

STORMWATER MANAGEMENT REPORT

for

RaceTrac Petroleum, Inc.

RaceTrac

10 S. Congress Avenue
Delray Beach, Florida

Prepared by:



6300 NW 31st Avenue
Ft Lauderdale, FL 33309
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September 14, 2020

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PROJECT DESCRIPTION

Introduction

The site is located at 10 S. Congress Avenue in the City of Delray Beach, FL and generally located on the southwest corner of Atlantic Avenue and Congress Avenue. The existing site is currently developed with a 13,801 sq. ft. Walgreens Pharmacy. This project seeks to develop a 5,411 sq. ft. RaceTrac Market and gasoline station with 20 gas pumps. The total site area is approximately 1.644-acres. A detailed breakdown of the existing and proposed land use areas is provided in Table 1 below.

Table 1-Land Use Breakdown for Overall Site

	Existing Site		Proposed Site	
	Square feet	Acres	Square feet	Acres
Building	13,801	0.317	5,411	0.124
Pavement/Sidewalk	41,899	0.962	45,227	1.038
Pervious	15,911	0.365	20,973	0.481
Total Area	71,611	1.644	71,611	1.644

The site located within Lake Worth Drainage District (LWDD) limits and is part of the existing LWDD permit no. 00-1471D.03. The site is also part for the South Florida Water Management District (SFWMD) mater permit no. 50-01056-S.

Water Quality

Based on the water quality calculations, the volume of runoff for 2.5” of runoff over the total impervious area is larger than the volume for 1” over the entire site; therefore, 2.5” of runoff over the impervious area controls. The volume of runoff required to be stored to meet water quality is 0.23 ac-ft. (2.81 ac.-in.).

Water quality will be provided through a combination of exfiltration trench and retention area storage. A “k” value of 1.0×10^{-4} cfs/sq.ft.-ft.-head average was used in the design of the exfiltration trench. Based on the performed exfiltration calculations, a total length of 218 linear feet of exfiltration trench is required to meet water quality requirements. This project proposes 245 linear feet of exfiltration trench which will provide 0.27 ac-ft of storage. Detailed calculations are included in Appendix A.

ANALYSIS SUMMARY

Water Quantity

The project site is located within a FEMA Flood Zone X with a 0.2 percent annual chance flood hazard. Per the Palm Beach County Water Table Map, the water table elevation at the site is 6.50 NAVD. A pre.- vs. post.- analysis was conducted for the 100-year 3-day, 25-year 3-day and 10-year 1-day storm events. The following results were obtained from the analysis:

Table 2: Pre- vs. Post- Analysis of Peak Stages

Storm Event	Pre-Development	Post-Development
100 Year-3 Day	16.31	16.31
25 Year-3 Day	16.20	15.84
10 Year-1 Day	15.28	14.93

Based on the routing results above, the peak stages for the design storm events are less in the post-development condition than in the pre-development condition. The proposed finished floor for the building is 17.00 NAVD which is higher than the 100-year 3-day storm event peak stage elevation. Detailed Calculations are included in Appendix A.

Conclusion

Water quality and water quantity are met by the proposed development. Based on the above, we request that the site be approved.

Appendix A

EXISTING DRAINAGE CALUCLATIONS



6300 NW 31st Avenue, Fort Lauderdale, FL 33309
Tel: 954-202-7000
Fax: 954-202-7070

Date: 8/21/2020
Project: RaceTrac - Delray Beach
Project No: F200063

Calculated By: JAL

Checked By: KB

EXISTING DRAINAGE CALCULATIONS

Design Criteria:

Water Table:

6.50 NAVD

FEMA Base Flood Elevation:

N/A NAVD (Zone X)

Proposed Acreages

Lake Areas (A_L):	0	sf	or	0.000	ac
Roof Areas (A_R):	13,801	sf	or	0.317	ac
Paved Areas (A_P):	41,899	sf	or	0.962	ac
Green Areas (A_G):	15,911	sf	or	0.365	ac
Total (A_T):	71,611	sf	or	1.644	ac

Compute Required Water Quality Volume (On-Site):

- 1) Provide at least 1 inch over the developed project:

$$\begin{aligned} V_{PRE} &= 1 \text{ inch} \times A_T \times 1 \text{ ft} / 12 \text{ inches} \\ &= 1 \times 1.644 / 12 \\ &= 0.14 \text{ ac-ft or } 1.68 \text{ ac-in} \end{aligned}$$

- 2) Provide 2.5" over % impervious area:

- a) Site Area for water quality pervious/impervious calculation:

$$\begin{aligned} A_S &= A_T - (A_L + A_R) \\ &= 1.644 - (0 + 0.317) \\ &= 1.33 \text{ ac of site area for water quality pervious/impervious} \end{aligned}$$

- b) Impervious area for water quality pervious/impervious calculation:

$$\begin{aligned} A_{IMP} &= A_S - A_G \\ &= 1.327 - 0.365 \\ &= 0.96 \text{ ac of impervious area for water quality pervious/impervious} \end{aligned}$$

- c) Percent of impervious for water quality calculation:

$$\begin{aligned} &= A_{IMP} / A_S \times 100\% \\ &= 0.962 / 1.327 \times 100\% \\ &= 72.5\% \text{ impervious} \end{aligned}$$

- d) For 2.5" times the percent impervious:

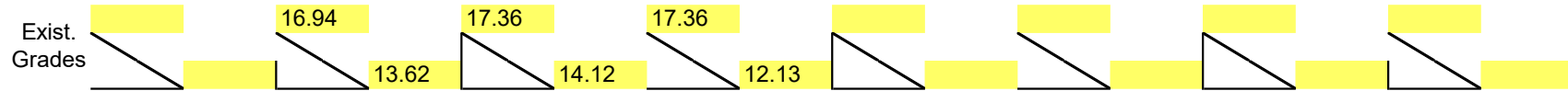
$$\begin{aligned} &= 2.5" \times \% \text{ impervious area} \\ &= 2.5 \times 0.725 \\ &= 1.81 \text{ inches to be treated} \end{aligned}$$

- e) Compute volume required volume for quality detention

$$\begin{aligned} V_{PRE} &= \text{inches to be treated} \times (A_T - A_L) \\ &= 1.81 \times (1.644 - 0) \times 1 \text{ foot} / 12 \text{ inches} \\ &= 0.25 \text{ ac-ft or } 2.98 \text{ ac-in} \end{aligned}$$

- 3) Since the 2.98 ac-in is greater than the 1.68 ac-in computed for the first inch of runoff the volume of 2.98 ac-in controls.

