

**NOBLE COUNTY
STORM DRAINAGE
&
EROSION CONTROL
ORDINANCE**



February 2007 Edition

BRIEF TABLE OF CONTENTS

<i>Part</i>	<i>Title</i>	<i>Page Number</i>
I	STORM DRAINAGE ORDINANCE	1
II	ORDINANCE FOR EROSION CONTROL ON SITES WITH LAND DISTURBING ACTIVITIES	55
III	ORDINANCE FEE STRUCTURE	63
IV	ENFORCEMENT STRUCTURE OF ORDINANCE	68
V	PROJECT TERMINATION	71
VI	APPEALS PROCESS	72
APPENDIX A	FIGURES & TABLES	75
APPENDIX B	STORM DRAINAGE AND EROSION CONTROL ORDINANCE	90



TABLE OF CONTENTS

PART ONE

STORM DRAINAGE ORDINANCE 1

Sections

1.	PURPOSE	3
2.	CONFLICTING ORDINANCES	4
3.	COMPLIANCE WITH THIS AND OTHER ORDINANCES	4
4.	DEFINITIONS AND ABBREVIATIONS	4
	A. Definitions	4
	B. Abbreviations	22
5.	STORMWATER CONTROL POLICY	23
6.	INFORMATION REQUIREMENTS	24
	A. Topographic Survey Map	25
	B. Preliminary Drainage Plans	26
	C. Valley Cross-Sections	28
	D. Site Engineering Plans	28
	E. Final Drainage Plans	29
	F. Submittal and Consideration of Plans	31
7.	DETERMINATION OF RUNOFF QUANTITIES	32
	A. Development Sites Less Than or Equal to 5 Acres in Size	32
	B. Development Sites Greater Than 5 Acres in Size	33
8.	AMOUNT OF RUNOFF TO BE ACCOMMODATED BY VARIOUS PARTS OF THE DRAINAGE FACILITY	33
	A. Minor Drainage System	34
	B. Major Drainage System	34
9.	LEVEL OF PROTECTION	34
10.	STORM SEWER DESIGN STANDARDS	35
	A. Manning's Equation	35
	B. Minimum Size for Storm Sewers	35
	C. Pipe Cover and Grade	35

	D.	Alignment	36
	E.	Manholes	36
	F.	Inlets	37
11.		WORKMANSHIP AND MATERIALS	37
	A.	Workmanship	37
	B.	Materials	37
	C.	Special Hydraulic Structures	37
12.		OPEN CHANNEL DESIGN STANDARDS	37
	A.	Manning's Equation	37
	B.	Channel Cross-Section and Grade	38
	C.	Side Slopes	38
	D.	Channel Stability	38
	E.	Drainage of Waterways	39
	F.	Establishment of New Regulated Drain	40
	G.	Appurtenant Structures	40
	H.	Disposition of Spoil	40
13.		CONSTRUCTION AND MATERIALS	41
	A.	Construction	41
	B.	Materials	41
14.		STORMWATER DETENTION	41
	A.	Acceptable Detention Methods	41
	B.	Design Storm	41
	C.	Allowable Release Rate	42
	D.	Drainage System Overflow Design	42
	E.	Acceptable Outlet	43
	F.	Determination of Storage Volume	43
	G.	General Detention Basin Design Requirements	45
	H.	Dry Bottom Facility Design Requirements	47
	I.	Wet Bottom Facility Design Requirements	47
	J.	Roof Top Storage	48
	K.	Parking Lot Storage	48
	L.	Facility Financial Responsibilities	48
	M.	Facility Maintenance Responsibilities	49
	N.	Inspections	49
	O.	Corrective Measures	49
	P.	Joint Development of Control Systems	49
	Q.	Installation of Erosion Control Systems	49
	R.	Detention Facilities in Floodplains	49
	S.	Off-site Drainage Provisions	49
15.		EROSION AND SEDIMENT CONTROL	50
16.		CERTIFICATIONS REQUIRED	50
17.		CHANGES IN PLAN	50
18.		DETERMINATION OF IMPACT DRAINAGE AREAS	51

11.	PERMITS	61
12.	INSPECTION	62

PART THREE

ORDINANCE FEE STRUCTURE 63

Sections

1.	TIME OF PAYMENT	63
2.	METHOD OF PAYMENT	64
3.	PLACE OF PAYMENT	64
4.	REFUND OF PAYMENT	64
5.	AMOUNT OF FEES	64
6.	FEE SCHEDULE	64
7.	REQUIRED BONDS	67

Tables

3A.	Fee Schedule for New Development	65
3B.	Fee Schedule for Remodeling, or Additions to Existing Structures, or New Construction on a Previously Platted Tract	66
3C.	Fee Schedule for Land Disturbing Activities	66

PART FOUR

**ENFORCEMENT STRUCTURE OF 68
ORDINANCE**

Sections

1.	SCOPE OF FINE	68
2.	POSTING OF A STOP-WORK ORDER	69
3.	FINE FOR NON-COMPLIANCE WITHIN FIRST 10 CALENDAR DAYS	69
4.	REVOCAION OF PERMIT FOR NON-COMPLIANCE WITHIN FIRST 30 CALENDAR DAYS	69

5.	HOW TO REAPPLY AFTER A PERMIT HAS BEEN REVOKED	69
6.	APPEALING TO THE BOARD OF APPEALS	69
7.	ISSUANCE OF A NOTICE OF INTENT	69
8.	NON PAYMENT OF FINE	70
9.	PENALTIES ASSESSED FOR ORDINANCE VIOLATION	70
10.	METHOD OF PAYMENT	70

PART FIVE

PROJECT TERMINATION **71**

Sections

1.	PROJECT TERMINATION	71
----	---------------------	----

PART SIX

APPEALS PROCESS **72**

Sections

1.	SCOPE OF APPEALS	72
2.	ADVISORY/APPEALS BOARD	72
3.	ADVISORY/APPEALS BOARD MEETING	73
4.	APPEALS PROCESS	73

APPENDIX A

FIGURES & TABLES **75**

Figures For Section 1

Figure 1	Rainfall Intensity-Duration-Frequency Curves for City of Kendallville	76
Figure 2	Street & Gutter Capacities	77
Figure 3	Rainfall Intensity-Duration-Frequency Curves for City of Avilla	78

Tables For Section 1

1A	Urban Runoff Coefficients	79
1B	Rural Runoff Coefficients	80
2	Runoff Coefficients "C" by Land Use and Typical Inlet Times	81
3	Typical Values of Manning's "n"	82
4	Maximum Permissible Velocities in Vegetal-Lined Channels	83
5A	Rainfall Depths for Various Return Periods and Storm Durations	84
5B	Rainfall Intensities for Various Return Periods and Storm Durations	85
6	Huff Quartiles (50%) Rainfall Distribution for ALBION, IN	89

APPENDIX B

**STORM DRAINAGE AND EROSION
CONTROL ORDINANCE**

90



PART ONE

STORM DRAINAGE

ORDINANCE

TABLE OF CONTENTS

Sections

1.	PURPOSE	3
2.	CONFLICTING ORDINANCES	4
3.	COMPLIANCE WITH THIS AND OTHER ORDINANCES	4
4.	DEFINITIONS AND ABBREVIATIONS	4
	A. Definitions	4
	B. Abbreviations	22
5.	STORMWATER CONTROL POLICY	23
6.	INFORMATION REQUIREMENTS	24
	A. Topographic Survey Map	25
	B. Preliminary Drainage Plans	26
	C. Valley Cross-Sections	28
	D. Site Engineering Plans	28
	E. Final Drainage Plans	29
	F. Submittal and Consideration of Plans	31
7.	DETERMINATION OF RUNOFF QUANTITIES	32
	A. Development Sites Less Than or Equal to Acres in Size	32
	B. Development Sites Greater Than 5 Acres in Size	33
8.	AMOUNT OF RUNOFF TO BE ACCOMMODATED BY VARIOUS PARTS OF THE DRAINAGE FACILITY	33
	A. Minor Drainage System	34
	B. Major Drainage System	34
9.	LEVEL OF PROTECTION	34

TABLE OF CONTENTS *Continued...*

10.	STORM SEWER DESIGN STANDARDS	35
	A. Manning's Equation	35
	B. Minimum Size for Storm Sewers	35
	C. Pipe Cover and Grade	35
	D. Alignment	36
	E. Manholes	36
	F. Inlets	37
11.	WORKMANSHIP AND MATERIALS	37
	A. Workmanship	37
	B. Materials	37
	C. Special Hydraulic Structures	37
12.	OPEN CHANNEL DESIGN STANDARDS	37
	A. Manning's Equation	37
	B. Channel Cross-Section and Grade	38
	C. Side Slopes	38
	D. Channel Stability	38
	E. Drainage of Waterways	39
	F. Establishment of New Regulated Drain	40
	G. Appurtenant Structures	40
	H. Disposition of Spoil	40
13.	CONSTRUCTION AND MATERIALS	41
	A. Construction	41
	B. Materials	41
14.	STORMWATER DETENTION	41
	A. Acceptable Detention Methods	41
	B. Design Storm	41
	C. Allowable Release Rate	42
	D. Drainage System Overflow Design	42
	E. Acceptable Outlet	43
	F. Determination of Storage Volume	43
	G. General Detention Basin Design Requirements	45
	H. Dry Bottom Facility Design Requirements	47
	I. Wet Bottom Facility Design Requirements	47
	J. Roof Top Storage	48
	K. Parking Lot Storage	48
	L. Facility Financial Responsibilities	48
	M. Facility Maintenance Responsibilities	49
	N. Inspections	49
	O. Corrective Measures	49
	P. Joint Development of Control Systems	49

TABLE OF CONTENTS *Continued...*

Q.	Installation of Erosion Control Systems	49
R.	Detention Facilities in Floodplains	49
S.	Off-site Drainage Provisions	49
15.	EROSION AND SEDIMENT CONTROL	50
16.	CERTIFICATIONS REQUIRED	50
17.	CHANGES IN PLAN	50
18.	DETERMINATION OF IMPACT DRAINAGE AREAS	51
19.	OTHER REQUIREMENTS	51
A.	Sump Pumps	51
B.	Down Spouts	51
C.	Footing Drains	52
D.	Basement Floor Drains	52
20.	DISCLAIMER OF LIABILITY	52
21.	CORRECTIVE ACTION	52
22.	REPEALER	52
23.	WHEN EFFECTIVE	52
24.	EXEMPT PROJECTS	52
25.	NO PRIVATE RIGHTS CONFERRED	53
26.	INSPECTION	53

1. PURPOSE

The purpose of this ordinance is to reduce the hazard to public health and safety caused by excessive stormwater runoff, to enhance economic objectives, and to protect, conserve and promote the orderly development of land and water resources within the regulatory area.

This ordinance regulates:

- ◆ Stormwater drainage improvements related to development of lands located within Noble County.

- ◆ Drainage control systems installed in developments as defined in Section 4-A “Definitions.”
- ◆ Erosion and sediment control systems installed in developments as defined in Section 4-A “Definitions.”
- ◆ The design, construction, and maintenance of stormwater drainage facilities and systems.

2. CONFLICTING ORDINANCES

In case of conflicting requirements between ordinances, the most restrictive requirements shall apply.

3. COMPLIANCE WITH THIS AND OTHER ORDINANCES

In addition to the requirements of this ordinance, compliance with the requirements set forth in local Zoning Ordinances is also necessary. Compliance with ordinances of Noble County and other applicable ordinances with respect to submission, approval of preliminary and final Subdivision Plats, improvement plans, building and zoning permits, construction, inspections, appeals and similar matters, and compliance with applicable State of Indiana statutes and regulations shall be required. Unless otherwise stated, all other specifications referred to in this ordinance shall be the most recent edition available. No building permit shall be issued for any construction in a development, as defined in Part 1, Section 4-A, until the plans required by this ordinance for such construction have been approved in writing by the Noble County Surveyor’s Office.

4. DEFINITIONS AND ABBREVIATIONS

For the purpose of this ordinance, the following definitions and abbreviations shall apply. Although not all of the definitions and abbreviations listed below are used in this ordinance, the additional terminology is provided to assist ordinance administrators, other community officials, residents and permit applicants in understanding technical terminology associated with the subject matter of this ordinance.

A. Definitions

- A -

Agricultural activity means tillage, planting, cultivation, or harvesting operations for the production of agricultural or nursery vegetative crops. The term

also includes pasture renovation and establishment, the construction of agricultural conservation practices, and the installation and maintenance of agricultural drainage. For purposes of this ordinance, the term does not include activities for the construction of agricultural related facilities, such as:

- (A) Barns;
- (B) Buildings to house livestock;
- (C) Roads associated with infrastructure;
- (D) Agricultural waste lagoons and facilities;
- (E) Lakes and ponds;
- (F) Wetlands; and
- (G) Other infrastructure.

Antecedent Runoff Condition. The index of runoff potential before a storm event. The index, developed by the Soil Conservation Service (SCS), is an attempt to account for the variation of the SCS runoff curve number (CN) from storm to storm.

Acre-Foot (AF). A measure of water volume equal to the inundation of a flat one-acre area to a depth of one foot (43,560 cubic feet).

Amortization Period. The length of time used to repay a debt or mortgage or to depreciate an initial cost.

- B -

Backflow Preventer. Device that allows liquids to flow in only one direction in a pipe. Backflow preventers are used on sewer pipes to prevent a reverse flow during flooding situations.

Backwater. The rise in water surface elevation caused by some obstruction such as narrow bridge openings, buildings or fill material that limits the area through which the water shall flow.

Base Flood Elevation (BFE). The water surface elevation corresponding to a flood having a one percent probability of being equaled or exceeded in a given year.

Basement. Any area of the building having its floor subgrade on one or more sides.

Benchmark. A marked point of known elevation from which other elevations may be established.

Best Management Practices. Design, construction, and maintenance practices and criteria for stormwater facilities that minimize the impact of stormwater runoff rates and volumes, prevent erosion, and capture pollutants.

Building. See "structure".

- C -

Capacity of a Storm Drainage Facility. The maximum flow that can be conveyed or stored by a storm drainage facility.

Centerline of Channel. The thalweg of a channel.

Channel. A natural or artificial watercourse which periodically or continuously contains moving water, or which forms a connecting link between two bodies of water. It has a defined bed and banks which serve to confine the water.

Channel Modification. Alteration of a channel by changing the physical dimensions or materials of its bed or banks. Channel modification includes damming, rip-rapping or other armoring, widening, deepening, straightening, relocating, lining and significant removal of bottom or woody vegetation. Channel modification does not include the clearing of dead or dying vegetation, debris, or trash from the channel. Channelization is a severe form of channel modification typically involving relocation of the existing channel (e.g., straightening).

Closed Conduit. A pipe, tube, or tile used for transmitting water.

Compensatory Storage. An excavated volume of storage within a floodplain used to balance the loss of natural flood storage capacity when any fill is placed within the floodplain. Such excavated volume has to be available for inundation by and accessible to the flood waters.

Contiguous. Adjoining or in actual contact with.

Contour. Imaginary line on the earth's surface which connects points of equal elevation.

Contour Line. Line on a map which represents a contour or points of equal elevation.

Control Structure. A structure designed to control the rate of flow that passes through the structure, given a specific upstream and downstream water surface elevation.

Convolution. The process of translating precipitation excess into a runoff hydrograph.

Crawl Space. Low space below first floor of a house where there has not been excavation deep enough for a basement, usually less than seven (7) feet in depth, but where there is access for pipes, ducts, utilities and similar equipment.

Crown of Pipe. The elevation of top of pipe.

Cross-Section. A graph or plot of ground elevation across a stream valley or a portion of it, usually along a line perpendicular to the stream or direction of flow.

Cubic Feet Per Second (CFS). Used to describe the amount of flow passing a given point in a stream channel. One cubic foot per second is equivalent to approximately 7.5 gallons per second.

Culvert. A closed conduit used for the conveyance of surface drainage water under a roadway, railroad, canal or other impediment.

Curve Number (CN). The Soil Conservation Service index that represents the combined hydrologic effect of soil, land use, land cover, hydrologic condition and antecedent runoff condition.

- D-

Dam. All obstructions, wall embankments or barriers, together with any abutments and appurtenant works, constructed to store, direct water or create a pool (not including underground water storage tanks).

Damage. Measurable rise in flood heights on buildings currently subject to flooding, flooding of buildings currently not subject to flooding and increases in volume or velocity to the point where the rate of land lost to erosion and scour is substantially increased.

Datum. Any level surface to which elevations are referred, usually using Mean Sea Level.

Depressional Storage Areas. Non-riverine depressions in the earth where stormwater collects. The volumes are often referred to in units of acre-feet.

Design Storm. A selected storm event, described in terms of the probability of occurring once within a given number of years, for which stormwater or flood control improvements are designed and built.

Detention Facility. A facility designed to detain a specified amount of stormwater runoff assuming a specified release rate. The volumes are often referred to in units of acre-feet.

Detention Storage. The temporary detaining of storage of stormwater in storage facilities, on rooftops, in streets, parking lots, school yards, parks, open spaces or other areas under predetermined and controlled conditions, with the rate of release regulated by appropriately installed devices.

Development. Any man-made change to improved or unimproved real estate including but not limited to:

1. All major subdivisions;
2. All multi-family developments, business subdivisions, commercial subdivisions, and industrial subdivisions;
3. All new construction or additions to existing structures which create hard surface areas on multi-family, commercial, business, or industrial tracts of land;
4. Construction of flood control structures such as levees, dikes, dams, channel improvements, etc.;
5. Mining, dredging, filling, grading, excavation, or drilling operations;
6. Any other activity that might change the direction, height, or velocity of flood or surface waters.

"Development" does not include activities such as the maintenance of existing buildings and facilities such as painting, re-roofing, resurfacing roads, or gardening, plowing, and similar agricultural practices that do not involve filling, grading, excavation, or the construction of permanent buildings. In addition, "Development" does not include the reconstruction or maintenance of regulated drains or replacement of existing stream crossings by the Noble County Surveyor's Office or the Noble County Drainage Board. Also, "development" does not include any activity initiated by a government entity.

Discharge. Normally, the rate of flow into or out of a sewer, stormwater storage facility, or from a land surface. Discharges are customarily measured in cubic feet per second (cfs).

Drainage Area. The area from which water is carried off by a drainage system, a watershed or catchment area.

Drop Manhole. Manhole having a vertical drop pipe connecting the inlet pipe to the outlet pipe.

Dry Bottom Detention Facility. A facility designed to be completely dewatered after having provided its planned detention of runoff during a storm event.

Duration. The time period of a rainfall event.

- E -

Elevation Certificate. A form published by the Federal Emergency Management Agency that is used to certify the 100-year or base flood elevation and the lowest elevation of usable space to which a building has been constructed.

