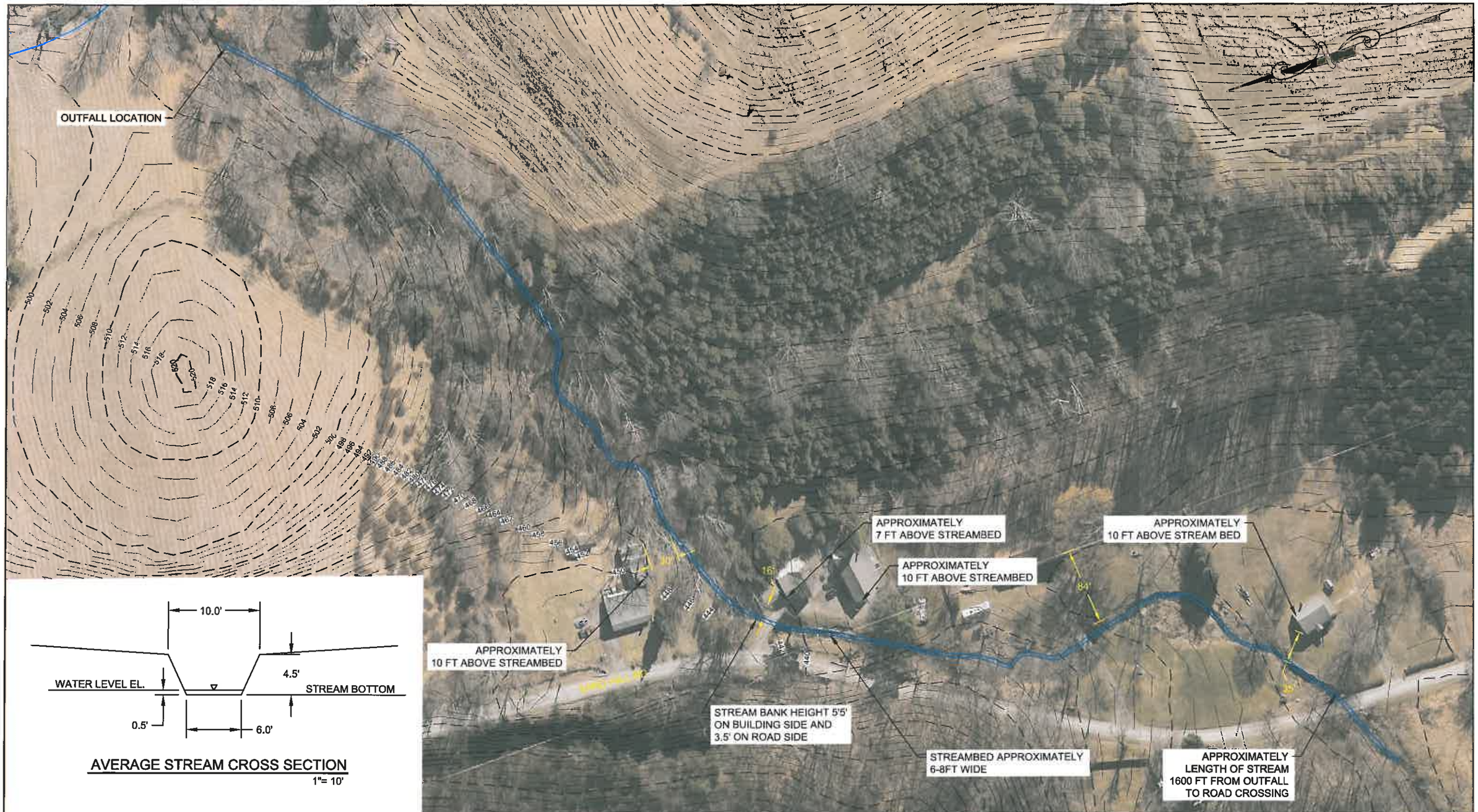

AVERAGE STREAM CROSS SECTION
1"= 10'

MAP NOTES:

1. DIGITAL ORTHOIMAGERY OBTAINED FROM THE NYS GIS CLEARINGHOUSE. IMAGERY RESOLUTION IS .5 FT NATURAL COLOR, COMPLETED SPRING 2009.
2. TOPOGRAPHIC DATA BASED UPON USGS 10' CONTOURS.
3. NOTED ELEVATIONS BASED UPON VISUAL FIELD OBSERVATIONS COMPLETED ON DEC. 20, 2012 BY RENNIA ENGINEERING DESIGN.

