

Westwood

POND ANALYSIS

The Meadows

Jackson County, MO

October, 2015



Prepared For:



**John Knox
Village**

Pond Analysis for
The Meadows

Jackson County, Missouri

Prepared for:

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Certification

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Texas.

Westwood Project Number: 0004044.00

Date: 10/6/2015

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INTRODUCTION

The purpose of this report is to describe the impact that development of The Meadows will have on the existing pond downstream of the site in Lee's Summit, Missouri. (Appendix A) Additionally, this report addresses the positive overflow beneath the proposed pedestrian bridge.

EXISTING POND ANALYSIS

The existing pond downstream of the project is approximately 3.5 acres in size at the normal water elevation and is controlled by a 10' x 10' vertical orifice that discharges under Pryor Road. (Appendix B) Pond volume was calculated using publically available LiDAR elevation data. Construction of the project will add 0.57 acres of new impervious surface (Table 1). This new impervious surface will increase the amount of runoff entering the pond downstream of the site. The total area draining to the pond from onsite and offsite sources is 157.72 acres (Appendix C).

Table 1. Impervious surface summary

Cover Type	Existing Impervious Areas (ac)	Proposed Impervious Areas (ac)	Impervious Areas Increase (ac)
Building	1.90	1.82	-0.08
Pavement	2.30	2.61	0.31
Sidewalk	0.62	0.97	0.35
Total	4.83	5.40	0.57

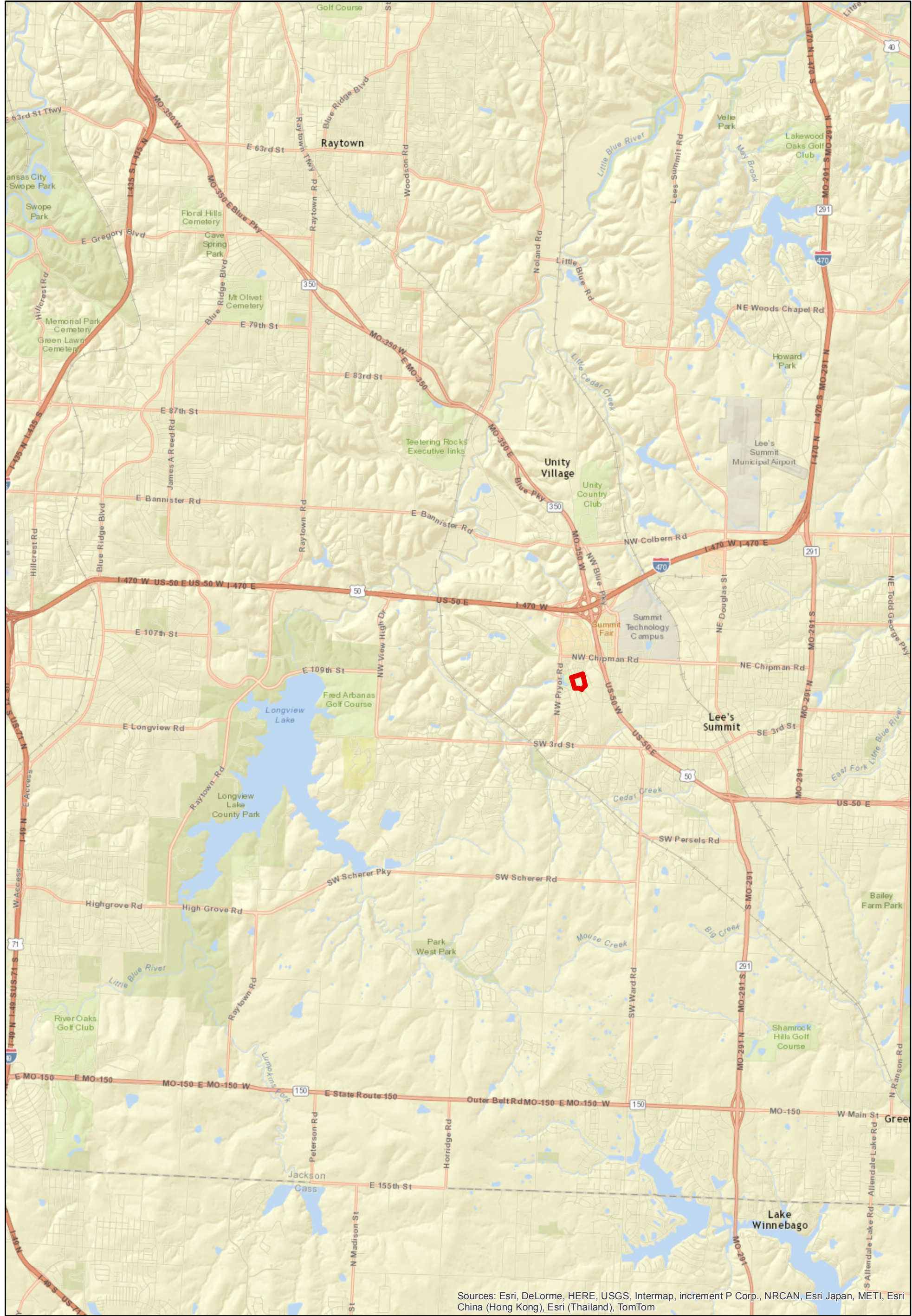
To analyze the impact on the pond from the development, HydroCAD modeling software was used. HydroCAD can be used to calculate existing and proposed runoff rates and volumes and route flows through ponds. Atlas-14 was used as the source for precipitation data. (Appendix D) The existing high water elevation of the Pond is 950.37' for the 100-year event. (Appendix E) Under proposed conditions, this high water elevation changes slightly to 950.38' This nominal increase is acceptable and will not cause noticeable impacts to the pond, Pryor Road or surrounding properties. Additional model results are provided in Table 2.

Table 2. Modeling results for Pryor Pond

Parameter	Existing	Proposed
Normal Water Elevation [ft]	947.0	947.0
2-year High Water Elevation [ft]	948.4	948.4
10-year High Water Elevation [ft]	949.2	949.2
100-year High Water Elevation [ft]	949.7	949.7
2-year Peak Flow Rate Out [cfs]	212.8	213.5
10-year Peak Flow Rate Out [cfs]	502.4	503.6
100-year Peak Flow Rate Out [cfs]	966.1	967.4



Appendix A



Sources: Esri, DeLorme, HERE, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom

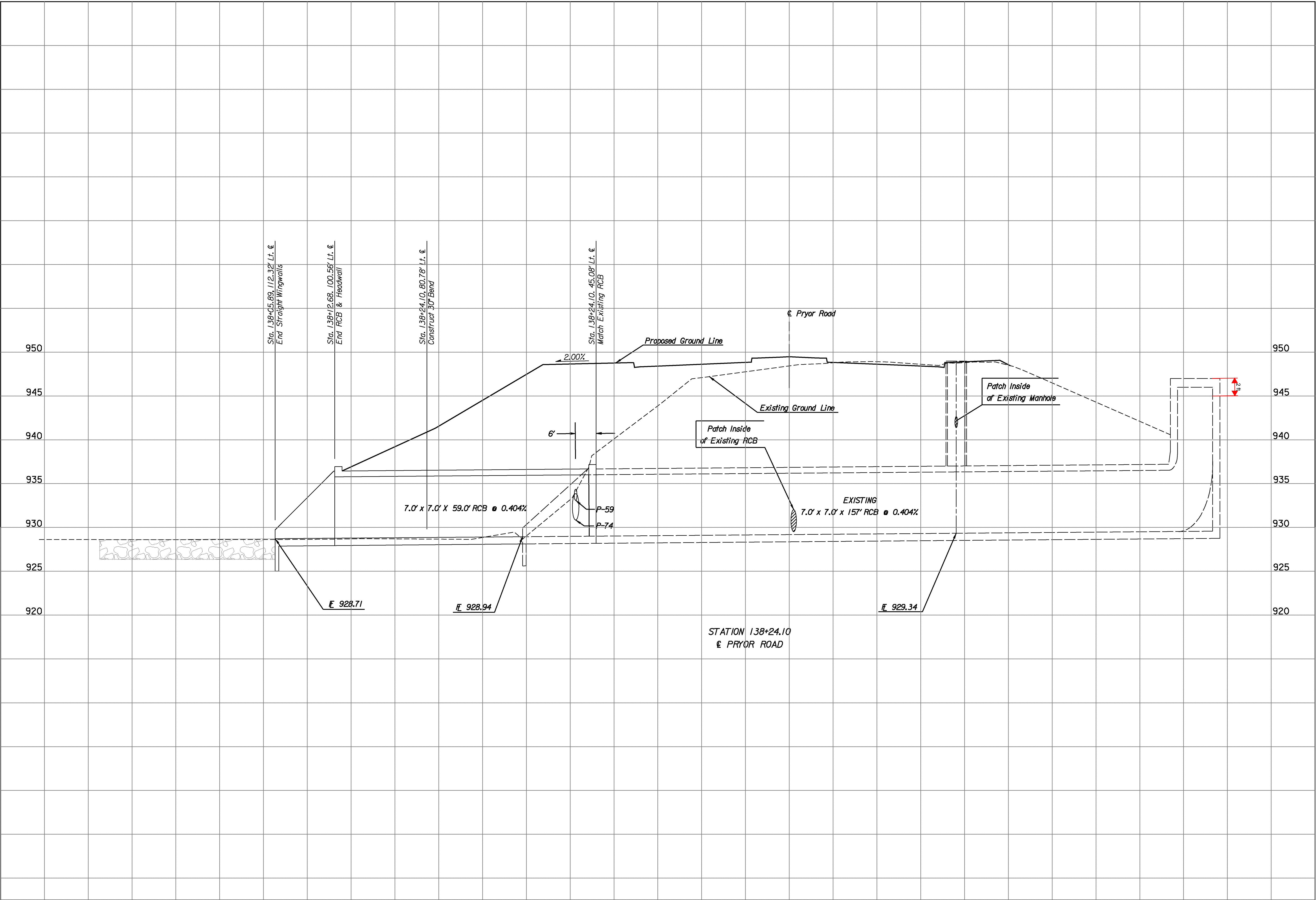
Data Source(s):



Appendix B

APPROVED		DETAILED
DESIGNED		DETAIL CK.
QUANTITIES		TRACED
QUANLCK		TRACE CK.

