

Elkcam Circle Warehouse

Project Location:

850 E Elkcam Circle,
Marco Island, Florida 34145

DRAINAGE CALCULATIONS

Date: 03/26/24

Prepared by:



Andres Boral Digitally signed by Andres Boral
Date: 2024.03.28 10:58:23 -04'00'

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Project Background

The proposed project is located within the City of Marco Island, encompassing +/- 0.40 acres at the corner of E Elkcam Circle and Windward Drive. Currently, the property is fully developed, having an asphalt pavement parking area which conveys runoff directly into the roadside swale along E Elkcam Drive with no pre-treatment or surface water management system. The roadside swale flows south to an inlet along Windward Drive that discharges west to the Gulf of Mexico. The project proposes a new building along with associated parking and a dry detention storm water management system.

This property contains no wetlands of any kind.

Proposed Site Area Breakdown

LAND USE TABLE (PROPOSED)

BUILDING	7,128 SF	0.16 AC	40.82%
CONCRETE	455 SF	0.01 AC	2.61%
PERVIOUS PAVER	3,315 SF	0.08 AC	18.98%
DRY DETENTION	1,924 SF	0.04 AC	11.02%
OPEN SPACE	4,641 SF	0.11 AC	26.58%
TOTAL	17,463 SF	0.40 AC	100.00%

Pre-development Discharge

The 3-Day 25-Year design storm in the project area is 12.50 inches. Based on the Santa Barbara Unit Hydrograph, the maximum hourly rate of rainfall during this storm is 6 in/hr. A "C" factor of 0.8 will be used for pre-development. Based upon these figures and utilizing the rational formula:

$$Q = CiA$$

C = 0.8 (Light Industrial Area- Asphaltic)

i = 6 in.

A = 0.40 Acres

Q = (0.8) x 6.0 in. x 0.40 Ac.

Q (pre-development) = **1.92 c.f.s.**

Design Storms

Based upon the design storm maps as found in the E.R.P. Information Manual, the design storms for the project are as follows:

1-Day, 5-Year: 5.5 in.

3-Day, 25-Year: 12.0 in.

3-Day, 100-Year: 16.0 in.

Control Elevation

The proposed control elevation for this project is 2.70' N.A.V.D. based on the following:

1. Wet season water table for project located on 921 Windward Drive is 2.60' N.A.V.D. Project is within ±0.10 miles of subject site. The elevation of the roadside swale along Windward Drive where the runoff is being directed is at elevation 2.60' N.A.V.D.

Water Quality

1. First inch of run-off:

$$1 \text{ in.} \times 17,463 \text{ S.F.} \times 1 \text{ ft.} / 12 \text{ in.} = 1,455 \text{ C.F.}$$

2. 2.5 in. times percent imperviousness:

- a. 17,463 S.F. – 7,128 S.F. (Roof) = 10,335 S.F. of site area for water quality

- b. $10,335 \text{ S.F.} - 6,565 \text{ S.F. (Green Area)} = 3,770 \text{ S.F. of impervious area}$
- c. $3,770 \text{ S.F.} / 10,335 \text{ S.F.} = 36.48\% \text{ impervious for water quality}$
- d. $2.5 \text{ in.} \times 0.3648 = 0.91 \text{ inches to be treated}$
- e. $0.91 \text{ in.} \times 17,463 \text{ S.F.} \times 1 \text{ ft.} / 12 \text{ in} = 1,327 \text{ C.F.}$

1,327 C.F. is less than 1,455 C.F. Therefore, 1,455 C.F. controls water quality.

Since all the proposed retention areas are dry retention areas, a 0.25% reduction factor will be applied to the water quality volume requirement.

Therefore: $1,455 \text{ CF} \times .75 = 1,091.3 \text{ CF Required}$

Per the City of Marco Island, 150% water quality shall be provided.

Therefore: $1,091.3 \times 1.5 = 1,637 \text{ CF}$

1,637 C.F. (0.038 Ac.-Ft.) Required for Water Quality provided below elevation +/- 4.30' N.A.V.D.

Please refer to attached stage storage table. Per linear interpolation, .038 Ac-Ft is provided at 4.30' NAVD.

Water Quantity (Flood Attenuation)

Dry Detention/Retention Bottom

There is 0.044 ac. of dry detention/retention bottom area with an average bottom elevation of 3.70' N.A.V.D. proposed. Storage over the dry detention/retention area will be vertical starting at elevation 3.70' N.A.V.D.

Dry Detention/Retention Slopes

There is 0.042 ac. of dry detention/retention bank area from 3.70' to 5.40' N.A.V.D. proposed. Storage over the dry detention/retention area will be linear starting at elevation 3.70' to elevation 5.40' and vertical above elevation 5.40' N.A.V.D.

