AECOM

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Pompton Lake Dam Floodgate Operations Study Final Report

Floodgate Operation Reviewed for the Following Storm Events

March 13-15, 2010
March 6-8, 2011
March 10-12, 2011
Hurricane Irene, August 2011

Table of Contents

1 Executive Summary 1
2 Introduction 3
3 Purpose of Study 3
3.1 Analysis Overview 3
3.2 Flood Events Investigated 4
3.3 Computer Animations 5
3.4 Additional Analyses 5
4 Analysis 6
4.1 Hydrology & Hydrologic Modeling 6
4.1.1 RAMPP HEC-HMS Hydrologic Model Overview 9
4.1.1.1 Initial SCS CN and Lag Times 9
4.1.1.2 Soils 9
4.1.1.3 Recession Baseflow 9
4.1.1.4 Channel and Reservoir Routing 9
4.1.1.5 Model Calibration and Validation 10
4.1.2 Current HEC-HMS v3.5 Hydrologic Model 11
4.1.2.1 Frequency Events 11
4.1.2.2 NOAA Atlas 14 12
4.1.2.3 USGS Gages 12
4.1.2.4 Calibration 13
4.1.2.5 SPAS Analysis 14
4.1.2.6 Reservoir Curves 15
4.1.2.7 Optimization 16
4.1.2.8 HEC-HMS Results 16
4.1.2.9 Validation 16
4.1.2.10 HEC-HMS Summary 17
4.2 Hydraulics 18
4.2.1 HEC-RAS – Unsteady Flow Model 18
4.2.1.1 Processing 18
4.2.1.2 Surveyed Data 19
4.2.1.3 As-Built Data 19
4.2.1.4 Parameter Estimation 19

4.2.1.5 Inflow Hydrographs 20
4.2.1.6 Rating Curve 21
4.2.1.7 USACE Rule Curve 21
4.2.1.8 Rule Curve Coding 22
4.2.1.9 Calibration of the Unsteady HEC-RAS Analysis 24
4.2.1.10 High Water Marks 24
4.2.1.11 HEC-2 Pre- and Post- Conditions 28
5 Study Results 29
5.1 Impact of Floodgate Operation 29
5.2 Alternative Analysis 67
5.3 Impact of Development Analysis 80
5.4 Channel Velocity Downstream 82
5.5 HEC-2 Pre and Post Conditions 83
5.6 Overall Summary of Results 84
6 References 86

List of Tables

Table 1: HEC-HMS Precipitation Frequency Totals 12
Table 2 : USGS Gage Locations and Drainage Area 13
Table 3 : Summary of Roughness Coefficients 20
Table 4 : Flooding Sources Studied by Unsteady HEC-RAS 20
Table 5 : Unsteady HEC-RAS Inflow Boundary Conditions 21
Table 6 : Pompton Lake Dam Rule Curve Data 23
Table 7 : USGS Gage High Water Marks from Hurricane Irene 25
Table 8 *:* USGS Field Measured High Water Marks from Hurricane Irene 25
Table 9 : USACE - NY District Measured High Water Marks from Hurricane Irene 27
Table 10: Maximum velocities for the Pre- and Post Project Conditions 83

List of Figures

Figure 1 - Pompton Lake Study Area 6
Figure 2 - Study Area 7
Figure 3 - Pompton Lake Dam Rule Curve 24
Figure 4 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre Project Condition and Post Project Conditions 31
Figure 5: March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge - Pre Project Condition and Post Project Conditions 32

Figure 6 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge - Pre Project Condition and Post Project Conditions 33
Figure 7 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ - Pre Project Condition and Post Project Conditions 34
Figure 8 : March 6-9, 2011 Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre Project Condition and Post Project Conditions 35
Figure 9 : March 6-9, 2011 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge – Pre Project Condition and Post Project Conditions 36
Figure 10 : March 6-9, 2011 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream the Hamburg Turnpike Bridge – Pre Project Condition and Post Project Conditions..... 37
Figure 11 : March 6-9, 2011 Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre Project Condition and Post Project Conditions 38
Figure 12 : March 9-13, 2011 Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre Project Condition and Post Project Conditions 39
Figure 13 : March 9-13, 2011 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge – Pre Project Condition and Post Project Conditions 40
Figure 14 : March 9-13, 2011 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream the Hamburg Turnpike Bridge – Pre Project Condition and Post Project Conditions..... 41
Figure 15 : March 9-13, 2011 Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre Project Condition and Post Project Conditions 42
Figure 16 : Hurricane Irene, August 2011, Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre Project Condition and Post Project Conditions 43
Figure 17 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge – Pre Project Condition and Post Project Conditions 44
Figure 18 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre Project Condition and Post Project Conditions..... 45
Figure 19 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre Project Condition and Post Project Conditions..... 46
Figure 20 : 2-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre and Post Conditions..... 47
Figure 21 : 2-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge – Pre and Post Conditions..... 48
Figure 22 : 2-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre and Post Conditions..... 49

Figure 23 : 2-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre and Post Conditions 50
Figure 24 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre and Post Conditions..... 51
Figure 25 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream from the Dawes Highway Bridge – Pre and Post Conditions 52
Figure 26 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre and Post Conditions 53
Figure 27 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre and Post Conditions 54
Figure 28 : 25-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre and Post Conditions..... 55
Figure 29 : 25-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream from the Dawes Highway Bridge – Pre and Post Conditions 56
Figure 30: 25-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre and Post Conditions 57
Figure 31 : 25-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre and Post Conditions 58
Figure 32 : 40-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre and Post Conditions..... 59
Figure 33 : 40-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream from the Dawes Highway Bridge – Pre and Post Conditions 60
Figure 34 : 40-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre and Post Conditions 61
Figure 35 : 40-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre and Post Conditions 62
Figure 36: 50-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre and Post Conditions..... 63
Figure 37 : 50-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream from the Dawes Highway Bridge – Pre and Post Conditions 64
Figure 38 : 50-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre and Post Conditions 65
Figure 39 : 50-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre and Post Conditions 66
Figure 40 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Lowering Reservoir 3.0 feet Compared to Post Conditions 68
Figure 41 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge – Lowering Reservoir 3.0 feet Compared to Post Conditions 69

Figure 42: Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Lowering Reservoir 3.0 feet Compared to Post Conditions 70
Figure 43 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 26058 Just Downstream of the Railroad Bridge in Oakland NJ – Lowering Reservoir 3.0 feet Compared to Post Conditions 71
Figure 44 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Hamburg Turnpike - Lowering Reservoir 3.0 feet Compared to Post Conditions 72
Figure 45 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge - Lowering Reservoir 3.0 feet Compared to Post Conditions 73
Figure 46 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge - Lowering Reservoir 3.0 feet Compared to Post Conditions 74
Figure 47 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ - Lowering Reservoir 3.0 feet Compared to Post Conditions 75
Figure 48 : 10-Year Rainfall Storm Event – Stage and Flow Discharges at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge - Lowering Reservoir 3.0 feet Compared to Post Conditions 76
Figure 49 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge - Lowering Reservoir 3.0 feet Compared to Post Conditions 77
Figure 50 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Lowering Reservoir 3.0 feet Compared to Post Conditions 78
Figure 51 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 25085 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ - Lowering Reservoir 3.0 feet Compared to Post Conditions 79
Figure 52 : 72 - Month Accumulated Precipitation Departure from Normal through the End of February 2012 81
Figure 53 : Northern New Jersey Accumulated Precipitation Departure from Normal through the End of February 2012 81
Figure 54 : Average Peak Flows for each Decade for Ramapo River near Mahwah 82

Appendices

Appendix A - Hydrology

Appendix B – SPAS Figures

Appendix C – Operating Rule Curve

Appendix D – Survey Cross Section Data

Appendix E – Bridge Survey Data

Appendix F – Culvert Survey Data

Appendix G – Dams Survey Data

Appendix H – Velocity Distribution at Hamburg Turnpike Bridge

Appendix I – Flow and Velocity Distribution for Ramapo River Cross Sections

Appendix J - HEC-RAS Output Report- Pre and Post Conditions Analysis

1 Executive Summary

In response to the recommendations of the Governor's Passaic River Basin Flood Advisory Commission, NJDEP retained the services of AECOM to evaluate the operational impacts of the Pompton Lakes Dam Floodgate Facility. Advisory Commission and public criticism of the U.S. Army Corps of Engineers' previous studies required that a more impartial study be performed to clarify and confirm the downstream consequences of floodgate operations.

The purpose of the study was to develop a hydraulic computer model to simulate the downstream effects resulting from the operation of the Pompton Lakes Dam Floodgate Facility. The study included approximately 5.50 miles of the Ramapo River (including Pompton Lakes) and 0.17 miles of the Pompton River.

The study area focused on the floodway/floodplain area downstream of the Pompton Lakes Dam, which is within the Borough of Pompton Lakes and Wayne Township. The analysis began at the downstream face of the Route 287 Bridge (Ramapo River crossing) and continued downstream and terminated at the Jackson Avenue Bridge (Pompton River crossing), or approximately 11,500 feet downstream of the Pompton Lakes Dam. Tributaries to the Ramapo that may be affected by backwater were also studied; these included the Wanaque and Pequannock Rivers.

A hydraulic model, the unsteady flow model within the Hydrologic Engineering Centers River Analysis System (HEC-RAS), was used to determine downstream water surface elevations and velocities during various flood events. The existing Operating Rule Curve controlling the floodgate openings and operations of the Pompton Lakes Dam was incorporated into the HEC-RAS computer model. The HEC-RAS unsteady flow model is a widely accepted hydraulic model and it was chosen for this study due to its ability to model the unsteady flow (flow rates that vary with time) discharging from the flood gates and predict both the stages (water surface elevations) and discharges (flow rates and velocities) downstream of the dam.

Precipitation for the four recent floods; March 13-15, 2010, March 6-8, 2011, March 10-12, 2011, and Hurricane Irene, August 2011, were entered into a hydrologic model, HEC-HMS, to develop inflow hydrographs for input into the unsteady flow model. Applied Weather Associates, (AWA), used the Storm Precipitation Analysis System (SPAS) model in conjunction with NEXRAD weather radar data to analyze the rainfall for these four storms over the Pompton Lakes drainage basin. The rainfall amounts were provided in a 1 km grid with 5 minute time intervals for each of the basin/sub-basin boundaries.

The hydrologic model was calibrated to several USGS stream gaging stations throughout the basin. The hydraulic model was also calibrated in a similar manner but also was verified with several high water marks for Hurricane Irene. The four storms were significant flood events.

The three March storms were somewhere between a 10 year and 25 year return period (10% to 4% probability of occurrence). Based on flow records and rainfall, Hurricane Irene was somewhere between a 500-year event in the upper portion of the watershed and about a 100-year event in the lower portion.

The four storms occurred within a short time span of one another, March 2010 to August 2011. All four storms caused significant flooding. The Western Regional Climate Center Desert Research Institute in Reno Nevada produced a map of the United States showing the 72-month accumulated precipitation departure from normal through the end of February 2012. Northern New Jersey has had 50-to 65 additional inches of precipitation over that 72-month period. This same trend is shown in the peak stream flow data taken from the USGS Stream gages for the Ramapo River near Mahwah NJ. The average of the peak stream flow data for the past decade, 2000 to 2011, is about 55% higher than the average of decades for the past 60 years.

Besides analyzing the Floodgate Facility for the four recent flood events, a range of flows from low to high were also analyzed/modeled. All of the flows investigated the Operating Rule Curve by modeling the system as pre-project condition (without gates) and post-project condition (with gates). The results of the analyses found that the gates function as intended with no significant downstream impacts during any of the flow events. The impacts were considered at four locations. Three sites downstream from the Pompton Lakes Dam and one site upstream in Oakland, NJ.

With the gates in operation the flow and the stage may arrive somewhat sooner than without the gate operation. However, the maximum flows and elevations are nearly the same. The increases vary depending on the storm and the associated flow rates. The maximum predicted water surface increase in the vicinity of the Dawes Highway Bridge ranged between 0.18 and 0.24 feet and occurred for the simulated 2-year rainfall storm event. All of the other flow situations had significantly less increases in the flood elevations.

During Hurricane Irene Pompton Lake was lowered three feet prior to the onset of the storm. When comparing that analysis with not lowering lake levels both the stage and flow hydrographs downstream of the dam were essentially identical, indicating that there was no effect of lowering the reservoir before the onset of Hurricane Irene. There is simply not enough storage to attenuate the flooding caused by Hurricane Irene. The March 2010 storm and a smaller simulated storm event were run with the model to determine the effect of lowering the lake by 3.0 ft. prior to the rainfall event occurring. Both cases showed similar results. There is not enough volume of storage in the reservoir to reduce flooding.

Therefore, based on our modeling results, the Pompton Lakes Dam Gates and the Operating Rule Curve are performing as designed with no significant increases in the downstream impacts.

2 Introduction

The purpose of this study was to evaluate the operational impacts of the Pompton Lakes Floodgate Facility by developing a hydraulic computer model to simulate the downstream effects resulting from the operation of the Floodgate Facility. The study reaches includes approximately 5.50 miles of the Ramapo River, which includes Pompton Lake, and 0.17 miles of the Pompton River. Additionally, a 3-D computer animation was developed to illustrate the effects of the floodgate operation and downstream flow dynamics.

The study area focused on the floodway/floodplain area downstream of the Pompton Lakes Dam, which is within the Borough of Pompton Lakes. The study limits are from the Jackson Avenue Bridge (Pompton River crossing), which is approximately 11,500 feet below the Pompton Lakes Dam, to the downstream face of the Route 287 Bridge (Ramapo River crossing). Tributary flows from the Wanaque, Pequannock, Haycock, Pompton and Pequannock Rivers were also incorporated into the hydrologic and hydraulic models.

3 Purpose of Study

In response to the recommendations of the Governor's Passaic River Basin Flood Advisory Commission, NJDEP retained the services of AECOM to evaluate the operational impacts of the Pompton Lakes Dam Floodgate Facility. The study included approximately 5.50 miles of the Ramapo River (including Pompton Lake) and 0.17 miles of the Pompton River. Additionally, a 3-D computer animation was developed for use in public outreach to illustrate the effects of the floodgate operations and downstream flow dynamics.

3.1 Analysis Overview

The US Army Corps of Engineers (USACE) HEC-RAS Unsteady Flow model was used to determine downstream water surface elevations during various flood events. The HEC-RAS model incorporated the existing rules for controlling the floodgate openings and operation. An existing HEC-HMS (ArcHydro/HEC-GeoHMS) model was used to develop inflow hydrographs for input into the unsteady flow HEC-RAS model.

- The existing HEC-HMS watershed model for the Pompton River drainage basin was developed by the Risk Assessment, Mapping, and Planning Partners (RAMPP) team, a joint venture of Dewberry, URS, and ESP. Existing studies completed by the USACE as well as other approved studies were also utilized for this study. Contributory flows of the Ramapo, Pequannock, Wanaque, and Pompton Rivers were incorporated into the analysis/model.

- LIDAR data of the project area collected by the NJ Highlands Council and by the National Geospatial-Intelligence Agency (NGA) were used. Three (3) meter or better Digital Elevation Models (DEMs) of the area or better were downloaded from the USGS National Elevation Dataset website (http://ned.usgs.gov). Additional field surveys were also conducted to supplement the LIDAR and USGS data. Approximately 45 channel cross-sections were surveyed and combined with the LIDAR data and used for the cross section information for HEC-RAS between the Pompton Lakes Dam and Jackson Avenue. Also, cross-sectional data/information of the three bridges, two feeder dams and a weir between Jackson Avenue and Pompton Lake Dam was collected. The best available cross-sectional data upstream of the Pompton Lakes Dam was utilized for the needed geometry.

- As part of this analysis, the models were calibrated to four flood events: the March 12-14, 2010, March 6-9, 2011, March 9-13, 2011, and Hurricane Irene (August 2011). For the purpose of the analysis "Post-Condition is defined as the Pompton Lakes Dam Floodgate Facility and the upstream channelization of the Ramapo River. Data from the USGS Pompton Lakes stream gage, USGS Dawes Highway stream gage, SCADA data from the floodgate facility, as well as other available/collected data (i.e. high water marks) were used to calibrate the models and overall analysis.

- Residents within the study area have reported surges each time the floodgate opens. The analysis was developed to ascertain the extent of any possible surge resulting from the operation of the Pompton Lake Floodgate Facility within the limitations of the modeling software.

3.2 Flood Events Investigated

In addition to the four flood events noted above, five other simulated events representing a range in flows were also modeled and analyzed.

- The downstream water surface elevations for the existing conditions (post-condition with floodgate in operation) were used for each of the above-noted flood events.

- The downstream water surface elevations using the pre-condition at the Pompton Lakes Dam were used for each of the above-noted flood events. The original spillway at Pompton Lakes Dam was used for the pre-existing conditions.

- The current Floodgate Operating Rule Curve was used for the post-condition analysis.

- The Pompton River drainage basin HEC-HMS model was used for development of the inflow hydrographs to Pompton Lakes Dam. Additionally, information from existing hydrologic and hydraulic studies completed by the USACE was evaluated for incorporation in the inflow hydrographs to Pompton Lake.

3.3 Computer Animations

3-D computer animations for use in public outreach were developed based upon the results of the analysis. The animations illustrate the overall downstream flooding and the effects of the floodgate operations. The animation was developed with standard HEC RAS and ArcGIS software.

3.4 Additional Analyses

The following additional analyses were completed as part of the study:

- **Alternative Analysis**
  For the post-condition only, the downstream effects of lowering the Pompton Lakes Reservoir by 3.0 feet in advance of an impending flood event were analyzed for three storm events. The three events used for these simulations were: (1) Hurricane Irene, (2) March 12-14, 2010 flood event, and (3) a 10-year rainfall storm event. The model was run assuming the floodgates were in automatic operations and was operated in accordance with the existing operating rule curve.

- **Impact of Development Analysis**
  The impact of development within the watershed has been evaluated. The analysis included:

  - The evaluation of the Western Regional Climate Center Desert Research Institute in Reno Nevada publication of the 72-month Accumulated Precipitation Departures from Normal through the end of February 2012, and
  - Comparing runoff events on the Ramapo River at Mahwah NJ (most of the watershed at this location is in New York) to the Ramapo River at Pompton Lakes NJ.

4 Analysis

4.1 Hydrology & Hydrologic Modeling

The focus of this study is the Pompton River Basin, located in the larger Passaic River Watershed, which includes areas of northeastern New Jersey and southeastern New York. Figure 1 shows the study area with the USGS Stream Gage Locations identified.

Figure 1 - Pompton Lake Study Area

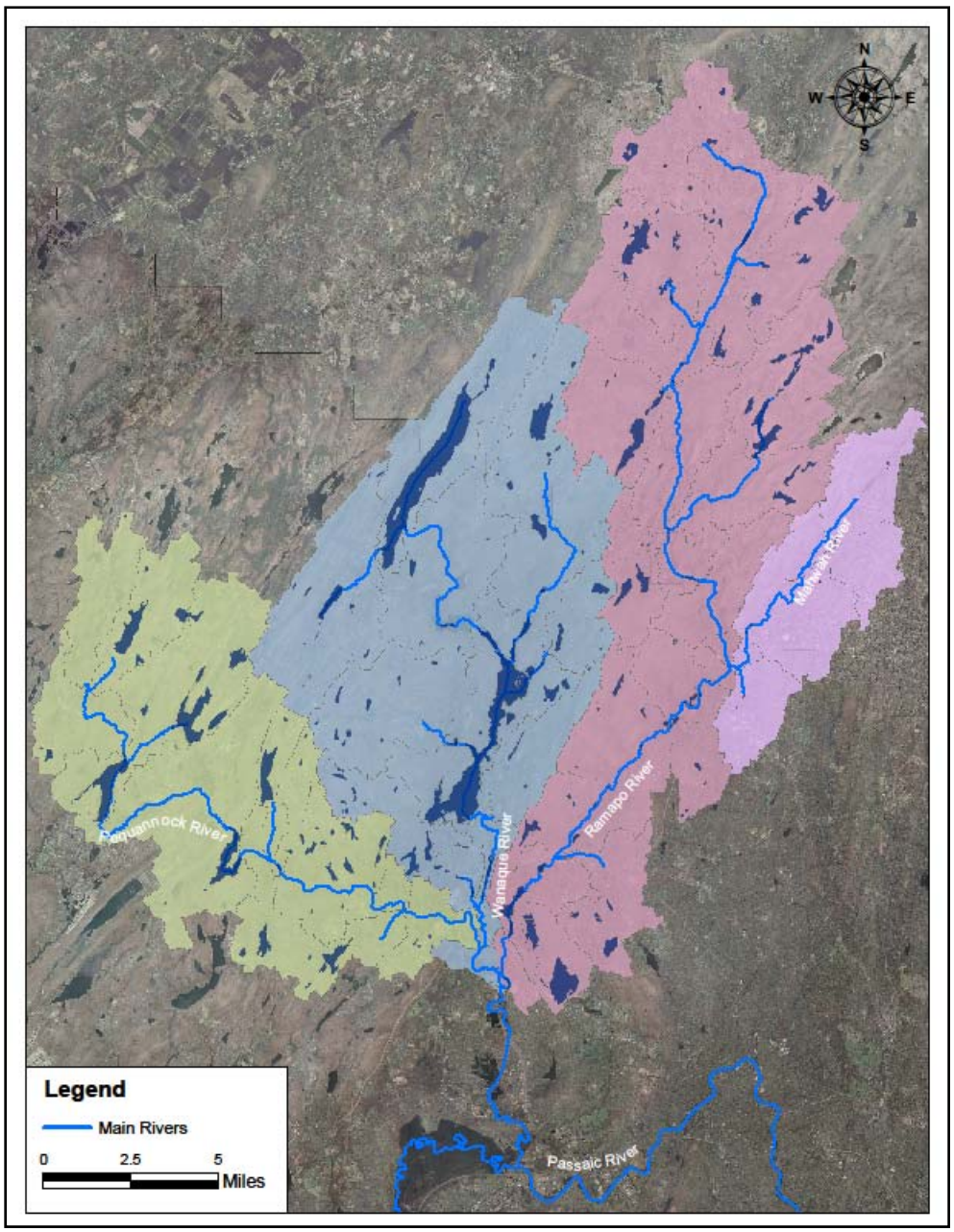


Figure 2 - Study Area

The downstream reach of the Pompton River Basin receives 354 square miles of runoff from numerous tributaries and storage reservoirs. The basin includes three major rivers that flow into the Pompton River near the downstream boundary, the Pequannock, Wanaque, and Ramapo Rivers. The Pompton River Basin is characterized by a varying density of residential areas upstream in the watershed, and increasingly higher density residential and urban land uses downstream in the watershed. The Pompton River Basin has been sub-divided into 64 sub-basins representing a varying degree of land cover, river confluences, impervious coverage, and storage areas within the watershed. The sub-basins were delineated based on a USGS 10 m elevation topographic grid data and the New Jersey

Department of Environmental Protection (NJDEP) Hydrologic Unit Code 14 (HUC14) Delineations. Table 1 in Appendix A provides the area and drainage outlet for each sub-area in the Pompton River Basin.

In 1995 the USACE developed a HEC-1 hydrologic model of the Pompton River Basin as part of the Passaic River Flood Damage Reduction Project. The USACE calibration of the HEC-1 model included an analysis three major storm events in May 1968, November 1977, and April 1984. The primary calibration parameters for the development of the HEC-1 model included the basin curve numbers, lag time values and storage assumptions for the major basin reservoirs. The HEC-1 model peak flow rates and runoff volumes were adjusted by the USACE through the modification of curve numbers that were changed to reflect antecedent moisture conditions. Time of peak discharge values were also calibrated by USACE through the adjustment of lag times as well as the storage assumptions for the major reservoirs located within the basin.

In 2011, as part of FEMA Task Order HSFE02-09-J-001 for Passaic River Watershed Hydrologic & Hydraulic Study, the Risk Assessment, Mapping, and Planning Partners (RAMPP) team updated the USACE HEC-1 study and developed a more detailed HEC-HMS hydrologic model of the Pompton River Basin. The HEC-HMS model was calibrated to four (4) storm events from 1999 to 2008 with return periods of at least 10 years. Two events in September 1999 (validation) and April 2007 (calibration) had recurrence intervals of approximately 25 years. One validation event based on a storm in October 2005 was approximately a 5-year event, with close to a 100 year rainfall amount. The second calibration event in October 2004 was less than a 5-year event and was only used to calibrate lag time. Two of the four events with extreme antecedent moisture conditions were selected for the validation period to examine the model performance. The selection of storms provided the bracketing of a range of SCS values for the basin. The primary purpose of the calibration was to develop a representative 100-year inflow for the steady state hydraulic model completed for the Central Passaic Basin downstream of the Pompton basin outlet.

For the purposes of this study, the RAMPP HEC-HMS hydrologic model of the Pompton River Basin was updated and re-calibrated to four recent flood events. These four recent calibration events included the March 12-14, 2010, March 6-9, 2011, March 9-13, 2011, and Hurricane Irene (August 27-29, 2011) events. The following sections give a brief overview of the RAMPP HEC-HMS model along with a discussion of the calibration process and the resulting flow hydrographs that were developed and used for input into the unsteady HEC-RAS modeling:

4.1.1 RAMPP HEC-HMS Hydrologic Model Overview

The HEC-HMS (HMS) model was developed using several base parameters and storage curves. The following sections provide a summary of the basin characteristics of the existing model that was calibrated to the four storms throughout 2005-2009.

4.1.1.1 Initial SCS CN and Lag Times

The calibrated HMS model calculates runoff with the SCS Curve Numbers (CN) method based on existing land use and soils data for the watershed. Land use data for the watershed areas within the New Jersey boundary was retrieved from NJDEP sources. Land use cover for the watershed areas in New York was retrieved from the Orange and Rockland County municipal web databases. All land use cover was verified against orthoimagery and reclassified into seven different land cover classifications. The land cover classifications for the Pompton River Basin are presented in Table 2 in Appendix A.

4.1.1.2 Soils

Soils data was retrieved from the National Resources Conservation Service (NRCS) Soil Survey Geographic (SSURGO) Database. During the soils analysis, the observed discrepancies in the soils data for New York State and were resolved with the Rockland County GIS Department to achieve a more accurate soils representation. Composite curve numbers were processed using HEC-GeoHMS and input into the HEC-HMS model.

4.1.1.3 Recession Baseflow

Recession baseflow was only simulated for watersheds draining into the Ramapo and Pequannock Rivers. These sub-basins are characterized primarily by forest land use and steep slopes. Groundwater inflow can be dominant throughout basins with steep slopes and was therefore simulated in the basin model. Table 3 in Appendix A presents the recession baseflow values input into the HEC-HMS model.

4.1.1.4 Channel and Reservoir Routing

Channel flow was calculated in the basin model using the Muskingum Cunge and Modified Puls methods. Channel slopes and 8-point cross-sections were derived from terrain data built in ArcGIS. The Modified Puls method was used for stream reaches to account for storage and attenuation effects. The existing storage discharge relationships for channel routing in HMS were derived from an approximate HEC-RAS steady flow

hydraulics models. The Manning's roughness coefficients were derived from several sources, including the 1995 USACE study and the existing FEMA Flood Insurance Study.

The hydrology of the Pompton watershed is significantly influenced by numerous lakes and reservoirs with varying degrees of storage capacity and flow attenuation characteristics. The existing model development by the RAMPP team only includes storage areas that are capable of affecting 100-year discharges. The following reservoirs are included in the basin model:

- Charlotteburg Reservoir
- Clinton Reservoir
- Echo Lake Spillway Dam
- Greenwood Lake
- Monksville Reservoir
- Oak Ridge Reservoir
- Wanaque Reservoir

The Canistear Reservoir was not modeled since it is located on a tributary headwater well upstream of the main river system and was identified as providing little storage by the USACE (1995).

4.1.1.5 Model Calibration and Validation

The previous calibration phase of the current model was applied to total of 8 USGS gages within the watershed boundary. The Pompton watershed contains a total of 19 USGS gages. Only gages with over 10% of the total drainage area (35 sq mi) were included in the calibration and validation phase. Five gages were included in the Ramapo Basin, one on the Pompton River, one on the Pequannock River, and Wanaque Rivers.

Two calibration and two validation events were selected to reflect a wide range of possible SCS values and utilize the availability of radar precipitation data; these storms reflected what could be average conditions. Two extreme antecedent moisture conditions were selected for the validation period in an effort to represent average conditions for the Pompton watershed.

Overall CN values were reduced 11% during the calibration process, based on the previous four calibration storms. Overall lag time values were adjusted by a factor of four from the initial estimates. This increase in lag time values was suggested to represent a combination of the wetland land and reservoir storage capacities throughout the watershed. Urban areas along the river valley, especially basins in the Ramapo and

Mahwah River watershed, required significant increases in lag time during the calibration process.

Table 4 in Appendix A presents the initial basin CN and Initial lag time calculated for the Pompton sub-basins. Numerous reservoirs within the Pompton River Basin are not managed as flood control structures, but have significant influences on downstream discharge values. In particular, during extended dry periods the Charlotteburg and Wanaque Reservoirs experience significant draw down which creates significant flood storage. During the calibration and validation stages, observed flows at USGS gages downstream of these reservoirs were used as direct inflows in the model. CN values that were applied to sub-basins downstream of these gages, during the calibration and validation phase, were reflected in the adjustment of CN values upstream of the USGS observation gages. For the 100-year event, the drainage areas upstream of the USGS gages were reconnected to the channel and the reservoirs were adjusted to their normal pool elevations.

The final basin parameters that served as the base parameters for the latest calibration phase of the model were intended to represent conditions with recurrence intervals greater than 10 years. In general, the model was slightly under predicting flows for three of the four events in the Ramapo basin. There was greater discrepancy in model performance versus the observed gage data at the Pompton gage for the calibration events. The greatest discrepancy was seen in a 21.5% mismatch in flows at the Pompton gage in the 1999 event, which was suggested to be a result of poor spatial coverage in rainfall data available for the event.

4.1.2 Current HEC-HMS v3.5 Hydrologic Model

The following sections discuss the development of the hydrology and hydrologic calibration of the Pompton River Basin HEC-HMS model for this study.

4.1.2.1 Frequency Events

As a part of the scope of work for the unsteady state HEC-RAS model for the Pompton River Basin, a range of precipitation frequency events were simulated in HEC-HMS 3.5 to generate input for HEC-RAS model. The precipitation frequency events analyzed for this study included the 2-, 10-, 25-, 40-, 50-, 100-, and 500-yr events for the Pompton River Basin.

The precipitation frequency estimates were retrieved from the NOAA Atlas 14 Precipitation Frequency Atlas Data Server at the following website: http://hdsc.nws.noaa.gov/hdsc/pfds/index.html

4.1.2.2 NOAA Atlas 14

The frequency estimates coincide with the values in NOAA Atlas 14 - Volume 2 - Version 3. The following 24 hour duration estimates, presented in Table 1 below, were retrieved at Latitude (40.9923) | Longitude (-74.2786) within the Pompton River Basin boundary:

Table 1: HEC-HMS Precipitation Frequency Totals

Frequency (Return Period yr)	**2**	**10**	**25**	**40**	**50**	**100**	**500**
24-hr Rainfall Total (in)	3.42	5.16	6.36	7.01	7.38	8.52	11.65

The 40-year precipitation frequency estimate was not available in NOAA Atlas 14 and was interpolated using a power series trend line.

As previously stated, the Pompton River Basin HMS model includes 64 sub-basins with a high variability in basin size. Since the precipitation frequency estimates for the entire basin were retrieved as point rainfall totals from NOAA Atlas 14, an area reduction factor for the entire basin was applied to the rainfall total for the entire basin. This reduction factor provides a point to area conversion of precipitation to an average depth over the entire basin to address the magnitude of the basin size in comparison to the spatial variability in storm cover that cannot be simulated with the frequency estimates. An overall reduction factor of 7% was applied to the entire Pompton River Basin for each frequency event during the model simulations. This reduction factor was referenced from the U.S. Weather Bureau - Intensity-Frequency Regime—Pt. 1 - Technical Paper 29 (USWB, 1957). The precipitation frequency hydrographs were generated using SCS synthetic rainfall distribution to develop a range of flow to analyze the operation of the Floodgate Facility.

4.1.2.3 USGS Gages

Instantaneous stream flow observations for the four calibration storms were retrieved from the USGS NWIS web data archive for eleven (11) USGS stream gages within the Pompton River Basin. The gage locations are presented in Figure 1. The gage names and drainage areas are presented below in Table 2:

Table 2 : USGS Gage Locations and Drainage Area

USGS Gage	Name	Drainage Area (sq mi)
01382500	Pequannock River at Macopin Intake Dam NJ	63.7
01383500	Wanaque River at Awosting NJ	27.1
01384500	Ringwood Creek near Wanaque NJ	17.9
01386000	West Brook near Wanaque NJ	11.8
01387000	Wanaque River at Wanaque NJ	90.4
01387400	Ramapo River at Ramapo NY	86.9
01387420	Ramapo River at Suffern NY	93.0
01387450	Mahwah River near Suffern NY	12.3
01387500	Ramapo River near Mahwah NJ	120
01388000	Ramapo River at Pompton Lakes NJ - Downstream of Dam	160
01388500	Pompton River at Pompton Plains NJ	355

4.1.2.4 Calibration

The existing RAMPP HEC-HMS model was run with the existing calibration parameters to check the model performance with the new calibration storms. The general shape of the hydrograph (rising and recession limb) showed a fair correlation against the observed data; however, it under-predicted the peak flow for all four storms. The previous RAMPP model calibration was completed against storms with smaller recurrence intervals than the new calibration storms, suggesting that the basin curve numbers and lag time values may be under-calibrated for storms representing more significant precipitation.

The primary gages used during the calibration were the USGS Gage 01388000 - Ramapo River at Pompton Lakes NJ (downstream of the Flood Gate Facility) and USGS Gage 01388500 - Pompton River at Pompton Plains NJ (upstream of the Jackson Avenue Bridge). The gage immediately downstream of the Pompton Lake Dam flood gates was the starting gage to be calibrated for a close match in the simulated versus observed hydrographs from the Ramapo and Mahwah River Basins during the four storm events.

In order to develop the inflow hydrographs required for the unsteady HEC-RAS model in the Pompton River Basin down to the Jackson Avenue Bridge, the HEC-HMS model was also closely calibrated to the USGS Gage 01388500 - Pompton River at Pompton Plains NJ upstream of the Jackson Avenue Bridge to capture the confluence of the Pequannock, Ramapo, and Pompton Rivers just upstream of the gage.

The two primary calibration parameters chosen for the optimization trials were the basin curve numbers and lag time values. These parameters were chosen as calibration parameters since they were adjusted during the previous RAMPP model calibration to the rainfall events from 1999-2008, and are parameters that cannot be explicitly measured in the field. In an effort to minimize major adjustments to the previous model calibration conducted by the RAMPP team, only the basin curve number and lag times values were adjusted to update the model performance based on the new calibration events.

In order to develop inflows hydrographs for the unsteady HEC-RAS model that accurately reflected the hydrographs observed at the USGS gages during the four calibration storms, four individual basin models were created from the existing conditions HMS model and each was calibrated to an individual storm event. Calibrating individual basin models to each storm event allows for the flexibility in developing precise inflow hydrographs for the unsteady HEC-RAS model for each storm event. The alternative would be to simulate all four storms with one average basin model. However, the results using an average basin model would not be as accurate for each of the storms.

4.1.2.5 SPAS Analysis

The HEC-HMS model was calibrated to four recent flood events, March 12-14, 2010, March 6-7, 2011, March 9-12, 2011 and August 27-29, 2011 (Hurricane Irene). The rainfall data for the four storms was supplied by Applied Weather Associates (AWA) of Monument, Colorado. AWA used the Storm Precipitation Analysis System (SPAS) with NEXRAD weather data to analyze rainfall over the Pompton Lake drainage basin in New Jersey. A large storm domain that includes sufficient hourly rain gauge observations to calibrate the NEXRAD data over northern New Jersey and the surrounding areas was analyzed for each storm. NEXRAD data were acquired from Weather Decisions Technologies of Norman, Oklahoma.

The rainfall analysis results were provided on a 1 km by 1 km grid for both the rainfall amount and the temporal frequency of 5 minutes. In addition to the rainfall grids, clipped to the Pompton River Basin, sub-basin average rainfall amounts were provided for all 64 sub-basins.

AWA provided an Average Recurrence Interval (ARI) analysis for each storm to describe frequency (rareness) of the rainfall. The analysis was based on the government-issued precipitation frequency estimates published in NOAA Atlas 14 for areas in New Jersey and Technical Paper 40 (TP-40) in New York. The analysis was based on the maximum 6- and 24-hour values for each grid cell as compared to NOAA Atlas 14 or TP-40. The ARI analysis results are presented in Appendix B.

The focus of the rainfall analysis was the Pompton River Basin (41.75^{o}N/75.0^{o}W to 40.30^{o}N/73.3^{o}W) to ensure a reliable sample size for determining unique Z-R relationship (Z being the radar reflectivity factor and R the rainfall rate) each hour as well as providing an ample buffer area.

For the three storms in March 2010 and March 2011, the analysis used between 217 and 247 rain gages comprised of daily, hourly, pseudo hourly and supplemental gauges. Since Hurricane Irene had such a large areal extent, the large-scale storm analysis used 726 rain gauge reports spanning northern New Jersey, southeastern New York, extreme eastern Pennsylvania, western Connecticut, western Massachusetts and southwestern Vermont. The maximum rainfall of 11.42 inches reported in New Jersey was in Jefferson Township. The maximum 6- and 24- hour rainfall from this event exceeded an Average Recurrence Interval (ARI) of 1,000 years in some areas of the Pompton River Basin.

The four storm events were simulated using the radar rainfall time series (5 min increment) created from the SPAS model and NEXRAD weather radar data. The rainfall data was input for each sub-basin in HEC-HMS as a time series derived from sub-basin averages over the duration of the storm events.

Only one basin model was selected for validation with the precipitation frequency events in order to reflect average conditions during these events. The validation of the HEC-HMS model based on the precipitation frequency events is presented in this report.

4.1.2.6 Reservoir Curves

As an update to the existing RAMPP model, four reservoir curves were revised in the HEC-HMS model based on information provided by NJDEP Bureau of Dam Safety and Flood Control. These reservoirs included the Charlotteburg Reservoir, Wanaque Reservoir, Greenwood Lake, and Echo Lake Reservoir. The existing model simulated these storage units with stage-storage-discharge curves that may have come from extrapolated data. For example, the flow routing at the Echo Lake Dam spillway was only a function of the structure geometry and was included in order to achieve the calibration required at USGS Gage 01382500 - Pequannock River at Macopin Intake Dam NJ. The rating curves for each storage structure were input into HEC-HMS as Storage-Discharge relationships.

4.1.2.7 Optimization

The optimization of the curve number and lag time parameters was conducted simultaneously for all 64 sub-basins using the Univariate-gradient and Nelder & Mead search algorithms available in the HEC-HMS computation block. The optimization routine was applied to find reasonable parameters that yielded the minimum values of the objective function. Up to 1000 trials were performed at the model junctions representing the primary USGS gages. A peak-weighted root mean square error function was applied to measure the peak flow (cfs), total volume (ac-ft), and peak timing of the observed versus simulated hydrographs.

The optimization of the HEC-HMS model was completed in two phases to search for a match between the simulated and observed hydrographs. The first optimization phase involved the calibration of the Ramapo and Mahwah River sub-basins to the USGS 0188000 - Ramapo River at Pompton Lakes NJ gage. Once a satisfactory calibration of the model was achieved using curve numbers and lag time values, the parameters were locked in for the calibration of the Pequannock, Wanaque, and Pompton River Basins. Based on the observed hydrographs, the model was calibrated to the USGS 0188500 - Pompton River at Pompton Plains NJ gage at the downstream outlet to reflect an overall calibration of the Pompton River Basin.

4.1.2.8 HEC-HMS Results

The standard measures for comparison between the simulated and observed hydrographs at the primary calibration gages included peak flow (cfs), total volume (ac-ft), and time to peak (hh:mm). These measures were calculated in HEC-HMS during each iteration of parameter optimizations during the calibration period.

The results of the HEC-HMS calibration to the four storm events by adjusting curve numbers and lag time values for the individual basin models are presented in Figures 1-16 and Tables 5-8 in Appendix A of this report. The final adjusted curve number and lag time values for each basin model are presented in Tables 9 and 10 in Appendix A of this report.

4.1.2.9 Validation

The model was validated to be within one standard error for the 2-, 10-, 25-, 40-, 50- and 100-year frequency rainfall events. Based on the performance of the individual basin models for the four calibration storm events, the basin model calibrated to the August 27-29, 2011 (Hurricane Irene) precipitation was selected for validation against the frequency events. The Hurricane Irene basin model was selected based on the broad range of curve

numbers and lag time values chosen throughout the basin during the optimization trials and the overall wellness of the fit achieved at the primary gages for this event. The range of curve numbers and lag times represent the high variability in land cover, topography, and storage effects from numerous lakes and reservoirs throughout the Pompton River Basin.

Table A.11 in Appendix A presents the model validation summary for the two primary USGS gages analyzed during the calibration period of this study. Predicted peak flow estimates were using the U.S. Army Corps of Engineers Statistical Software Package (HEC-SSP). The SSP model performs flood flow frequency analysis based on Bulletin 17B, "Guidelines for Determining Flood Flow Frequency" (1982). The computed frequency values for the 2-yr, 10-yr, 40-yr (interpolated), and 50-yr, events are presented in Table 12 along with the HEC-HMS simulated peaks.

4.1.2.10 HEC-HMS Summary

The Pompton River Basin HEC-HMS model has been calibrated to the four recent storm events of March 12-14, 2010, March 6-9, 2011, March 9-13, 2011, and Hurricane Irene (August 2011). The model hydrographs at the two primary calibration gages (USGS 0188800 and USGS 0188500) near the downstream reach of the Ramapo and Pompton River, respectively, show a fair fit to the three major calibration measurements of peak volume, peak flow, and time of peak during all four storm events. The secondary gages on the Ramapo, Pequannock, and Wanaque reaches show a higher degree of error based on the observed data. The discrepancies in the calibration of the HEC-HMS model to the Pequannock and Wanaque gages suggest that the effects of storage areas and reservoirs located throughout the watershed has a significant effect on the basin to basin hydrology during lower frequency storms events that could not be simulated with the calibration storm events.

The model has also been validated against the USGS regression equations to be within one standard error for the 2-, 10-, 25-, 40-, 50- and 100-year rainfall events.

Table 12 in Appendix A shows a comparison of the simulated and observed peak flows to estimated annual exceedance probabilities based on historical annual peak flow observations at the USGS gage downstream of the Pompton Lake Dam floodgate facility and at the Jackson Avenue Bridge, at the downstream model boundary. Since there are several ways to complete a flood frequency analysis and related recurrence intervals, a range of flows in the observed data was captured to provide an estimate on the probably return period of the four calibrated events. The analysis was completed using USGS PeakFQ based on Bulletin 17B and the Pearson Type III frequency distribution fit to the

logarithms of the instantaneous annual peak flows. The historical record also included water year 2011 which includes the four calibrated events.

The application of the high resolution radar rainfall precipitation data provided the HEC-HMS model with an excellent spatial coverage of the high return period events analyzed in this study. Due to the broad range in sub-basin size and the overall size of the Pompton River drainage basin, and variation in storm coverage, the availability of precise spatial coverage for each event over the entire basin allowed for a precise calibration of the HEC-HMS model.

4.2 Hydraulics

4.2.1 HEC-RAS – Unsteady Flow Model

The USACE Hydrologic Engineering Centers River Analysis System computer model (HEC-RAS) was used to solve for the flow profiles both up and downstream of the Pompton Lake Dam. The unsteady option within HEC-RAS was chosen for its ability to solve the full dynamic, Saint-Venant equations using the implicit finite difference method. Under unsteady flow, a discharge hydrograph is applied at the upstream boundary, and a discharge-stage rating (rating curve) at the downstream boundary. The unsteady methodology allows the program to calculate both stages and discharges throughout the studied reach. Due to the operation of the Pompton Lake Dam floodgates, the water surface elevation and flow both upstream and downstream of the dam have the potential to change. Therefore, the use of the dynamic wave (discharge and stage vary over time) approach will allow for the attenuation of the water as it moves downstream.

4.2.1.1 Processing

The detail study methodology incorporates WISE (Watershed Concepts, 2004) as a preprocessor to HEC-RAS. WISE utilizes the georeferenced data from the terrain model and miscellaneous shapefiles (including streams, cross sections, etc.) and with user input creates the input data files for HEC-RAS. HEC-RAS Version 4.1.0 (USACE, 2010) is then executed to determine the flood elevation at each cross section of the modeled stream. The resulting elevations are then imported back to WISE for creation of the flood boundaries. The techniques and tools utilized to perform the analyses meet FEMA's adopted standards. No individual community criteria were incorporated within this study. HEC-RAS Version 4.1.0 is the computer program used to build the hydraulic models.

Model cross sections are placed along the study streams using the available contour data. Where roads or other structures are encountered, supplemental cross sections are placed along the top of the structure and at the upstream and downstream faces of the structure to meet HEC-RAS data input needs. Survey data is collected for each detail study structure. All data points collected for each structure are precisely captured and recorded. In addition to structures, natural channel cross sections are also surveyed, and cross sections are placed in these locations using the WISE tools. The channel shapes of the surveyed locations are then used to create a channel shape for the non-surveyed cross sections located near the survey locations. The HEC-RAS preprocessor within WISE blends the survey data with the topographic data to create a seamless transition between the datasets and generates a HEC-RAS model.

4.2.1.2 Surveyed Data

Cross-sectional data for 45 channel cross-sections were surveyed and combined with the LiDAR data and used for the cross section information for HEC-RAS for the entire modeled reach. Detailed descriptions of the surveyed cross-sections can be found in Survey Data section of the Appendix D.

In addition to the surveyed cross-sections, data for nine bridges, six dams, and one culvert were collected and combined with the LiDAR data for use in HEC-RAS. Detailed descriptions of the surveyed structures can be found in the *Survey Data* section of the Appendices E, F, and G.

4.2.1.3 As-Built Data

For the Pompton Lake Dam, construction plans were supplied to AECOM from the US Army Corps of Engineers – NY District July 2003 Ramapo River at Oakland, New Jersey Flood Control Project Pompton Lake Dam. The existing data was converted to the vertical datum of NAVD88 with shift of -0.876 ft calculated via VERTCON (National Geodetic Survey). The Pompton Lake Dam spillway and gated structure with radial gates was transferred to HEC-RAS. In order to capture the inline structure and service bridge, a combination of HEC-RAS inline structure data, blocked obstructions and lidded cross-sections were used. Currently HEC-RAS does not have the ability to perform a multiple opening analysis for a bridge-inline weir combination.

4.2.1.4 Parameter Estimation

To estimate the Manning's roughness coefficients, engineering judgment was used based on available survey pictures, aerial photography and land use data. Polygons were created to identify areas of different Manning's n-values. The original Manning's n-

values represented by the polygons were adjusted where necessary in the hydraulic modeling phase on a cross section by cross section basis. The drag coefficients for the bridge piers were selected based on the pier shape according to Table 5.3 of the HEC-RAS Hydraulic Reference Manual. Table 3 represents a summary of Manning's n-values used with the unsteady model.

Table 3 : Summary of Roughness Coefficients

Flooding Source	Channel	Overbanks
Pequannock River	0.035	0.024-0.150
Pompton River	0.035	0.024-0.150
Ramapo River	0.024-0.035	0.024-0.150
Ramapo River Lt. Diversion Channel	0.035	0.030-0.15
Ramapo River Rt. Diversion Channel	0.035	0.024-0.140

4.2.1.5 Inflow Hydrographs

The unsteady HEC-RAS model was developed for the study limits presented in Table 4.

Table 4 : Flooding Sources Studied by Unsteady HEC-RAS

Flooding Source	Reach Length (miles)	Study Limits
Pequannock River	2.0	From approximately 88 ft downstream of Riverdale Road to the confluence of the Ramapo and Pequannock Rivers
Pompton River	0.2	From the confluence of the Pequannock and Ramapo Rivers to approximately 148 feet downstream of Jackson Avenue
Ramapo River	5.3	From approximately 260 ft downstream of Interstate 287 to the confluence with the Pequannock River.
Ramapo River Lt. Diversion Channel	0.3	From approximately 100 ft upstream of the Potash Lake weir to 867 ft upstream of Doty Road.
Ramapo River Rt. Diversion Channel	0.6	From approximately 100 ft upstream of the Potash Lake weir to 867 ft upstream of Doty Road.

Within the unsteady HEC-RAS model inflow hydrographs were used as inputs into the model. The source for the data comes from the calibrated HEC-HMS model described above. The locations of the boundary conditions are listed in Table 5.

Table 5 : Unsteady HEC-RAS Inflow Boundary Conditions

River	Reach	RS	Boundary Condition
Pequannock River	Reach-1	10642	Flow Hydrograph
Pequannock River	Reach-1	407	Lateral Inflow Hydrograph
Ramapo River	Reach-1	28220	Flow Hydrograph
Ramapo River	Reach-3	10512	Uniform Lateral Inflow
Ramapo River	Reach-3	955	Lateral Inflow Hydrograph

4.2.1.6 Rating Curve

For all model runs, a downstream boundary condition of a rating curve was chosen to be the most appropriate approach. A rating curve was constructed for USGS Gage No. 01388500 near Jackson Avenue from the USGS Water Watch website Custom Rating Curve Builder toolkit (U.S. Department of the Interior). All stage versus discharge data was converted from NGVD 29 to NAVD88 and then the stage value was converted to water surface elevation using the gages localized datum.

4.2.1.7 USACE Rule Curve

The floodgates on the Pompton Lake Dam are operated to maintain a set pool elevation in Pompton Lake. The set point elevations are defined as a function of the gate opening and the lake level, and vary from 201.37 ft (NAVD88) at a gate opening of 0 ft to 201.4 ft (NAVD88) at gate openings equal to or exceeding 4.5 ft as defined by the operation rule curve in the U.S. Army Corps of Engineers, New York, NY Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual (OMRR and R), Pompton Lake Dam, NJ, Appendix C- Gate Operating Rule Curve (March 2008), as shown in Figure 3 on page 24.

The gate operation is a function of the difference between the lake elevation and the set point elevation. If the lake level is more than 0.25 ft above the set point elevation, the gates are to be opened 0.25 ft; if the lake level is more than 0.5 ft above the set point elevation, the gates are to be opened 0.5 ft; if the lake level is more than 1.0 ft above the set point elevation, the gates are to be opened 1.0 ft. Similarly, if the lake level is more than 0.25 ft below the set point elevation, the gates are to be closed 0.5 ft; if the lake level is more than 1.0 ft below the set point elevation, the gates are to be closed 1.0 ft.

The only exception to these rules is that if the lake level is falling, then the gates would not be opened. Similarly, if the lake level is rising, then the gates would not be closed. These exceptions minimize lake level oscillations.

Under normal conditions, the gates remain closed and all outflow passes over the fixed spillway portion of the dam. The gates are initially opened 0.25 ft when the lake level reaches 201.37 ft (NAVD88) or 0.25 ft above the target elevation of 201.37 ft for a gate opening of 0 ft. Initial gate opening is controlled by the PLC/RTU automatic control equipment if the controls are in SCADA AUTO, or can be remotely controlled from either of the two SCADA PC work stations, or locally controlled from the gate control console cabinets.

Every 15 minutes thereafter, the lake level and stream flow gauges are checked, and the gates are operated automatically if necessary. The two gates can be opening simultaneously, or sequentially, but they should maintain the same opening.

Defining the gate operation as a function of the gate opening and lake level allows the gates to be operated manually, without the benefit of computers and gauge data, should those systems become inoperable for any reason. Under such a situation, the gate operator need only check the gate opening and staff gauge at the dam site, and then plot that data on the rule curve to determine the required gate operation.

Should one gate fail to operate, the gate operation would follow the same rules as the normal two gate operation. The one gate will simply open faster since the rules will make the gate open more frequently.

4.2.1.8 Rule Curve Coding

The aforementioned rule curve data was extracted from the Pompton Lake Dam, NJ, Appendix C, NY OMRR and R Manual document (USACE, 2008) as supplied by the USACE – NY District and coded into HEC-RAS user-defined Rule Operation boundary condition. The rule curve operation was coded in such a way to determine the simulated water surface elevation for each unsteady simulation at every fifteenth minute. The water surface elevation reading was taken at the first cross-section just upstream of Pompton Lake Dam. This elevation was then used to calculate the difference in relation to the set point (target) elevation which in turn, determined the gate opening so as to mimic the rule curve data defined in Table 6.

Table 6 : Pompton Lake Dam Rule Curve Data

Gate Operation Rule Curve Data (NAVD 88)							
Lake Elevation (feet)							
Current Gate Opening	**Open 1.0 (ft.)**	**Open 0.5 (ft.)**	**Open .25 (ft.)**	**TARGET**	**Close 0.25 (ft.)**	**Close 0.5 (ft.)**	**Close 1.0 (ft.)**
0.00	202.37	201.87	201.62	201.37	201.12	200.87	200.37
0.25	202.37	201.87	201.62	201.37	201.12	200.87	200.37
0.50	202.32	201.82	201.57	201.32	201.07	200.82	200.32
0.75	202.27	201.77	201.52	201.27	201.02	200.77	200.27
1.00	202.22	201.72	201.47	201.22	200.97	200.72	200.22
1.25	202.17	201.67	201.42	201.17	200.92	200.67	200.17
1.50	202.12	201.62	201.37	201.12	200.87	200.62	200.12
1.75	202.07	201.57	201.32	201.07	200.82	200.57	200.07
2.00	202.02	201.52	201.27	201.02	200.77	200.52	200.02
2.25	201.97	201.47	201.22	200.97	200.72	200.47	199.97
2.50	201.92	201.42	201.17	200.92	200.67	200.42	199.92
2.75	201.87	201.37	201.12	200.87	200.62	200.37	199.87
3.00	201.82	201.32	201.07	200.82	200.57	200.32	199.82
3.25	201.77	201.27	201.02	200.77	200.52	200.27	199.77
3.50	201.72	201.22	200.97	200.72	200.47	200.22	199.72
3.75	201.67	201.17	200.92	200.67	200.42	200.17	199.67
4.00	201.62	201.12	200.87	200.62	200.37	200.12	199.62
4.25	201.57	201.07	200.82	200.57	200.32	200.07	199.57
4.50	201.52	201.02	200.77	200.52	200.27	200.02	199.52
14.00	201.52	201.02	200.77	200.52	200.27	200.02	199.52

In order to correctly model the USACE rule curves that govern the operation of the Pompton Lakes Dam floodgates (aka tainter gates); HEC-RAS user-defined rules for hydraulic structures was invoked as an internal boundary condition within the unsteady flow data editor. This option allowed for user-defined control of the gates and subsequent release/impoundment of water during a modeled flood event. HEC-RAS rule operations editor was used to code the day-to-day functioning of the gates. The custom coding allowed the program to extract simulation values such as the water surface elevation just upstream of the dam. As described in the above USACE Rule Curve section, the water surface elevation pulled from the simulation value was used to determine if the lake level was falling or rising. This simulation value was in turn, used

to determine the difference in height between the target elevation and water surface elevation thus dictating the height at which the gate opens or closes.

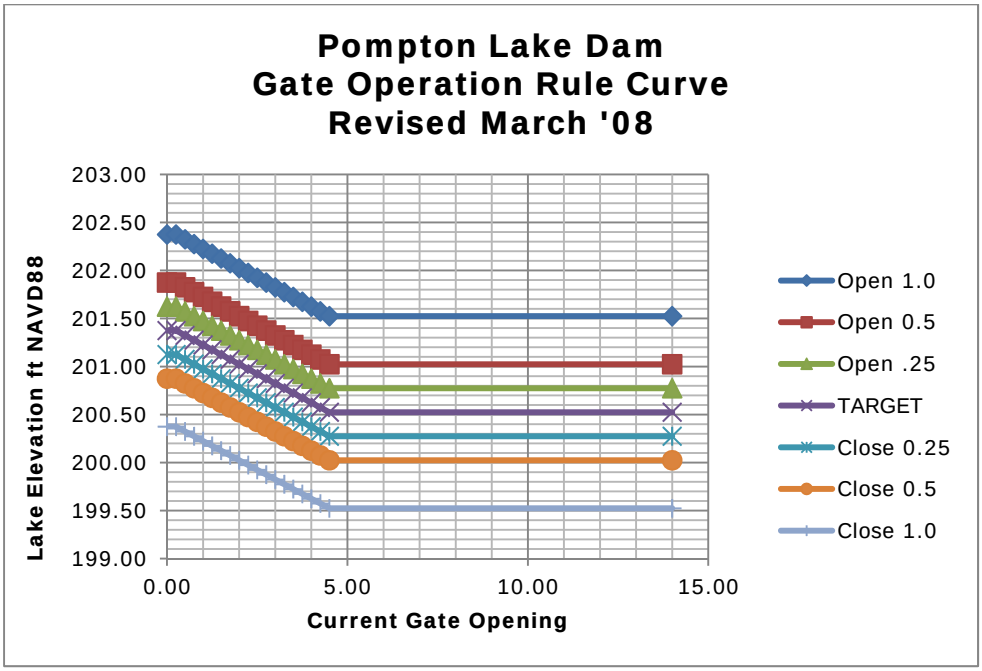


Figure 3 - Pompton Lake Dam Rule Curve

4.2.1.9 Calibration of the Unsteady HEC-RAS Analysis

Since a great deal of effort was spent in calibrating the existing HEC-HMS modeled developed by RAMPP, the goal of the hydraulic calibration was to maintain as close as possible duplication of the routed inflow hydrograph data to that of observed hydrograph at the following USGS gages: No. 1388500 near Jackson Avenue, and No. 1388000 just upstream of Pompton Lake Dam and the stages at No. 0138810 Dawes Highway Bridge. Minor modifications were made to two of the inflow hydrographs by the use of a multiplier. Various multipliers were tested for the Hurricane Irene plan since numerous high waters were available for this event. A multiplier of 0.9 was applied to the inflow hydrograph for the Ramapo River and 0.4 for the Pequannock River. These values yielded the best comparison between the routed hydrology and observed hydrographs as well as the observed high water marks.

4.2.1.10 High Water Marks

For calibration of the unsteady HEC-RAS model high water marks were acquired from three different sources for the Hurricane Irene event: The USGS Water Website and field measurements from both the United State Army Corps of Engineers and the United States Geological Survey.

The USGS Water Watch website Flood Table Tool was used to extract high water marks from Hurricane Irene as shown in Table 7.

Table 7 : USGS Gage High Water Marks from Hurricane Irene

USGS Gage No.	Station Name	HWM (ft) NAVD88
1387940	Ramapo River at Lakeside Avenue in Pompton Lakes NJ	202.994
1387998	Ramapo River above dam in Pompton Lakes NJ	201.567
1388100	Ramapo River at Dawes Highway in Pompton Lakes NJ	188.384
1388500	Pompton River in Pompton Plains NJ	184.325

The USGS also supplied field measured high water marks from Hurricane Irene for various locations along the modeled reaches of the Ramapo River, Pequannock River, and Pompton River. A summary of these high water marks can be found in Table 8. Note that on Table 8, the distance downstream is in reference to the cross section number if not specifically noted.

Table 8 *:* USGS Field Measured High Water Marks from Hurricane Irene

Stream	R.S.	USGS Site Name	HWM ID	Reference Location	HWM (ft) NAVD 88
Pequannock River	10642	PEQU2	3	Downstream of Riverdale Road	188.731
Pequannock River	10642	PEQU2	4	Downstream of Riverdale Road	188.711
Pequannock River	1744	PEQU1	1	198 feet downstream of feeder dam	184.93
Pequannock River	1744	PEQU1	2	224 feet downstream of feeder dam	184.91

Stream	R.S.	USGS Site Name	HWM ID	Reference Location	HWM (ft) NAVD 88
Pequannock River	1744	PEQU1	4	224 feet downstream of feeder dam	185.26
Pequannock River	1804	PEQU1	5	Just upstream of feeder dam	186.18
Pequannock River	1804	PEQU1	6	Just upstream of feeder dam	186.53
Pequannock River	1744	PEQU1	7	136 feet downstream of feeder dam	184.18
Pequannock River	1744	PEQU1	8	99 feet downstream of feeder dam	183.85
Ramapo River	28076	RAMA5	2	142 feet downstream	220.074
Ramapo River	27845	RAMA5	1	14 feet downstream	219.534
Ramapo River	27716	RAMA5	3	Upstream face of West Oakland Avenue	219.344
Ramapo River	27716	RAMA5	4	87 feet upstream of West Oakland Avenue	220.004
Ramapo River	27616	RAMA5	5	Downstream face of West Oakland Avenue	217.544
Ramapo River	27616	RAMA5	6	93 feet downstream of West Oakland Avenue	217.564
Ramapo River	21862	RAMA4	1	Doty Road	206.538
Ramapo River	21614	RAMA4	2	82 feet downstream	206.788

Stream	R.S.	USGS Site Name	HWM ID	Reference Location	HWM (ft) NAVD 88
Ramapo River	22118	RAMA4	3	83 feet downstream	207.058
Ramapo River	22118	RAMA4	4	140 feet downstream	207.188
Ramapo River	22118	RAMA4	5	25 feet downstream	207.028
Ramapo River	21813	RAMA4	7	Downstream face of Doty Road	206.218
Ramapo River	1336	RAMA1	1	44 feet downstream	186.1125
Ramapo River	1336	RAMA1	2	63 feet downstream	185.8825
Ramapo River	21813	RAMA4	8	Downstream face of Doty Road	206.188
Ramapo River	21862	RAMA4	9	Doty Road	206.368

The United States Army Corps of Engineers – New York District also supplied field measured high water marks. A summary of the high water marks as it pertains to the model can be found in Table 9.

Table 9 : USACE - NY District Measured High Water Marks from Hurricane Irene

Stream	R.S.	USACE Node Name	Downstream distance from R.S.	HWM (ft) NAVD 88
Pequannock River	8339	Pomp3	400	187.62
Ramapo River	9865	Ram1	0	191.95
Ramapo River	7993	Ram2	70.2	187.24
Ramapo River	4937	Ram3	44	186.77

4.2.1.11 HEC-2 Pre- and Post- Conditions

The HEC-2 data files from prior studies were converted to HEC-RAS data format. The data for the HEC-RAS files are in Appendix J.

5 Study Results

The study results are described in the following paragraphs.

5.1 Impact of Floodgate Operation

Four recent flood events, March 12-14, 2010, March 6-9, 2011, March 9-13, 2011, and Hurricane Irene were modeled and analyzed to investigate the effect of the Floodgate Facility Operation on downstream flooding. In addition flows ranging from low to high were also modeled and analyzed. These flows were generated from the HEC-HMS hydrologic model by entering hypothetical 2-, 10-, 25-, 40- and 50-year rainfall amounts to generate hydrographs that were inputted in the HEC-RAS Unsteady Flow Model. All of the flows investigated the Operating Rule Curve by modeling the system as pre-project condition (without gates) and post-project condition (with gates). The impacts were considered at four location for each event, three downstream of the Pompton Lake Dam; the first just upstream from the Jackson Avenue Bridge, the second just downstream of the Dawes Highway Bridge, and the third just upstream of the Hamburg Turnpike Bridge. The fourth location was just downstream of the railroad bridge in Oakland NJ.

The results of the runs for the recent storms (the March storms and Hurricane Irene) are presented in Figures 3 through 18; the results for the rainfall frequency storm events are shown in Figures 19 through 38.

The stage hydrographs for cross section 10135 which is just upstream of the Hamburg Turnpike Bridge shows some flattening of the stages for a few of the storm events. When the stage reaches an elevation of about 186.5 at the bridge the flow transitions from low flow (water passing beneath the bridge) to pressure flow (when the flow impacts the low chord of the bridge.) This creates a backwater at the bridge and the flattening of the hydrograph.

With the gates in operation the flow and stage may arrive somewhat sooner than without the gate operation. However, the maximum flows and elevations are nearly the same. The increases vary depending on the storm and the associated flow rates. The maximum predicted water surface increase in the vicinity of the Dawes Highway Bridge ranged between 0.18 and 0.24 feet and occurred for the simulated 2-year rainfall storm event. All of the other flow situations had significantly less increases in the flood elevations.

The modeling results for the runs with the flows ranging from low to high are shown in Figures 19 through 38.

During Hurricane Irene Pompton Lake was lowered three feet prior to the onset of the storm. The stage and flow hydrographs downstream of the dam were essentially identical, indicating that there is no effect due to the lowering of the reservoir level. The only difference in the hydrographs is at the beginning of the storm where the lake level is 3.0 feet lower at the beginning of the event. There is simply not enough storage to attenuate the flooding caused by Hurricane Irene. The March 2010 storm and a 10-year rainfall storm event were run with the model to determine the effect of lowering the lake by 3.0 ft. prior to the rainfall event occurring. Both cases showed similar results. There is not enough volume of storage in the reservoir to reduce flooding

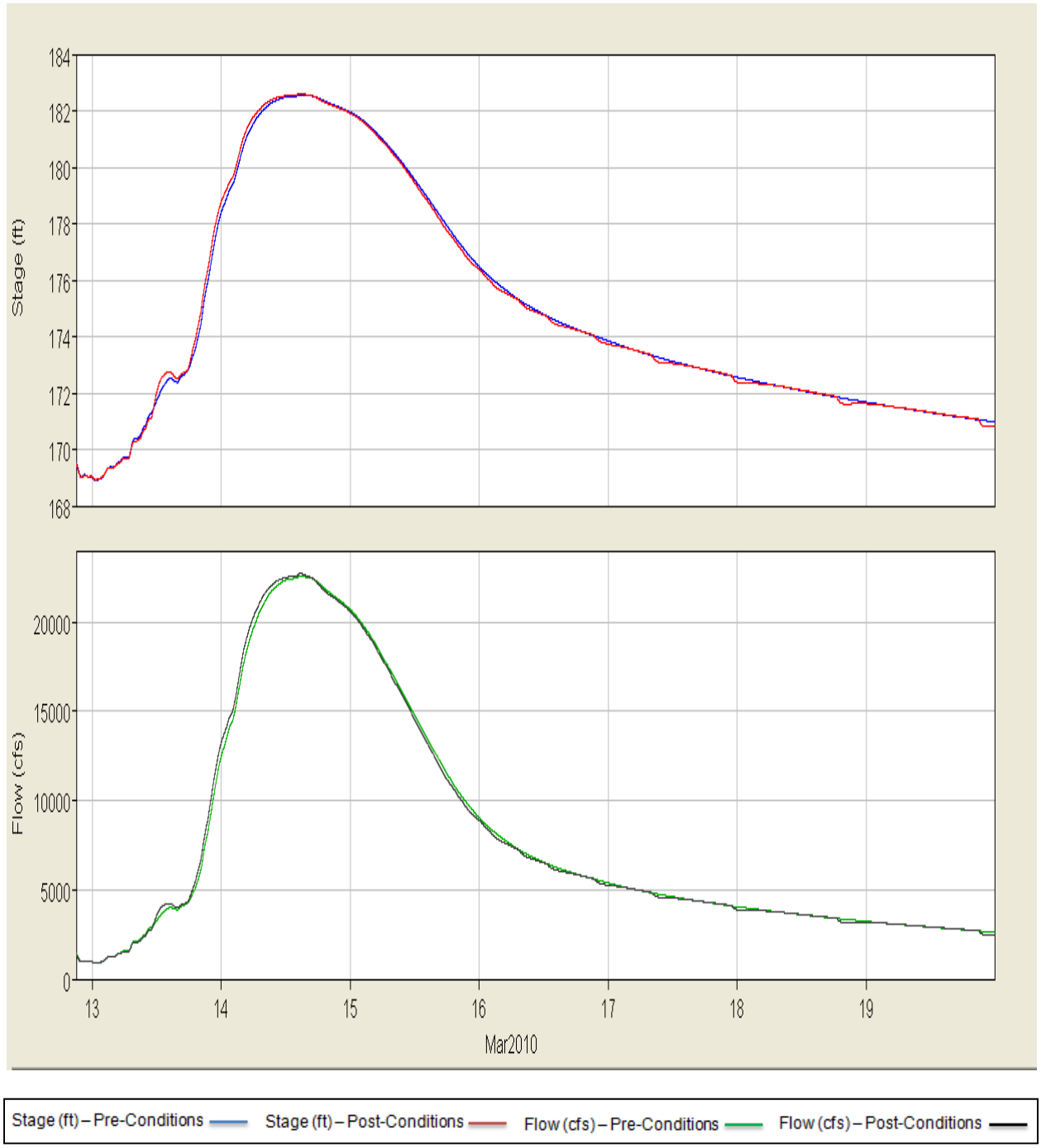


Figure 4 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre Project Condition and Post Project Conditions

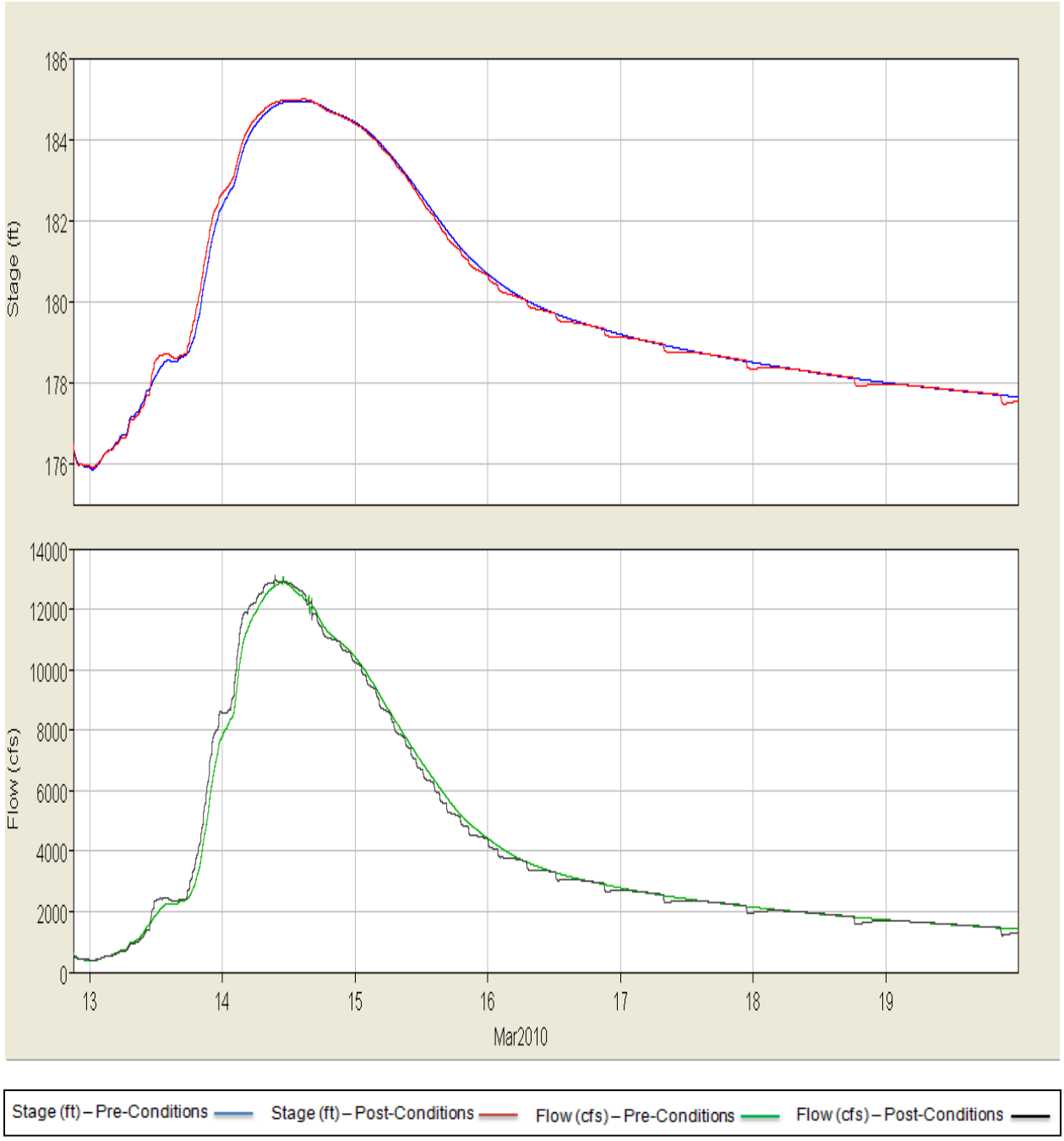


Figure 5: March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge - Pre Project Condition and Post Project Conditions

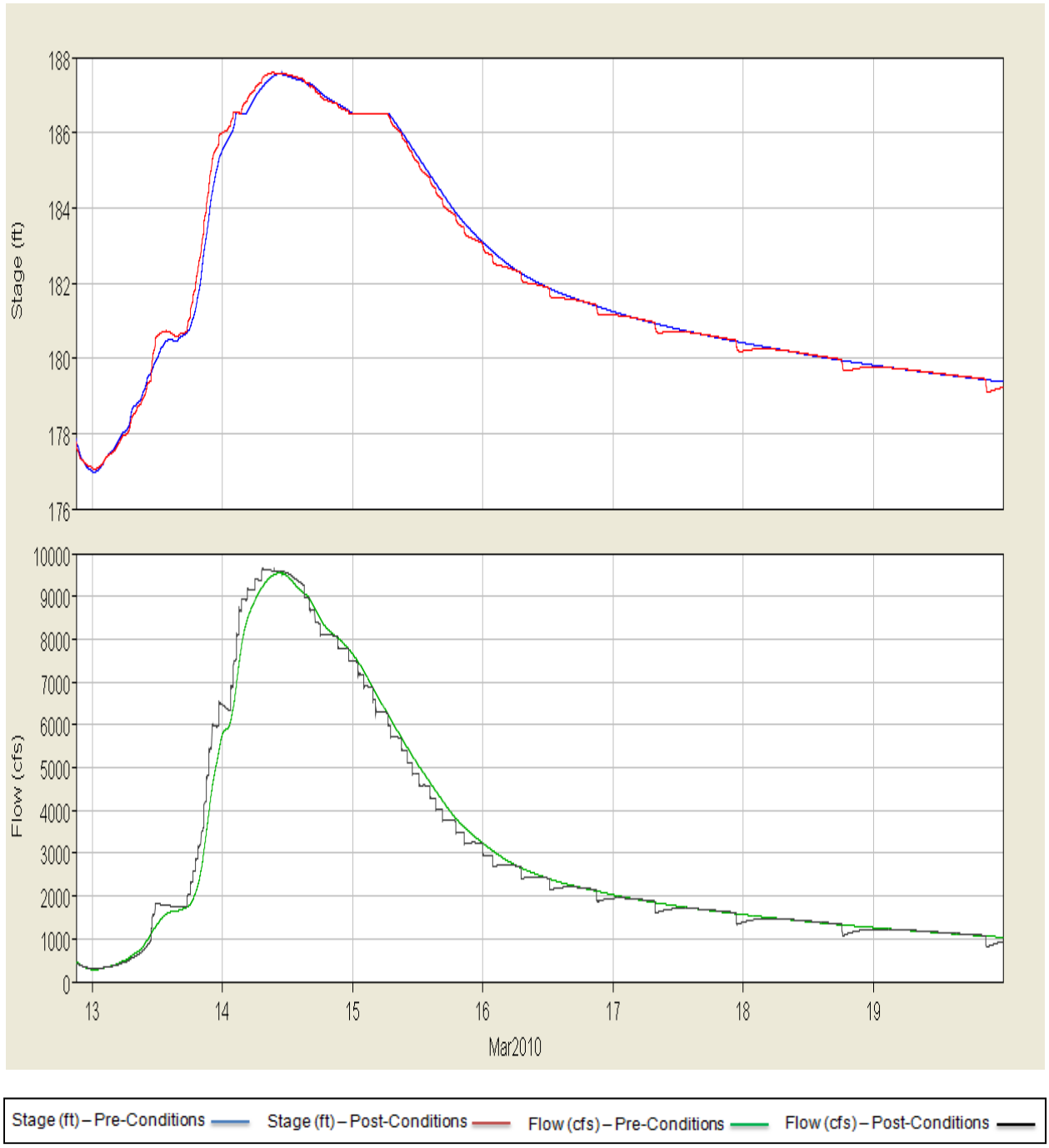


Figure 6 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge - Pre Project Condition and Post Project Conditions

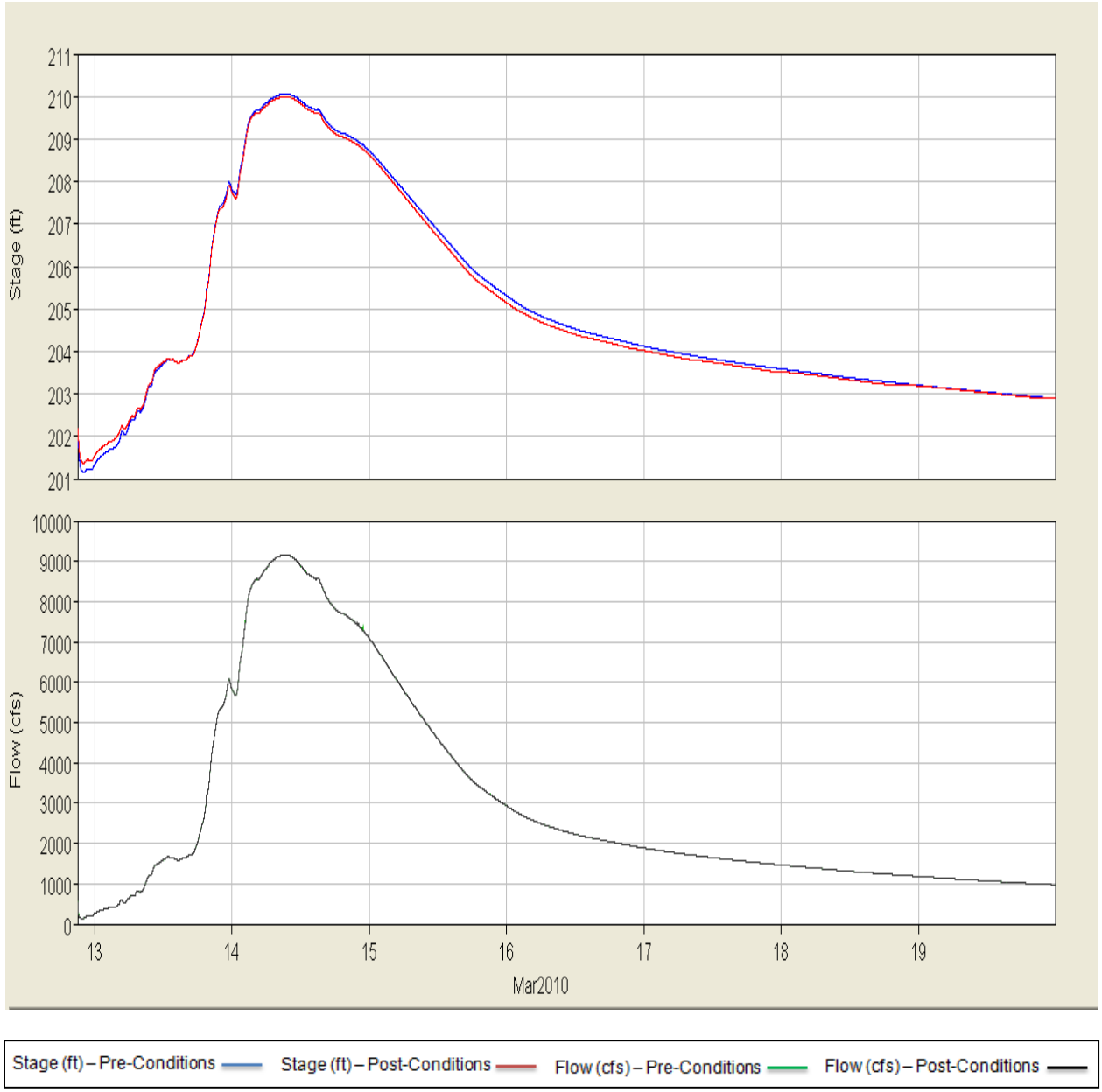


Figure 7 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ - Pre Project Condition and Post Project Conditions

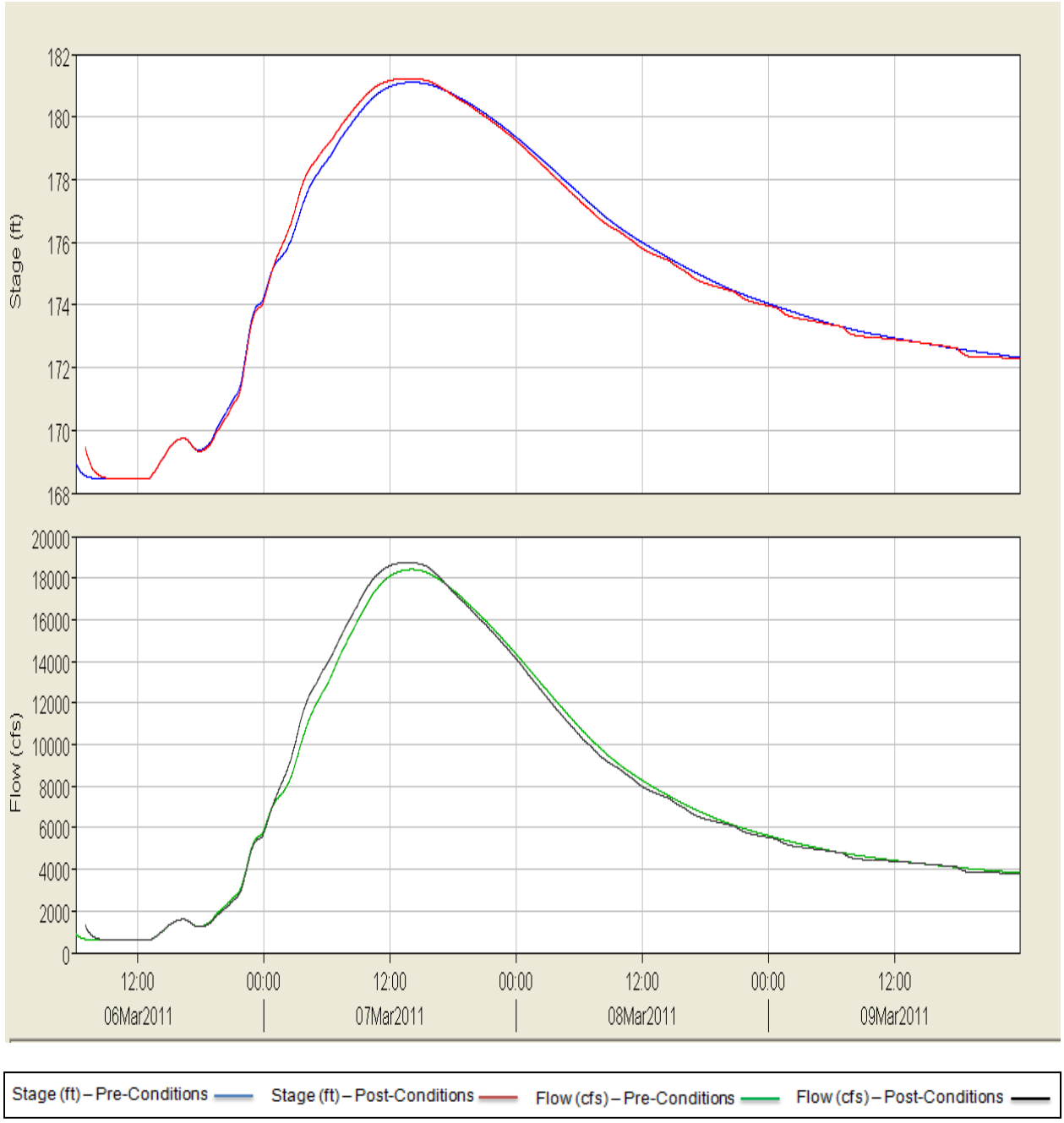


Figure 8 : March 6-9, 2011 Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre Project Condition and Post Project Conditions

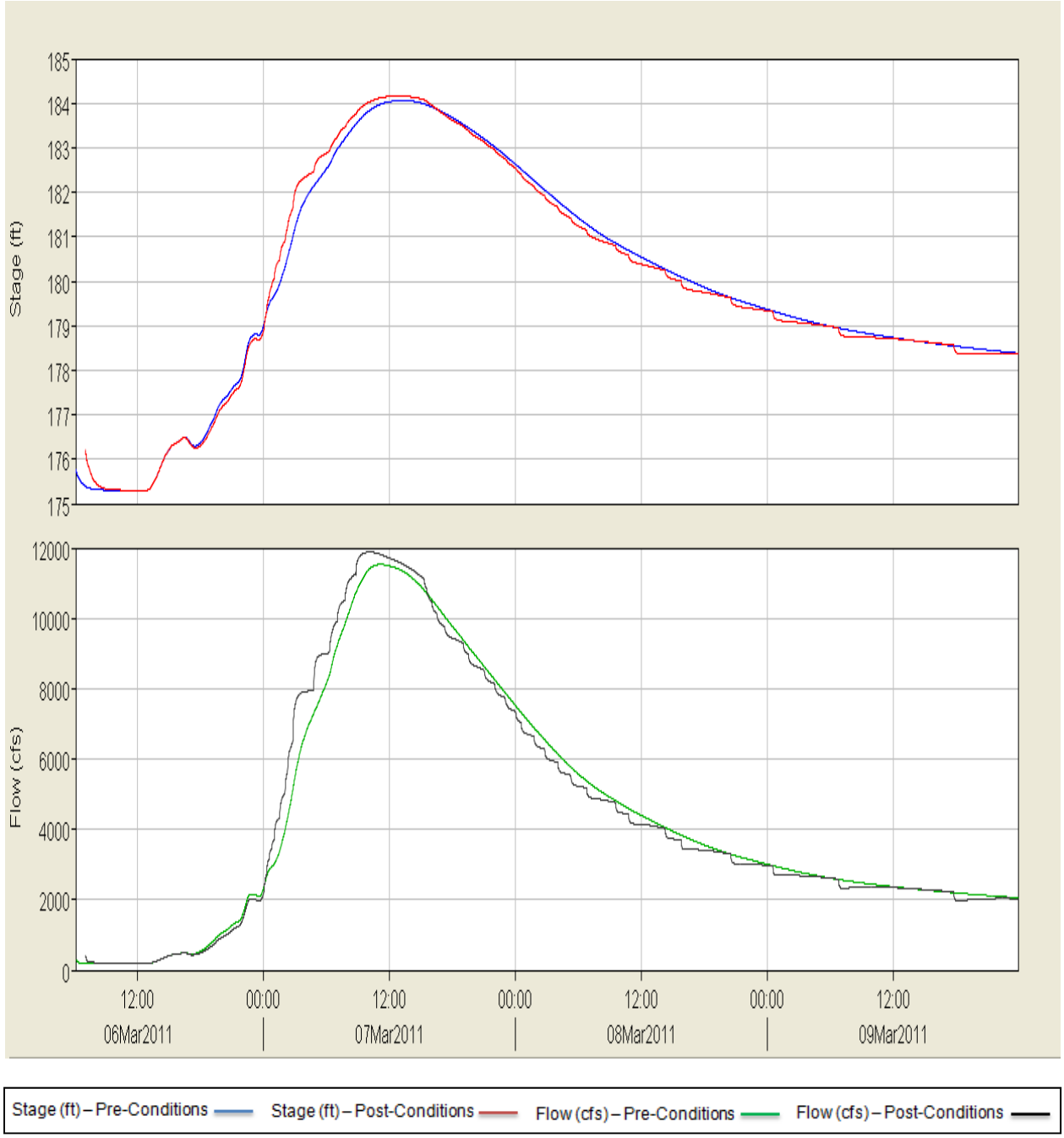


Figure 9 : March 6-9, 2011 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge – Pre Project Condition and Post Project Conditions

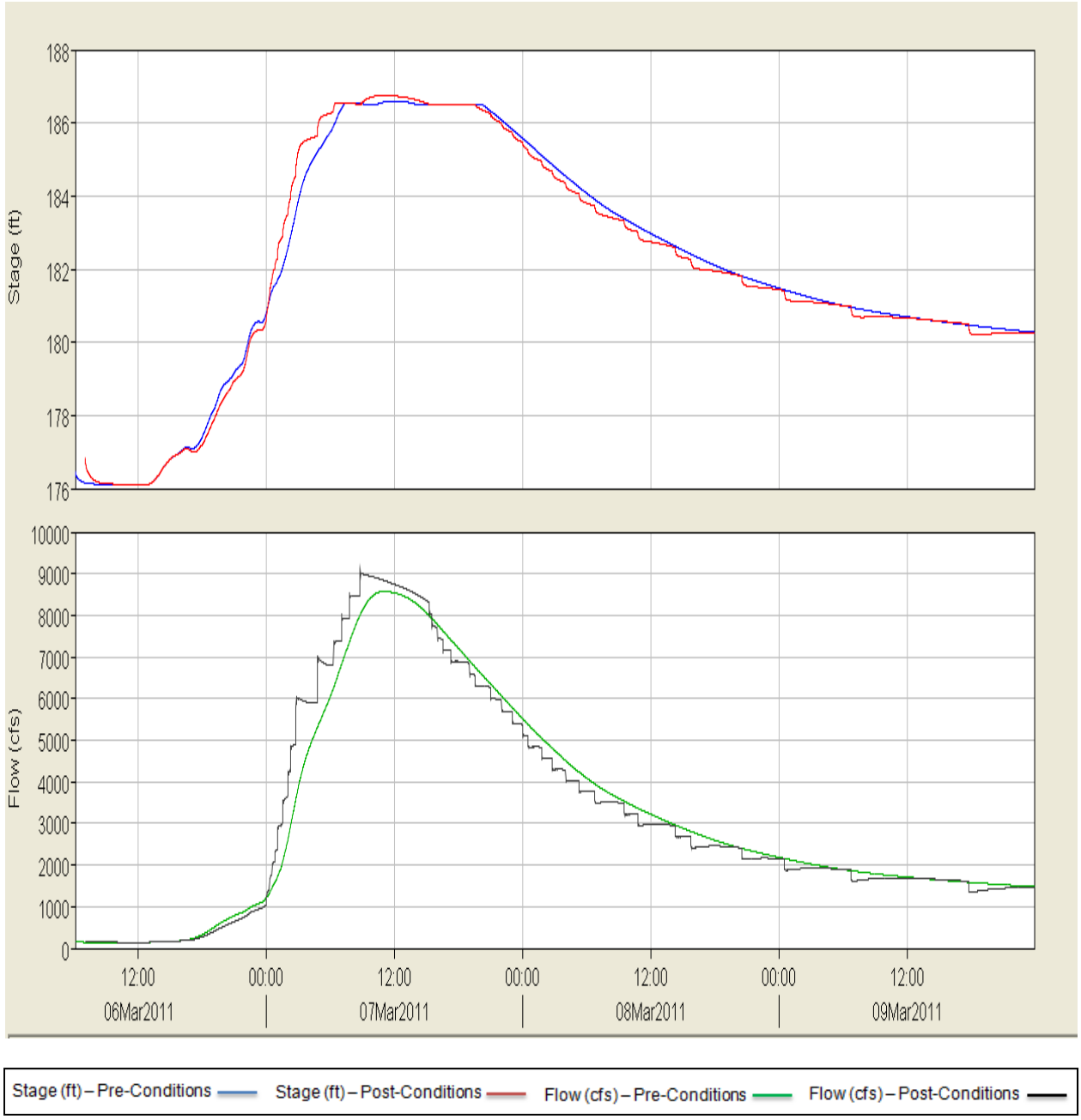


Figure 10 : March 6-9, 2011 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream the Hamburg Turnpike Bridge – Pre Project Condition and Post Project Conditions

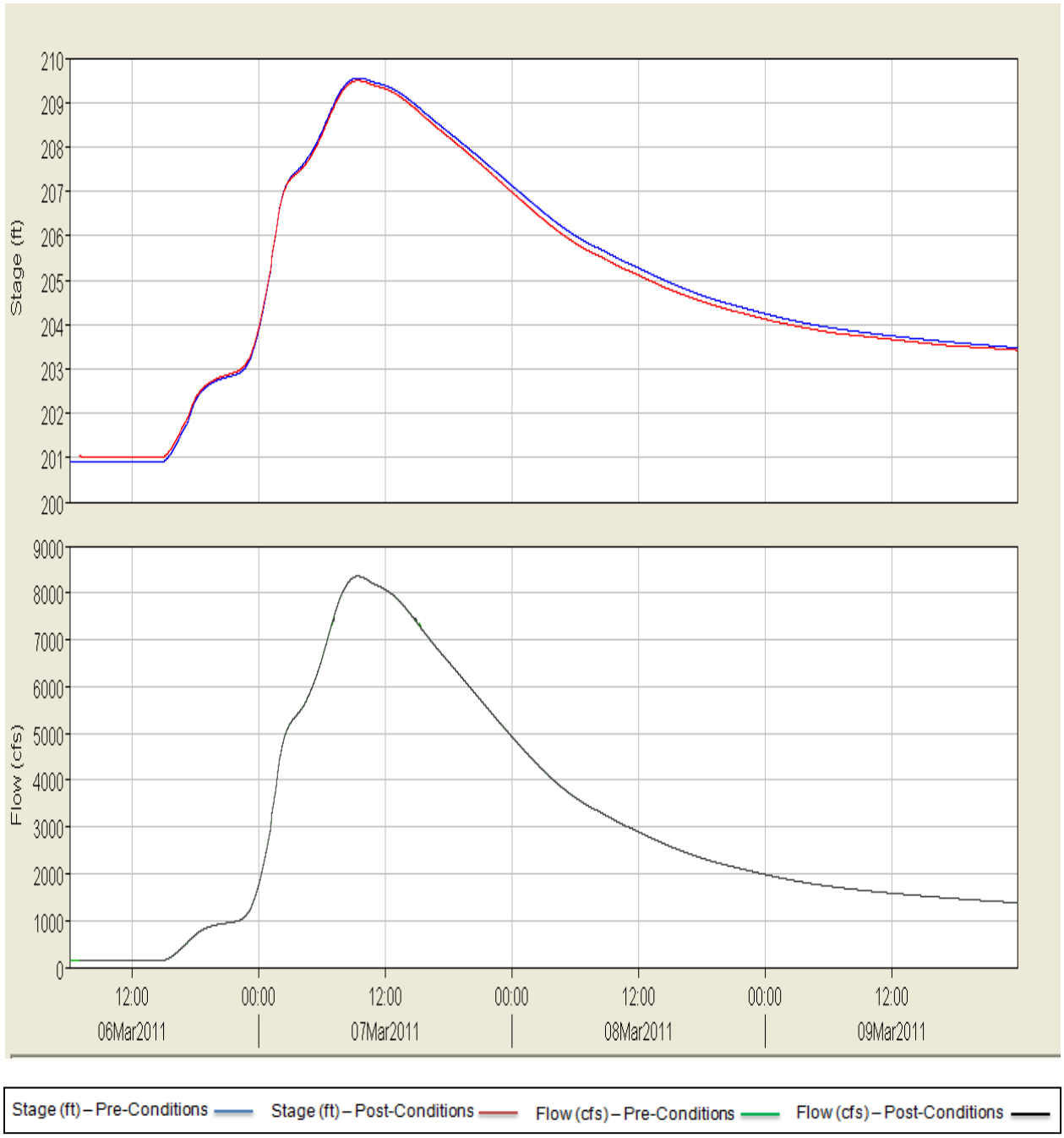


Figure 11 : March 6-9, 2011 Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre Project Condition and Post Project Conditions

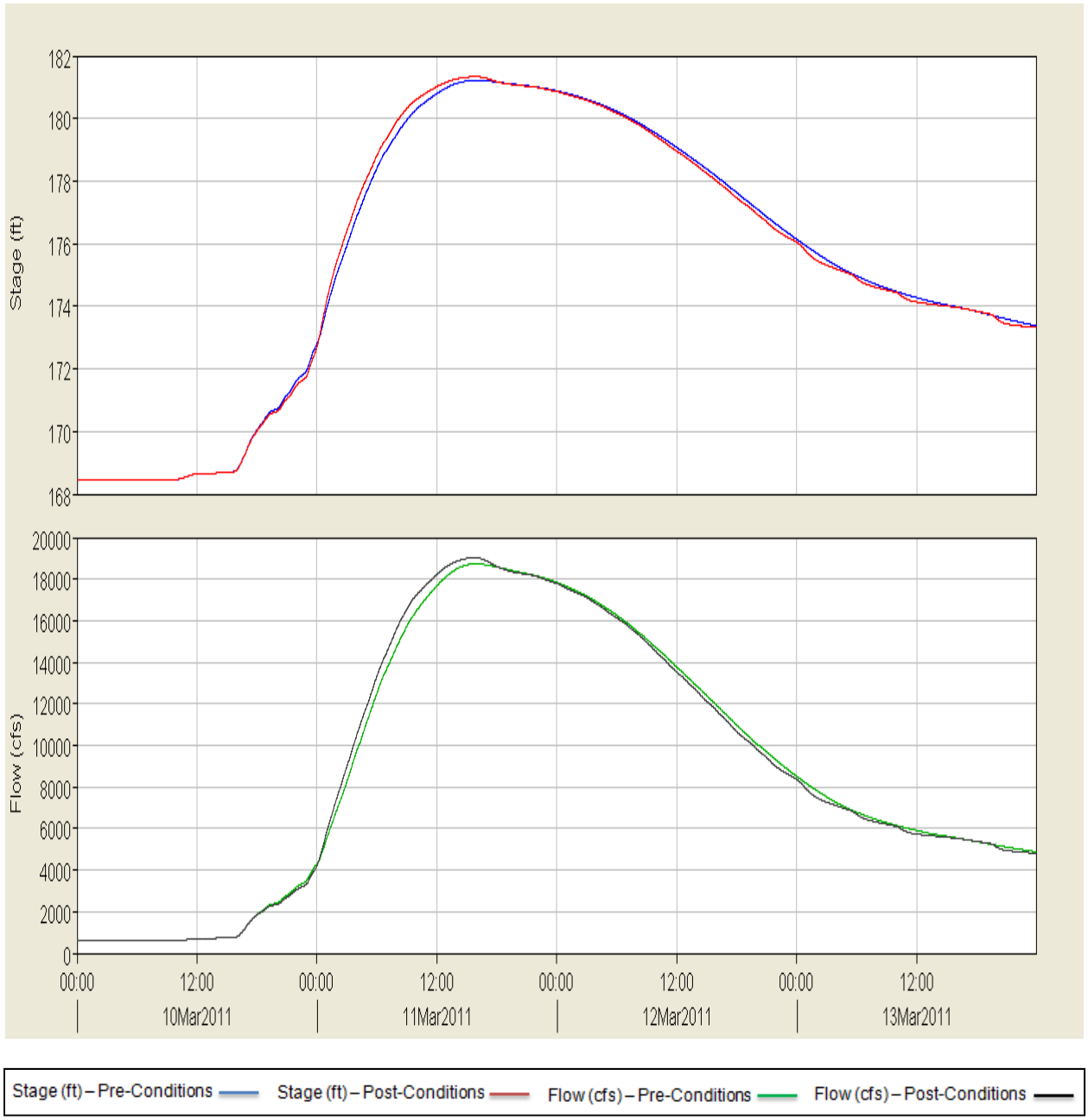


Figure 12 : March 9-13, 2011 Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre Project Condition and Post Project Conditions

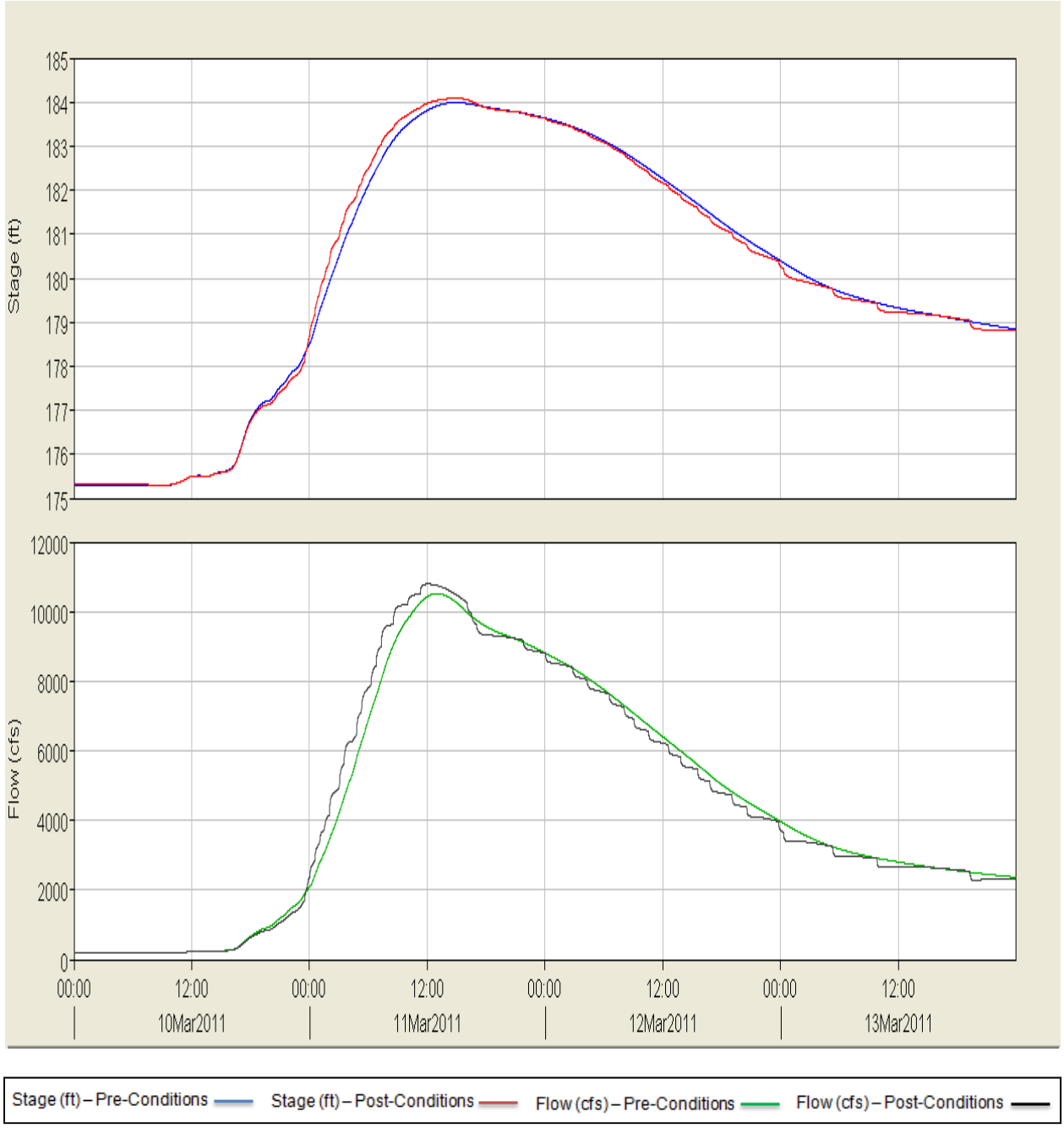


Figure 13 : March 9-13, 2011 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge – Pre Project Condition and Post Project Conditions

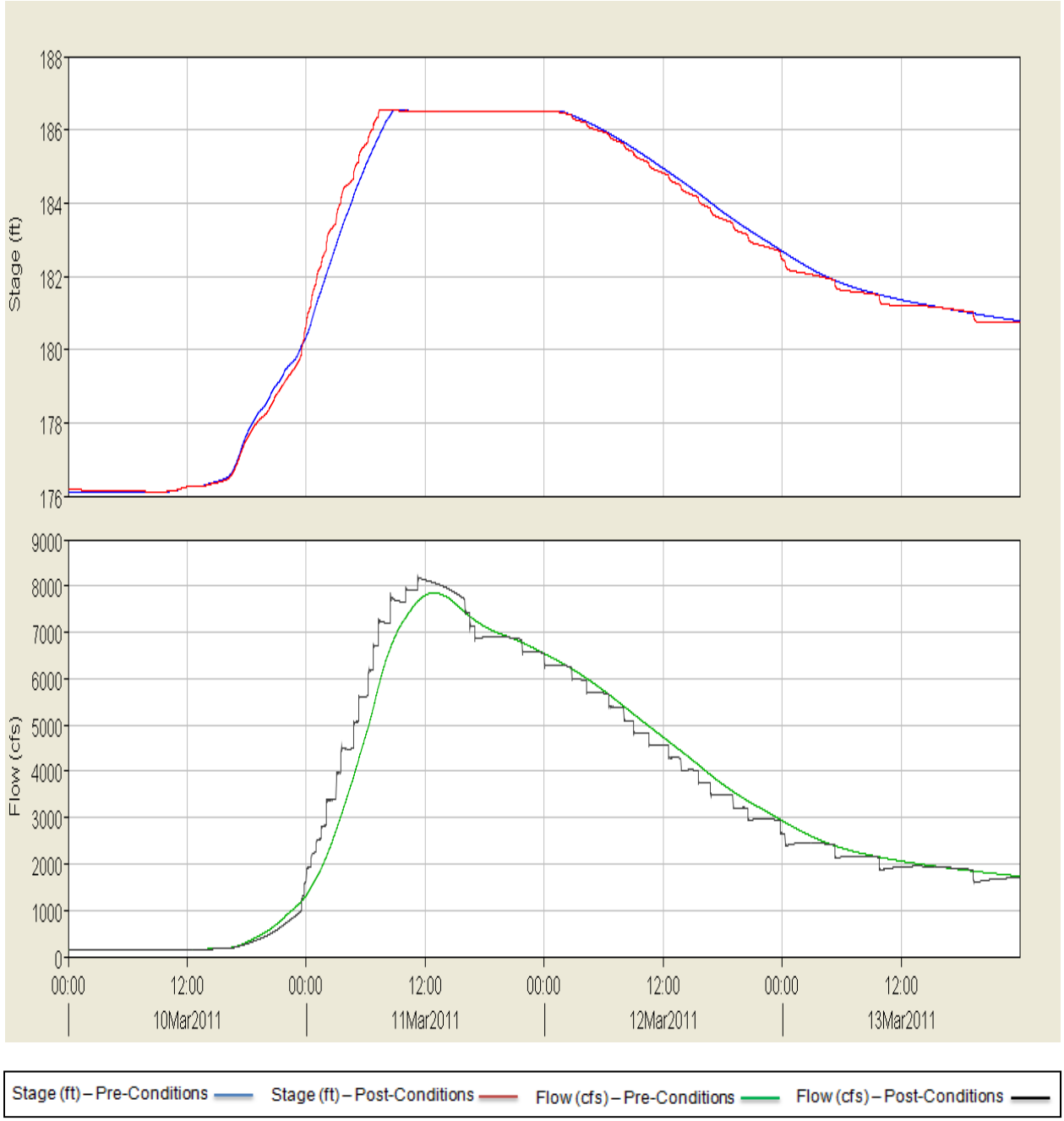


Figure 14 : March 9-13, 2011 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream the Hamburg Turnpike Bridge – Pre Project Condition and Post Project Conditions

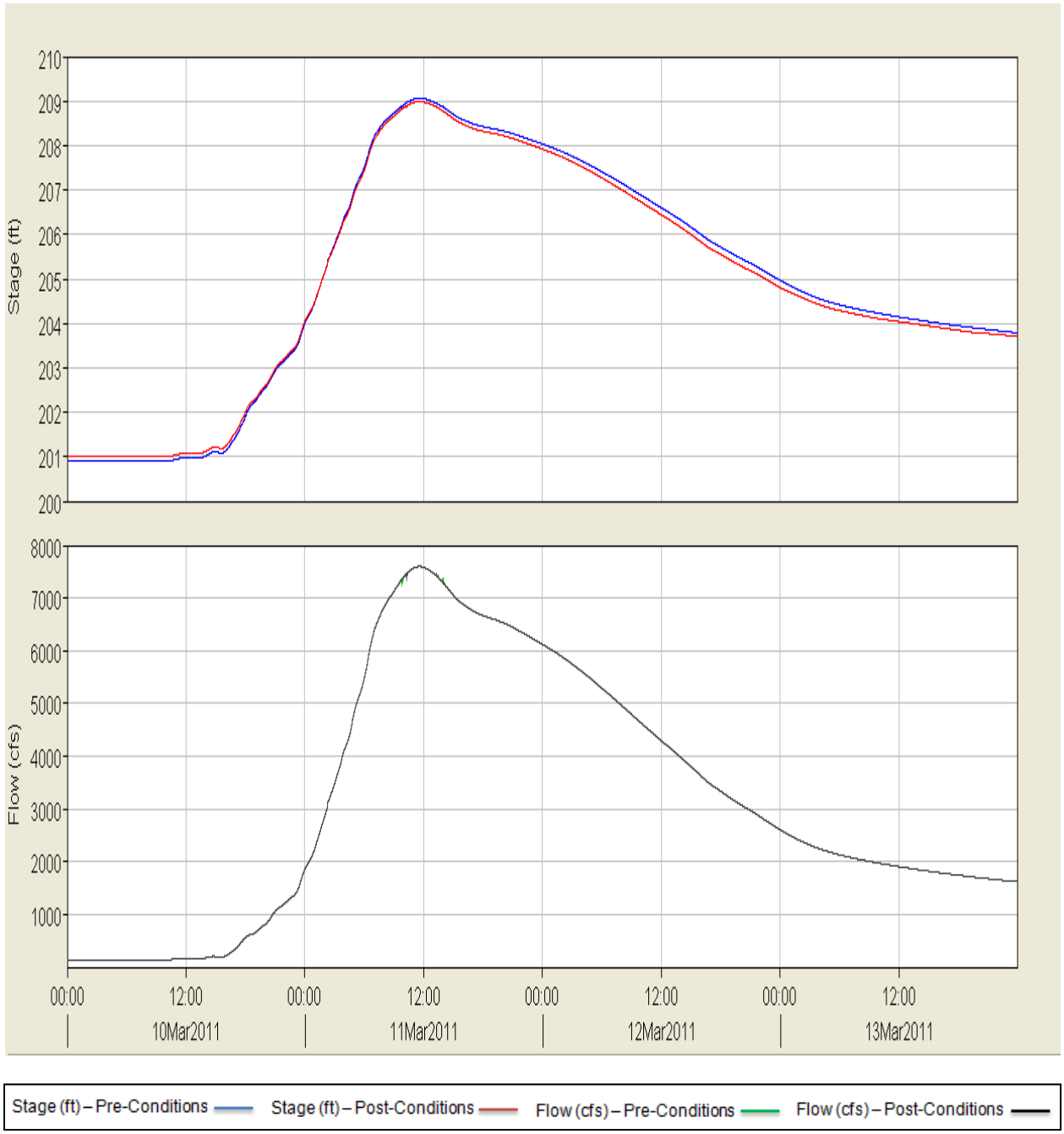


Figure 15 : March 9-13, 2011 Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre Project Condition and Post Project Conditions

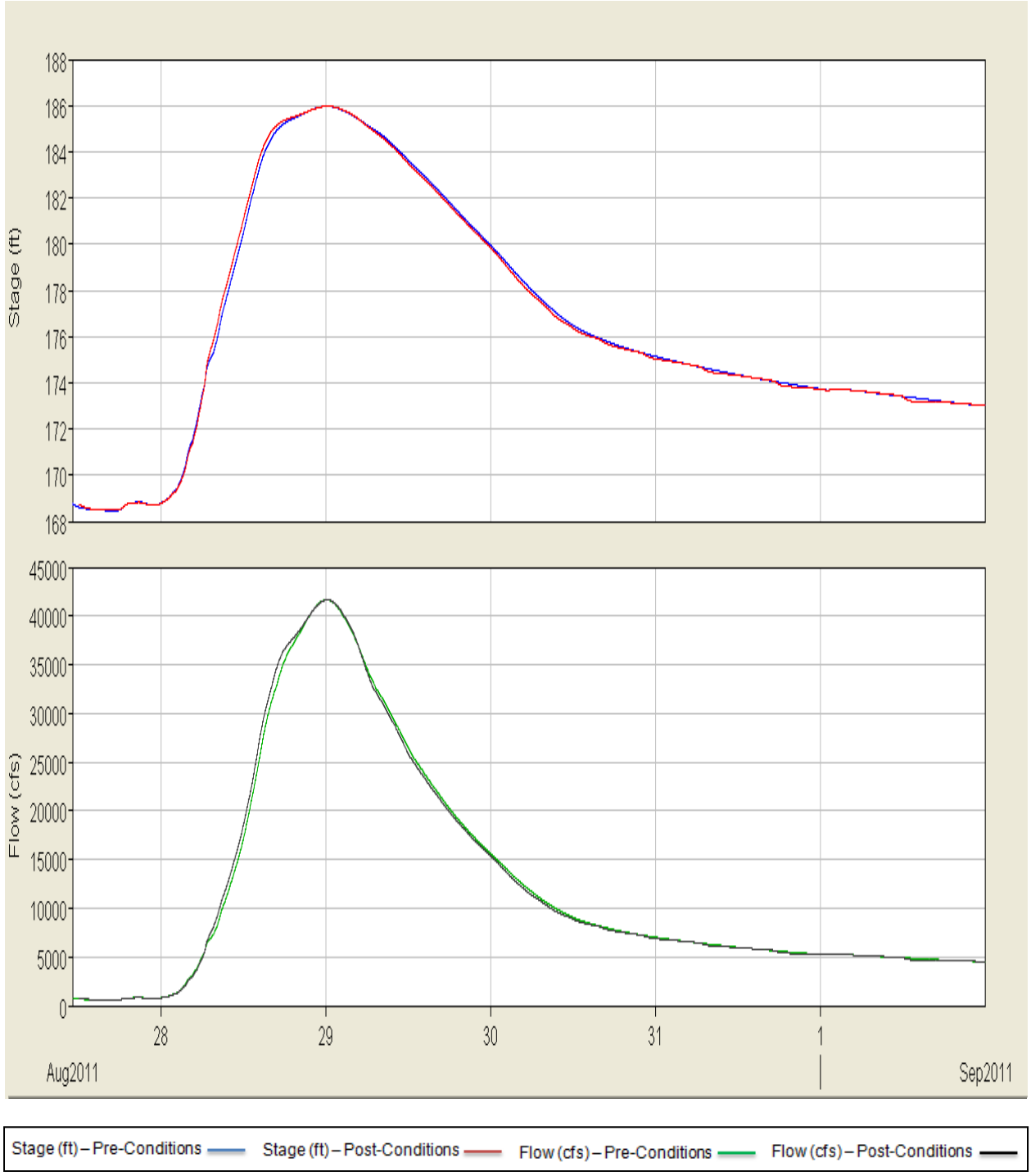


Figure 16 : Hurricane Irene, August 2011, Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre Project Condition and Post Project Conditions

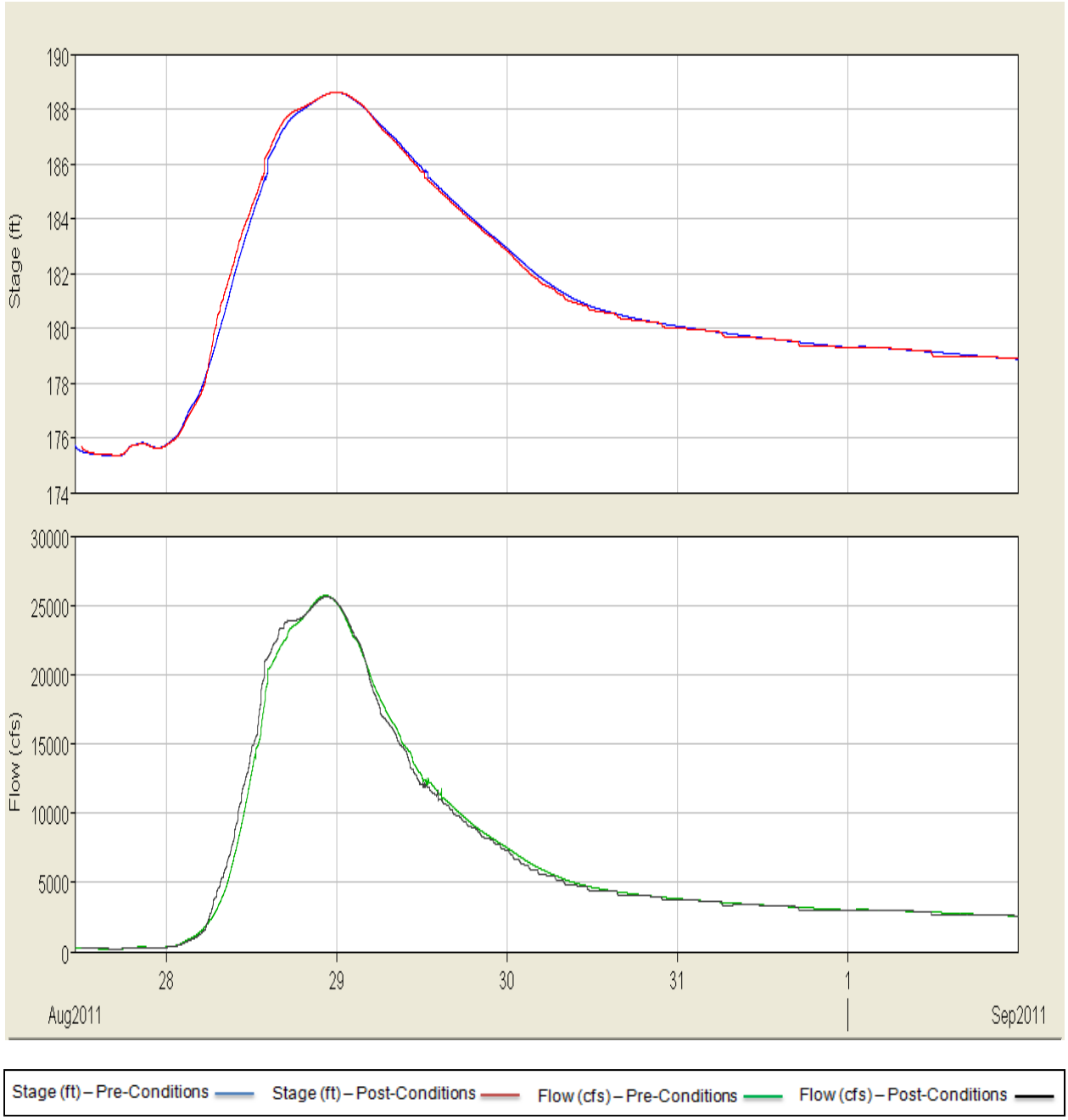


Figure 17 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge – Pre Project Condition and Post Project Conditions

