

016
PASCOAG RESERVOIR
UPPER DAM

PASCOAG RESERVOIR UPPER DAM, BURRILLVILLE (016)

Pascoag Reservoir Upper Dam (**Figure 1**) has been classified by DEM as having a **High Hazard** potential. The following report summarizes GZA's evaluation of the dam's potential impact area due to failure of the dam.



1.00 SUMMARY OF SITE AND POTENTIAL DOWNSTREAM IMPACT AREA

In addition to compiling background information, including the U.S. Army Corps of Engineers Phase I Inspection Report (USACE, 1979), and GIS mapping data, GZA performed field reconnaissance of the dam and its associated downstream area (**Figure 2**). GZA representatives David M. Leone and Damiana Diaz-Reck visited the site and the downstream river valley on May 12, 2009. A field checklist from the reconnaissance is provided in **Attachment I** and selected photographs are provided in **Attachment II**.

1.10 Site Description

Pascoag Reservoir Upper Dam is located on Brandy Brook in the Town of Burrillville, Providence County, Rhode Island (See Locus Map, **Figure 1**). The following state and federal identification numbers are associated with the dam:

- DEM ID Number 016
- NID ID Number RI00304

The dam is an approximately 475 ft long, 27 ft high earthen embankment structure. The spillway is an approximately 21 ft long cut stone masonry overflow weir. It has a 8.42 square mile watershed. Pertinent engineering data, as obtained from USACE Phase I Inspection Report, is provided in **Table 1**.

The dam was reportedly constructed in 1860 for hydropower to downstream mills. Since the closing of these mills the reservoir has developed into a recreational impoundment.

TABLE 1. Pertinent Engineering Data

Dam	
Type	Earthen Embankment
Length	± 475 ft
Height	± 27 ft
Drainage Area	± 8.42 square miles
Elevation (NGVD)	
Normal Pool	± 437 ft
Spillway	± 441 ft
Top of Dam	± 449 ft



Storage (Acre-ft)	
Normal Pool	± 5,000
Top of Dam	± 9,000
Primary Spillway	
Type	Broad-Crested Stone Masonry Weir
Weir Length	± 21 ft

1.20 Downstream Description

Pascoag Reservoir Upper Dam is located on Brandy Brook and within the Town of Burrillville. The village of Pascoag is 2000 ft downstream of the impoundment. Brandy Brook is tributary of Pascoag River which is tributary of Clear River. Clear River meets Branch River 4.3 mi downstream of Pascoag Reservoir Upper Dam.

1.21 Downstream Dams

About 1,700 ft downstream of Pascoag Reservoir Upper Dam, on the Pascoag River, is the Union Mill Pond Dam (015). Union Mill Pond Dam is an approximately 8 ft high earth masonry run-of-river dam with a primary spillway length of approximately 25 ft.

Akela Pond Dam (014) is a 10-ft high, 50-ft long dam located about 2,500 ft downstream of Pascoag Reservoir Upper Dam. It has a reported maximum spillway capacity discharge of 329 cfs, as obtained from the DEM dam information database.

American Mill Pond Dam (011) is a 14 ft high, 190 ft long earthen and masonry dam located about 3,700 ft downstream of Pascoag Reservoir Upper Dam. It has a reported maximum spillway capacity discharge of 292 cfs, as obtained from the DEM dam information database.

Harrisville Pond Dam (008) is a 19 ft high dam located on the Clear River about 2.8 mi downstream of Pascoag Reservoir Upper Dam. It has a reported maximum spillway capacity discharge of 3,200 cfs, as obtained from the DEM dam information database.

Oakland Pond Dam (037) is an 11 ft high dam located on the Branch River about 2.6 mi downstream of Harrisville Pond Dam. It has a reported maximum spillway capacity discharge of 4,280 cfs, as obtained from the DEM dam information database.

1.22 Downstream Bridges

There are several bridges downstream of Pascoag Reservoir Upper Dam over Pascoag River, Branch River and Clear River, including, but not limited to the following:



- The High St (Route 100) crossing includes a concrete culvert about 4 ft high and 14 ft wide and is situated just downstream of the Union Mill Pond Dam, about 2,000 ft downstream of Pascoag Reservoir Upper Dam.
- The Sayles Av crossing includes a stone masonry arch culvert about 5 ft high and 20 ft wide and is situated about 2,300 ft downstream of the dam.
- The Bridgeway St crossing includes a stone masonry arch culvert 12 ft high and 30 ft wide and is situated about 2,600 ft downstream of the dam.

1.23 Downstream Development

The land use along the floodplain of the Pascoag River is primarily commercial and residential. There is a commercial plaza located on the left overbanks of the Pascoag River about 2,000 ft downstream of the dam. The old mill building, which was once located along the right bank of the river and downstream of Union Mill Pond Dam, has been demolished, and re-development of this area seems likely considering the highly developed / urban nature of the vicinity. The remaining mill structure and sluiceway forms an approximately 5 ft wide by 3 ft high culvert, which is likely to constrict flow. The High Street bridge is located about 3 ft above the floor of the old sluiceway.

The downstream area along the Clear River consists mainly of areas of moderate population density, with some commercial development, similar to the area along Branch River.

2.00 DAM HAZARD POTENTIAL ASSESSMENT

To further evaluate the extent of flooding due to a potential dam failure, GZA performed a limited hydraulic investigation of the hypothetical dam break flood. The analysis was performed with the National Weather Service (NWS) Simplified Dam Break (SMPDBK) model, which estimates the peak dam break flood outflow, peak water surface elevations, and the timing of the flood wave as it travels downstream, given breach characteristics specific to the dam and the geometry of the downstream channel and overbank. SMPDBK output summaries are provided in **Attachment III**.