Site Storage

There is 0.065 ac of site storage area proposed in this development. Storage over this area will be linear from elevation 4.90' to elevation 5.40' N.A.V.D.

Storage over Paved Parking

There is 0.076 ac of site storage proposed in this development. Storage over this area will be linear from elevation 4.00' to elevation 5.78' N.A.V.D.

Concrete Sidewalk and Dumpster Pad

There is 0.044 ac of site storage proposed in this development. Storage over this area will be linear from elevation 4.20' to elevation 5.70' N.A.V.D.

Please see the attached Stage/Storage Chart for further information.

Soil Storage

The proposed control elevation for this project is 2.7' N.A.V.D.

The estimated wet season water table is 2.60' N.A.V.D. It is assumed that the wet season water table is no greater than the roadside swale invert elevation of 2.60' NAVD as there are edge of pavement elevations along Windward Drive as low as 3.0' NAVD.

The average grade over the pervious area is: 4.34' N.A.V.D.

The average depth to the water table is: 4.70 ft. – 2.60 ft. = 2.10 ft.

From the Soil Storage Chart in the E.R.P. Information Manual, Compacted Normal Typical Sandy, 2.90 in. of soil storage under pervious areas is available.

2.90 in. x 9,880 S.F. x 1 ft. / 12 in. = 2,388 C.F. over pervious areas

2,388 C.F. / 17,463 S.F. x 12 in. / 1 ft. = 1.64 in. of Soil Storage Over the Entire Site

Design of the Project Outfall Control Structure

The proposed outfall control structure for the project was designed using the Cascade 2001, Version 1.0 flood routing program. A three (3) inch diameter bleeder will be utilized with the invert of the bleeder placed at 2.70' N.A.V.D.

After several iterations using Cascade 2001, Version 1.0, it was determined that this control structure yields a maximum discharge of **0.32 c.f.s.** with the minimum 3" diameter bleeder at the 3-Day, 25-Year design storm. Please see the attached hydrograph detailing these results.

The maximum stage attained during the 3-Day, 25-Year design storm is elevation 4.60' N.A.V.D. The minimum proposed perimeter berm elevation is 5.40' N.A.V.D., and the proposed grate elevation of the control structure is 5.00' N.A.V.D., allowing for unlimited discharge over the 3-Day, 25-Year maximum design flood stage.

Minimum Building Finish Floor Elevation

Based upon State of Florida regulations, the minimum building finish floor elevation must be the greater of the maximum flood stage during the 3-Day, 100-Year design storm or the F.E.M.A. minimum finish floor elevation within the flood zone that the structure is located.

The project lies in a F.E.M.A. Flood Zone "AE-8". The proposed building will be flood proofed to 1' above that elevation to a minimum of 9' N.A.V.D. The proposed finished floor elevation is 5.8' NAVD.

Using Cascade 2001, Version 1.0, the flood stage for the 3-Day, 100-Year design storm is elevation 5.04' N.A.V.D. Please see the attached hydrograph detailing these results.

Therefore, the minimum building finish floor elevation within this development shall be elevation 5.04' N.A.V.D. to accommodate the water management criteria and flood protection measures. The actual proposed finished floor elevation is 5.80' N.A.V.D.

Minimum Road Crown and Parking Elevation

Based upon the City of Marco Island guidelines, the minimum crown elevation of all roads and parking lots within the project shall be set at or above the maximum flood stage during the 1-Day, 5-Year design storm. Using Cascade 2001, Version 1.0, the maximum flood stage during the above-mentioned design storm is at elevation 3.94' N.A.V.D.

WINDWARD WAREHOUSES

Execution Date: 03/25/24
Engineer's Name: GM
Job No: 23-164

Computation Type Stage-Storage

Starting Stage 2.50
Ending Stage 6.00
Stage Increment 0.50

Name	DRY DETENTION BOTTOM	DRY DETENTION SLOPES	SITE	PERVIOUS PAVERS PARKING	18" STORM PIPE	35% VOIDS IN STONES UNDER PAVERS	CONCRETE SIDEWALK AND DUMPSTER
Area	0.044	0.042	0.065	0.076	0.00	0.00	0.010
Start Elev	3.70	3.70	4.90	4.00	0.00	0.00	4.20
End Elev		5.40	5.40	5.78	0.00	0.00	5.70

