



CAULFIELD & WHEELER, INC.

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September 19th, 2025

120 SW 3RD AVENUE
DELRAY BEACH, FLORIDA
C&W Project Number 11149
STORMWATER MANAGEMENT CALCULATIONS

PROJECT DESCRIPTION:

Project is located at 120 SW 3rd Avenue. It is bounded on the west by single family residences, on the north by a single family residence, on the south by a single family residence and on the east by SW 3rd Avenue. The project includes five proposed townhomes with associated hardscape features, storm water management controls and landscaping amenities needed to support the development.

DESIGN CRITERIA:

I. Given

Post Total

A. Acreage

- | | | |
|----|----------------------|-------------|
| 1. | Total | = 19,290 SF |
| 2. | Impervious | |
| | a. Buildings (roofs) | = 5,969 SF |
| | b. Paved Areas | = 3,467 SF |
| 3. | Pervious | = 9,854 SF |

B. Proposed Minimum Elevations

- | | | |
|----|-------------------|---------------|
| 1. | Roads and parking | = 14.35' NAVD |
| 2. | Floors | = 15.90' NAVD |
| 3. | Water Control El. | = 8.00' NAVD |

C. No points of legal positive outfall so all runoff is contained onsite.

D. Water level elevations

- | | | |
|----|------------------------|--------------|
| 1. | Wet season water table | = 8.00' NAVD |
|----|------------------------|--------------|

(Note: Proposed minimum road grade (14.35' NAVD) is more than the 2 ft. minimum distance above the wet season water table, or control elevation, of 8.00' NAVD).

E. Rainfall amounts:

1. Roads (5-year, 1-day) = 9.0 inches
2. Design (25- year, 3-day) = 16.0 inches
3. Floors (100-year, 3-day) = 20.0 inches

II. Design Criteria – See the attached design criteria for your reference.

III. Computations – See the attached computations for your reference.

IV. Check storm stages and discharges

A. Minimum building floor elevation

1. The rainfall of the 100-year 3-day storm = 20.00 in.
2. From the attached routing computations the 100 year flood contour is at elevation of 14.66' NAVD. Since the proposed minimum floor elevation is 15.90' NAVD, the proposed minimum floor is acceptable.

B. Roads versus local criteria

1. The minimum road grade must be at least 2 feet above control elevation, which is 8.00' NAVD. Since minimum proposed road elevation is 14.00' NAVD, the criteria is satisfied.
2. The minimum road grade must also be no lower than the peak of the 5-year 1-day storm. From the flood routing of that event, a peak elevation of 11.35' NAVD will occur. Since the proposed minimum road elevation is 14.00' NAVD, the proposed minimum road elevation is acceptable.

C. Allowable peak discharge

1. No discharge is proposed from the site below the 25Yr-3Day Storm elevation.

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Stormwater CalculationsPROJECT: **120 SW 3rd Avenue**DATUM: **ft-NAVD** (ft-NAVD or ft-NGVD)**LAND-USE**

TOTAL SITE AREA:	19290.00	SF
BUILDING AREA:	5969.00	SF
PAVEMENT AREA:	3467.00	SF
POOL AREA:	0.00	SF
WATER SURFACE AREA:	0.00	SF
LAKE BANK AREA:	0.00	SF
PERVIOUS AREA (DRY DET DEEP):	3670.00	SF
PERVIOUS AREA (DRY DET BANK DEEP):	110.00	
PERVIOUS AREA (MISC):	6074.00	SF
GROUNDWATER EL.:	8.00	ft-NAVD
AVERAGE GROUND EL.:	14.00	ft-NAVD
DEPTH TO GROUNDWATER:	6.00	ft.
COMPACTED SOIL STORAGE:	8.18	in.
"S" VALUE:	4.18	--
CURVE NUMBER, CN:	70.53	--

TREATMENT REQUIREMENTS

1" OVER TOTAL AREA:	1607.50	CF
% IMPERVIOUS:	26%	
2.5" x %IMPERVIOUS:	0.65	in.
2.5" x %IMPERVIOUS x SITE AREA:	1045.94	SF
TREATMENT VOLUME REQ'D:	1607.50	CF
DRY PRETREATMENT VOL. REQ'D:	803.75	CF

DRY RETENTION

DRY DETENTION BOTTOM EL.:	9.00	ft-NAVD
DRY DETENTION BOTTOM AREA:	3670.0000	SF
DRY DETENTION TOP EL.:	14.50	ft-NAVD
DRY DETENTION TOP AREA:	3780.000	SF
DRY DETENTION VOLUME PROVIDED:	20487.50	CF

