NW 600 Block Leasing Office

Delray Beach, FL
Township 46S, Range 43E, and Section 17

PRELIMINARY DRAINAGE CALCULATIONS

August 7, 2026
Engenuity Project No. 23014.01

Submitted To:

City of Delray Beach

Prepared For:

City of Delray Beach CRA

Prepared By:

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Drainage Calculations
For
NW 600 Block Leasing Office

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This project meets the applicable requirements of the following agencies as shown in this report:
South Florida Water Management District (SFWMD) and City of Delray Beach.

Digitally signed
by Lisa Tropepe
Date: 2026.08.07
14:22:23 -04'00'

Lisa A. Tropepe, P.E.
Florida License No. 45408
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(Responsible for all content in this report)

STORMWATER REPORT

A) INTRODUCTION

Existing Site Conditions

The existing site is approximately 0.15 acres located in the City of Delray Beach within Section 17, Township 46S, Range 43E. The Property Control Number (PCN) for the site is 12-43-46-17-01-012-0190. The project is located at 34 NW 6th Ave on NW 6th Ave approximately 0.07 miles north of W Atlantic Road. The existing site is currently a vacant lot which in the recent years was a developed one-story residential property, bounded by an alley to the north and west, a residential/commercial neighborhood to the south, and municipal land to the east.

Proposed Improvements

The proposed project improvements consist of a 1-story leasing office building, adding paver parking lot areas to the east and west of property and added concrete and paver sidewalks. The proposed improvements also consist of the removal of existing trees, removal of an existing driveway and existing wood decks. There is an increase in the water quality treatment volume required and this volume increase from pre-development to post-development is 0.02 ac-ft. The proposed drainage will include new yard drains and the addition of a new exfiltration trench system that will be designed to meet the requirements of the improvements. Since the site is in an impaired basin, water quality is designed to meet 150% water quality treatment volume. The drainage system design will require appropriate agency permitting for storm water and parking lot elevation design. This increase is compensated for by utilizing exfiltration trenches.

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DATE: 8/6/2026

DRAINAGE CALCULATIONS SUMMARY - PRE

Pre-Development

LAND USE DATA:

	PRE Impervious (ac)	PRE Pervious (ac)	Elev (NAVD) low	Elev (NAVD) high
A. Building	0.03			
B. Pervious		0.09	16.56	17.36
C. Impervious	0.03		16.80	17.36
D. Lake	0.00		0.00	0.00
E. Lake Bank		0.00	0.00	0.00
F. Dry Detention Bottom		0.00	0.00	0.00
G. Dry Detention Side		0.00	0.00	0.00
Sub-Totals =	0.06	0.09		

Total Site Area = 0.15 ac

STAGE-STORAGE:

See attached "Surface Storage" calculations.

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DRAINAGE CALCULATIONS SUMMARY - POST

Post-Development

LAND USE DATA:

	POST Impervious (ac)	POST Pervious (ac)	Elev (NAVD) low	Elev (NAVD) high
A. Building	0.05			
B. Pervious		0.07	16.55	17.20
C. Impervious	0.03		16.85	17.80
D. Lake	0.00		0.00	0.00
E. Lake Bank		0.00	0.00	0.00
F. Dry Detention Bottom		0.00	0.00	0.00
G. Dry Detention Side		0.00	0.00	0.00
Sub-Totals =	0.08	0.07		

Total Site Area = 0.15 ac

STAGE-STORAGE:

See attached "Surface Storage" calculations.