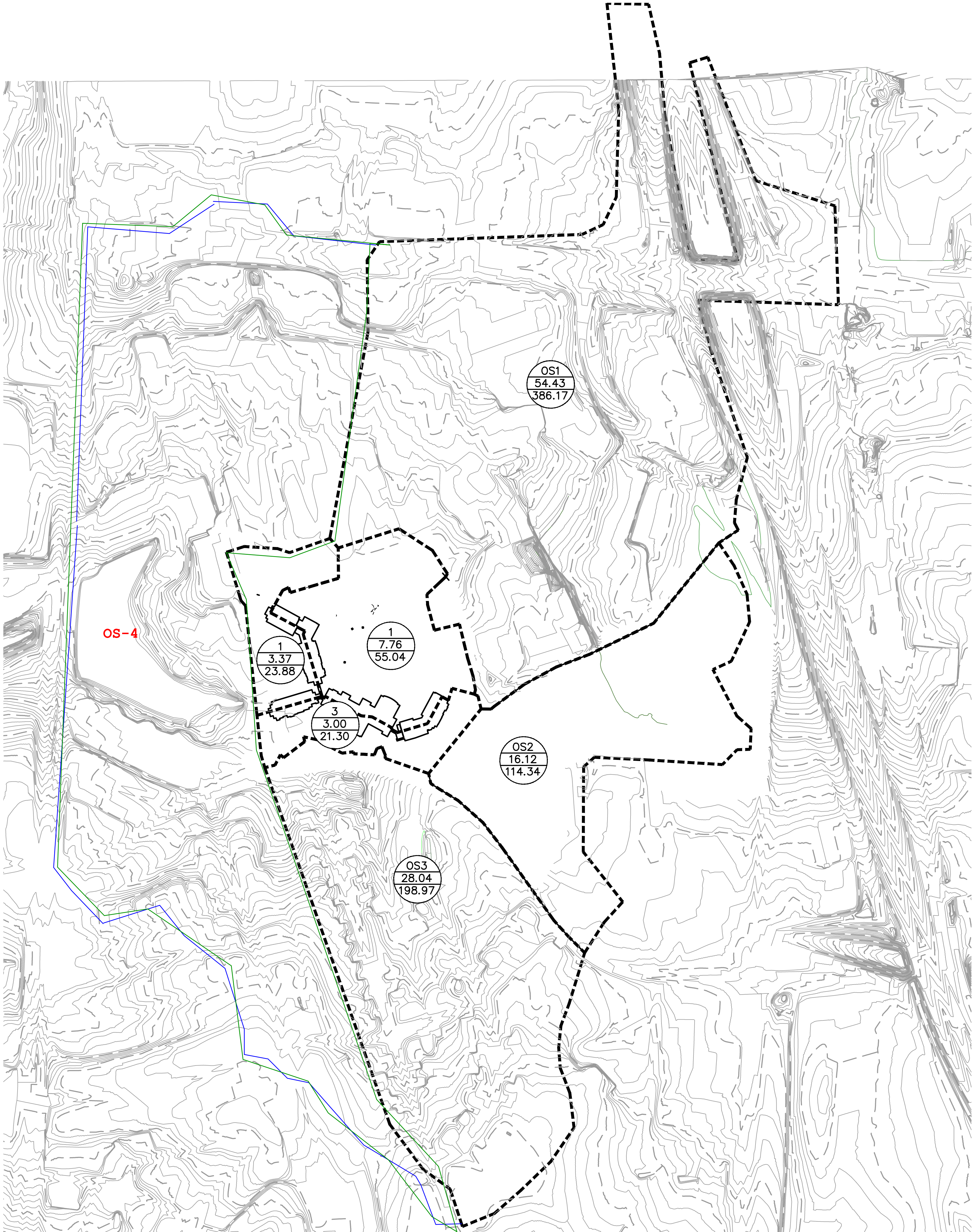
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Design Filename: h\\33455\\002-Pryor-Road\\CD\\drainage\\culvert_prc.dgn



SHEET NO.		TOTAL SHEETS	
106		237	
7450 WEST 130TH STREET OVERLAND PARK, KANSAS 66213 PHONE NO. (913) 491-9333 WWW.HNTB.COM			
HNTB			
CITY OF LEE'S SUMMIT, MISSOURI			
NO.		BY	
4		APP'D	
3		BY	
2		BY	
1		BY	
NO.		DATE	
4		DATE	
3		DATE	
2		DATE	
1		DATE	
NO.		DATE	
REVISIONS			
CULVERT EXTENSION PROFILE			



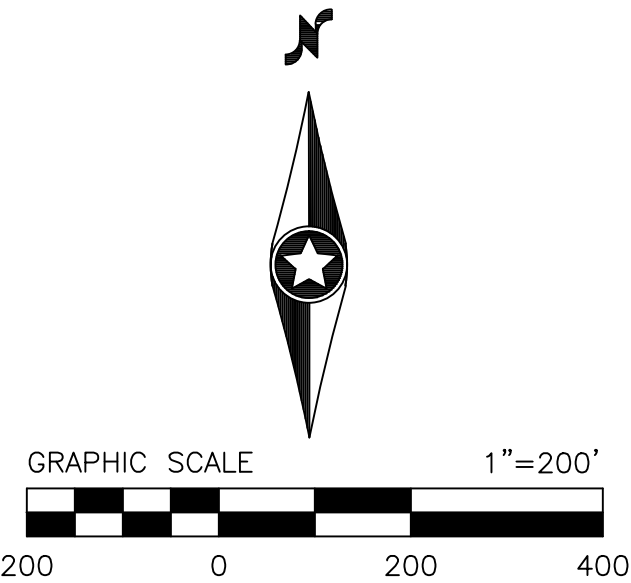
Appendix C



LEGEND

- STORM DRAIN LINE WITH INLET
- PROP. FLOW ARROW
- EXISTING 5' CONTOUR INTERVAL
- EXISTING 1' CONTOUR INTERVAL
- DRAINAGE AREA DIVIDE

A	WATERSHED ID
1.00	DRAINAGE AREA
5.0	Q ₁₀₀ RUNOFF



**OVERALL DRAINAGE
MAP**



Appendix D

General Info

NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: MO

DATA DESCRIPTION

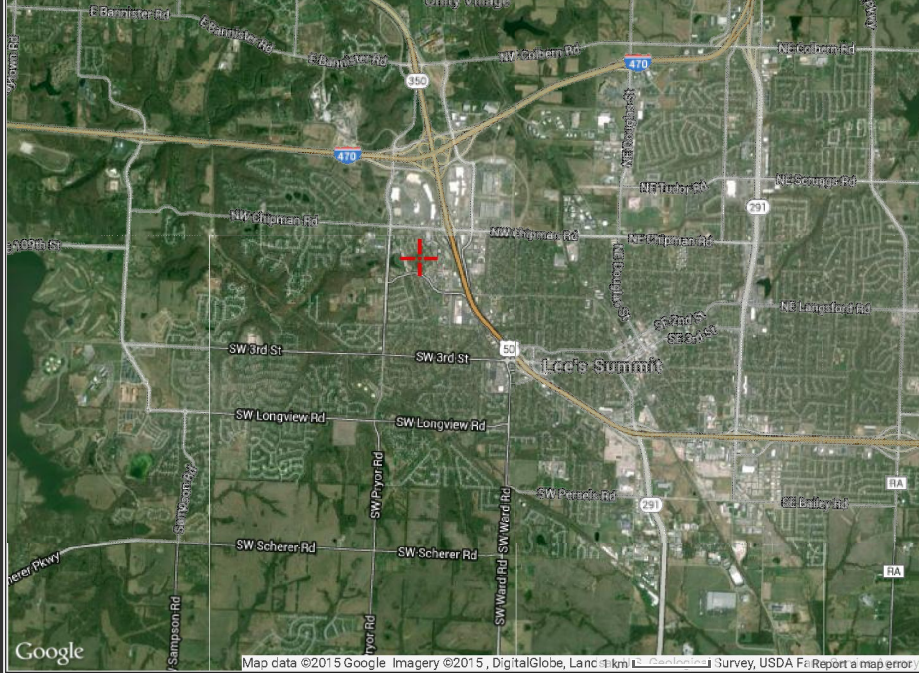
Data type: Units: Time series type:

SELECT LOCATION

1. Manually:

- a) Enter location (decimal degrees, use "-" for S and W): latitude: longitude:
- b) Select station ([click here for a list of stations used in frequency analysis for MO](#)):

2. Use map:



a) Select location (move crosshair or double click)

b) Click on station icon (☐ show stations on map)

