

## SECTION 1.0

### GENERAL INFORMATION

#### 1.1 STATEMENT OF PURPOSE OF MANUAL

The Gadsden County Board of County Commissioners, hereafter referred to as the “Board”, has determined that the preservation of the water resources of the Gadsden County, hereafter referred to as the “County” is critical to the public health, safety and welfare. Unmanaged stormwater runoff causes water quality degradation, erosion, sedimentation and flooding; and may also prevent recharge of the aquifer upon which the public, statewide, depends for potable fresh water. The Board finds it is necessary to imposed these minimum Procedures, Policies and Design standards to manage stormwater runoff and conserve the water resources of the County. The manual will be know as the *Gadsden County Stormwater Management Policy and Procedures Manual*.

#### 1.2 OBJECTIVES OF THE MANUAL

The requirements outlined in this Policy and Procedures Manual hereafter are intended to allow landowners reasonable use of their property while promoting the Best Management Practices (BMP’s) to protect the health, safety, and welfare interest of the public. Therefore the following County wide objectives are offered.

- (1) Protect the quantity and quality of ground and surface waters;
- (2) Prevent the lowering of existing groundwater table elevations to detriment of the environmentally sensitive areas and public interest;
- (3) Perpetuate recharge into the groundwater system where feasible;
- (4) Protect natural flood storage areas, floodways and environmentally sensitive water bodies, wetlands and waterways;
- (5) Minimize the production of nuisance and disease vectoring mosquitoes;
- (6) Discourage reliance on stormwater management and drainage systems which depend on the use of electrical energy, or petroleum fuels to convey water, remove pollutants, or maintain the systems;
- (7) Reduce erosion caused by wind and water; alleviate the loss of valuable top soils and subsequent sedimentation of surface water bodies;
- (8) Alleviate downstream flood hazards;
- (9) Prevent loss of life and property due to stormwater runoff from foreseeable rainfall events;
- (10) Reduce the capital expenditures incurred by the public associated with retrofitting flood protection and perpetual maintenance stormwater management systems;

- (11) Maximize protection of Outstanding Florida Waters (OFW's), Class I waters and Class II waters.

### **1.3 INTENT OF THE MANUAL**

This Manual is intended to allow landowners reasonable use of their property while promoting sound procedures and policies to protect the health, safety and welfare of the citizens and visitors of Gadsden County specifically in regards to stormwater management practices. It is further the intent of this Manual to develop procedures, policies, and design standards in conformance with the adopted Comprehensive Plan as well as with Federal, State, Regional and local laws, rules and regulations.

### **1.4 HIERARCHY OF POLICY**

This Manual gives specific design criteria, procedures and policies for stormwater management practices in Gadsden County in accordance with the statement of purpose, objectives and intent expressed in the previous sections. This Manual shall not supersede the policies, goals, or objectives of the adopted Gadsden County Comprehensive Plan (hereinafter referred to as the Comp Plan). The contents of this manual are intended to provide additional detail to implement the Goal, Objectives and Policy statement of the Comp Plan.

#### **1.4.1 Acknowledgment other Rules, Policies and Regulations.**

The following provides a partial listing of several of the important stormwater management and/or closely related Florida Administrative Code (FAC) that shall provided minimum regulatory guidance when more specific policies, procedures and design details are not provided herein.

- FAC 17-3 Water Quality Standards
- FAC 17-25 Regulations of Stormwater Discharge
- FAC 17-40 Water Policy
- FAC 17-43 SWIM Rule
- FAC 17-301 Surface Waters of the State
- FAC 17-302 Surface Water Quality Standards
- FAC 17-312 Dredge and Fill Activities
- FAC 17-330 Management and Storage of Surface Waters

#### **1.4.2 Allowable Comprehensive Plan Objectives and Policy**

There are several policies of the Comp Plan listed (but not limited to) below that are applicable to Stormwater Management in Gadsden County. It is these policies and objectives that serve as the basis of the policies and procedures herein, therefore, the actual language in the Comp Plan is used as an understanding of the intent of the Policy and Procedures outlined herein.

Quick Reference Guide to Comprehensive Plan Objectives and Policy

<u>Section</u>	<u>Brief Description</u>
<b>Objective 1.7</b>	<b>Protection of Natural Resources</b>
Policy 1.7.3	Protect Surface Water - Quincy Creek
Policy 1.7.4	Protect Surface Water - Little River/Ochlockonee River
Policy 1.7.5	Protect Surface Water - Telogia Creek/Apalachicola River
<b>Objective 1.10 Control Urban Sprawl</b>	
Policy 1.10.7	Prohibition of Impacts to Wetlands, Floodplains, and Cones of Influence
<b>Objective 1.12 Land Development Regulations</b>	
Policy 1.12.1	Manage Growth in Environmentally Sensitive Lands and
(c) and (d)	Periodic Flood Zones
<b>Objective 4.10 Drainage Sub-Element and LOS</b>	
Policy 4.10.1	Construction at Grade
Policy 4.10.2	Turbidity and Sediment Control
Policy 4.10.3	Access Management
Policy 4.10.4	Water Quality
Policy 4.10.5	Ecological System Integrity
Policy 4.10.6	Design Storm Criteria
<b>Objective 4.11 Floodplain Protection</b>	
Policy 4.11.1	Control Development in Floodplains
<b>Objective 4.12 Groundwater Recharge</b>	
Policy 4.12.1	Protection Standards
Policy 4.12.2	Coordination with the NFWFMD
Policy 4.12.3	Natural Recharge Areas
Policy 4.12.4	Restrict Development in Conservation and Floodplain areas
Policy 4.12.5	Protect the Quincy Creek Drainage area
Policy 4.12.6	Coordinate with the City of Quincy
<b>Objective 5.2</b>	<b>Best Management Practices (BMP's)</b>
Policy 5.2.4	Wetland Buffers
Policy 5.2.5	Restrict Land Use Activities in Wetlands
Policy 5.2.6	Pre/Post Development Comparison Criteria
Policy 5.2.7	Maintain Wetland and Floodplain functions

Policy 5.2.8	Maintain 100 Year Floodplain storage capabilities
Policy 5.2.9	Restrict Draining and Filling of Wetlands
Policy 5.2.13	Mining Reclamation Drainage and Erosion Standards
Policy 5.2.15	Protect Water Recharge Area
Policy 5.2.16	Maintain Water Quality and Quantity in Surface Runoff
Policy 5.2.21	Identify known Drainage Wells
Policy 5.2.23	Stormwater Management
Policy 5.2.24	Environmentally Sensitive Water Bodies

<b>Objective 5.3</b>	<b>Erosion Protection</b>
Policy 5.3.2	Conserve Soil - Limit Erosion
Policy 5.3.4	Erosion Control and Water Quality

<b>Objective 5.6</b>	<b>Mining</b>
Policy 5.6.2	Stormwater Settling Ponds/Setbacks

<b>Objective 7.1</b>	<b>Intergovernmental Coordination</b>
Policy 7.1.8	Stream Protection from Septic Tanks
Policy 7.1.9	Stream Protection from Septic Tanks

<b>Objective 8.1</b>	<b>Capital Improvements</b>
Policy 8.3.1	LOS Drainage Facilities
Policy 8.3.2	5 Year CIP Drainage Element

**1.4.3 Authority of Manual**

The Gadsden County Stormwater Management Policy and Procedures Manual current edition is adopted by reference as part of the Gadsden County Comprehensive Land Development code under subsection 3109.

**1.4.4 Concurrency Management System**

Prior to any Development Order (DO) being issued by the County, the Planning and Zoning Department shall evaluate the public drainage facilities for the proposed project as a part of Gadsden County’s Concurrency Management System process to ensure that the proposed drainage activities do not exceed the Level of Service (LOS) standards established in the adopted Comprehensive Plan. A Drainage Capacity Reservation Application is required as one of the documents submitted as part of the Application for Concurrency Evaluation. The application is submitted to and review by the Planning and Zoning (P&Z) Department staff. In the event that the P&Z staff identifies that the project can not be served adequately (at the required LOS) by the existing drainage system, then the applicant shall be required to demonstrate what improvements they intend to implement in order to increase the LOS of the existing Storm water Management System sufficiently to accommodate the proposed

construction activities as well as maintain the required LOS in the existing system. A copy of the Drainage Capacity Reservation Application is included in the Appendix.

## **1.5 DEFINITIONS USED IN THE MANUAL**

For the purpose of these design standards, procedures and policies contained within this manual, the following terms, phrases, and definitions shall apply. Words used in the singular shall include the plural, and the plural, the singular. Words used in the present tense shall include the future tense. The word “shall” is mandatory and not discretionary. The word “may” is permissive. Words not defined herein shall be construed to have the meaning given by common and ordinary use as defined by the latest edition of Webster’s Dictionary.

In addition, some words or phrases such as “County Engineer” are used in this manual but not defined in this manual. The Definitions of such words and phrases are defined in the Gadsden County Comprehensive Land Development Code Section 2100 (LDC 2100).

**Applicant** shall mean any person applying for or who has been granted a permit to proceed with a project.

**Aquifer** shall mean an underground formation, group of formations, or part of a formation that is permeable enough to transmit, store, or yield usable quantities of water.

