

OKEECHOBEE COUNTY SOUTHWEST AREA DRAINAGE IMPROVEMENTS

ASSESSMENT OF WATER QUALITY TREATED AREAS FOR COMMERCIAL/INSTITUTIONAL PARCELS

COMMERCIAL/INSTITUTIONAL PARCELS		Past Approvals		Water Quality Provided					
Parcel Name	Parcel Acreage	SFWMD, COUNTY, BOTH, NONE	SFWMD OR COUNTY PETITION NUMBERS	Y/N	Comments				
Wolff Road (SW 28th Street)	4.01	NONE		N	Road contains deep roadside ditches				
SW 3rd Terrace	2.02	BOTH	47-00073	Y	Overlapped by Northlake Business Park Permit				
SW 3rd Avenue	3.29	NONE		N					
Durrance Road (SW 32nd Street)	2.74	NONE		N					
Osceola Middle School	40.00	SFWMD	47-00426	Y	Required water quality was 2.46 ac-ft and provided was 13.30 ac-ft.				
New Endeavor South Elementary	14.30	SFWMD	47-00500	Y	14.3 acres permitted by SF, remaining 5.7 existing; Required water quality was 1.2 ac-ft and provided was 5.6 ac-ft.				
Church of the Nazarene	10.00	NONE		N					
Moesching/Costopolus	0.44	SFWMD	47-00279, P1990-012	Y					
Pizza Hut	0.88	NONE		N					
Harbor Federal Bank	1.00	COUNTY	P2006-015	Y					
Lachapell - Vacant Lot	3.00	NONE		N/A					
Quality A/C	0.44	SFWMD	47-00073	Y	Overlapped by Northlake Business Park Permit				
KJ Investments	0.44	SFWMD	47-00073	Y	Overlapped by Northlake Business Park Permit				
Tri-County Supply	0.95	SFWMD	47-00073	Y	Overlapped by Northlake Business Park Permit				

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Parcel Name	Parcel Acreage	SFWMD, COUNTY, BOTH, NONE	SFWMD OR COUNTY PETITION NUMBERS	Y/N	Comments				
Galaxy WH	2.36	BOTH	47-00073	Y	Redesigned to be Stand alone system				
Holiday Inn Exp.	4.34	BOTH	47-00640-P, P2004-010DP	Y					
Dawling Watford - Vacant	1.67	NONE		N/A	Vacant lot; can only discharge to SR 441; Hence, not considered				
Okee. Motor Co. - Vacant	0.99	NONE		N/A	Vacant lot w/same owner to the south; can be part of adjacent site in future				
Okee. Motor Co.	4.24	COUNTY	P1996-017	Y					
Mims	3.08	NONE		N					
Dr. Stephens	0.44	SFWMD	47-00073	Y	Overlapped by Northlake Business Park Permit				
Conlon - Vacant	0.44	SFWMD	47-00073	Y	Although undeveloped, it is overlapped by Northlake Business Park Permit				
Watford Lot 9 - Vacant	0.43	NONE		N/A					
Waford Alley -Vacant	0.14	NONE		N/A					
Watford Lot 7-8 -Vacant	0.48	NONE		N/A					
Croslyn Elect & Drive Thru	0.57	BOTH	47-00073, P2005-013	Y	Overlapped by Northlake Business Park Permit				
Vest Office Bldg	0.43	SFWMD	47-00073	Y	Overlapped by Northlake Business Park Permit				
Seder	1.30	SFWMD	47-00073	Y	Overlapped by Northlake Business Park Permit				
Bass	0.43	SFWMD	47-00073	Y	Overlapped by Northlake Business Park Permit				

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Parcel Name	Parcel Acreage	SFWMD, COUNTY, BOTH, NONE	SFWMD OR COUNTY PETITION NUMBERS	Y/N	Comments				
Bank of America	1.79	NONE		N					
Platt Prof Bdlg	1.00	COUNTY	P1998-015-DP	Y					
CF Physical Therapy	1.00	COUNTY	P2000-018	Y					
CF Physical Therapy - Vacant	1.98	NONE		N/A					
Kelly - Vacant 2C	1.00	NONE		N/A					
Kelly - Vacant 2G	1.45	NONE		N/A					
Oakview Baptist Church	33.62	BOTH	47-00528-P, P2003-005	Y					
TOTAL COMMERCIAL/INSTITUTIONAL AREA:	106.70	ACRES							
TOTAL AREAS WITH PERMITTED WATER QUALITY TREATMENT SYSTEMS:	69.76	ACRES	OR	41.04%	OF HMGP AREA TREATED				
VACANT LOTS:	11.58	ACRES	Development of these parcels will require on-site treatment prior to offsite dischar						
ESTIMATED DEVELOPED AREA IN NEED OF WATER QUALITY TREATMENT	170	-	69.76	-	11.58	=	88.65	ACRES	