Stage Feet	Vert Storage	Linear Storage	Linear Storage	Linear Storage	Vert Storage	Vert Storage	Linear Storage	Total Storage
NGVD	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft	Ac-ft
2.50	0.00	0.00	0.00	0.00	0.0095	0.00	0.00	0.01
3.00	0.00	0.00	0.00	0.00	0.0095	0.00	0.00	0.01
3.50	0.00	0.00	0.00	0.00	0.0095	0.00	0.00	0.01
4.00	0.01	0.00	0.00	0.00	0.0095	0.040	0.00	0.06
4.50	0.04	0.01	0.00	0.01	0.0095	0.040	0.00	0.10
5.00	0.06	0.02	0.00	0.02	0.0095	0.040	0.00	0.15
5.50	0.08	0.04	0.02	0.05	0.0095	0.040	0.01	0.25
6.00	0.10	0.06	0.06	0.08	0.0095	0.040	0.01	0.36

Project Name: ELKCAM CIR WAREHOUSE
 Reviewer: CITY OF MARCO ISLAND
 Project Number: 23-164

Period Begin: Jan 01, 2000;0000 hr End: Jan 16, 2000;0000 hr Duration: 360 hr
 Time Step: 0.016 hr, Iterations: 10

Basin 1: Project Basin

Method: Santa Barbara Unit Hydrograph
 Rainfall Distribution: SFWMD - 3day
 Design Frequency: 100 year
 3 Day Rainfall: 16.0001 inches
 Area: 0.4 acres
 Ground Storage: 1.64 inches
 Time of Concentration: 0.1 hours
 Initial Stage: 2.5 ft NGVD

Stage (ft NGVD)	Storage (acre-ft)
2.50	0.01
3.00	0.01
3.50	0.01
4.00	0.06
4.50	0.10
5.00	0.15
5.50	0.25
6.00	0.36

Offsite Receiving Body: Offsitel

Time (hr)	Stage (ft NGVD)
0.00	1.60
60.00	2.60
360.00	1.60

Structure: 1

From Basin: Project Basin
 To Basin: Offsitel
 Structure Type: Gravity
 Weir: None
 Bleeder: Circular, Invert Elev = 2.7 ft NGVD, Diameter = 0.25 ft
 Default Coefs: Weir Coef = 0.6, Orifice Coef = 0.6
 Pipe: Diameter = 1.5 ft, Manning's n = 0.012, Length = 28 ft
 US Invert Elev = 2.7 ft NGVD, DS Invert Elev = 0.7 ft NGVD, no flap gate

Time (hr)	Cumulative Rainfall (in)	Instant Runoff (cfs)	Current Discharge (cfs)	Cumulative Discharge (acre-ft)	Head Water Stage (ft NGVD)	Tail Water Stage (ft NGVD)
0.00	0.00	0.00	0.00	0.00	2.50	1.60
4.00	0.29	0.00	0.00	0.00	2.50	1.67
8.00	0.57	0.01	0.01	0.00	2.76	1.73
12.00	0.86	0.01	0.01	0.00	2.78	1.80
16.00	1.15	0.02	0.02	0.01	2.80	1.87
20.00	1.43	0.02	0.02	0.01	2.81	1.93
24.00	1.72	0.02	0.02	0.02	2.81	2.00
28.00	2.14	0.03	0.03	0.03	2.84	2.07
32.00	2.55	0.03	0.03	0.04	2.85	2.13
36.00	2.97	0.04	0.04	0.05	2.85	2.20
40.00	3.39	0.04	0.04	0.07	2.85	2.27
44.00	3.81	0.04	0.04	0.08	2.86	2.33
48.00	4.23	0.04	0.04	0.09	2.86	2.40
52.00	4.76	0.06	0.06	0.11	2.91	2.47
56.00	5.84	0.13	0.13	0.14	3.15	2.53
60.00	11.95	3.13	0.32	0.20	4.72	2.60
64.00	14.59	0.14	0.32	0.32	4.70	2.59

