

ARTICLE 34

STORMWATER MANAGEMENT

Index	34.01	<u>GENERAL</u>
	34.02	<u>DESIGN STANDARDS</u>
	34.03	<u>DESIGN STORM (minimum)</u>
	34.04	<u>DRAINAGE AREA GEOMETRY</u>
	34.05	<u>MATERIAL AND DESIGN SPECIFICATIONS</u>
	34.06	<u>FLOOD PRONE AREAS</u>

[BACK TO TABLE OF CONTENTS](#)

Section	34.01	GENERAL
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The purpose of this ARTICLE is to provide design criteria for proposed stormwater management systems within the City of Ocoee. The proposed stormwater management system shall comply with this ARTICLE, the City of Ocoee Comprehensive Plan and City of Ocoee Land Development Code. In addition, while this ARTICLE is intended to be the minimum standard, guidelines and criteria for the design of stormwater management systems in the City of Ocoee, other regulatory agencies and/or government entities by the State statutes or by political boundaries also have jurisdiction. Most of these agencies or government entities have established design criteria for stormwater management. In some cases, established design parameters of those agencies contain conflicting standards or criteria. In the case of conflicting criteria, it is the intent of this ARTICLE to have the most stringent regulations govern. The following agencies and government entities may have jurisdiction within the City of Ocoee:

- St. Johns River Water Management District
- Florida Department of Transportation
- Florida Department of Environmental Protection
- Orange County Environmental Protection Department
- U.S. Army Corps of Engineers
- Federal Emergency Management Agency

Section	34.02	<u>DESIGN STANDARDS</u>
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To comply with the foregoing performance Standards, the proposed stormwater management system shall conform to the following design Standards:

- A) Side slopes and bottoms of all retention areas shall have grass or other landscape material cover. The maximum side slopes of retention areas are given within this ARTICLE. Landscaping of maintenance berms is prohibited unless approved by City Engineer.
- B) Spillways or other entrance channels to retention areas shall be designed to prevent scouring and flushing of these retention areas by heavy rains.

- C) Dry retention systems shall be designed and function such that the water quality volume shall be recovered within 3 days (72 hours) in accordance with the SJRWMD criteria. If this is not accomplished by percolation and/or evaporation, the retention area must be improved and approved by the City Engineer to meet the performance is requirements.
- D) Wet Detention/Retention systems shall be designed to meet the SJRWMD design and performance criteria. If the design CRITERIA is not accomplished following construction, the system must be improved and approved by the City Engineer to meet the performance requirements.
- E) Closed Basin or Land Locked Lake Criteria: Proposed stormwater management systems located within a closed basin and/or land locked lake system with no positive outfall to a stream or river that ultimately discharges to the ocean, the proposed design shall retain the total volume of runoff from the 100-year; 24-hour storm event (10.6-inches) for the post-developed site. The total recovery of the 100-year; 24-hour retention volume should occur within 14 days after the storm event. If the infiltration credit during the storm event is included in the recovery analysis, seepage and infiltration rates will have to be certified by a geotechnical engineer licensed to practice in the State of Florida. For pre-existing developed conditions, the Developer/Owner will only need to retain and recover 100 percent of the runoff generated from the increase in impervious area or the pre-development verse post-development net increase of runoff volume, whichever is greater.
- F) Hydraulic design criteria: The design engineer must submit drainage computations for the hydraulic design of the proposed secondary drainage systems. Specifically, storm sewer systems shall be designed and analyzed to provide sufficient conveyance capacity for the ten-year storm event (Rational method) to prevent upstream surcharging even when the downstream outlet is experiencing tailwater submergence. Roadway spread of water should also be analyzed with inlet spacing based upon both allowable spread width and inlet capacity for the ten-year storm event (Rational method).
- G) The proposed stormwater management system shall be designed to accommodate the stormwater that originates within the development and stormwater that flows onto or across the development from adjacent lands.
- H) The proposed stormwater management system shall be designed to function properly for a minimum 20 year life.
- I) The design and construction of the stormwater management system shall be certified as meeting the requirements of this ARTICLE by a Professional Engineer registered in the State of Florida.
- J) No surface water may be channeled or directed into a sanitary sewer.
- K) Dredging, clearing of vegetation, deepening, widening, straightening, stabilizing or otherwise altering natural surface waters shall be minimized.