LAND USE WATER QUALITY TREATMENT CALCULATIONS

SITE:	SOUTHWEST HMGP DRAINAGE AREA IMPROVEMENTS												
The total drainage area for the HMGP area is about 170 acres in size. About 69.8 acres of that area contains either a SFWMD permit, a County land development approval, or both. Either approval would entail the assumption that water quality treatment has been provided. Portions of the HMGP area are undeveloped as the following calculations illustrate. This information was obtained from SFWMD and County permit records.													
TOTAL HMGP AREA	170.00	ACRES											
AREA UNDER SFWMD OR COUNTY APPROVALS	69.76	ACRES											
VACANT LAND WITHIN THE HMGP AREA	11.58	ACRES	Development of these parcels will require on-site treatment prior to offsite discharge.										
EXCLUDING ROW SHOWN IN THE FOLLOWING TABLES:	11.85	ACRES											
NET DRAINAGE AREA FOR WATER QUALITY TREATMENT ASSESSMENT	76.81	ACRES	This remaining area is located within the limits of Basin 14 of the Okeechobee County Stormwater Master Plan where land use assumptions were made for modeling purposes and will be utilized in the same manner to remain consistent.										
Area Calculations for Remaining portion:													
Total Site	76.81	Acres											
Bldg/sw	7.68	Acres	10%	Per the Master Plan									
Pvmt/DW	15.36	Acres	20%	Per the Master Plan									
Pervious	53.76	Acres											
County Roadway Area Calculations:	SW 28 ST	SW 32 ST		SW 3 AVE		SW 3 TERR		Total Roadway Drainage Area			Total Area for Water Quality Treatmnet		
Total Site	3.43	Acres	3.03	Acres	3.29	Acres	2.09	Acres	11.85	Acres		88.65	Acres
Bldg/sw	0	Acres	0	Acres	0	Acres	0.00	Acres	0.00	Acres		7.68	Acres
Pvmt/DW	2.27	Acres	1.21	Acres	1.13	Acres	0.72	Acres	5.33	Acres		20.69	Acres
Pervious	1.16	Acres	1.82	Acres	2.16	Acres	1.37	Acres	6.52	Acres		60.28	Acres

LAND USE WATER QUALITY TREATMENT CALCULATIONS

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LAND USE WATER QUALITY TREATMENT CALCULATIONS

[illegible]

LAND USE WATER QUALITY TREATMENT CALCULATIONS

AREA:			88.7	AC.									
TOTAL TREATMENT @ DESIGN FLOW:			14	CFS									
RUNOFF TREATED @ DESIGN FLOW:			0.16	IN.									
VOLUME TREATED @ DESIGN FLOW @ 90% REMOVAL EFFICIENCY:			1.05	AC-FT									
(1) WATER QUALITY TREATMENT SUMMARIES:					(2) WATER QUALITY TREATMENT SUMMARIES:								
REGULATORY TREATMENT VOLUME FOR ROAD AREA:						REGULATORY TREATMENT VOLUME FOR HMGP AREA:							
	1.11	AC-FT					7.39	AC-FT					
ROADSIDE SWALE =	1.67	AC-FT				ROADSIDE SWALE =	1.67	AC-FT					
DOWNSTREAM DEFENDER	1.05	AC-FT	@ 90% removal with lower			DOWNSTREAM DEFENDER	1.05	AC-FT	@ 70% removal with higher discharge rate				
TOTAL TREATMENT PROVIDED =	2.72	AC-FT				TOTAL TREATMENT PROVIDED =	2.72	AC-FT					
PERCENT ROAD VOLUME TREATED:	(1)	<u>2.72</u> 1.11	X	100%	=	245%							
PERCENT HMGP VOLUME TREATED:	(2)	<u>2.72</u> 7.39	X	100%	=	37%							
CONCLUSION:	BASICALLY,	37%	TREATMENT OF REGULATORY VOLUME CAN BE EXPECTED.										
AS THE CALCULATIONS SHOW, THE PROJECT CANNOT PROVIDE TREATMENT OF THE REGULATORY VOLUME. HOWEVER, AN IMPROVEMENT IS ACHIEVED. DUE TO EXISTING CONDITIONS AND THE PROPOSED COLLECTION SYSTEM SOME AREAS WILL RECEIVE MORE TREATMENT THAN OTHERS. THIS IS TYPICAL OF STORMWATER RETROFIT PROJECTS. ALSO, FLOW THROUGH THE DD OCCURS THROUGHOUT THE STORMS AS HYDRAULIC CONDITIIONS ALLOW TO PROVIDE TREATMENT.													
IN ADDITION, OKEECHOBEE COUNTY HAS EMBARKED ON A FEASIBILITY STUDY FOR A FUTURE SYSTEM THAT WOULD SERVE THE SW 7TH AVENUE DRAINAGE AREA SYSTEM FOR WATER QUALITY AND WATER QUANTITY PURPOSES. THIS STUDY INCLUDES AN ALTERNATE WHICH CONSIDERS THE ACQUISITION OF LAND (33 ACRES) FOR THE CONSTRUCTION OF A STORMWATER FACILITY TO SERVE THIS HMGP AND OTHER CONTRIBUTING DRAINAGE AREAS, I.E., AREAS THAT HAVE/WILL HAVE A DISCHARGE TO SW 7 AVE DITCH. THIS STORMWATER FACILITY IS BEING STUDIED IN ADDITION TO THE PROPOSED SFWMD LEMKIN CREEK STORMWATER FACILITY.													