Time (hr)	Cumulative Rainfall (in)	Instant Runoff (cfs)	Current Discharge (cfs)	Cumulative Discharge (acre-ft)	Head Water Stage (ft NGVD)	Tail Water Stage (ft NGVD)
68.00	15.43	0.08	0.25	0.41	3.93	2.57
72.00	16.00	0.06	0.06	0.47	2.90	2.56
76.00	16.00	0.00	0.00	0.47	2.70	2.55
80.00	16.00	0.00	0.00	0.47	2.70	2.53
84.00	16.00	0.00	0.00	0.47	2.70	2.52
88.00	16.00	0.00	0.00	0.47	2.70	2.51
92.00	16.00	0.00	0.00	0.47	2.70	2.49
96.00	16.00	0.00	0.00	0.47	2.70	2.48
100.00	16.00	0.00	0.00	0.47	2.70	2.47
104.00	16.00	0.00	0.00	0.47	2.70	2.45
108.00	16.00	0.00	0.00	0.47	2.70	2.44
112.00	16.00	0.00	0.00	0.47	2.70	2.43
116.00	16.00	0.00	0.00	0.47	2.70	2.41
120.00	16.00	0.00	0.00	0.47	2.70	2.40
124.00	16.00	0.00	0.00	0.47	2.70	2.39
128.00	16.00	0.00	0.00	0.47	2.70	2.37
132.00	16.00	0.00	0.00	0.47	2.70	2.36
136.00	16.00	0.00	0.00	0.47	2.70	2.35
140.00	16.00	0.00	0.00	0.47	2.70	2.33
144.00	16.00	0.00	0.00	0.47	2.70	2.32
148.00	16.00	0.00	0.00	0.47	2.70	2.31
152.00	16.00	0.00	0.00	0.47	2.70	2.29
156.00	16.00	0.00	0.00	0.47	2.70	2.28
160.00	16.00	0.00	0.00	0.47	2.70	2.27
164.00	16.00	0.00	0.00	0.47	2.70	2.25
168.00	16.00	0.00	0.00	0.47	2.70	2.24
172.00	16.00	0.00	0.00	0.47	2.70	2.23
176.00	16.00	0.00	0.00	0.47	2.70	2.21
180.00	16.00	0.00	0.00	0.47	2.70	2.20
184.00	16.00	0.00	0.00	0.47	2.70	2.19
188.00	16.00	0.00	0.00	0.47	2.70	2.17
192.00	16.00	0.00	0.00	0.47	2.70	2.16
196.00	16.00	0.00	0.00	0.47	2.70	2.15
200.00	16.00	0.00	0.00	0.47	2.70	2.13
204.00	16.00	0.00	0.00	0.47	2.70	2.12
208.00	16.00	0.00	0.00	0.47	2.70	2.11
212.00	16.00	0.00	0.00	0.47	2.70	2.09
216.00	16.00	0.00	0.00	0.47	2.70	2.08
220.00	16.00	0.00	0.00	0.47	2.70	2.07
224.00	16.00	0.00	0.00	0.47	2.70	2.05
228.00	16.00	0.00	0.00	0.47	2.70	2.04
232.00	16.00	0.00	0.00	0.47	2.70	2.03
236.00	16.00	0.00	0.00	0.47	2.70	2.01
240.00	16.00	0.00	0.00	0.47	2.70	2.00
244.00	16.00	0.00	0.00	0.47	2.70	1.99
248.00	16.00	0.00	0.00	0.47	2.70	1.97
252.00	16.00	0.00	0.00	0.47	2.70	1.96
256.00	16.00	0.00	0.00	0.47	2.70	1.95
260.00	16.00	0.00	0.00	0.47	2.70	1.93
264.00	16.00	0.00	0.00	0.47	2.70	1.92
268.00	16.00	0.00	0.00	0.47	2.70	1.91
272.00	16.00	0.00	0.00	0.47	2.70	1.89
276.00	16.00	0.00	0.00	0.47	2.70	1.88
280.00	16.00	0.00	0.00	0.47	2.70	1.87
284.00	16.00	0.00	0.00	0.47	2.70	1.85
288.00	16.00	0.00	0.00	0.47	2.70	1.84
292.00	16.00	0.00	0.00	0.47	2.70	1.83
296.00	16.00	0.00	0.00	0.47	2.70	1.81
300.00	16.00	0.00	0.00	0.47	2.70	1.80
304.00	16.00	0.00	0.00	0.47	2.70	1.79
308.00	16.00	0.00	0.00	0.47	2.70	1.77
312.00	16.00	0.00	0.00	0.47	2.70	1.76
316.00	16.00	0.00	0.00	0.47	2.70	1.75
320.00	16.00	0.00	0.00	0.47	2.70	1.73
324.00	16.00	0.00	0.00	0.47	2.70	1.72
328.00	16.00	0.00	0.00	0.47	2.70	1.71
332.00	16.00	0.00	0.00	0.47	2.70	1.69
336.00	16.00	0.00	0.00	0.47	2.70	1.68
340.00	16.00	0.00	0.00	0.47	2.70	1.67

Time (hr)	Cumulative Rainfall (in)	Instant Runoff (cfs)	Current Discharge (cfs)	Cumulative Discharge (acre-ft)	Head Water Stage (ft NGVD)	Tail Water Stage (ft NGVD)
344.00	16.00	0.00	0.00	0.47	2.70	1.65
348.00	16.00	0.00	0.00	0.47	2.70	1.64
352.00	16.00	0.00	0.00	0.47	2.70	1.63
356.00	16.00	0.00	0.00	0.47	2.70	1.61
360.00	16.00	0.00	0.00	0.47	2.70	1.60

