ENRAC – STORMWATER REGULATIONS

CURRENT STORMWATER REGULATIONS

Tadd Kasbeer, P.E.

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Stormwater Regulations

Regulation occurs on multiple levels:

- Federal: Clean Water Act - National Pollutant Discharge Elimination System (NPDES) Construction & MS4 permitting
- State: Environmental Resource Permit (ERP)
- County: Stormwater Permit

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Stormwater Regulations

Regulation to control Flooding (Attentuation) or Water Quality:

- Federal: Clean Water Act - NPDES regulates Water Quality
- State: ERP regulates Flooding & Water Quality
- County: Stormwater Permit regulates Flooding

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Stormwater Regulations - Federal

Clean Water Act - NPDES permits (administered by FDEP)

- Construction Permit – construction related pollutants specific to the type of project/activity. Sediment runoff is primary.
- MS4 Permit – Municipality-wide permit that targets stormwater treatment and the existing systems used to treat stormwater.

Regulation solely for Water Quality (Treatment).

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Stormwater Regulations - Federal

NPDES Construction Permit

- Targets pollutants generated by construction activities
- Primary pollutant of most construction projects is sediment picked up in stormwater runoff and moved offsite
- Requires a SWPPP and weekly and post storm inspection of erosion controls and resolution of issues

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Stormwater Regulations - Federal

MS4 Permit

- Municipalities in large population counties
- Inspection/maintenance of existing stormwater systems
- Maintenance of public non-stormwater facilities specific to stormwater treatment such as street sweeping
- Public education aspects

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Stormwater Regulations - State

ERP permits (administered by FDEP and WMDs)

- State split into multiple Water Management Districts (WMDs) along major basin lines – Volusia is in the SJRWMD
- WMD responsible for permitting development within its limits with certain exceptions that area permitted via the FDEP

Regulation of Water Quality (Treatment) and Attenuation (Flooding).

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Stormwater Regulations - State

ERP permit – Water Quality

- First flush – determines the initial volume to be treated
- On-line versus Off-line systems – modifies the volume
- Outstanding Florida Waters – modifies the volume
- Specific Basin Criteria – Tomoka River Basin Criteria restricts the types of treatment method allowed

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Stormwater Regulations - State

ERP permit – Attenuation

- Pre vs Post Rate of Discharge (no volume restrictions)
  - Open Basin criteria: Mean Annual and 25 yr / 24 hr storms
  - Closed Basin criteria: Mean Annual and 25 yr / 96 hr storms
- Typical Methods: Retention, Wet or Dry Detention, Exfiltration Trench (aka French Drains), Underdrains, Swales, Wetland Stormwater Management Systems

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Stormwater Regulations - Local

County Minimum Standard stormwater requirements:

- All development within Volusia County (unincorp. or incorp.)
- Cities can tighten requirements but cannot relax requirements
- Water quality requirements very general
- Similar to requirements of State's attenuation requirements

Regulation of Water Quality (Treatment) and Attenuation (Flooding).

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Stormwater Regulations - Local

Stormwater requirements – Attenuation:

- Pre vs Post Rate of Discharge & Volume
  - Open Basin criteria: 25 yr / 24 hr storm
  - Closed Basin criteria: 100 yr / 24 hr storm
- Typical Methods: “Best Management Practices” – Retention or Detention

County Rule Review

Stormwater Regulations - Local

Stormwater Rule Potential Modifications:

- Seasonal High ground water elevation
  - Require Geotech to add safety factor to elev
  - Require a minimum number of borings per area
- Tailwater elevation
- Curve Numbers

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Stormwater Regulations - Local

Stormwater Rule Potential Modifications:

- Stormwater facilities (ponds) locations on site
- Design storms
- Frequency of storms/recovery
- Redevelopment standards