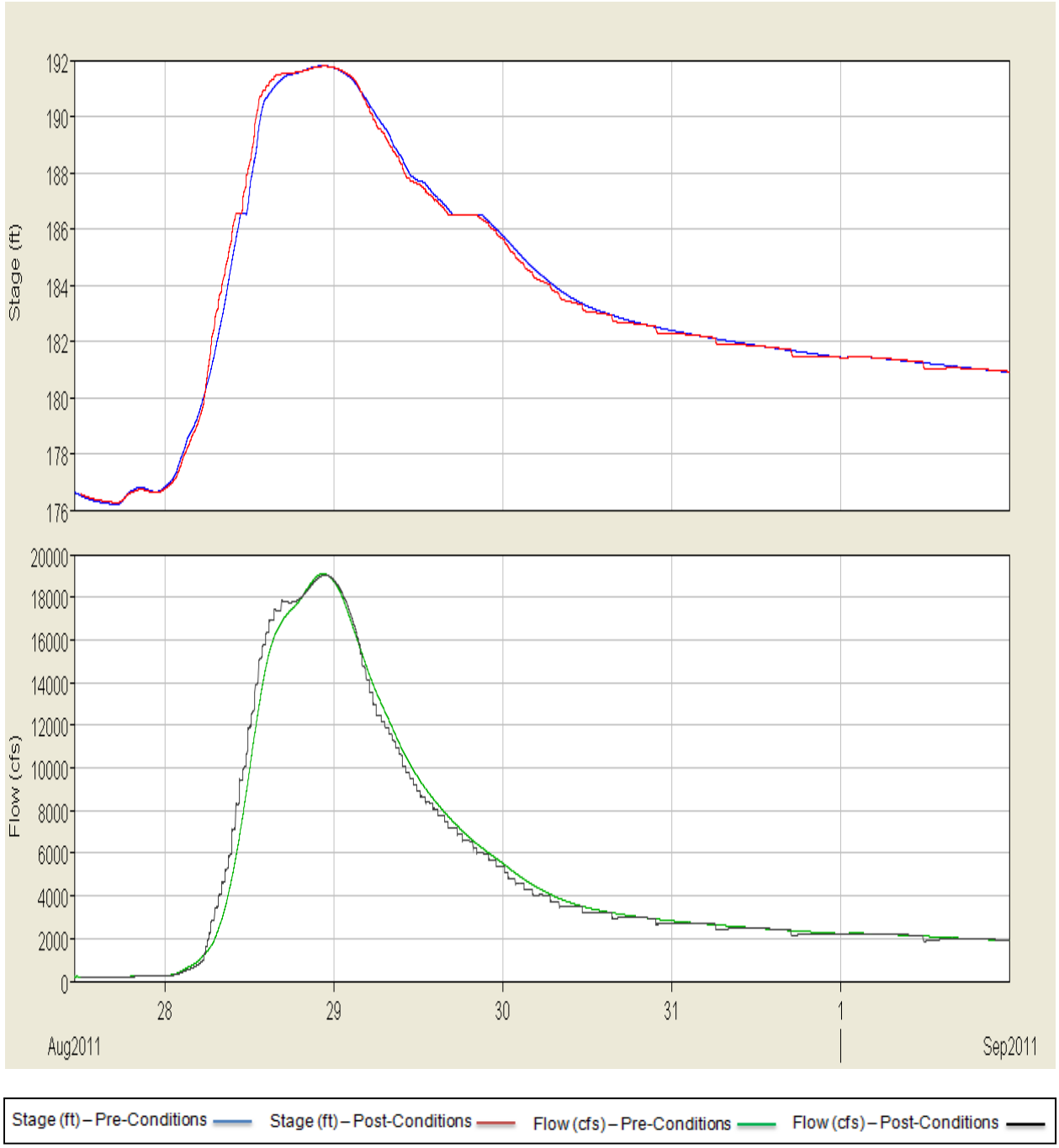


Figure 18 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre Project Condition and Post Project Conditions

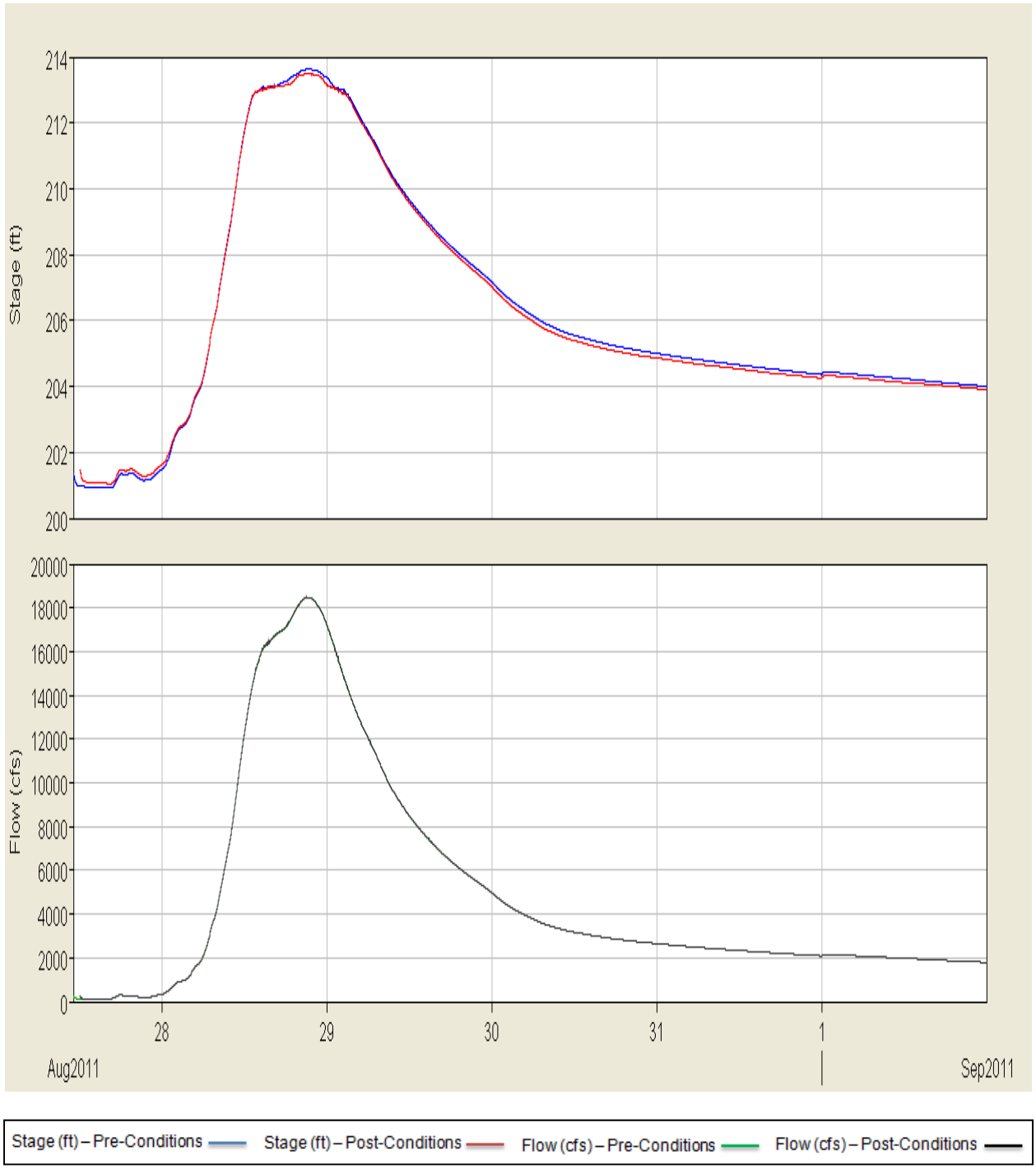


Figure 19 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre Project Condition and Post Project Conditions

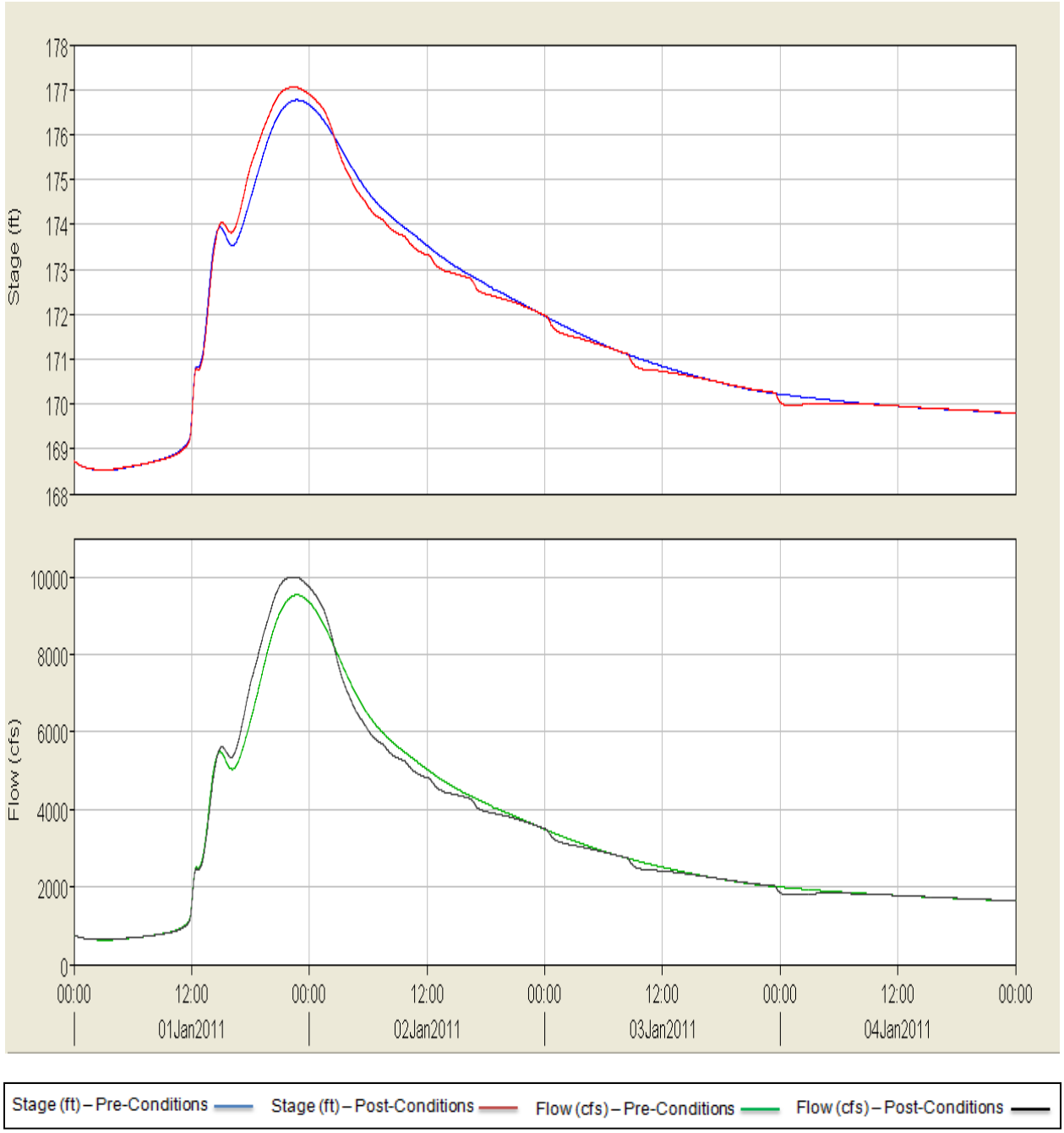


Figure 20 : 2-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre and Post Conditions

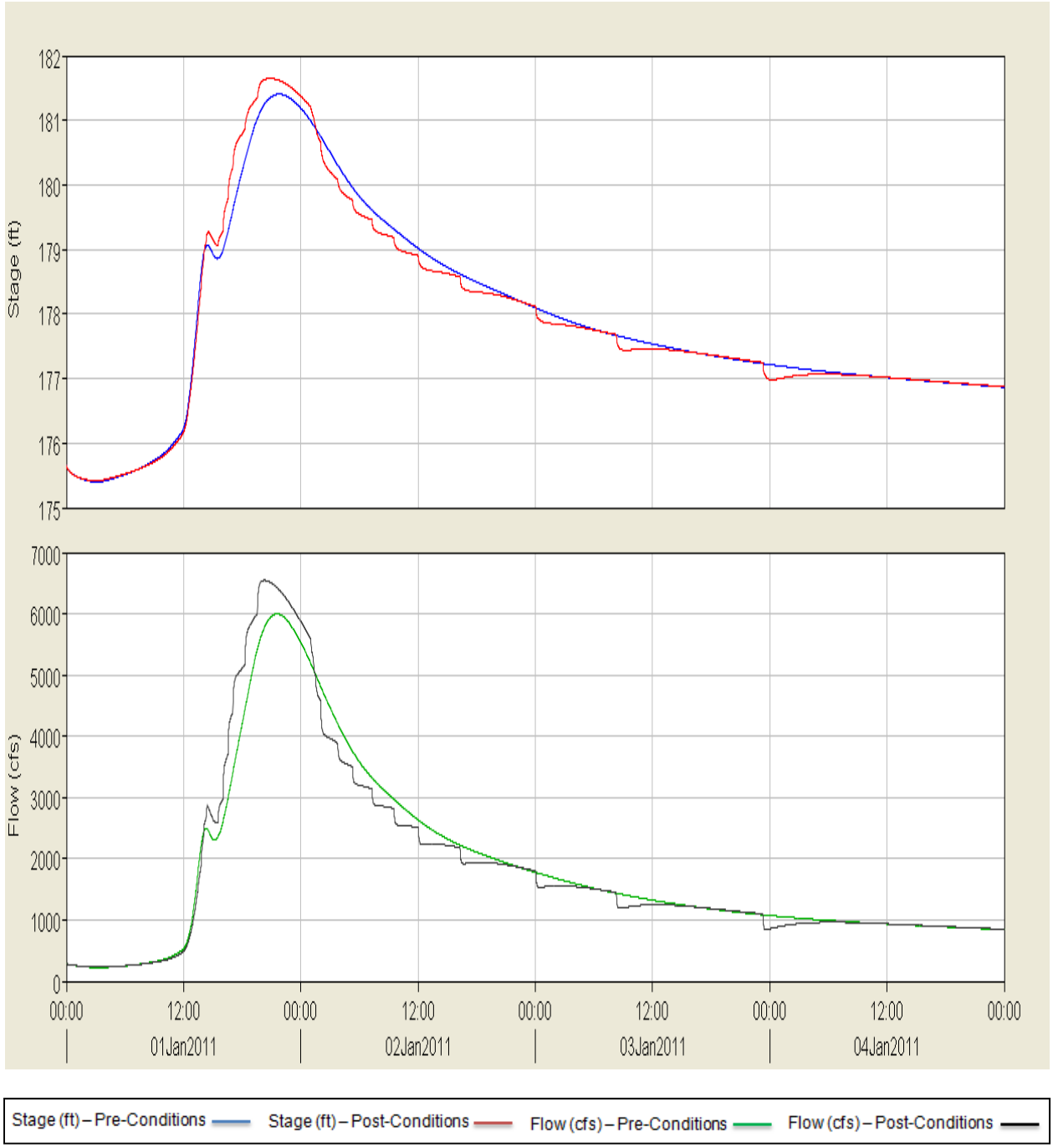


Figure 21 : 2-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge – Pre and Post Conditions

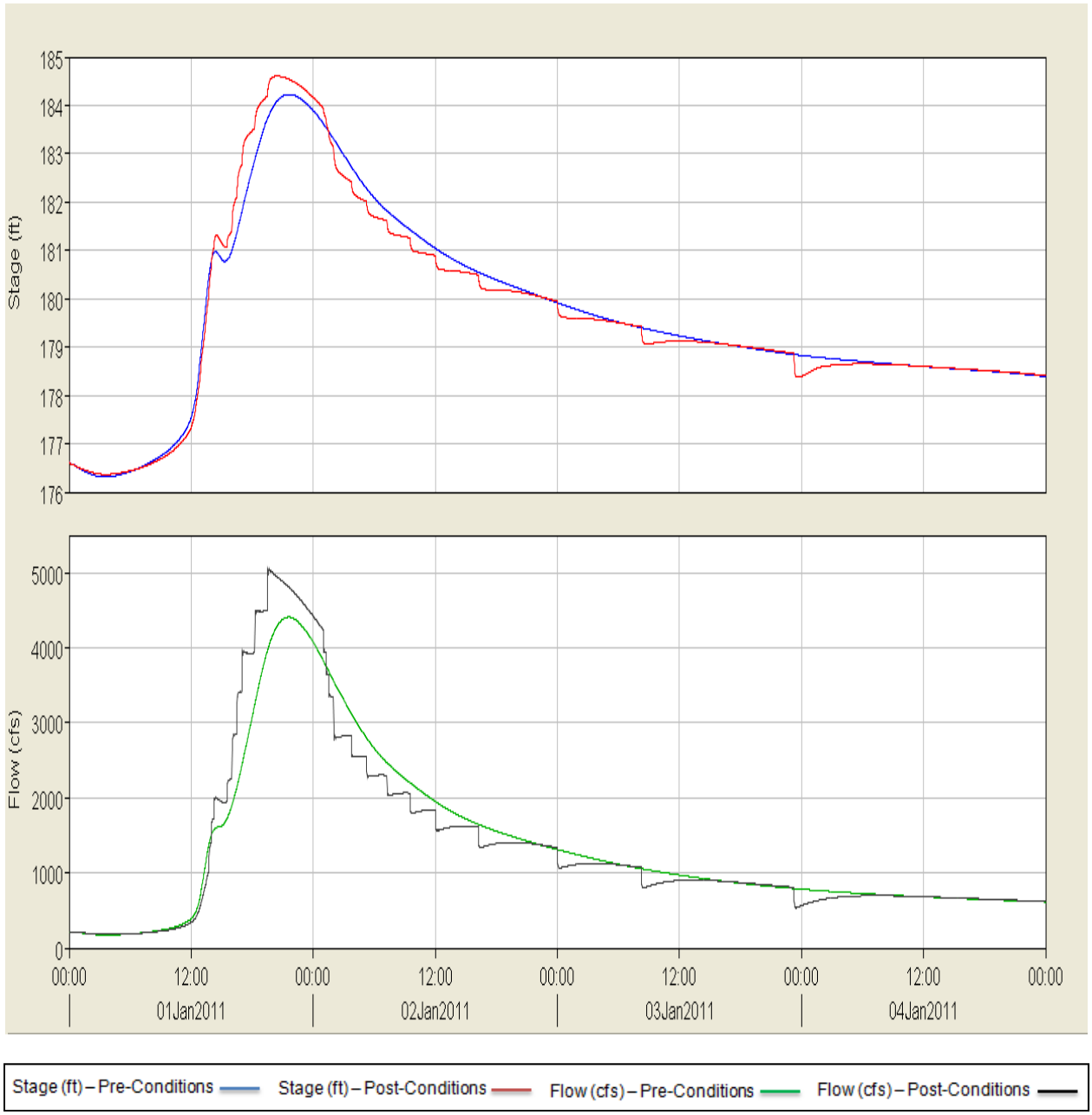


Figure 22 : 2-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre and Post Conditions

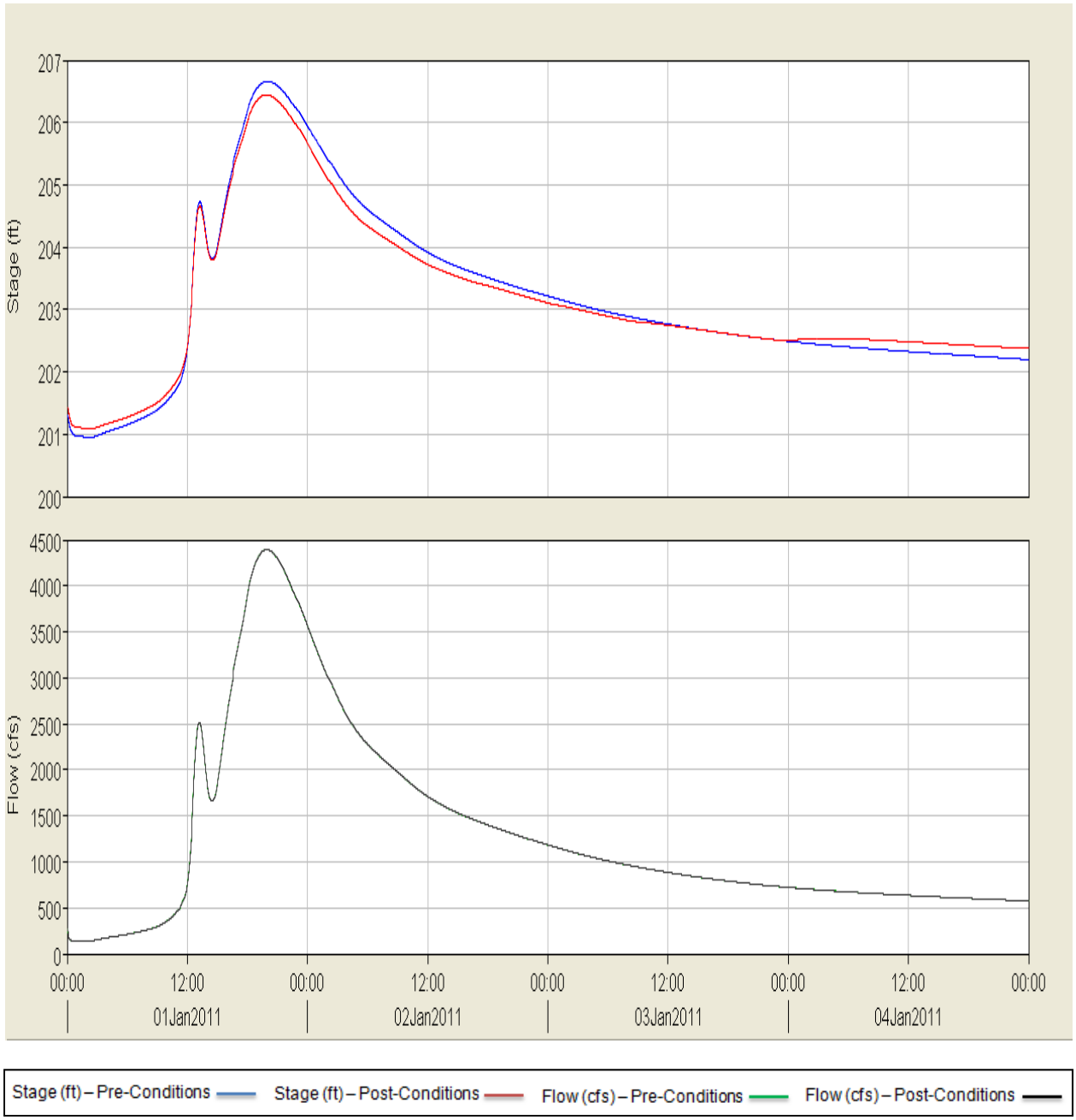


Figure 23 : 2-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre and Post Conditions

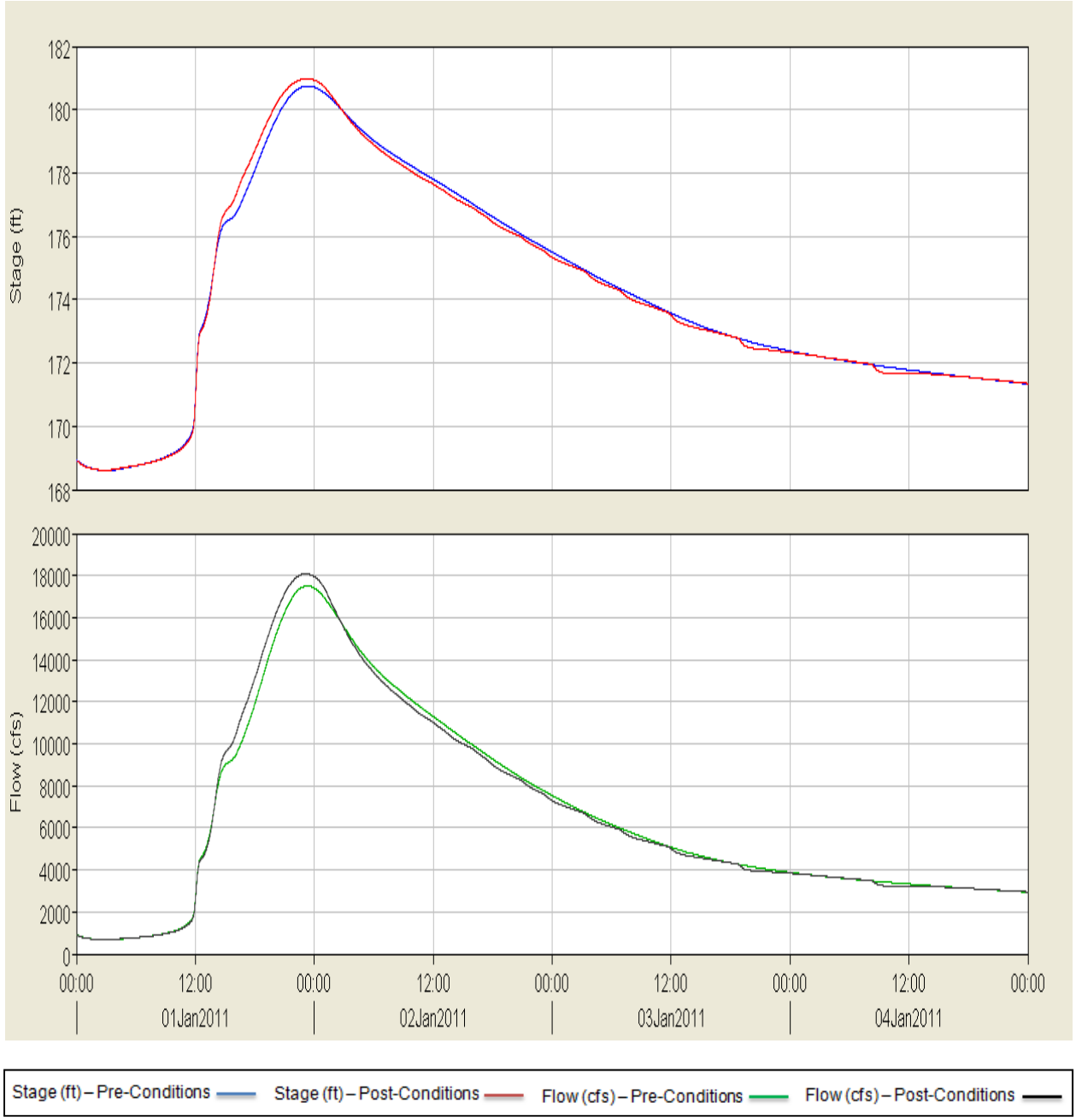


Figure 24 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre and Post Conditions

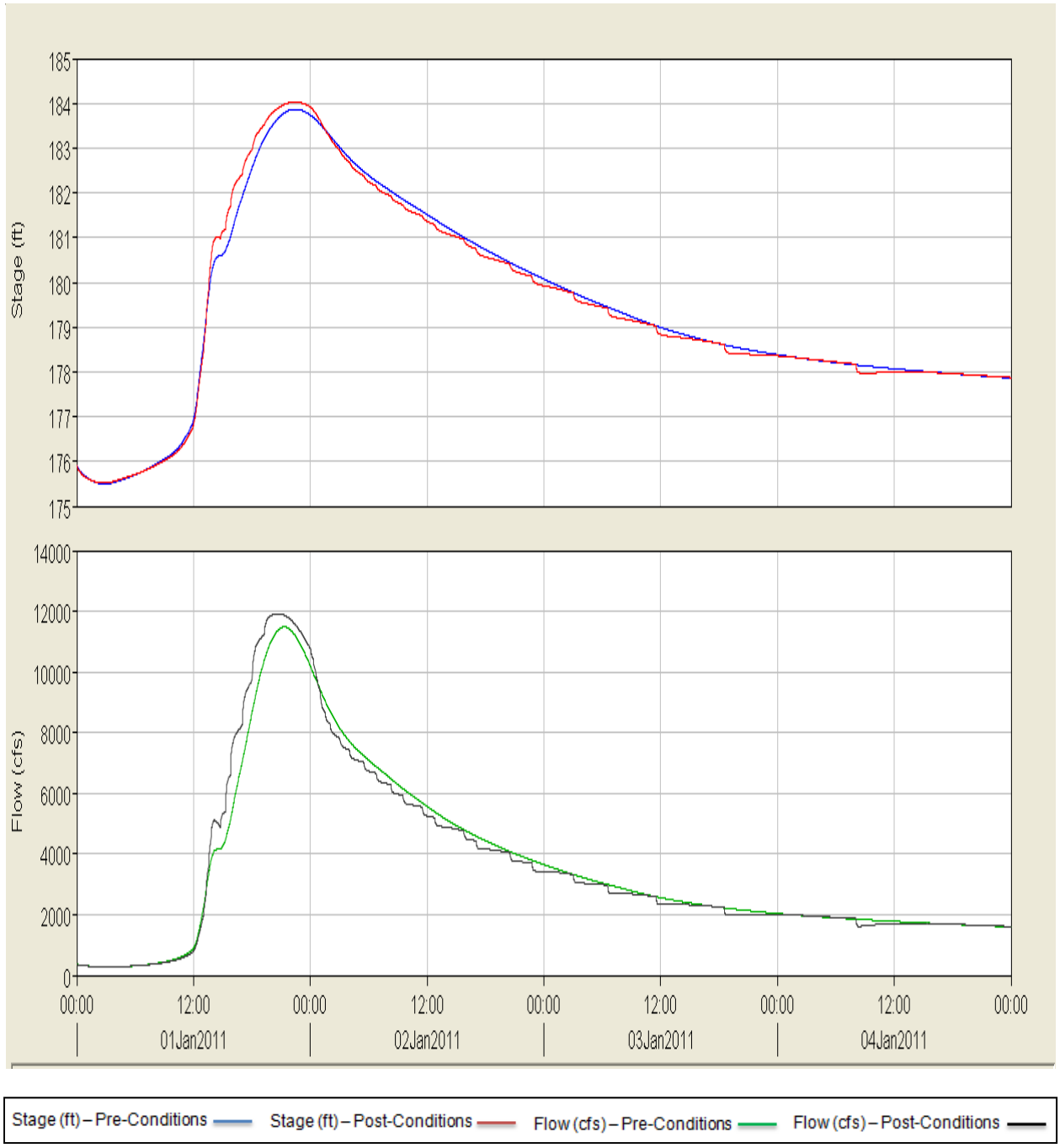


Figure 25 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream from the Dawes Highway Bridge – Pre and Post Conditions

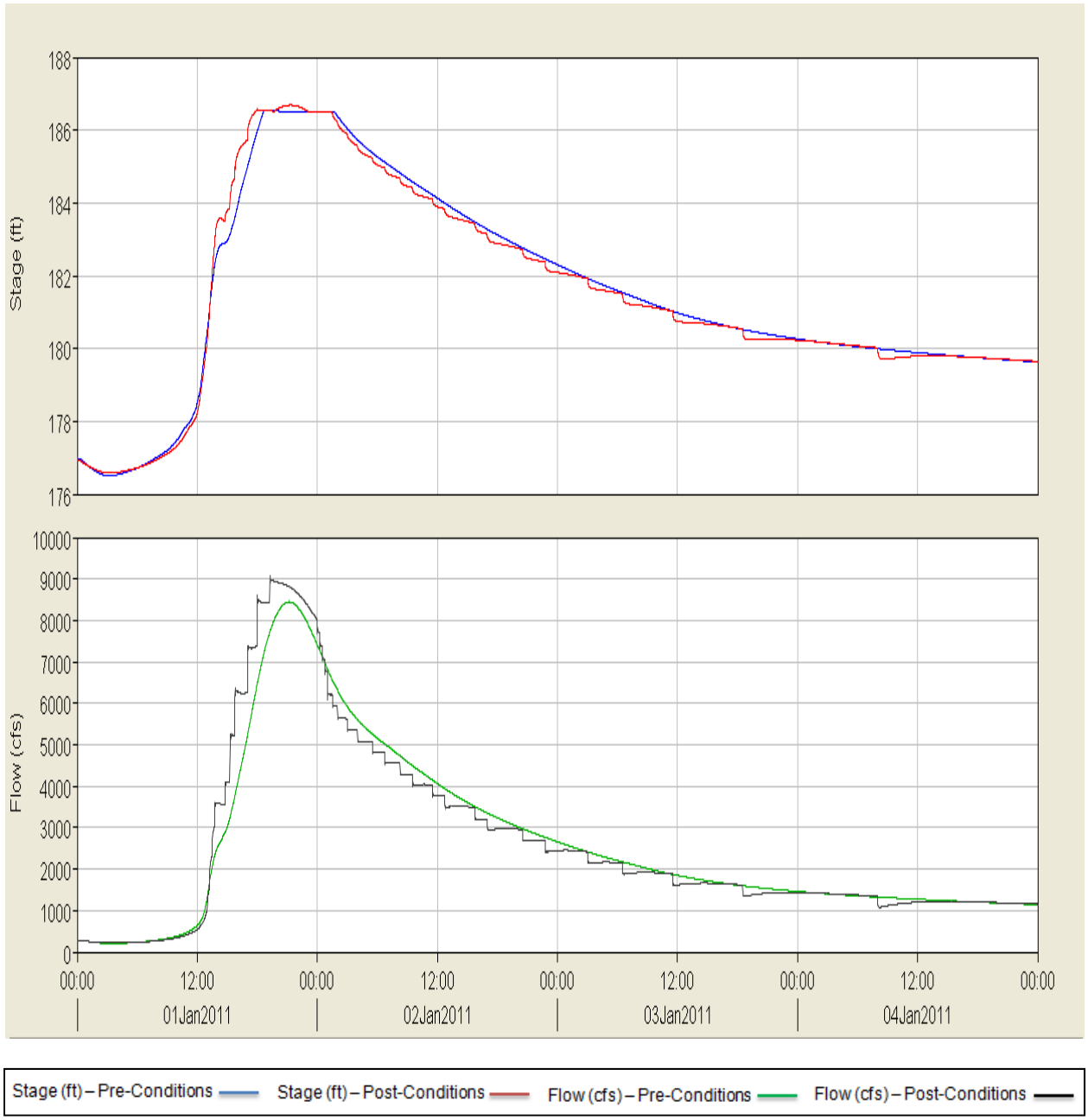


Figure 26 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre and Post Conditions

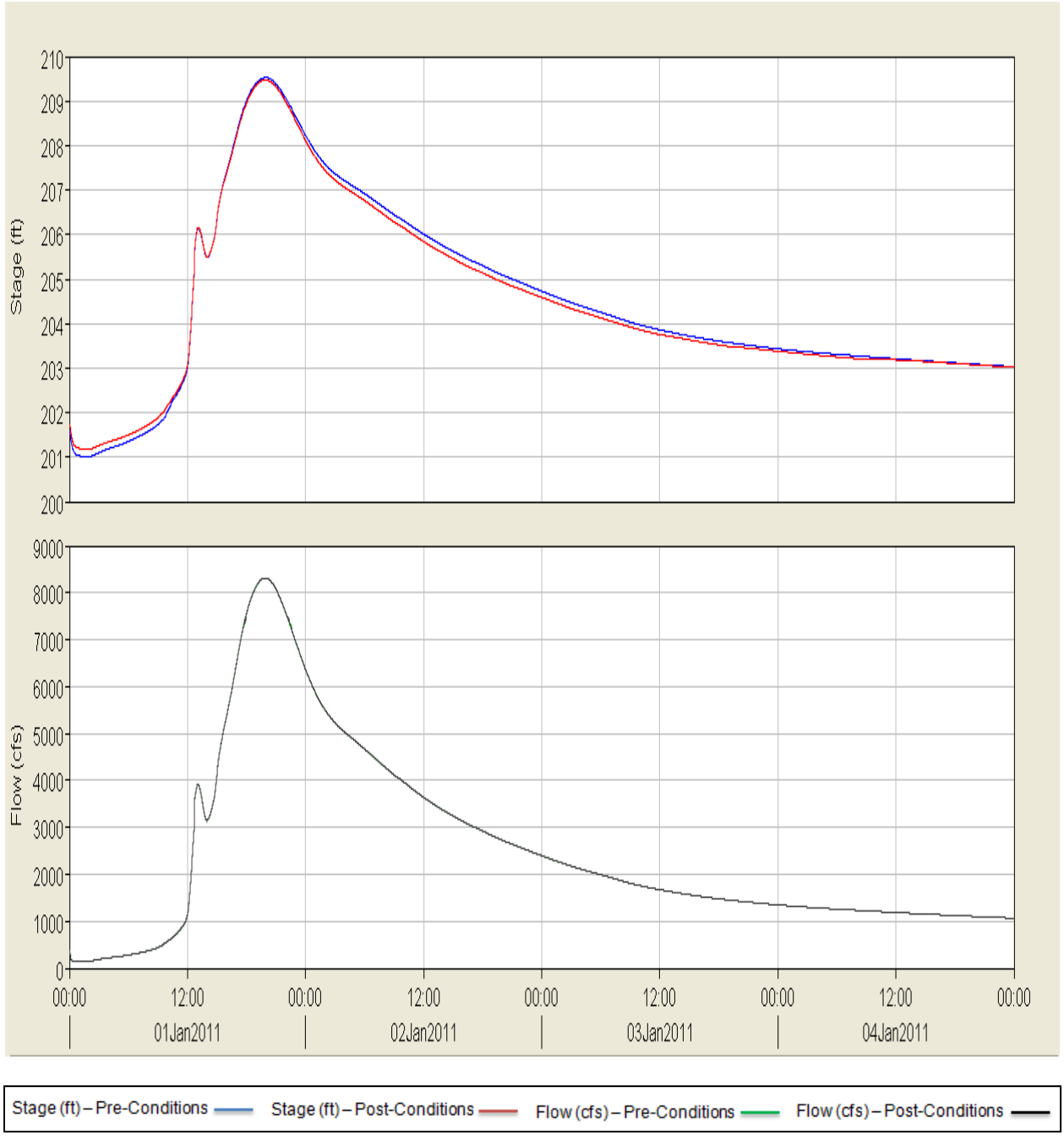


Figure 27 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre and Post Conditions

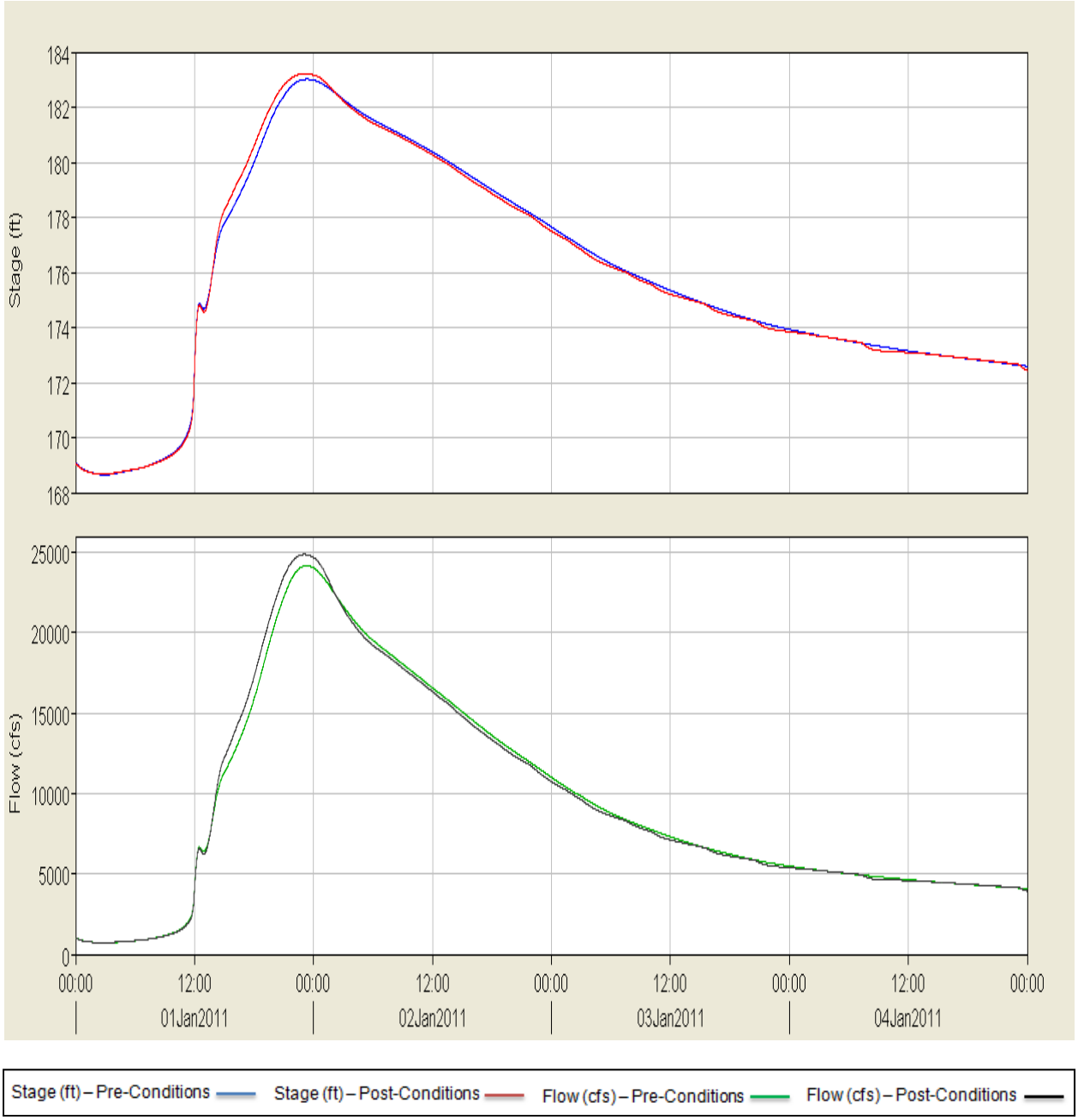


Figure 28 : 25-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre and Post Conditions

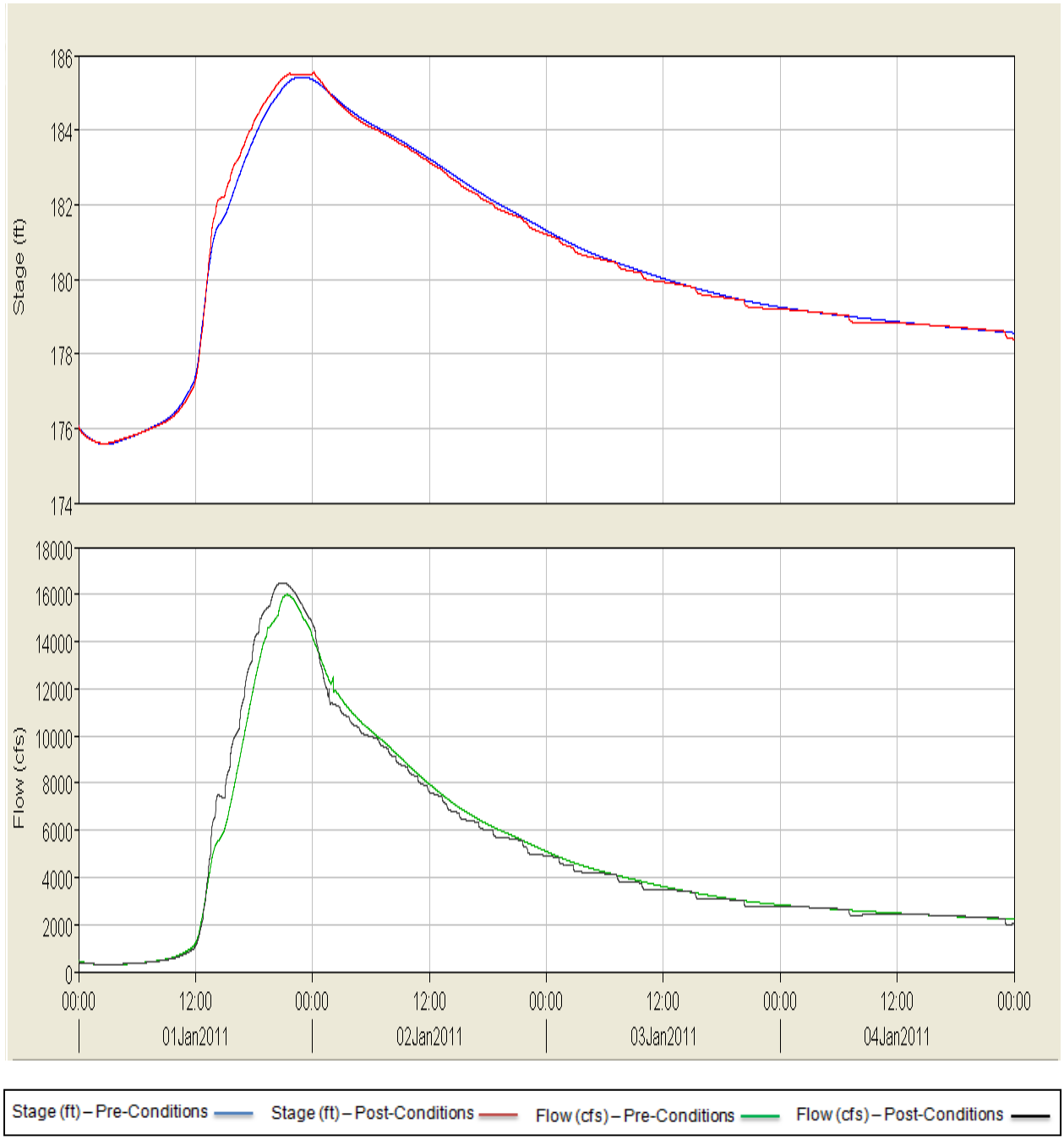


Figure 29 : 25-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream from the Dawes Highway Bridge – Pre and Post Conditions

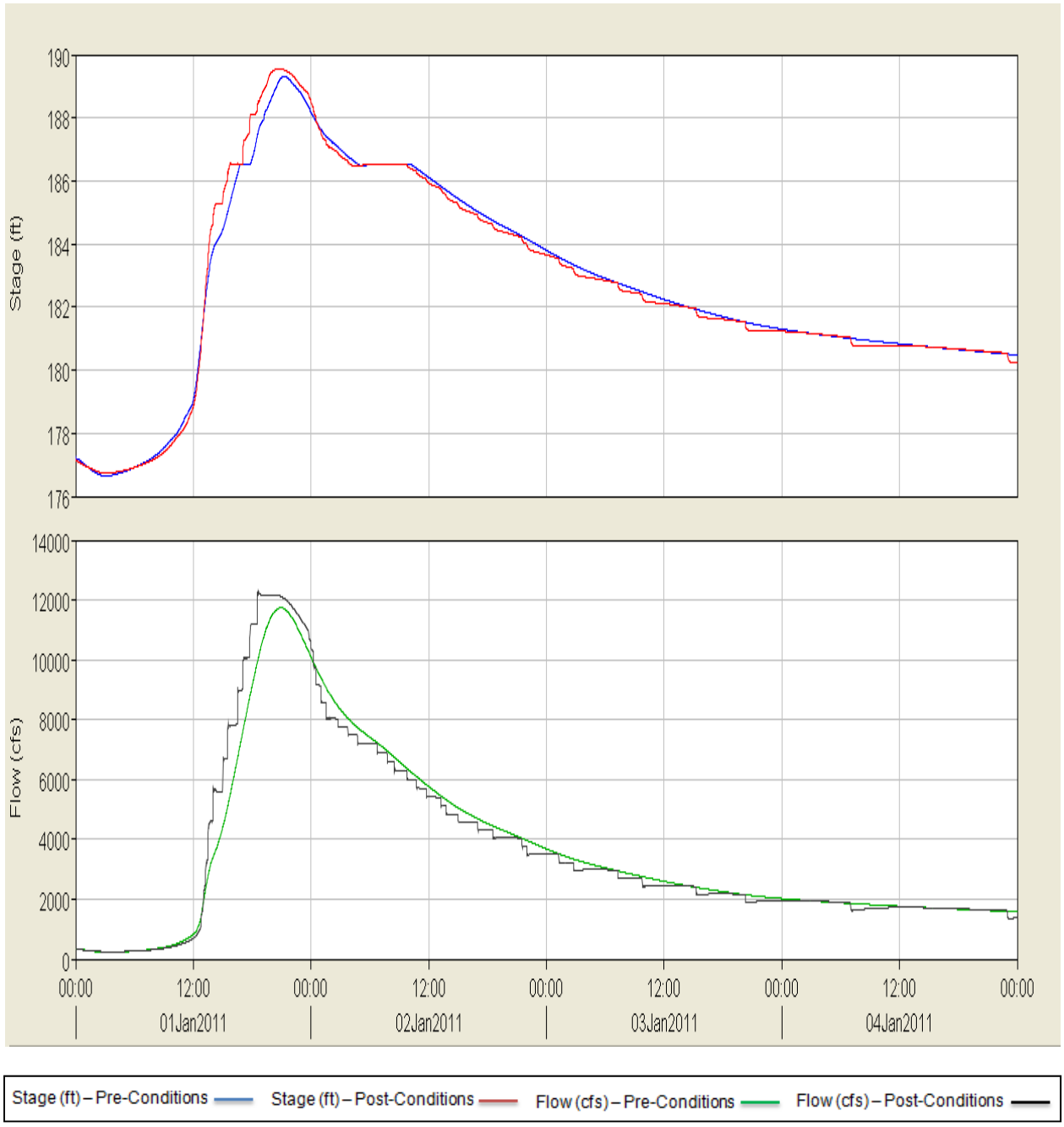


Figure 30: 25-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre and Post Conditions

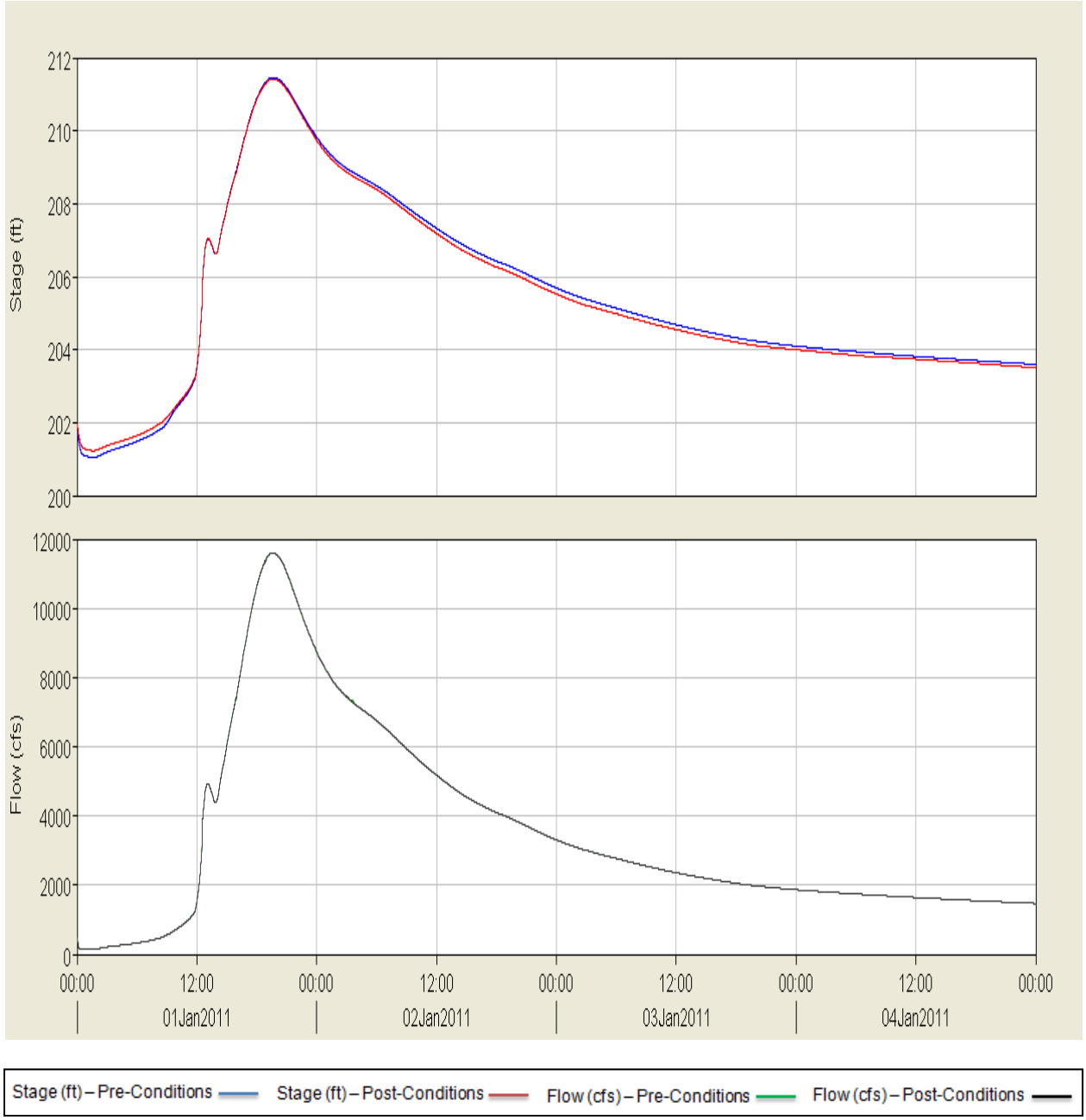


Figure 31 : 25-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre and Post Conditions

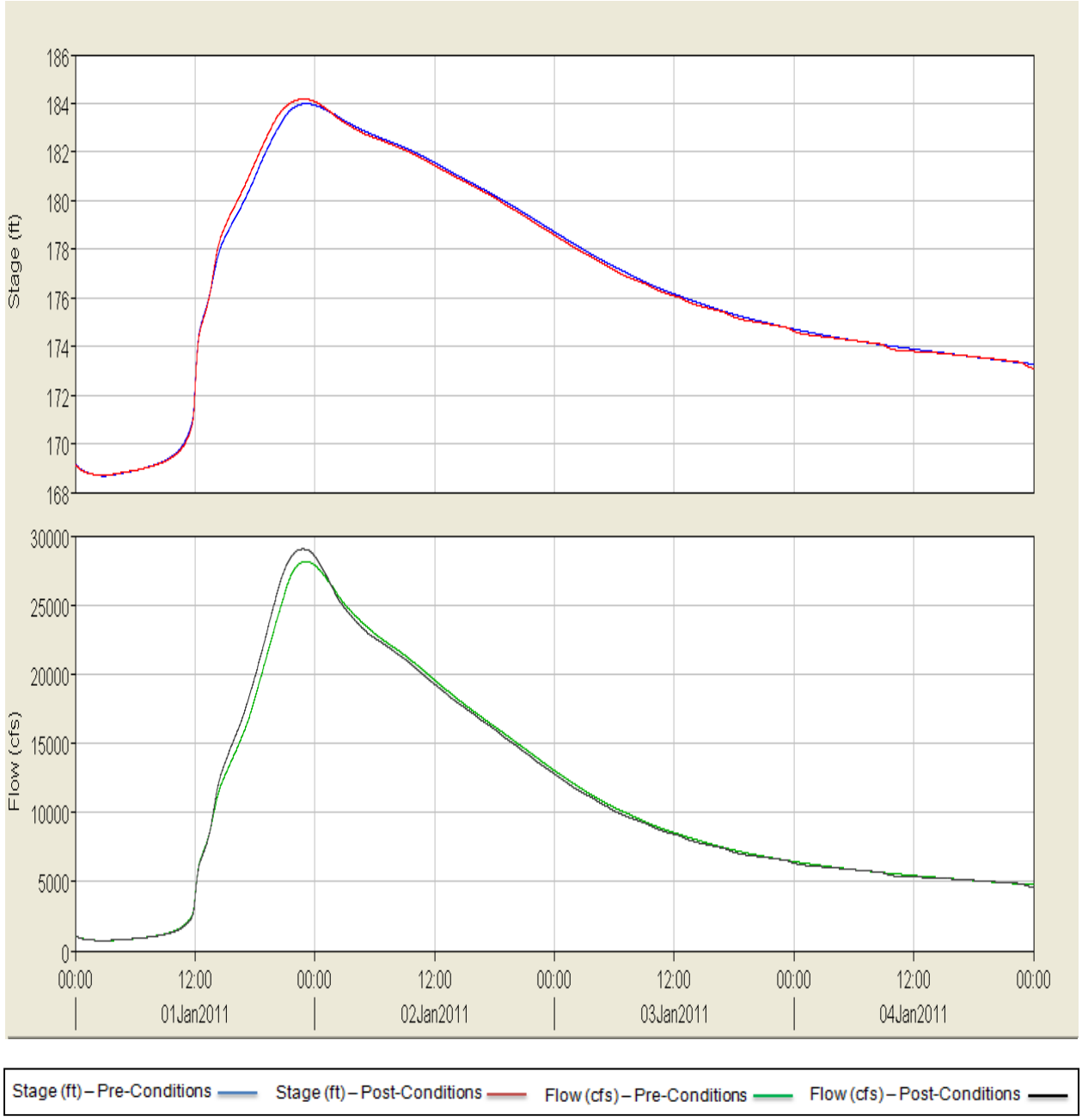


Figure 32 : 40-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre and Post Conditions

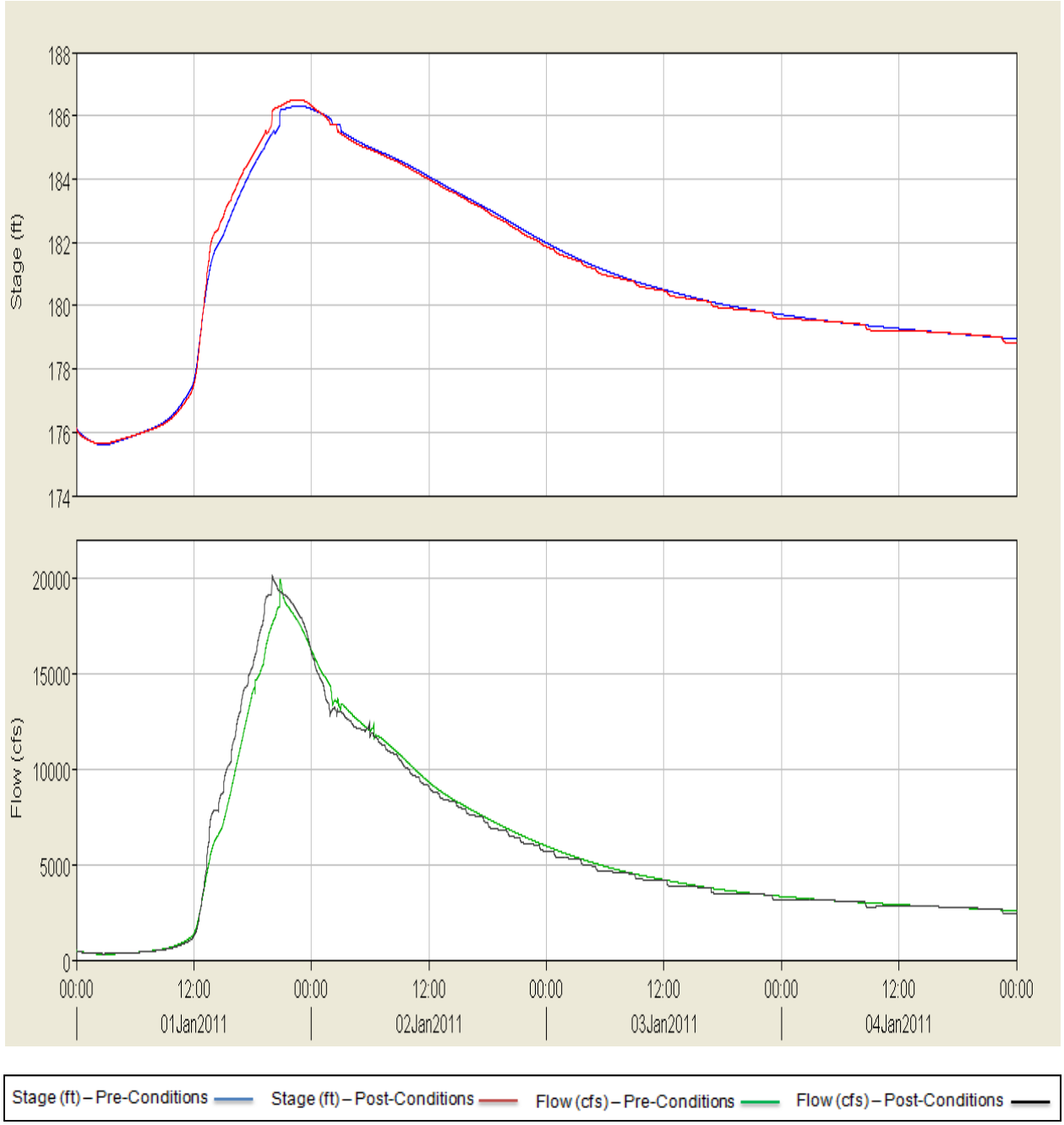


Figure 33 : 40-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream from the Dawes Highway Bridge – Pre and Post Conditions

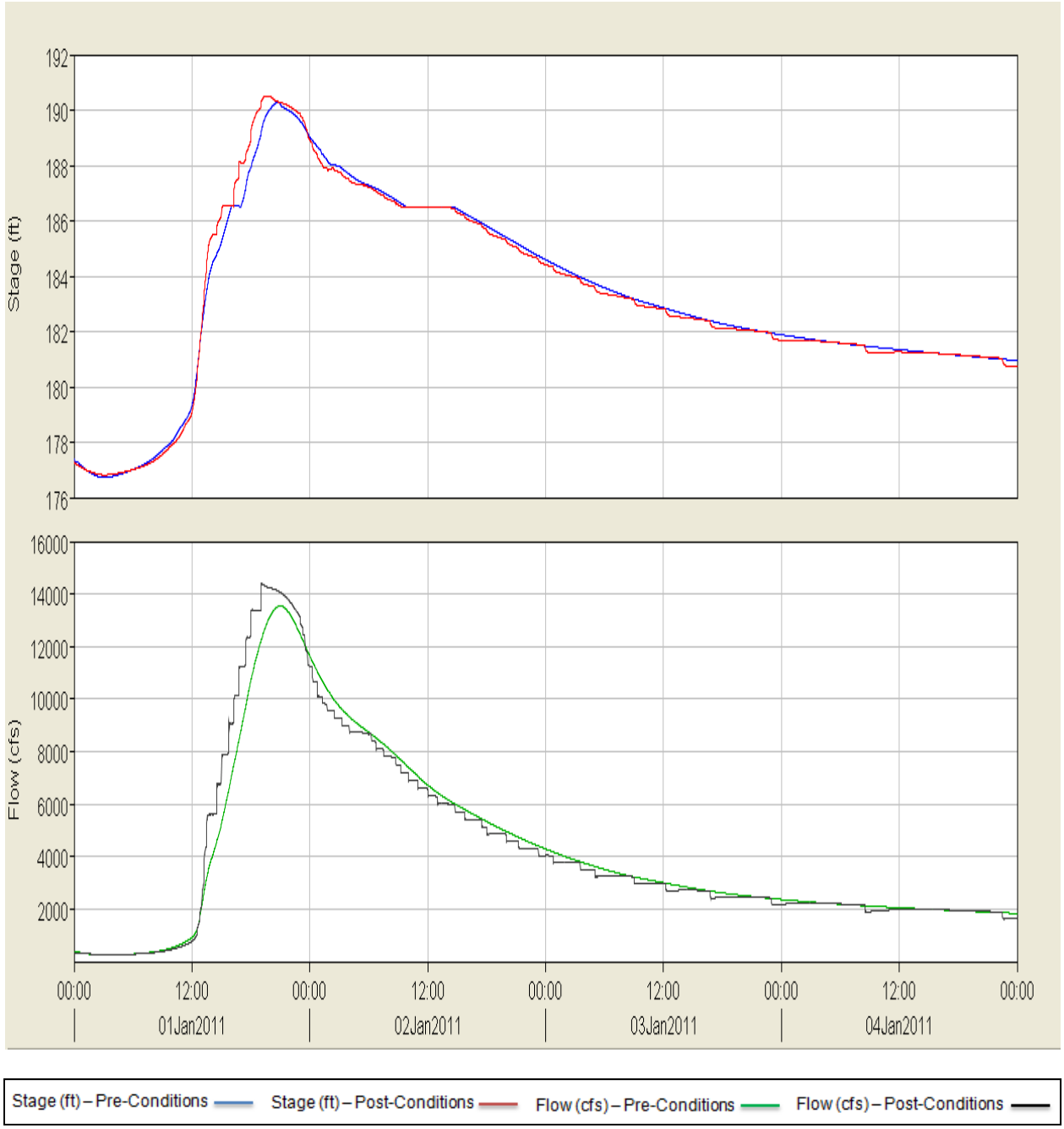


Figure 34 : 40-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre and Post Conditions

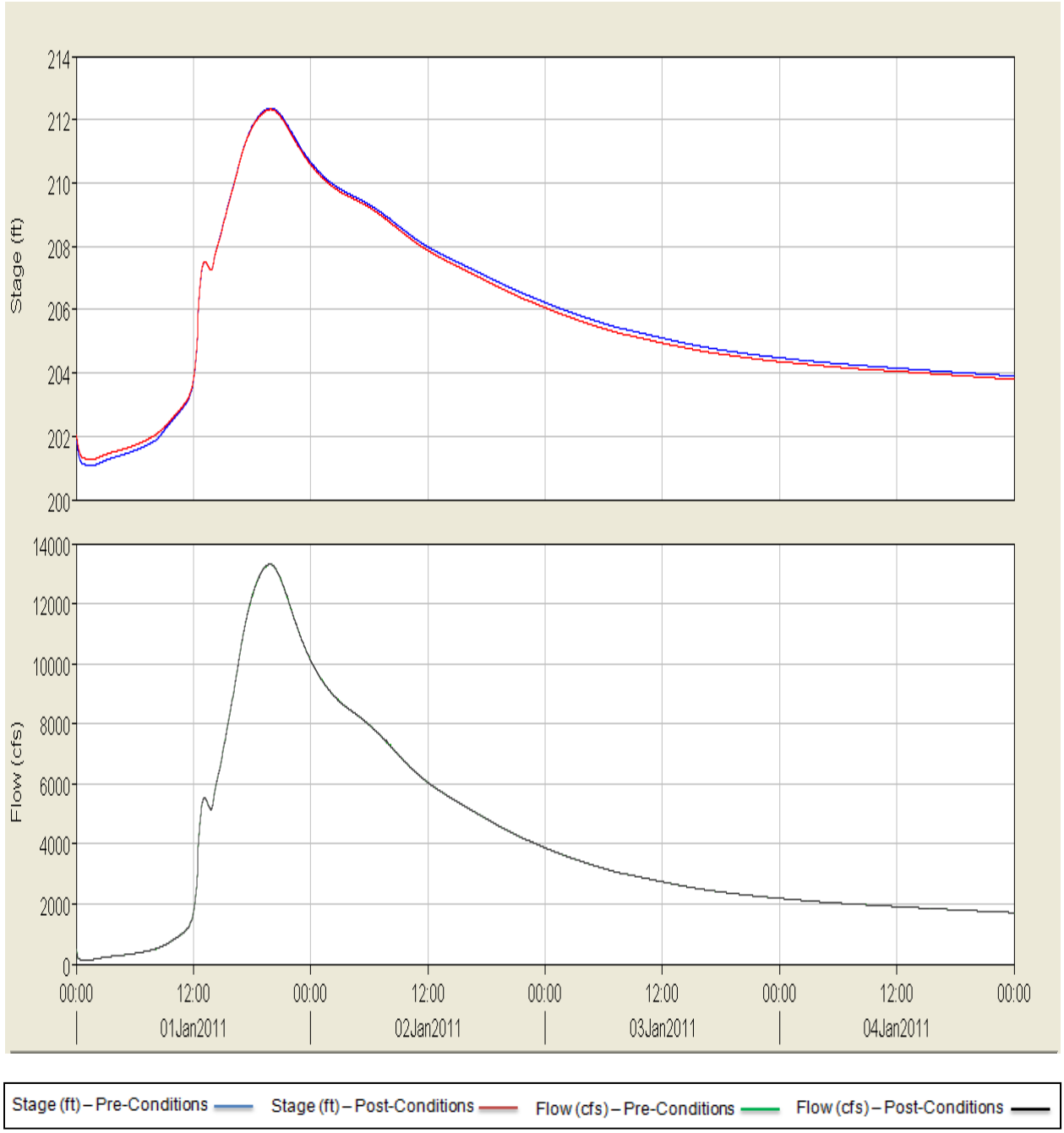


Figure 35 : 40-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre and Post Conditions

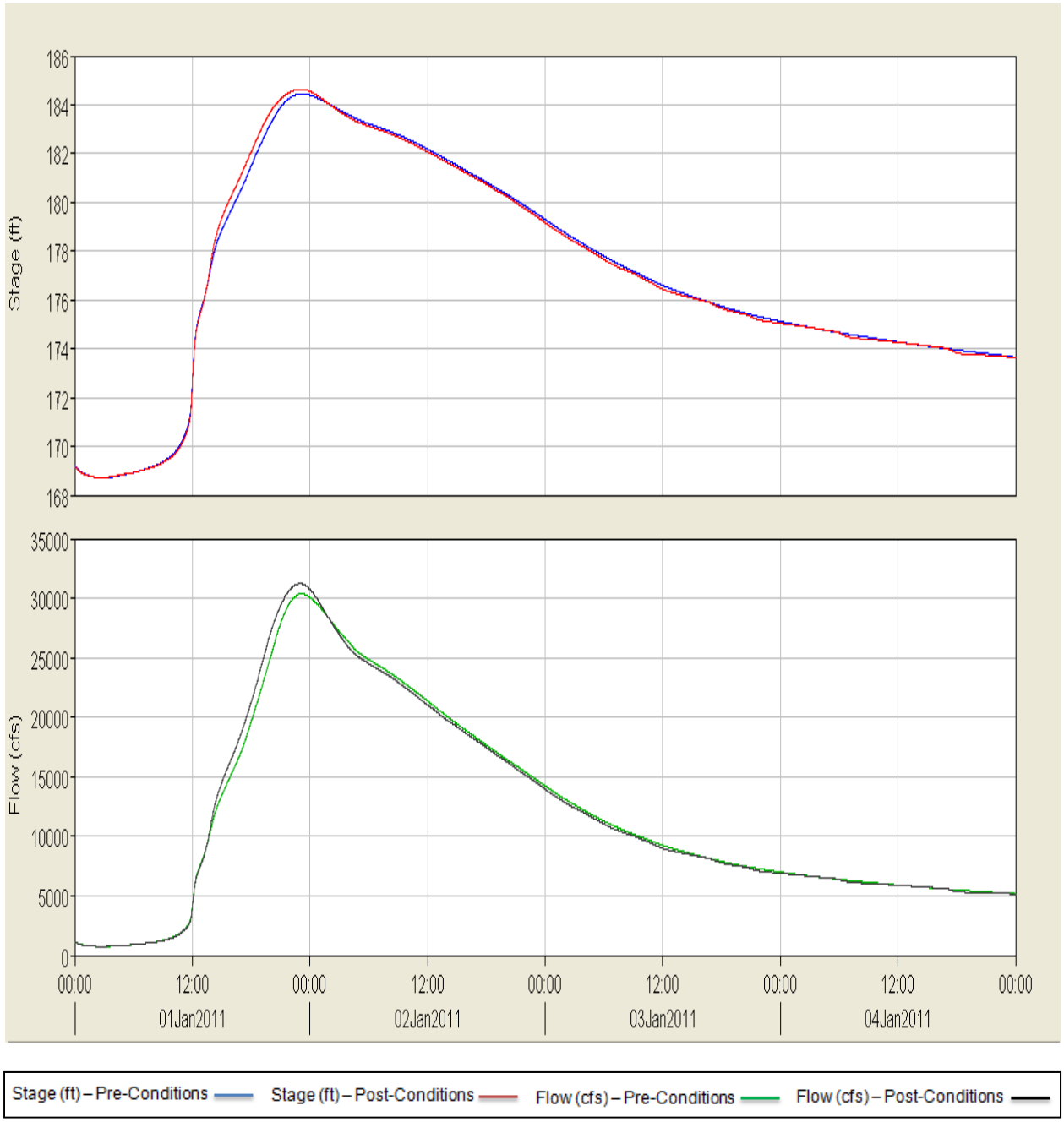


Figure 36: 50-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Pre and Post Conditions

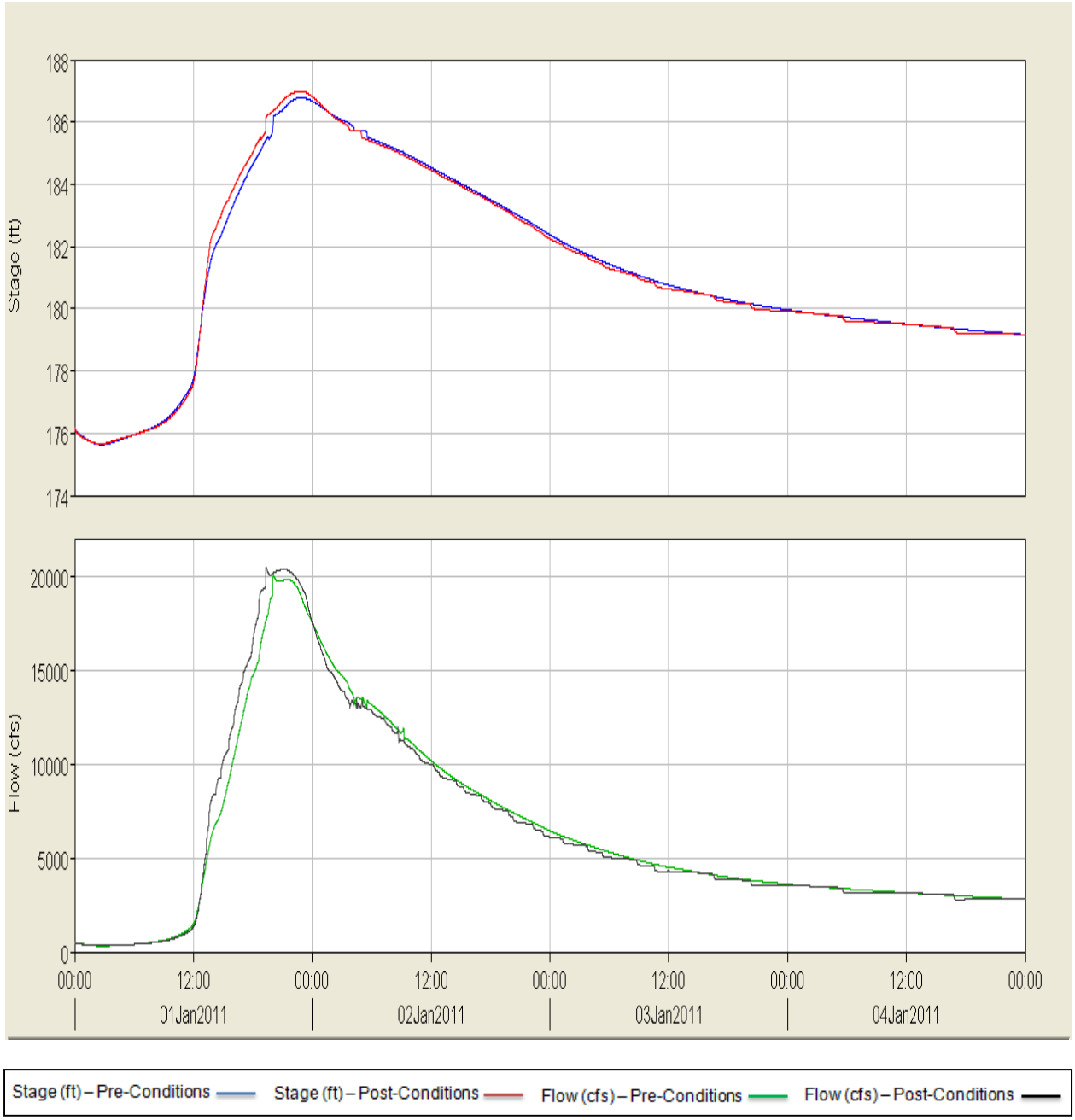


Figure 37 : 50-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream from the Dawes Highway Bridge – Pre and Post Conditions

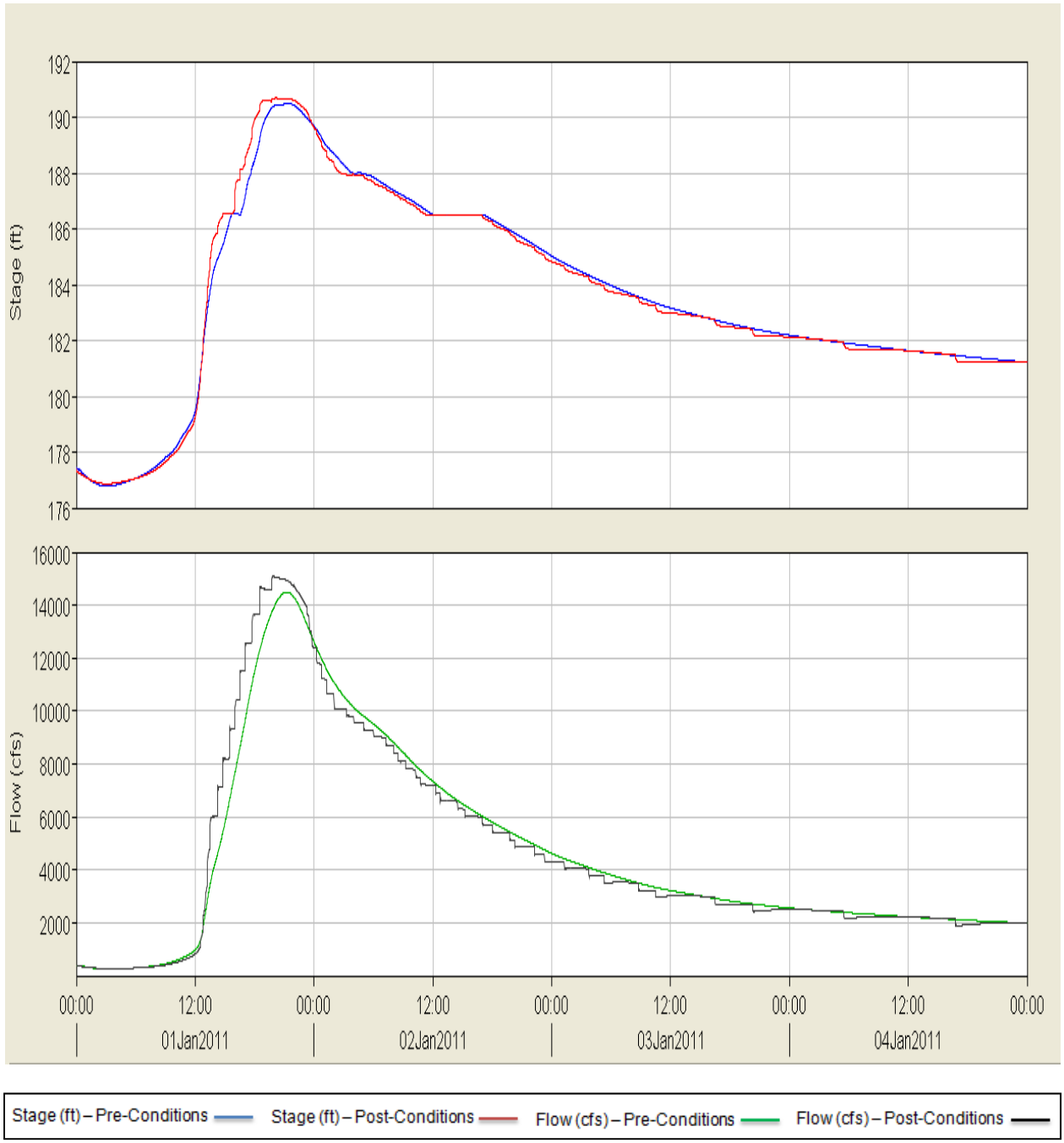


Figure 38 : 50-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Pre and Post Conditions

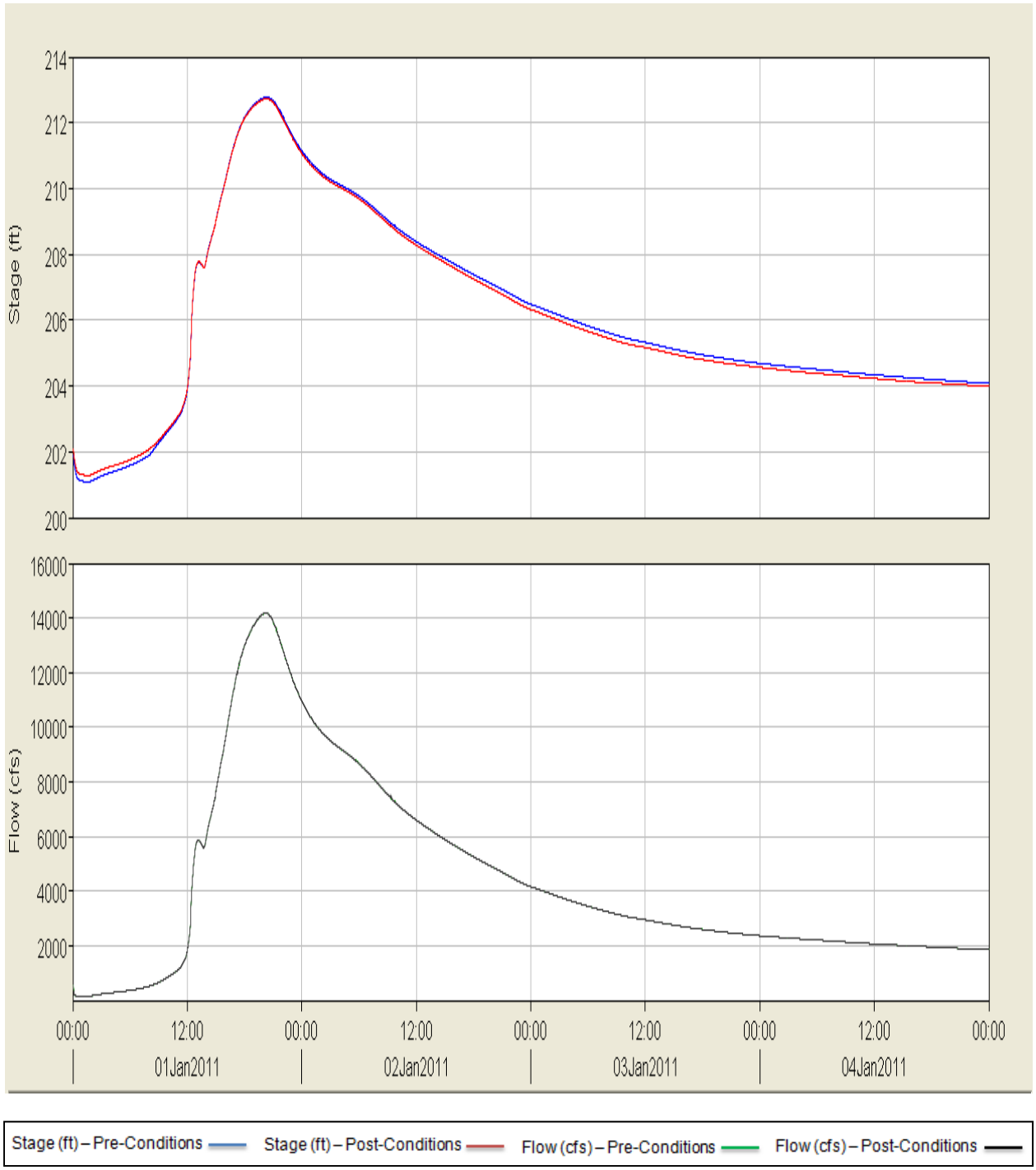


Figure 39 : 50-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ – Pre and Post Conditions

The results are similar to results presented above for the recent storms; with the flow hydrographs showing more variation than the stage hydrographs. However, the operation of the Floodgate Facility has more impact on the smaller storms (i.e. the 2-year and 10-year) simulated rainfall events than the larger storms. The stage hydrograph shows less difference, with the 2-year rainfall event about 0.5 ft higher at the Hamburg Turnpike Bridge and less than 0.25 ft higher at the Dawes Highway Bridge. The 10-year rainfall storm event and the other larger flow events all indicate less of an impact.

There is little to no negative impact when comparing the stage and flow hydrographs in Oakland NJ, just downstream of the railroad bridge.

5.2 Alternative Analysis

For the post condition only, the downstream impacts of lowering the Pompton Lakes Reservoir by 3.0 feet in advance of the impending flood were analyzed for three storm events. The three events analyzed were: (1) Hurricane Irene, (2) March 12-14, 2010 flood event, and (3) a simulated event of smaller magnitude (lower peak flow and less volume of runoff). The model was run assuming that the floodgates were in automatic operation and were operated in accordance with the existing operating rule curve. The results of those runs are shown in Figures 39 through 50.

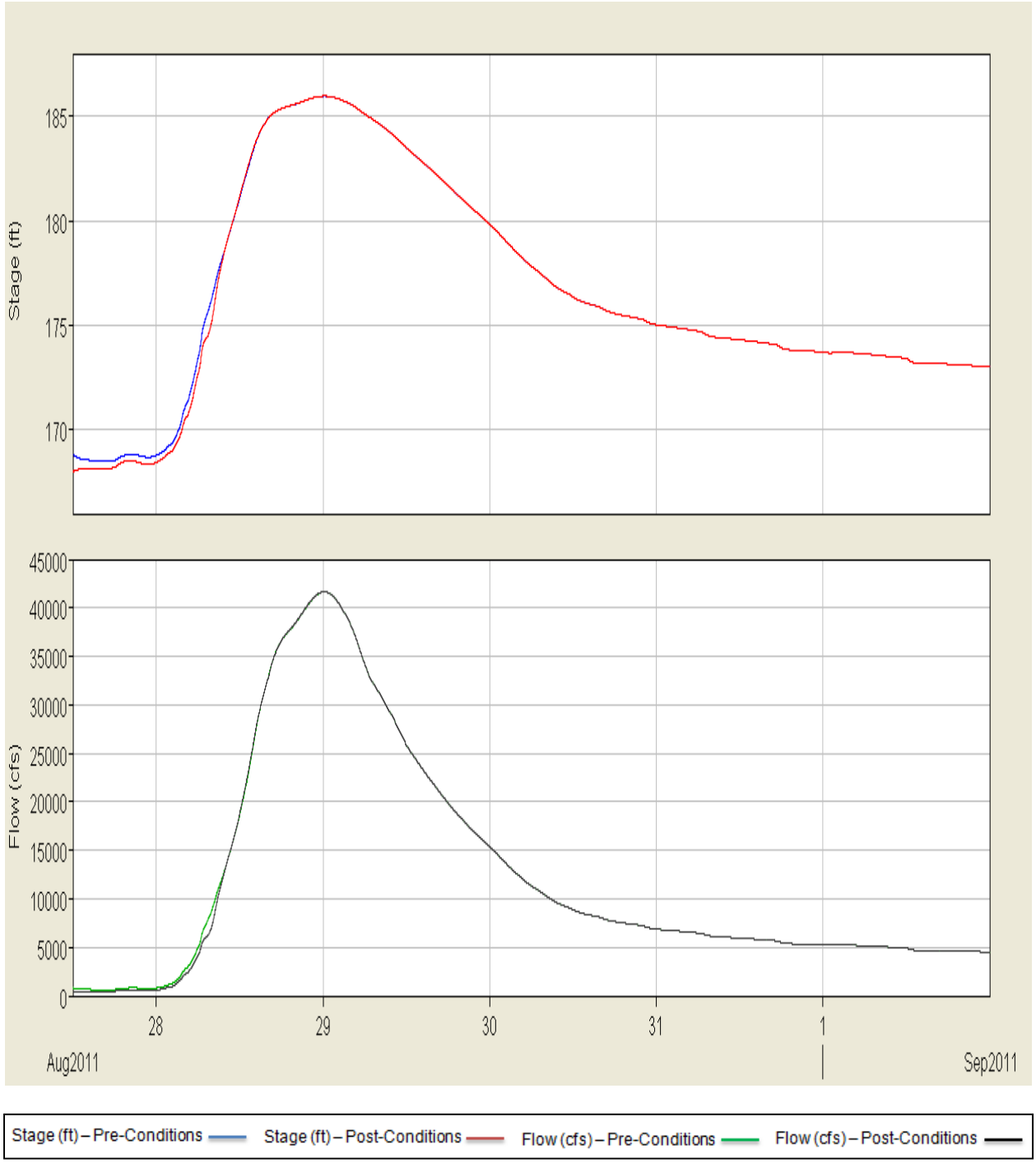


Figure 40 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge – Lowering Reservoir 3.0 feet Compared to Post Conditions

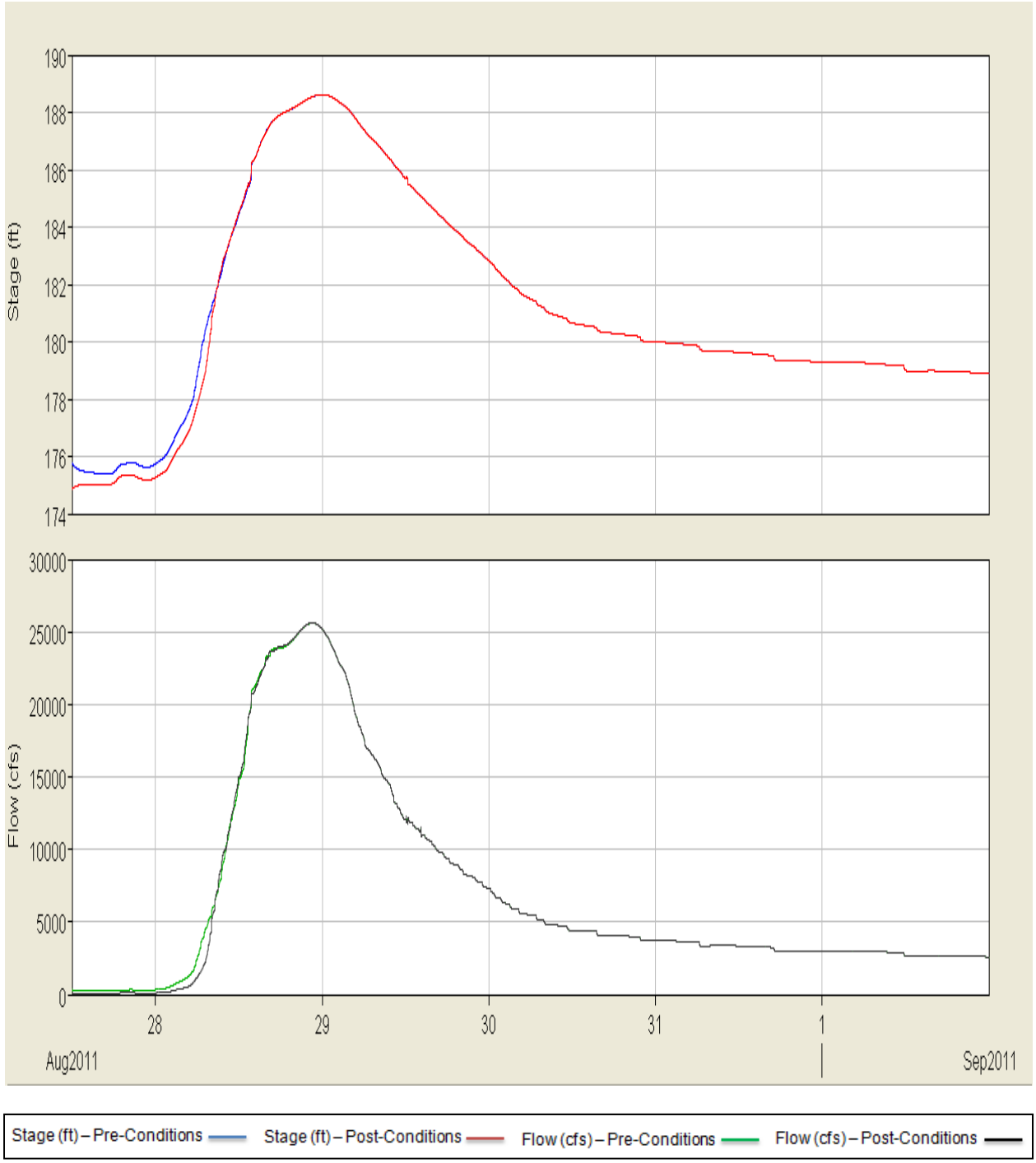


Figure 41 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge – Lowering Reservoir 3.0 feet Compared to Post Conditions

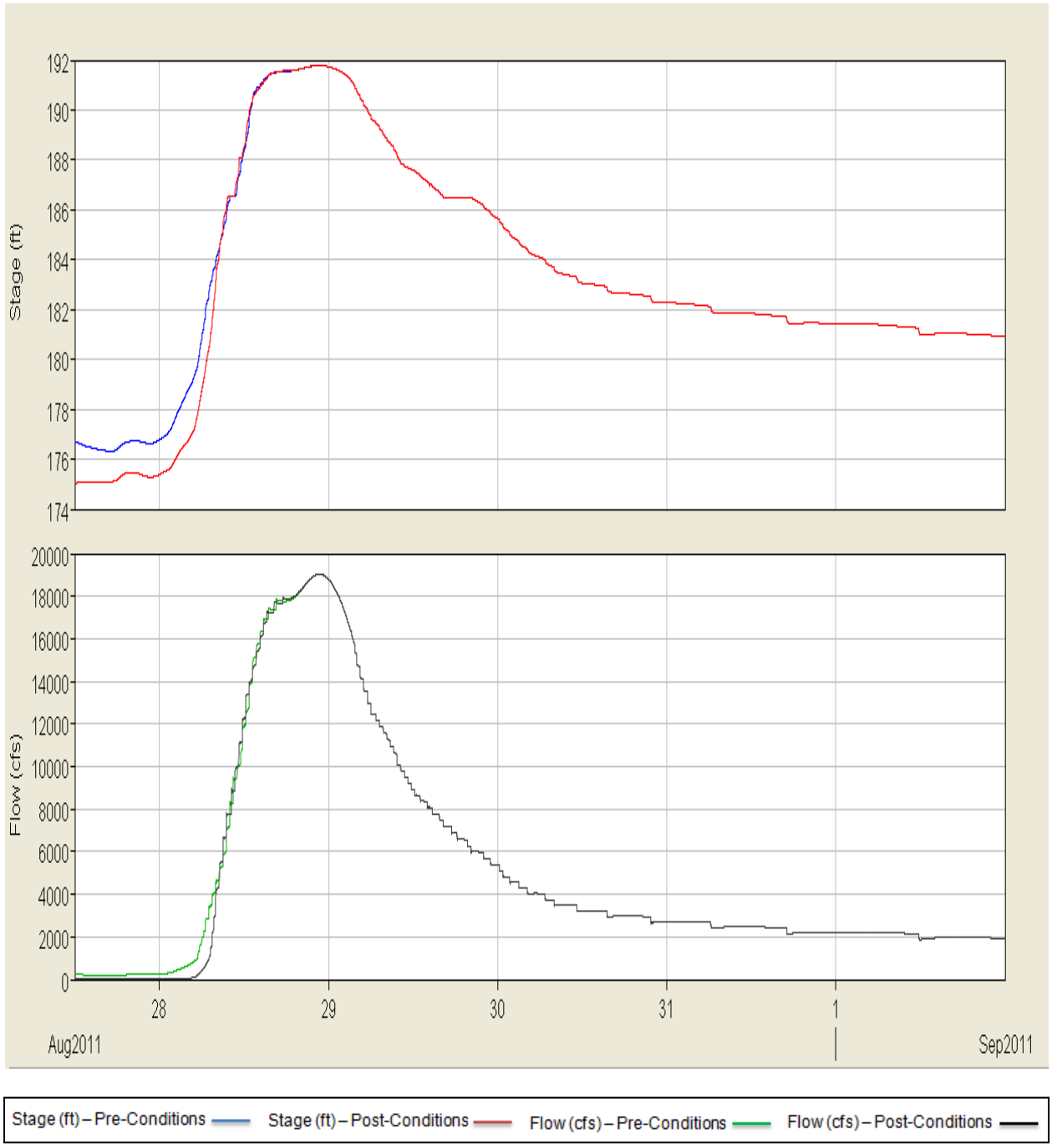


Figure 42: Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Lowering Reservoir 3.0 feet Compared to Post Conditions

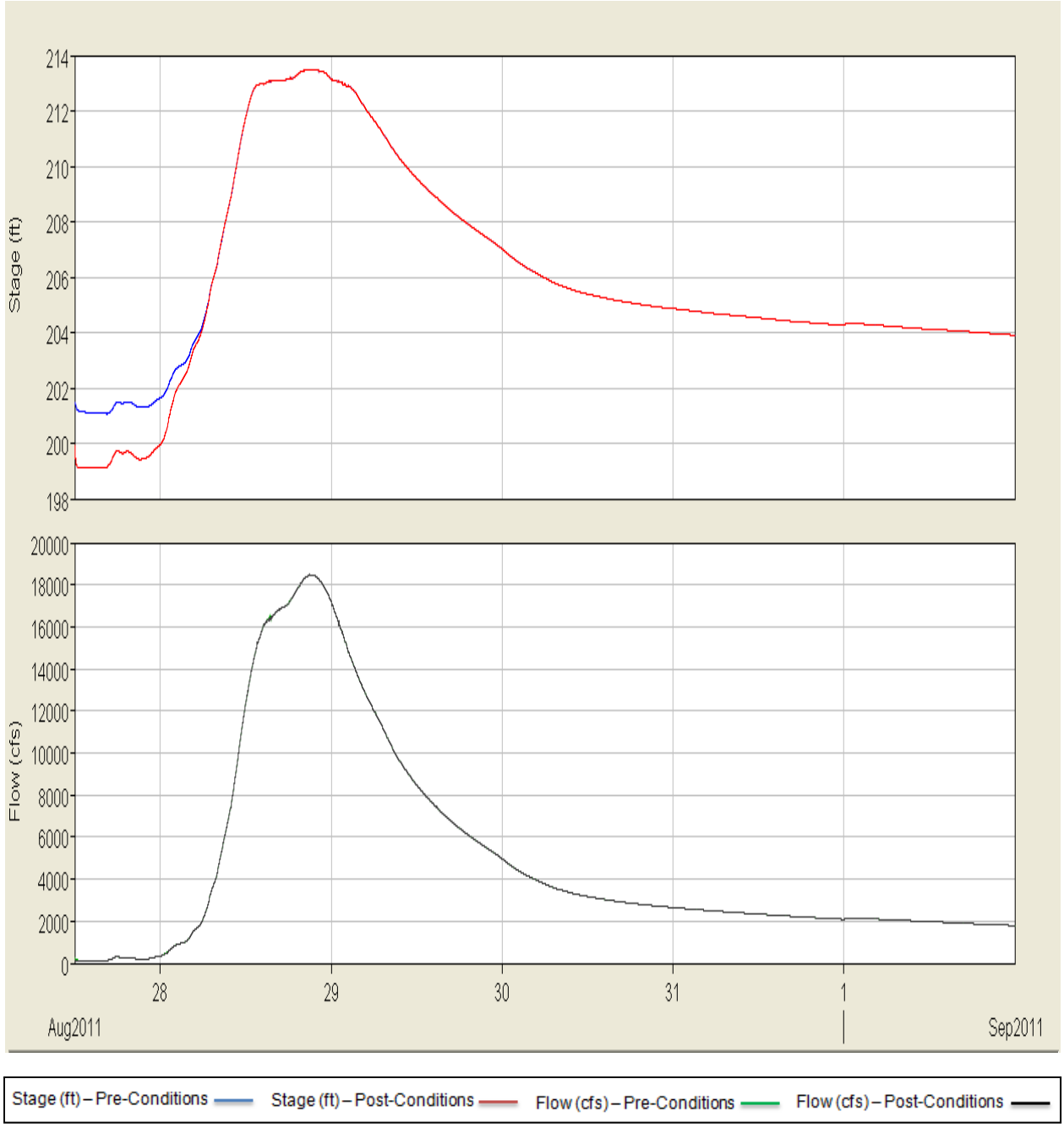


Figure 43 : Hurricane Irene, August 29, 2011 Storm Event – Stage and Flow Hydrographs at Station 26058 Just Downstream of the Railroad Bridge in Oakland NJ – Lowering Reservoir 3.0 feet Compared to Post Conditions

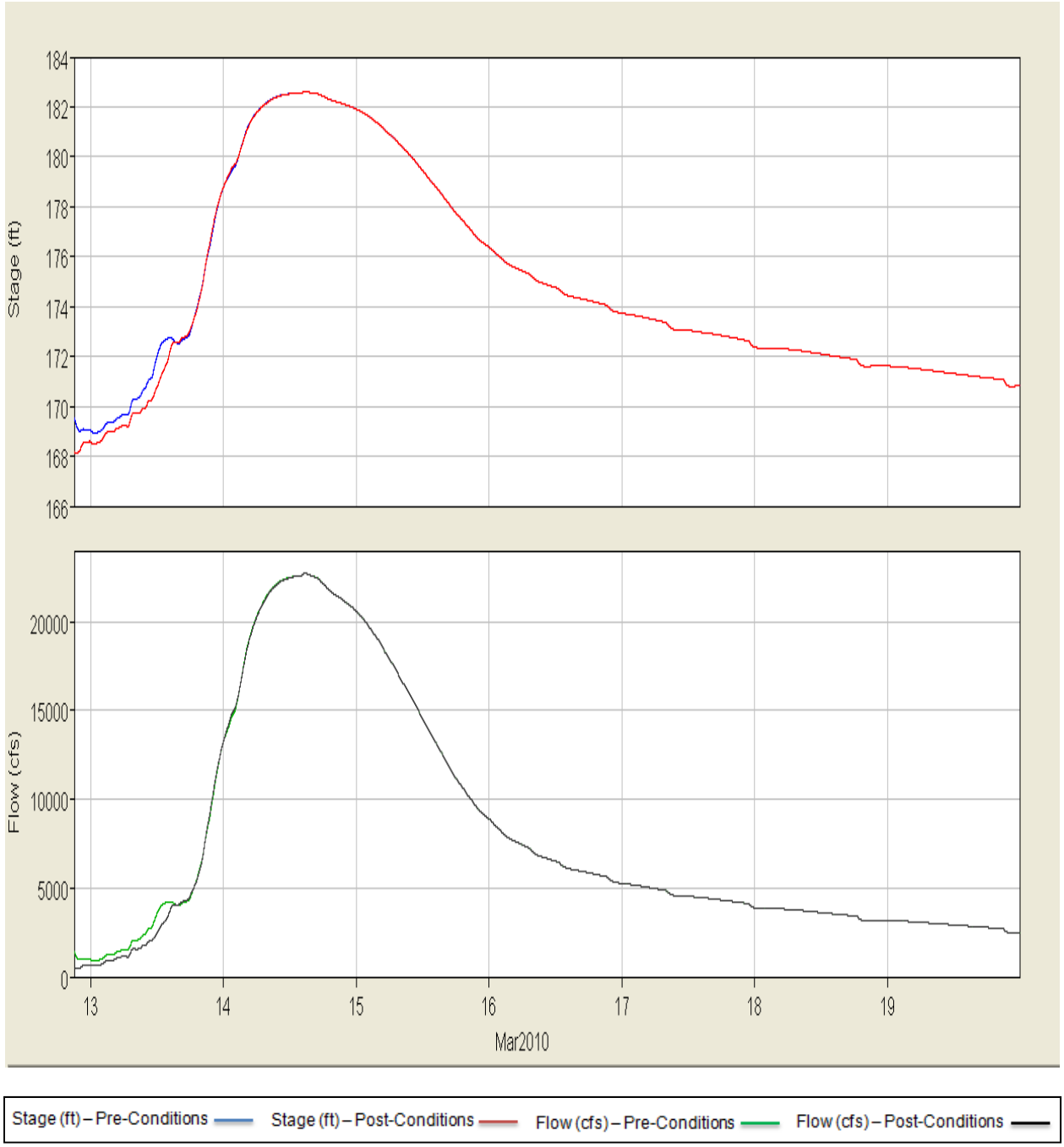


Figure 44 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 34810 Pompton River Just Upstream of the Hamburg Turnpike - Lowering Reservoir 3.0 feet Compared to Post Conditions

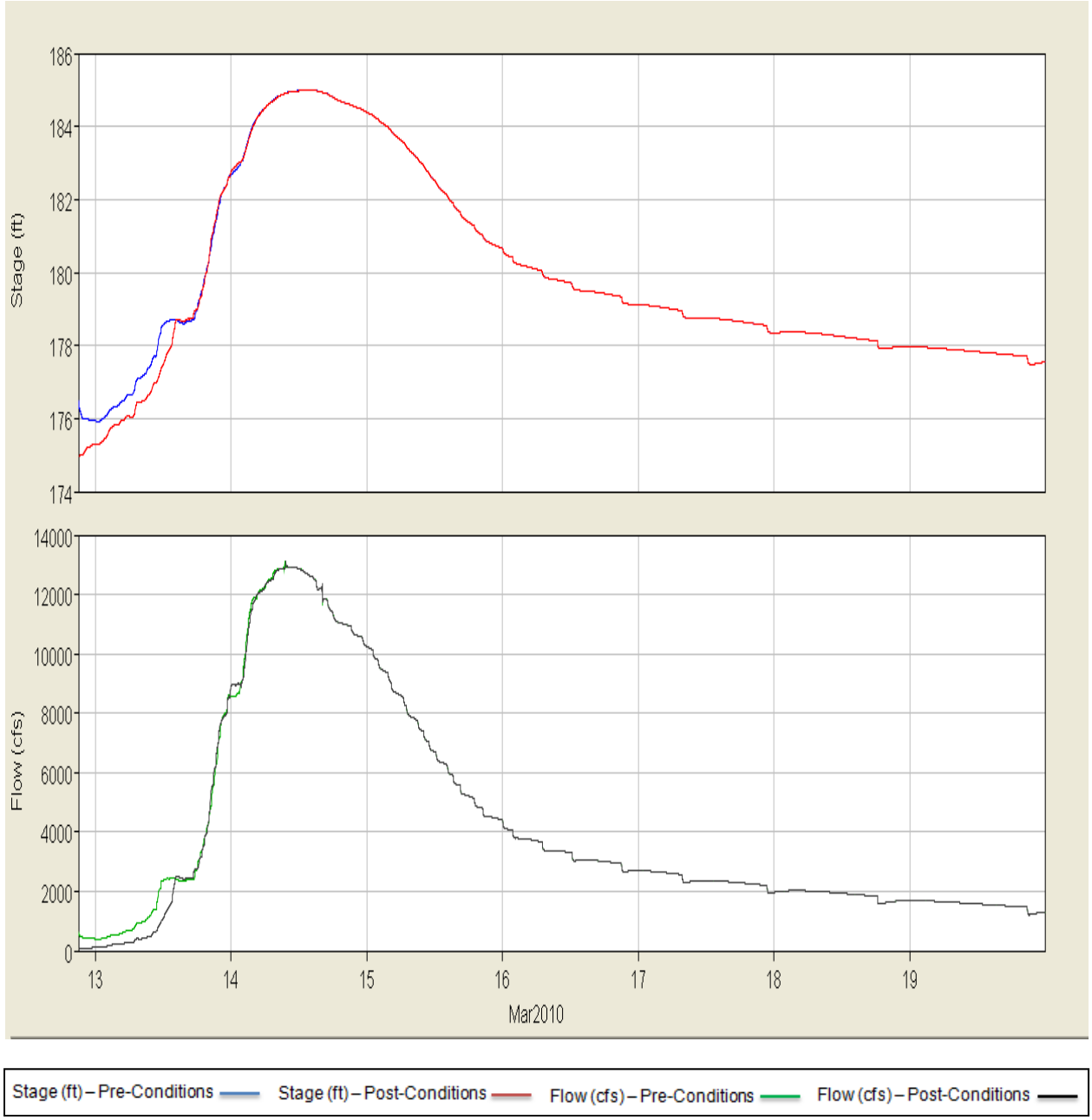


Figure 45 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge - Lowering Reservoir 3.0 feet Compared to Post Conditions

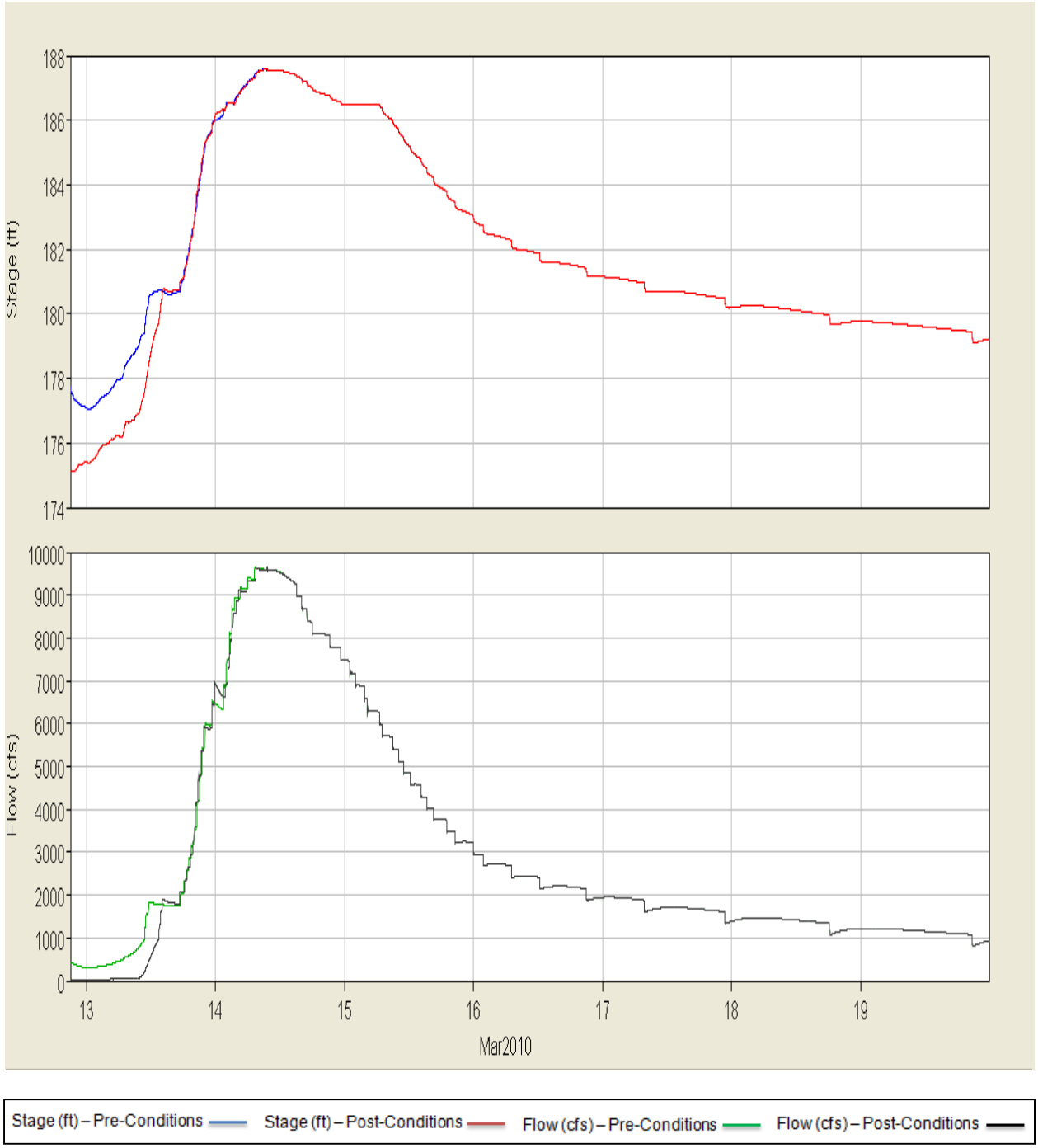


Figure 46 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge - Lowering Reservoir 3.0 feet Compared to Post Conditions

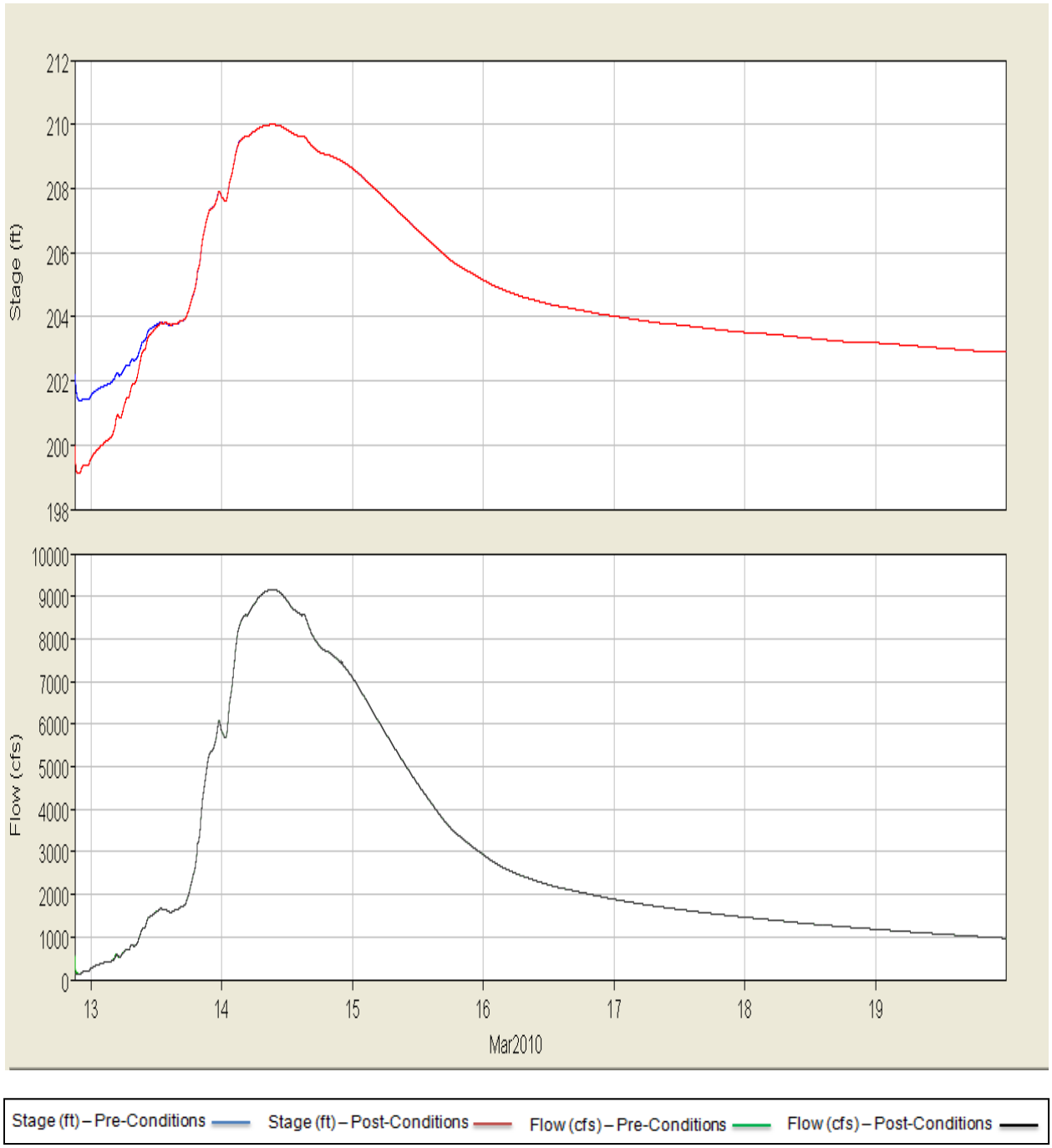


Figure 47 : March 12-14, 2010 Storm Event – Stage and Flow Hydrographs at Station 26058 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ - Lowering Reservoir 3.0 feet Compared to Post Conditions

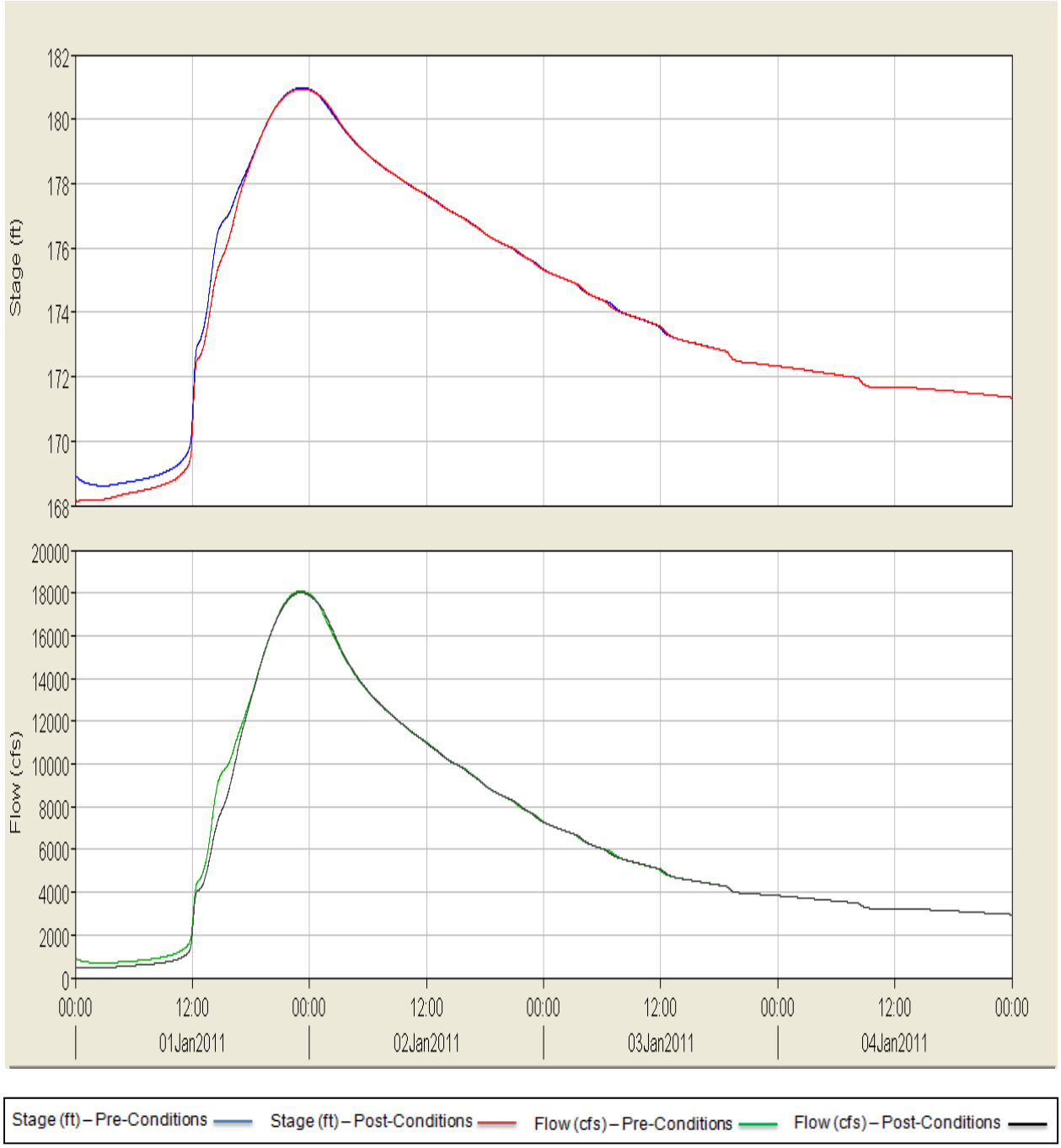


Figure 48 : 10-Year Rainfall Storm Event – Stage and Flow Discharges at Station 34810 Pompton River Just Upstream of the Jackson Avenue Bridge - Lowering Reservoir 3.0 feet Compared to Post Conditions

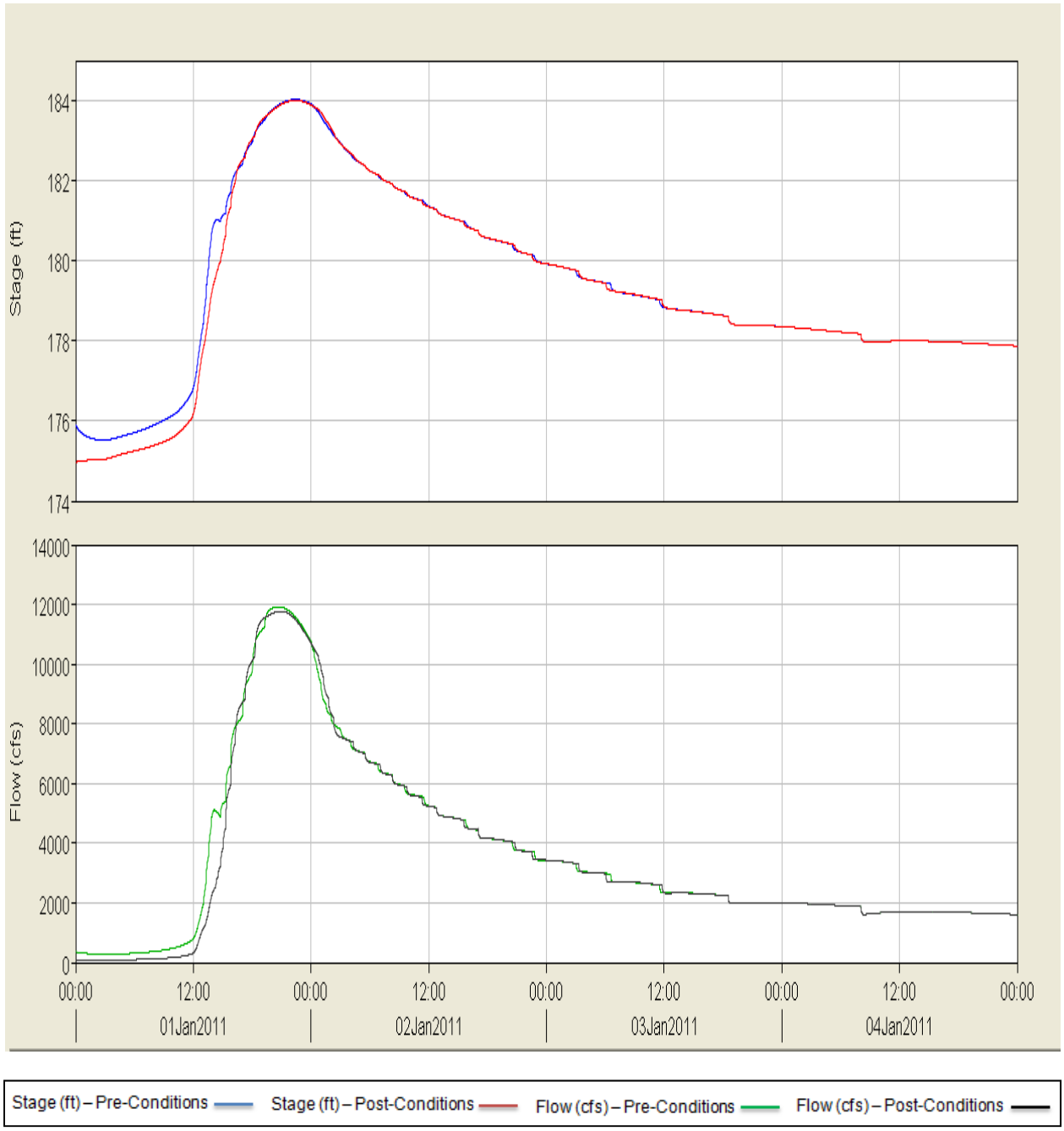


Figure 49 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 7445 Ramapo River Just Downstream of the Dawes Highway Bridge - Lowering Reservoir 3.0 feet Compared to Post Conditions

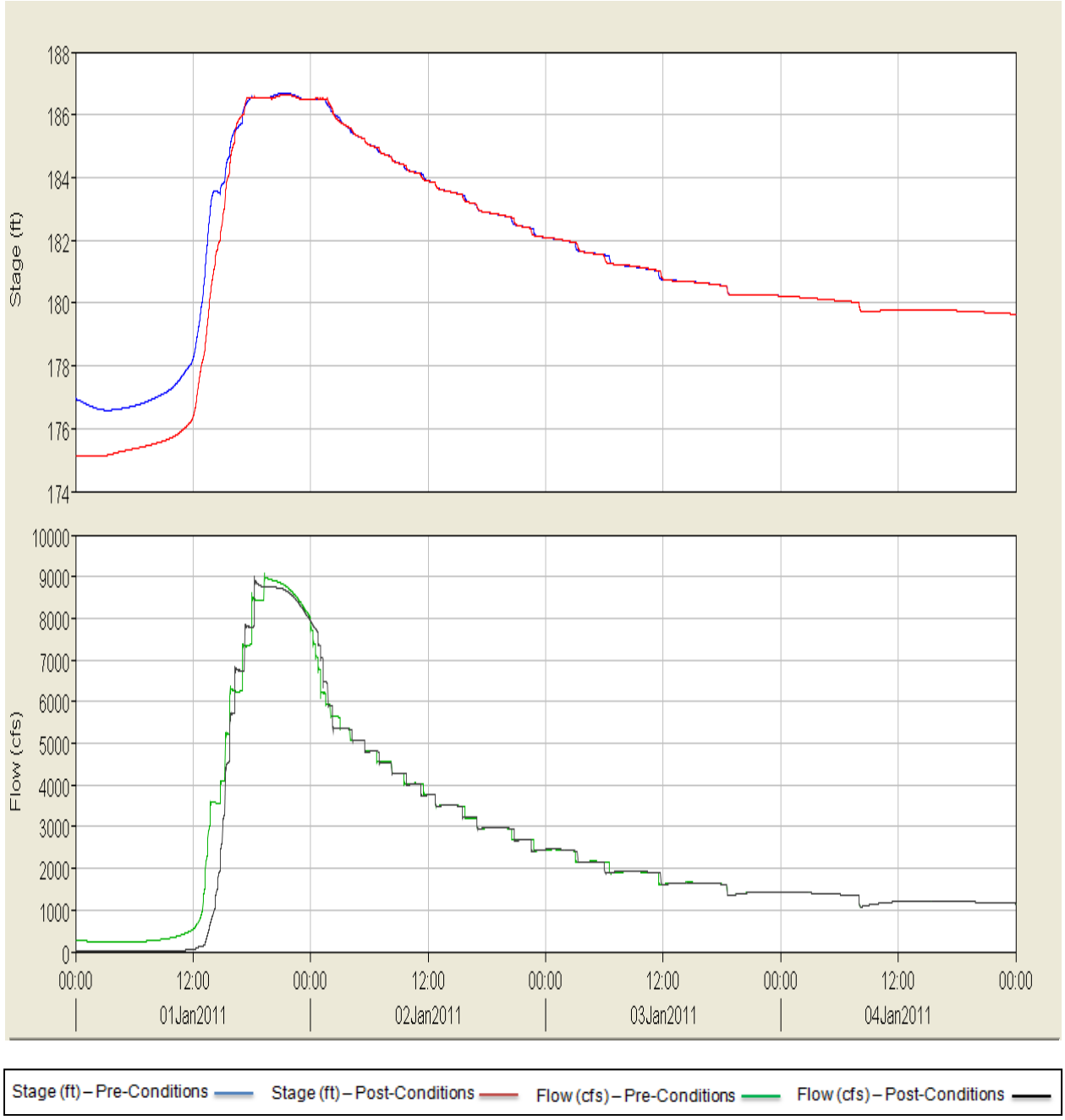


Figure 50 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 10135 Ramapo River Just Upstream of the Hamburg Turnpike Bridge – Lowering Reservoir 3.0 feet Compared to Post Conditions

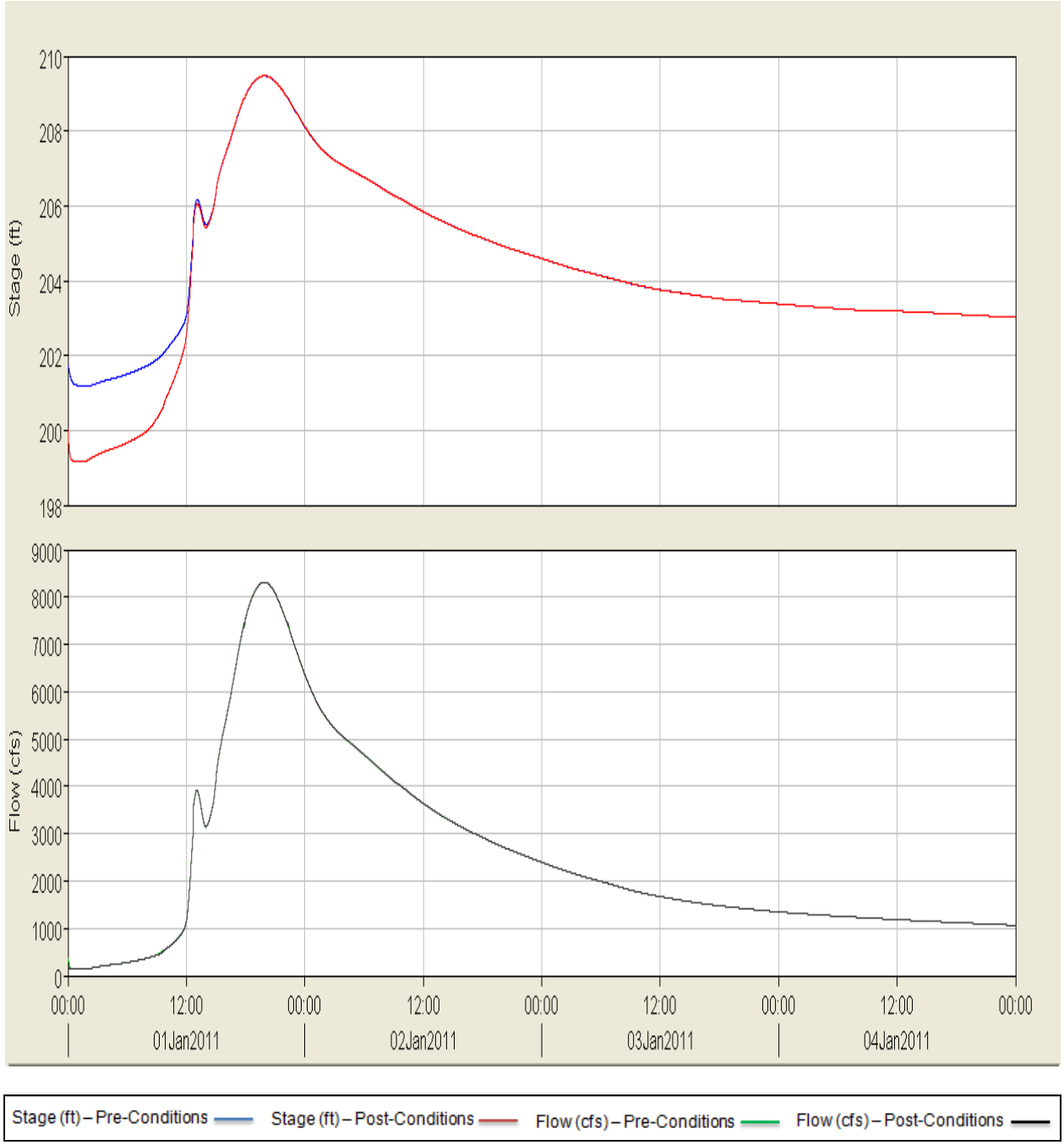


Figure 51 : 10-Year Rainfall Storm Event – Stage and Flow Hydrographs at Station 25085 Ramapo River Just Downstream of the Railroad Bridge in Oakland NJ - Lowering Reservoir 3.0 feet Compared to Post Conditions

5.3 Impact of Development Analysis

The impact that upstream development has had on the inflow rates to Pompton Lake Dam was evaluated. The evaluation included:

- Analysis of the Western Regional Climate Center Desert Research Institute in Reno Nevada publication of the 72-month Accumulated Precipitation Departures from Normal through the end of February 2012, and
- Comparing runoff events on the Ramapo River at Mahwah NJ (most of the watershed at this location is in New York) to the Ramapo River at Pompton Lakes NJ.