Elevation Reference Mark (ERM). Elevation benchmark tied to the National Geodetic Vertical Datum of 1929 and identified during the preparation of a Flood Insurance Study prepared for the Federal Emergency Management Agency.

Energy Dissipater. A device to reduce the energy of flowing water.

Erosion. Wearing away of the land by running water and waves, abrasion, temperature changes, ice and wind.

Extraterritorial Jurisdiction (ETJ). Areas located outside the corporate limits of a community over which the community has statutory development authority.

- F -

Farm or Field Tile. A pipe installed in an agricultural area to allow subsurface drainage of farmland for the purpose of agricultural production.

FEMA. The Federal Emergency Management Agency.

Flood or Flood Waters. A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow, the unusual and rapid accumulation, or the runoff of surface waters from any source.

Flood Boundary and Floodway Map (FBFM). A map prepared by the Federal Emergency Management Agency that depicts the FEMA designated floodways within a community. This map also includes the delineation of the 100-year and 500-year floodplain boundaries and the location of the Flood Insurance Study cross-sections.

Flood Crest. The maximum stage or elevation reached or expected to be reached by the waters of a specific flood at a given location.

Flood Duration. The length of time a stream is above flood stage or overflowing its banks.

Flood Easement. Easement granted to identify areas inundated by the 100-year flood and prohibit or severely restrict development activities.

Flood Elevation. The elevation at all locations delineating the maximum level of high waters for a flood of a given return period.

Flood Fighting. Actions taken immediately before or during a flood to protect human life and to reduce flood damages such as evacuation, emergency sandbagging and diking.

Flood Forecasting. The process of predicting the occurrence, magnitude and duration of an imminent flood through meteorological and hydrological observations and analysis.

Flood Frequency. A statistical expression of the average time period between floods equaling or exceeding a given magnitude. For example, a 100-year flood has a magnitude expected to be equaled or exceeded on the average of once every hundred years; such a flood has a one-percent chance of being equaled or exceeded in any given year. Often used interchangeably with "recurrence interval".

Flood Insurance Rate Map (FIRM). A map prepared by the Federal Emergency Management Agency that depicts Special Flood Hazard Areas within a community. This map also includes the 100-year or Base Flood Elevation at various locations along the watercourses. More recent versions of the FIRM may also show the FEMA designated floodway boundaries and the location of the Flood Insurance Study cross-sections.

Flood Insurance Study (FIS). A study prepared by the Federal Emergency Management Agency to assist a community participating in the National Flood Insurance Program in its application of the program regulations. The study consists of a text which contains community background information with respect to flooding, a floodway data table, summary of flood discharges, flood profiles, a Flood Insurance Rate Map, and a Flood Boundary and Floodway Map.

Flood Hazard Boundary Map (FHBM). A map prepared by the Federal Emergency Management Agency that depicts Special Flood Hazard Areas as a Zone A within a community. There are no study text, base flood elevations or floodways associated with this map.

Floodplain. The channel proper and the areas adjoining any wetland, lake or watercourse which have been or hereafter may be covered by the regulatory or 100-year flood. Any normally dry land area that is susceptible to being inundated by water from any natural source. The floodplain includes both the floodway and the floodway fringe districts.

Floodplain Management. The operation of a program of corrective and preventive measures for reducing flood damage, including but not limited to flood control projects, floodplain land use regulations, flood proofing of buildings, and emergency preparedness plans.

Floodplain Regulations. General term applied to the full range of codes, ordinances and other regulations relating to the use of land and construction within floodplain limits. The term encompasses zoning ordinances, subdivision regulations, building and housing codes, encroachment laws and open area (space) regulations.

Flood Profile. A graph showing the relationship of water surface elevation to a specific location, the latter generally expressed as distance above the mouth of a stream of water flowing in an open channel. It is generally drawn to show surface elevation for the crest of a specific magnitude of flooding, but may be prepared for conditions at any given time or stage.

Flood Protection Grade (FPG). The elevation of the regulatory or 100-year flood plus two (2) feet at any given location in the Special Flood Hazard Area or 100-year floodplain.

Flood Resistant Construction (Flood proofing). Additions, changes or adjustments to structures or property that are designed to reduce or eliminate the potential for flood damage.

Flood Storage Areas. Depressions, basins, or other areas that normally stand empty or partially empty, but fill with rainfall runoff during storms to hold the runoff and reduce downstream flow rates. The volumes are often referred to in units of acre-feet.

Floodway. The channel of a river or stream and those portions of the floodplains adjoining the channel which are reasonably required to carry and discharge efficiently the peak flow of the regulatory flood of any river or stream.

Floodway Fringe. Those portions of the floodplain lying outside the regulatory floodway.

Footing Drain. A drain pipe installed around the exterior or interior of a foundation footer to remove water from the surrounding footer area.

Freeboard. An increment of height added to the base flood elevation to provide a factor of safety for uncertainties in calculations, unknown local conditions, wave actions and unpredictable effects such as those caused by ice or debris jams. (See Flood Protection Grade).

French Drain. A drainage trench backfilled with a coarse, water-transmitting material; may contain a perforated pipe.

- G -

Gabion. An erosion control structure consisting of a wire cage or cages filled with rocks.

Grade. The inclination or slope of a channel, canal, conduit, etc. or natural ground surface usually expressed in terms of the percentage the vertical rise (or fall) bears to the corresponding horizontal distance.

Groundwater Recharge. The infiltration of water into the earth. It may increase the total amount of water stored underground or only replenish supplies depleted through pumping or natural discharge.

- H -

Hard Surface. See "Impervious Surface."

High Water. Maximum designed, permitted, or regulated water level for an impoundment.

Hydraulics. A branch of science that deals with the practical application of the mechanics of water movement. A typical hydraulic study is undertaken to calculate water surface elevations.

Hydraulic Grade Line (HGL). For open channel flow, the HGL is equal to the water surface whereas for pressure flow it is the piezometric surface.

Hydrodynamic Loads. Forces imposed on structures by floodwaters due to the impact of moving water on the upstream side of the structure, drag along its sides, and eddies or negative pressures on its downstream side.

Hydrograph. For a given point on a stream, drainage basin, or a lake, a graph showing either the discharge, stage (depth), velocity, or volume of water with respect to time.

Hydrology. The science of the behavior of water, its dynamics, composition and distribution in the atmosphere, on the surface of the earth, and underground. A typical hydrologic study is undertaken to compute flowrates associated with specified flood events.

Hydrometeorologic. Water-related meteorologic data such as rainfall or runoff.

Hydrostatic Loads. Those loads or pressures resulting from the static mass of water at any point of floodwater contact with a structure. They are equal in all directions and always act perpendicular to the surface on which they are applied. Hydrostatic loads can act vertically on structural members such as floors, decks and roofs, and can act laterally on upright structural members such as walls, piers, and foundations.

- I-

Impact Areas. Areas defined or mapped by the (City Council/Town Board/County Drainage Board/City Engineer/Town Engineer/County Surveyor) which are unlikely to be easily drained because of one or more factors including but not limited to any of the following: soil type, topography, land where there is not adequate outlet, a floodway or floodplain, land within 75 feet of each bank of any regulated drain or within 75 feet from the center line of any regulated tile ditch.

Impervious Surface. Any hard-surfaced, man-made area that does not readily absorb or retain water, including but not limited to building roofs, parking and driveway areas, graveled areas, sidewalks and paved recreation areas.

IDNR. Indiana Department of Natural Resources.

Infiltration. Passage or movement of water into the soil.

Infiltration Swales. A depressed earthen area that is designed to promote infiltration.

Inlet. An opening into a storm sewer system for the entrance of surface stormwater runoff, more completely described as a storm sewer inlet.

- J-

Junction Chamber. A converging section of conduit, usually large enough for a person to enter, used to facilitate the flow from one or more conduits into a main conduit.

- L -

Land Surveyor. A person licensed under the laws of the State of Indiana to practice land surveying.

Lateral Storm Sewer. A sewer that has inlets connected to it but has no other storm sewer connected.

Life Cycle Cost. Cost based on the total cost incurred over the system life including research, development, testing, production, construction, operation, and maintenance. Costs are normally determined on present worth or equivalent annual cost basis.

Low Entry Elevation. The elevation in a structure where overbank flooding can enter the structure.

Lowest Floor. Refers to the lowest of the following:

1. The top of the basement floor;
2. The top of the garage floor, if the garage is the lowest level of the building;
3. The top of the first floor of buildings constructed on a slab or of buildings elevated on pilings or constructed on a crawl space with permanent openings; or
4. The top of the floor level of any enclosure below an elevated building where the walls of the enclosure provide any resistance to the flow of flood waters unless:
 - i. The walls are designed to automatically equalize the hydrostatic flood forces on the walls by allowing for the entry and exit of flood waters, by providing a minimum of two openings (in addition to doorways and windows) having a total area of one (1) square foot for every two (2) square feet of enclosed area subject to flooding. The bottom of all such openings shall be no higher than one (1) foot above grade.

- ii. Such enclosed space shall be usable only for the parking of vehicles or building access.

- M -

Major Drainage System. Drainage system carrying runoff from a drainage area of one (1) or more square miles.

Major Subdivision. Any division of land which creates more than 3 new parcels, any division of land which is required to connect to existing infrastructures, such as but not limited to storm sewers, sanitary sewers, or municipal water, and or any division of land which requires the construction of a new street.

Manhole. Storm sewer structure through which a person may enter to gain access to an underground storm sewer or enclosed structure.

Manning Roughness Coefficient or Manning's "n" Value. A dimensionless coefficient ("n") used in the Manning's equation to account for channel wall frictional losses in steady uniform flow.

Minor Drainage System. Drainage system carrying runoff from a drainage area less than one (1) square mile.

Minor Subdivision. Any division of land which creates 3 or less new parcels of land and that is not required to connect to any storm sewer, sanitary sewer, or municipal water systems, or that does not require the construction of a new street.

Multi-Family. Any structure which contains three or more dwelling units. A dwelling unit is any structure, or part of a structure, which is constructed to house a family.

- N -

National Flood Insurance Program (NFIP). The NFIP is a Federal program enabling property owners to purchase flood insurance. The Federal Emergency Management Agency administers the NFIP in communities throughout the United States. The NFIP is based on an agreement between local communities and the Federal government which states that if a community will implement floodplain management measures to reduce future flood risks to new construction and substantially improved structures in flood hazard areas, the Federal government will make flood insurance available within the community as a financial protection against flood losses that do occur.

National Geodetic Vertical Datum of 1929 (NGVD 1929). The nationwide, Federal Elevation datum used to reference topographic elevations to a known value.

National Pollution Discharge Elimination System (NPDES). Permit system under the authority of the U.S. Environmental Protection Agency regarding point and non-point sources of water pollution.

Nonpoint Source Pollution. Pollution that enters a water body from diffused origins on the watershed or drainage basin and does not result from discernible, confined, or defined conveyances or discharge points.

North American Vertical Datum of 1988 (NAVD 1988). The nationwide, Federal Elevation datum used to reference topographic elevations to a known value.

- O-

Off-site. Everything not located at or within a particular site.

Off-site Land Areas. Those areas which by virtue of existing topography naturally shed surface water onto or through the developing property.

100-Year Frequency Flood. See "regulatory flood".

On-Site. Located within the controlled or urbanized area where runoff originates.

Open Channels. Open channels include not only those which are completely open overhead, but also closed conduits which are flowing partly full. Examples of such closed conduits are tunnels, storm sewers, sanitary sewers, and various types of pipelines. Flow in open channels involves a free surface.

Orifice. A device which controls the rate of flow from a detention basin.

Outfall. The point or location where storm runoff discharges from a sewer or drain. Also applies to the outfall sewer or channel which carries the storm runoff to the point of outfall.

Overland Flow. Consists of sheet flow, shallow concentrated flow and open channel flow.

- P-

Peak Flow. The maximum rate of flow of water at a given point in a channel or conduit resulting from a predetermined storm or flood.

Planimetric Data. Horizontal measurements involving distances or dimensions on a diagram, map, Plat of Survey or topographic map. Normally in units of feet.

Plat of Survey. A scaled diagram showing boundaries of a tract of land or subdivision. This may constitute a legal description of the land and be used in lieu of a written description.

Probable Maximum Flood. The most severe flood that may be expected from a combination of the most critical meteorological and hydrological conditions that are reasonably possible in the drainage basin. It is used in designing high-risk flood protection works and siting of structures and facilities that shall be subject to almost no risk of flooding. The probable maximum flood is usually much larger than the 100-year flood.

Professional Engineer. A person licensed under the laws of the State of Indiana to practice professional engineering.

- R -

Radius of Curvature. Length of radius of a circle used to define a curve.

Rainfall Intensity. The cumulative depth of rainfall occurring over a given duration, normally expressed in inches per hour. In the Rational Formula, this represents the average rainfall intensity over a duration equal to the time of concentration for the catchment.

Reach. Any length of river, channel or storm sewer.

Recurrence Interval. A statistical expression of the average time between floods equaling or exceeding a given magnitude.

Redevelopment. See the definition for "Development".

Regulated Area. All of Noble County.

Regulated Drain. A drain subject to the provisions of the Indiana Drainage Code, I.C.-36-9-27.

Regulatory or 100-Year Flood. The flood having a one percent (1%) probability of being equaled or exceeded in any given year, as calculated by a method and procedure which is acceptable to and approved by the Indiana

Department of Natural Resources and the Federal Emergency Management Agency. If a permit from the Indiana Department of Natural Resources - Division of Water (IDNR-DOW) for construction in the floodway is required, then the regulatory flood peak discharge should be calculated by a method acceptable to the IDNR-DOW. The "regulatory flood" is also known as the "base flood".

Regulatory Floodway. See "floodway".

Release Rate. The amount of stormwater released from a stormwater control facility per unit of time.

Reservoir. A natural or artificially created pond, lake or other space used for storage, regulation or control of water. May be either permanent or temporary. The term is also used in the hydrologic modeling of storage facilities.

Retention Facility. A facility designed to completely retain a specified amount of stormwater runoff without release except by means of evaporation, infiltration or pumping. The volumes are often referred to in units of acre-feet.

Return Period. The average interval of time within which a given rainfall event will be equaled or exceeded once. A flood having a return period of 100 years has a one percent probability of being equaled or exceeded in any one year.

Right-of-Way for a County Drain. The statutory right of way as defined by Indiana Code for a regulated drain.

RipRap. Large rock that when installed along an erodible surface reduces the erosion potential.

Riverine. Relating to, formed by, or resembling a stream (including creeks and rivers).

Runoff. The waters derived from melting snow or rain falling within a tributary drainage basin that exceed the infiltration capacity of the soils of that basin, flow over the surface of the ground, or are collected in channels or conduits.

Runoff Coefficient. A decimal fraction relating the amount of rain which appears as runoff and reaches the storm sewer system to the total amount of rain falling. A coefficient of 0.5 implies that 50 percent of the rain falling on a given surface appears as stormwater runoff.

- S -

Sanitary Backup. The condition where a sanitary sewer reaches capacity and surcharges into the lowest area.

Scour. The clearing and digging action of flowing water.

Sediment. Material of soil and rock origin, transported, carried or deposited by water.

Sedimentation. The process that deposits soils, debris and other materials either on the ground surfaces or in bodies of water or watercourses.

Seepage. The passage of water or other fluid through a porous medium, such as the passage of water through an earth embankment or masonry wall.

Silt Screen Fence. A fence constructed of wood or steel supports and either natural (e.g. burlap) or synthetic fabric stretched across areas of flow during site development to trap and retain on-site sediment due to rainfall runoff.

Siphon. A closed conduit or portion of which lies above the hydraulic grade line, resulting in a pressure less than atmospheric and requiring a vacuum within the conduit to start flow. A siphon utilizes atmospheric pressure to effect or increase the flow of water through a conduit. An inverted siphon is used to carry stormwater flow under an obstruction such as a sanitary sewer.

Special Flood Hazard Area (SFHA). Those lands within the jurisdiction of a community which are subject to inundation by the regulatory or 100-year flood. Special Flood Hazard Areas are usually designated on a Flood Hazard Boundary Map as Zone A. After detailed evaluation of local flooding characteristics, the Flood Insurance Rate Map will refine this categorization into Zones A, AE, AH, AO and A1-30.

Spillway. A waterway in or about a hydraulic structure, for the escape of excess water.

Standard Project Flood. A term used by the U.S. Army Corps of Engineers to designate a flood that may be expected from the most severe combination of meteorological and hydrological conditions that are considered reasonable characteristics of the geographical area in which the drainage basin is located, excluding extremely rare combinations. The peak flow for a standard project flood is generally 40 to 60 percent of the probable maximum flood for the same location.

Stilling Basin. A basin used to slow water down or dissipate its energy.

Storm Duration. The length of time that water may be stored in any stormwater control facility, computed from the time water first begins to be stored.

Storm Sewer. A closed conduit for conveying collected stormwater.

Stormwater Facility. All ditches, channels, conduits, levees, ponds, natural and manmade impoundments, wetlands, tiles, swales, sewers and other natural or artificial means of draining surface and subsurface water from land.

Stormwater Runoff. The water derived from rains falling within a tributary basin, flowing over the surface of the ground or collected in channels or conduits.

Structure. Refers to a structure that is principally above ground and is enclosed by walls and a roof. The term includes but is not limited to, a gas or liquid storage tank, a manufactured home or a prefabricated building, and recreational vehicles to be installed on a site for more than 180 days.

Structural Engineer. A person licensed under the laws of the State of Indiana to engage in the designing or supervising of construction, enlargement or alteration of structures or any part thereof.

Structural Floodplain. Management Measures. Those physical or engineering measures employed to modify the way floods behave, (e.g., dams, dikes, levees, channel enlargements and diversions).

Subarea/Subbasin. Portion of a watershed divided into homogenous drainage units which can be modeled for purposes of determining runoff rates. The subareas/subbasins have distinct boundaries, as defined by the topography of the area.

Sump Failure. A failure of the sump pump that results in inundation of a crawl space or basement.

Sump Pump. A pump that discharges seepage from foundation footing drains.

Surcharge. Backup of water in a sanitary or storm sewer system in excess of the design capacity of the system.

-T-

Tailwater. The water surface elevation at the downstream side of a hydraulic structure (i.e. culvert, bridge, weir, dam, etc.).

Thalweg. The deepest point (or centerline) of a channel.

Time of Concentration (tc). The travel time of a particle of water from the most hydraulically remote point in the contributing area to the point under study. This can be considered the sum of an overland flow time and times of travel in street gutters, storm sewers, drainage channels, and all other drainage ways.

Topographic Map. Graphical portrayal of the topographic features of a land area, showing both the horizontal distances between the features and their elevations in relation to a given datum.