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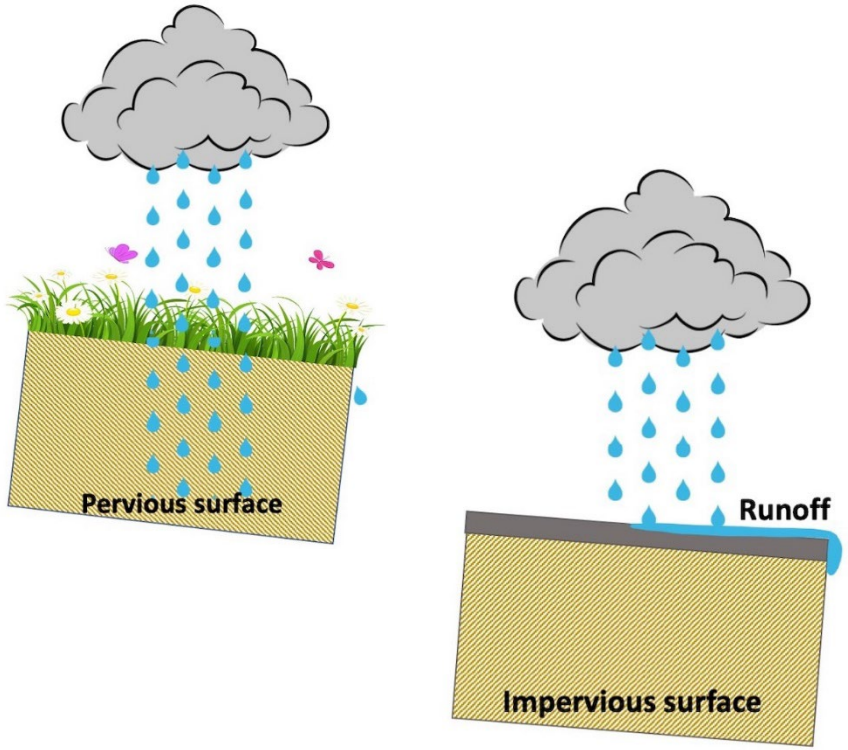
Stormwater Runoff versus Infiltration



Factors that affect runoff vs infiltration:

- Surface cover – pervious vs impervious
- Slope of the ground
- Soil type – sandy vs clayey/organics
- Voids in soil
- Saturation of soils

Stormwater Runoff – Runoff Rate

Type	TR-55 Cover Type	Curve Number (TR – 55)			
		HSG A	HSG B	HSG C	HSG D
Assumed Impervious	Impervious Area	98	98	98	98
Sidewalk	Impervious Area	98	98	98	98
Road/Parking	Impervious Area	98	98	98	98
Building	Impervious Area	98	98	98	98
Other Asphalt/Concrete	Impervious Area	98	98	98	98
Dense Forest	Woods	36	60	73	79
Light Forest/Tree Canopy	Woods - Grass Combination	43	65	79	82
Brush/Bush	Brush	35	56	70	77
Open Space (Lawn)	Open Space	49	69	79	84
Gravel	Streets & Roads - Gravel	76	85	89	91
Light Bush/Dirt/Mulch	Open Space - Poor Condition	68	79	86	89
Dirt	Streets & Roads - Dirt	72	82	87	89

"A" Soils = sandy, well drained soils

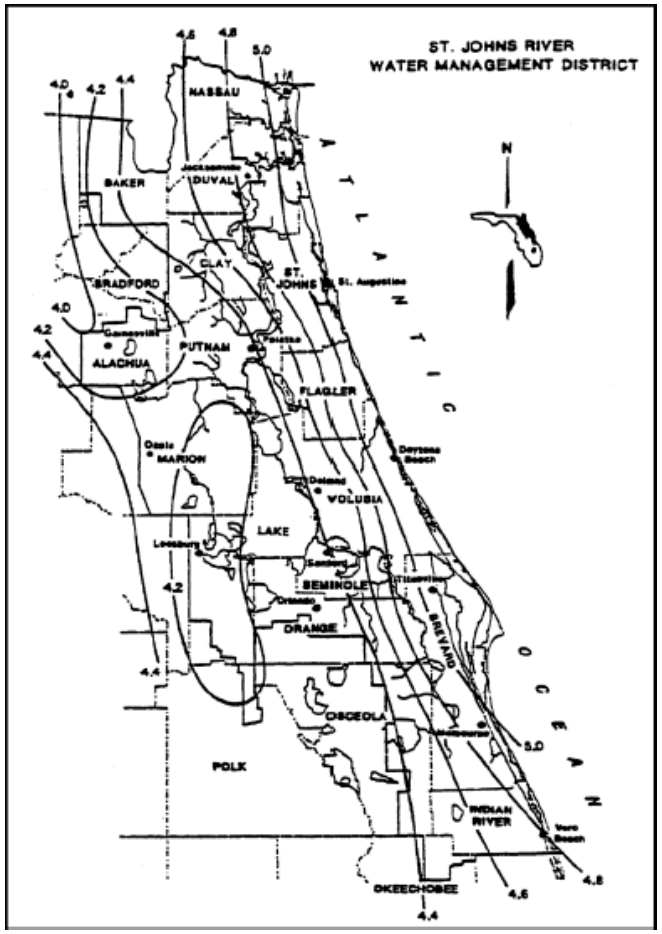
"D" Soils = clayey, heavily saturated soils with organics