DATE	REVISION

ENGINEERING, DESIGN, & PLANS PREPARED BY:
RENNIA ENGINEERING DESIGN, PLLC
CIVIL & ENVIRONMENTAL ENGINEERING
6 Dover Village Plaza, Suite 5, P.O. Box 400, Dover Plains, NY 12522
Tel: (845) 877-0555 Fax: (845) 877-0556
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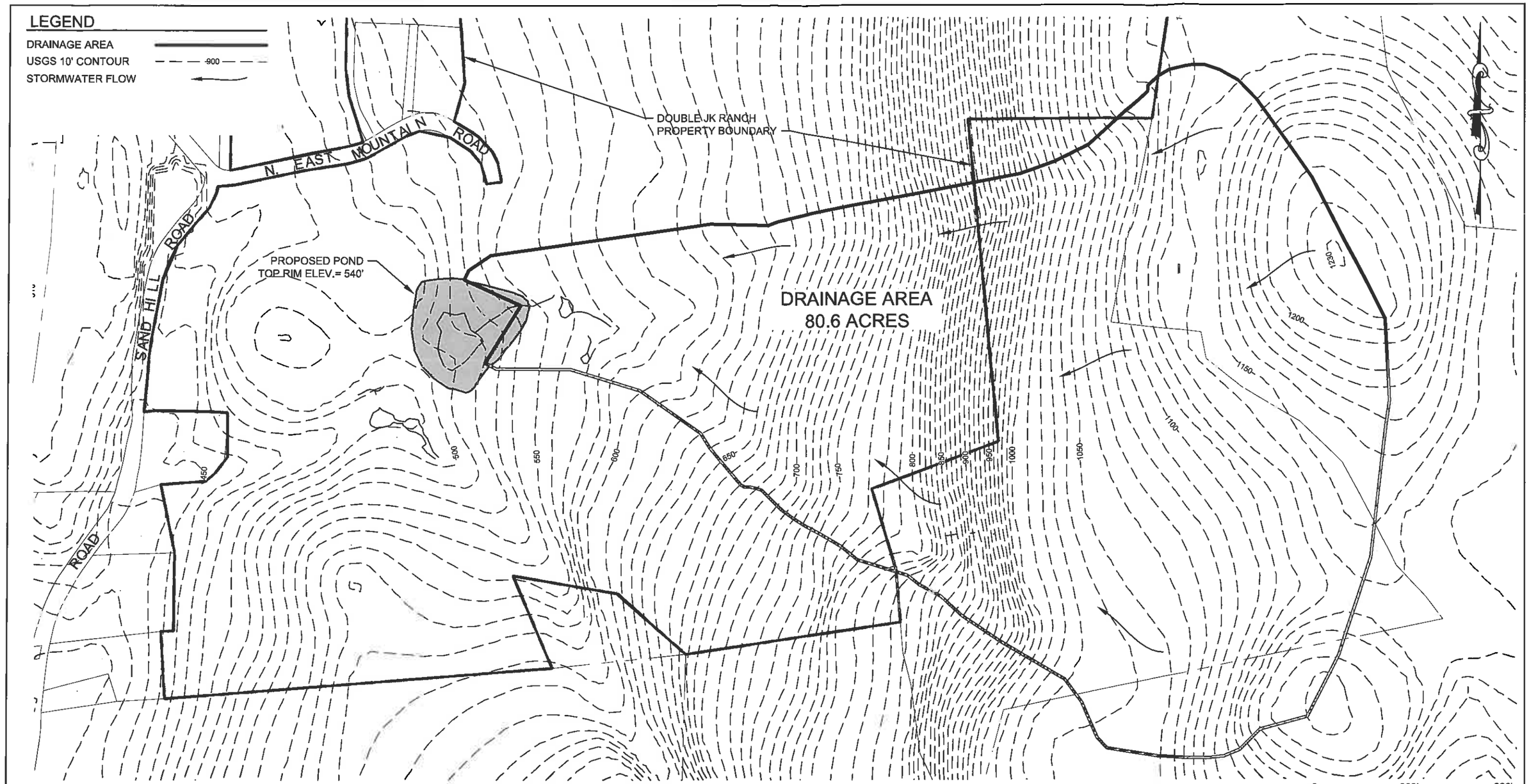
DOUBLE JK RANCH

TOWN OF DOVER — DUTCHESS COUNTY, NY

EXHIBIT 1: DAM OUTFALL RECEIVING STREAM

DATE	SCALE	DESIGNED BY:	DRAWN BY:	CHECKED BY:	JOB NO.
1/8/13	1"=100'	RED	RED	RAR	12-009



SITE DATA

ZONING DISTRICT: "RU" RURAL DISTRICT
EXISTING LOT SIZE: ±241.23 ACRES
TAX GRID NO. : 132600-7163-00-380110
PROPERTY ADDRESS: 39 NE MOUNTAIN ROAD
TOWN OF DOVER, NY
PROPERTY OWNER: DOUBLE JK RANCH
63 SALE HARBOUR DR
NEW FAIRFIELD, CT 06812

MAP NOTES:
1. PROPERTY BOUNDARY DATA BASED UPON TAX MAPS FROM DUTCHESS COUNTY REAL PROPERTY.
2. TOPOGRAPHIC DATA BASED UPON USGS 10' CONTOURS.

