delivery of “As-Builts” plans or “record drawings.” The final inspection of the drainage facilities shall be made only subsequent to the delivery of the As Built plans or Record Drawings to the surveyor and county engineer and shall be based upon said as-built plans or Record Drawings or in the case of a certification statement on the originally approved plans.

1. The applicant shall install and maintain the street system and the storm drainage system until the project has been completed, or until maintenance of such systems is assumed by others.

2. The applicant shall agree to remove, and shall remove sediment from, or repair erosion damages to all property where such damage has been caused by the project.

3. The applicant shall allow the drainage board, or agents of the drainage board, to enter the project to verify compliance with this chapter or to bring the project into compliance with this chapter.

4. The applicant shall develop methods of maintenance for all drainage facilities, and shall have printed clearly on the plat, and/or other documents of record for the project, the developed methods of maintenance.

(Ord. 12-15-013 § 6, amended, 12/22/2015; Ord. dated 10/31/94 § 609)

13.04.105 Enforcement of drainage plan approval.

A. The board shall make inspections, or shall order inspections to be made of a project site to ensure compliance with the requirements of this chapter, and other terms and/or conditions attached to the approval of a drainage plan and/or a street plan.

B. The board may deny, withdraw, or suspend approval of a drainage plan if the board determines that:

1. The requirements of this chapter are not met in full;

2. Other terms and/or conditions of the approval of a final drainage plan and/or a street plan are violated;

3. A drainage plan or a street plan or an attached submittal contains a false statement or a misrepresentation;

4. Some part of a drainage plan or a street plan is not executed in good faith, or is not executed in accordance with the various plans approved by the boards;

5. A project is undertaken without an approved final drainage plan;

6. An alteration or a modification is made to a drainage system prior to the completion of a project, which alteration or modification is not documented to or authorized by the board and/or their appointed representative in accordance with the requirements of this chapter.

(Ord. dated 10/31/94 § 610)

13.04.110 Remedies for violations of the terms of plan approval.

The drainage board will take such actions as the board deems necessary and legal to remedy a violation of the terms and/or conditions of plan approval, or will take such actions as the board deems necessary and legal to bring a project determined not to be in compliance with the requirements of this chapter into such compliance; and such actions of the board may include, but are not limited to:

A. Levying a Fine for Violations. Levying a fine equal to not more than one hundred dollars ($100.00) per day per violation determined to exist after thirty (30) days beyond the date on which a notice of the violation was sent by registered mail to the last known address of the party determined by the drainage board to be the party responsible for the violation of the terms and/or conditions of plan approval, and/or to be the party responsible for the condition of the drainage system which is not in accordance with the requirements of this chapter.

B. The Fine Shall be Levied Against the Violator. A fine as described in subsection A of this section shall be levied against the party determined by the board to have violated the terms and/or conditions of plan approval, or against the party determined by the board to be the party to have caused the condition of the drainage system which is not in accordance with the requirements of this chapter.

C. Disposition of Moneys Collected From Fines.

1. Moneys collected from fines assessed against properties within residential subdivisions using the Plan "B" method of maintenance as defined in Section 13.04.460 shall be deposited into the Plan "B" repair account created by this chapter and described in said Section 13.04.460.

2. Moneys collected from fines assessed against properties in projects which are not residential subdivisions using the abovesaid Plan "B" shall be deposited into the general storm drainage account which account is created and described by said Section 13.04.460.

D. Correcting Violations by Contractual Services.

1. The drainage board also may contract for work to be accomplished to bring a project, or a part thereof, into compliance with the requirements of this chapter, and/or the terms and conditions of plan approval; and the board shall bill the cost of such work to the property owner upon whose property the work is accomplished.

2. If the cost of such work as is described in subsection (D)(1) of this section is levied against a property owner, but is not paid by said property owner within forty-five (45) days of date of the mailing of the bill, the board shall pay the contractor who accomplished the work from funds as follows:

a. For properties in subdivisions using Plan "B" method of maintenance the payments shall be made from the Plan "B" repair account.

b. For properties other than those in subdivisions using Plan "B" method of maintenance, the payments shall be made from the general storm drainage account.

E. The Board May Apply a Tax Lien to Collect Payment. If the board contracts for work to correct a violation as described in subsection D of this section, and the owner of the property upon which the work is accomplished fails to pay for the costs of the work as billed by the board within ninety (90) days of the

mailing date of the bill, the board shall apply a tax lien in an amount equal to the cost of the work against the subject property.

F. Disposition of Moneys Collected for Contractual Works. All moneys collected from property owners for works contracted by the board to correct violations, whether said monies are collected directly from the property owners or collected through tax liens, shall be deposited into the same repair accounts from which the moneys to pay the costs of the works were withdrawn originally.

(13.04.110 (D) (2) amended 1/20/2009, Ord. dated 10/31/94 § 611)

13.04.115 The board and the commissioners may act together.
In the levying of a fine, and/or in the contracting for work to correct violations as described in Section 13.04.110, the drainage board and the county commissioners may take the actions described in Section 13.04.110 either separately or together, as is recommended to be appropriate by the legal council to the boards.

(Ord. dated 10/31/94 § 612)

13.04.120 APC site improvement permits conditioned.
The area plan commission shall not issue an improvement permit on a project requiring final drainage plan approval until such approval has been expressed by the board.

(Ord. dated 10/31/94 § 613)

13.04.125 Building permits conditioned.
The Vanderburgh County building commissioner shall not allow construction of buildings, or other impervious structures or facilities to commence at the site of a project requiring final drainage plan approval until:

A. Such approval has been expressed by the drainage board;

B. And all storm drainage facilities are constructed.

(Ord. dated 10/31/94 § 614)

13.04.130 Phased development of large projects allowed.
Large projects may be divided into phases for the purpose of constructing drainage facilities and obtaining permits in accordance with the requirements of this chapter. For projects in which phasing may occur a table must be provided with the relative timing of construction of all drainage structures including basins, swales, storm sewers in relation to the development of individual lots.

In multiple lot subdivisions, an entire swale must be constructed prior to the development on any single lot containing the swale. If, due to the slope of the swale sod or rip rap is required, placement of this material may be postponed on individual lots until such time as structures are completed and final lot grading is

accomplished in order to provide contiguous seeding provided that proper temporary erosion control measures are taken within the swales.

No construction may begin in any subdivision without the construction of the corresponding basins that handle the drainage from the lots to be affected.

For subdivisions in which material from basins is required in order to utilize in the grading of streets and/or lots simultaneous development of the basins and lots may occur provided that prior approval of this action is included within the Drainage Plan.

(Ord. 12-15-013 § 7, amended, 12/22/2015; Ord. dated 10/31/94 § 615)

13.04.135 Drainage plan--General requirements by policy.

A. Unless a project has been exempted from the requirement to submit a Drainage Plan, the applicant shall provide a detailed drainage plan and supporting submittals in accordance with the provisions of this chapter.

B. Unless a project subject to the requirement to detain excess stormwater runoff has been exempted from that requirement, the drainage plan and supporting submittals shall demonstrate clearly that the post development peak rate of stormwater runoff during a twenty-five (25) year return period storm is controlled sufficiently so that it shall not exceed the peak runoff rate from the same project site in its pre-development condition during a ten (10) year return period storm.

C. The required computations shall be made using only the methods, factors, charts, and data specified by or supplied within this chapter, or approved for use by the drainage board.

D. The critical storm durations used in the submitted computations to design detention storage shall be those durations which require the greatest detention storage.

E. Computations for watersheds of fifty (50) acres or less shall be made either by the Rational Method using the runoff coefficients and rainfall data given in this chapter; or by hydrographic techniques, or computer storm drainage modeling methods approved by the drainage board.

F. For watersheds larger than fifty (50) acres, hydrographic techniques and computer storm drainage modeling methods approved by the Drainage Board shall be used.

G. All calculations submitted to determine stormwater runoff and storage volumes shall be made by hydrographic techniques and computer modeling methods granted prior approval of the drainage board upon the recommendation of the County Surveyor, and/or the County Engineer.

H. Form 800 as referenced hereinabove shall be the form used for charting and submitting storage volumes when using the Rational Method.

I. The Current Edition of the Indiana LTAP Stormwater Drainage Manual, (previously HERPIC County Storm Drainage Manual September 1994 Edition), and the hydrographic techniques and modeling methods contained therein are approved by the board for use in determining stormwater runoff and storage.

J. Applicants may be required to submit Drainage Plans on Application forms (FORM 802) developed by the County Surveyor and/or County Engineer. Such Application forms shall be approved by the Drainage Board and made available to all applicants via hard copy and electronic versions through County websites or other acceptable means of communication. Upon approval by the Drainage Board of the Application Forms, any future Drainage Plans must be submitted on the approval application form.

(Ord. 12-15-013 § 8, amended, 12/22/2015; Ord. dated 10/31/94 § 701)

13.04.140 Information submittal and review schedule.

The required drainage plan and supporting data shall be submitted and reviewed by a schedule as follows:

A. Regular Drainage Board Meetings. Meetings of the Vanderburgh County Drainage Board are established by Ordinance on or before the first meeting of the Vanderburgh County Commissioners in February of each year.

B. Special Drainage Board Meetings.

1. Special meetings of the Drainage Board outside the regular and advertised annual schedule of board meetings may be requested of the board, or may be called by the Drainage Board.

2. Special meetings shall be granted, called, announced, advertised, and held at the discretion of the board and/or the commissioners.

3. The Vanderburgh County Auditor shall provide a schedule of all Drainage Board meeting dates and times.

C. Plan Submittal Deadline.

1. For a Drainage Plan to be reviewed by the board's technical advisors prior to the regularly scheduled meeting, and to receive recommendations to the board at that meeting, the Drainage Plan and supporting data must be submitted in duplicate to the County Surveyor by the close of business day two full weeks prior to the meeting at which plan approval shall be sought.

2. Drainage Plans and data not submitted two weeks prior to the meeting, as stated above, may be viewed by the Drainage Board at its discretion; but are liable to come before the board without a positive recommendation, should the technical advisors lack sufficient review time.

3. Drainage Plans will be reviewed by the advisors in the same chronological order in which the plans are received.

4. The Drainage Board requires that a printed agenda be submitted no later than noon of one business day prior to the Drainage Board meeting.

D. Late Submittals Omitted From Agenda. Any plan, or request submitted to the County Surveyor later than Noon of the business day immediately preceding the Drainage Board meeting will not appear on the agenda, and may be heard by the Drainage Board only at its discretion.

E. Notification of Insufficiency. Notification of the insufficiency of a Drainage Plan or other insufficiency of submittal may be issued by the County Surveyor, or by other technical advisors to the Drainage Board with explanation of the insufficiency provided to the applicant.

F. Viewing of Plan Guaranteed. In the absence of a notification of insufficiency as described in subsection E of this section, any Drainage Plan timely submitted shall be viewed by the Drainage Board at its regular scheduled meeting, or at a special meeting called for that purpose.

G. Additional Time Required for Review-Delayed Review. If additional review time is required beyond that time described above, the applicant will be notified by the authorized representative of the Drainage Board requiring the additional time with an explanation for the postponement of the presentation of the drainage plan to the Drainage Board.

H. For all new major subdivisions as defined in Title 16 of this code, which major subdivisions are shown to discharge an amount of stormwater in addition to that which is discharged prior to new development and all minor subdivisions, C-0 Through M-3, as defined in Title 16 of this code, which minor subdivisions are zoned for commercial use, the applicant shall notify all adjoining landowners and Registered Neighborhood Associations within 1/2 mile of any development of the proposed Drainage Plan.

1. The notification shall consist of the following language.

"Notice is hereby given that a Drainage Plan for _____ with a location of _____ has been submitted to the Vanderburgh County Surveyors Office, Room 325, Civic Center, Evansville, IN. The submitted Drainage Plan will be heard for approval or disapproval before the Drainage Board meeting on (date and time) at Room 301 of the Civic Center. A copy of the Drainage Plan is available for review in the County Surveyor's Office during normal business hours."

2. Also included in the notice shall be the name of the developer, name of the landowner where the development is to occur and the name of the engineer/engineering firm that has developed the Drainage Plan.

3. The notification shall occur by certified mail or delivery using approved overnight services providing that the overnight services obtain a signed receipt. All mailings must be made at least 7 days in advance of the scheduled Drainage Board meeting in which the Drainage Plan is to be heard.

4. For new subdivisions in which approval of a preliminary plan is sought under Section 13.04.150 to satisfy certain requirements of the Area Plan Commission (APC), the mailing shall give notice of the preliminary plan. Once noticed for a preliminary plan, notice will not be required for hearing of the final Drainage Plan unless stated by the Drainage Plan as a condition for approval of the preliminary Drainage Plan.

5. Any required notice under this section may be done in conjunction with notice requirements by the Area Plan Commission provided that the required notice is sent at least 7 days in advance of the scheduled Drainage Board meeting in which the Drainage Plan is to be heard.

I. For significant changes to any previously approved final drainage plan, the Drainage Board may require, at their sole discretion, the applicant to notify all adjoining landowners and Registered Neighborhood Associations within 1/2 mile of any development of the proposed Drainage Plan. Any notification will meet the criteria of Subsection H.

J. Review Delay for Additional Information. If additional information beyond that submitted with the Drainage Plan is required by the Drainage Board or by one or more of the technical advisors the person(s) requiring the additional information shall notify the applicant in a timely fashion as to the information needed and the reason for the additional information.

K. Applicant May Protest Delay; or Appeal “Insufficiency.” The applicant may protest postponement of presentation of the drainage plan or appeal the notification of insufficiency, by requesting to be put on the agenda at or before noon of the above said one business day prior agenda deadline; and then appearing before the Drainage Board.

(Ord. 12-15-013 § 9, amended, 12/22/2015; Ord. dated 10/31/94 § 702)

13.04.145 Detailed final drainage plan required.

A comprehensive final drainage plan shall be submitted for each project subject to the provisions of this chapter. The final drainage plan shall be designed to convey stormwater runoff in a safe and orderly fashion and to detain the increased storm water runoff where detention is required.

(Ord. dated 10/31/94 § 703)

13.04.150 Preliminary drainage plan allowed.

Presentation of a preliminary form of the final drainage plan may be allowed when the applicant is in need of approval of a preliminary drainage plan to satisfy certain requirements of the area plan commission

(APC), and it can be shown that the complexity of the project prohibits the submittal of the final drainage plan within the time limits set by the APC for plan submittals.

(Ord. dated 10/31/94 § 704)

13.04.155 Approval of preliminary drainage plan limited.

A. Approval of a preliminary form of the final drainage plan shall not constitute, nor be interpreted as, final approval of the final drainage plan for a project as required herein.

B. Permits not Issued on Preliminary Approval. The area plan commission shall not issue a site improvement permit, nor shall the building commissioner issue a building permit, nor shall the owner or developer of a project start construction of a project subject to the requirements of this chapter until the board approves the final drainage plan for the project.

