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STORMWATER MANAGEMENT REPORT

For

Fairfield Logistics Center

Fairfield Township
Butler County, Ohio
Prepared: January 2018

Prepared by: Joe Haubert, PE
Reviewed by: David V. Wright, PE, LEED AP

JOB #: 170044.004

Table of Contents

Fairfield Township
Butler County, Ohio
STORMWATER MANAGEMENT PLAN

Introduction

The following report details the steps taken to provide storm water conveyance, detention, and water quality for the proposed development of a parcel of land east of Seward Road in Fairfield Township, Butler County, Ohio. The proposed construction will consist of a new industrial building, associated utilities, parking lot, and modification of existing stormwater management facilities.

Site Description

The existing site is an undeveloped field along the east side of Seward Road in Fairfield Township, Butler County, Ohio. Storm runoff from this site generally runs west to east and is detained by an existing dry detention basin located in the northeastern corner of the site. This basin was designed to detain runoff from 21.88 acres onsite and an additional 44.813 acres from offsite areas. The analysis of this existing basin can be found in the Miller Farm Detention Report by Nexus Engineering in November 2007. This basin will be modified into a wet detention basin to provide detention and water quality to the proposed development while continuing to detain and control runoff from all offsite locations. Runoff ultimately is routed to Mill Creek.

Hydrologic Methodologies

The stormwater detention calculations contained in this report were performed by using the SCS Unit Hydrograph hydrologic method in Bentley's PondPack, Version 10.1 software. Pre-developed and post-developed condition hydrographs were generated for storm frequencies of 1, 2, 5, 10, 25, 50, and 100 year 24-hour storm events using an SCS Type II distribution. Please refer to the drainage maps at the back of this report for a delineation of the drainage areas.

Fairfield Township and Butler County require projects to adhere to the stormwater management requirements provided in the Butler County Subdivision Regulations. These regulations stipulate a critical year storm method where the percent increase in runoff volume from the 1 year, 24-hour storm frequency determines the critical storm event. The post-developed peak rate of runoff must be controlled for storms of a frequency between one year and the critical storm so that the rate of runoff does not exceed the peak rate of runoff for a pre-developed, 24-hour, 1-year frequency storm. All storm events greater than the critical year must be controlled such the post-developed runoff rate does not exceed the pre-developed runoff rate for the previous storm event frequency

The 1-year pre-developed hydrologic volume for the site is 4.654 ac-ft. The 1-year post-developed hydrologic volume for the site is 6.414 ac-ft. The difference between the two volumes represents an increase in stormwater runoff of 37.82%, which corresponds to a 5-year critical storm.

Table 1 - Existing Hydrologic Conditions

Tributary Area Name	Area (ac)	CN	Tc (hr)	Q1 (cfs)	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
PREDEV	66.693	79.17	0.25	65.45	88.80	132.51	165.23	205.57	239.80	267.47

Table 2 - Proposed Hydrologic Conditions

Tributary Area Name	Area (ac)	CN	Tc (hr)	Q1 (cfs)	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
POSTDEV	68.973	84.28	0.25	92.92	119.85	168.74	204.48	247.85	284.22	313.40

Applicable Permits

The Ohio Environmental Protection Agency (OEPA) required projects to capture and treat stormwater from a storm event of 0.75" or less.

The required water quality volume is calculated by the following equation and provided in Appendix 1:

$$WQ_v = \frac{CPA}{12}$$

Where WQv= water quality volume, in acre feet
C = runoff coefficient, $0.858i^3-0.78i^2+0.774i+0.04$, where i = 0.49 (fraction of impervious area)
P = 0.75 inch precipitation depth
A = area draining into the BMP in acres

$$WQ_v = \frac{(0.33)(0.75)(24.16)}{12} = 0.50\ ac-ft$$

As required by the OEPA, a volume equivalent to 75% WQv must be provided in both the permanent pool and above the permanent pool. An additional 20% should also be provided in the permanent pool for sediment storage.

The required volume in the permanent pool for water quality: 0.75WQv + 0.2WQv = 0.4777 acre-feet.
The required volume above the permanent pool for water quality: 0.75WQv = 0.3771 acre-feet.

Water quality capture and treatment for this site will occur in the proposed retention basin.
A 12" diameter orifice, invert elevation=599.45, has been designed to provide the drawdown time required. The orifice provides a 100% drawdown time of 26.60 hours, which satisfies the minimum 24 hour drawdown time required by the OEPA. The water quality elevation in the basin is 599.75. The water quality volume provided in the permanent pool is 12.30 acre-feet and the water quality volume provided above the permanent pool is 0.607 acre-feet.

Stormwater Management Plan

Stormwater management for the watershed (POSTDEV) will be achieved through the wet detention basin.

The existing outlet structure on site will remain as the basin's outlet control. The structure has a 12" PVC reverse flow pipe with an invert on the structure at an elevation of 599.45. It has windows at 603.02 and it's top elevation is 604.57. The 12" PVC will be capped with a 5.5" orifice at 599.45 and a 2' x 1' windows at 599.75 will be added to the structure to provide adequate water quality volume and drawdown time. With these modifications, the structure will also adequately control all storm peak flows to the conditions of the critical storm.

Table 3 – Wet Basin Detention Summary from Pond Pack

Storm Event	Peak Water Surface Elevation (ft)	Detention Storage Volume (ac-ft)	Peak Flow (cfs)
1-yr	601.12	4.417	9.50
2-yr	601.57	5.431	11.03
5-yr	602.38	7.351	13.48
10-yr	602.96	8.818	15.05
25-yr	603.61	10.540	18.76
50-yr	604.11	11.926	22.94
100-yr	604.49	13.034	26.61

Results Summary

The detained area will adhere to the release rates specified in the Butler County Subdivision Regulations. A summary of the peak flows of pre to post conditions are present below for reference.

Table 4 – Peak Flows

Storm Event	PREDEV Peak Flows (cfs)	POSTDEV Peak Flows (cfs)	Allowable Release Rate (cfs)	POST-DEVELOPED RELEASE RATES (cfs) (ONSITE)
1-yr	65.45	92.92	65.45	9.50
2-yr	88.80	119.85	65.45	11.03
5-yr*	132.51	168.74	65.45	13.48
10-yr	165.23	204.48	132.51	15.05
25-yr	205.57	247.85	165.23	18.76
50-yr	239.80	284.22	205.57	22.94
100-yr	267.47	313.40	239.80	26.61

*denotes critical storm

Appendix A
Design Calculations

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West Chester, OH 45069
513.779.7851