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SOIL STORAGE - PRE

SITE CHARACTERISTICS

	SF	AC		Pervious area	Average Elevation
Total Area:	6,517	0.15	100.0%		
A. Building	1,316	0.03	20.2%		
B. Pervious	3,703	0.09	56.8%	0.09	16.96
C. Impervious	1,498	0.03	23.0%		
D. Lake	0	0.00	0.0%		
E. Lake Bank	0	0.00	0.0%	0.00	0.00
F. Dry Detention Bottom	0	0.00	0.0%	0.00	0.00
G. Dry Detention Side	0	0.00	0.0%	0.00	0.00

Total pervious area:	0.09	ac
Average pervious elevation:	17.0	ft
Avg Ground Water Level:	8.0	ft
Depth to Water Table:	9.0	ft

SCS SOIL MOISTURE CAPABILITY FOR SFWMD	Flatwoods	Soils
DEPTH TO WATER TABLE (FT)	UNCOMPACTED SOIL WATER STORAGE (IN)	COMPACTED SOIL WATER STORAGE (IN)
1	0.60	0.45
2	2.50	1.88
3	5.40	4.05
4	9.00	6.75

COMPACTED SOIL				
Low Storage =	4.00	ft	6.75	in
High Storage	4.00	ft	6.75	in

*Available Soil Storage for COMPACTED SOIL 6.75 inches

COMPOSITE SOIL MOISTURE STORAGE (S)

S = (Pervious Area / Total Area) x (Available Soil Storage)

S = 3.84 inches

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SOIL STORAGE - POST

SITE CHARACTERISTICS

	SF	AC		Pervious area	Average Elevation
Total Area:	6,517	0.15	100.0%		
A. Building	2,091	0.05	32.1%		
B. Pervious	3,062	0.07	47.0%	0.07	16.88
C. Impervious	1,363	0.03	20.9%		
D. Lake	0	0.00	0.0%		
E. Lake Bank	0	0.00	0.0%	0.00	0.00
F. Dry Detention Bottom	0	0.00	0.0%	0.00	0.00
G. Dry Detention side	0	0.00	0.0%	0.00	0.00

Total pervious area:	0.1	ac
Average pervious elevation:	16.9	ft
Avg Ground Water Level:	8.0	ft
Depth to Water Table:	8.9	ft

SCS SOIL MOISTURE CAPABILITY FOR SFWMD	Flatwoods Soils
DEPTH TO WATER TABLE (FT)	UNCOMPACTED SOIL WATER STORAGE (IN)	COMPACTED SOIL WATER STORAGE (IN)
1	0.60	0.45
2	2.50	1.88
3	5.40	4.05
4	9.00	6.75

COMPACTED SOIL				
Low Storage =	4.00	ft	6.75	in
High Storage	4.00	ft	6.75	in

*Available Soil Storage for COMPACTED SOIL 6.75 inches

COMPOSITE SOIL MOISTURE STORAGE (S)

S = (Pervious Area / Total Area) x (Available Soil Storage)

S = 3.17 inches

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DATE: **8/6/2026**

INPUTS: ELMAX= 18.90 ELMIN= 15.50 OUTPUT STAGE INCREMENT (FT) = 0.20

VERTICAL SURFACE STORAGE - PRE

Area #	1	2	3	4	5	6	7	8
Name	Lake	Dry Detention Bottom						
Area (Ac)	0.00	0.00						
Starting El	0.00	0.00						

Area #	9	10	11	12	13	14	15	16
Name								
Area (Ac)								
Starting El								

LINEAR SURFACE STORAGE -PRE

Area #	1	2	3	4	5	6	7	8
Name	Pervious	Dry Detention Side	Impervious	Lake Bank				
Area (Ac)	0.09	0.00	0.03	0.00				
Starting El	16.56	0.00	16.80	0.00				
Ending El	17.36	0.00	17.36	0.00				

Area #	9	10	11	12	13	14	15	16
Name								
Area (Ac)								
Starting El								
Ending El								

Area #	17	18	19	20	21	22	23	24
Name								
Area (Ac)								
Starting El								
Ending El								