LOCATION INFORMATION:
Name: Lee's Summit, Missouri, US*
Latitude: 38.9226°
Longitude: -94.4085°
Elevation: 956 ft*

* source: Google Maps

POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 8, Version 2

PF tabular

PF graphical

Supplementary information

 Print PagePDS-based precipitation frequency estimates with 90% confidence intervals (in inches)¹

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.414 (0.336-0.508)	0.483 (0.391-0.593)	0.598 (0.482-0.736)	0.695 (0.557-0.858)	0.832 (0.646-1.06)	0.940 (0.713-1.21)	1.05 (0.770-1.38)	1.16 (0.819-1.57)	1.32 (0.892-1.82)	1.44 (0.947-2.01)
10-min	0.607 (0.491-0.744)	0.707 (0.572-0.869)	0.875 (0.706-1.08)	1.02 (0.816-1.26)	1.22 (0.946-1.55)	1.38 (1.04-1.77)	1.54 (1.13-2.02)	1.70 (1.20-2.30)	1.93 (1.31-2.67)	2.10 (1.39-2.95)
15-min	0.740 (0.599-0.908)	0.863 (0.698-1.06)	1.07 (0.861-1.31)	1.24 (0.995-1.53)	1.49 (1.15-1.89)	1.68 (1.27-2.16)	1.88 (1.37-2.47)	2.08 (1.46-2.80)	2.35 (1.59-3.25)	2.57 (1.69-3.59)
30-min	1.02 (0.830-1.26)	1.20 (0.972-1.48)	1.50 (1.21-1.84)	1.74 (1.40-2.15)	2.09 (1.62-2.66)	2.36 (1.79-3.04)	2.64 (1.93-3.47)	2.92 (2.06-3.94)	3.31 (2.24-4.57)	3.60 (2.37-5.04)
60-min	1.34 (1.08-1.64)	1.57 (1.27-1.93)	1.96 (1.58-2.41)	2.29 (1.84-2.83)	2.76 (2.15-3.53)	3.14 (2.38-4.05)	3.52 (2.58-4.64)	3.92 (2.76-5.30)	4.47 (3.02-6.18)	4.89 (3.22-6.85)
2-hr	1.65 (1.35-2.02)	1.94 (1.58-2.37)	2.42 (1.97-2.96)	2.84 (2.29-3.49)	3.44 (2.69-4.36)	3.92 (2.99-5.02)	4.41 (3.25-5.78)	4.92 (3.49-6.61)	5.63 (3.84-7.75)	6.18 (4.10-8.60)
3-hr	1.87 (1.53-2.27)	2.19 (1.79-2.66)	2.75 (2.24-3.35)	3.23 (2.61-3.95)	3.93 (3.09-4.98)	4.50 (3.45-5.75)	5.08 (3.77-6.65)	5.70 (4.06-7.64)	6.56 (4.49-8.99)	7.23 (4.82-10.0)
6-hr	2.25 (1.85-2.71)	2.66 (2.18-3.21)	3.36 (2.75-4.07)	3.98 (3.24-4.84)	4.89 (3.86-6.16)	5.62 (4.34-7.16)	6.39 (4.77-8.31)	7.21 (5.16-9.60)	8.34 (5.75-11.4)	9.24 (6.20-12.7)
12-hr	2.65 (2.19-3.17)	3.17 (2.61-3.79)	4.05 (3.33-4.87)	4.83 (3.95-5.83)	5.97 (4.74-7.47)	6.89 (5.35-8.72)	7.86 (5.90-10.2)	8.88 (6.40-11.8)	10.3 (7.15-14.0)	11.4 (7.72-15.6)
24-hr	3.10 (2.57-3.69)	3.71 (3.08-4.42)	4.76 (3.93-5.68)	5.68 (4.66-6.80)	7.01 (5.61-8.72)	8.10 (6.32-10.2)	9.24 (6.97-11.9)	10.4 (7.57-13.7)	12.1 (8.46-16.3)	13.4 (9.13-18.3)
2-day	3.66 (3.05-4.32)	4.30 (3.59-5.09)	5.42 (4.50-6.43)	6.41 (5.29-7.63)	7.85 (6.32-9.70)	9.03 (7.09-11.3)	10.3 (7.80-13.1)	11.6 (8.46-15.1)	13.4 (9.44-17.9)	14.9 (10.2-20.1)

3-day	4.06 (3.40–4.78)	4.70 (3.93–5.54)	5.81 (4.84–6.86)	6.80 (5.63–8.06)	8.25 (6.66–10.2)	9.44 (7.44–11.7)	10.7 (8.16–13.6)	12.0 (8.83–15.7)	13.9 (9.83–18.5)	15.4 (10.6–20.7)
4-day	4.39 (3.68–5.15)	5.03 (4.21–5.90)	6.13 (5.12–7.22)	7.12 (5.91–8.41)	8.56 (6.93–10.5)	9.74 (7.70–12.1)	11.0 (8.41–13.9)	12.3 (9.06–16.0)	14.2 (10.0–18.8)	15.7 (10.8–21.0)
7-day	5.19 (4.37–6.06)	5.86 (4.93–6.85)	7.01 (5.87–8.20)	8.00 (6.67–9.40)	9.44 (7.66–11.5)	10.6 (8.41–13.0)	11.8 (9.07–14.8)	13.1 (9.66–16.8)	14.8 (10.6–19.6)	16.2 (11.2–21.6)
10-day	5.88 (4.96–6.84)	6.62 (5.58–7.70)	7.86 (6.61–9.17)	8.91 (7.45–10.4)	10.4 (8.44–12.5)	11.6 (9.19–14.1)	12.8 (9.83–15.9)	14.0 (10.4–17.9)	15.7 (11.2–20.6)	17.0 (11.8–22.6)
20-day	7.84 (6.65–9.05)	8.85 (7.50–10.2)	10.5 (8.85–12.1)	11.8 (9.92–13.7)	13.6 (11.0–16.2)	14.9 (11.9–18.0)	16.2 (12.5–20.0)	17.5 (13.0–22.2)	19.2 (13.8–24.9)	20.5 (14.3–27.0)
30-day	9.47 (8.07–10.9)	10.7 (9.11–12.3)	12.7 (10.7–14.6)	14.2 (12.0–16.5)	16.3 (13.2–19.2)	17.8 (14.2–21.3)	19.2 (14.8–23.5)	20.6 (15.3–25.8)	22.3 (16.0–28.8)	23.5 (16.6–30.9)
45-day	11.6 (9.88–13.2)	13.1 (11.1–15.0)	15.4 (13.1–17.7)	17.2 (14.6–19.8)	19.5 (15.9–22.9)	21.2 (17.0–25.3)	22.8 (17.7–27.7)	24.2 (18.1–30.3)	26.0 (18.7–33.3)	27.2 (19.2–35.6)
60-day	13.4 (11.4–15.3)	15.1 (12.9–17.2)	17.7 (15.0–20.2)	19.7 (16.7–22.6)	22.2 (18.1–25.9)	24.0 (19.2–28.5)	25.7 (19.9–31.1)	27.2 (20.3–33.8)	28.9 (20.9–36.9)	30.1 (21.3–39.3)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in csv format:

Main Link Categories:

[Home](#) | [OHD](#)

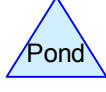
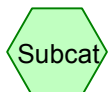
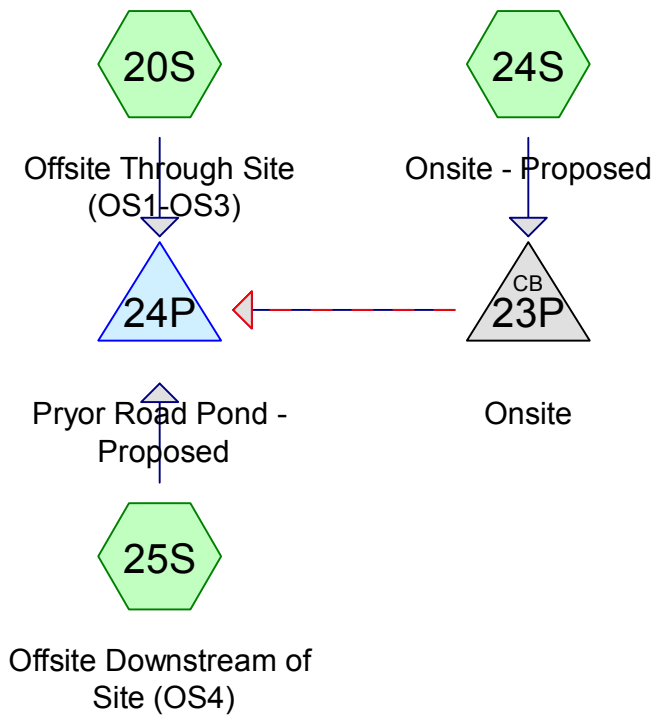
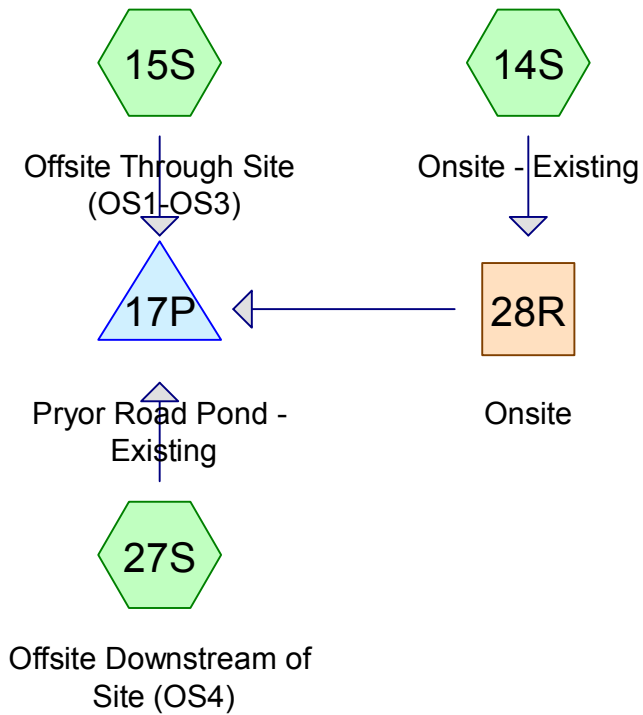
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National Oceanic and Atmospheric Administration
National Weather Service
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Appendix E



