

Wekiva Parkway Sections 6 & 7A
SR 429 from Wekiva River Road to East of River Oaks Circle
Lake and Seminole Counties, Florida

Financial Project IDs: 238275-7-52-01 and 240200-2-52-01

DRAINAGE DESIGN CRITERIA
FOR WATER QUALITY AND QUANTITY, GROUNDWATER RECHARGE AND DRAWDOWN,
EROSION AND SEDIMENT CONTROL, AND FLOODPLAIN MANAGEMENT
IN THE WEKIVA RIVER BASIN

A. INTRODUCTION

The project is located within Lake and Seminole Counties, and is under the jurisdiction of the Florida Department of Environmental Protection (FDEP). FDEP will utilize the stormwater rules and design criteria of the St. Johns River Water Management District (SJRWMD) in order to permit this project. Drainage design criteria from the Florida Department of Transportation (FDOT) and SJRWMD will be used to locate and size the stormwater facilities.

The project limits are located entirely within the Wekiva River Hydrologic Basin and the Wekiva Recharge Protection Basin. Therefore, special basin criteria for the Wekiva River basin as presented in Section 13.3 of the SJRWMD Permit Information Manual (dated October 1, 2013) apply. The Wekiva River is designated as an Outstanding Florida Water (OFW) and a State Aquatic Preserve per Chapter 62-302, F.A.C. Therefore, OFW criteria as presented in the SJRWMD Permit Information Manual apply.

The Wekiva River is designated as a FEMA Zone AE floodplain in the vicinity of the project limits, and design storm water surface elevations have been determined for the 10-year, 50-year, 100-year and 500-year storm events from the confluence with the St. Johns River to upstream of the confluence with the Little Wekiva River as part of the FEMA Flood Insurance Study (FIS) for Seminole County (dated September 28, 2007). There are no regulatory floodways associated with the Wekiva River.

The following is a list of drainage design criteria regarding water quality, water quantity, and floodplains that apply to this project.

I. STORMWATER MANAGEMENT CRITERIA

A. Hydrologic Methods (FDOT Drainage Manual, Sec. 5.3.2)

1. Rainfall distribution for the Mean Annual and 25-year/24-hour storm events:
SCS Type II (Florida Modified)
2. Runoff Estimation: SCS Unit Hydrograph Method
3. Peak Runoff Factor:
 - a. 323 – used for pre and post conditions
4. Time of Concentration
 - a. Sheet Flow -- Kinematic Wave Equation (Max. length = 100 ft)
 - b. Channel Flow – Manning’s Equation

B. Rainfall Depths

Frequency (Years)	Duration (Hours)	Depth, P (inches)	Comments
25	24	8.6	SJRWMD Design Storm – Open Basin

C. Water Quality (Treatment) Criteria

This section covers water quality treatment requirements based on the type of stormwater management facility used, as well as water quality requirements to address criteria for nutrient loading and erosion and sediment control.

1. Wet detention:

a. Treatment Volume:

The design treatment volume is the greater of the following: (*SJRWMD Permit Information Manual Vol. II, Sec. 8.2*)

- i. one inch of runoff over the drainage area
- ii. 2.5 inches times the impervious area (excluding water bodies)

b. Additional Treatment for OFW:

Wet Detention systems which discharge to Class I, Class II, OFWs, or Class III waters which are approved, conditionally approved, restricted, or conditionally restricted for shellfish harvesting, must provide either:

- i. An additional fifty percent of both the required treatment and permanent pool volumes. (*SJRWMD Permit Information Manual Vol. II, Sec. 8.13(a)*)
- ii. Pre-treatment of the stormwater prior to the stormwater entering the wet detention pond. The level of pre-treatment must be at least that required for retention, underdrain, exfiltration, or swale systems. (*SJRWMD Permit Information Manual Vol. II, Sec. 8.13(b)*)

c. Recovery:

Drawdown of one half of the required treatment volume between 24 to 30 hours, but no more than one half of the required treatment volume will be discharged within the first 24 hours. (*SJRWMD Permit Information Manual Vol. II, Sec. 8.3*)

d. Permanent Pool:

The permanent pool shall be sized to provide at least a 14-day average residence time during the wet season (June - October). (*SJRWMD Permit Information Manual Vol. II, Sec. 8.5*)

e. Littoral Zone:

The littoral zone is that portion of a wet detention pond which is designed to contain rooted aquatic plants. The littoral area is usually provided by extending and gently sloping the sides of the pond down to a depth of 2-3 feet below the normal water level or control elevation. Also, the littoral zone can be provided in other areas of the pond that have suitable depths (i.e., a shallow shelf in the middle of the lake). The following is a list of the design criteria for wet detention littoral zones. (*SJRWMD Permit Information Manual Vol. II, Sec. 8.6 and 8.7*)