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TOTAL SURFACE STORAGE

Stage	Vertical Storage (AcFt)	Linear Storage (AcFt)	Surface Storage (AcFt)	Exfiltration Storage (Acft)	Total Storage (Acft)
15.50	0.00	0.00	0.00		**0.00**
15.70	0.00	0.00	0.00		**0.00**
15.90	0.00	0.00	0.00		**0.00**
16.10	0.00	0.00	0.00		**0.00**
16.30	0.00	0.00	0.00		**0.00**
16.50	0.00	0.00	0.00		**0.00**
16.70	0.00	0.00	0.00		**0.00**
16.90	0.00	0.01	0.01		**0.01**
17.10	0.00	0.02	0.02		**0.02**
17.30	0.00	0.04	0.04		**0.04**
17.50	0.00	0.06	0.06		**0.06**
17.70	0.00	0.08	0.08		**0.08**
17.90	0.00	0.11	0.11		**0.11**
18.10	0.00	0.13	0.13		**0.13**
18.30	0.00	0.16	0.16		**0.16**
18.50	0.00	0.18	0.18		**0.18**
18.70	0.00	0.20	0.20		**0.20**
18.90	0.00	0.23	0.23		**0.23**

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INPUTS: ELMAX= 18.50 ELMIN= 15.50 OUTPUT STAGE INCREMENT (FT) = 0.20

VERTICAL SURFACE STORAGE - Post

Area #	1	2	3	4	5	6	7	8
Name	Lake	Dry Detention Bottom						
Area (Ac)	0.00	0.00						
Starting El	0.00	0.00						

Area #	9	10	11	12	13	14	15	16
Name								
Area (Ac)								
Starting El								

LINEAR SURFACE STORAGE -Post

Area #	1	2	3	4	5	6	7	8
Name	Pervious	Dry Detention Side	Impervious	Lake Bank				
Area (Ac)	0.07	0.00	0.03	0.00				
Starting El	16.55	0.00	16.85	0.00				
Ending El	17.20	0.00	17.80	0.00				

Area #	9	10	11	12	13	14	15	16
Name								
Area (Ac)								
Starting El								
Ending El								

Area #	17	18	19	20	21	22	23	24
Name								
Area (Ac)								
Starting El								

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Ending El

TOTAL SURFACE STORAGE

Stage	Vertical Storage (AcFt)	Linear Storage (AcFt)	Surface Storage (AcFt)	Exfiltration Storage (Acft)	Total Storage (Acft)
15.50	0.00	0.00	0.00	0.03	**0.03**
15.70	0.00	0.00	0.00	0.03	**0.03**
15.90	0.00	0.00	0.00	0.03	**0.03**
16.10	0.00	0.00	0.00	0.03	**0.03**
16.30	0.00	0.00	0.00	0.03	**0.03**
16.50	0.00	0.00	0.00	0.03	**0.03**
16.70	0.00	0.00	0.00	0.03	**0.03**
16.90	0.00	0.01	0.01	0.03	**0.04**
17.10	0.00	0.02	0.02	0.03	**0.05**
17.30	0.00	0.03	0.03	0.03	**0.06**
17.50	0.00	0.05	0.05	0.03	**0.08**
17.70	0.00	0.07	0.07	0.03	**0.10**
17.90	0.00	0.09	0.09	0.03	**0.12**
18.10	0.00	0.11	0.11	0.03	**0.14**
18.30	0.00	0.13	0.13	0.03	**0.16**
18.50	0.00	0.15	0.15	0.03	**0.18**

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WATER QUALITY CALCULATIONS

SITE CHARACTERISTICS

	SF	AC
Total Area:	**6,517**	**0.15**
Water Surface Area:	**0**	**0.00**
Roof Area:	**2,091**	**0.05**
Impervious Area:	**1,363**	**0.03**
Pervious Area:	**3,062**	**0.07**
	6,516.58	**0.15**

SFWMD WATER QUALITY TREATMENT VOLUME

Site Area For Water Quality = Total Area - (Water Surface Area + Roof Area)
= 0.15 AC - (0.00 AC + 0.05 AC)
= 0.10 AC

Impervious Area For Water Quality = Site Area For Water Quality - Pervious Area
= 0.10 AC - 0.07 AC
= 0.03 AC

Impervious Percentage For Water Quality = (Impervious Area / Site Area W.Q.) x 100%
= (0.03 AC / 0.10 AC) x 100%
= 30.81%

SFWMD Water Quality Treatment Volume = First Inch of Runoff Over the Total Area
= 1 IN x 0.15 AC
= 0.15 AC-IN x (1/12 FT/IN)
= 0.01 AC-FT