(Ord. dated 10/31/94 § 705)

13.04.160 Contents of preliminary drainage plan.

A. The contents of the preliminary drainage plan shall include a map based on the most current county planimetric maps, or a topographic map prepared from a more recent aerial photo reconnaissance that provides more accurate data, complete with contour lines, and showing the following:

1. The extent and area of each watershed affecting the design of the drainage facilities for the project;

2. The soil types based on the most current information available from the SWCD;

3. Zone “A” floodplain based on the current FIRM panels;

4. The existing man-made and natural waterways, ponds, basins, pipes, culverts, and other drainage facilities or features within or affecting the project;

5. The preliminary layout and design of the streets, and all stormwater drainage facilities, including depressed pavements used to convey or temporarily store overflow from the heavier storms, and all outlets for the storm water drainage facilities;

6. The existing streams, floodways, and floodplains to be maintained, and new channels to be constructed, their locations, cross sections, profiles, and materials used;

7. The proposed culverts and bridges to be built, with the proposed materials to be used;

8. Existing detention basins or ponds within the project, or outside the project but affecting it, to be maintained, enlarged, or otherwise altered, together with any new basins or ponds to be built; and their basis of design;

9. The estimated depth and amount of storage required of the basins and ponds, and their available freeboards;

10. The estimated location and percentage of impervious surface existing and expected to be constructed at completion of the project;

11. Any interim plan which is to be incorporated into the project pending its completion according to the final Drainage Plan.

12. A copy of the Notice of Public Hearing as required by the Area Plan Commission.

B. Notations and Explanations on the Preliminary Plan. All notations necessary to indicate the existing conditions, and the proposed functions of the various features shown thereon; and shall include the following.

C. Geographic Orientation Required. A north arrow, scale, location insert, and other information necessary for geographic clarification shall be included on a preliminary plan.

D. Data Required to Accompany Preliminary Plan. Descriptive data sufficient to support the feasibility of the preliminary drainage plan with regard to the requirements of this chapter, including calculations of the predevelopment and post development runoff rates using rainfall data supplied herein shall accompany a preliminary drainage plan.

E. Recommendation of Preliminary Plans Restricted. No preliminary drainage plan shall be recommended to the drainage board by their technical advisors unless the preliminary drainage plan shall be a workable plan according to the same criteria as, and capable of being incorporated into, a final drainage plan.

F. Determination of Sufficiency. The drainage board shall decide the sufficiency of the preliminary drainage plan, and any conditions or additional requirements to be applied to the preliminary drainage plan.

(Ord. 12-15-013 § 10, amended, 12/22/2015; Ord. dated 10/31/94 § 706)

13.04.165 Contents of the final drainage plan.

The contents of the final Drainage Plan shall include all the items listed above for a preliminary drainage plan, plus:

A. Soils Map. A soils map indicating soils names and their hydrologic classification must be provided for a proposed project.

B. Location and Topographic Map. In addition, a location and topographic map must be provided showing the land to be developed, and such adjoining land whose location and topography may affect or be affected by the layout or drainage of the project. The map must also identify all adjoining landowners.

C. Contour Intervals.

1. The contour intervals shown on the topographic map shall be two and one-half feet for slopes less than four percent; and five feet for slopes four percent or greater; or best available;

2. The location of streams and other stormwater conveyance channels, both natural and man-made; and the vertical and horizontal limits of the one hundred (100) year floodplain, according to FIRM panels, and/or the Building Commissioner; all properly identified;

3. The normal shoreline of lakes, ponds, swamps, and basins, their floodplains, and lines of inflow and outflow;

4. The location of existing regulated drains, farm drains, inlets and outfalls;

5. Storm, sanitary, and combined sewers, and outfalls;

6. Wells, septic tank systems, and outfalls, if any;

7. Seeps, springs, sinkholes, caves, shafts, faults, or other such geological features visible, or of record;

8. The limits of the entire proposed project and the limits of the expected extent of land disturbance required to accomplish the project;

9. The location of the streets, lot lines, and easements;

10. A scale, preferably one inch equals fifty (50) feet;

11. An arrow indicating North.

D. On-Site Bench Mark Required. A benchmark determined by “Mean Sea Level Datum 1929,” is required to be located within the project limits.

E. For all non residential Major Subdivisions and all Minor Subdivisions C-0 through M-3 that per Section 13.04.015 meet the requirements for storage and controlled release of excess stormwater, in which the retention will be achieved by utilizing shared detention and or retention facilities between two or more parcels, a table must be provided with following additional information for each lot.

1) the assumed weighted Developed C value for each lot,

2) the proposed basin(s) that will be utilized for retention of the excess runoff for each lot and

3) the designated lots in which any excess retention capacity will be allocated and the quantity of excess capacity that will be allocated to those designated lots.

(Ord. 12-15-013 § 11, amended, 12/22/2015; Ord. dated 10/31/94 § 707)

13.04.170 Final drainage plan layout.

A. In addition to the requirements listed for a preliminary drainage plan, the final drainage plan shall depict the following:

1. The extent and area of each watershed tributary to the drainage facilities within the project;

2. The final layout and design of proposed storm sewers, their inlet and outfall locations and elevations, the receiving streams or channels; all with the basis of their design;

3. The location and design of the proposed street system, including depressed pavements used to convey or detain overflow from storm sewers and over-the-curb runoff resulting from heavier rainstorms, and the outlets for such overflows; all with their designed elevations;

4. The locations, cross sections, and profiles of existing streams, floodways, and floodplains to be maintained, and the same for all new channels to be constructed;

5. The materials, elevations, waterway openings, size, and basis for design of the proposed culverts and bridges;

6. Existing ponds and basins to be altered, enlarged, filled, or maintained; and new ponds, basins, swales, to be built, and the basis of their design;

7. The location and percentage of impervious surfaces existing and expected to be constructed;

8. The material types, sizes, slopes, grades and other details of all the stormwater drainage facilities;

9. The estimated depth and amount of storage required in the new ponds or basins, the freeboard above the normal pool and highwater pool of wet basins, and details of the emergency overflows from the basins;

10. For all controlled release basins, a plot or tabulation of the storage volumes with corresponding water surface elevations, and a plot or tabulation of the basin outflow rates for those water surface elevations;

11. The location of any applicable “impacted drainage areas” or other areas designated to remain totally undisturbed, natural, or for common and/or recreational use.

12. The location of Drainage Easements for retention/detention basins, drainage ditches/swales, storm sewers, junction boxes, inlets, or manholes outside of any county right of

way. Easements dimensions must be shown on each individual lot to the extent that they can be recreated in the field within the lot boundaries of said lot.

Drainage Easements will not be required for retention/detention basins, drainage ditches/swales, storm sewers, junction boxes, inlets, or manholes in the following situations:

a) The submitted Drainage Plan is for a single lot subdivision and there is no common or shared drainage with any adjoining lot, parcel or other lands or

b) The submitted Drainage Plan is for a multiple lot commercial or industrial subdivision and the retention/detention basins, drainage ditches/swales, storm sewers, junction boxes, inlets, or manholes are contained within a single lot and the retention/detention basins, drainage ditches/swales, storm sewers, junction boxes, inlets, or manholes serve the drainage needs of the specific lot only.

B. Protection of Structures From One Hundred Year Flooding. All structures to be occupied as residences or businesses shall have finished floor elevations two feet above the high water calculated to occur during a one hundred (100) year return period storm for the subject building site; and the required floor elevations shall be depicted on the plan drawings for such affected sites.

(Ord. 12-15-013 § 12, amended, 12/22/2015; Ord. dated 10/31/94 § 708)

13.04.175 Submittal of a written drainage design report.

The final drainage plan shall be accompanied by a written report containing the following:

A. Any significant stormwater drainage problems existing or anticipated to be associated with the project;

B. The analysis procedure used to identify and evaluate the drainage problems associated with the project;

C. Any assumptions or special conditions associated with the use of the procedures, especially hydrologic or hydraulic methods, used to identify and evaluate drainage problems associated with the project;

D. The proposed design of the drainage control system;

E. The results of the analysis of the proposed drainage control system showing that it does solve the project's identified and anticipated drainage problems;

F. A detailed description, depiction, and log of all hydrologic and hydraulic calculations or modeling, and the results obtained thereby; together with the input and output files for all computer runs;

G. Maps showing individual drainage areas within the project subdivided for use in the analysis thereof.

(Ord. dated 10/31/94 § 709)

13.04.180 Typical cross sections of the drainage facilities.

One or more typical cross sections must be provided for each existing and proposed channel, basin, pond, or other open drainage facility, which cross sections:

A. Must show the elevation of the existing land immediately adjacent to all drainage facilities;

B. Must show the high water elevations adjacent to all waterways and impoundments as expected from the one hundred (100) year storm in relationship to permanent structures

(Ord. dated 10/31/94 § 710)

13.04.185 A site plan required.

A site plan must be provided, drawn to scale, showing the overall site dimensions with existing and proposed drainage facilities, streets, parking lots, buildings and other existing or proposed improvements.

(Ord. dated 10/31/94 § 711)

13.04.190 Timely review by board of final drainage plan.

The drainage board's consideration of the final drainage plan will not be continued greater than two consecutive regular meetings, including the first hearing of the final drainage plan, without due cause shown, such as insufficiency of plan, conflict between plans, or other discrepancy, omission, or defect of the plan(s), or unless the applicant consents to a continuance.

(Ord. dated 10/31/94 § 712)

13.04.195 Final drainage plan approval.

Any drainage plan in compliance with the requirements of this chapter and with conditions and requirements applied by the drainage board shall be approved by the drainage board.

(Ord. dated 10/31/94 § 713)

13.04.200 Recording, storing, and viewing of final approval.

A. Drainage plan approval shall be recorded in the minutes of the meeting at which the approval occurs.

B. The drainage board's minutes are kept by the Vanderburgh County auditor, and may be viewed at the auditor's office.

(Ord. dated 10/31/94 § 714)

13.04.205 Determination of runoff quantities.

A. Computing Rates of Stormwater Runoff. The stormwater runoff quantities shall be computed for the area of the project, plus the area of the watershed flowing into the project. The quantity of runoff which is generated as the result of a given rainfall intensity may be calculated as follows in this section.

B. The Rational Method.

1. For watersheds up to and including fifty (50) acres, the Rational Method may be used, providing the runoff coefficients and rainfall data given in this chapter are employed.

2. In the Rational Method, the peak rate of runoff, “Q,” in cubic feet per second (cfs) is computed as:

Q = C I A

a. Where: “C,” or the runoff coefficient, is the ratio of peak runoff rate to average rainfall rate over the entire watershed during the time of concentration.

b. Where: “I” = the rainfall intensity in inches per hour.

c. Where: “A” = the tributary drainage area in acres.

3. Guidance to selection of the runoff coefficient “C” is provided by Table 13.04.205-A and Table 13.04.205-B, which show values for different types of surface characteristics.

4. The composite “C” value used for a drainage area with various surface types shall be the weighted average value for the total area calculated from a breakdown of individual areas having different surface types.

Table 13.04.205-A

UNDEVELOPED RUNOFF COEFFICIENTS (Cu)

Surface Type-Woodland, Turfed Meadows, Rough Pasture, Fallow Brush.

Slope:			
Less than 2%	C	=	0.12
2% to 5%	C	=	0.24
5+% to 10%	C	=	0.36
Over 10%	C	=	0.48

Surface Type-Cultivated Fields.

Slope:

Less than 2%	C	=	0.20
2% to 5%	C	=	0.35
5+% to 10%	C	=	0.50
Over 10%	C	=	0.65
Gravel Roadway or Shoulder			
	C	=	0.50

Table 13.04.205-B

DEVELOPED RUNOFF COEFFICIENTS (Cd)

Surface Type-Pavement, Rooftop, Other Impervious Surfaces:

Slope:

Less than 2%	C	=	0.92
2% to 5%	C	=	0.94
5+% to 10%	C	=	0.96
Over 10%	C	=	0.98

Surface Type-Lawns with Turf.

Slope:

Less than 2%	C	=	0.15
2% to 5%	C	=	0.25
5+% to 10%	C	=	0.40
Over 10%	C	=	0.55

Surface Type-All Water Surfaces, Basins, Ponds and Lakes.

	C	=	1.00

Gravel Roadway and Parking

Gravel Roadway and Parking-25 Year Storm	C	=	0.60
Gravel Roadway and Parking-50 & 100 Year Storm	C	=	0.65

C. Determination of Rainfall Intensity.

1. "I" or rainfall intensity shall be determined from data interpolated from the weather bureau rainfall frequency curves, which data is shown in Table 13.04.205-C.

2. When using the Rational Method, the storm duration is equal to the "time of concentration" (tc), which is the travel time from the most hydraulically distant point to contribute to the point under consideration.

3. The travel time to a given location shall be the sum of the overland flow time, the gutter flow time, and the sewer flow time.

4. The time of concentration (tc) at the point under consideration is the longest travel time when all paths are considered.

5. In terms of sewer design practice, the inlet time for each sub-basin must be compared to the travel time from all upstream sub-basins, and the longer time selected as the local time of concentration.

6. The flow time in the storm sewers may be estimated by the distance in feet divided by the velocity of flow in feet per second (fps).

7. The velocity shall be determined by the Manning Formula.

8. Inlet time is the combined time required for the runoff to reach the inlet of the storm sewer.

9. Inlet time includes overland flow time, and flow time through established surface drainage channels, and sheet flow across such areas as lawns, fields, and parking lots.

10. Calculations to determine Time of Concentration "t_c" for undeveloped areas shall be made utilizing methodology in US Department of Agriculture, Natural Resources Conservation Service TR-55. For previously or partially developed areas and areas with small drainage areas other accepted formulas such as Ragan, Kerby and Federal Aviation Agency may be utilized provided that the assumed parameters for the formula(s) used meet the site conditions.

D. Rates for Acreage in Excess of Fifty Acres. The runoff rate for areas in excess of fifty (50) acres shall be determined by a computer model, such as TR-55 (NRCS), TR-20 (NRCS), HEC-HMS (COE), and HEC-1 (COE), or preapproved commercial computer software that can generate hydrographs based upon such models.

