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Matlacha Shops

Drainage Calculations

4613 Pine Island Road NW, Matlacha, FL 33933

Date: April 1, 2019

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Preliminary Water Quality

I. Given:

A. Acreages		CN
1. Site Area =	0.33 ac	**93**
2. Total Water Quality Area	0.33 ac	
3. Off system area	0.00 ac	
4. Impervious		
a. Building (roof) =	0.09 ac	98
b. Parking/pavement =	0.13 ac	98
5. Lake =	0.00 ac	100
6. Pervious (Open Space) =	0.11 ac	84

II. Design Criteria

A. Quality

1. For a wet detention system, then whichever is the greater of
   a. The first inch of runoff from the entire site.
   b. The amount of 2.5 inches time the percentage of imperviousness.

2. For a dry detention system, then 75% of the volume required wet detention.
3. For a retention system, then 50% of the volume required.
4. The detention system shall be design to discharge not more than 0.5 inch of the detained volume per day.

III. Computations

A. Quality

1. Compute the first inch of runoff for the developed project:

= 1 inch x 0.33 ac x (1 ft/ 12 in.)

= 0.03 ac-ft for the first inch of runoff.

2. Compute 2.5 inches times the percentage of imperviousness:
   a. Site area for water quality pervious/impervious calculations only.
   = Total project - (water surface + roof)

= 0.33 ac - (0.00 ac + 0.09 ac)

= 0.24 ac of site area for water quality pervious/impervious

   b. Impervious area for water quality pervious/impervious calculations only
   = (Site area for water quality pervious/impervious) - pervious

= 0.24 ac - 0.11 ac

= 0.13 ac of impervious area for water quality pervious/impervious

c. Percentage of impervious area for water quality
= Impervious area for water quality x 100%
Site area for water quality

= (0.13 ac / 0.24 ac)

= 53.4% impervious

d. For 2.5 inches times the percentage impervious
= 2.5 inches x percentage impervious

= 2.5 in x 0.534

= 1.33 in to be treated

e. Compute volume required for quality detention
= inches to be treated x (total site - lake)

= 1.33 in x (0.33 ac - 0.00 ac)

= 0.04 ac-ft

3. Since the volume of 0.04 ac-ft is greater than the 0.03 ac-ft computed for the first inch over the site, the volume of 0.04 ac-ft controls.

Since Dry Detention take a 75% credit =	0.03 ac-ft
50% additional water quality volume =	0.04 ac-ft

4. Compute the required detention volume

Total required dry detention

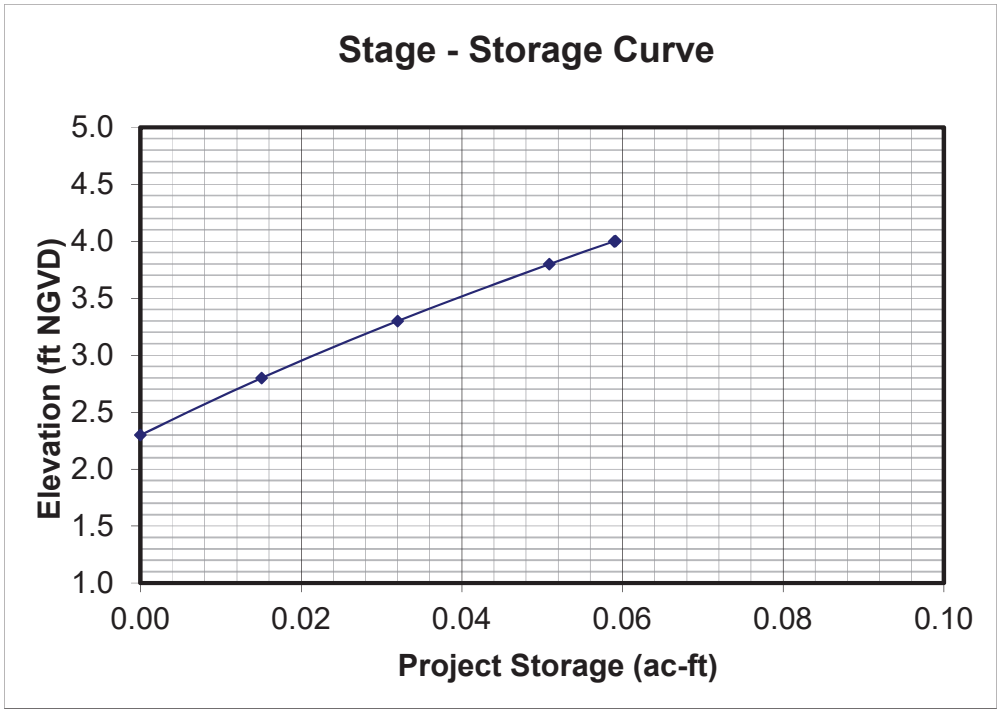
= 0.04 ac-ft

= 0.04 ac-ft of required detention volume

Elevation	Area (Ac)	Dry Detention Vol. (ac-ft)
2.30	0.028	0
2.80	0.032	0.02
3.30	0.036	0.03
3.80	0.040	0.05
4.00	0.041	0.06
4.001	0.230	0.06

Stage Storage Curve

Elevation (FT)	Total Volume (ac-ft)
2.30	0
2.80	0.02
3.30	0.03
3.80	0.05
4.00	0.06
4.001	0.06



A. Control structure weir crest elevation

1. Set the control structure weir crest high enough to store the water volume quantity of 0.04 ac-ft to meet quality criteria.

2. The weir crest elevation should be set no lower than elevation 3.55 NAVD according to the stage storage curve.