STORM SEWER COMPUTATIONS

2/27/2018
i = MORPC manual

Project: Fairfiled Logistics Center
Project Number: 170044.004

Design Storm: 10 yr
Check Storm: 25 yr
Manning's n: 0.013

LOCATION			BASIN DATA									PIPE DATA							HGL CHECK							
Inlet	Station	Outlet	ΔA (ac)	ΣA (ac)	ΔT_c (min)	ΣT_c (min)	Design i (in/hr)	Coeff. C	ΔCA (ac)	ΣCA (ac)	Design Discharge (cfs)	Pipe Size (in)	Pipe Length (ft)	Pipe Slope (ft/ft)	US Invert (ft)	DS Invert (ft)	Mean Velocity (ft/sec)	Pipe Full Capacity (cfs)	Check i (in/hr)	Check Discharge (cfs)	Mean Velocity (ft/sec)	Friction Slope (ft/ft)	Head Loss (ft)	TW Elevation (ft)	HW Elevation (ft)	Grate Elevation (ft)
105		104	0.39	0.39	10	10	5.15	0.90	0.35	0.35	1.81	12	153	0.0100	612.17	610.64	4.55	3.57	5.75	2.02	4.55	0.0100	1.53	611.44	612.97	616.17
104		103	0.30	0.69	10	11	5.07	0.90	0.27	0.62	3.15	12	153	0.0100	610.64	609.11	4.55	3.57	5.67	3.52	4.55	0.0100	1.53	609.91	611.44	616.17
103		102	0.35	1.04	10	11	4.98	0.90	0.32	0.94	4.66	15	75	0.0101	608.86	608.10	5.30	6.50	5.59	5.24	5.30	0.0101	0.76	609.10	609.86	616.50
102		102A	0.19	1.23	10	11	4.95	0.90	0.17	1.11	5.48	18	104	0.0100	607.85	606.82	5.95	10.51	5.56	6.16	5.95	0.0100	1.03	608.02	609.05	616.70
102A		101	0.18	1.41	10	12	4.91	0.90	0.16	1.27	6.23	18	104	0.0100	606.82	605.78	5.97	10.56	5.52	7.01	5.97	0.0100	1.04	613.05	614.09	616.75
101		100	1.13	2.54	10	12	4.87	0.90	1.02	2.12	10.33	24	194	0.0076	605.33	603.85	6.31	19.82	5.48	11.65	6.31	0.0076	1.48	605.45	606.93	616.13
201		200	1.16	1.16	10	10	5.15	0.90	1.04	1.04	5.38	12	164	0.0400	612.25	605.69	9.10	7.15	5.75	6.00	9.10	0.0400	6.56	606.49	613.05	616.25
303		301	0.64	0.64	10	10	5.15	0.90	0.58	0.58	2.97	12	153	0.0100	612.25	610.72	4.55	3.58	5.75	3.31	4.55	0.0100	1.53	611.72	613.25	616.25
302		301	0.69	0.69	10	10	5.15	0.90	0.62	0.62	3.20	12	153	0.0100	612.25	610.72	4.55	3.58	5.75	3.57	4.55	0.0100	1.53	611.72	613.25	616.25
301		300	1.03	2.36	10	11	5.07	0.90	0.93	2.12	10.76	15	131	0.0400	610.72	605.47	10.55	12.95	5.67	12.04	10.55	0.0400	5.25	606.47	611.72	616.25
401		400	0.20	0.20	10	10	5.15	0.90	0.18	0.18	0.93	12	28	0.0599	611.66	609.96	11.13	8.74	5.75	1.04	11.13	0.0599	1.70	610.76	612.46	615.66
501		500	0.17	0.17	10	10	5.15	0.90	0.15	0.15	0.79	12	28	0.0600	611.67	609.99	11.14	8.75	5.75	0.88	11.14	0.0600	1.68	610.79	612.47	615.67
605		604	0.19	0.19	10	10	5.15	0.90	0.17	0.17	0.88	12	156	0.0070	608.19	607.10	3.80	2.99	5.75	0.98	3.80	0.0070	1.09	610.52	611.61	613.60
604		603	2.99	3.18	10	11	5.05	0.90	2.69	2.86	14.44	24	268	0.0037	607.10	606.10	4.41	13.86	5.65	16.18	5.15	0.0051	1.36	609.16	610.52	609.86
603		602	3.20	6.38	10	12	4.90	0.90	2.88	5.74	28.13	30	268	0.0037	606.10	605.11	5.09	25.00	5.52	31.67	6.45	0.0059	1.59	607.57	609.16	609.86
602		601	1.61	7.99	10	13	4.78	0.90	1.45	7.19	34.36	36	231	0.0037	605.11	604.26	5.74	40.55	5.40	38.85	5.74	0.0037	0.85	606.72	607.57	609.86
601		600	1.51	9.50	10	13	4.69	0.90	1.36	8.55	40.10	36	69	0.0038	604.26	604.00	5.81	41.07	5.32	45.47	6.43	0.0046	0.32	606.40	606.72	612.16

Designed:
Checked:

PROJECT	**Fairfield Logistics Center**
JOB #	**170044**
DATE	**2/20/2018**

DESIGN	**JMH**
CHECK	**DVW**

WATER QUALITY VOLUME

= INPUT FIELDS

Method 2

WQv= C * P * A / 12

C = 0.33

P = 0.75 IN

A = 24.16 ACRES *

WQv = 0.50 AC FT

RUNOFF COEFFICIENT

$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$

WHERE: i = IMPERVIOUS RATIO

IMPERVIOUS RATIO, i = IMPERVIOUS AREA / TOTAL AREA

IMPERVIOUS AREA =	11.74
TOTAL AREA =	24.16
i =	0.485927

P = Precipitation Depth of 0.75 - inches

***AREA TO INCLUDE OFFSITE DRAINAGE**

THEREFORE, WQv =		**0.50**	**AC FT**
	OR,	21730.72	CF

WQv DRAWDOWN COMPUTATIONS

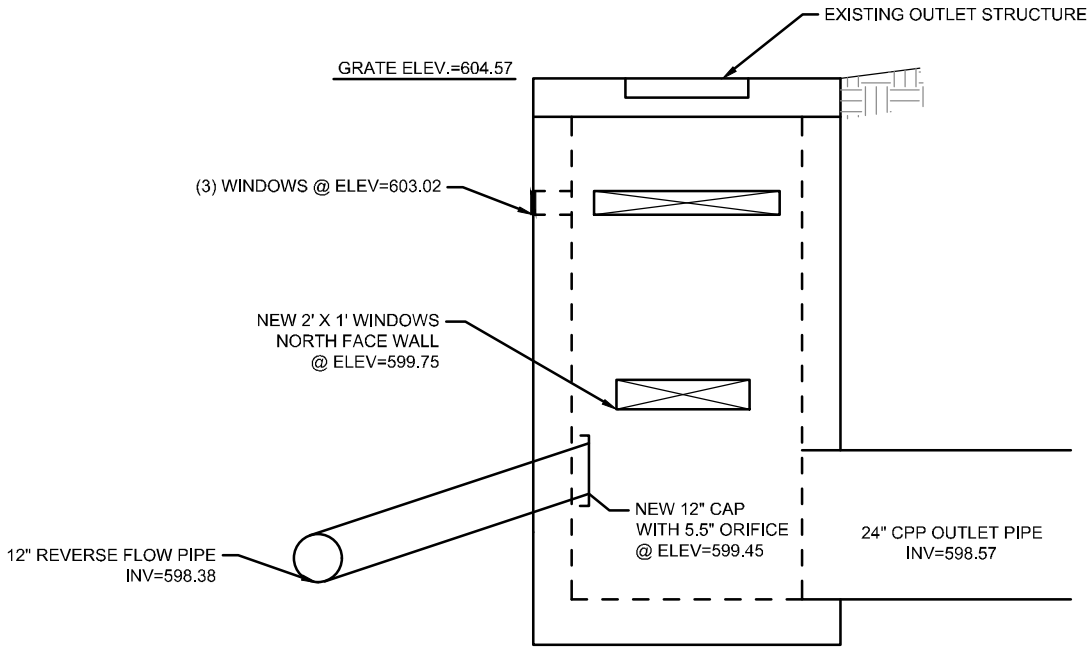
3/2/2018

6305 Centre Park Drive
West Chester, OH 45069
513.779.7851

Project: Fairfield Logistics Center
Project Number: 170044.004

Orifice Size: 5.5 in
Orifice Invert: 599.45 ft
WQv Required 21780 cf
Drawdown Target 24 hrs

WQv Drawdown Time						
Elevation (ft)	Area (ft^2)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)	Incremental Discharge (cfs)	Incremental Drawdown (hr)	Total Drawdown (hr)
599.75	88,775	13,267	26,440	0.377	9.78	26.60
599.6	88,122	13,173	13,173	0.218	16.82	16.82
599.45	87,512	0	0	0	0	0



DETENTION OUTFALL STRUCTURE

N.T.S.