ASSUMED LAND USE BASED ON AERIAL MAP VISUAL OBSERVATION

% LAND USES WERE ASSUMED BASED VISUAL
OBSERVATION VIA PROPERTY APPRAISER AERIALS
OR BY PERMIT DATA

TIME OF CONCENTRATION FOR EACH
BASIN FOR MUNICIPAL-RESIDENTIAL;
SOME T_c WERE MANUALLY ENTERED
FROM EXISTING PERMIT RECORDS

ASSUME TERRAIN SLOPE
NO GREATER THAN 0.1%
SUCH THAT AVG
OVERLAND V = 35'/MIN

AREA	BASIN	ACREAGE	%LAKE/CANAL/ WETLAND	%BLDG	%PAVMT	%LAWN	ASSUMED RUNOFF LENGTH (FT)	35 OVERLAND V = 35'/MIN
BASIN'S WITHIN THE VICINITY OF SOUTHWEST DRAINAGE HMGP AREA	BASIN 14	203.00	1%	10%	20%	69%	2300	65.7
	BASIN 16A	4.27	0%	0%	60%	40%	500	14.3
	BASIN 16B	34.60	0%	9%	35%	56%	700	20.0
	BASIN 16C	10.87	0%	40%	45%	15%	700	20.0
	BASIN 16D	3.10	0%	1%	10%	89%	500	14.3
	BASIN 16E	6.66	0%	5%	21%	74%	500	14.3
	BASIN 16F	1.43	0%	20%	40%	40%	200	5.7
	BASIN 16G	4.37	0%	13%	55%	32%	550	15.7
	BASIN 17B	53.17	39%	20%	14%	27%	500	14.3
	BASIN 18	332.00	3%	20%	20%	57%	2600	74.3

SOIL STORAGE CALCULATIONS

Adjusted soil storage calculation per SFWMD Volume IV, Page E-2 (4/5/01)

Depth to W.T (ft)	Flatwoods Storage (in) (NAS)	CN	75% reduction for compaction (DAS)	Adj. CN
1	0.60	94	0.450	96
2	2.50	80	1.875	84
3	5.40	65	4.050	71
4	9.00	53	6.850	59
5	12.00	45	9.000	53
6	14.00	42	10.500	49

BASIN NO.	ACREAGE	PERVIOUS ACREAGE	AVG SITE GRADE (FT-NGVD)	~WATER TABLE (FT-NGVD)	DWT (FT)	DAS (IN)	S (IN)	CN
BASIN 14	203.00	140.07	21.00	18	3.00	4.05	2.79	78.2
BASIN 16A	4.27	1.71	20.00	15	5.00	9.00	3.60	73.5
BASIN 16B	34.60	19.49	19.00	15	4.00	6.85	3.86	72.2
BASIN 16C	10.87	1.63	19.00	15	4.00	6.85	1.03	90.7
BASIN 16D	3.10	2.76	19.00	15	4.00	6.85	6.10	62.1
BASIN 16E	6.66	4.96	21.00	17	4.00	6.85	5.10	66.2
BASIN 16F	1.43	0.57	21.00	17	4.00	6.85	2.74	78.5
BASIN 16G	4.37	1.40	20.00	16	4.00	6.85	2.19	82.0
BASIN 17B	53.17	14.36	18.00	15	3.00	4.05	1.09	90.1
BASIN 18	332.00	189.70	18.00	15	3.00	4.05	2.31	81.2
TOTALS & AVERAGES	653.5	376.65	19.60	17.5	3.80	6.29	3.63	73.4

**STAGE STORAGE CALCULATIONS
BASIN 14**

Basin Grading Assumptions:

Total Project Area = 203 ac.
Control Elevation = 18 ft-NGVD

Assumptions:

Land Use	%	Area (ac)	Stores Linearly	
			From	To
Roads, Pads & Parking	20%	40.60	19.0	25.0
Building Area	10%	20.30		
Lake/Canal Area	1%	2.03	18.0	vertically
Green Area	69%	140.07	19.0	25.0

Stage (ft-NGVD)	Area (ac)				Storage (ac-ft)
	Roads	Detention	Green	Total	
18.0	0.00	2.03	0.00	2.03	0.00
18.5	0.00	2.03	0.00	2.03	1.02
19.0	0.00	2.03	0.00	2.03	2.03
19.5	3.38	2.03	11.67	17.09	6.81
20.0	6.77	2.03	23.35	32.14	19.12
20.5	10.15	2.03	35.02	47.20	38.95
21.0	13.53	2.03	46.69	62.25	66.31
21.3	15.23	2.03	52.53	69.78	82.82
21.5	16.92	2.03	58.36	77.31	101.20
21.8	18.61	2.03	64.20	84.84	121.47
22.0	20.30	2.03	70.04	92.37	143.62
22.5	23.68	2.03	81.71	107.42	193.57
23.0	27.07	2.03	93.38	122.48	251.04
23.5	30.45	2.03	105.05	137.53	316.05
24.0	33.83	2.03	116.73	152.59	388.58
24.5	37.22	2.03	128.40	167.64	468.63
25.0	40.60	2.03	140.07	182.70	556.22

THE FOLLOWING REUSLTS ARE THEORETICAL PEAK FLOOD STAGES WITH NO OFF-SITE DISCHARGE.

100 - YEAR,3-DAY RAINFALL = 10 inches	10 - YEAR,3-DAY RAINFALL = 7 inches
Soil Storage = S = 2.79 inches	Soil Storage = S = 2.79 inches

EXFILTRATION TRENCH VOLUME (XT Volun 0 AC-FT

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 7.3 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 4.5 inches
---	---

Net Runoff Volume = V = v x Project Area/12 -X' 123.2 ac-ft	Net Runoff Volume = V = v x Project Area/12 -XT \ 76.0 ac-ft
---	--

From Stage - Storage Table, Peak Stage = 21.77 ft_NGVD	From Stage - Storage Table, Peak Stage = 21.15 ft_NGVD
--	--

25 - YEAR, 3-DAY RAINFALL = 9 inches	5 - YEAR, 1-DAY RAINFALL = 4.5 inches
Soil Storage = S = 2.79 inches	Soil Storage = S = 2.79 inches

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 6.3 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 2.3 inches
---	---

Net Runoff Volume = V = v x Project Area/12 -X' 107.3 ac-ft	Net Runoff Volume = V = v x Project Area/12 -XT \ 39.0 ac-ft
---	--