Summary for Subcatchment 14S: Onsite - Existing

Runoff = 37.29 cfs @ 12.01 hrs, Volume= 2.059 af, Depth= 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=3.10"

Area (ac)	CN	Description
9.300	80	>75% Grass cover, Good, HSG D
* 4.830	98	Impervious
14.130	86	Weighted Average
9.300		65.82% Pervious Area
4.830		34.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Subcatchment 15S: Offsite Through Site (OS1-OS3)

Runoff = 190.20 cfs @ 12.24 hrs, Volume= 18.533 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=3.10"

Area (ac)	CN	Description
98.590	92	1/8 acre lots, 65% imp, HSG D
34.507		35.00% Pervious Area
64.084		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Summary for Subcatchment 20S: Offsite Through Site (OS1-OS3)

Runoff = 190.20 cfs @ 12.24 hrs, Volume= 18.533 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=3.10"

Area (ac)	CN	Description
98.590	92	1/8 acre lots, 65% imp, HSG D
34.507		35.00% Pervious Area
64.084		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Summary for Subcatchment 24S: Onsite - Proposed

Runoff = 38.85 cfs @ 12.01 hrs, Volume= 2.151 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=3.10"

Area (ac)	CN	Description
8.730	80	>75% Grass cover, Good, HSG D
* 5.400	98	Impervious
14.130	87	Weighted Average
8.730		61.78% Pervious Area
5.400		38.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Subcatchment 25S: Offsite Downstream of Site (OS4)

Runoff = 148.33 cfs @ 12.01 hrs, Volume= 8.459 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=3.10"

Area (ac)	CN	Description
45.000	92	1/8 acre lots, 65% imp, HSG D
15.750		35.00% Pervious Area
29.250		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Subcatchment 27S: Offsite Downstream of Site (OS4)

Runoff = 148.33 cfs @ 12.01 hrs, Volume= 8.459 af, Depth= 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-year Rainfall=3.10"

Area (ac)	CN	Description
45.000	92	1/8 acre lots, 65% imp, HSG D
15.750		35.00% Pervious Area
29.250		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Reach 28R: Onsite

Inflow Area = 14.130 ac, 34.18% Impervious, Inflow Depth = 1.75" for 2-year event
Inflow = 37.29 cfs @ 12.01 hrs, Volume= 2.059 af
Outflow = 37.29 cfs @ 12.01 hrs, Volume= 2.059 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Summary for Pond 17P: Pryor Road Pond - Existing

Inflow Area = 157.720 ac, 62.24% Impervious, Inflow Depth = 2.21" for 2-year event
 Inflow = 294.50 cfs @ 12.05 hrs, Volume= 29.051 af
 Outflow = 212.80 cfs @ 12.30 hrs, Volume= 29.046 af, Atten= 28%, Lag= 15.4 min
 Primary = 212.80 cfs @ 12.30 hrs, Volume= 29.046 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
 Starting Elev= 947.00' Surf.Area= 3.565 ac Storage= 3.427 af
 Peak Elev= 948.38' @ 12.30 hrs Surf.Area= 4.009 ac Storage= 8.634 af (5.207 af above start)

Plug-Flow detention time= 116.8 min calculated for 25.618 af (88% of inflow)
 Center-of-Mass det. time= 32.2 min (845.3 - 813.1)

Volume	Invert	Avail.Storage	Storage Description
#1	946.00'	26.380 af	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
946.00	3.290	0.000	0.000
948.00	3.840	7.130	7.130
950.00	4.720	8.560	15.690
952.00	5.970	10.690	26.380

Device	Routing	Invert	Outlet Devices
#1	Primary	929.57'	84.0" W x 84.0" H Box Culvert L= 216.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 929.57' / 928.71' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 49.00 sf
#2	Device 1	947.00'	120.0" x 120.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	948.60'	Road Overtopping, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.40 1.40 Width (feet) 3.00 105.00 260.00

Primary OutFlow Max=212.65 cfs @ 12.30 hrs HW=948.38' (Free Discharge)

↑**1=Culvert** (Passes 212.65 cfs of 1,071.47 cfs potential flow)

↑**2=Orifice/Grate** (Weir Controls 212.65 cfs @ 3.85 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=947.00' (Free Discharge)

↑**3=Road Overtopping** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 17P: Pryor Road Pond - Existing

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
946.00	3.290	0.000	951.30	5.532	22.354
946.10	3.318	0.330	951.40	5.595	22.910
946.20	3.345	0.664	951.50	5.658	23.473
946.30	3.372	0.999	951.60	5.720	24.042
946.40	3.400	1.338	951.70	5.783	24.617
946.50	3.427	1.679	951.80	5.845	25.198
946.60	3.455	2.024	951.90	5.907	25.786
946.70	3.483	2.370	952.00	5.970	26.380
946.80	3.510	2.720			
946.90	3.537	3.072			
947.00	3.565	3.427			
947.10	3.593	3.785			
947.20	3.620	4.146			
947.30	3.647	4.509			
947.40	3.675	4.875			
947.50	3.702	5.244			
947.60	3.730	5.616			
947.70	3.758	5.990			
947.80	3.785	6.367			
947.90	3.812	6.747			
948.00	3.840	7.130			
948.10	3.884	7.516			
948.20	3.928	7.907			
948.30	3.972	8.302			
948.40	4.016	8.701			
948.50	4.060	9.105			
948.60	4.104	9.513			
948.70	4.148	9.926			
948.80	4.192	10.343			
948.90	4.236	10.764			
949.00	4.280	11.190			
949.10	4.324	11.620			
949.20	4.368	12.055			
949.30	4.412	12.494			
949.40	4.456	12.937			
949.50	4.500	13.385			
949.60	4.544	13.837			
949.70	4.588	14.294			
949.80	4.632	14.755			
949.90	4.676	15.220			
950.00	4.720	15.690			
950.10	4.783	16.165			
950.20	4.845	16.647			
950.30	4.907	17.134			
950.40	4.970	17.628			
950.50	5.033	18.128			
950.60	5.095	18.635			
950.70	5.158	19.147			
950.80	5.220	19.666			
950.90	5.282	20.191			
951.00	5.345	20.722			
951.10	5.408	21.260			
951.20	5.470	21.804			

Summary for Pond 23P: Onsite

Inflow Area = 14.130 ac, 38.22% Impervious, Inflow Depth = 1.83" for 2-year event
 Inflow = 38.85 cfs @ 12.01 hrs, Volume= 2.151 af
 Outflow = 38.85 cfs @ 12.01 hrs, Volume= 2.151 af, Atten= 0%, Lag= 0.0 min
 Primary = 38.85 cfs @ 12.01 hrs, Volume= 2.151 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 950.19' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	948.81'	72.0" W x 48.0" H Box Proposed 4 x 6 Box L= 380.9' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 948.81' / 945.00' S= 0.0100 ' ' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 24.00 sf
#2	Secondary	954.00'	144.0" W x 24.0" H Box Positive Overflow L= 40.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 954.00' / 952.00' S= 0.0500 ' ' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 24.00 sf

Primary OutFlow Max=36.96 cfs @ 12.01 hrs HW=950.17' TW=947.96' (Dynamic Tailwater)

↑**1=Proposed 4 x 6 Box** (Outlet Controls 36.96 cfs @ 6.04 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=948.81' TW=947.00' (Dynamic Tailwater)

↑**2=Positive Overflow** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 23P: Onsite