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HAMILTON, OH 45011

PROJECT NO:	**170044.004**
DATE:	**2018-03-02**
SCALE:	**NOT TO SCALE**
SHEET NO.	**1 OF 1**

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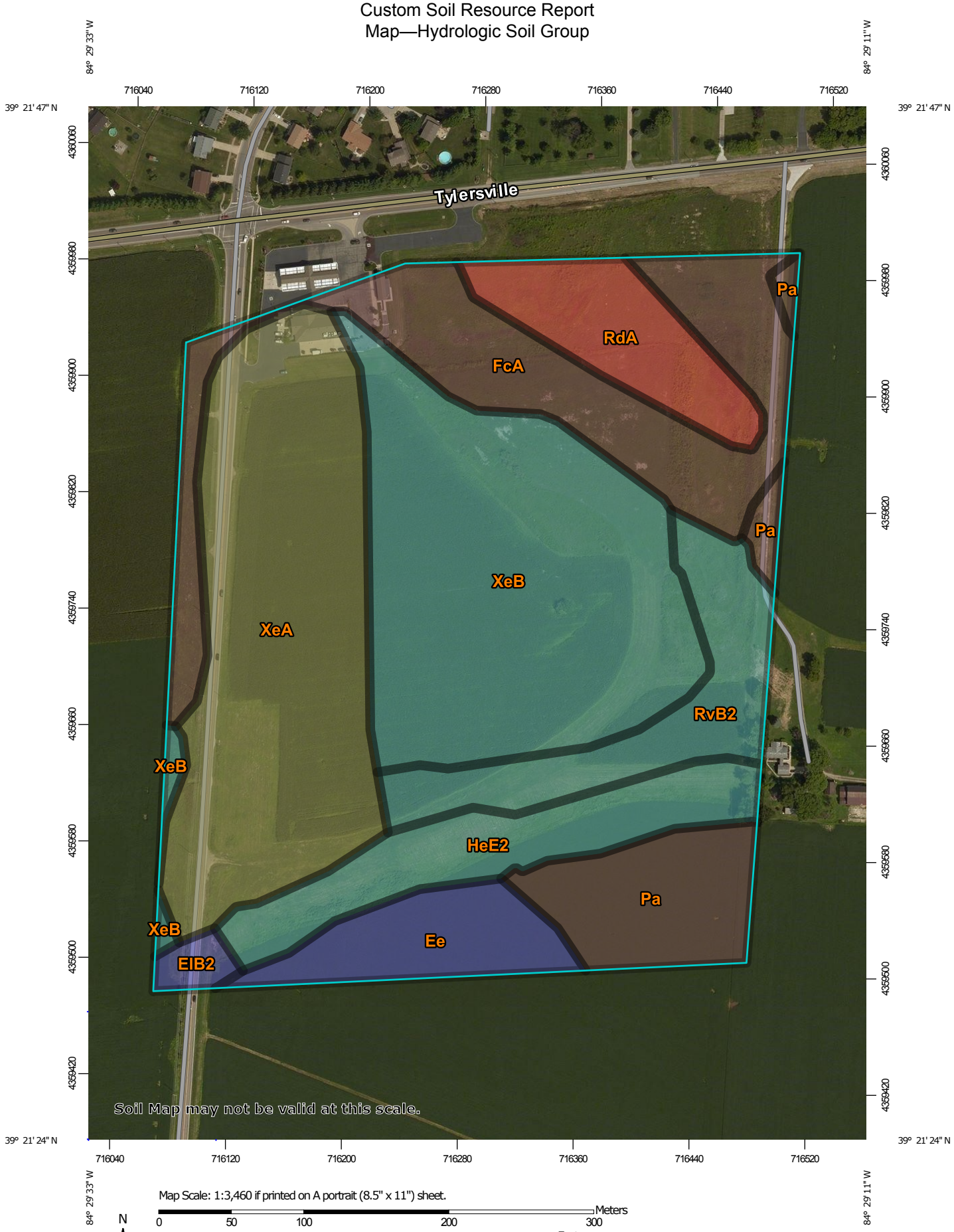
Appendix B
Hydrologic Soil Map

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:3,460 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Butler County, Ohio
Survey Area Data: Version 16, Sep 26, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 26, 2014—Oct 26, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Ee	Eel silt loam, 0 to 2 percent slopes, occasionally flooded	B	2.6	5.2%
ElB2	Eldean loam, 2 to 6 percent slopes, eroded	B	0.4	0.9%
FcA	Fincastle silt loam, Southern Ohio Till Plain, 0 to 2 percent slopes	B/D	7.6	15.2%
HeE2	Hennepin-Miamian silt loams, 18 to 25 percent slopes, moderately eroded	C	4.0	8.0%
Pa	Patton silty clay loam, 0 to 2 percent slopes	B/D	3.6	7.2%
RdA	Raub silt loam, 0 to 2 percent slopes	D	3.0	6.0%
RvB2	Russell-Miamian silt loams, 2 to 6 percent slopes, moderately eroded	C	3.9	7.8%
XeA	Xenia silt loam, Southern Ohio Till Plain, 0 to 2 percent slopes	C/D	11.8	23.9%
XeB	Xenia silt loam, Southern Ohio Till Plain, 2 to 6 percent slopes	C	12.8	25.7%
Totals for Area of Interest			**49.7**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix C
Drainage Maps

OFFSITE DRAINAGE AREA PER MILLER
FARM DETENTION REPORT
TOTAL OFFSITE AREA: 44.813 ACRES
AREA A: 27.522 ACRES, CN: 80
AREA B: 2.283 ACRES, CN: 72
AREA C: 3.254 ACRES, CN: 79
AREA D: 11.754 ACRES, CN: 79

PREDEVELOPED DRAINAGE AREA
(ON SITE AREA PART OF AREA D)
TOTAL AREA: 21.88 ACRES, CN: 79

RdA
FcA
XeA
XeB
RvB2
Pa
HeE2

BENCHMARK #1 =619.81'
ARROW BOLT ON FH

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PREDEVELOPED DRAINAGE MAP

ISSUANCES

#	Description	Date
1	PERMIT ISSUE	01.26.2018

DRAWING INFORMATION

Scale:	as noted
Date:	12.22.2017
Checked By:	DVW
Drawn By:	JMH
Duke Realty Job #:	DUKEAJ-351
A/E Job #:	170044.004

DRAWING / SHEET TITLE

PREDEVELOPED
DRAINAGE MAP

SHEET NUMBER

1 OF 3

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OFFSITE DRAINAGE AREA PER MILLER FARM DETENTION REPORT
TOTAL OFFSITE AREA: 44.813 ACRES
AREA A: 27.522 ACRES, CN: 80
AREA B: 2.283 ACRES, CN: 72
AREA C: 3.254 ACRES, CN: 79
AREA D: 11.754 ACRES, CN: 90 (FUTURE DEV)

POSTDEVELOPED DRAINAGE AREA
TOTAL AREA: 24.16 ACRES
PERVIOUS: 12.42 ACRES, CN: 79
IMPERVIOUS: 11.74 ACRES, CN: 98

RdA
FcA
XeA
XeB
RvB2
Pa
HeE2
BENCHMARK #1 =619.82
ARROW BOLT ON FH

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POSTDEVELOPED DRAINAGE MAP

ISSUANCES

#	Description	Date
1	PERMIT ISSUE	01.26.2018

DRAWING INFORMATION

Scale:	as noted
Date:	12.22.2017
Checked By:	DVW
Drawn By:	JMH
Duke Realty Job #:	DUKEAJ-351
A/E Job #:	170044.004

DRAWING / SHEET TITLE

POSTDEVELOPED DRAINAGE MAP

SHEET NUMBER

2 OF 3

H:\2017\170044\Design\Storm Drainage\170044SPWSM.dwg, 2/1/2018 2:11:52 PM, jhubbert