Table 13.04.205-C

RAINFALL INTENSITY-DURATION-FREQUENCY

TABLE FOR EVANSVILLE

Intensity in Inches Per Hour

	Storm Return Period in Years				
Storm Duration	**5**	**10**	**25**	**50**	**100**
5 minutes	6.063	6.625	7.208	7.936	8.469
10 minutes	4.863	5.380	5.925	6.616	7.126
15 minutes	4.029	4.515	5.033	5.697	6.194
30 minutes	2.837	3.226	3.646	4.194	4.608
60 minutes	1.549	1.819	2.078	2.412	2.663
2 hours	1.053	1.230	1.400	1.620	1.785
3 hours	0.774	0.899	1.019	1.175	1.291
4 hours	0.632	0.736	0.836	0.965	1.062
5 hours	0.524	0.606	0.684	0.785	0.861
6 hours	0.453	0.522	0.589	0.676	0.741
7 hours	0.399	0.459	0.516	0.591	0.647
8 hours	0.358	0.412	0.463	0.530	0.581
9 hours	0.323	0.370	0.415	0.472	0.516
10 hours	0.297	0.339	0.379	0.431	0.470
11 hours	0.276	0.314	0.351	0.399	0.435
12 hours	0.259	0.296	0.331	0.376	0.410
13 hours	0.245	0.280	0.314	0.357	0.390
14 hours	0.233	0.267	0.299	0.341	0.372
15 hours	0.220	0.252	0.281	0.320	0.349
16 hours	0.209	0.238	0.266	0.302	0.329
17 hours	0.198	0.225	0.251	0.284	0.310
18 hours	0.189	0.215	0.240	0.272	0.296
19 hours	0.181	0.206	0.299	0.260	0.282

20 hours	0.175	0.199	0.222	0.251	0.273
21 hours	0.169	0.193	0.215	0.244	0.266
22 hours	0.164	0.187	0.208	0.236	0.257
23 hours	0.160	0.181	0.202	0.229	0.250
24 hours	0.154	0.174	0.194	0.219	0.239
25 hours	0.149	0.168	0.187	0.212	0.230
26 hours	0.143	0.162	0.180	0.204	0.221
27 hours	0.139	0.156	0.174	0.196	0.212
28 hours	0.135	0.152	0.169	0.190	0.206
29 hours	0.132	0.149	0.165	0.186	0.201
30 hours	0.129	0.145	0.161	0.182	0.197
31 hours	0.126	0.142	0.158	0.178	0.193
32 hours	0.122	0.138	0.153	0.173	0.188
33 hours	0.119	0.135	0.149	0.168	0.183
34 hours	0.116	0.131	0.146	0.164	0.178
35 hours	0.113	0.128	0.142	0.160	0.174
36 hours	0.111	0.125	0.139	0.157	0.171

Table 13.04.205-D

HUFF CURVE COORDINATES

Percent Precipitation Values

Evansville Station

Four Quartiles

Storm Time	**Qt. 1**	**Qt. 2**	**Qt. 3**	**Qt.4**
		10% Probability		
0%	00.00	00.00	00.00	00.00
10%	45.44	15.56	13.64	17.14
20%	69.63	32.50	23.62	28.75

30%	79.14	60.00	30.83	37.50
40%	86.09	77.27	40.00	43.40
50%	89.09	88.72	53.85	50.00
60%	92.85	93.94	77.62	55.17
70%	95.00	95.77	90.33	62.55
80%	96.97	97.50	96.30	83.33
90%	98.78	98.98	98.78	96.92
100%	100.00	100.00	100.00	100.00

20% Probability

10%	36.67	12.28	10.00	13.23
20%	60.00	27.27	18.67	23.38
30%	71.15	49.40	28.86	30.41
40%	78.57	69.38	35.19	37.61
50%	85.19	82.31	48.08	44.12
60%	88.57	89.38	70.38	51.43
70%	92.35	93.29	87.82	60.00
80%	95.23	96.12	94.49	79.05
90%	97.96	98.40	98.09	95.00

30% Probability

10%	30.00	9.86	8.00	10.00
20%	52.80	22.98	16.36	20.00
30%	66.67	42.77	24.00	26.79
40%	74.19	62.50	32.00	33.67
50%	80.00	77.14	44.44	40.44
60%	85.45	85.00	67.34	47.65
70%	85.45	85.00	67.34	47.65
80%	89.39	90.73	84.21	57.14
90%	93.55	94.73	92.50	75.83

40% Probability

10%	27.00	8.00	6.45	8.00
20%	48.48	20.00	13.08	16.64
30%	60.74	37.20	20.29	23.75
40%	69.83	57.93	28.81	30.00
50%	75.71	73.68	40.91	37.66
60%	81.22	81.82	61.12	43.61
70%	87.12	88.13	80.17	54.12
80%	92.17	93.18	90.63	72.73
90%	96.58	97.14	96.58	91.43

50% Probability

10%	22.82	6.28	5.13	6.92
20%	44.69	17.33	11.11	14.04
30%	57.11	33.33	16.67	20.51
40%	65.33	53.09	25.44	27.06
50%	71.43	69.57	37.93	34.21
60%	78.15	78.57	57.39	40.91
70%	84.66	85.60	77.44	50.79
80%	90.00	91.72	88.54	69.70
90%	95.36	96.50	95.88	89.36

60% Probability

10%	19.15	5.07	4.00	5.22
20%	40.51	15.12	9.00	11.11
30%	53.13	30.00	13.69	16.94
40%	60.86	48.81	22.22	23.00
50%	66.95	65.79	33.96	30.77
60%	74.36	75.56	53.33	37.23
70%	80.91	82.46	74.43	47.27
80%	87.50	89.53	86.67	66.00

90%	94.00	95.50	94.67	86.00

70% Probability

10%	15.88	4.08	3.13	3.75
20%	36.67	12.33	7.10	8.72
30%	49.88	25.88	11.33	14.00
40%	56.79	44.40	17.55	18.18
50%	63.37	61.11	29.30	25.00
60%	70.00	71.58	49.41	32.86
70%	76.54	79.76	70.34	43.33
80%	85.00	87.32	84.08	61.33
90%	92.50	94.11	93.62	82.04

80% Probability

10%	12.40	2.92	2.22	2.78
20%	33.33	9.80	5.17	6.36
30%	45.83	22.02	8.70	10.22
40%	51.06	40.00	13.60	13.50
50%	59.14	56.73	24.00	17.89
60%	65.37	66.67	43.48	27.29
70%	72.00	75.56	66.33	38.33
80%	80.00	84.72	80.70	55.56
90%	89.71	92.50	91.67	77.73

90% Probability

10%	7.69	1.80	1.27	1.61
20%	28.89	6.48	3.39	3.87
30%	38.79	16.67	5.65	6.25
40%	46.15	34.29	9.52	8.92
50%	51.22	51.90	13.71	11.65
60%	60.00	62.00	34.00	20.00

70%	66.67	71.11	61.75	30.60
80%	74.29	80.00	76.67	46.32
90%	84.00	90.00	88.64	69.27

Note: Per HERPIC instructions:

“For detention storage the 3rd quartile (50%) rainfall distribution should be used, along with storm durations up to and including the 24-hour duration.”

(Ord. 12-15-013 § 13, amended, 12/22/2015; Ord. dated 10/31/94 § 800)

13.04.210 Amount of runoff to be accommodated by various parts of the drainage system.
Various parts of a stormwater drainage system must accommodate stormwater runoff as follows:

A. Streets Not to be Flooded.

1. The interior street drainage system for a project, including inlets, catch basins, street gutters, and curbs shall be designed so that stormwater during a ten (10) year return period storm shall not exceed twenty-five hundredths (0.25) foot, (three inches deep), as measured at the gutter line ten (10) feet either side of a maximum inlet rim sump of one tenth (0.10) foot.

2. For the street drainage calculations, rainfall duration shall be equal to the time of concentration of one hour, if the time of concentration is less than one hour.

B. Use of the First Quartile Storm Distribution. The first quartile storm distribution, shown in Table 13.04.205-D, should only be used for minor drainage systems such as inlets, catch basins, street gutters, swales, sewers, and small channels; per HERPIC instructions to Indiana counties.

C. Minimum Requirements to be Satisfied. In projects subject to this chapter, these minimum requirements must be satisfied:

1. An open channel carrying a peak flow greater than thirty (30) cubic feet per second, shall be capable of accommodating peak runoff for a fifty (50) year return period storm within the drainage easement designated for that channel.

2. Culverts shall be capable of accommodating peak runoff from a fifty (50) year return period storm when draining an area greater than one square mile, or when crossing under a road which is part of the INDOT urban or rural functional classification system, and is classified as a principal or minor arterial, major or minor collector road.

3. A stormwater drainage system, or any part thereof, draining a tributary area greater than one square mile shall be designed to carry the volume of stormwater runoff calculated to occur during a fifty (50) year return period storm entirely within the easement for that stormwater drainage system.

(Ord. dated 10/31/94 § 900)

13.04.215 Storm sewer design standards.

The storm sewer system for a project subject to the requirements of this chapter, whether such storm sewer system is to remain private or public, and whether constructed on private or public property, shall conform to the design standards and requirements contained, attached to, or referred to in this chapter.

(Ord. dated 10/31/94 § 1000)

13.04.220 Storm sewer--Manning Equation.

A. The hydraulic capacity of storm sewers shall be determined using Manning Equations:

1. $V = \frac{1.486}{n} R^{2/3} S^{1/2}$

2. V = mean velocity of flow in feet per second

3. R = the hydraulic radius in feet

4. S = the slope of the energy grade line in feet per foot

5. n = the roughness coefficient of the conduit surface(s)

B. The hydraulic radius, R, is defined as the cross sectional area of flow divided by the wetted flow surface or wetted perimeter. Typical “n” values and maximum permissible velocities for storm sewer materials are listed in Table 13.04.220, following.

C. Roughness coefficient (n) values for other sewer materials can be found in standard hydraulics texts and references.

D. The use of texts and references must be documented in all submittals of hydraulic calculations.

Table 13.04.220

TYPICAL VALUES OF MANNING’S “n”

Type of Material	**Manning’s “n”**		**Max. Velocity**
Closed conduits/culverts:			
PVC; Storm sewer grades	0.010	15	fps
Concrete (circular or elliptical)	0.011	15	fps
Smooth flow HDPE	0.010	15	fps
Precast concrete boxes	0.013	15	fps

C.1 or D.1 S.J. Type/Cement Lined	0.013	15	fps	
Corrugated metal pipe:	circ. weld	spiral weld		
Unpaved	0.024	0.021	7	fps
25% Paved	0.021	0.018	7	fps
50% Paved	0.018	0.015	7	fps
100% Paved	0.013	0.013	7	fps
Other concrete culverts	0.013			
Open Channels:				
Concrete, trowel finish	0.013			
Concrete, broom or float finish	0.015			
Gunite	0.018			
Riprap, placed	0.030			
Riprap, dumped	0.035			
Gabions	0.028			
New earth	0.025			
Mature earth, some weeds	0.030			
Mature, dense weeds	0.040			
Mature, weeds and brush	0.040			
Swale, grass cover	0.035			

Other “n” values shall be taken from manufacturers’ data.

(Ord. dated 10/31/94 §§ 1001, 1002)

13.04.225 Minimum pipe sizing.

A. The minimum pipe size for all storm sewers shall be twelve (12) inches inside diameter.

B. Orifice Plates and Flow-Limiting Devices.

1. Where a twelve (12) inch pipe will not limit the rate of release to that rate required to meet detention storage requirements, an orifice plate, or other device subject to the approval of the drainage board, shall control the rate of release.

2. When an orifice plate or other device is used inside of the pipe or enclosed system, the opening in the plate or device shall not be less than eight inches in diameter, or eight inches on a side.

3. If a controlling device less than eight inches on a side, or in diameter is required to restrict the release rate, the controlling device shall be installed above ground, and in a place easily accessible for maintenance, and protected from tampering.

(Ord. dated 10/31/94 § 1003)

13.04.230 Storm sewer grade.

A. The following are minimum requirements for storm pipe grade.

1. Grade Related to Pipe Cover. Storm sewer grades generally shall be such that minimum cover as required in Sections 13.04.255 through 13.04.300 of this chapter, and/or as shown in detailed drawings attached to Section 13.04.505 of this chapter, is achieved and maintained over the top outside surface of all pipe in projects subject to the provisions of this chapter.

2. Uniform Pipe Grades Required. Uniform grades shall be maintained in subsurface pipes between inlets to the subsurface storm sewer system, and between manholes connecting the pipes and inlets of the storm sewer system.

3. Grade Related to Capacity and Velocity. Final grade(s) shall be set with full consideration of the capacity required, sedimentation problems expected, and other storm sewer design parameters.

B. Minimum and maximum allowable slopes shall be those capable of producing velocities of two feet per second, and fifteen (15) feet per second, respectively, when the storm sewer is flowing full.

(Ord. dated 10/31/94 § 1004)

13.04.235 Alignment.

Storm sewer pipe shall be aligned horizontally straight between manholes, inlets, and similar structures, in-so-far as is possible.

A. Minimum Radius and Pipe Size for Curved Installations.

1. Where long radius curves are necessary to conform to street layout, the minimum radius of curvature shall be no less than fifty (50) feet, and allowable for sewers forty-two (42) inches in diameter and larger only.

2. Deflection of pipe sections shall not exceed the maximum deflection recommended by the manufacturer of the specific pipe to be installed, and that manufacturer's recommendation shall

accompany the submittal; and only the type and size of pipe specified in such a submittal shall be installed.

3. The deflection shall be uniform, if used; and the finished installation shall follow a smooth curve.

B. Prefab Forty-Five Percent Structures.

1. Prefabricated forty-five (45) degree structures may be allowed with only one manhole access or inlet to one of the laterals thereof, if it can be shown that by using such a structure, one or more ninety (90) degree turns is eliminated.

2. Designs for other special prefabricated junctions may be submitted for approval.

(Ord. dated 10/31/94 § 1005)

13.04.240 Manholes.

A. Manholes shall be installed to provide access to continuous underground storm sewers for the purpose of inspection and maintenance. Manholes shall be provided at the following locations:

1. Where two or more storm sewers converge;

2. At the point of beginning of, or at the end of a curve; and at the point of reverse curvature (PC. PT. & PRC.);

3. Where pipe size changes;

4. Where an abrupt change in horizontal alignment occurs;

5. Where a change in storm sewer profile grade occurs;

6. At suitable intervals in otherwise straight sections of storm sewer runs, as specified in subsection B of this section.

B. Maximum Distances Between Manholes. The maximum distance between storm sewer manholes shall be as follows:

Size of Pipe in Inches	**Maximum Distance in Feet**
12 through 24	400
27 through 42	500
48 and larger	600

(Ord. dated 10/31/94 § 1006)

13.04.245 Pipe easements.

All storm sewer pipes not located within dedicated street rights-of-way shall be housed in easements dedicated for the purpose of accessing the storm sewer facilities to perform maintenance thereon.

A. Pipe Centered in Easements.

1. The easement lines generally shall be parallel to and equidistant from the centerline of the pipe run.

2. In cases where the pipe is not centered in the easement, the outside wall of the pipe shall be no closer to the closest easement line than one half the vertical distance from the flowline of the pipe to the dirt grade; and pipe alignment and location shall be shown clearly on the as-built plans.

B. Minimum Easement Widths. For pipes with up to 6’ of cover, the easement shall be a minimum ten (10) feet in width for pipes up to twenty-four (24) inches in diameter, and a total of twelve (12) feet plus the diameter of the pipe, for pipes larger than twenty-four (24) inches in diameter. For pipes with greater than 6’ of cover, the easement shall be a minimum ten (10) feet in width for pipes up to twenty-four (24) inches in diameter plus an additional 2 feet of easement for each additional foot of cover over 6’ of cover up to a maximum easement of eighteen (18) feet. For pipes with greater than 6’ of cover and greater than twenty-four (24) inches in diameter, the easement shall be a total of twelve (12) feet plus the diameter of the pipe, plus an additional 2 feet of easement for each additional foot of cover over 6’ of cover up to a maximum easement of twenty-two (22) feet. The required minimum easements are summarized in the Table 13.04.245 B

TABLE 13.04.245B

Pipe Diameter	Feet of Cover	Minimum Easement Width
Pipe Diameter of 2’ or less	with cover up to 6’	10’
Pipe Diameter greater than 2’	with cover up to 6’	12’ + Diameter of Pipe
Pipe Diameter of 2’ or less	with cover greater than 6’	Easement width would be obtained by subtracting 6’ from the total cover depth and multiplying that number by 2 and then adding 10 to the product. In no case would the easement exceed 18’
Pipe Diameter greater than 2’	with cover greater than 6’	Easement width would be obtained by subtracting 6’ from the total cover depth and multiplying that number by 2 and then adding 12 + the diameter of the pipe to the product. In no case would the easement exceed 22’

C. Off-Centered and Combination Easements. The adequacy of design for combination easements housing storm sewers with other utilities shall be adjudged by the board on a case-by-case basis.

D. Pipe Collars, Headwalls, and Aprons are Required. A collar, headwall, and/or drop box shall be provided on the upstream end, and an apron on the downstream end of all open-ended pipes in the storm sewer system.

(Ord. 12-15-013 § 14, amended, 12/22/2015; Ord. dated 10/31/94 § 1007)

13.04.250 Inlets.

Inlets, or other collecting drainage structures, shall be designed and utilized to collect surface water through grated openings; and convey it into storm sewers, channels or culverts.

A. Use of INDOT Road Design Manual. Inlet design and spacing shall be in accordance with Section 7-400 of the INDOT Road Design Manual, Volume 1, or other approved design manuals and procedures.