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
948.81	0.000	950.93	0.000	953.05	0.000	955.17	0.000
948.85	0.000	950.97	0.000	953.09	0.000	955.21	0.000
948.89	0.000	951.01	0.000	953.13	0.000	955.25	0.000
948.93	0.000	951.05	0.000	953.17	0.000	955.29	0.000
948.97	0.000	951.09	0.000	953.21	0.000	955.33	0.000
949.01	0.000	951.13	0.000	953.25	0.000	955.37	0.000
949.05	0.000	951.17	0.000	953.29	0.000	955.41	0.000
949.09	0.000	951.21	0.000	953.33	0.000	955.45	0.000
949.13	0.000	951.25	0.000	953.37	0.000	955.49	0.000
949.17	0.000	951.29	0.000	953.41	0.000	955.53	0.000
949.21	0.000	951.33	0.000	953.45	0.000	955.57	0.000
949.25	0.000	951.37	0.000	953.49	0.000	955.61	0.000
949.29	0.000	951.41	0.000	953.53	0.000	955.65	0.000
949.33	0.000	951.45	0.000	953.57	0.000	955.69	0.000
949.37	0.000	951.49	0.000	953.61	0.000	955.73	0.000
949.41	0.000	951.53	0.000	953.65	0.000	955.77	0.000
949.45	0.000	951.57	0.000	953.69	0.000	955.81	0.000
949.49	0.000	951.61	0.000	953.73	0.000	955.85	0.000
949.53	0.000	951.65	0.000	953.77	0.000	955.89	0.000
949.57	0.000	951.69	0.000	953.81	0.000	955.93	0.000
949.61	0.000	951.73	0.000	953.85	0.000	955.97	0.000
949.65	0.000	951.77	0.000	953.89	0.000		
949.69	0.000	951.81	0.000	953.93	0.000		
949.73	0.000	951.85	0.000	953.97	0.000		
949.77	0.000	951.89	0.000	954.01	0.000		
949.81	0.000	951.93	0.000	954.05	0.000		
949.85	0.000	951.97	0.000	954.09	0.000		
949.89	0.000	952.01	0.000	954.13	0.000		
949.93	0.000	952.05	0.000	954.17	0.000		
949.97	0.000	952.09	0.000	954.21	0.000		
950.01	0.000	952.13	0.000	954.25	0.000		
950.05	0.000	952.17	0.000	954.29	0.000		
950.09	0.000	952.21	0.000	954.33	0.000		
950.13	0.000	952.25	0.000	954.37	0.000		
950.17	0.000	952.29	0.000	954.41	0.000		
950.21	0.000	952.33	0.000	954.45	0.000		
950.25	0.000	952.37	0.000	954.49	0.000		
950.29	0.000	952.41	0.000	954.53	0.000		
950.33	0.000	952.45	0.000	954.57	0.000		
950.37	0.000	952.49	0.000	954.61	0.000		
950.41	0.000	952.53	0.000	954.65	0.000		
950.45	0.000	952.57	0.000	954.69	0.000		
950.49	0.000	952.61	0.000	954.73	0.000		
950.53	0.000	952.65	0.000	954.77	0.000		
950.57	0.000	952.69	0.000	954.81	0.000		
950.61	0.000	952.73	0.000	954.85	0.000		
950.65	0.000	952.77	0.000	954.89	0.000		
950.69	0.000	952.81	0.000	954.93	0.000		
950.73	0.000	952.85	0.000	954.97	0.000		
950.77	0.000	952.89	0.000	955.01	0.000		
950.81	0.000	952.93	0.000	955.05	0.000		
950.85	0.000	952.97	0.000	955.09	0.000		
950.89	0.000	953.01	0.000	955.13	0.000		

Summary for Pond 24P: Pryor Road Pond - Proposed

Inflow Area = 157.720 ac, 62.60% Impervious, Inflow Depth = 2.22" for 2-year event
 Inflow = 295.89 cfs @ 12.05 hrs, Volume= 29.143 af
 Outflow = 213.52 cfs @ 12.30 hrs, Volume= 29.138 af, Atten= 28%, Lag= 15.3 min
 Primary = 213.52 cfs @ 12.30 hrs, Volume= 29.138 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Starting Elev= 947.00' Surf.Area= 3.565 ac Storage= 3.427 af

Peak Elev= 948.39' @ 12.30 hrs Surf.Area= 4.010 ac Storage= 8.647 af (5.219 af above start)

Plug-Flow detention time= 116.6 min calculated for 25.710 af (88% of inflow)

Center-of-Mass det. time= 32.2 min (845.0 - 812.8)

Volume	Invert	Avail.Storage	Storage Description
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#1	946.00'	26.380 af	Custom Stage Data (Prismatic) Listed below (Recalc)
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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
946.00	3.290	0.000	0.000
948.00	3.840	7.130	7.130
950.00	4.720	8.560	15.690
952.00	5.970	10.690	26.380

Device	Routing	Invert	Outlet Devices
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#1	Primary	929.57'	84.0" W x 84.0" H Box Culvert L= 216.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 929.57' / 928.71' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 49.00 sf
#2	Device 1	947.00'	120.0" x 120.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	948.60'	Road Overtopping, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.40 1.40 Width (feet) 3.00 105.00 260.00

Primary OutFlow Max=213.42 cfs @ 12.30 hrs HW=948.39' (Free Discharge)

↑ **1=Culvert** (Passes 213.42 cfs of 1,071.62 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 213.42 cfs @ 3.85 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=947.00' (Free Discharge)

↑ **3=Road Overtopping** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 24P: Pryor Road Pond - Proposed

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
946.00	3.290	0.000	951.30	5.532	22.354
946.10	3.318	0.330	951.40	5.595	22.910
946.20	3.345	0.664	951.50	5.658	23.473
946.30	3.372	0.999	951.60	5.720	24.042
946.40	3.400	1.338	951.70	5.783	24.617
946.50	3.427	1.679	951.80	5.845	25.198
946.60	3.455	2.024	951.90	5.907	25.786
946.70	3.483	2.370	952.00	5.970	26.380
946.80	3.510	2.720			
946.90	3.537	3.072			
947.00	3.565	3.427			
947.10	3.593	3.785			
947.20	3.620	4.146			
947.30	3.647	4.509			
947.40	3.675	4.875			
947.50	3.702	5.244			
947.60	3.730	5.616			
947.70	3.758	5.990			
947.80	3.785	6.367			
947.90	3.812	6.747			
948.00	3.840	7.130			
948.10	3.884	7.516			
948.20	3.928	7.907			
948.30	3.972	8.302			
948.40	4.016	8.701			
948.50	4.060	9.105			
948.60	4.104	9.513			
948.70	4.148	9.926			
948.80	4.192	10.343			
948.90	4.236	10.764			
949.00	4.280	11.190			
949.10	4.324	11.620			
949.20	4.368	12.055			
949.30	4.412	12.494			
949.40	4.456	12.937			
949.50	4.500	13.385			
949.60	4.544	13.837			
949.70	4.588	14.294			
949.80	4.632	14.755			
949.90	4.676	15.220			
950.00	4.720	15.690			
950.10	4.783	16.165			
950.20	4.845	16.647			
950.30	4.907	17.134			
950.40	4.970	17.628			
950.50	5.033	18.128			
950.60	5.095	18.635			
950.70	5.158	19.147			
950.80	5.220	19.666			
950.90	5.282	20.191			
951.00	5.345	20.722			
951.10	5.408	21.260			
951.20	5.470	21.804			

Summary for Subcatchment 14S: Onsite - Existing

Runoff = 84.90 cfs @ 12.01 hrs, Volume= 4.835 af, Depth= 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=5.68"

Area (ac)	CN	Description
9.300	80	>75% Grass cover, Good, HSG D
* 4.830	98	Impervious
14.130	86	Weighted Average
9.300		65.82% Pervious Area
4.830		34.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Subcatchment 15S: Offsite Through Site (OS1-OS3)

Runoff = 388.47 cfs @ 12.23 hrs, Volume= 39.067 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=5.68"

Area (ac)	CN	Description
98.590	92	1/8 acre lots, 65% imp, HSG D
34.507		35.00% Pervious Area
64.084		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Summary for Subcatchment 20S: Offsite Through Site (OS1-OS3)

Runoff = 388.47 cfs @ 12.23 hrs, Volume= 39.067 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=5.68"

Area (ac)	CN	Description
98.590	92	1/8 acre lots, 65% imp, HSG D
34.507		35.00% Pervious Area
64.084		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Summary for Subcatchment 24S: Onsite - Proposed

Runoff = 86.58 cfs @ 12.01 hrs, Volume= 4.959 af, Depth= 4.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=5.68"

Area (ac)	CN	Description
8.730	80	>75% Grass cover, Good, HSG D
* 5.400	98	Impervious
14.130	87	Weighted Average
8.730		61.78% Pervious Area
5.400		38.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Subcatchment 25S: Offsite Downstream of Site (OS4)

Runoff = 299.42 cfs @ 12.01 hrs, Volume= 17.832 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=5.68"

Area (ac)	CN	Description
45.000	92	1/8 acre lots, 65% imp, HSG D
15.750		35.00% Pervious Area
29.250		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Subcatchment 27S: Offsite Downstream of Site (OS4)

Runoff = 299.42 cfs @ 12.01 hrs, Volume= 17.832 af, Depth= 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-year Rainfall=5.68"

Area (ac)	CN	Description
45.000	92	1/8 acre lots, 65% imp, HSG D
15.750		35.00% Pervious Area
29.250		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Reach 28R: Onsite

Inflow Area = 14.130 ac, 34.18% Impervious, Inflow Depth = 4.11" for 10-year event
Inflow = 84.90 cfs @ 12.01 hrs, Volume= 4.835 af
Outflow = 84.90 cfs @ 12.01 hrs, Volume= 4.835 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Summary for Pond 17P: Pryor Road Pond - Existing

Inflow Area = 157.720 ac, 62.24% Impervious, Inflow Depth = 4.70" for 10-year event
 Inflow = 611.58 cfs @ 12.04 hrs, Volume= 61.734 af
 Outflow = 502.37 cfs @ 12.19 hrs, Volume= 61.729 af, Atten= 18%, Lag= 8.6 min
 Primary = 417.96 cfs @ 12.19 hrs, Volume= 59.492 af
 Secondary = 84.41 cfs @ 12.19 hrs, Volume= 2.236 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Starting Elev= 947.00' Surf.Area= 3.565 ac Storage= 3.427 af