Figures 51 through 53 show the 72-month accumulated precipitation departure from normal through the end of February 2011.

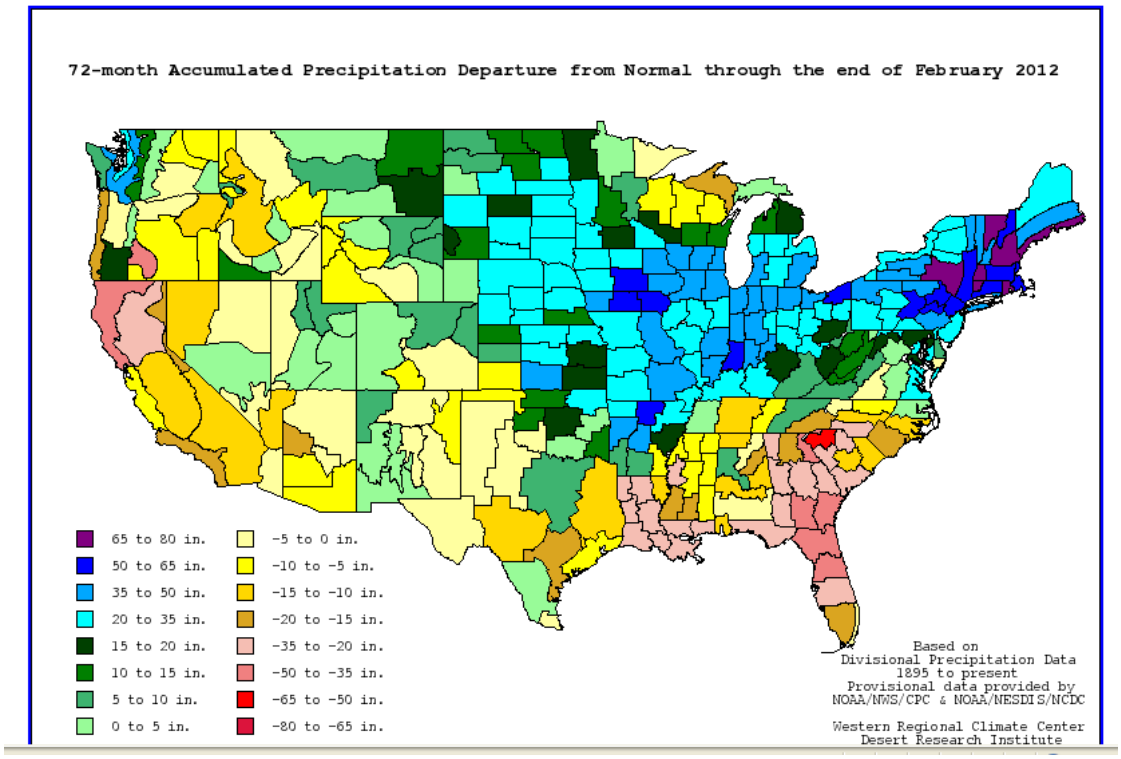


Figure 52 : 72 - Month Accumulated Precipitation Departure from Normal through the End of February 2012

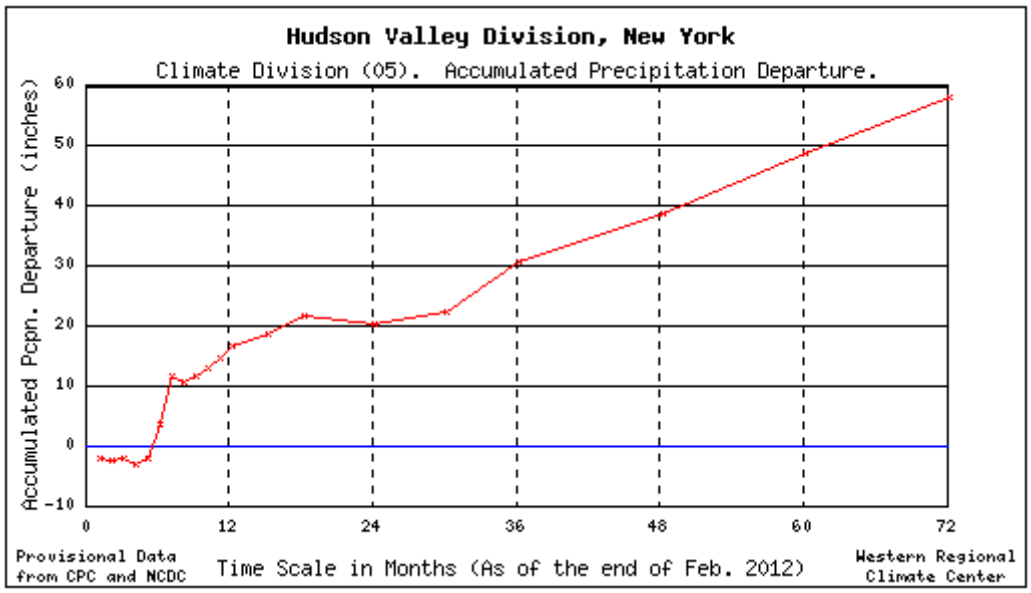


Figure 53 : Northern New Jersey Accumulated Precipitation Departure from Normal through the End of February 2012

From Figure 52, the Hudson Valley Division in New York area received about 50 to 60 inches of additional rainfall over the past 72 months. That has translated into more runoff and consequently more flooding. Figure 53 is a plot of average peak annual flows for each decade for the Ramapo River near Mahwah, NJ (the major portion of the watershed is in New York. Over the last decade the average of the peak flows for each decade has increased by more than 50%. This is consistent with the additional rainfall causing additional flooding.

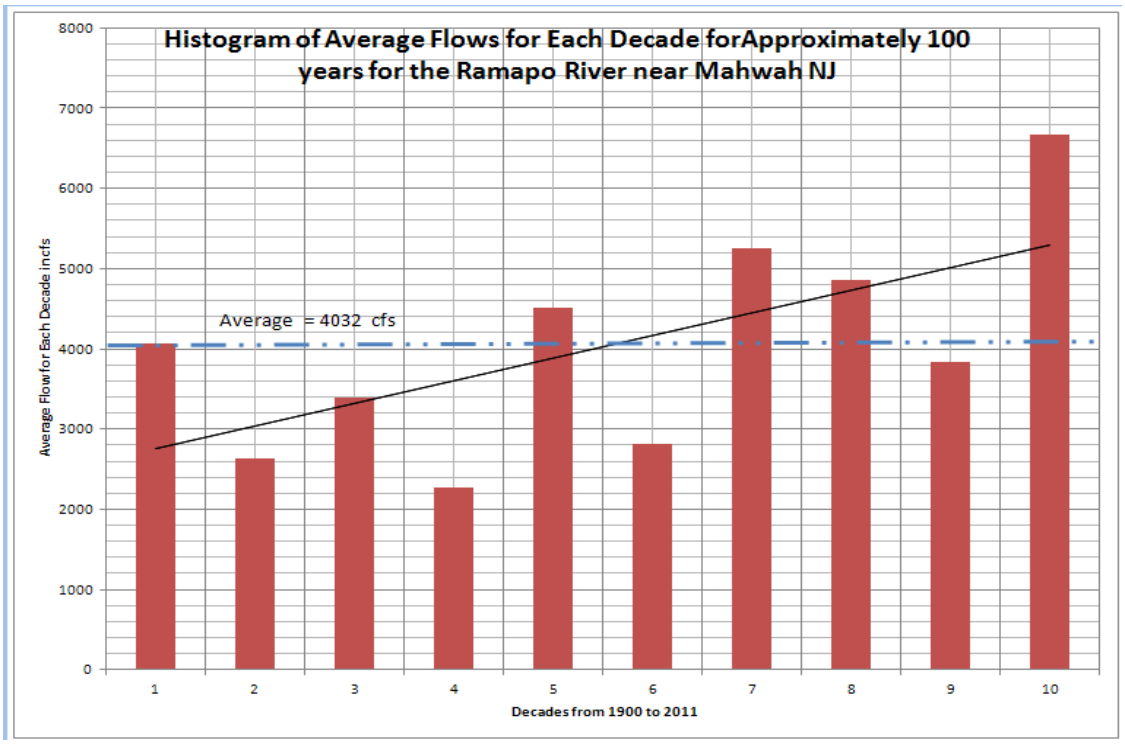


Figure 54 : Average Peak Flows for each Decade for Ramapo River near Mahwah

5.4 Channel Velocity Downstream

Appendix H present the flow distribution tables and figures of velocity distributions for the March 2010 and 2011storm events, Hurricane Irene and the five rainfall storm at the Hamburg Turnpike Bridge. Table 11 below summarizes the maximum velocities for the Pre- and Post Project Conditions. The differences in the velocities for the Pre- and Post Project Conditions are not very different at Hamburg Turnpike Bridge and have less of a difference downstream of the Bridge. The 10-year rainfall storm event and the March 9-13 storm event show the greatest difference in the maximum velocities at the Hamburg Turnpike Bridge. However, just downstream from the Bridge the differences in the velocities is only 0.16 fps (5.34 fps – 5.38 fps) for the 10-year rainfall storm event and for the March 9-13 storm event the difference is 0.07 fps (5.16 fps – 5.09 fps).

Table 10: Maximum velocities for the Pre- and Post Project Conditions

Storm Event	Maximum Velocity at Hamburg Turnpike Bridge Pre-Project Condition (fps)	Maximum Velocity at Hamburg Turnpike Bridge Post-Project Condition (Fps)	Difference in Velocity (fps)
March 12-14, 2010	5.92	5.95	0.03
March 6-9, 2011	5.76	5.88	0.12
March 9-13, 2011	4.63	5.11	0.48
Hurricane Irene	7.09	7.07	-0.02
2-Year Rainfall	3.69	4.00	0.31
10-Year Rainfall	4.89	5.88	0.99
25-Year Rainfall	5.81	5.89	0.08
40-Year Rainfall	5.96	6.12	0.16
50-Year Rainfall	6.24	6.30	0.06

5.5 HEC-2 Pre and Post Conditions

The HEC-2 converted data files (files that were converted to HEC-RAS format) are in Appendix I along with the HEC-2 converted runs for the 10-, 40-, 100- and 500-year flood events. All figures and tables in this section are presented in Appendix I.

The US Army Corps of Engineers has designed and implemented channel modifications to the Ramapo River upstream of the Pompton Lakes Dam through Potash Lake for approximately 15,000 feet. The channel modifications consisted of lowering the stream channel inverts and the formation of a series of riffles and pools throughout the stream reach. Figures I.1 and I.2 illustrate the type of channel modifications that were carried out. Essentially the low flow channel was shaped more as a trapezoid and the invert was lowered. The Manning's n resistance coefficient for these sections was typically lowered to better represent the new channel conditions.

The Pre-Project Condition HEC-2 data files indicated that there was approximately 33,600 feet of stream channel measured from the Jackson Avenue Bridge to the Lenape Lane Bridge in Oakland. The Post-Project Condition HEC-2 geometry data indicated that there was approximately 47,400 feet of stream channel measured from the Jackson Avenue Bridge to the Lenape Bridge in Oakland. The additional distance appears to be the result of the added sinuosity in the Post-Project flow channel. Figures I.3, I.4, and I.5 show the channel invert elevations between the two bridges as measured along the thalweg (the lowest elevation point within each cross section).

Running the HEC-RAS steady flow model for the converted HEC-2 data files for the 10-, 40-, 100-, and 500-year flood events for the Pre- and Post-Project Conditions resulted in slightly higher water surface elevations for the Post-Project Conditions as illustrated in Table I.1 for the geometry of cross section 20070. Also, note that the flows in the USACE study are slightly higher for the Post-Project Condition which would contribute to the slightly higher water surface

elevations when compared to the Pre-Project Conditions. The water surface profiles for the Pre- and Post-Project Conditions for the 40-year flood event are shown in Figure I.7.

Table I.2 shows the results of the accumulated travel time using the average channel velocity divided into the channel length from the Lenape Lane Bridge to the Jackson Avenue Bridge. The average travel time for the Pre-Project Condition was computed to be approximately 5 ¼ hours in contrast to 7 hours for the Post-Project Conditions. Thus, the added sinuosity of the Post-Project condition seems to have lengthened the travel time throughout the reach.

The perception that the Pre-Project Condition has more storage available upstream of the Pompton Lakes Dam compared to the Post-Project Condition does not seem to be valid. The results of the HEC-RAS (converted HEC-2 data) steady flow runs for the two conditions resulted in similar water surfaces in the upstream channel (see Table I.1). Due to the difference in the length of channel for the pre and post conditions, the Post-Project Condition would actually account for more storage than the Pre-Project Condition. Also, the accumulated average travel time through the reach is longer for the Post-Project Condition, which would indicate that the Post-Project Condition is not conveying flows faster through the reach than the Pre-Post Condition.

5.6 Overall Summary of Results

The overall results of this study can be summarized as follows:

- The installation and operation of the Pompton Lake Flood Gate Facility has not contributed to increased flooding downstream of the dam. Based on our modeling results the Pompton Lakes Dam Gates and the Operating Rule Curve are performing as designed with little or no significant increases in the downstream impacts.

- Lowering the Pompton Lake Reservoir prior to flooding events will not have any significant reduction in downstream flooding. There simply is not enough storage volume in the reservoir relative to the overall runoff volume to make any difference.

- Based on a limited analysis of the older HEC-2 modeling versus the newer HEC-RAS modeling, it does not appear that the upstream channel modifications have had any effect on downstream flooding.

- While overall development (or an increase in impervious coverage) in the watershed cannot be ruled out as a source of more frequent flooding as a result of this study, it is apparent from the average watershed runoff rates over the past few decades, that the percentage of runoff from the different reaches of the watershed has remained consistent. This indicates that development in one part of the

watershed has not outpaced development in another part of the watershed and thus resulted in a higher percentage of the overall runoff from a particular reach of the watershed. Analysis of regional climatic and flow data indicates that there has been an increase in flooding events over the past decade, but it is most likely due to the significant increase in precipitation that the region has seen over the past 72 months.

6 References

1. OMRR & R Manual, Pompton Lake Dam, NJ, Appendix C- Gate Operating Rule Curve. March 2008. U.S. Army Corps of Engineers, New York, NY.

2. U.S. Department of the Interior, U.S. Geological Survey, http://waterwatch.usgs.gov

3. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-RAS, River Analysis System v4.1.0, Davis, California, January 2010. http://www.hec.usace.army.mil

4. Watershed Concepts, WISE (Watershed Information System), Greensboro, North Carolina, revised 2011.

5. National Geodetic Survey, NAVD 88 minus NGVD 29 Datum Shift Contours. http://www.ngs.noaa.gov/TOOLS/Vertcon/vertcon.html

Appendix A

HYDROLOGIC DATA

Project: Pompton_HMS_FINAL_120217
Simulation Run: March 13_15 2010 Junction: USGS_1388000

Start of Run:	12Mar2010, 21:00	Basin Model:	AECOM_MAR2010
End of Run:	19Mar2010, 23:55	Meteorologic Model:	Mar_12_13_14_2010
Compute Time:	29Feb2012, 11:44:08	Control Specifications:	Mar_13_15_2010

Volume Units: IN AC-FT

Computed Results

Peak Outflow : 10920.1 (CFS) Date/Time of Peak Outflow : 14Mar2010, 10:20
Total Outflow : 52156.3 (AC-FT)

Observed Hydrograph at Gage USGS_1388000

Peak Discharge : 11000.00 (CFS) Date/Time of Peak Discharge : 14Mar2010, 10:15
Avg Abs Residual : 397.16 (CFS)
Total Residual : -214.2 (AC-FT) Total Obs Q : 52357.55 (AC-FT)

Figure A.1: Summary of Results - March 13-15, 2010

USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam

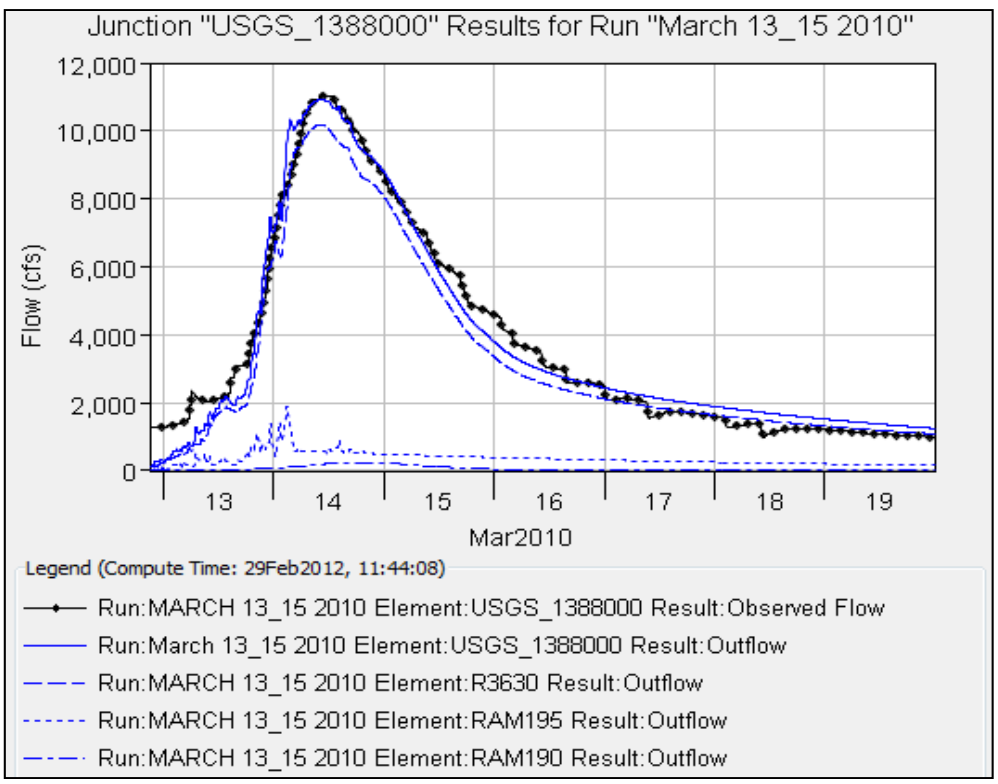


Figure A.2: Simulated versus Observed Hydrograph - March 13-15, 2010

USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam

Project: Pompton_HMS_FINAL_120217
Simulation Run: March 13_15 2010 Junction: USGS_1388500

Start of Run:	12Mar2010, 21:00	Basin Model:	AECOM_MAR2010
End of Run:	19Mar2010, 23:55	Meteorologic Model:	Mar_12_13_14_2010
Compute Time:	29Feb2012, 11:44:08	Control Specifications:	Mar_13_15_2010

Volume Units: IN AC-FT

Computed Results

Peak Outflow : 19538.5 (CFS) Date/Time of Peak Outflow : 14Mar2010, 19:25
Total Outflow : 100113.1 (AC-FT)

Observed Hydrograph at Gage USGS_1388500

Peak Discharge : 18900.00 (CFS) Date/Time of Peak Discharge : 14Mar2010, 17:15
Avg Abs Residual : 1582.61 (CFS)
Total Residual : -18484.8 (AC-FT) Total Obs Q : 118574.79 (AC-FT)

Figure A.3: Summary of Results - March 13-15, 2010

USGS GAGE 01388500 - Pompton River at Pompton Plains NJ

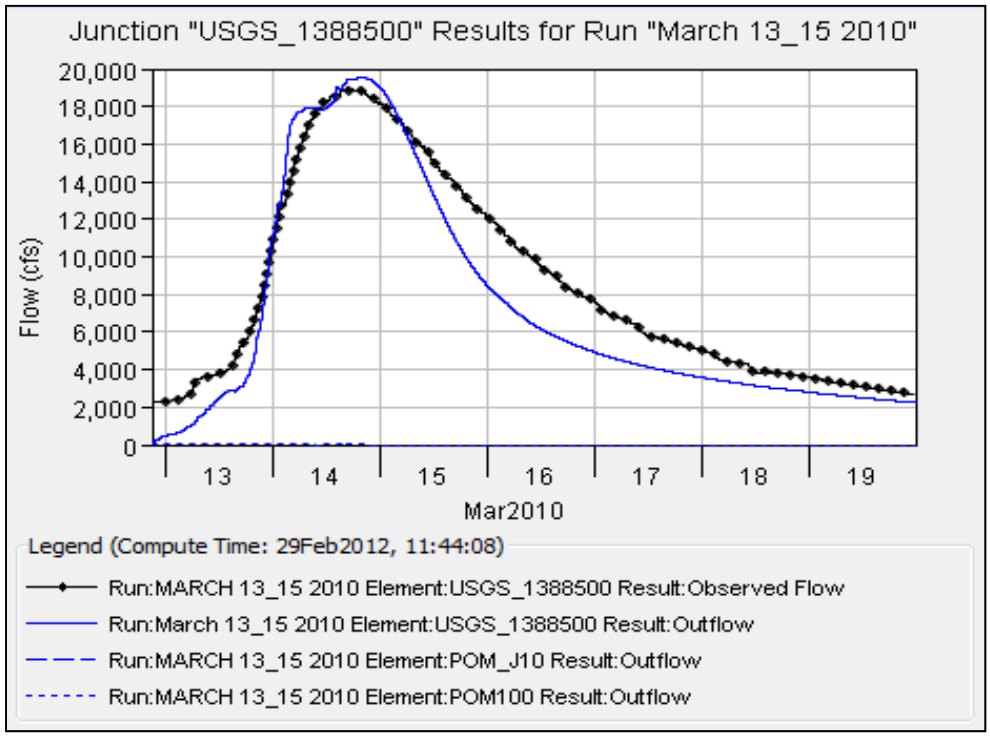


Figure A.4: Simulated versus Observed Hydrograph - March 13-15, 2010

USGS GAGE 01388500 - Pompton River at Pompton Plains NJ

Project: Pompton_HMS_FINAL_120217
Simulation Run: Mar 2011 - 1 Junction: USGS_1388500

Start of Run:	06Mar2011, 06:05	Basin Model:	AECOM_MAR62011
End of Run:	09Mar2011, 23:55	Meteorologic Model:	MAR_6_2011
Compute Time:	17Feb2012, 10:53:43	Control Specifications:	Mar 2011 - 1

Volume Units: IN AC-FT

Computed Results

Peak Outflow : 12778.6 (CFS) Date/Time of Peak Outflow : 07Mar2011, 10:50
Total Outflow : 45715.5 (AC-FT)

Observed Hydrograph at Gage USGS_1388500

Peak Discharge : 14400.00 (CFS) Date/Time of Peak Discharge : 07Mar2011, 16:00
Avg Abs Residual : 1166.42 (CFS)
Total Residual : -8099.7 (AC-FT) Total Obs Q : 53815.16 (AC-FT)

Figure A.5: Summary of Results - March 6-8, 2011

USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam

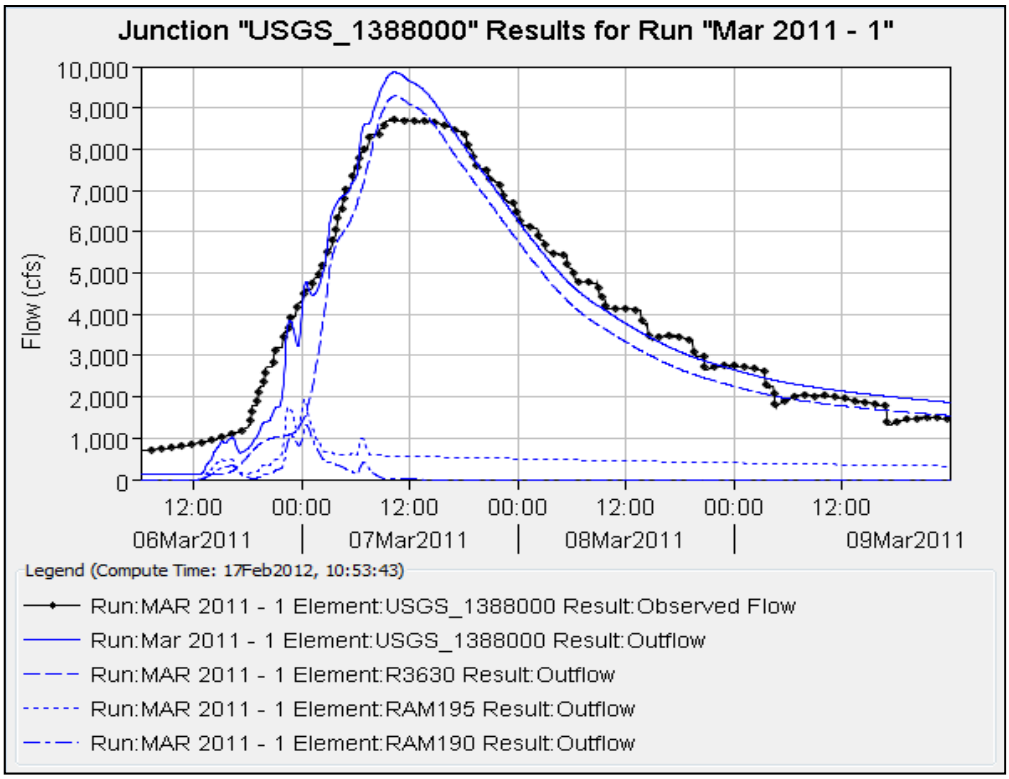


Figure A.6: Simulated versus Observed Hydrograph - March 6-8, 2011

USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam

Project: Pompton_HMS_FINAL_120217
Simulation Run: Mar 2011 - 1 Junction: USGS_1388500

Start of Run:	06Mar2011, 06:05	Basin Model:	AECOM_MAR62011
End of Run:	09Mar2011, 23:55	Meteorologic Model:	MAR_6_2011
Compute Time:	17Feb2012, 10:53:43	Control Specifications:	Mar 2011 - 1

Volume Units: IN AC-FT

Computed Results

Peak Outflow : 12778.6 (CFS) Date/Time of Peak Outflow : 07Mar2011, 10:50
Total Outflow : 45715.5 (AC-FT)

Observed Hydrograph at Gage USGS_1388500

Peak Discharge : 14400.00 (CFS) Date/Time of Peak Discharge : 07Mar2011, 16:00
Avg Abs Residual : 1166.42 (CFS)
Total Residual : -8099.7 (AC-FT) Total Obs Q : 53815.16 (AC-FT)

Figure A.7: Summary of Results - March 6-8, 2011
USGS GAGE 01388500 - Pompton River at Pompton Plains NJ

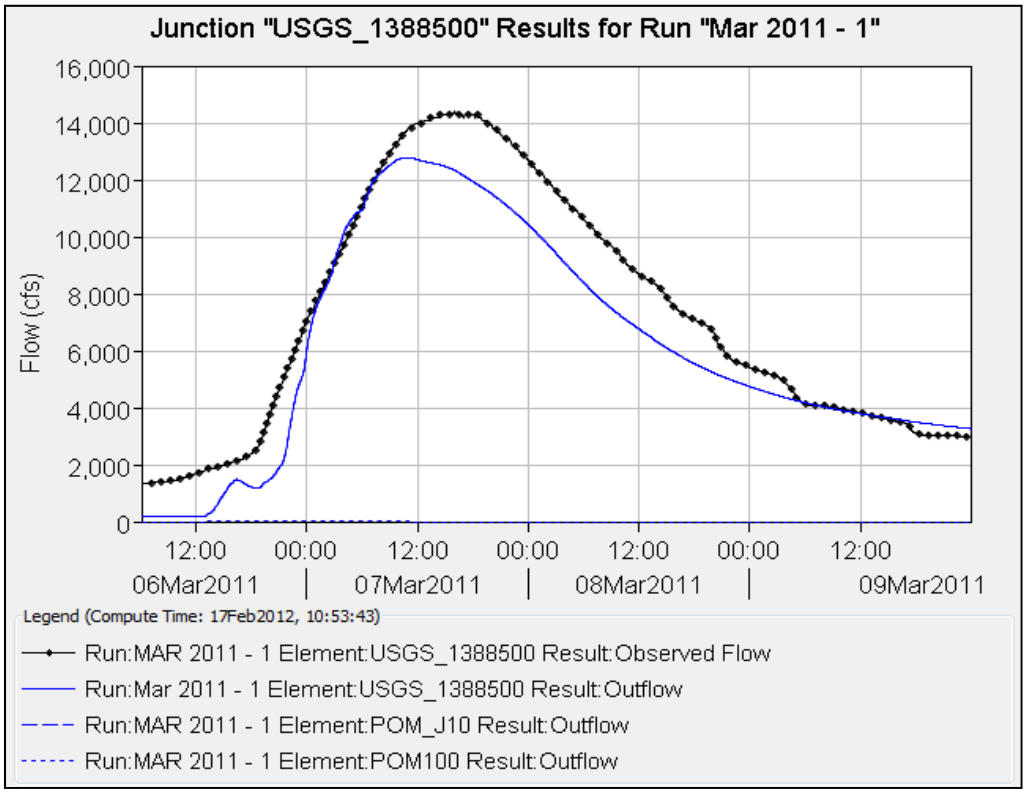


Figure A.8: Simulated versus Observed Hydrograph - March 6-8, 2011

USGS GAGE 01388500 - Pompton River at Pompton Plains NJ

Project: Pompton_HMS_FINAL_120217
Simulation Run: Mar 2011 - 2 Junction: USGS_1388000

Start of Run:	10Mar2011, 00:00	Basin Model:	AECOM_MAR122011
End of Run:	13Mar2011, 23:55	Meteorologic Model:	MAR_12_2011
Compute Time:	17Feb2012, 10:53:54	Control Specifications:	Mar 2011 - 2

Volume Units: IN AC-FT

Computed Results

Peak Outflow : 8833.4 (CFS) Date/Time of Peak Outflow : 11Mar2011, 12:30
Total Outflow : 31196.6 (AC-FT)

Observed Hydrograph at Gage USGS_1388000

Peak Discharge : 9650.00 (CFS) Date/Time of Peak Discharge : 11Mar2011, 12:05
Avg Abs Residual : 585.04 (CFS)
Total Residual : -4100.6 (AC-FT) Total Obs Q : 35297.27 (AC-FT)

Figure A.9: Summary of Results - March 10-12, 2011

USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam

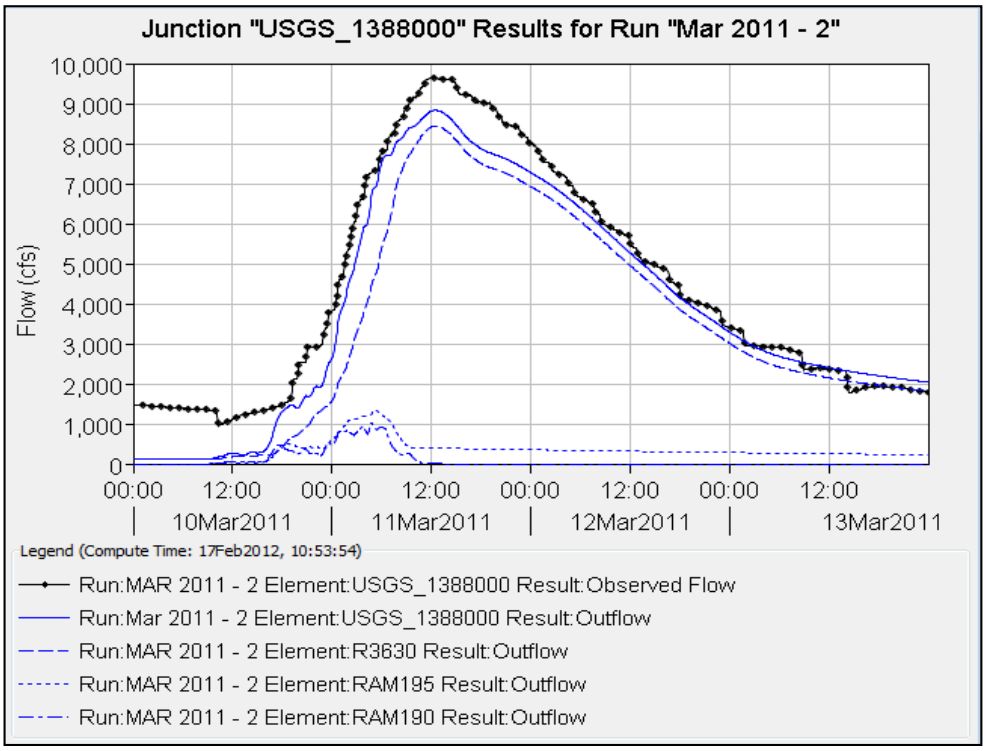


Figure A.10: Simulated versus Observed Hydrograph - March 10-12, 2011

USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam

Project: Pompton_HMS_FINAL_120217
Simulation Run: Mar 2011 - 2 Junction: USGS_1388500

Start of Run:	10Mar2011, 00:00	Basin Model:	AECOM_MAR122011
End of Run:	13Mar2011, 23:55	Meteorologic Model:	MAR_12_2011
Compute Time:	17Feb2012, 10:53:54	Control Specifications:	Mar 2011 - 2

Volume Units: IN AC-FT

Computed Results

Peak Outflow : 17490.1 (CFS) Date/Time of Peak Outflow : 11Mar2011, 21:35
Total Outflow : 69100.9 (AC-FT)

Observed Hydrograph at Gage USGS_1388500

Peak Discharge : 17700.00 (CFS) Date/Time of Peak Discharge : 11Mar2011, 19:00
Avg Abs Residual : 1348.82 (CFS)
Total Residual : -9870.7 (AC-FT) Total Obs Q : 78971.60 (AC-FT)

Figure A.11: Summary of Results - March 10-12, 2011

USGS GAGE 01388500 - Pompton River at Pompton Plains NJ

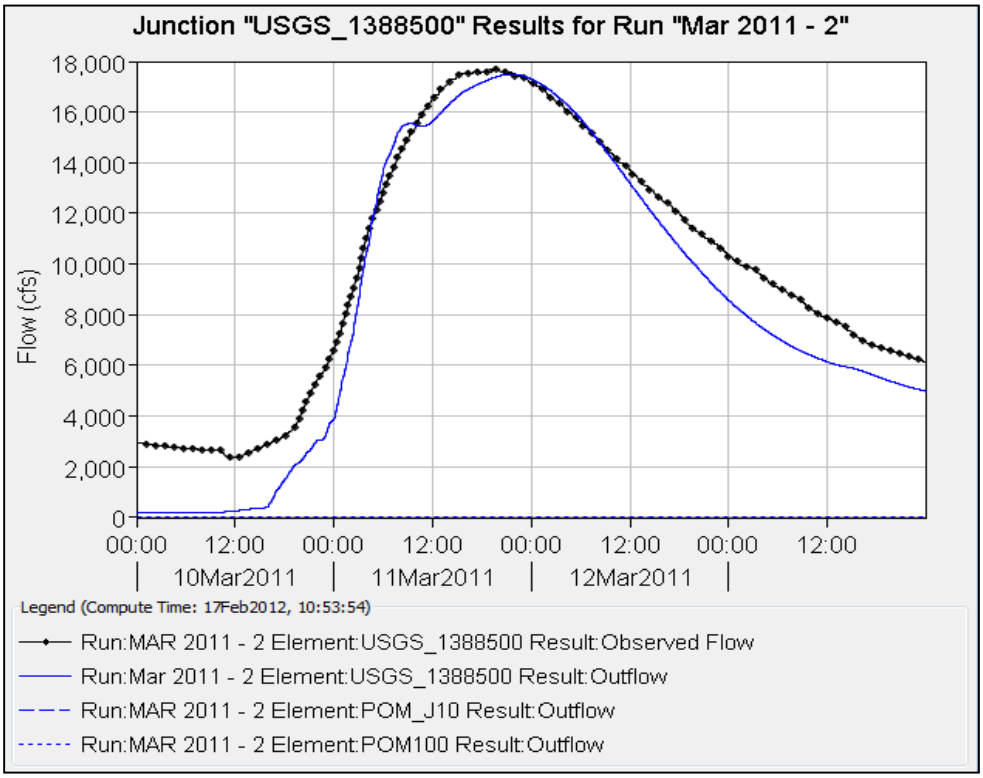


Figure A.12: Simulated versus Observed Hydrograph - March 10-12, 2011

USGS GAGE 01388500 - Pompton River at Pompton Plains NJ

Project: Pompton_HMS_FINAL_120217
Simulation Run: Irene Junction: USGS_1388000

Start of Run:	27Aug2011, 11:05	Basin Model:	AECOM_IRENE
End of Run:	03Sep2011, 00:00	Meteorologic Model:	Irene
Compute Time:	17Feb2012, 10:53:31	Control Specifications:	Irene

Volume Units: IN AC-FT

Computed Results

Peak Outflow : 21521.6 (CFS) Date/Time of Peak Outflow : 28Aug2011, 22:00
Total Outflow : 68606.8 (AC-FT)

Observed Hydrograph at Gage USGS_1388000

Peak Discharge : 21400.00 (CFS) Date/Time of Peak Discharge : 28Aug2011, 21:30
Avg Abs Residual : 865.17 (CFS)
Total Residual : 7299.2 (AC-FT) Total Obs Q : 61301.50 (AC-FT)

Figure A.13: Summary of Results - August 27-29, 2011

USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam

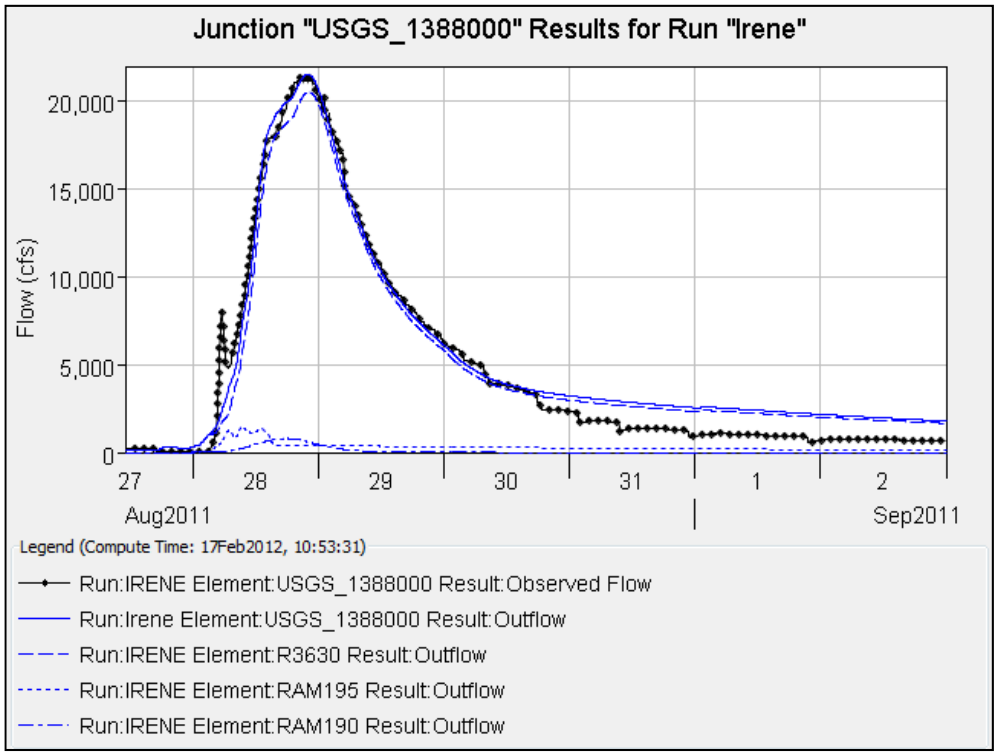


Figure A.14: Simulated versus Observed Hydrograph - August 27-29, 2011

USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam

Project: Pompton_HMS_FINAL_120217
Simulation Run: Irene Junction: USGS_1388500

Start of Run:	27Aug2011, 11:05	Basin Model:	AECOM_IRENE
End of Run:	03Sep2011, 00:00	Meteorologic Model:	Irene
Compute Time:	17Feb2012, 10:53:31	Control Specifications:	Irene

Volume Units: IN AC-FT

Computed Results

Peak Outflow : 28555.1 (CFS) Date/Time of Peak Outflow : 29Aug2011, 00:50
Total Outflow : 113637.9 (AC-FT)

Observed Hydrograph at Gage USGS_1388500

Peak Discharge : 29000.00 (CFS) Date/Time of Peak Discharge : 29Aug2011, 01:15
Avg Abs Residual : 1139.37 (CFS)
Total Residual : -5498.1 (AC-FT) Total Obs Q : 119088.50 (AC-FT)

Figure A.15: Summary of Results - August 27-29, 2011
USGS GAGE 01388500 - Pompton River at Pompton Plains NJ

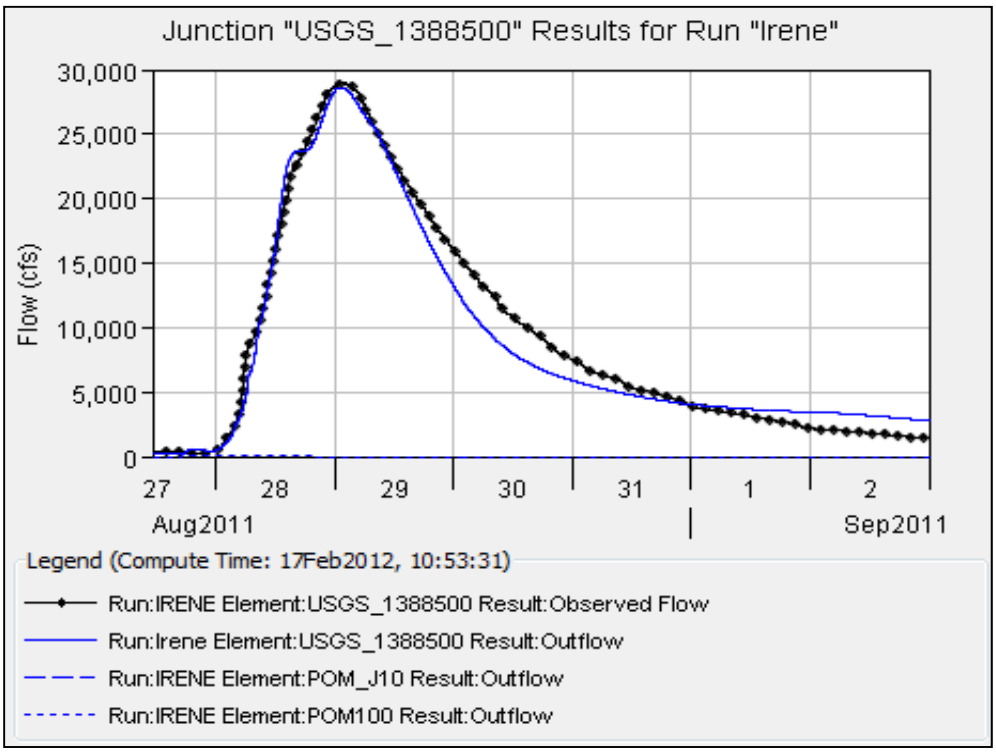


Figure A.16: Simulated versus Observed Hydrograph - August 27-29, 2011
USGS GAGE 01388500 - Pompton River at Pompton Plains NJ

Table A.1: Sub-basin Drainage Areas

River	Sub-Basin	Area Sq Mi
Mahwah	MAH070	6.3
	MAH075	3.6
	MAH080	2.0
	MAH085	2.0
	MAH090	6.4
	MAH095	4.8
	MAH100	0.5
Pequannock	PEQ050	6.9
	PEQ055	6.4
	PEQ060	6.0
	PEQ065	13.2
	PEQ069	3.3
	PEQ070	19.4
	PEQ075	1.7
	PEQ076	2.2
	PEQ077	2.0
	PEQ078	0.9
	PEQ080	2.7
	PEQ084	0.3
	PEQ085	6.5
	PEQ086	5.5
	PEQ090	2.0
	PEQ095	1.9
	PEQ100	4.1
Pompton	POM095	1.4
	POM100	0.1
Ramapo	RAM070	8.7
	RAM075	8.2
	RAM080	7.6
	RAM085	8.7
	RAM090	3.5
	RAM095	6.8
	RAM100	8.3
	RAM105	7.9
	RAM110	10.4
	RAM115	8.5

	RAM120	1.9
	RAM125	2.6
	RAM130	3.5
	RAM135	6.2
	RAM140	0.7
	RAM145	0.8
	RAM150	3.6
	RAM154	1.1
	RAM155	3.5
	RAM159	6.7
	RAM160	4.5
	RAM170	3.8
	RAM180	7.1
	RAM190	3.7
	RAM195	5.1
	RAM200	1.6
Wanaque	WAN045	14.9
	WAN050	14.0
	WAN055	18.0
	WAN060	13.7
	WAN065	11.8
	WAN070	6.1
	WAN074	4.2
	WAN075	14.4
	WAN080	5.2
	WAN085	2.9
	WAN095	1.7
	WAN100	0.6

Table A.2: Land Cover Classification

	Land Use
1	Predominately Forest (85%)
2	Suburban (generally R-4 to R-6 and less)
3	Transportation, Commercial, High Density Urban
4	Deciduous Wetlands, Herbaceous Wetlands, Wetland Rights-of-Way, Managed Wetlands, Former Agricultural Wetlands, etc.
5	Stormwater Basin, Natural Lakes and Artificial Lakes
6	Agricultural - Rangeland/Pasture/Abandoned/Farmland
7	Agricultural - Row/Cereal/etc

Table A.3: Recession Baseflow Values for Sub-basins

Subbasin	Recession Constant	Threshold Type	Ratio to Peak
RAM080	0.8	Ratio to Peak	0.28
RAM085	0.8	Ratio to Peak	0.28
RAM100	0.8	Ratio to Peak	0.28
RAM095	0.8	Ratio to Peak	0.28
RAM110	0.8	Ratio to Peak	0.28
RAM115	0.8	Ratio to Peak	0.28
RAM150	0.8	Ratio to Peak	0.28
RAM159	0.8	Ratio to Peak	0.28
RAM170	0.8	Ratio to Peak	0.28
RAM195	0.8	Ratio to Peak	0.3
PEQ050	0.8	Ratio to Peak	0.28
PEQ055	0.8	Ratio to Peak	0.28
PEQ070	0.8	Ratio to Peak	0.28
PEQ065	0.8	Ratio to Peak	0.28

Table A.4: Initial CN and Lag Time Estimates

River	Sub-Basin	Initial Basin CN	Initial Lag Time (min)
Mahwah	MAH070	76	178
	MAH075	77	308
	MAH080	70	300
	MAH085	74	300
	MAH090	81	178
	MAH095	83	111
	MAH100	79	80*
Pequannock	PEQ050	77	229
	PEQ055	76	289
	PEQ060	75	327
	PEQ065	77	277
	PEQ069	78	52
	PEQ070	74	165
	PEQ075	77	44

	PEQ076	81	113
	PEQ077	73	87
	PEQ078	73	51
	PEQ080	77	120
	PEQ084	78	56
	PEQ085	79	181
	PEQ086	78	158
	PEQ090	85	120
	PEQ095	86	120
	PEQ100	81	138
Pompton	POM095	81	103
	POM100	76	55
Ramapo	RAM070	81	213
	RAM075	78	102
	RAM080	75	137
	RAM085	79	218
	RAM090	72	212
	RAM095	77	175
	RAM100	78	153
	RAM105	74	182
	RAM110	72	221
	RAM115	71	100
	RAM120	77	143
	RAM125	72	143
	RAM130	76	250
	RAM135	73	147
	RAM140	83	109
	RAM145	84	165
	RAM150	73	250
	RAM154	77	100
	RAM155	76	252
	RAM159	73	250
	RAM160	76	200
	RAM170	76	180
	RAM180	77	186
	RAM190	87	101
	RAM195	81	120
	RAM200	85	98

Wanaque	WAN045	77	314
	WAN050	82	227
	WAN055	76	164
	WAN060	77	173
	WAN065	76	90
	WAN070	79	129
	WAN074	78	91
	WAN075	82	100
	WAN080	78	233
	WAN085	81	100
	WAN095	80	153
	WAN100	89	51

Table A.5: Calibration Summary Table - March 13-15, 2010

River	Measure	Simulated	Observed	Difference
Ramapo	**USGS GAGE 01387400 - Wanaque River at Wanaque NJ**			
	Volume (AC-FT)	28,739.1	32,033.3	-10%
	Peak Flow (CFS)	7,363.4	7,560.5	-3%
	Time of Peak	3:45	4:00	-00:15
	USGS GAGE 01387420 - Ramapo River at Suffern NY			
	Volume (AC-FT)	30,117.6	34,450.7	-13%
	Peak Flow (CFS)	7,808.9	7,538.7	4%
	Time of Peak	4:10	3:00	+01:10
	USGS GAGE 01387500 - Ramapo River near Mahwah NJ			
	Volume (AC-FT)	33,482.3	43,501.0	-23%
	Peak Flow (CFS)	8,476.5	11,500.0	-26%
	Time of Peak	6:45	5:00	+00:15
	USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam			
	Volume (AC-FT)	52,156.3	52,357.6	0%
	Peak Flow (CFS)	10,920.1	11,000.0	-1%
	Time of Peak	10:20	10:15	+00:05
Pompton	**USGS GAGE 01388500 - Pompton River at Pompton Plains NJ**			
	Volume (AC-FT)	100,113.1	118,574.8	-16%
	Peak Flow (CFS)	19,538.5	18,900.0	3%
	Time of Peak	19:25	17:15	+02:10
Pequannock	**USGS GAGE 01382500 - Pequannock River at Macopin Intake Dam NJ**			
	Volume (AC-FT)	26,192.6	18,867.6	39%
	Peak Flow (CFS)	5,066.1	3,110.0	63%
	Time of Peak	3:20	16:00	-12:40
Wanaque	**USGS GAGE 01387000 - Wanaque River at Wanaque NJ**			
	Volume (AC-FT)	14,262.1	17,973.0	-21%
	Peak Flow (CFS)	4,159.1	3,100.0	34%
	Time of Peak	19:10	21:30	-02:20

Table A.6: Calibration Summary Table - March 6-8, 2011

River	Measure	Simulated	Observed	Difference
Ramapo	**USGS GAGE 01387400 - Wanaque River at Wanaque NJ**			
	Volume (AC-FT)	13,795.3	19,147.2	-28%
	Peak Flow (CFS)	4,902.0	6,624.3	-26%
	Time of Peak	6:50	9:00	-02:10
	USGS GAGE 01387420 - Ramapo River at Suffern NY			
	Volume (AC-FT)	14,968.5	18,824.6	-20%
	Peak Flow (CFS)	6,004.8	5,963.7	1%
	Time of Peak	7:10	7:30	-00:20
	USGS GAGE 01387500 - Ramapo River near Mahwah NJ			
	Volume (AC-FT)	17,626.2	24,319.6	-28%
	Peak Flow (CFS)	7,087.5	9,130.0	-22%
	Time of Peak	7:50	7:00	+00:50
	USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam			
	Volume (AC-FT)	29,059.5	29,387.5	-1%
	Peak Flow (CFS)	9,861.5	8,710.0	13%
	Time of Peak	10:15	9:45	+00:30
Pompton	**USGS GAGE 01388500 - Pompton River at Pompton Plains NJ**			
	Volume (AC-FT)	45,715.5	53,815.2	-15%
	Peak Flow (CFS)	12,778.6	14,400.0	-11%
	Time of Peak	10:50	16:00	-05:10
Pequannock	**USGS GAGE 01382500 - Pequannock River at Macopin Intake Dam NJ**			
	Volume (AC-FT)	11,434.9	7,570.8	51%
	Peak Flow (CFS)	3,274.6	1,620.0	102%
	Time of Peak	2:55	14:30	-5:10
Wanaque	**USGS GAGE 01387000 - Wanaque River at Wanaque NJ**			
	Volume (AC-FT)	1,544.3	349.2	342%
	Peak Flow (CFS)	499.4	190.0	163%
	Time of Peak	13:20	2:45	-11:40

Table A.7: Calibration Summary Table - March 10-12, 2011

River	Measure	Simulated	Observed	Difference
Ramapo	**USGS GAGE 01387400 - Wanaque River at Wanaque NJ**			
	Volume (AC-FT)	17,859.0	18,580.8	-4%
	Peak Flow (CFS)	5,267.5	5,707.6	-8%
	Time of Peak	9:35	10:30	-00:55
	USGS GAGE 01387420 - Ramapo River at Suffern NY			
	Volume (AC-FT)	18,053.1	18,114.3	0%
	Peak Flow (CFS)	5,412.1	5,209.9	4%
	Time of Peak	9:55	4:45	+04:50
	USGS GAGE 01387500 - Ramapo River near Mahwah NJ			
	Volume (AC-FT)	19,893.0	24,139.5	-18%
	Peak Flow (CFS)	5,985.8	7,870.0	-24%
	Time of Peak	10:30	6:45	
	USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam			
	Volume (AC-FT)	31,196.6	35,297.3	-12%
	Peak Flow (CFS)	8,833.4	9,650.0	-8%
	Time of Peak	12:30	12:05	+00:25
Pompton	**USGS GAGE 01388500 - Pompton River at Pompton Plains NJ**			
	Volume (AC-FT)	69,100.9	78,971.6	-12%
	Peak Flow (CFS)	17,490.1	17,700.0	-1%
	Time of Peak	21:35	19:00	+02:35
Pequannock	**USGS GAGE 01382500 - Pequannock River at Macopin Intake Dam NJ**			
	Volume (AC-FT)	18,494.6	10,635.2	74%
	Peak Flow (CFS)	4,556.0	2,790.0	63%
	Time of Peak	6:00	9:45	-03:45
Wanaque	**USGS GAGE 01387000 - Wanaque River at Wanaque NJ**			
	Volume (AC-FT)	12,067.1	13,708.4	-12%
	Peak Flow (CFS)	4,305.4	3,740.0	15%
	Time of Peak	14:30	14:00	+00:30

Table A.8: Calibration Summary Table - August 27-29, 2011

River	Measure	Simulated	Observed	Difference
Ramapo	**USGS GAGE 01387400 - Wanaque River at Wanaque NJ**			
	Volume (AC-FT)	40,066.1	34,187.2	17%
	Peak Flow (CFS)	12,910.5	13,700.0	-6%
	Time of Peak	13:50	13:00	+00:50
	USGS GAGE 01387420 - Ramapo River at Suffern NY			
	Volume (AC-FT)	41,678.8	35,469.3	18%
	Peak Flow (CFS)	14,346.4	13,100.0	10%
	Time of Peak	15:25	13:45	+01:40
	USGS GAGE 01387500 - Ramapo River near Mahwah NJ			
	Volume (AC-FT)	47,789.2	47,271.9	1%
	Peak Flow (CFS)	17,792.4	17,600.0	1%
	Time of Peak	14:15	16:00	-01:45
	USGS GAGE 01388000 - Ramapo River at Pompton Lakes NJ - Downstream of Dam			
	Volume (AC-FT)	68,606.8	61,301.5	12%
	Peak Flow (CFS)	21,521.6	21,400.0	1%
	Time of Peak	22:00	21:30	-00:30
Pompton	**USGS GAGE 01388500 - Pompton River at Pompton Plains NJ**			
	Volume (AC-FT)	113,637.9	119,088.5	-5%
	Peak Flow (CFS)	28,555.1	29,000.0	-2%
	Time of Peak	0:50	1:15	-00:25
Pequannock	**USGS GAGE 01382500 - Pequannock River at Macopin Intake Dam NJ**			
	Volume (AC-FT)	15,645.3	13,385.4	17%
	Peak Flow (CFS)	3,596.8	3,030.0	19%
	Time of Peak	10:00	14:45	-04:45
Wanaque	**USGS GAGE 01387000 - Wanaque River at Wanaque NJ**			
	Volume (AC-FT)	17,138.9	16,452.7	4%
	Peak Flow (CFS)	5,883.9	3,520.0	67%
	Time of Peak	2:35	2:45	-00:10

Table A.9: Final Calibrated Curve Number Values for Individual Basin Models

River	Sub-Basin	Basin Model March 13-15, 2010 CN	Basin Model March 6-8, 2011 CN	Basin Model March 10-12, 2011 CN	Basin Model Aug. 27-29, 2011 CN
Mahwah	MAH070	82	79	94	50
	MAH075	55	70	63	35
	MAH080	90	87	52	54
	MAH085	72	89	46	99
	MAH090	86	79	44	38
	MAH095	86	81	63	88
	MAH100	43	96	99	99
Pequannock	PEQ050	99	91	94	72
	PEQ055	99	89	94	70
	PEQ060	99	87	94	69
	PEQ065	99	85	94	67
	PEQ069	99	91	94	72
	PEQ070	90	92	73	73
	PEQ075	99	84	94	67
	PEQ076	99	90	94	71
	PEQ077	99	99	94	78
	PEQ078	99	84	94	67
	PEQ080	81	98	94	90
	PEQ084	70	92	66	73
	PEQ085	82	98	94	93
	PEQ086	81	98	94	92

River	Sub-Basin	Basin Model March 13-15, 2010 CN	Basin Model March 6-8, 2011 CN	Basin Model March 10-12, 2011 CN	Basin Model Aug. 27-29, 2011 CN
	PEQ090	99	98	94	98
	PEQ095	99	98	94	98
	PEQ100	99	98	94	99
Pompton	POM095	99	98	99	82
	POM100	99	96	99	82
Ramapo	RAM070	99	80	99	74
	RAM075	98	79	99	66
	RAM080	88	84	99	57
	RAM085	99	53	80	55
	RAM090	82	84	99	65
	RAM095	99	87	99	62
	RAM100	99	88	77	41
	RAM105	99	77	74	64
	RAM110	99	82	73	55
	RAM115	77	81	99	57
	RAM120	99	84	99	99
	RAM125	99	90	99	62
	RAM130	89	85	45	99
	RAM135	99	98	56	64
	RAM140	99	98	99	99
	RAM145	99	98	99	99
	RAM150	99	98	99	74

River	Sub-Basin	Basin Model March 13-15, 2010 CN	Basin Model March 6-8, 2011 CN	Basin Model March 10-12, 2011 CN	Basin Model Aug. 27-29, 2011 CN
	RAM154	99	80	99	99
	RAM155	99	98	46	99
	RAM159	99	98	99	55
	RAM160	99	98	99	57
	RAM170	99	84	99	99
	RAM180	82	98	68	63
	RAM190	99	98	99	73
	RAM195	99	98	99	67
	RAM200	99	98	99	75
Wanaque	WAN045	99	62	99	67
	WAN050	99	70	99	76
	WAN055	85	52	78	57
	WAN060	85	54	79	58
	WAN065	85	52	78	57
	WAN070	99	57	99	62
	WAN074	99	55	99	59
	WAN075	90	60	84	65
	WAN080	90	61	85	66
	WAN085	99	56	99	61
	WAN095	99	60	99	65
	WAN100	99	58	99	63

Table A.10: Final Calibrated Lag Time (min) Values for Individual Basin Models

River	Sub-Basin	Basin Model March 13-15, 2010 Lag Time (min)	Basin Model March 6-8, 2011 Lag Time (min)	Basin Model March 10-12, 2011 Lag Time (min)	Basin Model Aug. 27-29, 2011 Lag Time (min)
Mahwah	MAH070	894	895	1196	814
	MAH075	900	900	900	884
	MAH080	678	273	192	87
	MAH085	677	297	196	85
	MAH090	822	911	444	565
	MAH095	883	562	376	357
	MAH100	59	57	86	26
Pequannock	PEQ050	171	25	114	591
	PEQ055	199	439	102	693
	PEQ060	686	288	691	691
	PEQ065	1193	887	1212	1242
	PEQ069	625	348	541	546
	PEQ070	116	73	29	904
	PEQ075	26	26	38	26
	PEQ076	915	271	616	610
	PEQ077	66	44	66	100
	PEQ078	43	29	63	43
	PEQ080	1218	815	1218	1224
	PEQ084	120	120	120	120
	PEQ085	1223	1188	1222	1223

River	Sub-Basin	Basin Model March 13-15, 2010 Lag Time (min)	Basin Model March 6-8, 2011 Lag Time (min)	Basin Model March 10-12, 2011 Lag Time (min)	Basin Model Aug. 27-29, 2011 Lag Time (min)
	PEQ086	1223	1189	1222	1223
	PEQ090	51	50	75	51
	PEQ095	88	11	39	39
	PEQ100	64	42	42	95
Pompton	POM095	33	47	48	21
	POM100	18	26	26	38
Ramapo	RAM070	1488	991	1137	949
	RAM075	1009	861	588	562
	RAM080	1216	1188	1212	1332
	RAM085	1192	753	1157	1163
	RAM090	613	182	400	118
	RAM095	256	579	1301	602
	RAM100	1186	499	710	1186
	RAM105	364	105	356	160
	RAM110	234	678	1153	727
	RAM115	188	203	198	221
	RAM120	47	12	27	63
	RAM125	26	17	90	85
	RAM130	978	371	169	180
	RAM135	730	373	484	407
	RAM140	13	9	6	19
	RAM145	19	13	18	19

River	Sub-Basin	Basin Model March 13-15, 2010 Lag Time (min)	Basin Model March 6-8, 2011 Lag Time (min)	Basin Model March 10-12, 2011 Lag Time (min)	Basin Model Aug. 27-29, 2011 Lag Time (min)
	RAM150	44	109	488	123
	RAM154	12	26	17	12
	RAM155	913	564	405	405
	RAM159	39	188	277	131
	RAM160	98	96	127	489
	RAM170	29	98	65	68
	RAM180	815	589	756	502
	RAM190	1216	46	44	502
	RAM195	23	34	83	57
	RAM200	21	20	31	44
Wanaque	WAN045	359	333	350	360
	WAN050	260	111	259	266
	WAN055	556	250	373	559
	WAN060	593	176	176	393
	WAN065	687	305	203	790
	WAN070	929	1179	1223	1223
	WAN074	918	465	1042	799
	WAN075	767	29	96	331
	WAN080	925	1189	1223	1400
	WAN085	776	39	125	58
	WAN095	1357	909	79	900
	WAN100	53	10	35	111

Table A.11: Pompton Basin HEC-HMS Model Validation Summary

River	USGS GAGE	Precipitation Frequency	Simulated Peak Flow	HEC-SSP Flow	Confidence Limits
			(cfs)	(cfs)	(cfs)
Ramapo	01388000	2-yr	5,239	3,606	3,231 to 4,020
		10-yr	10,169	8,578	7392 to 9,969
		40-yr	16,457	-	-
		50-yr	17,582	15,352	12,396 to 18,625
		100-yr	20,942	19,098	14,496 to 25,500
River	**USGS GAGE**	**Precipitation Frequency**	**Simulated Peak Flow**	**HEC-SSP Flow**	**Standard Error**
			cfs	**cfs**	**%**
Pompton	01388500	2-yr	5,961	6,021	-
		10-yr	11,837	14,753	-
		40-yr	19,228	-	-
		50-yr	20,681	25,950	-
		100-yr	25,723	31,878	-

Table A.12: Flood Frequency Analysis

River	USGS Gage	Storm	Simulated Peak	Observed Peak	Bulletin 17B Estimate	Annual Exceedance Probability	Recurrence Interval
			(cfs)	(cfs)	(cfs)	-	(yr)
Ramapo	01388000	March 13-15, 2010	10,920	11,000	8,341 - 12,230	0.1 - 0.04	10 - 25yr
		March 6-8, 2011	9,862	8,710	8,341 - 12,230	0.1 - 0.04	10 - 25yr
		March 10-12, 2011	8,833	9,650	8,341 - 12,230	0.1 - 0.04	10 - 25yr
		Aug. 27-29, 2011	21,522	21,400	20,320 - 25,670	0.01 - 0.005	100 - 200yr

River	USGS Gage	Storm	Simulated Peak	Observed Peak	Bulletin 17B Estimate	Annual Exceedance Probability	Recurrence Interval
			(cfs)	(cfs)	(cfs)	-	(yr)
Pompton	01388500	March 13-15, 2010	19,539	18,900	14,040 - 19,910	0.1 - 0.04	10 - 25yr
		March 6-8, 2011	12,779	14,400	10,220 - 14,040	0.2 -0.1	5 - 10yr
		March 10-12, 2011	17,490	17,700	14,040 - 19,910	0.1 - 0.04	10 - 25yr
		Aug. 27-29, 2011	28,555	29,000	25,100 - 31,030	0.02 - 0.01	50 - 100yr

Appendix B

SPAS FIGURES

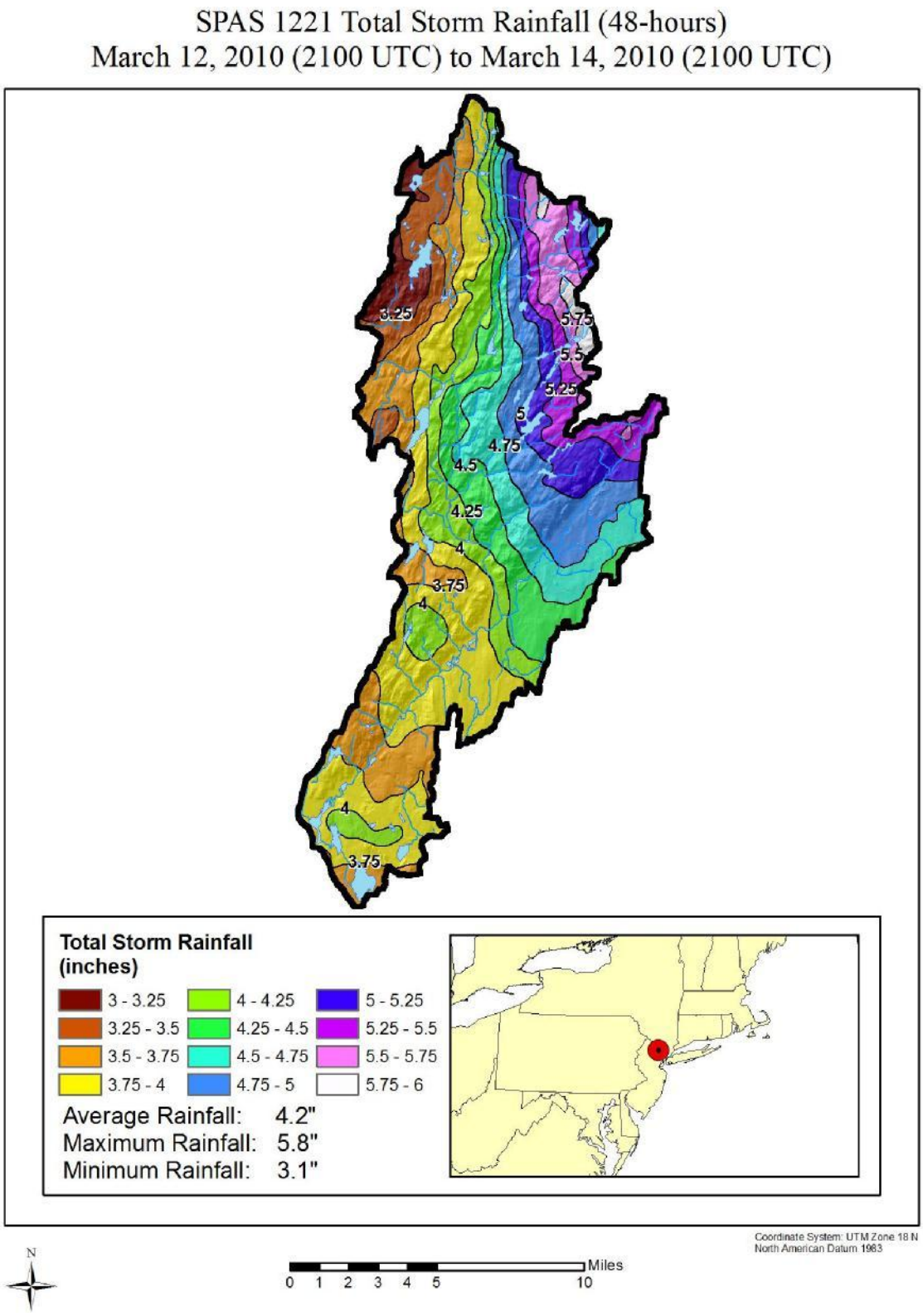


Figure 1 Total storm rainfall over Pompton Lake Drainage Basin (PLDB)

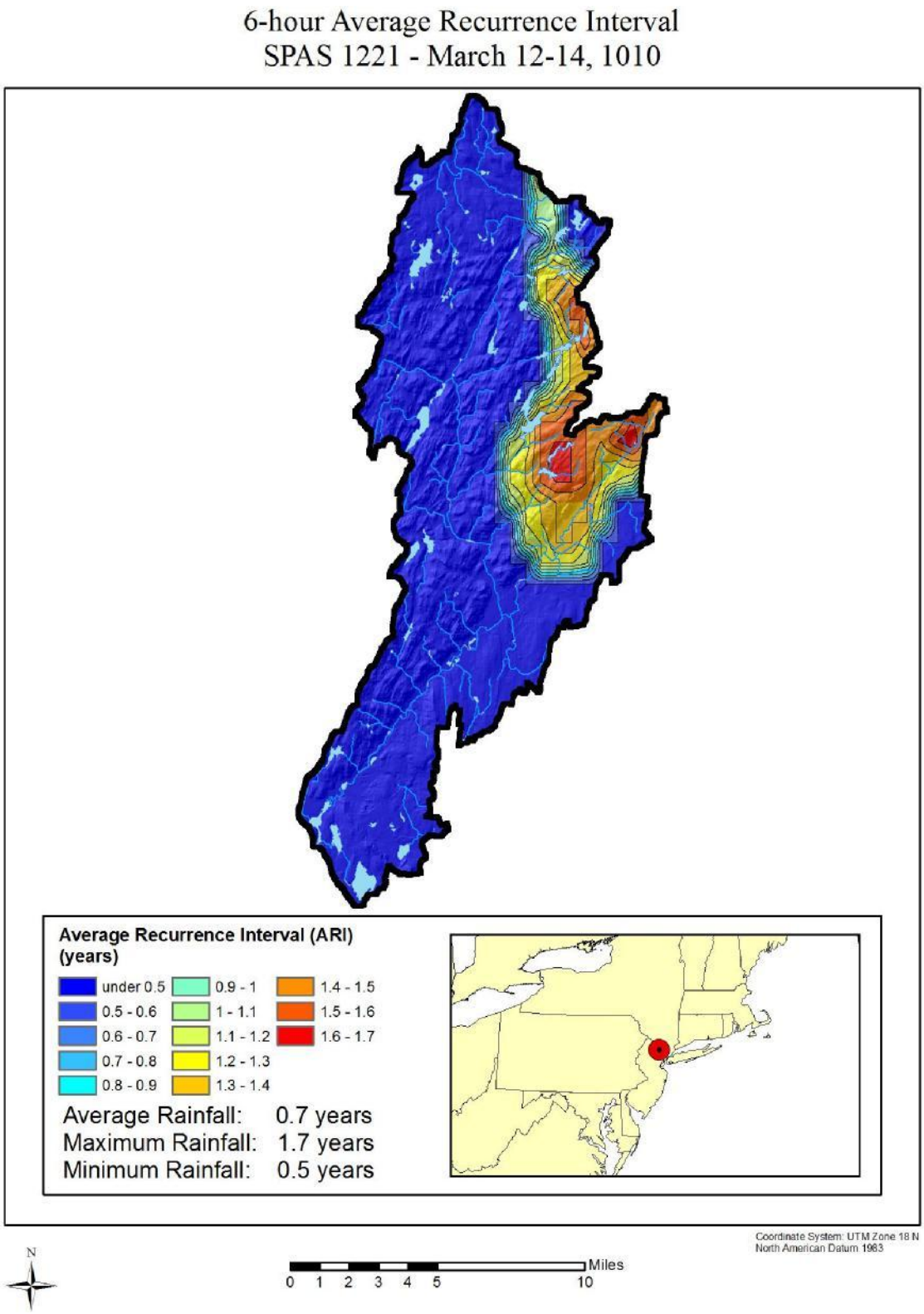


Figure 2 6-hour ARI over Pompton Lake Drainage Basin (PLDB)

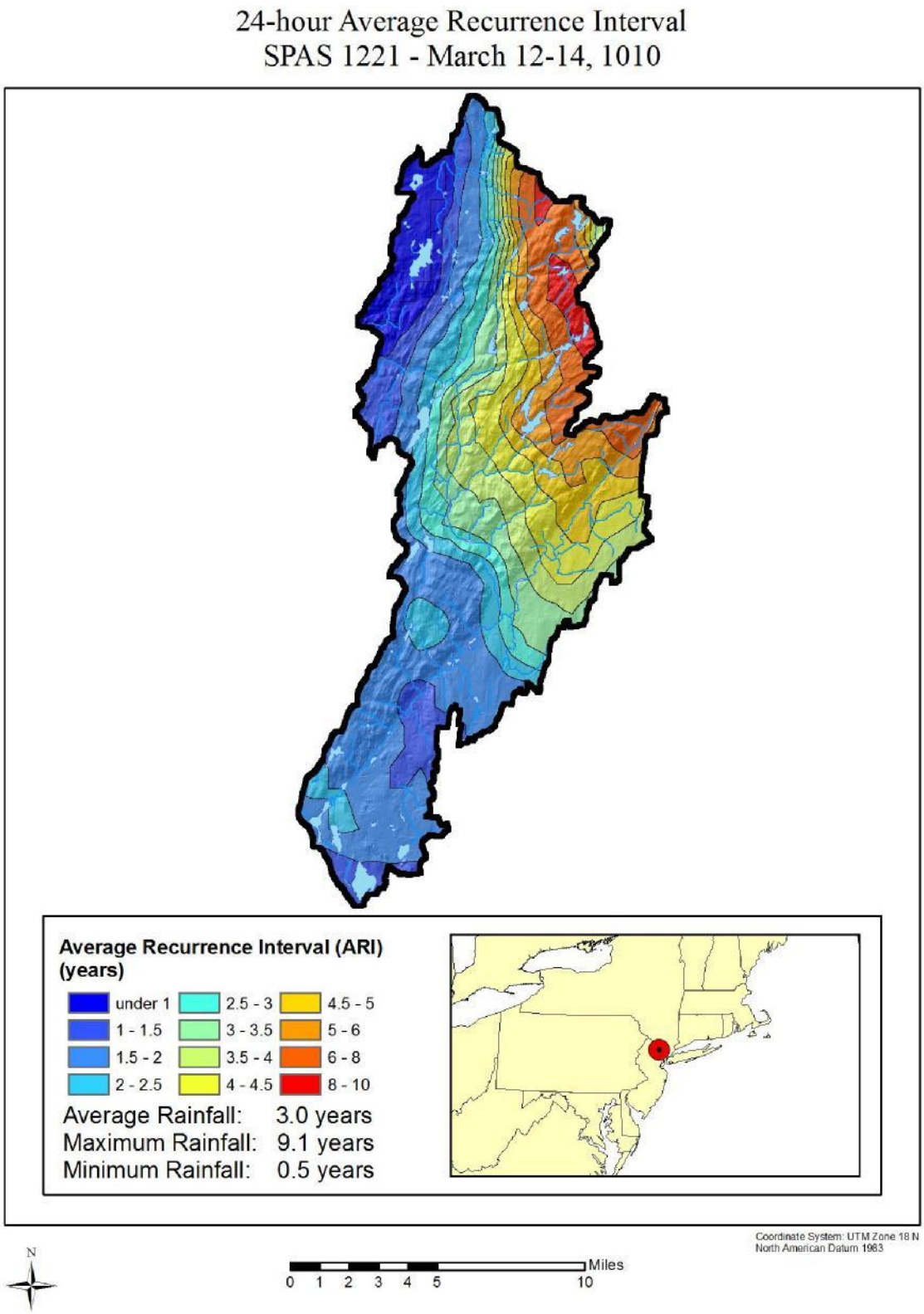


Figure 3 24-hour ARI over Pompton Lake Drainage Basin (PLDB)

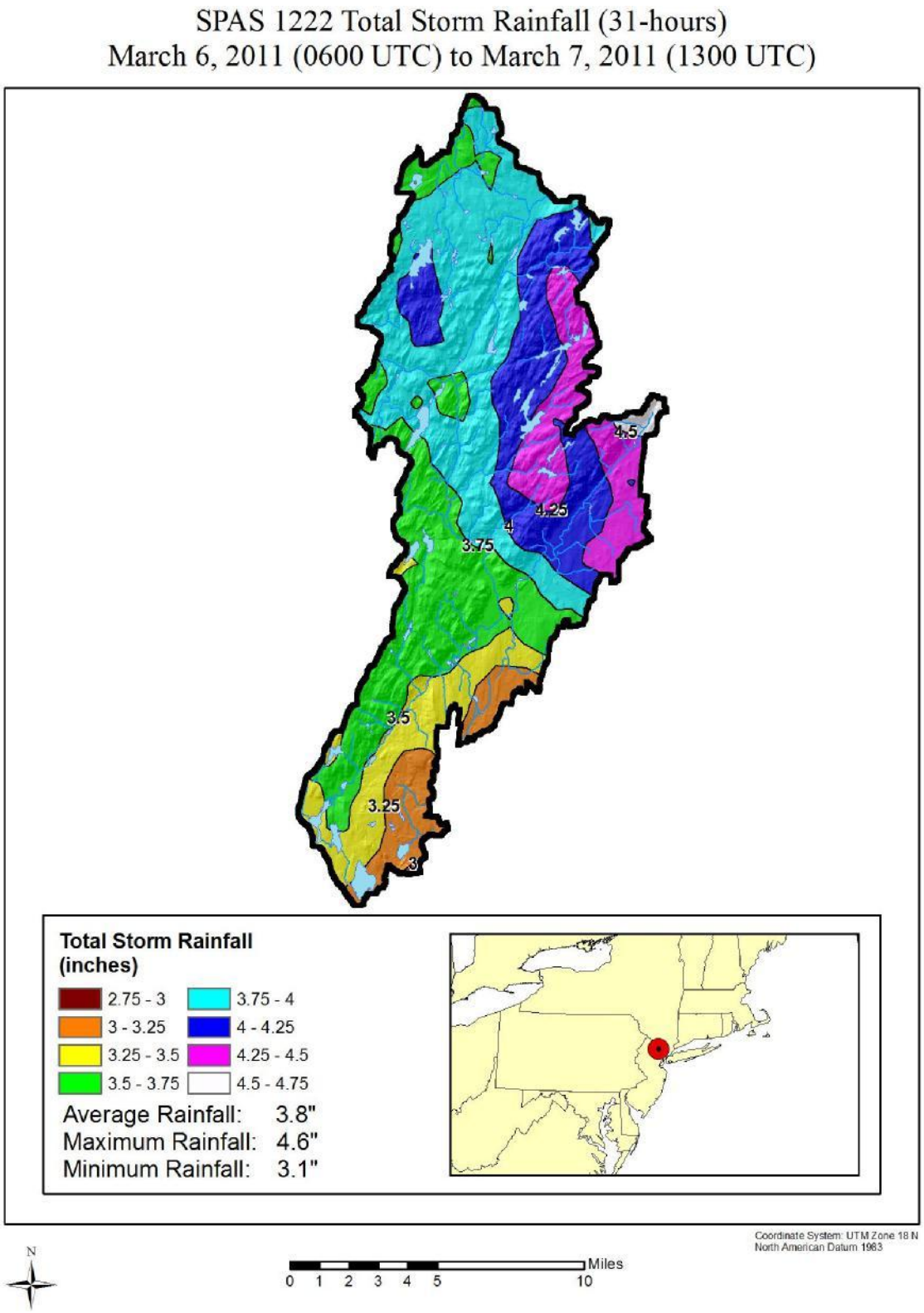


Figure 4 Total storm rainfall over Pompton Lake Drainage Basin (PLDB)

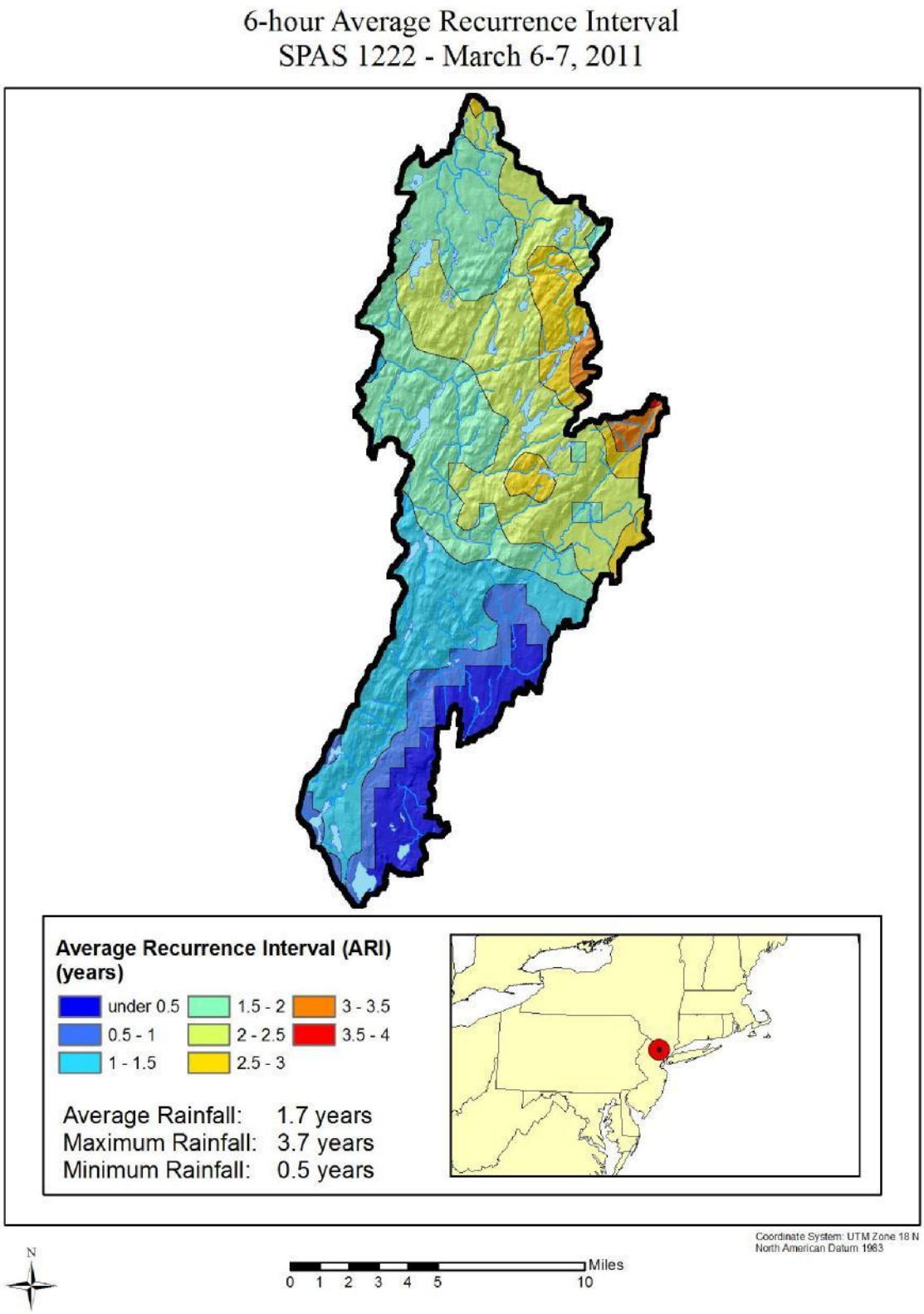


Figure 5 6-hour ARI over Pompton Lake Drainage Basin (PLDB)

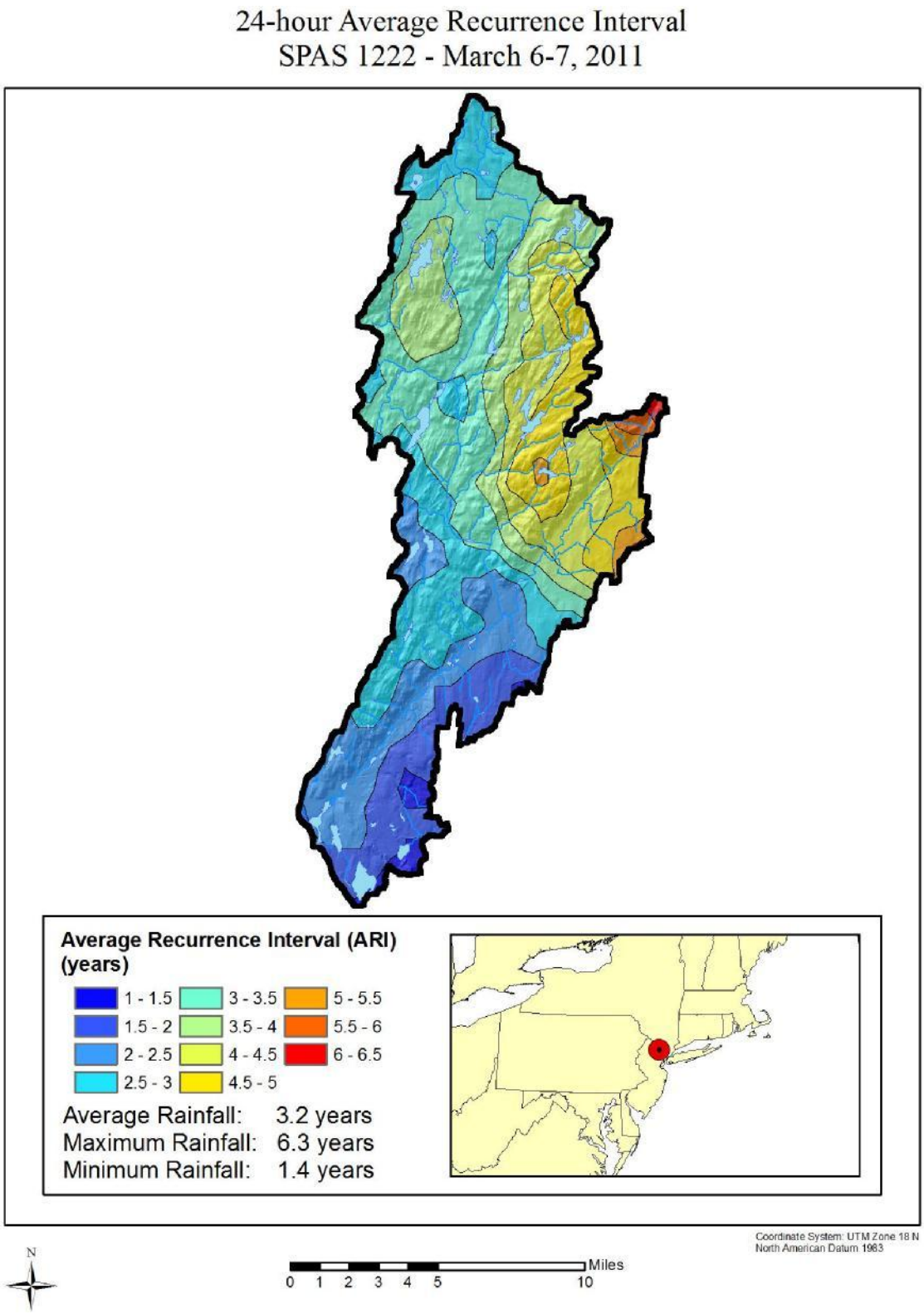


Figure 6 24-hour ARI over Pompton Lake Drainage Basin (PLDB)

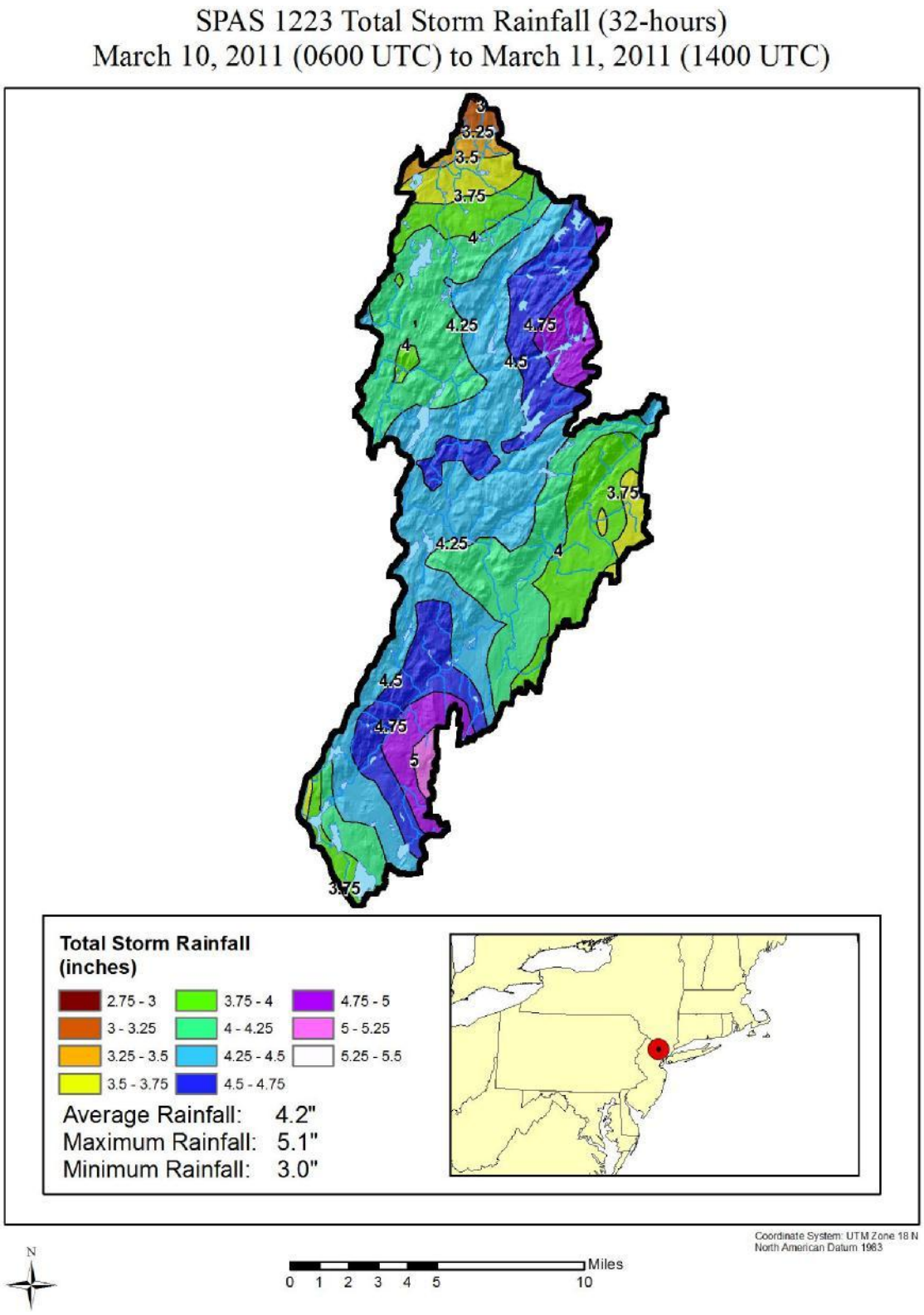


Figure 7 Total storm rainfall over Pompton Lake Drainage Basin (PLDB)

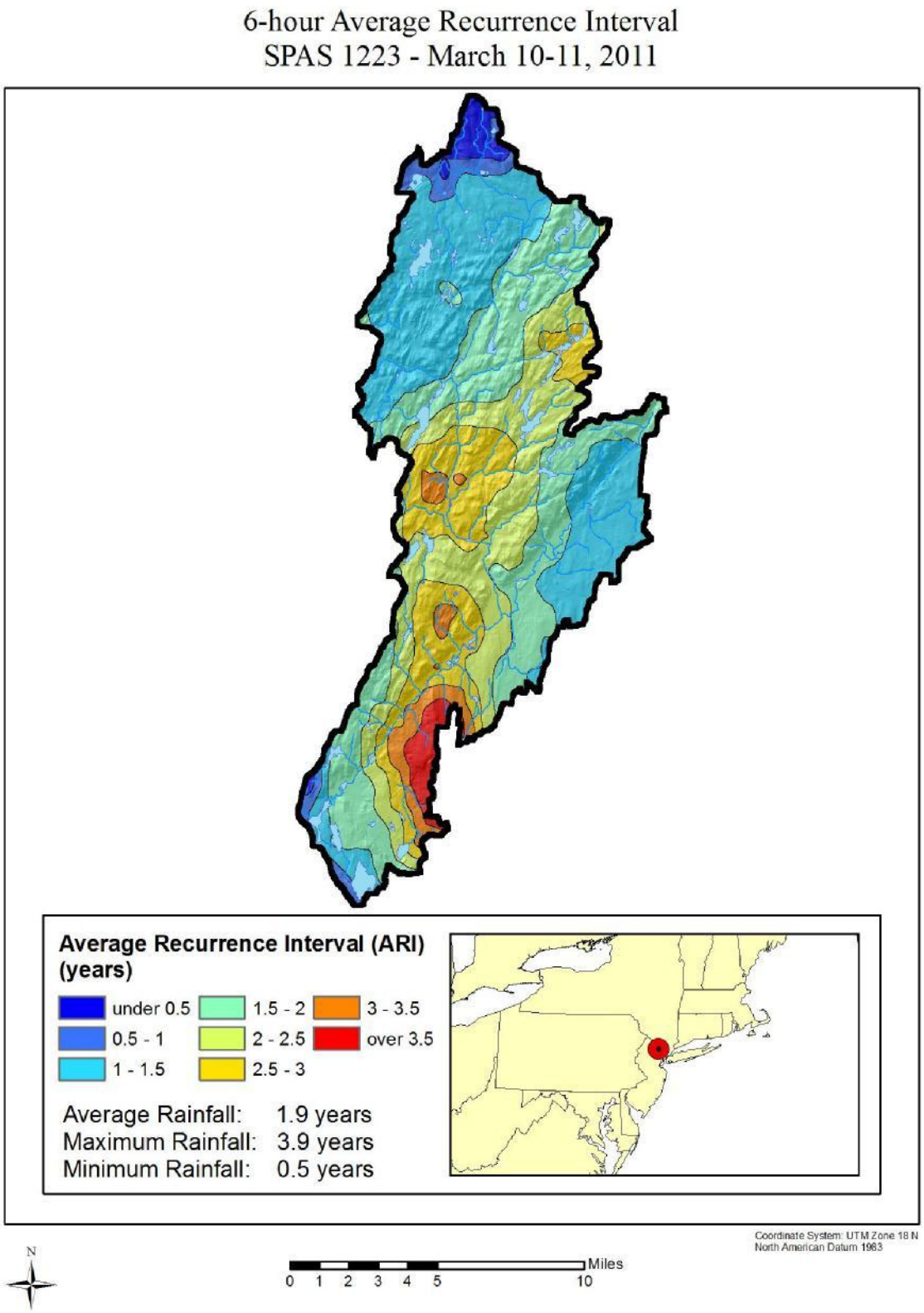


Figure 8 6-hour ARI over Pompton Lake Drainage Basin (PLDB)

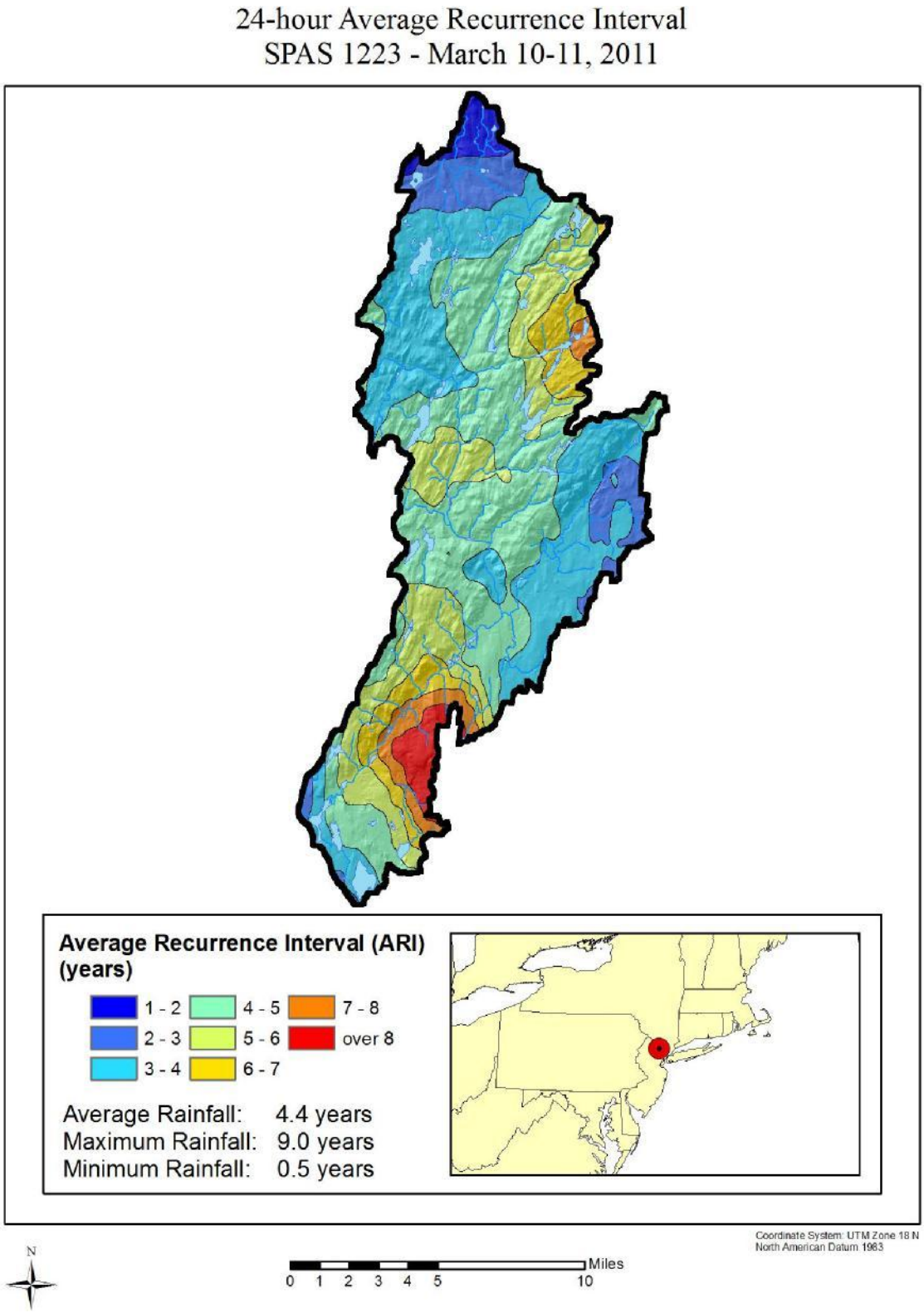


Figure 9 24-hour ARI over Pompton Lake Drainage Basin(PLDB)

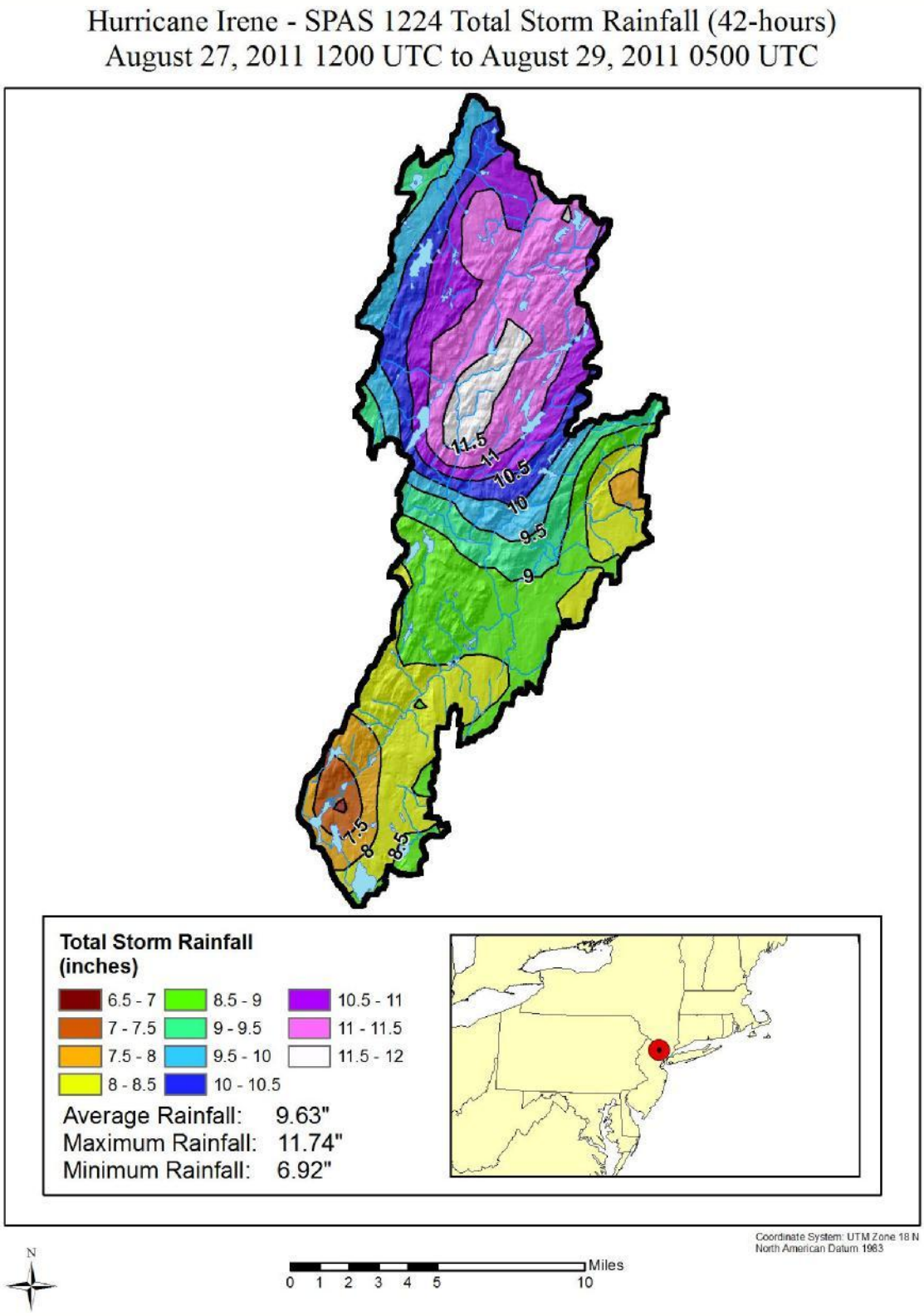


Figure 10 Total storm rainfall over Pompton Lake Drainage Basin (PLDB)

6-hour Average Recurrence Interval - Hurricane Irene
SPAS 1224 - August 27 - 29, 2011

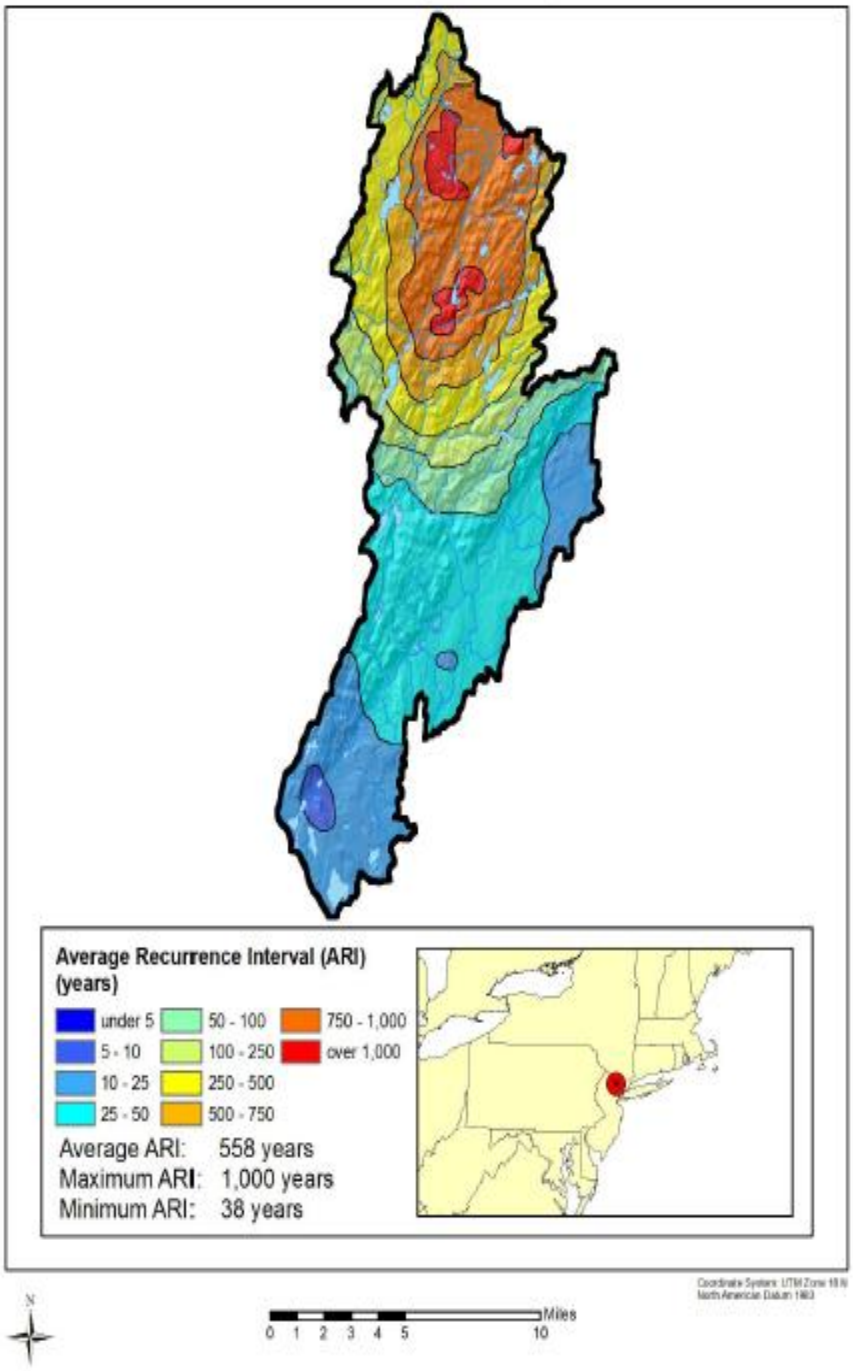


Figure 11 6-hour ARI over Pompton Lake Drainage Basin (PLDB)

24-hour Average Recurrence Interval - Hurricane Irene
SPAS 1224 - August 27 - 29, 2011

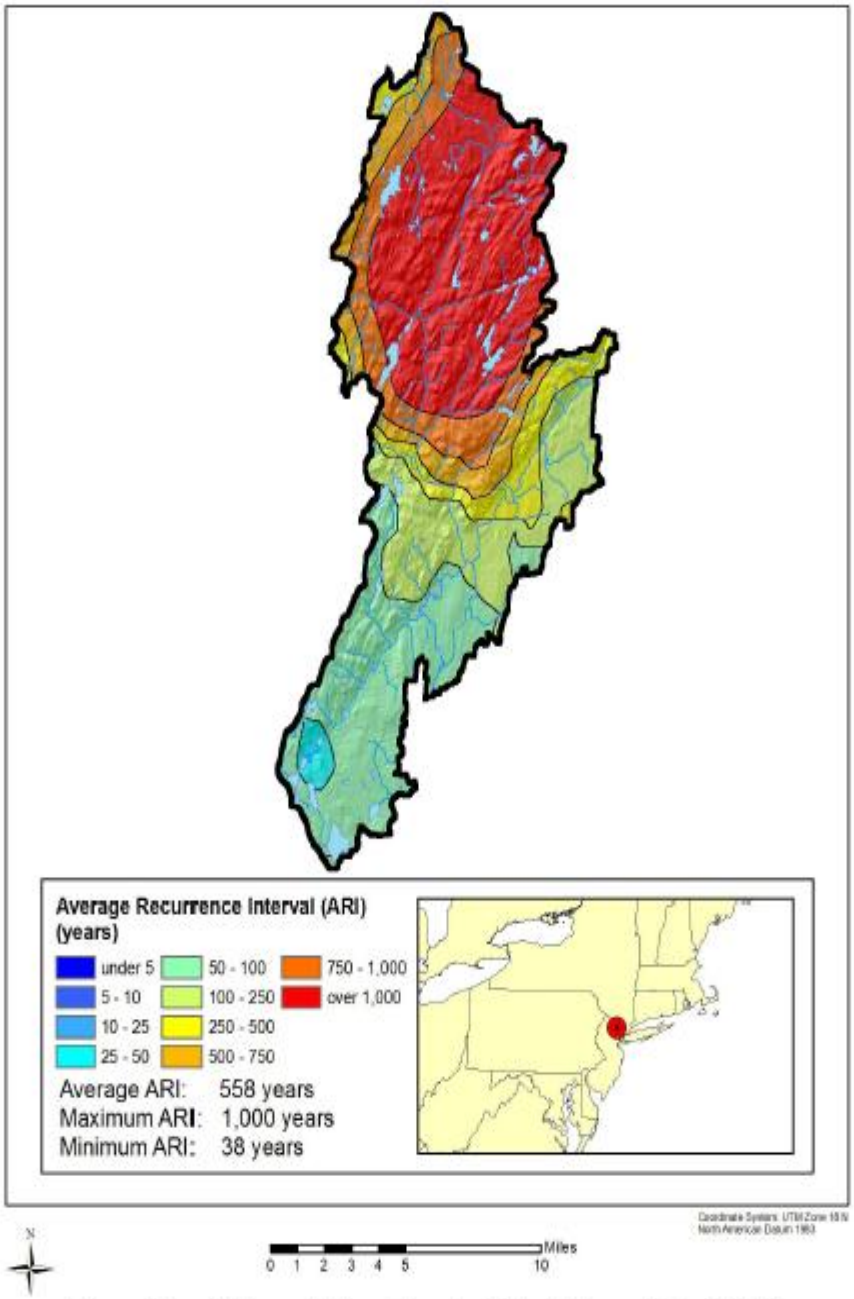


Figure 12 24-hour ARI over Pompton Lake Drainage Basin (PLDB)