DATE	REVISION

ENGINEERING, DESIGN, & PLANS PREPARED BY:
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CIVIL & ENVIRONMENTAL ENGINEERING
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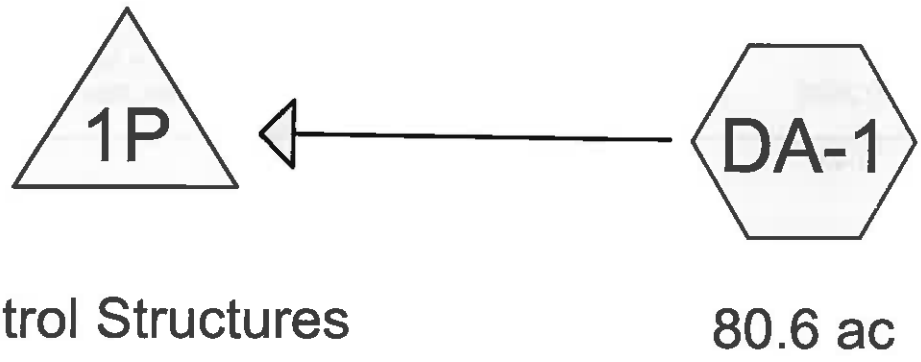
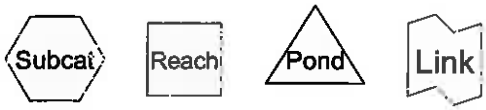
DOUBLE JK RANCH
TOWN OF DOVER — DUTCHESS COUNTY, NY

DRAINAGE AREA PLAN

DATE	SCALE	DESIGNED BY:	DRAWN BY:	CHECKED BY:	JOB NO.	SHEET NO.
12/12/12	1"=300'	RAR	RED	RAR	12-009	1 of 1





Routing Diagram for ginder watershed 12.10.12
Prepared by Rennia Engineering Design, Printed 12/19/2012
HydroCAD® 10.00 s/n 07191 © 2011 HydroCAD Software Solutions LLC

Summary for Subcatchment DA-1: 80.6 ac

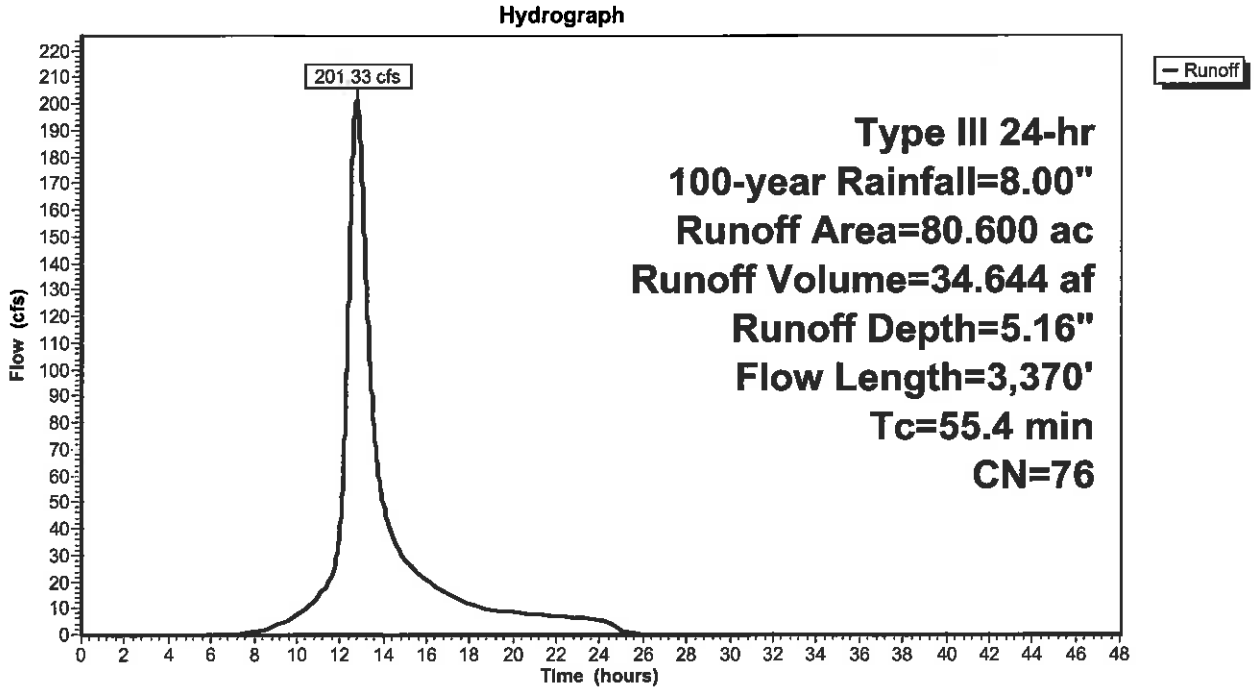
Runoff = 201.33 cfs @ 12.74 hrs, Volume= 34.644 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.00"

Area (ac)	CN	Description
80.600	76	Woods/grass comb., Fair, HSG C
80.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.2500	0.13		**Sheet Flow, Woods with 25% slope** Woods: Dense underbrush n= 0.800 P2= 3.50"
30.8	1,534	0.1100	0.83		**Shallow Concentrated Flow, Wooded with 11% Slope** Forest w/Heavy Litter Kv= 2.5 fps
11.6	1,736	0.2500	2.50		**Shallow Concentrated Flow, Wooded with 25% Slope** Woodland Kv= 5.0 fps
55.4	3,370	Total			

Subcatchment DA-1: 80.6 ac



Summary for Pond 1P: Control Structures

Inflow Area =	80.600 ac,	0.00% Impervious,	Inflow Depth =	5.16"	for 100-year event
Inflow =	201.33 cfs @	12.74 hrs,	Volume=	34.644 af	
Outflow =	177.10 cfs @	12.97 hrs,	Volume=	34.643 af,	Atten= 12%, Lag= 13.8 min
Primary =	177.10 cfs @	12.97 hrs,	Volume=	34.643 af	