STRUCTURE MAXIMUM AND MINIMUM DISCHARGES

Struc	Max (cfs)	Time (hr)	Min (cfs)	Time (hr)
1	0.35	61.00	0.00	0.00

BASIN MAXIMUM AND MINIMUM STAGES

Basin	Max (ft)	Time (hr)	Min (ft)	Time (hr)
Project Basin	5.04	61.00	2.50	0.00

BASIN WATER BUDGETS (all units in acre-ft)

Basin	Total Runoff	Structure Inflow	Structure Outflow	Initial Storage	Final Storage	Residual
Project Basin	0.47	0.00	0.47	0.01	0.01	0.00

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 Time Step: 0.016 hr, Iterations: 10

Basin 1: Project Basin

Method: Santa Barbara Unit Hydrograph
 Rainfall Distribution: SFWMD - 3day
 Design Frequency: 25 year
 3 Day Rainfall: 12 inches
 Area: 0.4 acres
 Ground Storage: 1.64 inches
 Time of Concentration: 0.1 hours
 Initial Stage: 2.5 ft NGVD

Stage (ft NGVD)	Storage (acre-ft)
2.50	0.01
3.00	0.01
3.50	0.01
4.00	0.06
4.50	0.10
5.00	0.15
5.50	0.25
6.00	0.36

Offsite Receiving Body: Offsitel

Time (hr)	Stage (ft NGVD)
0.00	1.60
60.00	2.60
360.00	1.60

Structure: 1

From Basin: Project Basin
 To Basin: Offsitel
 Structure Type: Gravity
 Weir: None
 Bleeder: Circular, Invert Elev = 2.7 ft NGVD, Diameter = 0.25 ft
 Default Coefs: Weir Coef = 0.6, Orifice Coef = 0.6
 Pipe: Diameter = 1.5 ft, Manning's n = 0.012, Length = 28 ft
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Time (hr)	Cumulative Rainfall (in)	Instant Runoff (cfs)	Current Discharge (cfs)	Cumulative Discharge (acre-ft)	Head Water Stage (ft NGVD)	Tail Water Stage (ft NGVD)
0.00	0.00	0.00	0.00	0.00	2.50	1.60
4.00	0.21	0.00	0.00	0.00	2.50	1.67
8.00	0.43	0.00	0.00	0.00	2.59	1.73
12.00	0.64	0.01	0.01	0.00	2.76	1.80
16.00	0.86	0.01	0.01	0.00	2.77	1.87
20.00	1.07	0.01	0.01	0.01	2.78	1.93
24.00	1.29	0.01	0.01	0.01	2.79	2.00
28.00	1.60	0.02	0.02	0.02	2.81	2.07
32.00	1.92	0.02	0.02	0.03	2.82	2.13
36.00	2.23	0.02	0.02	0.03	2.82	2.20
40.00	2.54	0.03	0.03	0.04	2.83	2.27
44.00	2.86	0.03	0.03	0.05	2.83	2.33
48.00	3.17	0.03	0.03	0.06	2.83	2.40
52.00	3.57	0.04	0.04	0.07	2.87	2.47
56.00	4.38	0.10	0.10	0.09	3.00	2.53
60.00	8.96	2.32	0.29	0.15	4.33	2.60
64.00	10.94	0.10	0.27	0.25	4.13	2.59