What would the number be for wetlands?

Stormwater Runoff – Rainfall

Depending on basin there are different storm sizes/rainfall amounts:

- Open Basin – Mean Annual (~5 inches) & 25 year/24 hour (~8 inches)
- Closed Basin – 25 year/96 hour (~11 inches)



Stormwater Runoff – Flood Control (Attenuation)

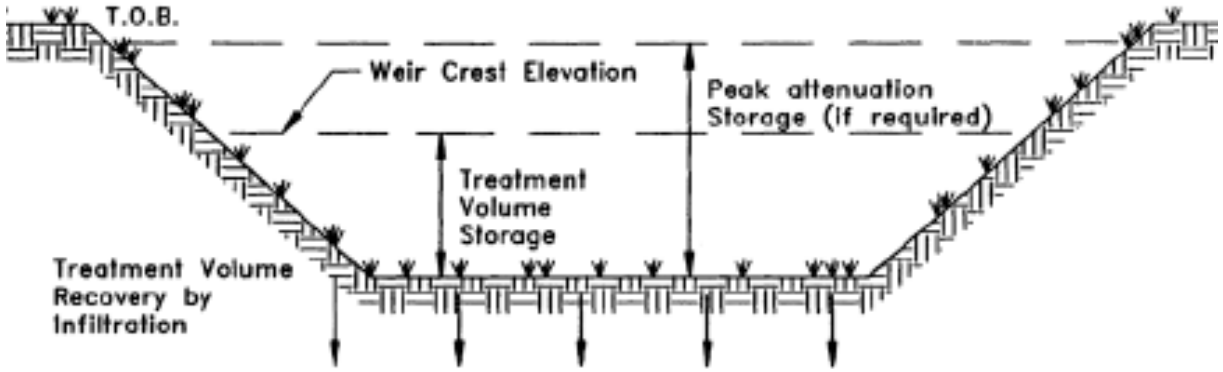
Many types of stormwater impoundment:

- Wet/Dry Ponds
- Underground Storage
- Swales
- LID methods

Stormwater Attenuation - Design

Design factors:

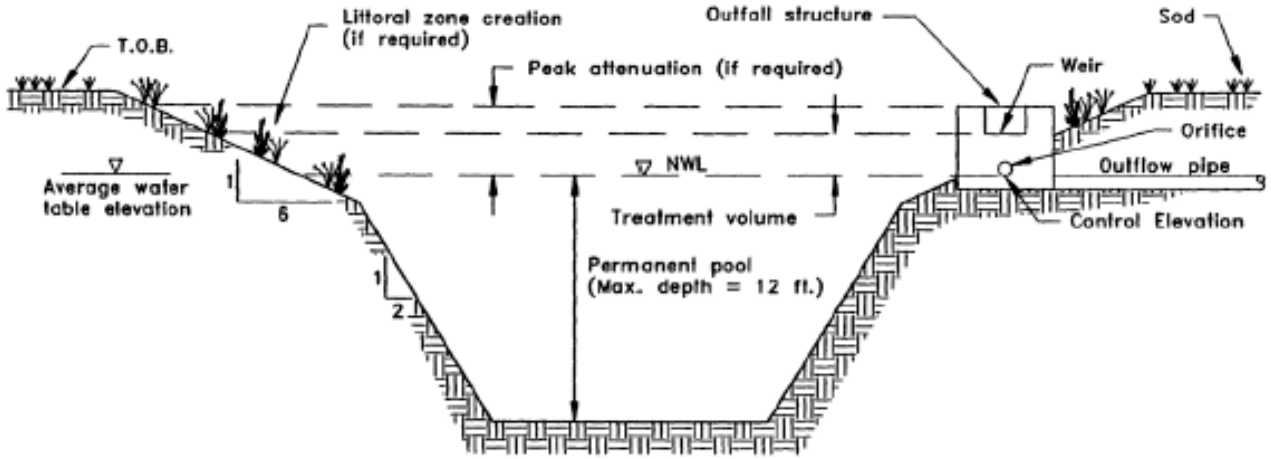
- Existing Water Table Elevation
- Runoff Volume
- Soil Types/Characteristics
- Tailwater