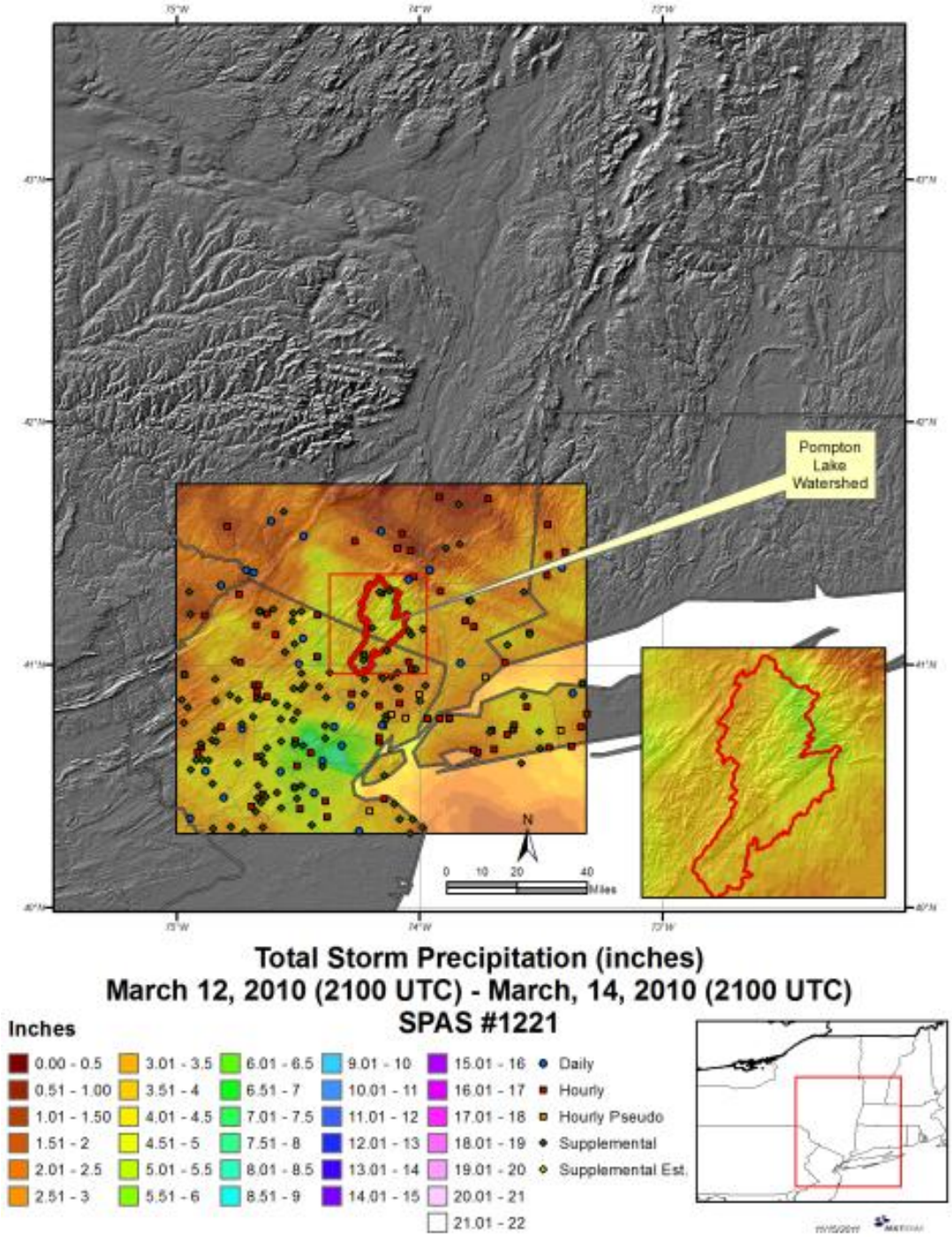


Figure 13 Total Storm Precipitation of the March 12-14, 2010 Storm Domain

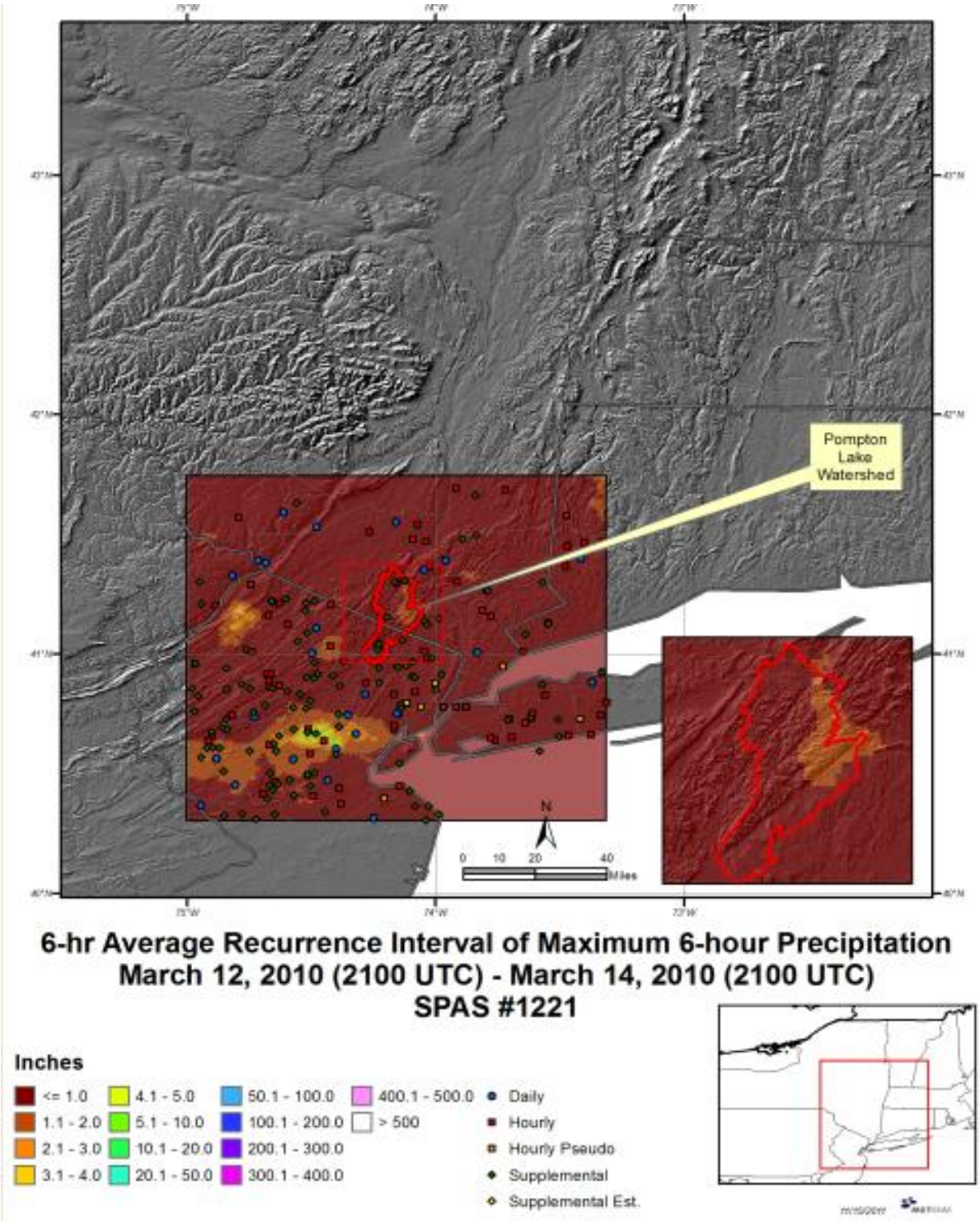


Figure 14 6-hour ARI over the Storm Domain for the March 12-14, 2010 Precipitation Event

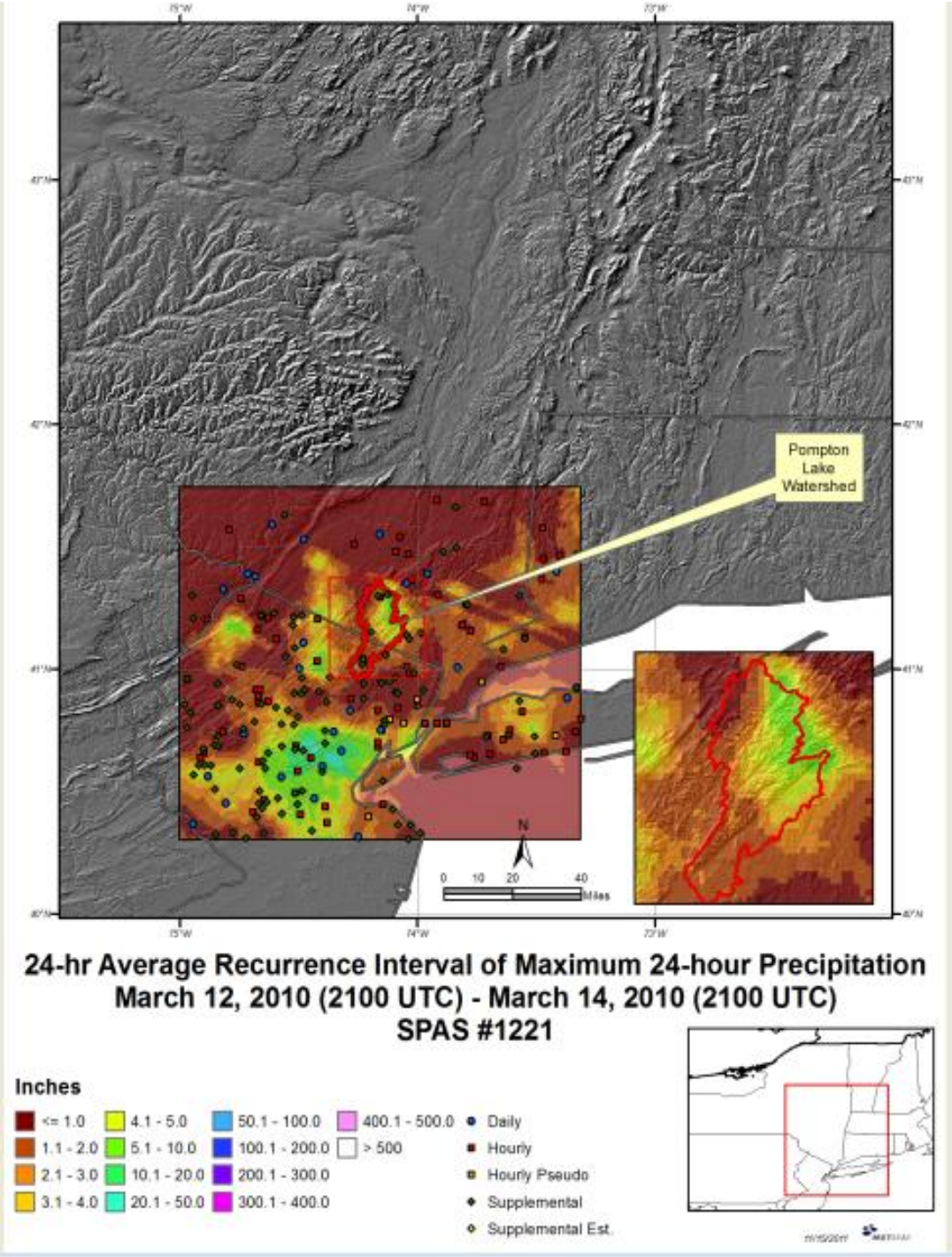


Figure 15 24-hour ARI over the Storm Domain for the March 12-14, 2010 Precipitation Event

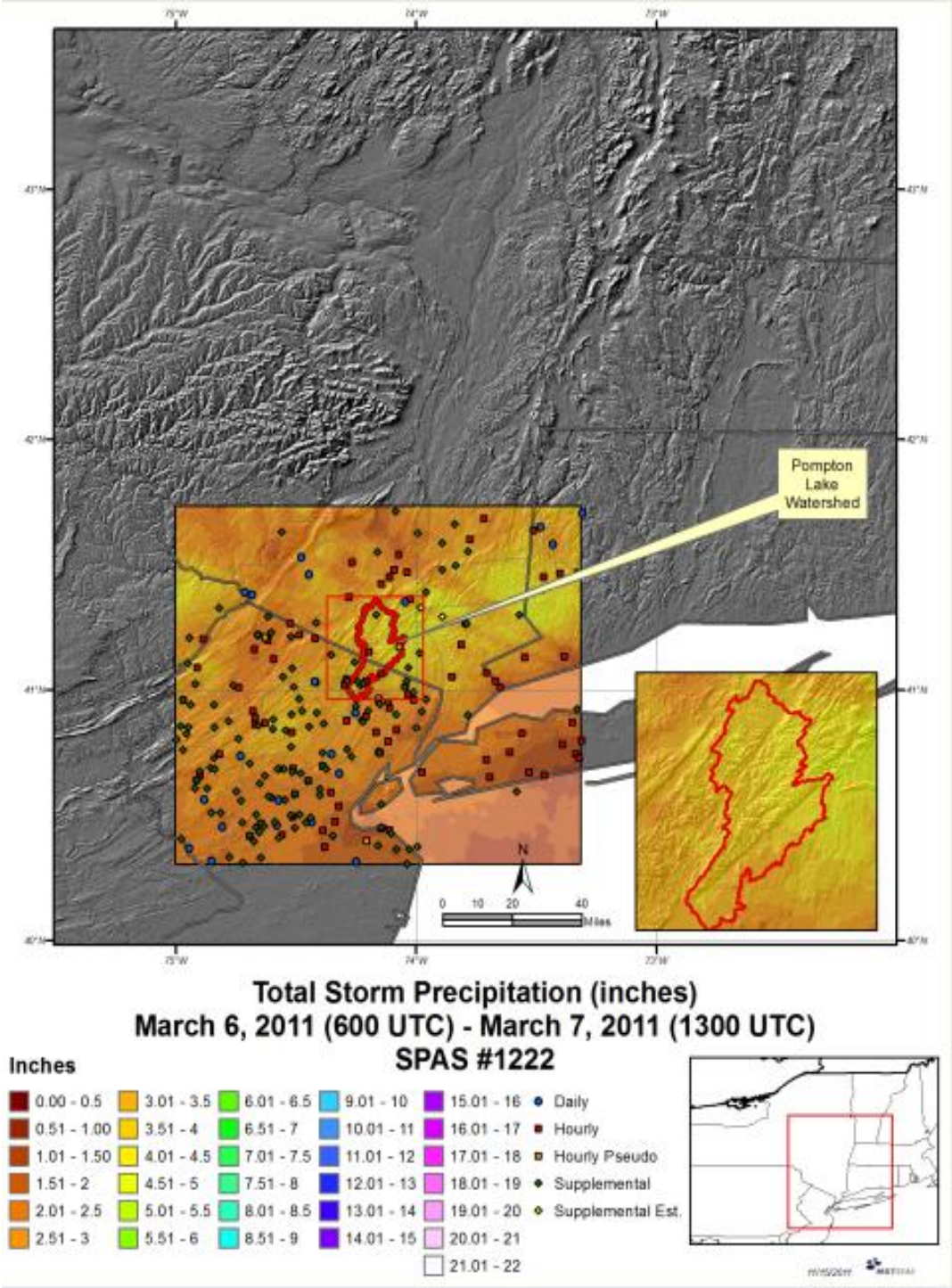


Figure 16 Total Storm Precipitation of the March 6-7, 2011 Storm Domain

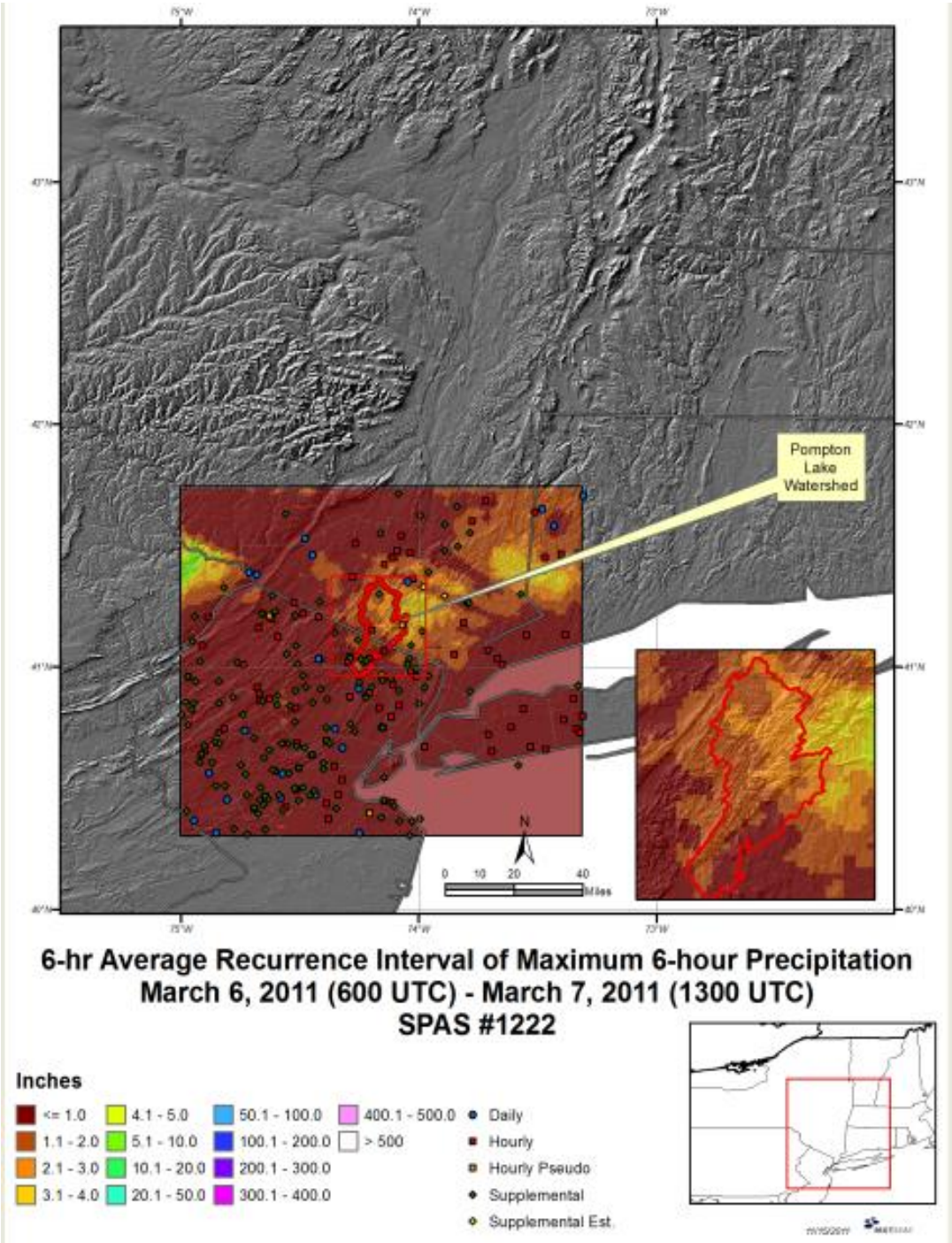


Figure 17 6-hour ARI over the Storm Domain for March 6-7, 2011 Precipitation Event

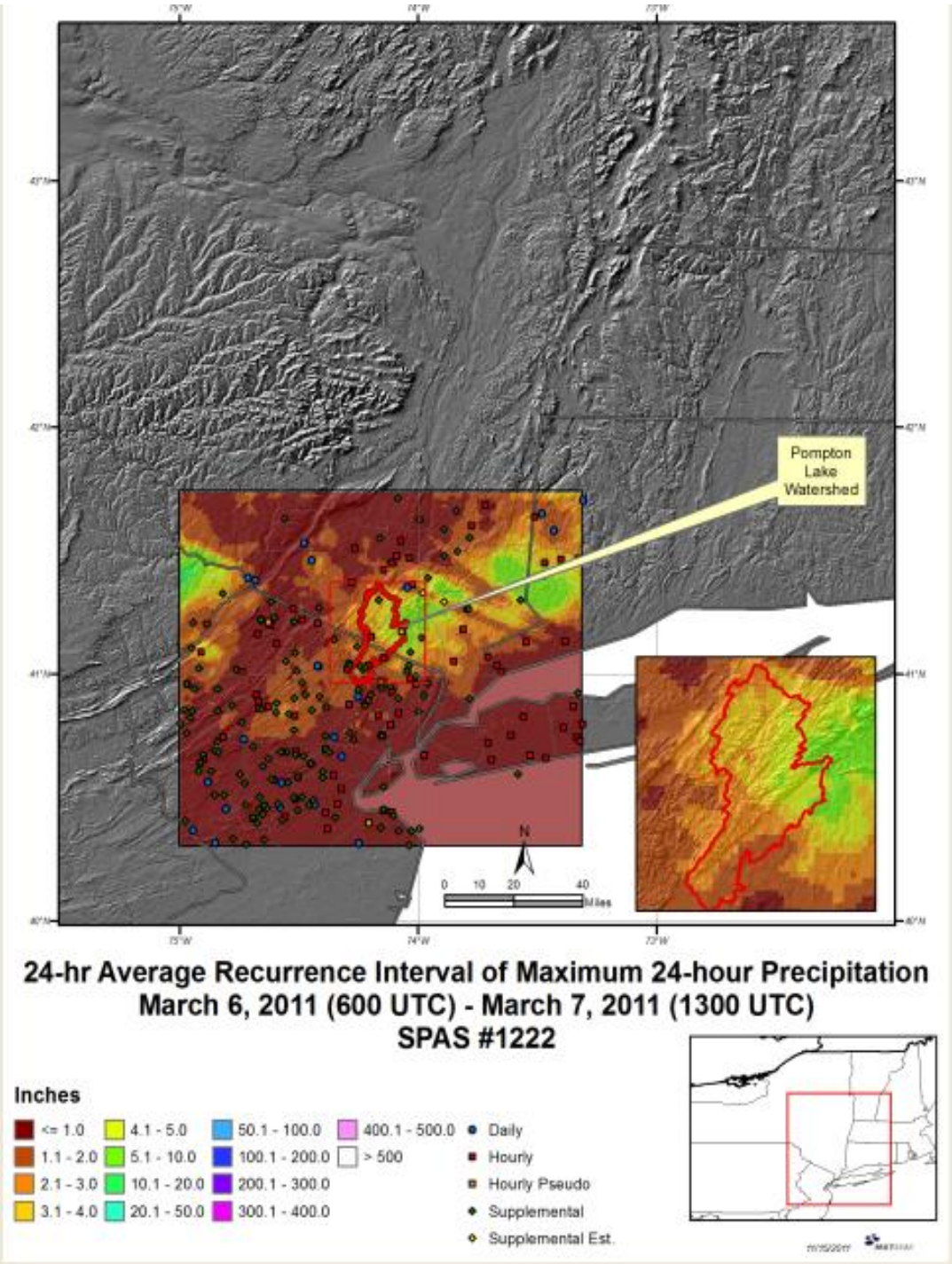


Figure 18 24-hour ARI over the Storm Domain for March 6-7, 2011 Precipitation Event

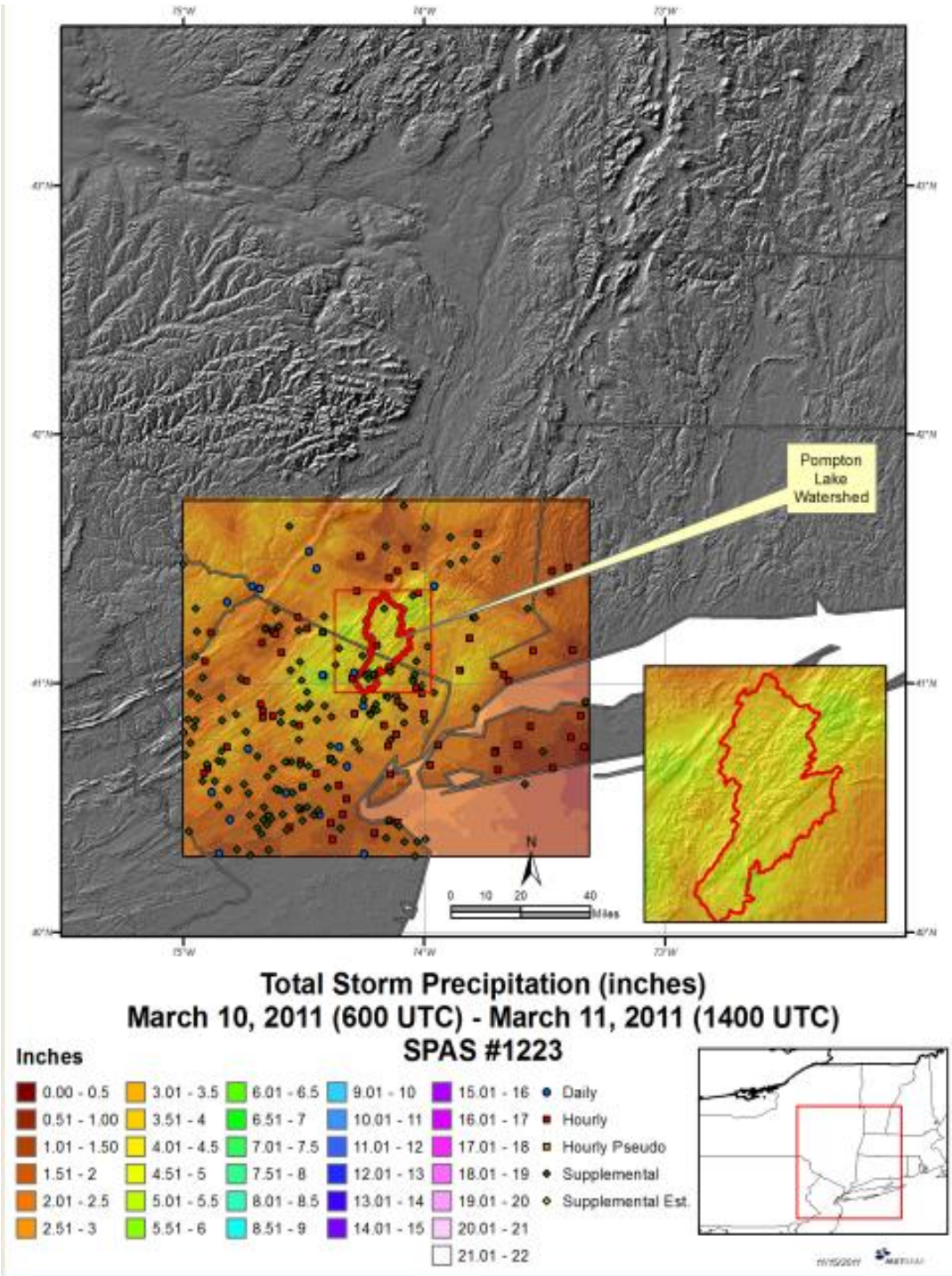


Figure 19 Total Storm Precipitation of the March 10-11, 2011 Storm Domain

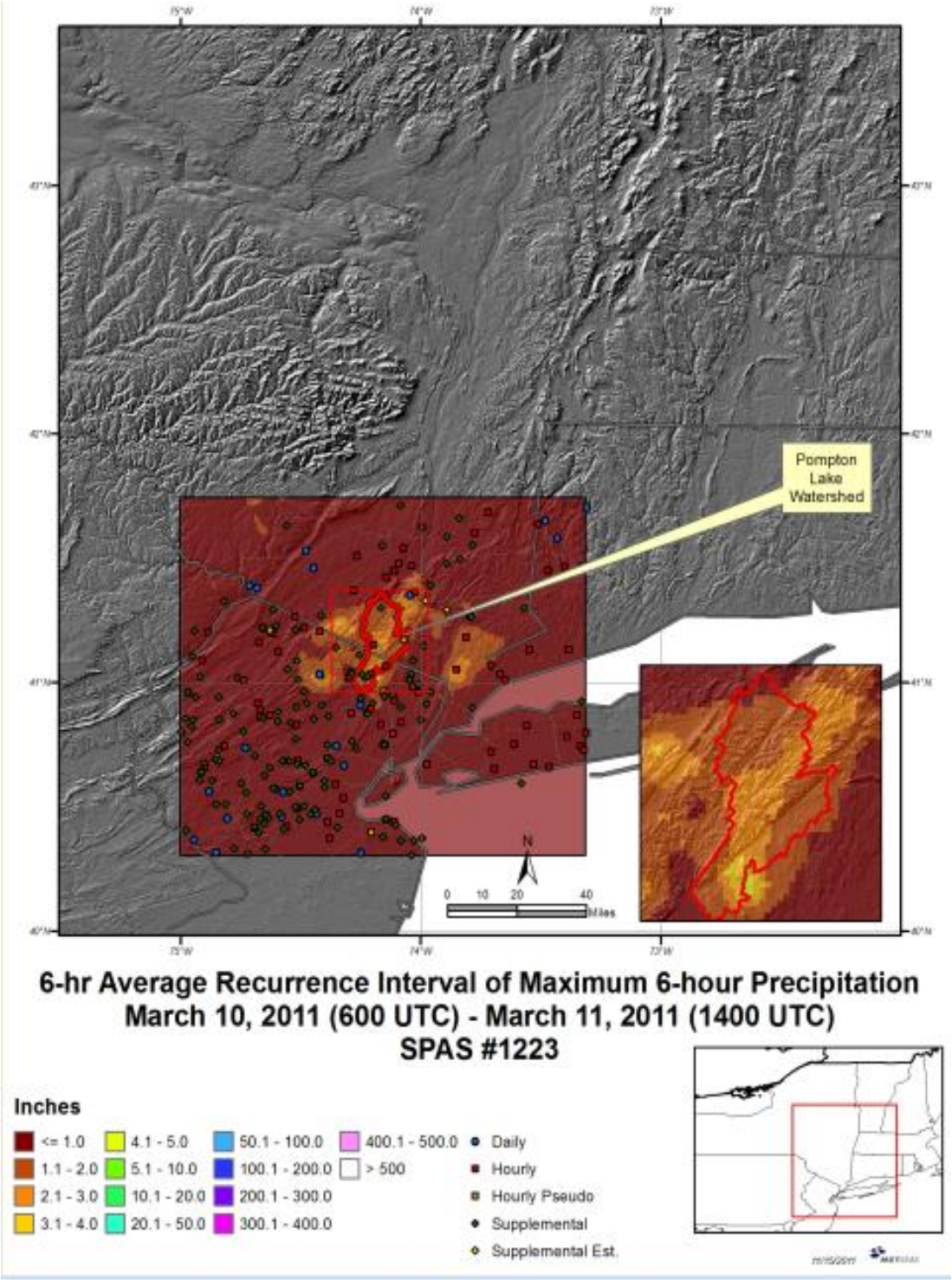


Figure 20 6-hour ARI over the Storm Domain for March 10-11, 2011 Precipitation Event

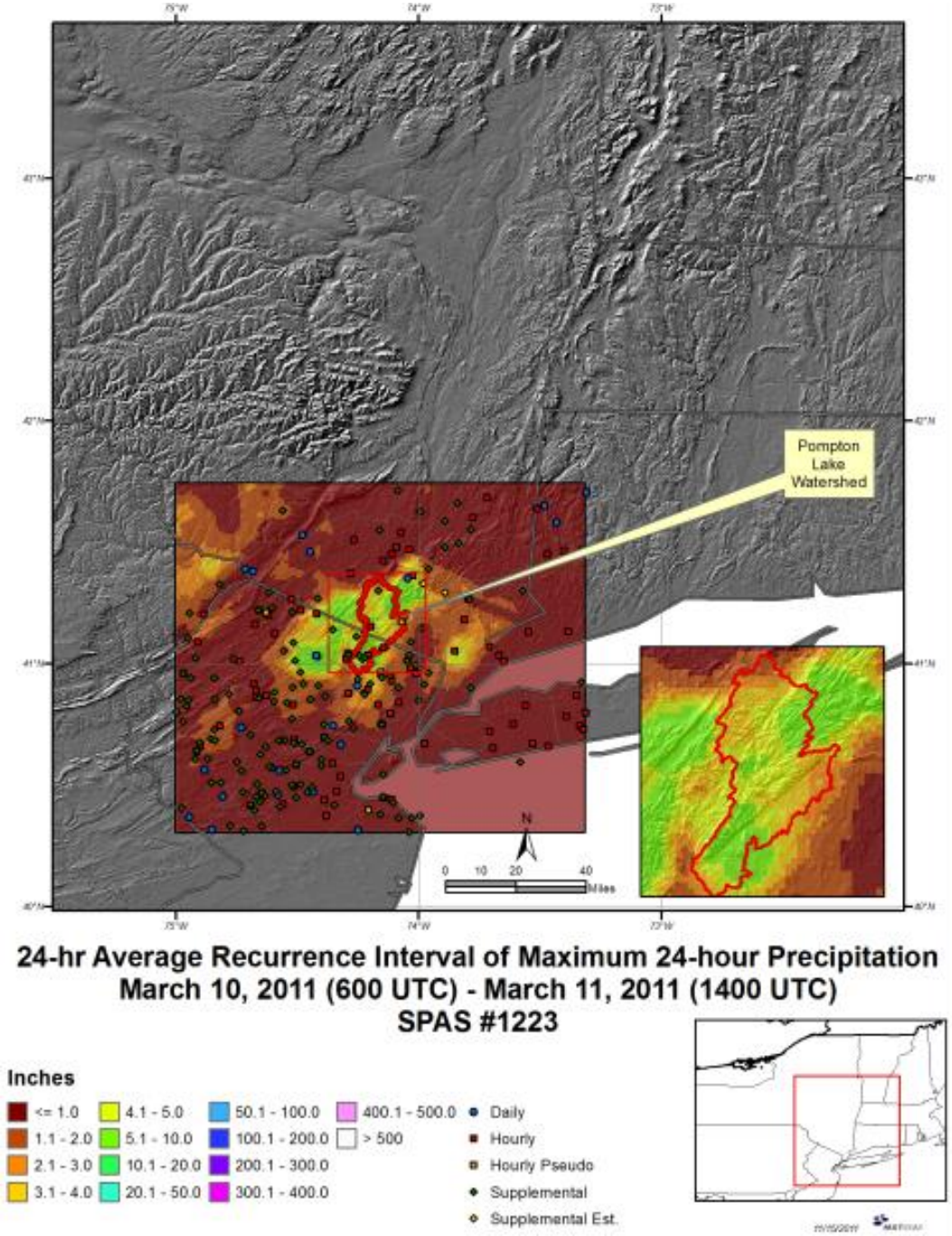


Figure 21 24-hour ARI over the Storm Domain for March 10-11, 2011 Precipitation Event

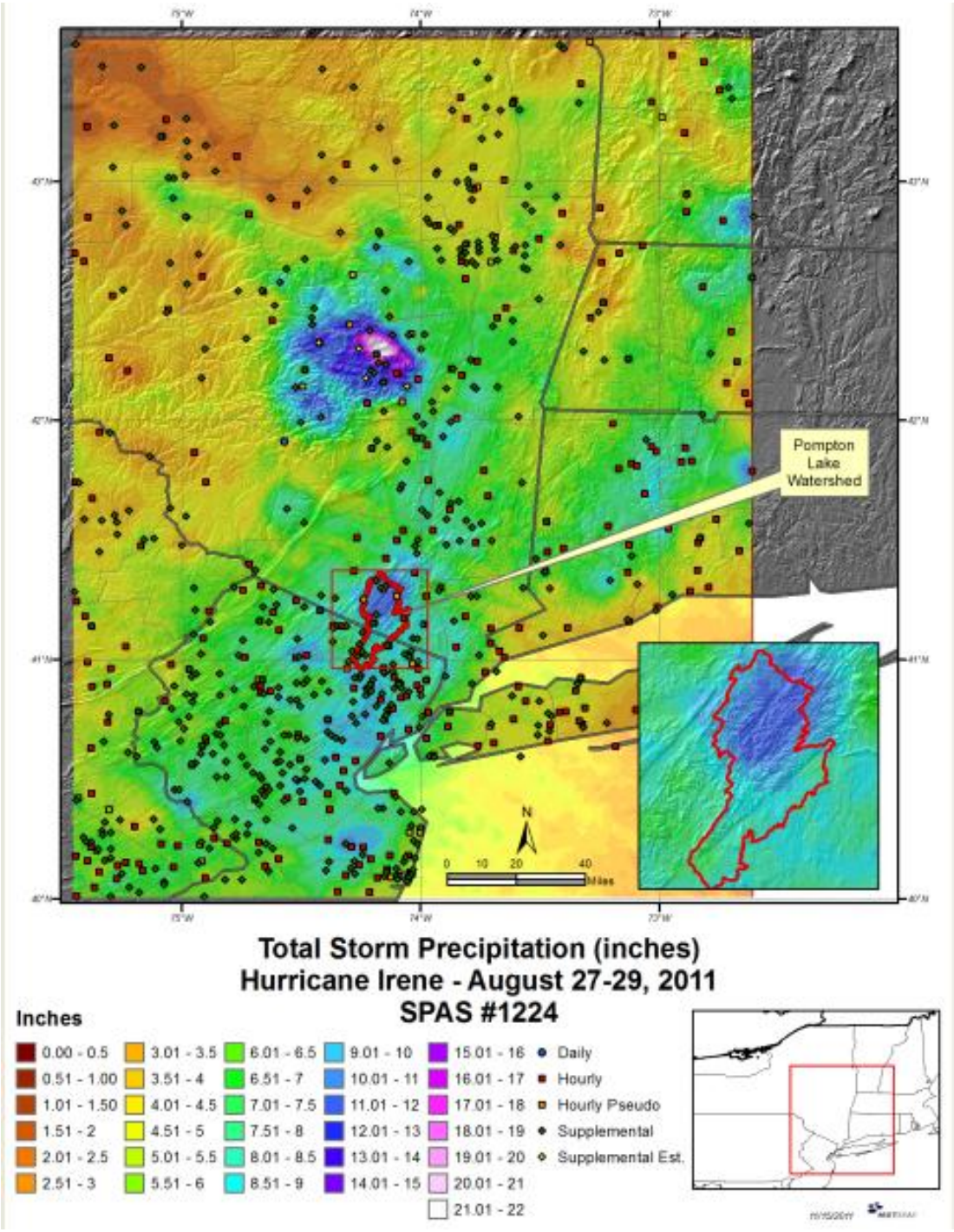


Figure 22 Total Storm Precipitation Hurricane Irene August 27-29, 2011 Storm Domain

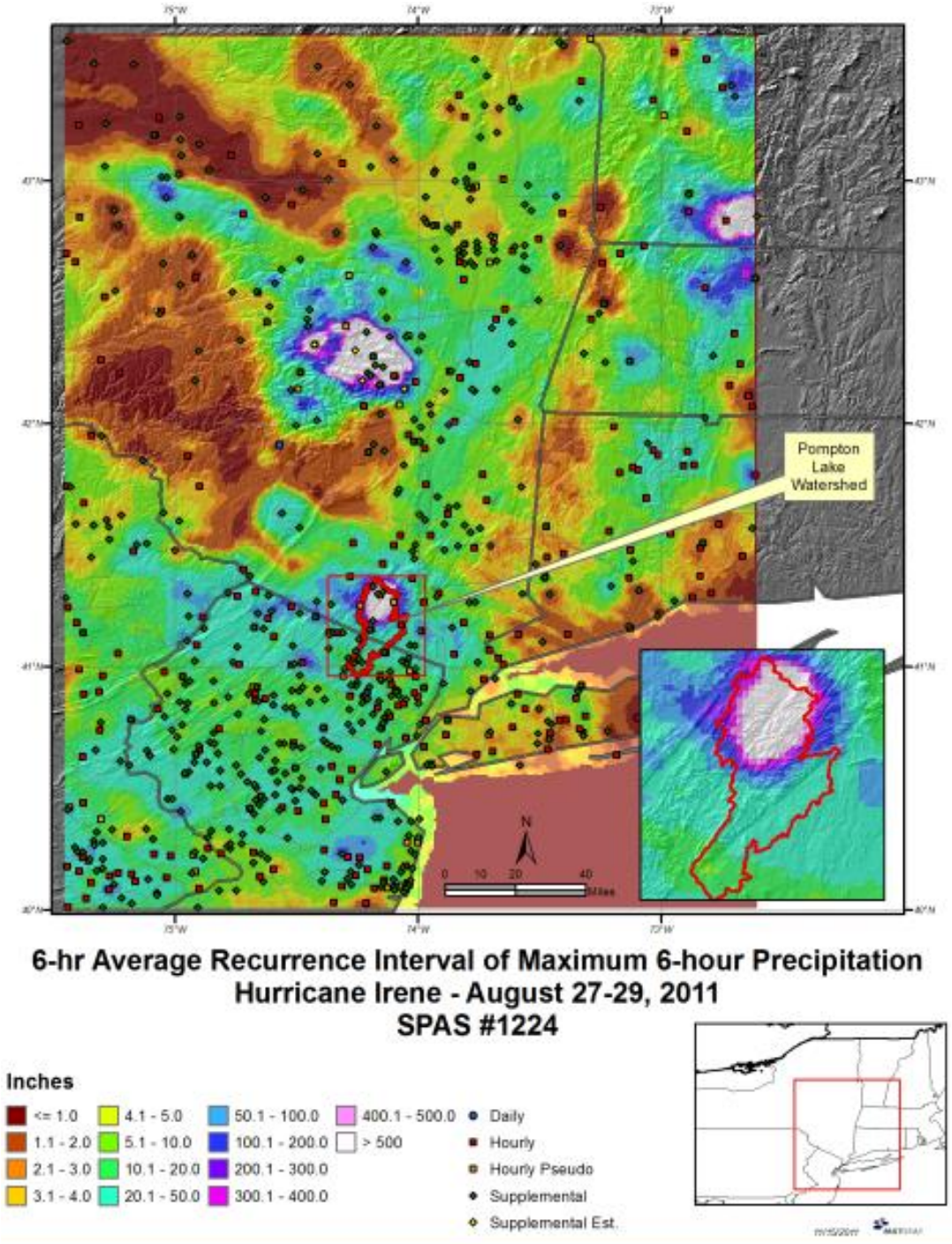


Figure 23 6-hour ARI over the Storm Domain for Hurricane Irene August 27-29, 2011 Precipitation Event

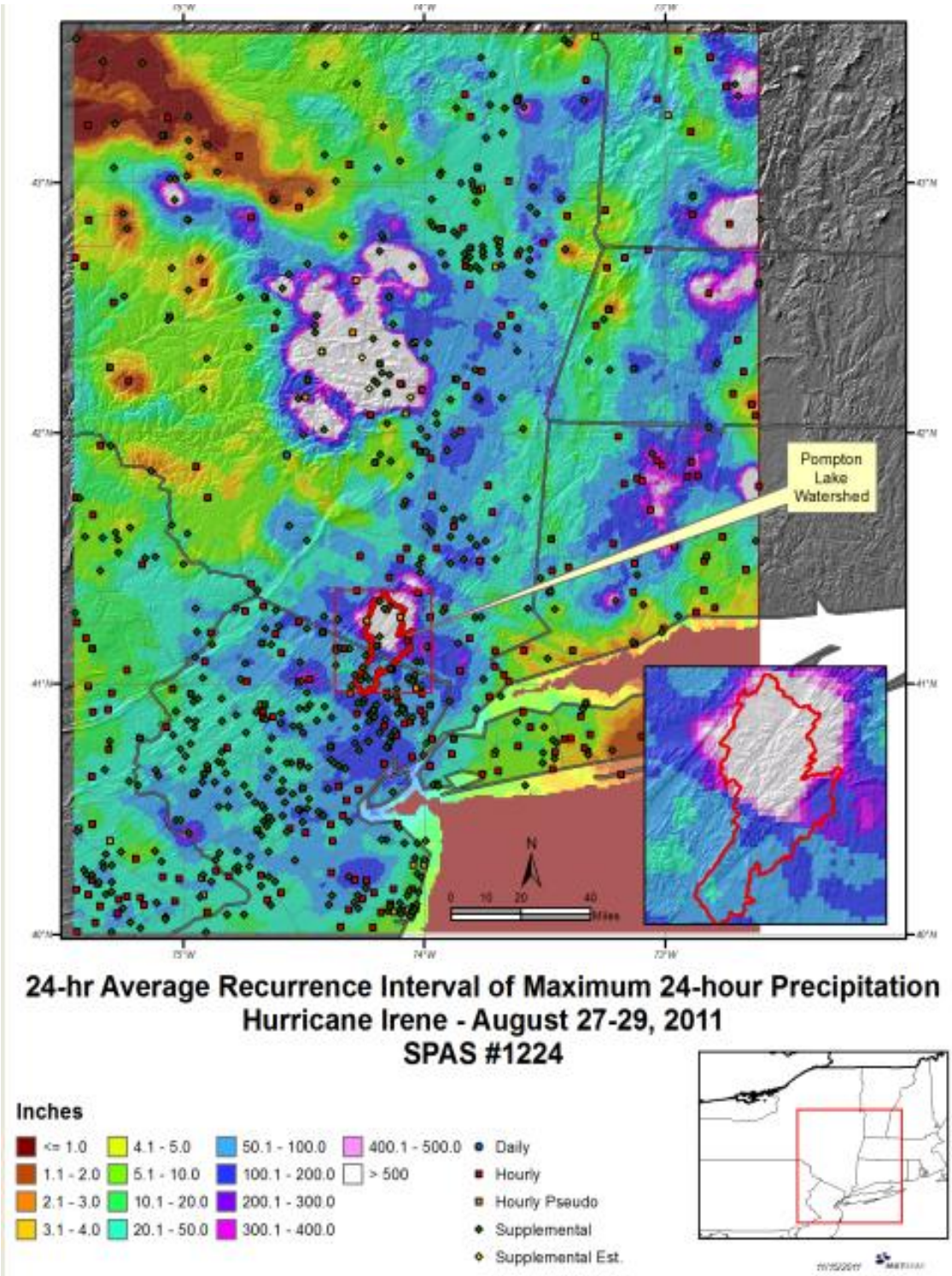
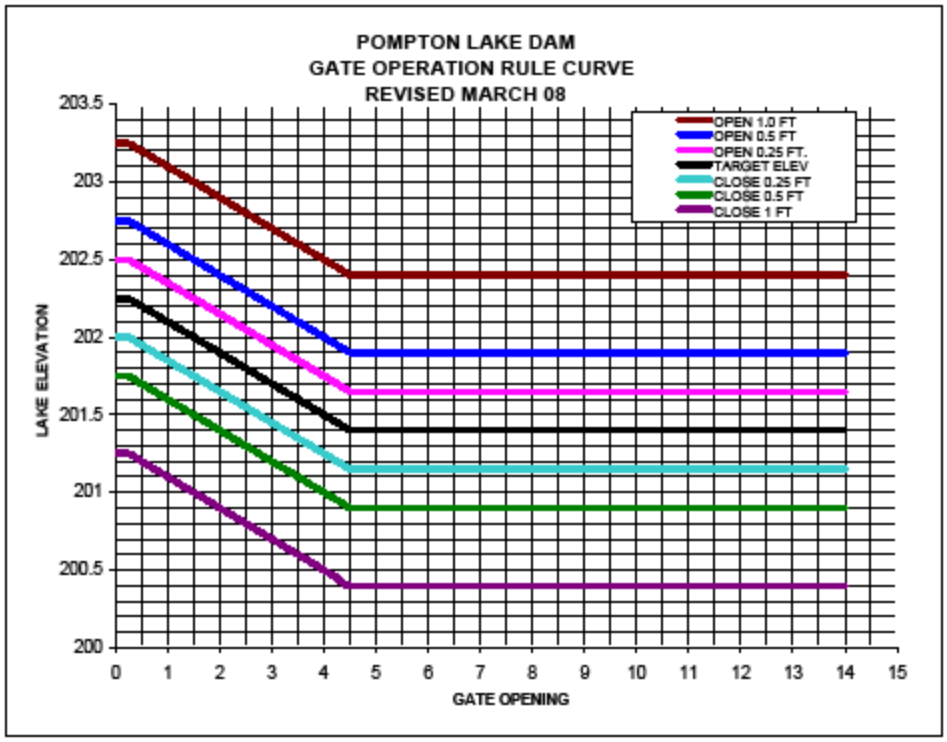


Figure 24 24-hour ARI over the Storm Domain for Hurricane Irene August 27-29, 2011 Precipitation Event

Appendix C

OPERATING RULE CURVE



EXCEPTIONS
LAKE LEVEL RISING - DO NOT CLOSE GATES
LAKE LEVEL FALLING - DO NOT OPEN GATES

		GATE OPERATION RULE CURVE - DATA					
GATE	OPEN 1.0	OPEN 0.5	OPEN 0.25	TARGET	CLOSE 0.25	CLOSE 0.5	CLOSE 1.0
0	203.25	202.75	202.5	202.25	202	201.75	201.25
0.25	203.25	202.75	202.5	202.25	202	201.75	201.25
0.5	203.2	202.7	202.45	202.2	201.95	201.7	201.2
0.75	203.15	202.65	202.4	202.15	201.9	201.65	201.15
1	203.1	202.6	202.35	202.1	201.85	201.6	201.1
1.25	203.05	202.55	202.3	202.05	201.8	201.55	201.05
1.5	203	202.5	202.25	202	201.75	201.5	201
1.75	202.95	202.45	202.2	201.95	201.7	201.45	200.95
2	202.9	202.4	202.15	201.9	201.65	201.4	200.9
2.25	202.85	202.35	202.1	201.85	201.6	201.35	200.85
2.5	202.8	202.3	202.05	201.8	201.55	201.3	200.8
2.75	202.75	202.25	202	201.75	201.5	201.25	200.75
3	202.7	202.2	201.95	201.7	201.45	201.2	200.7
3.25	202.65	202.15	201.9	201.65	201.4	201.15	200.65
3.5	202.6	202.1	201.85	201.6	201.35	201.1	200.6
3.75	202.55	202.05	201.8	201.55	201.3	201.05	200.55
4	202.5	202	201.75	201.5	201.25	201	200.5
4.25	202.45	201.95	201.7	201.45	201.2	200.95	200.45
4.5	202.4	201.9	201.65	201.4	201.15	200.9	200.4
14	202.4	201.9	201.65	201.4	201.15	200.9	200.4

POMPTON LAKE DAM

GATE OPERATION RULES

| Current Gate Opening | <<<

RAMAPO RIVER @ OAKLAND, NEW JERSEY

GATE OPERATION

The gates are operated to maintain a set point pool elevation in Pompton Lake. The set point elevations are defined as a function of the gate opening and lake level, and vary from 202.25 at a gate opening of 0 ft to 201.4 at gate openings equal to or exceeding 4.5 ft as defined in the Gate Operation Rule Curve. Elevations are referenced to the National Geodetic Vertical Datum (N.G.V.D.).

The gate operation is a function of the difference between the lake elevation and the set point elevation. If the lake level is more than 0.25 ft above the set point elevation, the gates are to be opened 0.25 ft; if the lake level is more than 0.5 ft above the set point elevation, the gates are to be opened 0.5 ft; if the lake level is more than 1.0 ft above the set point elevation, the gates are to be opened 1.0 ft. Similarly, if the lake level is more than 0.25 ft below the set point elevation, the gates are to be closed 0.25 ft; if the lake level is more than 0.5 ft below the set point elevation, the gates are to be closed 0.5 ft; if the lake level is more than 1.0 ft below the set point elevation, the gates are to be closed 1.0 ft.

The only exception to these rules is that if the lake level is falling, then the gates would not be opened. Similarly, if the lake level is rising, then the gates would not be closed. These exceptions will minimize lake level oscillations.

Under normal conditions, the gates remain closed and all outflow passes over the fixed spillway portion of the dam. The gates are initially opened 0.25 ft when the lake elevation reaches 202.5, or 0.25 ft above the target elevation of 202.25 for a gate opening of 0. Initial gate opening will be controlled by the PLC/RTU automatic control equipment if the controls are in SCADA AUTO, or can be remotely controlled from either of the two SCADA PC work stations, or locally controlled from the gate control console cabinets.

Every 15 minutes thereafter, the lake level and stream flow gauges are checked, and the gates operated automatically if necessary. The two gates can be opened simultaneously, or sequentially, but they should maintain the same opening.

Defining the gate operation as a function of gate opening and lake level allows the gates to be operated manually, without the benefit of computers and gauge data, should those systems become inoperable for any reason. Under such a situation, the gate operator need only check the gate opening and staff gauge at the dam site, and then plot that data on the rule curve to determine the required gate operation.

Should one gate fail to operate, the gate operation would follow the same rules as the normal two gate operation. The one gate will simply open faster since the rules will make that gate open more frequently.

SEQUENCE OF OPERATIONS – TAINTER GATES

A. INITIATION OF GATE OPERATION

1. Lake level reaches 202.2, alarm sounds at Water Commission HQ in Wanaque.
2. Lake level reaches 202.5 (approx. 30 min after alarm sounded)
    a. A warning is sounded.
    b. Gate operation is initiated automatically or manually.
3. At 15 minute intervals:
    a. Gate operation continues automatically or,
    b. Operator can manually override gate operation as necessary.

B. RETURN TO NORMAL OPERATION

1. Normal gate operation closes gates.
2. Operator dispatched to site to inspect and lubricate all equipment.

Appendix D

SURVEY CROSS SECTION DATA

PROJECT NJDEP Field Survey - Cross Sections

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Cross Sections Report

(All Units In Feet)

ID:	**{7467F3E7-6DBC-4B2B-8534-52B2D82D8247}**	**Stream**		**Centerline**	
Name:	BE_RAM_22XS	Name:		Station:	1,212.33
Location:	67 LAKEVIEW TERR	Station:	0.00	Easting:	557,073.56
County:		Orientation:	Looking D/S	Northing:	795,078.31
State:				Invert:	177.87
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_22XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	558,247.19	795,156.63	411.77	219.28	SPECIAL	RAM_06A FLD
2	558,247.18	795,156.63	411.78	219.27	SPECIAL	PA_RAM_06A
3	558,078.11	795,369.56	680.21	215.24	SPECIAL	PA_RAM_22BXS REF
4	557,968.35	795,512.29	857.50	210.06	SPECIAL	PA_RAM_06B
5	557,968.35	795,512.29	857.51	210.04	SPECIAL	RAM_06B FLD
6	557,236.13	794,921.71	1,000.00	201.19	GR	GR
7	557,236.13	794,921.71	1,000.00	201.19	SPECIAL	ALPT1
8	557,300.61	795,024.16	1,021.46	203.18	SPECIAL	PA_RAM_22CXS
9	557,219.92	794,936.14	1,021.70	201.51	GR	GR
10	557,207.26	794,953.88	1,043.01	202.67	GR	GR
11	557,197.37	794,961.85	1,055.69	202.72	GR	GR
12	557,181.62	794,981.50	1,080.56	203.04	GR	GR
13	557,172.73	794,986.36	1,090.41	202.68	CB	Channelbank [CB
14	557,171.02	794,988.60	1,093.18	200.79	TE	TE
15	557,168.58	794,990.86	1,096.51	198.16	H2O	H2O
16	557,167.92	794,993.23	1,098.59	197.03	H2O	H2O
17	557,163.85	794,999.13	1,105.58	195.06	H2O	H2O
18	557,155.94	795,006.52	1,116.40	191.32	H2O	H2O
19	557,130.33	795,022.24	1,145.92	183.33	H2O	H2O
20	557,098.62	795,058.15	1,193.54	177.87	H2O	H2O
21	557,072.44	795,078.12	1,226.34	182.54	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data **Data type:** **BE_RAM_22XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
22	557,054.72	795,097.45	1,252.46	191.32	H2O	H2O
23	557,048.42	795,101.36	1,259.74	192.34	H2O	H2O
24	557,025.62	795,122.08	1,290.56	194.27	H2O	H2O
25	557,004.18	795,140.11	1,318.54	195.16	H2O	H2O
26	556,998.56	795,148.41	1,328.30	197.07	H2O	H2O
27	556,996.27	795,149.88	1,330.98	197.82	H2O	H2O
28	556,995.96	795,150.29	1,331.48	200.78	TE	TE
29	556,995.66	795,150.53	1,331.86	201.56	CB	Channelbank [CB
30	556,987.81	795,153.26	1,339.51	202.81	GR	GR
31	556,971.16	795,166.18	1,360.51	202.68	GR	GR
32	556,426.23	794,573.35	1,363.18	202.79	SPECIAL	PA_RAM_21A FLD
33	556,426.23	794,573.35	1,363.18	202.79	SPECIAL	DATE 10-18-2011
34	556,426.07	794,573.47	1,363.38	202.75	SPECIAL	PA_RAM_21AXS BS
35	556,948.25	795,184.63	1,389.87	202.74	GR	GR
36	556,931.95	795,199.65	1,412.03	202.74	GR	GR
37	556,919.32	795,211.27	1,429.19	203.11	GR	GR
38	556,909.93	795,219.75	1,441.85	202.57	SPECIAL	BE_RAM_22AXS
39	556,902.81	795,225.85	1,451.22	202.70	GR	GR
40	556,902.70	795,226.16	1,451.51	202.71	SPECIAL	ALPT2

PROJECT NJDEP Field Survey - Cross Sections

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Cross Sections Report

(All Units In Feet)

ID:	**{172C26B9-9908-486F-9356-7DE06D99476A}**	**Stream**		**Centerline**	
Name:	BE_RAM_23XS	Name:		Station:	1,226.75
Location:	22 RAMAPO TERR	Station:	0.00	Easting:	557,647.75
County:		Orientation:	Looking D/S	Northing:	795,217.48
State:				Invert:	189.48
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_23XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	557,728.17	794,899.29	1,000.00	202.71	SPECIAL	ALPT1
2	557,728.16	794,899.33	1,000.04	202.71	GR	GR
3	557,724.10	794,920.57	1,021.63	202.94	GR	GR
4	557,717.09	794,946.52	1,048.51	203.19	GR	GR
5	557,710.75	794,970.09	1,072.91	203.62	GR	GR
6	557,709.76	794,972.10	1,075.10	204.77	GR	GR
7	557,708.00	794,977.91	1,081.17	204.76	GR	GR
8	557,704.31	794,985.94	1,089.86	202.83	GR	GR
9	557,701.92	794,994.00	1,098.26	202.52	GR	GR
10	557,697.90	795,017.89	1,122.40	202.59	SPECIAL	BE_RAM_23AXS
11	557,696.86	795,022.72	1,127.34	202.69	CB	Channelbank [CB
12	557,695.36	795,027.14	1,131.99	200.72	TE	TE
13	557,693.34	795,031.23	1,136.45	199.52	H2O	H2O
14	557,691.88	795,034.69	1,140.16	198.00	H2O	H2O
15	557,689.75	795,048.45	1,154.03	193.10	H2O	H2O
16	557,683.15	795,076.11	1,182.46	189.98	H2O	H2O
17	557,674.62	795,098.20	1,205.97	190.12	H2O	H2O
18	557,668.48	795,131.43	1,239.68	189.88	H2O	H2O
19	557,660.72	795,156.51	1,265.91	189.48	H2O	H2O
20	557,654.86	795,175.80	1,286.04	189.51	H2O	H2O
21	557,649.48	795,194.22	1,305.22	193.41	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data **Data type:** **BE_RAM_23XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
22	557,650.26	795,204.35	1,314.85	198.34	H2O	H2O
23	557,649.04	795,210.91	1,321.51	200.66	TE	TE
24	557,648.55	795,214.30	1,324.91	201.30	CB	Channelbank [CB
25	557,643.95	795,233.74	1,344.90	201.63	GR	GR
26	557,640.73	795,247.57	1,359.09	201.05	GR	GR
27	558,078.15	795,369.52	1,370.54	215.23	SPECIAL	RAM_22B BS CHK
28	558,078.11	795,369.55	1,370.58	215.21	SPECIAL	DATE 10-11-2011
29	558,078.11	795,369.55	1,370.58	215.21	SPECIAL	BE_RAM_22B FLD
30	558,078.11	795,369.56	1,370.58	215.24	SPECIAL	BE_RAM_22BXS REF
31	557,635.77	795,267.75	1,379.87	200.69	GR	GR
32	557,633.39	795,277.40	1,389.81	200.76	GR	GR
33	557,630.44	795,288.30	1,401.10	199.86	GR	GR XH2O
34	557,628.29	795,297.31	1,410.36	199.84	GR	GR XH2O
35	557,624.67	795,311.59	1,425.10	198.98	GR	GR XH2O
36	557,624.61	795,311.93	1,425.44	198.97	GR	GR XH2O
37	557,622.39	795,320.83	1,434.61	197.72	GR	GR XH2O
38	557,621.37	795,326.00	1,439.87	197.58	GR	GR XH2O
39	557,618.94	795,332.88	1,447.14	198.72	GR	GR XH2O
40	557,612.42	795,361.53	1,476.51	200.72	GR	GR
41	557,608.00	795,376.71	1,492.32	201.10	GR	GR
42	557,605.34	795,390.21	1,506.05	200.72	GR	GR
43	557,603.37	795,398.37	1,514.45	200.12	GR	GR XH2O
44	557,599.61	795,408.44	1,525.13	200.02	GR	GR XH2O
45	557,596.73	795,418.74	1,535.82	198.85	GR	GR XH2O
46	557,594.15	795,432.09	1,549.39	197.35	GR	GR XH2O
47	557,588.12	795,454.47	1,572.57	197.01	GR	GR XH2O
48	557,582.11	795,477.87	1,596.73	196.49	GR	GR XH2O
49	557,575.47	795,504.36	1,624.04	195.54	GR	GR XH2O
50	557,571.55	795,519.31	1,639.49	196.87	GR	GR XH2O
51	557,570.48	795,526.86	1,647.08	198.62	GR	GR XH2O
52	557,570.31	795,528.09	1,648.32	200.99	GR	GR XTE
53	557,570.31	795,528.75	1,648.96	202.24	GR	GR
54	557,567.90	795,535.78	1,656.36	203.18	SPECIAL	ALPT2
55	557,567.90	795,535.78	1,656.36	203.18	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{10C6719C-19E0-4190-8905-8ECC5E8EB630}**	**Stream**		**Centerline**	
Name:	BE_RAM_24XS	Name:		Station:	1,272.19
Location:	30 ISLAND TERR	Station:	0.00	Easting:	558,333.01
County:		Orientation:	Looking D/S	Northing:	795,839.33
State:				Invert:	188.37
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_24XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	559,032.85	797,450.88	102.39	206.75	SPECIAL	BE_RAM_28AXS
2	558,514.65	797,469.68	592.22	207.48	SPECIAL	BE_RAM_27C BS
3	558,514.58	797,469.72	592.29	207.40	SPECIAL	DATE 10-20-2011
4	558,514.58	797,469.72	592.29	207.44	SPECIAL	BE_RAM_27C FLD
5	558,514.57	797,469.65	592.32	207.62	SPECIAL	BE_RAM_27C
6	558,569.35	795,902.76	1,000.00	205.34	SPECIAL	ALPT1
7	558,569.33	795,902.75	1,000.02	205.31	GR	GR
8	558,553.15	795,898.60	1,016.70	205.49	GR	GR
9	558,529.89	795,892.00	1,040.88	205.27	GR	GR
10	558,504.58	795,885.17	1,067.08	204.51	GR	GR
11	558,484.88	795,879.96	1,087.44	203.52	GR	GR
12	558,463.74	795,874.25	1,109.33	203.55	GR	GR
13	558,439.81	795,868.10	1,134.00	203.39	GR	GR
14	558,439.68	795,868.19	1,134.10	203.39	GR	GR
15	558,424.67	795,863.89	1,149.72	203.25	GR	GR
16	558,410.35	795,859.35	1,164.73	203.88	GR	GR
17	558,390.80	795,854.60	1,184.82	203.66	CB	Channelbank [CB
18	558,386.79	795,853.75	1,188.90	201.28	TE	TE
19	558,384.58	795,853.15	1,191.19	200.05	H2O	H2O
20	558,379.75	795,852.14	1,196.10	199.13	H2O	H2O
21	558,374.75	795,852.90	1,200.66	197.41	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: BE_RAM_24XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	558,372.30	795,853.31	1,202.88	195.47	H2O	H2O
23	558,357.57	795,845.25	1,219.33	190.64	H2O	H2O
24	558,344.84	795,837.75	1,233.70	189.44	H2O	H2O
25	558,326.29	795,838.11	1,251.33	188.82	H2O	H2O
26	558,321.91	795,830.63	1,257.71	188.92	H2O	H2O
27	558,314.54	795,832.74	1,264.14	188.79	H2O	H2O
28	558,296.24	795,820.60	1,285.19	188.37	H2O	H2O
29	558,275.24	795,817.73	1,306.11	188.77	H2O	H2O
30	558,257.99	795,813.62	1,323.80	190.87	H2O	H2O
31	558,241.21	795,811.09	1,340.59	195.31	H2O	H2O
32	558,233.44	795,811.14	1,348.01	197.57	H2O	H2O
33	558,226.60	795,810.98	1,354.59	198.41	H2O	H2O
34	558,225.70	795,810.91	1,355.47	201.26	TE	TE
35	558,224.39	795,810.62	1,356.80	202.30	CB	Channelbank [CB
36	558,218.94	795,808.08	1,362.76	202.57	SPECIAL	BE_RAM_24AXS
37	558,206.39	795,804.29	1,375.88	202.60	GR	GR
38	558,187.96	795,797.32	1,395.54	202.47	GR	GR
39	558,168.81	795,787.84	1,416.62	202.65	GR	GR
40	558,147.23	795,784.41	1,438.26	202.36	GR	GR
41	558,128.94	795,774.97	1,458.52	202.28	GR	GR
42	558,102.40	795,759.34	1,488.48	203.18	GR	GR
43	558,102.40	795,759.34	1,488.48	203.19	SPECIAL	ALPT2

Cross Sections Report

(All Units In Feet)

ID:	**{75E7CCCD-A840-4964-8BDC-EEFF26AEF60B}**	**Stream**		**Centerline**	
Name:	BE_RAM_25XS	Name:		Station:	1,321.09
Location:	DIVERSION CHANNEL	Station:	0.00	Easting:	558,338.25
County:		Orientation:	Looking D/S	Northing:	796,184.92
State:				Invert:	188.84
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_25XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	559,032.85	797,450.88	407.49	206.75	SPECIAL	BE_RAM_28AXS
2	558,514.57	797,469.65	919.05	207.62	SPECIAL	BE_RAM_27C REF
3	558,595.27	796,219.10	999.98	203.51	GR	GR
4	558,595.25	796,219.11	1,000.00	203.51	SPECIAL	ALPT1
5	558,589.12	796,217.58	1,006.27	204.12	GR	GR
6	558,571.48	796,217.81	1,023.74	204.77	GR	GR
7	558,550.84	796,213.82	1,044.72	204.29	GR	GR
8	558,523.84	796,209.78	1,072.02	204.51	GR	GR
9	558,505.38	796,202.28	1,091.29	203.05	GR	GR
10	558,481.07	796,200.44	1,115.63	202.65	GR	GR
11	558,453.39	796,199.07	1,143.26	203.79	GR	GR
12	558,437.82	796,198.07	1,158.83	204.39	GR	GR
13	558,409.43	796,192.62	1,187.68	204.96	GR	GR
14	558,396.40	796,192.23	1,200.65	204.68	GR	GR
15	558,384.36	796,191.05	1,212.75	204.29	GR	GR
16	558,374.35	796,257.43	1,214.13	206.71	SPECIAL	BE_RAM_25A NL
17	558,372.39	796,188.57	1,224.93	203.79	CB	Channelbank [CB
18	558,365.81	796,189.06	1,231.40	201.22	TE	TE
19	558,362.85	796,189.55	1,234.27	199.61	H2O	H2O
20	558,352.99	796,183.25	1,244.86	197.11	H2O	H2O
21	558,337.16	796,182.73	1,260.63	192.90	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: BE_RAM_25XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	558,335.90	796,186.56	1,261.38	192.68	H2O	H2O
23	558,317.85	796,181.07	1,279.99	190.10	H2O	H2O
24	558,298.41	796,173.48	1,300.24	188.84	H2O	H2O
25	558,281.91	796,171.53	1,316.86	190.12	H2O	H2O
26	558,261.17	796,169.19	1,337.73	189.81	H2O	H2O
27	558,241.53	796,164.61	1,357.79	190.00	H2O	H2O
28	558,220.98	796,167.59	1,377.78	195.16	H2O	H2O
29	558,202.03	796,172.58	1,395.94	196.71	H2O	H2O
30	558,195.10	796,170.32	1,403.10	197.59	H2O	H2O
31	558,188.77	796,168.08	1,409.66	199.99	H2O	H2O
32	558,187.69	796,167.86	1,410.77	201.22	TE	TE
33	558,186.55	796,168.71	1,411.78	201.73	CB	Channelbank [CB
34	558,177.35	796,168.42	1,420.95	201.61	GR	GR
35	558,175.23	796,167.94	1,423.11	202.99	GR	GR
36	558,219.05	795,808.02	1,425.99	202.51	SPECIAL	BE_RAM_24A BS
37	558,218.94	795,808.08	1,426.08	202.57	SPECIAL	BE_RAM_24AXS
38	558,218.94	795,808.06	1,426.09	202.56	SPECIAL	DATE 10-20-2011
39	558,218.94	795,808.06	1,426.09	202.56	SPECIAL	BE_RAM_24AXS FLD
40	558,169.90	796,169.20	1,428.24	203.67	GR	GR
41	558,153.85	796,169.45	1,444.12	204.05	GR	GR
42	558,132.05	796,167.64	1,465.97	203.84	GR	GR
43	558,103.50	796,159.53	1,495.33	203.39	GR	GR
44	558,081.07	796,152.37	1,518.49	203.77	GR	GR
45	558,081.07	796,152.37	1,518.49	203.78	SPECIAL	ALPT2

Cross Sections Report

(All Units In Feet)

ID:	**{4EB261D6-65D6-4C1D-AC61-C6775322DEFD}**	**Stream**		**Centerline**	
Name:	BE_RAM_26XS	Name:		Station:	1,509.99
Location:	DS OF BOAT RAMP	Station:	0.00	Easting:	558,346.59
County:		Orientation:	Looking D/S	Northing:	796,912.43
State:				Invert:	184.99
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_26XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	558,893.77	796,787.98	984.57	200.73	GR	GR XH2O
2	559,032.85	797,450.88	986.94	206.75	SPECIAL	BE_RAM_28AXS
3	558,890.82	796,789.97	987.88	202.08	GR	GR XTE
4	558,887.10	796,791.74	991.88	203.99	GR	GR XCB
5	558,879.44	796,794.73	1,000.00	206.99	SPECIAL	ALPT1
6	558,879.41	796,794.75	1,000.04	206.99	GR	GR
7	558,865.71	796,800.58	1,014.65	209.35	GR	GR
8	558,854.89	796,805.47	1,026.25	210.38	GR	GR
9	558,843.66	796,810.67	1,038.32	210.50	SPECIAL	BE_RAM_26A NL
10	558,843.66	796,810.67	1,038.32	210.50	GR	GR
11	558,840.66	796,811.97	1,041.53	210.25	CB	Channelbank [CB
12	558,840.03	796,811.64	1,042.08	210.14	GR	GR
13	558,828.65	796,817.50	1,054.43	205.73	GR	GR
14	558,819.41	796,821.16	1,064.22	202.03	GR	GR
15	558,813.69	796,821.43	1,069.88	201.22	TE	TE
16	558,810.15	796,822.70	1,073.61	200.41	H2O	H2O
17	558,805.24	796,824.07	1,078.69	199.88	H2O	H2O
18	558,798.48	796,825.46	1,085.59	198.98	H2O	H2O
19	558,789.78	796,828.36	1,094.71	198.59	H2O	H2O
20	558,766.07	796,835.74	1,119.43	198.63	H2O	H2O
21	558,732.45	796,840.89	1,153.39	197.53	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: BE_RAM_26XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	558,688.20	796,849.90	1,198.54	197.73	H2O	H2O
23	558,651.65	796,854.79	1,235.31	198.38	H2O	H2O
24	558,616.63	796,860.17	1,270.68	197.68	H2O	H2O
25	558,583.73	796,869.24	1,304.75	194.93	H2O	H2O
26	558,542.18	796,889.73	1,349.66	186.52	H2O	H2O
27	558,512.76	796,877.19	1,375.82	187.68	H2O	H2O
28	558,497.66	796,895.60	1,394.43	189.14	H2O	H2O
29	558,460.69	796,880.31	1,427.39	187.86	H2O	H2O
30	558,218.94	795,808.08	1,439.99	202.57	SPECIAL	BE_RAM_24AXS
31	558,402.74	796,927.59	1,493.93	188.93	H2O	H2O
32	558,514.66	797,469.70	1,497.64	207.56	SPECIAL	BE_RAM_27C BS
33	558,514.57	797,469.65	1,497.72	207.56	SPECIAL	BE_RAM_27C FLD
34	558,514.57	797,469.65	1,497.72	207.56	SPECIAL	DATE 10-20-2011
35	558,302.74	796,925.67	1,591.33	188.97	H2O	H2O
36	558,229.86	796,931.55	1,663.83	189.79	H2O	H2O
37	558,204.90	796,937.95	1,689.57	189.97	H2O	H2O
38	558,175.38	796,943.76	1,719.66	188.97	H2O	H2O
39	558,151.03	796,954.00	1,745.61	187.02	H2O	H2O
40	558,108.43	796,963.54	1,789.26	184.99	H2O	H2O
41	558,065.54	796,964.90	1,831.50	195.69	H2O	H2O
42	558,034.11	796,971.76	1,863.66	197.47	H2O	H2O
43	558,002.05	796,986.34	1,898.06	200.08	H2O	H2O
44	557,983.18	796,984.26	1,916.08	198.48	H2O	H2O
45	557,965.41	796,985.61	1,933.74	199.19	H2O	H2O
46	557,959.00	796,990.36	1,941.00	200.00	H2O	H2O
47	557,949.81	796,990.92	1,950.11	201.19	TE	TE
48	557,941.90	796,994.36	1,958.55	204.11	GR	GR
49	557,934.82	796,996.15	1,965.85	207.27	CB	Channelbank [CB
50	557,921.78	796,999.44	1,979.30	207.66	GR	GR
51	557,913.95	797,000.62	1,987.20	204.85	GR	GR
52	557,909.72	797,000.84	1,991.38	202.07	GR	GR
53	557,906.95	797,000.65	1,994.05	201.54	GR	GR XTE
54	557,904.05	797,001.03	1,996.96	201.12	GR	GR XH2O
55	557,887.97	797,006.43	2,013.82	201.42	GR	GR XH2O
56	557,887.74	797,006.41	2,014.04	201.45	SPECIAL	ALPT2
57	557,884.51	797,007.09	2,017.34	200.54	GR	GR XH2O
58	557,878.34	797,010.80	2,024.15	199.41	GR	GR XH2O
59	557,870.70	797,012.38	2,031.95	199.11	GR	GR XH2O
60	557,854.92	797,012.00	2,047.30	199.04	GR	GR XH2O
61	557,846.36	797,012.77	2,055.84	200.11	GR	GR XH2O
62	557,845.15	797,013.54	2,057.19	201.68	GR	GR XTE
63	557,837.70	797,015.48	2,064.87	209.18	GR	GR
64	557,830.38	797,018.15	2,072.59	213.93	GR	GR
65	557,819.19	797,021.74	2,084.28	222.99	GR	GR
66	557,800.93	797,025.97	2,103.02	234.81	GR	GR
67	557,795.84	797,026.57	2,108.13	234.53	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{192D732C-2550-4F72-9D83-F43AD4943DE8}**	**Stream**		**Centerline**	
Name:	BE_RAM_27XS	Name:		Station:	1,346.78
Location:	BOAT RAMP	Station:	0.00	Easting:	558,648.55
County:		Orientation:	Looking D/S	Northing:	797,352.13
State:				Invert:	196.19
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_27XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	558,219.81	795,807.84	697.48	202.55	SPECIAL	BS CK 24A
2	558,218.93	795,808.00	698.23	202.51	SPECIAL	DATE 10-20-2011
3	558,218.93	795,808.00	698.23	202.51	SPECIAL	BE_RAM_24A FLD
4	558,218.94	795,808.08	698.27	202.57	SPECIAL	BE_RAM_24AXS
5	558,973.19	797,028.85	1,000.00	208.69	GR	GR
6	558,973.19	797,028.85	1,000.00	208.69	SPECIAL	ALPT1
7	558,957.41	797,043.34	1,021.42	209.08	GR	GR
8	558,942.38	797,057.77	1,042.26	208.83	GR	GR
9	558,937.43	797,066.23	1,051.69	210.77	GR	GR
10	558,919.85	797,077.92	1,072.47	210.07	CB	Channelbank [CB
11	558,910.62	797,087.82	1,085.98	203.64	GR	GR
12	558,906.82	797,091.07	1,090.97	202.74	GR	GR
13	558,902.19	797,095.74	1,097.54	201.29	TE	TE
14	558,899.89	797,097.08	1,100.13	200.66	H2O	H2O
15	558,897.67	797,098.88	1,102.98	200.06	H2O	H2O
16	558,896.76	797,100.31	1,104.62	200.00	H2O	H2O
17	558,890.13	797,105.69	1,113.13	198.98	H2O	H2O
18	558,880.71	797,119.74	1,129.66	198.25	H2O	H2O
19	558,860.18	797,132.71	1,153.45	198.23	H2O	H2O
20	558,836.82	797,151.01	1,182.97	198.31	H2O	H2O
21	558,816.73	797,170.19	1,210.75	200.53	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: BE_RAM_27XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	558,805.82	797,180.23	1,225.58	198.97	H2O	H2O
23	558,791.99	797,189.73	1,242.13	198.25	H2O	H2O
24	559,032.85	797,450.88	1,249.33	206.75	SPECIAL	BE_RAM_28AXS
25	559,032.89	797,450.98	1,249.38	206.78	SPECIAL	BE_RAM_28A FLD
26	558,777.67	797,210.21	1,266.65	199.48	H2O	H2O
27	558,757.84	797,235.16	1,298.23	200.05	H2O	H2O
28	558,740.67	797,264.39	1,330.86	199.82	H2O	H2O
29	558,718.36	797,290.98	1,365.37	199.50	H2O	H2O
30	558,696.64	797,317.11	1,399.13	198.18	H2O	H2O
31	558,679.97	797,337.42	1,425.22	198.40	H2O	H2O
32	558,650.41	797,354.85	1,458.62	198.66	H2O	H2O
33	558,622.37	797,368.53	1,488.32	197.39	H2O	H2O
34	558,597.43	797,383.83	1,516.91	197.24	H2O	H2O
35	558,582.09	797,398.93	1,538.43	196.19	H2O	H2O
36	558,565.94	797,416.30	1,562.11	196.31	H2O	H2O
37	558,555.61	797,428.98	1,578.34	197.66	H2O	H2O
38	558,549.94	797,442.67	1,591.92	199.31	H2O	H2O
39	558,548.45	797,447.06	1,596.03	201.33	TE	TE
40	558,549.82	797,455.76	1,601.07	203.21	GR	GR
41	558,549.77	797,455.86	1,601.18	203.22	GR	GR
42	558,534.77	797,450.69	1,608.41	202.16	SPECIAL	XTR
43	558,530.70	797,457.41	1,616.00	203.95	SPECIAL	XTR
44	558,536.12	797,472.93	1,622.84	205.32	GR	GR
45	558,524.64	797,463.73	1,624.75	206.02	SPECIAL	XTR
46	558,527.43	797,478.96	1,633.29	206.80	GR	GR
47	558,514.57	797,469.65	1,636.12	207.62	SPECIAL	BE_RAM_27C REF
48	558,506.26	797,480.42	1,649.57	209.44	SPECIAL	XTR
49	558,507.38	797,491.35	1,656.33	210.31	GR	GR
50	558,499.80	797,486.60	1,658.51	210.60	SPECIAL	XTR
51	558,501.86	797,500.87	1,666.91	210.76	GR	GR
52	558,487.86	797,496.62	1,674.06	211.70	SPECIAL	XTR
53	558,491.85	797,512.50	1,682.18	211.98	GR	GR
54	558,485.15	797,509.31	1,684.81	216.41	SPECIAL	XRAIL
55	558,485.13	797,517.30	1,690.36	211.74	CB	Channelbank [CB
56	558,473.10	797,509.56	1,693.67	213.72	SPECIAL	XTR
57	558,476.75	797,518.52	1,697.24	207.48	GR	GR
58	558,473.08	797,522.66	1,702.75	205.10	GR	GR
59	558,464.00	797,518.21	1,706.22	213.71	SPECIAL	XBEGIN
60	558,468.10	797,523.57	1,706.98	216.61	SPECIAL	XRAIL
61	558,467.71	797,526.29	1,709.14	202.68	GR	GR
62	558,464.47	797,528.90	1,713.29	201.89	GR	GR XTE
63	558,459.42	797,532.76	1,719.60	200.39	GR	GR XH2O
64	558,453.20	797,538.12	1,727.80	198.54	GR	GR XH2O
65	558,447.28	797,543.99	1,736.14	198.51	GR	GR XH2O
66	558,440.76	797,550.02	1,745.02	200.08	GR	GR XH2O
67	558,446.68	797,564.58	1,750.84	201.37	GR	GR XH2O
68	558,445.40	797,566.70	1,753.23	201.87	GR	GR XTE

Cross Sections Report

(All Units In Feet)

Cross Section Data **Data type:** **BE_RAM_27XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
69	558,444.04	797,568.41	1,755.40	202.27	GR	GR XCB
70	558,427.59	797,561.97	1,762.80	216.45	SPECIAL	XRAIL
71	558,420.99	797,558.90	1,765.44	213.57	SPECIAL	XEND
72	558,438.95	797,580.81	1,767.65	203.62	GR	GR
73	558,432.20	797,591.11	1,779.66	205.59	GR	GR
74	558,408.54	797,570.55	1,782.47	214.00	SPECIAL	XTR
75	558,410.12	797,578.94	1,787.15	216.28	SPECIAL	XRAIL
76	558,421.03	797,603.79	1,796.49	207.65	GR	GR
77	558,406.15	797,592.78	1,799.60	213.56	GR	GR
78	558,390.65	797,587.16	1,806.89	214.48	SPECIAL	XTR
79	558,383.94	797,616.47	1,832.03	214.05	GR	GR
80	558,355.69	797,620.39	1,855.12	215.02	SPECIAL	XTR
81	558,362.20	797,637.24	1,862.10	215.02	GR	GR
82	558,345.24	797,657.47	1,888.35	215.79	GR	GR
83	558,319.87	797,654.59	1,904.64	216.31	SPECIAL	XTR
84	558,327.50	797,679.06	1,916.09	215.96	GR	GR
85	558,303.03	797,672.49	1,929.19	217.25	SPECIAL	XTR
86	558,296.04	797,679.30	1,938.95	218.18	SPECIAL	XTR
87	558,296.03	797,679.31	1,938.97	218.18	SPECIAL	ALPT2

Cross Sections Report

(All Units In Feet)

ID:	**{F2966F04-3E86-4DCB-BC45-1DCCAA030CF9}**	**Stream**		**Centerline**	
Name:	BE_RAM_29XS	Name:		Station:	1,080.30
Location:	18 RIVERSIDE DR	Station:	0.00	Easting:	559,517.51
County:		Orientation:	Looking D/S	Northing:	797,187.71
State:				Invert:	192.88
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_29XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	559,553.20	797,042.78	950.86	210.77	GR	GR
2	559,543.11	797,066.56	976.29	210.96	GR	GR
3	559,542.83	797,076.89	986.43	211.70	GR	GR
4	559,539.62	797,090.08	1,000.00	211.55	SPECIAL	ALPT1
5	559,539.61	797,090.12	1,000.04	211.55	GR	GR
6	559,537.73	797,098.43	1,008.56	211.27	GR	GR
7	559,536.38	797,103.39	1,013.69	210.27	GR	GR
8	559,535.45	797,110.88	1,021.20	209.82	CB	Channelbank [CB
9	559,535.69	797,119.31	1,029.37	205.91	GR	GR
10	559,533.07	797,127.96	1,038.38	202.13	TE	TE
11	559,532.82	797,129.04	1,039.49	201.68	H2O	H2O
12	559,530.88	797,135.27	1,045.99	199.11	H2O	H2O
13	559,530.28	797,139.05	1,049.81	197.16	H2O	H2O
14	559,527.95	797,143.68	1,054.85	195.92	H2O	H2O
15	559,527.17	797,151.28	1,062.43	193.28	H2O	H2O
16	559,517.13	797,165.35	1,078.40	192.88	H2O	H2O
17	559,516.27	797,177.15	1,090.09	193.71	H2O	H2O
18	559,513.57	797,190.24	1,103.45	194.48	H2O	H2O
19	559,512.47	797,198.58	1,111.82	197.39	H2O	H2O
20	559,513.40	797,206.02	1,118.86	199.59	H2O	H2O
21	559,512.68	797,207.96	1,120.92	201.58	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: BE_RAM_29XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	559,512.41	797,209.22	1,122.21	202.12	TE	TE
23	559,511.90	797,210.59	1,123.66	202.89	GR	GR
24	559,510.95	797,215.83	1,128.98	204.20	CB	Channelbank [CB
25	559,510.26	797,223.44	1,136.54	205.21	GR	GR
26	559,510.42	797,229.03	1,141.96	207.09	GR	GR
27	559,509.49	797,231.71	1,144.78	207.84	GR	GR
28	559,509.28	797,232.05	1,145.16	209.34	GR	GR
29	559,507.74	797,238.73	1,152.01	209.27	GR	GR
30	559,507.54	797,239.13	1,152.44	210.69	GR	GR
31	559,507.19	797,240.76	1,154.11	210.66	GR	GR
32	559,507.06	797,241.05	1,154.42	210.16	GR	GR
33	559,482.48	797,239.74	1,158.67	207.95	SPECIAL	BE_RAM_29BXS NL
34	559,503.49	797,258.19	1,171.93	210.03	GR	GR
35	559,500.55	797,268.75	1,182.87	210.01	GR	GR
36	559,499.50	797,272.40	1,186.67	209.76	GR	GR
37	559,495.93	797,287.33	1,202.02	209.92	GR	GR
38	559,489.85	797,319.52	1,234.76	209.89	GR	GR
39	559,483.61	797,333.07	1,249.36	210.27	SPECIAL	ALPT2
40	559,483.61	797,333.07	1,249.36	210.27	GR	GR
41	559,910.76	797,540.71	1,355.76	211.38	SPECIAL	DATE 10-11-2011
42	559,910.76	797,540.71	1,355.76	211.38	SPECIAL	BE_RAM_30AXS FLD
43	559,910.71	797,540.71	1,355.77	211.41	SPECIAL	BE_RAM_30AXS
44	559,577.21	797,541.48	1,431.42	209.68	SPECIAL	BE_RAM_29AXS BS
45	559,577.02	797,541.52	1,431.50	209.69	SPECIAL	BE_RAM_29AXS
46	559,577.03	797,541.54	1,431.52	209.67	SPECIAL	BE_RAM_29AXS FLD

Cross Sections Report

(All Units In Feet)

ID:	**{54B805DC-38E7-4123-BD0F-189350F88907}**	**Stream**		**Centerline**	
Name:	BE_RAM_30XS	Name:		Station:	1,155.62
Location:	33 RIVERSIDE DR	Station:	0.00	Easting:	559,992.58
County:		Orientation:	Looking D/S	Northing:	797,484.57
State:				Invert:	193.56
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_30XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	560,126.61	797,395.35	999.94	211.33	GR	GR
2	560,126.56	797,395.39	1,000.00	211.33	SPECIAL	ALPT1
3	560,112.31	797,404.01	1,016.64	211.87	GR	GR
4	560,090.89	797,417.62	1,042.00	212.18	GR	GR
5	560,076.96	797,427.01	1,058.80	212.11	GR	GR
6	560,076.65	797,427.20	1,059.16	211.27	GR	GR
7	560,065.48	797,434.52	1,072.53	210.99	GR	GR
8	560,062.06	797,437.29	1,076.91	210.31	GR	GR
9	560,052.66	797,444.47	1,088.72	209.33	GR	GR
10	560,043.10	797,449.99	1,099.72	206.13	GR	GR
11	560,038.17	797,451.60	1,104.71	205.51	CB	Channelbank [CB
12	560,032.09	797,454.39	1,111.31	203.21	GR	GR
13	560,029.89	797,455.72	1,113.88	202.19	TE	TE
14	560,024.94	797,457.79	1,119.14	200.59	H2O	H2O
15	560,021.27	797,459.71	1,123.25	198.08	H2O	H2O
16	560,020.70	797,461.09	1,124.50	197.17	H2O	H2O
17	560,014.06	797,464.10	1,131.68	195.19	H2O	H2O
18	560,001.00	797,470.41	1,146.04	193.56	H2O	H2O
19	559,990.64	797,477.71	1,158.71	194.15	H2O	H2O
20	559,984.55	797,488.06	1,169.55	194.54	H2O	H2O
21	559,981.04	797,491.85	1,174.58	194.64	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data **Data type:** **BE_RAM_30XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
22	559,974.20	797,498.70	1,184.08	197.12	H2O	H2O
23	559,966.42	797,502.31	1,192.55	199.77	H2O	H2O
24	559,964.64	797,504.26	1,195.12	201.27	H2O	H2O
25	559,962.65	797,505.30	1,197.35	202.24	TE	TE
26	559,962.23	797,506.63	1,198.45	203.26	GR	GR
27	559,959.82	797,508.27	1,201.36	204.14	CB	Channelbank [CB
28	559,955.21	797,511.58	1,207.03	205.17	GR	GR
29	559,951.47	797,513.48	1,211.19	206.14	GR	GR
30	559,948.83	797,513.76	1,213.54	207.04	GR	GR
31	559,945.39	797,516.85	1,218.13	211.24	GR	GR
32	559,944.80	797,517.84	1,219.16	211.41	GR	GR
33	559,944.57	797,517.95	1,219.42	211.94	GR	GR
34	559,944.20	797,518.19	1,219.86	212.00	GR	GR
35	559,943.89	797,518.27	1,220.16	211.76	GR	GR
36	559,928.87	797,529.18	1,238.71	211.94	GR	GR
37	559,910.71	797,540.71	1,260.22	211.41	SPECIAL	BE_RAM_30AXS
38	559,910.71	797,540.71	1,260.22	211.71	GR	GR
39	559,892.79	797,552.99	1,281.94	211.70	GR	GR
40	559,873.01	797,566.14	1,305.69	211.14	GR	GR
41	559,859.79	797,575.74	1,322.02	211.59	GR	GR
42	559,859.71	797,575.80	1,322.12	211.59	SPECIAL	ALPT2
43	559,577.02	797,541.52	1,537.11	209.69	SPECIAL	BE_RAM_29AXS
44	559,576.97	797,541.50	1,537.14	209.70	SPECIAL	RAM_29AXS BS CHK
45	559,576.97	797,541.52	1,537.15	209.70	SPECIAL	BE_RAM_29AXS FLD
46	559,576.97	797,541.52	1,537.15	209.70	SPECIAL	DATE 10-11-2011

Cross Sections Report

(All Units In Feet)

ID:	**{246B6E16-6259-4322-98F1-EC5263103E2C}**	**Stream**		**Centerline**	
Name:	BE_RAM_31XS	Name:		Station:	1,278.91
Location:	DS OF RAILROAD	Station:	0.00	Easting:	560,221.40
County:		Orientation:	Looking D/S	Northing:	797,941.03
State:				Invert:	196.77
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_31XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	560,901.99	798,119.41	742.78	227.96	SPECIAL	BE_RAM_07B
2	560,473.00	797,823.60	999.98	225.26	GR	GR
3	560,472.98	797,823.61	1,000.00	225.26	SPECIAL	ALPT1
4	560,459.44	797,830.11	1,015.02	224.85	GR	GR
5	560,453.78	797,831.96	1,020.92	223.54	GR	GR
6	560,445.30	797,835.73	1,030.20	219.52	GR	GR
7	560,437.48	797,838.33	1,038.37	219.00	GR	GR
8	560,429.76	797,841.91	1,046.88	215.46	GR	GR
9	560,422.52	797,845.12	1,054.79	215.06	GR	GR
10	560,417.38	797,847.68	1,060.53	213.53	GR	GR
11	560,403.37	797,853.23	1,075.56	211.65	GR	GR
12	560,375.76	797,865.54	1,105.77	211.58	GR	GR
13	560,355.54	797,874.75	1,127.99	212.03	SPECIAL	BE_RAM_31BXS NL
14	560,355.54	797,874.75	1,127.99	212.23	GR	GR
15	560,337.31	797,883.48	1,148.20	210.84	GR	GR
16	560,322.82	797,890.70	1,164.39	210.65	GR	GR
17	560,465.87	798,200.27	1,170.55	213.24	SPECIAL	DATE 10-11-2011
18	560,465.87	798,200.27	1,170.55	213.24	SPECIAL	BE_RAM_07A FLD
19	560,465.87	798,200.26	1,170.55	213.24	SPECIAL	BE_RAM_07A
20	560,311.98	797,897.04	1,176.91	211.28	GR	GR
21	560,381.02	798,051.17	1,181.93	215.53	SPECIAL	BE_RAM_31AXS BS

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: BE_RAM_31XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	560,381.01	798,051.16	1,181.95	215.53	SPECIAL	BE_RAM_31AXS TRA 7A
23	560,381.01	798,051.17	1,181.95	215.53	SPECIAL	BE_RAM_31AXS FLD
24	560,304.87	797,900.72	1,184.91	211.41	GR	GR
25	560,299.16	797,903.41	1,191.23	211.00	GR	GR
26	560,290.87	797,906.42	1,200.00	210.12	CB	Channelbank [CB
27	560,284.50	797,909.27	1,206.97	207.94	GR	GR
28	560,281.99	797,910.42	1,209.73	205.76	GR	GR
29	560,279.26	797,911.18	1,212.52	202.11	TE	TE
30	560,278.54	797,913.84	1,214.33	199.66	H2O	H2O
31	560,273.57	797,915.34	1,219.45	198.72	H2O	H2O
32	560,267.15	797,917.66	1,226.24	198.88	H2O	H2O
33	560,261.10	797,920.56	1,232.95	198.81	H2O	H2O
34	560,254.75	797,924.23	1,240.27	199.24	H2O	H2O
35	560,248.11	797,927.25	1,247.56	199.29	H2O	H2O
36	560,241.54	797,930.38	1,254.84	198.70	H2O	H2O
37	560,233.35	797,931.81	1,262.83	198.21	H2O	H2O
38	560,225.45	797,936.70	1,272.07	198.79	H2O	H2O
39	560,216.00	797,941.90	1,282.84	199.31	H2O	H2O
40	560,206.80	797,947.38	1,293.51	199.77	H2O	H2O
41	560,195.44	797,954.38	1,306.79	199.86	H2O	H2O
42	560,184.41	797,959.91	1,319.13	198.87	H2O	H2O
43	560,177.75	797,964.41	1,327.08	197.62	H2O	H2O
44	560,166.54	797,965.02	1,337.43	196.77	H2O	H2O
45	560,162.60	797,966.64	1,341.68	198.74	H2O	H2O
46	560,159.14	797,967.79	1,345.30	202.11	TE	TE
47	560,153.17	797,975.03	1,353.83	210.53	CB	Channelbank [CB
48	560,139.48	797,981.21	1,368.84	211.14	GR	GR
49	560,137.87	797,982.69	1,370.94	212.41	GR	GR
50	560,118.18	797,992.55	1,392.96	213.07	GR	GR
51	560,105.39	798,001.15	1,408.21	206.26	GR	GR
52	560,087.55	798,009.65	1,427.98	205.57	GR	GR
53	560,067.75	798,019.51	1,450.10	206.79	GR	GR
54	560,049.49	798,028.93	1,470.64	207.91	GR	GR
55	560,029.80	798,038.51	1,492.53	207.61	GR	GR
56	560,014.90	798,045.42	1,508.96	208.99	SPECIAL	ALPT2
57	560,014.77	798,045.38	1,509.06	209.00	GR	GR
58	560,007.55	798,048.59	1,516.95	211.46	GR	GR
59	560,007.44	798,048.64	1,517.07	211.46	GR	GR
60	560,003.82	798,049.24	1,520.60	214.31	GR	GR
61	559,994.18	798,054.31	1,531.48	211.82	GR	GR
62	559,972.66	798,064.46	1,555.27	211.88	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{42EDF44E-8BE0-4318-B909-8475206564B8}**	**Stream**		**Centerline**	
Name:	BE_RAM_32XS	Name:		Station:	1,315.93
Location:	10 RIVER RD	Station:	0.00	Easting:	560,526.09
County:		Orientation:	Looking D/S	Northing:	798,570.97
State:				Invert:	199.76
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_32XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	560,901.99	798,119.41	703.39	227.96	SPECIAL	BE_RAM_07B
2	560,751.06	798,400.78	999.92	211.70	GR	GR
3	560,751.02	798,400.86	1,000.00	211.70	SPECIAL	ALPT1
4	560,730.35	798,416.65	1,025.99	211.71	GR	GR
5	560,704.92	798,437.12	1,058.62	212.19	GR	GR
6	560,465.87	798,200.26	1,089.37	213.24	SPECIAL	BE_RAM_07A
7	560,678.88	798,456.66	1,091.13	212.80	GR	GR
8	560,672.94	798,462.25	1,099.27	213.02	GR	GR
9	560,671.43	798,463.37	1,101.15	213.28	GR	GR
10	560,651.74	798,478.09	1,125.70	213.56	GR	GR
11	560,631.28	798,493.11	1,151.02	212.96	GR	GR
12	560,614.08	798,505.57	1,172.20	212.75	GR	GR
13	560,610.32	798,508.00	1,176.65	212.44	GR	GR
14	560,599.25	798,513.70	1,188.80	212.24	GR	GR
15	560,483.43	798,384.66	1,194.50	210.76	SPECIAL	DATE 10-11-2011
16	560,483.43	798,384.66	1,194.50	210.76	SPECIAL	BE_RAM_07D FLD
17	560,483.44	798,384.68	1,194.50	210.76	SPECIAL	BE_RAM_07D TRA 7A
18	560,483.41	798,384.68	1,194.53	210.76	SPECIAL	BS CK 07D
19	560,589.39	798,520.58	1,200.77	211.96	SPECIAL	BE_RAM_32AXS TRA 7D
20	560,580.95	798,527.24	1,211.51	211.86	GR	GR
21	560,565.42	798,538.53	1,230.67	206.06	GR	GR

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: BE_RAM_32XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	560,549.09	798,550.11	1,250.61	205.53	CB	Channelbank [CB
23	560,546.31	798,553.07	1,254.65	203.62	TE	TE
24	560,541.68	798,555.99	1,260.08	201.85	H2O	H2O
25	560,537.11	798,559.64	1,265.93	201.87	H2O	H2O
26	560,529.08	798,565.86	1,276.07	202.35	H2O	H2O
27	560,521.28	798,571.81	1,285.87	202.24	H2O	H2O
28	560,516.61	798,576.43	1,292.42	202.37	H2O	H2O
29	560,509.75	798,582.05	1,301.28	202.53	H2O	H2O
30	560,503.07	798,587.48	1,309.89	201.75	H2O	H2O
31	560,497.16	798,591.91	1,317.27	200.83	H2O	H2O
32	560,491.23	798,597.22	1,325.22	200.06	H2O	H2O
33	560,485.88	798,602.33	1,332.61	199.76	H2O	H2O
34	560,481.41	798,605.94	1,338.35	199.76	H2O	H2O
35	560,478.82	798,609.05	1,342.33	200.01	H2O	H2O
36	560,474.38	798,614.16	1,349.02	201.89	H2O	H2O
37	560,470.54	798,616.87	1,353.70	201.55	H2O	H2O
38	560,462.69	798,624.34	1,364.52	201.88	H2O	H2O
39	560,458.51	798,631.62	1,372.40	202.46	H2O	H2O
40	560,454.88	798,634.77	1,377.21	203.67	TE	TE
41	560,451.90	798,637.58	1,381.30	205.54	GR	GR
42	560,448.12	798,641.67	1,386.82	212.58	CB	Channelbank [CB
43	560,409.74	798,679.81	1,440.74	211.75	GR	GR
44	560,381.51	798,707.02	1,479.86	211.78	GR	GR
45	560,360.99	798,725.42	1,507.40	211.49	GR	GR
46	560,343.26	798,741.66	1,531.42	212.04	GR	GR
47	560,336.08	798,748.99	1,541.63	214.14	GR	GR
48	560,319.51	798,763.22	1,563.48	215.04	SPECIAL	ALPT2
49	560,319.49	798,763.24	1,563.50	215.03	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{6F4B1CA1-6304-4D6B-81ED-FDE3386B2BF3}**	**Stream**		**Centerline**	
Name:	BE_RAM_33XS	Name:		Station:	1,211.40
Location:	16 RIVER RD	Station:	0.00	Easting:	560,580.99
County:		Orientation:	Looking D/S	Northing:	798,730.96
State:				Invert:	200.63
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_33XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	560,901.99	798,119.41	591.77	227.96	SPECIAL	BE_RAM_07B
2	560,997.25	798,448.31	711.61	225.33	SPECIAL	X BE_RAM_33AXS
3	561,184.34	798,762.59	749.04	216.25	SPECIAL	X BE_RAM_33BXS
4	560,465.87	798,200.26	989.98	213.24	SPECIAL	BE_RAM_07A
5	560,754.08	798,604.56	999.98	212.27	GR	GR
6	560,754.06	798,604.57	1,000.00	212.27	SPECIAL	ALPT1
7	560,746.35	798,608.99	1,008.83	212.53	GR	GR
8	560,740.34	798,612.77	1,015.91	212.78	GR	GR
9	560,732.94	798,617.95	1,024.93	212.90	GR	GR
10	560,722.71	798,624.18	1,036.87	213.17	GR	GR
11	560,711.24	798,630.20	1,049.66	212.74	GR	GR
12	560,710.21	798,631.49	1,051.25	212.37	GR	GR
13	560,699.33	798,638.65	1,064.26	212.42	GR	GR
14	560,690.53	798,644.83	1,075.01	212.40	SPECIAL	BE_RAM_33CXS TRA 7D
15	560,687.06	798,645.81	1,078.38	212.29	GR	GR
16	560,686.00	798,648.42	1,080.78	212.83	GR	GR
17	560,483.44	798,384.68	1,085.93	210.76	SPECIAL	BE_RAM_07D TRA 7A
18	560,483.44	798,384.68	1,085.93	210.75	SPECIAL	DATE 10-11-2011
19	560,483.44	798,384.68	1,085.93	210.75	SPECIAL	BE_RAM_07D FLD
20	560,483.40	798,384.71	1,085.97	210.75	SPECIAL	RAM_07D BS CHK
21	560,679.91	798,653.06	1,088.44	213.09	GR	GR

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: BE_RAM_33XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	560,673.54	798,658.04	1,096.52	212.27	GR	GR
23	560,669.81	798,663.55	1,102.80	211.06	CB	Channelbank [CB
24	560,658.49	798,666.81	1,113.83	205.81	GR	GR
25	560,646.13	798,675.74	1,129.08	205.96	GR	GR
26	560,636.90	798,682.66	1,140.61	204.37	GR	GR
27	560,626.06	798,693.83	1,155.98	203.69	TE	TE
28	560,620.47	798,698.67	1,163.35	202.72	H2O	H2O
29	560,610.94	798,705.59	1,175.13	202.49	H2O	H2O
30	560,600.94	798,713.23	1,187.71	201.66	H2O	H2O
31	560,592.90	798,718.11	1,197.07	201.36	H2O	H2O
32	560,586.64	798,724.27	1,205.77	200.63	H2O	H2O
33	560,580.24	798,730.41	1,214.58	200.71	H2O	H2O
34	560,572.11	798,736.72	1,224.86	201.15	H2O	H2O
35	560,563.21	798,743.25	1,235.90	201.27	H2O	H2O
36	560,556.14	798,749.72	1,245.44	201.80	H2O	H2O
37	560,548.05	798,756.32	1,255.87	202.79	H2O	H2O
38	560,539.33	798,762.96	1,266.83	203.66	TE	TE
39	560,535.25	798,766.32	1,272.11	204.67	GR	GR
40	560,531.31	798,768.46	1,276.55	206.24	GR	GR
41	560,529.26	798,770.22	1,279.24	213.13	CB	Channelbank [CB
42	560,505.33	798,788.07	1,309.09	212.63	GR	GR
43	560,485.60	798,802.33	1,333.44	211.65	GR	GR
44	560,466.57	798,817.29	1,357.63	211.51	GR	GR
45	560,446.82	798,832.25	1,382.41	212.34	GR	GR
46	560,439.97	798,837.22	1,390.87	214.27	GR	GR
47	560,425.68	798,848.62	1,409.14	214.51	GR	GR
48	560,423.19	798,850.53	1,412.28	215.03	GR	GR
49	560,410.10	798,860.37	1,428.65	224.52	SPECIAL	ALPT2
50	560,410.09	798,860.38	1,428.67	224.52	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{3C540EC9-FB51-41B1-ABC5-B7E6FF7FA83B}**	**Stream**		**Centerline**	
Name:	BE_RAM_34XS	Name:		Station:	1,130.60
Location:	35 RIVER RD	Station:	0.00	Easting:	560,854.95
County:		Orientation:	Looking D/S	Northing:	799,107.23
State:				Invert:	202.71
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_34XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	561,095.75	799,040.91	934.22	214.11	SPECIAL	DATE 10-11-2011
2	561,095.73	799,040.91	934.23	214.11	SPECIAL	BE_RAM_34XS
3	561,095.73	799,040.91	934.23	214.11	SPECIAL	BE_RAM_34AXS FLD
4	561,095.71	799,040.90	934.24	214.10	SPECIAL	RAM_34AXS BS CHK
5	561,152.44	799,137.89	959.44	219.28	SPECIAL	BE_RAM_08A
6	561,152.45	799,137.89	959.44	219.26	SPECIAL	BE_RAM_08A FLD
7	560,971.12	799,004.53	1,000.00	211.83	GR	GR
8	560,971.12	799,004.53	1,000.00	211.83	SPECIAL	ALPT1
9	560,957.29	799,014.86	1,017.15	211.69	GR	GR
10	560,944.94	799,023.04	1,031.74	211.28	GR	GR
11	560,929.88	799,033.77	1,050.06	211.31	GR	GR
12	560,926.36	799,036.77	1,054.69	210.39	SPECIAL	BE_RAM_34BXS NL
13	560,923.79	799,039.04	1,058.12	209.77	GR	GR
14	560,922.23	799,039.97	1,059.89	209.12	CB	Channelbank [CB
15	560,920.84	799,041.52	1,061.96	207.96	GR	GR
16	560,916.68	799,045.48	1,067.71	207.31	GR	GR
17	560,915.00	799,047.46	1,070.29	206.20	GR	GR
18	560,910.09	799,050.67	1,076.06	204.36	TE	TE
19	560,907.41	799,054.27	1,080.48	203.75	H2O	H2O
20	560,904.86	799,056.27	1,083.71	203.70	H2O	H2O
21	560,897.71	799,064.06	1,094.25	203.98	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data **Data type:** **BE_RAM_34XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
22	560,890.09	799,071.26	1,104.74	203.31	H2O	H2O
23	560,884.56	799,078.10	1,113.45	203.08	H2O	H2O
24	560,876.32	799,086.67	1,125.32	203.32	H2O	H2O
25	560,869.36	799,091.93	1,134.00	202.86	H2O	H2O
26	560,861.72	799,098.69	1,144.20	202.71	H2O	H2O
27	560,856.53	799,103.44	1,151.23	203.02	H2O	H2O
28	560,850.40	799,108.57	1,159.21	203.54	H2O	H2O
29	560,844.15	799,113.83	1,167.37	202.96	H2O	H2O
30	560,837.72	799,120.17	1,176.39	202.96	H2O	H2O
31	560,834.11	799,122.96	1,180.94	203.62	H2O	H2O
32	560,831.65	799,126.48	1,185.14	204.32	TE	TE
33	560,828.82	799,129.27	1,189.11	206.55	GR	GR
34	560,825.43	799,136.73	1,196.69	212.83	CB	Channelbank [CB
35	560,812.41	799,149.40	1,214.86	214.40	GR	GR
36	560,811.58	799,151.01	1,216.57	217.92	GR	GR
37	560,792.79	799,168.31	1,242.11	231.14	GR	GR
38	560,780.68	799,180.61	1,259.36	241.69	GR	GR
39	560,763.24	799,200.94	1,285.99	249.13	GR	GR
40	560,928.69	799,408.24	1,307.67	223.33	SPECIAL	BE_RAM_08B
41	560,745.15	799,217.37	1,310.43	251.65	GR	GR
42	560,745.15	799,217.37	1,310.43	251.65	SPECIAL	ALPT2

Cross Sections Report

(All Units In Feet)

ID:	**{73E2E8F1-A35E-413E-9403-7A2BA8C8AA7B}**	**Stream**		**Centerline**	
Name:	BE_RAM_35XS	Name:		Station:	1,206.35
Location:	DS OF I-287	Station:	0.00	Easting:	561,365.83
County:		Orientation:	Looking D/S	Northing:	799,550.22
State:				Invert:	203.71
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **BE_RAM_35XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	561,514.58	799,446.62	999.96	214.92	GR	GR
2	561,514.54	799,446.64	1,000.00	214.92	SPECIAL	ALPT1
3	561,508.10	799,450.22	1,007.32	214.22	GR	GR
4	561,478.22	799,471.88	1,044.23	213.87	GR	GR
5	561,371.45	799,358.72	1,064.01	215.29	SPECIAL	BE_RAM_35AXS
6	561,371.45	799,358.72	1,064.01	215.29	SPECIAL	BE_RAM_35BXS
7	561,371.47	799,358.76	1,064.02	215.30	SPECIAL	RAM_35AXS BS CHK
8	561,371.46	799,358.76	1,064.02	215.30	SPECIAL	DATE 10-11-2011
9	561,371.46	799,358.76	1,064.02	215.30	SPECIAL	BE_RAM_35AXS FLD
10	561,460.55	799,486.83	1,067.31	214.16	GR	GR
11	561,457.14	799,488.90	1,071.28	214.69	GR	GR
12	561,438.27	799,500.40	1,093.31	215.25	GR	GR
13	561,427.39	799,505.49	1,105.10	215.23	GR	GR
14	561,152.45	799,137.89	1,111.22	219.24	SPECIAL	BE_RAM_08A FLD
15	561,152.44	799,137.89	1,111.22	219.28	SPECIAL	BE_RAM_08A
16	561,418.13	799,511.93	1,116.37	214.85	SPECIAL	BE_RAM_35BXS NL
17	561,418.13	799,511.93	1,116.37	215.15	GR	GR
18	561,411.13	799,516.07	1,124.47	213.69	GR	GR
19	561,408.23	799,518.19	1,128.07	213.30	CB	Channelbank [CB
20	561,401.15	799,524.37	1,137.43	208.46	GR	GR
21	561,399.05	799,525.97	1,140.07	206.49	TE	TE

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: BE_RAM_35XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	561,395.34	799,528.87	1,144.77	206.28	H2O	H2O
23	561,391.15	799,531.21	1,149.54	205.24	H2O	H2O
24	561,386.68	799,534.34	1,154.99	204.16	H2O	H2O
25	561,383.77	799,535.90	1,158.26	203.99	H2O	H2O
26	561,377.71	799,539.87	1,165.50	203.71	H2O	H2O
27	561,374.13	799,543.40	1,170.47	204.25	H2O	H2O
28	561,369.18	799,547.74	1,177.02	204.70	H2O	H2O
29	561,364.24	799,551.78	1,183.40	205.44	H2O	H2O
30	561,356.70	799,558.11	1,193.22	206.22	H2O	H2O
31	561,351.29	799,561.70	1,199.71	205.56	H2O	H2O
32	561,343.44	799,567.77	1,209.62	205.74	H2O	H2O
33	561,336.35	799,573.07	1,218.47	206.24	H2O	H2O
34	561,312.61	799,591.16	1,248.31	205.97	H2O	H2O
35	561,305.15	799,598.42	1,258.62	204.43	H2O	H2O
36	561,301.21	799,599.97	1,262.71	204.13	H2O	H2O
37	561,299.01	799,602.13	1,265.76	204.29	H2O	H2O
38	561,295.67	799,604.67	1,269.96	205.29	H2O	H2O
39	561,293.30	799,605.94	1,272.62	206.48	TE	TE
40	561,281.60	799,613.85	1,286.74	211.57	CB	Channelbank [CB
41	561,271.19	799,622.86	1,300.46	212.25	GR	GR
42	561,249.21	799,640.26	1,328.47	212.18	GR	GR
43	561,221.39	799,659.86	1,362.49	213.52	GR	GR
44	561,221.39	799,659.86	1,362.49	213.52	SPECIAL	ALPT2
45	560,928.69	799,408.24	1,451.19	223.33	SPECIAL	BE_RAM_08B

Cross Sections Report

(All Units In Feet)

ID:	**{8CEF6254-31ED-4296-A4DD-2DB6593DFAB1}**	**Stream**		**Centerline**	
Name:	PA_POM_09	Name:		Station:	1,072.05
Location:	WEIR	Station:	0.00	Easting:	552,210.31
County:		Orientation:	Looking D/S	Northing:	778,146.18
State:				Invert:	156.48
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_POM_09**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,592.30	778,038.11	828.53	183.39	SPECIAL	PA_POM_08B
2	552,359.64	778,234.20	921.10	175.40	GR	GR
3	552,323.65	778,222.19	957.96	174.88	GR	GR
4	552,316.72	778,223.93	962.90	174.60	GR	GR
5	552,305.64	778,222.48	973.05	173.08	GR	GR
6	552,290.63	778,216.72	988.82	172.13	GR	GR
7	552,277.87	778,216.52	999.73	172.88	GR	GR
8	552,312.92	778,160.29	1,000.00	183.49	SPECIAL	WEIR
9	552,312.92	778,160.29	1,000.00	183.49	SPECIAL	ALPT1
10	552,268.60	778,210.82	1,010.62	171.74	CB	Channelbank [CB
11	552,304.67	778,151.46	1,011.68	171.83	SPECIAL	GAGE BOARD 13
12	552,291.06	778,163.71	1,016.68	167.91	TE	TE
13	552,299.15	778,142.79	1,020.97	169.49	SPECIAL	WEIR
14	552,298.50	778,143.27	1,021.26	167.51	SPECIAL	WEIR
15	552,282.80	778,165.09	1,022.94	165.45	H2O	H2O
16	552,271.48	778,163.52	1,033.36	163.42	H2O	H2O
17	552,254.33	778,155.20	1,052.30	160.81	H2O	H2O
18	552,243.90	778,144.34	1,066.92	158.12	H2O	H2O
19	552,229.14	778,138.04	1,082.76	156.48	H2O	H2O
20	552,214.80	778,133.23	1,097.46	157.52	H2O	H2O
21	552,205.29	778,130.46	1,106.99	162.60	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data **Data type:** **PA_POM_09**

Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,218.17	778,097.99	1,113.37	167.53	SPECIAL	WEIR
23	552,189.06	778,117.88	1,127.42	167.84	TE	TE
24	552,184.67	778,117.74	1,131.21	168.65	CB	Channelbank [CB
25	552,187.29	778,081.29	1,148.40	168.01	SPECIAL	ALPT2
26	552,162.55	778,111.65	1,153.18	169.26	GR	GR
27	552,137.35	778,108.15	1,176.37	170.24	GR	GR
28	552,108.75	778,109.19	1,200.03	170.63	GR	GR
29	552,100.55	778,106.16	1,208.59	171.31	GR	GR
30	552,080.28	778,110.60	1,223.39	179.92	GR	GR
31	552,042.00	778,113.00	1,254.51	179.65	GR	GR
32	552,042.00	778,113.00	1,254.51	179.66	SPECIAL	XALPT2
33	552,042.39	777,984.99	1,322.33	185.34	SPECIAL	PA_POM_08A
34	552,042.38	777,984.99	1,322.34	185.36	SPECIAL	PA_POM_08A FLD
35	552,042.38	777,984.99	1,322.34	185.36	SPECIAL	DATE 10-26-2011

PROJECT NJDEP Field Survey - Cross Sections

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Cross Sections Report

(All Units In Feet)