**As-built plans or Record Drawings** shall mean the final plans amended to include all locations, dimensions, elevations, capacities, capabilities, as actually constructed and installed. This term is not the same as as-built survey.

**As-built Survey** shall mean a survey performed to obtain horizontal and vertical dimension data so that the constructed improvements may be located and delineated. The survey must be signed and sealed by a professional surveyor registered in the state of Florida and the survey shall meet the minimum technical standards of **F.A.C. 61 G 17**.

**Canal** shall mean an artificial waterway for transportation, irrigation, or Storm water conveyance, that has a perpetually wet cross-section.

**County** shall mean as defined in LDC 2100.

**Clearing** shall mean the removal of trees and brush from a part of the land, but shall not include mowing for maintenance purposes.

**Compensation storage** shall mean equivalent floodplain storage provided to counterbalance floodplain filling.

**Comp Plan** shall mean the latest approved Gadsden County, Florida Comprehensive Plan 2001 as originally adopted by Ordinance 91-006 and is reflected by all subsequent approved amendments.

**Construction** shall mean the building, assembling, expansion, modification or alteration of the existing contours of the site, the erection of buildings or other structures, or any part thereof, or land clearing.

**Detention** for purposed of this manual shall mean the collection and temporary storage of Storm water in such manner as to provide for treatment through physical, chemical, or biological processes or attenuation of the peak rate of flow.

**Development** shall mean as defined in LDC 2100.

**Discharge** shall mean the outflow of water from a project, site, aquifer, drainage basin or facility.

**Ditch** shall mean an artificial waterway for irrigation or Storm water conveyance that does not maintain a perpetually wet cross-section nor meets the requirements to be called a swale.

**Drainage system** shall mean all facilities used for the movement of storm water through and from a drainage area including, but not limited to, any and all of the following conduits and appurtenant features: canals, channels, ditches, flumes, culverts, streets, etc. It also includes all watercourses, waterbodies and wetlands.

**Erosion** shall mean the wearing or washing away of soil by the action of water or wind.

**100-year flood** shall mean the flood flow or stage of the magnitude which has a one percent(1%) chance of being equaled or exceeded during any one given year.

**100-year floodplain** shall mean Flood Prone Area as defined in LDC.

**Floodway** shall mean the permanent channel of a stream or other watercourse, plus any adjacent floodplain areas that must be kept free of any encroachment in order to discharge the 100-year-flood without cumulatively increasing the water surface elevation more than a designated amount, not to exceed one foot except as otherwise established by the Water Management District or established by a Flood Insurance Rate Study conducted by the Federal Emergency Management Agency (FEMA).

**Geotechnical Engineer** shall mean a licensed Professional Engineer in the State of Florida whose expertise or experience is in the field of geotechnical engineering.

**Groundwater** shall mean water below the surface of the ground whether or not flowing through known or defined channels.

**Hydrograph** shall mean as defined in LDC 2100.

**Impervious surface** shall mean a surface which has been compacted or covered with a layer of material so that it is highly resistant to infiltration by water. It includes semi-impervious surfaces such as compacted clay, as well as most conventionally surfaced streets, roofs, sidewalks, parking lots, and other similar surfaces.

**Land-locked** area shall mean a depressional area or basin which does not discharge runoff in its existing condition because of existing storage capabilities.(Closed Basin)

**Maintenance** shall mean the action taken to restore or preserve the functional design of the as-built plans of any stormwater management facility or drainage system.

**Open channel** shall mean a canal, ditch, or swale used to safely convey storm water runoff.

**Owner** shall mean the person in whom is vested the fee, ownership, dominion, or title of

property, (i.e., the proprietor). This term may also include a tenant, if chargeable under his lease for the maintenance of the property, and any agent of the owner or tenant including a developer.

**Peak rate of flow** shall mean the maximum rate of discharge resulting from a given storm event.

**Person** shall mean any and all persons, natural or artificial, and includes any individual, firm, corporation, governmental agency, business trust, estate, trust, partnership, association, two or more persons having a joint or common interest, or any other legal entity.

**Positive outfall** shall mean a gravity discharge from a basin via overland flow, artificial waterway, natural waterway, or pipe.

**Post-development** shall refer to the average hydrologic conditions as of the completion of the development for which a permit has been applied.

**Pre-development** shall mean the hydrologic condition of the project site immediately before development or construction begins.

**Professional Engineer** shall mean the State of Florida Registered Professional Engineer of record for the project under consideration.

**Professional Geologist** shall mean the State of Florida Registered Professional Geologist of record for the project under consideration whose expertise and experience allows for the performance of the tests and preparation of evaluations and report as set out in the applicable sections of this Ordinance.

**Receiving waters or receiving waterbodies** shall mean any waterbodies, watercourses, and wetlands into which surface waters flow.

**Recharge** shall mean the inflow of water into an aquifer which meets state aquifer and water quality requirements contained in Chapters 17-3 and 17-4, Florida Administrative Code.

**Record Drawings** shall be synonymous “As-built plans” defined previously.

**Retention or to retain** for purposes of this manual shall mean the prevention of, or to prevent, the discharge, directly or indirectly, of a given volume of storm water runoff into surface waters by complete onsite storage.

**Sediment** shall mean solid material, whether mineral or organic, that is in suspension, being transported, or has been moved from its site of origin by water.

**Storm event** shall mean the storm of a specific duration, intensity, and frequency.

**Storm water or runoff** shall refer to the flow of water which results from and which occurs during and immediately following, a rainfall event.

**Storm water management system/facilities** shall refer to the designed/constructed features of the property which collect, convey, channel, store, inhibit, or divert the movement of storm water.

**Swale** shall mean an artificial waterway which:

- (a) Has a top width-to-depth ratio of the cross-section equal to or greater than 6:1, or side slopes equal to or greater than 3 feet horizontal to 1 foot vertical;
- (b) Contains contiguous areas of standing or flowing water only following a rainfall event;
- (c) Is planted with or has stabilized vegetation suitable for soil stabilization, stormwater treatment, and nutrient uptake; and
- (d) Is designed to take into account the soil erodibility, soil percolation, slope, slope length, and contributing area so A.A.S. to prevent erosion and reduce the pollutant concentration of any discharge.

**Tailwater** shall mean the water into which a spillway or outfall discharges.

**Waterbody** shall mean any natural or artificial pond, lake, reservoir, or other area which ordinarily or intermittently contains water and which has a discernible shoreline.

**Watercourse** shall mean any natural or artificial stream, creek, channel, ditch, canal, waterway, gully, ravine, or wash in which water flows either continuously or intermittently, and which has a definite channel, bed, or banks.

**Water Management District** shall mean the Northwest Water Management District unless otherwise specified.

**Wet detention** shall mean a detention basin that contains a permanent pool of water for the purpose of treating runoff water quality that retains runoff for a minimum period of 14 days for an average rainfall summer, and which has a littoral zone over a substantial portion of the pond surface area.

**Wetlands** shall mean as defined in LDC 2100 or by the current Northwest Florida Water Management District, whichever, is stricter in interpretation.

## 1.6 PROHIBITIONS AND EXEMPTIONS

### 1.6.1 Prohibitions

No person may develop or make any change in the use of land or construct a structure or change the size of a structure, except as exempted in Section 1.6.2 of this Manual, without first obtaining a permit. No building permit, development order or other form of construction approval shall be granted without the prior approval by the County, of plans exhibiting the methods by which these minimum Stormwater Management standards shall be met. The following development activities may potentially alter or disrupt existing storm water runoff patterns, and as such, will, unless exempt pursuant to Section 1.6.2 hereof, require a permit prior to the commencement of construction:

- (1) Clearing and/or draining of land as an adjunct to construction;
- (2) Clearing and/or draining of uses that are not bona-fide agricultural pursuits;



- (3) Converting agricultural lands to non - agricultural uses;
- (4) Subdividing land;
- (5) Re-platting recorded subdivisions;
- (6) Changing the use of land and/or the construction of a structure or a change in the size of one or more structures;
- (7) Altering the shoreline or bank of any surface water body;
- (8) Filling of depressional areas;
- (9) The lowering of the water table; and
- (10) Either the placement of more than 5,000 square feet of impervious surfaces (including building, tennis courts, basketball courts, sidewalks, etc.) Or 2,000 square feet of area subjected to vehicular traffic (parking and roadways whether asphalt, concrete, or alternative materials such as mulch).

### **1.6.2 Exemptions**

- (1) The following activities may be exempt from these standards:
  - (a) One (1) single family, duplex, triple, or quadraplex residences;
  - (b) Accessory structures to existing structures listed in (a) above with less than 1,000 square feet of impervious surface additions;
  - (c) Bona fide agricultural pursuits, including forestry, except where an artificial drainage system will be used to increase the discharge of surface water from the applicant's land to offsite persons land;
  - (d) Maintenance work on utility or transportation systems, provided such maintenance work does not alter the purpose and intent of the drainage system as constructed;
  - (e) Any maintenance, alteration, renewal, use or improvement to an existing structure not changing or affecting rate of volume of storm water runoff; and
  - (f) The one-time construction of any structure or addition not otherwise exempt not exceeding the impervious area thresholds give in Section 1.b.1(10).
- (2) Emergency Exemption: This Manual shall not be construed to develop procedures or policies which prevent the doing of any act necessary to prevent material harm to, or destruction of, real or personal property as a result of a present emergency, including, but not limited to, fire, infestation by pests, or hazards resulting from violent storms or hurricanes or when the property is in imminent peril and the necessity of obtaining a permit is impractical and would cause undue hardship in the protection of the property.