From Stage - Storage Table, Peak Stage = 21.53 ft_NGVD	From Stage - Storage Table, Peak Stage = 20.42 ft_NGVD
--	--

**STAGE STORAGE CALCULATIONS
BASIN 16A**

Basin Grading Assumptions:

Total Project Area = 4.27 ac.
Control Elevation = 15 ft-NGVD

Assumptions:

Land Use	%	Area (ac)	Stores Linearly	
			From	To
Roads, Pads & Parking	60%	2.56	15.0	17.0
Building Area	0%	0.00		
Lake/Canal Area	0%	0.00	15.0	vertically
Green Area	40%	1.71	16.0	17.0

Stage (ft-NGVD)	Area (ac)				Storage (ac-ft)
	Roads	Detention	Green	Total	
15.0	0.00	0.00	0.00	0.00	0.00
15.5	0.64	0.00	0.00	0.64	0.16
16.0	1.28	0.00	0.00	1.28	0.64
16.5	1.92	0.00	0.85	2.78	1.65
17.0	2.56	0.00	1.71	4.27	3.42
17.5	2.56	0.00	1.71	4.27	5.55
18.0	2.56	0.00	1.71	4.27	7.69
18.3	2.56	0.00	1.71	4.27	8.75
18.5	2.56	0.00	1.71	4.27	9.82
18.8	2.56	0.00	1.71	4.27	10.89
19.0	2.56	0.00	1.71	4.27	11.96
19.5	2.56	0.00	1.71	4.27	14.09
20.0	2.56	0.00	1.71	4.27	16.23
20.5	2.56	0.00	1.71	4.27	18.36
21.0	2.56	0.00	1.71	4.27	20.50
21.5	2.56	0.00	1.71	4.27	22.63
22.0	2.56	0.00	1.71	4.27	24.77

THE FOLLOWING RESULTS ARE THEORETICAL PEAK FLOOD STAGES WITH NO OFF-SITE DISCHARGE.

100 - YEAR, 3-DAY RAINFALL = 10 inches	10 - YEAR, 3-DAY RAINFALL = 7 inches
Soil Storage = S = 3.60 inches	Soil Storage = S = 3.60 inches

EXFILTRATION TRENCH VOLUME (XT Volun) 0 AC-FT

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 6.7 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 4.0 inches
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Net Runoff Volume = $V = v \times \text{Project Area}/12$ -X' 2.4 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12$ -XT \ 1.4 ac-ft
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From Stage - Storage Table, Peak Stage = 16.76 ft_NGVD	From Stage - Storage Table, Peak Stage = 16.38 ft_NGVD
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25 - YEAR, 3-DAY RAINFALL = 9 inches	5 - YEAR, 1-DAY RAINFALL = 4.5 inches
Soil Storage = S = 3.60 inches	Soil Storage = S = 3.60 inches

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 5.8 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 1.9 inches
---	---

Net Runoff Volume = $V = v \times \text{Project Area}/12$ -X' 2.1 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12$ -XT \ 0.7 ac-ft
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From Stage - Storage Table, Peak Stage = 16.61 ft_NGVD	From Stage - Storage Table, Peak Stage = 16.02 ft_NGVD
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**STAGE STORAGE CALCULATIONS
BASIN 16B
OAKVIEW BAPTIST CHURCH**

Basin Grading Assumptions:

Total Project Area = 34.6 ac.
Control Elevation = 18 ft-NGVD

Assumptions:

Land Use	%	Area (ac)	Stores Linearly	
			From	To
Roads, Pads & Parking	35%	12.11	19.0	21.0
Building Area	9%	3.00		
Lake/Canal Area	0%	2.00	18.0	vertically
Green Area	56%	19.49	19.0	21.0

Stage (ft-NGVD)	Area (ac)				Storage (ac-ft)
	Roads	Detention	Green	Total	
18.0	0.00	2.00	0.00	2.00	0.00
18.5	0.00	2.00	0.00	2.00	1.00
19.0	0.00	2.00	0.00	2.00	2.00
19.5	3.03	2.00	4.87	9.90	4.98
20.0	6.06	2.00	9.75	17.80	11.90
20.5	9.08	2.00	14.62	25.70	22.78
21.0	12.11	2.00	19.49	33.60	37.60
21.3	12.11	2.00	19.49	33.60	46.00
21.5	12.11	2.00	19.49	33.60	54.40
21.8	12.11	2.00	19.49	33.60	62.80
22.0	12.11	2.00	19.49	33.60	71.20
22.5	12.11	2.00	19.49	33.60	88.00
23.0	12.11	2.00	19.49	33.60	104.80
23.5	12.11	2.00	19.49	33.60	121.60
24.0	12.11	2.00	19.49	33.60	138.40
24.5	12.11	2.00	19.49	33.60	155.20
25.0	12.11	2.00	19.49	33.60	172.00

THE FOLLOWING RESULTS ARE THEORETICAL PEAK FLOOD STAGES WITH NO OFF-SITE DISCHARGE.