ID:	**{BB2AC149-C7D2-4725-8C01-96E9B7037B2D}**	**Stream**		**Centerline**	
Name:	PA_RAM_01XS	Name:		Station:	1,112.49
Location:	US OF JACKSON	Station:	0.00	Easting:	552,319.45
County:		Orientation:	Looking D/S	Northing:	778,826.01
State:				Invert:	162.45
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_01XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,749.66	778,745.94	743.19	215.53	SPECIAL	PA_RAM_01CXS
2	552,523.59	778,543.30	826.47	193.84	SPECIAL	PA_RAM_01BXS FLD
3	552,523.58	778,543.30	826.47	193.83	SPECIAL	DATE 10-25-11
4	552,523.57	778,543.34	826.51	193.80	SPECIAL	PA_RAM_01BXS
5	552,478.43	778,761.17	980.80	197.72	SPECIAL	PA_RAM_01AXS
6	552,478.24	778,761.16	980.95	197.70	SPECIAL	BS CK 01FXS
7	552,478.22	778,761.18	980.98	197.69	SPECIAL	PA_RAM_01AXS FLD
8	552,464.74	778,743.52	982.98	197.27	GR	GR
9	552,448.32	778,749.39	1,000.00	195.18	SPECIAL	ALPT1
10	552,448.27	778,749.42	1,000.05	195.16	GR	GR
11	552,439.46	778,754.69	1,010.32	189.85	GR	GR
12	552,432.36	778,757.55	1,017.86	184.96	GR	GR
13	552,425.19	778,760.78	1,025.64	182.48	GR	GR
14	552,418.92	778,763.67	1,032.49	180.45	SPECIAL	PA_RAM_01FXS NL
15	552,418.92	778,763.67	1,032.49	180.45	GR	GR
16	552,414.21	778,766.32	1,037.89	178.98	GR	GR
17	552,405.84	778,771.28	1,047.61	172.16	GR	GR
18	552,401.37	778,773.17	1,052.41	170.55	CB	Channelbank [CB
19	552,399.98	778,774.08	1,054.06	168.12	TE	TE
20	552,399.05	778,774.40	1,055.03	166.27	H2O	H2O
21	552,394.33	778,778.32	1,061.10	164.45	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_01XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,387.45	778,782.02	1,068.90	163.35	H2O	H2O
23	552,376.57	778,785.21	1,079.81	163.00	H2O	H2O
24	552,377.23	778,787.05	1,080.23	162.97	H2O	H2O
25	552,368.87	778,792.16	1,090.03	162.45	H2O	H2O
26	552,359.74	778,797.32	1,100.49	162.92	H2O	H2O
27	552,350.25	778,802.96	1,111.53	163.71	H2O	H2O
28	552,339.10	778,805.35	1,122.24	164.50	H2O	H2O
29	552,330.34	778,814.49	1,134.53	164.46	H2O	H2O
30	552,315.42	778,830.00	1,155.41	164.15	H2O	H2O
31	552,307.46	778,840.04	1,167.50	165.02	H2O	H2O
32	552,302.11	778,837.97	1,170.93	168.16	TE	TE
33	552,299.17	778,839.09	1,174.01	171.69	CB	Channelbank [CB
34	552,288.00	778,846.94	1,187.64	172.63	GR	GR
35	552,281.29	778,851.59	1,195.80	174.23	GR	GR
36	552,262.39	778,863.82	1,218.31	172.98	GR	GR
37	552,255.24	778,868.71	1,226.96	175.05	GR	GR
38	552,231.72	778,885.16	1,255.63	176.58	GR	GR
39	552,206.18	778,901.46	1,285.93	176.34	GR	GR
40	552,179.89	778,918.49	1,317.25	176.18	SPECIAL	ALPT2
41	552,179.88	778,918.50	1,317.27	176.17	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{D750BDAB-6144-43D3-BA95-BD4BFB70017A}**	**Stream**		**Centerline**	
Name:	PA_RAM_02XS	Name:		Station:	1,249.33
Location:	72 COLE STREET	Station:	0.00	Easting:	553,549.40
County:		Orientation:	Looking D/S	Northing:	779,498.12
State:				Invert:	167.40
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_02XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,889.62	779,421.53	940.97	185.20	SPECIAL	PA_RAM_02AXS FLD
2	553,889.62	779,421.53	940.97	185.20	SPECIAL	DATE 10-24-2011
3	553,889.62	779,421.53	940.98	185.25	SPECIAL	PA_RAM_02AXS
4	553,889.61	779,421.52	940.98	185.21	SPECIAL	BS CK 02AXS
5	553,835.68	779,619.69	953.36	187.27	SPECIAL	PA_RAM_02BXS FLD
6	553,835.67	779,619.70	953.38	187.25	SPECIAL	PA_RAM_02BXS
7	553,802.98	779,548.10	999.98	185.64	GR	GR
8	553,802.96	779,548.09	1,000.00	185.64	SPECIAL	ALPT1
9	553,771.67	779,544.77	1,031.31	185.68	GR	GR
10	553,765.37	779,543.96	1,037.65	185.63	SPECIAL	PA_RAM_02CXS REF
11	553,765.37	779,543.96	1,037.65	185.63	GR	GR
12	553,748.54	779,540.92	1,054.74	185.68	GR	GR
13	553,728.70	779,536.39	1,075.09	185.51	GR	GR
14	553,720.14	779,534.90	1,083.77	181.42	GR	GR
15	553,707.85	779,533.31	1,096.13	179.49	GR	GR
16	553,702.28	779,532.27	1,101.80	178.15	GR	GR
17	553,695.65	779,530.28	1,108.69	177.95	CB	Channelbank [CB
18	553,694.61	779,530.02	1,109.76	177.54	GR	GR
19	553,694.14	779,529.55	1,110.32	175.43	GR	GR
20	553,692.43	779,529.31	1,112.04	175.35	TE	TE
21	553,686.57	779,527.33	1,118.18	174.29	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_02XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	553,681.52	779,527.08	1,123.18	172.79	H2O	H2O
23	553,673.71	779,525.57	1,131.13	170.57	H2O	H2O
24	553,658.42	779,518.31	1,147.57	168.17	H2O	H2O
25	553,650.25	779,515.37	1,156.18	167.58	H2O	H2O
26	553,641.08	779,511.01	1,166.04	167.40	H2O	H2O
27	553,622.72	779,501.44	1,185.96	169.01	H2O	H2O
28	553,605.11	779,500.73	1,203.35	170.09	H2O	H2O
29	553,584.61	779,495.87	1,224.41	170.24	H2O	H2O
30	553,562.88	779,487.14	1,247.46	168.60	H2O	H2O
31	553,540.53	779,479.02	1,271.00	169.67	H2O	H2O
32	553,524.23	779,475.76	1,287.62	170.16	H2O	H2O
33	553,505.74	779,469.78	1,306.95	171.69	H2O	H2O
34	553,488.68	779,468.24	1,323.96	172.84	H2O	H2O
35	553,475.96	779,471.72	1,335.70	173.16	H2O	H2O
36	553,460.77	779,467.44	1,351.44	174.19	H2O	H2O
37	553,451.74	779,467.38	1,360.30	174.07	H2O	H2O
38	553,435.11	779,466.15	1,376.84	174.52	H2O	H2O
39	553,427.16	779,466.72	1,384.50	174.76	H2O	H2O
40	553,425.06	779,466.41	1,386.62	175.29	TE	TE
41	553,409.01	779,465.34	1,402.55	175.69	GR	GR
42	553,401.84	779,465.37	1,409.56	179.22	GR	GR
43	553,392.74	779,463.67	1,418.82	182.19	CB	Channelbank [CB
44	553,383.06	779,460.99	1,428.84	182.27	GR	GR
45	553,374.11	779,459.39	1,437.93	178.11	GR	GR
46	553,364.98	779,457.36	1,447.28	175.74	GR	GR
47	553,342.30	779,452.29	1,470.51	174.97	GR	GR
48	553,320.34	779,448.04	1,492.89	174.24	GR	GR
49	553,296.97	779,442.68	1,516.85	174.56	SPECIAL	ALPT2
50	553,296.87	779,442.66	1,516.95	174.57	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{DBD4C786-529C-46FE-A452-D5F94AB629E2}**	**Stream**		**Centerline**	
Name:	PA_RAM_03XS	Name:		Station:	1,235.16
Location:	16 MAPLE LN	Station:	0.00	Easting:	553,363.57
County:		Orientation:	Looking D/S	Northing:	780,104.32
State:				Invert:	167.01
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_03XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,758.99	780,167.75	877.67	179.63	SPECIAL	PA_RAM_03AXS
2	553,411.36	780,505.74	964.51	183.13	SPECIAL	PA_RAM_03BXS
3	553,411.36	780,505.74	964.51	183.14	SPECIAL	DATE 10-20-2011
4	553,411.36	780,505.74	964.51	183.14	SPECIAL	PA_RAM_03BXS FLD
5	553,411.28	780,505.71	964.59	183.15	SPECIAL	PA_RAM_03BXS FLD
6	553,555.17	780,242.89	1,000.00	184.53	GR	GR
7	553,555.17	780,242.89	1,000.00	184.53	SPECIAL	ALPT1
8	553,532.44	780,224.78	1,029.02	182.75	GR	GR
9	553,519.56	780,215.90	1,044.66	182.23	SPECIAL	PA_RAM_03C REF
10	553,514.84	780,212.92	1,050.24	182.04	GR	GR
11	553,508.88	780,208.57	1,057.61	178.47	GR	GR
12	553,503.08	780,204.30	1,064.82	177.30	CB	Channelbank [CB
13	553,502.35	780,203.87	1,065.66	175.80	TE	TE
14	553,501.85	780,203.62	1,066.21	174.50	H2O	H2O
15	553,499.54	780,202.38	1,068.82	173.34	H2O	H2O
16	553,492.52	780,198.44	1,076.82	171.32	H2O	H2O
17	553,478.94	780,188.18	1,093.83	167.01	H2O	H2O
18	553,464.77	780,176.91	1,111.91	168.56	H2O	H2O
19	553,451.57	780,165.70	1,129.16	170.99	H2O	H2O
20	553,438.09	780,155.85	1,145.86	172.21	H2O	H2O
21	553,431.27	780,150.07	1,154.78	173.73	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_03XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	553,426.58	780,146.02	1,160.93	174.72	H2O	H2O
23	553,420.59	780,145.09	1,166.36	175.32	H2O	H2O
24	553,419.55	780,144.29	1,167.67	175.78	GR	GR XTE
25	553,418.95	780,144.30	1,168.15	176.96	GR	GR
26	553,417.36	780,143.31	1,170.02	177.69	GR	GR XCB
27	553,403.99	780,131.65	1,187.68	176.99	GR	GR
28	553,386.15	780,119.02	1,209.54	176.42	GR	GR
29	553,363.28	780,102.24	1,237.90	175.99	GR	GR XCB
30	553,361.03	780,100.71	1,240.61	175.79	GR	GR XTE
31	553,357.66	780,098.80	1,244.47	175.09	H2O	H2O
32	553,349.86	780,093.15	1,254.10	174.21	H2O	H2O
33	553,339.94	780,086.45	1,266.07	171.62	H2O	H2O
34	553,331.75	780,078.73	1,277.22	170.37	H2O	H2O
35	553,320.05	780,070.81	1,291.34	170.21	H2O	H2O
36	553,309.18	780,061.84	1,305.40	169.66	H2O	H2O
37	553,301.58	780,057.89	1,313.89	169.96	H2O	H2O
38	553,291.93	780,050.03	1,326.31	168.51	H2O	H2O
39	553,277.29	780,037.16	1,345.69	170.52	H2O	H2O
40	553,258.96	780,025.18	1,367.58	173.01	H2O	H2O
41	553,247.17	780,015.72	1,382.66	173.70	H2O	H2O
42	553,229.89	780,004.83	1,403.06	175.23	H2O	H2O
43	553,228.59	780,003.89	1,404.67	175.76	TE	TE
44	553,227.76	780,003.05	1,405.83	176.39	GR	GR
45	553,224.93	780,000.47	1,409.63	176.94	GR	GR
46	553,219.34	779,996.44	1,416.52	177.50	GR	GR
47	553,212.86	779,993.71	1,423.38	179.96	GR	GR
48	553,205.15	779,990.78	1,431.36	183.01	CB	Channelbank [CB
49	553,197.51	779,985.41	1,440.69	182.98	GR	GR
50	553,181.27	779,976.25	1,459.24	176.61	GR	GR
51	553,170.15	779,968.38	1,472.86	176.63	SPECIAL	ALPT2
52	553,170.15	779,968.38	1,472.86	176.63	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{10D78924-9E75-4E9F-8D82-305EC808629D}**	**Stream**		**Centerline**	
Name:	PA_RAM_04XS	Name:		Station:	1,437.92
Location:	33 SHORE ROAD	Station:	0.00	Easting:	552,382.07
County:		Orientation:	Looking D/S	Northing:	780,694.00
State:				Invert:	169.62
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_04XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,763.32	780,957.86	988.00	184.04	SPECIAL	BS CK 04AXS
2	552,763.30	780,957.88	988.01	184.13	SPECIAL	PA_RAM_04AXS
3	552,763.30	780,957.87	988.02	184.04	SPECIAL	PA_RAM_04AXS FLD
4	552,782.12	780,861.87	1,000.00	195.19	SPECIAL	ALPT1
5	552,782.12	780,861.87	1,000.00	185.08	GR	GR
6	552,755.21	780,849.98	1,029.27	185.20	GR	GR
7	552,731.98	780,840.84	1,054.19	185.43	GR	GR
8	552,725.95	780,838.47	1,060.65	185.24	SPECIAL	PA_RAM_04BXS FLD
9	552,725.91	780,838.51	1,060.68	185.24	SPECIAL	BS CK 04BXS
10	552,725.92	780,838.45	1,060.69	185.23	SPECIAL	PA_RAM_04BXS NL
11	552,722.56	780,837.53	1,064.17	184.89	GR	GR
12	552,708.75	780,832.03	1,079.01	178.87	GR	GR
13	552,698.05	780,826.85	1,090.78	178.30	GR	GR XCB
14	552,694.45	780,824.41	1,094.97	175.35	GR	GR XTE
15	552,691.51	780,822.41	1,098.38	174.20	GR	GR XH2O
16	552,691.35	780,819.98	1,099.29	173.92	GR	GR XH2O
17	552,688.02	780,816.57	1,103.52	172.34	GR	GR XH2O
18	552,683.53	780,816.24	1,107.89	172.19	GR	GR XH2O
19	552,674.08	780,812.26	1,118.11	173.43	GR	GR XH2O
20	552,666.17	780,806.11	1,127.54	174.20	GR	GR XH2O
21	552,659.45	780,803.33	1,134.79	174.56	GR	GR XH2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_04XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,652.15	780,800.15	1,142.71	174.44	GR	GR XH2O
23	552,645.90	780,800.36	1,148.59	175.36	GR	GR XTE
24	552,644.06	780,798.78	1,150.83	176.19	GR	GR
25	552,525.17	781,150.59	1,154.38	183.24	SPECIAL	PA_RAM_05AXS
26	552,525.14	781,150.61	1,154.40	183.24	SPECIAL	DATE 10-24-2011
27	552,525.14	781,150.61	1,154.40	183.24	SPECIAL	PA_RAM_05AXS FLD
28	552,639.42	780,797.70	1,155.57	176.03	GR	GR
29	552,637.26	780,796.68	1,157.95	176.32	GR	GR
30	552,633.89	780,794.91	1,161.70	177.05	GR	GR
31	552,619.03	780,787.99	1,177.97	177.36	GR	GR
32	552,601.60	780,779.47	1,197.19	176.43	GR	GR
33	552,596.64	780,777.69	1,202.46	177.19	GR	GR
34	552,582.19	780,771.09	1,218.25	177.20	GR	GR
35	552,564.78	780,767.41	1,235.93	176.93	GR	GR
36	552,555.82	780,762.66	1,245.93	176.58	GR	GR
37	552,533.99	780,748.55	1,271.07	176.13	GR	GR
38	552,510.28	780,737.88	1,296.92	176.58	GR	GR
39	552,478.25	780,722.79	1,332.05	177.26	GR	GR
40	552,473.07	780,721.93	1,337.24	177.59	GR	GR
41	552,461.18	780,716.54	1,350.22	177.00	GR	GR
42	552,454.99	780,712.84	1,357.25	177.13	SPECIAL	PA_RAM_04CXS NL
43	552,442.87	780,710.13	1,369.62	177.04	CB	Channelbank [CB
44	552,441.27	780,709.78	1,371.24	175.52	TE	TE
45	552,440.18	780,709.41	1,372.40	174.61	H2O	H2O
46	552,438.80	780,709.57	1,373.66	174.13	H2O	H2O
47	552,434.21	780,707.58	1,378.64	173.97	H2O	H2O
48	552,424.09	780,703.78	1,389.44	173.82	H2O	H2O
49	552,415.30	780,700.78	1,398.72	173.78	H2O	H2O
50	552,403.68	780,698.75	1,410.40	173.43	H2O	H2O
51	552,391.45	780,696.86	1,422.61	172.87	H2O	H2O
52	552,378.49	780,690.71	1,436.84	172.73	H2O	H2O
53	552,372.03	780,687.13	1,444.10	172.76	H2O	H2O
54	552,355.80	780,680.86	1,461.47	173.21	H2O	H2O
55	552,337.32	780,677.26	1,480.15	169.62	H2O	H2O
56	552,322.62	780,679.43	1,493.45	169.74	H2O	H2O
57	552,316.40	780,676.68	1,500.22	171.01	H2O	H2O
58	552,312.27	780,675.24	1,504.59	175.48	TE	TE
59	552,310.99	780,675.14	1,505.84	176.00	CB	Channelbank [CB
60	552,288.89	780,669.58	1,528.57	176.10	GR	GR
61	552,253.42	780,663.43	1,564.19	176.41	GR	GR XCB
62	552,252.50	780,662.58	1,565.33	175.60	GR	GR XTE
63	552,251.78	780,661.81	1,566.26	174.24	GR	GR XH2O
64	552,247.55	780,661.40	1,570.40	173.01	GR	GR XH2O
65	552,239.27	780,659.99	1,578.71	173.04	GR	GR XH2O
66	552,226.19	780,656.63	1,592.18	173.04	GR	GR XH2O
67	552,203.69	780,651.11	1,615.29	173.29	GR	GR XH2O
68	552,176.13	780,643.89	1,643.72	173.39	GR	GR XH2O

Cross Sections Report

(All Units In Feet)

Cross Section Data **Data type:** **PA_RAM_04XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
69	552,144.61	780,637.91	1,675.55	173.64	GR	GR XH2O
70	552,119.08	780,630.07	1,702.25	173.58	GR	GR XH2O
71	552,082.41	780,621.74	1,739.68	171.15	GR	GR XH2O
72	552,065.38	780,617.34	1,757.24	170.28	GR	GR XH2O
73	552,036.60	780,610.24	1,786.80	169.88	GR	GR XH2O
74	552,000.01	780,601.44	1,824.31	171.68	GR	GR XH2O
75	551,990.26	780,597.80	1,834.71	172.19	GR	GR XH2O
76	551,978.49	780,596.85	1,846.20	175.56	GR	GR XTE
77	551,975.61	780,596.87	1,848.92	177.19	GR	GR XCB
78	551,959.56	780,592.62	1,865.50	177.26	SPECIAL	ALPT2
79	551,959.56	780,592.62	1,865.50	177.26	GR	GR XGR

PROJECT NJDEP Field Survey - Cross Sections

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Cross Sections Report

(All Units In Feet)

ID:	**{3C303E04-3999-4B4A-8620-FC1C0F081B85}**	**Stream**		**Centerline**	
Name:	PA_RAM_05XS	Name:		Station:	1,184.96
Location:	47 SHORE ROAD	Station:	0.00	Easting:	552,336.67
County:		Orientation:	Looking D/S	Northing:	781,092.93
State:				Invert:	168.39
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_05XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,763.32	780,957.87	766.41	184.02	SPECIAL	PA_RAM_04AXS FLD
2	552,763.30	780,957.88	766.42	184.02	SPECIAL	DATE 10-24-2011
3	552,763.30	780,957.88	766.42	184.13	SPECIAL	PA_RAM_04AXS
4	552,525.23	781,150.60	987.63	183.25	SPECIAL	BS CK 05AXS
5	552,525.22	781,150.61	987.64	183.25	SPECIAL	PA_RAM_05AXS FLD
6	552,525.17	781,150.59	987.70	183.24	SPECIAL	PA_RAM_05AXS
7	552,516.45	781,107.07	1,000.00	182.72	SPECIAL	ALPT1
8	552,516.43	781,107.07	1,000.02	182.71	GR	GR
9	552,482.60	781,105.60	1,033.86	182.45	GR	GR
10	552,453.27	781,107.29	1,062.95	182.46	GR	GR
11	552,424.05	781,103.14	1,092.42	182.94	GR	GR
12	552,407.27	781,100.97	1,109.32	182.83	SPECIAL	PA_RAM_05BXS NL
13	552,401.74	781,099.20	1,114.97	182.73	GR	GR
14	552,392.70	781,097.00	1,124.17	182.78	GR	GR
15	552,392.07	781,096.97	1,124.79	180.07	GR	GR
16	552,387.49	781,095.41	1,129.48	179.26	CB	Channelbank [CB
17	552,384.55	781,095.00	1,132.46	175.54	TE	TE
18	552,383.64	781,094.90	1,133.36	174.78	H2O	H2O
19	552,378.30	781,093.54	1,138.80	172.32	H2O	H2O
20	552,372.66	781,092.03	1,144.55	170.23	H2O	H2O
21	552,362.00	781,093.77	1,155.02	169.69	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_05XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,348.26	781,086.23	1,169.35	169.48	H2O	H2O
23	552,330.49	781,085.53	1,187.12	168.77	H2O	H2O
24	552,317.61	781,088.22	1,199.72	168.68	H2O	H2O
25	552,304.84	781,088.27	1,212.45	168.39	H2O	H2O
26	552,296.07	781,087.01	1,221.29	169.61	H2O	H2O
27	552,289.46	781,086.85	1,227.89	172.79	H2O	H2O
28	552,280.92	781,089.89	1,236.14	174.63	H2O	H2O
29	552,279.57	781,090.24	1,237.46	175.58	TE	TE
30	552,278.11	781,090.07	1,238.93	177.66	CB	Channelbank [CB
31	552,265.97	781,089.97	1,251.04	176.55	GR	GR
32	552,241.33	781,086.98	1,275.84	176.16	GR	GR
33	552,224.18	781,085.70	1,293.04	175.78	GR	GR
34	552,206.17	781,082.65	1,311.24	175.57	GR	GR
35	552,182.61	781,080.41	1,334.91	175.41	GR	GR
36	552,157.08	781,077.08	1,360.63	175.98	GR	GR
37	552,157.06	781,077.07	1,360.65	175.99	SPECIAL	ALPT2

PROJECT NJDEP Field Survey - Cross Sections

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Cross Sections Report

(All Units In Feet)

ID:	**{96FE53CA-1DE9-4519-B733-58FB307F93B1}**	**Stream**		**Centerline**	
Name:	PA_RAM_06XS	Name:		Station:	1,264.54
Location:	21 LAKE ROAD	Station:	0.00	Easting:	552,457.65
County:		Orientation:	Looking D/S	Northing:	782,058.68
State:				Invert:	168.34
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_06XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,822.19	781,363.02	697.12	185.87	SPECIAL	PA_RAM_06BXS FLD
2	552,822.19	781,363.02	697.12	185.87	SPECIAL	DATE 10-24-2011
3	552,822.18	781,363.10	697.16	186.04	SPECIAL	PA_RAM_06BXS
4	552,722.65	781,751.42	893.38	182.15	SPECIAL	PA_RAM_06AXS
5	552,722.65	781,751.42	893.38	182.11	SPECIAL	PA_RAM_06AXS FLD
6	552,679.17	782,002.14	1,000.00	184.23	SPECIAL	ALPT1
7	552,679.13	782,002.15	1,000.04	184.23	GR	GR
8	552,666.39	782,003.60	1,012.73	184.25	SPECIAL	PA_RAM_06CXS FLD
9	552,666.39	782,003.60	1,012.73	184.25	SPECIAL	BS CK 06CXS
10	552,666.37	782,003.61	1,012.75	184.24	SPECIAL	PA_RAM_06CXS NL
11	552,648.07	782,010.10	1,032.10	184.47	GR	GR
12	552,610.71	782,019.57	1,070.63	184.61	GR	GR
13	552,573.58	782,029.26	1,109.01	184.83	GR	GR
14	552,548.56	782,036.60	1,135.07	185.02	GR	GR
15	552,524.57	782,042.13	1,159.68	185.27	GR	GR
16	552,503.43	782,047.01	1,181.37	185.36	GR	GR
17	552,494.30	782,049.26	1,190.76	185.33	SPECIAL	PA_RAM_06DXS NL
18	552,492.15	782,049.77	1,192.98	185.18	CB	Channelbank [CB
19	552,489.38	782,050.38	1,195.81	184.28	GR	GR
20	552,482.44	782,051.16	1,202.71	179.50	GR	GR
21	552,481.06	782,051.41	1,204.12	178.77	GR	GR

Cross Sections Report

(All Units In Feet)

Cross Section Data **Data type:** **PA_RAM_06XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,480.96	782,051.61	1,204.27	177.78	GR	GR
23	552,476.73	782,052.74	1,208.64	177.54	GR	GR
24	552,476.27	782,052.74	1,209.09	176.22	GR	GR
25	552,475.33	782,052.76	1,210.00	176.18	GR	GR
26	552,474.80	782,052.71	1,210.49	175.59	TE	TE
27	552,474.09	782,052.88	1,211.22	173.87	H2O	H2O
28	552,472.91	782,052.96	1,212.39	172.80	H2O	H2O
29	552,466.49	782,054.19	1,218.91	168.66	H2O	H2O
30	552,458.02	782,055.92	1,227.53	168.46	H2O	H2O
31	552,444.61	782,054.57	1,240.15	168.90	H2O	H2O
32	552,435.98	782,062.05	1,250.41	168.89	H2O	H2O
33	552,426.07	782,064.11	1,260.52	168.94	H2O	H2O
34	552,408.25	782,070.79	1,279.46	168.46	H2O	H2O
35	552,398.74	782,074.77	1,289.68	168.34	H2O	H2O
36	552,381.96	782,082.06	1,307.76	170.56	H2O	H2O
37	552,376.46	782,083.93	1,313.56	171.33	H2O	H2O
38	552,370.71	782,081.83	1,318.58	175.60	TE	TE
39	552,367.81	782,081.89	1,321.40	179.62	CB	Channelbank [CB
40	552,364.89	782,082.40	1,324.35	179.49	GR	GR
41	552,348.48	782,087.12	1,341.42	177.93	GR	GR
42	552,336.96	782,089.48	1,353.16	177.76	GR	GR
43	552,319.08	782,098.78	1,372.83	177.84	GR	GR
44	552,297.14	782,105.69	1,395.81	177.91	GR	GR
45	552,283.37	782,109.51	1,410.10	178.30	GR	GR
46	552,267.10	782,112.03	1,426.47	180.13	SPECIAL	ALPT2
47	552,267.08	782,112.03	1,426.49	180.13	GR	GR
48	552,237.10	782,118.66	1,457.17	182.00	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{53DD8CF6-9F36-499C-BD8E-EF59C9A5D13F}**	**Stream**		**Centerline**	
Name:	PA_RAM_07XS	Name:		Station:	1,226.05
Location:	1576 RIVEREDGE	Station:	0.00	Easting:	552,472.47
County:		Orientation:	Looking D/S	Northing:	783,059.39
State:				Invert:	170.26
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_07XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,677.77	783,100.00	1,000.00	179.71	SPECIAL	ALPT1
2	552,677.69	783,099.99	1,000.08	179.72	GR	GR
3	552,660.09	783,096.13	1,018.10	180.05	GR	GR
4	552,522.72	783,705.83	1,034.84	179.32	SPECIAL	RAM_08AXS FLD
5	552,522.71	783,705.82	1,034.85	179.32	SPECIAL	DATE 10-10-2011
6	552,522.68	783,705.78	1,034.88	179.40	SPECIAL	PA_RAM_08AXS
7	552,640.15	783,093.18	1,038.22	180.30	GR	GR
8	552,632.26	783,090.99	1,046.39	178.56	GR	GR
9	552,628.33	783,090.42	1,050.36	178.04	GR	GR
10	552,617.72	783,089.41	1,060.96	177.50	GR	GR
11	552,607.50	783,086.66	1,071.52	178.75	GR	GR
12	552,593.32	783,082.08	1,086.32	179.21	GR	GR
13	552,587.49	783,081.07	1,092.24	178.13	GR	GR
14	552,585.78	783,080.38	1,094.04	177.58	GR	GR
15	552,581.55	783,079.39	1,098.38	177.59	GR	GR
16	552,575.68	783,078.47	1,104.32	178.93	GR	GR
17	552,567.39	783,077.03	1,112.74	179.67	GR	GR
18	552,563.41	783,076.40	1,116.76	179.69	GR	GR
19	552,557.27	783,075.43	1,122.98	180.37	GR	GR
20	552,546.98	783,073.80	1,133.38	179.82	GR	GR
21	552,543.32	783,073.14	1,137.11	178.29	GR	GR

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_07XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,539.10	783,073.30	1,141.21	177.72	GR	GR
23	552,536.49	783,073.94	1,143.65	175.88	GR	GR
24	552,533.20	783,071.56	1,147.34	174.92	GR	GR
25	552,529.77	783,071.62	1,150.69	174.51	GR	GR
26	552,524.99	783,070.15	1,155.67	175.42	GR	GR
27	552,522.04	783,068.54	1,158.87	178.11	GR	GR
28	552,519.44	783,068.84	1,161.36	178.18	CB	Channelbank [CB
29	552,515.19	783,067.91	1,165.71	175.37	TE	TE
30	552,512.38	783,067.12	1,168.62	174.77	H2O	H2O
31	552,505.56	783,066.87	1,175.36	173.46	H2O	H2O
32	552,494.51	783,062.39	1,187.07	172.67	H2O	H2O
33	552,486.26	783,060.36	1,195.56	172.34	H2O	H2O
34	552,472.28	783,056.28	1,210.06	171.67	H2O	H2O
35	552,455.33	783,053.55	1,227.22	171.23	H2O	H2O
36	552,441.57	783,052.54	1,240.91	170.52	H2O	H2O
37	552,431.59	783,049.60	1,251.28	170.26	H2O	H2O
38	552,416.07	783,047.04	1,267.00	170.37	H2O	H2O
39	552,404.76	783,045.94	1,278.31	172.16	H2O	H2O
40	552,400.94	783,045.92	1,282.06	173.79	H2O	H2O
41	552,397.35	783,045.17	1,285.73	174.78	H2O	H2O
42	552,396.69	783,045.11	1,286.38	175.54	TE	TE
43	552,390.20	783,042.83	1,293.20	181.40	CB	Channelbank [CB
44	552,377.84	783,038.67	1,306.13	181.13	SPECIAL	PA_RAM_07BXS NL
45	552,364.56	783,036.08	1,319.66	180.55	GR	GR
46	552,341.08	783,031.94	1,343.49	180.43	GR	GR
47	552,315.18	783,026.69	1,369.92	180.43	GR	GR
48	552,290.77	783,022.75	1,394.63	180.36	GR	GR
49	552,267.26	783,019.00	1,418.42	180.26	SPECIAL	ALPT2
50	552,267.24	783,018.91	1,418.46	180.26	GR	GR
51	552,208.38	783,214.86	1,438.28	180.12	SPECIAL	RAM_07AXS FLD
52	552,208.37	783,214.85	1,438.28	180.12	SPECIAL	RAM_07AXS BS
53	552,208.37	783,214.86	1,438.28	180.12	SPECIAL	PA_RAM_07AXS

PROJECT NJDEP Field Survey - Cross Sections

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Cross Sections Report

(All Units In Feet)

ID:	**{195515F8-823A-4F87-B483-2F063B6EA5DD}**	**Stream**		**Centerline**	
Name:	PA_RAM_08XS	Name:		Station:	1,199.49
Location:	1524 RIVEREDGE	Station:	0.00	Easting:	552,774.12
County:		Orientation:	Looking D/S	Northing:	783,643.90
State:				Invert:	166.54
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_08XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,906.81	783,510.84	1,000.00	182.46	SPECIAL	ALPT1
2	552,906.79	783,510.85	1,000.02	182.46	GR	GR
3	552,888.48	783,527.45	1,024.69	182.51	GR	GR
4	552,881.39	783,534.85	1,034.93	182.43	GR	GR
5	552,878.48	783,537.99	1,039.21	183.01	GR	GR
6	552,869.15	783,547.56	1,052.58	182.99	GR	GR
7	552,863.79	783,553.66	1,060.70	183.36	GR	GR
8	552,857.96	783,558.96	1,068.56	182.58	GR	GR
9	552,848.30	783,569.31	1,082.71	182.40	GR	GR
10	552,838.83	783,579.35	1,096.51	182.26	GR	GR
11	552,829.34	783,588.32	1,109.56	182.20	GR	GR
12	552,816.71	783,600.48	1,127.08	183.23	GR	GR
13	552,798.84	783,615.94	1,150.62	178.02	CB	Channelbank [CB
14	552,796.99	783,616.07	1,152.01	175.67	TE	TE
15	552,794.70	783,619.78	1,156.26	174.62	H2O	H2O
16	552,791.80	783,623.72	1,161.11	172.76	H2O	H2O
17	552,786.41	783,626.84	1,167.11	170.81	H2O	H2O
18	552,778.51	783,634.16	1,177.86	170.41	H2O	H2O
19	552,774.15	783,640.04	1,185.12	166.54	H2O	H2O
20	552,770.29	783,647.93	1,193.46	166.93	H2O	H2O
21	552,762.43	783,659.24	1,207.05	167.99	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_08XS

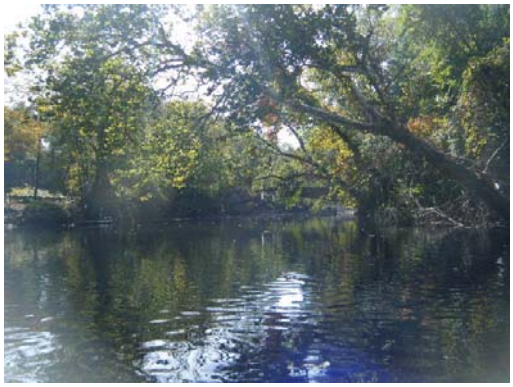
Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,754.59	783,669.06	1,219.55	168.82	H2O	H2O
23	552,743.40	783,679.69	1,234.97	168.91	H2O	H2O
24	552,741.31	783,683.17	1,238.92	171.08	H2O	H2O
25	552,735.84	783,686.66	1,245.24	174.63	H2O	H2O
26	552,734.77	783,688.03	1,246.97	175.59	TE	TE
27	552,731.97	783,691.58	1,251.46	181.32	CB	Channelbank [CB
28	552,728.42	783,695.57	1,256.80	181.26	SPECIAL	PA_RAM_08BXS NL
29	552,724.48	783,699.66	1,262.48	181.10	GR	GR
30	552,719.72	783,704.53	1,269.29	179.86	GR	GR
31	552,208.33	783,214.81	1,275.30	180.23	SPECIAL	DATE 10-10-2011
32	552,208.33	783,214.81	1,275.30	180.23	SPECIAL	RAM_07AXS FLD
33	552,208.37	783,214.86	1,275.31	180.12	SPECIAL	PA_RAM_07AXS
34	552,702.76	783,722.59	1,294.06	178.89	GR	GR
35	552,689.50	783,735.23	1,312.37	179.69	GR	GR
36	552,682.19	783,742.33	1,322.55	182.37	GR	GR
37	552,662.62	783,760.75	1,349.40	182.22	GR	GR
38	552,644.60	783,780.03	1,375.79	181.98	GR	GR
39	552,644.60	783,780.03	1,375.79	181.98	SPECIAL	ALPT2
40	552,522.68	783,705.76	1,407.65	179.41	SPECIAL	PA_RAM_08AXS BS
41	552,522.69	783,705.78	1,407.66	179.41	SPECIAL	RAM_08AXS FLD
42	552,522.68	783,705.78	1,407.66	179.40	SPECIAL	PA_RAM_08AXS

Cross Sections Report

(All Units In Feet)

ID:	**{8991B71B-8600-49E7-ABB0-28EFF2AD2F10}**	**Stream**		**Centerline**	
Name:	PA_RAM_09XS	Name:		Station:	1,235.10
Location:	1440 RIVERSEDGE	Station:	0.00	Easting:	552,982.41
County:		Orientation:	Looking D/S	Northing:	784,371.68
State:				Invert:	167.74
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel



Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_09XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,178.44	784,436.02	999.74	191.37	GR	GR
2	553,178.22	784,435.86	1,000.00	191.36	SPECIAL	ALPT1
3	553,152.12	784,427.22	1,027.49	190.53	GR	GR
4	553,141.59	784,423.72	1,038.58	189.67	GR	GR
5	553,128.17	784,418.51	1,052.95	187.98	GR	GR
6	553,111.13	784,413.69	1,070.64	185.46	GR	GR
7	553,097.58	784,410.01	1,084.67	183.77	GR	GR
8	553,070.85	784,402.32	1,112.48	182.68	GR	GR
9	553,040.31	784,392.31	1,144.61	182.12	GR	GR
10	553,024.80	784,386.81	1,161.06	181.51	GR	GR
11	553,014.51	784,381.48	1,172.48	181.00	CB	Channelbank [CB
12	553,008.49	784,380.67	1,178.46	176.41	GR	GR
13	553,006.21	784,379.48	1,180.99	175.54	TE	TE
14	553,002.28	784,378.12	1,185.15	174.22	H2O	H2O
15	552,996.17	784,376.78	1,191.38	172.00	H2O	H2O
16	552,987.94	784,373.71	1,200.15	170.77	H2O	H2O
17	552,976.98	784,370.07	1,211.70	170.21	H2O	H2O
18	552,968.93	784,366.19	1,220.54	169.64	H2O	H2O
19	552,959.63	784,361.69	1,230.76	168.99	H2O	H2O
20	552,943.26	784,353.72	1,248.76	167.74	H2O	H2O
21	552,918.53	784,349.98	1,273.48	169.29	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_09XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,913.56	784,347.61	1,278.93	171.98	H2O	H2O
23	552,909.89	784,347.33	1,282.52	173.97	H2O	H2O
24	552,905.00	784,348.32	1,286.89	174.94	H2O	H2O
25	552,902.85	784,347.43	1,289.21	175.50	TE	TE
26	552,898.17	784,345.97	1,294.11	178.43	CB	Channelbank [CB
27	552,894.26	784,344.26	1,298.35	179.52	GR	GR
28	552,888.57	784,343.04	1,304.14	179.37	SPECIAL	PA_RAM_09BXS NL
29	552,877.08	784,339.50	1,316.16	179.58	GR	GR
30	552,626.33	785,122.15	1,321.99	183.26	SPECIAL	PA_RAM_10AXS FLD
31	552,626.33	785,122.15	1,321.99	183.28	SPECIAL	DATE 10-10-2011
32	552,855.20	784,333.67	1,338.79	180.64	GR	GR
33	552,832.08	784,326.73	1,362.93	181.01	GR	GR
34	552,808.14	784,319.34	1,387.98	180.97	GR	GR
35	552,784.66	784,312.84	1,412.33	181.13	GR	GR
36	552,784.63	784,312.83	1,412.37	181.13	SPECIAL	ALPT2
37	552,704.88	784,466.47	1,442.64	180.34	SPECIAL	PA_RAM_09AXS
38	552,704.87	784,466.48	1,442.65	180.35	SPECIAL	PA_RAM_09AXS FLD
39	552,704.87	784,466.47	1,442.66	180.35	SPECIAL	RAM_09AXS BS CH
40	552,753.12	784,069.68	1,514.98	181.93	SPECIAL	PA_RAM_02A

Cross Sections Report

(All Units In Feet)

ID:	**{57572BAE-5C27-4D13-AC2D-73C7A653FB31}**	**Stream**		**Centerline**	
Name:	PA_RAM_10XS	Name:		Station:	1,162.14
Location:	RIVEREDGE DR	Station:	0.00	Easting:	552,853.09
County:		Orientation:	Looking D/S	Northing:	785,141.02
State:				Invert:	165.33
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_10XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,023.74	785,159.46	1,000.00	194.84	SPECIAL	ALPT1
2	553,023.68	785,159.46	1,000.06	194.83	GR	GR
3	553,003.53	785,157.55	1,020.30	194.83	GR	GR
4	552,960.31	785,151.95	1,063.88	193.95	GR	GR
5	552,938.69	785,149.55	1,085.63	193.50	GR	GR
6	552,938.65	785,149.54	1,085.67	193.50	GR	GR
7	552,932.56	785,150.11	1,091.65	193.78	GR	GR
8	552,932.11	785,150.05	1,092.10	192.16	GR	GR
9	552,916.71	785,148.66	1,107.56	185.41	GR	GR
10	552,916.49	785,148.70	1,107.77	182.62	GR	GR
11	552,915.36	785,148.22	1,108.94	182.07	GR	GR
12	552,912.31	785,147.67	1,112.04	181.31	GR	GR
13	552,911.96	785,150.19	1,112.09	180.83	CB	Channelbank [CB
14	552,909.77	785,148.19	1,114.51	178.11	GR	GR
15	552,905.38	785,147.04	1,118.99	175.52	TE	TE
16	552,903.24	785,147.09	1,121.12	174.45	H2O	H2O
17	552,899.11	785,145.03	1,125.47	173.05	H2O	H2O
18	552,887.54	785,146.65	1,136.75	167.89	H2O	H2O
19	552,875.07	785,149.82	1,148.75	165.33	H2O	H2O
20	552,862.71	785,146.21	1,161.46	166.36	H2O	H2O
21	552,847.06	785,142.92	1,177.39	168.25	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_10XS

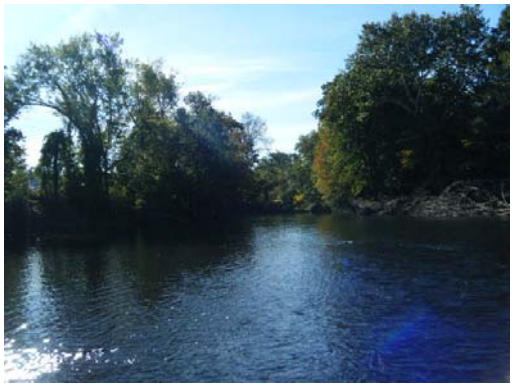
Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,834.03	785,140.61	1,190.60	169.16	H2O	H2O
23	552,826.54	785,138.09	1,198.34	171.80	H2O	H2O
24	552,823.17	785,137.72	1,201.73	173.43	H2O	H2O
25	552,819.74	785,136.54	1,205.28	175.20	TE	TE
26	552,813.51	785,134.86	1,211.67	180.81	CB	Channelbank [CB
27	552,797.08	785,131.25	1,228.41	181.67	SPECIAL	PA_RAM_10BXS NL
28	552,787.40	785,129.70	1,238.20	182.19	GR	GR
29	552,761.48	785,125.28	1,264.47	182.66	GR	GR
30	552,735.65	785,122.14	1,290.49	182.63	GR	GR
31	552,710.56	785,121.03	1,315.53	182.76	GR	GR
32	552,682.95	785,118.15	1,343.29	182.90	GR	GR
33	552,682.93	785,118.15	1,343.31	182.90	SPECIAL	ALPT2
34	552,626.35	785,122.11	1,399.00	183.30	SPECIAL	PA_RAM_10AXS BS
35	552,626.35	785,122.08	1,399.01	183.31	SPECIAL	PA_RAM_10AXS FLD
36	552,626.34	785,122.08	1,399.01	183.31	SPECIAL	PA_RAM_10AXS
37	552,704.88	784,466.47	1,399.95	180.34	SPECIAL	PA_RAM_09AXS
38	552,704.81	784,466.41	1,400.03	180.33	SPECIAL	PA_RAM_09AXS FLD
39	552,704.81	784,466.39	1,400.03	180.33	SPECIAL	DATE 10-10-2011

Cross Sections Report

(All Units In Feet)

ID:	**{7DF40654-FF42-45F0-8900-FAF6F4703319}**	**Stream**		**Centerline**	
Name:	PA_RAM_11XS	Name:		Station:	1,267.87
Location:	CAR LOT	Station:	0.00	Easting:	552,490.38
County:		Orientation:	Looking D/S	Northing:	785,901.87
State:				Invert:	172.98
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel



Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_11XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,905.57	786,233.33	858.45	188.71	SPECIAL	RAM_03A FLD
2	552,905.57	786,233.33	858.45	188.71	SPECIAL	DATE 10-10-2011
3	552,905.57	786,233.26	858.47	188.69	SPECIAL	PA_RAM_03A
4	552,928.59	785,680.86	923.33	192.07	SPECIAL	PA_RAM_11AXS FLD
5	552,928.59	785,680.86	923.33	192.08	SPECIAL	RAM_11AXS BS CHK
6	552,928.58	785,680.86	923.33	192.08	SPECIAL	PA_RAM_11AXS
7	552,804.97	785,967.18	999.98	188.31	GR	GR
8	552,804.95	785,967.17	1,000.00	188.31	SPECIAL	ALPT1
9	552,765.62	785,953.94	1,040.93	186.33	GR	GR
10	552,746.37	785,947.47	1,060.97	187.22	GR	GR
11	552,699.96	785,931.47	1,109.33	187.23	GR	GR
12	552,673.81	785,923.74	1,136.38	185.33	SPECIAL	PA_RAM_11BXS
13	552,666.62	785,922.11	1,143.73	184.73	GR	GR
14	552,663.69	785,921.91	1,146.65	184.98	CB	Channelbank [CB
15	552,653.74	785,921.44	1,156.55	180.31	GR	GR
16	552,647.15	785,920.96	1,163.14	176.47	GR	GR
17	552,644.03	785,920.69	1,166.25	175.66	TE	TE
18	552,641.74	785,920.24	1,168.59	174.93	H2O	H2O
19	552,635.41	785,920.78	1,174.76	175.10	H2O	H2O
20	552,627.14	785,920.86	1,182.90	175.20	H2O	H2O
21	552,612.77	785,918.27	1,197.50	175.39	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_11XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,598.21	785,916.69	1,212.14	174.72	H2O	H2O
23	552,574.21	785,916.86	1,235.80	174.90	H2O	H2O
24	552,555.17	785,915.02	1,254.89	174.59	H2O	H2O
25	552,547.26	785,916.10	1,262.53	175.38	H2O	H2O
26	552,531.31	785,915.58	1,278.36	175.26	H2O	H2O
27	552,511.36	785,911.76	1,298.67	174.40	H2O	H2O
28	552,500.58	785,907.46	1,309.99	173.65	H2O	H2O
29	552,486.38	785,905.95	1,324.25	172.98	H2O	H2O
30	552,486.32	785,905.95	1,324.31	172.98	H2O	H2O
31	552,469.19	785,898.57	1,342.40	174.20	H2O	H2O
32	552,457.31	785,898.04	1,354.20	174.81	H2O	H2O
33	552,445.37	785,896.19	1,366.29	175.04	H2O	H2O
34	552,442.19	785,895.81	1,369.49	175.82	TE	TE
35	552,438.65	785,895.88	1,372.97	180.26	CB	Channelbank [CB
36	552,430.93	785,894.91	1,380.75	181.27	GR	GR
37	552,420.15	785,895.37	1,391.32	180.97	GR	GR
38	552,400.82	785,893.20	1,410.75	181.18	GR	GR
39	552,400.79	785,893.19	1,410.79	181.18	GR	GR
40	552,389.55	785,892.54	1,421.99	179.54	GR	GR
41	552,377.81	785,891.35	1,433.77	179.02	GR	GR
42	552,373.14	785,892.37	1,438.21	180.34	GR	GR
43	552,367.23	785,891.34	1,444.21	180.71	GR	GR
44	552,356.88	785,889.16	1,454.77	182.21	GR	GR
45	552,351.55	785,888.82	1,460.09	182.52	GR	GR
46	552,341.06	785,887.26	1,470.70	182.00	GR	GR
47	552,334.32	785,886.64	1,477.45	181.20	GR	GR
48	552,320.74	785,885.17	1,491.09	181.02	GR	GR
49	552,312.26	785,884.54	1,499.56	181.31	GR	GR
50	552,303.60	785,883.38	1,508.30	179.14	GR	GR
51	552,294.51	785,882.67	1,517.39	178.86	GR	GR
52	552,287.21	785,881.41	1,524.79	178.10	GR	GR
53	552,272.56	785,879.80	1,539.51	177.85	GR	GR
54	552,265.85	785,879.07	1,546.25	178.21	GR	GR
55	552,252.22	785,877.58	1,559.95	181.21	GR	GR
56	552,244.06	785,875.00	1,568.41	185.53	GR	GR
57	552,231.86	785,872.92	1,580.79	186.02	GR	GR
58	552,228.45	785,872.94	1,584.15	185.04	GR	GR
59	552,212.57	785,871.55	1,600.05	185.38	GR	GR
60	552,198.94	785,870.01	1,613.76	185.07	GR	GR
61	552,198.70	785,869.98	1,614.00	185.40	GR	GR
62	552,192.92	785,868.88	1,619.87	185.62	SPECIAL	ALPT2
63	552,192.88	785,869.10	1,619.88	185.64	GR	GR
64	552,182.32	785,867.80	1,630.51	186.69	GR	GR
65	552,169.51	785,866.46	1,643.37	187.22	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{752CC3E5-47EF-4448-B510-6D82387DC6C6}**	**Stream**		**Centerline**	
Name:	PA_RAM_12XS	Name:		Station:	1,169.63
Location:	GEORGES MARKET	Station:	0.00	Easting:	552,553.37
County:		Orientation:	Looking D/S	Northing:	786,320.91
State:				Invert:	167.64
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_12XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,905.59	786,233.23	850.79	188.69	SPECIAL	DATE 10-10-2011
2	552,905.58	786,233.25	850.81	188.69	SPECIAL	PA_RAM_03A FLD
3	552,701.15	786,208.92	999.92	186.59	GR	GR
4	552,701.09	786,208.97	1,000.00	186.58	SPECIAL	ALPT1
5	552,684.42	786,222.85	1,021.66	186.17	GR	GR
6	552,651.41	786,246.91	1,062.51	184.85	GR	GR
7	552,630.36	786,262.01	1,088.41	183.90	GR	GR
8	552,627.67	786,263.90	1,091.69	183.83	CB	Channelbank [CB
9	552,620.83	786,271.55	1,101.75	177.96	GR	GR
10	552,615.10	786,276.46	1,109.28	176.17	TE	TE
11	552,612.26	786,279.03	1,113.09	175.65	H2O	H2O
12	552,608.36	786,282.08	1,118.05	174.84	H2O	H2O
13	552,601.88	786,292.18	1,129.28	172.73	H2O	H2O
14	552,582.33	786,300.99	1,150.21	170.26	H2O	H2O
15	552,571.95	786,312.04	1,165.15	171.09	H2O	H2O
16	552,555.53	786,320.14	1,183.14	167.64	H2O	H2O
17	552,681.78	786,518.19	1,200.71	189.58	SPECIAL	PA_RAM_03B FLD
18	552,681.77	786,518.18	1,200.71	189.58	SPECIAL	PA_RAM_03A
19	552,681.78	786,518.19	1,200.71	189.59	SPECIAL	RAM_03B BS CHK
20	552,537.62	786,337.43	1,207.85	171.27	H2O	H2O
21	552,524.12	786,343.72	1,222.42	174.66	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_12XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	552,519.68	786,350.41	1,229.98	176.17	TE	TE
23	552,508.95	786,354.99	1,241.32	184.37	GR	GR
24	552,502.63	786,359.83	1,249.28	187.85	CB	Channelbank [CB
25	552,489.33	786,370.71	1,266.44	188.49	SPECIAL	PA_RAM_12AXS NL
26	552,480.50	786,376.72	1,277.11	187.74	GR	GR
27	552,477.35	786,374.43	1,278.26	187.66	SPECIAL	PA_RAM_03B
28	552,479.20	786,377.70	1,278.75	187.18	GR	GR
29	552,466.01	786,387.19	1,294.99	187.60	GR	GR
30	552,450.71	786,397.62	1,313.49	187.05	GR	GR
31	552,449.68	786,397.99	1,314.53	187.55	GR	GR
32	552,440.78	786,402.90	1,324.61	188.18	GR	GR
33	552,424.39	786,412.96	1,343.75	189.57	GR	GR
34	552,404.24	786,431.08	1,370.74	190.06	SPECIAL	ALPT2
35	552,404.24	786,431.08	1,370.74	190.06	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{DF60F0B7-34B4-44CE-B466-044D424B3037}**	**Stream**		**Centerline**	
Name:	PA_RAM_13XS	Name:		Station:	1,202.33
Location:	DS POMPTON LAKE DAM	Station:	0.00	Easting:	553,046.86
County:		Orientation:	Looking D/S	Northing:	786,424.20
State:				Invert:	161.98
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_13XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,084.74	786,230.93	1,000.00	191.98	GR	GR
2	553,084.74	786,230.93	1,000.00	191.98	SPECIAL	ALPT1
3	553,082.25	786,245.44	1,014.71	192.02	GR	GR
4	553,079.15	786,259.56	1,029.17	191.29	GR	GR
5	553,072.37	786,295.83	1,066.04	187.39	GR	GR
6	553,068.73	786,313.92	1,084.49	185.80	CB	Channelbank [CB
7	553,061.06	786,333.03	1,104.80	178.48	TE	TE
8	553,065.90	786,338.22	1,108.84	175.22	H2O	H2O
9	553,059.59	786,342.65	1,114.51	172.48	H2O	H2O
10	553,067.35	786,373.37	1,142.90	162.83	H2O	H2O
11	553,065.42	786,402.26	1,171.54	163.29	H2O	H2O
12	553,039.62	786,445.84	1,219.59	161.98	H2O	H2O
13	553,030.39	786,468.20	1,243.39	163.72	H2O	H2O
14	553,028.47	786,481.11	1,256.42	165.05	H2O	H2O
15	553,024.62	786,493.94	1,269.78	168.71	H2O	H2O
16	553,025.73	786,511.57	1,286.77	172.25	H2O	H2O
17	553,025.02	786,517.59	1,292.80	176.23	H2O	H2O
18	553,023.11	786,521.44	1,296.97	177.27	H2O	H2O
19	553,025.40	786,524.90	1,299.87	178.31	TE	TE
20	553,024.22	786,532.84	1,307.88	181.80	GR	GR
21	553,024.24	786,538.28	1,313.20	184.87	CB	Channelbank [CB

Cross Sections Report

(All Units In Feet)

Cross Section Data **Data type:** **PA_RAM_13XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
22	553,023.89	786,550.23	1,324.95	184.82	GR	GR
23	553,018.01	786,565.28	1,340.90	192.15	GR	GR
24	553,016.71	786,571.77	1,347.52	192.91	GR	GR
25	553,016.34	786,573.30	1,349.09	193.67	GR	GR
26	552,681.75	786,518.20	1,365.98	189.58	SPECIAL	PA_RAM_03B BS CH
27	552,681.74	786,518.22	1,366.00	189.56	SPECIAL	DATE 10-18-2011
28	552,681.74	786,518.22	1,366.00	189.56	SPECIAL	PA_RAM_03B FLD
29	553,012.98	786,596.96	1,372.92	205.47	GR	GR
30	553,001.59	786,615.31	1,393.27	206.02	SPECIAL	ALPT2
31	553,000.36	786,615.31	1,393.53	206.07	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{8DB98357-6FBB-4E9C-BF8F-B6382BA23882}**	**Stream**		**Centerline**	
Name:	PA_RAM_14XS	Name:		Station:	1,282.09
Location:	HEMLOCK RD	Station:	0.00	Easting:	553,473.67
County:		Orientation:	Looking D/S	Northing:	786,641.59
State:				Invert:	182.82
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_14XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,640.35	786,409.41	977.56	240.14	GR	GR
2	553,633.93	786,428.77	996.74	232.41	GR	GR
3	553,630.68	786,430.36	1,000.00	229.25	SPECIAL	ALPT1
4	553,630.67	786,430.37	1,000.02	229.25	GR	GR
5	553,626.86	786,438.89	1,009.06	220.17	GR	GR
6	553,621.61	786,449.08	1,020.31	211.02	GR	GR
7	553,618.90	786,454.12	1,025.95	208.72	GR	GR
8	553,929.01	786,708.97	1,033.92	209.68	SPECIAL	DATE 10-18-2011
9	553,929.01	786,708.97	1,033.92	209.68	SPECIAL	PA_RAM_14BXS FLD
10	553,929.01	786,708.97	1,033.93	209.68	SPECIAL	PA_RAM_14BXS
11	553,929.00	786,709.00	1,033.96	209.66	SPECIAL	PA_RAM_14BXS BS
12	553,609.35	786,468.21	1,042.93	208.81	GR	GR
13	553,600.85	786,484.04	1,060.62	208.33	GR	GR
14	553,597.68	786,489.09	1,066.55	208.53	CB	Channelbank [CB
15	554,194.82	786,960.96	1,067.10	208.27	SPECIAL	PA_HAY_01A
16	554,194.87	786,961.00	1,067.10	208.29	SPECIAL	HAY_01A FLD
17	553,596.86	786,492.24	1,069.53	205.11	GR	GR
18	553,596.68	786,495.64	1,072.31	202.64	GR	GR
19	553,595.78	786,497.50	1,074.33	200.83	TE	TE
20	553,594.79	786,497.68	1,075.08	200.24	H2O	H2O
21	553,593.96	786,500.58	1,077.87	199.98	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_14XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	553,585.92	786,509.70	1,090.02	197.30	H2O	H2O
23	553,586.60	786,511.45	1,090.97	195.82	H2O	H2O
24	553,581.47	786,520.27	1,101.07	190.50	H2O	H2O
25	553,575.30	786,524.61	1,108.30	186.22	H2O	H2O
26	553,562.23	786,533.04	1,123.01	184.28	H2O	H2O
27	553,537.74	786,560.53	1,159.76	182.82	H2O	H2O
28	553,510.39	786,595.36	1,204.05	184.17	H2O	H2O
29	553,492.58	786,624.28	1,237.79	188.64	H2O	H2O
30	553,466.28	786,656.64	1,279.47	190.86	H2O	H2O
31	553,438.80	786,680.95	1,315.59	191.32	H2O	H2O
32	553,418.08	786,704.76	1,347.12	191.93	H2O	H2O
33	553,405.82	786,733.65	1,377.38	192.05	H2O	H2O
34	553,395.65	786,751.49	1,397.69	193.26	H2O	H2O
35	553,389.44	786,763.24	1,410.77	193.72	H2O	H2O
36	553,375.67	786,775.71	1,429.08	194.61	H2O	H2O
37	553,365.75	786,786.44	1,443.65	194.53	H2O	H2O
38	553,356.89	786,794.09	1,455.14	194.02	H2O	H2O
39	553,350.89	786,802.19	1,465.22	194.42	H2O	H2O
40	553,341.84	786,810.17	1,477.09	195.93	H2O	H2O
41	553,337.04	786,814.97	1,483.83	198.63	H2O	H2O
42	553,331.59	786,816.80	1,488.65	199.99	H2O	H2O
43	553,330.64	786,817.60	1,489.86	200.79	TE	TE
44	553,329.28	786,819.14	1,491.91	203.64	CB	Channelbank [CB
45	553,326.84	786,820.32	1,494.35	204.58	GR	GR
46	553,326.11	786,826.25	1,499.45	204.76	SPECIAL	PA_RAM_14AXS
47	553,315.25	786,833.96	1,512.23	205.19	GR	GR
48	553,314.29	786,834.76	1,513.46	205.57	GR	GR
49	553,309.27	786,838.46	1,519.47	209.67	GR	GR
50	553,302.38	786,845.68	1,529.41	215.18	GR	GR
51	553,300.14	786,849.67	1,533.93	218.86	GR	GR
52	553,296.19	786,854.28	1,539.99	223.63	SPECIAL	ALPT2
53	553,296.18	786,854.29	1,540.01	223.64	GR	GR
54	553,289.00	786,861.01	1,549.73	227.73	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{270D7716-50A3-4DD2-BDF6-37D6942F7DDF}**	**Stream**		**Centerline**	
Name:	PA_RAM_15XS	Name:		Station:	1,420.40
Location:	CONFLUENCE HAYCO	Station:	0.00	Easting:	553,892.94
County:		Orientation:	Looking D/S	Northing:	787,704.57
State:				Invert:	182.21
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_15XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	554,395.46	787,184.75	689.57	207.04	SPECIAL	DATE 10-20-2011
2	554,395.46	787,184.77	689.57	207.02	SPECIAL	PA_HAY_01B TR 1A
3	554,395.47	787,184.77	689.57	207.04	SPECIAL	PA_HAY_01B FLD
4	554,446.95	787,288.63	693.41	210.76	SPECIAL	BS CK 15AXS
5	554,446.92	787,288.58	693.42	210.77	SPECIAL	PA_RAM_15AXS
6	554,446.91	787,288.59	693.43	210.77	SPECIAL	PA_RAM_15AXS FLD
7	554,194.82	786,960.96	760.30	208.27	SPECIAL	PA_HAY_01A
8	553,929.01	786,708.97	875.07	209.68	SPECIAL	PA_RAM_14BXS
9	554,296.76	787,470.85	911.99	204.16	GR	GR
10	554,296.49	787,470.91	912.26	208.75	GR	GR
11	554,286.85	787,477.72	923.97	206.97	GR	GR
12	554,263.92	787,493.09	951.45	206.20	GR	GR
13	554,241.36	787,506.29	977.57	205.17	GR	GR
14	554,224.31	787,521.95	1,000.00	204.08	SPECIAL	ALPT1
15	554,224.29	787,521.96	1,000.02	204.08	GR	GR
16	554,199.99	787,535.41	1,027.80	203.45	GR	GR
17	554,177.65	787,548.01	1,053.44	202.65	GR	GR
18	554,162.11	787,562.20	1,073.84	202.05	SPECIAL	PA_RAM_15BXS NL
19	554,153.26	787,562.63	1,081.85	201.73	CB	Channelbank [CB
20	554,147.63	787,565.65	1,088.23	201.05	TE	TE
21	554,145.96	787,566.60	1,090.16	200.36	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_15XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	554,142.90	787,567.68	1,093.36	197.85	H2O	H2O
23	554,136.37	787,576.15	1,103.12	197.67	H2O	H2O
24	554,127.94	787,585.27	1,114.86	196.75	H2O	H2O
25	554,112.22	787,600.30	1,135.83	196.49	H2O	H2O
26	554,085.89	787,609.13	1,163.20	196.15	H2O	H2O
27	554,069.89	787,612.71	1,178.99	195.53	H2O	H2O
28	554,050.40	787,624.29	1,201.64	192.24	H2O	H2O
29	554,026.49	787,642.33	1,231.25	189.99	H2O	H2O
30	553,981.22	787,670.63	1,284.51	188.10	H2O	H2O
31	553,956.39	787,686.33	1,313.82	185.31	H2O	H2O
32	553,923.66	787,704.80	1,351.39	182.21	H2O	H2O
33	553,902.85	787,718.09	1,376.02	182.84	H2O	H2O
34	553,875.05	787,734.01	1,408.04	184.53	H2O	H2O
35	553,845.06	787,748.61	1,441.37	187.44	H2O	H2O
36	553,809.22	787,771.74	1,483.89	193.42	H2O	H2O
37	553,774.97	787,799.19	1,527.05	194.96	H2O	H2O
38	553,747.91	787,818.61	1,560.08	195.82	H2O	H2O
39	553,715.41	787,828.32	1,593.31	195.81	H2O	H2O
40	553,688.29	787,842.63	1,623.97	197.49	H2O	H2O
41	553,649.20	787,853.04	1,663.33	198.40	H2O	H2O
42	553,619.82	787,860.49	1,692.73	198.57	H2O	H2O
43	553,597.27	787,866.70	1,715.54	198.51	H2O	H2O
44	553,567.22	787,882.90	1,749.68	200.65	H2O	H2O
45	553,564.58	787,884.08	1,752.56	201.03	TE	TE
46	553,560.51	787,885.84	1,756.98	201.89	CB	Channelbank [CB
47	553,546.97	787,893.68	1,772.61	206.25	GR	GR
48	553,532.87	787,898.37	1,787.25	212.26	GR	GR
49	553,514.09	787,903.45	1,806.20	220.16	GR	GR
50	553,500.37	787,911.25	1,821.98	229.25	GR	GR
51	553,491.85	787,915.34	1,831.42	233.97	GR	GR
52	553,480.12	787,922.11	1,844.96	234.85	SPECIAL	ALPT2
53	553,480.11	787,922.11	1,844.96	234.79	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{FD4145C1-60F3-4BFA-A0E6-CFFF15D8A191}**	**Stream**		**Centerline**	
Name:	PA_RAM_16XS	Name:		Station:	1,306.79
Location:	287 TERHUNE AVE	Station:	0.00	Easting:	553,884.58
County:		Orientation:	Looking D/S	Northing:	788,785.89
State:				Invert:	183.57
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_16XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	554,169.46	788,817.43	999.96	225.34	GR	GR
2	554,169.42	788,817.43	1,000.00	225.33	SPECIAL	ALPT1
3	554,134.79	788,814.82	1,034.69	220.90	GR	GR
4	554,077.58	789,169.44	1,049.44	208.48	SPECIAL	BS CK 16A
5	554,077.57	789,169.46	1,049.45	208.49	SPECIAL	PA_RAM_16A NL
6	554,077.57	789,169.44	1,049.45	208.48	SPECIAL	PA_RAM_16AXS FLD
7	553,990.00	789,799.07	1,061.74	208.32	SPECIAL	PA_RAM_17AXS
8	554,096.15	788,810.06	1,073.63	217.03	GR	GR
9	554,071.89	788,807.87	1,097.97	213.89	GR	GR
10	553,994.89	789,378.36	1,106.77	204.76	SPECIAL	PA_RAM_17BXS
11	553,994.89	789,378.36	1,106.77	204.76	SPECIAL	PA_RAM_17BXS FLD
12	554,059.49	788,806.51	1,110.45	209.00	SPECIAL	PA_RAM_16BXS NL
13	554,055.57	788,805.87	1,114.41	207.68	GR	GR
14	554,047.01	788,804.72	1,123.05	202.27	CB	Channelbank [CB
15	554,044.75	788,804.37	1,125.34	201.16	TE	TE
16	554,044.20	788,802.98	1,126.04	200.91	H2O	H2O
17	554,041.16	788,802.89	1,129.08	199.88	H2O	H2O
18	554,034.21	788,804.36	1,135.80	199.23	H2O	H2O
19	554,027.29	788,804.92	1,142.60	198.27	H2O	H2O
20	554,013.16	788,803.89	1,156.76	194.38	H2O	H2O
21	553,987.19	788,801.27	1,182.85	191.18	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_16XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	553,963.51	788,797.14	1,206.86	190.33	H2O	H2O
23	553,945.90	788,793.04	1,224.83	189.88	H2O	H2O
24	553,861.07	789,473.24	1,228.40	202.22	SPECIAL	PA_RAM_17CXS REF
25	553,861.02	789,473.27	1,228.44	202.25	SPECIAL	PA_RAM_17CXS FLD
26	553,861.02	789,473.27	1,228.44	202.25	SPECIAL	DATE 10-20-2011
27	553,922.42	788,789.90	1,248.52	189.85	H2O	H2O
28	553,900.15	788,794.61	1,270.07	189.35	H2O	H2O
29	553,875.89	788,789.37	1,294.78	187.09	H2O	H2O
30	553,857.77	788,788.67	1,312.86	185.64	H2O	H2O
31	553,832.91	788,785.39	1,337.93	184.14	H2O	H2O
32	553,797.13	788,782.19	1,373.84	183.57	H2O	H2O
33	553,778.30	788,778.68	1,392.95	184.61	H2O	H2O
34	553,765.43	788,776.33	1,406.01	186.16	H2O	H2O
35	553,760.08	788,774.93	1,411.49	187.46	H2O	H2O
36	553,741.14	788,773.98	1,430.41	192.53	H2O	H2O
37	553,736.16	788,772.56	1,435.53	193.48	H2O	H2O
38	553,729.21	788,771.89	1,442.50	195.83	H2O	H2O
39	553,723.35	788,769.67	1,448.58	197.92	H2O	H2O
40	553,710.73	788,768.76	1,461.22	199.83	H2O	H2O
41	553,696.79	788,765.82	1,475.41	198.86	H2O	H2O
42	553,686.86	788,763.46	1,485.55	200.01	H2O	H2O
43	553,684.96	788,762.95	1,487.50	200.26	H2O	H2O
44	553,684.20	788,763.06	1,488.24	201.16	TE	TE
45	553,680.32	788,762.22	1,492.19	202.78	CB	Channelbank [CB
46	553,678.05	788,761.86	1,494.49	203.80	GR	GR
47	553,667.47	788,759.61	1,505.27	208.13	GR	GR
48	553,663.72	788,760.32	1,508.90	210.04	GR	GR
49	553,649.04	788,757.58	1,523.80	218.34	GR	GR
50	553,635.83	788,755.19	1,537.20	224.54	GR	GR
51	553,621.53	788,752.81	1,551.68	227.72	GR	GR
52	553,600.33	788,749.46	1,573.13	230.13	SPECIAL	ALPT2
53	553,600.33	788,749.47	1,573.13	230.13	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{8DD4FCAB-E62A-4F92-A561-5F57D651F9B7}**	**Stream**		**Centerline**	
Name:	PA_RAM_17XS	Name:		Station:	1,311.12
Location:	DOG PARK	Station:	0.00	Easting:	553,720.52
County:		Orientation:	Looking D/S	Northing:	789,409.07
State:				Invert:	184.87
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_17XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,990.02	789,799.12	877.69	208.33	SPECIAL	PA_RAM_17AXS FLD
2	553,990.01	789,799.10	877.70	208.33	SPECIAL	DATE 10-18-2011
3	553,990.00	789,799.07	877.73	208.32	SPECIAL	PA_RAM_17AXS
4	553,989.96	789,799.12	877.75	208.35	SPECIAL	BS CK 17A
5	553,980.32	789,504.55	1,000.00	206.03	GR	GR
6	553,980.32	789,504.55	1,000.00	206.03	SPECIAL	ALPT1
7	553,994.89	789,378.36	1,035.11	204.76	SPECIAL	PA_RAM_17BXS
8	553,994.89	789,378.32	1,035.13	204.74	SPECIAL	PA_RAM_17BXS FLD
9	553,941.52	789,488.56	1,041.96	204.41	GR	GR
10	553,915.64	789,484.92	1,067.25	203.72	GR	GR
11	553,873.65	789,475.55	1,109.62	203.13	GR	GR
12	553,861.07	789,473.24	1,122.12	202.22	SPECIAL	PA_RAM_17CXS REF
13	553,852.69	789,469.89	1,131.13	202.40	CB	Channelbank [CB
14	553,848.40	789,467.29	1,136.10	200.83	TE	TE
15	553,845.78	789,466.96	1,138.64	200.43	H2O	H2O
16	553,838.92	789,467.61	1,144.73	199.20	H2O	H2O
17	553,832.67	789,467.84	1,150.40	198.01	H2O	H2O
18	553,830.68	789,467.04	1,152.55	198.12	H2O	H2O
19	553,805.36	789,455.18	1,180.49	193.34	H2O	H2O
20	553,776.13	789,444.20	1,211.69	190.33	H2O	H2O
21	553,725.93	789,425.39	1,265.27	187.15	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_17XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	553,678.19	789,401.31	1,318.59	187.95	H2O	H2O
23	553,643.92	789,387.33	1,355.60	187.67	H2O	H2O
24	553,614.29	789,372.06	1,388.83	184.87	H2O	H2O
25	553,575.48	789,349.65	1,433.27	186.31	H2O	H2O
26	553,541.90	789,344.97	1,466.07	193.82	H2O	H2O
27	553,537.98	789,343.52	1,470.25	195.33	H2O	H2O
28	553,536.11	789,339.62	1,473.47	197.00	H2O	H2O
29	553,532.60	789,334.00	1,478.87	198.79	H2O	H2O
30	553,529.77	789,329.13	1,483.35	200.17	H2O	H2O
31	553,527.20	789,328.04	1,486.15	200.81	TE	TE
32	553,526.41	789,328.10	1,486.86	203.53	GR	GR
33	553,520.94	789,327.07	1,492.30	209.52	GR	GR
34	553,509.90	789,319.67	1,505.34	218.97	GR	GR
35	553,509.27	789,311.87	1,508.92	225.24	CB	Channelbank [CB
36	553,507.16	789,310.33	1,511.46	225.92	GR	GR
37	553,505.12	789,309.39	1,513.70	225.89	GR	GR
38	553,494.50	789,303.54	1,525.76	226.89	GR	GR
39	553,479.98	789,296.97	1,541.69	227.57	GR	GR
40	553,468.94	789,291.78	1,553.88	228.06	GR	GR
41	553,468.99	789,291.36	1,553.99	236.51	GR	GR WALL
42	553,468.99	789,291.36	1,553.99	236.51	SPECIAL	ALPT2

Cross Sections Report

(All Units In Feet)

ID:	**{72295F74-5E1D-4D42-93E6-A9D5154472D7}**	**Stream**		**Centerline**	
Name:	PA_RAM_18XS	Name:		Station:	1,506.82
Location:	603 SCHUYLER AVE	Station:	0.00	Easting:	554,054.19
County:		Orientation:	Looking D/S	Northing:	791,433.13
State:				Invert:	188.94
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_18XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	554,480.93	791,135.41	1,000.00	214.86	SPECIAL	ALPT1
2	554,480.92	791,135.43	1,000.02	214.86	GR	GR
3	554,456.30	791,162.04	1,035.41	213.22	GR	GR
4	554,437.60	791,175.95	1,058.70	211.39	GR	GR
5	554,419.45	791,185.37	1,078.98	208.47	GR	GR
6	554,398.09	791,199.35	1,104.51	203.88	GR	GR
7	554,385.17	791,225.08	1,129.76	202.16	CB	Channelbank [CB
8	554,383.80	791,226.29	1,131.58	201.16	TE	TE
9	554,380.29	791,226.72	1,134.71	199.91	H2O	H2O
10	554,368.94	791,231.30	1,146.66	198.66	H2O	H2O
11	554,358.38	791,237.56	1,158.90	198.37	H2O	H2O
12	554,342.36	791,240.32	1,173.65	197.93	H2O	H2O
13	554,325.17	791,248.53	1,192.45	197.52	H2O	H2O
14	554,292.15	791,261.70	1,227.10	197.29	H2O	H2O
15	554,246.26	791,279.77	1,275.11	196.95	H2O	H2O
16	554,226.85	791,301.35	1,303.36	197.18	H2O	H2O
17	554,183.28	791,343.26	1,363.04	196.42	H2O	H2O
18	554,140.85	791,381.70	1,419.80	193.56	H2O	H2O
19	554,104.96	791,407.99	1,464.27	190.98	H2O	H2O
20	554,100.55	791,406.14	1,466.85	190.80	H2O	H2O
21	554,085.85	791,417.80	1,485.57	189.34	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_18XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	554,075.54	791,416.87	1,493.51	189.20	H2O	H2O
23	554,064.32	791,422.67	1,506.04	188.94	H2O	H2O
24	554,059.40	791,434.95	1,517.08	189.41	H2O	H2O
25	554,033.12	791,441.55	1,542.44	190.03	H2O	H2O
26	553,986.00	791,485.14	1,606.00	192.00	H2O	H2O
27	553,958.85	791,485.90	1,628.75	191.66	H2O	H2O
28	553,922.75	791,505.56	1,669.63	192.68	H2O	H2O
29	553,884.74	791,536.67	1,718.59	194.03	H2O	H2O
30	553,860.60	791,552.17	1,747.25	195.19	H2O	H2O
31	553,842.85	791,555.02	1,763.48	196.47	H2O	H2O
32	553,838.99	791,558.83	1,768.82	194.54	H2O	H2O
33	553,830.98	791,569.77	1,781.63	194.21	H2O	H2O
34	553,819.03	791,574.41	1,794.09	192.70	H2O	H2O
35	553,799.47	791,582.18	1,814.60	191.64	H2O	H2O
36	553,785.45	791,593.92	1,832.81	191.96	H2O	H2O
37	553,777.25	791,607.83	1,847.47	193.82	H2O	H2O
38	553,767.03	791,614.02	1,859.40	196.76	H2O	H2O
39	553,749.34	791,622.93	1,879.02	198.62	H2O	H2O
40	553,747.54	791,625.68	1,882.06	201.32	TE	TE
41	553,743.03	791,631.24	1,888.93	204.49	GR	GR
42	553,734.27	791,634.23	1,897.83	208.79	CB	Channelbank [CB
43	553,732.84	791,635.53	1,899.75	209.14	GR	GR
44	553,732.43	791,636.08	1,900.40	208.88	GR	GR
45	553,722.15	791,646.78	1,914.94	209.21	GR	GR
46	553,709.04	791,663.41	1,935.19	208.85	SPECIAL	PA_RAM_18AXS
47	553,698.15	791,666.41	1,945.85	209.15	GR	GR
48	553,674.69	791,690.13	1,978.64	209.41	GR	GR
49	553,646.68	791,712.66	2,014.49	209.34	SPECIAL	ALPT2
50	553,646.66	791,712.67	2,014.51	209.34	GR	GR
51	553,625.67	791,729.14	2,041.14	209.19	GR	GR
52	553,246.15	791,935.76	2,470.80	210.41	SPECIAL	PA_RAM_18BXS
53	553,246.08	791,935.66	2,470.81	210.41	SPECIAL	BE_RAM_18BXS FLD
54	553,246.14	791,935.76	2,470.82	210.42	SPECIAL	BE_RAM_18BXS FLD
55	553,246.12	791,935.77	2,470.84	210.43	SPECIAL	DATE 10-20-2011
56	553,246.12	791,935.77	2,470.84	210.40	SPECIAL	BS CK 18B
57	553,246.10	791,935.78	2,470.86	210.38	SPECIAL	PA_RAM_18BXS FLD

Cross Sections Report

(All Units In Feet)

ID:	**{C690B2E1-4D2F-44E9-9A28-6964D6C2575A}**	**Stream**		**Centerline**	
Name:	PA_RAM_19XS	Name:		Station:	1,582.73
Location:	11 NOREEN LN	Station:	0.00	Easting:	555,017.41
County:		Orientation:	Looking D/S	Northing:	792,877.75
State:				Invert:	190.29
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_19XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	555,872.63	792,445.10	631.33	232.65	SPECIAL	PA_RAM_19BXS FLD
2	555,872.63	792,445.10	631.33	232.65	SPECIAL	DATE 10-18-2011
3	555,872.56	792,445.14	631.41	232.69	SPECIAL	PA_RAM_19BXS
4	555,599.13	792,598.09	936.99	219.95	SPECIAL	PA_RAM_19AXS CS
5	555,599.13	792,598.18	937.04	219.96	SPECIAL	PA_RAM_19AXS
6	555,599.09	792,598.17	937.07	219.95	SPECIAL	PA_RAM_19AXS FLD
7	555,434.01	792,508.77	1,000.00	228.16	SPECIAL	ALPT1
8	555,433.99	792,508.77	1,000.02	228.17	GR	GR
9	555,419.05	792,518.75	1,017.80	227.27	GR	GR
10	555,412.34	792,525.95	1,027.60	225.90	GR	GR
11	555,403.48	792,533.85	1,039.47	225.00	GR	GR
12	555,396.93	792,539.03	1,047.81	223.88	GR	GR
13	555,382.99	792,548.86	1,064.75	222.60	GR	GR
14	555,372.22	792,556.70	1,078.00	221.42	GR	GR
15	555,359.98	792,566.22	1,093.46	220.12	GR	GR
16	555,308.60	792,542.95	1,116.10	218.68	SPECIAL	PA_RAM_19CXS
17	555,337.31	792,578.77	1,118.71	217.94	GR	GR
18	555,324.12	792,592.45	1,137.67	215.67	GR	GR
19	555,314.29	792,599.54	1,149.72	214.61	CB	Channelbank [CB
20	555,304.03	792,605.14	1,161.09	210.40	GR	GR
21	555,294.19	792,611.47	1,172.64	205.45	GR	GR

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_19XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	555,287.31	792,616.66	1,181.22	201.19	GR	GR
23	555,286.89	792,616.97	1,181.75	200.78	TE	TE
24	555,286.60	792,617.03	1,182.00	200.33	H2O	H2O
25	555,281.74	792,622.25	1,189.10	199.66	H2O	H2O
26	555,272.42	792,630.17	1,201.32	197.98	H2O	H2O
27	555,260.79	792,647.96	1,221.87	196.73	H2O	H2O
28	555,228.78	792,669.99	1,260.40	197.80	H2O	H2O
29	555,195.09	792,695.39	1,302.44	198.26	H2O	H2O
30	555,168.35	792,717.52	1,337.12	198.18	H2O	H2O
31	555,142.18	792,735.90	1,368.87	197.55	H2O	H2O
32	555,118.29	792,763.04	1,404.78	196.59	H2O	H2O
33	555,093.76	792,786.22	1,438.52	195.67	H2O	H2O
34	555,055.25	792,829.11	1,495.84	192.79	H2O	H2O
35	555,009.36	792,861.26	1,551.45	190.29	H2O	H2O
36	554,958.55	792,891.93	1,609.74	191.66	H2O	H2O
37	554,903.55	792,931.43	1,677.04	191.45	H2O	H2O
38	554,839.46	792,985.58	1,760.90	192.44	H2O	H2O
39	554,804.09	793,047.09	1,828.34	193.18	H2O	H2O
40	554,780.91	793,091.41	1,875.21	192.62	H2O	H2O
41	554,757.40	793,124.81	1,915.03	192.43	H2O	H2O
42	554,728.06	793,155.93	1,957.66	197.67	H2O	H2O
43	554,716.59	793,161.65	1,970.01	198.96	H2O	H2O
44	554,707.58	793,171.24	1,983.12	200.38	H2O	H2O
45	554,706.79	793,171.24	1,983.71	200.75	TE	TE
46	554,704.90	793,170.59	1,984.68	201.81	CB	Channelbank [CB
47	554,700.49	793,172.15	1,989.00	201.90	GR	GR
48	554,691.46	793,178.74	2,000.12	202.54	GR	GR
49	554,681.81	793,185.99	2,012.14	204.02	GR	GR
50	554,673.23	793,196.01	2,025.23	207.01	GR	GR
51	554,664.71	793,204.95	2,037.54	209.42	GR	GR
52	554,657.59	793,216.96	2,050.86	215.01	GR	GR
53	554,630.12	793,225.22	2,076.81	218.35	GR	GR
54	554,623.86	793,234.70	2,087.80	220.17	GR	GR
55	554,606.25	793,253.42	2,113.42	220.76	GR	GR
56	554,606.16	793,253.51	2,113.54	220.76	SPECIAL	ALPT2

Cross Sections Report

(All Units In Feet)

ID:	**{8F2C976E-76F6-4CF5-9A0D-1E992990B5ED}**	**Stream**		**Centerline**	
Name:	PA_RAM_20XS	Name:		Station:	1,756.58
Location:	1054 COLFAX AVE	Station:	0.00	Easting:	555,529.22
County:		Orientation:	Looking D/S	Northing:	793,751.09
State:				Invert:	183.13
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_20XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	555,599.33	792,598.07	804.27	219.96	SPECIAL	BS CK 19AXS
2	555,599.17	792,598.03	804.33	219.96	SPECIAL	DATE 10-18-2011
3	555,599.17	792,598.03	804.33	219.96	SPECIAL	PA_RAM_19AXS FLD
4	555,599.13	792,598.18	804.48	219.96	SPECIAL	PA_RAM_19AXS
5	555,996.53	793,133.37	1,000.00	221.79	GR	GR
6	555,996.53	793,133.37	1,000.00	221.82	SPECIAL	ALPT1
7	555,985.18	793,151.80	1,021.57	221.93	GR	GR
8	555,956.53	793,182.66	1,063.40	222.09	GR	GR
9	555,941.77	793,200.86	1,086.81	222.04	GR	GR
10	555,928.52	793,208.04	1,100.44	221.71	CB	Channelbank [CB
11	555,923.83	793,215.90	1,109.56	214.83	GR	GR
12	555,915.16	793,225.32	1,122.28	202.43	GR	GR
13	555,914.69	793,226.19	1,123.26	200.97	GR	GR
14	555,914.27	793,227.06	1,124.21	200.85	TE	TE
15	555,912.28	793,230.36	1,128.05	199.83	H2O	H2O
16	555,907.15	793,234.98	1,134.81	198.24	H2O	H2O
17	555,905.03	793,246.54	1,145.38	194.71	H2O	H2O
18	555,896.82	793,260.68	1,161.63	194.44	H2O	H2O
19	555,899.85	793,274.44	1,170.92	195.10	H2O	H2O
20	555,885.64	793,295.83	1,196.57	196.97	H2O	H2O
21	555,853.39	793,333.66	1,246.15	189.57	H2O	H2O

Cross Sections Report

(All Units In Feet)

Cross Section Data Data type: PA_RAM_20XS

Point	Easting	Northing	Station	Elevation	Code	Comment
22	555,817.16	793,378.22	1,303.52	191.65	H2O	H2O
23	555,761.90	793,444.84	1,389.92	194.03	H2O	H2O
24	555,712.99	793,496.68	1,460.67	193.14	H2O	H2O
25	555,680.27	793,552.55	1,525.06	190.64	H2O	H2O
26	555,624.41	793,611.44	1,605.60	189.65	H2O	H2O
27	555,568.65	793,691.23	1,702.92	189.69	H2O	H2O
28	555,530.72	793,740.31	1,764.92	189.42	H2O	H2O
29	555,487.51	793,792.47	1,832.55	185.49	H2O	H2O
30	555,463.20	793,823.03	1,871.57	183.13	H2O	H2O
31	555,410.12	793,888.92	1,956.10	189.63	H2O	H2O
32	555,357.70	793,966.48	2,049.63	189.90	H2O	H2O
33	555,316.85	794,023.55	2,119.81	188.32	H2O	H2O
34	555,288.19	794,052.67	2,160.25	188.45	H2O	H2O
35	555,259.24	794,095.00	2,211.51	188.59	H2O	H2O
36	555,236.66	794,135.27	2,257.33	189.01	H2O	H2O
37	555,207.06	794,163.26	2,297.41	189.75	H2O	H2O
38	555,188.96	794,206.45	2,342.93	193.08	H2O	H2O
39	555,171.79	794,230.79	2,372.71	197.34	H2O	H2O
40	555,169.18	794,238.37	2,380.36	198.85	H2O	H2O
41	555,166.80	794,243.84	2,386.18	199.65	H2O	H2O
42	555,165.78	794,246.52	2,388.94	200.86	TE	TE
43	555,164.57	794,247.03	2,390.07	202.37	CB	Channelbank [CB
44	555,163.93	794,250.77	2,393.46	203.15	GR	GR
45	555,160.12	794,255.11	2,399.21	203.11	GR	GR
46	555,141.43	794,247.73	2,404.34	202.69	SPECIAL	PA_RAM_20AXS
47	555,149.43	794,272.80	2,419.79	204.13	GR	GR
48	555,126.92	794,280.35	2,439.22	204.22	GR	GR
49	555,132.67	794,297.08	2,449.28	205.48	GR	GR
50	555,121.93	794,291.18	2,450.90	204.83	GR	GR
51	555,117.06	794,299.74	2,460.68	206.08	GR	GR
52	555,114.64	794,316.18	2,475.36	207.05	GR	GR
53	555,112.83	794,329.81	2,487.41	209.59	GR	GR
54	555,106.20	794,342.63	2,501.66	213.44	GR	GR
55	555,091.38	794,363.49	2,527.25	221.57	GR	GR
56	555,078.18	794,381.08	2,549.24	222.67	GR	GR
57	555,078.29	794,381.18	2,549.25	222.67	SPECIAL	ALPT2

Cross Sections Report

(All Units In Feet)

ID:	**{4A69AF23-9F54-4539-96F4-7B38A62EEFEB}**	**Stream**		**Centerline**	
Name:	PA_RAM_21XS	Name:		Station:	1,157.35
Location:	12 LAKEVIEW TERR	Station:	0.00	Easting:	556,538.95
County:		Orientation:	Looking D/S	Northing:	794,488.58
State:				Invert:	184.06
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Looking At: Upstream Channel

Looking At: Downstream Channel

Cross Section Data **Data type:** **PA_RAM_21XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	557,300.75	795,024.09	913.30	203.12	SPECIAL	RAM_22C FLD
2	556,696.86	794,374.06	999.94	200.53	GR	GR
3	556,696.81	794,374.09	1,000.00	200.53	SPECIAL	ALPT1
4	556,682.62	794,384.38	1,017.52	200.80	GR	GR
5	556,663.71	794,393.95	1,038.37	200.95	GR	GR
6	556,644.45	794,407.80	1,062.08	201.41	GR	GR
7	556,632.81	794,418.31	1,077.71	201.35	CB	Channelbank [CB
8	556,630.29	794,420.09	1,080.79	200.82	TE	TE
9	556,628.48	794,421.26	1,082.94	200.23	H2O	H2O
10	556,627.46	794,422.80	1,084.68	196.64	H2O	H2O
11	556,622.24	794,426.09	1,090.83	194.92	H2O	H2O
12	556,607.73	794,444.21	1,113.35	188.38	H2O	H2O
13	556,592.42	794,447.26	1,127.38	187.78	H2O	H2O
14	556,579.70	794,457.37	1,143.63	186.70	H2O	H2O
15	556,559.49	794,469.55	1,167.08	184.70	H2O	H2O
16	556,542.24	794,481.43	1,188.01	184.06	H2O	H2O
17	556,527.14	794,493.23	1,207.17	187.82	H2O	H2O
18	556,511.36	794,504.49	1,226.54	193.47	H2O	H2O
19	556,507.82	794,508.20	1,231.61	197.55	H2O	H2O
20	556,507.83	794,512.00	1,233.90	200.78	TE	TE
21	556,507.03	794,512.47	1,234.82	202.01	CB	Channelbank [CB

Cross Sections Report

(All Units In Feet)

Cross Section Data **Data type:** **PA_RAM_21XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
22	556,486.10	794,532.83	1,263.81	202.56	GR	GR
23	556,472.04	794,545.46	1,282.64	203.20	GR	GR
24	556,452.05	794,560.68	1,307.78	203.24	GR	GR
25	556,448.07	794,563.11	1,312.42	202.76	GR	GR
26	556,433.21	794,575.16	1,331.54	202.90	GR	GR
27	556,426.24	794,573.37	1,336.00	202.81	SPECIAL	RAM_21AXS TR 22A
28	556,909.94	795,219.77	1,342.77	202.53	SPECIAL	PA_RAM_22AXS BS
29	556,909.94	795,219.77	1,342.77	202.51	SPECIAL	DATE 10-18-2011
30	556,909.94	795,219.77	1,342.77	202.51	SPECIAL	PA_RAM_22AXS FLD
31	556,414.50	794,590.10	1,355.47	202.94	GR	GR
32	556,386.54	794,610.36	1,389.99	202.93	GR	GR
33	556,386.52	794,610.37	1,390.01	202.93	SPECIAL	ALPT2

PROJECT NJDEP Field Survey - Cross Sections

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Cross Sections Report

(All Units In Feet)

ID:	**{4B40F9D0-81BD-49C4-AB83-BC06D222A057}**	**Stream**		**Centerline**	
Name:	MO_PEQ_01XS	Name:		Station:	1,052.97
Location:	MO_PEQ_01XS	Station:	0.00	Easting:	551,946.38
County:		Orientation:	Looking D/S	Northing:	781,019.34
State:				Invert:	169.62
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Photographs - None

Cross Section Data **Data type:** **MO_PEQ_01XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	551,808.23	780,963.07	1,000.00	177.31	TE	TE
2	551,808.23	780,963.07	1,000.00	177.31	GR	GR
3	551,808.23	780,963.07	1,000.00	177.31	SPECIAL	ALPT1
4	551,811.16	780,964.26	1,003.17	175.87	H2O	H2O
5	551,813.09	780,965.88	1,005.59	174.37	GR	GR
6	551,826.40	780,975.66	1,021.71	173.01	GR	GR
7	551,832.77	780,975.87	1,027.62	173.56	GR	GR
8	551,868.69	780,985.05	1,064.19	171.36	GR	GR
9	551,870.61	780,984.80	1,065.84	176.01	H2O	H2O
10	551,883.01	780,992.79	1,080.41	177.00	GR	GR
11	551,902.35	781,004.70	1,102.91	177.25	SPECIAL	ALPT2
12	551,904.61	781,005.60	1,105.36	175.95	H2O	H2O
13	551,905.14	781,005.83	1,105.93	175.43	TE	TE
14	551,927.90	781,015.88	1,130.81	173.51	CB	Channelbank [CB
15	551,959.03	781,025.81	1,163.29	173.16	GR	GR
16	551,990.77	781,039.16	1,197.72	169.62	GR	GR
17	552,020.17	781,046.06	1,227.40	170.95	GR	GR
18	552,029.43	781,051.18	1,237.94	174.40	GR	GR
19	552,030.71	781,051.81	1,239.37	176.21	H2O	H2O
20	552,032.89	781,052.44	1,241.61	177.92	CB	Channelbank [CB
21	552,086.06	781,072.12	1,298.20	176.74	TE	TE

Cross Sections Report

(All Units In Feet)

ID:	**{7234AFC9-4F87-4DB8-BEA2-C4784B8CD337}**	**Stream**		**Centerline**	
Name:	MO_PEQ_02XS	Name:		Station:	1,358.64
Location:	MO_PEQ_02XS	Station:	0.00	Easting:	550,519.67
County:		Orientation:	Looking D/S	Northing:	781,764.94
State:				Invert:	171.69
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Photographs - None

Cross Section Data Data type: MO_PEQ_02XS

Point	Easting	Northing	Station	Elevation	Code	Comment
1	550,461.37	782,028.50	889.69	178.56	GR	GR
2	550,476.87	781,987.91	931.26	179.07	GR	GR
3	550,480.87	781,978.80	940.62	177.87	H2O	H2O
4	550,489.85	781,969.05	950.97	174.46	GR	GR
5	550,498.95	781,949.67	970.94	172.32	CB	Channelbank [CB
6	550,504.45	781,934.33	986.62	174.47	GR	GR
7	550,502.66	781,929.11	991.70	177.22	GR	GR
8	550,505.05	781,920.96	1,000.00	177.91	SPECIAL	ALPT1
9	550,519.17	781,821.57	1,100.13	178.79	TE	TE
10	550,515.61	781,769.04	1,152.29	177.66	SPECIAL	ALPT2
11	550,517.28	781,763.59	1,157.84	175.51	GR	GR
12	550,518.62	781,753.18	1,168.32	176.34	GR	GR
13	550,523.23	781,736.73	1,185.05	177.64	H2O	H2O
14	550,524.93	781,732.00	1,189.88	178.09	GR	GR
15	550,527.29	781,697.01	1,224.95	176.70	CB	Channelbank [CB
16	550,528.41	781,673.79	1,248.20	175.18	GR	GR
17	550,537.32	781,646.69	1,275.85	174.63	GR	GR
18	550,553.73	781,622.68	1,300.94	171.69	GR	GR
19	550,554.25	781,619.28	1,304.37	178.18	CB	Channelbank [CB
20	550,563.58	781,581.47	1,342.73	178.29	TE	TE
21	550,565.08	781,576.97	1,347.32	176.82	GR	GR
22	550,570.75	781,554.68	1,369.95	176.08	GR	GR
23	550,576.19	781,542.57	1,382.41	177.34	GR	GR
24	550,585.21	781,500.50	1,425.00	178.29	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{B1F72F85-E268-4253-9FE4-69740EB4DCE6}**	**Stream**		**Centerline**	
Name:	MO_PEQ_03XS	Name:		Station:	1,106.12
Location:	MO_PEQ_03XS	Station:	0.00	Easting:	549,507.08
County:		Orientation:	Looking D/S	Northing:	781,849.86
State:				Invert:	170.72
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Photographs - None

Cross Section Data **Data type:** **MO_PEQ_03XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	549,487.67	781,792.32	1,000.00	180.96	GR	GR
2	549,487.67	781,792.32	1,000.00	180.96	SPECIAL	ALPT1
3	549,497.64	781,822.95	1,032.21	180.33	TE	TE
4	549,501.49	781,831.53	1,041.56	178.31	CB	Channelbank [CB
5	549,503.86	781,850.84	1,060.68	172.57	H2O	H2O
6	549,515.01	781,873.40	1,085.55	170.72	GR	GR
7	549,519.02	781,891.93	1,104.43	172.53	CB	Channelbank [CB
8	549,523.34	781,908.30	1,121.34	173.91	CB	CB
9	549,526.66	781,916.72	1,130.37	178.37	TE	TE
10	549,542.04	781,963.94	1,180.02	179.04	SPECIAL	ALPT2
11	549,542.04	781,963.94	1,180.02	179.04	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{CB4C7370-F5F7-45B2-A796-694425A8710B}**	**Stream**		**Centerline**	
Name:	MO_PEQ_04XS	Name:		Station:	1,114.13
Location:	MO_PEQ_04XS	Station:	0.00	Easting:	547,989.47
County:		Orientation:	Looking D/S	Northing:	782,033.06
State:				Invert:	169.71
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Photographs - None

Cross Section Data **Data type:** **MO_PEQ_04XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	548,092.65	782,028.81	1,000.00	181.83	GR	GR
2	548,092.65	782,028.81	1,000.00	181.83	SPECIAL	ALPT1
3	548,032.37	782,030.82	1,060.31	181.28	TE	TE
4	548,030.68	782,030.79	1,061.99	178.73	CB	Channelbank [CB
5	548,028.34	782,031.23	1,064.36	174.14	H20	H20
6	548,009.25	782,037.35	1,083.71	172.43	GR	GR
7	547,977.74	782,034.18	1,115.03	169.71	SPECIAL	ALPT2
8	547,977.74	782,034.18	1,115.03	169.71	GR	GR
9	547,967.09	782,036.86	1,125.80	169.86	GR	GR
10	547,946.26	782,035.09	1,146.53	174.23	GR	CGR
11	547,931.98	782,033.82	1,160.73	176.51	CB	Channelbank [CB
12	547,924.59	782,030.51	1,167.96	180.11	TE	TE
13	547,911.84	782,028.43	1,180.59	179.68	GR	GR OPEN
14	547,886.76	782,027.26	1,205.59	188.45	GR	GR OPEN

Cross Sections Report

(All Units In Feet)

ID:	**{48FE5FB5-F74C-4A6E-8021-9F5C3838A1FF}**	**Stream**		**Centerline**	
Name:	MO_PEQ_05XS	Name:		Station:	1,085.92
Location:	MO_PEQ_05XS	Station:	0.00	Easting:	547,962.84
County:		Orientation:	Looking D/S	Northing:	782,883.99
State:				Invert:	172.05
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Photographs - None

Cross Section Data **Data type:** **MO_PEQ_05XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	548,062.66	782,890.44	1,000.00	182.67	GR	GR
2	548,062.66	782,890.44	1,000.00	182.67	SPECIAL	ALPT1
3	548,020.68	782,888.05	1,042.02	182.23	TE	TE
4	548,012.06	782,888.01	1,050.63	179.06	CB	Channelbank [CB
5	548,007.99	782,885.99	1,054.73	175.15	H20	H20
6	547,977.35	782,883.07	1,085.41	173.12	GR	GR
7	547,957.67	782,883.76	1,105.08	172.05	GR	GR
8	547,940.49	782,881.68	1,122.29	175.11	GR	GR
9	547,937.42	782,881.91	1,125.35	178.97	CB	Channelbank [CB
10	547,932.95	782,881.75	1,129.82	182.71	TE	TE
11	547,862.87	782,887.53	1,199.81	182.78	SPECIAL	ALPT2
12	547,862.87	782,887.53	1,199.81	182.78	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{CAC87C74-1D33-4F67-B4B0-AC16B106D83A}**	**Stream**		**Centerline**	
Name:	MO_PEQ_06XS	Name:		Station:	1,064.45
Location:	MO_PEQ_06XS	Station:	0.00	Easting:	548,073.05
County:		Orientation:	Looking D/S	Northing:	783,363.11
State:				Invert:	172.87
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Photographs - None

Cross Section Data **Data type:** **MO_PEQ_06XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	548,016.77	783,383.86	1,000.00	183.72	GR	GR
2	548,016.77	783,383.86	1,000.00	183.72	SPECIAL	ALPT1
3	548,040.85	783,374.63	1,025.77	184.10	TE	TE
4	548,045.41	783,373.22	1,030.54	178.64	H2O	H2O
5	548,048.75	783,373.26	1,033.69	175.28	CB	Channelbank [CB
6	548,061.13	783,365.43	1,047.93	172.87	GR	GR
7	548,082.11	783,359.32	1,069.76	173.66	CB	Channelbank [CB
8	548,114.36	783,350.49	1,103.14	176.18	TE	TE
9	548,130.38	783,345.51	1,119.91	177.19	SPECIAL	ALPT2
10	548,130.38	783,345.51	1,119.91	177.19	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{DDFB63E7-0506-45B9-9750-B190E3DA6565}**	**Stream**		**Centerline**	
Name:	MO_PEQ_07XS	Name:		Station:	1,050.62
Location:	MO_PEQ_07XS	Station:	0.00	Easting:	548,439.79
County:		Orientation:	Looking D/S	Northing:	783,839.03
State:				Invert:	174.50
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Photographs - None

Cross Section Data **Data type:** **MO_PEQ_07XS**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	548,348.87	783,858.90	936.83	183.64	CB	Channelbank [CB
2	548,366.46	783,856.69	954.31	179.17	GR	GR
3	548,410.70	783,845.13	1,000.00	181.12	TE	TE
4	548,410.70	783,845.13	1,000.00	181.12	CB	Channelbank [CB
5	548,412.42	783,844.88	1,001.72	178.80	H2O	H2O
6	548,413.01	783,844.65	1,002.35	176.80	GR	GR
7	548,430.86	783,841.94	1,020.23	174.50	GR	GR
8	548,458.67	783,837.19	1,048.23	174.88	GR	GR
9	548,476.35	783,830.60	1,067.05	174.76	GR	GR
10	548,502.81	783,819.32	1,095.65	177.15	GR	GR
11	548,505.12	783,818.52	1,098.09	178.67	CB	Channelbank [CB
12	548,507.86	783,816.68	1,101.24	179.56	TE	TE
13	548,545.16	783,804.64	1,140.43	185.10	SPECIAL	ALPT2
14	548,545.16	783,804.64	1,140.43	185.10	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{BB19BF16-09A9-4A46-8D95-3ADA76D25A9F}**	**Stream**		**Centerline**	
Name:	MO_PEQ_08XS	Name:		Station:	1,092.16
Location:	MO_PEQ_08XS	Station:	0.00	Easting:	548,502.54
County:		Orientation:	Looking D/S	Northing:	783,921.66
State:				Invert:	174.10
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Photographs - None

Cross Section Data Data type: MO_PEQ_08XS

Point	Easting	Northing	Station	Elevation	Code	Comment
1	548,395.84	783,943.33	966.65	184.36	GR	GR
2	548,411.26	783,937.90	982.94	180.21	GR	GR
3	548,427.87	783,934.00	1,000.00	179.15	GR	GR
4	548,427.87	783,934.00	1,000.00	179.15	SPECIAL	ALPT1
5	548,464.83	783,921.27	1,038.97	181.49	TE	TE
6	548,466.52	783,921.71	1,040.50	178.83	CB	Channelbank [CB
7	548,467.51	783,920.93	1,041.65	176.15	GR	GR
8	548,491.91	783,924.22	1,064.44	174.10	GR	GR
9	548,527.48	783,915.65	1,101.02	174.62	GR	GR
10	548,523.74	783,894.81	1,102.64	175.07	GR	GR
11	548,559.02	783,899.88	1,135.51	177.04	SPECIAL	ALPT2
12	548,559.02	783,899.88	1,135.51	177.04	GR	GR
13	548,561.12	783,898.28	1,137.95	178.77	CB	Channelbank [CB
14	548,567.81	783,894.60	1,145.35	181.43	TE	TE
15	548,603.80	783,882.43	1,183.24	182.20	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{28409F3E-09E6-4E42-A342-03153D80ED4E}**	**Stream**		**Centerline**	
Name:	MO_PEQ_09XS	Name:		Station:	1,115.81
Location:	MO_PEQ_09XS	Station:	0.00	Easting:	548,991.63
County:		Orientation:	Looking D/S	Northing:	784,456.64
State:				Invert:	175.43
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Photographs - None

Cross Section Data Data type: MO_PEQ_09XS

Point	Easting	Northing	Station	Elevation	Code	Comment
1	548,882.18	784,467.84	1,000.00	181.83	GR	GR
2	548,882.18	784,467.84	1,000.00	181.83	SPECIAL	ALPT1
3	548,935.03	784,461.34	1,053.24	180.57	TE	TE
4	548,936.50	784,461.34	1,054.70	179.10	CB	Channelbank [CB
5	548,937.42	784,461.58	1,055.59	176.01	H20	H20
6	548,959.77	784,463.25	1,077.68	175.43	GR	GR
7	549,004.24	784,464.44	1,121.81	175.54	GR	GR
8	549,037.16	784,452.57	1,155.73	175.81	SPECIAL	ALPT2
9	549,037.16	784,452.57	1,155.73	175.81	GR	GR
10	549,048.44	784,451.47	1,167.07	176.98	H20	H20
11	549,050.90	784,449.97	1,169.66	179.11	CB	Channelbank [CB
12	549,059.50	784,448.35	1,178.38	181.85	TE	TE
13	549,101.04	784,445.13	1,220.04	184.35	GR	GR

Cross Sections Report

(All Units In Feet)

ID:	**{E919C262-5AA5-4B5A-964B-8D86205996D6}**	**Stream**		**Centerline**	
Name:	MO_PEQ_10XS	Name:		Station:	1,065.92
Location:	MO_PEQ_10XS	Station:	0.00	Easting:	549,205.69
County:		Orientation:	Looking D/S	Northing:	784,778.72
State:				Invert:	175.69
State Zone:		**Datum**			
Provided By:		Horizontal:			
Comments:		Vertical:			

Photographs - None

Cross Section Data Data type: MO_PEQ_10XS

Point	Easting	Northing	Station	Elevation	Code	Comment
1	549,299.76	784,762.57	999.53	193.91	GR	GR
2	549,299.22	784,760.45	1,000.00	180.04	TE	TE
3	549,299.22	784,760.45	1,000.00	180.04	SPECIAL	ALPT1
4	549,292.27	784,763.36	1,007.05	179.22	CB	Channelbank [CB]
5	549,285.61	784,764.18	1,013.73	176.68	GR	GR
6	549,263.16	784,764.64	1,036.18	175.69	GR	GR
7	549,244.79	784,777.15	1,054.96	175.94	GR	GR
8	549,216.36	784,780.03	1,083.48	175.74	GR	GR
9	549,194.09	784,779.52	1,105.71	175.74	GR	GR
10	549,178.26	784,773.33	1,121.33	179.25	CB	Channelbank [CB
11	549,174.75	784,772.02	1,124.79	180.20	TE	TE
12	549,161.22	784,768.81	1,138.21	180.06	GR	GR
13	549,138.78	784,767.34	1,160.58	182.12	GR	GR
14	549,109.75	784,766.91	1,189.58	182.39	SPECIAL	ALPT2
15	549,109.75	784,766.91	1,189.58	182.39	GR	GR

Appendix E

BRIDGE SURVEY DATA

PROJECT NJDEP Field Survey - Bridges

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Bridge Report

(All Units In Feet)

General		**Material**		**Design**	
ID:	**BE_RAM_06**	Bed:	Unknown	Designer:	
Road Name:	DOTY RD	Fill:	Unknown	Contractor:	
Stream Name:				Year Built:	
County:		**Datum**			
State:		Horizontal:			
State Zone:		Vertical:			

Centerline		**Invert**	
Station:	1,129.64	Downstream:	188.89
Offset:	0.00	Upstream:	188.71
Easting:	558,100.21		
Northing:	795,371.80	**Rail Height:**	2.30
		Deck Thickness:	6.00

Plans

Plan Location:

Survey File: N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\BE_RAM_06.TXT

Comments:

Opening

	Left	Right
Abutment	1,040.63	1,232.37
Fill Station	1,040.73	1,232.27
Side slopes	0.00	0.00

Type: Vertical Wall

Looking At: Upstream Face

Looking At: Upstream Channel

PROJECT NJDEP Field Survey - Bridges

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Bridge Report

(All Units In Feet)

Looking At: Downstream Channel

Looking At: Downstream Face

Piers

CL Station	Foundation Type	Shape	Column Count	Width	Cap Height	Cap Top Elev	Foot Width	Foot Top Elev	Comment
1,135.94	FOOTER	Round	1	3.00	0.00	0.00	0.00	0.00	P1 3.0

Rails

Station	Easting	Northing	Elevation	Height
744.24	558,288.16	795,029.93	224.63	1.70
798.74	558,270.53	795,085.19	223.02	1.53
842.23	558,257.34	795,129.97	221.97	1.46
851.99	558,259.27	795,143.81	220.88	0.58
852.45	558,259.26	795,144.39	218.46	0.00
884.48	558,248.27	795,176.39	217.98	0.00
884.90	558,247.98	795,176.69	220.24	0.62
891.83	558,242.55	795,181.25	220.55	1.04
1,005.94	558,188.77	795,283.92	219.27	1.90
1,010.86	558,185.83	795,287.86	219.53	2.25
1,035.83	558,170.69	795,307.72	219.23	2.38
1,036.04	558,170.59	795,307.91	219.94	3.09
1,037.19	558,170.21	795,309.06	220.65	3.82
1,038.61	558,169.19	795,310.07	220.65	3.84
1,048.46	558,163.18	795,317.87	221.02	4.38
1,222.89	558,055.53	795,455.13	217.80	4.30
1,232.48	558,049.68	795,462.73	217.14	3.82
1,233.94	558,048.75	795,463.85	217.12	3.84
1,235.06	558,048.01	795,464.69	216.41	3.16
1,235.29	558,047.75	795,464.78	215.74	2.50
1,247.71	558,040.19	795,474.65	215.28	2.40
1,260.13	558,032.59	795,484.46	214.92	2.39
1,266.25	558,029.01	795,489.44	214.39	2.04
1,316.18	558,000.27	795,530.33	212.48	2.05
1,440.66	557,929.81	795,633.20	207.52	1.70
1,507.34	557,900.19	795,694.58	206.48	1.64
1,573.94	557,871.63	795,756.70	206.99	2.24

PROJECT NJDEP Field Survey - Bridges

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Bridge Report

(All Units In Feet)

Cross Section Data **Data type:** **FIELD**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	558,339.20	795,065.27	740.96	206.68	GR	GR
2	558,331.33	795,076.38	754.56	205.68	GR	GR
3	558,321.85	795,096.15	776.00	204.32	GR	GR
4	558,317.90	795,122.80	799.49	204.06	GR	GR
5	558,327.41	795,143.35	809.93	204.91	GR	GR
6	558,315.81	795,160.18	830.34	211.79	GR	GR RD
7	558,312.88	795,163.07	834.42	212.64	GR	GR RD
8	558,310.94	795,165.84	837.80	212.98	GR	GR RD
9	558,306.48	795,176.65	849.08	213.11	GR	GR RD
10	558,302.06	795,188.73	861.33	212.92	GR	GR RD
11	558,300.07	795,192.01	865.15	212.61	GR	GR RD
12	558,247.18	795,156.63	869.52	219.31	SPECIAL	RAM_06A FLD
13	558,247.18	795,156.63	869.52	219.27	SPECIAL	BE_RAM_06A
14	558,247.21	795,156.68	869.54	219.28	SPECIAL	RAM_06A BS CHK
15	558,291.42	795,192.88	871.12	212.74	GR	GR RD
16	558,290.06	795,213.46	888.24	205.30	GR	GR
17	558,279.39	795,230.99	908.63	204.87	GR	GR
18	558,269.14	795,245.49	926.37	204.49	GR	GR
19	558,258.68	795,267.38	950.09	205.30	GR	GR
20	558,242.78	795,293.10	980.15	205.14	GR	GR
21	558,179.13	795,268.95	1,000.00	217.47	SPECIAL	ALPT1
22	558,236.62	795,318.44	1,003.97	204.69	GR	GR
23	558,202.64	795,332.29	1,035.71	203.86	CB	Channelbank [CB
24	558,171.97	795,311.41	1,037.96	216.93	SPECIAL	ERM BE_RAM_06
25	558,163.19	795,317.90	1,048.47	201.12	TE	TE
26	558,159.88	795,322.15	1,053.86	197.93	H2O	H2O
27	558,153.87	795,329.77	1,063.57	192.61	H2O	H2O
28	558,145.53	795,340.42	1,077.09	189.88	H2O	H2O
29	558,136.69	795,351.69	1,091.42	188.84	H2O	H2O
30	558,129.48	795,360.84	1,103.06	188.97	H2O	H2O
31	558,119.57	795,373.58	1,119.20	188.71	H2O	H2O
32	558,109.24	795,386.75	1,135.94	190.38	P	P1 3.0
33	558,106.80	795,390.65	1,140.52	187.65	SPECIAL	USSTRUCT
34	558,075.85	795,367.57	1,141.20	187.51	SPECIAL	DSSTRUCT
35	558,074.52	795,370.21	1,144.10	188.89	DS	DS IN
36	558,100.99	795,397.31	1,149.34	188.85	H2O	H2O
37	558,089.28	795,412.21	1,168.29	189.54	H2O	H2O
38	558,080.58	795,423.29	1,182.38	190.19	H2O	H2O
39	558,073.26	795,432.57	1,194.20	192.97	H2O	H2O
40	558,065.31	795,442.81	1,207.16	199.70	H2O	H2O
41	558,063.00	795,445.64	1,210.81	201.01	TE	TE
42	558,068.82	795,455.82	1,215.31	203.13	CB	Channelbank [CB
43	558,066.06	795,476.61	1,233.43	203.53	GR	GR
44	558,057.59	795,496.02	1,253.97	203.24	GR	GR
45	558,049.23	795,513.86	1,273.20	202.97	GR	GR
46	558,008.91	795,488.99	1,278.20	212.00	SPECIAL	ALPT2
47	558,038.10	795,531.49	1,293.96	204.43	GR	GR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
48	557,968.35	795,512.29	1,321.44	210.06	SPECIAL	BE_RAM_06B
49	557,968.34	795,512.30	1,321.46	209.99	SPECIAL	DATE 10-05-2011
50	557,968.34	795,512.30	1,321.46	209.99	SPECIAL	BE_RAM_06B FLD
51	557,968.32	795,512.28	1,321.46	210.01	SPECIAL	RAM_06B BS CHK
52	558,015.63	795,557.25	1,328.08	204.79	GR	GR
53	557,990.40	795,591.69	1,370.75	205.11	GR	GR
54	557,962.96	795,618.97	1,409.12	205.04	GR	GR
55	557,943.43	795,639.59	1,437.38	203.92	GR	GR
56	557,926.54	795,660.04	1,463.89	202.79	GR	GR
57	557,896.88	795,708.46	1,520.34	203.38	GR	GR

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	558,276.58	794,997.25	725.47	223.58	TR	TR
2	558,268.98	795,026.48	753.24	222.61	TR	TR
3	558,250.77	795,085.48	811.05	221.18	TR	TR
4	558,230.20	795,151.66	875.98	219.78	TR	TR
5	558,207.26	795,216.54	941.34	218.65	TR	TR
6	558,179.13	795,268.95	1,000.00	217.47	TR	TR
7	558,154.84	795,301.52	1,040.63	216.78	BEGIN	BEGIN
8	558,037.15	795,452.90	1,232.37	213.32	END	END
9	558,008.99	795,489.19	1,278.30	212.00	TR	TR
10	557,950.55	795,565.61	1,374.51	208.03	TR	TR
11	557,912.87	795,626.30	1,445.57	205.66	TR	TR
12	557,876.34	795,700.70	1,526.77	204.59	TR	TR
13	557,851.41	795,753.90	1,584.10	204.78	TR	TR

Detailed Bridge Report

(All Units In Feet)

General		**Material**		**Design**
ID:	**BE_RAM_07**	Bed:	Unknown	Designer:
Road Name:	RAILROAD	Fill:	Unknown	Contractor:
Stream Name:				Year Built:
County:		**Datum**		
State:		Horizontal:		
State Zone:		Vertical:		

Centerline		**Invert**	
Station:	1,378.51	Downstream:	200.35
Offset:	0.00	Upstream:	190.31
Easting:	560,327.52		
Northing:	798,292.76	**Rail Height:**	0.65
		Deck Thickness:	11.60

Plans

Plan Location:

Survey File: N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\BE_RAM_07.TXT

Comments:

Opening Type: Unknown

	Left	Right
Abutment	1,199.08	1,506.51
Fill Station	1,203.91	1,501.86
Side slopes	0.00	0.00

Looking At: Upstream Face

Looking At: Upstream Channel

PROJECT NJDEP Field Survey - Bridges

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Bridge Report

(All Units In Feet)

Looking At: Downstream Channel

Looking At: Downstream Face

Piers

CL Station	Foundation Type	Shape	Column Count	Width	Cap Height	Cap Top Elev	Foot Width	Foot Top Elev	Comment
1,301.72	FOOTER	Unknown	1	8.00	0.00	0.00	0.00	0.00	P1 8.0
1,404.88	FOOTER	Unknown	1	8.00	0.00	0.00	0.00	0.00	P2 8.0

Rails

Station	Easting	Northing	Elevation	Height
904.46	560,800.81	798,263.80	239.49	0.65
999.92	560,704.85	798,261.93	237.79	0.65
1,000.02	560,704.75	798,261.95	237.78	0.65
1,103.73	560,601.38	798,270.33	236.14	0.65
1,506.51	560,199.90	798,302.80	235.25	0.65
1,508.78	560,197.92	798,306.24	235.32	0.65
1,562.57	560,144.29	798,310.50	235.51	0.65
1,619.97	560,087.06	798,314.82	235.80	0.65
1,706.36	560,000.65	798,318.23	236.49	0.65
1,784.29	559,922.31	798,316.86	237.16	0.65

Cross Section Data **Data type:** **FIELD**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	560,902.02	798,119.40	791.34	227.91	SPECIAL	BE_RAM_07B BS CHK
2	560,902.02	798,119.40	791.34	227.92	SPECIAL	DATE 10-05-2011
3	560,902.02	798,119.40	791.34	227.92	SPECIAL	BE_RAM_07B FLD
4	560,901.99	798,119.41	791.37	227.96	SPECIAL	BE_RAM_07B
5	560,704.77	798,261.94	1,000.00	237.13	SPECIAL	ALPT1
6	560,651.92	798,325.85	1,058.09	212.25	GR	GR
7	560,626.40	798,335.08	1,084.30	211.73	GR	GR
8	560,604.65	798,335.72	1,106.03	211.66	GR	GR
9	560,585.91	798,342.00	1,125.24	212.02	GR	GR
10	560,565.68	798,348.25	1,145.92	212.41	GR	GR
11	560,542.29	798,357.71	1,170.03	211.93	GR	GR
12	560,518.14	798,288.53	1,188.22	233.87	SPECIAL	xPL1 60

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
13	560,521.81	798,366.12	1,191.16	211.51	GR	GR
14	560,511.45	798,286.41	1,194.70	233.92	SPECIAL	BE_RAM_07C NL
15	560,503.32	798,289.11	1,203.03	233.80	SPECIAL	xPL1 60
16	560,502.86	798,289.28	1,203.50	229.78	SPECIAL	xPL1 60
17	560,500.68	798,268.61	1,203.91	212.76	TOE	TOE
18	560,504.22	798,371.03	1,209.10	211.35	GR	GR
19	560,501.21	798,344.43	1,209.83	215.55	HIS	HIS HWM4 RIVER RD
20	560,494.15	798,374.97	1,219.46	211.34	GR	GR
21	560,484.12	798,379.95	1,229.89	210.83	GR	GR
22	560,483.44	798,384.68	1,230.96	210.76	SPECIAL	BE_RAM_07D NL
23	560,465.89	798,200.29	1,232.77	213.23	SPECIAL	RAM_07A BC 7C
24	560,465.88	798,200.29	1,232.78	213.23	SPECIAL	RAM_07A FLD
25	560,465.87	798,200.27	1,232.79	213.23	SPECIAL	RAM_07A FLD
26	560,465.87	798,200.27	1,232.79	213.22	SPECIAL	RAM_07A BS CHK
27	560,465.87	798,200.26	1,232.79	213.24	SPECIAL	BE_RAM_07A
28	560,465.83	798,200.28	1,232.82	213.25	SPECIAL	RAM_07A FLD
29	560,465.83	798,200.26	1,232.83	213.24	SPECIAL	RAM_07A BC 7E
30	560,439.97	798,288.68	1,266.11	207.84	GR	GR
31	560,421.12	798,290.43	1,285.04	206.24	GR	GR
32	560,405.32	798,301.40	1,301.72	206.36	P	P1 8.0
33	560,401.38	798,304.48	1,305.90	205.91	CB	Channelbank [CB
34	560,389.28	798,292.31	1,316.93	204.09	TE	TE
35	560,385.29	798,293.07	1,320.97	202.35	H2O	H2O
36	560,370.73	798,294.64	1,335.60	201.54	H2O	H2O
37	560,368.22	798,308.18	1,339.26	201.17	H2O	H2O
38	560,345.68	798,296.56	1,360.73	199.80	H2O	H2O
39	560,342.72	798,274.79	1,361.82	200.35	DS	DS IN
40	560,321.85	798,298.39	1,384.63	198.83	H2O	H2O
41	560,301.69	798,300.24	1,404.88	190.82	P	P2 8.0
42	560,296.87	798,294.29	1,409.17	205.33	SPECIAL	GAGE BOARD 4.1
43	560,290.42	798,300.28	1,416.11	203.98	SPECIAL	GAGE TRANS
44	560,287.51	798,301.39	1,419.10	190.31	H2O	H2O
45	560,272.96	798,302.61	1,433.70	202.13	H2O	H2O
46	560,266.60	798,303.11	1,440.08	204.04	TE	TE
47	560,261.43	798,303.44	1,445.26	206.42	CB	Channelbank [CB
48	560,244.81	798,304.82	1,461.94	210.15	GR	GR
49	560,225.79	798,306.13	1,481.00	212.21	GR	GR
50	560,207.13	798,235.32	1,493.57	216.57	SPECIAL	GAGE
51	560,204.99	798,307.72	1,501.86	212.75	TOE	TOE
52	560,204.92	798,313.83	1,502.45	230.64	SPECIAL	xPL1 60
53	560,204.31	798,313.88	1,503.06	233.87	SPECIAL	xPL1 60
54	560,197.08	798,290.47	1,508.28	233.82	SPECIAL	ERM G20
55	560,196.13	798,315.17	1,511.32	233.88	SPECIAL	RAM_07E TRA 7C
56	560,189.36	798,315.46	1,518.09	233.86	SPECIAL	xPL1 60
57	560,161.75	798,357.32	1,549.16	216.15	GR	GR
58	560,132.65	798,360.36	1,578.41	217.22	GR	GR
59	560,100.95	798,356.76	1,609.70	218.16	GR	GR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
60	560,073.38	798,353.25	1,636.86	218.93	GR	GR
61	559,924.48	798,328.54	1,783.12	233.66	SPECIAL	ALPT2

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	560,800.81	798,263.80	904.46	238.84	TR	RAIL [TR RAIL .65
2	560,704.85	798,261.93	999.92	237.14	TR	RAIL [TR RAIL .65
3	560,704.75	798,261.95	1,000.02	237.13	TR	RAIL [TR RAIL .65
4	560,601.38	798,270.33	1,103.73	235.49	TR	RAIL [TR RAIL .65
5	560,506.39	798,278.68	1,199.08	234.75	BEGIN	BEGIN
6	560,199.90	798,302.80	1,506.51	234.60	END	RAIL [END RAIL .65
7	560,197.92	798,306.24	1,508.78	234.67	TR	RAIL [TR RAIL .65
8	560,144.29	798,310.50	1,562.57	234.86	TR	RAIL [TR RAIL .65
9	560,087.06	798,314.82	1,619.97	235.15	TR	RAIL [TR RAIL .65
10	560,047.19	798,316.98	1,659.87	235.46	TR	TR
11	560,000.65	798,318.23	1,706.36	235.84	TR	RAIL [TR RAIL .65
12	559,961.05	798,318.38	1,745.83	236.21	TR	TR
13	559,922.31	798,316.86	1,784.29	236.51	TR	RAIL [TR RAIL .65

Detailed Bridge Report

(All Units In Feet)

General		**Material**		**Design**	
ID:	**BE_RAM_08**	Bed:	Unknown	Designer:	
Road Name:	W OAKLAND RD	Fill:	Unknown	Contractor:	
Stream Name:				Year Built:	
County:		**Datum**			
State:		Horizontal:			
State Zone:		Vertical:			