### **1.6.3 Permits and Applications**

All Stormwater Management systems requiring permit approval from the County shall be required to:

- (1) Show proof that a permit from the Florida Department of Environmental Protection (FDEP) in accordance with F. A. C. 17-25 has been submitted to the FDEP or an exception notice has been applied for.
- (2) Submit a Gadsden County Drainage Capacity Reservation Application.
- (3) Submit a Gadsden County Stormwater Management Permit Application.
- (4) Submit three (3) sets of the following required stormwater management plans, exhibits, and calculations signed and sealed to the County Engineer:
  - (a) Drainage Map

The Project Engineer shall include in the construction plans a master drainage map showing all existing and proposed features. For projects greater than one (1) acre or five (5) acres of total drainage basin contribution area (including offsite flows) the map is to be prepared on a 24-inch by 36-inch sheet on a scale not to exceed 1" = 200'. Listed below are the features that are to be included on the drainage map.

- o Drainage basin boundaries, including all offsite areas draining to the proposed subdivision or project site.
- o Sufficient site topographical information with elevations to verify the location of all ridges, streams, etc. (One foot contour intervals typical)
- o Highwater data on existing structures upstream and downstream of the project including source of highwater data.
- o Existing drainage features (ditches, culverts, inlets, swales, ponds, etc.).
- o Delineation of drainage sub-areas (if applicable).
- o Show retention/detention areas and ingress/egress areas for retention/detention facilities.
- o General type of soils (obtain from USDA Soil Conservation Service soil survey of Gadsden County). Soil borings may also be required by the County Engineer where the general soils information is not deemed adequate for design or permitting purposes.
- o Flood hazard classification.
- o Description of current ground cover and/or land use.
- o 100 Year Flood Plain

- (b) Recent aerial photograph delineating project at no smaller scale than 1" = 400 ft. (Unless waived by County Engineer).
- (c) Drainage Calculations and computer simulations (if applicable).

## **1.7 INTERPRETATIONS AND RESPONSIBILITY OF IMPLEMENTATION**

The responsibility for administration of this manual is the County Engineer and Planning and Zoning Director. In the event that a questions arises concerning the application of design standards, procedures, or policies provide within this manual, the County Engineer shall be responsible for interpretation.

## **1.8 ERRORS AND OMISSIONS**

The document may have errors and omissions contained within and shall not substitute for professional engineering judgment. Any individual that finds any information in this manual to be in conflict with professionally accepted standards or newly revised laws, codes, or other standards such that he/she believes that the health, safety or welfare of the public may be compromised, is encouraged to bring the error, omission, or revision of the County's attention.

All construction plans and design calculations shall be signed and sealed by an Engineer registered in the State of Florida practicing within his or her area of expertise.

# **SECTION 2.0 STORMWATER MANAGEMENT SYSTEM COMPONENTS**

## **2.1 POLLUTION ABATEMENT -WATER QUALITY PROTECTION**

As a direct result of development, natural pervious ground surfaces are altered by the addition of pavement and building impervious surface. A source of stormwater pollution is introduced with the development of land associated with impervious surfaces as well as the introduction of fertilizers, pesticides, heavy metals, and other chemicals added to post-developed areas. As a result, the State and local government entities have adopted minimum regulation to abate pollution from stormwater runoff.

The minimum standards for pollution abatement shall be those specified in Chapter 17-25 F.A.C. These standards will apply to all development projects meeting the thresholds give in Chapter 17-25 as well as those listed in Section 1.6.1 of this manual. Where specific site conditions do not promote the successful completion of pollution abatement through the usage of retention or detention with filtration systems as defined in F.A.C. 17-25 then the County Engineer may consider the usage of other alternative treatment facilities such as wet-detention with littoral planting, wet-detention with extended residence time, dry detention,

and/or exfiltration systems if as the discretion of the County Engineer these systems are designed in accordance with Best Management Practices (BMP's) as given in the State of Florida Department of Environmental Regulation, Florida Development Manual.

Until the NFWMD or the Florida Department of Environmental Protection (FDEP) provides specific guidelines for the design for alternative water quality treatment systems, such as "wet detention", the design standards of the Water Management Districts may be considered on a case-by-case basis by the County Engineer.

In all instances of development exceeding the threshold given in Section 1.6.1, the applicant shall be required to demonstrate the following:

- (1)
  - (a) a permit has been obtained from the FDEP in compliance with F.A.C.17-25; or
  - (b) a letter by the FDEP acknowledging site specific exemption; or
  - (c) a letter to the FDEP providing Notice of Intent to construct a stormwater management facility exempt in accordance with F. A.C. 17-25 within 30 days
- (2) For minor projects involving the placement of impervious surfaces the County thresholds given in Section 1.6.1, but meeting the exemption of the FDEP under Chapter 17-25, all applicants shall be required to submit three (3) copies signed and sealed by an Engineer registered in the State of Florida to practice Stormwater Management Engineering the following items:
  - (a) Design calculations for sizing a pollution abatement facility for treating the runoff of ½ inch of runoff over the entire developed site.
  - (b) Design calculation showing the facility can recover through filtration, percolation, evaporation, and/or transpiration, the entire design pollution abatement volume within 72 hours.
  - (c) Construction plan showing proper stabilization and sediment control practices.
  - (d) Details of all control structures, storm drains, inlets, filter drains, manholes and other drainage facilities utilized to carry storm water to or out of the facility.
  - (e) Stage storage curve calculation or rating curves.
  - (f) Typical facility section details including side slopes, berm widths, bottom and top of bank elevations, and sodding limits.
  - (g) In all conditions Pre Development Runoff Conditions shall be maintained for appropriate design storm. Specific design criteria for pollution abatement facilities is given in Section 4.1.

## **2.2 PEAK ATTENUATION - WATER QUALITY PROTECTION (FLOOD PROTECTION)**

A direct result of development is the alteration of natural pervious ground surfaces with the addition of pavement and building impervious surface. Additional stormwater runoff rates and volumes are introduced with the development of land associated with impervious

surfaces. It becomes important to attenuate stormwater discharge rates and volumes after development to those rates and volumes that existed prior to development so as to not cause adverse drainage impacts to adjacent properties, public conveyance systems, and the community in general.

Performance criteria has been established as follows to accomplish this objective.

### **2.2.1 Stormwater Peak Discharge Attenuation Criteria**

A flood control practice designed to attenuate (lessen the impact of ) the additional stormwater runoff discharge rate generated from the development of the land. The peak flow rate leaving a developed site shall not be larger than that leaving the site prior to the development. The goal is to ensure that downstream lands are not adversely impacted from upstream development during large storm events. In Gadsden County the storm events used for peak attenuation are:

25-year/24 hour (for pre-post flood attenuation verification)

100-year/24-hour (for determining 100 year flood plains, determining finished flood elevations and land-locked closed basin).

### **2.2.2 Peak Attenuation Methods**

Specific design criteria for affecting the design and construction of peak attenuation facilities is given in Section 4.2. This section discusses the methodologies to be used.

(1) Methodologies: Peak discharge computations should consider the duration, frequency, and intensity of rainfall, the antecedent moisture conditions, upper soil zone and surface storage, time of concentration, tailwater conditions, changes in land use or land cover, and any other changes in topographic and hydrologic characteristics. Large systems should be divided into subbasins, according to artificial or natural drainage divides to allow for more accurate hydrologic simulations. Examples of accepted methodologies for computation of runoff are as follows:

- (a) Soil Conservation Method (see U. S. Department of Agriculture, Soil Conservation Service “National Engineering Handbook, Section 4, Hydrology, “TR-55 or TR-20 users manuals).
- (b) Santa Barbara Urban Hydrograph Method.
- (c) U. S. Army Corps of Engineers HEC-1 Computer Programs.
- (d) Rational method for small basins (40 acre or less)
- (e) Other hydrograph methods approved by the County Engineer.

(2) Rainfall Intensity: In determining peak discharge rates, intensity of rainfall values shall be obtained through a statistical analysis of historical long term rainfall data or from sources or methods generally accepted as good engineering practice.

Unless otherwise justified by specific studies or publications, Gadsden County will use the following rainfall amounts:

P = 8.7 25 yr/24 hr storm

P = 11.5" 100 yr/24 hr storm

Examples of acceptable sources include:

(a) USDA Soil Conservation Services, "Rainfall Frequency Atlas of Alabama, Florida, Georgia, and South Carolina for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 years: January 1978; Gainesville, Florida.

(b) U. S. Weather Bureau Technical Paper No. 49.

(c) U. S. Weather Bureau Technical Paper No. 40.