Topography. The representation of a portion of the earth's surface showing natural and man-made features of a given locality such as rivers, streams, ditches, lakes, roads, buildings and most importantly, variations in ground elevations for the terrain of the area.

TP-40 Rainfall. Design storm rainfall depth data for various durations published by the National Weather Service in their Technical Paper 40 dated 1961.

Transition Section. Reaches of the stream or floodway where water flows from a narrow cross-section to a wide cross-section or vice-versa.

Tributary. Based on the size of the contributing drainage area, a smaller watercourse which flows into a larger watercourse.

-U-

Underdrain. A small diameter perforated pipe that is located beneath a detention basin allowing for subsurface drainage beneath the detention basin.

Unit Hydrograph. A unit hydrograph is the hydrograph that results from one inch of precipitation excess generated uniformly over the watershed at a uniform rate during a specified period of time.

- W-

Watercourse. Any river, stream, creek, brook, branch, natural or man-made drainage way in or into which stormwater runoff or floodwaters flow either regularly or intermittently.

Watershed. The land area drained by contributing water to a specific point that could be along a stream, lake or other stormwater facilities. Watersheds are often broken down into subareas for the purpose of hydrologic modeling.

Watershed Area. The total area from which surface runoff is carried away by a drainage system.

Waterway. A naturally existing or manmade open conduit or channel utilized for the conveyance of water.

Weir. A device which is used to restrict the flow of water thereby limiting the discharge rates. A weir can also facilitate calculation or measurement of the discharge rates. These are often used to control the rate of flow out of stormwater storage facilities.

Wet Bottom Retention Facility. A facility designed to retain a permanent pool of water after having provided its planned detention of runoff during a storm event.

Wetlands. The most current definition as defined by the United States Army Corps of Engineers.

B. Abbreviations

BFE	Base Flood Elevation
CFS	Cubic Feet Per Second
CLOMR	Conditional Letter of Map Revision (from FEMA)
CLOMR-F	Conditional Letter of Map Revision Based on Fill (from FEMA)
CN	Curve Number
COE	United States Army Corps of Engineers
ERM	Elevation Reference Mark
ETJ	Extraterritorial Jurisdiction
FBFM	Flood Boundary and Floodway Map
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Map
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FPG	Flood Protection Grade

FPS	Feet Per Second
HGL	Hydraulic Grade Line
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
LAG	Lowest Adjacent Grade
LOMA	Letter of Map Amendment (from FEMA)
LOMR	Letter of Map Revision (from FEMA)
LOMR-F NFIP	Letter of Map Revision Based on Fill (from FEMA) National Flood Insurance Program
NAVD	North American Vertical Datum of 1988
NGVD	National Geodetic Vertical Datum of 1929
NPDES	National Pollution Discharge Elimination System
SFHA	Special Flood Hazard Area
tc	Time of Concentration

5. **STORMWATER CONTROL POLICY**

It is recognized that, with the possible exception of the major watercourses (such as the Elkhart River), the smaller streams and drainage channels serving Noble County do not have sufficient capacity to receive and convey stormwater runoff resulting from continued urbanization. Accordingly, the storage and controlled release rate of excess stormwater runoff shall be required for all developments, as defined in Part 1, Section 4, located within Noble County.

The release rate of stormwater from developments, and redevelopments may not exceed the peak 5-year return period stormwater runoff from the land area in its pre-developed state. For developments and redevelopments releasing stormwater runoff in areas prone to flooding, the Noble County Surveyors Office may require the release rate of stormwater not to exceed the peak 2-year return period stormwater runoff from the land area in its pre-developed state.

The Noble County Surveyors Office may require the construction of regional retention/detention facilities for areas reaching the peak capacity of stormwater runoff in local natural streams and county regulated ditches. The purpose of Regional

retention/detention facilities is to help reduce the potential risk of flooding downstream. Surrounding developments and redevelopments contributing stormwater runoff into Regional retention/detention facilities would be restricted to the amount of stormwater runoff per acre allowed to enter regional retention/detention facilities. Regional retention/detention facilities must meet the release rate requirements mentioned above.

The developer shall submit to the Noble County Surveyor's Office, detailed computations of runoff before and after development or redevelopment which demonstrates that runoff will not be increased. These computations shall show that the peak runoff rate after development for the 100-year return period storm of 24-hour duration shall not exceed the 5-year return period pre-development peak runoff rate. The Noble County Surveyor shall have the right to require more restrictive release rates if the given development area is susceptible to localized flooding or if an acceptable outlet is not available for the development.

Computations for development sites up to and including 5 acres in size, with a drainage area less than or equal to 50 acres and no depressional storage, may be based on the Rational Method or another method acceptable to the Noble County Surveyor's Office, typical runoff coefficients listed herein, and 5-year return rainfall data.

For development sites larger than 5 acres in size, or when the contributing drainage area is in excess of 50 acres or contains significant depressional storage, a drainage method, acceptable to the Noble County Surveyor's Office, shall be used.

6. INFORMATION REQUIREMENTS

The following information and data prepared by a licensed professional engineer or land surveyor engaged in storm drainage design shall accompany plans of:

- (1) Each proposed major subdivision lying within the Regulated Area (as defined in Section 4) prior to Final Plat Approval, and
- (2) Each building permit application for construction of a new structure or addition to existing structures which creates hard surface areas on multi-family, business, commercial or industrial real estate which lies within The Regulated Area and which has not been subdivided pursuant to the Noble County Storm Drainage and Erosion Control Ordinance or prior sub-division control ordinances, and
- (3) Each proposed minor subdivision except residential subdivisions lying within the Regulated Area (as defined in Section 4) prior to Final Plat Approval.

An initial review of proposed construction or development may be requested prior to submission of fees and plans. The initial review with the Noble County Surveyor's Office will be for determination of applicability of the Storm Water and Erosion Control ordinance with respect to the proposed development or construction.

A. Topographic Survey Map

A topographic map of the land to be developed shall be provided. Topography of adjoining land may be required if surface water naturally drains from the adjoining lands onto the proposed development and if said surface water will need to be addressed as part of the proposed development. The contour intervals shall be one foot when slopes are two percent or less and shall be two feet when slopes exceed two percent. On this map, the following shall be shown:

1. The location of streams and other flood water runoff channels, the extent of the floodplains at the established 100-year flood elevation where available, and the limits of the regulatory floodway, all properly identified and sources noted.

◆ **NOTE:** The regulatory floodway may be measured from the effective FEMA map. However, floodplain boundaries shall be determined based on the 100-year flood elevation/profile and the Topographic Survey Map prepared according to this section.

2. The normal shoreline of lakes, ponds, swamps and detention/retention facilities, their floodplains, and direction of inflow and outflow if any.
3. The location of regulated drains, if any of record. These drains must be accurately located in the field at the developers expense. The following information on enclosed conduit or open ditch lines shall be given:
 - i. Size (diameter of enclosed conduit or typical cross-section of open ditch)
 - ii. Condition
 - iii. Type of material (enclosed conduit only)
 - iv. Approximate slope
 - v. Easements
4. Storm, sanitary and combined sewers and outfalls, if any of record.
5. Septic tank systems and outlet, if any of record.
6. Seeps, springs, flowing and other wells, that are visible or of record.

7. Soil names and their hydrologic classification for the proposed development when hydrologic methods requiring soils information are used.

B. Preliminary Drainage Plans

A comprehensive plan, in preliminary form (or in combined preliminary and final form), designed to safely handle the stormwater runoff and detain the increased stormwater runoff. The plan shall provide or be accompanied by maps or other descriptive material indicating the feasibility of the drainage plan and showing the following:

1. The area of each upstream, off-site watershed tributary to the subject site. Required materials for preliminary review include:
 - i. Exhibit showing each upstream, off-site drainage area tributary to the subject site on USGS Quadrangle Maps or other more detailed topographic maps.
 - ii. Preliminary plan to convey upstream, off-site runoff through the subject property, shown on the preliminary drainage plan for the site.
2. The capacity of the downstream, off-site receiving system (outlet). Information (as described in Part 1, Section 6-A-3) may be requested to show that the downstream, off-site drainage system has the capacity to convey the expected runoff from the subject property and any upstream, off-site areas.
3. The general drainage plan for the subject property must include the following items:
 - i. The area of each watershed on the subject property in the existing condition. Calculations to determine the allowable release rate from the subject property should also be included.
 - ii. The area of each watershed affecting the design of detention facilities as shown on USGS Quadrangle Maps or other more detailed topographic maps as required by the Noble County Surveyor's Office.
 - iii. Elevations in either National Geodetic Vertical Datum of 1929 (NGVD '29) or North American Vertical Datum of 1988 (NAVD '88). An assumed datum may be used in a minor residential subdivision only if an above mentioned benchmark is not located within one-half mile of the perimeter of the development.

- iv. The estimated location and percentage of impervious surfaces expected to be constructed when the development is completed.
 - v. Existing detention/retention facilities to be maintained, enlarged, or otherwise altered and new ponds or basins to be built and the basis of their design.
 - vi. The estimated depth and amount of storage required by design of the new detention or retention facilities.
 - vii. The preliminary layout and design of street storm sewers, where proposed, and other storm drains to be built, the outfall and outlet locations and approximate elevations. The 100-year return period water elevation, if information is available in the Noble County Surveyor's Office.
 - viii. The preliminary layout of swales which collect runoff from on-site and/or off-site watersheds.
 - ix. Proposed culverts and bridges to be utilized, their materials, elevations and waterway openings.
 - x. Identification of proposed overland flow routes to detention/retention facilities.
4. The location of existing streams and floodplains to be maintained. Also, new channels to be constructed, with their locations, cross-sections and profiles.
 5. Any interim drainage plan which is to be incorporated into the development pending completion of the development and the final drainage plan.
 6. A copy of the effective FEMA map, annotated to show the project location and property boundaries in relation to the regulatory floodplain and floodway.
 7. The location of any regulatory wetlands on the subject property, as shown on the most recent Natural Resources Conservation Service maps, or the U.S. Department of the Interior National Wetlands Inventory maps.

C. Valley Cross-Sections

One or more typical cross-sections of all existing and proposed channels or other open drainage facilities carried into the overbank to a point above the 100-year flood elevation. These shall also show the elevation of the existing land and the proposed changes thereto, together with the high water elevations expected from the 100-year flood under the controlled conditions called for by this ordinance, and the relationship of structures, streets and other facilities. Cross-sections must be represented perpendicular to the expected flow path.

D. Preliminary Site Engineering Plans

Site engineering plans shall be drawn to a standard engineering scale and show the dimensions and features of the proposed development. The requirements for the site plan contents and format are as follows:

1. The set of plans shall contain the following sheets as a minimum:
 - i. Title Sheet, with project name and location map. The title sheet shall also include the name, address, telephone number and seal of the registered professional engineer or the licensed/registered land surveyor preparing the plans.
 - ii. Topographic Survey Map as defined in Part 1, Section 6-A.
 - iii. Geometric Plan showing all dimensions of existing property boundaries, and necessary data to layout the proposed development.
 - iv. Grading/Drainage Plan which identifies all existing and proposed drainage characteristics such as swales, drainage break points and storm sewers, detention facilities and erosion control facilities.
2. Each plan sheet shall include:
 - i. A title block that includes the project name, job number, sheet title (Geometric, Grading, etc.), sheet number, date of preparation and latest revision date and description.
 - ii. North arrow.
 - iii. Graphic scale (bar scale), preferably with a scale between 1 inch = 20 feet and 1 inch = 100 feet.
 - iv. A legend clearly identifying all symbols indicated on that plan sheet.

- v. Plan sheets shall be eighteen inches (18") by twenty-four inches (24") in size. If said plans are not required to be recorded, then larger sizes will be allowed.
- vi. A minimum of two (2) benchmarks located in a permanent position and shown with elevations referenced to NGVD '29 or NAVD '88. Also, show all reference benchmarks which were used to establish new benchmarks. After all construction is completed within the proposed development, then a minimum of two (2) benchmarks located in a permanent position and shown with elevations referenced to NGVD '29 or NAVD '88 shall be established and the corresponding description and elevation given to the Noble County Surveyor's Office and to any other appropriate governmental entity. Maximum spacing allowed between bench marks shall not exceed 1000 feet. Bench marks shall be spaced such that when a circle with a radius of 500 feet is drawn around each bench mark, all ground within the development shall be located within the above mentioned circles.
- vii. Delineation of all existing and proposed easements for underground and overhead utilities and drainage.

E. Final Drainage Plans

Upon approval of the preliminary drainage plans by the Noble County Surveyor's Office final drainage plans shall be resubmitted to the Noble County Surveyor's Office. In addition to data provided on the preliminary drainage plans and preliminary site engineering plans, the final plans shall provide or be accompanied by calculations, maps and other descriptive material including the following:

- 1. A set of plan drawings stamped by an Indiana Registered Professional Engineer or an Indiana Registered Land Surveyor showing all proposed detention areas, storm sewers, inlets, outfall structures, open ditches, culverts (including driveway crossings) and bridges. At the minimum, these plan drawings should show or be accompanied by the following:
 - i. The extent and area of each watershed area tributary to the drainage channels in the development.
 - ii. Elevations in either National Geodetic Vertical Datum of 1929 (NGVD '29) or North American Vertical Datum of

1988 (NAVD '88), or an assumed datum as specified above.

- iii. Proposed contours and where they tie into existing contours.
 - iv. The street storm sewers and other storm drains to be built, the basis of their design, outfall and outlet locations and invert elevations, receiving stream or channel and its 100-year flood elevations, and the functioning of the drains during 100-year flood conditions.
 - v. The parts of the proposed street system where pavements are planned to be depressed sufficiently to convey or temporarily store overflow from storm sewers and over the curb runoff resulting from the heavier rainstorms and the outlets for such overflow.
 - vi. Existing streams and 100-year floodplains to be maintained, and new channels to be constructed, their locations, cross-sections and profiles.
 - vii. Proposed culverts and bridges to be built, their materials, elevations, waterway openings and basis of their design.
 - viii. Existing detention/retention facilities to be maintained, enlarged or otherwise altered and new facilities to be built and the basis of their design.
 - ix. The estimated location and percentage of impervious surfaces existing and expected to be constructed when the development is completed.
 - x. The slope, type and size of all sewers and other waterways.
 - xi. An erosion control plan as specified in part two of this ordinance (Erosion Control Ordinance).
2. In addition to the criteria and requirements set in this ordinance, the plans and calculations should also meet the following criteria:
- i. If roadside ditches are used rather than storm sewers, the bottom of the ditch should be low enough to install adequately sized driveway culverts without creating "speed bumps". A minimum pipe diameter of 12 inches shall be

used with a minimum cover of 12 inches. Design of culverts shall meet the minimum requirements as specified in Chapter 7 of the 1981 HERPICC Stormwater Drainage Manual or in the most recent edition.

- ii. Driveway culvert inverts shall be designed to adequately consider upstream and downstream culvert elevations.
- iii. Minimum swale and yard slopes are 1% if vegetated and 0.5% if paved.
- iv. Maximum yard slopes shall be 3:1 in excavated or fill areas unless retaining walls are utilized.
- v. Top of finished floor no less than 8 inches above finished grade.
- vi. Spot elevations shown at the drainage break points.
- vii. Pipes have adequate slope to maintain 3.0 feet per second (fps) velocity at full flow.
- viii. When changing pipe size, the invert of the larger pipe shall be lowered sufficiently to maintain the same energy gradient. An appropriate method of insuring these results is to place the 0.8 depth point of both pipes at the same elevation.
- ix. Pipe slope is not so steep that inlets surcharge.
- x. Inlets are placed such that the tributary flows are in accordance with the grate capacity.

F. Submittal and Consideration of Plans

Preliminary drainage plans shall be submitted to the Noble County Surveyor's Office. The Noble County Surveyor's Office shall be given thirty (30) days to review the plans and calculations before a decision is required. Following the initial thirty (30) day review period, all final drainage plans shall be submitted to the Noble County Surveyor's Office in triplicate form (unless more are required by the local jurisdiction) and shall be in compliance with the standards of this ordinance. The Noble County Surveyor's Office shall approve, disapprove, or make recommendations to any preliminary plans within thirty (30) days of submission unless applicant consents in writing to a continuance or extension. The Noble County Surveyor's Office shall approve, disapproved, or make recommendations to any final plans within ten (10) days of submission unless the applicant consents in writing to a continuance or extension. If a final plan is

submitted that contains changes to the preliminary plan in excess of those required by the Noble County Surveyor's Office, then those plans will require thirty (30) days for review. These changes would include, but are not limited to additional lots, storm sewer lines, streets or ponds. All approvals and disapprovals with written reasons shall be given to the applicant and the appropriate governmental jurisdiction. Also, the Noble County Surveyor's Office shall stamp all approved final drainage plans and return one set to the applicant, and one set to the local governmental jurisdiction (if applicable). Any applicant may appeal the decision of the Noble County Surveyor's Office. The appeals process is outlined in Part Four of this Ordinance (Appeals Process).

7. DETERMINATION OF RUNOFF QUANTITIES

Runoff quantities shall be computed for the area of the parcel under development. Determination of off-site runoff quantities may be required if surface water from adjoining land flows on to the land being developed. The quantity of runoff generated for a given rainfall intensity may be calculated as follows:

A. Development sites less than or equal to 5 acres in size, with a drainage area less than or equal to 50 acres and no depressional storage.

The Rational Method may be used for sites meeting the stated criteria. In the Rational Method, the peak rate of runoff, Q, in cubic feet per second (cfs) is computed as:

$$Q = CIA$$

Where: C = Runoff coefficient, representing the characteristics of the drainage area and defined as the ratio of runoff to rainfall.

I = Average intensity of rainfall in inches per hour for a duration equal to the time of concentration (tc) for a selected rainfall frequency.

A = Tributary drainage area in acres.

Guidance to selection of the runoff coefficient "C" is provided by Table 1A and Table 1B (see Appendix) which show values for different types of surfaces and local soil characteristics. The composite "C" value used for a given 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 2 (see Appendix) provides runoff coefficients and inlet times for different land use classifications. In the instance of undeveloped land

situated in an upstream area, a coefficient or coefficients shall be used for this area in its present state of development.

Rainfall intensity shall be determined from the rainfall frequency curves shown in Figure 1 (see Appendix) or from data shown in Table 5B (see Appendix). The time of concentration (tc) to be used shall be the sum of the inlet time and flow time in the stormwater facility from the most hydrologic remote part of the drainage area to the point under consideration. The flow time in the storm sewers may be estimated by the distance in feet divided by velocity of flow in feet per second. The velocity shall be determined by the Manning's Equation (see Section 10). Inlet time is the combined time required for the runoff to reach the inlet of the storm sewer. Inlet time includes overland flow time and flow time through established surface drainage channels such as swales, ditches and sheet flow across such areas as lawns, fields and other graded surfaces.