ITEM #14
30' ACCESS EASEMENT
OR 7825 PG. 1911

TEMPORARY GRADING EASEMENT

PERMANENT STORM WATER DETENTION EASEMENT

ITEM #12
30' ACCESS EASEMENT
OR 7825 PG. 1911

ITEM #13
20' EASEMENT FOR WATER
MAIN AND APPURTENANCES
OR 8047 PG. 2090

PROP. 10' PUBLIC WATERLINE EASEMENT

PROP. 10' PUBLIC WATER EXTENSION

CB 102
AREA: 8459.30 SF
AREA: 0.19 ACRES

CB 102A
AREA: 7918.49 SF
AREA: 0.18 ACRES

CB 101
AREA: 49016.89 SF
AREA: 1.13 ACRES

CB 201
AREA: 50334.23 SF
AREA: 1.16 ACRES

CB 303
AREA: 27774.69 SF
AREA: 0.64 ACRES

CB 301
AREA: 44931.30 SF
AREA: 1.03 ACRES

CB 302
AREA: 30016.47 SF
AREA: 0.69 ACRES

CI 103
AREA: 15356.60 SF
AREA: 0.35 ACRES

CI 401
AREA: 8841.88 SF
AREA: 0.20 ACRES

CB 104
AREA: 13076.76 SF
AREA: 0.30 ACRES

CI 301
AREA: 7487.94 SF
AREA: 0.17 ACRES

0.152 ACRES ZONE X (AREAS OF 0.2% FLOOD CHANCE)
1.303 ACRES ZONE AE

CB 105
AREA: 16773.57 SF
AREA: 0.39 ACRES

CI 601
AREA: 65785.17 SF
AREA: 1.51 ACRES

CI 604
AREA: 130414.78 SF
AREA: 2.99 ACRES

CI 603
AREA: 139385.91 SF
AREA: 3.20 ACRES

CI 602
AREA: 69925.99 SF
AREA: 1.61 ACRES

CI 605
AREA: 8290.12 SF
AREA: 0.19 ACRES

ITEM #15
APPROXIMATE LOCATION OF
ANCHOR EASEMENT
OR 8321 PG. 1238

PROPERTY LINE

TEMPORARY 25' GRADING EASEMENT

ZONE X

ZONE X

ITEM #10
APPROXIMATE LOCATION OF
UTILITY EASEMENT LOCATION

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LOCAL DRAINAGE MAP

ISSUANCES

#	Description	Date
1	PERMIT ISSUE	01.26.2018

DRAWING INFORMATION

Scale:	as noted
Date:	12.22.2017
Checked By:	DVW
Drawn By:	JMH
Duke Realty Job #:	DUKEAJ-351
A/E Job #:	170044.004

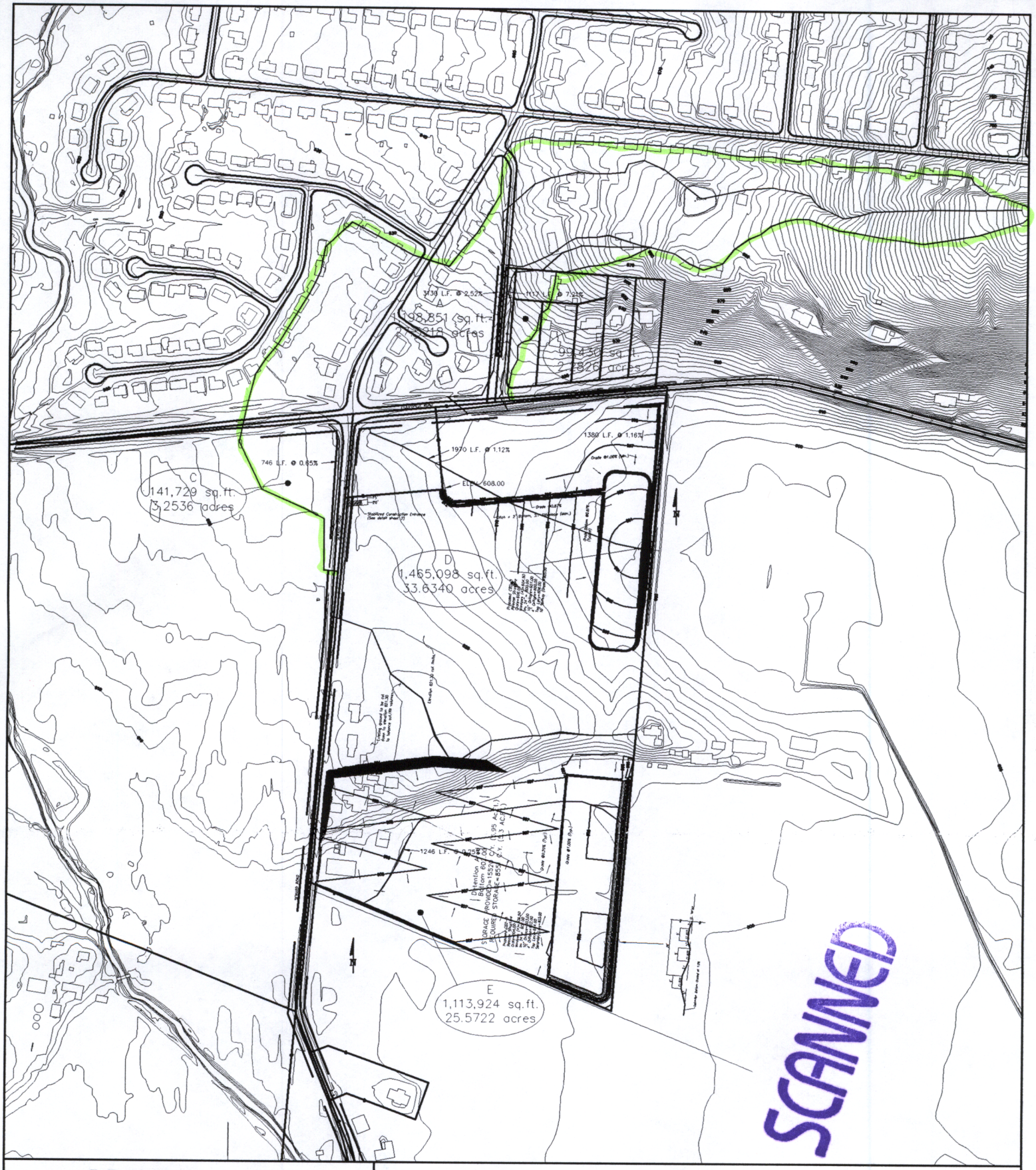
DRAWING / SHEET TITLE

LOCAL DRAINAGE MAP

SHEET NUMBER

3 OF 3

H:\2017\170044\Design\Storm Drainage\170044STM04.dwg, 12/12/2018 2:13:53 PM, jhubbert



DRAINAGE MAP
MILLER FARM
TYLERSVILLE@SEWARD
FAIRFIELD TWP. OH
SCALE: 1"=500'

NEXUS ENGINEERING

NEXUS ENGINEERING

CIVIL ENGINEERS AND LAND SURVEYORS
8080 BECKETT CENTER DRIVE, SUITE 203
WEST CHESTER, OHIO 45069
PHONE: (513) 860-9130

Appendix D
Pond Pack Calculations

Table of Contents

Table of Contents (continued)