(3) Upper Soil Zone Storage and Surface Storage: In most instances, the upper soil zone storage and surface storage capacities will have an effect on the pre-development and post-development peak discharges and should be considered in these computations. Any generally accepted and well documented method may be used to develop the upper soil storage and surface storage values.

(a) The soil zone storage at the beginning of a storm should be estimated by using reasonable and appropriate parameters to reflect drainage practices, average wet season water table elevation, the antecedent moisture condition (AMC II) and any underlying soil characteristics which would limit or prevent percolation of storm water into the entire soil column. In no case should the soil storage used in the computation exceed the difference between the maximum soil water capacity and the field capacity (i.e, gravitational water) for the soil columns above any impervious layer or seasonal ground water table.

(b) Surface storage, including that available in wetlands and low lying areas, shall be considered as depression storage. Depression storage shall be analyzed for its effect on peak discharge and the time of concentration. Depression storage can also be considered in post-development of stage-storage relationships; if depression storage is considered, then both pre-development and post-development storage routing must be considered.

(4) Time of Concentration: Calculations shall be performed in accordance with TR-55 methodology (Latest Edition) or other acceptable methodology as approved by the

County Engineer.

- (5) Soils Investigation: The area where storm water flood attenuation is proposed will require a certified soils report to verify (SHWT) and shall be required to verify soil permeability rate. One boring is require per area (minimum) depicting soil strata and depth to high groundwater table.

### **2.3 COMPENSATING STORAGE - FLOOD PLAN PROTECTION**

Protection of flood prone areas is vital to surface water management. Unrestricted development in the flood plain can cause an increase in the risk to life and property. Flood plain encroachment can cause an increase in flood height, flow velocity, rate of rise and duration of flooding. It can also pose a potential hazard by contributing to the sediment and building materials which may be swept downstream by flood waters. Therefore, the protection and preservation of flood prone areas has become an important criteria for development.

Developments which contain flood prone lands shall not cause an impact on the existing flooding characteristics. Flood plains shall be maintained hydrologically in their natural state and protected with a Conservation Easement. Flood prone areas often contain wetlands. In such cases, any proposed development within the area must be compatible with both allowable uses within flood prone areas and allowable uses within wetlands.

Development activities within the flood prone areas shall be limited in scope. Development in floodways as defined by the Federal Emergency Management Agency (FEMA) is prohibited in the county. Minor encroachments into the floodplains as defined by FEMA may be considered by the County Engineer if equal compensation adjacent to, and hydrologically satisfaction. A study shall be provided for any change in the flood prone elevations. This study must be approved by the County Engineer and FEMA. The details of design to compensate for flood plain encroachment are given in Section 4.3.

### **2.4 AQUIFER RECHARGE - GROUNDWATER RECHARGE AND PROTECTION**

Gadsden County endorses the practice of recharge, especially in upland areas to promote the long term protection of the quantity and quality of potable water supplies in the Floridan aquifer. Recharge is designated areas where the soils are compatible (Hydrologic Soils Group "A" as described by the USDA Soil Conservation Service) will be accomplished by providing for additional retention of storm water runoff beyond than that specified for pollution abatement.

The specific retention criteria is given in Section 4.4. Seepage credit may be considered on Type "A" soils at the discretion of the County Engineer and in accordance with Section 2.2.2(b).

Examples of Type “A” soils in Gadsden County according to the latest edition of the USDA Soil Conservation Service’s Soil Survey include:

- \* Arredondo fine sand
- \* Blanto
- \* Eustis
- \* Lakeland

### **SECTION 3.0 SPECIAL STORM WATER MANAGEMENT CONSIDERATIONS**

#### **3.1 EASEMENTS**

##### **3.1.1 Conservation Easements**

Conservation Easements are utilized to protect flood prone and wetland areas. Conservation Easements are blanket easements over the area of concern and are granted or dedicated to Gadsden County, a Homeowners Association, or a Master Property Owners Maintenance Association. Conservation Easements act to limit any future encroachment or development and thus provide protection of the County’s flood prone areas and wetlands areas.

Conservation easements shall be required of all developments which contain flood prone or wetland areas within their site boundaries. Conveyance of Conservation Easements shall be as follows.

- (1) Platted Subdivisions
  - (a) Public

Platted subdivisions which are dedicated to the public shall identify all flood prone areas and wetlands on the face of the plat and include these areas in the dedication. (Shall be called on plat (“conservation Easement”))

- (b) Private (Non-Public)

Subdivisions which are not publicly dedicated shall identify all flood prone areas and wetlands on the face of the plat. Conservation Easement shall be granted to the Homeowner Association by dedication in the plat.

- (2) Un-platted Land

Developments may contain flood prone areas or wetlands which are not included in the plat. These may be adjacent lands which were not platted or may be part of an overall master plan, such as in a Planned Unit Development. Areas such as these shall be dedicated as Conservation Easements by conveyance through an easement recorded in the official record book.



(3) Site Plans

Site plans which contain flood prone areas and wetlands shall grant an easement over these areas. The Conservation Easements shall be conveyed by means of an easement recorded in the official record book.

**3.1.2 Drainage Easements**

Drainage easements are utilized to provide for the protection and legal maintenance of drainage systems not within a right-of-way. Drainage easements shall be required over any portion of a drainage system not within a right-of-way and necessary for the functioning of the system.

Drainage easements for all facilities must be shown on construction drawings and approved by the County Engineer. The easements shall be executed prior to issuance of a Site permit, subsequently accepted by the Board of County Commissioners, and recorded in the Public Records.

The minimum allowable width of drainage easements shall be as follows:

<u>Drainage System</u>	<u>Minimum Easement Width</u>
Closed Drainage Systems D = Depth from grade to pipe invert	(Dia + 4 feet + 2.0D) where <u>15 feet min.</u>
Open Drainage Systems	Depth from Top of Bank 10' + TW to Bottom 4' or less Dept from Top of Bank 15' + TW to Bottom 4' - 6' Depth from Top of Bank 30' + TW to Bottom greater than 6' Where TW = Top Width of ditch

The minimum allowable width of drainage easement may be increased if deemed necessary by the County Engineer. Any variance to the above easement widths must be approved by the County Engineer.

Drainage easements shall be conveyed as follows:

(1) Platted Subdivisions

Drainage easements which are required within a platted subdivision shall be clearly identified on the face of the plat and included in the dedication. Retention/detention ponds within platted subdivisions shall not be protected by a drainage easement but shall be platted as a separate tract of land dedicated to entity responsible for its maintenance.

Public drainage facilities which are located within a private subdivision shall be granted a

drainage easement by conveyance recorded in the official record book.

(2) Un-platted Land

Developments may contain drainage systems which traverse property not included in the plat. These may be adjacent lands which were not platted, future phases of the development to be platted at a later date, or may be part of an overall master plan, as a in a Planned Unit Development. The drainage systems must be provided with an easement granted by conveyance recorded in the official record book.

(3) Off-Site

Developments may require off-site drainage improvements in order to insure the proper functioning of the on-site system. Such offsite improvements shall be provided with a drainage easement granted by conveyance and recorded in the official record book.

**3.1.3 Access Easements**

Access easements are utilized to provide unobstructed access (curb cuts where applicable) for maintenance equipment from a street or right-of-way. Adequate maintenance access shall be provided for all drainage systems (i.e., open and closed drainage systems, - retention/detention and exfiltration systems, etc.).

Access easements shall be provided for facilities which are publicly maintained or maintained by an organization (i.e., homeowners association). Drainage systems which are required as part of an individual site development (site plan) do not require public access easements for system maintenance.

Access easements for all facilities must be shown on construction drawings and approved by the County Engineer. The easements must be executed, accepted by the Board of County Commissioners, and recorded in the Public Records prior to issuance of a building permit.

**3.2 EROSION AND SEDIMENT CONTROL**

No grading, cutting, or filling shall be commenced until erosion and sedimentation control devices have been installed between the disturbed area and waterbodies, watercourses, and wetlands. Engineering plans supporting all storm water management permit applications for all site approvals shall include an erosion and sediment control plan. The plan should clearly identify those procedures and design approaches utilized to perpetually prevent erosion problems as well as these practices and procedures to be used during construction. Proposed sediment control practices should reflect latest FDOT procedure and State BMP's. A time schedule of the maintenance and removal of construction sediment control practices shall be included.

Vegetated buffer strips shall be created or, where practicable, retained in their natural state along the banks of all watercourses, water bodies, or wetlands. The width of the erosion and sediment control buffer should be maximized in order to construct the facilities in accordance with the approved construction plans and shall prevent erosion, trap the sediment in overland runoff, provide access to the waterbody, and allow for periodic flooding without damage to structures.

**3.2.1 Acceptable Stabilization Practices**

Acceptable stabilization practices include but are not limited to:

(1) Sodding/paving

The method of ground stabilization will be selected based upon the anticipated design storm velocity of the facility or the steepness of slope.

