Stormwater Management Report

DELRAY BUNGALOWS RESTAURANT

25 SE 3rd Avenue
Delray Beach, FL 33483

October 17, 2023

TEC Project No. 23-027

This item has been digitally signed and sealed by Justin Thompson, PE, on the date adjacent to the seal.

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10/18/2023

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TABLE OF CONTENTS

PROJECT DESCRIPTION

The Delray Bungalows Restaurant project is located on 0.318-acres in Delray Beach, Florida. The project site consists of two parcels comprising 0.318-acres and is separated by a 16-foot Public Alley.

The project site was most recently used as a bank with drive-thru teller lanes and office space upstairs. The project site contains 0.284 acres of impervious area which is 89% of the total project area. The remaining area is pervious area, containing 0.034-acres which is 11% of the total project area.

The proposed project consists of the redevelopment of the bank building and drive-thru area into a sit-down restaurant with the drive-thru teller area being converted to covered dining. The proposed impervious area will be 0.283-acres and will be 89% of the total project area. This leaves the other 11% of the project area as pervious area. The minor difference in impervious is do to the inclusion of some street tree planters.

STORMWATER MANAGEMENT CRITERIA

The proposed storm drainage system has been developed following the standard methods of the Lake Worth Drainage District (LWDD) and South Florida Water Management District (SFWMD). The most stringent design requirements were followed in the design of the stormwater improvements. The design criteria are as follows:

Water Quality Criteria

Volumetric Requirements

(a) Retention, detention, or both retention and detention in the overall system, including swales, lakes, canals, greenways, etc., shall be provided for one of the three following criteria or equivalent combinations thereof:

1. Wet detention volume shall be provided for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater.
2. Dry detention volume shall be provided equal to 75 percent of the above amounts computed for wet detention.
3. Retention volume shall be provided equal to 50 percent of the above amounts computed for wet detention. Retention volume included in flood protection calculations requires a guarantee of long term operation and maintenance of system bleed-down ability. Examples of such guarantee include evidence of excellent soil percolation rates, such as coastal ridge sands, or an operations entity which specifically reserves funds for operation, maintenance and replacement (example: Orange County MSTU). (NOTE: Orange County subdivision regulation criteria for retention - published by Orange County in Orange County Subdivision Regulations - may be utilized for Orange County MSTU projects in lieu of Agency retention criteria where retention volumes exceed one half inch.

(b) Systems with inlets in grassed areas will be credited with up to 0.2 inches of the required wet detention amount for the contributing areas. Full credit will be based on a ratio of 10:1 impervious area (paved or building area) to pervious area (i.e. the grassed area) with proportionately less credit granted for greater ratios.

Land Use and Coverage Criteria

(a) Commercial or industrial zoned projects shall provide at least one-half inch of dry detention or retention pretreatment as part of the required retention / detention unless reasonable assurances can be offered that hazardous materials will not enter the project's surface water management system. Such assurances include, for example, deed restrictions on property planned for re-sale, type of occupancy, recorded lease agreements, local government restrictive codes, ordinances, licenses, and separate containment systems designed to prevent discharge.

(b) Projects having greater than 40% impervious area and which discharge directly to the following receiving waters shall provide at least one half inch of dry detention or retention pretreatment as part of the required retention/detention. Receiving waters being addressed are:

1. Lake Okeechobee and the Kissimmee River.
2. Waterbodies designated as Class I or Class II waters by the Florida Department of Environmental Protection;
3. Canals back-pumped to Lake Okeechobee or to the Conservation areas, or proposed for back-pumping;
4. Other areas, such as the Savannas in St. Lucie and Martin Counties; the Six Mile Cypress Strand; the Big Cypress area of Collier County; and lands acquired by the District pursuant to Section 373.59, F.S.
Water Management Lands Trust Fund (Save Our Rivers); and mitigation bank lands;
5. Outstanding Florida Waters as defined in Chapter 62-302, F.A.C.; and Aquatic Preserves as created and provided for in Chapter 258, F.S.; and
6. Waterbodies within a District permitted public water supply wellfield cone-of-depression which are not separated from the aquifer by strata at least ten feet thick and having an average saturated

SUMMARY TABLES

The stormwater management analysis provided the following results:

SUMMARY OF WATER QUALITY CRITERIA			
Criteria	Water Quality Volume	Dry Pretreatment	Total Volume
EXISTING	0.054 ac-ft	0.013 ac-ft	0.067 ac-ft
PROPOSED	0.053 ac-ft	0.013 ac-ft	0.066 ac-ft

APPENDIX

STORMWATER MANAGEMENT CALCULATIONS

I. GIVEN:

A. ACREAGE:

1.	Buildings =	0.140	ac.
2.	Impervious =	0.144	ac.
3.	Pervious =	0.034	ac.
4.	Water / Retention Area =	0.000	ac.
4.	Total Site Area =	**0.318**	ac.