Peak Elev= 949.17' @ 12.19 hrs Surf.Area= 4.355 ac Storage= 11.922 af (8.494 af above start)

Plug-Flow detention time= 77.7 min calculated for 58.301 af (94% of inflow)

Center-of-Mass det. time= 25.6 min (818.1 - 792.5)

Volume	Invert	Avail.Storage	Storage Description
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#1	946.00'	26.380 af	Custom Stage Data (Prismatic) Listed below (Recalc)
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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
946.00	3.290	0.000	0.000
948.00	3.840	7.130	7.130
950.00	4.720	8.560	15.690
952.00	5.970	10.690	26.380

Device	Routing	Invert	Outlet Devices
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#1	Primary	929.57'	84.0" W x 84.0" H Box Culvert L= 216.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 929.57' / 928.71' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 49.00 sf
#2	Device 1	947.00'	120.0" x 120.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	948.60'	Road Overtopping, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.40 1.40 Width (feet) 3.00 105.00 260.00

Primary OutFlow Max=417.37 cfs @ 12.19 hrs HW=949.17' (Free Discharge)

↑ **1=Culvert** (Passes 417.37 cfs of 1,104.15 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 417.37 cfs @ 4.81 fps)

Secondary OutFlow Max=83.72 cfs @ 12.19 hrs HW=949.17' (Free Discharge)

↑ **3=Road Overtopping** (Weir Controls 83.72 cfs @ 2.02 fps)

Stage-Area-Storage for Pond 17P: Pryor Road Pond - Existing

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
946.00	3.290	0.000	951.30	5.532	22.354
946.10	3.318	0.330	951.40	5.595	22.910
946.20	3.345	0.664	951.50	5.658	23.473
946.30	3.372	0.999	951.60	5.720	24.042
946.40	3.400	1.338	951.70	5.783	24.617
946.50	3.427	1.679	951.80	5.845	25.198
946.60	3.455	2.024	951.90	5.907	25.786
946.70	3.483	2.370	952.00	5.970	26.380
946.80	3.510	2.720			
946.90	3.537	3.072			
947.00	3.565	3.427			
947.10	3.593	3.785			
947.20	3.620	4.146			
947.30	3.647	4.509			
947.40	3.675	4.875			
947.50	3.702	5.244			
947.60	3.730	5.616			
947.70	3.758	5.990			
947.80	3.785	6.367			
947.90	3.812	6.747			
948.00	3.840	7.130			
948.10	3.884	7.516			
948.20	3.928	7.907			
948.30	3.972	8.302			
948.40	4.016	8.701			
948.50	4.060	9.105			
948.60	4.104	9.513			
948.70	4.148	9.926			
948.80	4.192	10.343			
948.90	4.236	10.764			
949.00	4.280	11.190			
949.10	4.324	11.620			
949.20	4.368	12.055			
949.30	4.412	12.494			
949.40	4.456	12.937			
949.50	4.500	13.385			
949.60	4.544	13.837			
949.70	4.588	14.294			
949.80	4.632	14.755			
949.90	4.676	15.220			
950.00	4.720	15.690			
950.10	4.783	16.165			
950.20	4.845	16.647			
950.30	4.907	17.134			
950.40	4.970	17.628			
950.50	5.033	18.128			
950.60	5.095	18.635			
950.70	5.158	19.147			
950.80	5.220	19.666			
950.90	5.282	20.191			
951.00	5.345	20.722			
951.10	5.408	21.260			
951.20	5.470	21.804			

Summary for Pond 23P: Onsite

Inflow Area = 14.130 ac, 38.22% Impervious, Inflow Depth = 4.21" for 10-year event
 Inflow = 86.58 cfs @ 12.01 hrs, Volume= 4.959 af
 Outflow = 86.58 cfs @ 12.01 hrs, Volume= 4.959 af, Atten= 0%, Lag= 0.0 min
 Primary = 86.58 cfs @ 12.01 hrs, Volume= 4.959 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 951.23' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	948.81'	72.0" W x 48.0" H Box Proposed 4 x 6 Box L= 380.9' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 948.81' / 945.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 24.00 sf
#2	Secondary	954.00'	144.0" W x 24.0" H Box Positive Overflow L= 40.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 954.00' / 952.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 24.00 sf

Primary OutFlow Max=80.54 cfs @ 12.01 hrs HW=951.20' TW=948.73' (Dynamic Tailwater)

↑ **1=Proposed 4 x 6 Box** (Outlet Controls 80.54 cfs @ 7.50 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=948.81' TW=947.00' (Dynamic Tailwater)

↑ **2=Positive Overflow** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 23P: Onsite

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
948.81	0.000	950.93	0.000	953.05	0.000	955.17	0.000
948.85	0.000	950.97	0.000	953.09	0.000	955.21	0.000
948.89	0.000	951.01	0.000	953.13	0.000	955.25	0.000
948.93	0.000	951.05	0.000	953.17	0.000	955.29	0.000
948.97	0.000	951.09	0.000	953.21	0.000	955.33	0.000
949.01	0.000	951.13	0.000	953.25	0.000	955.37	0.000
949.05	0.000	951.17	0.000	953.29	0.000	955.41	0.000
949.09	0.000	951.21	0.000	953.33	0.000	955.45	0.000
949.13	0.000	951.25	0.000	953.37	0.000	955.49	0.000
949.17	0.000	951.29	0.000	953.41	0.000	955.53	0.000
949.21	0.000	951.33	0.000	953.45	0.000	955.57	0.000
949.25	0.000	951.37	0.000	953.49	0.000	955.61	0.000
949.29	0.000	951.41	0.000	953.53	0.000	955.65	0.000
949.33	0.000	951.45	0.000	953.57	0.000	955.69	0.000
949.37	0.000	951.49	0.000	953.61	0.000	955.73	0.000
949.41	0.000	951.53	0.000	953.65	0.000	955.77	0.000
949.45	0.000	951.57	0.000	953.69	0.000	955.81	0.000
949.49	0.000	951.61	0.000	953.73	0.000	955.85	0.000
949.53	0.000	951.65	0.000	953.77	0.000	955.89	0.000
949.57	0.000	951.69	0.000	953.81	0.000	955.93	0.000
949.61	0.000	951.73	0.000	953.85	0.000	955.97	0.000
949.65	0.000	951.77	0.000	953.89	0.000		
949.69	0.000	951.81	0.000	953.93	0.000		
949.73	0.000	951.85	0.000	953.97	0.000		
949.77	0.000	951.89	0.000	954.01	0.000		
949.81	0.000	951.93	0.000	954.05	0.000		
949.85	0.000	951.97	0.000	954.09	0.000		
949.89	0.000	952.01	0.000	954.13	0.000		
949.93	0.000	952.05	0.000	954.17	0.000		
949.97	0.000	952.09	0.000	954.21	0.000		
950.01	0.000	952.13	0.000	954.25	0.000		
950.05	0.000	952.17	0.000	954.29	0.000		
950.09	0.000	952.21	0.000	954.33	0.000		
950.13	0.000	952.25	0.000	954.37	0.000		
950.17	0.000	952.29	0.000	954.41	0.000		
950.21	0.000	952.33	0.000	954.45	0.000		
950.25	0.000	952.37	0.000	954.49	0.000		
950.29	0.000	952.41	0.000	954.53	0.000		
950.33	0.000	952.45	0.000	954.57	0.000		
950.37	0.000	952.49	0.000	954.61	0.000		
950.41	0.000	952.53	0.000	954.65	0.000		
950.45	0.000	952.57	0.000	954.69	0.000		
950.49	0.000	952.61	0.000	954.73	0.000		
950.53	0.000	952.65	0.000	954.77	0.000		
950.57	0.000	952.69	0.000	954.81	0.000		
950.61	0.000	952.73	0.000	954.85	0.000		
950.65	0.000	952.77	0.000	954.89	0.000		
950.69	0.000	952.81	0.000	954.93	0.000		
950.73	0.000	952.85	0.000	954.97	0.000		
950.77	0.000	952.89	0.000	955.01	0.000		
950.81	0.000	952.93	0.000	955.05	0.000		
950.85	0.000	952.97	0.000	955.09	0.000		
950.89	0.000	953.01	0.000	955.13	0.000		

Summary for Pond 24P: Pryor Road Pond - Proposed

Inflow Area = 157.720 ac, 62.60% Impervious, Inflow Depth = 4.71" for 10-year event
 Inflow = 613.07 cfs @ 12.04 hrs, Volume= 61.858 af
 Outflow = 503.59 cfs @ 12.19 hrs, Volume= 61.853 af, Atten= 18%, Lag= 8.6 min
 Primary = 418.51 cfs @ 12.19 hrs, Volume= 59.598 af
 Secondary = 85.07 cfs @ 12.19 hrs, Volume= 2.255 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Starting Elev= 947.00' Surf.Area= 3.565 ac Storage= 3.427 af

Peak Elev= 949.17' @ 12.19 hrs Surf.Area= 4.355 ac Storage= 11.930 af (8.502 af above start)

Plug-Flow detention time= 77.6 min calculated for 58.425 af (94% of inflow)

Center-of-Mass det. time= 25.6 min (817.8 - 792.2)

Volume	Invert	Avail.Storage	Storage Description
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#1	946.00'	26.380 af	Custom Stage Data (Prismatic) Listed below (Recalc)
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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
946.00	3.290	0.000	0.000
948.00	3.840	7.130	7.130
950.00	4.720	8.560	15.690
952.00	5.970	10.690	26.380