100 - YEAR, 3-DAY RAINFALL = 10 inches	10 - YEAR, 3-DAY RAINFALL = 7 inches
Soil Storage = S = 3.86 inches	Soil Storage = S = 3.86 inches

EXFILTRATION TRENCH VOLUME (XT Volun) 0 AC-FT

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 6.5 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 3.8 inches
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Net Runoff Volume = $V = v \times \text{Project Area}/12 - X'$ 18.8 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12 - XT \setminus$ 11.1 ac-ft
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From Stage - Storage Table, Peak Stage = 20.32 ft_NGVD	From Stage - Storage Table, Peak Stage = 19.94 ft_NGVD
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25 - YEAR, 3-DAY RAINFALL = 9 inches	5 - YEAR, 1-DAY RAINFALL = 4.5 inches
Soil Storage = S = 3.86 inches	Soil Storage = S = 3.86 inches

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 5.6 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 1.8 inches
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Net Runoff Volume = $V = v \times \text{Project Area}/12 - X'$ 16.2 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12 - XT \setminus$ 5.3 ac-ft
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From Stage - Storage Table, Peak Stage = 20.20 ft_NGVD	From Stage - Storage Table, Peak Stage = 19.52 ft_NGVD
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**STAGE STORAGE CALCULATIONS
BASIN 16C
NORTH LAKE BUSINESS PARK**

Basin Grading Assumptions:

Total Project Area = 10.87 ac.
Control Elevation = 19 ft-NGVD

Assumptions:

Land Use	%	Area (ac)	Stores Linearly	
			From	To
Roads, Pads & Parking	45%	4.89	19.0	20.5
Building Area	40%	4.35		
Lake/Canal Area	0%	0.00	19.0	vertically
Green Area	15%	1.63	19.0	21.0

Stage (ft-NGVD)	Area (ac)				Storage (ac-ft)
	Roads	Detention	Green	Total	
19.0	0.00	0.00	0.00	0.00	0.00
19.5	1.63	0.00	0.41	2.04	0.51
20.0	3.26	0.00	0.82	4.08	2.04
20.5	4.89	0.00	1.22	6.11	4.59
21.0	4.89	0.00	1.63	6.52	7.74
21.5	4.89	0.00	1.63	6.52	11.01
22.0	4.89	0.00	1.63	6.52	14.27
22.3	4.89	0.00	1.63	6.52	15.90
22.5	4.89	0.00	1.63	6.52	17.53
22.8	4.89	0.00	1.63	6.52	19.16
23.0	4.89	0.00	1.63	6.52	20.79
23.5	4.89	0.00	1.63	6.52	24.05
24.0	4.89	0.00	1.63	6.52	27.31
24.5	4.89	0.00	1.63	6.52	30.57
25.0	4.89	0.00	1.63	6.52	33.83
25.5	4.89	0.00	1.63	6.52	37.09
26.0	4.89	0.00	1.63	6.52	40.35

THE FOLLOWING REUSLTS ARE THEORETICAL PEAK FLOOD STAGES WITH NO OFF-SITE DISCHARGE.

100 - YEAR,3-DAY RAINFALL = 10 inches	10 - YEAR,3-DAY RAINFALL = 7 inches
Soil Storage = S = 1.03 inches	Soil Storage = S = 1.03 inches

EXFILTRATION TRENCH VOLUME (XT Volun 0 AC-FT

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 8.9 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 5.9 inches
---	---

Net Runoff Volume = $V = v \times \text{Project Area}/12$ -X' 8.0 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12$ -XT \ 5.3 ac-ft
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From Stage - Storage Table, Peak Stage = 21.04 ft_NGVD	From Stage - Storage Table, Peak Stage = 20.62 ft_NGVD
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25 - YEAR, 3-DAY RAINFALL = 9 inches	5 - YEAR, 1-DAY RAINFALL = 4.5 inches
Soil Storage = S = 1.03 inches	Soil Storage = S = 1.03 inches

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 7.9 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 3.5 inches
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Net Runoff Volume = $V = v \times \text{Project Area}/12$ -X' 7.1 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12$ -XT \ 3.1 ac-ft
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From Stage - Storage Table, Peak Stage = 20.90 ft_NGVD	From Stage - Storage Table, Peak Stage = 20.22 ft_NGVD
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STAGE STORAGE CALCULATIONS
BASIN 16D
MIMS

Basin Grading Assumptions:

Total Project Area = 3.1 ac.
Control Elevation = 18 ft-NGVD

Assumptions:

Land Use	%	Area (ac)	Stores Linearly	
			From	To
Roads, Pads & Parking	10%	0.31	19.0	21.0
Building Area	1%	0.03		
Lake/Canal Area	0%	0.00	18.0	vertically
Green Area	89%	2.76	19.0	21.0

Stage (ft-NGVD)	Area (ac)				Storage (ac-ft)
	Roads	Detention	Green	Total	
18.0	0.00	0.00	0.00	0.00	0.00
18.5	0.00	0.00	0.00	0.00	0.00
19.0	0.00	0.00	0.00	0.00	0.00
19.5	0.08	0.00	0.69	0.77	0.19
20.0	0.16	0.00	1.38	1.53	0.77
20.5	0.23	0.00	2.07	2.30	1.73
21.0	0.31	0.00	2.76	3.07	3.07
21.3	0.31	0.00	2.76	3.07	3.84
21.5	0.31	0.00	2.76	3.07	4.60
21.8	0.31	0.00	2.76	3.07	5.37
22.0	0.31	0.00	2.76	3.07	6.14
22.5	0.31	0.00	2.76	3.07	7.67
23.0	0.31	0.00	2.76	3.07	9.21
23.5	0.31	0.00	2.76	3.07	10.74
24.0	0.31	0.00	2.76	3.07	12.28
24.5	0.31	0.00	2.76	3.07	13.81
25.0	0.31	0.00	2.76	3.07	15.35

THE FOLLOWING RESULTS ARE THEORETICAL PEAK FLOOD STAGES WITH NO OFF-SITE DISCHARGE.