- L) Natural surface water shall not be used as sediment traps during or after development.
- M) For aesthetic reasons and to increase shoreline habitat, the shorelines of detention and retention areas shall be sinuous rather than straight.
- N) Water reuse and conservation shall, to the maximum extent practicable, be achieved by incorporating the stormwater management system into irrigation systems serving the development. (If Water Management District allows.)
- O) Vegetated buffers of sufficient width to prevent erosion shall be retained or created along the shores, banks or edges of all natural or man-made surface waters.
- P) Littoral zones for wet detention ponds shall meet the Saint Johns River Water Management District requirements.
- Q) In phased developments the stormwater management system for each integrated stage of completion shall be capable of functioning independently as required by this ARTICLE.
- R) All detention and retention basins shall be adequately accessible for maintenance from streets or public rights-of-way.
- S) Inlets shall be spaced in such a manner as to accept 100% of the design runoff. The maximum allowable gutter run shall be 600 feet. The actual required inlet spacing shall depend on the characteristics of each particular site. Manholes, in accordance with ARTICLE 17, shall be required at the end of each line, and at all changes in grade, size and alignment.
- T) Specifications shall include a section outlining the proposed method of controlling soil erosion during construction. Prior to approval of the Development Plan a Stormwater Pollution Prevention Plan must be submitted to the City Engineer for review and approval in accordance with the City's LDC.
- U) All drainage plans shall be subject to approval by the City Engineer or his Designee. Plan submission shall include clear engineering calculations showing the method of design, including soil information as required by the City Engineer, and existing, as well as proposed, topography.
- V) The required amount of treatment volume for each development shall be based on the Saint Johns River Water Management District regulations.
- W) Discharge from new development shall remain the same as pre-developed flow patterns.
- X) The City Engineer, at his discretion, may require additional requirements when a project discharges into areas currently under drainage distress.

- Y) All non-conventional retention/detention systems, such as but not limited to exfiltration systems, are not acceptable unless reviewed and approved by City Engineer. Exfiltration type systems must meet the SJRWMD design criteria. Design parameters must be accompanied with signed and sealed Geotechnical Subsurface Investigation with design parameters demonstrating successful recovery of required water quality and quantity volumes.

Section 34.03 DESIGN STORM (minimum)

A)	Retention/Detention basins with positive outfall flows (to Lake Apopka)	25 year, 24 hour (8.5")	Attenuate peak to pre-developed rate
B)	Retention/Detention basins (within Closed Basins and/or Land Locked Lakes)	100 year, 24 hours (10.6")	Retain increased volume, attenuate peak flow to pre-developed rate
C)	Stormwater Management Systems within FEMA Flood Prone Areas	100 year, 96 hours (14.4")	Retain increased volume, attenuate peak flow to pre-developed rate
D)	Collection and conveyance systems (residential streets)	10 year, 1 hour	
E)	Collection and conveyance systems (collection and arterial roads)	25 year, 1 hour	
F)	Canals	25 year, 24 hour	

- C) Design pipe velocity shall normally be less than 10 fps.
- D) Maximum hydraulic grade line shall be one (1) foot below finished edge of pavement elevation for 10 year storm, 0.5 feet below finished edge of pavement elevation for 25 year storm in sump locations..
- E) See ARTICLE 17 of this Manual for Inlet and Structure Specifications.
- F) Fencing of stormwater management areas shall not be allowed.

Section 34.06 FLOOD PRONE AREAS

The floodplain is that area subject to inundation during the 100 year; 24 hour storm event (rainfall depth in accordance with jurisdictional agency). The floodway is that portion of the floodplain that must remain clear of encroachment and shall not exceed the 100 year base flood elevation established on the effective floodplain maps and/or as determined by the City Engineer.

Encroachment may be allowed within the one hundred (100 year floodplain, with compensating storage.

All development within the areas of the 100 year floodplain as delineated on the official Flood Insurance Rate Maps (FIRM) or as determined by the City Engineer, shall comply with the following requirements:

- 1) The lowest floor elevation shall be at least 2 feet above the elevation of the 100 year, 24 hour storm, or at the maximum stage for the 100 year, 4 day storm event (rainfall depth in accordance with jurisdictional agency), whichever is higher.
- 2) For commercial or industrial developments, flood proofing may be substituted in lieu of elevating the lowest floor.
- 3) Compensating storage must be provided for all floodwater displaced by the proposed development below the 100 year 24 hour base flood elevation established by FEMA. Generally, compensating storage must be calculated between the existing 100 year base flood elevation and wet season groundwater/water table elevation. The latter elevation must be determined by a qualified geotechnical engineer, and his report shall identify the historical wet season groundwater/water table; recommend bottom elevations for compensating storage areas; and address the ability of said areas to remain dry and available for floodwater storage.
- 4) Special attention must be given to the project area relationship with the floodplain. An “active” site contributes a pre-development runoff volume in excess of that which is stored on the site during the 100 year storm. A “passive” site contributes a runoff volume less than that which is stored on the site during the 100 year storm. Passive sites must provide special assurances that encroachment is not occurring due to the construction of the

development or its ponds. Compensating storage may be claimed in the retention/detention pond system provided it is above the maintained water elevations, and berm elevations are such that the pond system can be inundated during the 100 year storm and still provide the required flood protection, as determined by the City Engineer.

- 5) No development will be permitted in any Area of Special Flood Hazard designation as unnumbered A Zone (no base flood elevation established) until a Conditional Letter of Map Revision is approved by FEMA.
- 6) No development will be permitted in the designated floodway