MASTER DESIGN STORM SUMMARY

Network Storm Collection: BUTLER

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.5000	Synthetic Curve	TypeII 24hr
2	2.9000	Synthetic Curve	TypeII 24hr
5	3.6000	Synthetic Curve	TypeII 24hr
10	4.1000	Synthetic Curve	TypeII 24hr
25	4.7000	Synthetic Curve	TypeII 24hr
50	5.2000	Synthetic Curve	TypeII 24hr
100	5.6000	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
01 PREDEV	AREA	1	4.654	--	12.0500	65.45		
01 PREDEV	AREA	2	6.202		12.0500	88.80		
01 PREDEV	AREA	5	9.138		12.0500	132.51		
01 PREDEV	AREA	10	11.366		12.0500	165.23		
01 PREDEV	AREA	25	14.146		12.0500	205.57		
01 PREDEV	AREA	50	16.532		12.0500	239.80		
01 PREDEV	AREA	100	18.478		12.0500	267.47		
02 EX POND IN	POND	1	4.654		12.0500	65.45		
02 EX POND IN	POND	2	6.202		12.0500	88.80		
02 EX POND IN	POND	5	9.138		12.0500	132.51		
02 EX POND IN	POND	10	11.366		12.0500	165.23		
02 EX POND IN	POND	25	14.146		12.0500	205.57		
02 EX POND IN	POND	50	16.532		12.0500	239.80		
02 EX POND IN	POND	100	18.478		12.0500	267.47		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
02 EX POND OUT	POND	1	4.615		13.7000	4.54	601.35	2.281
02 EX POND OUT	POND	2	6.163		13.7500	5.36	601.90	3.244
02 EX POND OUT	POND	5	9.098		14.1000	6.55	602.87	5.174
02 EX POND OUT	POND	10	11.326		13.8500	8.93	603.46	6.507
02 EX POND OUT	POND	25	14.107		13.4000	13.74	604.03	7.907
02 EX POND OUT	POND	50	16.493		13.1000	18.38	604.46	9.096
02 EX POND OUT	POND	100	18.439		12.9000	23.89	604.78	10.025
*03 PRE OUTFALL	JCT	1	4.615		13.7000	4.54		
*03 PRE OUTFALL	JCT	2	6.163		13.7500	5.36		
*03 PRE OUTFALL	JCT	5	9.098		14.1000	6.55		
*03 PRE OUTFALL	JCT	10	11.326		13.8500	8.93		
*03 PRE OUTFALL	JCT	25	14.107		13.4000	13.74		
*03 PRE OUTFALL	JCT	50	16.493		13.1000	18.38		
*03 PRE OUTFALL	JCT	100	18.439		12.9000	23.89		
04 POSTDEV	AREA	1	6.414		12.0500	92.92		
04 POSTDEV	AREA	2	8.245		12.0500	119.85		
04 POSTDEV	AREA	5	11.624		12.0500	168.74		
04 POSTDEV	AREA	10	14.137		12.0500	204.48		
04 POSTDEV	AREA	25	17.228		12.0500	247.85		
04 POSTDEV	AREA	50	19.852		12.0500	284.22		
04 POSTDEV	AREA	100	21.977		12.0500	313.40		
05 PR BASIN IN	POND	1	6.414		12.0500	92.92		
05 PR BASIN IN	POND	2	8.245		12.0500	119.85		
05 PR BASIN IN	POND	5	11.624		12.0500	168.74		
05 PR BASIN IN	POND	10	14.137		12.0500	204.48		
05 PR BASIN IN	POND	25	17.228		12.0500	247.85		
05 PR BASIN IN	POND	50	19.852		12.0500	284.22		
05 PR BASIN IN	POND	100	21.977		12.0500	313.40		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
05 PR BASIN OUT	POND	1	6.969	L	12.8000	9.50	601.12	4.417
05 PR BASIN OUT	POND	2	8.800	L	12.9000	11.03	601.57	5.431
05 PR BASIN OUT	POND	5	12.179	L	13.1000	13.48	602.38	7.351
05 PR BASIN OUT	POND	10	14.691	L	13.1000	15.05	602.96	8.818
05 PR BASIN OUT	POND	25	17.783	L	13.1000	18.76	603.61	10.540
05 PR BASIN OUT	POND	50	20.407	L	13.0000	22.94	604.11	11.926
05 PR BASIN OUT	POND	100	22.532	L	12.9000	26.61	604.49	13.034
*06 POST OUTFALL	JCT	1	6.970		12.8000	9.50		
*06 POST OUTFALL	JCT	2	8.800		12.9000	11.03		
*06 POST OUTFALL	JCT	5	12.180		13.1000	13.48		
*06 POST OUTFALL	JCT	10	14.692		13.1000	15.05		
*06 POST OUTFALL	JCT	25	17.783		13.1000	18.76		
*06 POST OUTFALL	JCT	50	20.408		13.0000	22.94		
*06 POST OUTFALL	JCT	100	22.533		12.9000	26.61		

Title... Project Date: 1/17/2018
Project Engineer: jhaubert
Project Title: Fairfield Logistics Center
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = BUTLER

Storm Tag Name = 1

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 2

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 2.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 5

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 3.6000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.1000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 4.7000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Title... Project Date: 1/17/2018
Project Engineer: jhaubert
Project Title: Fairfield Logistics Center
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = BUTLER

Storm Tag Name = 50

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 5.2000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 100

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.6000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: User Defined

Segment #1 Time: .2500 hrs

==========
Total Tc: .2500 hrs
==========

Tc Equations used...

==== User Defined ====

Tc = Value entered by user

Where: Tc = Time of concentration

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: User Defined

Segment #1 Time: .2500 hrs

Total Tc: .2500 hrs

Tc Equations used...

==== User Defined ====

Tc = Value entered by user

Where: Tc = Time of concentration

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Miller Farm Area A	80	27.522			80.00
Miller Farm Area B	72	2.283			72.00
Miller Farm Area C	79	3.254			79.00
Miller Farm Area D (Site w/i)	79	33.634			79.00
COMPOSITE AREA & WEIGHTED CN --->		66.693			79.17 (79)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Miller Farm Area D (Offsite)	90	11.754			90.00
Miller Farm Area A	80	27.522			80.00
Miller Farm Area B	72	2.283			72.00
Miller Farm Area C	79	3.254			79.00
Miller Farm Area D (Pervious)	79	12.420			79.00
Miller Farm Area D (Impervious)	98	11.740			98.00
COMPOSITE AREA & WEIGHTED CN --->		68.973			84.28 (84)

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
599.00	-----	0	0	.000	.000
600.00	-----	49792	49792	.381	.381
601.00	-----	67554	175343	1.342	1.723
602.00	-----	81337	223018	1.707	3.429
603.00	-----	94926	264133	2.021	5.451
604.00	-----	113098	311639	2.385	7.835
605.00	-----	139528	378245	2.894	10.730

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
599.00	-----	85228	0	.000	.000
600.00	-----	90587	263682	2.018	2.018
601.00	-----	95884	279669	2.140	4.158
602.00	-----	103411	298871	2.287	6.445
603.00	-----	112426	323661	2.477	8.922
604.00	-----	123070	353123	2.702	11.624
605.00	-----	133696	385039	2.946	14.570

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 599.00 ft
Increment = .25 ft
Max. Elev.= 605.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	W0	--->	C0	603.020	605.000
Inlet Box	R0	--->	C0	604.570	605.000
Orifice-Circular	O1	--->	C0	599.450	605.000
Culvert-Circular	C0	--->	TW	598.570	605.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID = W0
Structure Type = Weir-Rectangular

# of Openings = 1
Crest Elev. = 603.02 ft
Weir Length = 2.00 ft
Weir Coeff. = 3.330000

Weir TW effects (Use adjustment equation)

Structure ID = R0
Structure Type = Inlet Box

# of Openings = 1
Invert Elev. = 604.57 ft
Orifice Area = 2.5000 sq.ft
Orifice Coeff. = .600
Weir Length = 6.50 ft
Weir Coeff. = 3.330
K, Reverse = 1.000
Mannings n = .0000
Kev,Charged Riser = .000
Weir Submergence = No

Structure ID = O1
Structure Type = Orifice-Circular

# of Openings = 1
Invert Elev. = 599.45 ft
Diameter = 1.0000 ft
Orifice Coeff. = .610

OUTLET STRUCTURE INPUT DATA

Structure ID = C0
Structure Type = Culvert-Circular

No. Barrels = 1
Barrel Diameter = 2.0000 ft
Upstream Invert = 598.57 ft
Dnstream Invert = 598.55 ft
Horiz. Length = 49.00 ft
Barrel Length = 49.00 ft
Barrel Slope = .00041 ft/ft

OUTLET CONTROL DATA...
Mannings n = .0150
Ke = .0000 (forward entrance loss)
Kb = .016523 (per ft of full flow)
Kr = .0000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...
Equation form = 2
Inlet Control K = .5340
Inlet Control M = .5550
Inlet Control c = .01960
Inlet Control Y = .9000
T1 ratio (HW/D) = 1.070
T2 ratio (HW/D) = 1.213
Slope Factor = -.500

Use unsubmerged inlet control Form 2 equ. below T1 elev.
Use submerged inlet control Form 2 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev = 600.71 ft ---> Flow = 15.55 cfs
At T2 Elev = 601.00 ft ---> Flow = 17.77 cfs

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = W0 (Weir-Rectangular)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
599.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.45	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
603.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = W0 (Weir-Rectangular)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
603.02	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
603.25	.73	603.25	Free	600.08	.000	.000	Free Outfall	
		H=.23; Htw=.00; Qfree=.73;						
603.50	2.21	603.50	Free	600.24	.000	.000	Free Outfall	
		H=.48; Htw=.00; Qfree=2.21;						
603.75	4.15	603.75	Free	600.45	.000	.000	Free Outfall	
		H=.73; Htw=.00; Qfree=4.15;						
604.00	6.46	604.00	Free	600.69	.000	.000	Free Outfall	
		H=.98; Htw=.00; Qfree=6.46;						
604.25	9.08	604.25	Free	600.97	.000	.000	Free Outfall	
		H=1.23; Htw=.00; Qfree=9.08;						
604.50	11.99	604.50	Free	601.34	.000	.000	Free Outfall	
		H=1.48; Htw=.00; Qfree=11.99;						
604.57	12.85	604.57	Free	601.45	.000	.000	Free Outfall	
		H=1.55; Htw=.00; Qfree=12.85;						
604.75	15.15	604.75	Free	601.96	.000	.000	Free Outfall	
		H=1.73; Htw=.00; Qfree=15.15;						
605.00	18.54	605.00	603.06	603.06	.000	.000	Free Outfall	
		H=1.98; Htw=.04; Qfree=18.56;						