EXISTING ON-SITE STAGE/STORAGE AREA CALCULATION - NAVD



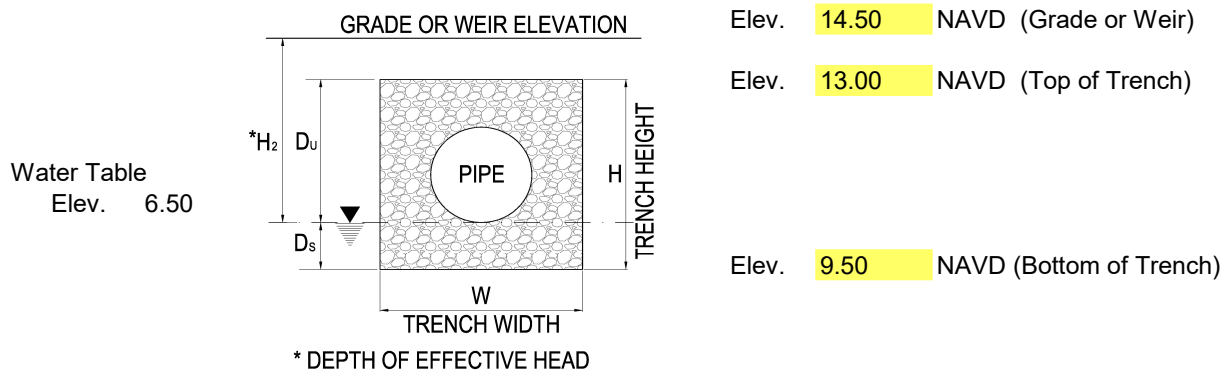
Stage	Building Area FFE 16.97 Area 0.317 (ac.-ft.)	Pavement Area Area 0.842 (ac.-ft.)	Concrete/ Curb Area Area 0.120 (ac.-ft.)	Landscape Area Area 0.365 (ac.-ft.)	Area (ac.-ft.)	Area (ac.-ft.)	Area (ac.-ft.)	Area (ac.-ft.)	Total Site Area 1.644
6.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.03
13.50	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.07
14.00	0.00	0.02	0.00	0.12	0.00	0.00	0.00	0.00	0.14
14.50	0.00	0.10	0.00	0.20	0.00	0.00	0.00	0.00	0.30
15.00	0.00	0.24	0.01	0.29	0.00	0.00	0.00	0.00	0.54
15.50	0.00	0.45	0.04	0.40	0.00	0.00	0.00	0.00	0.88
16.00	0.00	0.72	0.07	0.52	0.00	0.00	0.00	0.00	1.31
16.50	0.00	1.05	0.10	0.67	0.00	0.00	0.00	0.00	1.82
17.00	0.00	1.45	0.15	0.83	0.00	0.00	0.00	0.00	2.43
17.50	0.00	1.87	0.21	1.01	0.00	0.00	0.00	0.00	3.09

Exfiltration Trench Calculations (NAVD)

K-Value:

Test Hole #	(cfs/ft ² /ft hd)
EX-1	1.00E-04
K _{AVG}	1.00E-04

Trench:



K =	1.00E-04	cfs/ft ² - ft head
H ₂ =	8.00	ft
W =	6.00	ft
D _u =	6.50	ft
D _s =	0.00	ft
H = D _u + D _s =	6.50	ft

1) Existing Trench Volume Provided:

L = 130 feet

$$V = L \times (K(H_2W + 2H_2D_u - D_u^2 + 2H_2D_s) + (1.39 \times 10^{-4})Wdu)$$

V = 2.13 ac-in or 0.18 ac-ft



Date: 8/21/2020
 Project: RaceTrac - Delray Beach
 Project No: F200063

DESIGN CRITERIA

Water Table:	6.50	NAVD
FEMA Base Flood Elevation:	N/A	NAVD (Zone X)

STAGE STORAGE AREA SUMMARY CALCULATION

Stage (NGVD)	Site Storage (ac.-ft.)	Exfiltration Trench Storage (ac.-ft.)	Total Storage On-Site (ac.-ft.)
6.50	0.00	0.00	0.00
7.00	0.00	0.01	0.01
7.50	0.00	0.03	0.03
8.00	0.00	0.04	0.04
8.50	0.00	0.05	0.05
9.00	0.00	0.07	0.07
9.50	0.00	0.08	0.08
10.00	0.00	0.10	0.10
10.50	0.00	0.11	0.11
11.00	0.00	0.12	0.12
11.50	0.00	0.14	0.14
12.00	0.00	0.15	0.15
12.50	0.00	0.16	0.17
13.00	0.03	0.18	0.20
13.50	0.07	0.18	0.24
14.00	0.14	0.18	0.32
14.50	0.30	0.18	0.47
15.00	0.54	0.18	0.72
15.50	0.88	0.18	1.06
16.00	1.31	0.18	1.48
16.50	1.82	0.18	2.00

Soil Storage

Land Use Summary:

	Acres	Percent
Lake Areas (A_L):	0.000	0.0%
Roof Areas (A_R):	0.317	19.3%
Paved Areas (A_P):	0.962	58.5%
Green Areas (A_G):	0.365	22.2%
Total (A_T):	1.644	100.0%

Average Pervious Grade (Elev.): 14.75
Depth to Water Table: 8.25 ft
Soil Storage at Average Depth (S_S): 8.18 inches

Compacted Soil Storage per
SFWMD Vol. IV Page C-III-1

Depth to Water Table (feet)	Compacted Water Storage (inches)
1	0.45
2	1.88
3	4.95
4	8.18

Weighted S value:

$$= S_S \times \% \text{ Pervious}$$

$$= 8.18 \times 0.222$$

$$= \boxed{1.82 \text{ inches}}$$

Rainfalls (Obtained from Exiting LWDD Permit No. 00-1471D.03)