Time (hr)	Cumulative Rainfall (in)	Instant Runoff (cfs)	Current Discharge (cfs)	Cumulative Discharge (acre-ft)	Head Water Stage (ft NGVD)	Tail Water Stage (ft NGVD)
68.00	11.58	0.06	0.20	0.32	3.53	2.57
72.00	12.00	0.04	0.04	0.34	2.87	2.56
76.00	12.00	0.00	0.00	0.34	2.70	2.55
80.00	12.00	0.00	0.00	0.34	2.70	2.53
84.00	12.00	0.00	0.00	0.34	2.70	2.52
88.00	12.00	0.00	0.00	0.34	2.70	2.51
92.00	12.00	0.00	0.00	0.34	2.70	2.49
96.00	12.00	0.00	0.00	0.34	2.70	2.48
100.00	12.00	0.00	0.00	0.34	2.70	2.47
104.00	12.00	0.00	0.00	0.34	2.70	2.45
108.00	12.00	0.00	0.00	0.34	2.70	2.44
112.00	12.00	0.00	0.00	0.34	2.70	2.43
116.00	12.00	0.00	0.00	0.34	2.70	2.41
120.00	12.00	0.00	0.00	0.34	2.70	2.40
124.00	12.00	0.00	0.00	0.34	2.70	2.39
128.00	12.00	0.00	0.00	0.34	2.70	2.37
132.00	12.00	0.00	0.00	0.34	2.70	2.36
136.00	12.00	0.00	0.00	0.34	2.70	2.35
140.00	12.00	0.00	0.00	0.34	2.70	2.33
144.00	12.00	0.00	0.00	0.34	2.70	2.32
148.00	12.00	0.00	0.00	0.34	2.70	2.31
152.00	12.00	0.00	0.00	0.34	2.70	2.29
156.00	12.00	0.00	0.00	0.34	2.70	2.28
160.00	12.00	0.00	0.00	0.34	2.70	2.27
164.00	12.00	0.00	0.00	0.34	2.70	2.25
168.00	12.00	0.00	0.00	0.34	2.70	2.24
172.00	12.00	0.00	0.00	0.34	2.70	2.23
176.00	12.00	0.00	0.00	0.34	2.70	2.21
180.00	12.00	0.00	0.00	0.34	2.70	2.20
184.00	12.00	0.00	0.00	0.34	2.70	2.19
188.00	12.00	0.00	0.00	0.34	2.70	2.17
192.00	12.00	0.00	0.00	0.34	2.70	2.16
196.00	12.00	0.00	0.00	0.34	2.70	2.15
200.00	12.00	0.00	0.00	0.34	2.70	2.13
204.00	12.00	0.00	0.00	0.34	2.70	2.12
208.00	12.00	0.00	0.00	0.34	2.70	2.11
212.00	12.00	0.00	0.00	0.34	2.70	2.09
216.00	12.00	0.00	0.00	0.34	2.70	2.08
220.00	12.00	0.00	0.00	0.34	2.70	2.07
224.00	12.00	0.00	0.00	0.34	2.70	2.05
228.00	12.00	0.00	0.00	0.34	2.70	2.04
232.00	12.00	0.00	0.00	0.34	2.70	2.03
236.00	12.00	0.00	0.00	0.34	2.70	2.01
240.00	12.00	0.00	0.00	0.34	2.70	2.00
244.00	12.00	0.00	0.00	0.34	2.70	1.99
248.00	12.00	0.00	0.00	0.34	2.70	1.97
252.00	12.00	0.00	0.00	0.34	2.70	1.96
256.00	12.00	0.00	0.00	0.34	2.70	1.95
260.00	12.00	0.00	0.00	0.34	2.70	1.93
264.00	12.00	0.00	0.00	0.34	2.70	1.92
268.00	12.00	0.00	0.00	0.34	2.70	1.91
272.00	12.00	0.00	0.00	0.34	2.70	1.89
276.00	12.00	0.00	0.00	0.34	2.70	1.88
280.00	12.00	0.00	0.00	0.34	2.70	1.87
284.00	12.00	0.00	0.00	0.34	2.70	1.85
288.00	12.00	0.00	0.00	0.34	2.70	1.84
292.00	12.00	0.00	0.00	0.34	2.70	1.83
296.00	12.00	0.00	0.00	0.34	2.70	1.81
300.00	12.00	0.00	0.00	0.34	2.70	1.80
304.00	12.00	0.00	0.00	0.34	2.70	1.79
308.00	12.00	0.00	0.00	0.34	2.70	1.77
312.00	12.00	0.00	0.00	0.34	2.70	1.76
316.00	12.00	0.00	0.00	0.34	2.70	1.75
320.00	12.00	0.00	0.00	0.34	2.70	1.73
324.00	12.00	0.00	0.00	0.34	2.70	1.72
328.00	12.00	0.00	0.00	0.34	2.70	1.71
332.00	12.00	0.00	0.00	0.34	2.70	1.69
336.00	12.00	0.00	0.00	0.34	2.70	1.68
340.00	12.00	0.00	0.00	0.34	2.70	1.67

Time (hr)	Cumulative Rainfall (in)	Instant Runoff (cfs)	Current Discharge (cfs)	Cumulative Discharge (acre-ft)	Head Water Stage (ft NGVD)	Tail Water Stage (ft NGVD)
344.00	12.00	0.00	0.00	0.34	2.70	1.65
348.00	12.00	0.00	0.00	0.34	2.70	1.64
352.00	12.00	0.00	0.00	0.34	2.70	1.63
356.00	12.00	0.00	0.00	0.34	2.70	1.61
360.00	12.00	0.00	0.00	0.34	2.70	1.60

STRUCTURE MAXIMUM AND MINIMUM DISCHARGES

Struc	Max (cfs)	Time (hr)	Min (cfs)	Time (hr)
1	0.32	60.67	0.00	0.00

BASIN MAXIMUM AND MINIMUM STAGES

Basin	Max (ft)	Time (hr)	Min (ft)	Time (hr)
Project Basin	4.60	60.67	2.50	0.00

BASIN WATER BUDGETS (all units in acre-ft)

Basin	Total Runoff	Structure Inflow	Structure Outflow	Initial Storage	Final Storage	Residual
Project Basin	0.34	0.00	0.34	0.01	0.01	0.00