Centerline		**Invert**	
Station:	1,362.74	Downstream:	201.72
Offset:	0.00	Upstream:	201.29
Easting:	561,047.36		
Northing:	799,275.17	**Rail Height:**	3.13
		Deck Thickness:	5.00

Plans

Plan Location:

Survey File: N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\BE_RAM_08.TXT

Comments:

Opening

	Left	Right
Abutment	1,299.28	1,454.54
Fill Station	1,299.20	1,440.65
Side slopes	0.00	0.00

Type: Vertical Wall

Looking At: Upstream Face

Looking At: Upstream Channel

Detailed Bridge Report

(All Units In Feet)

Looking At: Downstream Channel

Looking At: Downstream Face

Piers

CL Station	Foundation Type	Shape	Column Count	Width	Cap Height	Cap Top Elev	Foot Width	Foot Top Elev	Comment
1,378.60	FOOTER	Round	1	3.00	0.00	0.00	0.00	0.00	P1 3.0

Rails

Station	Easting	Northing	Elevation	Height
1,200.68	561,185.26	799,185.26	221.96	2.39
1,207.38	561,180.95	799,190.47	222.09	2.46
1,253.07	561,146.31	799,220.33	222.34	2.32
1,278.20	561,127.90	799,237.43	222.91	2.66
1,283.84	561,123.89	799,241.41	223.53	3.23
1,296.74	561,114.40	799,250.15	223.68	3.27
1,297.12	561,114.25	799,250.54	224.14	3.73
1,299.92	561,112.14	799,252.37	224.17	3.73
1,300.19	561,111.94	799,252.56	224.67	4.23
1,456.09	560,998.50	799,359.50	226.36	4.23
1,456.49	560,998.22	799,359.78	225.84	3.71
1,459.29	560,996.13	799,361.66	225.83	3.69
1,459.62	560,995.85	799,361.84	225.39	3.24
1,472.55	560,986.64	799,370.92	225.55	3.34
1,478.49	560,983.10	799,375.82	225.03	2.79
1,493.99	560,975.72	799,390.60	224.61	2.13
1,514.19	560,971.57	799,415.69	223.60	0.75
1,543.12	560,966.34	799,452.36	222.85	0.00

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	561,342.51	799,052.08	994.88	220.31	GR	GR
2	561,311.52	799,026.58	1,000.00	221.45	SPECIAL	ALPT1
3	561,310.14	799,081.18	1,038.40	219.37	GR	GR
4	561,294.69	799,098.11	1,061.25	218.99	GR	GR
5	561,275.61	799,126.85	1,094.84	218.60	GR	GR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data **Data type:** **FIELD**

Point	Easting	Northing	Station	Elevation	Code	Comment
6	561,259.06	799,157.07	1,127.59	217.98	GR	GR
7	561,242.70	799,179.34	1,154.76	217.56	GR	GR
8	561,237.05	799,185.48	1,163.08	217.24	GR	GR
9	561,236.68	799,185.75	1,163.54	216.94	GR	GR
10	561,226.96	799,192.71	1,175.39	217.20	GR	GR
11	561,215.05	799,203.06	1,191.15	216.84	GR	GR
12	561,152.43	799,137.87	1,192.15	219.35	SPECIAL	RAM_08A BS CHK
13	561,152.44	799,137.89	1,192.15	219.28	SPECIAL	BE_RAM_08A
14	561,184.95	799,228.79	1,230.70	214.05	GR	GR
15	561,168.32	799,248.01	1,255.99	212.94	GR	GR
16	561,148.27	799,256.33	1,276.30	212.15	GR	GR
17	561,143.51	799,260.22	1,282.42	212.01	GR	GR
18	561,084.92	799,197.99	1,282.51	226.38	SPECIAL	GAGE TOP
19	561,141.46	799,267.12	1,288.65	211.21	CB	Channelbank [CB
20	561,141.46	799,267.12	1,288.65	211.21	SPECIAL	XGR
21	561,070.65	799,205.08	1,297.77	204.85	SPECIAL	GAGE TRANS
22	561,113.55	799,252.82	1,299.20	205.38	TOE	TOE TE
23	561,111.66	799,254.32	1,301.61	203.43	H2O	H2O
24	561,103.77	799,261.77	1,312.45	201.41	H2O	H2O
25	561,089.15	799,275.51	1,332.52	201.61	H2O	H2O
26	561,038.21	799,242.41	1,346.98	201.72	DS	DS IN
27	561,070.81	799,293.07	1,357.90	201.82	H2O	H2O
28	561,055.99	799,306.90	1,378.18	222.43	SPECIAL	USSTRUCT
29	561,016.34	799,265.01	1,378.38	222.53	SPECIAL	DSSTRUCT
30	561,055.82	799,307.34	1,378.60	201.42	P	P1 3.0
31	561,052.28	799,310.25	1,383.17	201.29	H2O	H2O
32	561,039.59	799,322.11	1,400.55	201.73	H2O	H2O
33	561,028.38	799,333.87	1,416.76	201.62	H2O	H2O
34	561,041.25	799,359.53	1,424.96	204.14	H2O	H2O
35	561,042.81	799,363.11	1,426.28	205.21	TE	TE
36	561,039.98	799,364.76	1,429.47	206.49	CB	Channelbank [CB
37	561,037.39	799,371.72	1,436.12	208.63	GR	GR
38	561,010.91	799,350.16	1,440.65	208.42	TOE	TOE
39	561,034.27	799,380.77	1,444.59	212.36	GR	GR
40	561,028.07	799,387.87	1,453.97	214.30	GR	GR
41	560,980.26	799,337.86	1,454.56	222.12	SPECIAL	ALPT2
42	560,955.72	799,322.06	1,461.63	222.49	SPECIAL	ERM RR-2
43	561,010.88	799,411.11	1,482.41	214.46	GR	GR
44	560,996.14	799,436.23	1,510.35	215.39	GR	GR
45	560,981.87	799,454.56	1,533.31	216.44	GR	GR
46	560,928.69	799,408.24	1,540.33	223.33	SPECIAL	BE_RAM_08B
47	560,928.66	799,408.27	1,540.38	223.20	SPECIAL	DATE 10-07-2011
48	560,928.66	799,408.27	1,540.38	223.20	SPECIAL	BE_RAM_08B FLD
49	560,928.64	799,408.26	1,540.39	223.22	SPECIAL	RAM_08B BS CHK
50	560,928.65	799,408.29	1,540.40	223.20	SPECIAL	BE_RAM_08B FLD
51	560,928.65	799,408.29	1,540.40	223.19	SPECIAL	BE_RAM_08B BS CH
52	560,973.72	799,463.39	1,545.29	218.19	GR	GR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
53	560,958.36	799,464.01	1,556.91	220.63	GR	GR
54	560,930.64	799,463.08	1,576.47	220.25	GR	GR
55	560,903.76	799,466.58	1,598.46	219.44	GR	GR
56	560,889.04	799,471.86	1,612.80	219.45	GR	GR
57	560,874.09	799,479.36	1,628.83	219.99	GR	GR
58	560,862.73	799,484.17	1,640.41	220.38	GR	GR
59	560,845.09	799,494.55	1,660.36	223.15	GR	GR
60	560,821.47	799,517.46	1,693.27	231.73	GR	GR

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	561,311.52	799,026.58	1,000.00	221.45	TR	TR
2	561,259.38	799,075.83	1,071.72	219.57	TR	TR
3	561,216.71	799,115.92	1,130.27	219.19	TR	TR
4	561,174.15	799,155.55	1,188.43	219.47	TR	TR
5	561,093.74	799,231.85	1,299.28	220.43	BEGIN	BEGIN
6	560,980.27	799,337.84	1,454.54	222.12	END	END
7	560,958.94	799,354.88	1,481.76	222.26	TR	TR
8	560,918.23	799,383.82	1,531.24	223.16	TR	TR
9	560,876.36	799,402.72	1,574.70	225.55	TR	TR
10	560,807.58	799,419.51	1,636.32	230.52	TR	TR

Detailed Bridge Report

(All Units In Feet)

General		**Material**		**Design**	
ID:	**BE_RAM_09**	Bed:	Unknown	Designer:	
Road Name:	I 287	Fill:	Unknown	Contractor:	
Stream Name:				Year Built:	
County:		**Datum**			
State:		Horizontal:			
State Zone:		Vertical:			

Centerline		**Invert**	
Station:	1,449.53	Downstream:	201.88
Offset:	0.00	Upstream:	199.33
Easting:	561,736.53		
Northing:	799,862.10	**Rail Height:**	1.94
		Deck Thickness:	10.10

Plans

Plan Location:

Survey File: N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\BE_RAM_09.TXT

Comments:

Opening

Type: Spill Through

	Left	Right
Abutment	1,319.87	1,649.70
Fill Station	1,356.45	1,599.38
Side slopes	0.00	0.00

Looking At: Upstream Face

Looking At: Upstream Channel

Detailed Bridge Report

(All Units In Feet)

Looking At: Downstream Channel

Looking At: Downstream Face

Piers

CL Station	Foundation Type	Shape	Column Count	Width	Cap Height	Cap Top Elev	Foot Width	Foot Top Elev	Comment
1,394.17	FOOTER	Round	1	3.00	0.00	0.00	0.00	0.00	P1 3.0
1,478.74	FOOTER	Round	1	3.00	0.00	0.00	0.00	0.00	P2 3.0
1,568.13	FOOTER	Round	1	3.00	0.00	0.00	0.00	0.00	P3 3.0

Rails

Station	Easting	Northing	Elevation	Height
1,098.38	562,087.14	799,815.74	246.79	2.76
1,132.03	562,053.43	799,819.74	245.99	2.62
1,207.34	561,979.09	799,833.04	244.11	2.08
1,231.48	561,954.87	799,835.78	243.55	1.91
1,238.08	561,948.27	799,836.60	243.75	2.22
1,262.18	561,924.16	799,839.58	243.55	2.26
1,262.84	561,923.49	799,839.62	243.88	2.59
1,689.56	561,502.15	799,914.46	241.38	1.29
1,690.02	561,501.71	799,914.59	240.74	0.65
1,739.43	561,455.01	799,931.38	241.17	0.64

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	562,179.56	799,779.61	999.89	246.18	SPECIAL	BE_RAM_09A BS CH
2	562,179.56	799,779.65	999.89	246.20	SPECIAL	BE_RAM_09A FLD
3	562,179.49	799,779.63	999.95	246.25	SPECIAL	RAM_09A BS CHK
4	562,179.48	799,779.65	999.97	246.25	SPECIAL	BE_RAM_09A FLD
5	562,179.46	799,779.67	1,000.00	246.22	SPECIAL	BE_RAM_09A
6	562,179.46	799,779.67	1,000.00	246.22	SPECIAL	ALPT1
7	562,184.95	799,893.92	1,023.06	268.18	GR	GR
8	562,168.69	799,890.67	1,038.00	268.52	GR	GR
9	562,158.28	799,887.29	1,047.24	268.62	GR	GR
10	562,131.25	799,894.31	1,075.16	256.75	GR	GR
11	562,101.44	799,845.48	1,091.91	261.78	SPECIAL	BE_RAM_09C TRA

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
12	562,106.15	799,904.75	1,102.08	238.15	GR	GR
13	562,089.06	799,921.51	1,122.79	221.26	GR	GR
14	562,077.26	799,934.71	1,137.49	218.56	GR	GR
15	562,037.74	799,927.42	1,173.97	217.30	GR	GR
16	562,008.44	799,924.80	1,201.70	213.55	GR	GR
17	561,960.41	799,931.57	1,249.91	211.87	GR	GR
18	561,924.69	799,946.23	1,288.15	212.65	GR	GR
19	561,831.09	799,856.15	1,356.45	213.76	TOE	TOE
20	561,830.07	799,856.37	1,357.49	213.73	GR	GR
21	561,809.13	799,860.04	1,378.69	211.65	GR	GR
22	561,795.76	799,862.39	1,392.22	210.75	CB	Channelbank [CB
23	561,793.82	799,862.68	1,394.17	210.75	P	P1 3.0
24	561,785.93	799,864.06	1,402.15	207.70	TE	TE
25	561,782.05	799,864.74	1,406.09	207.43	H2O	H2O
26	561,764.62	799,867.82	1,423.73	207.26	H2O	H2O
27	561,747.04	799,870.89	1,441.53	206.86	H2O	H2O
28	561,733.49	799,873.23	1,455.23	205.75	H2O	H2O
29	561,719.10	799,875.86	1,469.82	201.47	H2O	H2O
30	561,710.30	799,877.43	1,478.74	202.10	P	P2 3.0
31	561,693.87	799,880.28	1,495.36	199.33	H2O	H2O
32	561,692.36	799,880.59	1,496.90	207.61	TE	TE
33	561,689.55	799,880.94	1,499.70	210.56	CB	Channelbank [CB
34	561,668.01	799,912.79	1,528.49	210.70	GR	GR
35	561,656.80	799,937.68	1,545.53	211.76	GR	GR
36	561,652.23	799,967.90	1,557.46	212.49	GR	GR
37	561,622.25	799,893.87	1,568.11	210.13	SPECIAL	USSTRUCT
38	561,622.23	799,893.87	1,568.13	210.14	P	P3 3.0
39	561,631.50	799,993.93	1,584.00	212.99	GR	GR
40	561,559.26	799,755.73	1,594.83	201.88	DS	DS IN
41	561,598.85	799,928.52	1,599.38	211.94	SPECIAL	ALPT2
42	561,598.85	799,928.52	1,599.38	211.94	TOE	TOE
43	561,607.78	800,028.47	1,615.55	213.11	GR	GR
44	561,579.17	800,060.37	1,651.19	213.59	GR	GR
45	561,488.65	799,758.72	1,663.96	238.80	SPECIAL	DSSTRUCT
46	561,548.41	800,106.15	1,692.36	214.51	GR	GR
47	561,493.55	799,922.53	1,699.90	238.54	SPECIAL	BE_RAM_09D
48	561,538.65	800,142.22	1,710.77	214.98	GR	GR
49	561,471.53	799,882.83	1,711.37	240.25	SPECIAL	BE_RAM_09Bv
50	561,471.44	799,882.84	1,711.46	240.23	SPECIAL	DATE 11-03-2011
51	561,471.43	799,882.82	1,711.47	240.27	SPECIAL	BE_RAM_09B FLD
52	561,471.42	799,882.82	1,711.48	240.30	SPECIAL	BE_RAM_09B BS CH
53	561,471.42	799,882.84	1,711.48	240.23	SPECIAL	BE_RAM_09B FLD

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	562,179.46	799,779.67	1,000.00	246.22	TR	TR
2	562,129.46	799,790.38	1,051.09	245.13	TR	TR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data **Data type:** **TOP OF ROAD**

Point	Easting	Northing	Station	Elevation	Code	Comment
3	562,078.42	799,801.01	1,103.17	243.92	TR	TR
4	562,018.12	799,810.35	1,163.91	242.74	TR	TR
5	561,945.82	799,823.58	1,237.22	241.54	TR	TR
6	561,912.52	799,830.65	1,271.23	241.20	TR	TR
7	561,864.54	799,839.35	1,319.87	240.76	BEGIN	BEGIN
8	561,706.25	799,867.48	1,480.19	240.03	TR	TR
9	561,631.42	799,879.69	1,555.71	239.73	TR	TR
10	561,543.04	799,871.85	1,639.37	239.90	TR	TR
11	561,534.71	799,880.92	1,649.70	239.77	END	END
12	561,471.43	799,882.84	1,711.47	240.26	TR	TR
13	561,394.68	799,880.13	1,785.14	240.97	TR	TR

PROJECT NJDEP Field Survey - Bridges

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Bridge Report

(All Units In Feet)

General		**Material**		**Design**	
ID:	**BE_RAM_27BR**	Bed:	Unknown	Designer:	
Road Name:	BOAT RAMP	Fill:	Unknown	Contractor:	
Stream Name:				Year Built:	
County:		**Datum**			
State:		Horizontal:			
State Zone:		Vertical:			

Centerline		**Invert**	
Station:	1,124.82	Downstream:	198.26
Offset:	0.00	Upstream:	198.51
Easting:	558,444.38		
Northing:	797,536.77	**Rail Height:**	2.88
		Deck Thickness:	5.00

Plans

Plan Location:

Survey File: N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\BE_RAM_27BR.txt

Comments:

Opening Type: Vertical Wall

	Left	Right
Abutment	1,097.81	1,157.02
Fill Station	1,097.91	1,156.92
Side slopes	0.00	0.00

Looking At: Upstream Face

Looking At: Upstream Channel

PROJECT NJDEP Field Survey - Bridges

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Bridge Report

(All Units In Feet)

Looking At: Downstream Channel

Looking At: Downstream Face

Piers: None

Rails

Station	Easting	Northing	Elevation	Height
1,076.38	558,485.15	797,509.31	216.41	3.60
1,098.55	558,468.10	797,523.57	216.61	2.90
1,154.37	558,427.59	797,561.97	216.45	2.87
1,178.73	558,410.12	797,578.94	216.28	2.18

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	558,219.81	795,807.84	91.22	202.55	SPECIAL	BS CK 24A
2	558,218.93	795,808.00	91.97	202.51	SPECIAL	DATE 10-20-2011
3	558,218.93	795,808.00	91.97	202.51	SPECIAL	BE_RAM_24A FLD
4	558,218.94	795,808.08	92.01	202.57	SPECIAL	BE_RAM_24AXS
5	559,032.85	797,450.88	640.39	206.75	SPECIAL	BE_RAM_28AXS
6	559,032.89	797,450.98	640.43	206.78	SPECIAL	BE_RAM_28A FLD
7	558,549.82	797,455.76	992.64	203.21	GR	GR
8	558,549.77	797,455.86	992.74	203.22	GR	GR
9	558,534.77	797,450.69	1,000.00	202.16	SPECIAL	ALPT1
10	558,536.12	797,472.93	1,014.40	205.32	GR	GR
11	558,527.43	797,478.96	1,024.85	206.80	GR	GR
12	558,514.57	797,469.65	1,027.71	207.62	SPECIAL	BE_RAM_27C REF
13	558,507.38	797,491.35	1,047.90	210.31	GR	GR
14	558,501.86	797,500.87	1,058.47	210.76	GR	GR
15	558,491.85	797,512.50	1,073.74	211.98	GR	GR
16	558,485.13	797,517.30	1,081.92	211.74	CB	Channelbank [CB
17	558,476.75	797,518.52	1,088.81	207.48	GR	GR
18	558,473.08	797,522.66	1,094.33	205.10	GR	GR
19	558,467.71	797,526.29	1,100.71	202.68	GR	GR
20	558,464.47	797,528.90	1,104.86	201.89	TE	TE
21	558,459.42	797,532.76	1,111.18	200.39	H2O	H2O
22	558,453.20	797,538.12	1,119.38	198.54	H2O	H2O

PROJECT NJDEP Field Survey - Bridges

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
23	558,439.13	797,530.82	1,124.49	198.26	DS	DS IN
24	558,447.28	797,543.99	1,127.72	198.51	H2O	H2O
25	558,440.76	797,550.02	1,136.60	200.08	H2O	H2O
26	558,446.68	797,564.58	1,142.39	201.37	H2O	H2O
27	558,445.40	797,566.70	1,144.78	201.87	TE	TE
28	558,444.04	797,568.41	1,146.95	202.27	CB	Channelbank [CB
29	558,438.95	797,580.81	1,159.20	203.62	GR	GR
30	558,432.20	797,591.11	1,171.20	205.59	GR	GR
31	558,421.03	797,603.79	1,188.03	207.65	GR	GR
32	558,406.15	797,592.78	1,191.17	213.56	GR	GR
33	558,383.94	797,616.47	1,223.59	214.05	GR	GR
34	558,362.20	797,637.24	1,253.66	215.02	GR	GR
35	558,345.24	797,657.47	1,279.90	215.79	GR	GR
36	558,327.50	797,679.06	1,307.64	215.96	GR	GR
37	558,296.03	797,679.31	1,330.55	218.18	SPECIAL	ALPT2

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	558,534.77	797,450.69	1,000.00	202.16	TR	TR
2	558,530.70	797,457.41	1,007.58	203.95	TR	TR
3	558,524.64	797,463.73	1,016.33	206.02	TR	TR
4	558,506.26	797,480.42	1,041.15	209.44	TR	TR
5	558,499.80	797,486.60	1,050.09	210.60	TR	TR
6	558,487.86	797,496.62	1,065.64	211.70	TR	TR
7	558,473.10	797,509.56	1,085.25	213.72	TR	TR
8	558,464.00	797,518.21	1,097.81	213.71	BEGIN	BEGIN
9	558,420.99	797,558.90	1,157.02	213.57	END	END
10	558,408.54	797,570.55	1,174.06	214.00	TR	TR
11	558,390.65	797,587.16	1,198.48	214.48	TR	TR
12	558,355.69	797,620.39	1,246.71	215.02	TR	TR
13	558,319.87	797,654.59	1,296.23	216.31	TR	TR
14	558,303.03	797,672.49	1,320.78	217.25	TR	TR
15	558,296.04	797,679.30	1,330.53	218.18	TR	TR

Detailed Bridge Report

(All Units In Feet)

General		**Material**		**Design**	
ID:	**PA_POM_08**	Bed:	Unknown	Designer:	
Road Name:	JACKSON AVENUE	Fill:	Unknown	Contractor:	
Stream Name:				Year Built:	
County:		**Datum**			
State:		Horizontal:			
State Zone:		Vertical:			

Centerline		**Invert**	
Station:	1,463.25	Downstream:	159.20
Offset:	0.00	Upstream:	160.21
Easting:	552,285.43		
Northing:	778,061.30	**Rail Height:**	3.41
		Deck Thickness:	6.00

Plans

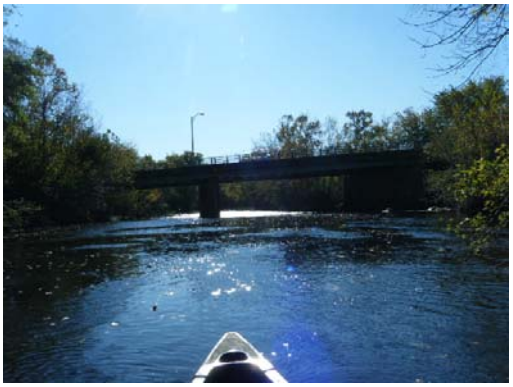
Plan Location:

Survey File: N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\PA_POM_08.txt

Comments:

Opening Type: Spill Through

	Left	Right
Abutment	1,314.21	1,653.64
Fill Station	1,343.02	1,635.30
Side slopes	0.00	0.00



Looking At: Upstream Face

Looking At: Upstream Channel

Detailed Bridge Report

(All Units In Feet)

Looking At: Downstream Channel

Looking At: Downstream Face

Looking At: UPSTREAM FACE

Looking At: UPSTREAM CHANNEL

Looking At: DOWNSTREAM CHANNEL

Looking At: DOWNSTREAM FACE

PROJECT NJDEP Field Survey - Bridges

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Bridge Report

(All Units In Feet)

Looking At: UPSTREAM FACE

Looking At: UPSTREAM CHANNEL

Looking At: DOWNSTREAM CHANNEL

Looking At: DOWNSTREAM FACE

Piers

CL Station	Foundation Type	Shape	Column Count	Width	Cap Height	Cap Top Elev	Foot Width	Foot Top Elev	Comment
1,359.62	FOOTER	Round	1	4.00	0.00	0.00	0.00	0.00	P1 4.0
1,446.57	FOOTER	Round	1	4.00	0.00	0.00	0.00	0.00	P2 4
1,531.58	FOOTER	Round	1	4.00	0.00	0.00	0.00	0.00	P3 4.0
1,618.30	FOOTER	Round	1	4.00	0.00	0.00	0.00	0.00	P4 4

Rails

Station	Easting	Northing	Elevation	Height
1,144.00	552,604.40	778,075.30	185.48	2.44
1,181.32	552,566.98	778,075.98	186.85	2.59
1,239.04	552,508.87	778,080.94	188.41	2.72
1,295.47	552,452.04	778,085.83	189.41	2.05
1,296.84	552,450.73	778,084.82	191.30	3.91
1,373.47	552,374.49	778,075.85	192.62	3.77
1,429.45	552,318.73	778,070.56	193.01	3.79
1,444.75	552,303.49	778,069.09	193.04	3.85

Detailed Bridge Report

(All Units In Feet)

Rails

Station	Easting	Northing	Elevation	Height
1,445.64	552,302.61	778,068.97	193.07	3.88
1,460.54	552,287.77	778,067.60	193.11	3.88
1,505.90	552,242.58	778,063.21	192.95	3.82
1,531.58	552,217.00	778,060.85	192.79	3.83
1,538.28	552,210.34	778,060.06	192.75	3.84
1,574.59	552,174.16	778,056.74	192.27	3.79
1,610.53	552,138.36	778,053.25	191.66	3.80
1,617.83	552,131.09	778,052.60	191.52	3.79
1,679.81	552,069.36	778,046.46	190.26	4.16
1,682.43	552,066.78	778,045.75	188.48	2.47
1,715.20	552,034.22	778,041.36	187.26	2.28

Cross Section Data **Data type: FIELD**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,353.05	778,141.68	392.73	180.98	GR	GR
2	553,340.58	778,114.60	406.79	180.02	SPECIAL	XALPT1
3	553,332.50	778,145.99	412.99	179.83	GR	GR
4	553,310.90	778,147.22	434.48	177.35	GR	GR
5	553,281.61	778,154.05	463.31	176.23	GR	GR
6	553,255.00	778,149.17	490.16	176.30	GR	GR
7	553,232.97	778,150.05	512.09	176.29	GR	GR
8	553,211.04	778,164.97	533.10	175.91	GR	GR
9	553,187.36	778,188.16	555.36	175.17	GR	GR
10	553,170.87	778,172.97	572.72	174.71	GR	GR
11	553,139.94	778,175.38	603.45	174.79	GR	GR
12	553,114.57	778,172.33	628.96	174.42	GR	GR
13	553,109.90	778,060.26	640.30	180.95	SPECIAL	PA_POM_08D NL
14	553,094.43	778,173.18	649.02	174.54	GR	GR
15	553,074.29	778,175.31	668.99	175.16	GR	GR XCB
16	553,070.20	778,128.99	675.84	172.82	SPECIAL	XH2O
17	553,067.86	778,128.55	678.20	172.56	SPECIAL	UIP1 .1
18	553,064.97	778,172.38	678.47	173.59	GR	GR XTE
19	553,062.78	778,172.07	680.68	173.01	GR	GR XH2O
20	553,063.50	778,127.84	682.59	172.50	GR	GR XH2O
21	553,059.50	778,130.68	686.41	173.10	GR	GR XH2O
22	553,059.11	778,044.60	691.94	170.56	SPECIAL	XDS IN
23	553,058.76	778,044.61	692.28	170.58	SPECIAL	DIP1 .1
24	553,038.79	778,167.41	704.90	173.68	GR	GR XTE
25	553,030.14	778,162.73	713.81	176.22	GR	GR XCB
26	553,012.20	778,152.81	732.32	176.94	GR	GR
27	552,995.72	778,143.84	749.30	176.96	GR	GR
28	552,977.52	778,131.71	768.18	178.06	GR	GR
29	552,951.04	778,124.73	795.04	181.07	GR	GR
30	552,927.16	778,133.18	818.37	181.88	GR	GR
31	552,921.86	778,132.90	823.68	180.34	GR	GR
32	552,914.76	778,131.16	830.87	179.99	GR	GR
33	552,883.34	778,122.55	862.75	180.03	GR	GR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
34	552,848.33	778,121.06	897.78	179.96	GR	GR
35	552,827.28	778,076.73	921.44	178.15	SPECIAL	XALPT2
36	552,812.98	778,120.28	933.11	179.85	GR	GR
37	552,779.13	778,121.07	966.86	179.57	GR	GR
38	552,758.31	778,116.69	987.90	178.69	GR	GR
39	552,754.85	778,114.75	991.47	178.60	GR	GR
40	552,751.17	778,110.26	995.41	178.41	GR	GR
41	552,748.65	778,075.45	1,000.00	178.81	SPECIAL	XTR
42	552,748.65	778,075.45	1,000.00	178.81	SPECIAL	ALPT1
43	552,725.22	778,125.59	1,020.40	178.20	GR	GR
44	552,710.71	778,133.60	1,034.41	177.11	GR	GR
45	552,676.63	778,136.98	1,068.22	176.37	GR	GR
46	552,652.84	778,139.31	1,091.84	175.69	GR	GR
47	552,651.90	778,129.43	1,093.37	176.11	GR	GR
48	552,620.92	778,139.95	1,123.67	175.09	GR	GR
49	552,620.18	778,134.19	1,124.75	175.00	GR	GR
50	552,592.34	778,038.11	1,158.26	183.43	SPECIAL	PA_POM_08B FLD
51	552,592.32	778,038.10	1,158.28	183.35	SPECIAL	PA_POM_08B FLD
52	552,592.30	778,038.11	1,158.30	183.39	SPECIAL	PA_POM_08B
53	552,585.43	778,118.25	1,160.38	174.72	GR	GR
54	552,549.58	778,127.40	1,195.63	173.76	GR	GR
55	552,511.95	778,131.47	1,232.95	173.12	GR	GR
56	552,514.66	778,003.65	1,237.86	178.54	SPECIAL	DTE2 10.5 20 2
57	552,505.18	778,103.12	1,241.39	182.76	SPECIAL	UTE2 10.5 20 2
58	552,492.53	778,112.64	1,253.45	173.62	GR	GR
59	552,483.40	778,115.64	1,262.39	175.96	GR	GR
60	552,476.44	778,089.83	1,270.88	186.87	GR	GR
61	552,469.31	778,106.82	1,276.98	185.28	GR	GR
62	552,449.77	778,087.55	1,297.63	185.86	GR	GR
63	552,444.91	778,082.94	1,302.76	188.50	SPECIAL	ERM GAGING STATION
64	552,404.77	778,079.77	1,343.02	171.18	TOE	TOE
65	552,400.73	778,104.45	1,345.58	177.86	GR	GR
66	552,388.29	778,077.13	1,359.62	169.68	P	P1 4.0
67	552,383.98	778,097.96	1,362.68	172.47	GR	GR
68	552,374.49	778,075.85	1,373.47	168.82	SPECIAL	XH2O
69	552,366.14	778,095.96	1,380.62	171.68	GR	GR
70	552,357.04	778,094.26	1,389.80	169.44	CB	Channelbank [CB
71	552,344.61	778,089.71	1,402.47	165.39	TE	TE
72	552,343.99	778,072.95	1,404.10	163.78	H2O	H2O
73	552,341.71	778,088.57	1,405.44	164.84	H2O	H2O
74	552,331.92	778,071.80	1,416.21	163.37	H2O	H2O
75	552,330.40	778,008.75	1,421.49	159.20	DS	DS IN
76	552,318.73	778,070.56	1,429.45	162.21	H2O	H2O
77	552,301.67	778,068.97	1,446.57	162.07	P	P2 4
78	552,286.98	778,067.68	1,461.31	161.79	H2O	H2O
79	552,275.06	778,066.49	1,473.29	163.35	H2O	H2O
80	552,268.51	778,064.52	1,479.94	189.21	SPECIAL	PA_POM_08C

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
81	552,266.63	778,002.58	1,485.51	193.02	SPECIAL	DSSTRUCT
82	552,258.07	778,064.99	1,490.33	160.21	H2O	H2O
83	552,244.17	778,063.69	1,504.29	162.19	H2O	H2O
84	552,231.12	778,062.35	1,517.39	164.10	H2O	H2O
85	552,224.52	778,061.71	1,524.02	165.46	TE	TE
86	552,220.87	778,061.34	1,527.68	165.93	CB	Channelbank [CB
87	552,217.00	778,060.85	1,531.58	192.79	SPECIAL	USSTRUCT
88	552,217.00	778,060.85	1,531.58	165.99	P	P3 4.0
89	552,195.88	778,077.67	1,551.66	167.88	GR	GR
90	552,178.93	778,078.68	1,568.52	168.60	GR	GR
91	552,165.06	778,079.74	1,582.30	169.25	GR	GR
92	552,153.87	778,024.32	1,596.77	187.62	SPECIAL	CLTR
93	552,143.86	778,078.48	1,603.54	169.47	GR	GR
94	552,130.53	778,053.97	1,618.30	167.59	P	P4 4
95	552,122.81	778,081.58	1,624.37	169.78	GR	GR
96	552,113.63	778,051.89	1,635.30	170.20	TOE	TOE
97	552,102.58	778,087.58	1,644.20	170.26	GR	GR
98	552,075.74	778,088.83	1,670.92	181.30	GR	GR
99	552,049.49	778,087.76	1,697.19	180.96	GR	GR
100	552,046.02	778,083.36	1,700.91	181.47	GR	GR
101	552,042.39	777,984.99	1,710.40	185.34	SPECIAL	PA_POM_08A
102	552,042.38	777,984.99	1,710.41	185.41	SPECIAL	PA_POM_08A FLD
103	552,042.38	777,984.99	1,710.41	185.36	SPECIAL	DATE 10-26-2011
104	552,042.38	777,984.99	1,710.41	185.37	SPECIAL	PA_POM_08A FLD
105	552,042.36	777,984.99	1,710.43	185.43	SPECIAL	PA_POM_08A FLD
106	552,042.34	777,984.99	1,710.45	185.38	SPECIAL	PA_POM_08A FLD
107	552,042.34	777,985.01	1,710.45	185.42	SPECIAL	PA_POM_08A BS CH
108	552,042.34	777,985.03	1,710.45	185.42	SPECIAL	BS CK 8A
109	552,042.33	777,985.06	1,710.45	185.35	SPECIAL	BS CK 8A
110	552,030.25	778,060.92	1,718.00	184.48	GR	GR
111	552,025.96	778,075.71	1,721.39	184.36	GR	GR
112	552,025.56	778,075.73	1,721.79	184.38	GR	GR
113	551,982.99	778,038.62	1,766.50	183.96	GR	GR
114	551,918.30	778,025.89	1,831.84	182.72	SPECIAL	ALPT2

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,340.58	778,114.60	406.79	180.02	TR	TR
2	553,297.45	778,110.84	450.07	179.37	TR	TR
3	553,256.27	778,104.33	491.56	178.76	TR	TR
4	553,218.47	778,101.72	529.46	178.72	TR	TR
5	553,181.80	778,098.39	566.26	179.36	TR	TR
6	553,138.55	778,094.83	609.64	180.51	TR	TR
7	553,095.37	778,092.04	652.91	181.37	TR	TR
8	553,064.11	778,090.70	684.19	181.30	TR	TR
9	553,030.95	778,089.32	717.38	180.89	TR	TR
10	552,997.22	778,086.82	751.19	180.16	TR	TR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data **Data type:** **TOP OF ROAD**

Point	Easting	Northing	Station	Elevation	Code	Comment
11	552,959.66	778,084.03	788.86	179.46	TR	TR
12	552,920.98	778,081.93	827.60	178.94	TR	TR
13	552,873.34	778,078.84	875.34	178.56	TR	TR
14	552,827.28	778,076.73	921.44	178.15	TR	TR
15	552,748.65	778,075.45	1,000.00	178.81	TR	TR
16	552,712.53	778,073.40	1,036.18	179.09	TR	TR
17	552,678.83	778,072.90	1,069.85	180.25	TR	TR
18	552,642.82	778,072.61	1,105.82	181.65	TR	TR
19	552,604.19	778,071.94	1,144.42	183.06	TR	TR
20	552,566.53	778,073.35	1,181.93	184.27	TR	TR
21	552,507.67	778,078.51	1,240.37	185.73	TR	TR
22	552,433.90	778,075.19	1,314.21	187.91	BEGIN	BEGIN
23	552,410.99	778,073.33	1,337.19	188.41	TR	TR
24	552,393.25	778,071.48	1,355.01	188.50	TR	TR
25	552,375.40	778,069.92	1,372.92	188.85	TR	TR
26	552,338.05	778,066.28	1,410.42	189.18	TR	TR
27	552,307.04	778,063.54	1,441.54	189.26	TR	TR
28	552,306.87	778,063.37	1,441.72	189.18	TR	TR
29	552,269.69	778,059.79	1,479.04	189.29	TR	TR
30	552,233.33	778,056.47	1,515.54	189.08	TR	TR
31	552,192.39	778,052.54	1,556.64	188.76	TR	TR
32	552,147.09	778,048.17	1,602.12	188.06	TR	TR
33	552,135.91	778,047.15	1,613.34	187.79	TR	TR
34	552,116.51	778,045.21	1,632.83	187.54	TR	TR
35	552,095.78	778,043.14	1,653.64	186.92	END	END
36	552,030.48	778,036.80	1,719.20	184.85	TR	TR
37	551,991.25	778,033.15	1,758.58	184.01	TR	TR
38	551,954.91	778,029.57	1,795.07	183.37	TR	TR
39	551,918.53	778,025.96	1,831.60	182.73	TR	TR

Detailed Bridge Report

(All Units In Feet)

General		**Material**		**Design**
ID:	**PA_RAM_02**	Bed:	Unknown	Designer:
Road Name:	DAWES HWY	Fill:	Unknown	Contractor:
Stream Name:				Year Built:
County:		**Datum**		
State:		Horizontal:		
State Zone:		Vertical:		

Centerline		**Invert**	
Station:	1,285.52	Downstream:	166.24
Offset:	0.00	Upstream:	164.00
Easting:	552,964.18		
Northing:	784,040.94	**Rail Height:**	3.91
		Deck Thickness:	4.75

Plans

Plan Location:

Survey File: N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\PA_RAM_02.TXT

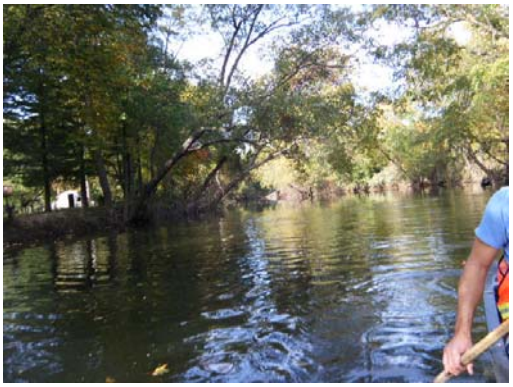
Comments:

Opening

Type: Vertical Wall

	Left	Right
Abutment	1,239.71	1,334.40
Fill Station	1,239.81	1,334.30
Side slopes	0.00	0.00

Looking At: Upstream Face



Looking At: Upstream Channel

PROJECT NJDEP Field Survey - Bridges

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Bridge Report

(All Units In Feet)

Looking At: Downstream Channel

Looking At: Downstream Face

Piers: None

Rails

Station	Easting	Northing	Elevation	Height
1,220.70	553,029.79	784,053.39	190.03	3.76
1,230.63	553,019.87	784,053.90	190.49	3.79
1,231.68	553,018.85	784,054.34	193.79	7.05
1,238.78	553,011.76	784,054.64	193.79	6.74
1,239.66	553,010.86	784,054.50	190.91	3.82
1,277.02	552,973.56	784,056.55	192.53	3.81
1,286.29	552,964.31	784,057.12	192.78	3.70
1,293.99	552,956.62	784,057.61	192.62	3.73
1,312.42	552,938.22	784,058.65	191.92	3.81
1,334.55	552,916.14	784,060.07	190.97	3.91
1,335.45	552,915.25	784,060.31	193.81	6.79
1,342.69	552,908.04	784,060.97	193.82	7.15
1,343.71	552,907.00	784,060.64	190.52	3.90
1,353.22	552,897.52	784,061.41	190.09	3.93
1,353.73	552,897.00	784,061.47	188.51	2.37
1,380.09	552,870.71	784,063.34	187.66	2.63

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,252.64	784,070.82	999.15	187.16	GR	GR
2	553,249.25	784,024.92	1,000.00	185.85	SPECIAL	ALPT1
3	553,219.53	784,071.18	1,032.23	186.55	GR	GR
4	553,188.18	784,068.11	1,063.36	186.14	GR	GR
5	553,174.04	784,067.10	1,077.43	183.56	GR	GR
6	553,140.96	784,074.15	1,110.85	182.71	GR	GR
7	553,108.06	784,071.57	1,143.55	183.54	GR	GR
8	553,090.52	784,139.87	1,164.84	183.83	SPECIAL	DATE 10-10-2011
9	553,090.52	784,139.87	1,164.84	183.83	SPECIAL	PA_RAM_02B FLD
10	553,090.51	784,139.84	1,164.84	183.84	SPECIAL	RAM_02B BS CHK
11	553,090.51	784,139.86	1,164.85	183.81	SPECIAL	PA_RAM_02B

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
12	553,073.24	784,072.71	1,178.38	184.97	GR	GR
13	553,044.10	784,074.44	1,207.57	186.06	GR	GR
14	553,033.41	784,069.71	1,217.99	185.68	CB	Channelbank [CB
15	553,016.71	784,067.04	1,234.51	175.49	TE	TE
16	553,008.98	784,019.98	1,239.64	184.88	SPECIAL	GAGE PLUS 3
17	553,009.90	784,056.29	1,240.72	171.26	H2O	H2O
18	552,997.54	784,057.19	1,253.11	166.50	H2O	H2O
19	552,984.85	784,057.60	1,265.80	164.00	H2O	H2O
20	552,976.84	784,058.02	1,273.82	165.24	H2O	H2O
21	552,968.16	784,023.89	1,280.61	166.24	DS	DS IN
22	552,966.91	784,058.45	1,283.77	166.21	H2O	H2O
23	552,960.68	784,058.83	1,290.00	166.77	H2O	H2O
24	552,954.31	784,059.59	1,296.41	166.98	H2O	H2O
25	552,944.21	784,061.25	1,306.59	167.32	H2O	H2O
26	552,938.19	784,028.30	1,310.78	188.55	SPECIAL	PA_RAM_02D
27	552,933.00	784,062.46	1,317.84	170.00	H2O	H2O
28	552,925.76	784,062.42	1,325.07	171.27	H2O	H2O
29	552,916.41	784,025.81	1,332.38	173.49	SPECIAL	GAGE TRANS
30	552,915.49	784,025.80	1,333.30	190.88	SPECIAL	GAGE PLUS 3
31	552,917.24	784,063.08	1,333.61	173.56	H2O	H2O
32	552,914.95	784,074.51	1,336.53	175.57	TE	TE
33	552,900.86	784,078.23	1,350.81	180.41	CB	Channelbank [CB
34	552,895.89	784,028.39	1,353.02	190.16	SPECIAL	ERM RR-7
35	552,876.86	784,082.80	1,375.02	180.22	GR	GR
36	552,869.53	784,082.33	1,382.32	181.93	GR	GR
37	552,863.77	784,083.48	1,388.12	181.38	GR	GR
38	552,841.63	784,085.06	1,410.32	182.58	GR	GR
39	552,806.72	784,084.24	1,445.14	183.01	GR	GR
40	552,782.15	784,050.73	1,467.82	182.86	SPECIAL	ALPT2
41	552,779.87	784,088.59	1,472.19	182.82	GR	GR
42	552,771.96	784,077.52	1,479.47	190.86	SPECIAL	STREAM GAGE
43	552,753.12	784,069.68	1,497.85	181.93	SPECIAL	PA_RAM_02A
44	552,753.12	784,069.68	1,497.85	181.90	SPECIAL	PA_RAM_02A FLD
45	552,747.93	784,085.33	1,503.89	181.94	GR	GR
46	552,745.87	784,085.42	1,505.96	181.36	GR	GR
47	552,745.87	784,085.42	1,505.96	181.37	GR	GR
48	552,727.16	784,082.50	1,524.48	181.57	GR	GR
49	552,713.85	784,082.90	1,537.79	181.13	GR	GR
50	552,712.01	784,082.04	1,539.58	181.77	GR	GR
51	552,678.86	784,082.31	1,572.70	182.14	GR	GR

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,249.29	784,024.91	999.96	185.86	TR	TR
2	553,213.54	784,026.68	1,035.76	185.45	TR	TR
3	553,179.42	784,028.67	1,069.94	185.08	TR	TR
4	553,145.27	784,030.74	1,104.14	184.78	TR	TR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data **Data type:** **TOP OF ROAD**

Point	Easting	Northing	Station	Elevation	Code	Comment
5	553,111.50	784,032.62	1,137.97	184.40	TR	TR
6	553,075.26	784,034.65	1,174.27	184.79	TR	TR
7	553,041.63	784,036.53	1,207.95	185.72	TR	TR
8	553,009.92	784,038.36	1,239.71	187.09	BEGIN	BEGIN
9	552,993.22	784,039.28	1,256.44	187.89	TR	TR
10	552,961.96	784,041.07	1,287.75	189.15	TR	TR
11	552,930.77	784,043.03	1,319.00	187.84	TR	TR
12	552,915.38	784,043.78	1,334.40	187.07	END	END
13	552,882.03	784,045.68	1,367.81	185.47	TR	TR
14	552,849.88	784,047.46	1,400.01	184.33	TR	TR
15	552,815.98	784,049.34	1,433.96	183.50	TR	TR
16	552,782.15	784,050.73	1,467.82	182.86	TR	TR
17	552,746.07	784,046.43	1,503.60	182.24	TR	TR
18	552,710.90	784,039.27	1,538.32	181.77	TR	TR
19	552,678.34	784,035.75	1,570.65	181.56	TR	TR

Detailed Bridge Report

(All Units In Feet)

General		**Material**		**Design**
ID:	**PA_RAM_03**	Bed:	Unknown	Designer:
Road Name:	HAMBURG TPK	Fill:	Unknown	Contractor:
Stream Name:				Year Built:
County:		**Datum**		
State:		Horizontal:		
State Zone:		Vertical:		

Centerline		**Invert**	
Station:	1,318.92	Downstream:	173.77
Offset:	0.00	Upstream:	171.97
Easting:	552,784.46		
Northing:	786,408.05	**Rail Height:**	2.22
		Deck Thickness:	2.50

Plans

Plan Location:

Survey File: N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\PA_RAM_03.TXT

Comments: There is a weir US.

Opening

Type: Vertical Wall

	Left	Right
Abutment	1,266.72	1,384.64
Fill Station	1,266.82	1,384.54
Side slopes	0.00	0.00

Looking At: Upstream Face

Looking At: Upstream Channel

Detailed Bridge Report

(All Units In Feet)

Looking At: Downstream Channel

Looking At: Downstream Face

Piers

CL Station	Foundation Type	Shape	Column Count	Width	Cap Height	Cap Top Elev	Foot Width	Foot Top Elev	Comment
1,299.97	FOOTER	Square	1	3.00	0.00	0.00	0.00	0.00	P1 3.0
1,342.11	FOOTER	Square	1	3.00	0.00	0.00	0.00	0.00	P2 3.0

Rails

Station	Easting	Northing	Elevation	Height
1,189.22	552,871.68	786,305.55	191.09	2.09
1,227.07	552,852.99	786,338.61	191.30	2.25
1,233.26	552,850.32	786,344.19	191.49	2.43
1,257.91	552,839.43	786,366.31	191.44	2.27
1,312.63	552,814.77	786,415.19	191.55	2.17
1,385.96	552,780.96	786,480.34	191.85	2.22
1,422.51	552,764.23	786,512.88	191.94	2.12
1,454.70	552,752.62	786,542.98	192.52	2.38

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	555,817.54	787,085.46	656.29	272.53	SPECIAL	PA_HAY_03C
2	553,010.64	786,089.68	934.91	190.14	GR	GR
3	552,987.78	786,123.75	975.43	189.11	GR	GR
4	552,987.10	786,124.01	975.96	188.66	GR	GR
5	552,911.57	786,115.46	1,000.00	188.74	SPECIAL	ALPT1
6	552,975.51	786,150.55	1,004.91	189.05	GR	GR
7	552,967.07	786,167.28	1,023.64	188.70	GR	GR
8	552,966.99	786,167.76	1,024.10	189.04	GR	GR
9	552,954.90	786,192.00	1,051.18	189.06	GR	GR
10	552,944.89	786,229.96	1,089.83	189.31	GR	GR
11	552,943.18	786,231.83	1,092.24	188.92	GR	GR
12	552,905.57	786,233.26	1,109.38	188.69	SPECIAL	PA_RAM_03A
13	552,931.59	786,258.91	1,121.68	188.40	GR	GR
14	552,904.10	786,302.81	1,173.08	188.57	GR	GR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
15	552,871.93	786,341.10	1,221.36	189.39	GR	GR
16	552,879.14	786,369.78	1,244.33	192.76	SPECIAL	GAGE STATION
17	552,853.81	786,364.59	1,250.29	189.71	GR	GR
18	552,849.15	786,367.11	1,254.54	187.48	GR	GR
19	552,860.99	786,373.59	1,255.44	177.92	SPECIAL	WEIR
20	552,841.35	786,365.29	1,256.18	189.72	SPECIAL	ERM PA_RAM_03
21	552,846.92	786,370.69	1,258.72	187.46	CB	Channelbank [CB
22	552,846.65	786,371.28	1,259.37	176.63	TE	TE
23	552,846.44	786,372.05	1,260.16	174.45	H2O	H2O
24	552,835.35	786,375.69	1,268.13	174.31	H2O	H2O
25	552,828.53	786,389.32	1,283.37	173.08	H2O	H2O
26	552,823.26	786,399.72	1,295.02	173.71	H2O	H2O
27	552,821.51	786,404.37	1,299.97	176.19	P	P1 3.0
28	552,820.92	786,404.22	1,300.09	191.50	SPECIAL	USSTRUCT
29	552,816.90	786,411.87	1,308.72	174.21	H2O	H2O
30	552,756.41	786,392.38	1,316.51	185.24	SPECIAL	DSSTRUCT
31	552,812.90	786,420.48	1,318.22	172.63	H2O	H2O
32	552,805.41	786,436.33	1,335.74	171.97	H2O	H2O
33	552,745.08	786,413.77	1,340.68	173.77	DS	DS IN
34	552,802.59	786,442.04	1,342.11	173.68	P	P2 3.0
35	552,793.82	786,457.33	1,359.66	172.25	H2O	H2O
36	552,837.66	786,492.21	1,372.85	177.78	SPECIAL	WEIR
37	552,786.57	786,471.74	1,375.79	174.14	H2O	H2O
38	552,798.74	786,480.33	1,378.46	176.55	TE	TE
39	552,798.53	786,480.83	1,379.00	187.52	CB	Channelbank [CB
40	552,795.39	786,483.15	1,382.43	187.63	GR	GR
41	552,795.41	786,490.26	1,388.87	190.88	GR	GR
42	552,681.77	786,518.18	1,462.04	189.58	SPECIAL	PA_RAM_03B
43	552,681.73	786,518.20	1,462.08	189.57	SPECIAL	PA_RAM_03B FLD
44	552,681.73	786,518.20	1,462.08	189.57	SPECIAL	DATE 10-18-2011
45	552,681.74	786,518.22	1,462.09	189.57	SPECIAL	PA_RAM_03B BS CH
46	552,783.10	786,569.47	1,465.90	191.24	GR	GR
47	552,773.64	786,600.28	1,497.83	191.94	GR	GR
48	552,766.07	786,616.68	1,515.89	192.19	GR	GR
49	552,760.27	786,632.13	1,532.35	192.02	GR	GR
50	552,760.17	786,632.41	1,532.65	192.42	GR	GR
51	552,757.12	786,642.05	1,542.67	192.51	GR	GR
52	552,757.12	786,642.05	1,542.67	192.51	GR	GR
53	552,674.65	786,625.84	1,562.69	191.99	SPECIAL	ALPT2
54	552,748.27	786,663.38	1,565.75	193.39	GR	GR

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,911.56	786,115.58	1,000.11	188.74	TR	TR
2	552,896.92	786,167.57	1,053.44	188.67	TR	TR
3	552,869.25	786,237.28	1,128.32	188.88	TR	TR
4	552,854.96	786,269.66	1,163.71	188.90	TR	TR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data **Data type:** **TOP OF ROAD**

Point	Easting	Northing	Station	Elevation	Code	Comment
5	552,840.25	786,301.61	1,198.88	189.04	TR	TR
6	552,825.85	786,330.55	1,231.19	189.05	TR	TR
7	552,809.82	786,362.27	1,266.72	189.21	BEGIN	BEGIN
8	552,765.10	786,443.01	1,358.78	189.57	TR	TR
9	552,751.84	786,465.37	1,384.64	189.63	END	END
10	552,738.38	786,497.30	1,419.27	189.79	TR	TR
11	552,707.36	786,563.58	1,492.44	190.52	TR	TR
12	552,674.67	786,625.80	1,562.65	192.00	TR	TR

Detailed Bridge Report

(All Units In Feet)

General		**Material**		**Design**
ID:	**PA_RAM_05**	Bed:	Unknown	Designer:
Road Name:	JEFFERSON AVE	Fill:	Unknown	Contractor:
Stream Name:				Year Built:
County:		**Datum**		
State:		Horizontal:		
State Zone:		Vertical:		

Centerline		**Invert**	
Station:	1,444.91	Downstream:	187.46
Offset:	0.00	Upstream:	187.53
Easting:	554,306.23		
Northing:	791,896.15	**Rail Height:**	3.64
		Deck Thickness:	3.90

Plans

Plan Location:

Survey File: N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\PA_RAM_05.TXT

Comments: There is a 8 foot releif pipe on each side of the bridge. Pipe 1 = 53', Pipe 2 = 69

Opening Type: Vertical Wall

	Left	Right
Abutment	1,340.57	1,545.49
Fill Station	1,340.67	1,545.39
Side slopes	0.00	0.00

Looking At: UPSTREAM FACE

Looking At: UPSTREAM CHANNEL

PROJECT NJDEP Field Survey - Bridges

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Bridge Report

(All Units In Feet)

Looking At: DOWNSTREAM CHANNEL

Looking At: DOWNSTREAM FACE

Piers

CL Station	Foundation Type	Shape	Column Count	Width	Cap Height	Cap Top Elev	Foot Width	Foot Top Elev	Comment
1,408.15	FOOTER	Round	1	3.00	0.00	0.00	0.00	0.00	P1 3
1,477.66	FOOTER	Round	1	3.00	0.00	0.00	0.00	0.00	P2 3

Rails

Station	Easting	Northing	Elevation	Height
1,145.80	554,549.59	791,720.63	214.81	2.28
1,145.80	554,549.59	791,720.63	214.81	2.28
1,166.74	554,533.51	791,734.04	214.27	2.16
1,194.89	554,512.35	791,752.60	214.12	2.47
1,198.11	554,510.33	791,755.21	215.66	4.05
1,204.45	554,505.50	791,759.31	215.63	4.09
1,204.45	554,505.50	791,759.31	215.63	4.09
1,204.68	554,505.36	791,759.50	215.37	3.83
1,262.04	554,461.71	791,796.71	214.75	3.84
1,337.73	554,403.75	791,845.40	214.36	3.90
1,438.74	554,326.94	791,910.99	213.80	3.79
1,548.57	554,243.30	791,982.17	213.10	3.94
1,684.94	554,139.34	792,070.44	211.42	3.27
1,693.58	554,133.81	792,077.27	211.42	3.26
1,693.77	554,133.69	792,077.42	211.69	3.54
1,699.37	554,131.48	792,083.47	211.67	3.51
1,702.12	554,130.12	792,086.12	210.26	2.10

Cross Section Data **Data type:** **FIELD**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	554,645.21	791,607.98	1,000.00	219.38	SPECIAL	ALPT1
2	554,699.93	791,678.90	1,004.20	218.34	GR	GR
3	554,695.47	791,677.20	1,006.50	217.46	GR	GR
4	554,685.72	791,682.96	1,017.66	217.33	GR	GR
5	554,684.81	791,683.31	1,018.57	217.12	GR	GR

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
6	554,662.27	791,697.32	1,044.82	216.63	GR	GR
7	554,650.99	791,704.02	1,057.76	215.39	GR	GR
8	554,640.12	791,711.06	1,070.60	213.71	GR	GR
9	554,610.77	791,726.63	1,103.05	212.52	GR	GR
10	554,588.61	791,748.23	1,133.93	210.40	GR	GR
11	554,575.12	791,754.91	1,148.53	209.13	GR	GR
12	554,568.88	791,756.96	1,154.62	207.60	GR	GR
13	554,556.90	791,767.00	1,170.25	206.76	CB	Channelbank [CB
14	554,553.83	791,774.59	1,177.50	204.64	GR	GR
15	554,546.02	791,785.72	1,190.65	202.42	GR	GR
16	554,496.16	791,768.90	1,217.78	200.82	TE	TE
17	554,488.75	791,776.15	1,228.11	199.45	H2O	H2O
18	554,475.21	791,786.41	1,245.08	199.03	H2O	H2O
19	554,462.97	791,798.68	1,262.35	198.68	H2O	H2O
20	554,419.73	791,766.24	1,274.31	203.87	SPECIAL	DTP1 8.0 0.0
21	554,451.71	791,806.45	1,275.96	195.95	SPECIAL	UIP1 8.0
22	554,444.15	791,813.96	1,286.58	196.74	H2O	H2O
23	554,428.31	791,827.73	1,307.57	195.35	H2O	H2O
24	554,400.83	791,850.83	1,343.47	190.89	H2O	H2O
25	554,375.00	791,872.15	1,376.97	188.32	H2O	H2O
26	554,351.17	791,892.26	1,408.15	188.30	P	P1 3
27	554,347.32	791,894.86	1,412.75	187.54	H2O	H2O
28	554,294.81	791,873.37	1,438.87	213.73	SPECIAL	DSSTRUCT
29	554,327.11	791,911.70	1,439.06	213.80	SPECIAL	USSTRUCT
30	554,322.88	791,917.63	1,446.13	190.34	H2O	H2O
31	554,286.28	791,880.32	1,449.87	187.46	DS	DS IN
32	554,298.68	791,937.85	1,477.66	187.53	P	P2 3
33	554,281.37	791,951.68	1,499.81	188.47	H2O	H2O
34	554,260.53	791,968.43	1,526.54	187.98	H2O	H2O
35	554,240.00	791,988.42	1,555.12	187.92	H2O	H2O
36	554,221.02	792,004.44	1,579.96	191.20	H2O	H2O
37	554,171.05	791,972.64	1,597.47	208.87	SPECIAL	PA_RAM_05A
38	554,152.04	791,970.72	1,610.71	195.90	SPECIAL	DIP2 8.0
39	554,195.48	792,024.24	1,612.24	195.92	SPECIAL	UIP2 8.0
40	554,190.86	792,030.11	1,619.57	194.64	H2O	H2O
41	554,169.58	792,048.13	1,647.45	197.17	H2O	H2O
42	554,062.76	791,936.53	1,656.63	207.40	SPECIAL	ERM RR-5
43	554,154.38	792,060.47	1,667.02	199.58	H2O	H2O
44	554,150.59	792,063.76	1,672.04	200.91	TE	TE
45	554,139.18	792,082.12	1,692.62	206.71	CB	Channelbank [CB
46	554,134.85	792,110.69	1,714.42	208.00	GR	GR
47	554,093.26	792,076.72	1,724.13	207.80	SPECIAL	ALPT2
48	554,121.32	792,131.93	1,738.48	209.30	GR	GR
49	554,094.29	792,183.38	1,792.39	211.28	GR	GR
50	554,075.94	792,224.33	1,832.88	212.10	GR	GR
51	554,051.15	792,248.44	1,867.39	212.91	GR	GR
52	553,784.83	792,067.74	1,953.41	210.31	SPECIAL	PA_RAM_05B

Detailed Bridge Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
53	553,784.79	792,067.69	1,953.41	210.35	SPECIAL	RAM_05B BS CHK
54	553,784.78	792,067.73	1,953.44	210.34	SPECIAL	DATE 10-07-2011
55	553,784.78	792,067.73	1,953.44	210.34	SPECIAL	RAM_05B FLD

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	554,645.19	791,607.99	1,000.02	219.37	TR	TR
2	554,592.21	791,653.33	1,069.75	215.29	TR	TR
3	554,542.43	791,695.52	1,135.00	212.75	TR	TR
4	554,505.91	791,726.53	1,182.92	211.79	TR	TR
5	554,449.87	791,773.60	1,256.10	210.94	TR	TR
6	554,385.67	791,828.49	1,340.57	210.44	BEGIN	BEGIN
7	554,312.51	791,890.76	1,436.63	210.03	TR	TR
8	554,229.88	791,961.62	1,545.49	209.18	END	END
9	554,167.16	792,005.79	1,621.89	208.36	TR	TR
10	554,115.13	792,025.63	1,674.39	208.14	TR	TR
11	554,040.40	792,043.77	1,743.10	208.19	TR	TR
12	553,965.04	792,063.21	1,813.12	209.05	TR	TR
13	553,905.45	792,080.59	1,869.79	209.68	TR	TR

Appendix F

CULVERT SURVEY DATA

PROJECT NJDEP Field Survey - Culverts

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Culvert Report

(All Units In Feet)

ID:	**PA_POM_08R**	**Material**		**Design**	
Road Name:	JACKSON AVENUE	Bed:	Unknown	Designer:	
Stream Name:		Fill:	Unknown	Contractor:	
County:				Year Built:	
State:		**Datum**			
State Zone:		Horizontal:			
		Vertical:			
Centerline		**Invert**			
Station:	1,283.85	Downstream:	170.56		
Offset:	0.00	Upstream:	172.50		
Easting:	553,057.74				
Northing:	778,090.44	**Rail Height:**	0.00		

Plans

Plan Location:

Survey File: N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\PA_POM_08R.txt

Comments:

Looking At: UPSTREAM FACE

Looking At: UPSTREAM CHANNEL

Looking At: DOWNSTREAM CHANNEL

Looking At: DOWNSTREAM FACE

PROJECT NJDEP Field Survey - Culverts

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Culvert Report

(All Units In Feet)

Culvert Pipes

CL Station	Culvert Type	Material	Inlet Type	Outlet Type	Rise	Width	Pipe Length	Inverts U/S	Inverts D/S	Comment
1,270.96	Circular	Unknown	Unknown	Unknown	0.10	0.00	84.43	172.56	170.58	UIP1 .1

Rails: None

Cross Section Data **Data type:** **FIELD**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,353.05	778,141.68	985.57	180.98	GR	GR
2	553,340.58	778,114.60	1,000.00	180.02	SPECIAL	ALPT1
3	553,332.50	778,145.99	1,005.75	179.83	GR	GR
4	553,310.90	778,147.22	1,027.21	177.35	GR	GR
5	553,281.61	778,154.05	1,055.91	176.23	GR	GR
6	553,255.00	778,149.17	1,082.81	176.30	GR	GR
7	553,232.97	778,150.05	1,104.71	176.29	GR	GR
8	553,211.04	778,164.97	1,125.48	175.91	GR	GR
9	553,187.36	778,188.16	1,147.40	175.17	GR	GR
10	553,170.87	778,172.97	1,164.96	174.71	GR	GR
11	553,139.94	778,175.38	1,195.63	174.79	GR	GR
12	553,114.57	778,172.33	1,221.15	174.42	GR	GR
13	553,109.90	778,060.26	1,234.06	180.95	SPECIAL	PA_POM_08D NL
14	553,094.43	778,173.18	1,241.18	174.54	GR	GR
15	553,074.29	778,175.31	1,261.10	175.16	CB	Channelbank [CB
16	553,070.20	778,128.99	1,268.59	172.82	SPECIAL	XH2O
17	553,064.97	778,172.38	1,270.62	173.59	TE	TE
18	553,067.86	778,128.55	1,270.96	172.56	SPECIAL	UIP1 .1
19	553,062.78	778,172.07	1,272.83	173.01	H2O	H2O
20	553,063.50	778,127.84	1,275.36	172.50	H2O	H2O
21	553,059.50	778,130.68	1,279.14	173.10	H2O	H2O
22	553,059.11	778,044.60	1,285.86	170.56	DS	DS IN
23	553,058.76	778,044.61	1,286.21	170.58	SPECIAL	DIP1 .1
24	553,038.79	778,167.41	1,297.09	173.68	TE	TE
25	553,030.14	778,162.73	1,306.06	176.22	CB	Channelbank [CB
26	553,012.20	778,152.81	1,324.69	176.94	GR	GR
27	552,995.72	778,143.84	1,341.78	176.96	GR	GR
28	552,977.52	778,131.71	1,360.82	178.06	GR	GR
29	552,951.04	778,124.73	1,387.74	181.07	GR	GR
30	552,927.16	778,133.18	1,410.94	181.88	GR	GR
31	552,921.86	778,132.90	1,416.24	180.34	GR	GR
32	552,914.76	778,131.16	1,423.45	179.99	GR	GR
33	552,883.34	778,122.55	1,455.42	180.03	GR	GR
34	552,848.33	778,121.06	1,490.44	179.96	GR	GR
35	552,827.28	778,076.73	1,514.70	178.15	SPECIAL	ALPT2
36	552,812.98	778,120.28	1,525.75	179.85	GR	GR
37	552,779.13	778,121.07	1,559.46	179.57	GR	GR
38	552,592.34	778,038.16	1,751.84	183.40	SPECIAL	BS CK 8B
39	552,592.34	778,038.11	1,751.84	183.43	SPECIAL	PA_POM_08B FLD
40	552,592.32	778,038.10	1,751.87	183.35	SPECIAL	PA_POM_08B FLD

PROJECT NJDEP Field Survey - Culverts

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Culvert Report

(All Units In Feet)

Cross Section Data Data type: FIELD

Point	Easting	Northing	Station	Elevation	Code	Comment
41	552,592.30	778,038.11	1,751.88	183.39	SPECIAL	PA_POM_08B
42	552,268.51	778,064.52	2,072.86	189.21	SPECIAL	PA_POM_08C
43	552,042.39	777,984.99	2,304.21	185.34	SPECIAL	PA_POM_08A
44	552,042.38	777,984.99	2,304.22	185.36	SPECIAL	DATE 10-26-2011
45	552,042.38	777,984.99	2,304.22	185.37	SPECIAL	PA_POM_08A FLD
46	552,042.34	777,985.03	2,304.26	185.42	SPECIAL	BS CK 8A

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,340.58	778,114.60	1,000.00	180.02	TR	TR
2	553,297.45	778,110.84	1,043.29	179.37	TR	TR
3	553,256.27	778,104.33	1,084.84	178.76	TR	TR
4	553,218.47	778,101.72	1,122.73	178.72	TR	TR
5	553,181.80	778,098.39	1,159.55	179.36	TR	TR
6	553,138.55	778,094.83	1,202.94	180.51	TR	TR
7	553,095.37	778,092.04	1,246.21	181.37	TR	TR
8	553,064.11	778,090.70	1,277.48	181.30	TR	TR
9	553,030.95	778,089.32	1,310.65	180.89	TR	TR
10	552,997.22	778,086.82	1,344.47	180.16	TR	TR
11	552,959.66	778,084.03	1,382.14	179.46	TR	TR
12	552,920.98	778,081.93	1,420.87	178.94	TR	TR
13	552,873.34	778,078.84	1,468.61	178.56	TR	TR
14	552,827.28	778,076.73	1,514.70	178.15	TR	TR

Appendix G

DAMS SURVEY DATA

Detailed Dam Report

(All Units In Feet)

General		**Material**		**Dam Detail**	
ID:	**BE_RAM_28XS**	Bed:	Unknown	Type:	Concrete Gravity
Road Name:	US OF BOAT RAMP	Fill:	Unknown	Height:	0.00
Stream Name:				Top Elevation:	0.00
County:		**Datum**		Shape:	Unknown
State:		Horizontal:		Normal Area:	0.00
State Zone:		Vertical:		Hazard Class:	
				Flood Elevation:	0.00
Centerline		**Invert**		Flood Volume:	0.00
Station:	1,270.06	Downstream:	194.28	Valve East:	0.00
Offset:	0.00	Upstream:	196.66	Valve North:	0.00
Easting:	558,993.38	**Rail Height:**	0.00		
Northing:	797,330.89			**Embankment**	
				Class:	
Design				Slope:	1.00
Designer:				Type:	Concrete
Contractor:					
Year Built:					
Plans					
Plan Location:					
Survey File:	N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\BE_RAM_28XS.txt				
Comments:					

Looking At: Upstream Face

Looking At: Upstream Channel

PROJECT NJDEP Field Survey - Dams

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Dam Report

(All Units In Feet)

Looking At: Downstream Channel

Looking At: Downstream Face

Riser Barrels: None

Spillways

CL Station	Depth	Top Width	Bot. Width	Top Elev	Crest Elev	L/Side Slope	R/Side Slope	Comment
1,276.33	6.89	244.31	215.37	208.83	201.94	2.09	2.12	SPILLWAY 1

Rails: None

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	558,931.17	797,067.74	1,000.04	210.55	TR	TR
2	558,938.02	797,091.92	1,025.17	210.67	TR	TR
3	558,943.99	797,118.17	1,052.04	210.84	TR	TR
4	558,948.36	797,142.93	1,077.03	210.41	TR	TR
5	558,950.34	797,154.51	1,088.69	210.66	TR	TR
6	558,955.31	797,165.19	1,100.35	211.31	TR	TR
7	558,960.82	797,184.33	1,120.26	211.50	TR	TR
8	558,963.23	797,201.45	1,137.37	211.58	TR	TR
9	558,964.79	797,213.70	1,149.56	211.18	TR	TR TOP SPY1
10	558,968.25	797,232.57	1,168.65	202.07	TR	TR BOT SPY1
11	559,021.62	797,441.36	1,384.01	201.82	TR	TR BOT SPY1
12	559,026.79	797,450.12	1,393.87	206.48	TR	TR TOP SPY1
13	559,032.89	797,466.83	1,411.62	207.45	TR	TR
14	559,042.41	797,494.14	1,440.51	208.63	TR	TR
15	559,053.04	797,514.96	1,463.48	208.29	TR	TR
16	559,065.02	797,550.61	1,501.06	208.28	TR	TR
17	559,077.71	797,584.58	1,537.23	208.23	TR	TR
18	559,092.19	797,616.23	1,571.68	206.98	TR	TR

Cross Section Data Data type: FIELD-UPSTREAM

Point	Easting	Northing	Station	Elevation	Code	Comment
1	558,218.94	795,808.08	-409.24	202.57	SPECIAL	PA_RAM_24AXS
2	558,931.16	797,067.70	1,000.00	210.56	SPECIAL	ALPT1

Detailed Dam Report

(All Units In Feet)

Cross Section Data Data type: FIELD-UPSTREAM

Point	Easting	Northing	Station	Elevation	Code	Comment
3	558,970.50	797,096.52	1,038.73	208.64	GR	GR
4	558,978.38	797,118.26	1,061.81	208.42	GR	GR
5	558,985.83	797,131.03	1,076.17	208.75	GR	GR
6	558,992.42	797,138.99	1,085.66	209.01	GR	GR
7	558,996.88	797,153.35	1,100.69	208.78	GR	GR
8	559,001.67	797,173.43	1,121.31	209.28	GR	GR
9	559,006.20	797,193.72	1,142.06	209.21	GR	GR
10	559,007.22	797,209.88	1,157.85	208.25	CB	Channelbank [CB
11	559,009.02	797,217.91	1,166.06	207.89	GR	GR
12	559,008.94	797,225.99	1,173.79	205.04	GR	GR
13	559,008.88	797,231.60	1,179.16	202.66	TE	TE
14	559,009.72	797,233.56	1,181.27	200.96	H2O	H2O
15	559,009.38	797,235.55	1,183.08	199.62	H2O	H2O
16	559,018.90	797,237.76	1,187.89	199.88	H2O	H2O
17	559,023.56	797,245.37	1,196.50	202.06	H2O	H2O
18	559,024.43	797,253.88	1,204.91	200.69	H2O	H2O
19	559,021.45	797,265.87	1,215.58	198.76	H2O	H2O
20	559,018.52	797,285.80	1,233.88	196.66	H2O	H2O
21	559,023.41	797,309.21	1,257.71	196.85	H2O	H2O
22	558,514.53	797,469.65	1,268.32	207.58	SPECIAL	DATE 10-20-2011
23	558,514.53	797,469.65	1,268.32	207.58	SPECIAL	BE_RAM_27C FLD
24	558,514.57	797,469.65	1,268.33	207.62	SPECIAL	BE_RAM_27C RESEC
25	558,514.54	797,469.87	1,268.53	207.58	SPECIAL	BE_RAM_27C BS
26	559,028.56	797,331.44	1,280.50	197.97	H2O	H2O
27	559,037.24	797,351.27	1,301.97	197.04	H2O	H2O
28	559,035.31	797,364.93	1,314.53	198.29	H2O	H2O
29	559,040.26	797,381.33	1,331.66	198.82	H2O	H2O
30	559,046.54	797,397.70	1,349.14	198.80	H2O	H2O
31	559,053.16	797,413.12	1,365.79	198.98	H2O	H2O
32	559,055.08	797,419.49	1,372.45	200.59	H2O	H2O
33	559,056.20	797,425.81	1,378.83	201.79	H2O	H2O
34	559,056.84	797,428.35	1,381.45	202.67	TE	TE
35	559,057.42	797,432.47	1,385.57	204.03	CB	Channelbank [CB
36	559,059.33	797,440.71	1,394.01	205.65	GR	GR
37	559,032.85	797,450.88	1,396.30	206.75	SPECIAL	PA_RAM_28AXS
38	559,065.68	797,450.30	1,405.00	206.67	GR	GR
39	559,071.46	797,462.46	1,418.29	207.59	GR	GR
40	559,077.05	797,483.49	1,440.05	208.78	GR	GR
41	559,079.87	797,502.05	1,458.65	208.59	GR	GR
42	559,084.64	797,522.98	1,480.08	207.42	GR	GR
43	559,093.36	797,549.16	1,507.65	206.51	GR	GR
44	559,095.31	797,570.98	1,529.14	206.77	GR	GR
45	559,105.18	797,593.37	1,553.40	206.79	GR	GR
46	559,092.21	797,616.27	1,571.72	206.97	SPECIAL	ALPT2
47	559,114.40	797,610.17	1,572.12	206.33	GR	GR

Detailed Dam Report

(All Units In Feet)

Cross Section Data **Data type:** **FIELD-DOWNSTREAM**

Point	Easting	Northing	Station	Elevation	Code	Comment
1	558,907.41	797,125.44	1,048.71	201.38	GR DS	GR DS
2	558,910.16	797,143.57	1,066.88	201.43	GR DS	GR DS
3	558,920.16	797,167.46	1,092.62	201.61	GR DS	GR DS
4	558,923.92	797,189.56	1,114.88	201.65	GR DS	GR DS
5	558,930.92	797,216.75	1,142.94	202.15	GR DS	GR DS
6	558,935.11	797,229.29	1,156.16	202.60	CB DS	Channelbank [CB DS
7	558,936.90	797,231.38	1,158.67	201.26	TE DS	TE DS
8	558,937.26	797,232.99	1,160.32	199.66	H2O DS	H2O DS
9	558,928.21	797,246.08	1,170.33	196.76	H2O DS	H2O DS
10	558,924.93	797,254.96	1,177.92	194.95	H2O DS	H2O DS
11	558,916.44	797,269.79	1,189.76	194.28	H2O DS	H2O DS
12	558,921.65	797,288.58	1,209.26	196.99	H2O DS	H2O DS
13	558,919.86	797,302.39	1,222.00	198.46	H2O DS	H2O DS
14	558,925.94	797,330.44	1,250.63	199.14	H2O DS	H2O DS
15	558,930.73	797,365.15	1,285.28	198.22	H2O DS	H2O DS
16	558,929.44	797,383.05	1,302.10	199.32	H2O DS	H2O DS
17	558,937.83	797,402.73	1,323.34	198.15	H2O DS	H2O DS
18	558,951.99	797,424.96	1,348.66	196.37	H2O DS	H2O DS
19	558,957.71	797,438.82	1,363.57	196.86	H2O DS	H2O DS
20	558,967.17	797,452.96	1,379.80	197.84	H2O DS	H2O DS
21	558,978.48	797,459.45	1,389.22	199.69	H2O DS	H2O DS
22	559,001.28	797,454.78	1,391.16	199.49	H2O DS	H2O DS
23	559,002.44	797,456.91	1,393.53	201.27	TE DS	TE DS
24	559,002.65	797,457.95	1,394.59	204.64	CB DS	Channelbank [CB DS
25	559,003.59	797,464.07	1,400.72	205.53	GR DS	GR DS
26	559,008.62	797,480.59	1,417.99	206.41	GR DS	GR DS
27	559,013.51	797,502.86	1,440.74	208.23	GR DS	GR DS
28	559,014.78	797,517.96	1,455.58	208.90	GR DS	GR DS
29	559,019.03	797,543.82	1,481.59	208.29	GR DS	GR DS
30	559,011.22	797,579.64	1,513.76	208.53	GR DS	GR DS

Detailed Dam Report

(All Units In Feet)

General		**Material**		**Dam Detail**	
ID:	**PA_RAM_01**	Bed:	Unknown	Type:	Concrete Gravity
Road Name:	WEIR	Fill:	Unknown	Height:	0.00
Stream Name:				Top Elevation:	0.00
County:		**Datum**		Shape:	Unknown
State:		Horizontal:		Normal Area:	0.00
State Zone:		Vertical:		Hazard Class:	
				Flood Elevation:	0.00
Centerline		**Invert**		Flood Volume:	0.00
Station:	1,119.35	Downstream:	161.73	Valve East:	0.00
Offset:	0.00	Upstream:	168.29	Valve North:	0.00
Easting:	553,109.28	**Rail Height:**	0.00		
Northing:	778,845.82			**Embankment**	
				Class:	
Design				Slope:	1.00
Designer:				Type:	Concrete
Contractor:					
Year Built:					
Plans					
Plan Location:					
Survey File:	N:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Survey\WISE\Structures\PA_RAM_01.txt				
Comments:					

Looking At: Upstream Face

Looking At: Upstream Channel

PROJECT NJDEP Field Survey - Dams

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Dam Report

(All Units In Feet)

Looking At: Downstream Channel

Looking At: Downstream Face

Riser Barrels: None

Spillways

CL Station	Depth	Top Width	Bot. Width	Top Elev	Crest Elev	L/Side Slope	R/Side Slope	Comment
1,134.75	8.49	270.58	269.51	183.07	174.57	0.07	0.05	SPILLWAY 1

Rails: None

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	553,001.70	778,656.35	901.78	198.19	TR	TR
2	553,009.51	778,663.69	912.17	192.97	TR	TR
3	553,014.07	778,668.34	918.55	189.07	TR	TR
4	553,017.81	778,674.05	925.38	184.41	TR	TR
5	553,021.43	778,679.20	931.66	180.79	TR	TR
6	553,023.72	778,683.55	936.56	179.02	TR	TR
7	553,024.93	778,685.74	939.06	177.33	TR	TR
8	553,026.85	778,688.28	942.24	177.46	TR	TR
9	553,028.67	778,691.91	946.28	178.88	TR	TR
10	553,031.90	778,696.15	951.59	180.34	TR	TR
11	553,035.46	778,702.37	958.75	179.88	TR	TR
12	553,040.55	778,711.44	969.12	181.31	TR	TR
13	553,043.47	778,715.25	973.91	181.66	TR	TR
14	553,045.28	778,717.00	976.36	182.37	TR	TR
15	553,048.40	778,720.68	981.14	182.53	TR	TR
16	553,052.34	778,726.15	987.88	181.42	TR	TR
17	553,056.86	778,733.12	996.18	181.29	TR	TR
18	553,042.58	778,743.25	997.01	183.08	TR	TR
19	553,043.80	778,745.29	999.38	183.06	TR	TR TOP SPY1
20	553,044.88	778,745.33	1,000.00	174.55	TR	TR BOT SPY1
21	553,190.29	778,972.25	1,269.51	174.59	TR	TR BOT SPY1
22	553,190.50	778,972.65	1,269.96	183.08	TR	TR TOP SPY1
23	553,191.75	778,974.91	1,272.53	183.07	TR	TR

Detailed Dam Report

(All Units In Feet)

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
24	553,269.99	778,975.64	1,315.36	182.36	TR	TR
25	553,297.23	779,002.69	1,352.83	182.42	TR	TR
26	553,323.98	779,030.45	1,390.64	182.32	TR	TR
27	553,346.62	779,055.75	1,424.16	182.25	TR	TR

Cross Section Data Data type: FIELD-UPSTREAM

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,523.57	778,543.34	548.67	193.80	SPECIAL	PA_RAM_01BXS
2	552,523.57	778,543.34	548.67	193.82	SPECIAL	DATE 10-24-2011
3	552,523.57	778,543.34	548.67	193.81	SPECIAL	PA_RAM_01BXS FLD
4	552,478.43	778,761.17	707.72	197.72	SPECIAL	PA_RAM_01AXS
5	552,478.44	778,761.23	707.77	197.68	SPECIAL	PA_RAM_01AXS FLD
6	552,749.67	778,745.86	841.17	215.47	SPECIAL	BS CK 01C
7	552,749.66	778,745.94	841.24	215.53	SPECIAL	PA_RAM_01CXS REF
8	552,749.67	778,745.94	841.24	215.47	SPECIAL	PA_RAM_01C FLD
9	553,129.33	778,545.99	877.72	179.90	GR	GR
10	553,093.40	778,569.51	878.14	182.49	SPECIAL	PA_RAM_01E
11	553,125.00	778,566.57	892.71	178.58	GR	GR
12	553,106.00	778,592.95	904.67	176.69	GR	GR
13	553,113.04	778,588.65	904.85	178.13	SPECIAL	XGR
14	553,113.04	778,588.65	904.85	178.13	CB	Channelbank [CB
15	553,107.52	778,592.65	905.25	176.46	GR	GR
16	553,105.70	778,617.83	925.46	175.98	GR	GR
17	553,097.94	778,655.35	952.86	176.35	GR	GR
18	553,090.89	778,684.48	973.58	176.81	GR	GR
19	553,052.35	778,726.14	987.87	181.42	SPECIAL	BS CK 01D FLD
20	553,052.34	778,726.15	987.88	181.42	SPECIAL	PA_RAM_01A NL
21	553,088.57	778,706.30	990.71	175.23	TE	TE
22	553,088.85	778,706.45	990.98	174.91	H2O	H2O
23	553,044.88	778,745.33	1,000.00	174.55	SPECIAL	ALPT1
24	553,095.46	778,716.56	1,003.06	172.35	H2O	H2O
25	553,100.97	778,726.48	1,014.39	172.03	H2O	H2O
26	553,104.58	778,734.71	1,023.26	169.44	H2O	H2O
27	553,111.10	778,744.03	1,034.63	168.29	H2O	H2O
28	553,114.25	778,754.43	1,045.08	168.87	H2O	H2O
29	553,119.75	778,769.28	1,060.55	170.62	H2O	H2O
30	553,130.96	778,783.37	1,078.47	171.59	H2O	H2O
31	553,131.01	778,789.19	1,083.40	172.88	H2O	H2O
32	553,135.85	778,797.91	1,093.35	174.55	H2O	H2O
33	553,144.66	778,809.80	1,108.11	173.58	H2O	H2O
34	553,151.62	778,820.15	1,120.58	172.75	H2O	H2O
35	553,160.65	778,830.28	1,133.98	170.74	H2O	H2O
36	553,168.27	778,846.50	1,151.75	171.12	H2O	H2O
37	553,171.59	778,859.85	1,164.78	171.21	H2O	H2O
38	553,180.87	778,874.12	1,181.80	171.56	H2O	H2O
39	553,191.18	778,889.15	1,200.02	171.79	H2O	H2O
40	553,203.30	778,906.00	1,220.75	171.33	H2O	H2O

Detailed Dam Report

(All Units In Feet)

Cross Section Data Data type: FIELD-UPSTREAM

Point	Easting	Northing	Station	Elevation	Code	Comment
41	553,209.30	778,920.84	1,236.48	171.77	H2O	H2O
42	553,214.59	778,927.73	1,245.14	173.70	H2O	H2O
43	553,215.48	778,929.16	1,246.82	174.25	H2O	H2O
44	553,217.51	778,929.27	1,248.00	175.35	TE	TE
45	553,219.13	778,930.49	1,249.91	175.98	CB	Channelbank [CB
46	553,223.42	778,939.15	1,259.51	176.40	GR	GR
47	553,224.79	778,940.23	1,261.16	175.23	GR	GR XTE
48	553,225.39	778,941.24	1,262.34	174.78	GR	GR XH2O
49	553,190.29	778,972.25	1,269.51	174.59	SPECIAL	ALPT2
50	553,260.77	778,929.00	1,271.12	174.71	GR	GR XH2O
51	553,261.36	778,929.82	1,272.13	175.34	GR	GR XTE
52	553,273.37	778,939.92	1,287.11	175.83	GR	GR
53	553,286.68	778,953.19	1,305.46	176.27	GR	GR
54	553,306.51	778,973.38	1,333.16	175.46	GR	GR
55	553,325.03	778,991.61	1,358.50	175.61	GR	GR
56	553,346.51	779,012.30	1,387.51	175.85	GR	GR
57	553,362.61	779,039.00	1,418.68	176.52	GR	GR

Cross Section Data Data type: FIELD-DOWNSTREAM

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,904.42	778,661.16	853.35	178.38	GR DS	GR DS
2	552,909.25	778,666.18	860.18	178.43	GR DS	GR DS
3	552,923.30	778,678.55	878.17	179.15	GR DS	GR DS
4	552,935.94	778,691.26	895.70	178.99	GR DS	GR DS
5	552,953.21	778,690.34	904.24	175.24	GR DS	GR DS
6	552,968.09	778,694.44	915.71	174.69	GR DS	GR DS
7	552,980.96	778,711.92	937.38	176.14	GR DS	GR DS
8	552,987.96	778,727.20	954.02	174.90	GR DS	GR DS
9	552,992.46	778,738.46	965.94	172.06	GR DS	GR DS
10	553,001.84	778,755.27	985.15	170.22	CB DS	Channelbank [CB DS
11	553,008.68	778,764.31	996.45	168.46	TE DS	TE DS
12	553,002.26	778,770.76	998.42	167.82	H2O DS	H2O DS
13	553,002.16	778,776.50	1,003.19	166.01	H2O DS	H2O DS
14	553,005.31	778,783.40	1,010.70	163.12	H2O DS	H2O DS
15	553,020.21	778,800.57	1,033.20	161.73	H2O DS	H2O DS
16	553,030.34	778,816.75	1,052.29	163.00	H2O DS	H2O DS
17	553,030.90	778,841.30	1,073.26	163.26	H2O DS	H2O DS
18	553,042.42	778,864.69	1,099.17	163.28	H2O DS	H2O DS
19	553,047.79	778,880.23	1,115.15	164.00	H2O DS	H2O DS
20	553,058.07	778,892.99	1,131.44	164.50	H2O DS	H2O DS
21	553,077.61	778,913.25	1,159.04	163.72	H2O DS	H2O DS
22	553,085.09	778,928.86	1,176.22	164.90	H2O DS	H2O DS
23	553,101.19	778,944.11	1,197.74	164.74	H2O DS	H2O DS
24	553,114.80	778,957.03	1,215.96	164.11	H2O DS	H2O DS
25	553,131.28	778,975.96	1,240.79	164.73	H2O DS	H2O DS
26	553,143.12	778,984.97	1,254.77	163.92	H2O DS	H2O DS
27	553,150.50	778,998.12	1,269.82	165.23	H2O DS	H2O DS

Detailed Dam Report

(All Units In Feet)

Cross Section Data **Data type:** **FIELD-DOWNSTREAM**

Point	Easting	Northing	Station	Elevation	Code	Comment
28	553,156.55	778,999.39	1,274.16	166.83	H2O DS	H2O DS
29	553,157.69	779,002.13	1,277.07	168.46	TE DS	TE DS
30	553,159.10	779,003.76	1,279.21	169.06	GR DS	GR DS
31	553,162.19	779,012.22	1,288.01	169.70	GR DS	GR DS
32	553,164.04	779,016.59	1,292.68	171.30	CB DS	Channelbank [CB DS
33	553,171.75	779,024.82	1,303.77	176.25	GR DS	GR DS
34	553,182.93	779,049.18	1,330.31	176.66	GR DS	GR DS
35	553,193.44	779,072.65	1,355.75	174.04	GR DS	GR DS
36	553,210.45	779,093.66	1,382.61	174.11	GR DS	GR DS
37	553,224.14	779,120.52	1,412.61	174.54	GR DS	GR DS

PROJECT NJDEP Field Survey - Dams

COMM. NO. **DATE** 23-Feb-2012 **CALC BY** **CHK BY**

TYPE **PREL.** **FINAL** **SHEET**

CONTENTS

Detailed Dam Report

(All Units In Feet)

General
ID: **MO_PEQ_01**
Road Name: WEIR
Stream Name:
County:
State:
State Zone:

Centerline
Station: 684.35
Offset: 0.00
Easting: 552,023.33
Northing: 780,437.28

Design
Designer:
Contractor:
Year Built:

Plans
Plan Location:
Survey File: n:\NewJersey\60223807_NJDEP_WorkOrder_1\PRODUCTION\Engineering\NJDEP_WorkOrder_1\Detailed\Eng\Ramapo_River_Unsteady\Interim_Models\Pequannock_River\Civil_Dynamics_Survey\Structures\MO_PEQ_01.txt
Comments:

Material
Bed: Unknown
Fill: Unknown

Datum
Horizontal:
Vertical:

Invert
Downstream: 168.37
Upstream: 182.04

Rail Height: 0.00

Dam Detail
Type: Unknown
Height: 0.00
Top Elevation: 0.00
Shape: Unknown
Normal Area: 0.00
Hazard Class:
Flood Elevation: 0.00
Flood Volume: 0.00
Valve East: 0.00
Valve North: 0.00

Embankment
Class:
Slope: 1.00
Type: Unknown

Photographs: None

Riser Barrels: None

Spillways: None

Rails: None

Cross Section Data Data type: TOP OF ROAD

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,069.85	780,425.17	638.77	175.33	TR	TR
2	551,939.15	780,459.20	766.83	175.39	TR	TR
3	551,934.72	780,462.19	771.05	176.27	TR	TR
4	551,925.37	780,463.26	780.30	175.88	TR	TR
5	551,922.66	780,462.03	783.09	175.32	TR	TR BOT SPY4
6	551,913.92	780,464.48	791.64	175.24	TR	TR BOT SPY3
7	551,910.27	780,466.79	795.12	176.04	TR	TR
8	551,901.27	780,469.80	803.89	176.75	TR	TR
9	551,894.35	780,470.43	810.76	175.88	TR	TR
10	551,892.48	780,471.29	812.56	175.37	TR	TR
11	551,820.58	780,489.24	883.06	175.36	TR	TR TOP SPY2
12	551,820.18	780,489.21	883.46	174.36	TR	TR BOT SPY2
13	551,809.69	780,490.33	893.85	174.30	TR	TR BOT SPY1
14	551,808.12	780,490.08	895.43	175.34	TR	TR TOP SPY1

Cross Section Data Data type: FIELD-UPSTREAM

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,261.23	780,382.12	450.79	182.86	TE	TE
2	552,159.28	780,406.05	550.86	183.11	CB	Channelbank [CB

Detailed Dam Report

(All Units In Feet)

Cross Section Data Data type: FIELD-UPSTREAM

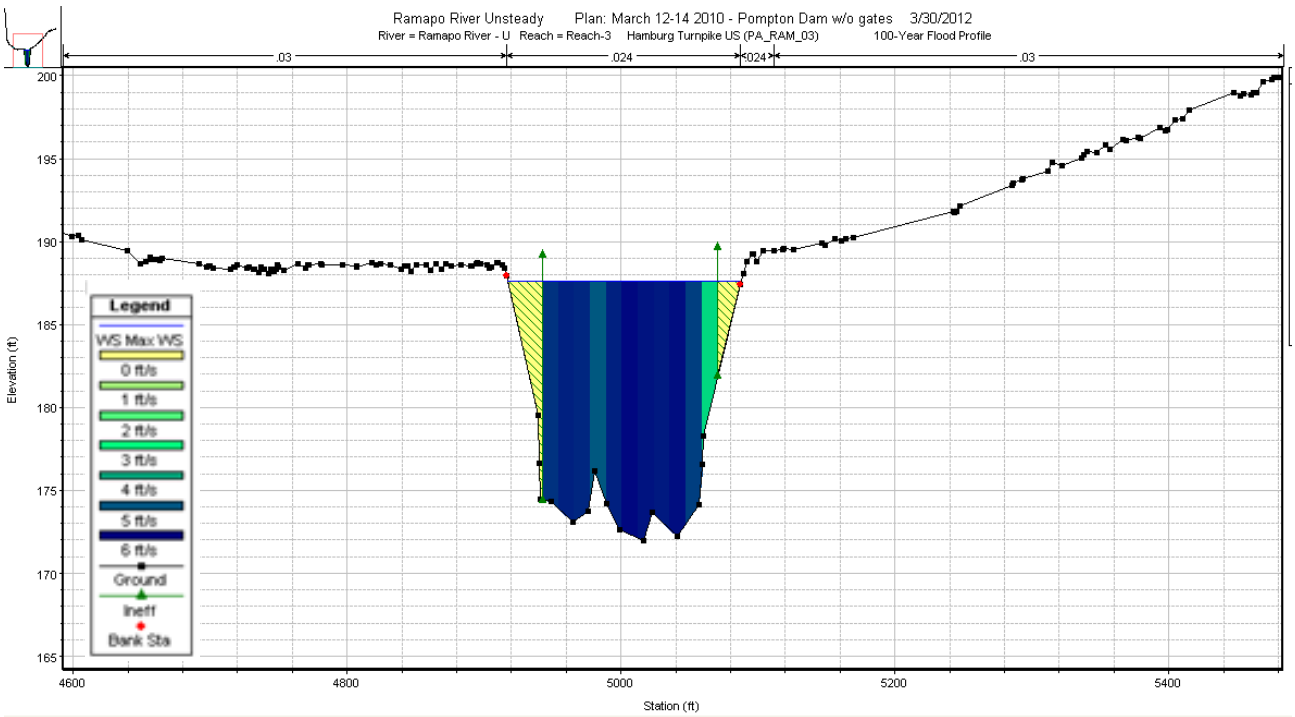
Point	Easting	Northing	Station	Elevation	Code	Comment
3	552,073.18	780,425.42	635.43	182.37	GR	GR
4	552,071.70	780,422.59	637.10	183.94	GR	GR
5	552,069.90	780,423.04	638.87	183.97	GR	GR
6	551,807.19	780,489.14	896.43	183.93	GR	GR
7	551,805.10	780,489.58	898.48	183.86	GR	GR
8	551,789.40	780,504.55	913.12	182.05	CB	Channelbank [CB
9	551,784.49	780,506.06	917.91	182.04	TE	TE
10	551,741.28	780,525.86	959.66	182.80	GR	GR
11	551,699.67	780,542.97	1,000.00	182.62	GR	GR
12	551,699.67	780,542.97	1,000.00	182.62	SPECIAL	ALPT1
13	551,571.93	780,534.19	1,128.04	177.98	SPECIAL	ALPT2

Cross Section Data Data type: FIELD-DOWNSTREAM

Point	Easting	Northing	Station	Elevation	Code	Comment
1	552,211.71	780,392.87	499.46	183.47	GR DS	GR DS
2	552,190.66	780,368.40	522.14	175.81	GR DS	GR DS
3	552,152.75	780,376.45	559.41	176.12	GR DS	GR DS
4	552,131.26	780,381.74	580.49	176.62	GR DS	GR DS
5	552,074.01	780,395.81	636.64	175.60	TE DS	TE DS
6	552,060.13	780,399.22	650.25	169.93	CB DS	Channelbank [CB DS
7	552,036.68	780,404.99	673.25	168.87	GR DS	GR DS
8	552,009.00	780,411.79	700.40	168.97	GR DS	GR DS
9	551,989.13	780,416.95	719.87	168.37	GR DS	GR DS
10	551,953.08	780,426.31	755.19	168.53	GR DS	GR DS
11	551,922.48	780,434.25	785.18	170.86	GR DS	GR DS
12	551,881.60	780,444.86	825.22	169.41	GR DS	GR DS
13	551,845.89	780,454.13	860.22	168.95	GR DS	GR DS
14	551,801.74	780,465.59	903.48	172.95	CB DS	Channelbank [CB DS
15	551,792.73	780,467.93	912.31	175.91	TE DS	TE DS
16	551,741.81	780,483.97	962.01	177.88	GR DS	GR DS
17	551,640.65	780,515.83	1,060.75	177.08	GR DS	GR DS
18	551,571.93	780,534.19	1,128.04	177.98	GR DS	GR DS
19	551,369.14	780,588.38	1,326.63	183.90	GR DS	GR DS

Appendix H

VELOCITY DISTRIBUTION AT HAMBURG TURNPIKE BRIDGE



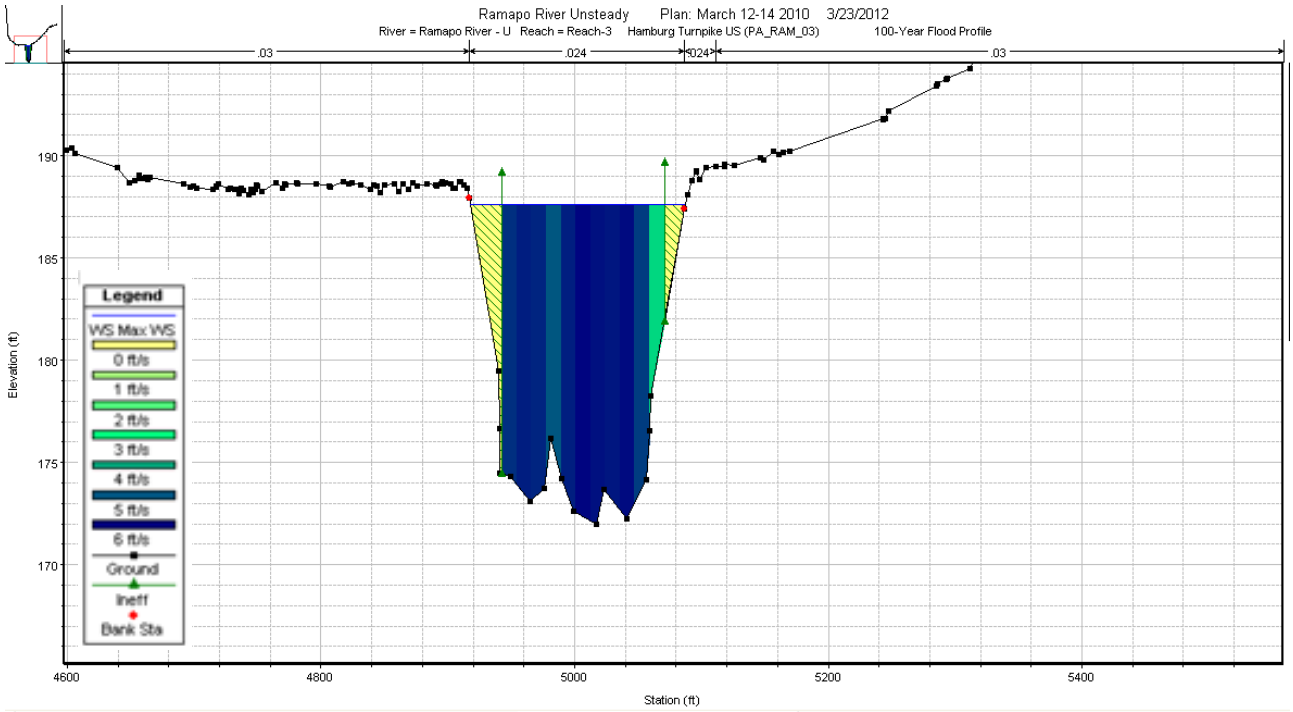


Figure H.1: March 12-14, 2010 Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top figure) Post Project Condition (bottom figure)

Flow Distribution Output

File Type Options Help

River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: March 12-14

Plan: March 12-14 Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	Chan	4916.70	4929.75	0.00	27.15	12.96	0.00	2.23	0.00	0.03	0.00
2	Chan	4929.75	4942.80	0.00	99.66	17.46	0.00	7.64	0.00	0.09	0.00
3	Chan	4942.80	4954.43	840.98	155.25	11.65	8.84	13.35	5.42	0.21	1.13
4	Chan	4954.43	4966.05	926.78	164.66	11.66	9.74	14.16	5.63	0.22	1.25
5	Chan	4966.05	4977.68	908.40	163.61	11.83	9.55	14.07	5.55	0.22	1.21
6	Chan	4977.68	4989.31	711.37	143.22	12.23	7.48	12.32	4.97	0.18	0.91
7	Chan	4989.31	5000.94	931.53	165.79	11.77	9.79	14.26	5.62	0.22	1.24
8	Chan	5000.94	5012.56	1049.99	177.30	11.64	11.03	15.25	5.92	0.24	1.42
9	Chan	5012.56	5024.19	1007.22	174.25	11.86	10.59	14.99	5.78	0.23	1.33
10	Chan	5024.19	5035.82	960.93	168.30	11.67	10.10	14.47	5.71	0.23	1.29
11	Chan	5035.82	5047.45	1022.55	174.83	11.69	10.75	15.04	5.85	0.23	1.37
12	Chan	5047.45	5059.07	840.04	159.50	12.48	8.83	13.72	5.27	0.20	1.06
13	Chan	5059.07	5070.70	315.76	91.42	13.47	3.32	7.86	3.45	0.11	0.37
14	Chan	5070.70	5086.70	0.00	47.42	16.94	0.00	2.96	0.00	0.04	0.00
15	ROB	5086.70	5163.54	0.00	0.06	0.70	0.00	0.09	0.00	0.00	0.00

Flow Distribution Output

File Type Options Help

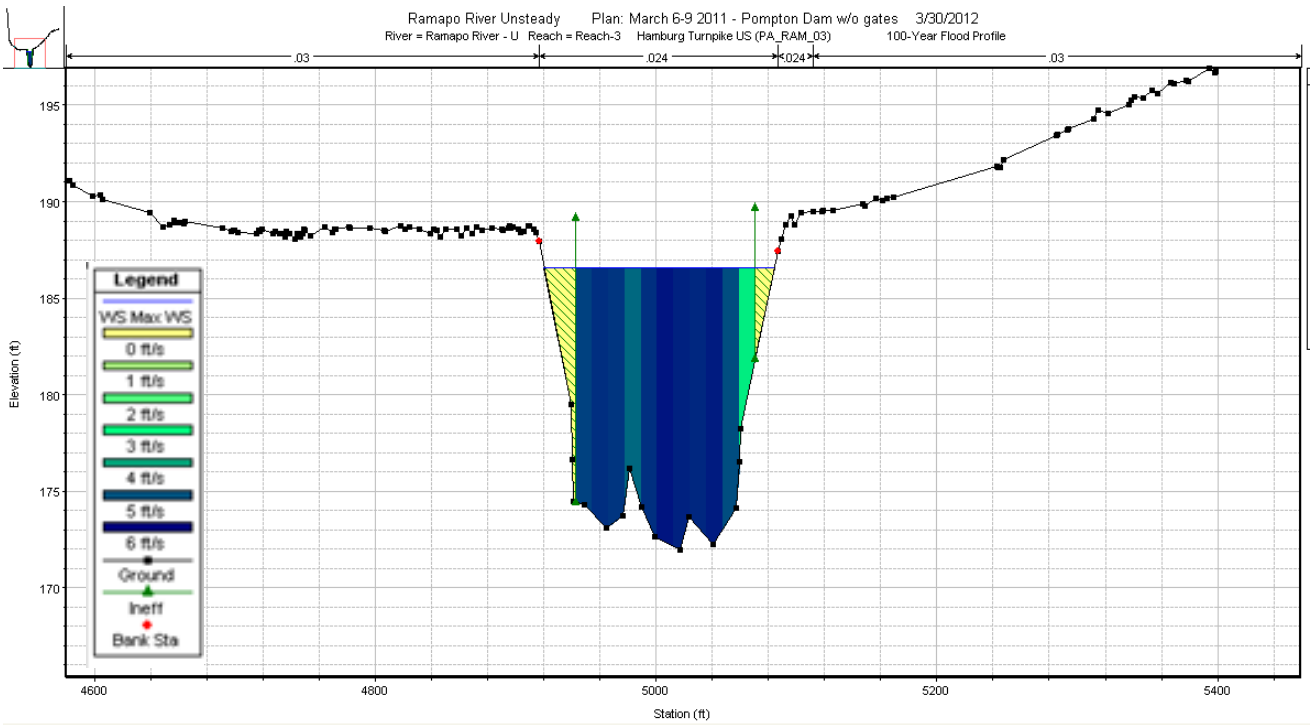
River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: March 12-14 2010

Plan: March 12-14 2010 Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	Chan	4916.70	4929.75	0.00	27.39	13.02	0.00	2.24	0.00	0.03	0.00
2	Chan	4929.75	4942.80	0.00	99.92	17.46	0.00	7.66	0.00	0.09	0.00
3	Chan	4942.80	4954.43	846.59	155.48	11.65	8.84	13.37	5.45	0.21	1.15
4	Chan	4954.43	4966.05	932.82	164.89	11.66	9.74	14.18	5.66	0.22	1.27
5	Chan	4966.05	4977.68	914.34	163.83	11.83	9.55	14.09	5.58	0.22	1.22
6	Chan	4977.68	4989.31	716.25	143.44	12.23	7.48	12.34	4.99	0.19	0.93
7	Chan	4989.31	5000.94	937.59	166.01	11.77	9.79	14.28	5.65	0.22	1.26
8	Chan	5000.94	5012.56	1056.66	177.53	11.64	11.03	15.27	5.95	0.24	1.44
9	Chan	5012.56	5024.19	1013.66	174.48	11.86	10.58	15.01	5.81	0.23	1.35
10	Chan	5024.19	5035.82	967.15	168.53	11.67	10.10	14.49	5.74	0.23	1.31
11	Chan	5035.82	5047.45	1029.08	175.06	11.69	10.74	15.06	5.88	0.24	1.39
12	Chan	5047.45	5059.07	845.58	159.73	12.48	8.83	13.74	5.29	0.20	1.07
13	Chan	5059.07	5070.70	318.40	91.65	13.47	3.32	7.88	3.47	0.11	0.37
14	Chan	5070.70	5086.70	0.00	47.74	16.94	0.00	2.98	0.00	0.04	0.00
15	ROB	5086.70	5163.54	0.00	0.08	0.77	0.00	0.10	0.00	0.00	0.00

Table H.1: March 12-14, 2010 Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top table) Post Project Condition (bottom table)



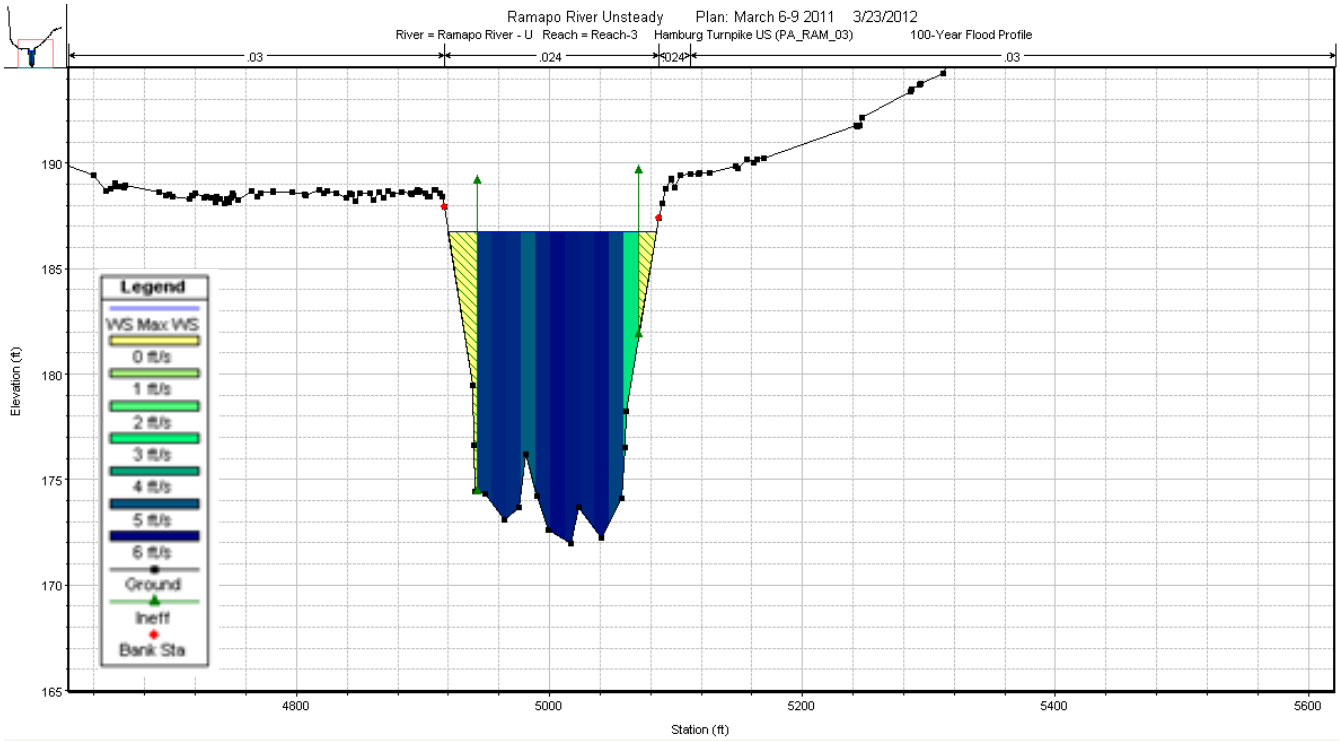


Figure H.2: March 6-9, 2011 Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top figure) Post Project Condition (bottom figure)

Flow Distribution Output

File Type Options Help

River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: March 6-9 20

Plan: March 6-9 20 Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	Chan	4916.70	4929.75	0.00	16.30	10.04	0.00	1.73	0.00	0.03	0.00
2	Chan	4929.75	4942.80	0.00	86.55	17.46	0.00	6.63	0.00	0.08	0.00
3	Chan	4942.80	4954.43	751.35	143.56	11.65	8.80	12.35	5.23	0.20	1.05
4	Chan	4954.43	4966.05	834.44	152.97	11.66	9.77	13.16	5.45	0.21	1.17
5	Chan	4966.05	4977.68	817.22	151.92	11.83	9.57	13.07	5.38	0.21	1.13
6	Chan	4977.68	4989.31	628.33	131.53	12.23	7.36	11.31	4.78	0.18	0.84
7	Chan	4989.31	5000.94	839.43	154.10	11.77	9.83	13.25	5.45	0.21	1.16
8	Chan	5000.94	5012.56	953.97	165.62	11.64	11.17	14.24	5.76	0.23	1.34
9	Chan	5012.56	5024.19	913.23	162.57	11.86	10.69	13.98	5.62	0.22	1.26
10	Chan	5024.19	5035.82	867.57	156.61	11.67	10.16	13.47	5.54	0.22	1.21
11	Chan	5035.82	5047.45	927.50	163.15	11.69	10.86	14.03	5.68	0.23	1.30
12	Chan	5047.45	5059.07	753.23	147.82	12.48	8.82	12.71	5.10	0.19	0.99
13	Chan	5059.07	5070.70	255.89	79.74	13.47	3.00	6.86	3.21	0.10	0.31
14	Chan	5070.70	5086.70	0.00	32.31	14.44	0.00	2.37	0.00	0.04	0.00

Flow Distribution Output

File Type Options Help

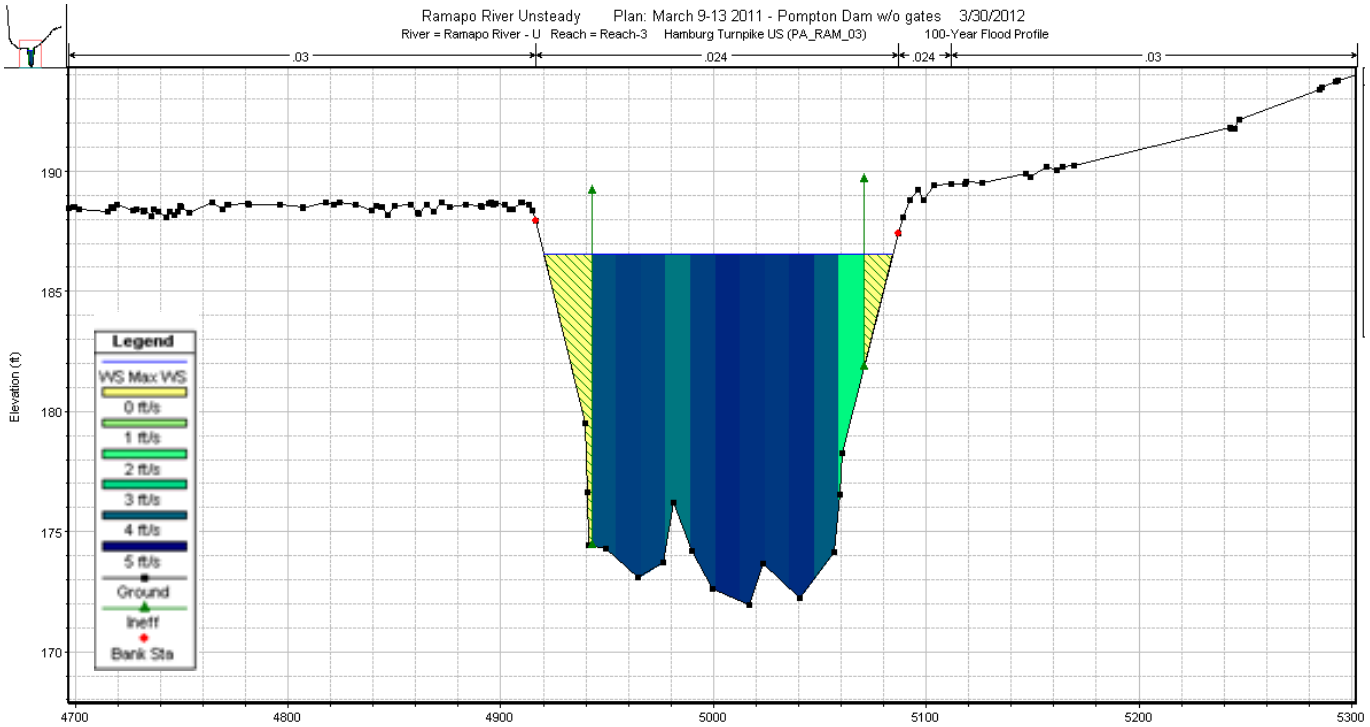
River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: March 6-9 2011

Plan: March 6-9 2011 Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	Chan	4916.70	4929.75	0.00	17.85	10.51	0.00	1.81	0.00	0.03	0.00
2	Chan	4929.75	4942.80	0.00	88.65	17.46	0.00	6.79	0.00	0.09	0.00
3	Chan	4942.80	4954.43	778.24	145.44	11.65	8.80	12.51	5.35	0.21	1.12
4	Chan	4954.43	4966.05	863.16	154.85	11.66	9.76	13.32	5.57	0.22	1.24
5	Chan	4966.05	4977.68	845.46	153.79	11.83	9.56	13.23	5.50	0.22	1.20
6	Chan	4977.68	4989.31	652.09	133.40	12.23	7.38	11.47	4.89	0.18	0.89
7	Chan	4989.31	5000.94	868.19	155.97	11.77	9.82	13.41	5.57	0.22	1.24
8	Chan	5000.94	5012.56	985.28	167.49	11.64	11.15	14.41	5.88	0.24	1.42
9	Chan	5012.56	5024.19	943.53	164.44	11.86	10.67	14.14	5.74	0.23	1.33
10	Chan	5024.19	5035.82	897.00	158.49	11.67	10.15	13.63	5.66	0.23	1.29
11	Chan	5035.82	5047.45	958.21	165.02	11.69	10.84	14.19	5.81	0.24	1.37
12	Chan	5047.45	5059.07	779.70	149.69	12.48	8.82	12.87	5.21	0.20	1.05
13	Chan	5059.07	5070.70	269.62	81.61	13.47	3.05	7.02	3.30	0.10	0.34
14	Chan	5070.70	5086.70	0.00	34.54	14.94	0.00	2.45	0.00	0.04	0.00

Table H.2: March 6-9, 2011 Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top table) Post Project Condition (bottom table)



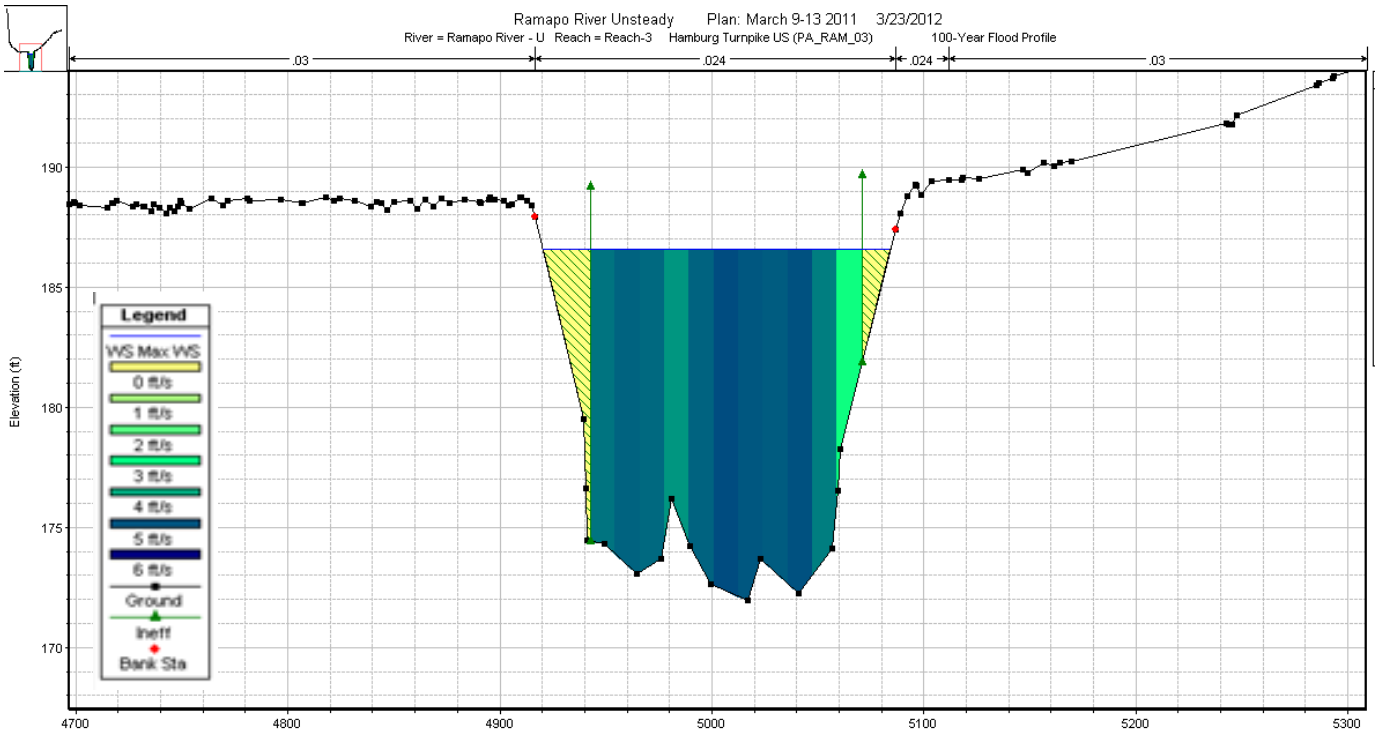


Figure H.3: March 9-13, 2011 Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top figure) Post Project Condition (bottom figure)

Flow Distribution Output

File Type Options Help

River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: March 9-13 2

Plan: March 9-13 2 Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	Chan	4916.70	4929.75	0.00	15.67	9.85	0.00	1.69	0.00	0.02	0.00
2	Chan	4929.75	4942.80	0.00	85.66	17.46	0.00	6.56	0.00	0.05	0.00
3	Chan	4942.80	4954.43	600.37	142.78	11.65	8.79	12.28	4.20	0.13	0.55
4	Chan	4954.43	4966.05	667.14	152.19	11.66	9.77	13.09	4.38	0.14	0.61
5	Chan	4966.05	4977.68	653.33	151.13	11.83	9.57	13.00	4.32	0.14	0.59
6	Chan	4977.68	4989.31	501.65	130.74	12.23	7.35	11.24	3.84	0.11	0.44
7	Chan	4989.31	5000.94	671.18	153.31	11.77	9.83	13.19	4.38	0.14	0.61
8	Chan	5000.94	5012.56	763.21	164.83	11.64	11.18	14.18	4.63	0.15	0.70
9	Chan	5012.56	5024.19	730.50	161.78	11.86	10.70	13.91	4.52	0.14	0.65
10	Chan	5024.19	5035.82	693.77	155.83	11.67	10.16	13.40	4.45	0.14	0.63
11	Chan	5035.82	5047.45	741.94	162.36	11.69	10.87	13.96	4.57	0.15	0.67
12	Chan	5047.45	5059.07	602.03	147.03	12.48	8.82	12.65	4.09	0.13	0.51
13	Chan	5059.07	5070.70	202.97	78.95	13.47	2.97	6.79	2.57	0.06	0.16
14	Chan	5070.70	5086.70	0.00	31.39	14.24	0.00	2.33	0.00	0.02	0.00