**Table 3.2.1 Maximum Channel Velocity/Slopes**

<u>Stabilization Practice</u>	<u>Velocity</u>	<u>Slope</u>
Seed/Grass & Mulched	0-2 Fps	<2.0%
Slope	2-4 Fps	2.0-5.0%
Paved or Fixed	> 4 Fps	>5.0%

- (a) Maximum channel velocities and slopes are given in Table 3.2.1.
- (b) All swales are required to be dependent on slope.
- (c) Ditches (canals) are required to have sodded side slopes from their top of bank to their normal water level (or bottom).
- (d) All ponds are required to have sodded side slopes from top of bank to their normal level or dry bottom.
- (e) Dry bottoms may be seed and mulched or grass and mulched, as an option to sodding.

(2) Flumes

Flumes are required whenever concentrated storm water leaves a parking area or road or enters a storm water management facility. Flumes shall be made of concrete or other suitable permanent, non-eroding material and contain sufficient vertical footing into the ground to prevent undermining.

(3) Check Dams

Check dams may be used to dissipate the velocity of swales.

(4) Culvert End-treatments

All culverts discharging to a storm water management facility shall have end treatment. These structures are to prevent undermining of the pipe, and providing a readily maintainable entrance/exit for storm water flow, free from vegetative overgrowth. Standard FDOT concrete head walls and metered end sections are acceptable.

(5) Energy Dissipaters

Whenever storm water is discharged from a pipe, flume, or other conveyance channel at a velocity sufficient to cause erosion, energy dissipation devices shall be employed.

(6) Splash Pads

Splash Pads are required to stabilize the soil of all storm water discharge structures with outlet velocities in excess of 2.5 Fps. Energy dissipaters may also be required in addition to splash pads in order to reduce outlet velocities from the splash pad.

### **3.2.3 Erosion & Sediment Control During Construction**

Erosion and sediment shall be controlled during construction. This includes the prevention of both wind erosion and water erosion (turbidity).

- (1) Inlet Protection: All inlets and catch basins shall be protected from sediment laden storm runoff with hay bales and or slit fence until completion of all construction operations that contribute sediment to the inlet.
- (2) Temporary Seeding: Areas exposed by construction for 30 days or more shall be seeded with a quick growing grass species, appropriate for that season, that will not compete with permanent grassing, and be applied at a rate of 30 lbs./acre.

### **3.3 MAINTENANCE OF FACILITIES**

The installed storm water management and conveyance system(s) required by this Manual shall be maintained by the owner except that the County may accept certain systems for maintenance. The system(s) to be maintained by the owner shall have adequate easements to permit the County to inspect and, if necessary, to take corrective action should the owner fail to maintain the system(s). Should the owner fail to properly maintain the system(s), the County shall give such owner written notice of the nature of the corrective action necessary. Should the owner fail, within thirty (30) days from the date of the notice to take, or commence taking, the necessary corrective action, the County may enter upon the property, take corrective action and place a lien on the property of the owner for the costs thereof.

Proof of enforceable legal obligations upon the owner to provide perpetual maintenance shall be provided. To satisfy this requirement, the Permittee must provide written documentation. If the

entity is a governmental unit, the Permittee must supply written proof in the appropriate form, by either letter or resolution, that the governmental entity will accept the operation and maintenance of all of the storm water management system, including lakes, easements, etc., prior to County Engineer approval.

### **3.3.1 Homeowners, Property Owners, or Master Associations**

If a homeowners, property owners, or master association is proposed, the Permittee must submit the Articles of Incorporation for the association, and Declaration of Protective Covenants or Deed Restrictions, as well as a reference map if referred to in documents. After these are approved, the Permittee must furnish the Certificate of Incorporation and the recording information (Official Book and page number) for the Declaration.

### **3.3.2 Condominium Association**

If a condominium association is proposed, the Permittee must supply the Articles of Incorporation for the condominium association, and Declaration of Condominium. After the documents are approved, it will be necessary for the Permittee to forward a copy of the letter from the Department of Business Regulation, Bureau of Condominiums stating that the documents are proper for filing.

### **3.3.2 Association Requirements**

The Association, be it either a non-profit association or a condominium association, must comply with the applicable provisions of Florida laws, specifically Chapters 617 or 718, Florida Statutes.

#### **(1) General Powers**

The association must have the following general powers which are reflected in the Articles of Incorporation:

- (a) Own and convey property.
- (b) Operate and maintain common property; specifically the storm water management system as permitted by the County and the Water management District, if required: including all lakes, retention areas, culverts, and related appurtenances.
- (c) Establish rules and regulation.
- (d) Assess members and enforce said assessments.
- (e) Sue and be sued.
- (f) Contract for services (if the association contemplates employing a maintenance company) to provide the services for operation and maintenance.
- (g) The association must have as members all the homeowners, lot owners, property owners, or unit covers.

- (h) The association shall exist in perpetuity; however, if the association is dissolved, the Articles of Incorporation must provide that the property consisting of the storm water management system shall be conveyed to an appropriate agency of local government. If it is not accepted, then the storm water management system must be dedicated to a similar non-profit corporation.
- (i) All other powers necessary for the purposes for which the association is organized.

(2) Required Association Stipulations

The Declaration of Protective covenants, Deed Restrictions, or Declaration of Condominium must set forth the following:

- (a) That it is the responsibility of the association to operate and maintain the storm water management system.
- (b) The storm water management system is owned by the association or described therein as common property.
- (c) That there be a method of assessing and collecting the assessment for operation and maintenance of the storm water management system.
- (d) That any amendment which would affect the storm water management system, including the water management portions of the common areas, must have prior approval of the County and the Water Management District, if required.
- (e) That the Declaration of Covenants be in effect for at least 25 years with automatic renewal periods thereafter.

(3) Phased Projects

- (a) If a property owner's association is proposed for a project which will be constructed in phases, and subsequent phases will utilize the storm water management system for the initial phase or phases, the association should be created with the ability to accept future phases into the association.
- (b) If the development scheme contemplates independent association for different phases, a master association should be formed to include all of the various associations with the master association having the responsibility to operate and maintain the storm water management.

**3.4 SPECIAL DRAINAGE PROTECTION BASINS**

**3.4.1 Waters of Special Concern**

The State of Florida recognizes certain waterways and water bodies as requiring special protection. The pollution abatement requirements (water quality treatment) are increased for all storm water management facilities discharging to these water bodies by 50% (1.5 x normal treatment requirements). In Gadsden County these waters are currently identified as follows:

- (1) Class I
  - \* Holman Branch - S. R. 270A to source.
  - \* Mosquito Creek - U. S. Highway 90 North to Florida State line.
  - \* Quincy Creek - S. R. 65 to source.
  
- (2) Class II
  - None currently listed.
  
- (3) Outstanding Florida Waters (OFW's)
  - \* Ochlockonee River
  - \* Apalachicola River
  - \* Bear Creek State Recreation Area

In addition, the following water bodies have been identified in the Adopted Comprehensive Plan as requiring protection of surface water quality through minimum setbacks and buffering:

- \* Quincy Creek
- \* Little River
- \* Ochlockonee River
- \* Telogia Creek
- \* Apalachicola River

Setback and buffering requirements are given in the LDC and are administered by the Planning & Zoning Department.

### **3.4.2 Basins of Special Concern**

(1) Quincy Creek Basin: All storm water management applications and development projects within Quincy Creek Basin shall be reviewed with special concern since the City of Quincy depends upon Quincy Creek for its potable water supply. All storm water management applications in this basin shall be required to perform the following activities in addition to the normal requirements of storm water management design and development submittal:

- (a) Show proof that the storm water management application and supporting documentation has been submitted to the City of Quincy and Northwest Florida Water Management District.

- (b) Show proof of FDEP water quality permit or appropriate exemption acknowledgment, under F.A.C. 17-25 prior to receiving final approval by the County Engineer for the storm water management application.
  - (c) Demonstrate that all pollution abatement for storm water runoff utilizes OFW water quality design standards for all ponds discharging to any water bodies connecting to waters of the State within the basins.
  - (d) Demonstrates that no hazardous chemicals, industrial waste, or similar substances can discharge to storm water management system.
  - (e) Demonstrate that all NPDES permits, Storm water Pollution Prevention Plans have been prepared and submitted to the Environmental Protection Agency (EPA) prior to the County Engineer's approval.  
(REQUIRED FOR AREAS OF DISTURBANCE OF 5 acres+.)
  - (f) Submit surface water quality monitoring plan ensuring that the performance of all on-site storm water management facilities will perpetually observe, monitor, maintain and correct deficiency in storm water management systems, not meeting the surface water quality standards of F.A.C. 17-302.
- (2) Telogia Creek Basin: The drainage basin has been identified in the Adopted Comprehensive Plan as a basin of special concern. Therefore, items (b) through (e) listed above for Quincy Creek Basin shall also apply to the Telogia Creek Basin.

### **3.5 ENVIRONMENTAL IMPACTS AND CONSERVATION**

#### **3.5.1 Wetland Protection and Conservation**

Storm water Management Systems shall not be designed to adversely affect wetland system. Protection from wetland system shall include but are not limited to:

- (1) Perimeter swales (runoff interceptor swales) that do not depress the existing water table.
- (2) Upland buffers as specified in the Land Development Regulations.
- (3) Conservation easements in accordance with Land Development Regulations.