100 - YEAR, 3-DAY RAINFALL = 10 inches	10 - YEAR, 3-DAY RAINFALL = 7 inches
Soil Storage = S = 6.10 inches	Soil Storage = S = 6.10 inches

EXFILTRATION TRENCH VOLUME (XT Volun) 0 AC-FT

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 5.2 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 2.8 inches
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Net Runoff Volume = $V = v \times \text{Project Area}/12 - X'$ 1.3 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12 - XT \setminus$ 0.7 ac-ft
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From Stage - Storage Table, Peak Stage = 20.30 ft-NGVD	From Stage - Storage Table, Peak Stage = 19.96 ft-NGVD
--	--

25 - YEAR, 3-DAY RAINFALL = 9 inches	5 - YEAR, 1-DAY RAINFALL = 4.5 inches
Soil Storage = S = 6.10 inches	Soil Storage = S = 6.10 inches

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 4.4 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 1.1 inches
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Net Runoff Volume = $V = v \times \text{Project Area}/12 - X'$ 1.1 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12 - XT \setminus$ 0.3 ac-ft
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From Stage - Storage Table, Peak Stage = 20.19 ft-NGVD	From Stage - Storage Table, Peak Stage = 19.59 ft-NGVD
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STAGE STORAGE CALCULATIONS

BASIN 16E

OKEECHOBEE MOTORS

(INCLUDING VACANT PARCEL OWNED BY SAME OWNER)

Basin Grading Assumptions:

Total Project Area = 6.66 ac.

Control Elevation = 17.5 ft-NGVD

Assumptions:

Land Use	%	Area (ac)	Stores Linearly	
			From	To
Roads, Pads & Parking	21%	1.37	20.0	22.5
Building Area	5%	0.33		
Lake/Canal Area	0%	0.51	18.5	vertically
Green Area	74%	4.96	18.5	22.0

Stage (ft-NGVD)	Area (ac)				Storage (ac-ft)
	Roads	Detention	Green	Total	
17.5	0.00	0.00	0.00	0.00	0.00
18.0	0.00	0.00	0.00	0.00	0.00
18.5	0.00	0.51	0.00	0.51	0.13
19.0	0.00	0.51	0.71	1.22	0.56
19.5	0.00	0.51	1.42	1.93	1.35
20.0	0.00	0.51	2.13	2.64	2.49
20.5	0.27	0.51	2.83	3.62	4.05
20.8	0.41	0.51	3.19	4.11	5.02
21.0	0.55	0.51	3.54	4.60	6.11
21.3	0.69	0.51	3.90	5.09	7.32
21.5	0.82	0.51	4.25	5.58	8.65
22.0	1.10	0.51	4.96	6.57	11.69
22.5	1.37	0.51	4.96	6.84	15.04
23.0	1.37	0.51	4.96	6.84	18.46
23.5	1.37	0.51	4.96	6.84	21.88
24.0	1.37	0.51	4.96	6.84	25.30
24.5	1.37	0.51	4.96	6.84	28.72

THE FOLLOWING REUSLTS ARE THEORETICAL PEAK FLOOD STAGES WITH NO OFF-SITE DISCHARGE.

100 - YEAR,3-DAY RAINFALL = 10 inches
Soil Storage = S = 5.10 inches

10 - YEAR,3-DAY RAINFALL = 7 inches
Soil Storage = S = 5.10 inches

EXFILTRATION TRENCH VOLUME (XT Volun 0 AC-FT

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 5.7 inches Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 3.2 inches

Net Runoff Volume = $V = v \times \text{Project Area}/12$ -X' 3.2 ac-ft Net Runoff Volume = $V = v \times \text{Project Area}/12$ -XT \ 1.8 ac-ft

From Stage - Storage Table, Peak Stage = 20.22 ft_NGVD From Stage - Storage Table, Peak Stage = 19.69 ft_NGVD

25 - YEAR, 3-DAY RAINFALL = 9 inches
Soil Storage = S = 5.10 inches

5 - YEAR, 1-DAY RAINFALL = 4.5 inches
Soil Storage = S = 5.10 inches

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 4.9 inches Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 1.4 inches

Net Runoff Volume = $V = v \times \text{Project Area}/12$ -X' 2.7 ac-ft Net Runoff Volume = $V = v \times \text{Project Area}/12$ -XT \ 0.8 ac-ft

From Stage - Storage Table, Peak Stage = 20.07 ft_NGVD From Stage - Storage Table, Peak Stage = 19.14 ft_NGVD

**STAGE STORAGE CALCULATIONS
BASIN 16F
HARBOUR FEDERAL**

Basin Grading Assumptions:

Total Project Area = 1.43 ac.
Control Elevation = 18 ft-NGVD

Assumptions:

Land Use	%	Area (ac)	Stores Linearly	
			From	To
Roads, Pads & Parking	40%	0.57	18.5	21.0
Building Area	20%	0.29		
Lake/Canal Area	0%	0.00	18.0	vertically
Green Area	40%	0.57	18.0	21.0

Stage (ft-NGVD)	Area (ac)				Storage (ac-ft)
	Roads	Detention	Green	Total	
18.0	0.00	0.00	0.00	0.00	0.00
18.5	0.00	0.00	0.10	0.10	0.02
19.0	0.11	0.00	0.19	0.31	0.12
19.5	0.23	0.00	0.29	0.51	0.33
20.0	0.34	0.00	0.38	0.72	0.64
20.5	0.46	0.00	0.48	0.93	1.05
21.0	0.57	0.00	0.57	1.14	1.57
21.3	0.57	0.00	0.57	1.14	1.86
21.5	0.57	0.00	0.57	1.14	2.15
21.8	0.57	0.00	0.57	1.14	2.43
22.0	0.57	0.00	0.57	1.14	2.72
22.5	0.57	0.00	0.57	1.14	3.29
23.0	0.57	0.00	0.57	1.14	3.86
23.5	0.57	0.00	0.57	1.14	4.43
24.0	0.57	0.00	0.57	1.14	5.01
24.5	0.57	0.00	0.57	1.14	5.58
25.0	0.57	0.00	0.57	1.14	6.15

THE FOLLOWING REUSLTS ARE THEORETICAL PEAK FLOOD STAGES WITH NO OFF-SITE DISCHARGE.