All stormwater management projects within Noble County shall be evaluated using the time of concentration methodology outlined in the U.S. Department of Agriculture (USDA) - Soil Conservation Service (SCS) TR-55 Manual or another method acceptable to the Noble County Surveyor's Office. The SCS TR-55 methodology examines the factors which affect time of concentration including surface roughness, channel shape and flow patterns along with watershed slope. Through the examination of sheet, shallow concentrated and open channel flows, a more refined time of concentration may be determined. The methodology represents the standardization by the SCS for procedures to calculate the times of concentration.

B. Development sites greater than 5 acres in size, or when the contributing drainage area is in excess of 50 acres or contains significant depressional storage.

The runoff rate for development sites meeting the stated criteria shall be determined by the use of an acceptable computer program for sites meeting the stated criteria as described in Section 5 (See Page 23).

The Noble County Surveyor's Office may allow various methods of runoff calculations for sites with unique characteristics.

8. AMOUNT OF RUNOFF TO BE ACCOMMODATED BY VARIOUS PARTS OF THE DRAINAGE FACILITY

Various parts of a drainage facility shall accommodate runoff water as follows:

A. Minor Drainage System

The minor drainage system such as inlets, catch basins, street gutters, swales, sewers and small channels which collect stormwater shall accommodate, as a minimum, peak runoff from a 10-year return frequency storm. For Rational Method analysis, the duration shall be equal to the time of concentration for the drainage area. In computer-based analysis, the duration is as noted in the applicable methodology associated with the computer program.

These minimum requirements shall be satisfied:

1. The allowable spread of water on collector streets is limited to maintaining two clear 10 foot moving lanes of traffic. One lane is to be maintained on local roads, while other access lanes (such as a subdivision cul-de-sac) can have a water spread equal to one-half of their total width and a maximum water depth of 0.35 feet.

The depth of water in parking lots shall not exceed the maximum allowed water depth as allowed in the most recent edition of the HERPICC Stormwater Drainage Manual.

2. Open channels carrying greater than 30 cubic feet per second shall be capable of accommodating peak runoff for a 24-hour, 50-year return frequency storm within the drainage easement.
3. Culverts shall be capable of accommodating peak runoff from a 24-hour, 50-year return frequency storm when crossing under a road which is part of the INDOT functional classification system.
4. Rear and side lot swales shall not carry more than 4 cfs and only 2 cfs if a swale crosses a sidewalk.

B. Major Drainage System

Major drainage systems are defined in Section 4 and shall be designed in accordance with IDNR standards.

9. LEVEL OF PROTECTION

The lowest floor elevations of all residential, commercial or industrial buildings, shall be such that all floors, including the lowest basement opening, shall be at the flood protection grade and therefore have 2 feet of freeboard above the 100-year flood elevation, as defined by FEMA.

The low entry elevation for residential buildings outside the 100-year floodplain shall be based upon the maximum flood of record or upon the 100-year flood, whichever is greater, together with a freeboard of two feet, as applies to ponds and swales. Pad

elevations for residential buildings shall be a minimum of 15 inches above the centerline of an adjacent road elevation.

10. STORM SEWER DESIGN STANDARDS

All storm sewer construction, which is required by this ordinance, shall conform to the design standards and other requirements contained herein. The Rational Method will be acceptable for storm sewer design, as long as the SCS TR-55 time of concentration methodology is used. Determination of hydraulic capacity for storm sewers sized by the Rational Method analysis should be done using Manning's Equation.

A. Manning's Equation

The hydraulic capacity of storm sewers shall be determined using the Manning's Equation to determine velocity, where:

$$V = \left(\frac{1.486}{n} \right) \left(R \frac{2}{3} \right) \left(S \frac{1}{2} \right)$$

Where:

V = mean velocity of flow in feet per second

R = the hydraulic radius in feet

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

n = Manning's "n" or roughness coefficient

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 3 (see Appendix).

B. Minimum Size for Storm Sewers

The minimum diameter of all storm sewers shall be twelve (12) inches or ten (10) inches from a single lead. The rate of release for detention storage shall be controlled by an orifice plate or other device, subject to approval of the Noble County Surveyor's Office, when the minimum twelve (12) inch diameter pipe will not sufficiently limit the rate of release to the required amount.

C. Pipe Cover and Grade

Sewer grade shall be such that, in general, a minimum of 18 inches of cover in non-traffic areas is maintained over the top of the pipe. If the pipe is to be placed under pavement, then the minimum pipe cover shall be 36 inches from road surface to top of pipe. Design of culverts shall meet the minimum requirements as specified in the most recent edition of the HERPICC Manual. Uniform slopes shall be maintained between drainage structures. Final grade shall be set with full consideration of the capacity required, sedimentation

problems and other design parameters. Minimum and maximum allowable slopes shall be those capable of producing velocities of between 3.0 and 15 feet per second, respectively, at full capacity. Maximum permissible velocities for storm sewer materials are listed in Table 3 (see Appendix).

D. Alignment

In general, storm sewers shall be laid with straight alignment between manholes. Curvilinear alignment of storm sewers will be considered on a case by case basis providing compression joints are specified and ASTM or specified pipe manufactures’ maximum allowable pipe joint deflection limits are not exceeded. Curvilinear storm sewers shall be limited to simple curves that start and end at manholes. When curvilinear storm sewers are proposed, minimum slopes must be increased accordingly to provide the required minimum velocity when flowing full.

E. Manholes

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. Where pipe size changes.
3. Where a change in horizontal alignment occurs.
4. Where a change in grade occurs.
5. At intervals in straight sections of sewer, not to exceed the maximum allowed.

The maximum distances between storm sewer manholes are as follows:

Size of Pipe (Inches)	Maximum Distance (Feet)
12 through 42	400
48 and larger	600

F. Inlets

Inlets or drainage structures shall be utilized to collect surface water through grated openings and convey it to storm sewers, channels or culverts. The inlet grate design, spacings, placement, and openings provided shall meet or exceed the requirements presented in Chapter 5 of the 1981 edition of the HERPICC Stormwater Drainage Manual or the most recent edition. Other design criteria may be utilized if approved by the Noble County Surveyor's Office.

11. WORKMANSHIP AND MATERIALS

A. Workmanship

The specifications for the construction of storm sewers shall not be less stringent than those set forth in the latest edition of the Indiana Department of Transportation "Standard Specifications". Additionally, ductile iron pipe shall be laid in accordance with American Water Works Association (AWWA) C-600 and clay pipe shall be laid in accordance with either American Society of Testing Materials (ASTM) C-12 or the appropriate American Association of State Highway and Transportation Officials (AASHTO) specifications.

B. Materials

Storm sewer manholes and inlets shall be constructed of masonry, cast in place concrete or precast reinforced concrete. Material and construction shall conform to the most recent edition of the Indiana Department of Transportation (IDOT) "Standard Specifications", specifically in Sections 907 and 908, and all other related sections governing pipe and related materials. Material and construction shall also conform to any local regulations or restrictions if more stringent than the IDOT "Standard Specifications."

C. Special Hydraulic Structures

Special hydraulic structures required to control the flow of water in storm runoff drainage systems include junction chambers, drop manholes, inverted siphons, stilling basins and other special structures. The use of these structures shall be limited to those locations justified by prudent planning and by careful and thorough hydraulic engineering analysis.

12. OPEN CHANNEL DESIGN STANDARDS

All open channels, whether private or public, and whether constructed on private or public land, shall conform to the design standards and other design requirements contained herein.

A. Manning's Equation

The waterway for channels shall be determined using Manning's Equation,

$$Q = \left(\frac{1.486}{n} \right) (A) \left(R \frac{2}{3} \right) \left(S \frac{1}{2} \right)$$

where, Q = Discharge in cubic feet per second (cfs)
 A = Waterway area of channel in square feet

Parameters R, S, and n are explained in Section 10A.

B. 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 depth may be required to provide adequate outlets for subsurface drains, tributary ditches, or streams. The channel grade shall be such that the velocity in the channel is high enough to prevent siltation but low enough to prevent erosion. Velocities less than 1.5 feet per second should be avoided since siltation will take place and ultimately reduce the channel cross-section. The maximum permissible velocities in vegetal-lined channels are shown in Table 4 (see Appendix). Developments through which the channel is to be constructed shall be considered in the design of the channel section.

C. Side Slopes

Earthen channel side slopes shall be no steeper than 2 horizontal to 1 vertical (2:1). Flatter slopes may be required to prevent erosion and for ease of maintenance. Where channels will be lined, side slopes shall be no steeper than 1 ½ horizontal to 1 vertical (1.5:1) with adequate provisions made for weep holes. Side slopes steeper than 1 ½ horizontal to 1 vertical (1.5:1) may be used for lined channels provided that the side lining is designed and constructed as a structural retaining wall with provisions for live and dead load surcharge.

D. Channel Stability

1. Characteristics of a stable channel are:
 - i. It neither promotes sedimentation or degrades the channel bottom and sides beyond tolerable limits.
 - ii. The channel banks do not erode to the extent that the channel cross-section is changed appreciably.
 - iii. Excessive sediment bars do not develop.
 - iv. Excessive erosion does not occur around culverts, bridges,

outfalls or elsewhere.

- v. Gullies do not form or enlarge due to the entry of uncontrolled flow to the channel.
2. 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, using an "n" value for various channel linings as shown in Table 3 (see Appendix) of this ordinance. In no case is it necessary to check channel stability for discharges greater than that from a 100-year frequency storm.
 3. Channel stability shall be checked for conditions immediately after construction. For this stability analysis, the velocity shall be calculated for the expected flow from a 10-year frequency storm on the watershed, or the bank full flow, whichever is smaller, and the "n" value for the newly constructed channels in fine-grained soils and sands may be determined in accordance with the "National Engineering Handbook 5, Supplement B, Soil Conservation Service" and shall not exceed 0.025. The allowable velocity in the newly constructed channel may be increased by a maximum of 20 percent to reflect the effects of vegetation to be established under the following conditions:
 - i. The soil and site in which the channel is to be constructed are suitable for rapid establishment and support of erosion controlling vegetation.
 - ii. Species of erosion controlling vegetation adapted to the area, and proven methods of establishment are shown.
 - iii. The channel design includes detailed plans for establishment of vegetation on the channel side slopes.

E. Drainage of Waterways

Vegetated waterways which have a centerline slope of less than one (1) percent (one vertical foot of fall in one hundred horizontal feet) and which are subject to low flows of long duration or where wet conditions prevail shall be drained with an enclosed conduit system or by other means such as paved gutters. Enclosed conduit lines under vegetated waterways shall be discharged into a storm sewer manhole, catch basin or inlet.

F. Establishment of New Regulated Drain

When it is necessary to establish a new regulated drain, the requirements of the most current revisions of Indiana Code 36-9-27-1 through 113, shall be followed.

G. Appurtenant Structures

The design of channels will include provisions for operation and maintenance and the proper functioning of all channels, laterals, travelways and structures associated with the project. Recessed inlets and structures needed for entry of surface and subsurface flow into channels without significant erosion or degradation shall be included in the design of channel improvements. The design will also provide for necessary flood gates, water level control devices, and any other appurtenant structure affecting the functioning of the channels and the attainment of the purpose for which they are built.

The effects of channel improvements on existing culverts, bridges, buried cables, pipelines and inlet structures for surface and subsurface drainage on the channel being improved and laterals thereto shall be evaluated to determine the need for modification or replacement. Culverts and bridges which are modified or added as part of channel improvement projects shall meet all requirements of the governmental agency that has jurisdiction of that structure.

H. Disposition of Spoil

Spoil material resulting from clearing, grubbing and channel excavation shall be disposed of in such a manner which will:

1. Minimize overbank wash.
2. Provide for the free flow of water between the channel and floodplain boundary unless the valley routing and water surface profiles are based on continuous dikes being installed.
3. Not hinder the development of travelways for maintenance.
4. Leave the right-of-way in the best condition feasible, consistent with the project purposes, for productive use by the owner.
5. Improve the aesthetic appearance of the site to the extent feasible.
6. Be approved by the IDNR or US Army Corps of Engineers (whichever is applicable), if deposited in the floodway.

13. CONSTRUCTION AND MATERIALS

A. Construction

Specifications shall be in keeping with the standards outlined in this ordinance and shall describe the requirements for proper installation of the project to achieve its intended purpose.

B. Materials

Materials acceptable for use as channel lining are:

1. Grass
2. Revetment Riprap
3. Concrete
4. Hand Laid Riprap
5. Precast Cement Concrete Riprap
6. Grouted Riprap
7. Gabions
8. Mattings (Straw, coconut, or synthetic)
9. Other-as approved by the Noble County Surveyor's Office

Other lining materials shall receive specific approval of the Noble County Surveyor's Office.

14. STORMWATER DETENTION

The following shall govern the design of any improvement with respect to the detention of stormwater runoff.

A. Acceptable Detention Methods

The increased stormwater runoff resulting from a proposed development should be detained on-site by the provisions of appropriate wet bottom retention or dry bottom detention facilities, storage on flat roofs, parking lots, streets, lawns, or other techniques acceptable to the Noble County Surveyor's Office. Detention/retention facilities shall be sized to store excess flows from storms with a 100-year return period. Control devices shall limit the discharge to a rate no greater than that prescribed by this ordinance (see Section 14, subsection E). Detention/retention facilities shall be sized to store excess flows from storms with a 100-year return period. Control devices shall limit the discharge to a rate no greater than that prescribed by this ordinance (see Section 14, subsection E).

B. Design Storm

Design of stormwater detention/retention facilities shall be based on a storm with a 1% chance of occurrence every year, also known as a 100-year storm. The storage volume and outflow rate shall be sufficient to handle

stormwater runoff from a 24-hour duration storm. Rainfall depth-duration-frequency relationships and intensity-duration-frequency relationships shall be used based on the parameters provided in Table 5A (see Appendix) and Table 5B (see Appendix).

C. Allowable Release Rate

The SCS TR-20 computer model or any other method approved by the Noble County Surveyor's Office shall be used to determine the 5-year return period pre-development release rate for development sites larger than 5 acres in size, or when the contributing drainage area is in excess of 50 acres or contains significant existing depressional storage.

The Rational Method or any other method approved by the Noble County Surveyor's Office shall be used to determine the 5-year return period pre-development release rate for development sites of less than or equal to 5 acres in size of commonly owned contiguous property, with a drainage area less than or equal to 50 acres and no depressional storage.

In the event the natural downstream channel or storm sewer system is inadequate to accommodate the release rate provided above, then the allowable release rate shall be reduced to that rate permitted by the capacity of the receiving downstream channel or storm sewer system. Additional detention as determined by the Noble County Surveyor's Office may be required to store that portion of the runoff exceeding the capacity of the receiving sewers or waterways.

D. Drainage System Overflow Design

Either of the following two conditions shall be met for handling offsite drainage.

1. Drainage systems, including all ditches, channels, conduits, swales, etc., shall have adequate capacity to convey the stormwater runoff from all upstream tributary areas (off-site land areas) through the development under consideration for a 100-year return period design storm calculated on the basis of the upstream land in its present state of development.
2. Closed conduits shall be designed to handle the 5-year return period design storm calculated on the basis of the upstream land in its present state of development and all ditches, channels, and swales, etc., shall be designed to handle the 100-year return period storm design calculated on the basis of the upstream land in its present state of development.

Swales between privately owned residential lots shall not be utilized for handling the 100-year return period storm events. Swales handling the 100-year return period storm event shall be located within a drainage easement large

enough to prevent water from flowing onto adjacent property and for the maintenance of said swale.

An allowance, equivalent to the reduction in flow rate provided, may be made for upstream detention when such upstream detention and release rate have previously been approved by the Noble County Surveyor's Office and evidence of its construction and maintenance can be shown.

E. Acceptable Outlet

Design and construction of the stormwater facility shall provide for the discharge of the stormwater runoff from off-site land areas as well as the stormwater from the area being developed (on-site land areas) to an acceptable outlet(s) having capacity to receive upstream (off-site) and on-site drainage.

The acceptable outlet for stormwater discharge shall be a regulated drain, a "Blue Line" open drain as shown on the U.S.G.S. Quadrangle Maps, or an existing municipal storm sewer line. All of the above mentioned outlets must be of adequate condition and size to handle the additional capacity. The Noble County Surveyor shall have the final authority to determine if the outlet is acceptable. Roadside ditches may be acceptable provided permission is granted from right-of-way owner, roadside ditch is in a maintained condition, and the outlet for the roadside ditch is a regulated drain.

Where the outfall from the stormwater drainage system of any development flows through real estate owned by others prior to reaching a regulated drain, municipal storm sewer, or natural waterway, no approval shall be granted for such stormwater drainage system until a drainage easement is obtained.

F. Determination of Storage Volume

The required volume of stormwater storage for development sites less than or equal to 5 acres in size, with a drainage area less than or equal to 50 acres and no depressional storage, shall be calculated using, as a minimum, the Rational Method and based on the runoff from a 100-year return period storm. However, the use of the SCS TR-20 computer model, SCS TR-55 computer model, or the POND-2 computer model is recommended to provide a more detailed analysis. Other design methods may also be used, subject to approval of the Noble County Surveyor's Office. Detention/retention facilities shall be sized to store excess flows from storms with a 100-year return period. Control devices should limit the discharge to a rate no greater than than prescribed by this ordinance (see section 14, subsection E).

The following 11 step procedure, based on the Rational Method, may be used to determine the required volume of storage.

1. Determine total drainage area in acres "A."
2. Determine composite runoff coefficient "Cu" based on existing land use.
3. Determine time of concentration "Tc" in minutes based on existing conditions.
4. Determine rainfall intensity "Iu" in inches per hour, based on time of concentration and using Figure 1 or from data given in Table 5B (see Appendix) for the 5-year return period.
5. Compute runoff based on existing land use and 5-year return period.
6. Determine composite runoff coefficient "Cd" based on developed conditions and a 100-year return period.
7. Determine 100-year return rainfall intensity "Id" for various storm durations "TD" up through the time of concentration for the developed area using Table 5B (see Appendix).
8. Determine developed inflow rates "Q" for various storm durations times "TD", measured in hours.

$$Qd = (Cd)(Id)(Ad)$$

9. Compute a storage rate "S(TD)" for various storm durations "TD" up through the time of concentration of the developed area.

$$S(Td) = (Qd) - (Qu)$$

10. Compute required storage volume "SR" in acre-feet for each storm duration "TD". This assumes a triangular hydrograph of duration (2 x td) hours with a peak flow of S(td) at td hours.

$$SR = S(td)t \left(\frac{d}{12} \right)$$

11. Select largest storage volume computed in Step 10 for any storm duration "td" for detention basin design.

All detention storage calculations for development sites greater than 5 acres in size, or when the contributing drainage area is in excess of 50 acres or contains significant depressional storage, shall be prepared using the SCS TR-20

computer program or another similar accepted method as approved by the Noble County Surveyor's Office. The SCS TR-55 time of concentration and curve number calculation methodologies shall be used, along with the Huff Third Quartile (50%) and a 24-hour duration storm.