B. Design Sources to be Documented. The source of inlet design shall be documented in the submittal, and approved by the board.

C. Minimum Openings and Flow Rates.

1. The inlet grate openings provided for street drains must be adequate to pass the design ten (10) year flow.

2. Sag inlets shall pass the design flow with a maximum gutter depth of 0.25 feet as measured ten feet distance either side of the inlet during a ten (10) year return period storm.

D. Overload Channels to Prevent Street Flooding Required. An overload channel from sag inlets to an overflow channel or basin shall be provided at sag inlets so that the maximum depth of water that is ponded in the street sag shall not exceed one-half foot, as measured at a point four feet in-street from and perpendicular to the gutter line, during a twenty-five (25) year return period storm with the inlet plugged.

E. Maximum Distance Between Street Inlets. The maximum distance between inlets for street drainage shall be six hundred (600) feet measured in the gutter.

F. Area Inlet Design Standards. Area inlets shall be designed and installed in such a manner as adequately will conduct the runoff from a twenty-five (25) year return period storm into the underground storm sewer system; and shall be designed to preclude safety hazards.

(Ord. dated 10/31/94 § 1008)

13.04.255 Workmanship.

The specifications, instructions, and design details for all storm sewer facilities provided in or with the drainage plan, and/or street construction plan for a project subject to the requirements of this chapter shall conform to the following:

A. The current standard specifications and drawings provided by the Vanderburgh County engineer;

B. The standard specifications, detailed drawings, requirements, and instructions contained within, attached to, adopted concurrent with, and/or subsequently referenced to in this chapter by the Vanderburgh County commissioners;

C. The specifications for the construction of storm sewers set forth in the latest edition of the Indiana Department of Transportation “Standard Specifications” (INDOT Standard Specifications);

D. The most current manufacturers’ recommendations for installation of the materials to be used.

1. A copy of the manufacturer’s recommendation used must be submitted with the drainage plan employing the recommendation;

E. High Quality Workmanship Required. All workmanship in the development and implementation of the drainage plan and the street construction plan shall be of high quality; and shall reflect compliance with the requirements of this chapter, and with all applicable local, state and industry standards.

(Ord. dated 10/31/94 § 1101)

13.04.260 Materials.

The materials used in the construction of storm sewers and open culverts in projects subject to the requirements of this chapter shall be in full conformance with regulations set forth hereinbelow:

A. Storm Sewer Defined.

1. For the purpose of this chapter, a storm sewer shall be defined as a network of pipe conduits, and precast concrete manholes, and/or box inlet structures, which collects and conveys surface and subsurface water by gravity flow from a specific geographical area.

2. A gravity flow system utilizes elevation gradients to cause water flow.

B. Certain Tiles and Drains Excluded.

1. Subsurface yard and field drainage tiles, building floor drains, downspout outlets, roof conductors, and sump pump lines are not considered as part of the storm sewer system with regard to the requirements of this section.

2. Requirements for some tiles and drains not covered in this section are covered in sections near the end of this chapter.

C. Storm Sewer Systems and Facilities Subject to Chapter.

1. Stormwater conveyance systems which route an existing natural or man-made stream channel, open ditch, storm sewer, or overland surface drainage around or through a project site shall be considered a storm sewer by the drainage board, and shall comply with the requirements of this section; and

2. Stormwater conveyance systems, excess stormwater storage and discharge facilities, and other drainage facilities defined within and specified by this chapter shall be subject to the requirements of this section.

D. Acceptable Pipe Materials. Table 1100, in Section 13.04.505 of this chapter, lists those pipe materials and corrosion protection measures subject to acceptance by the Drainage Board for the construction of enclosed gravity flow storm sewers. All materials incorporated into any work associated with this ordinance must be new unless specifically approved by the Vanderburgh County Drainage Board.

E. Open Culverts Defined.

1. An open culvert shall be defined as a conduit open on both ends, intended to provide for free passage of channelized stormwater runoff under highways, streets, roads, railroads and embankments.

2. For the purpose of this chapter, culverts further shall be defined, based upon their expected use, as follows:

a. Class A Culvert (High Fill). A culvert intended to provide for passage of channelized surface water under highways, streets, roads, railroads or other high fill embankments. High fill embankments are those engineered fills with a distance from the pipe invert to the top of embankment or pavement of twelve (12) feet or greater.

b. Class B Culvert (Low Fill). A culvert intended to provide for passage of channelized surface water under commercial entrance and exit drives, residential drives or other low fill embankments. Low fill embankments are those engineered fills with a distance from the pipe invert to the top of embankment or pavement of less than twelve (12) feet.

F. Acceptable Culvert Materials. Table 1199 in Section 13.04.505 of this chapter, lists those pipe materials and corrosion protection measures subject to acceptance by the drainage board for the construction of open culverts.

G. Paved Inverts.

1. If a paved invert is specified for circular pipe or pipe-arch, the pipe shall be fully or half coated as specified, and additional bituminous material applied in the bottom section to form a smooth pavement.

2. Except where the upper edges intersect the corrugations, the pavement shall be applied to the lower forty (40) percent of the inside periphery of the culvert.

H. Polymer Precoated CMP. Polymer precoated corrugated steel pipe shall be in full conformance with AASHTO M245 (or ASTM Designation A762) and AASHTO M246 (or ASTM Designation A742) Grade 10/10.

I. Bituminous Coated and Smooth-Lined CMP.

1. Bituminous coated and smooth-lined galvanized corrugated steel pipe shall be coated as required herein; and shall be lined on the inside of the pipe so that a smooth surface will be formed which surface completely fills the corrugations to a minimum thickness of one eighth inch above the crests, and a maximum thickness of one-half inch above the crest.

2. The interior lining shall be applied by a centrifugal or other approved method and shall be free from sags and runs; and the lining material shall meet the requirements of AASHTO M 190.

J. Fiber-Bonded CMP. Fiber-bonded corrugated metal pipe shall be in full conformance with Section 908.08 of INDOT Standard Specifications, latest edition.

(Ord. 12-15-013 § 15, amended, 12/22/2015; Ord. dated 10/31/94 § 1102)

13.04.265 Material specifications.

A. 1. This section outlines requirements for the manufacture of storm sewer and open culvert materials according to applicable American Association of State Highway and Transportation Officials (AASHTO) and American Society for Testing and Materials (ASTM) specifications.

2. These material requirements in part are restatements of requirements set forth within the referenced standard, with noted exceptions.

3. A summary of information from the referenced ASTM and AASHTO specifications has been included in this section for the convenience of the reader; however, the design engineer, contractor, manufacturer, and developer also must assume responsibility for familiarizing themselves with these specifications as they apply to the guidelines set forth herein.

4. The drainage board will not assume responsibility for noncompliance with the referenced specifications as a result of information not provided by this chapter.

5. The Drainage Board reserves the right to approve the use of materials other than those specified herein. However, any alternate materials proposed for use in any public rights of way

must be included on the Indiana Department of Transportation “Approved Materials List”. Documentation of the INDOT approval must be provided upon request.

6. Each storm sewer pipe or open culvert material has been separated into divisions which generally contain the following information:

a. Production and material standards;

b. Pipe joint requirements;

c. Criteria for rejection of damaged materials; and

d. Material markings.

B. Aluminum-Alloy Structural Plate Pipe, Pipe-Arches, Arches, Long-Spans, and Box Culverts.

1. Production and Material Standards.

a. Aluminum-alloy structural plate culverts must be formed from aluminum-alloy structural plate in conformance with ASTM B 790, and ASTM B 746.

b. Material used in the manufacture of aluminum-alloy structural plates must be as required in ASTM B 209, and secondary structural components must conform to ASTM B 221.

2. Rejection of Damaged Structural Plates.

a. Aluminum-alloy structural plates possessing the following defects will be rejected for installation:

i. Dents or bends in the metal;

ii. Lack of integrity;

iii. Illegible markings as specified herein, on the aluminum sheet;

iv. Ragged or diagonal sheared edges.

3. Aluminum-Alloy Structural Plate Markings.

a. Each plate shall be identified on the inside with the following information as a minimum:

i. Name or trademark of plate manufacturer;

ii. Name of fabricator, if other than the manufacturer;

iii. Year and month of manufacture; and

iv. ASTM designation.

C. Galvanized Structural Plate, Pipe, Pipe Arches, Arches, Long Spans and Box Culverts.

1. Production and Material Standards.

a. Galvanized structural plate culverts must be formed from galvanized structural plate in conformance with ASTM A 76 and ASTM A 796.

b. Steel sheet used for flat plate shall be galvanized by the hot-dip process according to ASTM A 444.

c. Repair of damaged hot-dip galvanized coatings shall be in conformance with ASTM A 780.

2. Rejection of Damaged Galvanized Structural Plates.

a. Galvanized structural plates possessing the following defects will be rejected for installation:

i. Dents or bends in the metal;

ii. Lack of integrity;

iii. Illegible markings, as specified herein, on the galvanized sheet; and

iv. Ragged or diagonal sheared edges.

3. Galvanized Structural Plate Markings.

a. For galvanized structural plate products, each plate shall be identified on the inside with the following information as a minimum:

i. Name of manufacturer;

ii. Specified zinc-coated plate thickness;

iii. Specified coating weight (mass);

iv. Identification showing heat number and coating lot number (may be omitted if fabricator's records tie the coating lot number to a specified heat number, and manufacturer); and

v. ASTM designation.

4. Exterior Field Coatings. Exterior field applied coatings of asphaltic mastic or tar base material shall be required for all galvanized structural plates with less than five feet of cover, in conformance with AASHTO M 243.

D. Corrugated Metal Pipe and Pipe Arches.

1. Production and Material Standards.

a. Corrugated metal pipe (CMP) shall be of either riveted lap joint construction (annular corrugations); or be constructed with a continuous lock seam, or welded seam from end to end of each length of pipe (helical corrugations).

b. Aluminum-alloy corrugated pipe shall be fabricated in accordance with ASTM B 745. This pipe shall be fabricated from aluminum-alloy sheet and plate, as specified within ASTM B 209.

c. Aluminum coated steel Type 2 corrugated pipe shall be fabricated as specified within ASTM A 760, except that all pipe and pipe coupling bands shall be formed from aluminum coated steel conforming to ASTM A 819.

d. Galvanized steel pipe shall be manufactured according to those guidelines set forth within ASTM A 760, formed from zinc-coated steel sheet material conforming to ASTM A 444.

2. Corrugated Metal Pipe (CMP) Joints.

a. External coupling bands conforming to those standards set forth within ASTM B 745 and ASTM A 760 will be accepted for use in the construction of corrugated metal pipe joints.

b. All coupling bands shall be fabricated with annular corrugations to lap an equal portion of each adjoining pipe section, and shall be of the same gauge and coating material as the pipe structure.

c. Each pipe end shall be reformed to have a minimum of two annular corrugations.

d. A tightly closed joint shall be formed in order to create a soil-tight seal.

e. The pipe ends shall be matched at the joint such that the difference in diameter between abutting pipes is no more than one-half inch around the entire pipe circumference.

f. All corrugated metal pipe couplings shall be required to be wrapped with a strip of nonwoven geotextile fabric around the entire pipe diameter to prevent infiltration of bedding and backfill materials.

g. The minimum width of this fabric shall be one foot, plus the band width, to allow a minimum six-inch overlap of each band edge.

h. Rubber “O” ring gaskets may be used in place of geotextile fabric wrap at the corrugated metal pipe joint provided that “O” rings are placed on each end corrugation, and hugger-type bands are used that seat into the second corrugation from the end of the pipe on both pipes at the joint.

i. Bolted connectors are required on the bands such that compression of the “O” rings occur.

j. “O” ring diameters shall be per the manufacturer’s recommendations.

3. Rejection of Damaged Corrugated Metal Pipe (CMP).

a. The completed pipe shall show careful, finished workmanship in all aspects of its production.

b. Pipe which has been damaged will be rejected for any one of the following defects:

i. Variation from a straight centerline;

ii. Elliptical shape in a pipe intended to be round;

iii. Dents or bends in the metal;

iv. Metallic coating or bituminous coating or liner which has been bruised, broken, or otherwise damaged;

v. Lack of rigidity;

vi. Illegible markings on the steel sheet;

vii. Ragged or diagonal sheared edges;

viii. Uneven laps in riveted or spot welded pipe;

ix. Loose, unevenly lined, or unevenly spaced rivets;

x. Defective spot welds or defective continuous welds; or

xi. Loosely formed lockseams.

4. Corrugated Metal Pipe Markings.

a. For corrugated metal pipe products, each corrugated sheet used in the fabrication of annular pipe, and each two feet to five feet of coiled sheet used in fabrication of helical pipe must be identified with the following information:

i. Name of sheet manufacturer;

ii. Alloy and temper;

iii. Specified thickness;

iv. ASTM designation; and

v. Heat number.

E. High Density Polyethylene Pipe (HDPE).

1. Production and Material Standards for HDPE.

a. Corrugated high density polyethylene Type S (HDPE) pipe shall be in manufactured accordance with AASHTO M 294.

b. Pipe manufactured under this specification shall have a minimum Cell Class of D 324420C in accordance with ASTM D 3350.

c. The flexibility factor of HDPE pipe shall not exceed 0.095.

d. Ribbed polyethylene pipe shall be in accordance with ASTM F 894 for the specified sizes, meeting the requirements for RSC 100 or RSC 160; and

i. Pipe manufactured under this specification shall have a minimum Cell Class of 334433C in accordance with ASTM D 3350.

e. Smoothwall polyethylene pipe shall be in accordance with ASTM F 714 for the specified sizes; and

i. Pipe manufactured under this specification shall have a minimum Cell Class of 35434C in accordance with STM D 3350.

f. All polyethylene pipe and fittings shall be made from high molecular weight high density polyethylene material meeting the applicable Cell Class requirements.

g. All polyethylene material used in storm sewer pipe manufacture shall be virgin resin.

2. High Density Polyethylene Pipe Joints.

a. High density polyethylene pipe shall possess male and female pipe ends which allow the construction of overlapping, gasketed pipe joints in conformance with the requirements of AASHTO M294.

b. The gasket material shall conform to all requirements of ASTM F 477.

c. As an alternative, pipe joints utilizing external coupling bands will be accepted, provided the minimum AASHTO requirements for satisfying silt tightness are also achieved.

d. Notice.

i. Manufactured wyes, tees, elbows, or adapters shall not be accepted for use in place of precast storm sewer manholes and box inlets.

ii. Precast manholes and box inlets shall be required within all storm sewer systems composed partially of, or totally of, HDPE storm sewer conduit.

3. Rejection of Damaged HDPE.

a. High density polyethylene pipe possessing the following defects will be rejected for installation:

i. Variations from straight centerline;

ii. Elliptical shape in pipe intended to be round;

iii. Illegible markings as required herein;

iv. Deep or excessive gouges or scratches on the pipe wall;

v. Fractures, punctures, or cracks passing through the pipe wall; or

vi. Damaged or cracked ends where such damage would prevent making a satisfactory joint.

4. HDPE Pipe Markings.

a. For high density polyethylene pipe products, each length of pipe shall be marked clearly with the following information as a minimum:

i. Manufacturer's name or identification symbol;

ii. Nominal pipe size; and

iii. Production/extrusion code.