From Figure C-9, 100-Year Storm 3-day = 18.4 inches

From Figure C-4, 25-Year Storm 3-day= 14.3 inches

From Figure C-3, 10-Year Storm 1-day= 8.5 inches

From Figure C-3, 5-Year Storm 1-day= 7.3 inches

Results from Flood Routings

100 Year - 3 Day Storm Routing

$$\begin{aligned}\text{Runoff (Q)} &= (P - 0.2S)^2 / (P + 0.8S) \\ &= ((18.4) - 0.2(1.82))^2 / ((18.4) + 0.8(1.82)) \\ &= 13.14 \text{ inches of total runoff}\end{aligned}$$

$$\begin{aligned}\text{Runoff Volume} &= Q * \text{Project Area} \\ &= 13.14 \times 1.644 = 21.60 \text{ acre-inches} = 1.80 \text{ acre-ft.}\end{aligned}$$

Maximum Stage for 100-Year 3-Day Storm (no discharge) 16.31 NGVD

25 Year - 3 Day Storm Routing

$$\begin{aligned}\text{Runoff (Q)} &= (P - 0.2S)^2 / (P + 0.8S) \\ &= (14.3 - 0.2(1.82))^2 / (14.3 + 0.8(1.82)) \\ &= 12.33 \text{ inches of total runoff}\end{aligned}$$

$$\begin{aligned}\text{Runoff Volume} &= Q * \text{Project Area} \\ &= 12.33 \times 1.644 = 20.26 \text{ acre-inches} = 1.69 \text{ acre-ft.}\end{aligned}$$

Maximum Stage for 25-Year 3-Day Storm (no discharge) 16.20 NGVD

10 Year - 1 Day Storm Routing

$$\begin{aligned}\text{Runoff (Q)} &= (P - 0.2S)^2 / (P + 0.8S) \\ &= (8.5 - 0.2(1.82))^2 / (8.5 + 0.8(1.82)) \\ &= 6.65 \text{ inches of total runoff}\end{aligned}$$

$$\begin{aligned}\text{Runoff Volume} &= Q * \text{Project Area} \\ &= 6.65 \times 1.644 = 10.93 \text{ acre-inches} = 0.91 \text{ acre-ft.}\end{aligned}$$

Maximum Stage for 10-Year 1-Day Storm (no discharge) 15.28 NGVD

PROPOSED DRAINAGE CALCULATIONS



6300 NW 31st Avenue, Fort Lauderdale, FL 33309
Tel: 954-202-7000
Fax: 954-202-7070

Date: 8/21/2020
Project: RaceTrac - Delray Beach
Project No: F200063

Calculated By: JAL

Checked By: KB

PROPOSED DRAINAGE CALCULATIONS

Design Criteria:

Water Table:

6.50 NAVD

FEMA Base Flood Elevation:

N/A NAVD (Zone X)

Proposed Acreages

Lake Areas (A_L):	0	sf	or	0.000	ac
Roof Areas (A_R):	5,411	sf	or	0.124	ac
Paved Areas (A_P):	45,227	sf	or	1.038	ac
Green Areas (A_G):	20,973	sf	or	0.481	ac
Total (A_T):	71,611	sf	or	1.644	ac

Compute Required Water Quality Volume:

- 1) Provide at least 1 inch over the developed project:

$$\begin{aligned} V_{PRE} &= 1 \text{ inch} \times A_T \times 1 \text{ ft} / 12 \text{ inches} \\ &= 1 \times 1.644 / 12 \\ &= 0.14 \text{ ac-ft or } 1.68 \text{ ac-in} \end{aligned}$$

- 2) Provide 2.5" over % impervious area:

- a) Site Area for water quality pervious/impervious calculation:

$$\begin{aligned} A_S &= A_T - (A_L + A_R) \\ &= 1.644 - (0 + 0.124) \\ &= 1.52 \text{ ac of site area for water quality pervious/impervious} \end{aligned}$$

- b) Impervious area for water quality pervious/impervious calculation:

$$\begin{aligned} A_{IMP} &= A_S - A_G \\ &= 1.52 - 0.481 \\ &= 1.04 \text{ ac of impervious area for water quality pervious/impervious} \end{aligned}$$

- c) Percent of impervious for water quality calculation:

$$\begin{aligned} &= A_{IMP} / A_S \times 100\% \\ &= 1.039 / 1.52 \times 100\% \\ &= 68.4\% \text{ impervious} \end{aligned}$$

- d) For 2.5" times the percent impervious:

$$\begin{aligned} &= 2.5" \times \% \text{ impervious area} \\ &= 2.5 \times 0.684 \\ &= 1.71 \text{ inches to be treated} \end{aligned}$$

- e) Compute volume required volume for quality detention

$$\begin{aligned} V_{PRE} &= \text{inches to be treated} \times (A_T - A_L) \\ &= 1.71 \times (1.644 - 0) \times 1 \text{ foot} / 12 \text{ inches} \\ &= 0.23 \text{ ac-ft or } 2.81 \text{ ac-in} \end{aligned}$$

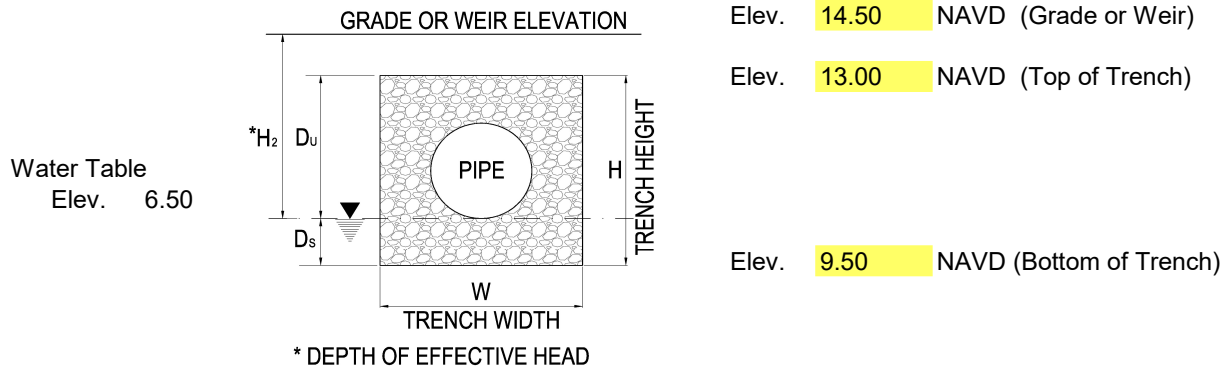
- 3) Since the 2.81 ac-in is greater than the 1.68 ac-in computed for the first inch of runoff the volume of 2.81 ac-in controls.