G. General Detention Basin Design Requirements

Basins shall be constructed to temporarily detain the stormwater runoff which exceeds the maximum peak release rate authorized by this ordinance. The volume of storage provided in these basins, together with such storage as may be authorized in other on-site facilities shall be sufficient to control excess runoff from the 100-year storm.

The following design principles shall be observed:

1. It is desirable that the maximum volume of water stored and subsequently released at the design release rate shall not result in a storage duration in excess of 48 hours from the start of the storm unless additional storms occur within the period.
2. For residential developments, the maximum planned depth of stormwater stored (without a permanent pool) shall not exceed four (4) feet where practical.
3. Where possible, all stormwater detention facilities should be no closer than 25 feet from any boundary or property line. Due care shall be taken to design all detention facilities to minimize all potential hazards to life and property.
4. All excavated excess spoil shall be spread so as to provide for aesthetic and recreational features such as sledding hills, sports fields, etc. Slopes no steeper than 3 horizontal to 1 vertical (3:1) for safety, erosion control, stability and ease of maintenance shall be permitted.
5. Safety screens having a maximum opening of four (4) inches shall be provided for any pipe to prevent children or large animals from crawling into the structures.
6. Danger signs shall be mounted at appropriate locations to warn of deep water, possible flood conditions during storm periods and other dangers that exist. Due care shall be taken to design all detention facilities to minimize all potential hazards to life and property. A minimum distance of 25 feet shall separate any detention facility from any road right-of-way. Due care shall also be taken in the design of the detention facilities to eliminate the

possibility of vehicular and pedestrian traffic from entering the detention facility.

7. Outlet control structures shall be designed to operate as simply as possible and shall require little or no maintenance and/or attention for proper operation. They shall limit discharges into existing or planned downstream channels or conduits so as not to exceed the predetermined maximum authorized peak flow rate.
8. Emergency overflow facilities such as a weir or spillway shall be provided for the release of at least 100-year storm runoff (or, if applicable, the minimum required under the IDNR dam safety criteria) or in emergency conditions should the normal discharge devices become totally or partially inoperative. The overflow facility shall be of such design that its operation is automatic and does not require manual attention.
9. Grass or other suitable vegetative cover shall be provided throughout the entire detention storage basin area. Grass should be cut regularly at approximately monthly intervals during the growing season or as required to maintain facility. Grass should not exceed a height of 9 inches.
10. Periodic maintenance of all detention facilities and storm water infrastructure shall be addressed in subdivision restrictive covenants. Maintenance shall be performed on a regular basis to assure continued operation in conformance to design. The following items shall be addressed in the subdivision restrictive covenants on the final plat:
 - ◆ Who will pay for maintenance of the detention facilities?
 - ◆ How payment for maintenance of the detention facilities will be collected?
 - ◆ Ownership of land on which the detention facilities are located.
 - ◆ Who will perform maintenance of the detention facilities?
 - ◆ Detailed plan of maintenance to be performed on the detention facilities.
 - ◆ How often will maintenance be performed on the detention facilities?
 - ◆ Structural components of the detention facility to be maintained.
11. Hydraulic calculations shall be submitted to substantiate all design features.

12. No residential lots or any part thereof, shall be used for any part of a detention basin or for the storage of water, either temporary or permanent.

H. Dry Bottom Facility Design Requirements

Detention facilities which will not contain a permanent pool of water shall comply with the following requirements:

1. Provisions shall be incorporated into facilities for complete interior drainage of dry bottom facilities, including the provisions of natural grades to outlet structures, longitudinal and transverse grades to perimeter drainage facility, paved gutters, or the installation of subsurface drains. If the bottom slope of the detention facility is less than 1%, then subsurface drainage shall be provided.
2. The detention facility shall, whenever possible, be designed to serve as a secondary or multipurpose function. Recreational facilities, aesthetic qualities (open spaces) or other types of use shall be considered in planning the detention facility.
3. In excavated detention facilities, a side slope of no steeper than a 3:1 shall be provided for stability. In the case of valley storage, natural slopes may be considered to be stable.

I. Wet Bottom Facility Design Requirements

Where part of a detention facility will contain a permanent pool of water, all the items required for detention storage shall apply except that the system of drains with a positive gravity outlet required to maintain a dry bottom facility will not be required. A controlled positive outlet will be required to maintain the design water level in the wet bottom facility and provide required detention storage above the design water level. However, the following additional conditions shall apply:

1. In excavated lakes, the underwater side slopes in the lake shall be stable. In the case of valley storage, natural slopes may be considered to be stable.
2. A safety ledge a minimum of eight (8) feet in width is required and shall be installed in all wet bottom facilities approximately 12 to 24 inches (a maximum of 18 inches for residential subdivisions) below the permanent water level. In addition, a similar maintenance ledge 12 to 18 inches above the permanent water line may be provided. The slope between the two ledges shall be stable and of a material such as stone or riprap which will prevent erosion

due to wave action.

3. Periodic maintenance is required in lakes to control weed and larval growth. The facility shall also be designed to provide for the easy removal of sediment which will accumulate during periods of reservoir operation.
4. For emergency use, facility cleaning or shoreline maintenance, additional facilities may have to be provided or plans prepared for auxiliary equipment to permit emptying and drainage.
5. Aeration facilities to prevent pond stagnation shall be provided, if required. Design calculations to substantiate the effectiveness of these aeration facilities shall be submitted with final engineering plans. Agreements for the perpetual operation and maintenance of aeration facilities shall be prepared to the satisfaction of the Noble County Surveyor's Office.

J. Roof Top Storage

Detention storage requirements may be met in total or in part by detention on flat roofs. Details of such design to be included in the building permit application shall include the depth and volume of storage, details of outlet devices and downdrains, elevations of emergency overflow provisions and certification of the structural portion of the building design plans by a structural engineer. This type of storage is allowable but should only be utilized as a last resort if no other options are available.

K. Parking Lot Storage

Paved parking lots may be designed to provide temporary detention storage of storm waters on all or a portion of their surfaces. Outlets will be designed so as to empty the stored waters slowly. Depths of storage shall be limited to the maximum depth allowed in the most recent addition of the HERPICC Stormwater Drainage Manual. This depth should be kept to a minimum so as to prevent damage to parked vehicles and so that access to parked vehicles is not impaired. Ponding should in general, be confined to those positions of the parking lots farthest from the area served.

L. Facility Financial Responsibilities

The construction cost of stormwater control systems and required facilities which are identified in the Noble Storm Drainage and Erosion Control Ordinance shall be accepted by the developer or owner as part of the cost of land development.

M. Facility Maintenance Responsibilities

Maintenance of detention/retention facilities during construction and thereafter, shall be the responsibility of the land developer/owner. Assignment of responsibility for maintaining facilities serving more than one lot or holding shall be documented by appropriate covenants to property deeds, unless responsibility is formally accepted by a public body, and shall be determined before the final drainage plans are approved. See Part 1, Section 14, item G, for a list of requirements to be addressed with regard to facility maintenance responsibilities.

N. Inspections

All public and privately owned detention storage facilities may be inspected by representatives of the Noble County Surveyor's Office.

O. Corrective Measures

See Part four (Enforcement Structure of Ordinance) of this ordinance.

P. Joint Development of Control Systems

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

Q. Installation of Erosion Control Systems

Runoff and erosion control systems shall be installed as soon as possible during the course of site development. The Noble County Surveyor's Office will require an erosion control plan to be submitted as part of the construction plans and specifications. Basins should be designed to collect sediment and debris in specific locations so that removal costs are kept to a minimum.

R. Detention Facilities in Floodplains

If detention storage is provided within a 100-year floodplain, only the net increase in storage volume above that which naturally existed on the floodplain shall be credited to the development. No credit will be granted for volumes below the elevation of the regulatory flood at the location unless compensatory storage is also provided.

S. Off-Site Drainage Provisions

When the allowable runoff is released in an area that is susceptible to flooding, the developer may be required to construct appropriate storm drains through such area to avert increased flood hazard caused by the concentration of allowable runoff at one point instead of the natural overland distribution.

15. EROSION AND SEDIMENT CONTROL

See Part Two (Ordinance for Erosion Control on Sites with Land Disturbing Activities) of this Ordinance.

16. CERTIFICATIONS REQUIRED

After completion of the project and before final approval and acceptance can be made, a certified “record” set of plans, as prepared by a registered engineer or registered land surveyor, shall be submitted to the Noble County Surveyor’s Office and appropriate local entity. These plans shall include all pertinent data relevant to the completed storm drainage system and shall include as a minimum:

- ◆ Pipe material.
- ◆ Invert elevations.
- ◆ Top rim elevations.
- ◆ Length and size of all pipe structures.
- ◆ Volume of retention/detention facilities as finally constructed and as based on actual survey data.
- ◆ Certified statement on plans saying the completed storm drainage system substantially complies with the final drainage plans and/or construction plans as approved by the Noble County Surveyor’s Office. All such submitted plans shall be reviewed for compliance within 30 days after submittal to the Noble County Surveyor’s Office.
- ◆ Any variations from approved plans.
- ◆ All elevations as based on required datum.
- ◆ Descriptions of all permanent bench marks as referenced in Section 6-D-2-vii (Preliminary Site Engineering Plans).

17. CHANGES IN PLAN

Any significant change or deviation in the detailed plans and specifications after granting formal approval shall be filed in duplicate with and approved by the Noble County Surveyor’s Office prior to the land development involving the change. Copies of the changes, if approved, shall be attached to the original plans and specifications.

18. DETERMINATION OF IMPACT DRAINAGE AREAS

The Noble County Surveyor's Office is authorized, but is not required, to classify certain geographical areas as Impact Drainage Areas and to enact and promulgate regulations which are generally applied. In determining Impact Drainage Areas, the Noble County Surveyor's Office shall consider such factors as topography, soil type, capacity of existing legal drains and distance from adequate drainage facility. The following areas shall be designated as Impact Drainage Areas, unless good reason for not including them is presented to the Noble County Surveyor's Office.

- ◆ A floodway or floodplain as designated by the Noble County Storm Water and Erosion Control Ordinance.
- ◆ Land within 75 feet of each bank of any regulated ditch.
- ◆ Land within 75 feet of the center line of any regulated drain enclosed conduit.

Land where there is not an adequate outlet, taking in to consideration the capacity and depth of the outlet, may be designated as an Impact Drainage Area by resolution of the Noble County Drainage Board. Special requirements for development within any Impact Drainage Area shall be included in the resolution.

19. OTHER REQUIREMENTS

A. Sump Pumps

Sump pumps installed to receive and discharge groundwater or other storm waters shall be connected to the storm sewer where possible or discharged into a designated storm drainage channel. Sump pumps installed to receive and discharge floor drain flow or other sanitary sewage shall be connected to the sanitary sewers. A sump pump shall be used for one function only, either the discharge of storm waters or the discharge of sanitary sewage.

B. Down Spouts

All down spouts or roof drains shall discharge onto the ground or be connected to the storm sewer. No down spouts or roof drains shall be connected to the sanitary sewers.

C. Footing Drains

Footing drains shall be connected to storm sewers where possible or designated storm drainage channels. No footing drains or drainage enclosed conduit shall be connected to the sanitary sewer.

D. Basement Floor Drains

Basement floor drains shall be connected to the sanitary sewers.

20. DISCLAIMER OF LIABILITY

The degree of protection required by this ordinance is considered reasonable for regulatory purposes and is based on historical records, engineering and scientific methods of study. Larger storms may occur or stormwater runoff depths may be increased by man-made or natural causes. This ordinance does not imply that land uses permitted will be free from stormwater damage. This ordinance shall not create liability on the part of the Noble County Surveyor's Office or any officer or employee thereof for any damage which may result from reliance on this ordinance or on any administrative decision lawfully made thereunder.

21. CORRECTIVE ACTION

Nothing herein contained shall prevent the Noble County Surveyor's Office or any city or town which has jurisdiction over a development from taking such other lawful action as may be necessary to prevent or remedy any violation. All costs connected therewith shall accrue to the person or persons responsible.

22. REPEALER

All ordinances or parts thereof in conflict with the provisions of this ordinance are repealed.

23. WHEN EFFECTIVE

This ordinance shall become effective after its final passage, approval and publication as required by law.

24. EXEMPT PROJECTS

Single-family dwelling houses in accepted subdivisions, new buildings (or cumulative building additions) with an area of less than 500 square feet in Urban areas and an area of less than 1000 square feet in Rural areas, and land-disturbing activities affecting less than 10,000 square feet of area may be exempted from the requirements of this Ordinance by the Noble County Surveyor. Agricultural activities as defined by this ordinance shall also be exempt from this Ordinance. Local government agency projects that were determined to be exempt from compliance with the previous version of the Ordinance shall be exempt from compliance for a period of two years after the effective date of this Ordinance.

Noble County recognizes the fact that each development project is unique and that on occasion a particular site may have unusual conditions that will make it difficult for the site developer to meet all applicable requirements of the Ordinance. Therefore, the Noble County Surveyor may grant exceptions or waive certain requirements for a project,

provided that the intent of the Ordinance is met. The applicant is encouraged to request a pre-submittal meeting with the Noble County Surveyor to discuss the applicability of various provisions of the Ordinance with regards to unique or unusual circumstances relating to a project. A decision of the Noble County Surveyor based on information presented in the pre-submittal meeting may be appealed pursuant to Part 6 of this Ordinance. However, any initial determination of such applicability shall not be binding on future determinations of the Noble County Surveyor that may be based on the review of more detailed information and plans.

Noble County municipal projects and projects performed by local government agencies shall be exempt from the application/review fees imposed by this Ordinance, but are expected to meet all applicable technical requirements of this Ordinance.

25. NO PRIVATE RIGHTS CONFERRED

Notwithstanding any provision as contained herein, this ordinance shall not be construed to confer any private enforceable rights upon any private person, firm or corporation for enforcement of this ordinance, for damages, for injunctive relief or for any cause of action whatsoever resulting of non-compliance herewith. All rights to enforcement of this ordinance shall be exclusively delegated to Noble County or an incorporated city or town within the county acting in its public capacity.

26. INSPECTION

The Noble County Surveyor, or the surveyor's representative, may enter the site for verifying compliance with the stormwater drainage ordinance, or for performing any work necessary to bring the site into compliance with the stormwater drainage ordinance. Required inspections shall be performed within two working days of notification.

The following minimum inspections and notifications will be required:

- ◆ Notification shall be given before beginning construction of storm sewer infrastructure.
- ◆ Random inspections will be performed during the construction of the storm sewer infrastructure.



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PART TWO

ORDINANCE FOR EROSION CONTROL ON SITES WITH LAND DISTURBING ACTIVITIES

TABLE OF CONTENTS

Sections

1.	AUTHORITY	56
2.	FINDINGS AND PURPOSE	56
3.	APPLICABILITY	56
4.	CONFLICTING ORDINANCES/REQUIREMENTS	57
5.	DEFINITIONS	57
6.	GENERAL PRINCIPLES	58
7.	DESIGN CRITERIA, STANDARDS AND SPECIFICATIONS FOR EROSION CONTROL MEASURES	58
8.	EROSION AND SEDIMENT CONTROL REQUIREMENTS	58
9.	CONTENT REQUIREMENTS OF EROSION CONTROL PLANS	59
10.	REVIEW OF EROSION CONTROL PLANS	61
11.	PERMITS	61
12.	INSPECTION	62

The intent of this ordinance is the control of soil erosion and sedimentation caused by land disturbing activities within Noble County. Measures taken to control erosion and sedimentation should assure that sediment is not transported from a site by storm events.

1. AUTHORITY

This ordinance is adopted under the authority granted by Indiana Code #36-1-4-11, #36-7-4, and all acts supplemental and mandatory thereto. This authority provides for the administration, enforcement and amendment of this ordinance for controlling soil erosion within Noble County.

2. FINDINGS AND PURPOSE

- A. Soil erosion resulting from land disturbing activities causes a significant amount of sediment and other pollutants to be transported off-site to locations including ditches, streams, wetlands, lakes, and reservoirs.
- B. The purpose of this ordinance is to conserve the natural resources; to protect the quality of air and water, and to protect and promote the health, safety and welfare of people to the extent practicable by minimizing the amount of sediment and other pollutants, resulting from soil erosion due to land disturbing activities, from being transported off-site to adjacent public or private lands including ditches, streams, lakes, wetlands, and reservoirs.

3. APPLICABILITY

The ordinance applies to all land disturbing activities on land within the boundaries and jurisdiction of Noble County. Agricultural Land Disturbing Activities as defined in Section 5, and Soil & Water Conservation projects, implemented through the Noble County Soil and Water Conservation District and the Noble County Surveyor's Office, are exempt from the requirements of this ordinance.

This section applies to the following sites with land disturbing activities:

- A. Those requiring a minor or major subdivision plat approval or local improvement location permit for the construction of commercial, residential, industrial or institutional buildings on lots of approved subdivision plats;
- B. Those involving grading, removal of protective ground cover or vegetation, excavation, land filling, or other land disturbing activity affecting a surface area of 10,000 square feet or more;
- C. Those involving excavation, filling, or a combination of excavation and filling affecting 1,000 cubic yards (27,000 cubic feet) or more of soil, sand, gravel, stone or other material.

This ordinance does not preclude the applicant from acquiring any other necessary local, state and federal permits.

4. CONFLICTING ORDINANCES/REQUIREMENTS

The provisions of this ordinance shall be deemed as additional requirements to minimum standards required by the Indiana General Permit Rule for Storm Water Run-off Associated With Construction Activity (Rule 5), 327 IAC 15-5 (or most recent revision). In case of conflicting requirements, the most restrictive shall apply.

5. DEFINITIONS

Administering authority means the designated unit of government given the authority to issue permits.

Agricultural land disturbing activities means the disturbance of land, including the clearing of land, for the production of animal or plant life, including forestry, pasturing of livestock, and planting, growing, cultivating, and harvesting crops for human or livestock consumption. This also includes the construction of farm facilities such as dwellings, barns, sheds or other structures.

Erosion means the detachment and movement of soil, sediment, or rock fragments by water, wind, ice or gravity.

Erosion control measure means a practice or a combination of practices to control erosion and resulting sedimentation.

Erosion control plan means a written description of pertinent information concerning erosion control measures designed to meet the requirements of this ordinance.