SIDE YARD EXFILTRATION

F.D. PIPE DIA.:	12.00	in.
F.D. PIPE INVERT EL.:	9.65	ft-NAVD
F.D. TOP OF TRENCH EL.:	11.65	ft-NAVD
F.D. BOTTOM OF TRENCH EL.:	7.25	ft-NAVD
AVG. GROUND (OR WEIR) EL.:	13.65	ft-NAVD
F.D. TRENCH WIDTH, W:	4.50	ft.
F.D. TRENCH HEIGHT:	4.40	ft.
DEPTH TO GROUNDWATER, H ₂ :	5.65	ft.
UNSATURATED TRENCH DEPTH, D _U :	3.65	ft.
SATURATED TRENCH DEPTH, D _S :	0.75	ft.
HYDRAULIC CONDUCTIVITY, K:	1.14E-03	cfs/ft ² /ft-head

TOTAL LENGTH OF PROPOSED F.D., L: **0** LFF.D. TREATMENT VOLUME PROVIDED, V: **0** CF

$$V = (L [K(H_2W + 2H_2D_U - D_U^2 + 2H_2D_S) + (1.39 \times 10^{-4})WD_U]) * 0.5$$

TREATMENT PROVIDED

DRY DETENTION VOLUME PROVIDED:	20487.50	CF
F.D. TREATMENT VOLUME PROVIDED:	0	CF
TOTAL TREATMENT VOLUME PROVIDED:	20488	CF

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Stormwater Calculations

Name	Exfil	Pvmt	Dry Det	Dry Det Bank	Green	Walks
Area		3467.00	3670.00	110.00	6074.00	0.00
Start Elev	8.00	14.35	9.00	9.00	12.90	0.00
End Elev	11.65	15.40	--	14.50	15.30	0.00

3yr-24hr RAINFALL, P:	6.50	in.
5yr-24hr RAINFALL, P:	9.00	in.
25yr-72hr RAINFALL, P:	16.00	in.
100yr-72hr RAINFALL, P:	20.00	in.
10yr-72hr RAINFALL, P:	13.00	in.

Start Feet ft-NAVD	Vert Storage cu-Ft	Linear Storage cu-Ft	Vert Storage cu-Ft	Linear Storage cu-Ft	Linear Storage cu-Ft	Linear Storage cu-Ft	Vert Storage cu-Ft	Linear Storage cu-Ft	Total Storage cu-Ft
8.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9.5	0.00	0.00	1835.00	2.50	0.00	0.00	0.00	0.00	1837.50
10.0	0.00	0.00	3670.00	10.00	0.00	0.00	0.00	0.00	3680.00
10.5	0.00	0.00	5505.00	22.50	0.00	0.00	0.00	0.00	5527.50
11.0	0.00	0.00	7340.00	40.00	0.00	0.00	0.00	0.00	7380.00
11.5	0.00	0.00	9175.00	62.50	0.00	0.00	0.00	0.00	9237.50
12.0	0.00	0.00	11010.00	90.00	0.00	0.00	0.00	0.00	11100.00
12.5	0.00	0.00	12845.00	122.50	0.00	0.00	0.00	0.00	12967.50
13.0	0.00	0.00	14680.00	160.00	12.65	0.00	0.00	0.00	14852.65
13.5	0.00	0.00	16515.00	202.50	455.55	0.00	0.00	0.00	17173.05
14.0	0.00	0.00	18350.00	250.00	1531.15	0.00	0.00	0.00	20131.15
14.5	0.00	37.15	20185.00	302.50	3239.47	0.00	0.00	0.00	23764.11
15.0	0.00	697.53	22020.00	357.50	5580.49	0.00	0.00	0.00	28655.51
15.5	0.00	2166.88	23855.00	412.50	8503.60	0.00	0.00	0.00	34937.98
16.0	0.00	3900.38	25690.00	467.50	11540.60	0.00	0.00	0.00	41598.48
16.5	0.00	5633.88	27525.00	522.50	14577.60	0.00	0.00	0.00	48258.98

3yr-24hr	3.26	in.
RUNOFF, Q5:	5239.82	cu-Ft
5yr-24hr	5.40	in.
RUNOFF, Q5:	8680.98	cu-Ft
25yr-72hr	11.89	in.
RUNOFF, Q25:	19110.53	cu-Ft
100yr-72hr	15.73	in.
RUNOFF, Q100:	25291.87	cu-Ft
10yr-24hr	9.05	in.
RUNOFF, Q5:	14554.40	cu-Ft

ZERO DISCHARGE STAGES

MAX 3yr-24hr STAGE:	10.42
MAX 5yr-24hr STAGE:	11.35
MAX 25YR STAGE:	13.83
MAX 100YR STAGE:	14.66
MAX 10yr-72hr STAGE:	12.92