Wetlands determined to be connected to Waters of the State (WOS) shall not be used (in the sense of F.A.C. 17-25) untreated storm water runoff. In other words, storm water must as a minimum be treated in accordance with F.A.C. 17-25 standards prior to any discharge to downstream wetlands.



### **3.5.2 Wetland Integration with Storm water Management**

Most wetlands found in Gadsden County are riparian wetlands associated with natural streams, rivers, and other similar water bodies. Therefore, the integration of storm water management systems (peak attenuation facilities) with wetland conservation areas for the purposes of providing additional flood storage for large design storm events is not feasible in most instances. Berms will not be allowed to be placed around riparian systems in order to provide flood storage (e.e, impounding water in flowing systems).

The County Engineer may consider non-riparian wetlands for storm water management integration providing that:

- (1) All pretreatment of first flush of pollutants is a separate pollution abatement facility in accordance with F.A.C. 17-25.
- (2) The storm water management facility (detention lake) has its control elevation set no higher than the wetlands seasonal high water table and no lower than its low season water table (as verified by a signed/sealed geotechnical report or geologist report).
- (3) That the detention pond's design fluctuations can simulate the range of hydroperiod of the wetland to the satisfaction of Gadsden County Planning Department and Florida Department of Environmental Regulation. This determination must be performed by a qualified biologist.
- (4) No loss of wildlife value is anticipated by the activity.
- (5) Any berms around the wetland are constructed in uplands.
- (6) The pretreated upland discharge or peak attenuation overflow is spread slowly to wetland by sheet flow or spillway structures with transfer velocities below erosive values.

### **3.5.3 Water Table Drawdown and Dewatering**

- (1) Storm water management facilities shall not be designed to adversely affect the natural hydroperiod of wetlands. Whenever storm water management facilities are proposed within 20 feet of any wetland, the County may require a signed and sealed report from a Professional Geologist or Geotechnical Engineer certified in the State of Florida giving the following information:
  - (a) Season low and high water table in the wetland and at the proposed storm water management facility location.
  - (b) Minimum of two (2) borings at pond location taken to a depth at least 2 feet below the storm water management facility bottom and describing the soils encountered.
  - (c) A determination of soil permeability of the soil by means of suitable field or laboratory

measurement techniques used to evaluate any potential drawdown effects.

Note: Storm water management facilities designed where the control elevation is consistent with the water table fluctuations of the adjacent wetland may not require a drawdown analysis.

- (2) Storm water management facilities designed outside of the influence of hydrologically sensitive areas (wetlands) may not permanently lower the water table more than four (4) feet below existing conditions at any given specific location; and no more than two (2) feet average over the project site. In any instance, where the storm water management system is designed to lower the groundwater surface, a signed and sealed geotechnical engineering or geological report shall be submitted providing the information listed in 3.5.3 (1)(a and b). These provisions do not include temporary impacts due to construction dewatering in order to excavate trenches for sewer systems, lift stations, ponds, and other like required facility improvements.
- (3) Temporary dewatering during construction shall be in conformance with Water Management District regulations. For storm water management systems that require large volumes of water to be removed during construction, the applicant will be required to demonstrate that they have made application or notice to the Water Management District to comply with this consumptive use permitting requirement.

### **3.6 GRADING STANDARDS**

Specific grading standards affecting storm water management system construction is given below. The intent of the side slope criteria is to meet State codes, meet Best Management Practices, minimize maintenance problems, prevent erosion, and protect the health, safety or general welfare of the public.

#### **3.6.1 Storm water Storage Facilities**

##### (1) Grading

The grading of storm water storage facilities shall be performed in such a manner as to provide side slopes that are easily stabilized; perpetually maintainable; reasonably safe to the public health; and aesthetically in keeping with the adjacent land uses so as not to detract from the overall property value or objectives of the adjacent land uses. The minimum side slopes required for grading ponds is dependent upon whether the pond is designed to have a normally dry bottom or a wet bottom. Table 3.6.1 gives the requirements for grading dry storage facilities. Information regarding wet detention design is dictated by the State's Best Management Practices (BMP's) manual and 4:1 shall be the minimum side slope in any situation

##### (2) Fencing Requirements

Fences shall be mandatory for all facilities with slopes steeper than those values listed in Tables 3.6.1. In addition, fencing may also be required on specific facilities regardless of slope, if in the

opinion of the County Engineer, a fence is necessary to protect the health, safety or general welfare of the public.

Table 3.6.1  
Storm water Storage Facilities Side-Slope Grading Requirements

<u>Dry Retention/Detention Pond W/O Fence</u>		<u>Retention Swale W/O Fence</u>	
<u>Depth Range (recommended)</u>	<u>(Minimum Allowed)</u>	<u>W/O Fence</u>	<u>(feet)</u>
≤ 1'	4:1	3:1	3:1
-3'	4:1	4:1	4:1
3 to 4	4:1	4:1	4:1
4 to 6	5:1	4:1	NA
> 6'	6:1	4:1	N/A

(3) Maximum Slopes

Slopes steeper than 3:1 or greater than the natural angle of repose of the soils to be used shall require certified calculations demonstrating that slopes have been adequately protected from erosion, sloughing, or other similar stability failures.

Slopes steeper than what is indicated in Table 3.6.1 shall require fencing. The maximum allowable side slopes of fenced retention/detention ponds and swales shall be 2:1.

(4) Maintenance Requirements

A maintenance berm shall be mandatory for all storage facilities. A maintenance berm is a level (no greater than 10:1 cross slope allowed) unobstructed strip of land surrounding the storm water facility to provide easy access around a storm water facility for maintenance personnel and equipment. The following table illustrates maintenance berm requirements:

Storm water Storage Facility Minimum Maintenance Berm Required

with fencing	5 ft. around pond perimeter
without fencing	10 ft. around pond perimeter

The maintenance berm must have adequate vehicular access to permit the maintenance vehicle to safely operate within the limits of the berm. Consideration must be given to proper turning movements and maintenance maneuvers within the corners of smaller facilities.

**3.6.2 Storm water Conveyance Facilities**

(1) Grading

The grading of storm water conveyance facilities shall be performed in such a manner as to provide side slopes that are easily stabilized; perpetually maintainable; reasonably safe to the public health; and aesthetically in keeping with the adjacent land uses so as not to detract from the overall property value or objectives of the adjacent land uses. Tables 3.6.2 gives the requirements for grading

conveyance facilities.

(2) Fencing Requirements

Fences shall be required for all facilities with slopes steeper than those values listed in Tables 3.6.2. In addition, fencing may also be required on specific facilities regardless of slope is in the opinion of the Enforcement Official or County Engineer, that fence is necessary to protect the health, safety or general welfare of the public.

**TABLE 3.6.2**  
Storm water Conveyance Facilities Side-Slope Grading Requirements

Depth Range	Conveyance Canal or Ditch W/O Fence	Conveyance Swale (feet) W/O Fence
< 3'	4:1	3:1
3' to 4'	4:1	N/A
4' to 6'	4:1	N/A
> 6'	4:1	N/A

Slopes steeper than what is indicated above shall require fencing unless otherwise determined by County Engineer. The maximum side slope of a fenced conveyance canal or ditch shall be 2:1 when sodded. Retaining walls and vertical containment structures are allowed with fence providing the structures are designed and certified by an Engineer. See Definition Section for what qualifies as a “swale”.

(3) Maintenance requirements

A maintenance berm shall be mandatory for all conveyance facilities with the exception of a swale. The maintenance berm is to be level, unobstructed strip of land surrounding the storm water facility to provide easy access around the conveyance facility for maintenance personnel and equipment. The following table illustrates maintenance berm requirements:

<u>Ditch or Canal Width</u>	<u>Minimum Maintenance Berm Required</u>
Depth of excavation less than 4' and less than 16'	10 ft. one side top width
Depth of excavation between 4' - 6' or top width greater than 16'	15 ft. one side
Depth of excavation greater than 6' and top width greater than 16'	15 ft. each side or 30 ft. total

Notes for Tables 3.6.1 and 3.6.2:

- \* Depth is measured from top of bank to bottom of excavation.
- \* Side slopes are measured as horizontal to vertical ratio (H:V).

- \* “Retention swale” are those manmade swales (as defined in Section 1.5) designed to retain water; have a dry bottom with vegetation suitable for stabilization, surface water treatment, and nutrient uptake; and be less than 3' deep.
- \* “Conveyance swales” are those dry, sodded areas designed to convey storm water, slope toward a positive outfall, and be no deeper than 3 feet and meet the definition of swale (see Section 1.5).
- \* “Dry” ditches and canals are those facilities designed to “convey” storm water but do not qualify by definition as “conveyance swales”.
- \* Side slopes steeper than 2:1 shall be considered in a case by case basis for retention ponds, ditches, and canals providing that: a suitable fence is placed to prevent public access to the facility (see Section on Suitable Fencing), and; that the side slopes be stabilized with a material other than sodding such as concrete, stone, brick, rip rap, fabric-form or other suitable material approved by the County Engineer. A geotechnical engineering report may be required to justify slopes steeper than 2:1.
- \* Swale type facilities are not intended to be fenced. Canal or ditch type facilities may be required to be fenced.