OR

= 2.5 Inches of Runoff Over the Impervious Area
= 2.5 IN x % Imperv. x (Tot. Area - Wtr. Srf. Area)
= 2.5 IN x 30.81% x (0.15 AC - 0.00 AC)
= 0.12 AC-IN x (1/12 FT/IN)
= 0.01 AC-FT

0.01 is equal to 0.01 , therefore Either First Inch of Runoff Over Total Area and 2.5 Inches of Runoff Over the Impervious Area Controls

SFWMD Water Quality Treatment Volume = 0.01 AC-FT

IF impaired basin, 150% of this volume is required:
Water Quality Treatment Volume = 0.01 AC-FT x 150% = 0.02 AC-FT

SFWMD PRETREATMENT
0.5 INCHES OVER THE 0.15 ACRE SITE = 0.006 ACRE-FT OF REQUIRED STORAGE

This Volume is held within the Exfiltration trench

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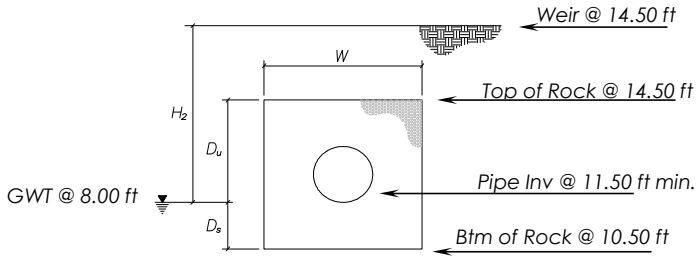
EXFILTRATION CALCULATIONS

STORAGE VOLUME

V_{wq} =	0.02	AC-FT	Water Quality Volume
V_{add} =	0.01	AC-FT	Storage Volume in addition to WQ volume
	0.03	AC-FT	TOTAL

SFWMD EXFILTRATION EQUATION

$$L = FS[(\%WQ)(V_{wq})+V_{add}]/[K(H_2W+2H_2D_U-D_U^2+2H_2D_s)+(1.39E\text{-}4)WD_U]$$



NOTE: All elevations in NAVD88.

WHERE:

L (ft) = required trench length =	Unknown	
Vwq (ac-in/hr) = treated volume =	0.24	
Vadd (ac-in/hr) = stored volume =	0.084	
FS =	2	
%WQ =	50%	
W (ft) = trench width =	6	
K (cfs/ft^2-ft_{head}) = hydraulic conductivity =	2.50E-04	(Permit 50-2892-S value)
H_2 (tt) = depth to water table =	6.5	(Weir Crest @ 14.50' and GWT @ 8.00')
D_U (ft) = Non-saturated trench depth =	6.5	
D_s (ft) = Saturated trench depth =	0.0	

CALCULATE REQ'D TRENCH LENGTH:

L = 15.85

Req'd Exfiltration Length = 16 LF *(18 LF Provided)*

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RUNOFF - PRE VS. POST

DESIGN STORM			PRE		POST		PRE VS POST	PRE VS POST
			Soil Storage(S, in)=	3.84	Soil Storage(S, in)=	3.17	Runoff Volume Increase	Runoff Volume Increase
Duration (days)	Frequency (years)	Rainfall (P, in)	Runoff (Q, in)	Runoff Volume (ac-ft)	Runoff (Q, in)	Runoff Volume (ac-ft)	(ac-ft)	(ac-in)
1	5	7.16	4.00	0.05	4.39	0.05	0.005	0.06
1	10	8	4.73	0.06	5.15	0.06	0.005	0.06
3	25	15	11.21	0.14	11.77	0.15	0.007	0.08
3	100	19	15.06	0.19	15.66	0.20	0.007	0.09

SCS Runoff Equation used to compute the runoff (inches): $$Q = \frac{(P - 0.2S)^2}{(P + 0.8S)}$$

Equation used to compute runoff volume (ac-ft): $$Volume = \frac{Q}{12} \times A$$

A = Total Site Area (acres) = 0.15

The runoff volume increase is met in the Exfiltration trench