Please note that the approximate extent of hypothetical dam break flooding generated with SMPDBK is not generally applicable for emergency planning or other hydraulic design purposes. Detailed hydraulic modeling using state-of-the-practice unsteady flow models such as the NWS DAMBRK, FLDWAV, or U.S. Army Corps of Engineers unsteady flow version of HEC-RAS computer programs, which is not in the scope of this study, should be performed when generating inundation maps for Emergency Action Plans or for use in spillway design / inflow design flood (IDF) studies.



2.10 Potential Dam Failure Mechanisms and Breach Description

As specified by the DEM, the simplified hypothetical dam failure analysis assumed starting pool elevations in the impoundment coincident with the top of dam elevation and average stream flow conditions prevailing (i.e., assumed about 2 cfs per square mile of drainage area). Dam breach parameters such as time of breach formation, breach shape, and the average width of the breach were selected according to these conditions and based upon the type of materials used in constructing the dam, in accordance with the recommended range of values published in the Federal Energy Regulatory Committee (FERC) guidelines and based on engineering judgment. For Pascoag Reservoir Upper Dam, primarily an earth embankment structure, a time to failure of 0.5 hrs and a trapezoidal breach shape (0.5 H : 1.0 V) was utilized. Such an earthen embankment dam is assumed to fail due to piping under fair weather circumstances. The average breach width was assumed to equal to three times the height of the dam, about 81 ft.

Failure of the Pascoag Reservoir Upper Dam is expected to lead to the “domino” failure of Union Mill Pond Dam, Akela Pond Dam and American Mill Pond Dam. These dams are very small relative to the Pascoag Reservoir Upper Dam and will contribute negligible additional flow. Therefore, development separate SMPDBK models were considered unnecessary.

Failure of the Pascoag Reservoir Upper Dam is expected to lead to the “domino” failure of Harrisville Pond Dam, for which a separate SMPDBK model was prepared. A base flow at the Harrisville Pond Dam of 16,000 cfs was used to represent the peak flow from the Pascoag Reservoir Upper Dam failure upstream. For Harrisville Pond Dam, primarily an earth embankment structure, a time to failure of 0.5 hrs and a trapezoidal breach shape (0.5 H : 1.0 V) was utilized. Such an earthen embankment dam is assumed to fail due to piping under fair weather circumstances. The average breach width was assumed to equal to three times the height of water at the dam, due to upstream dam failure, about 75 ft.

Oakland Pond Dam is not expected to overtop given its spillway capacity discharge of 4,280 cfs, as obtained from the DEM dam information database, relative to the estimated dam break of about 2,500 cfs.

2.20 Estimated Peak Outflow from Dam Break

The peak outflow from the hypothetical dam break was estimated using the breach outflow approximation equation developed by the National Weather Service as part of their SMPDBK computer model (see Attachment III), using the breach parameters described above and top-of-dam pool reservoir characteristics. The estimated peak dam breach outflow from Pascoag Reservoir Upper Dam is approximately 24,000 cfs.

The estimated peak dam breach outflow of approximately 24,000 cfs is about two order of magnitude higher than the published FEMA 500-yr flood 270 cfs estimate for Pascoag River at the outlet of Union Mill pond Dam.

2.30 Estimated Approximate Flood Impact Area

Several riverine cross sections, developed by GZA from USGS 7.5 minute quadrangle maps and RIGIS mapping data, were input into the SMPDBK model to preliminarily estimate approximate peak water surface elevations. The results of the analysis are provided as the approximate inundation area depicted in **Figures 2, 3 and 4**.