B. ZONING:

1. Commercial

II. DESIGN CRITERIA:

A. WATER QUALITY CRITERIA:

1. If a wet detention system, then whichever is the greater of the following:
   a. The first inch of runoff from the entire project site.
   b. The amount of 2.5 inches times the percent impervious for the project site.

2. If a dry detention system, then 75% of the volume required for the wet detention system.

3. If a retention system, then 50% of the volume required.

4. If the property is zoned "Commercial", at least 1/2 inch of retention or dry detention pre-treatment will be required.

5. Any detention system shall be designed to discharge no more than 0.5 inches of the detained volume per day.

III. COMPUTATIONS

A. WATER QUALITY COMPUTATIONS:

1. Compute the first inch of runoff from the entire developed project site:
   = 1.00 inch X 0.318 acres X (1 foot / 12 inches)
   = **0.027** **ac-ft for the first inch of runoff**

2. Compute 2.5 inches times the percent impervious for the developed project site:
   a. Site area for water quality pervious / impervious calculations only:
      = Total Project Area - (Water / Retention Area + Buildings)
      = 0.318 acres - (0.000 acres + 0.140 acres)
      = **0.178** **acres of site area for water quality calculations**

   b. Impervious area for water quality pervious / impervious calculations only:
      = Site area for water quality - Pervious area
      = 0.178 acres - 0.034 acres
      = **0.144** **acres of impervious area for water quality calculations**

   c. Percentage of impervious area for water quality:
      = Impervious area for water quality / Site area for water quality X 100%
      = 0.144 acres / 0.178 acres X 100%
      = **80.9%** **Impervious**

   d. For 2.5 inches times the percentage of impervious area:
      = 2.5 inches X 80.9% %
      = **2.022** **inches to be treated**

   e. Compute volume required for quality:
      = Inches to be treated X (Total Site Area - Water / Retention Area)
      = 2.022 inches X (0.318 acres - 0.000 acres) X (1 foot / 12 inches)
      = **0.054** **ac-ft required for detention storage**

3. ➔ The first inch of runoff from the entire developed site = **0.027** **ac-ft**
   ➔ 2.5 inches times the percentage of impervious area = **0.054** **ac-ft**

   ➔ Volume of **0.054** ac-ft controls

4. If the project is zoned "Commercial" or if the project were discharging directly to a sensitive receiving body and is more than 40% impervious, 0.5 inches of dry detention pre-treatment must be provided:
   = 0.5 inches X (Total Site Area - Water / Retention Area)
   = 0.5 inches X (0.318 acres - 0.000 acres) X (1 foot / 12 inches)
   = **0.013** **ac-ft required for pre-treatment**

5. Compute total volume required:
   = Total required detention + Pre-treatment
   = 0.054 ac-ft + 0.013 ac-ft
   = **0.067** **ac-ft of total volume required**

6. Compute credit for using one of the following systems:
   a. Wet detention volume to be provided:
      = Total required detention - Pre-treatment
      = 0.054 ac-ft - 0.013 ac-ft
      = **0.040** **ac-ft of volume required for wet detention**

b. Dry detention volume to be provided (75% of the total required detention volume):
= Total required detention volume X 75%
= 0.054 ac-ft X 0.75 %
= **0.040** **ac-ft of volume required for dry detention**

c. Dry retention volume to be provided (50% of the total required detention volume):
= Total required detention volume X 50%
= 0.054 ac-ft X 0.50 %
= **0.027** **ac-ft of volume required for dry retention**

B. SUMMARY OF WATER QUALITY COMPUTATIONS:

Item	Description	Quantity	
A.1	First inch of runoff from the entire developed project site	0.027	ac-ft
A.2	2.5 inches times percent impervious for the developed project site	0.054	ac-ft
A.3	Detention volume to be treated	0.054	ac-ft
A.4	Pre-treatment required for Commercial site	0.013	ac-ft
A.5	Total volume to be treated	0.067	ac-ft
A.6.a	Wet detention volume required	0.040	ac-ft
A.6.b	Dry detention volume required	0.040	ac-ft
A.6.c	Dry retention volume required	0.027	ac-ft

STORMWATER MANAGEMENT CALCULATIONS

I. GIVEN:

A. ACREAGE:

1.	Buildings =	0.140	ac.
2.	Impervious =	0.143	ac.
3.	Pervious =	0.035	ac.
4.	Water / Retention Area =	0.000	ac.
4.	Total Site Area =	**0.318**	ac.