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 538.27' @ 12.97 hrs Surf.Area= 2.232 ac Storage= 2.723 af

Plug-Flow detention time= 15.9 min calculated for 34.643 af (100% of inflow)
Center-of-Mass det. time= 15.8 min (873.6 - 857.8)

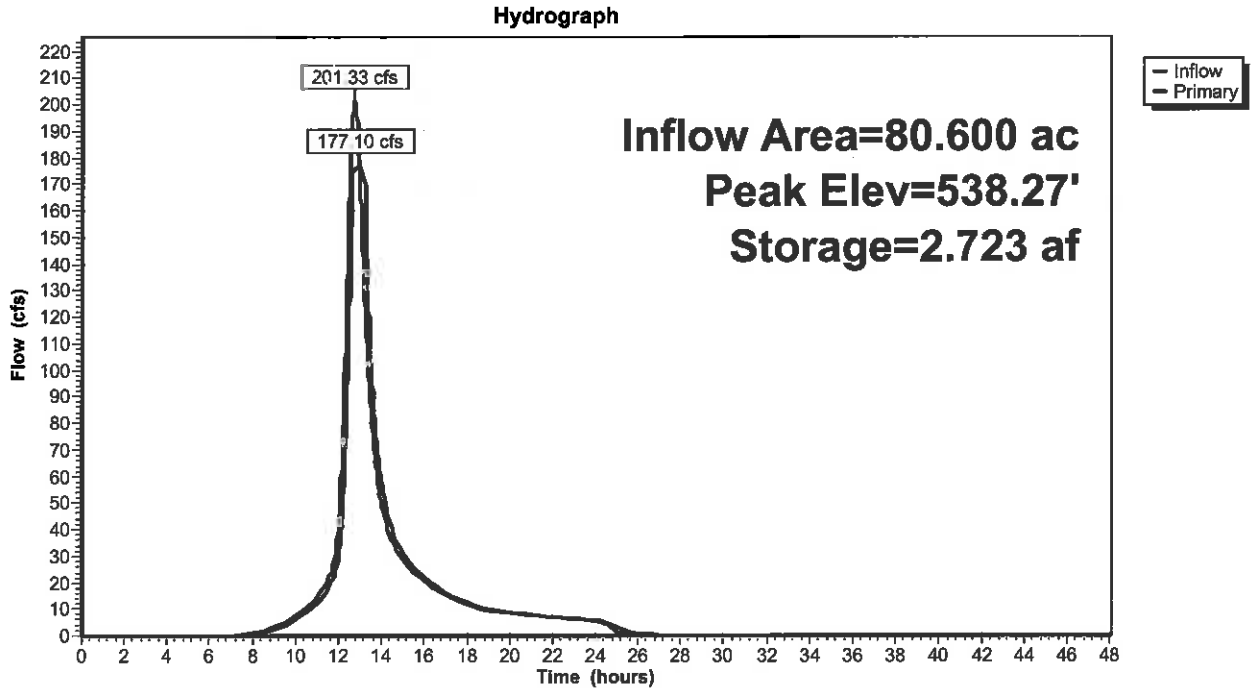
Volume	Invert	Avail.Storage	Storage Description
#1	537.00'	6.737 af	**Custom Stage Data (Pyramidal)**Listed below

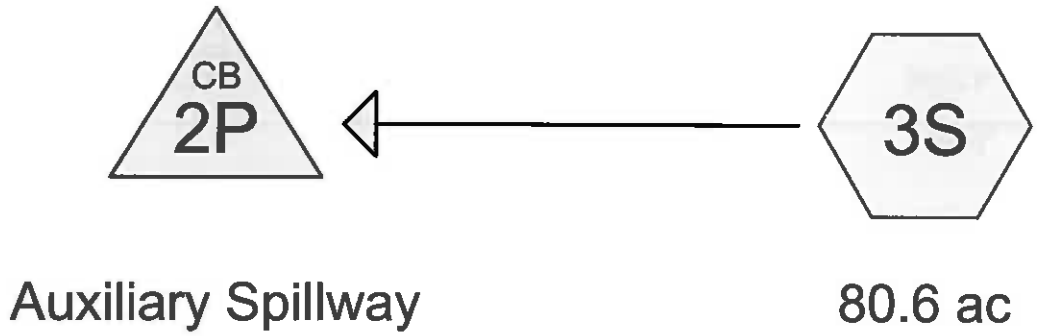
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
537.00	2.000	0.000	0.000	2.000
538.00	2.200	2.099	2.099	2.202
540.00	2.440	4.638	6.737	2.449

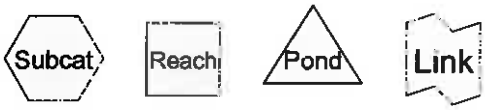
Device	Routing	Invert	Outlet Devices
#1	Primary	530.00'	**36.0" Round Culvert X 2.00** L= 135.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 530.00' / 506.00' S= 0.1778 '/' Cc= 0.900 n= 0.009 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	537.00'	**72.0" x 72.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=177.10 cfs @ 12.97 hrs HW=538.27' (Free Discharge)
└─**1=Culvert** (Inlet Controls 177.10 cfs @ 12.53 fps)
  └─**2=Orifice/Grate** (Passes 177.10 cfs of 224.36 cfs potential flow)