100 - YEAR,3-DAY RAINFALL = 10 inches	10 - YEAR,3-DAY RAINFALL = 7 inches
Soil Storage = S = 2.74 inches	Soil Storage = S = 2.74 inches

EXFILTRATION TRENCH VOLUME (XT Volun 0 AC-FT

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 7.3 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 4.5 inches
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Net Runoff Volume = V = v x Project Area/12 -X' 0.9 ac-ft	Net Runoff Volume = V = v x Project Area/12 -XT \ 0.5 ac-ft
---	---

From Stage - Storage Table, Peak Stage = 20.28 ft_NGVD	From Stage - Storage Table, Peak Stage = 19.84 ft_NGVD
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25 - YEAR, 3-DAY RAINFALL = 9 inches	5 - YEAR, 1-DAY RAINFALL = 4.5 inches
Soil Storage = S = 2.74 inches	Soil Storage = S = 2.74 inches

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 6.4 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 2.3 inches
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Net Runoff Volume = V = v x Project Area/12 -X' 0.8 ac-ft	Net Runoff Volume = V = v x Project Area/12 -XT \ 0.3 ac-ft
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From Stage - Storage Table, Peak Stage = 20.15 ft_NGVD	From Stage - Storage Table, Peak Stage = 19.38 ft_NGVD
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**STAGE STORAGE CALCULATIONS
BASIN 16G
HOLIDAY INN**

Basin Grading Assumptions:

Total Project Area = 4.37 ac.
Control Elevation = 18 ft-NGVD

Assumptions:

Land Use	%	Area (ac)	Stores Linearly	
			From	To
Roads, Pads & Parking	55%	2.39	20.6	22.0
Building Area	13%	0.58		
Lake/Canal Area	0%	0.14	18.3	vertically
Green Area	32%	1.40	18.3	23.0

Stage (ft-NGVD)	Area (ac)				Storage (ac-ft)
	Roads	Detention	Green	Total	
18.0	0.00	0.00	0.00	0.00	0.00
18.5	0.00	0.14	0.06	0.20	0.05
19.0	0.00	0.14	0.21	0.35	0.19
19.5	0.00	0.14	0.36	0.50	0.40
20.0	0.00	0.14	0.51	0.65	0.68
20.5	0.00	0.14	0.66	0.80	1.04
21.0	0.68	0.14	0.80	1.63	1.65
21.3	1.11	0.14	0.88	2.13	2.12
21.5	1.54	0.14	0.95	2.63	2.71
21.8	1.96	0.14	1.03	3.13	3.43
22.0	2.39	0.14	1.10	3.63	4.28
22.5	2.39	0.14	1.25	3.78	6.13
23.0	2.39	0.14	1.40	3.93	8.06
23.5	2.39	0.14	1.40	3.93	10.03
24.0	2.39	0.14	1.40	3.93	11.99
24.5	2.39	0.14	1.40	3.93	13.96
25.0	2.39	0.14	1.40	3.93	15.92

THE FOLLOWING REUSLTS ARE THEORETICAL PEAK FLOOD STAGES WITH NO OFF-SITE DISCHARGE.

100 - YEAR,3-DAY RAINFALL = 10 inches	10 - YEAR,3-DAY RAINFALL = 7 inches
Soil Storage = S = 2.19 inches	Soil Storage = S = 2.19 inches

EXFILTRATION TRENCH VOLUME (XT Volun 0 AC-FT

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 7.8 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 4.9 inches
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Net Runoff Volume = V = v x Project Area/12 -X' 2.8 ac-ft	Net Runoff Volume = V = v x Project Area/12 -XT \ 1.8 ac-ft
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From Stage - Storage Table, Peak Stage = 21.54 ft_NGVD	From Stage - Storage Table, Peak Stage = 21.07 ft_NGVD
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25 - YEAR, 3-DAY RAINFALL = 9 inches	5 - YEAR, 1-DAY RAINFALL = 4.5 inches
Soil Storage = S = 2.19 inches	Soil Storage = S = 2.19 inches

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 6.8 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 2.6 inches
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Net Runoff Volume = V = v x Project Area/12 -X' 2.5 ac-ft	Net Runoff Volume = V = v x Project Area/12 -XT \ 1.0 ac-ft
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From Stage - Storage Table, Peak Stage = 21.32 ft_NGVD	From Stage - Storage Table, Peak Stage = 20.38 ft_NGVD
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**STAGE STORAGE CALCULATIONS
BASIN 17B**

Basin Grading Assumptions:

Total Project Area = 53.17 ac.
Control Elevation = 15 ft-NGVD

Assumptions:

Land Use	%	Area (ac)	Stores Linearly	
			From	To
Roads, Pads & Parking	14%	7.44	17.0	19.0
Building Area	20%	10.63		
Lake/Canal Area	39%	20.74	15.0	vertically
Green Area	27%	14.36	15.0	19.0