Flow Distribution Output

File Type Options Help

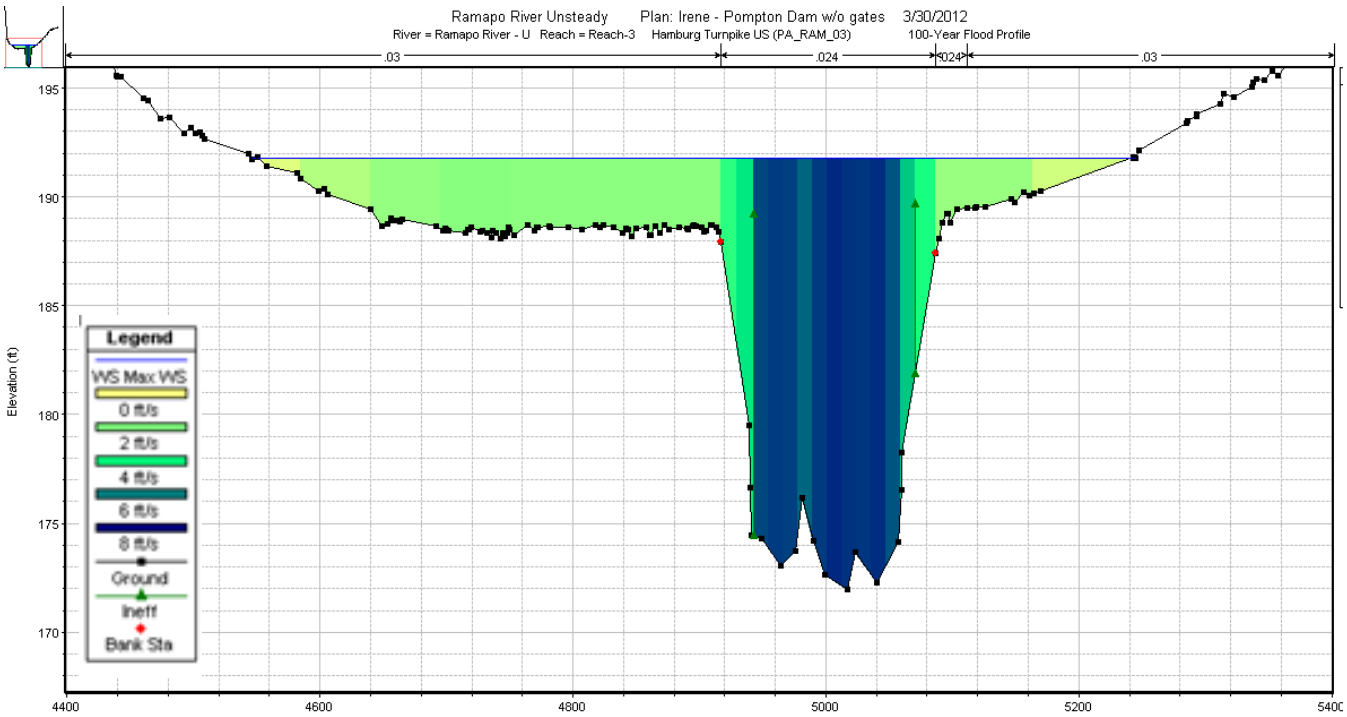
River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: March 9-13 2011

Plan: March 9-13 2011 Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	Chan	4916.70	4929.75	0.00	15.97	9.94	0.00	1.71	0.00	0.02	0.00
2	Chan	4929.75	4942.80	0.00	86.09	17.46	0.00	6.60	0.00	0.06	0.00
3	Chan	4942.80	4954.43	664.34	143.15	11.65	8.79	12.31	4.64	0.16	0.74
4	Chan	4954.43	4966.05	738.02	152.56	11.66	9.77	13.12	4.84	0.17	0.82
5	Chan	4966.05	4977.68	722.76	151.51	11.83	9.57	13.03	4.77	0.17	0.79
6	Chan	4977.68	4989.31	555.32	131.12	12.23	7.35	11.28	4.24	0.14	0.59
7	Chan	4989.31	5000.94	742.46	153.69	11.77	9.83	13.22	4.83	0.17	0.81
8	Chan	5000.94	5012.56	844.03	165.21	11.64	11.17	14.21	5.11	0.18	0.94
9	Chan	5012.56	5024.19	807.92	162.16	11.86	10.69	13.95	4.98	0.18	0.88
10	Chan	5024.19	5035.82	767.40	156.20	11.67	10.16	13.43	4.91	0.17	0.85
11	Chan	5035.82	5047.45	820.55	162.74	11.69	10.86	14.00	5.04	0.18	0.91
12	Chan	5047.45	5059.07	666.09	147.41	12.48	8.82	12.68	4.52	0.15	0.69
13	Chan	5059.07	5070.70	225.39	79.33	13.47	2.98	6.82	2.84	0.08	0.22
14	Chan	5070.70	5086.70	0.00	31.83	14.34	0.00	2.35	0.00	0.03	0.00

Table H.3: March 69-13, 2011 Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top table) Post Project Condition (bottom table)



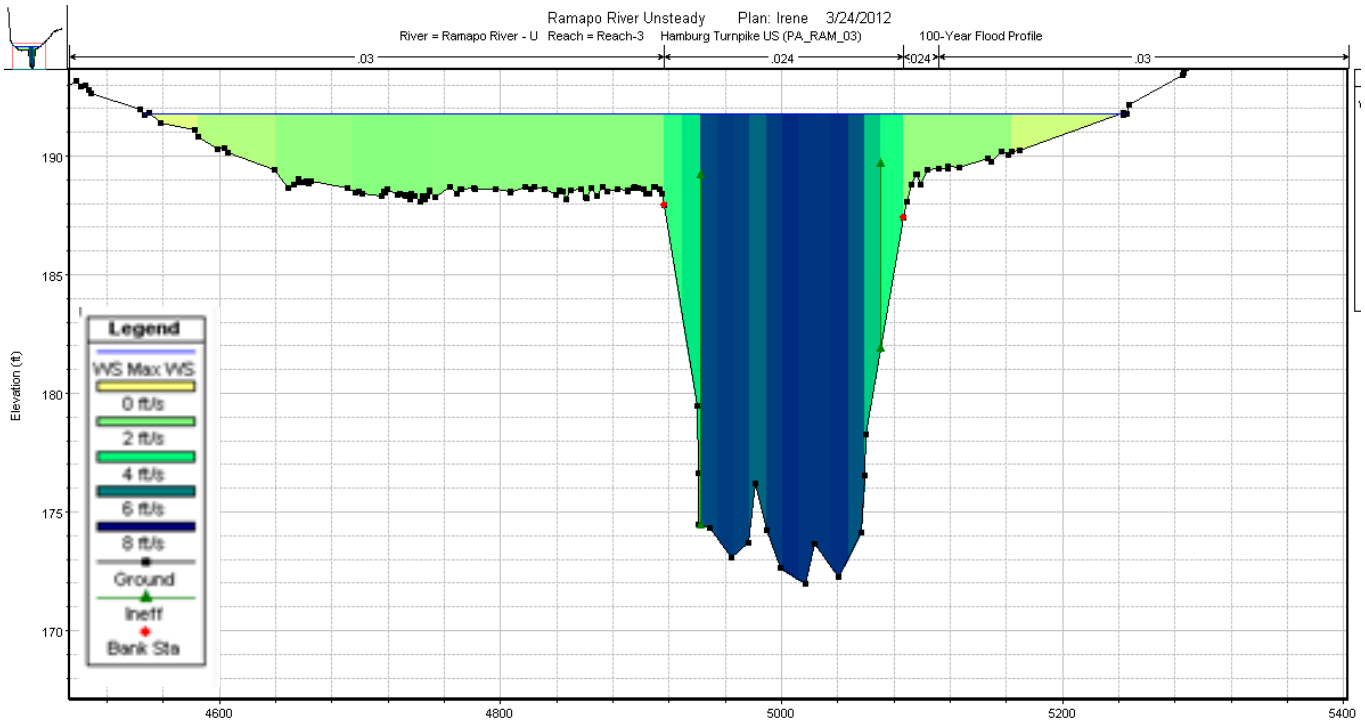


Figure H.4: Hurricane Irene, August 2011 Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top figure) Post Project Condition (bottom figure)

Flow Distribution Output

File Type Options Help

River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: Irene - wo gate

Plan: Irene - wo gate Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB	4529.25	4584.60	8.13	16.98	37.93	0.04	0.45	0.48	0.01	0.00
2	LOB	4584.60	4639.95	115.06	96.84	55.38	0.60	1.75	1.19	0.03	0.04
3	LOB	4639.95	4695.30	275.90	163.71	55.42	1.44	2.96	1.69	0.06	0.10
4	LOB	4695.30	4750.65	350.29	189.01	55.48	1.83	3.41	1.85	0.07	0.12
5	LOB	4750.65	4806.00	321.03	179.24	55.38	1.68	3.24	1.79	0.06	0.11
6	LOB	4806.00	4861.35	323.85	180.24	55.43	1.70	3.26	1.80	0.06	0.11
7	LOB	4861.35	4916.70	322.38	179.85	55.51	1.69	3.25	1.79	0.06	0.11
8	Chan	4916.70	4929.75	272.19	81.81	13.90	1.42	6.27	3.33	0.11	0.38
9	Chan	4929.75	4942.80	674.38	154.46	17.46	3.53	11.84	4.37	0.17	0.75
10	Chan	4942.80	4954.43	1405.18	204.07	11.65	7.36	17.55	6.89	0.34	2.33
11	Chan	4954.43	4966.05	1513.39	213.48	11.66	7.92	18.36	7.09	0.35	2.51
12	Chan	4966.05	4977.68	1487.04	212.43	11.83	7.78	18.27	7.00	0.35	2.43
13	Chan	4977.68	4989.31	1228.70	192.04	12.23	6.43	16.52	6.40	0.30	1.94
14	Chan	4989.31	5000.94	1517.22	214.61	11.77	7.94	18.46	7.07	0.35	2.49
15	Chan	5000.94	5012.56	1668.22	226.13	11.64	8.73	19.45	7.38	0.38	2.77

Flow Distribution Output

File Type Options Help

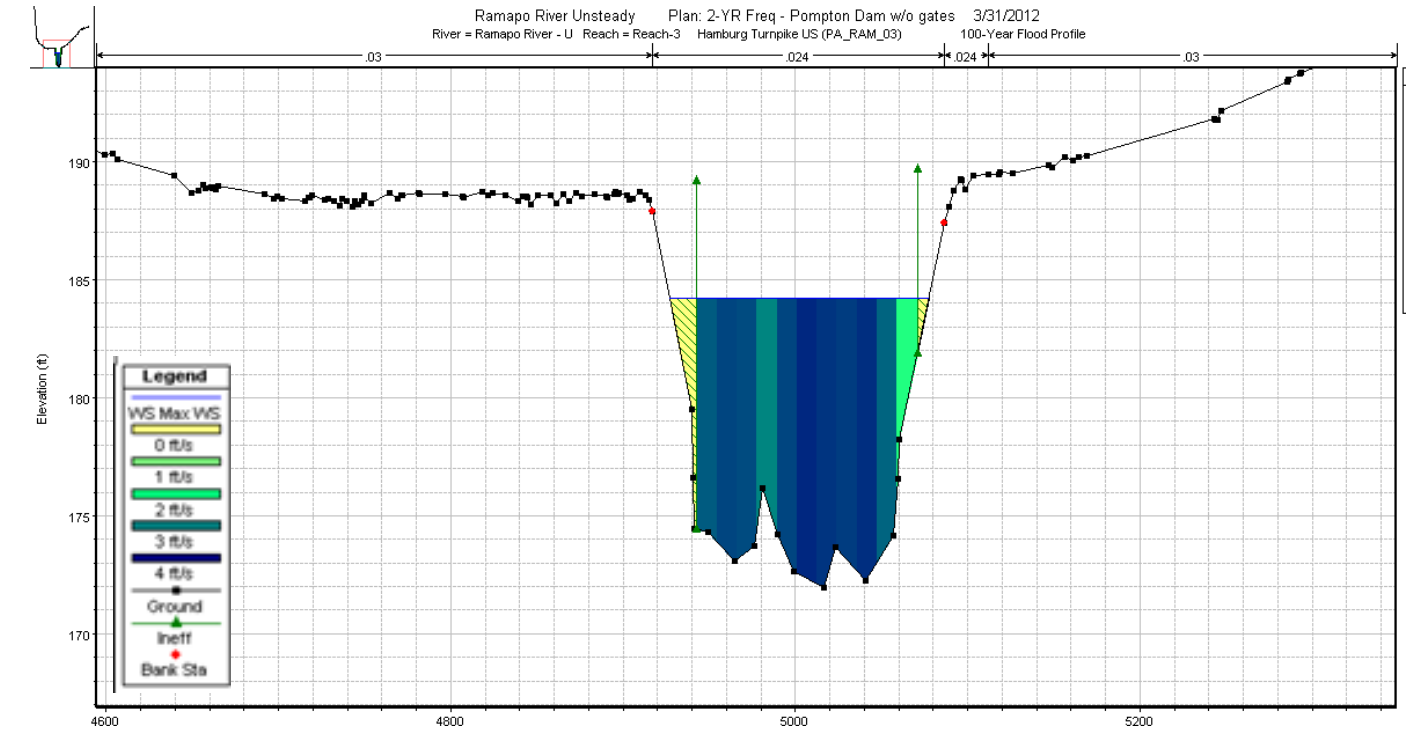
River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: Irene

Plan: Irene Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB	4529.25	4584.60	7.88	16.51	36.98	0.04	0.45	0.48	0.01	0.00
2	LOB	4584.60	4639.95	113.47	96.16	55.38	0.60	1.74	1.18	0.03	0.04
3	LOB	4639.95	4695.30	273.42	163.03	55.42	1.44	2.95	1.68	0.06	0.09
4	LOB	4695.30	4750.65	347.47	188.32	55.48	1.83	3.40	1.85	0.07	0.12
5	LOB	4750.65	4806.00	318.34	178.56	55.38	1.67	3.23	1.78	0.06	0.11
6	LOB	4806.00	4861.35	321.14	179.56	55.43	1.69	3.24	1.79	0.06	0.11
7	LOB	4861.35	4916.70	319.68	179.17	55.51	1.68	3.24	1.78	0.06	0.11
8	Chan	4916.70	4929.75	270.78	81.65	13.90	1.42	6.26	3.32	0.11	0.37
9	Chan	4929.75	4942.80	671.93	154.30	17.46	3.53	11.82	4.35	0.17	0.74
10	Chan	4942.80	4954.43	1400.89	203.93	11.65	7.36	17.54	6.87	0.34	2.31
11	Chan	4954.43	4966.05	1508.84	213.34	11.66	7.93	18.35	7.07	0.35	2.49
12	Chan	4966.05	4977.68	1482.56	212.29	11.83	7.79	18.26	6.98	0.35	2.41
13	Chan	4977.68	4989.31	1224.85	191.90	12.23	6.44	16.50	6.38	0.30	1.93
14	Chan	4989.31	5000.94	1512.67	214.47	11.77	7.95	18.44	7.05	0.35	2.47
15	Chan	5000.94	5012.56	1663.31	225.98	11.64	8.74	19.44	7.36	0.37	2.75

Table H.4: Hurricane Irene, August 2011 Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top table) Post Project Condition (bottom table)



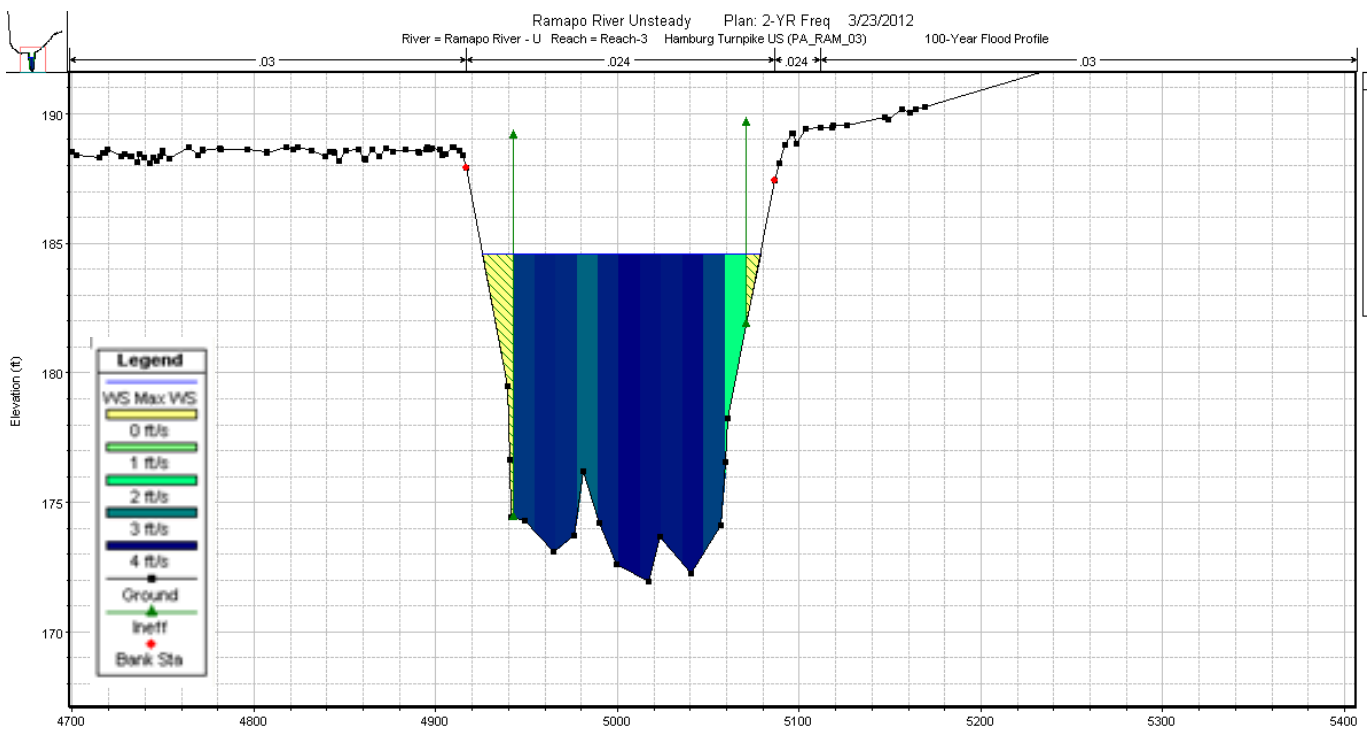


Figure H.5: 2-Year Rainfall Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top figure) Post Project Condition (bottom figure)

Flow Distribution Output

File Type Options Help

River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: 2-YR Freq -

Plan: 2-YR Freq - Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	Chan	4916.70	4929.75	0.00	1.62	3.17	0.00	0.55	0.00	0.00	0.00
2	Chan	4929.75	4942.80	0.00	55.68	17.46	0.00	4.27	0.00	0.03	0.00
3	Chan	4942.80	4954.43	381.65	116.06	11.65	8.66	9.98	3.29	0.09	0.29
4	Chan	4954.43	4966.05	434.20	125.48	11.66	9.85	10.79	3.46	0.09	0.32
5	Chan	4966.05	4977.68	424.15	124.42	11.83	9.62	10.70	3.41	0.09	0.31
6	Chan	4977.68	4989.31	307.71	104.03	12.23	6.98	8.95	2.96	0.07	0.22
7	Chan	4989.31	5000.94	437.96	126.60	11.77	9.93	10.89	3.46	0.09	0.32
8	Chan	5000.94	5012.56	510.32	138.12	11.64	11.57	11.88	3.69	0.10	0.38
9	Chan	5012.56	5024.19	485.48	135.07	11.86	11.01	11.62	3.59	0.10	0.36
10	Chan	5024.19	5035.82	455.27	129.12	11.67	10.33	11.10	3.53	0.10	0.34
11	Chan	5035.82	5047.45	493.66	135.65	11.69	11.20	11.67	3.64	0.10	0.37
12	Chan	5047.45	5059.07	386.97	120.32	12.48	8.78	10.35	3.22	0.08	0.27
13	Chan	5059.07	5070.70	91.55	52.24	13.47	2.08	4.49	1.75	0.03	0.06
14	Chan	5070.70	5086.70	0.00	8.09	7.23	0.00	1.18	0.00	0.01	0.00

Flow Distribution Output

File Type Options Help

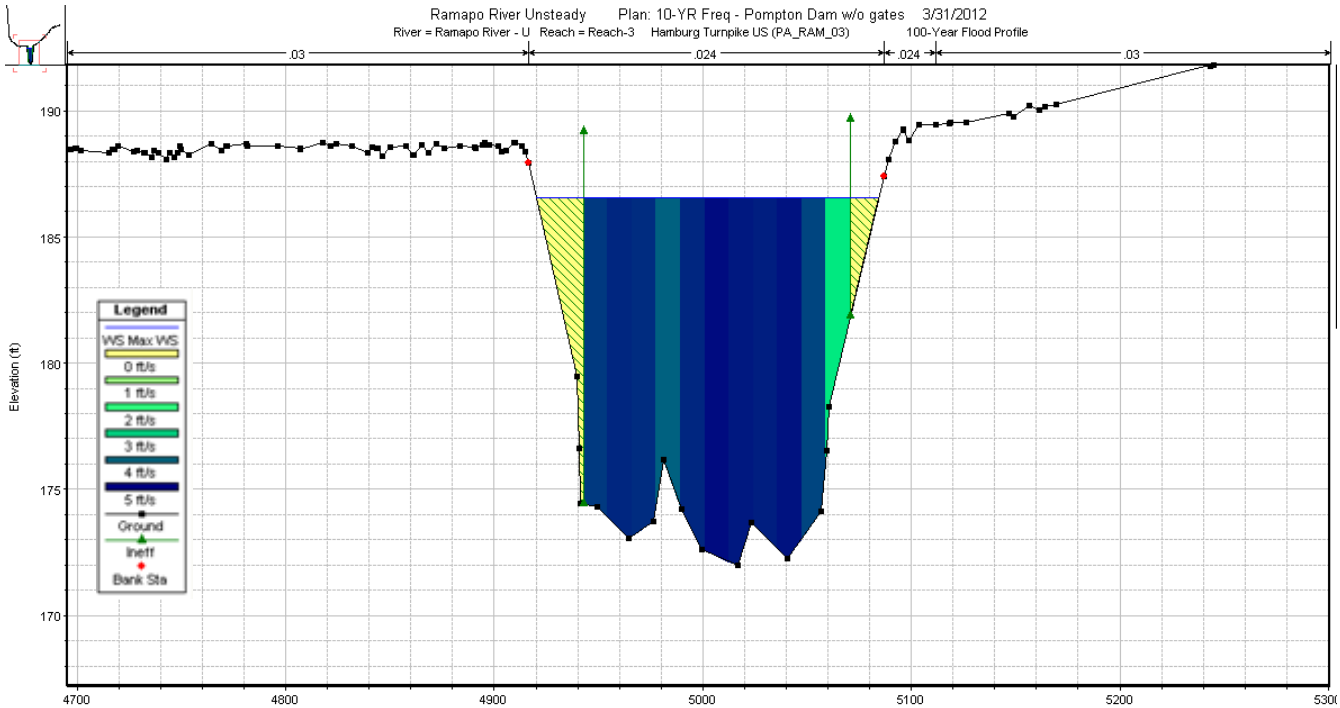
River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: 2-YR Freq

Plan: 2-YR Freq Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	Chan	4916.70	4929.75	0.00	2.94	4.26	0.00	0.73	0.00	0.01	0.00
2	Chan	4929.75	4942.80	0.00	60.59	17.46	0.00	4.64	0.00	0.03	0.00
3	Chan	4942.80	4954.43	429.98	120.44	11.65	8.68	10.36	3.57	0.10	0.36
4	Chan	4954.43	4966.05	486.97	129.85	11.66	9.83	11.17	3.75	0.11	0.41
5	Chan	4966.05	4977.68	475.93	128.79	11.83	9.61	11.08	3.70	0.11	0.39
6	Chan	4977.68	4989.31	349.11	108.40	12.23	7.05	9.32	3.22	0.09	0.28
7	Chan	4989.31	5000.94	490.94	130.97	11.77	9.91	11.26	3.75	0.11	0.41
8	Chan	5000.94	5012.56	569.40	142.49	11.64	11.50	12.26	4.00	0.12	0.48
9	Chan	5012.56	5024.19	542.31	139.44	11.86	10.95	11.99	3.89	0.11	0.45
10	Chan	5024.19	5035.82	509.79	133.49	11.67	10.30	11.48	3.82	0.11	0.43
11	Chan	5035.82	5047.45	551.33	140.02	11.69	11.13	12.04	3.94	0.12	0.46
12	Chan	5047.45	5059.07	435.04	124.70	12.48	8.79	10.72	3.49	0.10	0.34
13	Chan	5059.07	5070.70	110.88	56.61	13.47	2.24	4.87	1.96	0.04	0.08
14	Chan	5070.70	5086.70	0.00	10.87	8.38	0.00	1.37	0.00	0.01	0.00

Table H.5: 2-Year Rainfall Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top table) Post Project Condition (bottom table)



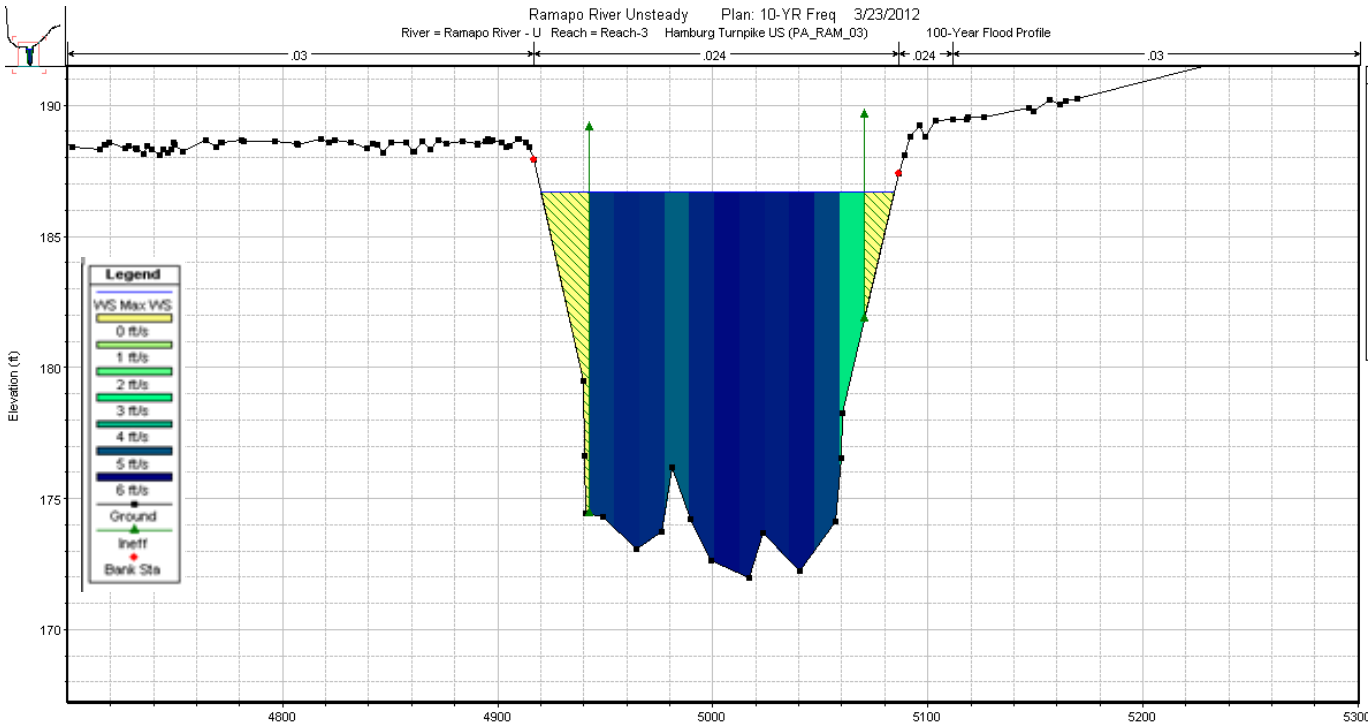


Figure H.6: 10-Year Rainfall Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top figure) Post Project Condition (bottom figure)

Flow Distribution Output

File Type Options Help

River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: 10-YR Freq -

Plan: 10-YR Freq - Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	Chan	4916.70	4929.75	0.00	15.76	9.88	0.00	1.70	0.00	0.02	0.00
2	Chan	4929.75	4942.80	0.00	85.80	17.46	0.00	6.57	0.00	0.06	0.00
3	Chan	4942.80	4954.43	634.65	142.90	11.65	8.79	12.29	4.44	0.15	0.65
4	Chan	4954.43	4966.05	705.17	152.31	11.66	9.77	13.10	4.63	0.15	0.72
5	Chan	4966.05	4977.68	690.58	151.25	11.83	9.57	13.01	4.57	0.15	0.69
6	Chan	4977.68	4989.31	530.36	130.87	12.23	7.35	11.25	4.05	0.13	0.51
7	Chan	4989.31	5000.94	709.43	153.44	11.77	9.83	13.20	4.62	0.15	0.71
8	Chan	5000.94	5012.56	806.63	164.95	11.64	11.18	14.19	4.89	0.17	0.82
9	Chan	5012.56	5024.19	772.08	161.90	11.86	10.70	13.92	4.77	0.16	0.77
10	Chan	5024.19	5035.82	733.29	155.95	11.67	10.16	13.41	4.70	0.16	0.74
11	Chan	5035.82	5047.45	784.16	162.48	11.69	10.86	13.97	4.83	0.16	0.79
12	Chan	5047.45	5059.07	636.38	147.15	12.48	8.82	12.66	4.32	0.14	0.60
13	Chan	5059.07	5070.70	214.81	79.07	13.47	2.98	6.80	2.72	0.07	0.19
14	Chan	5070.70	5086.70	0.00	31.53	14.27	0.00	2.34	0.00	0.03	0.00

Flow Distribution Output

File Type Options Help

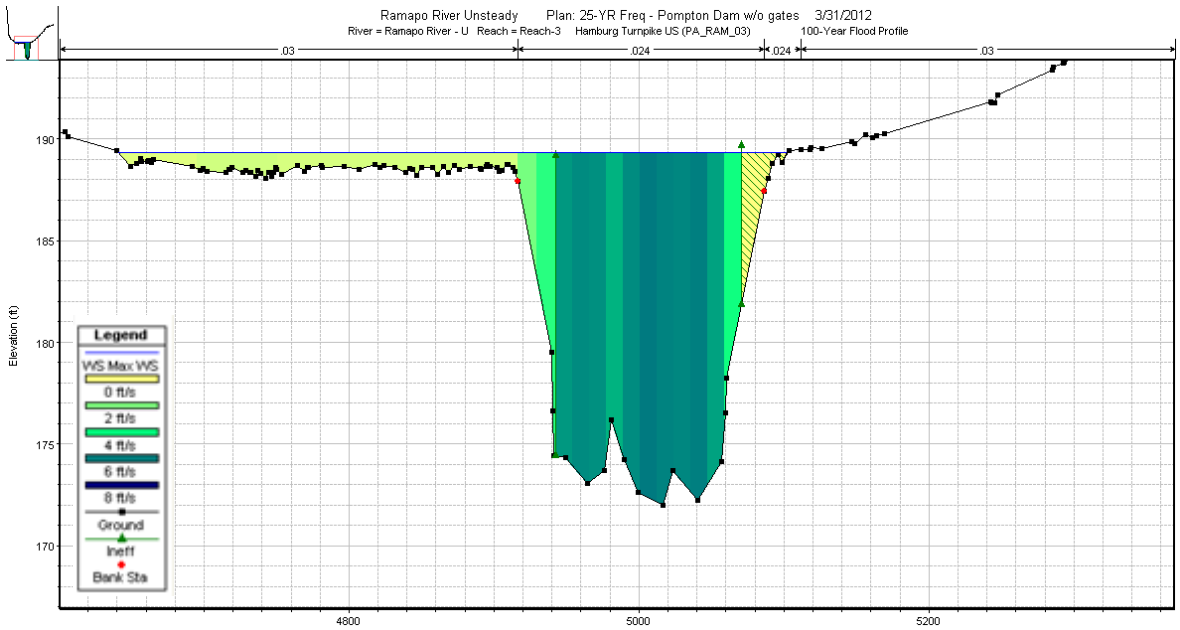
River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: 10-YR Freq

Plan: 10-YR Freq Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	Chan	4916.70	4929.75	0.00	17.18	10.31	0.00	1.77	0.00	0.03	0.00
2	Chan	4929.75	4942.80	0.00	87.76	17.46	0.00	6.72	0.00	0.08	0.00
3	Chan	4942.80	4954.43	773.92	144.64	11.65	8.80	12.44	5.35	0.21	1.12
4	Chan	4954.43	4966.05	858.85	154.05	11.66	9.77	13.25	5.57	0.22	1.24
5	Chan	4966.05	4977.68	841.18	153.00	11.83	9.56	13.16	5.50	0.22	1.20
6	Chan	4977.68	4989.31	647.93	132.61	12.23	7.37	11.40	4.89	0.18	0.89
7	Chan	4989.31	5000.94	863.91	155.18	11.77	9.82	13.35	5.57	0.22	1.24
8	Chan	5000.94	5012.56	980.99	166.70	11.64	11.15	14.34	5.88	0.24	1.42
9	Chan	5012.56	5024.19	939.29	163.65	11.86	10.68	14.07	5.74	0.23	1.34
10	Chan	5024.19	5035.82	892.70	157.69	11.67	10.15	13.56	5.66	0.23	1.29
11	Chan	5035.82	5047.45	953.93	164.23	11.69	10.85	14.12	5.81	0.24	1.38
12	Chan	5047.45	5059.07	775.58	148.90	12.48	8.82	12.81	5.21	0.20	1.05
13	Chan	5059.07	5070.70	266.21	80.82	13.47	3.03	6.95	3.29	0.10	0.33
14	Chan	5070.70	5086.70	0.00	33.58	14.73	0.00	2.41	0.00	0.04	0.00

Table H.6: 10-Year Rainfall Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top table) Post Project Condition (bottom table)



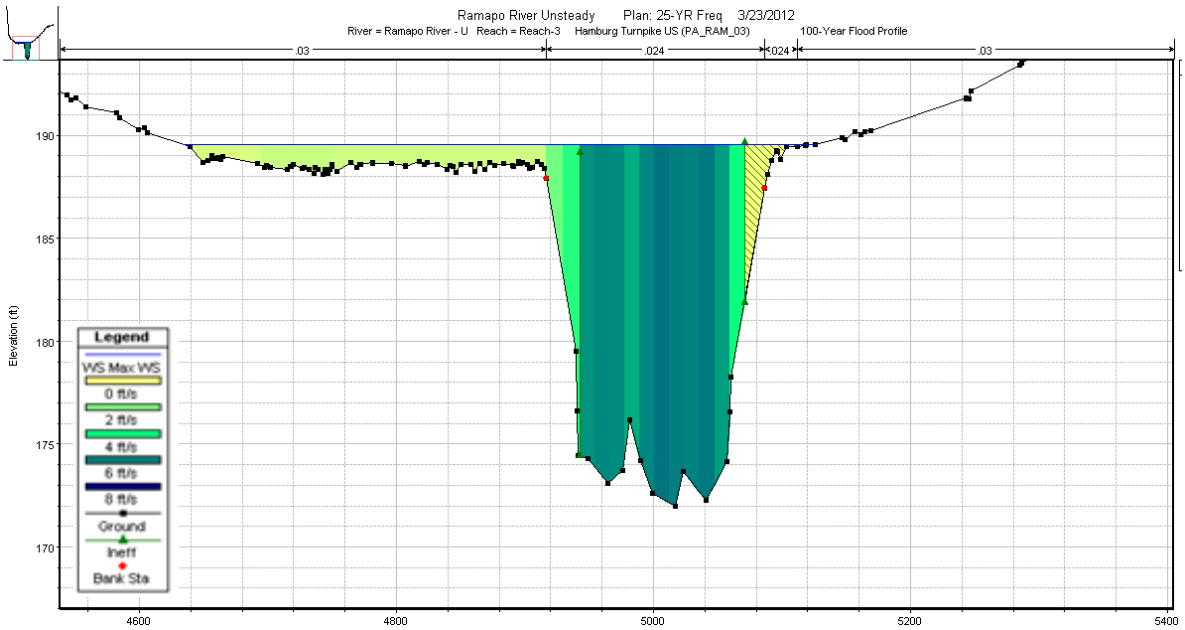


Figure H.7: 25-Year Rainfall Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top figure) Post Project Condition (bottom figure)

Flow Distribution Output

File Type Options Help

River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: 25-YR Freq -

Plan: 25-YR Freq - Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB	4639.95	4695.30	12.24	25.95	54.13	0.10	0.48	0.47	0.01	0.00
2	LOB	4695.30	4750.65	37.34	51.18	55.48	0.32	0.92	0.73	0.01	0.01
3	LOB	4750.65	4806.00	26.27	41.42	55.38	0.22	0.75	0.63	0.01	0.01
4	LOB	4806.00	4861.35	27.32	42.42	55.43	0.23	0.77	0.64	0.01	0.01
5	LOB	4861.35	4916.70	26.88	42.03	55.51	0.23	0.76	0.64	0.01	0.01
6	Chan	4916.70	4929.75	105.80	49.31	13.90	0.90	3.78	2.15	0.06	0.12
7	Chan	4929.75	4942.80	411.10	121.96	17.46	3.51	9.35	3.37	0.11	0.37
8	Chan	4942.80	4954.43	984.01	175.12	11.65	8.40	15.06	5.62	0.24	1.33
9	Chan	4954.43	4966.05	1072.69	184.53	11.66	9.16	15.87	5.81	0.25	1.45
10	Chan	4966.05	4977.68	1052.64	183.48	11.83	8.99	15.78	5.74	0.24	1.40
11	Chan	4977.68	4989.31	845.62	163.09	12.23	7.22	14.03	5.19	0.21	1.09
12	Chan	4989.31	5000.94	1076.88	185.66	11.77	9.20	15.97	5.80	0.25	1.44
13	Chan	5000.94	5012.56	1199.78	197.17	11.64	10.25	16.96	6.08	0.27	1.62
14	Chan	5012.56	5024.19	1154.31	194.12	11.86	9.86	16.70	5.95	0.26	1.53
15	Chan	5024.19	5035.82	1107.92	188.17	11.67	9.46	16.18	5.89	0.25	1.49

Flow Distribution Output

File Type Options Help

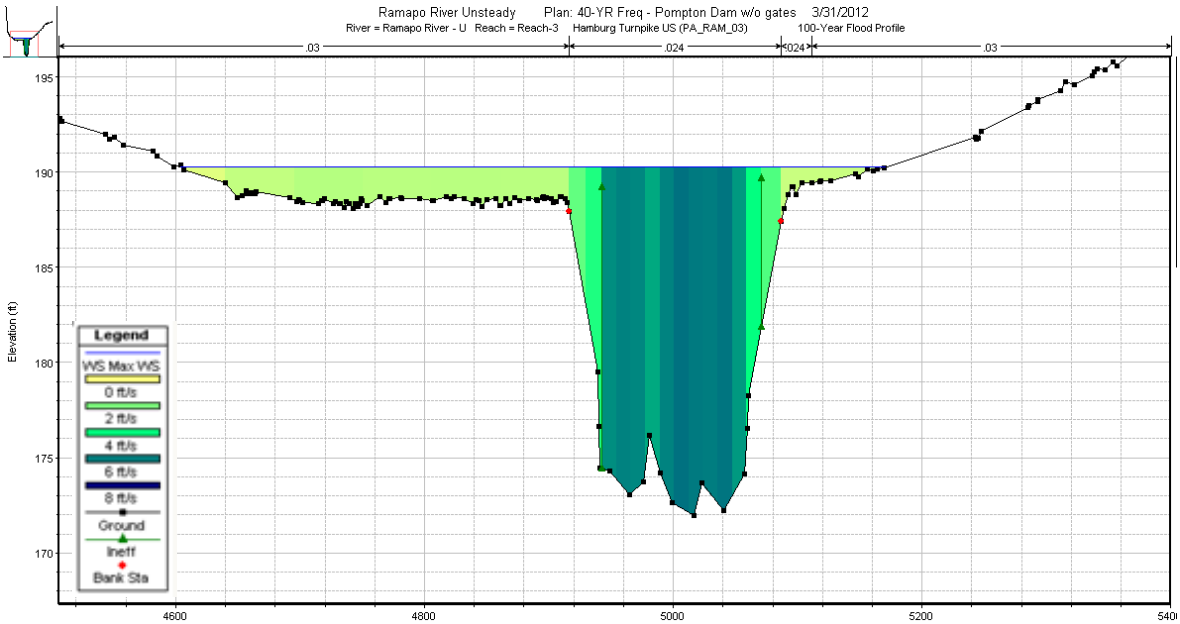
River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: 25-YR Freq

Plan: 25-YR Freq Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB	4584.60	4639.95	0.04	0.34	5.74	0.00	0.06	0.12	0.00	0.00
2	LOB	4639.95	4695.30	23.98	39.28	55.42	0.20	0.71	0.61	0.01	0.01
3	LOB	4695.30	4750.65	54.87	64.58	55.48	0.45	1.17	0.85	0.02	0.02
4	LOB	4750.65	4806.00	41.80	54.81	55.38	0.34	0.99	0.76	0.02	0.01
5	LOB	4806.00	4861.35	43.06	55.81	55.43	0.35	1.01	0.77	0.02	0.01
6	LOB	4861.35	4916.70	42.52	55.42	55.51	0.35	1.00	0.77	0.02	0.01
7	Chan	4916.70	4929.75	117.68	52.47	13.90	0.97	4.02	2.24	0.06	0.13
8	Chan	4929.75	4942.80	430.27	125.12	17.46	3.54	9.59	3.44	0.11	0.39
9	Chan	4942.80	4954.43	1013.51	177.93	11.65	8.35	15.30	5.70	0.24	1.37
10	Chan	4954.43	4966.05	1103.37	187.34	11.66	9.09	16.11	5.89	0.25	1.49
11	Chan	4966.05	4977.68	1082.90	186.29	11.83	8.92	16.02	5.81	0.25	1.44
12	Chan	4977.68	4989.31	872.67	165.90	12.23	7.19	14.27	5.26	0.21	1.12
13	Chan	4989.31	5000.94	1107.51	188.47	11.77	9.12	16.21	5.88	0.25	1.48
14	Chan	5000.94	5012.56	1232.11	199.99	11.64	10.15	17.20	6.16	0.27	1.67
15	Chan	5012.56	5024.19	1185.85	196.94	11.86	9.77	16.94	6.02	0.26	1.58

Table H.7: 25-Year Rainfall Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top table) Post Project Condition (bottom table)



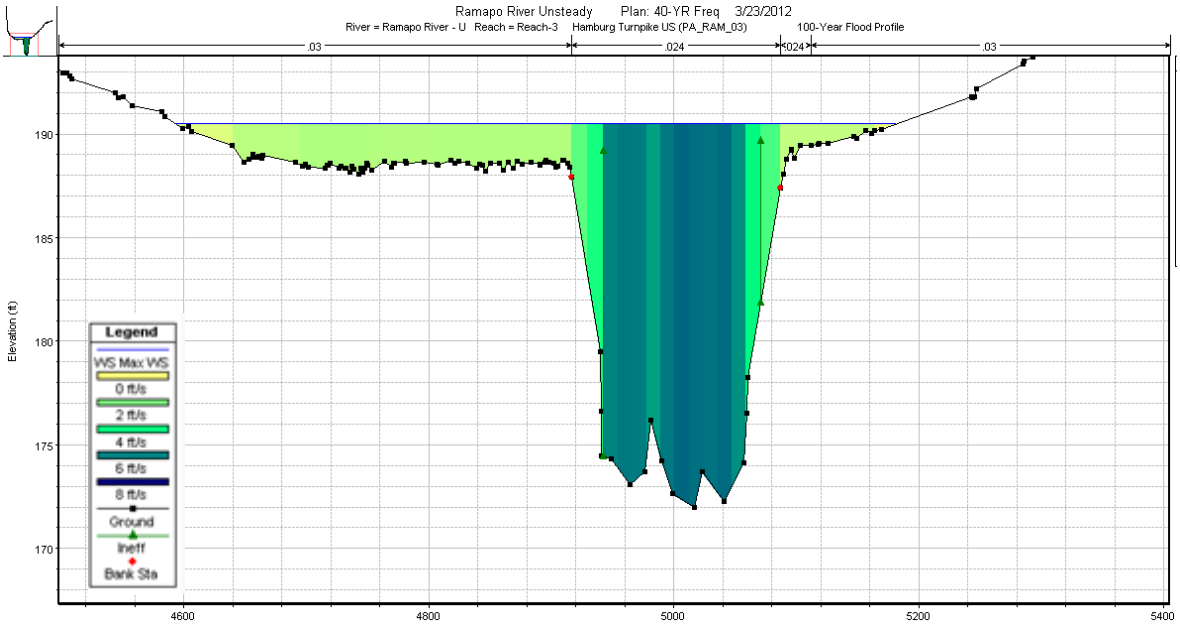


Figure H.8: 40-Year Rainfall Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top figure) Post Project Condition (bottom figure)

Flow Distribution Output

File Type Options Help

River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: 40-YR Freq -

Plan: 40-YR Freq - Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB	4584.60	4639.95	8.15	17.39	35.53	0.06	0.49	0.47	0.01	0.00
2	LOB	4639.95	4695.30	77.20	80.06	55.42	0.57	1.45	0.96	0.02	0.02
3	LOB	4695.30	4750.65	121.91	105.36	55.48	0.90	1.90	1.16	0.03	0.03
4	LOB	4750.65	4806.00	103.79	95.59	55.38	0.77	1.73	1.09	0.03	0.03
5	LOB	4806.00	4861.35	105.55	96.59	55.43	0.78	1.75	1.09	0.03	0.03
6	LOB	4861.35	4916.70	104.74	96.20	55.51	0.77	1.74	1.09	0.03	0.03
7	Chan	4916.70	4929.75	153.09	62.09	13.90	1.13	4.76	2.47	0.07	0.17
8	Chan	4929.75	4942.80	478.38	134.74	17.46	3.54	10.32	3.55	0.12	0.43
9	Chan	4942.80	4954.43	1077.22	186.50	11.65	7.96	16.04	5.78	0.25	1.45
10	Chan	4954.43	4966.05	1168.21	195.91	11.66	8.63	16.85	5.96	0.26	1.57
11	Chan	4966.05	4977.68	1147.01	194.86	11.83	8.48	16.76	5.89	0.26	1.52
12	Chan	4977.68	4989.31	932.67	174.47	12.23	6.89	15.00	5.35	0.22	1.20
13	Chan	4989.31	5000.94	1172.08	197.04	11.77	8.66	16.95	5.95	0.26	1.56
14	Chan	5000.94	5012.56	1298.51	208.55	11.64	9.60	17.94	6.23	0.28	1.75
15	Chan	5012.56	5024.19	1251.09	205.50	11.86	9.25	17.67	6.09	0.27	1.66

Flow Distribution Output

File Type Options Help

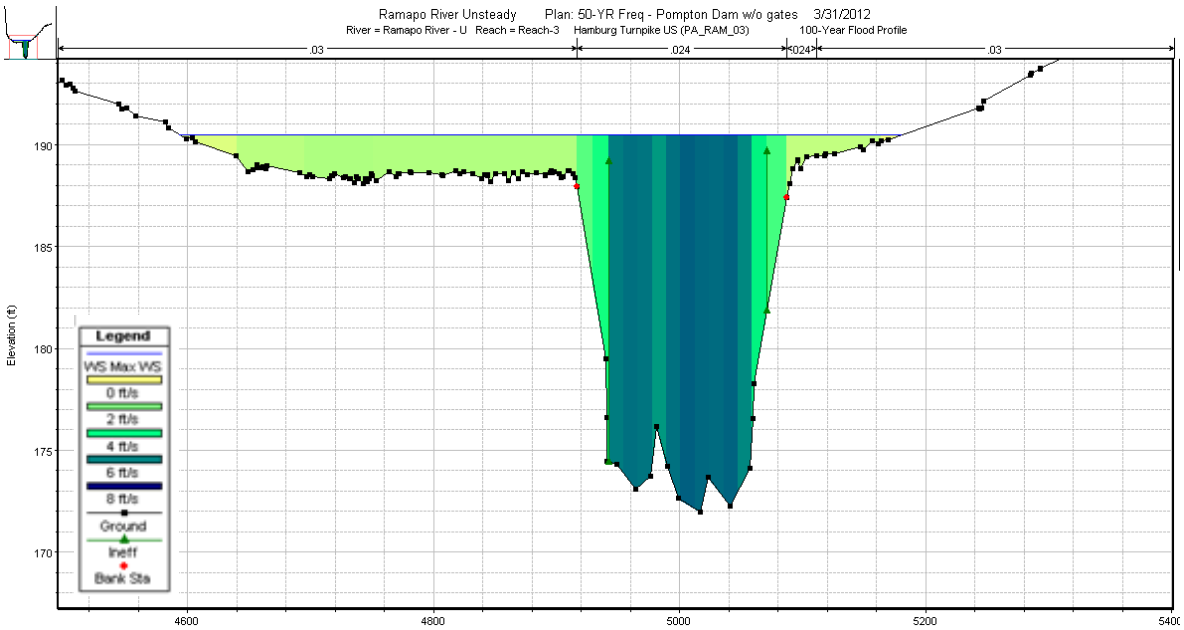
River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: 40-YR Freq

Plan: 40-YR Freq Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB	4584.60	4639.95	13.77	26.36	46.39	0.10	0.57	0.52	0.01	0.00
2	LOB	4639.95	4695.30	97.58	91.67	55.42	0.69	1.66	1.06	0.03	0.03
3	LOB	4695.30	4750.65	146.37	116.97	55.48	1.03	2.11	1.25	0.03	0.04
4	LOB	4750.65	4806.00	126.73	107.20	55.38	0.89	1.94	1.18	0.03	0.04
5	LOB	4806.00	4861.35	128.63	108.20	55.43	0.91	1.95	1.19	0.03	0.04
6	LOB	4861.35	4916.70	127.74	107.81	55.51	0.90	1.95	1.18	0.03	0.04
7	Chan	4916.70	4929.75	167.47	64.82	13.90	1.18	4.97	2.58	0.08	0.20
8	Chan	4929.75	4942.80	503.62	137.47	17.46	3.54	10.53	3.66	0.13	0.47
9	Chan	4942.80	4954.43	1120.70	188.94	11.65	7.89	16.25	5.93	0.26	1.56
10	Chan	4954.43	4966.05	1214.11	198.35	11.66	8.54	17.06	6.12	0.28	1.69
11	Chan	4966.05	4977.68	1192.21	197.30	11.83	8.39	16.97	6.04	0.27	1.63
12	Chan	4977.68	4989.31	971.76	176.91	12.23	6.84	15.21	5.49	0.23	1.29
13	Chan	4989.31	5000.94	1217.99	199.48	11.77	8.57	17.16	6.11	0.27	1.68
14	Chan	5000.94	5012.56	1347.85	210.99	11.64	9.48	18.15	6.39	0.29	1.88
15	Chan	5012.56	5024.19	1299.00	207.94	11.86	9.14	17.88	6.25	0.28	1.78

Table H.8: 40-Year Rainfall Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top table) Post Project Condition (bottom table)



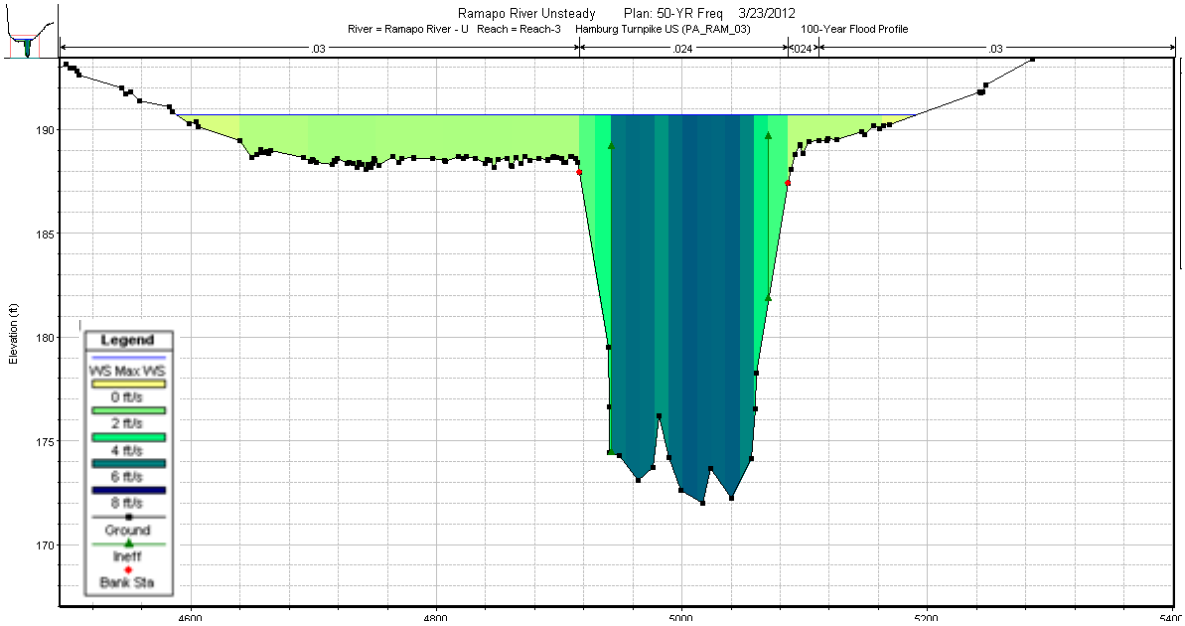


Figure H.9: 50-Year Rainfall Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top figure) Post Project Condition (bottom figure)

Flow Distribution Output

File Type Options Help

River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: 50-YR Freq -

Plan: 50-YR Freq - Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB	4584.60	4639.95	13.90	26.17	46.28	0.10	0.57	0.53	0.01	0.01
2	LOB	4639.95	4695.30	99.13	91.44	55.42	0.68	1.65	1.08	0.03	0.03
3	LOB	4695.30	4750.65	148.82	116.74	55.48	1.03	2.11	1.27	0.04	0.05
4	LOB	4750.65	4806.00	128.81	106.97	55.38	0.89	1.93	1.20	0.03	0.04
5	LOB	4806.00	4861.35	130.75	107.97	55.43	0.90	1.95	1.21	0.03	0.04
6	LOB	4861.35	4916.70	129.84	107.58	55.51	0.90	1.94	1.21	0.03	0.04
7	Chan	4916.70	4929.75	170.60	64.77	13.90	1.18	4.96	2.63	0.08	0.21
8	Chan	4929.75	4942.80	513.39	137.42	17.46	3.54	10.53	3.74	0.13	0.50
9	Chan	4942.80	4954.43	1142.68	188.89	11.65	7.89	16.25	6.05	0.27	1.66
10	Chan	4954.43	4966.05	1237.95	198.30	11.66	8.55	17.06	6.24	0.29	1.79
11	Chan	4966.05	4977.68	1215.62	197.25	11.83	8.39	16.96	6.16	0.28	1.73
12	Chan	4977.68	4989.31	990.80	176.86	12.23	6.84	15.21	5.60	0.24	1.37
13	Chan	4989.31	5000.94	1241.92	199.43	11.77	8.57	17.15	6.23	0.29	1.78
14	Chan	5000.94	5012.56	1374.36	210.94	11.64	9.49	18.14	6.52	0.31	1.99
15	Chan	5012.56	5024.19	1324.54	207.90	11.86	9.14	17.88	6.37	0.30	1.88

Flow Distribution Output

File Type Options Help

River: Ramapo River - U Profile: Max WS

Reach Reach-3 RS: 10135 Plan: 50-YR Freq

Plan: 50-YR Freq Ramapo River - U Reach-3 RS: 10135 Profile: Max WS

	Pos	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Conv	Hydr Depth(ft)	Velocity (ft/s)	Shear (lb/sq ft)	Power (lb/ft s)
1	LOB	4584.60	4639.95	22.45	36.46	51.71	0.15	0.71	0.62	0.01	0.01
2	LOB	4639.95	4695.30	121.17	103.07	55.42	0.81	1.86	1.18	0.03	0.04
3	LOB	4695.30	4750.65	174.57	128.37	55.48	1.17	2.32	1.36	0.04	0.05
4	LOB	4750.65	4806.00	153.18	118.60	55.38	1.02	2.14	1.29	0.04	0.05
5	LOB	4806.00	4861.35	155.26	119.60	55.43	1.04	2.16	1.30	0.04	0.05
6	LOB	4861.35	4916.70	154.27	119.21	55.51	1.03	2.15	1.29	0.04	0.05
7	Chan	4916.70	4929.75	183.05	67.51	13.90	1.22	5.17	2.71	0.08	0.22
8	Chan	4929.75	4942.80	531.30	140.16	17.46	3.55	10.74	3.79	0.14	0.51
9	Chan	4942.80	4954.43	1169.02	191.33	11.65	7.81	16.46	6.11	0.28	1.69
10	Chan	4954.43	4966.05	1265.21	200.74	11.66	8.45	17.27	6.30	0.29	1.83
11	Chan	4966.05	4977.68	1242.52	199.69	11.83	8.30	17.17	6.22	0.28	1.77
12	Chan	4977.68	4989.31	1015.10	179.30	12.23	6.78	15.42	5.66	0.25	1.40
13	Chan	4989.31	5000.94	1269.11	201.87	11.77	8.47	17.36	6.29	0.29	1.82
14	Chan	5000.94	5012.56	1402.91	213.39	11.64	9.37	18.35	6.57	0.31	2.03
15	Chan	5012.56	5024.19	1352.44	210.34	11.86	9.03	18.09	6.43	0.30	1.92

Table H.9: 50-Year Rainfall Storm Event – Velocity Distribution at Hamburg Turnpike Bridge – Pre Project Condition (top table) Post Project Condition (bottom table)

Appendix I

FLOW AND VELOCITY DISTRIBUTION FOR RAMAPO RIVER CROSS SECTIONS

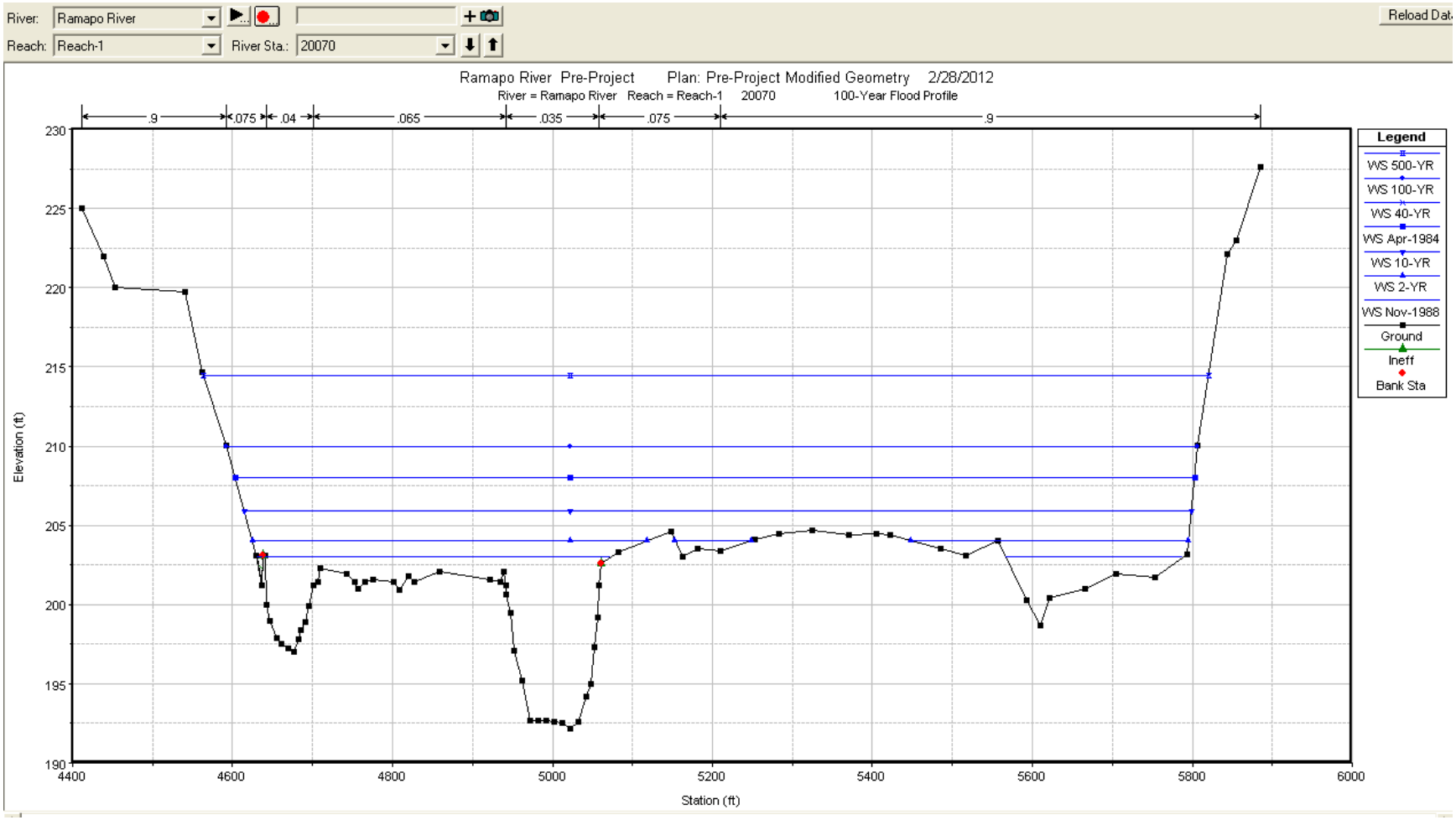


Figure I.1 - Cross Section 20070 Ramapo River Pre-Project Condition

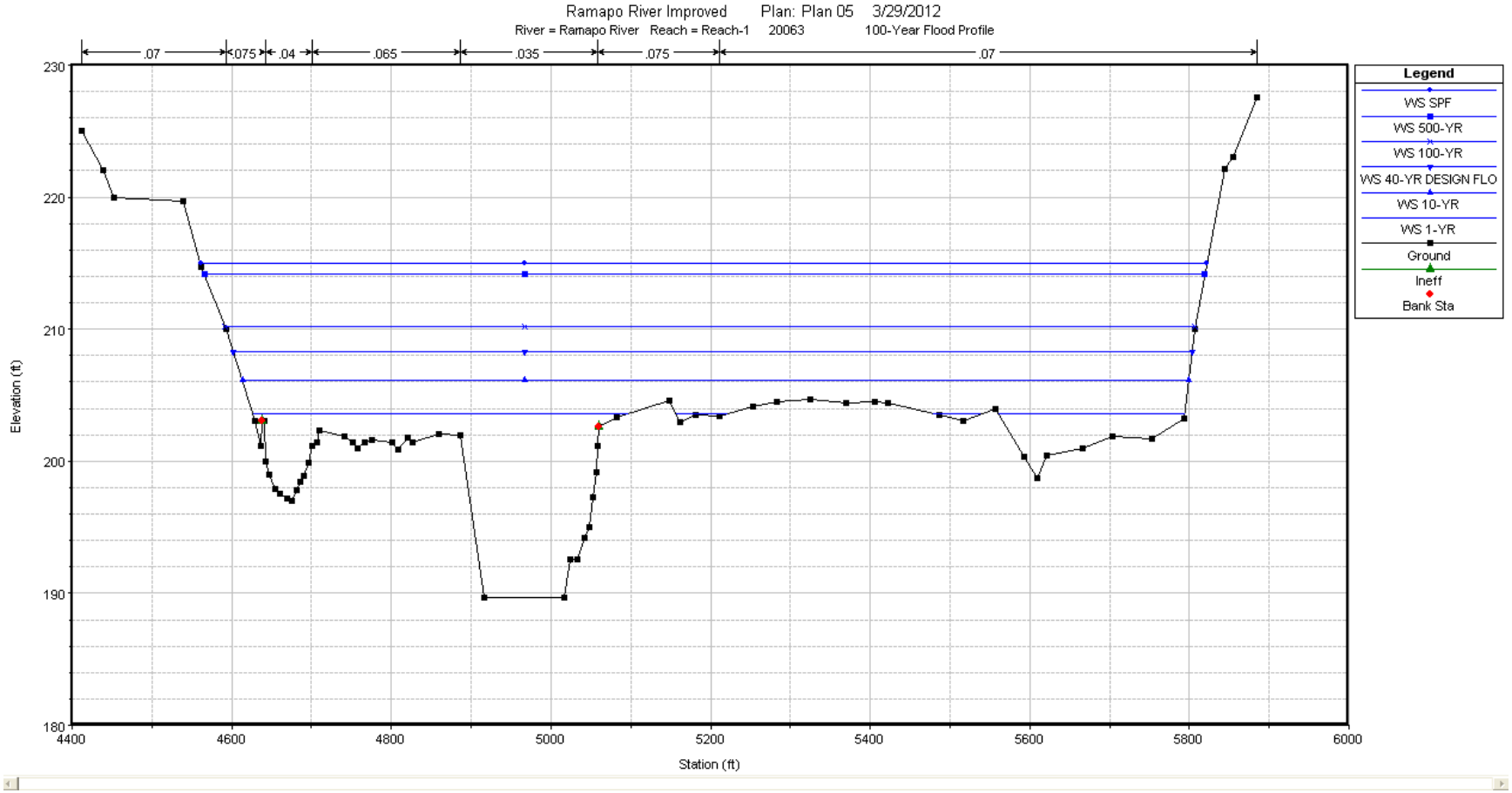


Figure 1.2-Cross Section 20063 Ramapo River Post-Project Condition

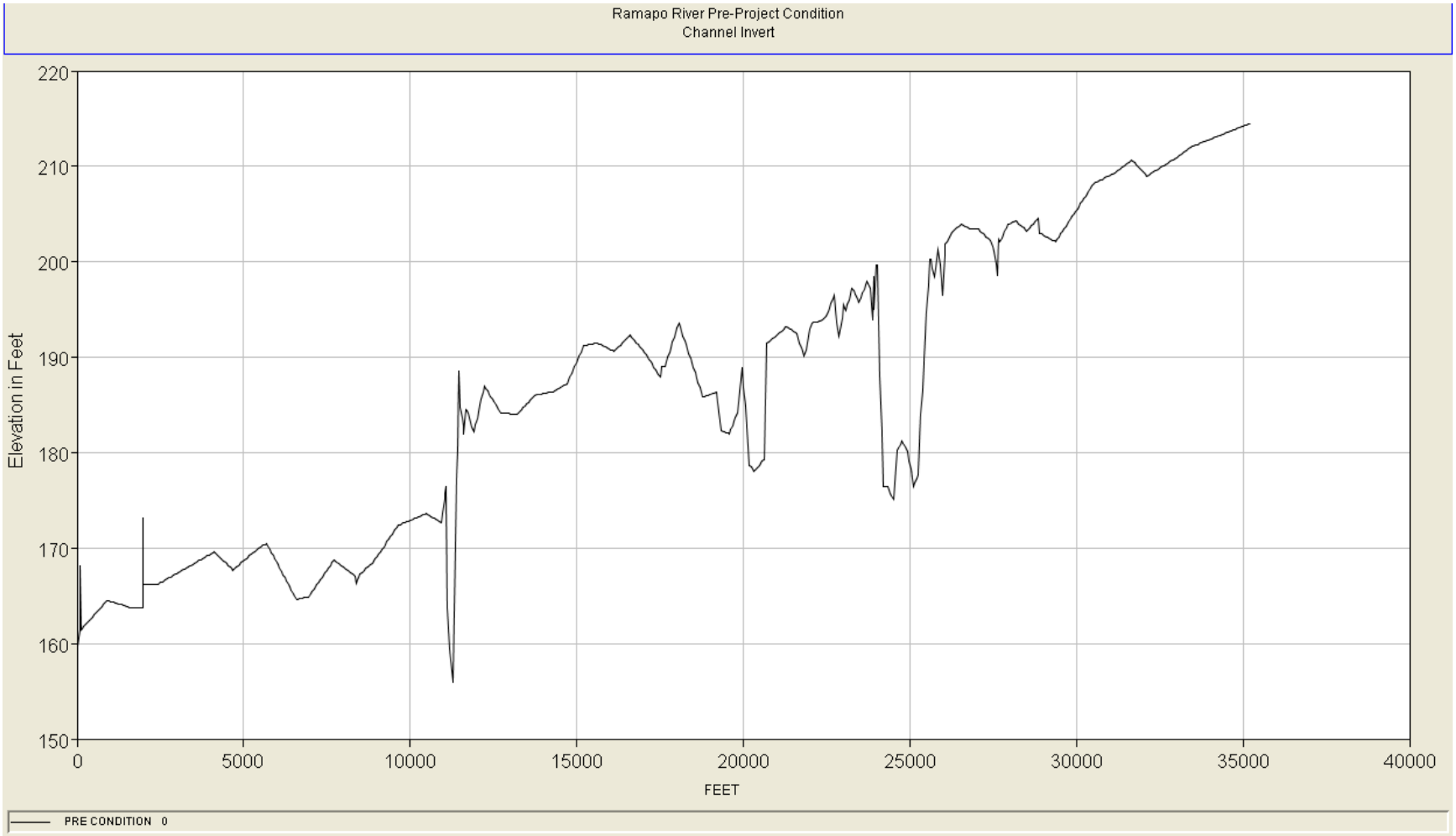


Figure I.3 - Channel Invert for the Ramapo River for Pre-Project Condition

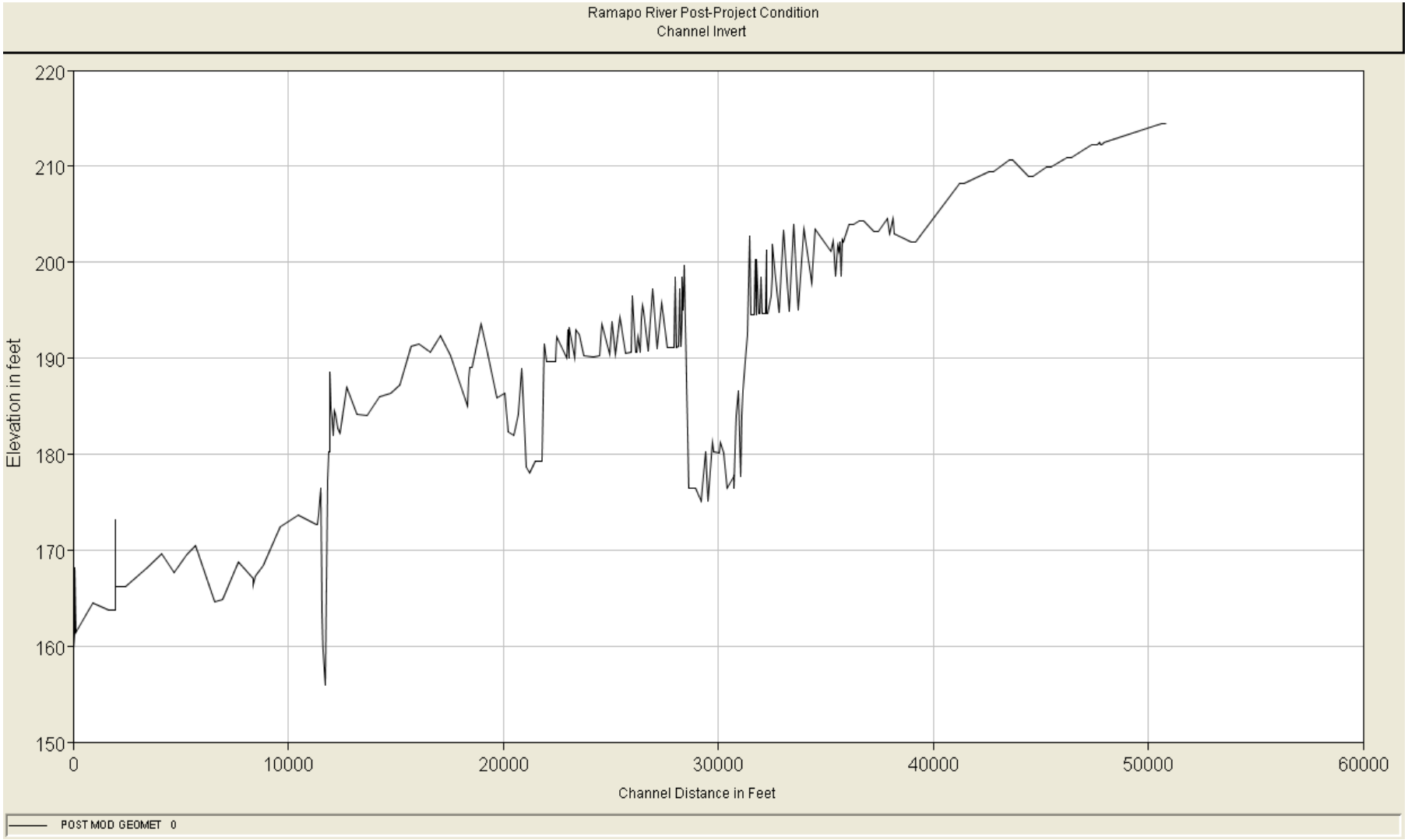


Figure I.4 - Channel Invert for the Ramapo River for Post-Project Condition

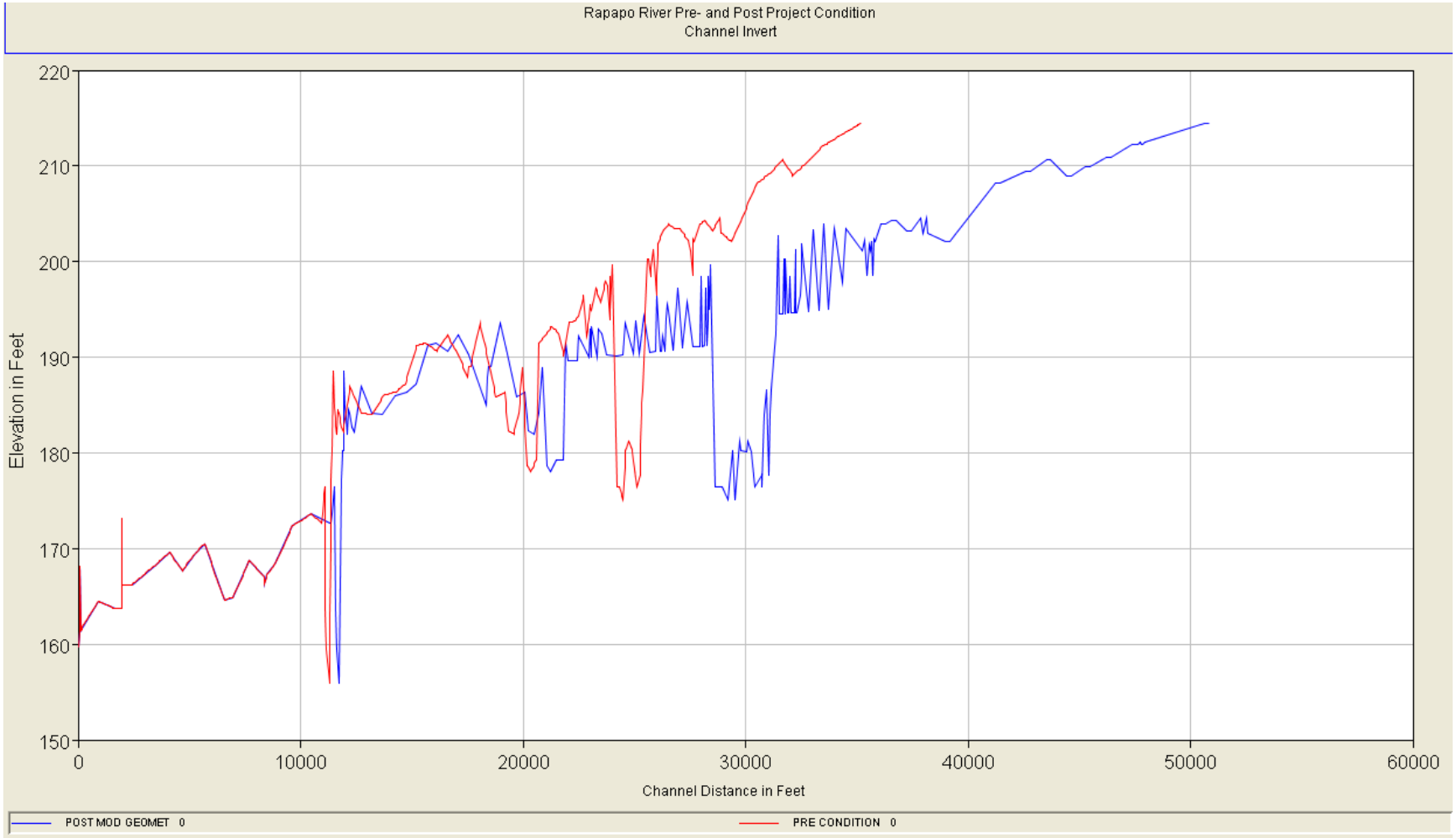
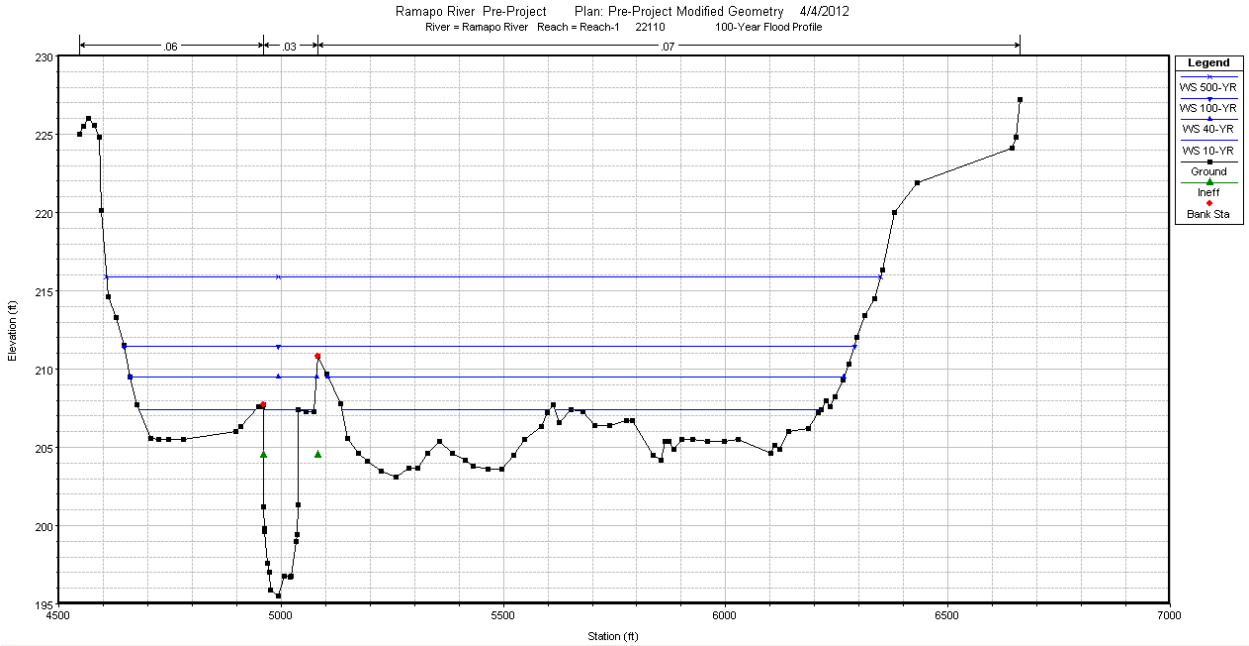


Figure I.5 - Channel Inverts for the Ramapo River for Pre-Project Condition (red line) and Post-Project Condition (blue line)

Table I.1 -Comparison of Pre- and Post Project Conditions at Cross Section 20070

Storm Event	Flow in cfs Pre-Project Condition cfs	Water Surface Elevation Pre-Project Condition	Flow in cfs Post-Project Condition cfs	Water Surface Elevation Post-Project Condition	Difference In feet
10-Year Flood	8,700	205.92	9,700	206.11	0.19
40-Year Flood	14,690	208.03	15,700	208.25	0.22
100-Year Flood	20,000	209.96	21,200	210.16	0.20
500-Year Flood t	34,600	214.43	36,100	214.13	-0.30

Note: The flows are higher for the Post-Project Condition which would result in slightly higher water surface elevations compared to the Pre-Project Condition



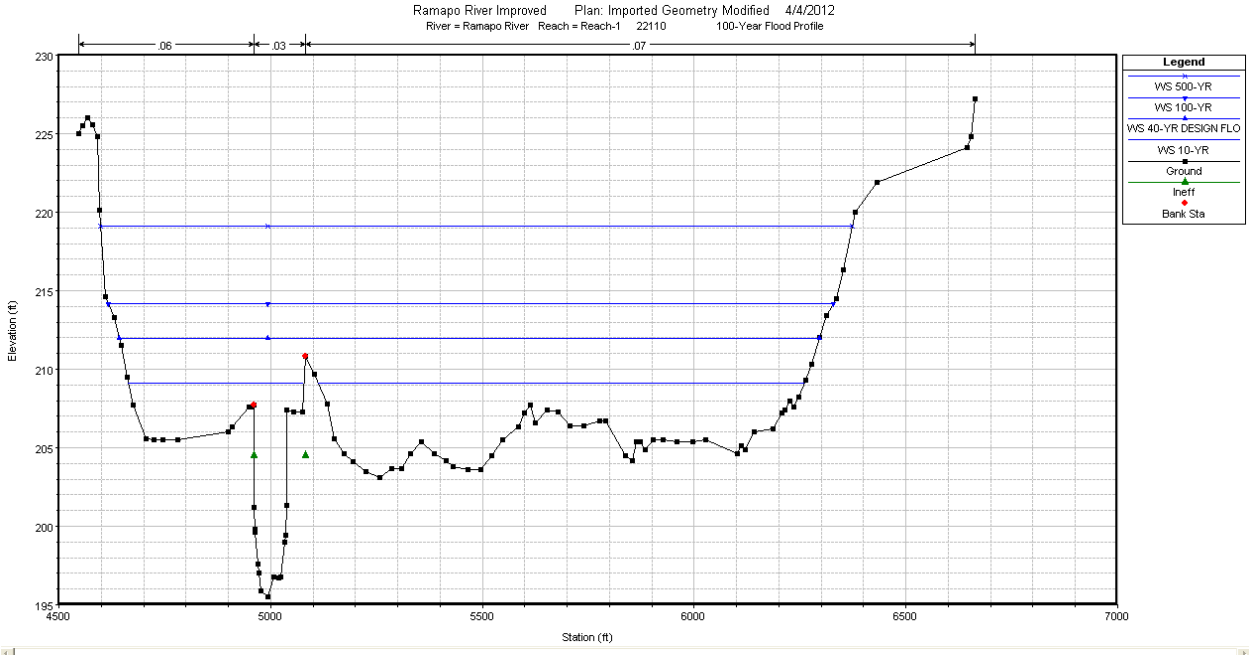


Figure I.6 - Ramapo River Cross Secton 22110 for Pre- (top figure) and Post Conditions (bottom figure). (Note that the cross sections are the same).

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Trvl Tme Chl
			(cfs)	(ft)	(ft)	(hrs)
Reach-1	32690		Bridge			
Reach-1	32670	10-YR	8700.00	212.30	222.96	4.90
Reach-1	32670	40-YR	14690.00	212.30	225.71	3.70
Reach-1	32670	100-YR	20000.00	212.30	227.27	3.19
Reach-1	32670	500-YR	34600.00	212.30	228.76	2.45

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Trvl Tme Chl
			(cfs)	(ft)	(ft)	(hrs)
Reach-1	32523		Bridge			
Reach-1	32503	10-YR	9200.00	212.30	225.45	7.00
Reach-1	32503	40-YR DESIGN FLO	15200.00	212.30	227.32	5.71
Reach-1	32503	100-YR	20600.00	212.30	228.07	5.09
Reach-1	32503	500-YR	35400.00	212.30	231.72	3.92

Table I.2 - Average Accumulated Travel Times for the flows at Lapate Lane Bridge to the Jackson Avenue Bridge for Pre- and Post Project Conditions (Note the average travel time is longer for the Post-Project Condition)

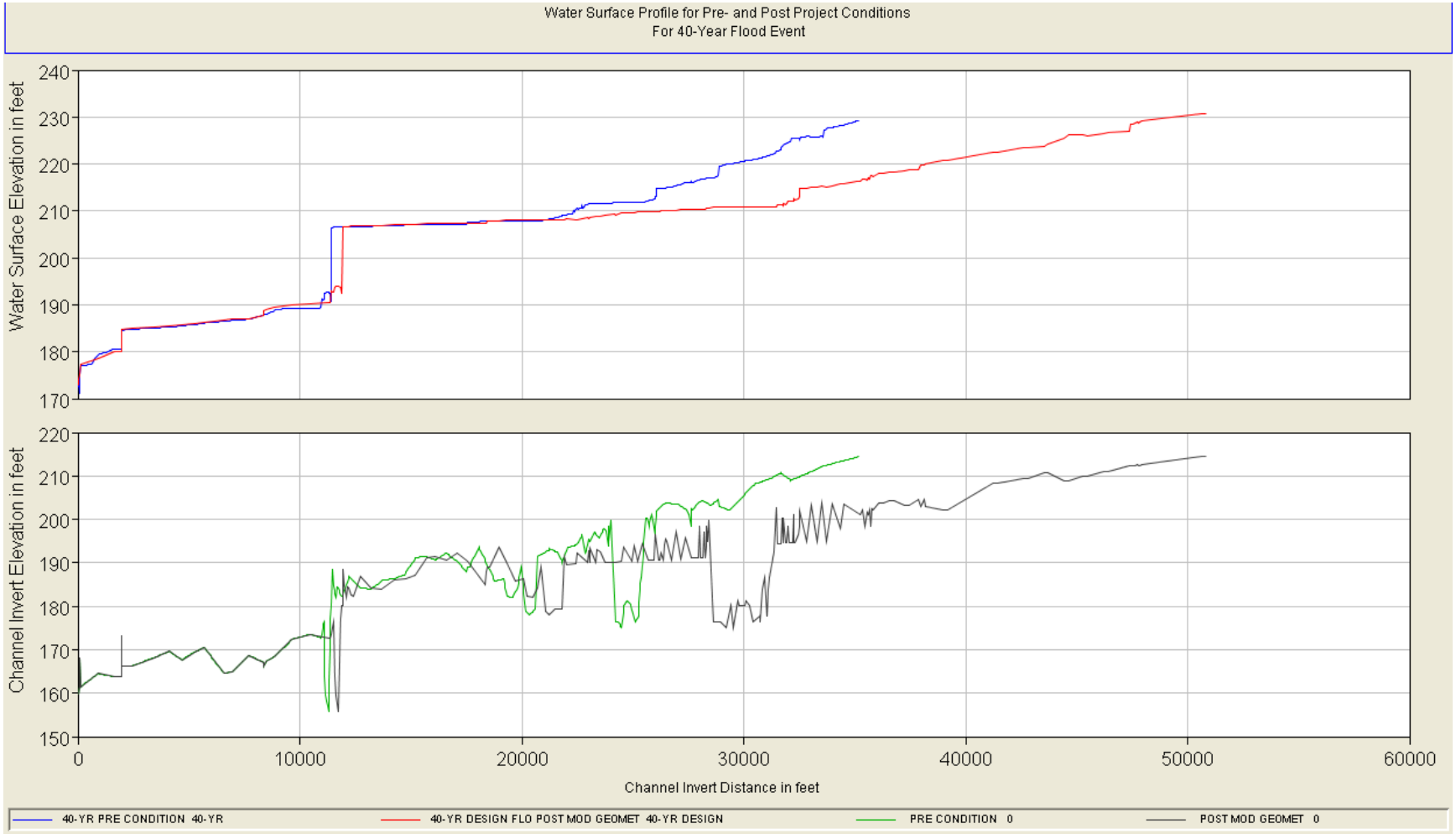


Figure I.7-Water Surface Profiles for the 40-Year Flood Event – Pre- (blue and greent lines) and Post Project Conditions (red and black lines)

Appendix J

HEC-RAS OUTPUT REPORT – PRE AND POST CONDITIONS ANALYSIS

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Ramapo River Pre-Project
Project File : RampoRiverPre.prj
Run Date and Time: 4/4/2012 11:49:26 AM

Project in English units

Project Description:
RAMAPO RIVER GDM, OAKLAND, N.J.,
 YEAR 2040, WITHOUT PROJECT CONDITIONS

FILE "RAMEX1"; 1 YEAR FLOW

PLAN DATA

Plan Title: Pre-Project Modified Geometry
Plan File : g:\New Jersey Prompton Lake Dam\Pre HEC-2 Conversion\RampoRiverPre.p03

Geometry Title: Pre-Project Modified Geometry
Geometry File : g:\New Jersey Prompton Lake Dam\Pre HEC-2 Conversion\RampoRiverPre.g04

Flow Title   : USACE Pre-Project
Flow File   : g:\New Jersey Prompton Lake Dam\Pre HEC-2 Conversion\RampoRiverPre.f02

Plan Summary Information:

Number of:	Cross Sections	= 138	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	1
	Bridges	= 7	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options
Critical depth computed at all cross sections

Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: USACE Pre-Project
Flow File : g:\New Jersey Prompton Lake Dam\Pre HEC-2 Conversion\RampoRiverPre.f02

Flow Data (cfs)

River	Reach	RS	Nov-1988	2-YR	10-YR	40-YR	Apr-1984	100-YR	500-YR
Ramapo River	Reach-1	34312	2430	4200	8700	14690	15460	20000	34600
Ramapo River	Reach-1	28480	2420	4300	8800	14700	15420	20260	34700
Ramapo River	Reach-1	20495	2440	4500	9100	15000	14980	20600	35300
Ramapo River	Reach-1	15696	2440	4500	9100	15000	14980	20600	35300
Ramapo River	Reach-1	4785	3580	7000	14800	25400	26300	36400	61700

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Ramapo River	Reach-1	Nov-1988	Critical	Critical
Ramapo River	Reach-1	2-YR	Critical	Critical
Ramapo River	Reach-1	10-YR	Critical	Critical
Ramapo River	Reach-1	40-YR	Critical	Critical
Ramapo River	Reach-1	Apr-1984	Critical	Critical
Ramapo River	Reach-1	100-YR	Critical	Critical
Ramapo River	Reach-1	500-YR	Critical	Critical

GEOMETRY DATA

Geometry Title: Pre-Project Modified Geometry
Geometry File : g:\New Jersey Prompton Lake Dam\Pre HEC-2 Conversion\RampoRiverPre.g04

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 34312

INPUT
Description: 34312

Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	250	1079	220	1134	217	1168	214.5	1202	214.5
1234	217	1450	250						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.055	1134	.035	1234	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1134	1234	1445.07	1445.07	1445.07	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 32867

INPUT
Description: 32867

Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	250	1060	216.1	1085	212.5	1120	212.5	1148	216.1
1228	220	1578	226						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.055	1060	.035	1148	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1060	1148	117	117	117	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 32750

INPUT
Description: 32750
This is a REPEATED section.

Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4712	243.2	4723.3	242	4736.9	241.1	4737.1	241.1	4750.4	240.1
4772.5	238	4791.1	236.6	4815.6	232.9	4836.7	231.9	4854	230.2
4874.7	228.5	4891.4	227.9	4903.9	226	4909.6	226	4913.6	227.1
4913.7	225.1	4925	216	4925.1	216	4929.6	214.4	4940	213
4954.8	212.5	4962	212.3	4962.1	212.3	4965	212.5	4965.1	212.5
4971.4	213.1	4991.4	212.8	5002	212.5	5002.1	212.5	5005	212.5
5005.1	212.5	5012.7	212.9	5030.8	213.7	5042	213.2	5042.1	213.5
5045	213.1	5045.1	213.1	5047.2	213.5	5060.2	213.5	5070.4	214.2

5082	219.5	5082.1	219.5	5092.7	223.8	5092.8	227.1	5096.4	226
5107.1	226.4	5138.9	226.2	5157.2	225.9	5176.6	224.9	5184.7	226.4
5201.3	226.6	5225.8	226.6	5258.5	227.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4712	.055	4913.6	.035	5092.8	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913.6	5092.8	40	40	40	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 32710

INPUT
Description: 32710
LENAPE LANE BRIDGE

Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4712	243.2	4723.3	242	4736.9	241.1	4737.1	241.1	4750.4	240.1
4772.5	238	4791.1	236.6	4815.6	232.9	4836.7	231.9	4854	230.2
4874.7	228.5	4891.4	227.9	4903.9	226	4909.6	226	4913.6	227.1
4913.7	225.1	4925	216	4925.1	216	4929.6	214.4	4940	213
4954.8	212.5	4962	212.3	4962.1	212.3	4965	212.5	4965.1	212.5
4971.4	213.1	4991.4	212.8	5002	212.5	5002.1	212.5	5005	212.5
5005.1	212.5	5012.7	212.9	5030.8	213.7	5042	213.2	5042.1	213.5
5045	213.1	5045.1	213.1	5047.2	213.5	5060.2	213.5	5070.4	214.2
5082	219.5	5082.1	219.5	5092.7	223.8	5092.8	227.1	5096.4	226
5107.1	226.4	5138.9	226.2	5157.2	225.9	5176.6	224.9	5184.7	226.4
5201.3	226.6	5225.8	226.6	5258.5	227.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4712	.055	4913.6	.035	5092.8	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913.6	5092.8	40	40	40	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4712	4913.6	243	F
5092.8	5258.5	227.1	F

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 32690

INPUT
Description: LENAPE LANE BRIDGE

Distance from Upstream XS = 11
Deck/Roadway Width = 18
Weir Coefficient = 2.7
Upstream Deck/Roadway Coordinates
num= 28

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord

4712	243.2	243.2	4723	242	242	4736.9	241.1	241.1
4737.1	241.1	241.1	4750.4	240.1	240.1	4772.5	238	238
4791.1	236.6	236.6	4815.6	232.9	232.9	4836.7	231.9	231.9
4854	230.2	230.2	4874.7	229	228.5	4891.4	228	227.9
4903.9	227.6	226	4909.6	227.5	226	4913.6	227.4	227.1
4913.7	227.4	225.1	4925	230	216.6	4925	230	224
4965	230.2	224	5002	230.5	224.5	5042	230.4	224.2
5082	230.1	224	5082.1	230.1	219.5	5092.7	227.1	223.8
5092.8	227.1	227.1	5096.4	227.1	226	5107.1	227.1	226.4
5138.9	227.1	226.2						

Upstream Bridge Cross Section Data
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4712	243.2	4723.3	242	4736.9	241.1	4737.1	241.1	4750.4	240.1
4772.5	238	4791.1	236.6	4815.6	232.9	4836.7	231.9	4854	230.2
4874.7	228.5	4891.4	227.9	4903.9	226	4909.6	226	4913.6	227.1
4913.7	225.1	4925	216	4925.1	216	4929.6	214.4	4940	213
4954.8	212.5	4962	212.3	4962.1	212.3	4965	212.5	4965.1	212.5
4971.4	213.1	4991.4	212.8	5002	212.5	5002.1	212.5	5005	212.5
5005.1	212.5	5012.7	212.9	5030.8	213.7	5042	213.2	5042.1	213.5
5045	213.1	5045.1	213.1	5047.2	213.5	5060.2	213.5	5070.4	214.2
5082	219.5	5082.1	219.5	5092.7	223.8	5092.8	227.1	5096.4	226
5107.1	226.4	5138.9	226.2	5157.2	225.9	5176.6	224.9	5184.7	226.4
5201.3	226.6	5225.8	226.6	5258.5	227.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4712	.055	4913.6	.035	5092.8	.055

Bank Sta: Left	Right	Coeff Contr.	Expan.
4913.6	5092.8	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4712	4913.6	243	F
5092.8	5258.5	227.1	F

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 23

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4712	243.2	243.2	4723	242	242	4736.9	241.1	241.1
4737.1	241.1	241.1	4750.4	240.1	240.1	4772.5	238	238
4791.1	236.6	236.6	4815.6	232.9	232.9	4836.7	231.9	231.9
4854	230.2	230.2	4874.7	229	229	4891.4	228	228
4913.6	227.4	227.4	4913.7	227.4	225.1	4925	230	224
4965	230.2	224	5002	230.5	224.5	5042	230.4	224.2
5082	230.1	224	5092.7	227.3	223.8	5096.4	227.1	227.1
5107.1	227.1	227.1	5138.9	227.1	227.1			

Downstream Bridge Cross Section Data
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4712	243.2	4723	242	4736.9	241.1	4737.1	241.1	4750.4	240.1
4772.5	238	4791.1	236.6	4815.6	232.9	4836.7	231.9	4854	230.2
4874.7	229	4891.4	228	4913.6	227.4	4916.5	215.9	4920.4	214.4
4933.9	213.2	4952	213.2	4966.2	212.3	4980.1	212.8	5000.8	213.5
5019.7	213.2	5036	212.8	5055.9	213	5079.6	213.9	5084.4	215.6
5092.7	223.8	5096.4	227.1	5107.1	227.1	5138.9	227.1	5167.2	226.2
5175.7	226.7	5195.8	227.2	5217.4	227.2	5233.7	227.1	5249	227.3
5275.1	228.3	5298.2	228.3	5315.2	230	5341.1	232	5383.2	235.7
5399.5	236.8	5418.9	238.5	5439.6	240.2	5463.1	241.1	5499	243.1

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4712    .055  4913.6    .035  5096.4    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
        4913.6  5096.4             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    4712  4916.4     241       F
Sediment Elevation = 0

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =   227.4
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  3

Pier Data
Pier Station     Upstream=  4963.5    Downstream=  4963.5
Upstream     num=       2
    Width   Elev    Width   Elev
       3     210       3     230
Downstream     num=       2
    Width   Elev    Width   Elev
       3     210       3     230

Pier Data
Pier Station     Upstream=  5003.5    Downstream=  5003.5
Upstream     num=       2
    Width   Elev    Width   Elev
       3     210       3     230
Downstream     num=       2
    Width   Elev    Width   Elev
       3     210       3     230

Pier Data
Pier Station     Upstream=  5043.5    Downstream=  5043.5
Upstream     num=       2
    Width   Elev    Width   Elev
       3     210       3     230
Downstream     num=       2
    Width   Elev    Width   Elev
       3     210       3     230

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd = .766965
           Max Low Cord                =   224.5

Additional Bridge Parameters
```

Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 32670

INPUT
Description: 32670
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4712	243.2	4723	242	4736.9	241.1	4737.1	241.1	4750.4	240.1
4772.5	238	4791.1	236.6	4815.6	232.9	4836.7	231.9	4854	230.2
4874.7	229	4891.4	228	4913.6	227.4	4916.5	215.9	4920.4	214.4
4933.9	213.2	4952	213.2	4966.2	212.3	4980.1	212.8	5000.8	213.5
5019.7	213.2	5036	212.8	5055.9	213	5079.6	213.9	5084.4	215.6
5092.7	223.8	5096.4	227.1	5107.1	227.1	5138.9	227.1	5167.2	226.2
5175.7	226.7	5195.8	227.2	5217.4	227.2	5233.7	227.1	5249	227.3
5275.1	228.3	5298.2	228.3	5315.2	230	5341.1	232	5383.2	235.7
5399.5	236.8	5418.9	238.5	5439.6	240.2	5463.1	241.1	5499	243.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4712	.055	4913.6	.035	5096.4	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913.6	5096.4	559.92	570	600	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
4712	4916.4	241	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 32100

INPUT
Description: 32100

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3359.9	243.2	3412.3	238.7	3441.9	233.8	3531.2	229.4	3658.2	230.5
3717.5	229.2	3804.6	217.5	3814.6	216.5	3824.6	215.4	3834.6	214.5
3844.6	213.3	3854.6	212	3864.6	211.1	3874.6	210.9	3884.6	210.8
3894.6	210.7	3904.6	210.8	3914.6	211.1	3924.6	211.2	3934.6	211
3944.6	209.6	3954.6	208.1	3964.6	207.5	3974.6	207.2	3984.6	207.3
3994.6	207.5	4004.6	208	4014.6	208.3	4024.6	208.1	4034.6	208.1
4044.6	208.1	4054.6	208.1	4064.6	208.4	4074.6	208.5	4084.6	208.6
4094.6	208.7	4114.6	208.8	4124.6	208.5	4134.6	208.6	4154.6	208.5
4194.6	208.5	4204.6	208.5	4214.6	208.5	4224.6	208.3	4234.6	208.1
4244.6	208	4254.6	208	4264.6	208.1	4274.6	208.9	4284.6	209.7
4294.6	210	4304.6	210.8	4314.6	211.1	4324.6	211.7	4334.6	212
4344.6	212.5	4354.6	213	4364.6	213.2	4374.6	213.8	4384.6	214
4394.6	214.5	4404.6	214.8	4414.6	215.1	4424.6	215.5	4436.6	217.2
4447	219.1	4452	220.9	4457	221.2	4457.9	222.2	4458	222.8
4466.8	224	4496.2	229.5	4552.1	237.4	4623.6	235.5	4699.7	225.3

4776.5	225.6	4818.9	223	4854.6	220.8	4872.6	220.1	4892.7	220.2
4910	219.7	4931	218.4	4936	214	4964	211.4	4977	211.1
5002	211	5026	210.9	5039	211.2	5059	213.2	5067	214.8
5076.5	218.3	5086	219.2	5105	219	5107	219.3	5139.3	216.2
5179	217.5	5207	229	5240.4	240	5248	243		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3359.9	.08	3804.6	.04	4452	.055	4776.5	.035	5179	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4776.5	5179	450	460	570	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3359.9	4776.5	238	F
5179	5248	217.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 31640

INPUT
Description: 31640

Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3185.4	243	3281	236	3307.5	235.4	3345.4	232.4	3387.9	232.4
3454.6	233.2	3522.5	231.5	3575.8	231.9	3761.6	230.9	3783	229.7
3796.4	224.1	3833.6	222.6	3844	231.2	3865.2	231.2	3871.3	224.5
3893.6	228.8	3919.1	229.5	3964	228.2	4047.2	224	4677.2	224.2
4704.8	223.9	4721.1	225	4781.2	225.3	4809.7	224	4827.4	223.2
4839.2	221.7	4854.2	221.8	4866.8	221.6	4881.2	221	4895.3	220.8
4919	220.2	4937.8	218.3	4942.8	215.8	4947.3	213.2	4955.8	212
4964.3	211	4974.3	210.1	4984.8	210.2	4994.8	210.3	5003.3	210.3
5012.8	209.9	5019.3	209.9	5026.3	209.9	5034.3	210.3	5042.8	210.8
5052.7	212.3	5052.8	213.2	5058.9	213.5	5124.2	243		

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3185.4	.08	3761.6	.04	3844	.055	3865.2	.035	3893.6	.08
4047.2	.03	4677.2	.07	4964.3	.045	5058.9	.08		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5003.3	5052.7	50.04	420.03	414.99	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 31220

INPUT
Description: 31220

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3402.2	243	3540	232.6	3574.4	231.1	3639.7	230.1	3669.5	228.7
3682.7	228.9	3739.2	230.2	3776.9	230.3	3842.6	229	3856.7	230.1
3864	221.5	3879.3	221.5	3887.3	230.7	4064.9	223.6	4075	227

4140	222.7	4193.9	219.2	4215	219	4245	216.8	4255	215.1
4275	212	4285	211.1	4305	210	4335	208.8	4355	207.3
4365	207	4375	207.3	4385	208	4395	208	4405	208
4410	207.5	4415	206.6	4425	206.2	4435	206.2	4445	206.3
4455	206.5	4465	206.5	4475	206.5	4485	206.4	4495	206
4505	205.9	4515	205.8	4525	205.7	4535	205.7	4545	205.7
4555	205.8	4565	205.9	4575	206	4585	206	4595	206.8
4605	207	4615	207	4625	208	4635	207.7	4645	208.2
4655	209.9	4665	210.8	4675	211.5	4685	212	4695	212.5
4705	213	4715	213.3	4725	213.7	4735	214	4745	214.5
4755	215	4760	215.8	4765	217.3	4768	218.1	4773.1	219.9
4777.2	221	4777.3	222	4777.4	224.5	4796	225.2	4895	224.5
4913	224	4921	216.5	4927	214.3	4933	213.3	4938	210.5
4944	210.4	4956	210.4	4969	210	4979	209.7	4991	209.3
5001	209.3	5012	209.1	5024	209	5034	209.4	5045	211.7
5057	213.3	5067	219.3	5079	221.3	5087	220.5	5095	220.3
5125	222.6	5151	224	5229.7	240	5269.3	243		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3402.2	.08	4140	.04	4765	.055	4913	.035	5125	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913	5125	540	464	520	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3402.2	4913	226	F
5125	5269.3	222.6	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 30756

INPUT
Description: 30756

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3449.5	243	3463.6	240.8	3476.6	232.3	3502.5	232.3	3522.2	241.7
3553.3	241.1	3592	240.3	3636.5	239.9	3673.9	237.8	3764.5	238.2
3807.1	240.1	3849.2	238.1	3874.2	238.1	3945.5	240.9	4034.8	237.9
4066.8	240.1	4098.7	240.1	4133.2	237	4137.8	234.6	4157.5	234.5
4174.5	233.5	4263.9	227.8	4304.3	226.2	4310.6	225.3	4321.2	222.1
4365.6	214.1	4380.6	207.1	4410.6	206	4430.6	206.1	4460.6	208
4470.6	208.2	4480.6	208	4490.6	207.1	4560.6	207.2	4580.6	209
4590.6	210.2	4600.6	212.1	4610.6	210	4620.6	209.3	4630.6	209.7
4640.6	209.1	4650.6	209.1	4660.6	209.2	4670.6	209.3	4680.6	209.5
4690.6	209.8	4700.6	210.2	4710.6	210.7	4720.6	211.8	4730.6	213
4740.6	214	4750.6	215	4760.6	216.5	4761.6	216.4	4771.6	218.1
4776.6	219.4	4781.6	220.8	4787.5	222.2	4788.7	223.7	4809.6	224.9
4875.5	227.1	4896.5	225.8	4915	225.1	4928.3	216.1	4939.3	215.6
4945.3	213.1	4956.8	212.7	4968.3	212.3	4980.3	211.8	4990.8	211.6
5000.8	211.3	5011.8	211.3	5023.8	210.9	5036.3	210.7	5047.8	211.5
5054.8	213.1	5059.8	215.5	5072.8	216.2	5078.8	218.1	5082.5	217.5
5110	217.8	5124.8	217.5	5154.6	220.1	5216.9	232.4	5262.1	235.5
5277.3	234.7	5314	238.7	5363.5	239	5397.6	238.2	5473.5	239.8
5553.3	239.6	5732.1	235.9	5793.5	235.3	5846.6	234	5878.3	234
5898.1	237.8	5902.8	234.4	5933	236.4	5983.1	243.1		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3449.5	.07	4321.2	.04	4781.6	.055	4896.5	.035	5054.8	.07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4915 5054.8 675 456 350 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3449.5	4915	227	F
5054.8	5983.1	213.1	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 30300

INPUT
Description: 30300

Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4813.5	243	4833.7	242	4866.3	241.7	4902.6	240	4924.5	228.4
4931.3	214.8	4943.8	214.2	4954.8	212.3	4965.8	211.6	4976.8	210.7
4987.3	209.4	4998.8	209.5	5008.3	209.8	5019.3	210.3	5031.3	210.8
5041.3	211.4	5045.3	212.3	5046.8	213.8	5068.8	214.8	5088.8	214.9
5156.2	218.2	5195	217.6	5237.3	217.9	5270.3	216.7	5301.3	217
5317.8	217.6	5332.4	215.7	5357.7	218.9	5407.8	225.9	5427.6	226.3
5443.1	228.5	5463.7	230.3	5483.9	230.3	5487.7	230.8	5496.1	231.6
5517.5	234.3	5535.9	235.4	5569.2	237.4	5620.2	237.7	5655.9	239.2
5694.5	240	5725	239.2	5770.3	238.6	5809.6	238.8	5844.6	237.4
5880.9	236.9	5919.4	237.2	5958.1	237.3	5985.2	237.3	6010.5	237.3
6028.4	238.9	6043	243.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4813.5	.055	4931.3	.035	5156.2	.055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4931.3 5156.2 689.92 678.02 570.08 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4813.5	4931.3	214.8	F
5156.2	6043	218.2	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 29622

INPUT
Description: 29622

Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4861.7	243.2	4873.4	239	4883	231.2	4891	232.4	4911	215.3
4919	211.8	4920	210.8	4926	208.2	4931	208.4	4936	208.5
4940	209	4946	208.2	4953	208.5	4962	209.1	4972	209.4
4983	209.8	4993	210.7	5005	211.3	5019	211.3	5029	211.8
5044	211.7	5062	211.1	5070	210.8	5078	210.4	5081	210.9
5095	213.5	5114	216.1	5139	216.8	5149.1	217.2	5182.7	217.7

5219.1	218.5	5252.5	217.7	5279.2	216.7	5320.4	217.5	5360.7	218.8
5393.6	221.3	5432.8	224.1	5465.8	226.4	5504.8	228.8	5550.9	230.8
5598.1	233.2	5645.3	233.8	5688.5	233.6	5738.2	232.4	5769.3	232.3
5790	234.1	5807.5	236.1	5845.4	237.9	5870.9	243.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4861.7	.055	4919	.035	5095	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4919	5095	1055.01	1141.95	1109.98	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 28480

INPUT
Description: 28480

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4758.5	230	4803.3	214.7	4857.3	213.7	4896.1	215.4	4910.9	216.4
4923	214.5	4931.8	210.2	4946	206.8	4956	205.4	4970	204.6
4985	204.6	4999	204.5	5011	203.4	5023	203.5	5042	203.4
5046	202.1	5054	206.8	5063.5	210.9	5077	215.7	5096.4	223.6
5125.4	230								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4758.5	.055	4946	.035	5054	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4946	5054	480	488	490	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27992

INPUT
Description: 27992
OAKLAND AVE. BRIDGE

Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4473.5	230	4530.7	226.5	4585.7	224.2	4652.2	221.2	4713.8	220.5
4765.3	220.2	4806.1	220.2	4857.7	220.1	4927.4	221.8	4928.5	206.8
4932	206.8	4932.1	206.8	4936.5	206.7	4947.5	205.2	4957.5	204.9
4967.5	204.8	4977.5	204.8	4987.5	205.2	4997.5	205.2	5007.5	204.5
5012.5	203.6	5012.6	203.6	5014.6	203.4	5014.7	203.4	5017.5	203
5027.5	204.6	5037.5	205.2	5047.5	204.9	5057.5	206	5063.7	206.7
5067.5	208.2	5074.5	209.1	5088.5	214.4	5094	215.7	5094.1	215.7
5096.5	215.7	5097.5	223.3	5143.7	222.2	5221.4	223	5307.1	230

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4473.5	.05	4927.4	.032	5097.5	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4927.4 5097.5 55 55 55 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4473.5	4927.4	221.8	F
5097.5	5307.1	223.3	F

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 27964.5

INPUT
Description: OAKLAND AVE. BRIDGE

Distance from Upstream XS = 14
Deck/Roadway Width = 27
Weir Coefficient = 2.7
Upstream Deck/Roadway Coordinates
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4473.5	230	230	4530.7	226.5	226.5	4585.7	224.2	224.2
4652.2	221.2	221.2	4713.8	220.5	220.5	4765.3	220.2	220.2
4806.1	220.2	220.2	4857.7	220.1	220.1	4927.4	221.8	221.8
4928.5	221.8	206.8	4932	222	206.8	4932.1	222	217
5012.5	222.6	217.7	5014.7	222.6	217.8	5094	223.2	218.5
5094.1	223.2	215.7	5096.5	223.2	215.7	5097.5	223.3	223.3
5143.7	222.2	222.2	5221.4	223	223	5307.1	230	230

Upstream Bridge Cross Section Data
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4473.5	230	4530.7	226.5	4585.7	224.2	4652.2	221.2	4713.8	220.5
4765.3	220.2	4806.1	220.2	4857.7	220.1	4927.4	221.8	4928.5	206.8
4932	206.8	4932.1	206.8	4936.5	206.7	4947.5	205.2	4957.5	204.9
4967.5	204.8	4977.5	204.8	4987.5	205.2	4997.5	205.2	5007.5	204.5
5012.5	203.6	5012.6	203.6	5014.6	203.4	5014.7	203.4	5017.5	203
5027.5	204.6	5037.5	205.2	5047.5	204.9	5057.5	206	5063.7	206.7
5067.5	208.2	5074.5	209.1	5088.5	214.4	5094	215.7	5094.1	215.7
5096.5	215.7	5097.5	223.3	5143.7	222.2	5221.4	223	5307.1	230

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4473.5	.05	4927.4	.032	5097.5	.05

Bank Sta: Left Right Coeff Contr. Expan.
4927.4 5097.5 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4473.5	4927.4	221.8	F
5097.5	5307.1	223.3	F

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 14

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4857.7	220.1	220.1	4927.4	221.8	221.8	4928.5	221.8	206.8
4932	222	206.8	4932.1	222	217	5012.5	222.6	217.7
5014.7	222.6	217.8	5094	223.2	218.5	5094.1	223.2	215.7
5096.5	223.2	215.7	5097.5	223.3	223.3	5143.7	222.2	222.2
5221.4	223	223	5307.1	230	230			

```
Downstream Bridge Cross Section Data
Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  4456.7     230  4478.3   229.2  4556.2   225.2  4635.7   221.6  4731.4   220.8
  4793.2   220.2  4868.6   220.7  4935.5     222  4936.5   206.7  4936.6   206.2
  4944.5   204.9  4954.5   205.1  4964.5   205.3  4974.5   205.3  4984.5     205
  4994.5   204.5  4998.5     205  5004.5   206.1  5009.5   206.2  5014.5   205.9
  5024.5   205.4  5034.5   205.8  5044.5   206.3  5054.5   205.9  5063.5   206.7
  5065.5   207.7  5066.5   209.5  5093.5   216.1  5094.5   223.5  5155.2     224
  5185.1     225  5229.3     227  5263.2     230

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  4456.7     .05  4935.5    .034  5094.5     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
        4935.5  5094.5             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  4456.7  4935.5     222       F
  5094.5  5263.2   223.5       F
Sediment Elevation = 0

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =   220.1
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  1

Pier Data
Pier Station     Upstream=  5013.6    Downstream=  5014.6
Upstream     num=       2
    Width   Elev    Width   Elev
       2     203       2   218.5
Downstream     num=       2
    Width   Elev    Width   Elev
       2   204.5       2   218.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.5
       Yarnell                KVal =      .9
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =.8164966
           Max Low Cord                =   218.5