- i. The littoral zone shall be gently sloped (6H:1V or flatter). At least 30 percent of the wet detention pond surface area shall consist of a littoral zone. The percentage of littoral zone is based on the ratio of vegetated littoral zone to surface area of the pond at the control elevation.
- ii. The treatment volume should not cause the pond level to rise more than 18 inches above the control elevation unless the applicant affirmatively demonstrates that the littoral zone vegetation can survive at greater depths.
- iii. Within 24 months of completion of the system or as specified by permit condition, 80 percent coverage of the littoral zone by suitable aquatic plants is required.
- iv. Planting of the littoral zone is recommended to meet the 80% coverage requirement. As an alternative to planting, portions of the littoral zone may be established by placement of wetland top soils (at least a four inch depth) containing a seed source of desirable native plants. When utilizing this alternative, the littoral zone must be stabilized by mulching or other means and at least the portion of the littoral zone within 25 feet of the inlet and outlet structures must be planted.

- v. In lieu of providing a littoral zone, an additional 50 percent of the appropriate permanent pool volume is required.
- f. Pond Configuration:
 - i. The average length to width ratio of the pond must be at least 2:1. Locate inlet and outlet structures to prevent short-circuiting. (*SJRWMD Permit Information Manual Vol. II, Sec. 8.9*)
 - ii. Provide for a maximum pond depth of 12 feet and a mean depth (pond volume divided by the pond area at the control elevation) between 2 and 8 feet. (*SJRWMD Permit Information Manual Vol. II, Sec. 8.8*)
 - iii. Sod all areas above the Control Elevation (*FDOT Drainage Manual, Sec. 5.3.4.2*)

2. Dry Retention

- a. Treatment Volume:
 - i. Off-line retention of the first one-half inch of runoff or 1.25 inches of runoff from the impervious area, whichever is greater. (*SJRWMD Permit Information Manual Vol. II Sec. 5.2 (a)*)
 - ii. On-line retention of an additional one half inch of runoff from the drainage area over that volume specified for off-line treatment. (*SJRWMD Permit Information Manual Vol. II Sec. 5.2 (b)*)
- b. Additional Treatment for OFW:

For direct discharges to Class I, Class II, OFWs, or Class III waters which are approved, conditionally approved, restricted, or conditionally restricted for shellfish harvesting the applicant shall provide retention for one of the following:

- i. At least an additional fifty percent of the applicable treatment volume specified for off-line retention, in Section 2.a.i above. *SJRWMD Permit Information Manual Vol. II Sec. 5.2 (a)*
- ii. On-line retention of an additional fifty percent of the treatment volume, specified in Section 2.a.ii above. *SJRWMD Permit Information Manual Vol. II Sec. 5.2 (b)*
- c. Recovery:
Drawdown of the required treatment volume within 72 hours. *SJRWMD Permit Information Manual Vol. II Sec. 5.3)*
- d. Pond Configuration:
To minimize ground water contributions and ensure the basin floor is normally dry, the control elevation and basin floor shall be set at least one foot above the seasonal high ground water table elevation. Sumps may be placed up to one foot below the control elevation. The basin floor shall be level or uniformly sloped toward the control structure. The system may only contain standing water within 3 days of a storm event. Continuous standing water in the basin may also reduce the aesthetic value of the system and may promote mosquito production. (*SJRWMD Permit Information Manual Vol. II, Sec. 12.5*)

3. Total Maximum Daily Load (TMDL) Criteria

- a. The project is located within the Wekiva River basin (Water Body Identification Number [WBID] 2956A), which has adopted TMDLs for Total Phosphorus (TP) and Nitrate-N.
- b. Basins with adopted TMDLs for nutrients shall be required to demonstrate net improvement Total Phosphorus (TP) and Total Nitrogen (TN). The pre-development condition used shall be the current condition, and the pre-development nutrient load must account for the reduction provided by any existing stormwater management systems currently in place.

4. Erosion and Sediment Control and Water Quality Criteria

1. Standards for Erosion and Sediment Control and Water Quality: A Water Quality Protection Zone shall extend one half mile from the Wekiva River, Little Wekiva River north of State Road 436, Black Water Creek, Rock Springs Run, Seminole Creek, and Sulphur Run. The applicant must give reasonable assurance in the erosion and sediment control plan that during construction or alteration of the system (including re-vegetation and stabilization), erosion will be minimized and sediment will be retained on-site. The plan must be in conformance with the erosion and sediment control principles set forth in *Section 13.8.2, SJRWMD Permit Information Manual*, and must contain the information set forth in *Section 13.8.3, SJRWMD Permit Information Manual*. Detailed plans depicting the erosion and sediment control measures shall be required when permit applications are submitted.