Existing Exfiltration Trench to Remain (NAVD)

K-Value:

Test Hole #	(cfs/ft ² /ft hd)
EX-1	1.00E-04
K _{AVG}	1.00E-04

Trench:



K =	1.00E-04	cfs/ft ² - ft head
H ₂ =	8.00	ft
W =	6.00	ft
D _u =	6.50	ft
D _s =	0.00	ft
H = D _u + D _s =	6.50	ft

1) Existing Trench Volume Provided:

L = 15 feet

$$V = L \times (K(H_2W + 2H_2D_u - D_u^2 + 2H_2D_s) + (1.39 \times 10^{-4})Wd_u)$$

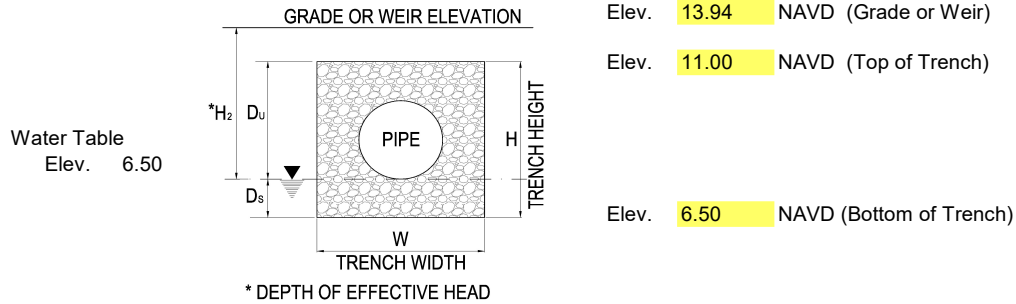
V = 0.25 ac-in or 0.02 ac-ft

Exfiltration Trench Calculations (NAVD)

K-Value:

Test Hole #	(cfs/ft ² /ft hd)
EX-1	1.00E-04
K _{AVG}	1.00E-04

Trench:



$K = 1.00E-04$ cfs/ft² - ft head
 $H_2 = 7.44$ ft
 $W = 6.00$ ft
 $D_u = 4.50$ ft
 $D_s = 0.00$ ft
 $H = D_u + D_s = 4.50$ ft

1) Trench Length for Water Quality:

$V = 2.81$ ac-in or 0.23 ac-ft

$$L = \frac{V}{K(H_2W + 2H_2D_u - D_u^2 + 2H_2D_s) + (1.39 \times 10^{-4})W D_u}$$
 $L = 218$ feet

2) Existing Trench Volume to Remain:

$L = 15$ feet
 $V = 0.25$ ac-in or 0.02 ac-ft

3) Computed Provided Trench Length/Volume:

$L = 230$ feet

$$V = L \times (K(H_2W + 2H_2D_u - D_u^2 + 2H_2D_s) + (1.39 \times 10^{-4})W D_u)$$
 $V = 2.96$ ac-in or 0.25 ac-ft

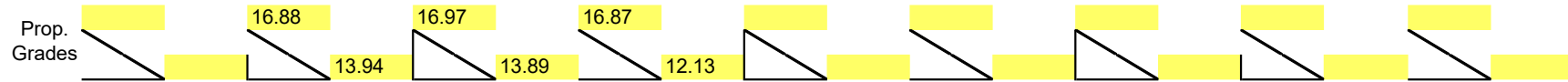
4) Total Trench Volume Provided (Existing to Remain + Proposed):

$L = 15 + 230 = 245$ feet
 $V = 0.02 + 0.25 = 0.27$ ac.-ft.



Date: 8/21/2020
 Project: RaceTrac - Delray Beach
 Project No: F200063

ON-SITE STAGE/STORAGE AREA CALCULATION - NAVD



Stage	Building Area FFE 17.00 Area 0.124 (ac.-ft.)	Pavement Area Area 0.958 (ac.-ft.)	Concrete/ Curb Area Area 0.080 (ac.-ft.)	Landscape Area Area 0.481 (ac.-ft.)	Area (ac.-ft.)	Area (ac.-ft.)	Area (ac.-ft.)	Area 0.000 (ac.-ft.)	Area (ac.-ft.)	Total Site Area 1.643
6.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.50	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
13.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.04
13.50	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.10
14.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.18
14.50	0.00	0.05	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.34
15.00	0.00	0.18	0.02	0.42	0.00	0.00	0.00	0.00	0.00	0.62
15.50	0.00	0.40	0.03	0.58	0.00	0.00	0.00	0.00	0.00	1.01
16.00	0.00	0.69	0.06	0.76	0.00	0.00	0.00	0.00	0.00	1.51
16.50	0.00	1.07	0.09	0.97	0.00	0.00	0.00	0.00	0.00	2.13
17.00	0.00	1.52	0.13	1.20	0.00	0.00	0.00	0.00	0.00	2.85
17.50	0.00	2.00	0.17	1.44	0.00	0.00	0.00	0.00	0.00	3.61



Date: 8/21/2020
Project: RaceTrac - Delray Beach
Project No: F200063

DESIGN CRITERIA

Water Table: 6.50 NAVD
FEMA Base Flood Elevation: N/A NAVD (Zone X)

STAGE\STORAGE AREA SUMMARY CALCULATION

Stage (NAVD)	Site Storage (ac.-ft.)	Exfiltration Trench Storage (ac.-ft.)	Total Storage On-Site (ac.-ft.)
6.50	0.00	0.00	0.00
7.00	0.00	0.03	0.03
7.50	0.00	0.06	0.06
8.00	0.00	0.09	0.09
8.50	0.00	0.12	0.12
9.00	0.00	0.15	0.15
9.50	0.00	0.18	0.18
10.00	0.00	0.21	0.21
10.50	0.00	0.24	0.24
11.00	0.00	0.27	0.27
11.50	0.00	0.27	0.27
12.00	0.00	0.27	0.27
12.50	0.01	0.27	0.27
13.00	0.04	0.27	0.31
13.50	0.10	0.27	0.36
14.00	0.18	0.27	0.45
14.50	0.34	0.27	0.61
15.00	0.62	0.27	0.88
15.50	1.01	0.27	1.27
16.00	1.51	0.27	1.78
16.50	2.13	0.27	2.39
17.00	2.85	0.27	3.12