Stormwater Attenuation - Design

Existing/Design Water Table Elevation will:

- Dictate either wet/dry system
- Dictate the bottom elevation of attenuation system
- Start chain of establishing elevations throughout development



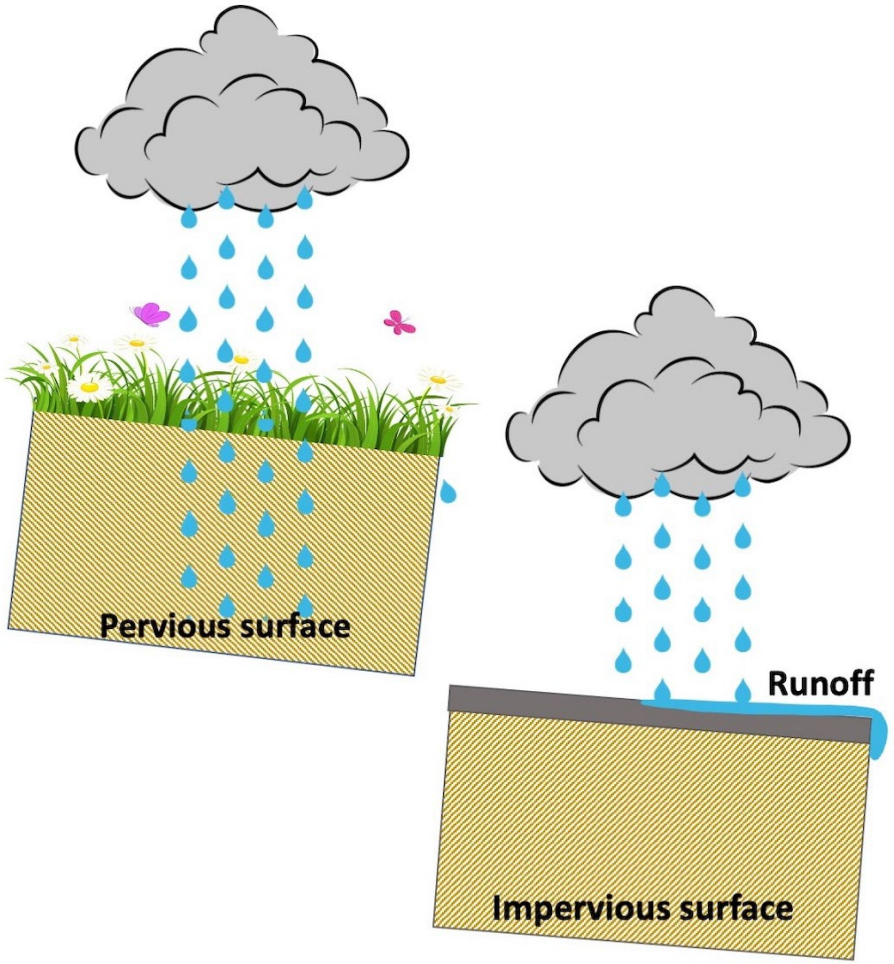
Stormwater Attenuation – Affect on a Development

The size of attenuation system will dictate elevations (in order):

1) Maximum/Peak stage in the stormwater pond
2) Minimum elevation of stormwater runoff collection system
3) Minimum elevation of the road network/parking area
4) Minimum elevations of home or building floor elevations