Stage (ft-NGVD)	Area (ac)				Storage (ac-ft)
	Roads	Detention	Green	Total	
15.0	0.00	20.74	0.00	20.74	0.00
15.5	0.00	20.74	1.79	22.53	10.82
16.0	0.00	20.74	3.59	24.33	22.53
16.5	0.00	20.74	5.38	26.12	35.14
17.0	0.00	20.74	7.18	27.91	48.65
17.5	1.86	20.74	8.97	31.57	63.52
18.0	3.72	20.74	10.77	35.23	80.22
18.3	4.65	20.74	11.66	37.05	89.25
18.5	5.58	20.74	12.56	38.88	98.75
18.8	6.51	20.74	13.46	40.71	108.70
19.0	7.44	20.74	14.36	42.54	119.10
19.5	7.44	20.74	14.36	42.54	140.37
20.0	7.44	20.74	14.36	42.54	161.64
20.5	7.44	20.74	14.36	42.54	182.90
21.0	7.44	20.74	14.36	42.54	204.17
21.5	7.44	20.74	14.36	42.54	225.44
22.0	7.44	20.74	14.36	42.54	246.71

THE FOLLOWING RESULTS ARE THEORETICAL PEAK FLOOD STAGES WITH NO OFF-SITE DISCHARGE.

100 - YEAR, 3-DAY RAINFALL = 10 inches	10 - YEAR, 3-DAY RAINFALL = 7 inches
Soil Storage = S = 1.09 inches	Soil Storage = S = 1.09 inches

EXFILTRATION TRENCH VOLUME (XT Volun) 0 AC-FT

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 8.8 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 5.8 inches
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Net Runoff Volume = $V = v \times \text{Project Area}/12 - X'$ 39.0 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12 - XT \setminus$ 25.9 ac-ft
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From Stage - Storage Table, Peak Stage = 16.64 ft_NGVD	From Stage - Storage Table, Peak Stage = 16.13 ft_NGVD
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25 - YEAR, 3-DAY RAINFALL = 9 inches	5 - YEAR, 1-DAY RAINFALL = 4.5 inches
Soil Storage = S = 1.09 inches	Soil Storage = S = 1.09 inches

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 7.8 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 3.4 inches
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Net Runoff Volume = $V = v \times \text{Project Area}/12 - X'$ 34.6 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12 - XT \setminus$ 15.1 ac-ft
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From Stage - Storage Table, Peak Stage = 16.48 ft_NGVD	From Stage - Storage Table, Peak Stage = 15.68 ft_NGVD
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**STAGE STORAGE CALCULATIONS
BASIN 18**

Basin Grading Assumptions:

Total Project Area = 332.00 ac.
Control Elevation = 14 ft-NGVD

Assumptions:

Land Use	%	Area (ac)	Stores Linearly	
			From	To
Roads, Pads & Parking	20%	66.40	15.0	19.0
Building Area	20%	66.40		
Lake/Canal Area	3%	9.50	14.0	vertically
Green Area	57%	189.70	14.0	19.0

Stage (ft-NGVD)	Area (ac)				Storage (ac-ft)
	Roads	Detention	Green	Total	
14.0	0.00	9.50	0.00	9.50	0.00
14.5	0.00	9.50	18.97	28.47	9.49
15.0	0.00	9.50	37.94	47.44	28.47
15.5	8.30	9.50	56.91	74.71	59.01
16.0	16.60	9.50	75.88	101.98	103.18
16.5	24.90	9.50	94.85	129.25	160.99
17.0	33.20	9.50	113.82	156.52	232.43
17.3	37.35	9.50	123.31	170.16	273.26
17.5	41.50	9.50	132.79	183.79	317.51
17.8	45.65	9.50	142.28	197.43	365.16
18.0	49.80	9.50	151.76	211.06	416.22
18.5	58.10	9.50	170.73	238.33	528.57
19.0	66.40	9.50	189.70	265.60	654.55
19.5	66.40	9.50	189.70	265.60	787.35
20.0	66.40	9.50	189.70	265.60	920.15
20.5	66.40	9.50	189.70	265.60	1052.95
21.0	66.40	9.50	189.70	265.60	1185.75

THE FOLLOWING REUSLTS ARE THEORETICAL PEAK FLOOD STAGES WITH NO OFF-SITE DISCHARGE.

100 - YEAR,3-DAY RAINFALL = 10 inches	10 - YEAR,3-DAY RAINFALL = 7 inches
Soil Storage = S = 2.31 inches	Soil Storage = S = 2.31 inches

EXFILTRATION TRENCH VOLUME (XT Volun 0 AC-FT

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 7.7 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 4.8 inches
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Net Runoff Volume = $V = v \times \text{Project Area}/12 - X'$ 212.3 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12 - XT \setminus$ 133.6 ac-ft
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From Stage - Storage Table, Peak Stage = 16.86 ft_NGVD	From Stage - Storage Table, Peak Stage = 16.26 ft_NGVD
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25 - YEAR, 3-DAY RAINFALL = 9 inches	5 - YEAR, 1-DAY RAINFALL = 4.5 inches
Soil Storage = S = 2.31 inches	Soil Storage = S = 2.31 inches

Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 6.7 inches	Runoff Depth = $v = \frac{(P-.2S)^2}{(P+.8S)}$ = 2.6 inches
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Net Runoff Volume = $V = v \times \text{Project Area}/12 - X'$ 185.8 ac-ft	Net Runoff Volume = $V = v \times \text{Project Area}/12 - XT \setminus$ 71.0 ac-ft
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From Stage - Storage Table, Peak Stage = 16.64 ft_NGVD	From Stage - Storage Table, Peak Stage = 15.64 ft_NGVD
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