Soil Storage

Land Use Summary:

	Acres	Percent
Lake Areas (A_L):	0.000	0.0%
Roof Areas (A_R):	0.124	7.5%
Paved Areas (A_P):	1.038	63.2%
Green Areas (A_G):	0.481	29.3%
Total (A_T):	1.643	100.0%

Compacted Soil Storage per
SFWMD Vol. IV Page C-III-1

Depth to Water Table (feet)	Compacted Water Storage (inches)
1	0.45
2	1.88
3	4.95
4	8.18

Average Pervious Grade (Elev.): 14.50
Depth to Water Table: 8.00 ft
Soil Storage at Average Depth (S_S): 8.18 inches

Weighted S value:

$$= S_S \times \% \text{ Pervious}$$

$$= 8.18 \times 0.293$$

$$= \boxed{2.40 \text{ inches}}$$

Rainfalls (Obtained from Exiting LWDD Permit No. 00-1471D.03)

From Figure C-9, 100-Year Storm 3-day = 18.4 inches

From Figure C-8, 25-Year Storm 3-day = 14.3 inches

From Figure C-3, 10-Year Storm 1-day = 8.5 inches

From Figure C-3, 5-Year Storm 1-day = 7.3 inches

Results from Flood Routings

100 Year - 3 Day Storm Routing

$$\begin{aligned} \text{Runoff (Q)} &= (P - 0.2S)^2 / (P + 0.8S) \\ &= ((18.4) - 0.2(2.4))^2 / ((18.4) + 0.8(2.4)) \\ &= 15.80 \text{ inches of total runoff} \end{aligned}$$

$$\begin{aligned} \text{Runoff Volume} &= Q * \text{Project Area} \\ &= 15.8 \times 1.643 = 25.97 \text{ acre-inches} = 2.16 \text{ acre-ft.} \end{aligned}$$

Maximum Stage for 100-Year 3-Day Storm (no discharge) 16.31 NAVD

25 Year - 3 Day Storm Routing

$$\begin{aligned} \text{Runoff (Q)} &= (P - 0.2S)^2 / (P + 0.8S) \\ &= (14.3 - 0.2(2.4))^2 / (14.3 + 0.8(2.4)) \\ &= 11.78 \text{ inches of total runoff} \end{aligned}$$

$$\begin{aligned} \text{Runoff Volume} &= Q * \text{Project Area} \\ &= 11.78 \times 1.643 = 19.35 \text{ acre-inches} = 1.61 \text{ acre-ft.} \end{aligned}$$

Maximum Stage for 25-Year 3-Day Storm (no discharge) 15.84 NAVD

10 Year - 1 Day Storm Routing

$$\begin{aligned} \text{Runoff (Q)} &= (P - 0.2S)^2 / (P + 0.8S) \\ &= (8.5 - 0.2(2.4))^2 / (8.5 + 0.8(2.4)) \\ &= 6.17 \text{ inches of total runoff} \end{aligned}$$

$$\begin{aligned} \text{Runoff Volume} &= Q * \text{Project Area} \\ &= 6.17 \times 1.643 = 10.14 \text{ acre-inches} = 0.85 \text{ acre-ft.} \end{aligned}$$

Maximum Stage for 10-Year 1-Day Storm (no discharge) 14.93 NAVD

Flood Criteria

1. 8" above the average crown on road	0.67	NGVD
2. At or above FEMA Baseflood Elevation	N/A	(Zone x)
3. 8" above Flood Criteria Contour Map Elevation	7.17	NGVD
4. Below Exist. 100 Year-3 Day Peak Stage Elevation	16.31	NGVD

Finished Floor Elevation Criteria

1. Post-development 100 Year-3 Day Peak Stage Elevation	16.31	NAVD
2. FEMA Baseflood Elevation	N/A	(Zone X)
2. Existing Finished Floor Elevation	16.97	NAVD
2. Existing LWDD Permit (No. 00-1471D.03) 100-Year Peak Stage	15.84	NAVD
Proposed Finished Floor	17.00	NAVD