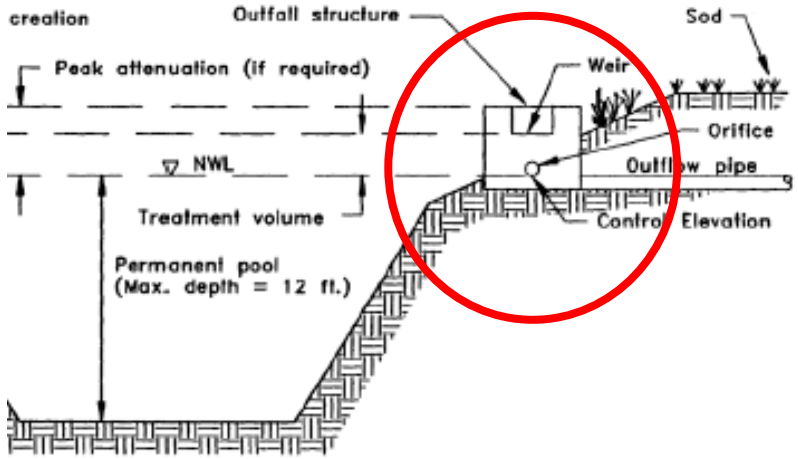
Stormwater Attenuation – Rate

- An increase in the rate of the runoff will increase chances of downhill/ downstream flooding
- Stormwater runoff rate does not have same negative effects if the rate is decreased as decrease in volume



Stormwater Attenuation – Discharge Design

- Attenuation system designed to hold increase in volume and manage rate
- Attenuation system should allow Pre volume to discharge
- Discharging less than Pre volume can have negative effects