Pond 1P: Control Structures







Routing Diagram for ginder watershed 12.12.12.2
Prepared by Rennia Engineering Design, Printed 12/19/2012
HydroCAD® 10.00 s/n 07191 © 2011 HydroCAD Software Solutions LLC

Summary for Subcatchment 3S: 80.6 ac

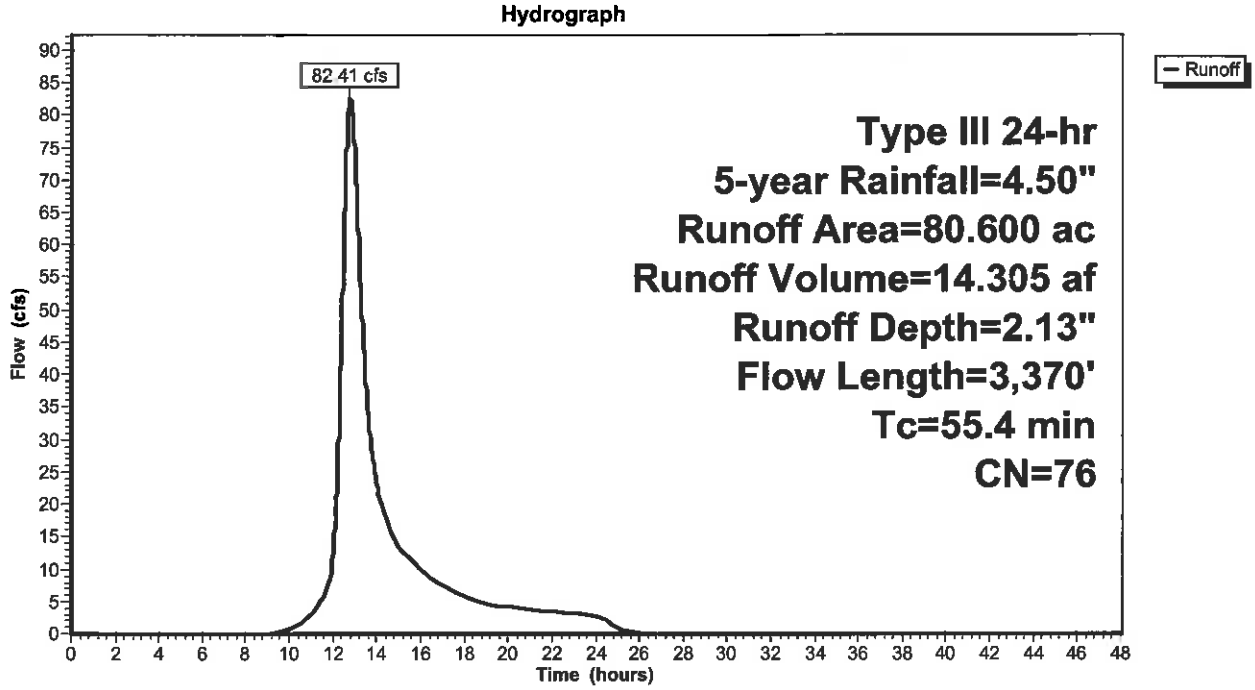
Runoff = 82.41 cfs @ 12.75 hrs, Volume= 14.305 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 5-year Rainfall=4.50"

Area (ac)	CN	Description
80.600	76	Woods/grass comb., Fair, HSG C
80.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.2500	0.13		**Sheet Flow, Woods with 25% slope** Woods: Dense underbrush n= 0.800 P2= 3.50"
30.8	1,534	0.1100	0.83		**Shallow Concentrated Flow, Wooded with 11% Slope** Forest w/Heavy Litter Kv= 2.5 fps
11.6	1,736	0.2500	2.50		**Shallow Concentrated Flow, Wooded with 25% Slope** Woodland Kv= 5.0 fps
55.4	3,370	Total			