Appendix B

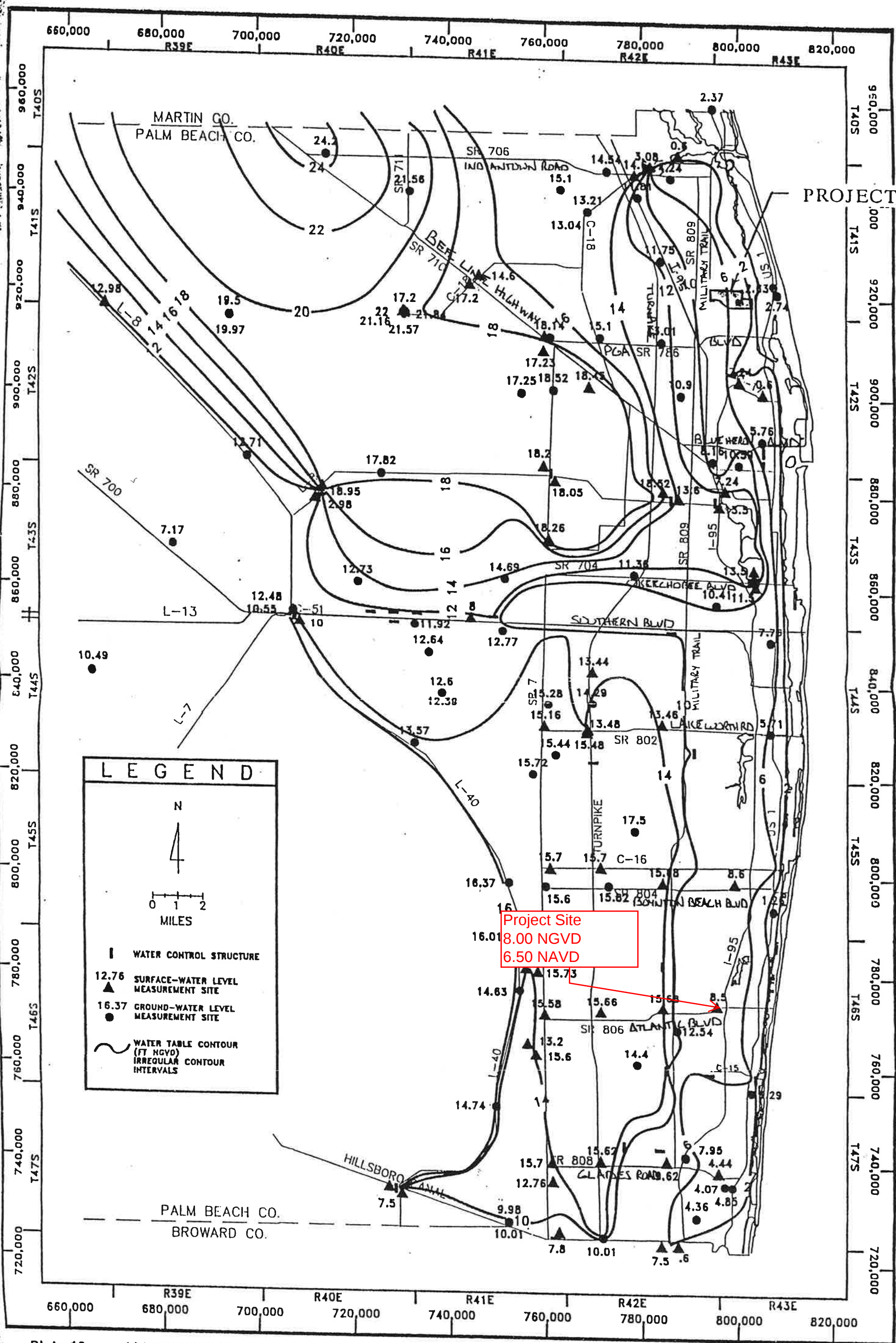
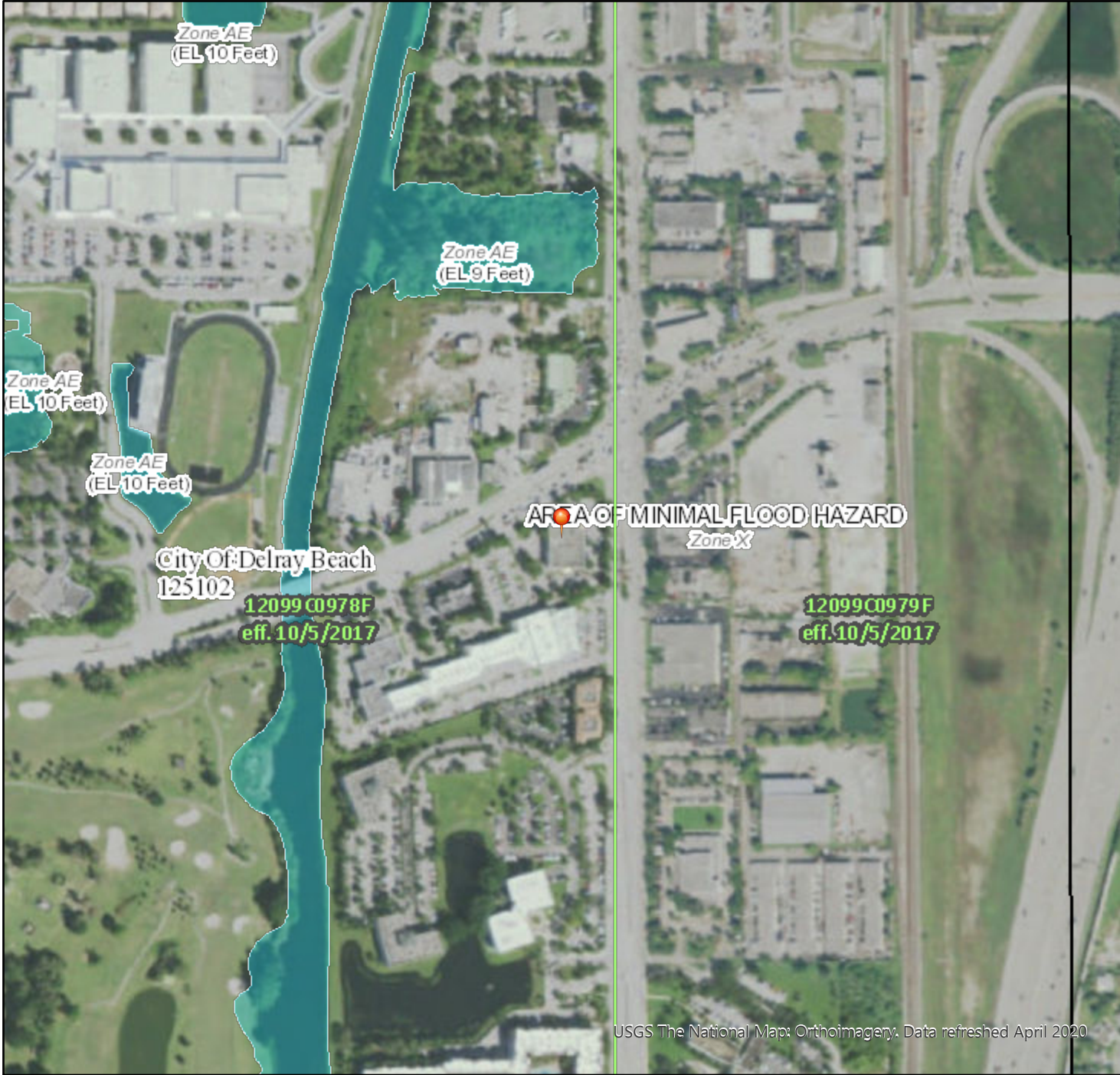


Plate 19 ALTITUDE OF WATER TABLE, SURFICIAL AQUIFER - EASTERN PALM BEACH COUNTY FLORIDA, NOVEMBER 9-14, 1984 (MODIFIED FROM MILLER 1985)