Land disturbing activity means any man-made change of the land surface, including removing vegetative cover, excavating, filling, transporting and grading.

Runoff means waters derived from melting snow or rain falling within a tributary drainage basin that exceed the infiltration capacity of the soils of that basin, flow over the surface of the ground, or are collected in channels or conduits.

Site means the entire area included in the legal description of the land on which land disturbing activity has been proposed in the permit application.

SWCD means Soil and Water Conservation District, a subdivision of state government charged with the responsibility of establishing programs and setting policy to protect the natural resources with Noble County boundaries.

6. GENERAL PRINCIPLES

The following principles apply to all land disturbing activities within Noble County and should be considered in the preparation of submissions required under this ordinance:

- A. To minimize the potential for soil erosion, development should fit the topography and soils of the site. Areas with steep slopes where deep cuts and fills may be required should be avoided wherever possible, and natural contours should be followed as closely as possible.
- B. Natural vegetation should be retained and protected wherever possible. Areas immediately adjacent to watercourses and lakes also should be left undisturbed wherever possible.
- C. All activities on a site should be conducted in a logical sequence so that the smallest practical area of land will be exposed for the shortest practical period of time during development.
- D. Provisions should be made to accommodate the increased runoff caused by changed soil and surface conditions (impervious areas) during and after development.
- E. Minimize the length and steepness of slopes to reduce erosion potential.

7. DESIGN CRITERIA, STANDARDS AND SPECIFICATIONS FOR EROSION CONTROL MEASURES

All erosion control measures including but not limited to those required to comply with this ordinance shall meet the design criteria, standards, and specifications for erosion control measures similar to or the same as those outlined in the “Indiana Handbook for Erosion Control in Developing Areas” published by the Indiana Department of Natural Resources.

8. EROSION AND SEDIMENT CONTROL REQUIREMENTS

The following requirements shall be met on all sites:

- A. Sediment-laden water flowing from the site shall be detained by erosion control measures appropriate to minimize sedimentation.
- B. Water shall not be discharged in a manner that causes erosion at or

downstream of the point of discharge.

- C. All access to building sites that cross a natural watercourse, drainage easement, or swale/channel shall have a culvert of appropriate size.
- D. Wastes or unused building materials, including but not limited to garbage, debris, cleaning wastes, wastewater, toxic materials, and hazardous substances, shall not be carried by runoff from a site. All wastes shall be disposed of in a proper manner.
- E. Sediment being tracked from a site onto public or private roadways shall be minimized. This can be accomplished initially by a temporary gravel construction entrance, in addition to a well planned layout of roads, access drives, and parking areas.
- F. Public or private roadways shall be kept cleared of accumulated sediment. Bulk clearing of sediment shall not include flushing the area with water.
- G. All storm drain inlets shall be protected against sedimentation with barriers meeting accepted criteria, standards and specifications.
- H. Runoff passing through a site from adjacent areas shall be controlled by diverting it around disturbed areas, where practical. Diverted runoff shall be conveyed in a manner that will not erode the channel and receiving areas. Alternatively, the existing channel may be left undisturbed or improved to prevent erosion or sedimentation from occurring.
- I. Drainage ways and swales shall be designed and adequately protected so that their final gradients and resultant velocities will not cause channel or outlet scouring.
- J. All disturbed ground left inactive for fourteen (14) or more days shall be stabilized by seeding, sodding, mulching, covering, or by other equivalent erosion control measures.
- K. Appropriate sediment control practices shall be installed prior to any land disturbance and thereafter whenever necessary.
- L. During the period of construction activity at a site, erosion control measures necessary to meet the requirements of this ordinance shall be maintained by the applicant.

9. CONTENT REQUIREMENTS OF EROSION CONTROL PLANS



Requirements for projects that will disturb one (1) acre or more of the site:

- 1. A map of existing site conditions is adequate to show the site and adjacent

areas, including:

- A. Site boundaries and adjacent lands which accurately identify the site location.
- B. Lakes, streams, channels, ditches, wetlands and other water courses on and near the site.
- C. One hundred (100) year floodplains, floodway fringes and floodways.
- D. Map showing the location of the predominant soil types as identified by the Noble County Soil Survey, or as determined by a certified professional soil scientist.
- E. Delineation of vegetative cover, such as grass, weeds, brush and trees.
- F. Location and dimensions of storm water drainage systems and natural drainage patterns on and immediately adjacent to the site.
- G. Locations and dimensions of utilities, structures, roads, highways and paving.
- H. Site topography at a contour interval appropriate to indicate drainage patterns.

2. A site construction plan including:

- A. Locations and dimensions of all proposed land disturbing activities.
- B. Locations and dimensions of soil stockpiles and borrow areas.
- C. Locations and dimensions of all erosion control measures.
- D. Sequence of construction, including each land disturbing activity and the installation of erosion control measures.
- E. Provisions for maintenance of the erosion control measures.

3. A plan of final site conditions on the same scale as the existing site map showing proposed site changes.

◆ **Requirements for projects that will disturb less than one (1) acre:**

1. A standardized erosion control and lot drainage plan will be provided to the applicant. The applicant's signature on the plan will serve as acknowledgment of responsibility in complying with the plan.

The erosion control and lot drainage plan will include the following:

- A. Specific measures that the applicant will implement to minimize soil erosion and the migration of soil off of the site and to provide adequate on-site and off-site drainage.
- B. Sequence of construction, including each land disturbing activity and the installation of erosion control and drainage measures.
- C. Provisions for maintenance of the erosion control and drainage measures.

10. REVIEW OF EROSION CONTROL PLANS

The Noble County Surveyor's Office shall be given 30 days to review the application and erosion control plan to determine whether the requirements of this ordinance have been met. In addition, the Noble County SWCD, or its representative, will be provided a copy of the comments on the erosion control plan. If the conditions are met, the Noble County Surveyor's Office shall approve the plan, inform the applicant, and issue a permit. If the conditions are not met, the Noble County Surveyor's Office shall inform the applicant in writing and either may require additional information or may disapprove the plan.

11. PERMITS

- A. No person shall begin a land disturbing activity subject to this ordinance without receiving approval of an erosion control plan.
- B. As a condition of approval and issuance of the permit, the Noble County Surveyor's Office may require the applicant to provide a surety bond or an irrevocable letter of credit when the erosion control plan has been approved to guarantee a good faith execution of the erosion control plan and any permit conditions.
- C. All permits shall require the applicants to:
 1. Notify the Noble County Surveyor's Office at least 24 hours before commencing land disturbing activities.
 2. Notify the Noble County Surveyor's Office prior to modifying the

erosion control plan. This will be necessary if planned measures do not suffice in controlling erosion and off-site sedimentation.

3. Install all erosion control measures as identified in the approved erosion control plan.
4. Maintain all road drainage systems, storm water drainage systems, erosion control measures and other facilities identified in the erosion control plan until the project is stable and has been terminated.
5. Where authorized, remove accumulated sediment from adjacent areas, including drainage ways, and where necessary, repair erosion damage to adjacent areas and drainage ways.

12. INSPECTION

The Noble County Surveyor, or the surveyor's representative, may enter the site for verifying compliance with the erosion control plan, or for performing any work necessary to bring the site into compliance with the erosion control plan. Required inspections shall be performed within two working days of notification.

The following minimum inspections and notifications will be required:

- ◆ An inspection will be required after erosion control measures are installed and before excavation begins (This may occur multiple times throughout a project).
- ◆ Inspection of erosion control procedures will be performed after all major storm events and at random points throughout the construction process.





PART THREE ORDINANCE FEE STRUCTURE

TABLE OF CONTENTS

Sections

1.	TIME OF PAYMENT	63
2.	METHOD OF PAYMENT	64
3.	PLACE OF PAYMENT	64
4.	REFUND OF PAYMENT	64
5.	AMOUNT OF FEES	64
6.	FEE SCHEDULE	64
7.	REQUIRED BONDS	67

Tables

3A.	Fee Schedule for New Development	65
3B.	Fee Schedule for Remodeling, or Additions to Existing Structures, or New Construction on a Previously Platted Tract	66
3C.	Fee Schedule for Land Disturbing Activities	66

1. TIME OF PAYMENT

All required fees must accompany the preliminary plans and request for review of storm drainage and erosion control requirements. The review process and corresponding time of review will not commence until payment is made in full.

2. METHOD OF PAYMENT

Fees shall be paid by one of the following methods:

- ◆ Certified Check
- ◆ Cashiers Check
- ◆ Money Order

All checks shall be made payable to the:

Noble County Surveyor

3. PLACE OF PAYMENT

All fees must be paid at the Noble County Surveyor's Office located at:

Noble County Surveyor's Office
2090 North State Road No. 9, Suite B
Albion, IN 46701

4. REFUND OF PAYMENT

Fees are refundable **only** if the Noble County Surveyor's Office determines that compliance by the development to this ordinance is not necessary.

5. AMOUNT OF FEES

The fees shall be calculated for both the type of development and the land disturbing activities. The higher of these two amounts shall be paid.

6. FEE SCHEDULE

The following tables show the per unit fee assessed with regard to this ordinance. Table 3A (page 65) shows the fee schedule for New Development. Table 3B (page 66) shows the fee schedule for Remodeling, Additions to an Existing Structure, or New Construction on a Previously Platted Tract. Table 3C (page 66) shows the fee schedule for Land Disturbing Activities. The required fee shall be the higher of either Table 3A, Table 3B, or Table 3C (whichever is applicable).

TABLE 3A

Fee Schedule for New Development			
<i>Type of New Development</i>	<i>Unit Price Fee</i>	<i>Minimum Fee</i>	<i>Maximum Fee</i>
◆ Residential Subdivisions			
Storm Sewers and/or Detention Required (Major Subdivision) (1)	\$100.00/Lot	\$500.00	\$5000.00
Storm Sewers and/or Detention Not Required (Minor Subdivision) (2)	\$100.00/Lot	\$200.00	\$300.00
◆ Other Developments and Subdivisions			
Multi-Family Developments	\$100.00/Acre	\$500.00	\$5000.00
Commercial Subdivisions	\$200.00/Acre	\$1000.00	\$5000.00
Industrial Subdivision	\$100.00/Acre	\$1000.00	\$5000.00

- NOTES:
- (1) A Major Subdivision is any subdivision which contains more than three lots or is required to construct either storm sewer lines or detention facilities.
 - (2) A Minor Subdivision is any subdivision with three lots or less AND which is not required to construct either storm sewer lines or detention facilities.

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TABLE 3B

Fee Schedule for Remodeling, or Additions to an Existing Structure, or New Construction on a Previously Platted Tract (3)			
<i>Type of Development</i>	<i>Unit Price Fee</i>	<i>Minimum Fee</i>	<i>Maximum Fee</i>
Multi-Family	\$0.04/Sq. Ft. (4)	\$500.00	\$5000.00
Commercial	\$0.05/Sq. Ft. (4)	\$500.00	\$5000.00
Industrial	\$0.02/Sq. Ft. (4)	\$500.00	\$5000.00

- NOTES:
- (3) Any addition to or remodeling of an existing structure which will increase the runoff of storm water. Also, the construction of any additional hard surface areas such as but not limited to structures, concrete, asphalt, limestone, or gravel.
 - (4) The square footage of any additional hard surface or impervious area such as but not limited to structures, concrete, asphalt, limestone, or gravel.

TABLE 3C

Fee Schedule for Land Disturbing Activities (5)			
<i>Type of Activity</i>	<i>Unit Price Fee</i>	<i>Minimum Fee</i>	<i>Maximum Fee</i>
Disturbed Areas Over One Acre in Size	\$100.00/Acre (6)	\$200.00	\$2000.00
Excavated Material Over 1000 Cubic Yards	\$0.10/Cu. Yd. (7)	\$200.00	\$2000.00

- NOTES:
- (5) Land disturbing activities include any man-made change of the land surface, including but not limited to removing vegetative cover, excavating, filling, transporting and grading.
 - (6) The area of land being disturbed in excess of 1.00 Acre (43,560 Square Feet).
 - (7) The volume of soil being excavated in excess of 1000 Cubic Yards (27,000 Cubic Feet).

7. REQUIRED BONDS

As a condition of approval and issuance of the permit, the Noble County Surveyor's Office shall require the applicant to provide a surety bond or an irrevocable letter of credit when the erosion control plan or storm drainage plan has been approved and before construction begins. Said bond will guarantee a good faith execution of the erosion control plan or storm drainage plan and any permit conditions. The bond shall be for an amount equal to or greater than 20 percent of the total costs of all storm water improvements and erosion control measures for the entire project. The above mentioned costs shall be based on an estimate as prepared by a registered engineer or land surveyor. Said costs shall be for erosion control measures, construction of storm drainage infrastructure, and detention/retention facilities as regulated under this ordinance. Bonds shall be for a minimum of \$500. Local governmental jurisdictions may require additional performance and / or maintenance bonds. The intent of this bond is NOT to complete the installation of storm sewer infrastructure for the project, but rather to insure that ground cover is re-established on excavated areas to prevent erosion. Said bond shall be one of the following:

- ◆ Irrevocable letter of credit.
- ◆ Surety bond from a sufficiently financed private bonding company.





PART FOUR

ENFORCEMENT STRUCTURE OF ORDINANCE

TABLE OF CONTENTS

Sections

1.	SCOPE OF FINE	68
2.	POSTING OF A STOP-WORK ORDER	69
3.	FINE FOR NON-COMPLIANCE WITHIN FIRST 10 CALENDAR DAYS	69
4.	REVOCAION OF PERMIT FOR NON- COMPLIANCE WITHIN FIRST 30 CALENDAR DAYS	69
5.	HOW TO REAPPLY AFTER A PERMIT HAS BEEN REVOKED	69
6.	APPEALING TO THE BOARD OF APPEALS	69
7.	ISSUANCE OF A NOTICE OF INTENT	69
8.	NON-PAYMENT OF FINE	70
9.	PENALTIES ASSESSED FOR ORDINANCE VIOLATION	70
10.	METHOD OF PAYMENT	70

1. SCOPE OF FINE

If any development is in violation of any portion of this ordinance or requirements placed on the development as conditions for approval, then a fine may be imposed on the development. Violations shall only be considered which are related to storm drainage or erosion control as required by this ordinance or other items required by the Noble County Surveyor's Office as conditions of approval.

2. POSTING OF A STOP-WORK ORDER

The Noble County Surveyor's Office shall post a stop-work order if:

- ◆ Any land disturbing activity regulated under this ordinance is being undertaken without a permit.
- ◆ The erosion control plan is not being implemented in good faith.
- ◆ The conditions of the permit are not being met.

3. FINE FOR NON-COMPLIANCE WITHIN FIRST 10 CALENDAR DAYS

If, within ten (10) calendar days after the issuance of a stop-work order, the violation and any damage caused by the violation is not corrected, then a maximum fine of two-hundred dollars (\$200) per day shall be imposed for each calendar day which expires until the violation is corrected. Notification shall be given by either certified mail, telephone, or letter delivered in person.

4. REVOCATION OF PERMIT FOR NON-COMPLIANCE WITHIN FIRST 30 CALENDAR DAYS

If, within thirty (30) days after the issuance of a stop-work order, a permit holder does not comply with the erosion control plan, the storm drainage plan, or other permit conditions, the Noble County Surveyor's Office shall revoke the permit.

5. HOW TO REAPPLY AFTER A PERMIT HAS BEEN REVOKED

Once a permit has been revoked the entire approval and review process, along with any associated fees required by part three of this ordinance, must again be satisfied.

6. APPEALING TO THE BOARD OF APPEALS

Upon appeal to the Board of Appeals, a stop-work order or the revocation may be retracted.

7. ISSUANCE OF A NOTICE OF INTENT

Ten (10) calendar days after revoking the permit, the Noble County Surveyor's Office shall issue a notice of intent to the violator stating that fourteen (14) days after issuing the notice of intent the Noble County Surveyor's Office will contract the work

necessary for providing compliance with this ordinance and use the surety bond to pay for said work.

8. NON-PAYMENT OF FINE

If the fine is not paid, then a lien may be placed on the property until such time as the fine is paid in full.

9. PENALTIES ASSESSED FOR ORDINANCE VIOLATION

Any person violating any of the provisions of this ordinance may be subject to a forfeiture of up to two hundred dollars (\$200.00) per calendar day. Total fines shall not exceed ten thousand dollars (\$10,000.00) plus the costs of prosecution and costs of corrective actions for each violation. Each day a violation exists shall constitute a separate offense.

10. METHOD OF PAYMENT

Fines shall be paid by one of the following methods:

- ◆ Certified Check
- ◆ Cashiers Check
- ◆ Money Order

All checks shall be made payable to the:

Noble County Surveyor





PART FIVE

PROJECT TERMINATION

1. PROJECT TERMINATION

When a project has been completed, the person holding the permit shall petition, in writing, the Noble County Surveyor's Office for approval of termination. The Noble County Surveyor's Office shall subsequently inspect the site to verify the project is complete and stable.

1. For projects with multiple lots, all roads, utilities, and infrastructure must be completed and accepted by the appropriate local agency. All non-paved areas must be stable with established vegetation or other suitable cover. (All individual lots do not have to be constructed upon, as they are covered separately under Part Two Section 13, item 2 of this Ordinance.)
2. For all other sites, including individual building lots, All construction must be completed and all unpaved areas must be stable with established vegetation or other suitable cover.

If the termination request is approved, any surety bonds and/or irrevocable letters of credit shall be released within 5 working day after final approval.





PART SIX

APPEALS PROCESS

TABLE OF CONTENTS

Sections

1.	SCOPE OF APPEALS	72
2.	ADVISORY / APPEALS BOARD	72
3.	ADVISORY / APPEALS BOARD MEETING	73
4.	APPEALS PROCESS	73

1. SCOPE OF APPEALS

Appeals can only be made for one of the following two reasons:

- ◆ Requirements placed on the development are in excess of that which is allowable in the ordinance.
- ◆ Fines imposed for violations or revocation of permits for violations are unnecessary since the violations are in excess of that which is required in the ordinance.

2. ADVISORY / APPEALS BOARD

The Advisory / Appeals Board shall be comprised of one member from each of the separate governmental entities (i.e., Albion, Avilla, Cromwell, Kendallville, Ligonier, Rome City, and Noble County) which have adopted this ordinance. Each member of this board shall be chosen at the discretion of the governing body for the entity which they represent. No later than January 31 of every year, each entity shall notify the Noble County Surveyor's Office of the name, address, and telephone number of the person who will represent that entity on the Advisory / Appeals Board for the coming year.