F. Polyvinyl Chloride Pipe (PVC).

1. Production and Material Standards.

a. Polyvinyl chloride (PVC) profile wall gravity flow storm sewer pipe shall be the integral wall bell and spigot type with elastomeric seal joints and smooth inner walls in accordance with AASHTO M 304.

b. A minimum Cell Class of 12454C or 12364C as set forth by ASTM D 1784 shall be required.

c. Smoothwall PVC pipe shall be in accordance with ASTM D 3034, ASTM F 679, ASTM F 891 or AASHTO M 278 for the specified sizes, and shall have a minimum Cell Class of 12364C for pipes meeting specification ASTM F 679, or 12454C for pipes meeting specification AASHTO M 278.

d. Cell class properties shall be as set forth by ASTM D 1784.

2. PVC Joints.

a. Flexible, gasketed joints shall be compression type so that when assembled, the gasket inside the bell is compressed radially on the pipe spigot to form a soil-tight seal.

b. The assembly of joints shall be in accordance with the pipe manufacturer's recommendations contained in ASTM D 3212 or AASHTO M 304.

c. The gasket shall conform to the requirements of ASTM F 477.

d. All field-cutting of pipe shall be completed in a neat, trim manner using a hand or power saw.

e. Notice.

i. Precast manholes and/or box inlets shall be required within PVC storm sewer systems at all changes in grade, alignment, size, and pipe material type.

ii. Manufactured, wyes, tees, elbows, or adapters shall not be accepted for use in place of manhole or box inlet structures.

3. Rejection of Damaged PVC.

a. Polyvinyl chloride pipe (PVC) possessing the following defects will be rejected for installation:

i. Variation from straight centerline;

ii. Elliptical shape in pipe intended to be round;

iii. Illegible markings as required herein;

iv. Deep or excessive gouges or scratches of the pipe wall;

v. Fractures, punctures, or cracks passing through the pipe wall; or

vi. Damaged or cracked ends where such damage would prevent making a satisfactory joint.

4. PVC Pipe Markings.

a. For polyvinyl chloride (PVC) pipe products, each length of pipe must be marked with the following information as a minimum:

i. Name of manufacturer;

ii. Trade name or trademark;

iii. Nominal pipe size;

iv. Production/extrusion code;

v. Material and cell class designation; and

vi. ASTM designation.

G. Reinforced Concrete Pipe (RCP).

1. Production and Material Standards.

a. Reinforced concrete pipe shall be Class III, IV, or V in accordance with ASTM C 76, latest edition.

b. A minimum “B” wall thickness will be required.

c. Elliptical reinforced concrete pipe shall be a minimum Class HE-II in full conformance with the requirements of ASTM C 507.

i. Notice. Elliptical pipe will be permitted only when severity of flat land grades prohibits installation of round pipe with adequate cover.

d. Longitudinal reinforcement shall be continuous, and all reinforcement shall have a minimum concrete cover of three-quarters of an inch.

e. Upon request by the drainage board, the manufacturer shall furnish certification on the type of cement, aggregate and steel used in the pipe furnished.

f. Lift holes will not be allowed for reinforced concrete pipe less than thirty-six (36) inches in diameter.

g. A maximum of two lift holes may be provided for each section of reinforced concrete pipe thirty-six (36) inches in diameter and larger.

h. Lift holes must be repaired in a clean, workmanlike manner using a conical shaped precast concrete plug, properly sealed into place using mastic or non-shrink cement grout.

i. Compliance with the Indiana Department of Transportation Standards and Specifications for completion of lift hole repair shall be required.

2. Reinforced Concrete Pipe Joints Must Have Rubber Gasket In Groove.

a. Concrete pipe shall be furnished with a bell or groove on one end of a unit of pipe, and a spigot or tongue on the adjacent end of the adjoining pipe.

b. All joints shall be sealed with a rubber gasket.

c. Joints provided with a groove on the spigot for placement of a rubber gasket shall be in conformance with ASTM C 443.

d. Joints provided with a cast-in-bell rubber gasket shall be in conformance with ASTM C 443.

e. The gasket shall be a continuous ring which fits snugly into the annular space between the overlapping surfaces of the assembled pipe joint to form a flexible, soil-tight seal.

3. Rejection of Damaged Reinforced Concrete Pipe.

a. Individual sections of reinforced concrete pipe will be rejected because of any of the following:

i. Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint;

ii. Defects that indicate proportioning, mixing, and molding not in compliance with Section 10.1, of ASTM C 76;

iii. Surface defects indicating honeycombed or open texture;

iv. Damaged or cracked ends where such damage would prevent making a satisfactory joint;

v. Any continuous crack having a surface width of greater than 0.01 in., and extending for a length of twelve (12) in. or more, regardless of position in the wall of the pipe;

vi. Or, visible spacers or longitudinal reinforcement used to position the reinforcing cage shall not be cause for rejection of reinforced concrete pipe sections.

4. Reinforced Concrete Pipe Markings.

a. Each length of reinforced concrete pipe must be marked with the following information as a minimum:

i. Date of manufacture;

ii. Class of pipe and specification designation;

iii. Size of pipe;

iv. Trade name or trademark of the manufacturer; and

v. Plant identification.

H. Reinforced Concrete Box Sections.

1. Production and Material Standards.

a. Precast reinforced concrete box sections for open storm drainage culverts must be manufactured from a homogenous concrete mixture conforming to the test and design requirements of ASTM C 789.

b. Box sections must be cured in such a manner that the specified compressive strength of the concrete is achieved in twenty-eight (28) days or less.

c. Compressive strength tests must be conducted in accordance with Section 10 of ASTM C 789, prior to shipment.

d. Reinforced concrete box sections are divided into three design types, dependent upon varying earth dead load and HS-20 and interstate live loading conditions.

e. Each Type “O” box section must be designated by type, span, rise and design cover.

f. Precast reinforced concrete box sections manufactured in accordance with ASTM G 850 also may be accepted by the drainage board under those minimum cover conditions for which the applicable standard is intended to apply.

2. Reinforced Concrete Box Joints.

a. Precast reinforced concrete box sections shall be produced with male and female ends, designed to allow box sections to be laid together in a continuous line.

b. Reinforced concrete box joints shall be sealed using either trowelable grade butyl rubber or asphaltic mastic to form a soil-tight seal.

c. Reinforced concrete box joints shall be wrapped around their entire outside periphery with a one (1) foot wide non-woven geotextile fabric wrap.

3. Steel Reinforcement of Concrete Box Sections.

a. The minimum cover of concrete over the steel reinforcement shall be one inch.

b. The inside steel reinforcement shall extend into the male portion of the joint.

c. The outside steel reinforcement shall extend into the female portion of the joint.

d. The clear distance of the end reinforcement steel wires must not be less than one-half an inch, nor more than two inches from the end of the box section.

4. Rejection of Damaged Concrete Box Sections.

a. Individual box sections will be rejected due to any of the following:

i. Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint;

ii. Honeycombed or open texture that would adversely affect the function of the box sections; or

iii. The ends of the box sections not being normal to the walls and centerline of the box section, within the specified acceptable tolerances.

5. Reinforced Concrete Box Section Markings.

a. For reinforced concrete box sections, each length of a reinforced concrete box must be marked with the following information as a minimum:

i. Box section span and rise;

ii. ASTM table number;

iii. Maximum and minimum design earth cover;

iv. Specification designation;

v. Date of manufacture;

vi. Name or trademark of manufacturer; and

vii. Orientation of the top of the structure.

(Ord. 12-15-013 § 16, amended, 12/22/2015; Ord. dated 10/31/94 § 1103)

13.04.270 Minimum cover over storm sewer pipe and culverts.

A. All flexible storm sewer pipe and culvert material shall be covered by a minimum two feet of cover unless the applicant submits detailed plans accompanied by manufacturers' recommendations specifying allowable cover less than two feet in depth.

B. All nonflexible storm sewer pipe and culvert material shall be covered by a minimum one and one-half foot of cover unless the applicant submits detailed plans accompanied by manufacturers' recommendations specifying allowable cover less than 1.5 feet in depth.

(Ord. dated 10/31/94 § 1104)

13.04.275 Integrity of the storm sewer system.

The storm sewer system for a project subject to the requirements of this chapter shall be built only of components specifically designed, engineered, manufactured, specified, and supplied to be fitted together to form a first quality storm sewer system.

(Ord. dated 10/31/94 § 1105)

13.04.280 Attachments and references in Section 13.04.505.

There are diagrams, charts, forms, checklists, instructions, and other reference documents attached to this chapter, in Section 13.04.505, which attachments are made a part hereof either coincidental with the

adoption of the ordinance codified in this chapter; or by subsequent action(s) of the county commissioners.

(Ord. dated 10/31/94 § 1106)

13.04.285 Materials and methods other than included herein.
Materials and methods proposed to be used in the storm sewer system for a project subject to the requirements of this chapter, which materials and methods are not described within, specified by, attached to, or referenced in this chapter shall be approved or rejected by the drainage board, and/or the county commissioners on a case-by-case basis after consideration of the applicant's justification for the use of alternative materials and methods.

(Ord. dated 10/31/94 § 1107)

13.04.290 Installation of nonconforming materials shall constitute a misrepresentation.
The installation of any material within the storm sewer system of a project subject to the requirements of this chapter, which installation is found to be not in accordance with this chapter, nor with the approved drainage plan, nor with the approved street construction plan, nor with the attached drawings, instructions, details, and specifications, shall be considered a misrepresentation, and a violation of the conditions of plan approval; and shall be removed and replaced with an installation in conformance with this chapter, the approved drainage plan, and/or the approved street construction plan, at the project owner's expense.

(Ord. dated 10/31/94 § 1108)

13.04.295 Culverts, bridges, pipes, and other structures in, near, or crossing regulated drains.
Any culvert, bridge, structure, pipe, earthwork, pavement, or utility installed within or across a regulated drain, or that land within seventy-five (75) feet either side of a regulated drain in Vanderburgh County shall be subject to prior approval of the Vanderburgh County drainage board and the Vanderburgh County surveyor, per Indiana State Statute.

(Ord. dated 10/31/94 § 1109)

13.04.300 Inspection of storm sewer system installation.
The Vanderburgh County engineer shall inspect, or cause to be inspected, all installations of storm sewer systems in projects subject to the requirements of this chapter; and shall keep a permanent record of the findings thereof, in accordance with the following:

A. Inspections of Work in Progress. The county engineer shall inspect or direct the inspection of all installations of storm sewer materials both within dedicated road rights-of-way, and within designated drainage and/or public utility easements at the same time as such materials are installed; and shall keep a permanent record of the findings of such inspections filed in the county engineer's office.

B. Twenty-Four Hour Advance Notification of Work to be Inspected. In order for county personnel to be scheduled to inspect work in progress, the applicant must notify the county engineer a minimum of twenty-four (24) hours in advance of the proposed storm sewer installation.

C. Penalties for Failure to Notify Twenty-Four Hours in Advance.

1. If work to install storm sewer system proceeds without the required notification, and/or if such work proceeds without an inspector assigned to the site, a violation of this chapter shall exist, and storm sewer systems installed in violation thereof are subject to denial of acceptance for maintenance by the county, and/or denial of repairs paid by funds held by the county.

2. Other remedies may be proposed and/or enforced by the drainage board and/of the commissioners for violation of the required twenty-four (24) hour advance notification.

D. Inspection Report. The record of the inspections conducted by or under the direction of the county engineer shall be in the form of an inspection report which accurately shall describe the workmanship and materials used in the storm sewer system, and shall give an accurate accounting of either compliance or noncompliance with the requirements of this chapter.

E. Inspection Time to be Sufficient. The county engineer shall schedule the inspections of storm sewer installations so that sufficient control of proper workmanship can be maintained and monitored by inspections of no less than a composite total of two hours per project per day. (Ord. dated 10/31/94 § 1110)

F. Deflection Testing Flexible Pipe.

1. All storm sewer constructed of flexible pipe, including pipe manufactured from Polyvinyl Chloride (PVC), High Density Polyethylene (HDPE), and Corrugated Metal Pipe (CMP), shall be inspected or tested for deflection in accordance with the following:

a. Pipes sized thirty-six (36) inches or smaller in diameter, which cannot be inspected and measured for deflection with video cameras, visual inspection, or manual measurement to the satisfaction of the County Engineer to determine less than five percent (5%) deflection, shall be tested using a mandrel.

b. The mandrel shall be pulled by hand without mechanical assistance, and the mandrel test shall be a “go/no-go” procedure.

c. The mandrel shall be approved by the County Engineer or his or her authorized representative prior to use to certify that the mandrel is rigid, nonadjustable, has an odd number of legs not less than nine (9), and has a length not less than its nominal diameter.

d. The diameter of the mandrel at any point shall not be less than the allowed percentage of deflection of the certified actual mean inside diameter of the pipe being tested.

e. The mandrel shall be fabricated of metal, fitted with pulling rings at each end, stamped or engraved on some segment other than a runner with the nominal pipe size and the mandrel's outside diameter.

f. For any vertical or horizontal deflection test, pipe failure shall be defined as five percent (5%) or greater deflection of the tested pipe's internal diameter.

g. The Project Site Owner/Operator shall perform, or shall cause to be performed, all required deflection tests no sooner than thirty (30) days after final backfill has been placed over the pipe to be tested.

h. Pipe inspection and test methods, procedures, and equipment, whether conducted or employed for mandrel testing or other inspections necessary to comply with this section, shall be subject to the County Engineer's approval, and all tests and inspections must be conducted in the presence of the County Engineer or his or her authorized representative.

i. The pipe inspection and test results must be reviewed and certified by the County Engineer or his or her authorized representative prior to final acceptance or release of the storm sewer facilities and applicable portion of the letter of credit covering the storm sewer and associated improvements.

j. All flexible pipe failing the deflection test within the warrantee period shall be replaced or caused to be replaced by the project site owner or operator at no cost to the County.

k. For flexible pipes larger than 36 inches diameter, inspection, measurement, and determination of deflection shall be achieved by methods and procedures approved by the County Engineer.

(13.04.300, Amended, 10/04/2005, Subsection "F" added.)

13.04.305 Open channel design standards.

All open channels in projects subject to the requirements of this chapter, whether private or public, and whether constructed on private or public land, shall conform to the design standards and other design requirements contained herein.

(Ord. dated 10/31/94 § 1200)

13.04.310 Open channel--Manning's equation.

The waterway for channels with uniform flow shall be determined using Manning's Equation:

$$Q = AV = A \frac{1.486}{n} R^{2/3} S^{1/2}$$

A = Waterway area of channel in square feet.

Q = Discharge in cubic feet per seconds (cfs).

V, R, S & n are explained in Section 13.04.215.

(Ord. dated 10/31/94 § 1201)

13.04.315 Channel cross section and grade.

The required channel cross section and grade are determined by the design capacity, the material in which the channel is to be constructed, and the requirements for maintenance.

A. Minimum Channel Depth. A minimum channel depth of one foot is required; however, additional depth may be required to provide adequate outlets for tributary drains.

B. Minimum Bottom Width. A minimum flat bottom width of one foot is required for all open drainage channels.

C. Velocity to Prevent Siltation. The channel grade shall be such that the velocity in the channel is high enough to prevent siltation, but low enough to prevent erosion. In no case shall a channel be constructed with a grade less than three-tenths of one percent unless that is the only physical method of tying the channel to an existing channel or outflow.

D. Minimum Velocity Set. The minimum allowable velocity shall not be less than one and one-half (1.5) feet per second in order to avoid siltation.

E. The construction of French Drains within the bottom of ephemeral channels that do not require concrete liners shall be allowed. Details of the drains shall be shown on typical cross section drawings. The design of the drains shall be for the purpose of drying the channel beds and shall not be utilized to displace any of the flow capabilities of the channel.