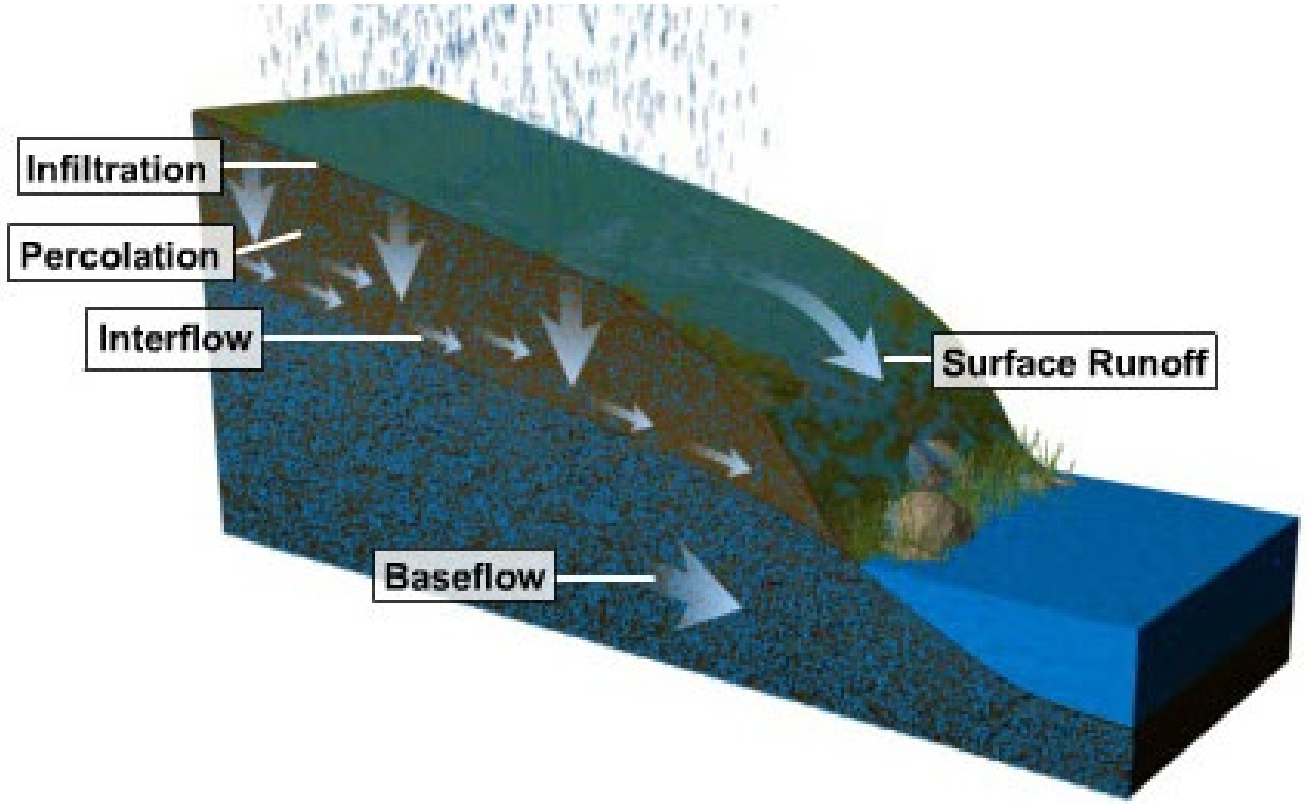
Stormwater Attenuation – Recovery

Recovery is the return of the system to pre-storm levels.

- Wet Systems – Release via an orifice and percolation
- Dry Systems – Percolation
- Required within a period of time (state)

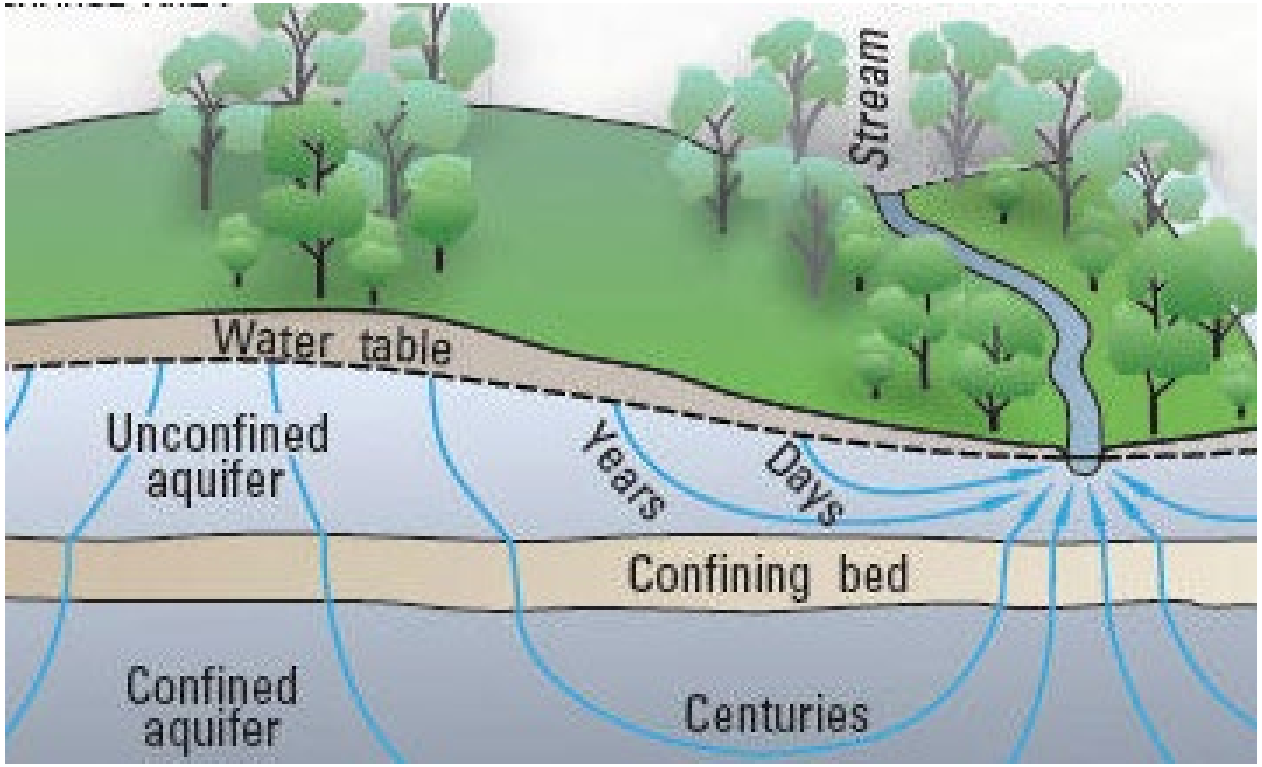
  Non-recovery requires a bigger stormwater system