3. ADVISORY / APPEALS BOARD MEETING

The Advisory / Appeals Board for the Noble County Storm Drainage and Erosion Control Ordinance will meet the second Thursday of each month at 7:30 p.m. at the Noble County South Office Complex, excluding the month of January. The advisory board will meet every February to organize and hear any appeals. However, all other meetings will be held only if an appeals petition has been duly filed and legally advertised. This meeting may be changed to a different time and day if a majority of all board members agree. At its first meeting of the year the board shall elect from its membership a person to serve as the chairperson of the Advisory Board. The board shall also elect a vice-chairperson from its membership. The chairperson shall preside over all meetings of the board. The vice-chairperson shall preside in the absence of the chair.

4. APPEALS PROCESS

- A. A petition for an appeals hearing may be filed if the appeal is for one of the two reasons mentioned above. The appeals petition must be accompanied with a filing fee in the amount of four hundred dollars (\$400.00) per appeal. This fee includes per diem expenses of fifty dollars (\$50.00) per member for each of the members on the Advisory Board and fifty dollars (\$50.00) in processing fees. Board members will receive fifty dollars (\$50.00) each per board meeting. This fee will be automatically increased in increments of fifty dollars (\$50.00) for every additional board member added to the Advisory Board in excess of seven .
- B. The petition must be filed at least twenty-one (21) days before a regularly scheduled meeting time of the Advisory Board.
- C. The Advisory Board will then be notified of the need for a meeting. The Noble County Surveyor's Office shall notify each of the board members by first class mail at least 10 (ten) days before a required meeting.
- D. A minimum of two thirds (67 percent) of ALL board members must be present at an appeals meeting in order to hear an appeal. For example, if the Advisory Board is comprised of 7 members, 5 must be present to hear an appeal.
- E. Evidence presented to the board and any rulings of the board may be for only those reasons mentioned above for an appeal.
- F. The requirements of the Noble County Surveyor's Office can only be overturned if those requirements are in excess of that which is allowable by this ordinance. A vote of at least two thirds (67 percent) of ALL board members is necessary to overturn the requirements of the Noble County Surveyor's Office. For example if the Advisory Board is comprised of 7

members, a minimum of 5 members must vote to overturn the requirements of the Noble County Surveyor's Office.

- G. If the board votes to overturn the requirements of the Noble County Surveyor's Office, then the Noble County Surveyor's Office shall modify the original requirements placed on the development to reflect the requirements allowed by the Advisory Board.
- H. The minutes of each meeting shall be maintained in the Noble County Surveyor's Office. Said minutes shall be signed by all board members present at the meeting.





APPENDIX A

FIGURES & TABLES

TABLE OF CONTENTS

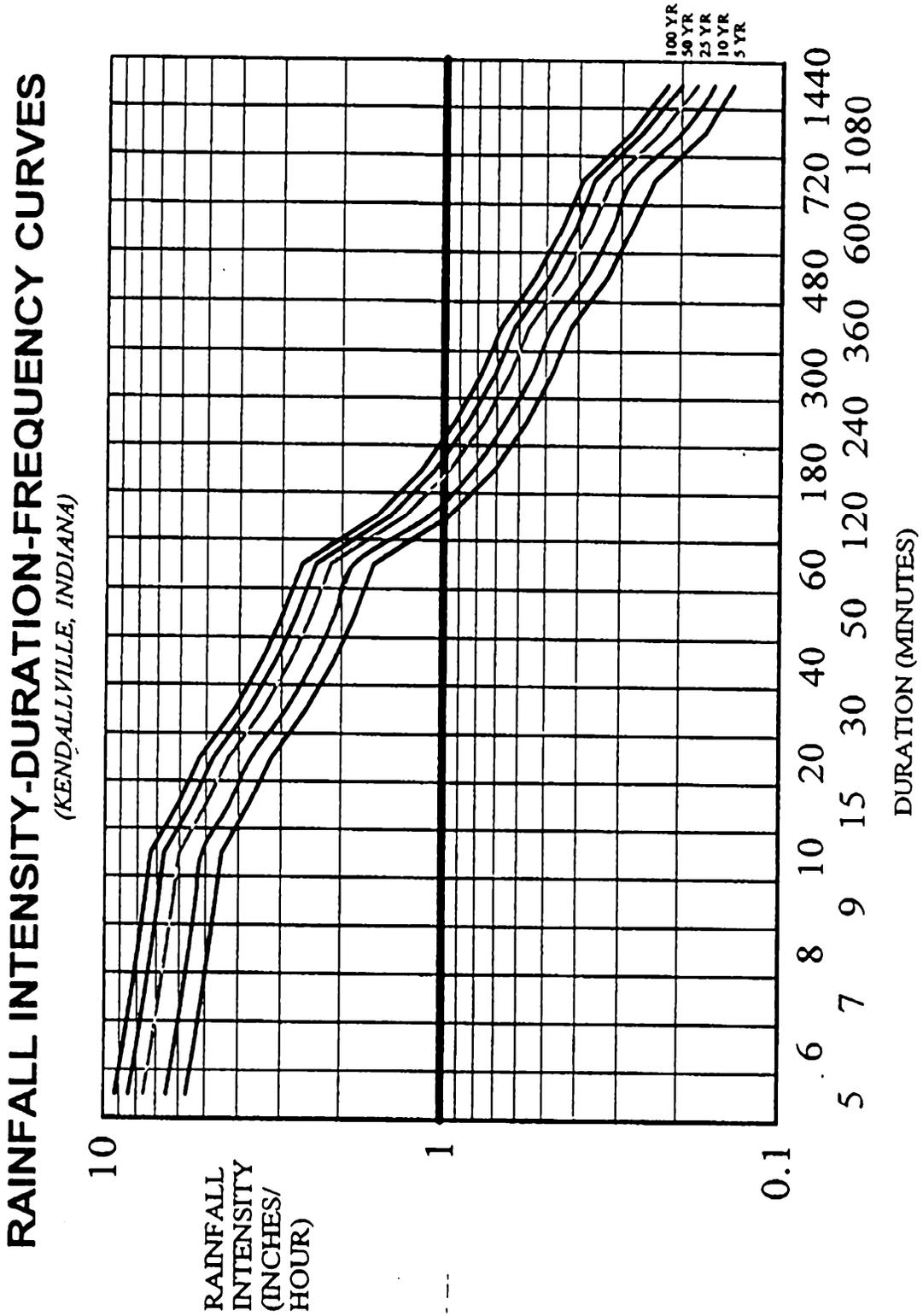
Figures For Section 1

Figure 1 Rainfall Intensity-Duration-Frequency Curves for City of Kendallville	76
Figure 2 Street & Gutter Capacities	77
Figure 3 Rainfall Intensity-Duration-Frequency Curves for City of Albion	78

Tables For Section 1

1A	Urban Runoff Coefficients	79
1B	Rural Runoff Coefficients	80
2	Runoff Coefficients "C" by Land Use and Typical Inlet Times	81
3	Typical Values of Manning's "n"	82
4	Maximum Permissible Velocities in Vegetal-Lined Channels	83
5A	Rainfall Depths for Various Return Periods and Storm Durations	84
5B	Rainfall Intensities for Various Return Periods and Storm Durations	85
6	Huff Quartiles (50%) Rainfall Distribution for ALBION, IN	89

FIGURE 1



STREET AND GUTTER CAPACITIES

FIGURE 2

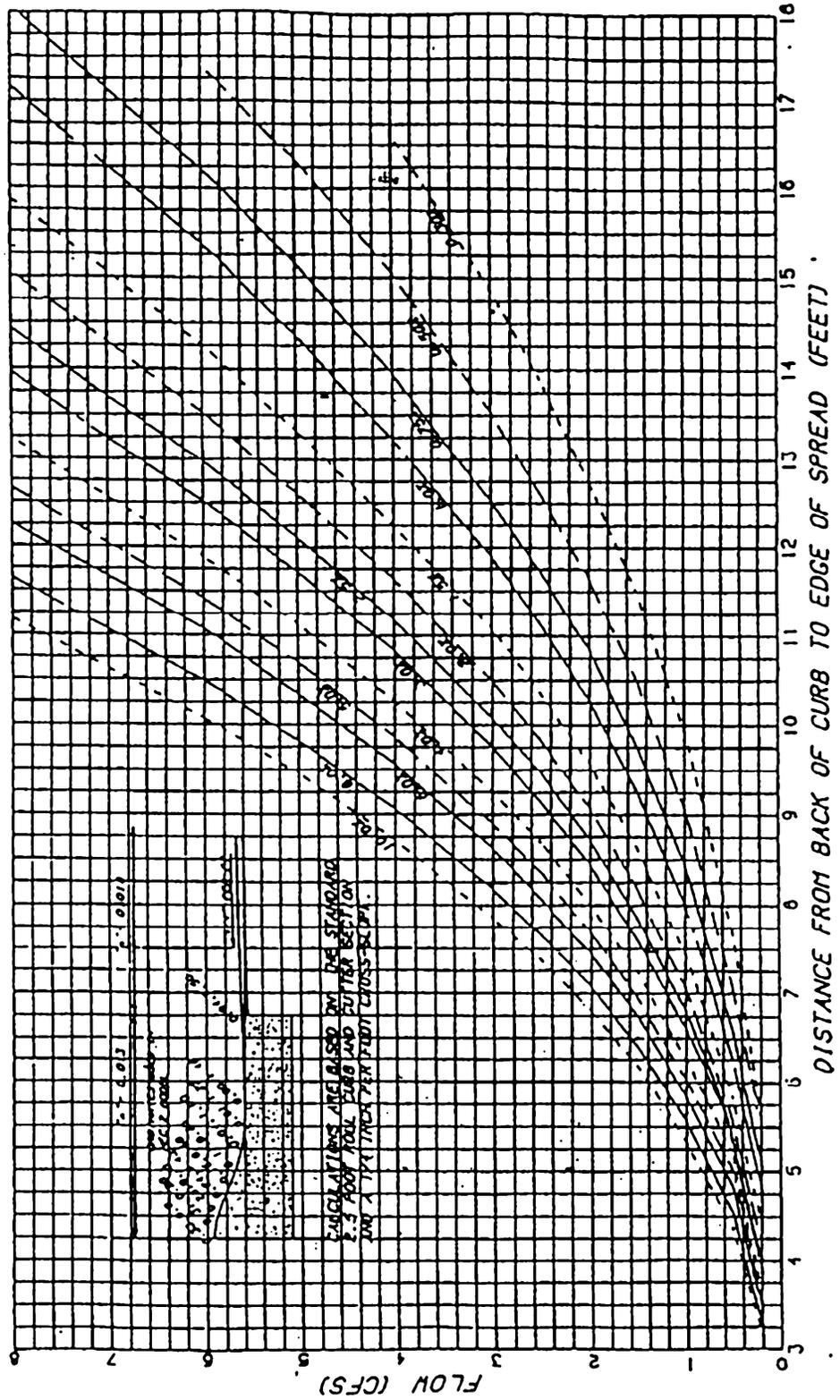


FIGURE 3

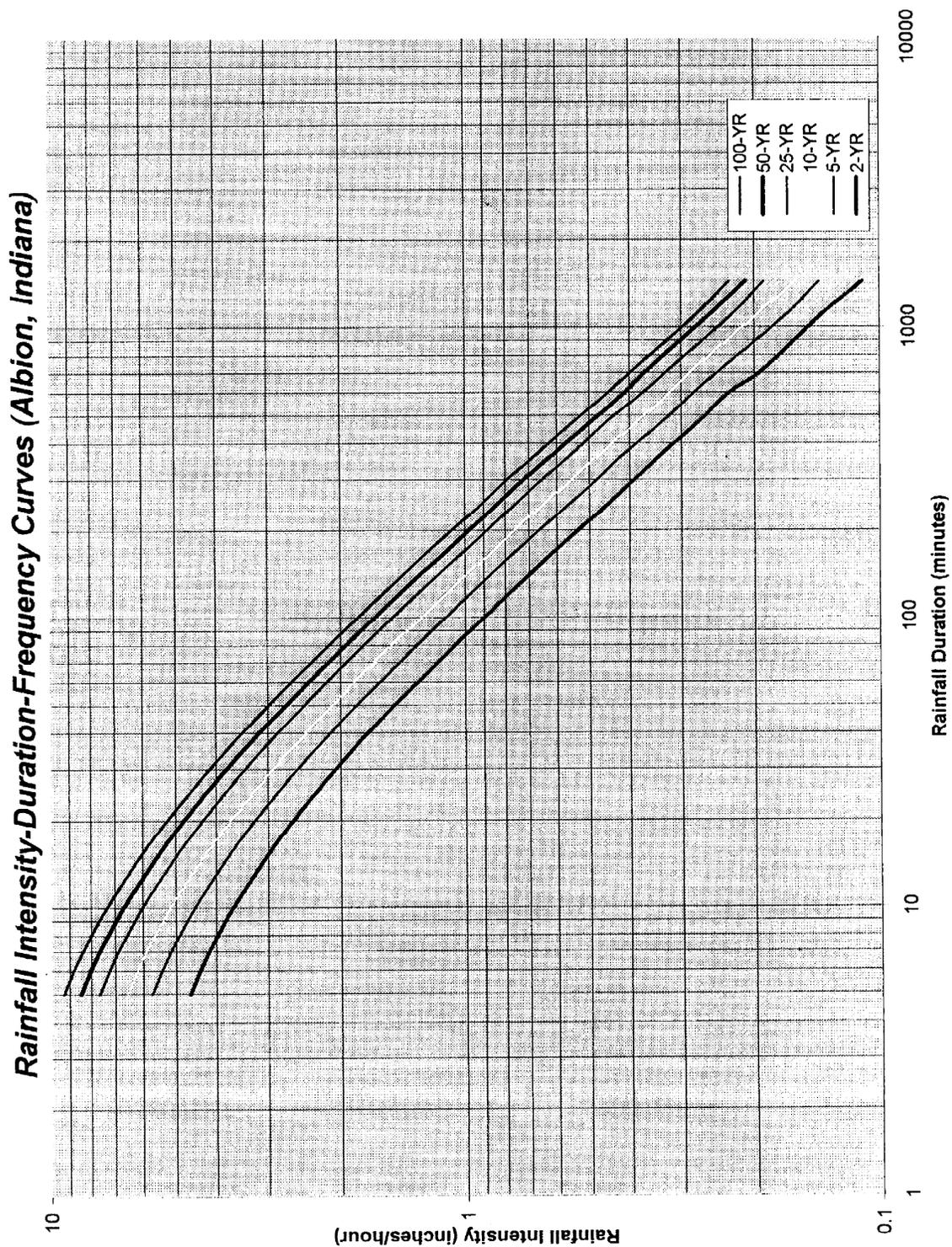


TABLE 1A

Urban Runoff Coefficients	
<i>Type of Surface</i>	<i>Runoff Coefficient "C"</i>
◆ Hard Surfaces	
Asphalt	0.82
Concrete	0.85
Roof	0.85
◆ Lawns (Sandy)	
Flat (0-2% Slope)	0.07
Rolling (2-7% Slope)	0.12
Steep (Greater than 7% Slope)	0.17
◆ Lawns (Clay)	
Flat (0-2% Slope)	0.16
Rolling (2-7% Slope)	0.21
Steep (Greater than 7% Slope)	0.30

Source: HERPICC Stormwater Drainage Manual, July 1994.

TABLE 1B

Rural Runoff Coefficients	
<i>Type of Surface</i>	<i>Runoff Coefficient "C"</i>
◆ Woodland (Sandy)	
Flat (0-5% Slope)	0.10
Rolling (5-10% Slope)	0.25
Steep (Greater than 10% Slope)	0.30
◆ Woodland (Clay)	
Flat (0-5% Slope)	0.30
Rolling (5-10% Slope)	0.35
Steep (Greater than 10% Slope)	0.50
◆ Pasture (Sandy)	
Flat (0-5% Slope)	0.10
Rolling (5-10% Slope)	0.16
Steep (Greater than 10% Slope)	0.22
◆ Pasture (Clay)	
Flat (0-5% Slope)	0.30
Rolling (5-10% Slope)	0.36
Steep (Greater than 10% Slope)	0.42
◆ Cultivated (Sandy)	
Flat (0-5% Slope)	0.30
Rolling (5-10% Slope)	0.40
Steep (Greater than 10% Slope)	0.52
◆ Cultivated (Clay)	
Flat (0-5% Slope)	0.50
Rolling (5-10% Slope)	0.60
Steep (Greater than 10% Slope)	0.72

Source: HERPICC Stormwater Drainage Manual, July 1994.

TABLE 2

Runoff Coefficients “C” by Land Use and Typical Inlet Times				
<i>Land Use</i>	<i>Runoff Coefficients</i>			<i>Inlet Times (Minutes) (4)</i>
	Flat (1)	Rolling (2)	Steep (3)	
Commercial (<i>CBD</i>)	0.75	0.83	0.91	5
Commercial (<i>Neighborhood</i>)	0.54	0.60	0.66	5-10
Industrial	0.63	0.70	0.77	
Garden Apartments	0.54	0.60	0.66	
Churches	0.54	0.60	0.66	
Schools	0.31	0.35	0.39	10-15
Semi Detached Residential	0.45	0.50	0.55	
Detached Residential	0.40	0.45	0.50	
Quarter Acre Lots	0.36	0.40	0.44	
Half Acre Lots	0.31	0.35	0.39	
Parkland	0.18	0.20	0.22	To be Computed

Source: HERPICC Stormwater Drainage Manual, July 1994.

- (1) Flat terrain involves slopes of 0-2%.
- (2) Rolling terrain involves slopes of 2-7%.
- (3) Steep terrain involves slopes greater than 7%.
- (4) Interpolation, extrapolation and adjustment for local conditions shall be based on engineering experience and judgment.

TABLE 3

Typical Values of Manning's "n"		
<i>Material</i>	<i>Manning's "n"</i>	<i>Maximum Velocities (feet/second)</i>
◆ Closed Conduits		
Concrete	0.013	15
Vitrified Clay	0.013	15
HDPE	0.012	15
PVC	0.011	15
◆ Circular CMP, Annular Corrugations, 2 2/3 x 1/2 inch		
Unpaved	0.024	7
25% Paved	0.021	7
50% Paved	0.018	7
100% Paved	0.013	7
Concrete Culverts	0.013	15
HDPE or PVC	0.012	10
◆ Open Channels		
Concrete, Trowel Finish	0.013	15
Concrete, Broom Finish	0.015	15
Gunite	0.018	15
Riprap Placed	0.030	10
Riprap Dumped	0.035	10
Gabion	0.028	10
New Earth (1)	0.025	3-5
Existing Earth (2)	0.030	3-5
Dense Growth of Weeds	0.040	3-5
Dense Weeds and Brush	0.040	3-5
Swale with Grass	0.035	3-5

Source: HERPICC Stormwater Drainage Manual, July 1994.