F. Low Velocity Channel Liner Required. In cases where minimum required grade and/or velocity requirements cannot be met, the board shall require concrete channel liners, and/or other methods of maintaining channel grade and cross section integrity.

G. Minimum Grade Set for Required Ribbon Liner.

1. All channels constructed within drainage easements of projects subject to the requirements of this chapter, which channels are constructed with grades less than eight-tenths of one percent shall have, as a minimum requirement, flow line grades established with concrete ribbon liners with dimensions as follows:

a. A minimum depth of eight inches; and

b. A minimum width of sixteen (16) inches.

2. The concrete ribbon liner must be finished smooth with no irregularities. The concrete ribbon liners must be constructed on a constant grade as indicated on the approved drainage plans. Concrete ribbon construction that does not meet these requirements will have to be removed and replaced.

A footing trencher may be used to achieve dimensions.

(Ord. 12-15-013 § 17, amended, 12/22/2015; Ord. dated 10/31/94 § 1202)

13.04.320 Maintenance of designed ditch grade and condition.

Open channels in storm water drainage systems subject to the requirements of this chapter shall be constructed in such a way that designed flow line grades and alignments are clearly defined, and so that alterations to the constructed flow line grades and alignments can be detected readily.

A. Control of Designed Condition Required. Channels which are likely to become altered or obstructed after construction due to natural or human acts shall have some method of marking the flow line grades and alignments worked into the design and construction of such channels. Such methods shall include:

1. Ribbon Liners. Ribbon liners as described in Section 13.04.315F;

2. Invert Elevations. Pipe inlet/outlet locations and invert elevations exactly described on the as-built final plans;

3. Other Methods as Designed and Approved. Other methods of marking grades, elevations, and alignments as may be developed by the design engineer and/or the advisors to the drainage board.

(Ord. dated 10/31/94 § 1203)

13.04.325 Period ditch inspections.

The county engineer shall inspect periodically, or cause to be inspected periodically, all channels constructed in projects subject to the requirements of this chapter, to determine their existing condition; and to assure that their as-built condition is maintained.

(Ord. dated 10/31/94 § 1204)

13.04.330 Ditch condition responsibility of property owner.

If the engineer's inspection determines that the grade, alignment, or general integrity of a channel has been altered, obstructed, or adversely affected by actions of a person not authorized by the board to take such actions, the board shall order any obstruction or alteration removed; and the channel restored to its approved, or as-built condition according to plan(s), and at the expense of the property owner of record.

(Ord. dated 10/31/94 § 1205)

13.04.335 Order to remove obstruction or restore condition.
The order to remove an obstruction or alteration, and/or restore the channel to its approved, designed, or as-built condition shall be mailed to the property owner of record at the address to which county property tax statements are mailed.

(Ord. dated 10/31/94 § 1206)

13.04.340 Remedy for improper or untimely repairs.
If work to restore the channel to its approved condition is not started within ten (10) days, and is not completed within thirty (30) days of the mailing of the notice, the board shall contract for the work to be completed, and shall bill the cost to the property owner of record all according to the same guidelines as set out for pipe runs in Section 13.04.110 of this chapter.

(Ord. dated 10/31/94 § 1207)

13.04.345 Waterway stabilization and cover.
The Vanderburgh County soil and water conservation district should be consulted for recommendations on open channel construction and vegetative cover.

(Ord. dated 10/31/94 § 1208)

13.04.350 Grass mix matched to site conditions.
The choice of grass mixture for stabilizing open channels shall be based upon specific site conditions such as shade and sun tolerance, velocity tolerance, and waterway maintenance requirements.

(Ord. dated 10/31/94 § 1209)

13.04.355 Timely channel seeding.
Grass-lined channels should be permanent seeded within two days of finish grading to promote proper seed germination.

(Ord. dated 10/31/94 § 1210)

13.04.360 Erosion control by percentage of grade.
A. The bottoms of seeded, grass-lined channels with grades from one percent to two percent shall have erosion control blankets properly installed.

B. Channels with grades greater than two percent and up to six percent shall have bottoms lined in staked sod.

C. All channels with grades greater than six percent shall have bottoms lined with six-inch riprap.

D. Side banks of grass-lined channels with a grade of two percent or greater shall be protected by erosion control blankets installed coincidental with seeding, and in accordance with manufacturer's recommendations.

(Ord. dated 10/31/94 § 1211)

13.04.365 Low flow troughs in wide bottom channels.
The bottom width of trapezoidal grass-lined channels shall not exceed fifteen (15) feet unless a paved low flow liner is provided to prevent flowline meandering.

(Ord. dated 10/31/94 § 1212)

13.04.370 Trickle troughs in wet bottom channels.
Grass-lined channels intended to convey a continual trickle flow shall be provided with a paved, low flow liner to prevent chronic wetness.

(Ord. dated 10/31/94 § 1213)

13.04.375 Vee-shaped channels.
Vee-shaped channel bottoms shall not be allowed.

(Ord. dated 10/31/94 § 1214)

13.04.380 Concrete channel liners to have under-baffles.
Other than in ribbon-lined channels as in Section 13.04.315F concrete channel liners shall be built as reinforced concrete flumes with cut-off walls at the beginning and end of the liner, poured monolithically with the liner to a depth of eighteen (18) inches below grade; and lugs poured monolithically to a depth of eighteen (18) inches, and spaced at the following intervals:

A. Up to six percent grade use one hundred (100) foot spacing between lugs;

B. Greater than six percent use fifty (50) foot spacing between lugs.

(Ord. dated 10/31/94 § 1215)

13.04.385 Open channel side slopes.
Channels side slopes treatment shall be as follows:

A. Earthen Side Slopes. Earthen side slopes shall be no steeper than three to one (3:1); and flatter side slopes may be required to prevent erosion, and facilitate maintenance.

B. Stone-Lined Side Slopes. Stone-lined side slopes shall be no steeper than two to one (2:1); and flatter side slopes may be required to prevent rock movement, facilitate maintenance, and promote safety.

C. Concrete Side Slopes. Reinforced concrete side slopes shall be no steeper than one and one-half to one (1.5:1); and flatter side slopes may be required to facilitate maintenance, and promote safety.

D. Other Side Slope Cover. The board will consider other methods of channel lining and other side slope ratios on a case-by-case basis; and render decisions based on submitted designs, applicable standards, manufacturer's recommendations, and other pertinent data.

E. Weep Holes in Concrete Side Slopes. All concrete-lined or grouted riprap-lined channels must have provisions made for weep holes.

F. Dead Load Design Required for Some Side Slopes. Side slopes steeper than one and one-half to one (1.5:1) shall be lined with side linings and structural retaining walls designed and constructed with provisions for live and dead load surcharge.

G. Acceptable Materials for Retaining Walls. Retaining walls can be reinforced concrete, concrete or metal bin walls, gabions, reinforced earth, or other approved designs.

(Ord. dated 10/31/94 § 1216)

13.04.390 Channel stability.

All channels constructed under the regulations of this chapter shall be designed and constructed to remain stable during and after the initial construction period; and the applicant shall transfer ownership of the channels only in a stable condition.

A. Characteristics of a stable channel.

1. It neither aggrades nor degrades beyond tolerable limits.

2. The channel banks do not erode to the extent that the channel cross section is changed appreciably.

3. Excessive erosion does not occur around culverts, bridges, or other structures and outlets.

4. Excessive sediment bars do not develop.

5. Gullies do not form or enlarge due to the entry of uncontrolled surface flow into the channel.

B. Determination of Channel Stability. Channel stability shall be determined for an aged condition, and the velocity shall be based on the design flow, or the bank full flow, whichever is greater.

C. Analysis of Channel Stability.

1. Channel stability must be checked for conditions immediately after construction.

2. For this analysis, the velocity shall be calculated for the expected flow from a ten (10) year return period storm in the watershed, or the bank full flow, whichever is smaller.

3. The “n” value for newly constructed open channels shall not exceed 0.025.

D. Accelerated Velocity Allowed for Analysis. The allowable velocity in newly constructed channels may be increased by a maximum of twenty (20) percent reflecting the effects of vegetation to be established, if the following apply:

1. The soil and site are suitable for rapid establishment and support of erosion-controlling vegetation.

2. Species of erosion-controlling vegetation adapted to the area, and proven methods of establishment are incorporated into the plan. (Ord. dated 10/31/94 § 1217)

13.04.395 Channel easements.

A. Channels Centered in Drainage Easements.

1. All channels shall be centered in easements dedicated for the purpose of accessing the drainage facilities to perform required maintenance.

2. Off-centered designs may be approved by the drainage board when a specific need is demonstrated for such an easement layout.

B. Required Easement Widths.

1. Easements for open channels based upon typical sections provided in the drainage plans shall be a minimum width equal to the width of the channel plus:

a. One and one/half (1.5) feet out from the tops of each bank for channels two feet or less (≤ 2’) in depth;

b. Two feet out from the top of each bank for channels with a depth greater than two feet but less than or equal to four feet (≤ 4’) in depth;

c. A distance in feet equal to the depth of the channel out from the top of each bank for channels greater than four feet deep.

2. The widths given above are the bare minimums required for minimal channel maintenance. Additional footage may be required for other utilities. For channels whose banks differ in height, or are constructed where one bank is against a long slope, the height utilized for calculation of the depth of the channel shall be the shallower of the two banks.

C. Utilities Not Allowed Within One Foot of Channel. Except for approved utility installations crossing open drainage channels no trench wall shall be allowed within one foot of the top of bank of any open channel; and no utility appurtenance shall be allowed to protrude greater than two inches above finished dirt grade within one foot of the top of bank of any channel.

D. Grass Cover of Easement Required. The entire area of the channel easement shall be maintained perpetually in an established grass cover, or other approved vegetative cover materials.

E. Fencing and Fixtures Restricted in Easements. Fencing, landscaping appurtenances, other fixtures whether publicly or privately owned, as well as designs for combination easements housing public utilities or private appurtenances together with drainage facilities, shall be allowed by the board on a case-by-case basis when the drainage plan includes adequate provisions for the perpetual maintenance of unobstructed stormwater drainage.

(Ord. 12-15-013 § 18, amended, 12/22/2015; Ord. dated 10/31/94 § 1218)

13.04.400 Structures appurtenant to drainage channels.

The design of channels will provide all structures required for the proper functioning of the channel, and the laterals thereto including:

A. Recessed inlets and structures needed for entry of surface and subsurface flow into channels without erosion or degradation shall be included in the design.

B. Culverts and bridges which are modified or added as part of channel improvement projects shall meet reasonable standards for the type of structure, and shall have a capacity equal to the design discharge, or governing agency's design requirements, whichever is greater.

(Ord. dated 10/31/94 § 1219)

13.04.405 Stormwater detention.

Sections 13.04.410 through 13.04.445 shall govern the design of any facility within a project with respect to the detention of stormwater runoff.

(Ord. dated 10/31/94 § 1300)

13.04.410 Acceptable detention methods.

A. The increased stormwater runoff resulting from a project shall be detained on site by providing wet pond, dry bottom, or storage swale reservoirs; or by storage on flat roofs, lawns or subterranean tanks or infiltration trenches.

B. Measures to retard the rate of overland flow and velocity in channels, also may be used to control the runoff rate.

C. The drainage board will not restrict reasonable dual purpose areas such as green space/detention.

(Ord. 12-15-013 § 19, amended, 12/22/2015; Ord. dated 10/31/94 § 1301)

13.04.415 Design storm.

A. Design of stormwater detention facilities shall be based on a return period of once in twenty-five (25) years.

B. Rainfall depth, duration, frequency, and intensity relationships shall be those developed from data given in Section 13.04.205.

(Ord. dated 10/31/94 § 1302)

13.04.420 Allowable release rate.

A. The allowable post development peak release rate of stormwater from a project during a twenty-five (25) year return period storm shall not exceed the pre-development peak release rate from the same land area during a ten (10) year return period storm.

B. Inadequate Downstream Drainage or Restrictions.

1. If the downstream channel or storm sewer system is not adequate to accommodate the release rate provided above, then the release rate shall be reduced to that rate permitted by the capacity of the receiving channel or storm sewer system; and additional detention shall be required to store that rate of runoff exceeding the capacity of the receiving stormwater drainage facilities (limiting restriction).

2. If more than one basin is involved in the development of the area upstream of the limiting restriction, the allowable release rate from any one basin shall be in direct proportion to the ratio of its drainage area to the drainage area of the entire watershed upstream of the restriction0.

C. As development continues within Impacted Areas as defined in Section 13.04.015 the Board on a project by project basis may decrease the allowable post development controlled peak release rate of stormwater to not exceed a five (5) or two (2) year return period storm from the same land area prior to its development for those areas that lie within those impacted areas.

(Ord. 12-15-013 § 20, amended, 12/22/2015; Ord. dated 10/31/94 § 1303)

13.04.425 Upstream flow through drainage system.

The upstream storm drainage flow through the storm water drainage system constructed for a project subject to this chapter shall be designed in accordance with the following:

A. For Watersheds One Square Mile or Less. Drainage systems serving a project shall have adequate capacity to convey the stormwater runoff from tributary areas totalling one square mile or less through the project under consideration, and within drainage easements, for a twenty-five (25) year return period storm calculated on the basis of upstream land in its existing condition.

B. Watersheds Larger Than One Square Mile. Drainage systems shall have adequate capacity to convey the stormwater runoff from all tributary areas totalling greater than one square mile through the project under consideration, and within drainage easements, for a fifty (50) year return period storm calculated on the basis of upstream land in its present state of development.

C. Allowance for Existing Upstream Detention. An allowance, equivalent to the reduction in flow rate provided, shall be made for upstream detention when such upstream detention and release rate previously have been approved by the board; and evidence of the detention facility's as-built construction, or existing condition, can be shown certified to the drainage board.

(Ord. dated 10/31/94 § 1304)

13.04.430 Determination of storage volume--Rational method.

For watersheds of fifty (50) acres or less, the rational method may be used to determine the required volume of stormwater storage. While other approved methods may be used, the following eleven step procedure may be used to determine the required volume of storage:

Steps Procedure

1. Determine total drainage area in acres - "A."

2. Determine composite runoff coefficient based on existing land use (undeveloped) - "Cu."

3. Utilizing methodology in US Department of Agriculture, Natural Resources Conservation Service TR-55 determine the Time of Concentration t_c in minutes based on existing conditions. Form 830 which shall be used to determine Time of Concentration, and is provided in Section 505 to be submitted showing the calculations for "t_c". Where the methodology utilizing TR-55 does not match existing conditions or for small watersheds other methods referenced in the current edition of the Indiana LTAP Stormwater Drainage Manual such as Federal Aviation Administration, Kinematic Wave (Ragan), Kirby or Izzard may be used provided that the initial assumptions for these methods are met.

4. Determine rainfall intensity in inches per hour based on time of concentration and using data given in Table 13.04.205-C for the ten (10) year return period – "i_u"

5. Compute runoff based on existing land use, and the ten (10) year return period: $Q_u = C_u\ i_u\ A_u$.

6. Determine composite runoff coefficient based on the developed conditions and a twenty-five (25) year return period - "C_D."

7. Determine the twenty-five (25) year return period rainfall intensity "i_d" for various storm durations "t_d" for the developed area using Table 13.04.205-C.

8. Determine the developed inflow rates "Q_D" for various storm durations "t_d" measured in hours: $Q_D = C_D\ i_d\ A_D$.