2.31 Downstream Extent of Flooding

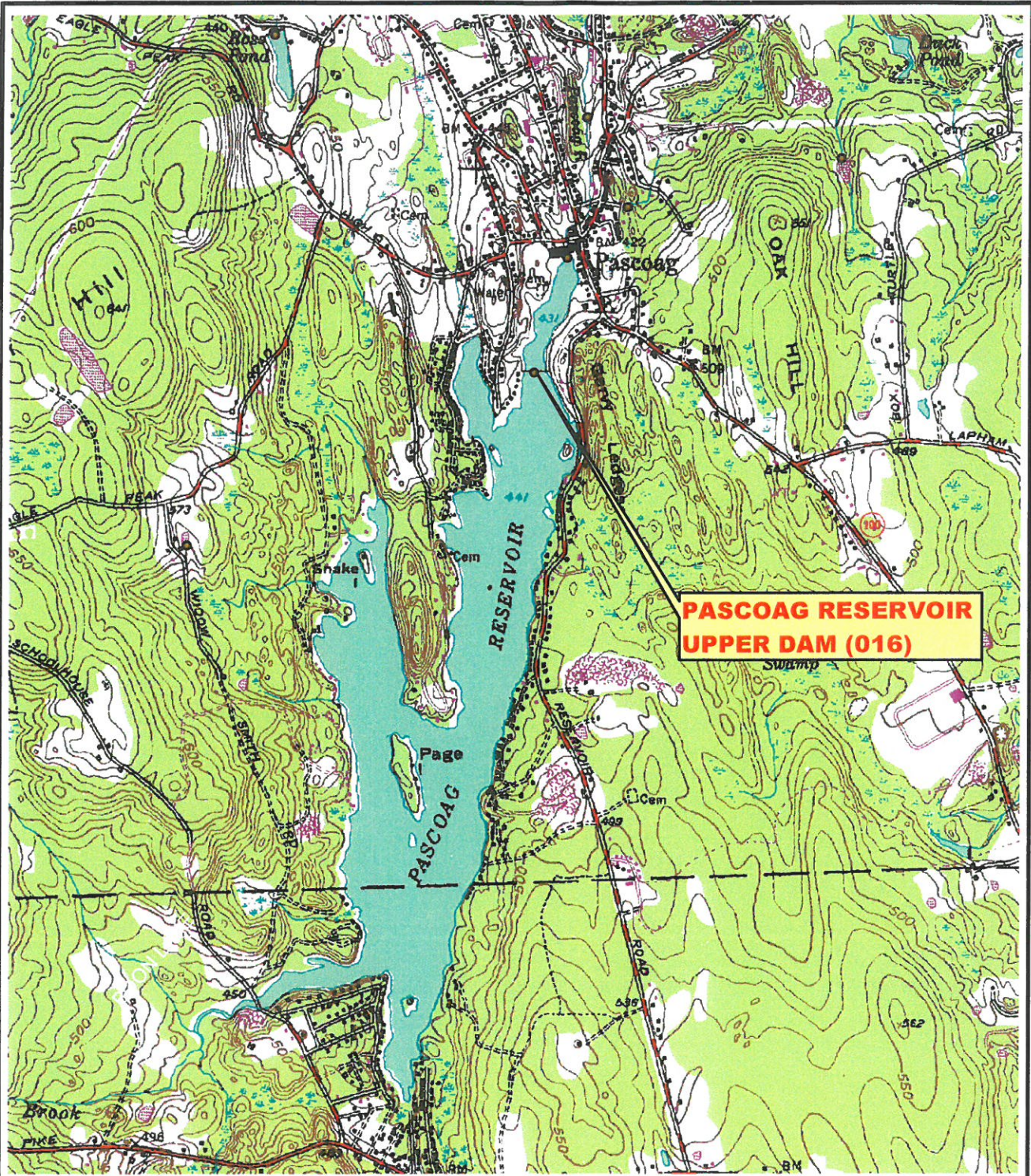
The stream channel downstream of Pascoag Reservoir Upper Dam has moderate to mild slopes. Typical Manning's "n" roughness coefficients used in the analysis were 0.04 for the channel areas, and 0.08 for the overbank areas. These values are consistent with the range of values used in the FEMA Flood Insurance studies for similar small streams throughout Rhode Island. The hypothetical dam failure flood wave is expected pass along Pascoag River to its confluence with the Clear River, and then along the Branch River to finally dissipate within Slatersville Reservoir Upper, which is the downstream extent of the model.

2.32 Potential Effects of Dam Break

Results of the analysis indicate a peak flood depth at the immediate toe of the dam of about 23 ft. The flood wave from a hypothetical dam failure at Pascoag Reservoir Upper Dam is expected to cause the failure of many downstream dams and bridges on the Pascoag River, the Clear River and the Branch River. The dam break flood wave is anticipated to inundate many structures and result in the loss of lives. The resulting dam break flood wave is anticipated to be several times larger than the 500-year flood and lead to widespread flooding along the Pascoag River, the Clear River and the Branch River.

j:\17,000-18,999\17085\17085-40.dml\dams\group 1\016 pascoag res upper\016 report.doc

FIGURES



**PASCOAG RESERVOIR
UPPER DAM (016)**

J:\17,000-18,999\17085\17085-40.DML\dams\Locus.mxd



SOURCE : SCANNED USGS TOPOGRAPHIC QUADRANGLES DISTRIBUTED BY THE RHODE ISLAND GEOGRAPHIC INFORMATION SYSTEM, RIGIS. DATA SET CREDIT: This DRG was produced through an Innovative Partnership agreement between The Land Information Technology Company, Ltd., of Aurora, CO and the USGS.

Data Supplied by :



0 1,000 2,000 4,000 6,000 Feet



PROJ. MGR.: DML
DESIGNED BY: DDR
REVIEWED BY: PHB
OPERATOR: DDR

DATE: 07/15/09

PASCOAG RESERVOIR UPPER DAM (016)

SITE LOCUS

JOB NO.
17085.40

FIGURE NO.
1

ATTACHMENT I
FIELD RECONNAISSANCE CHECKLIST

DAM HAZARD POTENTIAL FIELD CHECKLIST

Name of Dam:	Pascoag Reservoir Upper Dam	RIDEM ID NO.	16
Location:	Burrillville Town	Pascoag River River or Stream	
	Pascoag Village Downstream Communities	Clean River Major Confluence	
Classification Data:	Intermediate Size	1860	Date Built
PHYSICAL DATA:	Earthen Embankment Type of Dam	27 ft	475 ft Length of Dam
	Broad Crested Stone Masonry Weir Type of Spillway	21 ft	12 ft Normal Freeboard
	Recreation Purpose of Dam	3" to 6" above the spillway Pool at Inspection	5,000 acre-ft Normal Pool Storage Capacity
			9,000 acre-ft Maximum Pool Storage Capacity
Name	Title/Position		Representing
David M. Leone	Senior Project Manager/ Hydrogeologist		GZA GeoEnvironmental, Inc.
Damiana Diaz-Reck	Staff Engineer		GZA GeoEnvironmental, Inc.
DATE OF INSPECTION:	5/12/2009		
WEATHER:	Sunny		TEMPERATURE: 60s F

Name of Dam:

Pascoag Reservoir Upper Dam

Inspection No.:

16

Inspection Date: 12-Mar, '99

STRUCTURAL CONDITION	1	Concrete Condition	Masonry. Good condition. Seems to have been recently regouted	
	2	Outlet Condition	No low-level outlet observed. Spillway is stepped stone masonry.	
	3	Unusual Movement	None observed.	
	4	Seepage / Wet Area	None observed.	
	5	Embankment Slides/Erosion	Embankment need reseeded. No embankment slides noted.	
	6	Vegetation / Pest Control	The brush on the embankments slopes seem to have been recently cut.	
	7	Vicinity Description	Wooded / recreational.	
	8	Dam Roads & Utilities	None at dam.	
	9	Discharge Channel	The dam discharges on the Union Mill Pond.	
	10	Structures (Gatehouses, etc.)	Gatehouse on the left side of the embankment. Old iron bridge on top of spillway.	
	11	Adjacent Land Use	Recreational.	
	12	Adjacent Population Density	Low to moderate.	
	13	Downstream Constrictions	Old mill sluice culvert remains, 100' d/s of Union Mill Dam. Significant constriction.	
	14	Downstream Access / Use	None.	
	DAM & IMMEDIATE DOWNSTREAM AREA	15	Property / Infrastructure / Utility Description & Distance	House downstream on left overbank.
17		Land Use Classification	Moderately urbanized commercial / residential	
18		Population Density	Moderate to High (Pascoag Village)	
19		Property / Infrastructure	Many houses close to the banks of downstream channel.	
21		Downstream Dams	Union Mill Pond Dam; Akela Pond Dam, American Union Dam and Harrisville Pond Dam.	
22		Downstream Bridges	High Street culvert about 2000 ft D/S of dam; Sayles St about 2,300 ft D/S of dam; Bridgeway St about 2,600 ft D/S of dam.	
23		Upstream Dams	Burlingame Reservoir Dam	
24		Channel Description (depth, Manning's n, width, overbank)	After Union Mill Pond Dam very shallow stream, fair gradient downstream of dam. Thick vegetative cover at banks.	
GENERAL DOWNSTREAM AREA		ADDITIONAL COMMENTS: REFER TO ITEM NO. IF APPLICABLE		
		There is an iron beam on the top of the dam.		

ATTACHMENT II
FIELD PHOTOGRAPHS

DAM 016 – PASCOAG RESERVOIR DAM 05/12/2009



Photo 1. View of Pascoag Reservoir from embankment

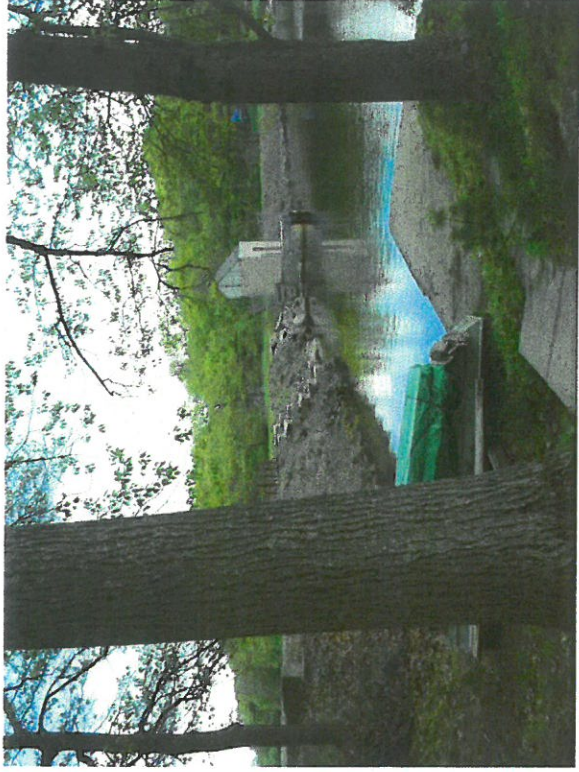


Photo 2. View of upstream face of the dam and spillway.



Photo 4. View along left side Pascoag Reservoir.



Photo 3. View along crest of spillway from left side of dam.



Photo 5. Sayles Av crossing.



Photo 6. Akela Pond Dam. Note the building close to the bank of Pascoag River.



Photo 7. View of downstream channel from Sayles Av.

ATTACHMENT III
SMPDBK OUTPUT SUMMARY

SIMPLIFIED DAMBREAK MODEL (SMPDBK) VERSION: 9/91
 BY D.L. FREAD, J.M. LEWIS, & J.N. WETMORE - PHONE: (301) 427-7640
 NWS HYDROLOGIC RESEARCH LAB W/OH3, 1325 EAST-WEST HIGHWAY,
 SILVER SPRING, MD 20910

C1 PASCOAG RESERVOIR UPPER DAM
 C2 PASCOAG BROOK RRILVILLE, RI

THE DATA FOR THIS DAM IS AS FOLLOWS:

TYPE OF DAM (IDAM)	EARTH			
DAM BREACH ELEVATION (HDE)		449.00	FT	
FINAL BREACH ELEVATION (BME)		422.00	FT	
SURFACE AREA OF RESERVOIR (SA)		500.00	ACRES	
FINAL BREACH WIDTH (BW)		81.00	FT	
TIME OF DAM FAILURE (TFM)		30.00	MINUTES	
NON-BREACH FLOW (QO)		17.00	CFS	
DISTANCE TO PRIMARY PT OF INTEREST (DISTTN)		.01	MILES	
DEAD STORAGE EQUIV. MANN. N (CMS)		.50		