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = R0 (Inlet Box)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
599.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.45	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
603.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = R0 (Inlet Box)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
603.02	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
603.25	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
603.50	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
603.75	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
604.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
604.25	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
604.50	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
604.57	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
604.75	1.65	604.75	Free	601.96	.000	.000	Free Outfall	
		Weir: H =.18ft						
605.00	6.10	605.00	Free	603.06	.000	.000	Free Outfall	
		Weir: H =.43ft						

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = O1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
599.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
599.25	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
599.45	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
599.50	.01	599.50	Free	598.64	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL	Vh= .011ft	Dcr= .039ft	CRIT.DEPTH Hev= .00ft			
599.75	.29	599.75	Free	.00	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL	Vh= .078ft	Dcr= .223ft	CRIT.DEPTH Hev= .00ft			
600.00	.91	600.00	Free	599.10	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL	Vh= .150ft	Dcr= .401ft	CRIT.DEPTH Hev= .00ft			
600.25	1.78	600.25	Free	599.29	.000	.000	Free Outfall	
		CRIT.DEPTH CONTROL	Vh= .232ft	Dcr= .568ft	CRIT.DEPTH Hev= .00ft			
600.50	2.85	600.50	599.47	.00	.000	.000	Free Outfall	
		H =.55						
600.75	3.44	600.75	599.56	.00	.000	.000	Free Outfall	
		H =.80						
601.00	3.94	601.00	599.63	599.63	.000	.000	Free Outfall	
		H =1.05						
601.25	4.38	601.25	599.69	599.69	.000	.000	Free Outfall	
		H =1.30						
601.50	4.78	601.50	599.75	599.75	.000	.000	Free Outfall	
		H =1.55						
601.75	5.16	601.75	599.79	.00	.000	.000	Free Outfall	
		H =1.80						
602.00	5.50	602.00	599.84	599.84	.000	.000	Free Outfall	
		H =2.05						
602.25	5.83	602.25	599.88	599.88	.000	.000	Free Outfall	
		H =2.30						
602.50	6.14	602.50	599.91	599.91	.000	.000	Free Outfall	
		H =2.55						
602.75	6.43	602.75	599.94	.00	.000	.000	Free Outfall	
		H =2.80						
603.00	6.68	603.00	599.98	599.98	.000	.000	Free Outfall	
		H =3.03						

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = O1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
603.02	6.70	603.02	599.98	599.98	.000	.000	Free Outfall	
		H =3.04						
603.25	6.85	603.25	600.08	600.08	.002	.000	Free Outfall	
		H =3.17						
603.50	6.93	603.50	600.24	600.24	.000	.000	Free Outfall	
		H =3.26						
603.75	6.98	603.75	600.45	600.45	.000	.000	Free Outfall	
		H =3.30						
604.00	6.99	604.00	600.69	600.69	.000	.000	Free Outfall	
		H =3.31						
604.25	6.96	604.25	600.97	600.97	.000	.000	Free Outfall	
		H =3.28						
604.50	6.83	604.50	601.34	601.34	.000	.000	Free Outfall	
		H =3.16						
604.57	6.79	604.57	601.45	601.45	.000	.000	Free Outfall	
		H =3.12						
604.75	6.42	604.75	601.96	601.96	.000	.000	Free Outfall	
		H =2.79						
605.00	5.36	605.00	603.06	603.06	.000	.000	Free Outfall	
		H =1.94						

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 4.26 cfs
UPstream ID's= W0, R0, O1
DNstream ID = TW (Pond Outfall)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
599.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.45	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.50	.01	598.64	Free	Free	.000	.000	Free Outfall	
	BACKWATER CONTROL.. Vh= .001ft hwDi= .065ft Lbw= 49.0ft Hev= .00ft							
599.75	.29	.00	Free	Free	.000	.000	Free Outfall	
	BACKWATER CONTROL.. Vh= .016ft hwDi= .296ft Lbw= 49.0ft Hev= .00ft							
600.00	.91	599.10	Free	Free	.000	.001	Free Outfall	
	BACKWATER CONTROL.. Vh= .038ft hwDi= .485ft Lbw= 49.0ft Hev= .00ft							
600.25	1.78	599.29	Free	Free	.000	.002	Free Outfall	
	BACKWATER CONTROL.. Vh= .060ft hwDi= .658ft Lbw= 49.0ft Hev= .00ft							
600.50	2.85	.00	Free	Free	.000	.000	Free Outfall	
	BACKWATER CONTROL.. Vh= .086ft hwDi= .818ft Lbw= 49.0ft Hev= .00ft							
600.75	3.44	.00	Free	Free	.000	.000	Free Outfall	
	BACKWATER CONTROL.. Vh= .100ft hwDi= .894ft Lbw= 49.0ft Hev= .00ft							
601.00	3.94	599.63	Free	Free	.000	.001	Free Outfall	
	BACKWATER CONTROL.. Vh= .110ft hwDi= .954ft Lbw= 49.0ft Hev= .00ft							
601.25	4.38	599.69	Free	Free	.000	.001	Free Outfall	
	BACKWATER CONTROL.. Vh= .119ft hwDi= 1.005ft Lbw= 49.0ft Hev= .00ft							
601.50	4.79	599.75	Free	Free	.000	.002	Free Outfall	
	BACKWATER CONTROL.. Vh= .128ft hwDi= 1.049ft Lbw= 49.0ft Hev= .00ft							
601.75	5.16	.00	Free	Free	.000	.000	Free Outfall	
	BACKWATER CONTROL.. Vh= .136ft hwDi= 1.089ft Lbw= 49.0ft Hev= .00ft							
602.00	5.50	599.84	Free	Free	.000	.001	Free Outfall	
	BACKWATER CONTROL.. Vh= .143ft hwDi= 1.123ft Lbw= 49.0ft Hev= .00ft							
602.25	5.83	599.88	Free	Free	.000	.001	Free Outfall	
	BACKWATER CONTROL.. Vh= .149ft hwDi= 1.156ft Lbw= 49.0ft Hev= .00ft							
602.50	6.14	599.91	Free	Free	.000	.000	Free Outfall	
	BACKWATER CONTROL.. Vh= .155ft hwDi= 1.187ft Lbw= 49.0ft Hev= .00ft							
602.75	6.42	.00	Free	Free	.000	.000	Free Outfall	
	BACKWATER CONTROL.. Vh= .161ft hwDi= 1.214ft Lbw= 49.0ft Hev= .00ft							
603.00	6.69	599.98	Free	Free	.000	.002	Free Outfall	
	BACKWATER CONTROL.. Vh= .166ft hwDi= 1.239ft Lbw= 49.0ft Hev= .00ft							