Stormwater Infiltration – Groundwater Terms



Stormwater Infiltration - Groundwater

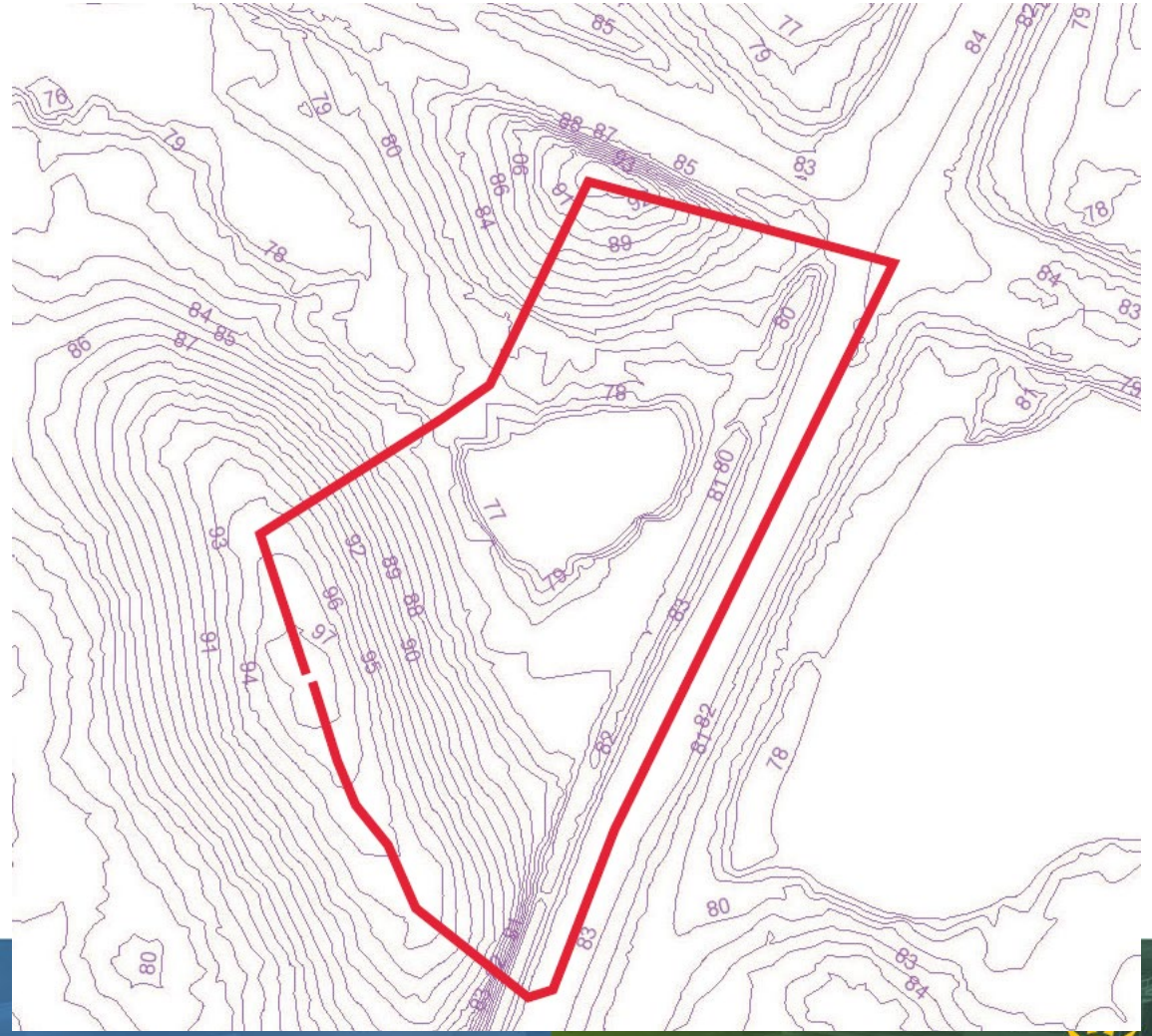
- Much slower flow rates than overland flow
- Water table mimics the ground elevation
- Confining layers affect flow/water table elevation



ENRAC – STORMWATER PRIMER

Stormwater – Closed Basins

- All runoff and infiltrated stormwater stays in basin
- Highly susceptible to flooding due to lack of discharge & increase in rainfall
- Modeled using a larger storm
- West Volusia predominantly