CROSS SECTION NO. 1				
FLOOD DEPTH (FLD)	5.00	FT		
ELEV.(FT) (HS)	422.0	430.0	440.0	449.0
TWIDTHS(FT) (BS)	81.0	100.0	200.0	475.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 2				
REACH LENGTH (D)	.32	MI		
FLOOD DEPTH (FLD)	5.00	FT		
ELEV.(FT) (HS)	421.0	430.0	440.0	450.0
TWIDTHS(FT) (BS)	24.0	50.0	400.0	650.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 3				
REACH LENGTH (D)	.73	MI		
FLOOD DEPTH (FLD)	5.00	FT		
ELEV.(FT) (HS)	370.0	374.0	380.0	390.0
TWIDTHS(FT) (BS)	.0	20.0	200.0	300.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 4				
REACH LENGTH (D)	.93	MI		
FLOOD DEPTH (FLD)	5.00	FT		
ELEV.(FT) (HS)	366.0	370.0	380.0	390.0
TWIDTHS(FT) (BS)	.0	100.0	1000.0	1300.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 5				
REACH LENGTH (D)	1.26	MI		
FLOOD DEPTH (FLD)	5.00	FT		
ELEV.(FT) (HS)	361.0	365.0	370.0	380.0
TWIDTHS(FT) (BS)	.0	20.0	1000.0	2000.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 6				
REACH LENGTH (D)	1.74	MI		
FLOOD DEPTH (FLD)	5.00	FT		

016.OUT

ELEV.(FT) (HS)	355.0	360.0	370.0	380.0
TWIDTHS(FT) (BS)	30.0	220.0	370.0	740.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 7
 REACH LENGTH (D) 2.32 MI
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	338.9	339.0	340.0	350.0
TWIDTHS(FT) (BS)	5.0	20.0	830.0	1570.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 8
 REACH LENGTH (D) 2.89 MI
 FLOOD DEPTH (FLD) 5.00 FT

ELEV.(FT) (HS)	335.8	339.0	340.0	350.0
TWIDTHS(FT) (BS)	500.0	520.0	600.0	870.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

AN ASTERISK (*) BESIDE A PARAMETER IMPLIES THAT A DEFAULT VALUE WAS COMPUTED

NAME OF DAM: PASCOAG RESERVOIR UP NAME OF RIVER: PASCOAG BROOK

RVR MILE FROM DAM *****	MAX FLOW (CFS) *****	MAX ELEV (FT-MSL) *****	MAX DEPTH (FT) *****	TIME(HR) MAX DEPTH *****	TIME(HR) FLOOD *****	TIME(HR) DEFLOOD *****	FLOOD DEPTH(FT) *****
.01	23955.	445.08	23.08	.50	.07	5.93	5.00
.32	17036.	441.15	20.15	.60	.14	9.07	5.00
.73	16865.	385.39	15.39	.64	.15	9.63	5.00
.93	16697.	376.02	10.02	.66	.22	8.78	5.00
1.26	16530.	372.07	11.07	.84	.35	10.08	5.00
1.74	16364.	368.38	13.38	.89	.48	8.66	5.00
2.32	16201.	344.47	5.57	1.22	1.12	3.04	5.00
2.89	16039.	344.47	8.67	1.52	1.33	5.23	5.00

ANALYSIS IS COMPLETE

008-B.OUT

SIMPLIFIED DAMBREAK MODEL (SMPDBK) VERSION: 9/91
BY D.L. FREAD, J.M. LEWIS, & J.N. WETMORE - PHONE: (301) 427-7640
NWS HYDROLOGIC RESEARCH LAB W/OH3, 1325 EAST-WEST HIGHWAY,
SILVER SPRING, MD 20910

HARRISVILLE DAM WITH PASCOAG BASE FLOW
PASCOAG BROOK BURRILLVILLE, RI

***** DISTANCE TO PRIMARY POINT OF INTEREST MOVED TO THE CROSS SECTION
***** CLOSEST TO THIS LOCATION (MI 7.26)

THE DATA FOR THIS DAM IS AS FOLLOWS:

TYPE OF DAM (IDAM)	EARTH			
DAM BREACH ELEVATION (HDE)		345.00	FT	
FINAL BREACH ELEVATION (BME)		320.00	FT	
SURFACE AREA OF RESERVOIR (SA)		21.00	ACRES	
FINAL BREACH WIDTH (BW)		75.00	FT	
TIME OF DAM FAILURE (TFM)		30.00	MINUTES	
NON-BREACH FLOW (QO)		16000.00	CFS	
DISTANCE TO PRIMARY PT OF INTEREST (DISTTN)		7.26	MILES	
DEAD STORAGE EQUIV. MANN. N (CMS)		.50		

CROSS SECTION NO. 1				
REACH LENGTH (D)	5.00	FT		
FLOOD DEPTH (FLD)				
ELEV.(FT) (HS)	320.0	323.0	340.0	350.0
TWIDTHS(FT) (BS)	75.0	75.0	800.0	1500.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 2				
REACH LENGTH (D)	.01	MI		
FLOOD DEPTH (FLD)	5.00	FT		
ELEV.(FT) (HS)	319.0	323.0	340.0	350.0
TWIDTHS(FT) (BS)	75.0	75.0	800.0	1500.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 3				
REACH LENGTH (D)	.38	MI		
FLOOD DEPTH (FLD)	5.00	FT		
ELEV.(FT) (HS)	315.0	318.0	320.0	330.0
TWIDTHS(FT) (BS)	.0	60.0	200.0	800.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 4				
REACH LENGTH (D)	1.70	MI		
FLOOD DEPTH (FLD)	5.00	FT		
ELEV.(FT) (HS)	306.0	309.0	310.0	320.0
TWIDTHS(FT) (BS)	.0	60.0	500.0	1150.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

CROSS SECTION NO. 5				
REACH LENGTH (D)	2.51	MI		
FLOOD DEPTH (FLD)	5.00	FT		
ELEV.(FT) (HS)	303.0	306.0	310.0	320.0
TWIDTHS(FT) (BS)	.0	60.0	1100.0	1500.0
INACTIVE TW(FT) (BSS)	.0	.0	.0	.0
MANNING N (CM)	.040	.040	.080	.080