Device	Routing	Invert	Outlet Devices
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#1	Primary	929.57'	84.0" W x 84.0" H Box Culvert L= 216.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 929.57' / 928.71' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 49.00 sf
#2	Device 1	947.00'	120.0" x 120.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	948.60'	Road Overtopping, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.40 1.40 Width (feet) 3.00 105.00 260.00

Primary OutFlow Max=417.88 cfs @ 12.19 hrs HW=949.17' (Free Discharge)

↑ **1=Culvert** (Passes 417.88 cfs of 1,104.22 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 417.88 cfs @ 4.82 fps)

Secondary OutFlow Max=84.33 cfs @ 12.19 hrs HW=949.17' (Free Discharge)

↑ **3=Road Overtopping** (Weir Controls 84.33 cfs @ 2.03 fps)

Stage-Area-Storage for Pond 24P: Pryor Road Pond - Proposed

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
946.00	3.290	0.000	951.30	5.532	22.354
946.10	3.318	0.330	951.40	5.595	22.910
946.20	3.345	0.664	951.50	5.658	23.473
946.30	3.372	0.999	951.60	5.720	24.042
946.40	3.400	1.338	951.70	5.783	24.617
946.50	3.427	1.679	951.80	5.845	25.198
946.60	3.455	2.024	951.90	5.907	25.786
946.70	3.483	2.370	952.00	5.970	26.380
946.80	3.510	2.720			
946.90	3.537	3.072			
947.00	3.565	3.427			
947.10	3.593	3.785			
947.20	3.620	4.146			
947.30	3.647	4.509			
947.40	3.675	4.875			
947.50	3.702	5.244			
947.60	3.730	5.616			
947.70	3.758	5.990			
947.80	3.785	6.367			
947.90	3.812	6.747			
948.00	3.840	7.130			
948.10	3.884	7.516			
948.20	3.928	7.907			
948.30	3.972	8.302			
948.40	4.016	8.701			
948.50	4.060	9.105			
948.60	4.104	9.513			
948.70	4.148	9.926			
948.80	4.192	10.343			
948.90	4.236	10.764			
949.00	4.280	11.190			
949.10	4.324	11.620			
949.20	4.368	12.055			
949.30	4.412	12.494			
949.40	4.456	12.937			
949.50	4.500	13.385			
949.60	4.544	13.837			
949.70	4.588	14.294			
949.80	4.632	14.755			
949.90	4.676	15.220			
950.00	4.720	15.690			
950.10	4.783	16.165			
950.20	4.845	16.647			
950.30	4.907	17.134			
950.40	4.970	17.628			
950.50	5.033	18.128			
950.60	5.095	18.635			
950.70	5.158	19.147			
950.80	5.220	19.666			
950.90	5.282	20.191			
951.00	5.345	20.722			
951.10	5.408	21.260			
951.20	5.470	21.804			

Summary for Subcatchment 14S: Onsite - Existing

Runoff = 150.56 cfs @ 12.01 hrs, Volume= 8.876 af, Depth= 7.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=9.24"

Area (ac)	CN	Description
9.300	80	>75% Grass cover, Good, HSG D
* 4.830	98	Impervious
14.130	86	Weighted Average
9.300		65.82% Pervious Area
4.830		34.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Subcatchment 15S: Offsite Through Site (OS1-OS3)

Runoff = 657.46 cfs @ 12.23 hrs, Volume= 67.967 af, Depth= 8.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=9.24"

Area (ac)	CN	Description
98.590	92	1/8 acre lots, 65% imp, HSG D
34.507		35.00% Pervious Area
64.084		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Summary for Subcatchment 20S: Offsite Through Site (OS1-OS3)

Runoff = 657.46 cfs @ 12.23 hrs, Volume= 67.967 af, Depth= 8.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=9.24"

Area (ac)	CN	Description
98.590	92	1/8 acre lots, 65% imp, HSG D
34.507		35.00% Pervious Area
64.084		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Summary for Subcatchment 24S: Onsite - Proposed

Runoff = 152.07 cfs @ 12.01 hrs, Volume= 9.021 af, Depth= 7.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=9.24"

Area (ac)	CN	Description
8.730	80	>75% Grass cover, Good, HSG D
* 5.400	98	Impervious
14.130	87	Weighted Average
8.730		61.78% Pervious Area
5.400		38.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Subcatchment 25S: Offsite Downstream of Site (OS4)

Runoff = 504.12 cfs @ 12.01 hrs, Volume= 31.022 af, Depth= 8.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=9.24"

Area (ac)	CN	Description
45.000	92	1/8 acre lots, 65% imp, HSG D
15.750		35.00% Pervious Area
29.250		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Subcatchment 27S: Offsite Downstream of Site (OS4)

Runoff = 504.12 cfs @ 12.01 hrs, Volume= 31.022 af, Depth= 8.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-year Rainfall=9.24"

Area (ac)	CN	Description
45.000	92	1/8 acre lots, 65% imp, HSG D
15.750		35.00% Pervious Area
29.250		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Summary for Reach 28R: Onsite

Inflow Area = 14.130 ac, 34.18% Impervious, Inflow Depth = 7.54" for 100-year event
Inflow = 150.56 cfs @ 12.01 hrs, Volume= 8.876 af
Outflow = 150.56 cfs @ 12.01 hrs, Volume= 8.876 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Summary for Pond 17P: Pryor Road Pond - Existing

Inflow Area = 157.720 ac, 62.24% Impervious, Inflow Depth = 8.21" for 100-year event
 Inflow = 1,042.77 cfs @ 12.04 hrs, Volume= 107.865 af
 Outflow = 966.06 cfs @ 12.11 hrs, Volume= 107.859 af, Atten= 7%, Lag= 4.2 min
 Primary = 581.56 cfs @ 12.11 hrs, Volume= 95.363 af
 Secondary = 384.50 cfs @ 12.11 hrs, Volume= 12.497 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Starting Elev= 947.00' Surf.Area= 3.565 ac Storage= 3.427 af

Peak Elev= 949.70' @ 12.11 hrs Surf.Area= 4.590 ac Storage= 14.312 af (10.884 af above start)

Plug-Flow detention time= 55.2 min calculated for 104.298 af (97% of inflow)

Center-of-Mass det. time= 21.1 min (799.7 - 778.6)

Volume	Invert	Avail.Storage	Storage Description
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#1	946.00'	26.380 af	Custom Stage Data (Prismatic) Listed below (Recalc)
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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
946.00	3.290	0.000	0.000
948.00	3.840	7.130	7.130
950.00	4.720	8.560	15.690
952.00	5.970	10.690	26.380

Device	Routing	Invert	Outlet Devices
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#1	Primary	929.57'	84.0" W x 84.0" H Box Culvert L= 216.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 929.57' / 928.71' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 49.00 sf
#2	Device 1	947.00'	120.0" x 120.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	948.60'	Road Overtopping, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.40 1.40 Width (feet) 3.00 105.00 260.00

Primary OutFlow Max=578.76 cfs @ 12.11 hrs HW=949.70' (Free Discharge)

↑ **1=Culvert** (Passes 578.76 cfs of 1,125.60 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 578.76 cfs @ 5.37 fps)

Secondary OutFlow Max=377.88 cfs @ 12.11 hrs HW=949.70' (Free Discharge)

↑ **3=Road Overtopping** (Weir Controls 377.88 cfs @ 2.86 fps)

Stage-Area-Storage for Pond 17P: Pryor Road Pond - Existing

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
946.00	3.290	0.000	951.30	5.532	22.354
946.10	3.318	0.330	951.40	5.595	22.910
946.20	3.345	0.664	951.50	5.658	23.473
946.30	3.372	0.999	951.60	5.720	24.042
946.40	3.400	1.338	951.70	5.783	24.617
946.50	3.427	1.679	951.80	5.845	25.198
946.60	3.455	2.024	951.90	5.907	25.786
946.70	3.483	2.370	952.00	5.970	26.380
946.80	3.510	2.720			
946.90	3.537	3.072			
947.00	3.565	3.427			
947.10	3.593	3.785			
947.20	3.620	4.146			
947.30	3.647	4.509			
947.40	3.675	4.875			
947.50	3.702	5.244			
947.60	3.730	5.616			
947.70	3.758	5.990			
947.80	3.785	6.367			
947.90	3.812	6.747			
948.00	3.840	7.130			
948.10	3.884	7.516			
948.20	3.928	7.907			
948.30	3.972	8.302			
948.40	4.016	8.701			
948.50	4.060	9.105			
948.60	4.104	9.513			
948.70	4.148	9.926			
948.80	4.192	10.343			
948.90	4.236	10.764			
949.00	4.280	11.190			
949.10	4.324	11.620			
949.20	4.368	12.055			
949.30	4.412	12.494			
949.40	4.456	12.937			
949.50	4.500	13.385			
949.60	4.544	13.837			
949.70	4.588	14.294			
949.80	4.632	14.755			
949.90	4.676	15.220			
950.00	4.720	15.690			
950.10	4.783	16.165			
950.20	4.845	16.647			
950.30	4.907	17.134			
950.40	4.970	17.628			
950.50	5.033	18.128			
950.60	5.095	18.635			
950.70	5.158	19.147			
950.80	5.220	19.666			
950.90	5.282	20.191			
951.00	5.345	20.722			
951.10	5.408	21.260			
951.20	5.470	21.804			