2. For a project which will be located wholly or partially within 100 feet of an Outstanding Florida Water or within 100 feet of any wetland abutting such a water, an applicant must provide reasonable assurance that the construction or alteration of the system will not cause sedimentation within these wetlands or waters and that filtration of runoff will occur prior to discharge into these wetlands and waters.

D. Water Quantity (Attenuation) Criteria

1. The post-development peak rate of discharge must not exceed the pre-development peak rate of discharge for the 25-year frequency, 24-hour duration storm. (*SJRWMD Permit Information Manual Vol. II, Sec. 3.2.1(b)*)

2. The design of stormwater management systems for Department projects shall comply with the water quality, rate, and quantity requirements of *Section 334.044(15), F.S., Chapter 14-86, F.A.C., Rules of the Department of Transportation* only in closed basins or areas subject to historical flooding. (*FDOT Drainage Manual, Sec. 5.2.1*)

E. Groundwater Recharge and Drawdown Criteria

1. Recharge Standard: Surface water management systems located within the Wekiva Recharge Protection Basin shall demonstrate that the system provides for retention storage of three inches of runoff from all impervious areas proposed to be constructed on soils defined as a Type “A” Soils as defined by the Natural Resources Conservation Service (NRCS) Soil Survey in the Soil Survey of Lake County Area, Florida (1975). Additional geotechnical information may be submitted to establish whether or not a site contains Type “A” soils. For purposes of this rule, areas with Type “A” Soils shall be considered “Most Effective Recharge Areas.” The system shall be capable of infiltrating this storage volume through natural percolation into the surrounding soils within 72 hours. Off-site areas or regional systems may be utilized to satisfy this requirement.

As an alternative, applicants may demonstrate that the post-development recharge capacity is equal to or greater than the pre-development recharge capacity. Pre-development recharge shall be based upon the land uses in place as of 12-3-06. Applicants may utilize existing permitted municipal master stormwater systems, in lieu of onsite retention, to demonstrate that post-development recharge is equal to or greater than pre-development recharge. *(SJRWMD Permit Information Manual Vol. II, Sec. 13.3.1)*

2. Standard for Limiting Drawdown: Within the Wekiva River Hydrologic Basin, a Water Quantity Protection Zone shall extend 300 feet landward of the landward extent of the wetlands abutting the Wekiva River, Black Water Creek and Rock Springs Run. A ground water table drawdown must not occur within the Water Quantity Protection Zone which would adversely affect the functions provided by the referenced wetlands. Where any part of a system located within this zone will cause a drawdown, reasonable assurance that construction, alteration, operation, or maintenance of the system will not cause ground water table drawdowns which would adversely affect the functions provided by the referenced wetlands. *(SJRWMD Permit Information Manual Vol. II, Sec. 13.3.4)*

II. FLOODPLAIN CRITERIA

- A. Floodways and floodplains, and levels of flood flows or velocities of adjacent stream impoundments or other water courses must not be altered so as to adversely impact the off-site storage and conveyance capabilities of the water resource. *(SJRWMD Permit Information Manual Vol. II, Sec. 3.3.2)*
- B. A system may not cause a net reduction in flood storage within the 10-year floodplain except for structures elevated on pilings or traversing works. *(SJRWMD Permit Information Manual Vol. II, Sec. 3.3.2)*
- C. Traversing works, works, or other structures shall cause no more than a one foot increase in the 100-year flood elevation immediately upstream. *(SJRWMD Permit Information Manual Vol. II, Sec. 3.3.2)*
- D. Traversing works, works, or other structures shall cause no more than a one tenth of a foot increase in the 100 year flood elevation 500 feet upstream. *(SJRWMD Permit Information Manual Vol. II 3.3.2)*
- E. A system may not cause a reduction in the flood conveyance capabilities provided by a floodway except for structure elevated on pilings or traversing works. *(SJRWMD Permit Information Manual Vol. II 3.3.2)*
- F. Good engineering practices shall be employed to minimize the flow velocity to avoid transport of soil particles and other suspended solids from one location and deposition in another location. *(SJRWMD Permit Information Manual Vol. II, Sec. 3.3.5)*
- G. Storage Standard: Within the Wekiva River Hydrologic Basin, a system may not cause a net reduction in flood storage within the 100-year floodplain of a stream or other watercourse which has a drainage area upstream of more than one square mile and which has a direct hydrologic connection to the Wekiva River or Black Water Creek.