008-B.OUT

CROSS SECTION NO. 6
 REACH LENGTH (D) 2.80 MI
 FLOOD DEPTH (FLD) 5.00 FT
 ELEV.(FT) (HS) 296.0 299.0 310.0 320.0
 TWIDTHS(FT) (BS) .0 60.0 400.0 600.0
 INACTIVE TW(FT) (BSS) .0 .0 .0 .0
 MANNING N (CM) .040 .040 .080 .080

CROSS SECTION NO. 7
 REACH LENGTH (D) 3.52 MI
 FLOOD DEPTH (FLD) 5.00 FT
 ELEV.(FT) (HS) 292.0 297.0 300.0 310.0
 TWIDTHS(FT) (BS) 10.0 60.0 140.0 700.0
 INACTIVE TW(FT) (BSS) .0 .0 .0 .0
 MANNING N (CM) .040 .040 .080 .080

CROSS SECTION NO. 8
 REACH LENGTH (D) 4.54 MI
 FLOOD DEPTH (FLD) 5.00 FT
 ELEV.(FT) (HS) 280.0 287.0 290.0 300.0
 TWIDTHS(FT) (BS) 10.0 60.0 110.0 300.0
 INACTIVE TW(FT) (BSS) .0 .0 .0 .0
 MANNING N (CM) .040 .040 .080 .080

CROSS SECTION NO. 9
 REACH LENGTH (D) 5.33 MI
 FLOOD DEPTH (FLD) 5.00 FT
 ELEV.(FT) (HS) 272.0 277.0 280.0 290.0
 TWIDTHS(FT) (BS) 10.0 60.0 265.0 560.0
 INACTIVE TW(FT) (BSS) .0 .0 .0 .0
 MANNING N (CM) .040 .040 .080 .080

CROSS SECTION NO. 10
 REACH LENGTH (D) 6.98 MI
 FLOOD DEPTH (FLD) 5.00 FT
 ELEV.(FT) (HS) 249.0 249.5 250.0 260.0
 TWIDTHS(FT) (BS) 100.0 120.0 150.0 650.0
 INACTIVE TW(FT) (BSS) .0 .0 .0 .0
 MANNING N (CM) .040 .040 .080 .080

CROSS SECTION NO. 11
 REACH LENGTH (D) 7.26 MI
 FLOOD DEPTH (FLD) 5.00 FT
 ELEV.(FT) (HS) 248.9 249.5 250.0 260.0
 TWIDTHS(FT) (BS) 1000.0 1050.0 1100.0 1400.0
 INACTIVE TW(FT) (BSS) .0 .0 .0 .0
 MANNING N (CM) .040 .040 .080 .080