9. Compute a storage rate, "SR" for various storm durations, "t_d" of the developed area: $SR = Q_D - Q_u$.

10. Compute required storage volume "$S(t_d)$" in cubic feet for each storm duration, "t_d": $S(t_d) = (t_d / 12)\ (Q_D - Q_u)$

11. Select the largest storage volume "$S(t_d)$" computed in step 10 for detention basin design.

(Ord. 12-15-013 § 21, amended, 12/22/2015; Ord. dated 10/31/94 § 1305)

13.04.435 Determination of storage volume--Other methods.

A. Methods other than the rational method for determining runoff and routing of stormwater may be used to determine the storage volume required to control stormwater runoff when such models and methods are approved by the board.

B. The use of the models and procedures subject to approval, can be defined in a seven step procedure to determine the required storage volume of the detention basin.

Steps Procedure

1. Calibrate the hydrologic/hydraulic model that is to be used for prediction of runoff and routing of stormwater.

2. For each storm duration listed in Table 13.04.205-C perform steps 3 through 6.

3. Determine the ten (10) year undeveloped peak flow. Denote this flow by Q10u.

4. Determine the twenty-five (25) year runoff hydrographic (H25d) for developed conditions.

5. Determine the hydrographic that must be stored (H25s) by subtracting a flow up to Q10u from the hydrographic (H25d) found in step 4.

6. Determine the volume of water (Vs) to be stored by calculating the area under the hydrographic H25s.

7. The detention basin must be designed to store the largest volume (Vs) found for any storm duration analyzed in step 6.

(Ord. dated 10/31/94 § 1306)

13.04.440 General detention/retention basin design requirements.

The following design principles shall be observed for detention and retention basins:

A. Duration of Storage. The maximum volume of water stored and subsequently released at the design release rate shall not result in a storage duration in excess of forty-eight (48) hours, unless additional storms occur within the period.

B. Depth of Stored Water. The maximum depth of stormwater to be stored, without a permanent pool shall not exceed four feet; and the maximum depth of stormwater to be stored above a permanent pool shall not exceed four feet.

C. Finished Floor Elevations Adjacent to Basins. The lowest floor of any building or structure occupied by humans must be at least two (2) feet above the one-hundred (100) year storm water elevation of detention/retention basins.

D. Earthen Side Slopes 4:1 Maximum Steepness for Basins. All detention and retention basins with grassed, earthen side slopes shall have side slopes no steeper than four horizontal units of measurement to one vertical unit of measurement (4:1) to the base of dry basins, and to the typical low waterline of wet basins.

E. Riprap Side Slopes 2:1 Maximum Steepness for Basins. Wet retention basins with riprap armored side slopes shall have slopes no steeper than two horizontal units of measurements to one vertical unit of measurement (2:1) at any point in the side slope.

F. Riprap to Extend Two Vertical Feet Below Waterline. The armored portion of the side slope must extend to a minimum depth below the permanent pool elevation of two vertical feet.

G. Underwater Earthen Side Slopes 2:1 Maximum Steepness. Nonarmored earthen side slopes shall have slopes no steeper than two horizontal units of measurement to one vertical unit of measurements from a point two vertical feet below permanent pool, thence downward.

H. Minimum Depth of Riprap Application. Riprap side slope armor shall be a minimum twelve (12) inches in depth at all points of application.

I. Drain Recommended for Maintenance of Wet Basins. If possible, a drain should be installed to lower the pool of wet basins to a level sufficient to repair any wave action erosion along the waterline, and to perform other periodic maintenance.

J. Safety Ledges and/or Fencing of Wet Basins. Safety fencing surrounding the basin, and/or shallow safety ledges shall be provided if deemed necessary by the design engineer or the board.

K. Outlet Controls to Operate Automatically. Outlet control structures shall be designed to operate as simply as possible, and shall require little or no maintenance for proper operation.

L. Designed Water Level Control Required. A controlled positive outlet shall be required to maintain the designed water level in wet basins, and provide the required detention storage above the designed low

water level. Wet basins shall have a minimum depth of 6 feet over 50% of the basin area and no extensive shallow areas shall be allowed except as required for the safety ledge.

M. Emergency Spillway Requirements.

1. An emergency overflow spillway shall be provided for the release of storm runoffs exceeding the designed maximum detention volume, or all overflow volumes in emergency conditions, should the normal discharge devices become totally or partially inoperative.

2. A minimum freeboard of one-half foot above the calculated elevation of the design storm detention high water level to the elevation of the spillway flowline peak is required as a safety factor for all basins.

3. The emergency overflow spillway shall be clearly marked with a defined weir, either grass, rip rap or paved. The emergency overflow spillway velocities shall be calculated and the necessary erosion control materials shall be specified and utilized in the construction of the overflow spillway and receiving stream. Energy dissipation measures must be employed where required.

N. Automatically Operating Emergency Spillway Required. The emergency overflow spillway shall be designed so that it operates openly, automatically, does not require manual attention, and will pass all the one hundred (100) year return period storm flow with a one-half foot vertical minimum above the one hundred (100) year return storm flow to the lowest dirt elevation in the surrounding earthwork.

O. All Permanent Pools Require Water Quality Provisions. Designers of basins with permanent pools shall consult available manuals from the soil and water conservation district, and incorporate provisions therefrom for maintaining water quality, safety, and soil stability.

P. Dry Basin Cover and Maintenance. Dry basins shall be planted and maintained in vegetative cover equal to that of residential lawns.

Q. Side Slopes to Remain Stable. All side slopes of a basin shall be constructed stable and shall be maintained in a stable condition by the same criteria as specified herein for open channels.

R. Wet Basin Cover and Maintenance. The earthen side slopes of wet basins shall be provided with grass cover above the low water elevation, which shall be maintained equal to turfed residential lawns, and in no case shall the cover growth exceed twelve (12) inches in height, or the most current county standard.

S. Maintenance Pathway for Basins. A flat pathway with a minimum width of ten (10) feet shall be constructed completely around the top of the embankment of all detention/retention basins.

T. Maintenance Easement for Basins. An easement dedicated for the purpose of accessing and maintaining the basin and its appurtenances shall be provided, and the easement shall be configured so

that it includes the entire basin, the entire earthwork encompassing the basin, the maintenance pathways into and around the basin, and all inletting and outletting appurtenances of the basin. The basins and maintenance easements shall not be located with the right of way of any county, state or federal road or highway.

U. Maintenance Report Required for Basin.

1. A brief and concise report shall be prepared, by the design engineer, consisting of a description of the location, intended function of all parts appurtenant to the basin, together with a description of the ways in which the basin and its appurtenances should be maintained, all worded in language easily understood by residential or commercial property owners; and

2. The report shall be attached to the restrictions for the property on which the basin and its parts are located.

3. Such restrictions shall be shown to exist prior to the board's final approval of the drainage plan for a project whose plans include a basin.

V. Copy of Report Must be Submitted With the As-Builts or Record Drawings. A copy of the maintenance report described above shall be included with the as-built plans or Record Drawings required to be submitted hereinabove.

W. Elevation of Dry Basin Bottom Marked. A continuous concrete liner at least equal in characteristics to that described in Section 13.04.315F shall be installed in all dry basins from the point of inflow of each channel entering a basin to the point of outflow from the basin. The concrete liner shall be installed at an elevation slightly lower than the earthen floor of the basin, so that it may serve as a trickle trough or low flow liner.

X. No tree limbs, trunks, refuse from legally burnt vegetation, nor construction waste, demolition materials, or other man made material may be buried within the area in which an impounding structure will be located. Notice shall be placed on construction drawings noting the prohibition to the burying of any such materials. Certain natural materials such as large rocks may be located in the bottom of wet basins in order to provide fish habitat or habitat breeding areas provided that such materials are not included within the calculations for required storage volumes and will not block outlet structures.

Y. For small sites of less than 5 acres, infiltration trenches may be utilized instead of a wet or dry basin. In utilizing an infiltration trench, the storage volume is equal to the void ratio multiplied by the total volume of the trench. Information must be provided in advance validating the void ratio as well as testing proposal to validate the void ratio. The infiltration trench must have an outlet that restricts the flow per code provisions.

Z. No retention basin shall be allowed within the flowline of a Regulated Drain of Vanderburgh County. The Drainage Board cannot use its rights to discretionary decisions granted under Section 13.04.025 to exempt this restriction.

(Ord. 12-15-013 § 22, amended, 12/22/2015; Ord. dated 10/31/94 § 1307)

13.04.445 Rooftop stormwater storage.

A. Detention storage requirements may be met in total or in part by detention on flat rooftops.

B. Details of such designs are to be included in the building permit application, and shall include the depth and volume of storage, details of outlet devices and down drains, and elevations of emergency overflow provisions.

(Ord. dated 10/31/94 § 1308

13.04.450 Parking lot stormwater storage.

Parking lots utilizing surface storage may not be designed to provide temporary detention of stormwaters on all or a portion of their surfaces unless preapproved by the Drainage Board. Approval shall only be granted if the applicant can show that other methods of temporary storage are not physically feasible. In no case can curbing be utilized to retain any of the designed portion of the proposed storm water storage.

A. Maximum Depth in Parking Lots. Depths of storage should be limited to a maximum depth of six inches to prevent damage to parked vehicles.

B. Storage Areas in Parking Lots to be Striped. A pattern for painting the parking area designated for stormwater detention shall be employed to alert vehicle owners to the possibility of stored water in the event of storms.

C. Storage in Parking Lots Exceeding Six Inches Depth. A separate pattern for painting the lot shall be developed for all areas where the detained volume of water will exceed six inches in depth; and such a pattern shall be highly visible, and easily recognizable as a warning.

D. For all areas in Parking Lots which are to be utilized for stormwater detention, in addition to patterns of painting a warning statement must be painted at a minimum interval of once in every 10 spaces stating “Warning-temporary stormwater detention area”. For lit parking areas, in lieu of painting, warning statement signs may be placed on all light structures within and immediately adjacent to the detention area with the required warning.

E. Confining Storage in Parking Lots. In general, ponding should be confined to those portions of the parking lot farthest from the area served, or parts of the lot likely to be used the least.

(Ord. 12-15-013 § 23, amended, 12/22/2015; Ord. dated 10/31/94 § 1309)

13.04.455 Financial responsibility for facility construction.

The cost of constructing stormwater drainage systems in accordance with the requirements of this chapter shall be accepted in total by the landowner and/or land developer as part of the cost of land development.

(Ord. dated 10/31/94 § 1400)

13.04.460 Responsibility for drainage facility maintenance.

The installation, maintenance, repair, and replacement of all stormwater drainage facilities, and erosion and siltation control measures for a project during the period of construction, and until final approval by the county engineer, shall be the responsibility of the land developer(s), and/or the property owner(s) of record.

The assignment of responsibility for the maintenance and repair of all stormwater drainage systems and facilities outside of county accepted road rights-of-way after the completion of the project, and final approval thereof by the county engineer, shall be determined before the final drainage plan is approved; and shall be documented by appropriate covenants and restrictions applied to the subdivision and to the property deeds thereof, and shall be printed clearly upon all recorded plats of the project.

A. For Projects Other Than Single-Family Residential Subdivisions. The maintenance and repair of all stormwater drainage facilities outside of county accepted rights-of-way after completion of a project other than single-family residential subdivisions, as defined in the Vanderburgh County subdivision control ordinance, Title 16 of this code, shall be the sole responsibility of the property owner(s) of record.

B. For All Single-Family Residential Subdivisions. For all single-family residential subdivisions, as defined by the Vanderburgh County Subdivision Control Ordinance, Title 16 of the Code, the maintenance and repair responsibility, after completion of a project, for all storm drainage facilities and systems outside of the County accepted road rights-of-way shall be determined by one of the following two methods:

Plan “A”: Lot owners’ association;

Plan “B”: Repair fund held by County.

1. Plan A: Lot Owners’ Association.

    a. The land owner(s)/land developer(s) shall create a lot owners’ association which, after construction and final approval of the storm sewer system, shall be solely responsible for all of the maintenance and repair of the stormwater drainage system and facilities outside of county accepted road rights-of-way, and within a subdivision’s boundaries, together with any off-site facilities housed within easements required for the project.

    b. The maintenance and repair required of the lot owners’ association shall include all measures needed to keep all parts of the stormwater drainage system and facilities outside

of county accepted road rights-of-way in working order according to the original provisions of the plan, the requirements of this chapter, including the engineer's report and the as-built plans required hereinabove, and the requirements of pertinent codes, statutes and ordinances.

c. Printed clearly upon the plat for a subdivision with a lot owners' association and incorporated into all covenants, restrictions, and contracts for any, all, or a part of the lands within the subdivision shall appear a notification exactly stating that:

"The Lot Owners' Association shall be responsible, including financially, for the maintenance and repair of the entire stormwater drainage system, its parts, and easements within or attached to this subdivision and outside of County accepted road rights-of-way including:

(1) "Mowing grass, controlling weeds, and maintaining the designed cover of the waterways, storage basins, and easements in accordance with applicable ordinances.

(2) "Keeping all parts of the stormwater drainage system operating at all times as designed and as constructed; and free of all trash, debris, and obstructions to the flow of water.

(3) "Keeping the channels, embankments, shorelines, and bottoms of waterways and basins free of all erosion and sedimentation.

(4) "Maintaining and repairing the stormwater drainage system in accordance with the conditions described on the approved street and/or drainage plans on file in the County Surveyor's Office, and/or the County Engineer's Office; and in compliance with the County Drainage Ordinance.

(5) "Preventing all persons or parties from causing any unauthorized alterations, obstructions, or detrimental actions from occurring to any part of the stormwater drainage system and easements within or attached to this subdivision.

(6) "NOTICE: Any pipe, fence, wall, building, pool, patio, planting, stored material, excavation, fill, or other construction, improvement, addition to, or alteration of the land within a drainage easement in this subdivision requires the prior written approval of the County Drainage Board.

(7) "In the event that the lot owner(s) association cease to exist, the responsibility for maintenance and repair of the stormwater drainage system and facilities outside of County accepted road rights-of-way, and within a subdivision's boundaries, together with any off-site facilities housed within easements acquired for the project drainage system shall become the responsibility of the individual lot owner on whose property those facilities lie

“The primary spillway or outlet pipe of the detention/retention basin located on lot(s)_____ is located on lot(s) ____ and in the event that the lot owner(s) association ceases to exist it shall be the sole responsibility of the owner of lot(s) _____ to maintain the primary spillway and/or outlet pipe to the design specifications of the approved Drainage Plan for this subdivision.

“The emergency spillway of the detention/retention basin located on lot(s) ____ is located on lot(s) ____ and in the event that the lot owner(s) association ceases to exist it shall be the sole responsibility of the owner of lot(s) _____ to maintain the emergency spillway to the design specifications of the approved Drainage Plan for this subdivision.”

2. Plan B: Repair Fund: Payment Per Lineal Foot.

a. As an alternative to Plan A, the land owner(s) and/or land developer(s) shall present to the county commissioners, at the same time and along with the submission of the street and drainage plans, a cashiers check or a certified check in an amount equal to the two dollars per lineal foot of storm sewer pipe located outside of dedicated road rights-of-way as shown on the plans for the subdivision.

b. The check shall be attached to a prescribed submittal form available from the county auditor or the county engineer, which form shall provide specific data with regard to the subdivision for which the check is presented.

c. Printed clearly on the plat for a subdivision using Plan “B” method of maintenance shall be a notification stating that:

“The individual lot owner(s) shall be responsible, including financially, for maintaining that part of the stormwater drainage system and its easements which exists on his or her property in proper working order including:

(1) “Mowing grass, controlling weeds, and maintaining the designed cover of the waterways, storage basins, and easements in accordance with applicable ordinances.

(2) “Keeping all parts of the storm water drainage system operating as designed and constructed; and free of all trash, debris, and obstructions to the flow of water.