Subcatchment 3S: 80.6 ac



Summary for Pond 2P: Auxiliary Spillway

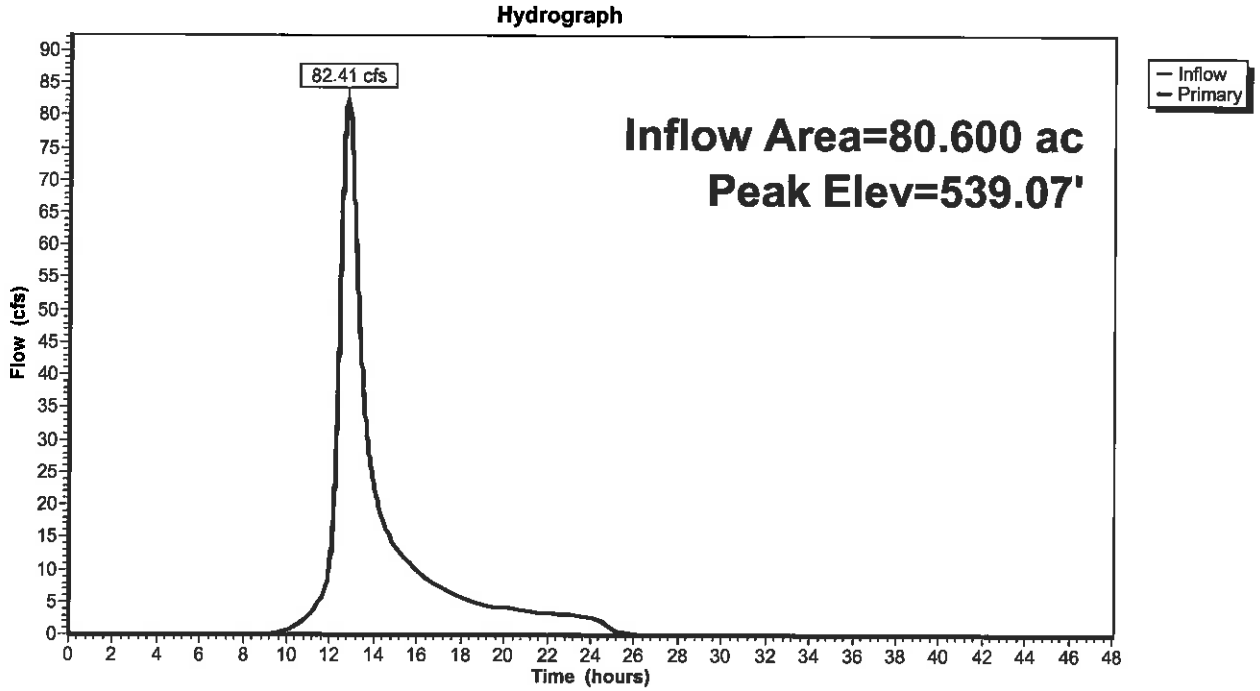
Inflow Area =	80.600 ac,	0.00% Impervious,	Inflow Depth =	2.13"	for 5-year event
Inflow =	82.41 cfs @	12.75 hrs,	Volume=	14.305 af	
Outflow =	82.41 cfs @	12.76 hrs,	Volume=	14.305 af,	Atten= 0%, Lag= 0.6 min
Primary =	82.41 cfs @	12.76 hrs,	Volume=	14.305 af	

Routing by Sim-Route method w/Net Flows, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 539.07' @ 12.76 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	538.27'	**152.0 deg x 35.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=82.40 cfs @ 12.76 hrs HW=539.07' (Free Discharge)
└**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 82.40 cfs @ 2.71 fps)

Pond 2P: Auxiliary Spillway



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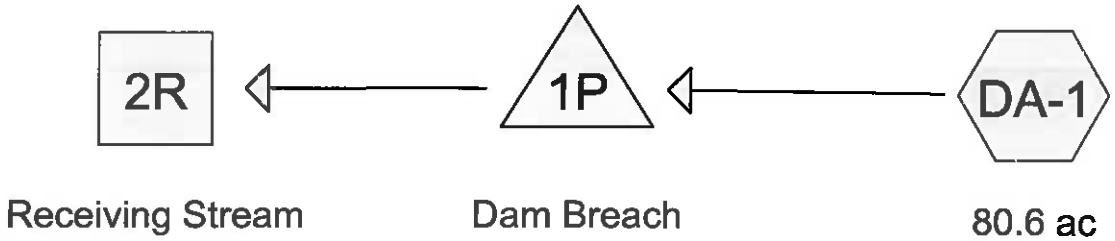

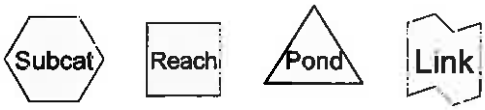

Routing Diagram for DamBreach
Prepared by Rennia Engineering Design, Printed 1/2/2013
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Summary for Subcatchment DA-1: 80.6 ac