Project Name: ELKCAM CIR WAREHOUSE

Reviewer: CITY OF MARCO ISLAND

Project Number: 23-164

Period Begin: Jan 01, 2000;0000 hr End: Jan 16, 2000;0000 hr Duration: 360 hr

Time Step: 0.016 hr, Iterations: 10

Basin 1: Project Basin

Method: Santa Barbara Unit Hydrograph

Rainfall Distribution: SFWMD - 24 hr

Design Frequency: 5 year

1 Day Rainfall: 5.5 inches

Area: 0.4 acres

Ground Storage: 1.64 inches

Time of Concentration: 0.1 hours

Initial Stage: 2.5 ft NGVD

Stage (ft NGVD)	Storage (acre-ft)
2.50	0.01
3.00	0.01
3.50	0.01
4.00	0.06
4.50	0.10
5.00	0.15
5.50	0.25
6.00	0.36

Offsite Receiving Body: Offsitel

Time (hr)	Stage (ft NGVD)
0.00	1.60
60.00	2.60
360.00	1.60

Structure: 1

From Basin: Project Basin

To Basin: Offsitel

Structure Type: Gravity

Weir: None

Bleeder: Circular, Invert Elev = 2.7 ft NGVD, Diameter = 0.25 ft

Default Coefs: Weir Coef = 0.6, Orifice Coef = 0.6

Pipe: Diameter = 1.5 ft, Manning's n = 0.012, Length = 28 ft

US Invert Elev = 2.7 ft NGVD, DS Invert Elev = 0.7 ft NGVD, no flap gate

Time (hr)	Cumulative Rainfall (in)	Instant Runoff (cfs)	Current Discharge (cfs)	Cumulative Discharge (acre-ft)	Head Water Stage (ft NGVD)	Tail Water Stage (ft NGVD)
0.00	0.00	0.00	0.00	0.00	2.50	1.60
4.00	0.25	0.00	0.00	0.00	2.50	1.67
8.00	0.75	0.02	0.02	0.00	2.82	1.73
12.00	3.61	1.29	0.24	0.03	3.84	1.80
16.00	4.84	0.06	0.20	0.10	3.54	1.87
20.00	5.24	0.04	0.04	0.12	2.85	1.93
24.00	5.50	0.03	0.03	0.13	2.82	2.00
28.00	5.50	0.00	0.00	0.13	2.70	2.07
32.00	5.50	0.00	0.00	0.13	2.70	2.13
36.00	5.50	0.00	0.00	0.13	2.70	2.20
40.00	5.50	0.00	0.00	0.13	2.70	2.27
44.00	5.50	0.00	0.00	0.13	2.70	2.33
48.00	5.50	0.00	0.00	0.13	2.70	2.40
52.00	5.50	0.00	0.00	0.13	2.70	2.47
56.00	5.50	0.00	0.00	0.13	2.70	2.53
60.00	5.50	0.00	0.00	0.13	2.70	2.60
64.00	5.50	0.00	0.00	0.13	2.70	2.59