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 4.26 cfs
UPstream ID's= W0, R0, O1
DNstream ID = TW (Pond Outfall)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
603.02	6.70	599.98	Free	Free	.000	.007	Free Outfall	
		BACKWATER CONTROL.. Vh= .166ft hwDi= 1.241ft Lbw= 49.0ft Hev= .00ft						
603.25	7.57	600.08	Free	Free	.000	.005	Free Outfall	
		BACKWATER CONTROL.. Vh= .184ft hwDi= 1.321ft Lbw= 49.0ft Hev= .00ft						
603.50	9.15	600.24	Free	Free	.000	.001	Free Outfall	
		BACKWATER CONTROL.. Vh= .216ft hwDi= 1.459ft Lbw= 49.0ft Hev= .00ft						
603.75	11.13	600.45	Free	Free	.000	.010	Free Outfall	
		BACKWATER CONTROL.. Vh= .258ft hwDi= 1.622ft Lbw= 49.0ft Hev= .00ft						
604.00	13.45	600.69	Free	Free	.000	.001	Free Outfall	
		BACKWATER CONTROL.. Vh= .316ft hwDi= 1.806ft Lbw= 49.0ft Hev= .00ft						
604.25	16.03	600.97	Free	Free	.000	.014	Free Outfall	
		BACKWATER CONTROL.. Vh= .405ft hwDi= 1.998ft Lbw= 49.0ft Hev= .00ft						
604.50	18.81	601.34	Free	Free	.000	.013	Free Outfall	
		FULL FLOW...Lfull=24.13ft Vh=.557ft HL=.779ft Hev= .00ft						
604.57	19.63	601.45	Free	Free	.000	.013	Free Outfall	
		FULL FLOW...Lfull=28.58ft Vh=.606ft HL=.893ft Hev= .00ft						
604.75	23.21	601.96	Free	Free	.000	.021	Free Outfall	
		FULL FLOW...Lfull=39.56ft Vh=.848ft HL=1.403ft Hev= .00ft						
605.00	29.97	603.06	Free	Free	.000	.024	Free Outfall	
		FULL FLOW...Lfull=46.75ft Vh=1.414ft HL=2.507ft Hev= .00ft						

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 599.00 ft
Increment = .25 ft
Max. Elev.= 605.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Orifice-Area	O2	--->	C0	599.750	605.000
Weir-Rectangular	W0	--->	C0	603.020	605.000
Inlet Box	R0	--->	C0	604.570	605.000
Orifice-Circular	O1	--->	C0	599.450	605.000
Culvert-Circular	C0	--->	TW	598.570	605.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID = O2
Structure Type = Orifice-Area

# of Openings = 1
Invert Elev. = 599.75 ft
Area = 2.0000 sq.ft
Top of Orifice = .00 ft
Datum Elev. = 599.75 ft
Orifice Coeff. = .600

Structure ID = W0
Structure Type = Weir-Rectangular

# of Openings = 1
Crest Elev. = 603.02 ft
Weir Length = 2.00 ft
Weir Coeff. = 3.330000

Weir TW effects (Use adjustment equation)

OUTLET STRUCTURE INPUT DATA

Structure ID = R0
Structure Type = Inlet Box

# of Openings = 1
Invert Elev. = 604.57 ft
Orifice Area = 2.5000 sq.ft
Orifice Coeff. = .600
Weir Length = 6.50 ft
Weir Coeff. = 3.330
K, Reverse = 1.000
Mannings n = .0000
Kev,Charged Riser = .000
Weir Submergence = No

Structure ID = O1
Structure Type = Orifice-Circular

# of Openings = 1
Invert Elev. = 599.45 ft
Diameter = .4500 ft
Orifice Coeff. = .610

OUTLET STRUCTURE INPUT DATA

Structure ID = C0
Structure Type = Culvert-Circular

No. Barrels = 1
Barrel Diameter = 2.0000 ft
Upstream Invert = 598.57 ft
Dnstream Invert = 598.55 ft
Horiz. Length = 49.00 ft
Barrel Length = 49.00 ft
Barrel Slope = .00041 ft/ft

OUTLET CONTROL DATA...
Mannings n = .0150
Ke = .0000 (forward entrance loss)
Kb = .016523 (per ft of full flow)
Kr = .0000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...
Equation form = 2
Inlet Control K = .5340
Inlet Control M = .5550
Inlet Control c = .01960
Inlet Control Y = .9000
T1 ratio (HW/D) = 1.070
T2 ratio (HW/D) = 1.213
Slope Factor = -.500

Use unsubmerged inlet control Form 2 equ. below T1 elev.
Use submerged inlet control Form 2 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev = 600.71 ft ---> Flow = 15.55 cfs
At T2 Elev = 601.00 ft ---> Flow = 17.77 cfs

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = O2 (Orifice-Area)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
599.00	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
599.25	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
599.45	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
599.50	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
599.75	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
600.00	4.60	600.00	599.77	599.77	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=.23						
600.25	5.64	600.25	599.91	599.91	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=.34						
600.50	6.61	600.50	600.03	600.03	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=.47						
600.75	7.54	600.75	600.14	600.14	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=.61						
601.00	8.40	601.00	600.24	600.24	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=.76						
601.25	9.23	601.25	600.33	600.33	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=.92						
601.50	10.01	601.50	600.42	600.42	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=1.08						
601.75	10.76	601.75	600.50	600.50	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=1.25						
602.00	11.47	602.00	600.58	600.58	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=1.42						
602.25	12.14	602.25	600.66	600.66	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=1.59						
602.50	12.80	602.50	600.73	600.73	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=1.77						
602.75	13.43	602.75	600.80	600.80	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=1.95						
603.00	14.03	603.00	600.88	600.88	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=2.12						

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = O2 (Orifice-Area)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
603.02	14.07	603.02	600.88	600.88	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=2.14						
603.25	14.40	603.25	601.01	601.01	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=2.24						
603.50	14.53	603.50	601.22	601.22	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=2.28						
603.75	14.51	603.75	601.48	601.48	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=2.27						
604.00	14.35	604.00	601.78	601.78	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=2.22						
604.25	14.06	604.25	602.12	602.12	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=2.13						
604.50	13.60	604.50	602.50	602.50	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=2.00						
604.57	13.45	604.57	602.62	602.62	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=1.95						
604.75	12.40	604.75	603.09	603.09	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=1.66						
605.00	10.49	605.00	603.81	603.81	.000	.000	Free Outfall	
		CHARGED RISER: Orifice Equation Control to TW; H=1.19						

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = W0 (Weir-Rectangular)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
599.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.45	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
603.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = W0 (Weir-Rectangular)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
603.02	.00	...	...	...	...	...	Free Outfall	
		WS below an invert; no flow.						
603.25	.73	603.25	Free	601.01	.000	.000	Free Outfall	
		H=.23; Htw=.00; Qfree=.73;						
603.50	2.21	603.50	Free	601.22	.000	.000	Free Outfall	
		H=.48; Htw=.00; Qfree=2.21;						
603.75	4.15	603.75	Free	601.48	.000	.000	Free Outfall	
		H=.73; Htw=.00; Qfree=4.15;						
604.00	6.46	604.00	Free	601.78	.000	.000	Free Outfall	
		H=.98; Htw=.00; Qfree=6.46;						
604.25	9.08	604.25	Free	602.12	.000	.000	Free Outfall	
		H=1.23; Htw=.00; Qfree=9.08;						
604.50	11.99	604.50	Free	602.50	.000	.000	Free Outfall	
		H=1.48; Htw=.00; Qfree=11.99;						
604.57	12.85	604.57	Free	602.62	.000	.000	Free Outfall	
		H=1.55; Htw=.00; Qfree=12.85;						
604.75	15.11	604.75	603.09	603.09	.000	.000	Free Outfall	
		H=1.73; Htw=.07; Qfree=15.15;						
605.00	16.58	605.00	603.81	603.81	.000	.000	Free Outfall	
		H=1.98; Htw=.79; Qfree=18.56;						

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = R0 (Inlet Box)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
599.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.45	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
600.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
601.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
602.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
603.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = R0 (Inlet Box)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
603.02	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
603.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
603.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
603.75	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
604.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
604.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
604.50	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
604.57	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
604.75	1.65	604.75	Free	603.09	.000	.000	Free Outfall	
	Weir: H =.18ft							
605.00	6.10	605.00	Free	603.81	.000	.000	Free Outfall	
	Weir: H =.43ft							