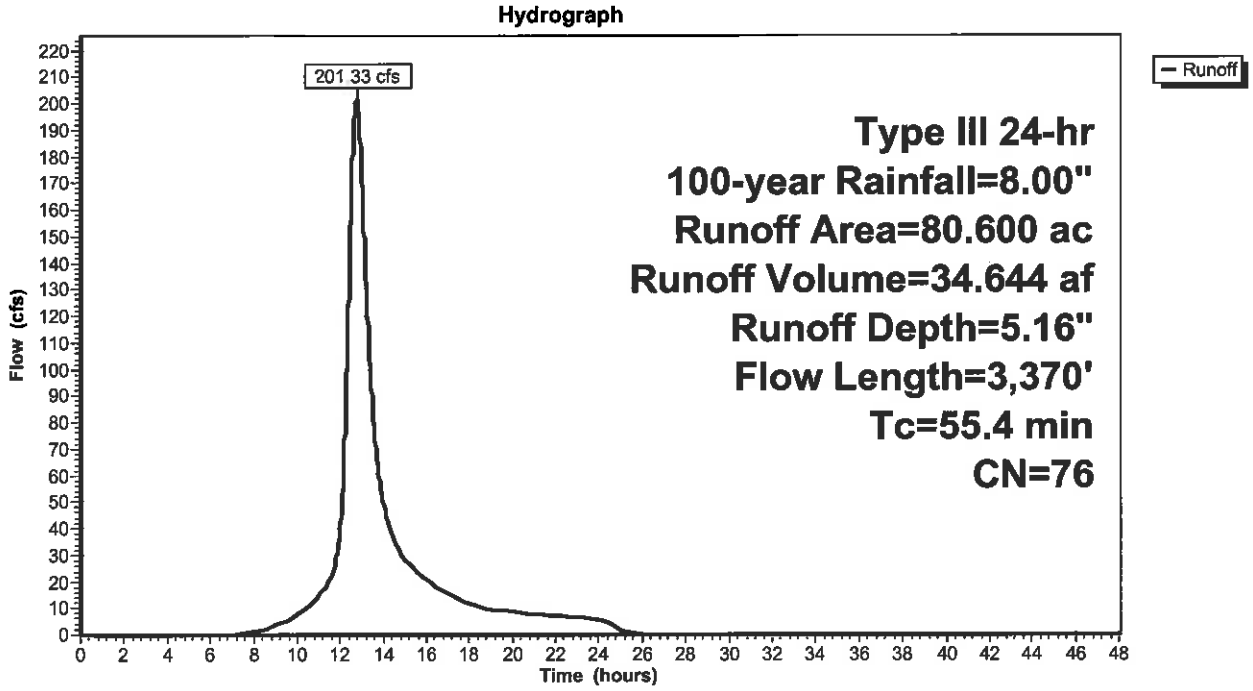
Runoff = 201.33 cfs @ 12.74 hrs, Volume= 34.644 af, Depth= 5.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=8.00"

Area (ac)	CN	Description
80.600	76	Woods/grass comb., Fair, HSG C
80.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.2500	0.13		**Sheet Flow, Woods with 25% slope** Woods: Dense underbrush n= 0.800 P2= 3.50"
30.8	1,534	0.1100	0.83		**Shallow Concentrated Flow, Wooded with 11% Slope** Forest w/Heavy Litter Kv= 2.5 fps
11.6	1,736	0.2500	2.50		**Shallow Concentrated Flow, Wooded with 25% Slope** Woodland Kv= 5.0 fps
55.4	3,370	Total			

Subcatchment DA-1: 80.6 ac



Summary for Reach 2R: Receiving Stream

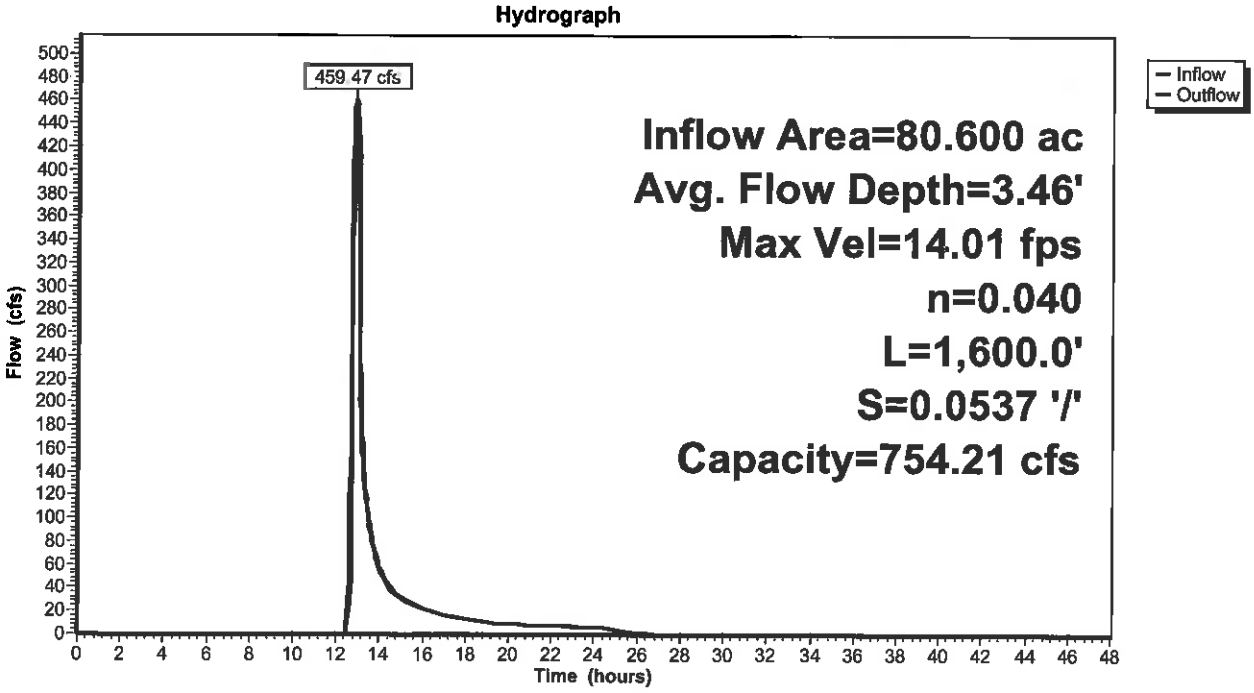
Inflow Area = 80.600 ac, 0.00% Impervious, Inflow Depth = 5.16" for 100-year event
Inflow = 460.60 cfs @ 12.86 hrs, Volume= 34.643 af
Outflow = 459.47 cfs @ 12.89 hrs, Volume= 34.643 af, Atten= 0%, Lag= 1.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Max. Velocity= 14.01 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 2.54 fps, Avg. Travel Time= 10.5 min