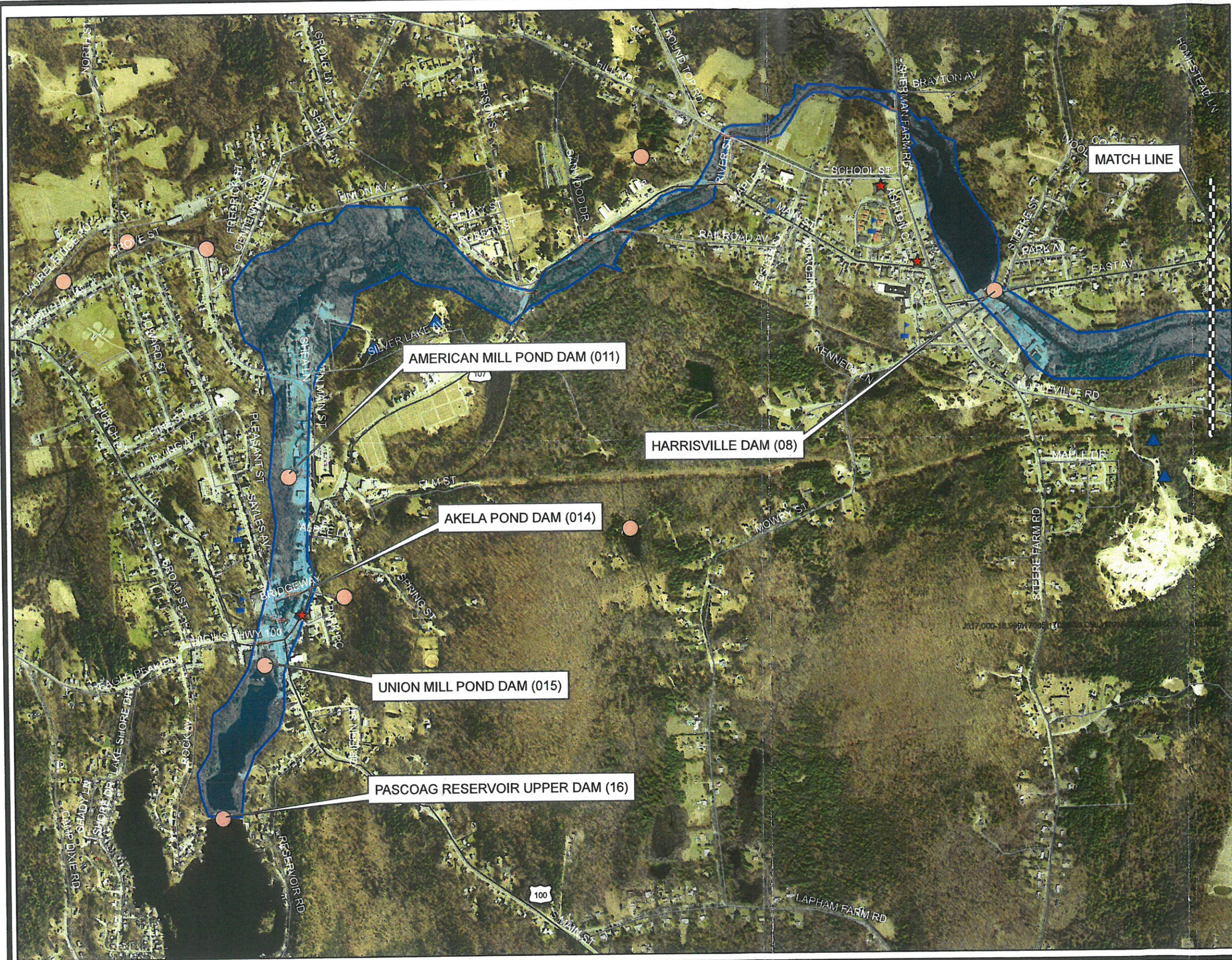
AN ASTERISK (*) BESIDE A PARAMETER IMPLIES THAT A DEFAULT VALUE WAS COMPUTED

NAME OF DAM: HARRISVILLE DAM WIT NAME OF RIVER: PASCOAG BROOK

RVR MILE FROM DAM	MAX FLOW (CFS)	MAX ELEV (FT-MSL)	MAX DEPTH (FT)	TIME(HR)	TIME(HR)	TIME(HR)	FLOOD DEPTH(FT)
*****	*****	*****	*****	*****	*****	*****	*****
.00	16012.	329.39	9.39	.50	.00	.00	5.00
.01	15388.	328.90	9.90	.50	.00	.00	5.00
.38	9593.	324.75	9.75	.71	.00	.00	5.00
1.70	3771.	313.16	7.16	1.76	.00	.00	5.00
2.51	2716.	310.18	7.18	2.66	.00	.00	5.00
2.80	2689.	304.39	8.39	2.68	.00	.00	5.00
3.52	2510.	302.76	10.76	3.40	.00	.00	5.00
4.54	2484.	293.65	13.65	3.74	.00	.00	5.00
5.33	2107.	281.46	9.46	4.62	.00	.00	5.00
6.98	1461.	253.15	4.15	6.46	.00	.00	5.00

7.26 1394. 252.52 3.62 6.91 008-B.OUT .00 .00 5.00

ANALYSIS IS COMPLETE



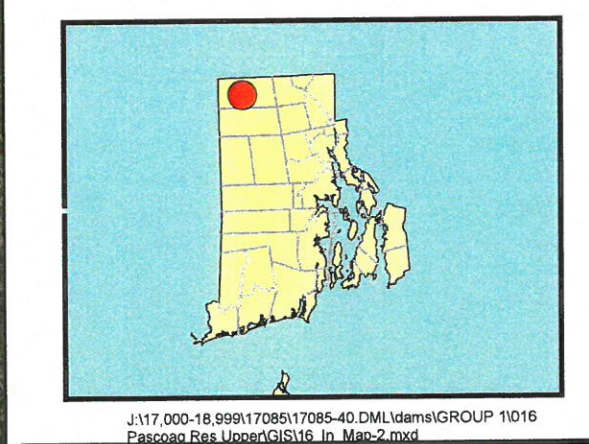
LEGEND

- BRIDGE
- SCHOOLS
- PUBLIC SAFETY BUILDINGS (FIRE, POLICE, TOWN HALLS)
- HOSPITALS
- APPROX. FLOOD HAZARD AREA
- WATER SUPPLY WITHDRAWALS
- DAMS

SOURCE

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0 500 1,000 2,000 Feet



GZA GeoEnvironmental, Inc.
 One Edgewater Drive
 Norwood, MA 02062
 Phone: (781) 278-3700 Fax: (781) 278-5701

**PASCOAG RESERVOIR
 UPPER DAM (016)
 BURRILLVILLE, RHODE ISLAND**

DAM FAILURE INUNDATION MAP

Proj. Mgr.: DML Designed By: DDR Reviewed By: PHB Operator: DDR	Dwg. Date: 07-13-09 Job No.: 17085.40	Figure No.: 2
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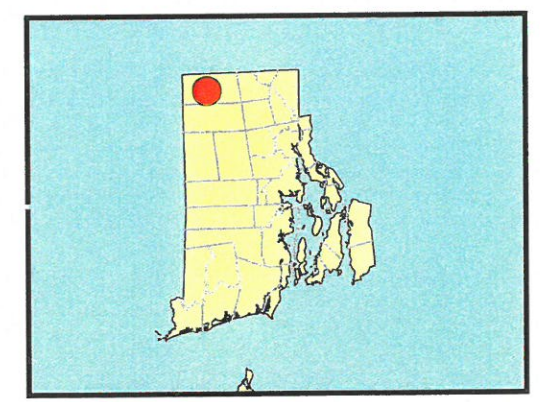
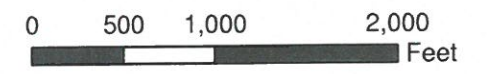


- LEGEND**
- BRIDGE
 - SCHOOLS
 - PUBLIC SAFETY BUILDINGS (FIRE, POLICE, TOWN HALLS)
 - HOSPITALS
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SOURCE

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J:\17,000-18,999\17085\17085-40.DML\dams\GROUP 1\016 Pascoag Res Upper\GIS\16_In_Map3.mxd