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = O1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
599.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.45	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.50	.01	599.50	Free	598.63	.000	.000	Free Outfall	
	CRIT.DEPTH CONTROL Vh= .016ft Dcr= .035ft CRIT.DEPTH Hev= .00ft							
599.75	.18	599.75	Free	598.82	.000	.000	Free Outfall	
	CRIT.DEPTH CONTROL Vh= .084ft Dcr= .216ft CRIT.DEPTH Hev= .00ft							
600.00	.37	600.00	599.77	599.77	.000	.000	Free Outfall	
	H =.23							
600.25	.46	600.25	599.91	599.91	.000	.000	Free Outfall	
	H =.34							
600.50	.53	600.50	600.03	600.03	.000	.000	Free Outfall	
	H =.47							
600.75	.61	600.75	600.14	600.14	.000	.000	Free Outfall	
	H =.61							
601.00	.68	601.00	600.24	600.24	.000	.000	Free Outfall	
	H =.76							
601.25	.75	601.25	600.33	600.33	.000	.000	Free Outfall	
	H =.92							
601.50	.81	601.50	600.42	600.42	.000	.000	Free Outfall	
	H =1.08							
601.75	.87	601.75	600.50	600.50	.000	.000	Free Outfall	
	H =1.25							
602.00	.93	602.00	600.58	600.58	.000	.000	Free Outfall	
	H =1.42							
602.25	.98	602.25	600.66	600.66	.000	.000	Free Outfall	
	H =1.59							
602.50	1.03	602.50	600.73	600.73	.000	.000	Free Outfall	
	H =1.77							
602.75	1.09	602.75	600.80	600.80	.000	.000	Free Outfall	
	H =1.95							
603.00	1.13	603.00	600.88	600.88	.000	.000	Free Outfall	
	H =2.12							

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = O1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
DNstream ID = C0 (Culvert-Circular)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
603.02	1.14	603.02	600.88	600.88	.002	.000	Free Outfall	
		H =2.14						
603.25	1.16	603.25	601.01	601.01	.000	.000	Free Outfall	
		H =2.24						
603.50	1.17	603.50	601.22	601.22	.000	.000	Free Outfall	
		H =2.28						
603.75	1.17	603.75	601.48	601.48	.000	.000	Free Outfall	
		H =2.27						
604.00	1.16	604.00	601.78	601.78	.000	.000	Free Outfall	
		H =2.22						
604.25	1.14	604.25	602.12	602.12	.000	.000	Free Outfall	
		H =2.13						
604.50	1.10	604.50	602.50	602.50	.000	.000	Free Outfall	
		H =2.00						
604.57	1.09	604.57	602.62	602.62	.000	.000	Free Outfall	
		H =1.95						
604.75	1.00	604.75	603.09	603.09	.000	.000	Free Outfall	
		H =1.66						
605.00	.85	605.00	603.81	603.81	.000	.000	Free Outfall	
		H =1.19						

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 4.26 cfs
UPstream ID's= O2, W0, R0, O1
DNstream ID = TW (Pond Outfall)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
599.00	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.25	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.45	.00	...	...	...	...	...	Free Outfall	
	WS below an invert; no flow.							
599.50	.01	598.63	Free	Free	.000	.000	Free Outfall	
	BACKWATER CONTROL.. Vh= .001ft hwDi= .054ft Lbw= 49.0ft Hev= .00ft							
599.75	.18	598.82	Free	Free	.000	.000	Free Outfall	
	BACKWATER CONTROL.. Vh= .011ft hwDi= .238ft Lbw= 49.0ft Hev= .00ft							
600.00	4.98	599.77	Free	Free	.000	.005	Free Outfall	
	BACKWATER CONTROL.. Vh= .132ft hwDi= 1.070ft Lbw= 49.0ft Hev= .00ft							
600.25	6.09	599.91	Free	Free	.000	.004	Free Outfall	
	BACKWATER CONTROL.. Vh= .154ft hwDi= 1.183ft Lbw= 49.0ft Hev= .00ft							
600.50	7.15	600.03	Free	Free	.000	.003	Free Outfall	
	BACKWATER CONTROL.. Vh= .175ft hwDi= 1.282ft Lbw= 49.0ft Hev= .00ft							
600.75	8.14	600.14	Free	Free	.000	.006	Free Outfall	
	BACKWATER CONTROL.. Vh= .195ft hwDi= 1.372ft Lbw= 49.0ft Hev= .00ft							
601.00	9.09	600.24	Free	Free	.000	.003	Free Outfall	
	BACKWATER CONTROL.. Vh= .215ft hwDi= 1.453ft Lbw= 49.0ft Hev= .00ft							
601.25	9.97	600.33	Free	Free	.000	.004	Free Outfall	
	BACKWATER CONTROL.. Vh= .233ft hwDi= 1.528ft Lbw= 49.0ft Hev= .00ft							
601.50	10.82	600.42	Free	Free	.000	.008	Free Outfall	
	BACKWATER CONTROL.. Vh= .252ft hwDi= 1.598ft Lbw= 49.0ft Hev= .00ft							
601.75	11.62	600.50	Free	Free	.000	.003	Free Outfall	
	BACKWATER CONTROL.. Vh= .269ft hwDi= 1.662ft Lbw= 49.0ft Hev= .00ft							
602.00	12.39	600.58	Free	Free	.000	.002	Free Outfall	
	BACKWATER CONTROL.. Vh= .288ft hwDi= 1.723ft Lbw= 49.0ft Hev= .00ft							
602.25	13.13	600.66	Free	Free	.000	.009	Free Outfall	
	BACKWATER CONTROL.. Vh= .307ft hwDi= 1.781ft Lbw= 49.0ft Hev= .00ft							
602.50	13.83	600.73	Free	Free	.000	.010	Free Outfall	
	BACKWATER CONTROL.. Vh= .326ft hwDi= 1.835ft Lbw= 49.0ft Hev= .00ft							
602.75	14.51	600.80	Free	Free	.000	.001	Free Outfall	
	BACKWATER CONTROL.. Vh= .347ft hwDi= 1.888ft Lbw= 49.0ft Hev= .00ft							
603.00	15.15	600.88	Free	Free	.000	.009	Free Outfall	
	BACKWATER CONTROL.. Vh= .368ft hwDi= 1.937ft Lbw= 49.0ft Hev= .00ft							

RATING TABLE FOR ONE OUTLET TYPE

Structure ID = C0 (Culvert-Circular)

Mannings open channel maximum capacity: 4.26 cfs
UPstream ID's= O2, W0, R0, O1
DNstream ID = TW (Pond Outfall)

Pond WS. Elev. ft	Device Q cfs	(into) HW HGL ft	Converge DS HGL ft	Next DS HGL ft	DS HGL Error +/-ft	Q SUM Error +/-cfs	DS Chan. TW ft	TW Error +/-ft
603.02	15.19	600.88	Free	Free	.000	.012	Free Outfall	
	BACKWATER CONTROL.. Vh= .370ft hwDi= 1.940ft Lbw= 49.0ft Hev= .00ft							
603.25	16.29	601.01	Free	Free	.000	.010	Free Outfall	
	FULL FLOW...Lfull=3.58ft Vh=.418ft HL=.443ft Hev= .00ft							
603.50	17.93	601.22	Free	Free	.000	.011	Free Outfall	
	FULL FLOW...Lfull=18.44ft Vh=.506ft HL=.660ft Hev= .00ft							
603.75	19.82	601.48	Free	Free	.000	.019	Free Outfall	
	FULL FLOW...Lfull=29.31ft Vh=.619ft HL=.918ft Hev= .00ft							
604.00	21.95	601.78	Free	Free	.000	.018	Free Outfall	
	FULL FLOW...Lfull=37.08ft Vh=.759ft HL=1.223ft Hev= .00ft							
604.25	24.27	602.12	Free	Free	.000	.011	Free Outfall	
	FULL FLOW...Lfull=41.51ft Vh=.928ft HL=1.564ft Hev= .00ft							
604.50	26.72	602.50	Free	Free	.000	.022	Free Outfall	
	FULL FLOW...Lfull=44.58ft Vh=1.124ft HL=1.952ft Hev= .00ft							
604.57	27.40	602.62	Free	Free	.000	.006	Free Outfall	
	FULL FLOW...Lfull=45.26ft Vh=1.182ft HL=2.066ft Hev= .00ft							
604.75	30.16	603.09	Free	Free	.000	.001	Free Outfall	
	FULL FLOW...Lfull=46.82ft Vh=1.432ft HL=2.540ft Hev= .00ft							
605.00	34.00	603.81	Free	Free	.000	.033	Free Outfall	
	FULL FLOW...Lfull=47.96ft Vh=1.820ft HL=3.262ft Hev= .00ft							

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