Summary for Pond 23P: Onsite

Inflow Area = 14.130 ac, 38.22% Impervious, Inflow Depth = 7.66" for 100-year event
 Inflow = 152.07 cfs @ 12.01 hrs, Volume= 9.021 af
 Outflow = 152.07 cfs @ 12.01 hrs, Volume= 9.021 af, Atten= 0%, Lag= 0.0 min
 Primary = 152.07 cfs @ 12.01 hrs, Volume= 9.021 af
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Peak Elev= 952.42' @ 12.02 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	948.81'	72.0" W x 48.0" H Box Proposed 4 x 6 Box L= 380.9' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 948.81' / 945.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 24.00 sf
#2	Secondary	954.00'	144.0" W x 24.0" H Box Positive Overflow L= 40.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 954.00' / 952.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 24.00 sf

Primary OutFlow Max=142.54 cfs @ 12.01 hrs HW=952.38' TW=949.45' (Dynamic Tailwater)

↑**1=Proposed 4 x 6 Box** (Outlet Controls 142.54 cfs @ 8.88 fps)

Secondary OutFlow Max=0.00 cfs @ 1.00 hrs HW=948.81' TW=947.00' (Dynamic Tailwater)

↑**2=Positive Overflow** (Controls 0.00 cfs)

Stage-Area-Storage for Pond 23P: Onsite

Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)	Elevation (feet)	Storage (acre-feet)
948.81	0.000	950.93	0.000	953.05	0.000	955.17	0.000
948.85	0.000	950.97	0.000	953.09	0.000	955.21	0.000
948.89	0.000	951.01	0.000	953.13	0.000	955.25	0.000
948.93	0.000	951.05	0.000	953.17	0.000	955.29	0.000
948.97	0.000	951.09	0.000	953.21	0.000	955.33	0.000
949.01	0.000	951.13	0.000	953.25	0.000	955.37	0.000
949.05	0.000	951.17	0.000	953.29	0.000	955.41	0.000
949.09	0.000	951.21	0.000	953.33	0.000	955.45	0.000
949.13	0.000	951.25	0.000	953.37	0.000	955.49	0.000
949.17	0.000	951.29	0.000	953.41	0.000	955.53	0.000
949.21	0.000	951.33	0.000	953.45	0.000	955.57	0.000
949.25	0.000	951.37	0.000	953.49	0.000	955.61	0.000
949.29	0.000	951.41	0.000	953.53	0.000	955.65	0.000
949.33	0.000	951.45	0.000	953.57	0.000	955.69	0.000
949.37	0.000	951.49	0.000	953.61	0.000	955.73	0.000
949.41	0.000	951.53	0.000	953.65	0.000	955.77	0.000
949.45	0.000	951.57	0.000	953.69	0.000	955.81	0.000
949.49	0.000	951.61	0.000	953.73	0.000	955.85	0.000
949.53	0.000	951.65	0.000	953.77	0.000	955.89	0.000
949.57	0.000	951.69	0.000	953.81	0.000	955.93	0.000
949.61	0.000	951.73	0.000	953.85	0.000	955.97	0.000
949.65	0.000	951.77	0.000	953.89	0.000		
949.69	0.000	951.81	0.000	953.93	0.000		
949.73	0.000	951.85	0.000	953.97	0.000		
949.77	0.000	951.89	0.000	954.01	0.000		
949.81	0.000	951.93	0.000	954.05	0.000		
949.85	0.000	951.97	0.000	954.09	0.000		
949.89	0.000	952.01	0.000	954.13	0.000		
949.93	0.000	952.05	0.000	954.17	0.000		
949.97	0.000	952.09	0.000	954.21	0.000		
950.01	0.000	952.13	0.000	954.25	0.000		
950.05	0.000	952.17	0.000	954.29	0.000		
950.09	0.000	952.21	0.000	954.33	0.000		
950.13	0.000	952.25	0.000	954.37	0.000		
950.17	0.000	952.29	0.000	954.41	0.000		
950.21	0.000	952.33	0.000	954.45	0.000		
950.25	0.000	952.37	0.000	954.49	0.000		
950.29	0.000	952.41	0.000	954.53	0.000		
950.33	0.000	952.45	0.000	954.57	0.000		
950.37	0.000	952.49	0.000	954.61	0.000		
950.41	0.000	952.53	0.000	954.65	0.000		
950.45	0.000	952.57	0.000	954.69	0.000		
950.49	0.000	952.61	0.000	954.73	0.000		
950.53	0.000	952.65	0.000	954.77	0.000		
950.57	0.000	952.69	0.000	954.81	0.000		
950.61	0.000	952.73	0.000	954.85	0.000		
950.65	0.000	952.77	0.000	954.89	0.000		
950.69	0.000	952.81	0.000	954.93	0.000		
950.73	0.000	952.85	0.000	954.97	0.000		
950.77	0.000	952.89	0.000	955.01	0.000		
950.81	0.000	952.93	0.000	955.05	0.000		
950.85	0.000	952.97	0.000	955.09	0.000		
950.89	0.000	953.01	0.000	955.13	0.000		

Summary for Pond 24P: Pryor Road Pond - Proposed

Inflow Area = 157.720 ac, 62.60% Impervious, Inflow Depth = 8.22" for 100-year event
 Inflow = 1,044.08 cfs @ 12.04 hrs, Volume= 108.010 af
 Outflow = 967.37 cfs @ 12.11 hrs, Volume= 108.004 af, Atten= 7%, Lag= 4.2 min
 Primary = 581.94 cfs @ 12.11 hrs, Volume= 95.479 af
 Secondary = 385.43 cfs @ 12.11 hrs, Volume= 12.525 af

Routing by Dyn-Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.05 hrs

Starting Elev= 947.00' Surf.Area= 3.565 ac Storage= 3.427 af

Peak Elev= 949.71' @ 12.11 hrs Surf.Area= 4.590 ac Storage= 14.317 af (10.890 af above start)

Plug-Flow detention time= 56.0 min calculated for 104.577 af (97% of inflow)

Center-of-Mass det. time= 21.1 min (799.4 - 778.3)

Volume	Invert	Avail.Storage	Storage Description
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#1	946.00'	26.380 af	Custom Stage Data (Prismatic) Listed below (Recalc)
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Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
946.00	3.290	0.000	0.000
948.00	3.840	7.130	7.130
950.00	4.720	8.560	15.690
952.00	5.970	10.690	26.380

Device	Routing	Invert	Outlet Devices
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#1	Primary	929.57'	84.0" W x 84.0" H Box Culvert L= 216.0' Box, 30-75° wingwalls, rounded crown, Ke= 0.200 Inlet / Outlet Invert= 929.57' / 928.71' S= 0.0040 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 49.00 sf
#2	Device 1	947.00'	120.0" x 120.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Secondary	948.60'	Road Overtopping, Cv= 2.62 (C= 3.28) Head (feet) 0.00 0.40 1.40 Width (feet) 3.00 105.00 260.00

Primary OutFlow Max=579.18 cfs @ 12.11 hrs HW=949.70' (Free Discharge)

↑ **1=Culvert** (Passes 579.18 cfs of 1,125.65 cfs potential flow)

↑ **2=Orifice/Grate** (Weir Controls 579.18 cfs @ 5.37 fps)

Secondary OutFlow Max=378.90 cfs @ 12.11 hrs HW=949.70' (Free Discharge)

↑ **3=Road Overtopping** (Weir Controls 378.90 cfs @ 2.86 fps)

Stage-Area-Storage for Pond 24P: Pryor Road Pond - Proposed

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
946.00	3.290	0.000	951.30	5.532	22.354
946.10	3.318	0.330	951.40	5.595	22.910
946.20	3.345	0.664	951.50	5.658	23.473
946.30	3.372	0.999	951.60	5.720	24.042
946.40	3.400	1.338	951.70	5.783	24.617
946.50	3.427	1.679	951.80	5.845	25.198
946.60	3.455	2.024	951.90	5.907	25.786
946.70	3.483	2.370	952.00	5.970	26.380
946.80	3.510	2.720			
946.90	3.537	3.072			
947.00	3.565	3.427			
947.10	3.593	3.785			
947.20	3.620	4.146			
947.30	3.647	4.509			
947.40	3.675	4.875			
947.50	3.702	5.244			
947.60	3.730	5.616			
947.70	3.758	5.990			
947.80	3.785	6.367			
947.90	3.812	6.747			
948.00	3.840	7.130			
948.10	3.884	7.516			
948.20	3.928	7.907			
948.30	3.972	8.302			
948.40	4.016	8.701			
948.50	4.060	9.105			
948.60	4.104	9.513			
948.70	4.148	9.926			
948.80	4.192	10.343			
948.90	4.236	10.764			
949.00	4.280	11.190			
949.10	4.324	11.620			
949.20	4.368	12.055			
949.30	4.412	12.494			
949.40	4.456	12.937			
949.50	4.500	13.385			
949.60	4.544	13.837			
949.70	4.588	14.294			
949.80	4.632	14.755			
949.90	4.676	15.220			
950.00	4.720	15.690			
950.10	4.783	16.165			
950.20	4.845	16.647			
950.30	4.907	17.134			
950.40	4.970	17.628			
950.50	5.033	18.128			
950.60	5.095	18.635			
950.70	5.158	19.147			
950.80	5.220	19.666			
950.90	5.282	20.191			
951.00	5.345	20.722			
951.10	5.408	21.260			
951.20	5.470	21.804			