### **3.6.3 Backslope Requirements:**

Backslope grading is that grading required to match the proposed top of bank with existing ground. Backslopes should be no steeper than 2:1 for differences in grades higher than 3 feet. 1.5:1 is the maximum backslope permitted for differences in grades less than 3 feet. All backslopes shall be sodded.

## **3.7 DRAINAGE WELLS AND SUBSURFACE SYSTEMS**

### **3.7.1 Drainage Wells**

Drainage wells are prohibited as a means of final disposal of storm water runoff. Any existing drainage wells encountered on a property shall be located and brought to the attention of the County and Florida Department of Environmental Protection for purposes of abandonment.

### **3.7.2 Exfiltration Systems**

French drains and other similar storm water outfall systems which rely on the soil's capacity to infiltrate and store subsurface discharge are highly discouraged and may be prohibited within the County because of high maintenance requirements and ineffectiveness in most soil types found in the County. Only in those instances where the intent is to recharge the soil; and the soil has been demonstrated to the County Engineer's satisfaction as being hydrologic type according to Soil Conservation Service (SCS) methodology (or investigated by Geotechnical Engineer by certified report) will the County Engineer consider such systems. Exfiltration system design shall include all of the State's Best Management Practices (BMP's) especially in regard to pre-sediment treatment, maintenance access and maintenance practices.

For privately maintained systems proposed, the applicant shall provide sufficient documentation to the County Engineer to assure that the responsibility of maintenance will be satisfied perpetually by the owner. Language in the property owner's association documents will be provided.

### **3.7.3 Infiltration Systems (underdrain)**

Infiltration systems are discouraged in the County because of high maintenance. Roadways should be designed with bases above the seasonal high water table in accordance with the latest FDOT procedures and policies for separating water table from the base whenever possible instead of incorporating underdrain.

Pollution abatement systems may use underdrain as a method of achieving detention with filtration, however, the County encourages retention, dry detention, or wet detention systems as methods to meet pollution abatement requirements instead of infiltration drawdown methods. Any infiltration system shall be designed in accordance with the latest Florida Department of Environmental Protection design guidelines as well as those standards given herein.

For privately maintained systems proposed, the applicant shall provide sufficient documentation to the County Engineer to assure that the responsibility of maintenance will be satisfied perpetually by the owner. Language in the property owner's association documents will be provided.

## **SECTION 4.0 STORM WATER MANAGEMENT SYSTEM DESIGN AND PERFORMANCE CRITERIA**

### **4.1 POLLUTION ABATEMENT FACILITIES**

Pollution abatement may be accomplished by several methods providing that the design volume is based upon F.A.C. 17-25 treatment standards and achieves the Water Quality Standards given in F.A.C. 17-3. Surface water bodies of special concern (such as Class I waters) shall require additional treatment volume as defined in the F.A.C.

In general, pollution abatement volume is determined by a rational equation as

- V = PCA, where
- P = design precipitation (1" for retention systems)
- C = rational coefficient of runoff
- A = area of runoff basin

All pollution abatement facilities shall be designed with a skimmer device to hold back floatable pollutants. The skimmer (on baffle) shall extend 6 inches above the design pollution abatement volume and 6 inches below the control elevation of the weir, culvert, etc. The following are acceptable pollution abatement facilities:

#### **4.1.1 Retention systems**

Facilities designed to percolate, evaporate, or transpire storm water for pollution abatement and groundwater recharge. If the pond bottom intercepts the water table, then the process is not valid.

- (1) Provide retention of 1 inch of rainfall or ½ inch runoff (whichever is greater) over the entire disturbed site.
- (2) Provide the capacity for the specified treatment volume of storm water within 72 hours following a storm event.
- (3) The pond bottom should be a minimal of two (2) feet above the estimated Seasonal High Water Table (SHWT) but in no circumstances will less than 18" be allowed. A certified soils report shall be required to verify SHWT and may be required to verify soil permeability rate. One boring per pond minimum, depicting soil strata and depth to high ground water table.
- (4) Minimum pond bottom width shall be five (5) feet unless approved by County Engineer.
- (5) All bottoms of facilities shall be seeded and mulched or sodded.
- (6) All side slopes, back slopes, and top of bank of the retention pond area shall be sodded.
- (7) In instances where other Federal, State, or Regional agency pollution abatement criteria is applicable, the more stringent criteria dictates.

#### **4.1.2 Wet Detention Ponds**

Facilities designed to store and release pollution abatement storm water at a controlled outflow rate. This method is greatly becoming throughout the State, especially in the St. Johns River Water Management District, South Florida Water Management District, and Southwest Florida Water Management District. Unfortunately, F.A.C. 17-25 does not currently provide design criteria for this method, nor does Northwest Florida Water Management District. Therefore, the County Engineer will consider this method of treatment on a case by case basis providing that:

- (1) Additional pollution abatement volume above that described in 4.1.1 above meeting the States latest Best Management Practices for Wet Detention. (P = 2.5" rainfall is usually accepted as the value).
- (2) For design criteria of wet detention systems refer to the latest edition of the Best Management Practices (BMP's) Manual issued by F.D.E.P.
- (3) A certified soil report shall be required to verify SHWT and may be required to verify soil permeability rate. One boring per pond, minimum depicting soil strata and depth to high

groundwater table.

- (4) The wet detention pond shall be sodded from back slope to top of bank to the littoral zone or control water elevation as applicable.

#### **4.1.3 Retention Swale Systems**

Are dry, shallow, linear shaped facilities designed to retain storm water for pollution abatement and groundwater recharge.

- (1) Provide retention of 1 inch of rainfall over the entire site. Runoff from 3 year 1 hour storm.
- (2) Provide the capacity for the specified treatment volume of storm water within 2 hours following a storm event.
- (3) The complete retention swale area shall be sodded.
- (4) Retention swales shall be less than three (3) feet deep.

#### **4.1.4 Exfiltration Systems**

Sub-surface systems that store pollution abatement and recharge stormwaters and percolate the storm water into the soil are discouraged in Gadsden County. Exfiltration system shall be used in public right-of-ways or any County maintained facility. Exfiltration systems may only be used to accomplish groundwater recharge. Such systems shall conform to the following design constraints.

- (1) There should be a clean-out on each side of the exfiltration pipe. The clean-out should be an approved inlet or manhole.
- (2) The maximum distance between clean-outs in 250 feet.
- (3) The sedimentation pit should be at least 12 inches deep with a weep hole at least 6" in diameter filled with clean gravel and wrapped in a siltation preventing wrap.
- (4) The invert of the exfiltration pipe must be a minimum of 18 inches above the seasonal high water table (SHWT) and preferably 24 inches or more. This should be verified by providing a certified soils report indicating the SHWT.
- (5) The soil-permeability value, "K", must be indicative of the native soil. A certified soils report will be required for any exfiltration system.
- (6) The system shall be designed with a minimum safety factor of at least two.
  - (a) Minimum filter material depth is 2' cover.
  - (b) All perforated pipe must be completely wrapped with a filter fabric equivalent to Dupont "Tyvar" or Celenses "Mirafi."
  - (c) All filter media must be totally wrapped with a filter fabric.
  - (d) The maximum distance between underdrain clean-outs is 100 feet.



(e) All clean-outs must be protected by a concrete collar.

(7) The system shall be designed with a minimum safety factor of at least two.

#### **4.2 PEAK ATTENUATION FACILITIES**

Peak Attenuation Facilities for systems with positive outfalls (those that not land-locked) shall be designed to attenuate the post-development peak runoff rate to that of its pre-development rate for the 25 year/24 hour storm event. Projects which contain land-locked basin's that are not wholly owned (more than one property owner within the basin) shall provide within these basins, facilities which store the difference in runoff volume generated during the 100 year/24 hour storm by comparing the post-development runoff volume within the land-locked basin with the pre-development runoff basin during the 100 year/24 hour storm. In other words,  $V$  (retained) =  $V$  -  $V$  landlocked 100/24 post 100/24 pre.

In addition, the facilities shall be designed to meet the following performance criteria.

- o 1 Foot minimum freeboard between top of bank and design highwater level (25 year/24 hour). Any encroachments into freeboard requirement must be waived by County Engineer.
- o 5 Foot minimum maintenance berm around entire facility.
- o All side slopes and backslopes completely sodded.
- o Control structures shall be of standard FDOT specifications unless otherwise approved by County Engineer.
  
- o Facilities shall have a five (5) foot minimum bottom width unless otherwise waived in special circumstances by the County Engineer.
- o Peak attenuation requirements and pollution abatement requirements may be provided within same facility providing that control structures are designed to meet each performance criteria.