Peak Storage= 52,460 cf @ 12.89 hrs
Average Depth at Peak Storage= 3.46'
Bank-Full Depth= 4.50' Flow Area= 47.3 sf, Capacity= 754.21 cfs

6.00' x 4.50' deep channel, n= 0.040 Earth, cobble bottom, clean sides
Side Slope Z-value= 1.0 '/' Top Width= 15.00'
Length= 1,600.0' Slope= 0.0537 '/'
Inlet Invert= 500.00', Outlet Invert= 414.00'

Reach 2R: Receiving Stream



Summary for Pond 1P: Dam Breach

Inflow Area = 80.600 ac, 0.00% Impervious, Inflow Depth = 5.16" for 100-year event
Inflow = 201.33 cfs @ 12.74 hrs, Volume= 34.644 af
Outflow = 460.60 cfs @ 12.86 hrs, Volume= 34.643 af, Atten= 0%, Lag= 7.3 min
Primary = 460.60 cfs @ 12.86 hrs, Volume= 34.643 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 524.98' @ 12.67 hrs Surf.Area= 1.007 ac Storage= 9.322 af

Plug-Flow detention time= 28.1 min calculated for 34.643 af (100% of inflow)
Center-of-Mass det. time= 28.1 min (885.8 - 857.8)

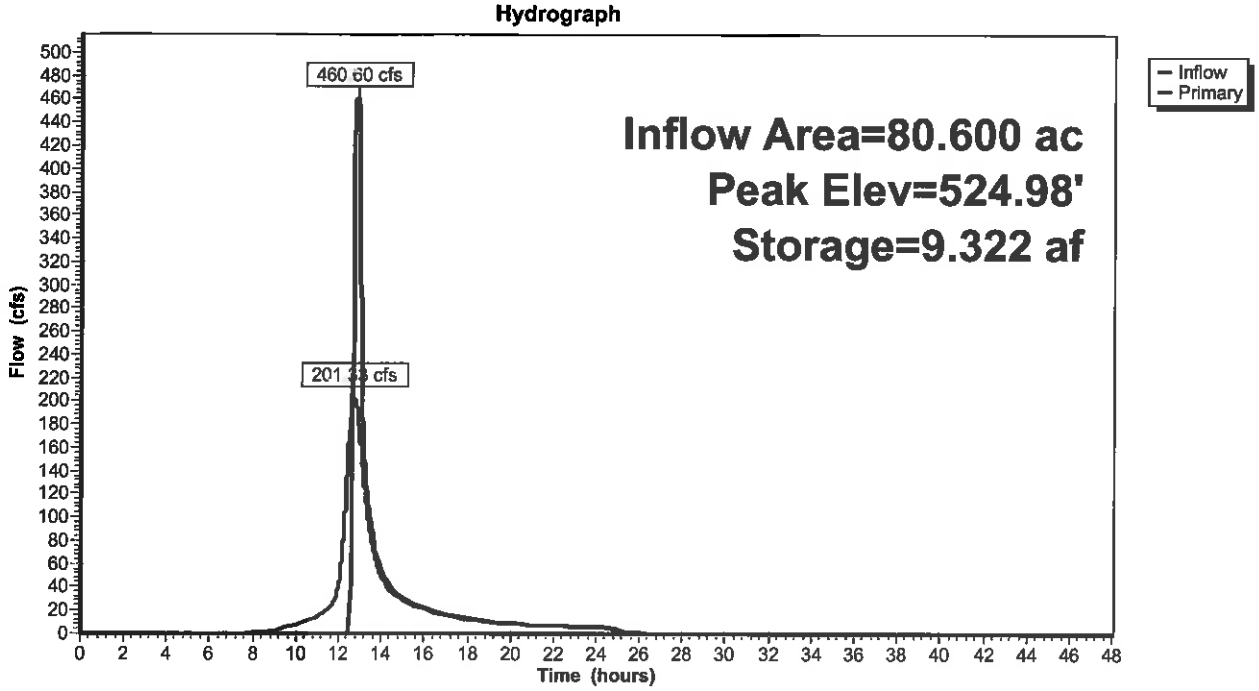
Volume	Invert	Avail.Storage	Storage Description
#1	514.00'	26.266 af	**Custom Stage Data (Pyramidal)** Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)	Wet.Area (acres)
514.00	0.100	0.000	0.000	0.100
537.00	2.000	19.529	19.529	2.038
538.00	2.200	2.099	21.628	2.240
540.00	2.440	4.638	26.266	2.487

Device	Routing	Invert	Outlet Devices
#1	Primary	514.00'	**152.0 deg x 10.0' wide x 26.00' high Dam Breach** C= 2.47 Top of breach = 540.00' Bottom of breach = 514.00' Breach starts at 12.00 hrs and develops over 1.00 hrs

Primary OutFlow Max=460.57 cfs @ 12.86 hrs HW=521.20' TW=503.46' (Dynamic Tailwater)
└─**1=Dam Breach** (Weir Controls 460.57 cfs @ 5.18 fps)

Pond 1P: Dam Breach



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