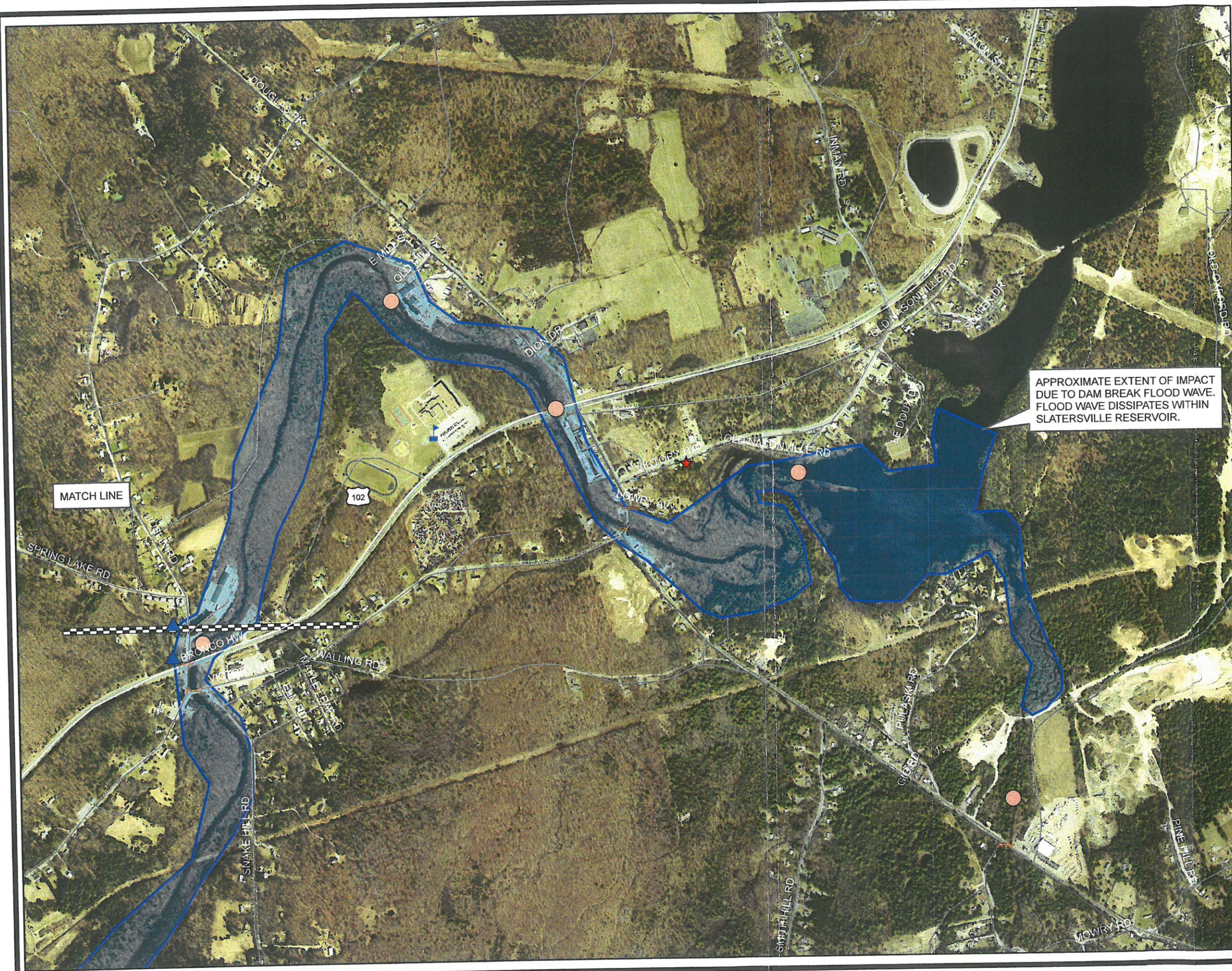
GZA GeoEnvironmental, Inc.
 One Edgewater Drive
 Norwood, MA 02062
 Phone: (781) 278-3700 Fax: (781) 278-5701



**PASCOAG RESERVOIR
 UPPER DAM (016)
 BURRILLVILLE, RHODE ISLAND**

DAM FAILURE INUNDATION MAP

Proj. Mgr.: DML Designed By: DDR Reviewed By: PHB Operator: DDR	Dwg. Date: 07-13-09 Job No.: 17085.40	Figure No.: 3
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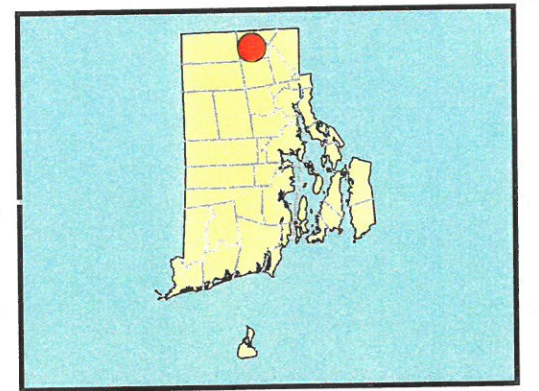
APPROXIMATE EXTENT OF IMPACT DUE TO DAM BREAK FLOOD WAVE. FLOOD WAVE DISSIPATES WITHIN SLATERSVILLE RESERVOIR.

- LEGEND**
- BRIDGE
 - SCHOOLS
 - PUBLIC SAFETY BUILDINGS (FIRE, POLICE, TOWN HALLS)
 - HOSPITALS
 - APPROX. FLOOD HAZARD AREA
 - WATER SUPPLY WITHDRAWALS
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SOURCE

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GZA GeoEnvironmental, Inc.
 One Edgewater Drive
 Norwood, MA 02062
 Phone: (781) 278-3700 Fax: (781) 278-5701



PASCOAG RESERVOIR
 UPPER DAM (016)
 BURRILLVILLE, RHODE ISLAND

DAM FAILURE INUNDATION MAP

Proj. Mgr.: DML	Dwg. Date: 08-13-00	Figure No.:
Designed By: DDR		4
Reviewed By: PHB	Job No.: 17085.40	
Operator: DDR		