(3) “Keeping the channels, embankments, shorelines, and bottoms of waterways and basins free of all erosion and sedimentation.

(4) “Maintaining that part of the stormwater drainage system which lies on his or her property in accordance with the conditions described on the approved street and/or drainage plans on file in the County Surveyor’s Office, and/or in the County Engineer’s Office, and in compliance with the County Drainage Ordinance.

(5) “Preventing all persons or parties from causing any unauthorized alterations, obstructions, or detrimental actions from occurring to any part of the stormwater drainage system and easement which lies on his or her property.

(6) “The Repair Fund established for this Project will pay the costs of repairing structural failures in the storm sewer pipes, pipe collars, drop boxes, aprons, inlets, manholes, junction boxes, and the piped or paved outlet structures of the stormwater control basins all of which are parts of the approved and constructed stormwater drainage system shown on the as-built plans for this Subdivision; and which are in permanent drainage easements and outside of the county accepted road rights-of-way as shown on the plat of this subdivision.

(7) “NOTICE: Any pipe, fence, wall, building, pool, patio, planting, stored material, excavation, fill, or other construction, improvement, addition to, or alteration of the land within a drainage easement in this subdivision requires the prior written approval of the County Drainage Board.”

d. Plan “B” will not be allowed in residential developments with privately maintained streets. Plan “A” must be utilized if the streets within a residential development will be privately maintained.

e. Pipes to be accepted for county maintenance through Plan “B” must be located within permanent easements located within the boundaries of the platted subdivision. The County will not accept pipes located in temporary easements.

3. The Inclusion of All Notices Upon the Plat and in the Covenants is the Responsibility of the Developer(s).

a. The inclusion of all notices required to be printed upon the recorded plats and within the covenants and restrictions for the subdivision, some of which notices are printed in this section, shall be the total responsibility of the applicant and/or the developer of the subdivision.

b. Exclusion of such notices as are required upon the recorded plats and/or within the covenants and restrictions for the subdivision may result in the recording of amended plats and covenants at the expense of the applicant and/or the developer.

c. The responsibility, if it exists, for notifying home builders, home buyers, lot owners, and others of the maintenance and repair responsibilities enumerated in the various notices and sections within this chapter shall be the responsibility of the applicant/developer and his or her sales agents and assigns.

C. Ownership of Real Estate and Improvements Within Drainage Easements. Regardless of whether the owner/developer chooses Plan “A” or Plan “B”, the real property and improvements thereon, laying

outside the county accepted road rights-of-way and within the drainage easements shall be deeded with and remain part of the property of the underlying lots, parcels, and/or holdings.

D. County Held Repair Funds. Two storm sewer repair accounts shall be created and maintained by the Vanderburgh County auditor as follows:

1. The Plan “B” Repair Account. The county auditor shall create an account into which the county treasurer shall deposit all of the prepaid maintenance moneys received from the owner(s) and the developer(s) of subdivisions which use the Plan “B” method of maintenance subsequent to the adoption of the ordinance codified in this chapter, along with all moneys collected through fines and liens from properties within subdivisions using Plan “B” and as described in this section; together with all funds previously collected under the terms of Section 16.12.080 of this code.

2. The General Storm Drainage Account. The county auditor shall create another account into which the county treasurer shall deposit all moneys received from fines, tax liens, interest payments, and penalties generated by violations of the terms of this chapter from projects not using Plan “B,” as described in Section 13.04.110 and this section.

3. Disbursement of Funds From Repair Accounts. The county auditor shall sign a warrant for payment of a claim for materials and/or labor used to repair structural failures of storm sewers, or to bring a project or a part thereof into compliance with the terms of this chapter all as described in Section 13.04.110 and in this section of this chapter; but only if the criteria are met:

a. The repair is a structural repair of storm sewer pipes, manholes, inlets, controlled release outlets, or other structures as described above in paragraph six of the plat notice for subdivisions using Plan “B” (see subsection (B)(2) of this section), all of which must be outside of county accepted rights-of-way and within designated drainage easements shown on the subdivision plat; or if the work is a contractual service in accordance with such as is described in Section 13.04.110 of this chapter; and if

b. The county engineer has determined and reported the determination to the drainage board and/or the county commissioners that the repair is needed to bring the storm sewer system or a part thereof into compliance with the requirements of this chapter, or to return the storm sewer system or a part thereof to its proper operating condition; and if

c. Bids have been sought, received, and a contract has been let and completed to accomplish the repairs detailed in the engineer’s report; and the repair specifications, cost estimates, and bidding procedures are in compliance with the applicable statutory requirements; and if

d. There exists sufficient funds within the appropriate account to pay the total estimated costs of the work; and only if

e. The subdivision or project is a subdivision or project from which funds have been collected according to the terms and requirements of this chapter.

4. Disbursements Shall Be From the Appropriate Account. All disbursements of funds for work in subdivisions operating under Plan “B” method of maintenance as described above shall be from the Plan “B” repair account; and all disbursements of funds for work in projects not operating under Plan “B” method of maintenance shall be from the general storm drainage account.

E. Acceptance Inspections. The entire storm sewer system, including the basins, for all projects subject to the terms of this chapter shall be inspected, after construction, by the following procedures:

1. Approval Inspection.

a. The installation of the street and stormwater drainage system, including basins and off-site facilities, shall be subject to the written approval of the county engineer.

b. The engineer’s approval inspection shall be by the following schedule:

i. The owner(s)/developer(s) shall give written notice to the county engineer that the stormwater drainage system for the project is completed.

ii. The engineer shall inspect, or cause to be inspected, the street and stormwater drainage system, including the basins; and shall issue, within twenty-one (21) days of the receipt of the owner’s/developer’s written notice, either a written approval of the facilities, or a notice listing any inadequacies in the system.

iii. Upon correction of inadequacies, if any, written notice of completion again shall be given to the engineer by the owner(s)/developer(s).

iv. The owner(s)/developer(s) shall maintain and guarantee the entire storm sewer system, including the basin(s), for a period of one year beginning on the date of the county engineer’s written approval of the system.

2. Periodic Inspections of Storm Sewer Systems and Basins.

a. Stormwater drainage systems and parts thereof constructed under the provisions of this chapter will be inspected by the county engineer or his/her agent on a periodic, or “as needed” basis.

b. A permanent record of all inspections shall be kept in the office of the county engineer.

c. The purpose of such periodic inspections shall be to determine compliance or noncompliance with the requirements of this chapter and compliance with the conditions of plan approval.

d. If required by the drainage board or the county commissioners, a certified inspection report covering physical conditions, operational conditions, compliance with ordinance requirements, and other pertinent data will be filed with the drainage board and made available for viewing by the public.

3. Correction of Deficiencies. If the county engineer discovers deficiencies within a stormwater drainage system constructed under the provisions of this chapter, the engineer shall file a report of such deficiencies with the drainage board, and the county commissioners, which boards shall take actions in accordance with provisions of this chapter to remedy such deficiencies.

(Ord. 12-15-013 § 24, amended, 12/22/2015; Ord. dated 10/31/94 § 1500)

13.04.465 Joint development of control systems.

Stormwater drainage systems may be planned and constructed jointly by two or more developers as long as compliance with this chapter is maintained.

(Ord. dated 10/31/94 § 1600)

13.04.470 Installation of control systems.

A. Stormwater drainage systems, and erosion and sedimentation control systems shall be installed in accordance with a schedule of construction activities submitted to the drainage board at the same time as, and attached to the final drainage plan.

B. Unless otherwise approved, the sequence of construction activities shall conform with the following:

1. Notify Underground Utilities. Notifying the Indiana Underground Plant Protection Systems, Inc., at 1-800-382-5544 for location and identification of utilities potentially affected by the proposed project;

2. Locate and Protect Certain Features. Identify, evaluate and clearly mark trees and associated root zones to be protected during construction; septic absorption fields where applicable; unique areas to be preserved such as wetlands; and existing vegetation suitable for use as filter strips, particularly in perimeter areas of the site;

3. Erosion and Sedimentation Control. Install perimeter erosion and sediment control measures such as flow diversions, sediment basins and traps, fabric fencing and straw bale dams, and construction access drives and parking areas, as shown on the erosion and sediment control plan;

4. Install Downstream Storage Facilities and Outfalls. Complete improvements to downstream stormwater outfalls, and install detention and/or retention facilities as shown on the approved drainage plan;

5. Install Storm Drainage Systems. Detention and/or retention facilities designed to become a permanent part of the stormwater drainage system shall be installed with an additional ten (10) percent capacity to allow for sediment accumulation resulting from development, and to permit the pond to function for reasonable periods between cleanings;

6. Stabilize Channels and Side Banks. Install stream and basin side bank stabilization measures including stream crossings, and other measures required by the erosion control plan;

7. Clearing, Grubbing, Grading, Et Cetera. Initiate on-site land development activities including site clearing, grubbing, filling, and grading activities, and installation of the main runoff conveyance systems;

8. Long Term Erosion Control Measures

a. Installation of the required erosion control measures such as temporary seeding, and permanent seeding in accordance with the Storm Water Pollution Prevention Plan for the project site.

b. All areas to be left undisturbed for more than fifteen (15) days shall be temporarily seeded;

9. Inlet Protection. Install storm drain inlet protection measures such as straw bale dams, silt fences, filter fabric wraps, and/or slotted barrel risers;

10. Road Construction. Initiate permanent road and building construction;

11. Final Grading. Complete final grading and permanent seeding.

(Ord. 12-15-013 § 25, amended, 12/22/2015; Ord. dated 10/31/94 § 1700)

13.04.475 Certified “as-built” plans or “Record Drawings.”

A. After completion of the project, and before final approval and/or acceptance can be made, two professionally prepared and certified sets of “as-built” plans or “Record Drawings” shall be submitted to the county surveyor, and to the county engineer for review. The “as-built” plans shall also be submitted electronically in pdf format which does not allow edits. In the case where the Drainage Plan is constructed essentially as designed or with only minor variations within acceptable Engineering Practice a Certification Statement may be submitted on the approved County Certification Form 803.

B. These “as-built” plans shall include all pertinent data relevant to the completed stormwater drainage system and shall include:

1. Pipe size, length and material;

2. All rim and invert elevations of all drainage structures;

3. Spot elevations on all drainage swales and ditches. Elevations shall be provided on the flow line at 100 foot intervals, or at each property line (whichever is less). Upon request of the County Engineer or County Surveyor, the top of bank shall also be shown on the as built plans.

4. Correctly located limits and alignment of all streets, walks, drainage facilities, erosion and sedimentation control facilities intended to remain in place, and all other pertinent improvements in correlation to platted easements and rights-of-way;

5. Data and calculations showing all basin storage volumes and storage elevations “as-built” with a statement that the volumes contained within any retention or detention facility meet or exceed the required design storage volumes;

6. An engineer certified statement on the “as-built” or “Record Drawings” plans that the completed stormwater drainage system complies with the final drainage plan approved by the board; or clearly depicting, describing, and explaining deviations from the approved final drainage plan.

C. County Surveyor to Store “As-Builts” or “Record Drawings” With Drainage Plan. The county surveyor shall store one copy of the “as-built” plans with the approved drainage plan.

D. County Engineer to Store “As-Builts” or “Record Drawings” With Street Plans. The county engineer shall store one copy of the “as-built” or “Record Drawings” plans with the approved street plans.

(Ord. 12-15-013 § 26, amended, 12/22/2015; Ord. dated 10/31/94 § 1800)

13.04.480 Changes in plan.

A. Modifications During Project Construction.

1. Any major modification of the final plan approved by the drainage board shall be filed with the drainage board prior to implementation of such major modification.

2. If the modification is approved by the board, it shall be attached to the final drainage plan.

3. The provisions of this subsection shall apply only to work in progress during the construction stages of the project.

B. Modifications After Project Completion.

1. Changes to any part of the entire stormwater drainage system after completion of the project shall require new approval of a drainage plan by the board.

2. Changes approved and implemented after submission of the required “as-built” plans shall be attached to the “as-built” plans.

(Ord. dated 10/31/94 § 1900)

13.04.485 Determination of impacted drainage areas.

A. The board is authorized, but not required, to classify certain geographical areas as “impacted drainage areas,” and to enact and promulgate regulations which generally are applied at the discretion of the board.

B. In determining impacted drainage areas, the board shall consider such factors as topography, soil type, proximity to a regulated drain, capacity, and condition of existing regulated drains; and distance from, or capacities of available adequate drainage facilities.

C. An impacted drainage area may be so designated by resolution of the board, and special requirements for development within any impacted drainage area shall be included in such a resolution of the board.

D. A resolution of the board designating an impacted drainage area shall be attached to the ordinance codified in this chapter, and become a part thereof.

(Ord. dated 10/31/94 § 2000)

13.04.490 Other requirements.

A. Sump Pumps.

1. A sump pump shall be used only for one function; either the discharge of stormwater, or the discharge of sanitary sewage.

2. Sump pumps installed to receive and discharge groundwater, or other stormwater, shall be connected to the subsurface stormwater drainage system where possible, and by a method and with fittings specifically designed and manufactured for the applied use.

3. Sump pumps installed to receive and discharge floor drain flow or other sanitary sewage shall be connected to the sanitary sewer system.

B. Down Spouts.

1. All down spouts or roof drain water shall be discharged by means that will not undermine street slabs, or otherwise damage street or stormwater drainage systems, neighboring property, adjacent structures, or downstream public or private property.

2. All connections into the storm sewer system, or through the street curbing shall be made using fittings specifically manufactured for the applied use.

C. Footing Drains.

1. Footing drains shall be connected to the stormwater drainage system sewers where possible.

2. Footing drains shall be installed to discharge without damaging street systems, stormwater drainage systems, neighboring or downstream property, or adjacent structures.

3. No footing drains or storm drainage tile shall be connected to the sanitary sewers.

D. Basement Floor Drains. All basement floor drains shall be connected to sanitary sewers.

(Ord. dated 10/31/94 § 2100)

13.04.495 Disclaimer of liability.

A. The degree of protection required by this chapter is considered reasonable for regulatory purposes, and is based on historical records, and engineering and scientific methods of study.

B. Larger storms may occur, or stormwater runoff depths may be increased by man-made or natural causes.

C. This chapter does not imply that the land uses permitted will be free from stormwater damage.

D. This chapter shall not create liability on the part of Vanderburgh County, Indiana, or any officer or employee thereof for any damage which may result from reliance on this chapter, or on any administrative decision lawfully made thereunder.

(Ord. dated 10/31/94 § 2200)

13.04.500 Corrective action.

A. Nothing herein contained shall prevent Vanderburgh County, Indiana, from taking such other lawful action as may be necessary to prevent or remedy any violation.

B. All costs connected therewith shall accrue to the person or persons responsible.

(Ord. dated 10/31/94 § 2300)

13.04.505 Attachments and reference material.

A. This section includes certain charts, diagrams, drawings, forms, specifications, instructions, and other special data attached to or referred to in or by this chapter.

B. The drawings, charts, forms, and other documents contained in this section are made a part of this chapter either by adoption concurrent with the enactment thereof, or by subsequent action(s) of the Board of County Commissioners of Vanderburgh County, Indiana.

1. Applicant Information Form 801

2. Engineer's Certification Form 803

3. Time of Concentration Tc Form 830

(Ord. 12-15-013 § 27, amended, 12/22/2015; Ord. dated 10/31/94 § 3000)

Editor's Note: Because of the size and/or complexity of the graphics set out in this section, they have been removed from this electronic database. These graphics can be found in the printed code currently on file in the clerk's office.