Time (hr)	Cumulative Rainfall (in)	Instant Runoff (cfs)	Current Discharge (cfs)	Cumulative Discharge (acre-ft)	Head Water Stage (ft NGVD)	Tail Water Stage (ft NGVD)
68.00	5.50	0.00	0.00	0.13	2.70	2.57
72.00	5.50	0.00	0.00	0.13	2.70	2.56
76.00	5.50	0.00	0.00	0.13	2.70	2.55
80.00	5.50	0.00	0.00	0.13	2.70	2.53
84.00	5.50	0.00	0.00	0.13	2.70	2.52
88.00	5.50	0.00	0.00	0.13	2.70	2.51
92.00	5.50	0.00	0.00	0.13	2.70	2.49
96.00	5.50	0.00	0.00	0.13	2.70	2.48
100.00	5.50	0.00	0.00	0.13	2.70	2.47
104.00	5.50	0.00	0.00	0.13	2.70	2.45
108.00	5.50	0.00	0.00	0.13	2.70	2.44
112.00	5.50	0.00	0.00	0.13	2.70	2.43
116.00	5.50	0.00	0.00	0.13	2.70	2.41
120.00	5.50	0.00	0.00	0.13	2.70	2.40
124.00	5.50	0.00	0.00	0.13	2.70	2.39
128.00	5.50	0.00	0.00	0.13	2.70	2.37
132.00	5.50	0.00	0.00	0.13	2.70	2.36
136.00	5.50	0.00	0.00	0.13	2.70	2.35
140.00	5.50	0.00	0.00	0.13	2.70	2.33
144.00	5.50	0.00	0.00	0.13	2.70	2.32
148.00	5.50	0.00	0.00	0.13	2.70	2.31
152.00	5.50	0.00	0.00	0.13	2.70	2.29
156.00	5.50	0.00	0.00	0.13	2.70	2.28
160.00	5.50	0.00	0.00	0.13	2.70	2.27
164.00	5.50	0.00	0.00	0.13	2.70	2.25
168.00	5.50	0.00	0.00	0.13	2.70	2.24
172.00	5.50	0.00	0.00	0.13	2.70	2.23
176.00	5.50	0.00	0.00	0.13	2.70	2.21
180.00	5.50	0.00	0.00	0.13	2.70	2.20
184.00	5.50	0.00	0.00	0.13	2.70	2.19
188.00	5.50	0.00	0.00	0.13	2.70	2.17
192.00	5.50	0.00	0.00	0.13	2.70	2.16
196.00	5.50	0.00	0.00	0.13	2.70	2.15
200.00	5.50	0.00	0.00	0.13	2.70	2.13
204.00	5.50	0.00	0.00	0.13	2.70	2.12
208.00	5.50	0.00	0.00	0.13	2.70	2.11
212.00	5.50	0.00	0.00	0.13	2.70	2.09
216.00	5.50	0.00	0.00	0.13	2.70	2.08
220.00	5.50	0.00	0.00	0.13	2.70	2.07
224.00	5.50	0.00	0.00	0.13	2.70	2.05
228.00	5.50	0.00	0.00	0.13	2.70	2.04
232.00	5.50	0.00	0.00	0.13	2.70	2.03
236.00	5.50	0.00	0.00	0.13	2.70	2.01
240.00	5.50	0.00	0.00	0.13	2.70	2.00
244.00	5.50	0.00	0.00	0.13	2.70	1.99
248.00	5.50	0.00	0.00	0.13	2.70	1.97
252.00	5.50	0.00	0.00	0.13	2.70	1.96
256.00	5.50	0.00	0.00	0.13	2.70	1.95
260.00	5.50	0.00	0.00	0.13	2.70	1.93
264.00	5.50	0.00	0.00	0.13	2.70	1.92
268.00	5.50	0.00	0.00	0.13	2.70	1.91
272.00	5.50	0.00	0.00	0.13	2.70	1.89
276.00	5.50	0.00	0.00	0.13	2.70	1.88
280.00	5.50	0.00	0.00	0.13	2.70	1.87
284.00	5.50	0.00	0.00	0.13	2.70	1.85
288.00	5.50	0.00	0.00	0.13	2.70	1.84
292.00	5.50	0.00	0.00	0.13	2.70	1.83
296.00	5.50	0.00	0.00	0.13	2.70	1.81
300.00	5.50	0.00	0.00	0.13	2.70	1.80
304.00	5.50	0.00	0.00	0.13	2.70	1.79
308.00	5.50	0.00	0.00	0.13	2.70	1.77
312.00	5.50	0.00	0.00	0.13	2.70	1.76
316.00	5.50	0.00	0.00	0.13	2.70	1.75
320.00	5.50	0.00	0.00	0.13	2.70	1.73
324.00	5.50	0.00	0.00	0.13	2.70	1.72
328.00	5.50	0.00	0.00	0.13	2.70	1.71
332.00	5.50	0.00	0.00	0.13	2.70	1.69
336.00	5.50	0.00	0.00	0.13	2.70	1.68
340.00	5.50	0.00	0.00	0.13	2.70	1.67

Time (hr)	Cumulative Rainfall (in)	Instant Runoff (cfs)	Current Discharge (cfs)	Cumulative Discharge (acre-ft)	Head Water Stage (ft NGVD)	Tail Water Stage (ft NGVD)
344.00	5.50	0.00	0.00	0.13	2.70	1.65
348.00	5.50	0.00	0.00	0.13	2.70	1.64
352.00	5.50	0.00	0.00	0.13	2.70	1.63
356.00	5.50	0.00	0.00	0.13	2.70	1.61
360.00	5.50	0.00	0.00	0.13	2.70	1.60

STRUCTURE MAXIMUM AND MINIMUM DISCHARGES

Struc	Max (cfs)	Time (hr)	Min (cfs)	Time (hr)
1	0.25	12.53	0.00	0.00

BASIN MAXIMUM AND MINIMUM STAGES

Basin	Max (ft)	Time (hr)	Min (ft)	Time (hr)
Project Basin	3.94	12.53	2.50	0.00

BASIN WATER BUDGETS (all units in acre-ft)

Basin	Total Runoff	Structure Inflow	Structure Outflow	Initial Storage	Final Storage	Residual
Project Basin	0.13	0.00	0.13	0.01	0.01	0.00