FLOOD-ROUTING STAGES

MAX 3yr-24hr STAGE:	
MAX 5yr-24hr STAGE:	
MAX 25YR STAGE:	
MAX 100YR STAGE:	

MINIMUM PARKING LOT EL.:	11.35	ft-NAVD
MINIMUM PERIMETER EL.:	13.83	ft-NAVD
MINIMUM FINISHED FLOOR EL.:	14.66	ft-NAVD

120 SW 3rd Avenue

Delray Beach

C & W Project No. 11149

SURFACE WATER MANAGEMENT CALCULATIONS

10 year, 3 day Pre/Post Analysis

DESIGN CRITERIA:

Water Table Elevation = 8.00 NAVD
Rainfall Depths: 13.00 Inches

PROJECT AREAS:

	<u>Existing Calc. Assumption</u>	<u>Proposed</u>
Project Area	19290 SF	19290 SF
Buildings	636 SF	5969 SF
Paved Areas	293 SF	3467 SF
Sod/Landscape Areas	18361 SF	9854 SF

COMPUTATIONS:

I. Compute Pervious-Impervious Acreages:

Existing Conditions:

$$\begin{aligned}\text{Impervious Acreage} &= \text{Building + Paved Areas} \\ &= 636.00 + 293.00 = 929.00 \\ \text{\% Impervious} &= \frac{929.00}{19290.00} \times 100 = 4.8\% \\ \text{Pervious Acreage} &= \text{Project Area - Impervious} \\ &= 19290.00 - 929.00 = 18361.00 \\ \text{\% Pervious} &= \frac{18361.00}{19290.00} \times 100 = 95.2\%\end{aligned}$$

Proposed Conditions:

$$\begin{aligned}\text{Impervious Acreage} &= \text{Building + Paved Areas} \\ &= 5969.00 + 3467.00 = 9436.00 \\ \text{\% Impervious} &= \frac{9436.00}{19290.00} \times 100 = 48.9\% \\ \text{Pervious Acreage} &= \text{Project Area - Impervious} \\ &= 19290.00 - 9436.00 = 9854.00 \\ \text{\% Pervious} &= \frac{9854.00}{19290.00} \times 100 = 51.1\%\end{aligned}$$

II. Compute Soil Storage and SCS Curve Number:

1. Water Table Elevation = 8.00 NAVD
2. Average Proposed Finished Grade Elev. = 14.00 NAVD
3. Average depth to wet season water table = 14.00 - 8.00 = 6.00 ft.
4. From the soil storage table, for an average depth of 6.00 ft., considering 25% soil compaction, 8.18 inches.

Existing Conditions:

5. Ground storage under pervious areas:

$$\frac{8.18}{12 \text{ in./ ft.}} \times 18361.00 = 12516.08 \text{ CF}$$

6. Equivalent soil storage:

$$S = \frac{12516.08}{19290.00} \times \frac{12 \text{ in.}}{1 \text{ ft.}} = 7.79$$

7. SCS Curve Number:

$$CN = \frac{1000}{S + 10} = 56$$

Proposed Conditions:

8. Ground storage under pervious areas:

$$\frac{8.18}{12 \text{ in./ ft.}} \times 9854.00 = 6717.14 \text{ CF}$$

9. Equivalent soil storage:

$$S = \frac{6717.14}{19290.00} \times \frac{12 \text{ in.}}{1 \text{ ft.}} = 4.18$$

10. SCS Curve Number:

$$CN = \frac{1000}{S + 10} = 71$$

III. Compute the increase of runoff for 13in over increase impervious area:

Rainfall Amount: 13.00 in.

Existing Conditions:

$$\text{Runoff} = \frac{[13.00 - 0.2 (7.79)]^2}{[13.00 + 0.8 (7.79)]} = \frac{130.94}{19.23} = 6.81$$

$$\text{Volume} = \frac{6.81 \times 19290.00}{12} = 10946.16 \text{ CF}$$

Proposed Conditions:

$$\text{Runoff} = \frac{[13.00 - 0.2 (4.18)]^2}{[13.00 + 0.8 (4.18)]} = \frac{147.97}{16.34} = 9.05$$

$$\text{Volume} = \frac{9.05 \times 19290.00}{12} = 14554.40 \text{ CF}$$

Increase in Runoff:

$$\text{Increase} = 14554.40 - 10946.16 = \underline{\underline{3608 \text{ CF}}}$$

11 inch over impervious area volume increase of 3608 CF is accomodated by the proposed dry retention areas which provide 20,488 CF of storage