#### **4.3 COMPENSATING STORAGE FACILITIES**

The County strongly encourages all development to remain outside of flood prone areas. In the event that a proposed development can demonstrate an unreasonable hardship to avoiding impact to the 100 year flood prone area, the County may permit certain limited flood plain encroachments providing a adequate compensating storage can be demonstrated. Any development to be considered within flood prone areas as delineated on the official National Flood Insurance Program, Flood Insurance Rate Maps, or the latest and best information available, or as determined by the County shall comply with the following requirements:

- (1) Establish, to the satisfaction of the County Engineer, the elevation of the 100 year flood.
- (2) Set the minimum finished floor elevation at 12 inches, or above, the elevation of the 100 year

flood.

- (3) Provide compensating storage for all flood water displaced by development below the elevation of the 100 year flood. Compensating storage is to be accomplished between the seasonal high water elevation and the estimated 100 year flood elevation.
- (4) Seasonal high water elevation shall be documented by a certified geotechnical or geological report.

#### **4.4 AQUIFER RECHARGE FACILITIES**

Gadsden County encourages the practice of recharge, especially in upland areas to promote the long term protection of the quantity and quality of potable water supplies in the Florida aquifer. Recharge is designated areas where the soils are compatible (Hydrologic Soils Group "A" as described by the USDA Soil Conservation Service) will be accomplished by providing for retention of the runoff from the first 3 inches of rainfall from the impervious areas within a project site. The Pollution Abatement Volume required will be considered as a subset of this criteria, therefore, the effect of this policy is to increase the volume required by "retention" process and this decreasing the volume required by "detention" process (25 year storm criteria). As an alternative, applicants may demonstrate that the post-development recharge capacity is equal to or greater than the pre-development recharge capacity by appropriate computer simulation and/or hydrogeologic computations.

#### **4.5 OPEN CONVEYANCE FACILITIES (Channels, Ditches, Swales, etc.)**

The design storm events for conveyance facilities shall be as follows:

Primary Conveyance Facilities (between lakes, master stormwater management facilities, or developments) - 25 year/24 hour storm event.

Secondary Conveyance Facilities (drainage collection system taking runoff to the storm water management facilities) - 10 year/24 hour storm event.

Tertiary Conveyance Facilities (minor conveyance systems such as swales, and culverts under 15" diameter when approved by County Engineer on a case-by-case basis) - 10 year/24 hour storm event.

##### **4.5.1 Open Conveyance Facilities**

- (1) All canals and ditches shall have a five (5) foot bottom minimum width unless otherwise approved by County Engineer.
- (2) All canals and ditches shall have graded side slopes conforming to Section 3.6.

- (3) All swales designed to meet pollution abatement criteria shall meet the design requirements of F.A.C. 17-25.
- (4) All open channel designs shall include velocity calculations, demonstrating that erosion shall not occur for the design storm events. Sufficient stabilization and/or special erosion treatment shall be provided as necessary to ensure stability of side slopes in design storm events.

#### **4.5.2 Closed Conveyance Facilities**

(1) Physical standards:

- (a) The minimum size pipe in public right-of-way is 18". Roof drains, bleeder pipes, underdrain collection systems, and sidewalk cross drains are excluded from this criteria and should be sized accordingly.
- (b) All drainage pipes within public right-of-way and easements shall be reinforced concrete pipe per F.D.O.T. Standard Specifications for Road and Bridge Construction (late edition) Section 4307, unless otherwise approved by the County Engineer.
- (c) Pipe materials subject to corrosion shall not be permitted in corrosive soil environments. The County Engineer may require a certified soils report to demonstrate the corrosiveness of a soil environment if corrosive pipe materials are proposed.
- (d) Driveway crossings shall have a minimum of 18" in public roadway diameter culvert.

(2) Hydraulic Standards:

All public roadway and paving projects must verify that secondary conveyance systems perform properly during the design storm event.

- (a) Storm water calculations shall include the following:
  - \* Storm sewer tabulations including, but not limited to, the following:
  - \* Locations and types of structures.
  - \* Types and lengths of pipe line.
  - \* Drainage sub-area tributary to each structure.
  - \* Runoff coefficient per sub-area.
  - \* Time of concentration to structure.
  - \* Hydraulic gradient for the 10 year frequency storm event.
  - \* Estimated receiving water (tailwater) elevation with sources of information or assumptions utilized.

- \* Diameters of pipe.
- \* Outlet and other pipe velocities.

(b) Hydraulic Grade Line Calculations - Public roadways shall be designed to that the Hydraulic Grade Line (HGL) computed through the storm sewer system shall be 1.0 foot below gutter line for arterial streets and at or below gutter line for arterial streets and at or below gutter line for collector and local streets during a 10-year intensity storm event. For public roadways utilizing swale sections for drainage, the HGL shall not reach the edge of pavement during a 10-year intensity storm event.

The Hydraulic Gradient Line for the storm sewer system shall be computed taking into consideration the design tailwater on the system and the energy losses associated with entrance into and exit from the system, friction through the system, and turbulence in the individual manholes/catch basins/junctions within the system. For simplicity, the County will consider a 0.11 foot loss at each structure when specific design losses are not presented for each structure utilizing the actual exit/entrance velocity.

Proposed systems outfalling to existing systems with unknown tailwater conditions are expected to utilize the applicant's best interpretation of probable tailwater conditions and submit to the County Engineer for review.

(c) Tailwater Conditions for storm sewer systems shall consider the receiving facility. In the case where the detention pond is the receiving facility, the design tailwater level can be estimated from the information generated by routing through the pond by hydrograph frequency storm of duration equal to that used in designing the pond.

Other existing sources may be used and the County encourages sound engineering judgement in the development of tailwater assumptions when no suitable information is present. All assumptions and sources must be clearly presented in the calculations submitted.

(d) Minimum & Maximum Velocities - Closed conveyance shall be designed such that the minimum flushing velocity in all pipes in 2.0 Fps when flowing full. The maximum velocity recommended within the pipe system is 10 Fps and sufficient energy dissipation shall be accomplished in the design so that outlet and exit velocities shall be reduced to those performance standards require to prevent erosion, undermining, or turbidity.

## 4.6 CLOSED CONVEYANCE FACILITIES

### 4.6.1 Maximum Spacing for Stormwater Manholes

The maximum spacing between manholes shall be as listed below unless otherwise approved by the County Engineer on a case-by-case basis. All manhole structures shall conform to the latest edition of the FDOT index of standard drainage structures.

<u>Pipe Size</u>	<u>Max. Spacing (ft.)</u>
≤ 18"	300
24" - 36"	400
≥ 42"	500

### 4.6.2 Inlets

Inlets are to be spaced so to provide adequate storm water runoff evacuation to prevent unacceptable storm water spreading into the traveled lanes of public roadways facilities during a 25 year/24 hour storm event. All inlet structures shall conform to the inlet structures given in the latest edition of the FDOT index of standard drainage structures.

- (1) The maximum distance for flow in a curb and gutter to the first point of removal for any roadway shall be 500'.
- (2) All low point (sump) location inlets shall be designed to intercept 100% of the design flow including by-pass flow from upstream single-throated inlets.
- (3) All intermediary inlets (not at low points) shall be designed to intercept at least 80% of the design flow.
- (4) All roadway inlet structures and ditch bottom inlets within the R/W that are subject to vehicular collision shall be set flush with finished grade. This is not meant to preclude the installation of weir-type control structures but to limit fixed protruding concrete structures from serving as hazards to motorists.

### 4.6.3 Clearance Requirements

There shall be a minimum cover of 6" over all concrete pipes under flexible or rigid pavement. 15" minimum cover shall be maintained over all corrugated steel or aluminum pipe. Larger diameter culverts (greater than 54" in diameter) require additional cover as determined by the County Engineer. Refer to FDOT Roadway Design Standards Manual for minimum cover with respect to culvert diameter and material. Non-doweled rigid pavement shall require a minimum of 9" of compacted soil or base (98% AASHTO T-180) between the concrete and the tip of pipe.

#### **4.6.4 Minimum Size Requirements**

- (1) All pipes sizes should be designed to produce a minimum flushing velocity of 2.0 fps (whenever possible) when flowing full or half full. For upstream culvert reaches requiring the minimal pipe size to a void clogging, half flow conditions may be assumed regardless of sub-drainage basin area size and the physical slopes shall be set to produce a minimum of 2.5 fps as half full flow conditions. Maximum internal pipe velocity is 10 fps unless otherwise justified to the satisfaction of the County Engineer.
- (2) The minimum pipe size to be used in a public R/W or any storm water facility to be maintained by the County shall be 18" regardless of actual flow velocity. The design slope of the culvert shall be set at a slope no flatter than to produce a flushing velocity of 2.5 fps assuming half-full flow conditions.
- (3) Pipe sizes in non-public R/W or that are perpetually maintained by private individuals shall be no less than 15".
- (4) Any pipe sizes less than those described are at the discretion of the County Engineer.

#### **4.7 STORM WATER MANAGEMENT AND DRAINAGE MATERIAL SPECIFICATIONS.**

All materials including pipes, culverts, inlets, manholes, filter media, filter wraps, erosion control devices, seeding, mulching, and other related storm water mulching, and other related storm water management or drainage facility structures shall conform to the latest editions of the FDOT Roadway and Traffic Design Standards and the FDOT Standard Specifications for Road and Bridge Construction. Any exceptions shall be at the discretion and approval of the County Engineer.