B. ZONING:

1. Commercial

II. DESIGN CRITERIA:

A. WATER QUALITY CRITERIA:

1. If a wet detention system, then whichever is the greater of the following:
   a. The first inch of runoff from the entire project site.
   b. The amount of 2.5 inches times the percent impervious for the project site.

2. If a dry detention system, then 75% of the volume required for the wet detention system.

3. If a retention system, then 50% of the volume required.

4. If the property is zoned "Commercial", at least 1/2 inch of retention or dry detention pre-treatment will be required.

5. Any detention system shall be designed to discharge no more than 0.5 inches of the detained volume per day.

III. COMPUTATIONS

A. WATER QUALITY COMPUTATIONS:

1. Compute the first inch of runoff from the entire developed project site:
   = 1.00 inch X 0.318 acres X (1 foot / 12 inches)
   = **0.027** **ac-ft for the first inch of runoff**

2. Compute 2.5 inches times the percent impervious for the developed project site:
   a. Site area for water quality pervious / impervious calculations only:
      = Total Project Area - (Water / Retention Area + Buildings)
      = 0.318 acres - (0.000 acres + 0.140 acres)
      = **0.178** **acres of site area for water quality calculations**

   b. Impervious area for water quality pervious / impervious calculations only:
      = Site area for water quality - Pervious area
      = 0.178 acres - 0.035 acres
      = **0.143** **acres of impervious area for water quality calculations**

   c. Percentage of impervious area for water quality:
      = Impervious area for water quality / Site area for water quality X 100%
      = 0.143 acres / 0.178 acres X 100%
      = **80.3%** **Impervious**

   d. For 2.5 inches times the percentage of impervious area:
      = 2.5 inches X 80.3 %
      = **2.008** **inches to be treated**

   e. Compute volume required for quality:
      = Inches to be treated X (Total Site Area - Water / Retention Area)
      = 2.008 inches X (0.318 acres - 0.000 acres) X (1 foot / 12 inches)
      = **0.053** **ac-ft required for detention storage**

3. ➔ The first inch of runoff from the entire developed site = **0.027** **ac-ft**
   ➔ 2.5 inches times the percentage of impervious area = **0.053** **ac-ft**

   ➔ Volume of **0.053** ac-ft controls

4. If the project is zoned "Commercial" or if the project were discharging directly to a sensitive receiving body and is more than 40% impervious, 0.5 inches of dry detention pre-treatment must be provided:
   = 0.5 inches X (Total Site Area - Water / Retention Area)
   = 0.5 inches X (0.318 acres - 0.000 acres) X (1 foot / 12 inches)
   = **0.013** **ac-ft required for pre-treatment**

5. Compute total volume required:
   = Total required detention + Pre-treatment
   = 0.053 ac-ft + 0.013 ac-ft
   = **0.066** **ac-ft of total volume required**

6. Compute credit for using one of the following systems:
   a. Wet detention volume to be provided:
      = Total required detention - Pre-treatment
      = 0.053 ac-ft - 0.013 ac-ft
      = **0.040** **ac-ft of volume required for wet detention**

b. Dry detention volume to be provided (75% of the total required detention volume):
= Total required detention volume X 75%
= 0.053 ac-ft X 0.75 %
= **0.040** **ac-ft of volume required for dry detention**

c. Dry retention volume to be provided (50% of the total required detention volume):
= Total required detention volume X 50%
= 0.053 ac-ft X 0.50 %
= **0.027** **ac-ft of volume required for dry retention**

B. SUMMARY OF WATER QUALITY COMPUTATIONS:

Item	Description	Quantity	
A.1	First inch of runoff from the entire developed project site	0.027	ac-ft
A.2	2.5 inches times percent impervious for the developed project site	0.053	ac-ft
A.3	Detention volume to be treated	0.053	ac-ft
A.4	Pre-treatment required for Commercial site	0.013	ac-ft
A.5	Total volume to be treated	0.066	ac-ft
A.6.a	Wet detention volume required	0.040	ac-ft
A.6.b	Dry detention volume required	0.040	ac-ft
A.6.c	Dry retention volume required	0.027	ac-ft