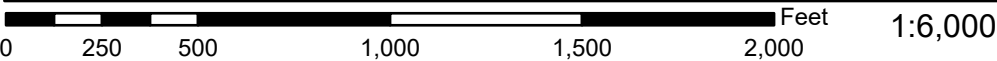
National Flood Hazard Layer FIRMette



80°5'58"W 26°27'51"N



USGS The National Map: Orthoimagery. Data refreshed April 2020



80°5'21"W 26°27'19"N

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/4/2020 at 11:15 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

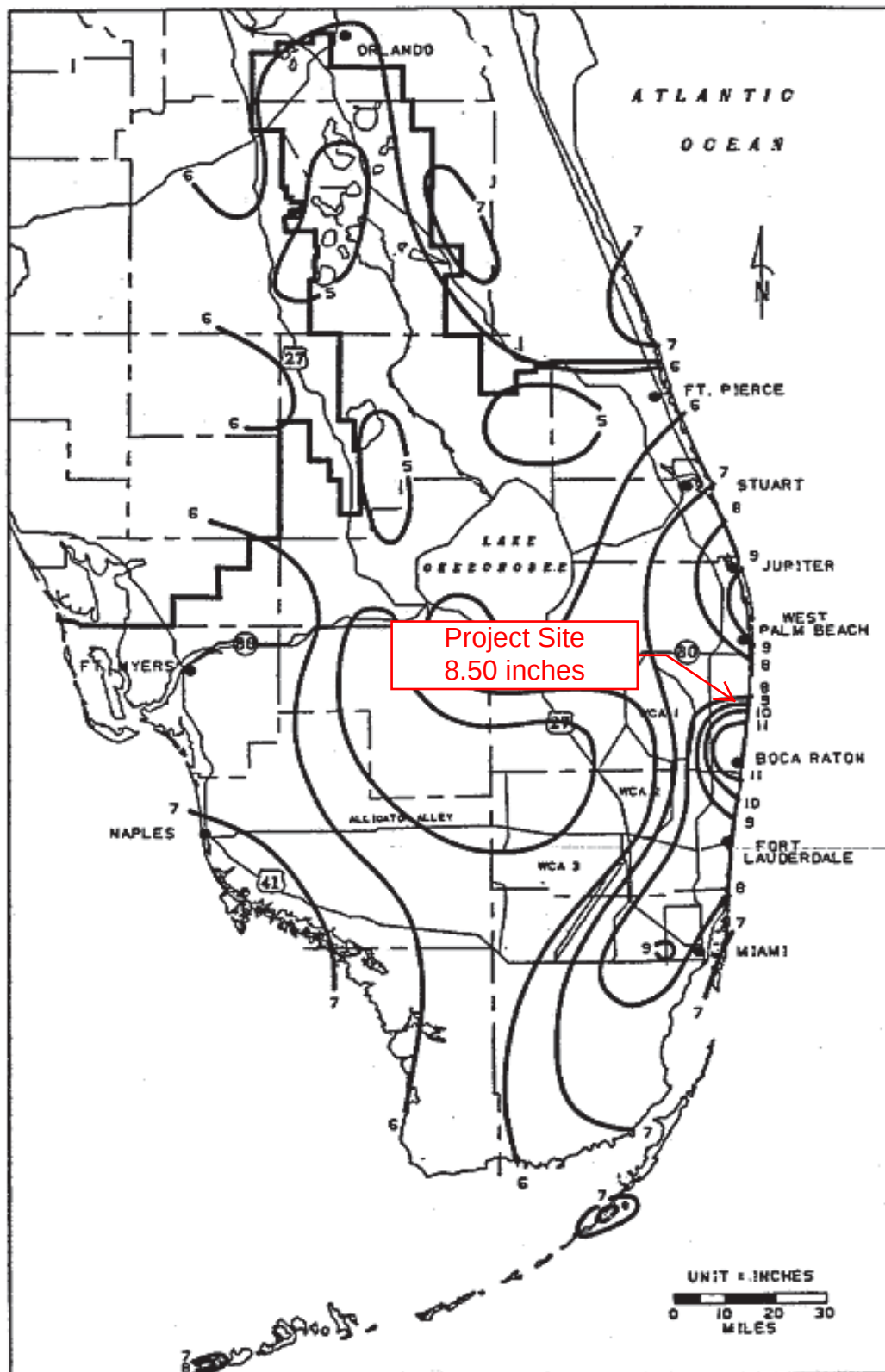


FIGURE C-4. 1-DAY RAINFALL: 10-YEAR RETURN PERIOD

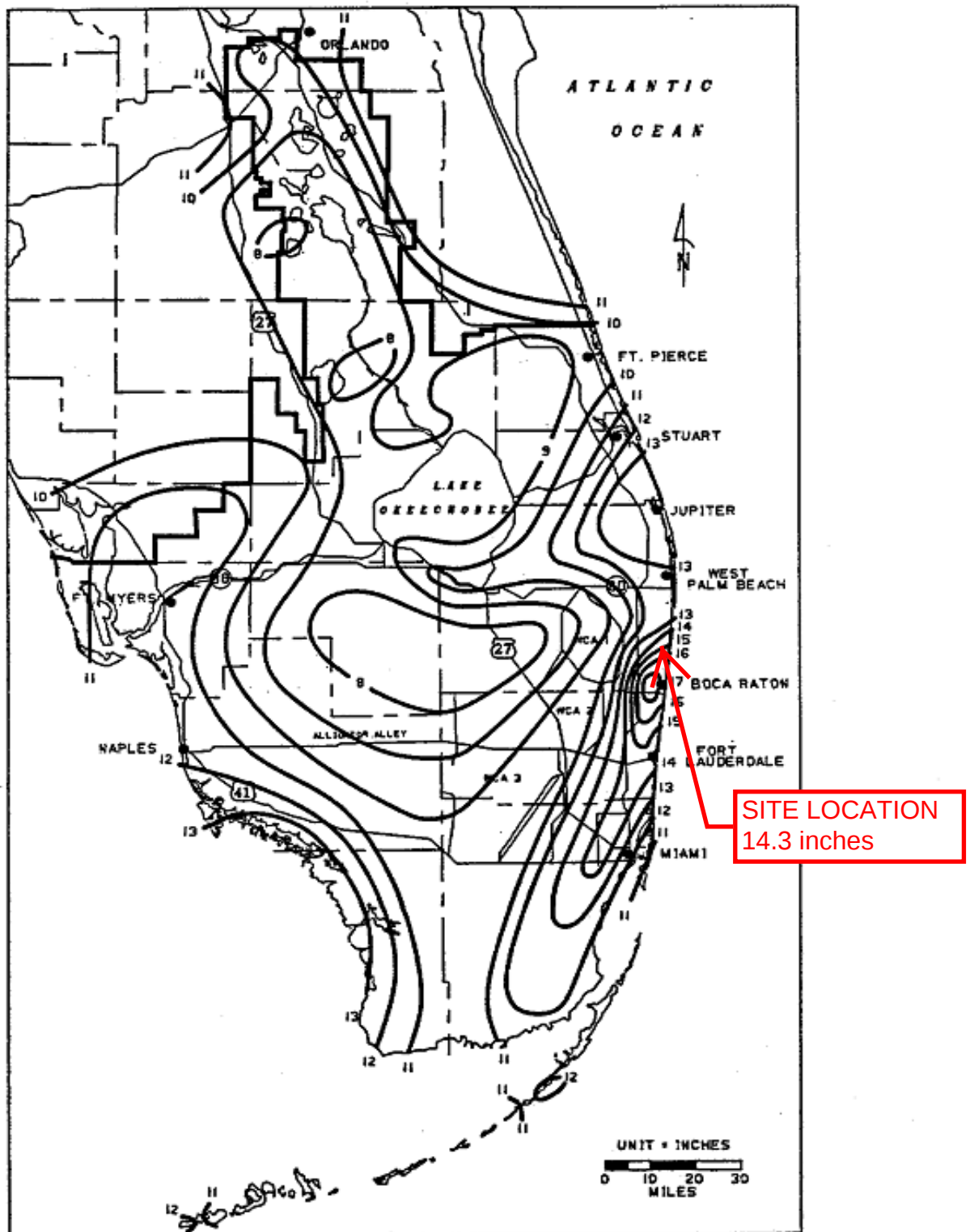


FIGURE C-8. 3-DAY RAINFALL: 25-YEAR RETURN PERIOD

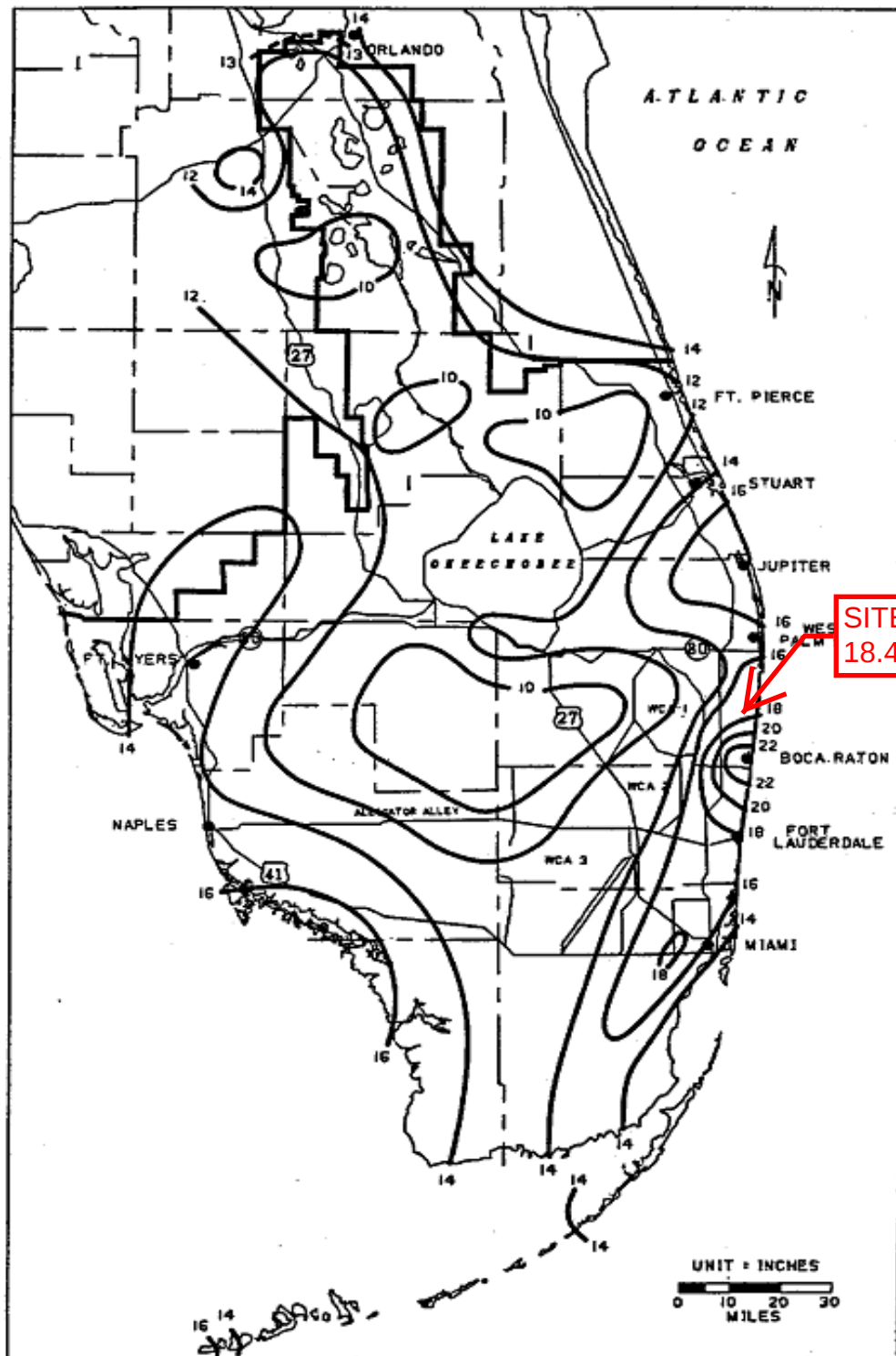


FIGURE C-9. 3-DAY RAINFALL: 100-YEAR RETURN PERIOD