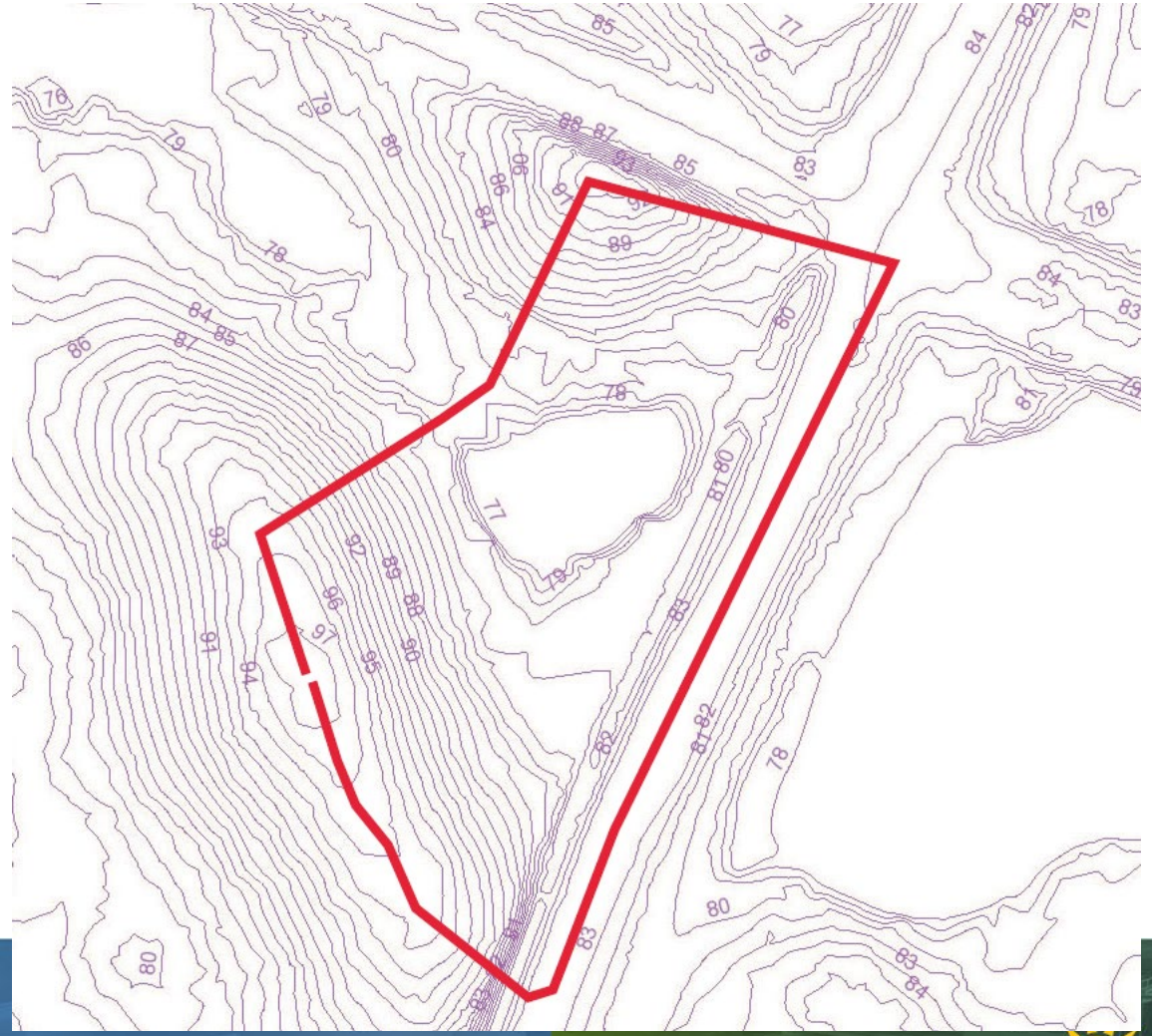


Volusia County
FLORIDA

Stormwater – Closed Basins

Percolation is only means of recovery (drop in water elevs) and it can be slowed by:

- Confining layers or poorly drained soils
- Higher rainfall amounts



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