- (1) New earth (uniform, sodded, clay soil)
 (2) Existing earth (fairly uniform, with some weeds)

TABLE 4

Maximum Permissible Velocities in Vegetal-Lined Channels (1)			
<i>Cover</i>	<i>Side Slope Range (Percent) (3)</i>	<i>Permissible Velocity (2)</i>	
		<i>Erosion Resistant Soils (ft. per sec.) (4)</i>	<i>Easily Eroded Soils (ft. per sec.) (4)</i>
Bermuda Grass	0-5 5-10 Over 10	8 7 6	6 5 4
Bahia Buffalo Grass Kentucky Bluegrass Smooth Brome Blue Grama	0-5 5-10 Over 10	7 6 5	5 4 3
Grass Mixture Reed Canary Grass	(3) 0-5 5-10	5 4	4 3
Lespedeza Sericea Weeping Lovegrass Yellow Bluestem Redtop Alfalfa Red Fescue	(4) 0-5 5-10	3.4	2.5
Common Lespedeza (5) Sudangrass (5)	(6) 0-5	3.5	2.5

- (1) From Soil Conservation Service, SCS-TP-61, "Handbook of Channel Design for Soil and Water Conservation".
- (2) Use velocities exceeding 5 feet per second only where good channel ground covers and proper maintenance can be obtained.
- (3) Do not use on slopes steeper than 10 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.
- (4) Do not use on slopes steeper than 5 percent except for vegetated side slopes in combination with a stone, concrete, or highly resistant vegetative center section.
- (5) Annuals - use on mild slopes or as temporary protection until permanent covers are established.
- (6) Use on slopes steeper than 5 percent is not recommended.

TABLE 5A

RAINFALL DEPTHS for VARIOUS RETURN PERIODS (IN)
For ALBION, INDIANA

<i>hours</i>	<i>minutes</i>	<i>2_YR</i>	<i>5_YR</i>	<i>10_YR</i>	<i>25_YR</i>	<i>50_YR</i>	<i>100_YR</i>
	5	0.38	0.48	0.55	0.64	0.71	0.78
	10	0.61	0.75	0.86	1.00	1.11	1.22
0.25	15	0.76	0.94	1.07	1.25	1.39	1.52
	20	0.87	1.08	1.23	1.44	1.59	1.75
0.5	30	1.03	1.27	1.46	1.70	1.89	2.07
	40	1.14	1.42	1.62	1.89	2.10	2.30
	50	1.23	1.53	1.75	2.04	2.26	2.48
1	60	1.30	1.61	1.85	2.16	2.39	2.63
1.5	90	1.46	1.81	2.08	2.42	2.69	2.95
2	120	1.58	1.95	2.24	2.61	2.89	3.18
3	180	1.74	2.15	2.47	2.88	3.19	3.50
4	240	1.86	2.30	2.63	3.07	3.41	3.74
5	300	1.95	2.41	2.76	3.23	3.58	3.93
6	360	2.03	2.51	2.87	3.35	3.72	4.08
7	420	2.09	2.59	2.97	3.46	3.84	4.22
8	480	2.15	2.66	3.05	3.56	3.95	4.34
9	540	2.21	2.73	3.13	3.65	4.05	4.44
10	600	2.25	2.79	3.19	3.73	4.13	4.54
12	720	2.34	2.89	3.31	3.87	4.29	4.71
14	840	2.41	2.99	3.42	3.99	4.42	4.86
16	960	2.48	3.07	3.51	4.10	4.54	4.99
18	1080	2.54	3.14	3.59	4.20	4.65	5.11
20	1200	2.59	3.20	3.67	4.28	4.75	5.21
24	1440	2.68	3.32	3.80	4.44	4.92	5.41

TABLE 5B
 Rainfall Intensities for Various Return Periods and Storm Durations
 (for Rational Method)
 (Albion, Indiana)

AVERAGE RAINFALL INTENSITIES (IN/HR)
For ALBION, INDIANA

TIME		2_YR	5_YR	10_YR	25_YR	50_YR	100_YR
hours	minutes						
0.1	5	4.62	5.72	6.55	7.64	8.47	9.30
	6	4.38	5.42	6.20	7.24	8.03	8.82
	7	4.16	5.15	5.90	6.89	7.64	8.38
0.15	8	3.97	4.91	5.63	6.57	7.28	8.00
	9	3.80	4.70	5.38	6.28	6.96	7.65
	10	3.64	4.50	5.16	6.02	6.67	7.33
0.2	11	3.50	4.33	4.95	5.78	6.41	7.04
	12	3.36	4.16	4.77	5.57	6.17	6.77
	13	3.24	4.01	4.60	5.37	5.95	6.53
0.25	14	3.13	3.87	4.44	5.18	5.74	6.30
	15	3.03	3.75	4.29	5.01	5.55	6.10
	16	2.93	3.63	4.15	4.85	5.38	5.90
0.3	17	2.84	3.52	4.03	4.70	5.21	5.72
	18	2.76	3.41	3.91	4.56	5.06	5.55
	19	2.68	3.32	3.80	4.43	4.92	5.40
0.35	20	2.61	3.23	3.69	4.31	4.78	5.25
	21	2.54	3.14	3.60	4.20	4.65	5.11
	22	2.47	3.06	3.50	4.09	4.53	4.98
0.4	23	2.41	2.98	3.42	3.99	4.42	4.85
	24	2.35	2.91	3.33	3.89	4.31	4.74
	25	2.30	2.84	3.26	3.80	4.21	4.63
0.45	26	2.24	2.78	3.18	3.71	4.12	4.52
	27	2.20	2.72	3.11	3.63	4.03	4.42
	28	2.15	2.66	3.04	3.55	3.94	4.32
0.5	29	2.10	2.60	2.98	3.48	3.86	4.23
	30	2.06	2.55	2.92	3.41	3.78	4.15
	31	2.02	2.50	2.86	3.34	3.70	4.06
0.55	32	1.98	2.45	2.80	3.27	3.63	3.98
	33	1.94	2.40	2.75	3.21	3.56	3.91
	34	1.91	2.36	2.70	3.15	3.49	3.84
0.6	35	1.87	2.31	2.65	3.09	3.43	3.77
	36	1.84	2.27	2.60	3.04	3.37	3.70
	37	1.81	2.23	2.56	2.99	3.31	3.63
0.65	38	1.77	2.20	2.51	2.94	3.25	3.57
	39	1.74	2.16	2.47	2.89	3.20	3.51
	40	1.72	2.12	2.43	2.84	3.15	3.46
0.7	41	1.69	2.09	2.39	2.79	3.10	3.40
	42	1.66	2.06	2.36	2.75	3.05	3.35
	43	1.64	2.03	2.32	2.71	3.00	3.30
0.75	44	1.61	1.99	2.28	2.67	2.96	3.25
	45	1.59	1.96	2.25	2.63	2.91	3.20
	46	1.56	1.94	2.22	2.59	2.87	3.15
0.8	47	1.54	1.91	2.19	2.55	2.83	3.11
	48	1.52	1.88	2.15	2.52	2.79	3.06
	49	1.50	1.86	2.12	2.48	2.75	3.02
0.85	50	1.48	1.83	2.10	2.45	2.71	2.98
	51	1.46	1.81	2.07	2.41	2.68	2.94
	52	1.44	1.78	2.04	2.38	2.64	2.90

TABLE 5B Continued...

	53	1.42	1.76	2.01	2.35	2.61	2.86
0.9	54	1.40	1.74	1.99	2.32	2.57	2.83
	55	1.39	1.71	1.96	2.29	2.54	2.79
	56	1.37	1.69	1.94	2.26	2.51	2.76
0.95	57	1.35	1.67	1.92	2.24	2.48	2.72
	58	1.34	1.65	1.89	2.21	2.45	2.69
	59	1.32	1.63	1.87	2.18	2.42	2.66
1	60	1.30	1.61	1.85	2.16	2.39	2.63
	61	1.29	1.60	1.83	2.13	2.37	2.60
	62	1.28	1.58	1.81	2.11	2.34	2.57
1.05	63	1.26	1.56	1.79	2.09	2.31	2.54
	64	1.25	1.54	1.77	2.06	2.29	2.51
	65	1.23	1.53	1.75	2.04	2.26	2.48
1.1	66	1.22	1.51	1.73	2.02	2.24	2.46
	67	1.21	1.49	1.71	2.00	2.21	2.43
	68	1.19	1.48	1.69	1.98	2.19	2.41
1.15	69	1.18	1.46	1.68	1.96	2.17	2.38
	70	1.17	1.45	1.66	1.94	2.15	2.36
	71	1.16	1.43	1.64	1.92	2.12	2.33
1.2	72	1.15	1.42	1.63	1.90	2.10	2.31
	73	1.14	1.41	1.61	1.88	2.08	2.29
	74	1.12	1.39	1.59	1.86	2.06	2.27
1.25	75	1.11	1.38	1.58	1.84	2.04	2.24
	76	1.10	1.37	1.56	1.83	2.02	2.22
	77	1.09	1.35	1.55	1.81	2.01	2.20
1.3	78	1.08	1.34	1.53	1.79	1.99	2.18
	79	1.07	1.33	1.52	1.78	1.97	2.16
	80	1.06	1.32	1.51	1.76	1.95	2.14
1.35	81	1.05	1.30	1.49	1.74	1.93	2.12
	82	1.04	1.29	1.48	1.73	1.92	2.10
	83	1.04	1.28	1.47	1.71	1.90	2.09
1.4	84	1.03	1.27	1.45	1.70	1.88	2.07
	85	1.02	1.26	1.44	1.68	1.87	2.05
	86	1.01	1.25	1.43	1.67	1.85	2.03
1.45	87	1.00	1.24	1.42	1.66	1.84	2.02
	88	0.99	1.23	1.41	1.64	1.82	2.00
	89	0.98	1.22	1.39	1.63	1.81	1.98
1.5	90	0.98	1.21	1.38	1.62	1.79	1.97
	95	0.94	1.16	1.33	1.55	1.72	1.89
	100	0.90	1.12	1.28	1.49	1.66	1.82
1.75	105	0.87	1.08	1.23	1.44	1.60	1.75
	110	0.84	1.04	1.19	1.39	1.54	1.70
	115	0.81	1.01	1.15	1.35	1.49	1.64
2	120	0.79	0.98	1.12	1.31	1.45	1.59
	125	0.77	0.95	1.08	1.27	1.40	1.54
	130	0.74	0.92	1.05	1.23	1.36	1.50
2.25	135	0.72	0.89	1.02	1.19	1.32	1.45
	140	0.70	0.87	1.00	1.16	1.29	1.41
	145	0.68	0.85	0.97	1.13	1.25	1.38
2.5	150	0.67	0.82	0.94	1.10	1.22	1.34
	155	0.65	0.80	0.92	1.08	1.19	1.31
	160	0.63	0.79	0.90	1.05	1.16	1.28
2.75	165	0.62	0.77	0.88	1.03	1.14	1.25
	170	0.61	0.75	0.86	1.00	1.11	1.22
	175	0.59	0.73	0.84	0.98	1.09	1.19
3	180	0.58	0.72	0.82	0.96	1.06	1.17

TABLE 5B Continued...

	185	0.57	0.70	0.80	0.94	1.04	1.14
	190	0.56	0.69	0.79	0.92	1.02	1.12
3.25	195	0.55	0.67	0.77	0.90	1.00	1.10
	200	0.53	0.66	0.76	0.88	0.98	1.08
	205	0.52	0.65	0.74	0.87	0.96	1.06
3.5	210	0.51	0.64	0.73	0.85	0.94	1.04
	215	0.51	0.63	0.72	0.84	0.93	1.02
	220	0.50	0.61	0.70	0.82	0.91	1.00
3.75	225	0.49	0.60	0.69	0.81	0.90	0.98
	230	0.48	0.59	0.68	0.79	0.88	0.97
	235	0.47	0.58	0.67	0.78	0.87	0.95
4	240	0.46	0.57	0.66	0.77	0.85	0.93
	245	0.46	0.57	0.65	0.76	0.84	0.92
	250	0.45	0.56	0.64	0.74	0.82	0.91
4.25	255	0.44	0.55	0.63	0.73	0.81	0.89
	260	0.44	0.54	0.62	0.72	0.80	0.88
	265	0.43	0.53	0.61	0.71	0.79	0.87
4.5	270	0.42	0.52	0.60	0.70	0.78	0.85
	275	0.42	0.52	0.59	0.69	0.77	0.84
	280	0.41	0.51	0.58	0.68	0.75	0.83
4.75	285	0.41	0.50	0.58	0.67	0.74	0.82
	290	0.40	0.50	0.57	0.66	0.73	0.81
	295	0.40	0.49	0.56	0.65	0.72	0.80
5	300	0.39	0.48	0.55	0.65	0.72	0.79
	305	0.38	0.48	0.55	0.64	0.71	0.78
	310	0.38	0.47	0.54	0.63	0.70	0.77
5.25	315	0.38	0.46	0.53	0.62	0.69	0.76
	320	0.37	0.46	0.53	0.61	0.68	0.75
	325	0.37	0.45	0.52	0.61	0.67	0.74
5.5	330	0.36	0.45	0.51	0.60	0.66	0.73
	335	0.36	0.44	0.51	0.59	0.66	0.72
	340	0.35	0.44	0.50	0.58	0.65	0.71
5.75	345	0.35	0.43	0.50	0.58	0.64	0.70
	350	0.35	0.43	0.49	0.57	0.63	0.70
	355	0.34	0.42	0.48	0.57	0.63	0.69
6	360	0.34	0.42	0.48	0.56	0.62	0.68
	365	0.33	0.41	0.47	0.55	0.61	0.67
	370	0.33	0.41	0.47	0.55	0.61	0.67
6.25	375	0.33	0.40	0.46	0.54	0.60	0.66
	380	0.32	0.40	0.46	0.54	0.59	0.65
	385	0.32	0.40	0.45	0.53	0.59	0.65
6.5	390	0.32	0.39	0.45	0.52	0.58	0.64
	395	0.31	0.39	0.45	0.52	0.58	0.63
	400	0.31	0.38	0.44	0.51	0.57	0.63
6.75	405	0.31	0.38	0.44	0.51	0.56	0.62
	410	0.30	0.38	0.43	0.50	0.56	0.61
	415	0.30	0.37	0.43	0.50	0.55	0.61
7	420	0.30	0.37	0.42	0.49	0.55	0.60
7.5	450	0.28	0.35	0.40	0.47	0.52	0.57
8	480	0.27	0.33	0.38	0.45	0.49	0.54
8.5	510	0.26	0.32	0.36	0.42	0.47	0.52
9	540	0.25	0.30	0.35	0.41	0.45	0.49
9.5	570	0.23	0.29	0.33	0.39	0.43	0.47
10	600	0.23	0.28	0.32	0.37	0.41	0.45
11	660	0.21	0.26	0.30	0.35	0.38	0.42
12	720	0.19	0.24	0.28	0.32	0.36	0.39

TABLE 5B Continued...

13	780	0.18	0.23	0.26	0.30	0.34	0.37
14	840	0.17	0.21	0.24	0.29	0.32	0.35
15	900	0.16	0.20	0.23	0.27	0.30	0.33
16	960	0.15	0.19	0.22	0.26	0.28	0.31
17	1020	0.15	0.18	0.21	0.24	0.27	0.30
18	1080	0.14	0.17	0.20	0.23	0.26	0.28
19	1140	0.13	0.17	0.19	0.22	0.25	0.27
20	1200	0.13	0.16	0.18	0.21	0.24	0.26
21	1260	0.12	0.15	0.18	0.21	0.23	0.25
22	1320	0.12	0.15	0.17	0.20	0.22	0.24
23	1380	0.12	0.14	0.16	0.19	0.21	0.23
24	1440	0.11	0.14	0.16	0.19	0.21	0.23

TABLE 6

Cumulative Percent of Storm Rainfall for a Given Storm Type	
<i>Cumulative Percent of Storm Time</i>	<i>Third Quartile</i>
5	3
10	6
15	9
20	12
25	15
30	19
35	23
40	27
45	32
50	38
55	45
60	57
65	70
70	79
75	85
80	89
85	92
90	95
95	97

Source: Huff Quartiles (50%) Rainfall Distribution (For TR-20 or HEC-1) for Albion, IN.



APPENDIX B

STORM DRAINAGE AND EROSION CONTROL ORDINANCE

ORIGINAL

NOBLE COUNTY ORDINANCE
NO. 1998-12

STORM DRAINAGE and EROSION CONTROL ORDINANCE

Adopted August 3, 1998

WHEREAS, the Noble County Commissioners, hereinafter referred to as the "Commissioners," have directed the Noble County Surveyor, Noble County Plan Commission, Noble County Soil and Water Conservation District, and representatives from each incorporated area within the county, hereinafter referred to as the "Committee," to investigate, study and develop a county wide storm drainage and erosion control ordinance; and

WHEREAS, said committee has met numerous times over the past eighteen months to investigate, study, develop and solicit user input regarding a county wide storm drainage and erosion control ordinance; and

WHEREAS, said committee has given approval to the aforementioned Storm Drainage and Erosion Control Ordinance; and

WHEREAS, said Storm Drainage and Erosion Control Ordinance was presented to the Noble County Plan Commission for their approval and having been given their approval was submitted to the Commissioners for their approval; and

WHEREAS, the Commissioners have agreed that the Storm Drainage and Erosion Control Ordinance will reduce the hazard to public health and safety caused by excess storm water runoff, will enhance economic objectives, and protect, preserve, and promote orderly development of land and water resources throughout the entire county;

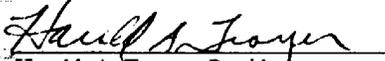
NOW, THEREFORE, BE IT RESOLVED BY THE NOBLE COUNTY COMMISSIONERS THAT:

1. The Noble County Code be amended to include the aforementioned "Storm Drainage and Erosion Control Ordinance."

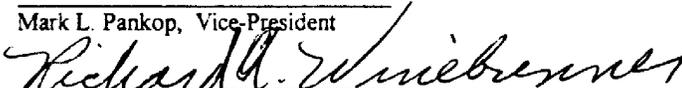
2. All eighty seven pages, as amended, of the aforementioned "Storm Drainage and Erosion Control Ordinance" are adopted, including: fees, enforcement, appeals, termination, figures, and tables, and are attached and marked Exhibit "A".
3. This ordinance shall be effective as of its date of adoption, August 3, 1998.

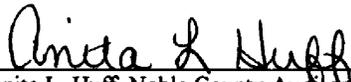
Signed this 10th day of August, 1998.

NOBLE COUNTY COMMISSIONERS


Harold A. Troyer, President

Mark L. Pankop, Vice-President


Richard A. Winebrenner, Member

ATTEST: 
Anita L. Huff, Noble County Auditor