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line
```

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27937

INPUT
Description: 27937

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4456.7	230	4478.3	229.2	4556.2	225.2	4635.7	221.6	4731.4	220.8
4793.2	220.2	4868.6	220.7	4935.5	222	4936.5	206.7	4936.6	206.2
4944.5	204.9	4954.5	205.1	4964.5	205.3	4974.5	205.3	4984.5	205
4994.5	204.5	4998.5	205	5004.5	206.1	5009.5	206.2	5014.5	205.9
5024.5	205.4	5034.5	205.8	5044.5	206.3	5054.5	205.9	5063.5	206.7
5065.5	207.7	5066.5	209.5	5093.5	216.1	5094.5	223.5	5155.2	224
5185.1	225	5229.3	227	5263.2	230				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4456.7	.05	4935.5	.034	5094.5	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4935.5	5094.5	310.03	317.03	319.97	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4456.7	4935.5	222	F
5094.5	5263.2	223.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27620

INPUT
Description: 27620

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4155.7	230.1	4195.4	221.3	4264.3	224.8	4291.8	219.7	4301.8	220.2
4313.6	219.5	4355.3	221.5	4449.8	220.4	4499.1	220.3	4532.4	217.1
4542.3	217.5	4550.6	217.2	4568.4	217.6	4639.9	214.2	4742.8	214.2
4770.1	213.3	4780.9	213.4	4790.8	213	4861.9	213.1	4914.5	213.2
4927.4	213.2	4935.4	208.1	4939.4	206.6	4954	205.8	4967.1	205.4
4980	205.1	4998.4	204.8	4999.9	204.9	5015	204.5	5033.5	204.1
5048.4	203.2	5057.5	205.5	5060.6	206.6	5063.2	211.8	5091.7	214.4
5106.9	220	5124.6	230						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4155.7	.04	4927.4	.03	5091.7	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4927.4	5091.7	339.99	347.97	350	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27272

INPUT
Description: 27272

Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4355	230	4360	229	4366	228	4528	226	4592	224
4630	222	4682	220	4704	218	4729	216	4754	214
4875	213.5	4903.2	211.8	4926	206.4	4941.5	205.4	4952.3	205.5
4960.4	205.7	4972.4	205.5	4983.2	205.5	4997	204.7	5008.4	204.7
5032.7	204.5	5049	204.4	5063.7	204.3	5074.2	206.5	5082.7	213.5
5105.5	213.5	5125	213.5	5137	214	5169	216	5176	218
5182	220	5205	230						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4355	.04	4875	.03	5082.7	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4875	5082.7	225	225	225	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27047

INPUT
Description: 27047

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4642	230	4686	220	4694	218	4710	214	4808	214
4850	214.7	4870	214.3	4870.1	213.3	4894	212.7	4908	211.3
4927	206.6	4935	205.9	4945	205.3	4955	205.1	4968	205.3
4982	205.3	4996	205.1	5010	204.9	5020	204.4	5034	204.1
5048	203.9	5060	204.3	5073	206.5	5097	208.8	5100	214.4
5127	213.1	5174	212.6	5243	213.1	5263	214	5283	216
5298	218	5307	220	5322	230				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4642	.04	4935	.03	5073	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4935	5073	170	235	300	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26812

INPUT
Description: 26812

Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4810	230	4840	220	4848	218	4854	216	4862	214

4871	212.5	4890	211.9	4907.3	211.8	4923	206.5	4925	205.3
4937	204.3	4952	204.8	4967	204.4	4999	203.9	5024	203.1
5037	202.1	5053	206.6	5066	204.5	5075	206.2	5087	215.1
5100	215.5	5111	216	5212	216	5224	214	5244	214
5248	216	5250	218	5261	220	5296	230		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4810	.04	4925	.03	5053	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4925	5053	25	50	55	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26762

INPUT
Description: 26762
RAILROAD BRIDGE

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4828.23	221.86	4842	217.54	4852	214.5	4852.1	214.5	4866	211.2
4890	211.4	4900.8	209	4920.1	209	4933.5	206.6	4947	205.8
4947.1	205.8	4950	205.7	4951.8	204.2	4954	204.2	4954.1	204.2
4970.6	203.8	4986.9	203.4	5000.6	202.9	5015.8	202.9	5025	202.9
5035.3	202.4	5049.2	203.3	5049.3	203.3	5057	203.6	5057.1	203.6
5063.2	203.8	5066.5	206.5	5076.5	210.4	5105.1	212.3	5130.4	213.5
5139	213.8	5144.6	214.9	5151	224.1				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4828.23	.04	4950	.03	5066.5	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4950	5066.5	40	41	45	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26721

INPUT
Description: RAILROAD BRIDGE

Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4818.67	219.48	4831.93	215.55	4843.1	212.4	4872.8	212	4884.2	211.5
4891.3	209	4908.1	206.5	4916.6	205.7	4929.3	206.4	4940.3	204.9
4951.2	204.7	4960.2	206.5	4967.9	206.6	4982.7	205.2	4985.5	203.3
5002.6	202	5005.2	201.5	5022.4	198.5	5045.5	201.5	5078.2	203.7
5091.9	206.5	5093.3	209.5	5103.6	213	5110.3	212.7	5118.6	212.5
5126	213.6	5135.54	215.03	5146.39	218.17	5150.6	219.61		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4818.67	.04	4908.1	.03	5091.9	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4908.1	5091.9	130	89	50	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26632

INPUT
Description: 26632

Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4586.3	228	4624.7	221.3	4666.5	220.5	4732.1	220.3	4775.6	221
4804.1	220.2	4822.5	214.3	4872.5	213.5	4890.5	211.9	4899.5	208.7
4911	206.3	4922.5	205.3	4934.5	204.8	4946.5	204.3	4959.5	203.5
4966.5	202.7	4974.5	202.6	4982.5	202.3	4989.5	202.6	4996.5	203
5004.5	203.7	5012.5	204.6	5018.5	205.4	5025.5	206.3	5033.5	206.9
5040.5	206.3	5052.5	204.9	5060.5	203.4	5065.5	202.4	5071.5	201.1
5084.8	203.8	5089.1	206.4	5100.3	213.1	5109.7	212.8	5133	212.8
5154.2	213.2	5181.5	213.4	5202	220	5238.5	228		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4586.3	.07	4872.5	.045	5100.3	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4872.5	5100.3	90	99	120	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26533

INPUT
Description: 26533

Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4598.8	228	4653.3	220.6	4718.5	220.6	4798.5	224.4	4840.8	222
4864.5	217.7	4877	217.7	4891	217.2	4905.1	213.3	4907.5	206.8
4920.2	206.2	4932.5	206.6	4944.7	206.4	4955.8	205.7	4966.4	205
4977.6	203.1	4988	203.1	4996.6	203	5011.8	202.8	5028.3	202.3
5040.9	202.2	5056.8	203.1	5067.5	205.9	5082.4	206.4	5089.7	205.4
5111	206.3	5139	209.3	5148.4	215.7	5161	215.7	5210.5	212.2
5278.8	212.3	5357.7	212.3	5411.3	212.4	5450	212.7	5487.1	220
5517	228								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4598.8	.07	4891	.045	5148.4	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4891	5148.4	400	376	340	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26157

INPUT
Description: 26157

Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4738.4	228	4771.4	224	4812	212.9	4850.7	212	4920.7	213.7
4931.8	206.5	4951.9	203.7	4968.9	204.9	4990.7	204.9	5010.6	203.5
5031.9	203.4	5052.1	204.3	5068.3	206.4	5080.4	209.2	5081.1	212.1
5097.9	212	5183.5	212.2	5204.4	212.5	5219.5	212.3	5303.7	210
5334.3	209.7	5373.6	212.2	5479.2	212.6	5493.5	210.8	5507	210.9
5521.9	210.8	5617.5	210.3	5697	220	5716	228		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4738.4	.07	4920.7	.045	5081.1	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4920.7	5081.1	279.96	267	240	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25890

INPUT
Description: 25890

Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4337.5	228	4411.1	222	4459.9	218.6	4532.3	213	4575.8	214
4608.3	220.4	4664.1	222.7	4704.5	214.3	4725.2	212.4	4801.4	212.2
4872.4	212.3	4916.4	211.4	4916.5	210.9	4947.4	206.5	4957.4	204.4
4972.4	203.9	4987.4	203.8	4999.4	203.5	5017.4	204	5032.4	204.1
5052.7	206.5	5060.2	211.9	5091.7	212.8	5169.9	212.5	5184.7	212.4
5228.6	212.3	5288	212	5385.8	211.2	5460.8	210.8	5534.7	210.8
5571.5	211.3	5640.5	210.2	5699.6	208	5714	210.3	5754.3	228

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4337.5	.07	4947.4	.045	5060.2	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4947.4	5060.2	350	233	180	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25657

INPUT
Description: 25657

Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3370.3	228	3439.1	222	3524.1	220.5	3575.4	220.5	3602.4	224

3641.6	226	3687.7	222	3723.3	216.4	3803.9	214.3	3890.9	212.9
4007.9	211.7	4097.4	211.5	4112.3	210.1	4148.2	210	4228.8	210.2
4304.1	210.7	4404.6	211.5	4561.2	211.4	4691	211.5	4733.7	212.2
4775.6	213.2	4837.8	212.3	4902.2	212.9	4935.7	212.6	4948.7	206.4
4954.7	204.6	4963.7	204.4	4975.7	203.9	4984.7	203.9	4995.7	204.9
5006.7	205.4	5039.7	205.9	5051.3	206.4	5062.8	210.9	5062.9	213.3
5063.5	213	5079.3	212.4	5165.5	210.9	5182	211	5192.9	210.6
5274	210.7	5312.8	210.4	5415.4	210.6	5527	210.4	5541.8	210.5
5555.2	210.2	5574	210.8	5679	210.2	5740.8	210	5780.2	228

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3370.3	.07	4935.7	.045	5062.9	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4935.7	5062.9	270	237	15	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25420

INPUT
Description: 25420

Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3818.06	216.56	3898.13	213.28	3985.9	209.5	4137.2	209.2	4266.8	209.1
4334.8	210.2	4474.4	212.3	4669.9	211.6	4730.7	212.1	4795	211.4
4825.7	212.2	4880	212.2	4933.9	211.9	4938.8	211.9	4938.9	213.5
4949.4	206.2	4949.9	205.2	4956.9	203.3	4965.9	203.4	4979.9	203.8
4995.9	204.4	5016.9	204.9	5037.9	205.2	5050.6	206.2	5052.3	213.3
5053	212.7	5065.3	212.1	5124.8	212.1	5171.3	211	5304.6	210.6
5390.3	210.4	5467.9	210.5	5521.3	210.7	5544.4	210.2	5563.5	210.6
5689.7	210.3	5755.34	210.98	5802.05	212.7	5839.86	214.51	5884.34	216.87

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3818.06	.07	4938.9	.045	5052.3	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4938.9	5052.3	180	255	6.96	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25165

INPUT
Description: 25165

Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4006.41	216.97	4078.9	206.5	4094.11	210.7	4109.68	208.8	4152.43	208.8
4205.89	209	4223.98	210.1	4260.43	212.2	4290.76	212.4	4345.66	211
4380.31	211.1	4416.49	211.2	4457.8	210.5	4502.89	210.5	4555	210.7
4594.51	210.3	4647.16	210.9	4699.54	211	4749.76	211	4777.48	210.7
4810.24	207.3	4817.71	207.3	4832.29	211	4845.79	211.5	4847.59	213.9
4849.39	210.5	4863.79	212	4876.39	212	4890.79	212	4893.49	212

```
 4895.29   204.1 4897.09   202.7 4915.99   201.9 4929.49   201.8 4933.99   203.8
 4943.89   203.8 4951.99     205 4957.39   205.7 4973.59   206.7 4997.89   206.6
 5025.88   206.7 5042.98   207.8 5061.61     211 5079.52   211.5 5101.57   211.8
 5109.31   212.6 5126.32     212 5158.72     212    5185   212.8 5206.78   211.8
 5229.73   211.5 5240.35   210.5 5259.88   210.7 5288.32   210.3 5334.22   210.8
 5401.63   210.5 5439.34   210.6 5495.95   210.4 5555.17   210.9 5582.62   210.6
 5601.52   211.5 5635.05  212.52 5665.48  214.41 5715.12  216.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
 4006.41     .06 4847.59    .045 5079.52     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       4847.59 5079.52               15      20       7              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 4006.41 4847.59     210       F
 5079.52 5715.12     210       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 25145

INPUT
Description: 25145

Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  2940.9     2283069.435   224.4 3254.59   224.23425.875   225.1 3473.09     225
 3758.47   216.1  3866.2     2203953.125     216 4013.83   206.24086.695   208.3
4203.165   210.9  4324.1   210.9 4431.64   210.6 4614.61   210.7 4733.55   210.6
 4789.41   207.84822.945   210.94833.395   210.84850.495   211.74851.445   213.9
4852.395     2134859.995     2134863.795     2134882.795     2134883.745   203.2
4894.195   202.24900.845   200.74914.145   201.14924.595   201.64930.295   202.3
4931.245   204.94932.195   206.14942.645   205.9 4942.74   208.55007.245   208.7
5105.855   211.25163.045     2125200.095   212.25261.655   210.55365.015   210.3
5473.695   210.3 5589.12   210.8 5715.09   210.75825.385     2105843.815   220.1
 5926.75     228

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  2940.9      .24851.445    .025 4942.74      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      4851.445 4942.74               10      15       7              .7       .9
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  2940.94851.445     210       F
 4942.74 5926.75     210       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 25130

INPUT
Description: 25130
```

Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3919.7	219.83	921.908		2104	008.404	206.54	091.348	208.7	4202.42
211.2	4384.628	210.74	497.236	210.5	4650.74	210.74	766.132	211.14	790.612
208.2	4830.068	210.64	843.412	208.74	843.508	210.64	858.868		2114
864.628	204.3	4874.228	201.94	885.748	202.54	891.508	201.54	897.268	198.54
927.988	201.5	4937.588	202.24	941.428	203.24	961.588	203.24	976.948	
2035	002.868	203.7	5022.068	203.75	033.588	203.55	047.988	204.75	057.588
	2065	068.148	206.1	5121.908	211.25	142.068	211.95	189.396	212.15
212.148	212.1	5266.58	210.5	5428.34	210.45	528.756	210.25	597.876	210.95
632.724	211.6	5659.43	212.24	5682.56	213.01	5741.99	214.4	5775.36	215.88
5830.96	217.41								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3919.7	.055	4858.868	.045	5121.908	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4858.868	5121.908	10	43	90	.7	.9

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25087

INPUT
Description: 25087

Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4017.44	216.74	4059.79	211.14	4102.3	208.4	4141	210	4208.4	210.3
4293	210.6	4422.2	210.1	4559.4	210.2	4688.6	211	4785.6	210.3
4821.6	210.4	4835.2	208.4	4852	211.9	4909	210.5	4912	206.9
4919	204.9	4931	202	4945	199.8	4951	197.7	4965	197.1
4981	196.5	4998	200.6	5018	201.5	5031	203.1	5043	201.8
5051	200.5	5063	199.6	5070	198.9	5079	199.5	5080	204.9
5081	208.5	5124	209.3	5169.2	210.2	5242.6	210.7	5306.3	210.8
5352.8	210.6	5368.1	210.5	5397.51	211.19	5411.21	213.44	5444.84	215.59
5470.46	217.56								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4017.44	.055	4931	.04	5080	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4931	5080	150	137.01	120	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24950

INPUT
Description: 24950

Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3820.82	216.72	3843.24	214.76	3880.07	212.28	3936.6	209	4084.1	210.7
4259.4	210.3	4446.4	210.7	4581.5	210.7	4640	210.6	4671.5	207.8
4731.1	211	4814.5	210.1	4873	210	4913	209.8	4914	204.8

4915	202	4926	201.2	4929	202	4940	203.4	4951	204.3
4977	204.8	4993	204.8	5009	204.2	5024	202.8	5032	201.8
5042	201.8	5055	202.8	5067	202.4	5075	202.8	5085	204.8
5103	209.7	5121	210	5232.1	210.6	5260.1	210.3	5293.1	210.4
5400.7	210.2	5439.6	210.5	5469.9	210.5	5505.6	211.3	5542.35	211.97
5572.78	214.03	5621.89	216.03	5668.59	217.17				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3820.82	.055	4915	.04	5024	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4915	5024	179.01	128.01	240	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24822

INPUT
Description: 24822

Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3096	216.9	3143.5	210	3211.2	209.3	3314.6	210.2	3429.4	210.3
3562.7	210.3	3733.8	210.5	3855.1	210.6	3938.5	207.8	4082.5	209.8
4196.6	209.1	4248.4	207	4320	211.7	4365	211.5	4400	203.3
4450	203.3	4480	208	4550	212.8	4600	209	4637.9	209.8
4701.8	209.3	4754.9	208.9	4833.6	208.4	4903	208.1	4935	207.6
4947	206.4	4949	204.8	4953	199.6	4972	198.4	4981	199.6
4995	200.1	5010	202.8	5024	201.6	5031	201.3	5051	204.8
5069	208.8	5099	209.2	5159	208	5229	206	5248	204
5262	204	5276	206	5294	208	5334	208	5394	208.2
5446.62	208.55	5475.53	209.89	5491.1	212.34	5517.79	214.25	5604.98	216.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3096	.055	4972	.04	5051	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4972	5051	1	87	650	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24735

INPUT
Description: 24735
This is a REPEATED section.

Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1992.8	228	2124	224.3	2533.6	224.4	2901	215.9	3003.9	215.4
3096	216.9	3143.5	210	3211.2	209.3	3314.6	210.2	3429.4	210.3
3562.7	210.3	3733.8	210.5	3855.1	210.6	3938.5	207.8	4082.5	209.8
4196.6	209.1	4248.4	207	4320	211.7	4365	211.5	4400	203.3
4450	203.3	4480	208	4550	212.8	4600	209	4637.9	209.8
4701.8	209.3	4754.9	208.9	4833.6	208.4	4895.1	209.2	4932	211.6

4946.5	212.1	4952	212.2	4965	203.1	4973	202	4983	200.8
4990	203	5010	203.1	5018	200.8	5024	200.3	5028	201
5035	202.8	5037	203	5109	205	5149	206.3	5160	209.5
5173	209	5179	211.4	5227	212.3	5283	212.7	5303	212.6
5344	212.1	5357	212	5364	207.9	5368	207.7	5390	211.7
5411	211	5425	211	5440	207.8	5484	207.5	5509	205.7
5514	202.1	5521	200.9	5534	200.3	5541	198	5551	198.2
5562	198.2	5572	198.4	5582	198	5590	200	5593	202.1
5597	205.3	5612	217.2	5628	226.3				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1992.8	.2	4637.9	.04	4833.6	.055	4965	.04	5037	.055
5509	.04								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4965	5035	1	45	50	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1992.8	4965	209	F
5035	5628	202.3	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24690

INPUT
Description: 24690

Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1992.8	228	2124	224.3	2533.6	224.4	2901	215.9	3003.9	215.4
3096	216.9	3143.5	210	3211.2	209.3	3314.6	210.2	3429.4	210.3
3562.7	210.3	3733.8	210.5	3855.1	210.6	3938.5	207.8	4082.5	209.8
4196.6	209.1	4248.4	207	4320	211.7	4365	211.5	4400	203.3
4450	203.3	4480	208	4550	212.8	4600	209	4637.9	209.8
4701.8	209.3	4754.9	208.9	4833.6	208.4	4895.1	209.2	4932	211.6
4946.5	212.1	4952	212.2	4965	203.1	4973	202	4983	200.8
4990	203	5010	203.1	5018	200.8	5024	200.3	5028	201
5035	202.8	5037	203	5109	205	5149	206.3	5160	209.5
5173	209	5179	211.4	5227	212.3	5283	212.7	5303	212.6
5344	212.1	5357	212	5364	207.9	5368	207.7	5390	211.7
5411	211	5425	211	5440	207.8	5484	207.5	5509	205.7
5514	202.1	5521	200.9	5534	200.3	5541	198	5551	198.2
5562	198.2	5572	198.4	5582	198	5590	200	5593	202.1
5597	205.3	5612	217.2	5628	226.3				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1992.8	.2	4637.9	.04	4833.6	.055	4965	.04	5037	.055
5509	.04								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4965	5035	1	213	525	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1992.8	4965	209	F
5035	5628	205.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24477

INPUT
Description: 24477

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2785.5	228	2903.2	225.3	3288.6	224.3	3309.1	225.9	3323.8	216.9
3337.5	217.3	3727.4	217	3731.3	217.4	3743.4	215.2	3793.7	215.6
3819.5	216.9	3847	217	3855.8	218.3	3914.9	213	3927.2	207.2
3939.5	207.2	3963.8	209.1	3980.5	207.3	4010.1	209.6	4082.5	210.7
4104.9	210.7	4579.9	210.9	4599	210.6	4715.8	205.9	4735.2	210.4
4767.5	211	4814.7	210	4850.3	210.2	4857	209.3	4915.8	209.7
4971.1	208.7	4971.6	210.3	4972.5	205.1	5006.7	207.4	5027.5	207.1
5030.2	210.2	5064.1	210.7	5068.5	212.9	5082.4	213.4	5087.3	213.2
5093	210	5123	208	5131	206	5151	205	5181	206
5221	206.5	5254	206	5258	204	5266	202.5	5277	187.6
5287	186.8	5297	186.6	5307	186.8	5317	186.8	5327	186.8
5337	187.5	5347	188	5357	188.3	5367	188.8	5377	189.3
5387	189.8	5397	190.8	5407	191.8	5417	193.3	5427	194.8
5437	195.8	5447	196.8	5457	196.8	5467	195.3	5477	195.8
5487	195.5	5497	196.3	5507	197.3	5517	197.7	5527	199.1
5538	200.5	5542.3	201.9	5548.5	202.8	5572.7	205.6	5592.7	210.8
5597.9	209.1	5645.8	212	5650.3	213.3	5650.4	213.3	5655	210.8
5666	206	5666.1	206	5675.3	202.4	5692.6	201.4	5700	201
5707.4	200.7	5718.1	202.1	5727	205	5727.1	205.1	5759.6	214.1
5759.7	214.1	5783.9	213.9	5853.6	216.3	5945	223	5955.2	228.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2785.5	.2	5266	.048	5542.3	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5266	5542.3	10	72	72	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2785.5	5266	209	F
5542.3	5955.2	205.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24405

INPUT
Description: TIMBER BRIDGE
TIMBER BRIDGE

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2785.5	228	2903.2	225.3	3288.6	224.3	3309.1	225.9	3323.8	216.9
3337.5	217.3	3727.4	217	3731.3	217.4	3743.4	215.2	3793.7	215.6
3819.5	216.9	3847	217	3855.8	218.3	3914.9	213	3927.2	207.2
3939.5	207.2	3963.8	209.1	3980.5	207.3	4010.1	209.6	4082.5	210.7
4104.9	210.7	4579.9	210.9	4599	210.6	4715.8	205.9	4735.2	210.4
4767.5	211	4814.7	210	4850.3	210.2	4857	209.3	4915.8	209.7
4971.1	208.7	4971.6	210.3	4972.5	205.1	5006.7	207.4	5027.5	207.1

5030.2	210.2	5064.1	210.7	5068.5	212.9	5082.4	213.4	5087.3	213.2
5127.3	193.4	5167	184	5207	191.4	5217	191.8	5227	191
5237	189.6	5247	188.8	5257	188.3	5267	187.8	5277	187.6
5287	186.8	5297	186.6	5307	186.8	5317	186.8	5327	186.8
5337	187.5	5347	188	5357	188.3	5367	188.8	5377	189.3
5387	189.8	5397	190.8	5407	191.8	5417	193.3	5427	194.8
5437	195.8	5447	196.8	5457	196.8	5467	195.3	5477	195.8
5487	195.5	5497	196.3	5507	197.3	5517	197.7	5527	199.1
5538	200.5	5542.3	201.9	5548.5	202.8	5572.7	205.6	5592.7	210.8
5597.9	209.1	5645.8	212	5650.3	213.3	5650.4	213.3	5655	210.8
5666	206	5666.1	206	5675.3	202.4	5692.6	201.4	5700	201
5707.4	200.7	5718.1	202.1	5727	205	5727.1	205.1	5759.6	214.1
5759.7	214.1	5783.9	213.9	5853.6	216.3	5945	223	5955.2	228.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2785.5	.2	5087.3	.048	5548.5	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5087.3	5548.5	55	55	55	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2785.5	5087.3	209	F
5548.5	5955.2	204.7	F

Cross Section Lid
num= 9

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
5650.3	213.3	213.3	5650.4	214.6	213.3	5655	214.6	210.8
5666	214.6	206	5666.1	214.6	210.8	5700	214.8	210.8
5727	214.6	210.8	5727.1	214.6	205.1	5759.6	214.6	214.1

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24350

INPUT
Description: 24350

Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3173.2	228	3299.3	224.4	3323.8	225.3	3720.7	224.6	3723.4	226.7
3737.8	217.7	4031.1	216.9	4082.4	217.8	4142.5	217.5	4161.5	215.2
4269.7	217.1	4340.3	214.5	4360.6	206.4	4380.6	206.4	4400.6	212.7
4419.1	209.1	4449.6	208.8	4521.5	210.6	4565.2	210.6	4646	210.1
4818.7	211	4854.8	211	4861.1	209.2	4933.6	209.5	4974.8	208.5
4975.5	210.3	4976.1	205.2	5001	206.6	5023.9	206.8	5027.7	209.9
5063.7	210.4	5068	212.8	5079	213.2	5104.1	202.8	5189	177.7
5199	177.7	5222	181.3	5249	182.9	5279	185.8	5299	185.9
5309	186.5	5319	186.6	5329	186.9	5339	187.2	5349	187.6
5379	187.8	5389	188	5409	188.1	5419	189.7	5429	190
5439	190.7	5449	192.2	5459	193.5	5464	194	5469	193.4
5474	192.8	5479	194.3	5484	193.3	5489	193	5496	193.5
5499	193.3	5502	193.5	5506	193.3	5509	193.7	5516	193
5519	193	5529	191.3	5539	190	5541	189.8	5549	191.9
5559	195.3	5564	195.9	5570.3	196.9	5579.6	199.3	5589.6	201.9
5594.1	202.9	5612.2	207	5638	207.3	5650.2	210.3	5655.8	210.6
5662.8	212.5	5669	212.6	5675.8	212.4	5685.6	204.1	5695	201.5
5707.1	201.3	5718.6	200.9	5731.7	201.3	5744	201.6	5756.4	203.1
5779.8	207.1	5834.3	214	5857.4	214.7	5934.7	215.7	5951	220.4
5954	220.3	5999.8	222.8	6010.7	228				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3173.2	.2	5104.1	.048	5594.1	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5104.1	5594.1	129.99	140.01	170.01	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3173.2	5104.1	209	F
5594.1	6010.7	204.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24210

INPUT
Description: 24210

Station Elevation Data num= 91

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2833.9	227	2957.7	224.3	3366.9	224.4	3695.5	216.9	3811.9	218
3978	216.2	4039.4	210	4062.1	206.2	4137.6	209.4	4252.5	209.9
4369	210.2	4465	210.1	4538	211.6	4599	211.3	4660	207.4
4734	204.3	4735	203.9	4739	203.5	4745	202.8	4749	202.5
4759	201.9	4769	201.9	4779	201.9	4789	203.9	4792	204
4797	204.3	4799	210.3	4799.1	205.8	4801	210.4	4801.1	205.9
4881	209.9	4952	208.8	4975.9	207.9	4976	205.5	5006	206.1
5014	205.2	5024	204.4	5035	208.9	5082	210.4	5090	212.4
5101	212.7	5121	202.7	5143	196.4	5146	194.9	5166	188.9
5186	181.9	5206	176.4	5226	177.9	5246	182.1	5266	182.9
5286	183.7	5306	184.6	5326	184.9	5346	185.2	5366	185.4
5386	185.8	5406	185.9	5426	185.9	5446	185.9	5466	186.4
5486	187.4	5506	188.2	5526	188.9	5546	188.9	5566	188.9
5586	189.1	5606	188.9	5626	188.7	5646	189	5666	189.1
5686	188.4	5706	187.4	5726	186.4	5746	184.9	5766	186.9
5786	191.9	5796	194.4	5806	194.4	5826	196.7	5836	202.9
5861	211.9	5881	211.5	5901	201.4	5911	200.3	5923	200.6
5933	201.5	5953	202.6	6070.2	223.4	6088.2	223.5	6103	223.3
6108.8	227								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2833.9	.2	5121	.048	5836	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5121	5836	130	178	315	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2833.9	5121	209	F
5836	6108.8	204.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24032

INPUT

Description: 24032

Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4408.01	217.78	4419.22	214.48	4451.25	212.72	4492	211.8	4567	212.5
4642	211.4	4682	206.5	4747	204	4757	203.1	4767	202.3
4777	201.2	4787	200.6	4797	199.9	4807	200.3	4817	201.5
4822	202.6	4907	210.2	4967	208.3	4983	203.4	4988	202.2
5002	202.4	5007	202.9	5017	203.5	5024	208.2	5063	208.6
5071	212.1	5083	212.2	5102	202.9	5112	193.9	5120	192.4
5140	188.4	5160	182.4	5180	184.6	5200	186.9	5220	186.9
5240	186.9	5260	187.4	5280	187.9	5300	185.4	5320	184.9
5340	182.9	5360	181.4	5380	180.4	5400	180.1	5420	180.8
5440	184.4	5460	184.8	5480	183.9	5500	183.7	5520	183.9
5540	184.4	5560	184.9	5580	186.7	5590	187.4	5600	186.7
5620	186.7	5640	186.9	5660	187.1	5680	187.1	5700	187.4
5720	187.7	5740	187.4	5760	187.4	5780	188.1	5800	189.3
5820	189.1	5840	186.9	5860	185.9	5880	190.9	5900	192.2
5910	193.4	5920	192.1	5940	191.9	5960	195.9	5963	202.9
5980	210.1	5994	210	6006	203.6	6018	202.9	6029	201.4
6038	200.8	6047	200.1	6059	200.1	6068	201.6	6073	203.9
6090	213.4	6123.13	218.08						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4408.01	.2	5102	.048	5963	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5102	5963	140	172	175	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4408.01	5102	209	F
5963	6123.13	204.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23860

INPUT
Description: 23860

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2891.2	227	2989.9	224.5	3383.7	223.7	3423.9	224.5	3536.2	220.2
3601.7	222.1	3637.3	222.8	3715	221.1	3853	221.8	3879.1	215.2
4068.4	214.1	4150.2	211.3	4324.6	209.1	4416.5	211.4	4449	211.5
4521	211.1	4586	211	4664	210.1	4733	207.2	4796	207
4848	206.1	4869	210.8	4902	210.9	4969	209	4976	203.9
5003	203.4	5024	204.2	5036	211	5053	211.8	5057	212.7
5068	212.7	5084	206.7	5089	207.1	5095	202.7	5115	198
5131	194.2	5142	191.7	5162	187.7	5182	181.9	5192	181.7
5202	182.7	5222	187.4	5242	187.4	5262	187.4	5282	186.7
5302	186.7	5322	185.7	5342	181.2	5362	183.5	5382	183.7
5402	184.2	5422	184.7	5442	185.7	5462	186.5	5482	187.2
5502	188.2	5522	187.7	5542	186.9	5562	186.6	5582	184.7
5602	183.2	5622	182.7	5642	182.7	5662	183.7	5682	184.4
5702	185.6	5722	186.4	5742	185.7	5752	184.4	5762	185.4
5782	185.9	5802	186.8	5822	187.7	5842	187.6	5862	188.7
5872	189.7	5882	188.7	5902	183.7	5922	184.3	5942	190.2
5962	190.9	5982	195.2	5987.4	202.7	5994	209.2	6003	209

6027	203.1	6040	202.6	6052	201.4	6060	200.7	6070	200.3
6083	200.4	6088	201.6	6092	203.9	6108	213.7	6129.1	227

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2891.2	.2	5095	.048	5987.4	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5095	5987.4	135	144.99	140.01	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2891.2	5095	209	F
5987.4	6129.1	204.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23715

INPUT
Description: 23715

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3041	227.1	3096.2	224.4	3199.6	228.8	3358.7	224.6	3427.6	223.6
3530.4	224.6	3615.7	224.1	3657.5	223.4	3708.2	223.8	3888.7	222.9
3927.2	215.3	4070.8	214.1	4149.2	213.5	4202.6	210.7	4402	208.9
4476.3	210.1	4535.4	210.3	4585.1	210.7	4626	210.3	4658	210.2
4711	210.8	4744	210.3	4785	210.4	4822	210.3	4855	210.6
4886	210.7	4911	210.2	4937	209.7	4965	205.6	4982	202.9
4989	202.2	4996	201.8	5002	201.4	5009	201.6	5018	203
5027	208.3	5037	207.8	5046	211.2	5079.8	202.6	5080	202.7
5123	189.7	5143	187.7	5163	187.7	5183	187.2	5203	185.2
5223	182.2	5243	181.7	5263	181.7	5283	180.2	5303	180.2
5323	181.2	5343	181.9	5363	182.7	5383	184.2	5403	183.7
5423	183.9	5443	185.2	5463	188.7	5483	188.7	5503	188.4
5523	187.7	5543	187.9	5563	188.3	5583	187.9	5603	187.7
5623	187.5	5643	187.2	5663	186.9	5683	186.8	5703	186.8
5723	186.7	5743	186.7	5763	186.4	5783	187	5803	187
5823	187.5	5843	188.7	5853	189.2	5863	188.7	5883	187.7
5903	185.7	5913	185.2	5923	185.1	5943	188.7	5963	192.1
5983	195.2	5987	202.7	5998	209.1	6012	208.7	6024	202.4
6039	201.5	6050	200.8	6060	200.3	6070	199.8	6080	199.9
6090	201.5	6099	209.8	6110	216.2	6122.3	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3041	.2	5079.8	.048	5987	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5079.8	5987	159.99	114.99	155.01	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3041	5079.8	209	F
5987	6122.3	205.2	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River

REACH: Reach-1 RS: 23600

INPUT
Description: 23600
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3464	227	3580.2	227	3660.1	228	3708.2	226.7	3759.2	226.2
3837.7	225.6	3952.5	223.8	3998.5	223	4035.3	222.9	4100.2	221.6
4186.4	210	4271.7	208.3	4377	207.6	4434.7	208.1	4523.9	208.2
4574.6	209.6	4674	209.6	4741	209.4	4806	210.1	4888	209.9
4964	209.5	4978	203.3	4994	200.9	5016	200.5	5022	203.3
5035	210	5053	210	5069	202.7	5072	196.9	5077	192.1
5087	189.6	5097	189.6	5107	189.6	5127	189.1	5147	189.1
5167	186.6	5187	181.6	5207	178.6	5227	176.6	5247	175.6
5267	175.1	5287	175.1	5307	175.3	5327	175.8	5347	177.6
5367	180.4	5387	183.2	5407	183.8	5427	183.2	5447	183.8
5467	186.6	5487	188.1	5507	188.6	5527	188.6	5547	188.8
5567	189.3	5587	189.3	5607	188.8	5627	188.6	5647	188.1
5667	187.7	5687	187.7	5707	187.6	5727	187.6	5747	187.4
5767	187.6	5787	188.2	5807	191.9	5827	189.4	5847	190.6
5867	186.6	5887	184.6	5907	185.1	5927	189.6	5947	191.1
5967	192.2	5977	194.1	5982	195.9	5987	198.6	5990.3	202.6
6001.8	208.4	6020.1	208.2	6029.3	205.5	6034	204.9	6040.5	201.6
6050.2	200.6	6061.8	199.8	6079.4	199.1	6083.9	199	6087.6	201.6
6091.7	204.8	6117	206	6118.1	202.6	6162.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3464	.2	5069	.048	5990.3	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5069	5990.3	370	160	145	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3464	5069	209	F
5990.3	6162.8	205.2	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23440

INPUT
Description: 23440

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3330.5	227	3536.3	222.8	3777	211.6	3837.4	210.5	3918.1	209.8
4063	209	4202	207.5	4317.7	207.7	4375.5	209	4404	209.3
4412	209.3	4462	208.9	4512	209.1	4562	208.5	4612	208
4662	208.6	4712	208.7	4762	208.9	4812	208.6	4861.8	206.6
4863	206.7	4883	206.1	4898	205	4911	202.8	4922	202.9
4924	204.9	4940	206	4943	202.8	4946	202.6	4948	202.3
4952	202.6	4955	203	4964	202.6	4971	202	4978	202.6
4985	203.1	4993	202.6	4998	201.5	5003	201.5	5007	202.6
5019	209.1	5024	209.4	5031	209.3	5041.1	202.7	5047	196.9
5062	194.6	5082	191.4	5102	188.9	5122	185.4	5142	181.2
5162	178.4	5182	176.4	5202	177.6	5222	181.9	5242	186.4
5262	191.1	5282	193.4	5302	189.2	5322	186.2	5342	185.6
5362	185.7	5382	186.1	5402	186.9	5422	186.9	5442	186.6
5462	186.9	5482	187.2	5502	187.2	5522	187.2	5542	187.6

5562	186.9	5582	187.9	5602	188.9	5622	185.4	5642	184.1
5662	186.2	5682	191.4	5702	190.4	5722	192.2	5732	194.2
5742	202.4	5752	207.3	5766.8	208.3	5786	208.4	5805	204.1
5807	201.3	5817	199.1	5827	198.5	5837	198.3	5847	198.4
5860	201.4	5867	204.9	5887	205.6	5906.4	205	5971.5	220
6000	222	6015.3	221.8	6031	221.1	6050.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3330.5	.2	5041.1	.048	5742	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5041.1	5742	.99	140.01	159.99	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3330.5	5041.1	209	F
5742	6050.8	205.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23300

INPUT
Description: 23300

Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3330.5	227	3536.3	222.8	3777	211.6	3837.4	210.5	3918.1	209.8
4063	209	4202	207.5	4317.7	207.7	4375.5	209	4404	209.3
4412	209.3	4462	208.9	4512	209.1	4562	208.5	4612	208
4662	208.6	4712	208.7	4762	208.9	4812	208.6	4861.8	206.6
4863	206.7	4883	206.1	4898	205	4911	202.8	4922	202.9
4924	204.9	4940	206	4943	202.8	4946	202.6	4948	202.3
4952	202.6	4955	203	4964	202.6	4971	202	4978	202.6
4985	203.1	4993	202.6	4998	201.5	5003	201.5	5007	202.6
5019	209.1	5024	209.4	5031	209.3	5041.1	202.7	5045.1	196.9
5135.7	176.4	5202.8	193.4	5417.7	188.9	5444.6	184.1	5484.8	190.4
5512	202.4	5522	207.3	5536.8	208.3	5556	208.4	5575	204.1
5577	201.3	5587	199.1	5597	198.5	5607	198.3	5617	198.4
5630	201.4	5637	204.9	5657	205.6	5676.4	205	5741.5	220
5770	222	5785.3	221.8	5801	221.1	5820.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3330.5	.2	5041.1	.048	5512	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5041.1	5512	180	180	180	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3330.5	5041.1	208	F
5512	5820.8	205.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23120

INPUT
Description: 23120
This is a REPEATED section.

Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3245	224	3346.1	222.2	3431.5	222.1	3528.6	220.8	3589.7	213.3
3703.1	210.7	3781.9	210.1	3852.2	208.6	3939.6	208.1	4005.5	208.7
4110.3	209.7	4136.4	209.9	4180.2	208.9	4202.5	209.1	4234.4	208.9
4298	209.2	4348.5	208.3	4398.5	208.3	4448.5	208	4498.5	207.4
4548.5	206.2	4598.5	206.5	4648.5	205.7	4698	205.4	4748.5	205.1
4798.5	205.5	4848.5	205.5	4898.5	205.2	4948.5	205.4	4971	204.5
4975	202.6	5023.9	202.7	5027.1	206.5	5048.5	202.6	5068.4	207.8
5086.9	202.8	5095.9	200.7	5100.5	199.8	5125.4	199.7	5130.4	202
5135.6	202.8	5145.2	205.5	5151	206.1	5173.7	207.5	5176.2	206.6
5192.7	205.9	5197.9	207.5	5224.2	208.2	5256.5	205	5270	206.7
5272	208.6	5346	208.9	5385.4	208.4	5411.7	206.7	5448.7	208.3
5492.5	209	5504.7	208.7	5507.7	208.7	5511.2	208.3	5523.4	208.3
5530.4	199.5	5543.3	199.3	5554.5	207.9	5567.3	202.2	5568.4	205
5569.4	203	5586.2	204.4	5611.6	204.2	5623.8	204.2	5625.7	203.9
5687.4	203.4	5691.5	201.5	5703	201.1	5710	203	5716	200.9
5724	201.5	5726.5	203	5767	203.2	5839.5	206.2	5867.5	209.1
5907.4	212	5945.5	216.1	5967.1	217.3	5987.6	217.4	5997.4	220.4
6011.2	227								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3245	.2	5048.5	.048	5130.4	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5048.5	5130.4	30	30	30	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3245	5048.5	207.9	F
5130.4	6011.2	205	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23090

INPUT
Description: 23090

Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3245	224	3346.1	222.2	3431.5	222.1	3528.6	220.8	3589.7	213.3
3703.1	210.7	3781.9	210.1	3852.2	208.6	3939.6	208.1	4005.5	208.7
4110.3	209.7	4136.4	209.9	4180.2	208.9	4202.5	209.1	4234.4	208.9
4298	209.2	4348.5	208.3	4398.5	208.3	4448.5	208	4498.5	207.4
4548.5	206.2	4598.5	206.5	4648.5	205.7	4698	205.4	4748.5	205.1
4798.5	205.5	4848.5	205.5	4898.5	205.2	4948.5	205.4	4971	204.5
4975	202.6	5023.9	202.7	5027.1	206.5	5048.5	202.6	5068.4	207.8
5086.9	202.8	5095.9	200.7	5100.5	199.8	5125.4	199.7	5130.4	202
5135.6	202.8	5145.2	205.5	5151	206.1	5173.7	207.5	5176.2	206.6
5192.7	205.9	5197.9	207.5	5224.2	208.2	5256.5	205	5270	206.7
5272	208.6	5346	208.9	5385.4	208.4	5411.7	206.7	5448.7	208.3
5492.5	209	5504.7	208.7	5507.7	208.7	5511.2	208.3	5523.4	208.3
5530.4	199.5	5543.3	199.3	5554.5	207.9	5567.3	202.2	5568.4	205
5569.4	203	5586.2	204.4	5611.6	204.2	5623.8	204.2	5625.7	203.9
5687.4	203.4	5691.5	201.5	5703	201.1	5710	203	5716	200.9

5724	201.5	5726.5	203	5767	203.2	5839.5	206.2	5867.5	209.1
5907.4	212	5945.5	216.1	5967.1	217.3	5987.6	217.4	5997.4	220.4
6011.2	227								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3245	.2	5048.5	.048	5130.4	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5048.5	5130.4	63	63	63	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3245	5048.5	207.5	F
5130.4	6011.2	204.9	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23027

INPUT
Description: 23027

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2952.3	231.2	3083.8	222	3117.6	221.8	3125.1	223.7	3138	223
3148.3	223.6	3315.6	221.6	3329	222.2	3395.9	222.1	3490.6	213.3
3558.8	211.2	3631.2	210.5	3680.9	209.3	3806.5	208	3813.9	208.4
3823.4	208.1	3860.9	208.1	3870.2	208.3	3905.9	209.3	3947.3	209.7
3979.3	210.2	3996.6	210.6	4012.7	210.4	4038.1	210.4	4051.4	209.3
4077.1	209.3	4117.6	209.5	4151.4	209.2	4179	208.9	4238	208.5
4270	208.3	4334	208.5	4383	208	4440	207.7	4488	206.8
4532	207.2	4545	206.8	4599	207.2	4622	206.6	4648	205.3
4698	205	4751	204.7	4794	205.6	4827	204.5	4871	205.5
4890	205.2	4902	206	4919	205.8	4920	203.6	4923	202.5
4929	201.3	4932	200.5	4936	198.5	4942	196.5	4947	195
4955	195	4962	197	4970	198.3	4978	199.2	4988	200.3
4995	201.4	5001	202	5008	200.4	5015	199.6	5022	199
5026	198.8	5029	198.8	5037	199.1	5045	199.3	5052	199.5
5062	200.1	5069	200.9	5077	201.8	5081	202.5	5087	204.2
5102	204.9	5623	204.1	5632.8	203.5	5646	203.8	5649	201.2
5662	199.6	5675	199.6	5694	198.9	5701	198.7	5709	201.2
5710	202.6	5715	205.9	5723	206.3	5723.1	206.3	5748.9	205.4
5761.8	205	5811	205	5844.6	204.7	5859.8	205.8	5875.5	206.2
5884	209.2	5905.7	209.2	5923.4	219.9	5939.6	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2952.3	.07	4919	.042	5081	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4919	5081	22	22	22	.6	.8

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23005

INPUT

Description: TERRACE ISLAND BRIDGE
TERRACE ISLAND BRIDGE

Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2966.4	231	3096.4	221.9	3121.1	221.2	3166.4	222.9	3190	222
3267.9	222.1	3308.2	221.5	3412.9	221.5	3442.7	220.3	3494.7	213.2
3534.5	212.6	3649.4	210.4	3813.1	207.9	3875.5	208	4056.9	210.2
4078	209.3	4143.5	209.1	4184.3	209.3	4537.7	207.5	4572	206.9
4623.4	206.2	4676.7	205.3	4715.6	205.6	4744.6	205.4	4773.1	205.4
4790.8	205.5	4811.5	205.9	4840.8	205.4	4870.5	204.9	4913	205.6
4933	205.1	4934	202.5	4934.1	200.7	4937	198.9	4947	196.4
4957	195.8	4967	194	4977	197.5	4987	198.8	4997	201.6
5003	202.5	5007	202.8	5009	202.5	5010	202	5017	201.1
5027	201	5037	200.4	5047	200.6	5057	200.5	5062	201
5065	202.5	5065.5	203.6	5077	204.6	5575	206.9	5595	206.7
5598	204.6	5598.1	204.6	5601	202.8	5604	201.2	5612	199.2
5622	198.4	5635	198.7	5643	201.2	5647	202.5	5648.4	204
5648.5	204	5651	206.6	5651.1	207	5652.5	206.5	5658	206.5
5663.1	206.8	5689.9	205.9	5715	205.6	5733.1	205.7	5789.2	205.1
5821.8	205.3	5846.3	205.3	5879.9	205.4	5925.6	205.2	5955.6	205.7
5977.2	205.2	5999.7	205.1	6037.3	204.7	6043.1	206.1	6062.6	208
6089.8	209.2	6096.6	209.2	6125.6	209.1	6140.3	210.3	6164.5	212
6204.6	213.9	6219.8	214.8	6363.4	214	6422.3	216.4	6442.2	218
6456.1	220.4	6478.2	227						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2966.4	.07	4933	.03	5663.1	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4933	5663.1	15	15	15	.05	.2

Cross Section Lid
num= 92

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
2966.4	231	231	3096.4	221.9	221.9	3121.1	221.2	221.2
3166.4	222.9	222.9	3190	222	222	3267.9	222.1	222.1
3308.2	221.5	221.5	3412.9	221.5	221.5	3442.7	220.3	220.3
3494.7	213.2	213.2	3534.5	212.6	212.6	3649.4	210.4	210.4
3813.1	207.9	207.9	3875.5	208	208	4056.9	210.2	210.2
4078	209.3	209.3	4143.5	209.1	209.1	4184.3	209.3	209.3
4537.7	207.5	207.5	4572	206.9	206.9	4623.4	206.2	206.2
4676.7	205.3	205.3	4715.6	205.6	205.6	4744.6	205.4	205.4
4773.1	205.4	205.4	4790.8	205.5	205.5	4811.5	205.9	205.9
4840.8	205.4	205.4	4870.5	204.9	204.9	4913	205.6	205.6
4933	205.1	205.1	4934	202.5	202.5	4934.1	200.7	200.7
4937	198.9	198.9	4947	196.4	196.4	4957	195.8	195.8
4967	194	194	4977	197.5	197.5	4987	198.8	198.8
4997	201.6	201.6	5003	202.5	202.5	5007	202.8	202.8
5009	202.5	202.5	5010	202	202	5017	201.1	201.1
5027	201	201	5037	200.4	200.4	5047	200.6	200.6
5057	200.5	200.5	5062	201	201	5065	202.5	202.5
5065.5	203.6	203.6	5077	204.6	204.6	5575	206.9	206.9
5595	207	206.7	5598	207	204.6	5598.1	210	204.6
5601	210	202.8	5604	210	204.6	5648.4	209.8	204.7
5648.5	209.8	204	5651	209.8	207	5651.1	207	207
5652.5	206.5	206.5	5658	206.5	206.5	5663.1	206.8	206.8
5689.9	205.9	205.9	5715	205.6	205.6	5733.1	205.7	205.7
5789.2	205.1	205.1	5821.8	205.3	205.3	5846.3	205.3	205.3
5879.9	205.4	205.4	5925.6	205.2	205.2	5955.6	205.7	205.7
5977.2	205.2	205.2	5999.7	205.1	205.1	6037.3	204.7	204.7
6043.1	206.1	206.1	6062.6	208	208	6089.8	209.2	209.2
6096.6	209.2	209.2	6125.6	209.1	209.1	6140.3	210.3	210.3

6164.5	212	212	6204.6	213.9	213.9	6219.8	214.8	214.8
6363.4	214	214	6422.3	216.4	216.4	6442.2	218	218
6456.1	220.4	220.4	6478.2	227	227			

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22990

INPUT
Description: 22990

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2959.4	231	3110	221.1	3162.7	222.2	3285.1	220.9	3318	221.2
3416.7	220.7	3535	211.7	3784.6	208.9	3861	207.3	3871.6	208.5
3909.3	208	3941.5	208.5	3967	208.7	3989.3	209	4006	209
4023.1	209.8	4048.1	210.2	4067.6	209.2	4092.9	209.1	4126.6	209.1
4169.4	209.3	4176.9	209.2	4202.9	209.2	4244.4	209.1	4306	209.1
4355.9	208.7	4414	208.1	4470.2	207.2	4516.9	207.2	4565.7	207.1
4615.1	206.1	4656.1	205.2	4684.3	205.4	4760	206	4795.7	206.6
4818.1	207	4850.3	205.4	4915	205.5	4935	204.8	4936	202.4
4940	199.8	4945	197.2	4955	195.4	4965	193.9	4975	195.6
4985	197.9	4995	200.5	5000	201.5	5009	202.5	5012	202.7
5015	202.5	5020	201.8	5025	201.8	5031	201.4	5035	200.6
5045	200.5	5055	199.3	5058	199.8	5062	201.9	5085	204.9
5575	207.5	5594	206.7	5601	201.2	5607	199.6	5621	198.9
5633	198.8	5644	201.2	5645	202.6	5652	206.3	5654	206.7
5655.2	206.5	5675	206.5	5704.5	206.2	5735	205.7	5781.6	206
5809.3	205.1	5840.4	205.5	5868.5	205.5	5907.9	205.8	5939.4	205.2
5973.5	205.3	5992.7	205.6	6012.7	204.4	6040.3	204.4	6057.2	205.9
6077.6	208.2	6108.7	209.3	6135.3	209.1	6143	208.2	6160.3	210.1
6200.9	212.6	6234.3	213.9	6255.9	214.1	6304.8	214.4	6369.7	214
6420.7	216	6454.4	218	6464.6	220	6491.6	227.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2959.4	.06	4935	.028	5655.2	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4935	5655.2	35	60	80	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22930

INPUT
Description: 22930

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2996.4	231.4	3110.9	221.3	3151.1	221.3	3160.5	220.7	3190.1	221.7
3215.5	221.7	3291	220.2	3339.8	221.1	3454.2	220	3497.2	214.2
3607.8	211.6	3808.6	209.2	3841.4	208.5	3884.7	208	3948.8	209.2
3987.2	209.3	4074.1	211.2	4093.1	209.8	4187.5	209.5	4194	209
4238	208.5	4291	208.4	4345	208.5	4415	207.9	4475	207.4
4540	206.8	4605	206.5	4654	205.4	4682	205.9	4714.4	205.3
4761	205.3	4812	205.6	4860	205.8	4891	203.6	4902	203.3

4914	204.5	4922	204.7	4931	203.7	4943	203.3	4944	202.6
4945	201.7	4949	198.6	4956	197.4	4961	197.3	4971	197.2
4981	198.6	4991	199.9	5001	199.9	5011	200.2	5021	200.9
5031	200.7	5041	201.5	5051	201.3	5055	201.9	5055.1	202.6
5058	204.4	5071	204.7	5497	203	5515	203.6	5516	201.2
5521	200.7	5527	199.1	5535	198.8	5545	198	5554	198.3
5561	201.2	5571	207.9	5574	207.7	5596.7	208.6	5672	206.4
5795.6	205.2	5816.4	205.2	5870	205.7	5945.8	204.8	6012	205.9
6034	205.3	6055.8	205.9	6077.3	205.8	6100.4	207.9	6163.8	208.2
6181.8	209.1	6193.3	208.6	6202.9	208.5	6227	210.1	6249.8	211.6
6295.9	213.8	6327.3	215.2	6362.8	215.9	6384.5	216.9	6386.9	218.3
6393.8	218.1	6412.7	220.7	6448.4	221	6453.1	219.2	6463	219.8
6464.7	223.7	6477.6	223.7	6502.2	225.3	6622.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2996.4	.06	4914	.028	5596.7	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4914	5596.7	150	110.01	189.99	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22820

INPUT
Description: 22820

Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2960.5	227.9	2963.9	223.7	3005.5	223.7	3010.3	220.3	3031	220.3
3075.8	222.2	3098.3	221.1	3119.3	220.9	3159.8	222.2	3182.9	222
3217.2	219	3238.2	220.1	3248.2	220	3266	219.4	3303.7	219.2
3359.2	217.2	3401	213.6	3431.1	213.8	3470.9	217.8	3513.7	214.1
3577.3	212	3602.1	212.3	3670.9	209.8	3700.1	210	3794.1	208.3
3849.9	207.2	4011	208	4047.2	207.3	4086.7	209.5	4110.5	209.5
4151.2	208.3	4192	209	4242	208.5	4392	208.4	4442	208.2
4492	207.5	4592	205.6	4603	205.1	4635	206.5	4671	207
4707	204	4728	205.1	4755	205.3	4792	205.5	4824	205.5
4881	204.4	4886	202.6	4900	202.7	4919	202	5025	200.1
5059	204.6	5284.4	203.8	5304.4	203.5	5308.4	201.3	5316.4	199.2
5328.4	198	5338.4	198	5349.4	198	5362.4	199.3	5369.4	201.3
5370.4	202.2	5378.4	202.4	5387.4	206.1	5394.4	206	5395.1	206.5
5408.4	206.5	5426.8	205.6	5474.2	205.4	5486.1	206.1	5524.1	206.6
5536.6	206.6	5546.3	205.7	5557.8	206.4	5622.5	206.7	5655.2	205.6
5745	205.5	5760.4	204	5858.4	204.5	5898.7	205.6	5931.7	205.5
5952.5	204.3	6063.2	204.4	6073.2	206.5	6118.8	207.7	6146.9	206.8
6176.9	207.8	6198.2	207	6374.6	215.2	6383.3	217.3	6416.9	220.7
6438.1	217.9	6452.2	222.2	6470.2	223.4	6602.2	227.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2960.5	.06	4824	.028	5387.4	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4824	5387.4	240	245	150	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22575

INPUT
Description: 22575

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3968	227	4042	211	4063	209.5	4088	208.7	4280	207.6
4316	207.2	4411	207.2	4439	207.9	4472	207.5	4500	208.2
4591	208.2	4607.3	206.8	4629	207.2	4674	206.4	4688	206.1
4692	203	4697	202.7	4704	202.6	4711	202.3	4713	202.6
4715	203.9	4720	204.9	4839	205.7	4850	202.9	4896.3	203.4
4920	203.2	4941	203.8	4966	204.3	4972	204.5	4977	198.5
4979	197	4986	195.8	5007	200.3	5024	201.8	5033	202
5041	203.9	5262	203	5272	204.1	5282	203.3	5285	202.4
5289	200.7	5294	200.2	5310	199.9	5324	199.7	5335	199.4
5346.7	201	5346.8	202.3	5347	203.3	5347.9	203.3	5348	206
5381	206.4	5464	205.2	5474	204.3	5486	204.7	5497	204.7
5510	205.8	5536	205.9	5563	205.3	5573	205.9	5584	206.2
5599	205.9	5618	204.6	5641	204.7	5686	206	5700	207.1
5737	207	5746	207.4	5775	207.1	5847	206.3	5865	207.1
5889	206.8	5920	207.4	5964	204.8	5982	205.1	5992	205.9
6011	206	6075	206.1	6103	205.3	6132	205.4	6160	205.9
6233	204.6	6260	207.3	6280	207.7	6309	207.4	6330	207.6
6342	208.4	6353	207.8	6402	211.8	6502	216.3	6522	216.4
6524	219	6550	222.1	6575	221.7	6580	218.9	6592	218.9
6594	224.1	6598	222.1	6630	225.1	6738	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3968	.06	4972	.028	5348	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4972	5348	210	210	160	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22365

INPUT
Description: 22365

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4362	227.1	4400	210	4431	207.3	4484	206.9	4515	206.6
4542	206.9	4602	207.3	4607	207.1	4622	207.5	4635	207
4640	208.6	4660	208.1	4695	202.9	4718	202.9	4752	208.9
4763	209.8	4777	207.3	4822	206.4	4855	206.2	4866	205.7
4890	206.2	4918	207.3	4936	206.6	4957	204.1	4959	201.4
4962	200.9	4970	199.6	4982	200.1	4992	200.5	5002	200.7
5012	200.7	5022	200.8	5032	201.2	5039	201	5041	201.4
5041.1	203.3	5175	203.3	5195	202.8	5197	201.2	5203	200
5250	197.2	5260	197.2	5273	197.6	5288	198.2	5303	199.8
5307.7	201.2	5307.9	203.9	5400	204.4	5476	204.6	5511	204.9
5525	204	5553	204.5	5577	204.8	5613	205.4	5645	206.5
5666	206.5	5725	207.2	5739	207	5767	207	5805	207.4
5838	207.4	5868	206.5	5895	206.1	5929	206.1	5940	207
5989	204.6	6011	204.6	6028	205	6042	205	6064	205.6

6116	204.9	6141	204.7	6182	204.7	6250	205	6292	204.5
6315	204.5	6327	206.3	6353	207.5	6376	207	6415	206.6
6423	207.4	6438	208	6451	207.9	6478	209	6508	210.1
6543	212	6585	214.1	6622	214.8	6631	217.3	6662	219.2
6671	220.1	6691	221.6	6726	221	6732.8	217.5	6742	217.5
6744	222.4	6750	222.4	6915	225.8	6936	227.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4362	.06	4936	.028	5307.9	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4936	5307.9	230	192	20	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22173

INPUT
Description: 22173

Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4552.7	225	4569.6	224.1	4577.8	220	4590	213.4	4600.2	208.1
4607.4	205.8	4628.7	205.6	4661.1	205.5	4687.2	205.4	4706.6	205.4
4726.7	205.1	4752.7	205.9	4764.7	205.9	4777.8	205.8	4798.4	205.5
4811.1	205.6	4820.6	205.6	4830.1	205.5	4855	205.6	4861	205.6
4898	205.2	4930	205.3	4938	201.2	4949	200	4961	198.8
4973	198.5	4987	200.1	4999	200.4	5006	197.7	5016	196.3
5031	194.9	5037	194.9	5055	198.2	5061	201.3	5071	203.9
5129	204.4	5200	204.5	5240.2	205.2	5277.1	204.6	5295.7	203.8
5310.4	203.9	5325	204.2	5336.2	204.6	5351.4	205.9	5395.7	205.6
5409.9	205.3	5435.7	204.6	5457.1	205.5	5486.8	203.6	5520.3	204.6
5549.5	205.2	5563.7	205.8	5590.5	206.3	5605.5	206.5	5619.7	207.2
5631.1	207.1	5649.4	207.3	5661.7	207.5	5704.3	207.5	5725.4	207.3
5742.1	207.2	5767.6	206.5	5783.6	206.2	5812.7	205.7	5838.5	204.9
5858.2	204.2	5867	205.1	5878.5	205.1	5890.2	205.3	5896.6	205.4
5962.5	205.5	6002.3	205.2	6029.7	204.9	6062.8	204.7	6092.5	204.3
6109.9	204.3	6119.5	204.2	6131.9	204.2	6140	205.8	6158	207.6
6198.3	207.5	6224.7	207.4	6236	207.7	6249.8	207.6	6262.8	208.4
6283.1	209.5	6295.9	210.7	6312.3	212	6336.5	213.5	6349	214.3
6369	215.8	6390	218.2	6413.4	220.3	6429.4	221.5	6441	222.1
6654.2	224.7	6667.1	225.9	6672.7	227.1				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4552.7	.06	4930	.028	5071	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4930	5071	115	63	40	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22110

INPUT
Description: 22110

DOTY RD. BRIDGE (GRATE BRIDGE DECK, MAY NOT DEVELOP PRES-FLOW)

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4546.1	225	4555.2	225.5	4566.9	226	4579.5	225.6	4590.9	224.8
4596.7	220.1	4610.7	214.6	4630.1	213.3	4646.9	211.5	4660.2	209.5
4676.3	207.7	4706.7	205.6	4724.1	205.5	4746.1	205.5	4779.5	205.5
4899	206	4910	206.3	4949	207.6	4957	207.6	4957.1	207.6
4960	207.7	4961	201.2	4962	199.8	4962.1	199.6	4962.3	199.6
4970	197.6	4973	197	4977	195.9	4993	195.5	5008	196.8
5020	196.7	5023	196.8	5034	199	5034.1	199	5036	199.4
5036.1	199.4	5038	201.3	5038.1	207.4	5055	207.3	5074.8	207.3
5082.2	210.8	5102.5	209.7	5133.9	207.8	5149.8	205.6	5173.8	204.6
5194.7	204.1	5225.4	203.5	5257.4	203.1	5286.6	203.7	5308.3	203.7
5330.2	204.6	5355.6	205.4	5385.4	204.6	5414	204.2	5431	203.8
5465.5	203.6	5495.5	203.6	5523.1	204.5	5548.7	205.5	5584.5	206.3
5598.5	207.2	5612.3	207.7	5626	206.6	5652.3	207.4	5679	207.3
5705.8	206.4	5739.8	206.4	5776.3	206.7	5789.9	206.7	5836.8	204.5
5855.2	204.2	5862.4	205.4	5873.1	205.4	5883.4	204.9	5902.1	205.5
5926.1	205.5	5959.7	205.4	5996.8	205.4	6027.6	205.5	6101.8	204.6
6110.5	205.1	6121.2	204.9	6141.1	206	6186.7	206.2	6208.1	207.2
6215.1	207.4	6225.1	208	6235.6	207.6	6247	208.2	6262.8	209.3
6276.7	210.3	6295.2	212	6313.2	213.4	6334.8	214.5	6352.8	216.3
6379.5	220	6431.2	221.9	6643.4	224.1	6653.3	224.8	6662.2	227.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4546.1	.06	4960	.03	5082.2	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4960	5082.2	33	33	33	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4546.1	4960	204.5	F
5082.2	6662.2	204.5	F

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 22093.5

INPUT
Description: DOTY RD. BRIDGE (GRATE BRIDGE DECK, MAY NOT DEVELOP PRESS-FLOW

Distance from Upstream XS = 9
Deck/Roadway Width = 15
Weir Coefficient = 2.4
Upstream Deck/Roadway Coordinates
num= 53

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4555.2	225.5	225.5	4566.9	226	226	4579.5	225.6	225.6
4590.9	224.8	224.8	4596.7	220.1	220.1	4610.7	214.6	214.6
4630.1	213.3	213.3	4646.9	211.5	211.5	4660.2	209.5	209.5
4676.3	207.7	207.7	4706.7	205.6	205.6	4724.1	205.5	205.5
4746.1	205.5	205.5	4779.5	205.5	205.5	4899	206	206
4910	206.3	206.3	4949	210.6	207.6	4957	211	207.6
4957.1	215	207.6	4960	215	207.7	4962	215	
4962.1	215	199.6	4962.3	215	207	4970	215	207
4973	217	207	5020	217	207	5023	215	207
5034	215	207	5034.1	215	199	5036	215	199.4

5036.1	211	199.4	5038	210.7	201.3	5038.1	210.7	207.4
5074.8	207.3		5082.2	210.8	210.8	5102.5	209.7	209.7
5133.9	207.8	207.8	5149.8	205.6	205.6	5173.8	204.6	204.6
5194.7	204.1	204.1	5225.4	203.5	203.5	5257.4	203.1	203.1
5286.6	203.7	203.7	5308.3	203.7	203.7	5330.2	204.6	204.6
5355.6	205.4	205.4	5385.4	204.6	204.6	5414	204.2	204.2
5431	203.8	203.8	5465.5	203.6	203.6	5495.5	203.6	203.6
5523.1	204.5	204.5	5548.7	205.5	205.5			

Upstream Bridge Cross Section Data
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4546.1	225	4555.2	225.5	4566.9	226	4579.5	225.6	4590.9	224.8
4596.7	220.1	4610.7	214.6	4630.1	213.3	4646.9	211.5	4660.2	209.5
4676.3	207.7	4706.7	205.6	4724.1	205.5	4746.1	205.5	4779.5	205.5
4899	206	4910	206.3	4949	207.6	4957	207.6	4957.1	207.6
4960	207.7	4961	201.2	4962	199.8	4962.1	199.6	4962.3	199.6
4970	197.6	4973	197	4977	195.9	4993	195.5	5008	196.8
5020	196.7	5023	196.8	5034	199	5034.1	199	5036	199.4
5036.1	199.4	5038	201.3	5038.1	207.4	5055	207.3	5074.8	207.3
5082.2	210.8	5102.5	209.7	5133.9	207.8	5149.8	205.6	5173.8	204.6
5194.7	204.1	5225.4	203.5	5257.4	203.1	5286.6	203.7	5308.3	203.7
5330.2	204.6	5355.6	205.4	5385.4	204.6	5414	204.2	5431	203.8
5465.5	203.6	5495.5	203.6	5523.1	204.5	5548.7	205.5	5584.5	206.3
5598.5	207.2	5612.3	207.7	5626	206.6	5652.3	207.4	5679	207.3
5705.8	206.4	5739.8	206.4	5776.3	206.7	5789.9	206.7	5836.8	204.5
5855.2	204.2	5862.4	205.4	5873.1	205.4	5883.4	204.9	5902.1	205.5
5926.1	205.5	5959.7	205.4	5996.8	205.4	6027.6	205.5	6101.8	204.6
6110.5	205.1	6121.2	204.9	6141.1	206	6186.7	206.2	6208.1	207.2
6215.1	207.4	6225.1	208	6235.6	207.6	6247	208.2	6262.8	209.3
6276.7	210.3	6295.2	212	6313.2	213.4	6334.8	214.5	6352.8	216.3
6379.5	220	6431.2	221.9	6643.4	224.1	6653.3	224.8	6662.2	227.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4546.1	.06	4960	.03	5082.2	.07

Bank Sta: Left	Right	Coeff Contr.	Expan.
4960	5082.2	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4546.1	4960	204.5	F
5082.2	6662.2	204.5	F

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 20

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4910	206.3	206.3	4949	210.6		4957	211	207.6
4957.1	215	207.6	4960	215		4962	215	
4962.1	215		4962.3	215	207	4970	215	207
4973	217	207	5020	217	207	5023	215	207
5034	215	207	5034.1	215		5036	215	
5036.1	211		5038	210.7		5038.1	210.7	
5074.8	207.3	207.3	5074.8	207.3	207.3			

Downstream Bridge Cross Section Data
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4559.3	225	4569	225.2	4580.3	226	4592.5	225.7	4602.8	223.7
4611.1	220	4629.5	210	4653.2	207.9	4667	206.1	4688.9	206.1
4716.9	206.3	4752.9	205.8	4795	206.1	4828.6	206.1	4849.2	206.1
4865.2	206.3	4880.9	206.3	4899.3	206.5	4923.7	206.6	4944.3	207

4955.1	208.2	4962.1	207.5	4963	201.2	4963.1	198.8	4979.6	195.2
4995.3	194	5010	195.2	5025.5	197.5	5036.4	199.9	5036.9	201.2
5040.2	207.5	5060.7	207.3	5073.2	206.4	5090.9	206.6	5116.1	203.6
5134.6	203.1	5156.1	202.5	5173	203.8	5198.3	203.6	5228.7	202.5
5247.8	202.8	5274.3	202.5	5295	204.1	5322.5	204	5355.1	204
5385.7	202.9	5411.4	203	5456.8	203.6	5480.1	204.4	5506.9	205
5530.8	205.9	5556.9	205.9	5598.2	206.9	5611.3	207.4	5625.4	206.4
5638.3	206.3	5697.4	206.3	5720.6	206.3	5755.2	206.4	5795.6	205.8
5822.2	205	5845.9	204.7	5857.5	204.5	5868.9	205	5878.9	204.8
5892	205.4	5909.3	204.7	5932.2	204.5	5959.1	204.9	5989.8	204.6
6015.8	205.4	6034.5	204.5	6052	205.4	6082	203.9	6092.4	203.5
6099.9	203.8	6108.5	204.5	6117.7	204	6130.6	206.1	6147.4	206.4
6174	206.1	6189.6	207.2	6204.5	207	6212.3	207.1	6220.9	207.9
6233.1	207	6238.4	207.6	6250.7	209	6267.6	210	6285.8	211.4
6313.1	214.1	6331.6	216	6356.1	219	6369.9	220	6387.5	221.2
6417.4	221.6	6627.8	223.2	6644	221.3	6657.7	227.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4559.3	.06	4962.1	.037	5040.2	.06

Bank Sta: Left Right Coeff Contr. Expan.
4962.1 5040.2 .5 .7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4559.3	4962.1	204.5	F
5040.2	6657.7	204.5	F

Sediment Elevation = 0

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 204.5
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Momentum Cd = 2
Selected Low Flow Methods = Energy

High Flow Method
Pressure and Weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd = .745356
Max Low Cord = 207.5

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22077

INPUT
Description: 22077

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4559.3	225	4569	225.2	4580.3	226	4592.5	225.7	4602.8	223.7
4611.1	220	4629.5	210	4653.2	207.9	4667	206.1	4688.9	206.1
4716.9	206.3	4752.9	205.8	4795	206.1	4828.6	206.1	4849.2	206.1
4865.2	206.3	4880.9	206.3	4899.3	206.5	4923.7	206.6	4944.3	207
4955.1	208.2	4962.1	207.5	4963	201.2	4963.1	198.8	4979.6	195.2
4995.3	194	5010	195.2	5025.5	197.5	5036.4	199.9	5036.9	201.2
5040.2	207.5	5060.7	207.3	5073.2	206.4	5090.9	206.6	5116.1	203.6
5134.6	203.1	5156.1	202.5	5173	203.8	5198.3	203.6	5228.7	202.5
5247.8	202.8	5274.3	202.5	5295	204.1	5322.5	204	5355.1	204
5385.7	202.9	5411.4	203	5456.8	203.6	5480.1	204.4	5506.9	205
5530.8	205.9	5556.9	205.9	5598.2	206.9	5611.3	207.4	5625.4	206.4
5638.3	206.3	5697.4	206.3	5720.6	206.3	5755.2	206.4	5795.6	205.8
5822.2	205	5845.9	204.7	5857.5	204.5	5868.9	205	5878.9	204.8
5892	205.4	5909.3	204.7	5932.2	204.5	5959.1	204.9	5989.8	204.6
6015.8	205.4	6034.5	204.5	6052	205.4	6082	203.9	6092.4	203.5
6099.9	203.8	6108.5	204.5	6117.7	204	6130.6	206.1	6147.4	206.4
6174	206.1	6189.6	207.2	6204.5	207	6212.3	207.1	6220.9	207.9
6233.1	207	6238.4	207.6	6250.7	209	6267.6	210	6285.8	211.4
6313.1	214.1	6331.6	216	6356.1	219	6369.9	220	6387.5	221.2
6417.4	221.6	6627.8	223.2	6644	221.3	6657.7	227.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4559.3	.06	4962.1	.037	5040.2	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4962.1	5040.2	105	120	80.01	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4559.3	4962.1	204.5	F
5040.2	6657.7	204.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21957

INPUT
Description: 21957

Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4609	225.2	4613.9	225.5	4626.5	225.8	4636.6	225.5	4646.5	223
4657.4	220	4693.2	210	4711.3	206.3	4733.5	203.9	4766.4	204.3
4813.1	203.6	4831.2	204.6	4844.4	204.6	4868.3	205.6	4884.6	205.5
4904	204.2	4929	204.4	4949	202.2	4950	201.3	4953	200.9
4960	198.8	4970	196.4	4985	194.2	4997	193.2	5010	192.2
5025	193.8	5036	196.6	5049	201.2	5051	202.3	5076	203.2
5082	203.7	5107.7	203	5147.2	202.6	5210.1	202.1	5267.1	202.9
5318.1	202.7	5370	202.6	5424.6	202.9	5457.9	203	5480.3	204
5504.9	204.3	5526.2	205.6	5556.9	205.5	5593.4	206.3	5612.1	206.5
5623.1	207.1	5635.2	206.8	5660.7	207.1	5717.5	206.7	5745.7	205.9
5778.9	207.7	5812.8	206.3	5826.2	205.9	5846.5	205	5867.9	205.1
5876.1	205.3	5886.3	204.7	5910.7	204.2	5941.3	203.8	5970.1	203.2
6002.8	203.5	6048.2	203.5	6081.8	203.8	6103.5	204.4	6113.4	204.7
6123.4	204.4	6132.5	204.7	6147.7	206.3	6183.4	206.3	6201.7	207.2

6216.3	207.5	6232.3	207.2	6240.9	206.5	6254.4	208.4	6268.4	210.1
6289.3	212	6310.2	215	6332.8	217.7	6362	220	6393.4	221.3
6414.7	221.8	6623.3	219.9	6633.7	219.9	6645	222.6	6654.8	227.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4609	.7	4929	.043	5082	.09

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4929	5082	159.99	132	50.01	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21825

INPUT
Description: 21825

Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4683.7	225	4710.3	210	4732.5	203.9	4782.9	203.8	4804.6	203.7
4823.3	203.7	4844	205	4914	203.6	4941	204	4945	201.2
4957	197.3	4970	196.6	4988	196.5	5005	196.6	5020	198.4
5035	198.5	5041	199.9	5054	201.2	5055	202.5	5084	202.8
5110	202.5	5165	202	5182	201.9	5200	201.7	5222	201.2
5226	201	5233	200.4	5235	200.2	5240	199.4	5245	199
5250	198.5	5255	198.1	5265	198	5275	198.4	5285	198.3
5295	198.7	5305	198.7	5315	198.6	5325	198.2	5335	197.6
5345	197.6	5355	197.9	5365	198	5375	198.5	5385	198.3
5395	197.7	5405	197.4	5415	196.5	5425	196	5435	195.7
5445	196.1	5455	197.2	5460	198.4	5464.3	201	5464.4	201.2
5465	203.4	5484.9	204.8	5494.2	204.8	5519	205.1	5555.9	205.9
5591.6	206.8	5604.3	207.4	5616	206.5	5656.1	207	5693.2	206
5733.3	205.7	5771.1	204.8	5805.4	204.7	5828.3	204.4	5841	204.6
5849.7	204.6	5859.7	204.6	5880.6	204.1	5913.2	204.6	5965.6	204.6
5985.6	204.4	6014.6	203.9	6063.3	204.4	6076.2	204.2	6087.1	204.6
6097.3	204.4	6121.9	205.8	6152.4	206.4	6171.5	207.3	6188.3	208
6201.2	207.7	6207.5	207.4	6224.5	209.4	6239.1	210.1	6254.3	211.7
6273.6	214	6292.4	216.3	6317.7	219.7	6369.3	222.1	6585.8	220.5
6606.1	223.6	6609.6	227.2						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4683.7	.9	4782.9	.075	4945	.037	5054	.09	6207.5	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4941	5055	250	225	90	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4683.7	4941	204	F
5055	6609.6	202.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21600

INPUT

Description: 21600

Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4685.6	225	4693	223.6	4702.5	223.7	4715.8	223.5	4731.8	220
4743.3	210	4767.5	205.8	4792.3	204.6	4813.6	203.8	4831.1	203.8
4860.5	203.9	4884.6	203.8	4911.1	203.9	4915	203.3	4942	203.5
4943	201.3	4953	200.7	4966	198.9	4977	194.9	4995	194.3
5011	195.2	5028	196.2	5041	197.1	5056	198.1	5056.1	198.7
5059	201.1	5082	203.1	5114	202.8	5158	202	5184	202.1
5202	201.2	5204	200.5	5210	200.1	5216	200.6	5221	200.7
5226	200.8	5231	201.2	5239	201.6	5254	201.9	5270	201.6
5282	201.3	5297	201.2	5304	200.9	5314	200.8	5321	200.6
5324	199.9	5334	198.8	5344	198.2	5354	196.9	5364	196.4
5374	195.7	5384	195.8	5394	196.5	5404	199.5	5409	200.2
5414	200.8	5419	201.2	5421	203.4	5424	203.8	5449	204.4
5450.1	205.2	5470	205.2	5488.7	205.2	5552	207	5563.6	207.2
5599.9	206.3	5640	206.3	5683.1	205.7	5737.1	205.2	5796.4	205.2
5809.5	205.5	5832.2	204.3	5860	204.3	5905.5	204.4	5953.5	205.1
6006	204.8	6029.7	205.1	6044	204.9	6089.5	205.7	6132.8	207.5
6142.9	207.9	6154.5	207.5	6162.7	207.2	6173.2	209.2	6189.4	210
6207.8	212	6226.2	214.1	6256.1	217.5	6274.1	220.2	6301.2	221.8
6325.7	221.8	6332.5	221.9	6545.4	227.6				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4685.6	.9	4813.6	.075	4943	.037	5059	.09	6162.7	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4942	5082	260	183	70	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4685.6	4942	203.5	F
5082	6545.4	203.1	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21417

INPUT
Description: 21417

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4580.8	225	4590.6	220.3	4601.6	220.6	4617.6	220.7	4622.9	221.3
4638	216.1	4653.8	210	4688.8	204.3	4719.1	205	4754.4	205.5
4782.7	205.2	4804.3	205.2	4817.3	205.4	4849.5	205	4865.7	204.6
4879.1	204.8	4895.7	204.7	4923.6	203.7	4931	203.8	4951	203.3
4954	202.9	4955	201.2	4962.6	199.7	4962.7	196	4972	195.2
4982	194.5	4992	194.1	5002	193.8	5012	195	5022	196.2
5032	198.9	5044	201.1	5046	202.3	5066	202.4	5092	202.3
5125.5	201.8	5149.5	201.2	5154.5	200.1	5163.5	199.1	5173.5	198.4
5183.5	198.2	5193.5	198.1	5203.5	198	5213.5	198.3	5223.5	198.4
5233.5	198.4	5243.5	198.2	5253.5	198	5263.5	197.7	5273.5	196.9
5283.5	194.9	5293.5	194.4	5303.5	194.4	5313.5	194.4	5323.5	195.2
5332.5	196.6	5337.5	197.7	5342.4	199.4	5342.5	201.2	5343.5	203.7
5358	205.3	5368.5	204.9	5388.5	202.2	5431.5	205.4	5603.5	205.8
5691.5	204.2	5769.5	204.7	5832	203.3	5870	204.2	5992	203.8
6094	209.7	6118	209.5	6130	208.8	6290	222.8	6516	225.1

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4580.8	.9	4601.6	.075	4955	.038	5044	.09	6130	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4951	5046	110.1	264.9	200.1	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21152

INPUT
Description: 21152

Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4397.3	225	4407.4	221.2	4410.1	222.1	4415.9	222.7	4428.9	222.7
4435.7	222.4	4445.2	220	4458	210	4477.5	204.5	4497.8	204.7
4524.7	205.1	4549.7	205.4	4581.4	205.8	4602	205.9	4625.3	205.5
4650.6	204.8	4674.9	205.3	4696.1	205	4713.5	203.9	4743.3	203
4792.7	204.5	4854.7	204.4	4885.4	203.8	4889	201.6	4911	202
4912	202.2	4919	201.3	4929	199.6	4939	196.6	4949	195.1
4959	194.3	4969	193.7	4979	193.6	4989	194.2	4999	195.2
5009	195.5	5019	194.7	5029	194.5	5039	194.4	5049	194
5059	193.8	5069	194.8	5074	195.8	5077	197.3	5079	199.4
5081	201.3	5083	204.1	5090	204.7	5100.2	204.2	5134.1	205.1
5179	205.7	5206.1	204.7	5225.4	204.1	5237.3	204.6	5249.7	204.3
5276.8	204.3	5314.1	204.2	5351.9	204.5	5373.6	205.2	5390.5	205.1
5438.2	205.8	5461.3	204.5	5472.1	204.8	5485.7	204.5	5505	205.3
5577.6	206.5	5619.1	206.2	5639.5	208.1	5670.3	208.9	5679.5	208.9
5695.3	212	5713.3	213.2	5751.7	212.1	5780.2	212.4	5800.5	215.6
5814.1	216	5829.6	215.8	5852.8	216.1	5883.4	217.5	5895.3	218.3
5913.3	220	5935.9	221	5952.2	222.5	5999.2	225		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4397.3	.9	4428.9	.075	4919	.038	5081	.09	5679.5	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4911	5090	50	222	270	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20930

INPUT
Description: 20930

Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4370.3	225	4382.5	220.8	4393.3	220.7	4407.3	220.8	4415.8	219.7
4433.8	214.1	4446.1	210.1	4459.7	204.8	4485	205	4519	205.3
4555	205.3	4592.8	205.3	4632.2	205.1	4672.1	203.9	4696.7	202.2
4727.9	202.2	4751.2	202.8	4779.8	203.8	4799.5	203.3	4827.5	203.1
4848.1	203.2	4869.4	203.4	4893.9	202.2	4907	202.1	4914	202.2
4915	201.4	4922	201.4	4924	201.9	4930	202	4931	201.3
4931.1	200.7	4937	199.5	4942	198.4	4947	197.4	4957	197.4

4967	197.4	4977	197.4	4987	196.3	4997	195.3	5007	193.3
5017	191.4	5027	190.1	5037	190.6	5047	191.9	5052	194.3
5057	195.3	5062	198	5067	198.8	5069	199.1	5069.1	201.3
5069.2	203	5087	203.7	5092.2	203.1	5111	203.7	5159.5	203.8
5172.5	204.3	5188.1	203.5	5211.9	204.3	5236	204.4	5265.1	205.4
5293.4	204.5	5333.1	205	5377.3	205.8	5394.9	205.8	5408.1	205.9
5420.4	205.9	5442.7	207	5483.3	207.9	5493.7	209.6	5504.5	210.4
5516.6	211.7	5541	212.5	5574	213.1	5598	214.8	5630.7	216.6
5684	216.4	5723.3	217.8	5746.8	221.3	5761.3	222.5	5773.3	222.3
5792.7	223.2	5822.8	223.4	5859.1	225.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4370.3	.9	4415.8	.075	4931	.037	5069.1	.09	5420.4	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4930	5069.2	180	230	280	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20700

INPUT
Description: 20700

Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4402.5	225	4414.1	218.1	4427.7	216.9	4441.7	216.6	4457.3	215.2
4479.7	214.7	4508.8	215	4536.4	214.5	4563.2	213.2	4591.1	210
4608.4	204.9	4683.2	204	4741.3	203.8	4786	203.5	4831.2	202.3
4875.1	203.6	4913.7	204.7	4915.7	204.6	4933.7	202.5	4938.7	201.3
4943.7	200.8	4948.7	199.9	4953.7	198.5	4963.7	196.6	4973.7	194.8
4983.7	194.3	4993.7	194.5	5003.7	193.8	5013.7	193.3	5023.7	192.8
5033.7	192.6	5038.7	192.4	5043.7	193.8	5048.7	193.7	5053.7	195
5058.7	196.5	5060.2	200.9	5061	200.9	5061.1	201.3	5061.7	203.4
5066.7	203.9	5077	203.8	5123	204.7	5150.4	205.1	5173.6	203.8
5187.1	204.2	5198.7	203.9	5222.7	203.5	5256	203.5	5296.5	202.2
5311.4	201.1	5340.9	201.2	5380.6	201.1	5414.6	201.5	5446.3	202.6
5456.8	203.9	5476.2	210	5501.2	213	5516.6	213.8	5537.5	214.3
5565.4	215.3	5597.4	214.7	5625.1	214.7	5645.6	217.5	5663.9	221.2
5706.3	224	5737.3	225						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4402.5	.9	4441.7	.075	4938.7	.037	5061.1	.09	5256	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4915.7	5066.7	290	205	150	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20495

INPUT
Description: 20495

Station Elevation Data num= 70

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4428.6	225	4434.7	222	4446.3	222.6	4462.2	221.6	4487.4	220.3
4526.3	219.5	4554.2	218.2	4582.5	214.7	4607.4	210	4642.9	204.8
4706.4	202.8	4746	202.4	4753	202.4	4777	202.4	4782	201.8
4783	201.3	4788	199.8	4797	198.8	4807	199.3	4817	200
4827	200.3	4837	200.3	4847	200.7	4849	201.3	4852	202.4
4862	202.8	4877	202.8	4897	202.8	4908	202.8	4917	203.2
4931	202.9	4934	201.2	4935	201.2	4940	200.4	4948	198.8
4953	197.2	4958	196.7	4968	196.1	4978	193.5	4988	193
4998	193.1	5008	193.3	5018	193.4	5028	193.2	5038	193.8
5043	194	5048	194.1	5053	194.4	5058	195.9	5061	197.9
5065	199.4	5065.1	201.1	5066	202.9	5079.9	203.8	5102.5	203.8
5124.5	203.9	5176.5	204	5199.8	203.9	5223.9	203.6	5261.3	202.6
5305.4	202.6	5362.3	202.6	5426	201	5500.7	201	5519.4	209.8
5536.7	215.7	5586.3	215.8	5601.2	218.2	5620.1	222.4	5661.8	225

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4428.6	.9	4526.3	.075	4783	.04	4849	.065	4931	.035
5065.1	.09	5223.9	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4782	5066	148.05	147	157.95	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20348

INPUT
Description: 20348
This is a REPEATED section.

Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4381.8	225.1	4406.3	220	4437.4	218.2	4511.1	218.7	4544.4	220.1
4576.8	220.2	4599.8	215.9	4657.8	202.8	4686.4	203	4722	202.9
4742	202.8	4745	202.8	4746	201.3	4752	200	4762	199.2
4762.5	198.9	4764	199	4764.1	199	4772	198.8	4783	199.6
4783.5	199.6	4784.5	199.6	4785	199.6	4792	199.8	4802	200.5
4812	200.7	4813	201.3	4818	202.2	4818.1	202.2	4832	202.3
4851	202.7	4872	202.4	4881	202.6	4910.5	203.1	4930.5	202.7
4932.5	201.4	4938.5	200.6	4945.5	198.6	4955.5	197.3	4960.5	196.1
4970.5	194	4980.5	193.7	4990.5	193.6	5000.5	193.4	5010.5	193.6
5020.5	193.4	5030.5	193.2	5040.5	193.4	5050.5	193.8	5055.5	194.4
5060.5	196	5064.5	197.2	5065.5	199.9	5066.5	200.2	5066.6	201.2
5066.7	202.7	5078.5	203.2	5103.1	202.7	5135.8	203.2	5158.4	203.7
5181.6	203.5	5208.8	203.2	5244	203.8	5435.7	199.9	5474.1	200.2
5523.7	200.7	5552.7	200.7	5568.4	201.7	5581.1	202.8	5614.3	214.3
5625.5	214	5640.1	219.6	5658.4	222.1	5682.9	224.4	5694.8	224.4
5733.4	224.8	5765	224.3	5800.7	225				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4381.8	.9	4576.8	.07	4746	.04	4813	.06	4932.5	.035
5066.6	.075	5208.8	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4722	5066.7	16	16	16	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20332

INPUT
Description: 20332
This is a REPEATED section.

Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4374.3	225	4404.8	218.4	4435.8	218.4	4465	218.5	4503.7	218.6
4542.6	220.3	4568.2	220	4711.8	202.6	4721	202.8	4741	202.8
4745	202.9	4745.1	201.3	4745.2	199.8	4751	199.1	4764	199
4764.1	198.7	4765.4	198.7	4765.5	198.6	4771	198.4	4785	199.3
4785.1	199.3	4786.4	199.3	4786.5	199.3	4791	198.6	4803	199
4803.1	199	4811	200.6	4818	201.3	4824	202.4	4841	202
4861	202.2	4881	202.5	4895	202.4	4909	202.9	4931	202.8
4934	201.1	4939	200.4	4944	198.7	4949	198.1	4954	197.1
4959	195.8	4969	194	4979	193.8	4989	193.3	4999	193.4
5009	193.2	5019	193.1	5029	192.9	5039	193.1	5049	193.5
5054	194.4	5064	196.9	5066	200.2	5066.1	201.1	5066.2	202.6
5079	203.2	5081.1	202.1	5112.9	202.7	5139.5	203.7	5161.6	203.9
5172.8	203.7	5184.7	203.1	5201.3	203.4	5233.3	203.2	5263	203
5299.3	202.2	5337.7	202.1	5373.8	201.1	5418.6	201.1	5447.1	200.4
5485.5	200	5516.7	200	5546.7	200.6	5594.1	204.8	5609.9	207.2
5679	225								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4374.3	.9	4568.2	.075	4745.1	.04	4818	.065	4934	.035
5066.1	.075	5201.3	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4745	5066.1	2	2	2	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20330

INPUT
Description: 20330

Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4374.3	225	4404.8	218.4	4435.8	218.4	4465	218.5	4503.7	218.6
4542.6	220.3	4568.2	220	4711.8	202.6	4721	202.8	4741	202.8
4745	202.9	4745.1	201.3	4745.2	199.8	4751	199.1	4764	199
4764.1	198.7	4765.4	198.7	4765.5	198.6	4771	198.4	4785	199.3
4785.1	199.3	4786.4	199.3	4786.5	199.3	4791	198.6	4803	199
4803.1	199	4811	200.6	4818	201.3	4824	202.4	4841	202
4861	202.2	4881	202.5	4895	202.4	4909	202.9	4931	202.8
4934	201.1	4939	200.4	4944	198.7	4949	198.1	4954	197.1
4959	195.8	4969	194	4979	193.8	4989	193.3	4999	193.4
5009	193.2	5019	193.1	5029	192.9	5039	193.1	5049	193.5
5054	194.4	5064	196.9	5066	200.2	5066.1	201.1	5066.2	202.6
5079	203.2	5081.1	202.1	5112.9	202.7	5139.5	203.7	5161.6	203.9
5172.8	203.7	5184.7	203.1	5201.3	203.4	5233.3	203.2	5263	203
5299.3	202.2	5337.7	202.1	5373.8	201.1	5418.6	201.1	5447.1	200.4

5485.5	200	5516.7	200	5546.7	200.6	5594.1	204.8	5609.9	207.2
5679	225								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4374.3	.9	4568.2	.075	4745.1	.04	4818	.065	4934	.035
5066.1	.075	5201.3	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4745.1	5066.1	260.1	260.1	260.1	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4374.3	4745.1	201.3	F
5066.1	5679	201.1	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20070

INPUT
Description: 20070

Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4411.7	225	4439.1	222	4452.7	220	4539.9	219.7	4562.3	214.7
4592.4	210	4629.7	203.1	4637	201.2	4638	203.1	4641	203.1
4643	200	4647	199	4655	197.9	4661	197.5	4670	197.2
4676	197	4682	197.8	4686	198.4	4691	198.9	4696	199.9
4701	201.2	4707	201.4	4710	202.3	4742	201.9	4752	201.4
4757	201	4766	201.4	4776	201.6	4801	201.4	4809	200.9
4820	201.8	4827	201.4	4859	202.1	4922.5	201.6	4934.5	201.4
4939.5	202.1	4941.5	201.2	4942.5	200.6	4947.5	199.5	4952.5	197.1
4962.5	195.2	4972.5	192.7	4982.5	192.7	4992.5	192.7	5002.5	192.6
5012.5	192.5	5022.5	192.2	5032.5	192.6	5042.5	194.2	5047.5	195
5052.5	197.3	5056.5	199.2	5058.5	201.2	5060.5	202.6	5082.5	203.3
5148	204.6	5162.5	203	5181.3	203.5	5210.5	203.4	5252.9	204.1
5283.7	204.5	5324.3	204.7	5370.6	204.4	5405.6	204.5	5421.7	204.4
5485.9	203.5	5517.2	203.1	5556.9	204	5593.4	200.3	5609.4	198.7
5621.4	200.4	5666.1	201	5704.3	201.9	5753.4	201.7	5794	203.2
5806.7	210	5843.8	222.1	5854.8	223	5884.8	227.6		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4411.7	.9	4592.4	.075	4643	.04	4701	.065	4941.5	.035
5058.5	.075	5210.5	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4638	5060.5	159.9	260.1	245.1	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4411.7	4638	203.1	F
5060.5	5884.8	202.6	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19810

INPUT
Description: 19810

Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4408.3	225	4426	222.1	4439.8	222	4455	220	4472.5	217.6
4487.1	214.6	4496	215.5	4519	207	4553	202.9	4554	201.2
4555	199.7	4560	199.4	4565	198.4	4575	198.1	4583	197.7
4590	197.7	4595	198.1	4600	198.4	4602	198.9	4609	201.1
4610	203.6	4614	203.7	4623	201.8	4637	201.4	4688	201.5
4697	201.4	4709	200.7	4722	199.4	4782	200	4832	200.6
4872	201.2	4919	201.7	4938	201.8	4939	201.2	4943	200.4
4944	199.4	4949	198	4954	196.6	4959	195	4964	192.5
4969	192.2	4979	192.2	4989	192.5	4999	192.2	5009	192
5019	191.8	5029	191.5	5039	191.6	5049	194.8	5054	196.3
5059	199.9	5061	201.2	5063	202.9	5089	204.6	5177	206.1
5228	204	5297	203.3	5313	202.8	5365	201.2	5375	200.5
5380	198.6	5399	191	5409	188.2	5415	187.3	5423	188.7
5428	188.1	5433	188.4	5439	187.2	5449	184.2	5454	184.2
5459	185.2	5469	186.6	5479	185.7	5485	187.2	5489	186.5
5499	184.9	5509	184	5514	183.6	5521	184	5529	184.1
5539	183.9	5544	184.2	5549	184.2	5554	185.2	5559	184.1
5569	183.4	5579	183.3	5589	183.2	5599	183.1	5604	183
5799	187.3	5847	197.7	5850	198.8	5856	200.4	5857	201.2
5867	204.4	5879	213.4	5910.7	225.8				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4408.3	.9	4519	.075	4554	.04	4609	.065	4939	.035
5061	.075	5089	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4554	5061	180	90	385	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19720

INPUT
Description: 19720

Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4367	232	4405	220.7	4419	216.9	4428	210.2	4456	200.9
4458	199.9	4464	199.4	4470	199.8	4476	199.8	4483	199.3
4491	198.9	4496	198.4	4506	198.8	4513	198.9	4515	199
4517	201.3	4519	201.7	4528	201.6	4533	202.3	4576	202.1
4614	201.5	4850	201.6	4933	201.4	4934	201.3	4937	200.3
4943	199	4948	196.5	4953	195.9	4958	193.2	4963	192.6
4973	192.1	5033	192.3	5043	193.8	5053	195.1	5058	195.9
5063	200	5066	201.3	5069	203.2	5157	203.2	5173	202.9
5202	201.4	5204	200.6	5205	201.9	5207	201.2	5210	200.7
5215	198.6	5220	193.3	5228	192.1	5238	189.5	5245	188
5250	188	5258	186.1	5263	185.2	5268	186	5272	184.8
5278	184.6	5288	184.5	5298	183.4	5303	182.4	5308	184
5310	184	5318	181.2	5320	181.2	5328	183.2	5332	183.7
5338	181.9	5348	181	5358	180.1	5378	180.1	5386	179.3
5408	179.3	5428	180	5430	180.1	5438	182.3	5448	188.2
5458	192.3	5464	199.2	5493	200	5501	201.2	5550	202.6
5645	203.4	5753	203.1	5796	202.9	5796.5	201.8	5808	203.4

5848	203.7	5880	202.8	5889	201.2	5891	199.9	5899	196.3
5901	194.2	5909	194	5914	196	5919	198.7	5922	200.2
5922.1	201.2	5924	204.8	5939	205.3	5969.57	205.8	5995.2	210.1
6008.01	216								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4367	.075	4456	.043	5501	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4456	5501	435	294.9	159.9	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19425

INPUT
Description: 19425

Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3799.4	231.2	3819	234.3	3841	219.9	3870.6	201.3	3875.9	200.3
3888.6	199.2	3897.8	198.9	3908.7	199	3920.6	199.3	3934.5	199.5
3944.6	199.9	3955.1	199.8	3962.6	200.5	3970	201.2	3978	204.4
3988.4	205.2	3992.6	204.6	4045.2	204.8	4102.7	204.7	4156	204.8
4218.8	205.3	4245.6	204.8	4256	202	4258	201.2	4261	200.6
4265	199.7	4284	198.8	4295	198.3	4305	199.3	4315	199.8
4327	201.1	4327.5	200.5	4347	200.3	4366	201	4387	200.9
4422	201.1	4446	201.3	4494	200.9	4498	200.7	4504	200.1
4509	199.3	4514	197.5	4519	193.2	4529	193.2	4619	194.1
4629	194.5	4707	195	4779	187.9	4840	187.7	4871	185
4909	180	5020	178	5112	180.1	5149	183.4	5242	201.1
5270.6	202.2	5290.9	202.1	5314.8	202.4	5326.7	201.1	5337	200.8
5347	200.6	5360	200.1	5366	199.3	5370	198.7	5384	197.4
5395	195.3	5409	192.8	5427	188.6	5433	184.6	5507.4	201.2
5534.4	210.5	5564	222.6	6010.4	224.1	6023.2	225.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3799.4	.075	4258	.043	5507.4	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4258	5507.4	130.05	145.05	205.05	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19280

INPUT
Description: 19280

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4444.84	215.88	4465.12	210.33	4506	201.2	4519	201.2	4524	200.4
4529	200.1	4534	199.5	4544	198.6	4554	197.5	4564	197
4574	197	4584	195.7	4594	194	4604	192.2	4614	192.6
4624	193	4627	193.2	4760	192.2	4825	190.7	4843	190

4890	185	4950	180	4970	179.9	5025	180	5025.1	180
5126	180.1	5159	178.7	5167	180.1	5169	179.8	5171	179.7
5177	181.2	5179	181.3	5183	181.2	5189	180.4	5193	180
5199	180.8	5201	180.9	5205	181	5209	180.7	5219	181.5
5228	182.7	5231	184.3	5235	184.4	5289	188.6	5323	184.8
5351	189	5362	186.7	5399	190	5409	190	5459	197.7
5470	198.3	5472	198.9	5476	200.3	5478	200.9	5480	201.3
5532	212.1	5562	219.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4444.84	.075	4825	.043	5478	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4825	5478	475	209	180	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19071

INPUT
Description: 19071
Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3961	225	3981	224	3999.9	221.8	4020.1	220.9	4053	218.9
4072.6	219.7	4083.2	219.9	4095.7	219.3	4127.6	220.8	4151.1	219.6
4177.6	210.2	4207.5	208.1	4242.5	210.2	4293.7	211.8	4322.6	211.7
4352.5	211	4388.8	210	4412.2	208.3	4436.3	207.9	4452	206.6
4476.1	206.3	4478.8	206.6	4495.2	206.6	4498.7	206	4508.6	201.7
4604	192.8	4615	189.5	4653	188.9	4671	190	4700	193.5
4844	192.5	4870	193.2	4920	190	4986	190	5011	190.7
5165	191.5	5330	191.5	5420	190	5455	190	5460	196
5491.5	201.2	5517.5	208.1	5542.2	215.5	5550.2	216.9	5560	217.7
5581.5	219	5609.5	219.5	5644.2	220.1	5718.2	221.5	5749.4	222
5798.3	222.7	5901.3	224.8	5930.7	223.9	5935.8	223.2	5954.3	223.7
5969.1	222.7	5978.6	223.4	6016.4	223.9	6061.9	224	6107.7	224.5
6144.3	224.5	6181.7	225.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3961	.075	4508.6	.043	5491.5	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4508.6	5491.5	150.08	155.04	304.96	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 18916

INPUT
Description: 18916

Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4374	209.7	4381	201.2	4386	200.5	4391	198.8	4395	198
4407	194.7	4418	194.5	4428	194.3	4438	194.4	4443	194.7
4492	193.5	4518	184.2	4528	184.2	4548	186.5	4561	191.7

4642	191.3	4703	192.4	4749	192.8	4758	192.2	4798	184.4
4818	184.1	4828	185.1	4838	185.3	4843	185.4	4865	189.2
4878	189	4898	186.7	4908	189	4932	189.5	4971	189
4990	191.1	5051	188.2	5163	188.4	5168	188.9	5171	189.2
5176	189.1	5178	189	5184	189.1	5188	188	5198	188.2
5208	189.9	5211	189.9	5216	189.3	5218	189.3	5226	189.7
5228	189.5	5234	188.9	5238	188.9	5248	189.2	5258	189.9
5263	190.1	5268	189.9	5276	189.3	5278	189.2	5288	189.2
5298	189.2	5308	189.3	5316	189.8	5318	189.6	5328	188.6
5331	188.4	5338	188.3	5348	187.7	5358	187.6	5365	188.8
5368	188.8	5375	188.4	5378	188.3	5388	188.1	5390	188.1
5398	189.2	5408	188.9	5418	188.6	5428	188.4	5430	188.5
5448	188.8	5450	188.9	5458	188.6	5463	188.5	5468	188.8
5473	189.1	5478	189	5488	188.5	5558	192	5610	198.9
5618	201.2	5625	202.8						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4374	.075	4381	.043	5618	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4381	5618	245	234	170	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 18682

INPUT
Description: 18682

Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3948.1	225.1	3968.6	222	3998.4	220.3	4144.1	220.3	4171.5	221.1
4224.6	222	4243.3	222.4	4299.4	222.7	4328.5	221	4356.9	202.2
4361.3	201.2	4384	192.7	4397	192.4	4417	192.4	4427	193
4447	194.6	4457	194.5	4487	184.3	4497	184.7	4507	185.1
4527	186.8	4547	190.4	4571	191.4	4692	190.7	4708	190
4762	185	4798	183.5	4826	185	4871	188	4970	187.5
5070	185.1	5259	185	5267	186.2	5317	188	5327	187.6
5337	187.4	5347	187.4	5357	187.5	5367	187.5	5377	187.7
5387	187.7	5397	187.8	5407	187.9	5417	187.9	5427	187.7
5437	187.7	5441	187.4	5447	188	5457	187.5	5467	187.4
5477	187	5487	186.8	5490	186.8	5495	187.5	5497	187.5
5499	187.5	5506	187.1	5507	187.1	5509	187.4	5517	184.2
5522	182.1	5527	182	5537	182.1	5631.6	200.6	5647.6	201.2
5713.9	205	5737.3	206.9	5794.6	217.8	5821.1	218.1	5849.1	220.8
5885.1	222.9	5902	223.7	5917	222.9	5936.4	223.5	5967.6	223.7
6011.1	224	6054.2	223.3	6092.5	223.6	6124.7	223.4	6137.8	225.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3948.1	.075	4361.3	.043	5647.6	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4361.3	5647.6	260	235	285	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 18447

INPUT
Description: 18447

Station Elevation Data num= 102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4186	219.7	4193	219.2	4219	203	4233	201.2	4240	199.9
4245	198.7	4250	198.9	4255	200.4	4260	201.2	4407	201.7
4433	201.6	4439	199.3	4476	196.6	4492	192.5	4572	191.6
4674	191.2	4706	190.5	4713	190.7	4758	183.5	4766	183.4
4776	182.9	4786	182.6	4791	182.5	4796	183	4806	182.3
4816	182.3	4818	182.3	4826	182.6	4836	183.1	4846	183.7
4856	184.1	4875	188.2	4930	188.3	4936	188.9	4944	188.3
4946	188.3	4952	188.3	4956	188.9	4966	188.2	4974	189.1
4976	188.4	4986	187.2	4989	187.1	4996	187.2	4999	187.4
5004	187.7	5006	188.2	5008	188.3	5015	187.5	5016	187.3
5026	187.6	5033	187.7	5036	186.4	5040	186.3	5046	186.4
5053	186.6	5056	188.2	5065	186.5	5066	186.4	5072	186.1
5076	186.1	5078	186.2	5086	186.5	5096	186.8	5098	186.9
5106	186.8	5116	186.4	5120	186.3	5126	186.4	5129	186.5
5136	186.3	5146	186.1	5156	185.9	5166	185.8	5176	185.9
5186	186	5194	186.2	5196	186.2	5206	186.3	5216	186.9
5218	187	5226	187.8	5236	188.1	5246	187.5	5256	187.4
5264	187.4	5266	187.3	5268	187.2	5276	187.7	5284	187
5286	186.2	5294	187	5296	186.4	5298	186.3	5306	186.2
5551	200.9	5561	200.2	5566	201.2	5567	202.4	5652	207.2
5707.12	211.26	5732.74	215.17						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4186	.075	4407	.043	5566	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4407	5566	150	167	310	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 18280

INPUT
Description: 18280

Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4139.6	225.2	4157	222.8	4191.5	219.8	4222.5	219.6	4248.6	219.7
4272	220.4	4296.9	220.6	4322.2	221.6	4325	221.6	4345	221.1
4383	202.7	4398	201.2	4403	200.8	4408	200.2	4418	200.4
4423	201.2	4427	201.8	4442	201.7	4450	201.3	4470	200.9
4493	200.8	4503	201	4518	201.1	4533	201.1	4548	200.9
4563	200.8	4583	200.8	4588	200.2	4593	199.7	4598	199.1
4604	199.8	4694	199	4787	188.9	4794	189.4	4800	191.5
4865	190.6	4946	191.9	5005	190	5005.1	190	5034	188.3
5062	187.2	5066	188.5	5074	189.7	5107	190.3	5114	190.4
5118	190.1	5124	190.9	5134	192.2	5144	194.2	5154	195.2
5159	195.5	5164	195.4	5174	193.5	5184	190.3	5194	187.9
5204	186.9	5214	187	5222	187.4	5224	186.7	5264	186.3
5274	186.4	5284	186.5	5294	186.6	5300	186.7	5304	187.2
5314	187.4	5324	187.3	5334	187.4	5546	199.2	5549	201.2

5613	222.9	5622.6	223.4	5647.8	223.3	5663.7	224.1	5692.1	224.4
5715.5	224.3	5742.3	224.4	5779.5	224.9	5815.7	225.3		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4139.6	.075	4398	.043	5549	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4398	5549	435.2	396	430	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 17884

INPUT
Description: 17884
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4685.6	220	4703	218.3	4722.7	215.1	4738	212.2	4753.2	208.2
4799	203.5	4803	202.1	4807	201.2	4811	200.2	4816	198.7
4824	198	4830	197.3	4847	197.3	4861	197.4	4875	197.8
4891	197.7	4904	198.4	4919	198.9	4934	199.3	4951	199.2
4967	199.1	4982	198.7	4997	198.4	5011	197.9	5024	197.7
5041	197.7	5059	197.9	5073	197.7	5088	196	5091	195.4
5096	192	5108	188	5121	186.6	5134	185.8	5147	186.2
5160	188.2	5167	190	5173	190.5	5193	190	5200	190
5210	190	5225	190	5245	191.4	5258	191.5	5268	190.1
5289	189.1	5317	190.7	5340	193.9	5347	192.8	5365	193.5
5370	191.8	5396	192	5474	190.7	5540	191.1	5561	193.5
5567	196.3	5586	198.5	5596	198.6	5600	198.4	5606	199.8
5611	201.2	5620.4	206	5702	222.6				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4685.6	.075	4807	.043	5611	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4807	5611	419.85	417.15	419.85	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 17467

INPUT
Description: 17467

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4691.7	220	4706.3	219.3	4725	220.1	4742.5	214.6	4761	202.1
4766.5	201.2	4771.5	200.2	4777.5	199	4787.5	198.1	4802.5	197.3
4816.5	197.1	4826.5	197.1	4839.5	197.4	4850.5	197.6	4865.5	198.1
4879.5	198.7	4898.5	198.7	4917.5	198.7	4934.5	198.4	4948.5	198.5
4965.5	198.2	4984.5	198.2	4997.5	197.7	5009.5	197.5	5021.5	197.9
5042.5	198.6	5062.5	198.1	5079.5	197.7	5097.5	197.7	5112.5	197.8
5127.5	198	5140.5	197.9	5149.5	197.7	5150.5	197.2	5151.5	195.4
5159.5	192.9	5169.5	191.7	5184.5	191	5196.5	191	5203	190.4
5210	190.4	5220	190.4	5273	190.4	5403	194.9	5430	195

5640.5	198.6	5650.5	198.8	5657.5	198.8	5663.5	199.5	5668.5	200.2
5669.5	201.1	5670.5	202	5680.5	204.6	5694.3	208.7	5709.7	214.5
5724	216.9	5731.4	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4691.7	.075	4766.5	.043	5669.5	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4766.5	5669.5	299.95	306.95	540.05	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 17160

INPUT
Description: 17160

Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4606.1	220.2	4631.8	218.3	4665.9	217.6	4690.5	219.2	4725.9	217.1
4748.4	216	4766.6	216.2	4777.5	213.4	4791.8	212.3	4812.1	209.2
4830	207.4	4839	205.5	4847	203.5	4850	201.2	4855	200.2
4865	198	4875	194.6	4880	193.6	4890	193.6	4900	194.1
4915	194.7	4925	194.9	4940	195	4960	195	4980	194.8
5000	195.2	5020	195.2	5040	194.9	5050	194.9	5062	195.4
5080	195.7	5096	195.7	5107	195.8	5118	195.8	5328	197
5349	205.2	5492	206.7	5524	206.3	5539	206.4	5553	208.1
5644	207	5669	208.3	5690	207.5	5722	220		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4606.1	.075	4850	.043	5669	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4850	5669	409.95	409.95	409.95	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 16750

INPUT
Description: 16750
This is a REPEATED section.

Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4537.6	220	4555.8	218.6	4564.9	218.6	4577.6	217.2	4601.4	215.3
4622	214.1	4726	213.1	4746	215.4	4762	202.9	4774	201.5
4802	200.6	4812	200.6	4822	199.9	4852	196.4	4872	195.9
4887.9	195	4888	195	4956	189	4956.1	189	4959.9	189
4960	189	5024	189	5024.1	189	5027.9	189	5028	189
5096	195	5096.1	195	5122	194.1	5132	193.8	5142	193.8
5152	194.1	5202	199	5217	200.4	5222	201.3	5228	202
5231.9	202.2	5236	203.1	5240	212.1	5243.5	212.1	5243.6	209.1
5256.9	208.7	5258.5	208.2	5264.4	208.8	5285.4	209.7	5306.1	209.9
5334.2	211.5	5375.4	212.9	5396.1	213.1	5424	212.9	5457.5	214.2

5495	214.4	5556	215.1	5567.3	215.5	5611.3	214.5	5635.8	215.3
5690.9	215.2	5719.5	214.5	5738.3	215.2	5779.2	213.5	5802.6	214.3
5823	217.5	5846.7	220.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4537.6	.075	4774	.043	5222	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4774	5222	93	93	93	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 16657

INPUT
Description: 16656
LAKESIDE AVE. BRIDGE
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4537.6	220	4555.8	218.6	4564.9	218.6	4577.6	217.2	4601.4	215.3
4622	214.1	4726	213.1	4746	215.4	4762	202.9	4774	201.5
4802	200.6	4812	200.6	4822	199.9	4852	196.4	4872	195.9
4887.9	195	4888	195	4956	189	4956.1	189	4959.9	189
4960	189	5024	189	5024.1	189	5027.9	189	5028	189
5096	195	5096.1	195	5122	194.1	5132	193.8	5142	193.8
5152	194.1	5202	199	5217	200.4	5222	201.3	5228	202
5231.9	202.2	5236	203.1	5243.6	209.1	5256.9	208.7	5258.5	208.2
5264.4	208.8	5285.4	209.7	5306.1	209.9	5334.2	211.5	5375.4	212.9
5396.1	213.1	5424	212.9	5457.5	214.2	5495	214.4	5556	215.1
5567.3	215.5	5611.3	214.5	5635.8	215.3	5690.9	215.2	5719.5	214.5
5738.3	215.2	5779.2	213.5	5802.6	214.3	5823	217.5	5846.7	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4537.6	.075	4774	.043	5222	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4774	5222	52	52	52	.4	.6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4537.6	4774	201.5	F
5222	5846.7	201.3	F

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 16630.5

INPUT
Description: LAKESIDE AVE. BRIDGE

Distance from Upstream XS = .5
Deck/Roadway Width = 51
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 38

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord

4537.6	220	220	4555.8	218.6	218.6	4564.9	218.6	218.6
4577.6	217.2	217.2	4601.4	215.3	215.3	4622	214.1	214.1
4726	213.1	213.1	4746	215.4	215.4	4762	214	202.9
4774	213.8	201.5	4802	213.5	200.6	4812	213.2	200.6
4822	213	199.7	4852	212.6	196.4	4887.9	212	195
4888	212	208.8	4956	211	207.8	4960	211	207.8
5024	210.4	207.5	5028	210.4	207.5	5096	210	207
5096.1	210	195	5142	209.7	193.8	5152	210.6	194.1
5202	209	199	5217	209	200.4	5232	208.8	202.2
5236	208.7	203.1	5240	208.7		5243.5	209	
5243.6	209.1	209.1	5256.9	209.5	208.7	5258.5	209.5	208.2
5264.4	209.5	208.8	5285	209.7	209.7	5306.1	209.9	209.9
5334.2	211.5	211.5	5375.4	212.9	212.9			

Upstream Bridge Cross Section Data
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4537.6	220	4555.8	218.6	4564.9	218.6	4577.6	217.2	4601.4	215.3
4622	214.1	4726	213.1	4746	215.4	4762	202.9	4774	201.5
4802	200.6	4812	200.6	4822	199.9	4852	196.4	4872	195.9
4887.9	195	4888	195	4956	189	4956.1	189	4959.9	189
4960	189	5024	189	5024.1	189	5027.9	189	5028	189
5096	195	5096.1	195	5122	194.1	5132	193.8	5142	193.8
5152	194.1	5202	199	5217	200.4	5222	201.3	5228	202
5231.9	202.2	5236	203.1	5243.6	209.1	5256.9	208.7	5258.5	208.2
5264.4	208.8	5285.4	209.7	5306.1	209.9	5334.2	211.5	5375.4	212.9
5396.1	213.1	5424	212.9	5457.5	214.2	5495	214.4	5556	215.1
5567.3	215.5	5611.3	214.5	5635.8	215.3	5690.9	215.2	5719.5	214.5
5738.3	215.2	5779.2	213.5	5802.6	214.3	5823	217.5	5846.7	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4537.6	.075	4774	.043	5222	.1

Bank Sta: Left	Right	Coeff Contr.	Expan.
4774	5222	.4	.6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4537.6	4774	201.5	F
5222	5846.7	201.3	F

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4754.9	216	213.2	4762	214	202.9	4774	213.8	201.5
4802	213.5	200.6	4812	213.2	200.6	4822	213	199.7
4852	212.6	196.4	4887.9	212	195	4888	212	208.8
4956	211	207.8	4960	211	207.8	5024	210.4	207.5
5028	210.4	207.5	5096	210	207	5096.1	210	
5142	209.7		5152	210.6		5202	209	
5217	209	200.4	5232	208.8	202.2	5236	208.7	203.1

Downstream Bridge Cross Section Data
Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4584.2	220	4613.8	218.1	4634.4	217.4	4657.6	216.9	4681.9	215.5
4703	215.3	4719.4	215.1	4736	213.9	4754.9	216	4755	213.2
4773	211	4786	202.2	4792	202.1	4796	202.3	4816	202.2
4826	201.7	4833	201.3	4836	199.9	4846	198	4856	197.2
4866	196.6	4876	197.1	4886	196.5	4896	196.7	4906	196.7
4916	196.4	4926	197.5	4936	196.8	4946	197.2	4956	197.4
4966	196.4	4976	194.4	4986	192	4996	189.5	5006	188.1

5013.9	187.9	5014	188.9	5015.9	188.9	5021	189.9	5026	189.1
5036	188.2	5046	188	5056	188.2	5062.9	188.9	5063	192.6
5064.9	192.6	5069	192.9	5070.9	192.9	5071	188.5	5076	188.1
5086	189.6	5095.9	189.8	5096.82	190.17	5106	192.8	5116	193.4
5126	194.4	5136	193.2	5146	194.1	5156	194.4	5165.8	195
5165.9	201.3	5173	209.8	5186	209.5	5199.9	209.1	5200	209.1
5211	209.4	5245.8	209.5	5287.5	208.9	5328.2	208.5	5341.9	209.7
5362.8	211.4	5392.1	212.9	5420	213.4	5444.4	213.2	5465.2	213.6
5489.7	214.1	5528.9	213.9	5571.4	213.9	5609.8	214.2	5657.7	213.9
5690.7	213	5755.9	212.5	5780.3	213.3	5813.9	213.5	5838.7	213.4
5864.8	215.2	5884.8	216.2	5911.8	218.3	5966.5	220.4	5976.3	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4584.2	.075	4833	.043	5165.9	.1

Bank Sta: Left Right Coeff Contr. Expan.
4833 5165.9 .4 .6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4584.2	4833	208.9	F
5165.9	5976.3	207	F

Sediment Elevation = 0

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 210
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 2

Pier Data
Pier Station Upstream= 4958 Downstream= 4958
Upstream num= 2

Width	Elev	Width	Elev
4	180	4	220

Downstream num= 2

Width	Elev	Width	Elev
4	180	4	220

Pier Data
Pier Station Upstream= 5026 Downstream= 5026
Upstream num= 2

Width	Elev	Width	Elev
4	180	4	220

Downstream num= 2

Width	Elev	Width	Elev
4	180	4	220

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Momentum Cd = 1.6
Yarnell KVal = 1.1
Selected Low Flow Methods = Yarnell

High Flow Method
Pressure and Weir flow
Submerged Inlet Cd =

Submerged Inlet + Outlet Cd =.7559289
Max Low Cord = 208.4

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 16605

INPUT
Description: 16605
Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4584.2	220	4613.8	218.1	4634.4	217.4	4657.6	216.9	4681.9	215.5
4703	215.3	4719.4	215.1	4736	213.9	4754.9	216	4755	213.2
4773	211	4786	202.2	4792	202.1	4796	202.3	4816	202.2
4826	201.7	4833	201.3	4836	199.9	4846	198	4856	197.2
4866	196.6	4876	197.1	4886	196.5	4896	196.7	4906	196.7
4916	196.4	4926	197.5	4936	196.8	4946	197.2	4956	197.4
4966	196.4	4976	194.4	4986	192	4996	189.5	5006	188.1
5013.9	187.9	5014	188.9	5015.9	188.9	5021	189.9	5026	189.1
5036	188.2	5046	188	5056	188.2	5062.9	188.9	5063	192.6
5064.9	192.6	5069	192.9	5070.9	192.9	5071	188.5	5076	188.1
5086	189.6	5095.9	189.8	5096.82	190.17	5106	192.8	5116	193.4
5126	194.4	5136	193.2	5146	194.1	5156	194.4	5165.8	195
5165.9	201.3	5173	209.8	5186	209.5	5199.9	209.1	5200	209.1
5211	209.4	5245.8	209.5	5287.5	208.9	5328.2	208.5	5341.9	209.7
5362.8	211.4	5392.1	212.9	5420	213.4	5444.4	213.2	5465.2	213.6
5489.7	214.1	5528.9	213.9	5571.4	213.9	5609.8	214.2	5657.7	213.9
5690.7	213	5755.9	212.5	5780.3	213.3	5813.9	213.5	5838.7	213.4
5864.8	215.2	5884.8	216.2	5911.8	218.3	5966.5	220.4	5976.3	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4584.2	.075	4833	.043	5165.9	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4833	5165.9	440.1	418.95	450	.4	.6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4584.2	4833	208.9	F
5165.9	5976.3	207	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 16186

INPUT
Description: 16186

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4426.3	220.1	4564	210.1	4594	213.4	4626	209.7	4649	201.1

4676	198.3	4716	197.5	4726	197.4	4736	197.4	4746	197.5
4756	197.6	4766	197.7	4776	197.8	4786	198	4796	198.1
4806	198.2	4816	198.2	4826	198.1	4836	198	4846	197.9
4856	197.8	4866	197.7	4876	197.5	4886	197.2	4896	197
4906	196.7	4916	196.2	4926	195.7	4976	191.4	4986	190.9
4996	190.5	5006	190.3	5016	190.7	5026	191.2	5036	192
5046	192.4	5056	192.3	5066	192.2	5076	192.2	5086	192.3
5096	192.7	5106	193	5116	193.2	5126	193.2	5136	193.2
5146	193.2	5156	193.2	5166	193.2	5176	193.3	5186	193.4
5196	193.6	5206	193.7	5216	193.8	5226	193.9	5236	194
5246	193.7	5256	193.3	5266	193.2	5276	193	5286	192.9
5296	192.7	5306	192.6	5316	192.5	5326	192.6	5336	192.8
5346	193.2	5351	201.4	5351.1	202.1	5366	210.1	5368	209.5
5383	209.9	5398	209.6	5398.1	210	5414	211.5	5447.2	212.2
5469.8	212.1	5513.7	212	5552.4	211.8	5583.6	211.4	5620.8	211.8
5652.5	211.5	5686.3	211.2	5714.8	211.5	5761.3	211.6	5801.1	211.7
5821.7	212.2	5859.4	211.6	5888.3	213.3	5911.4	213.8	5953.6	213
5997.7	213.9	6008.3	213.9	6053.3	214.4	6082.8	215.6	6108.8	214.8
6138.2	215.5	6176.7	216	6230.6	216.7	6268.1	217.8	6296.9	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4426.3	.07	4649	.043	5351	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4649	5351	505	490	510	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 15696

INPUT
Description: 15696

Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4308.7	220	4335.5	215.7	4358.5	214.6	4390.5	212.3	4407.5	202.8
4411.5	201.4	4430.5	198.4	4450.5	197	4650.5	193.2	4690.5	193.4
4698	193.8	4928	196.1	4968	196.1	5028	193.8	5038	193.6
5048	193.4	5058	193.3	5068	193.2	5078	193.2	5088	193.1
5098	193	5108	192.9	5118	192.8	5128	192.9	5168	193.6
5178	193.7	5258	195.9	5278	195.9	5288	196	5308	196.1
5318	196	5328	195.9	5388	192.5	5398	192.3	5408	192.3
5418	192.5	5428	193.4	5438	196.3	5458	197.5	5478	197.5
5488	197.6	5588.5	201.1	5591.5	201.6	5601.5	203.5	5624.5	205.5
5651.5	206.9	5651.6	204.6	5670.8	206.9	5701.1	208.4	5724.2	208.9
5736.7	208.6	5761.5	209.1	5816.9	208.9	5870.3	208	5915.8	207.8
6001.7	208.2	6089.3	208	6149.4	207.2	6220	208.1	6248.9	208.2
6396.7	218.2	6452	218.4	6536.9	218.2	6595.8	219.2	6684.4	218.4
6771.3	218.8	6847.8	218.8	6915.9	216.6	7062.4	215.4	7116	217.8
7177.2	218.8	7267.4	219.9	7351.4	219.8	7536.4	219.7	7560.8	219.9
7584.7	221.6	7650.9	217.4	7681.8	216.5	7700.9	221.1	7722.9	219.6
7776.5	216.3	7848.5	217	7916.5	218.3	7944.8	218.6	7967.4	218.4
7999.7	218.3	8001.7	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4308.7	.07	4411.5	.043	5591.5	.07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

4411.5	5591.5	505	481	875	.1	.3	

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 15215

INPUT
Description: 15215

Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3894.9	217.6	3952.3	204.6	3959.7	201	3992.3	197	4032.3	194.8
4072.3	195	4092.3	195.2	4152.3	195.2	4232.3	195.4	4272.3	193.4
4292.3	193.2	4332.3	193.2	4352.3	193.6	4392.3	193.6	4412.3	193.4
4492.3	193.6	4572.3	193	4592.3	193	4632.3	192.7	4652.3	191.7
4672.3	190.7	4692.3	190.6	4712.3	191.2	4732.3	191.8	4752.3	192.6
4772.3	193	4792.3	193.2	4812.3	193.4	4832.3	194.2	4852.3	194.6
4872.3	194.8	4892.3	195	4912.3	195.2	4932.3	195.8	4952.3	195.2
4972.3	195.4	4992.3	195	5012.3	195.2	5032.3	196.2	5052.3	196.4
5072.3	196.6	5092.3	196.8	5112.3	196.8	5132.3	196.4	5152.3	197.8
5172.3	197.8	5192.3	197.7	5212.3	197.6	5232.3	197.6	5252.3	197.5
5952.3	198.2	5972.3	198.5	5992.3	199.3	6012.3	199.8	6084.9	208.5
6101	208.7	6116.6	208.7	6131.9	207.8	6140.7	208	6170.6	209
6189.5	210.3	6340.7	211.2	6402.5	210.9	6458.3	210.1	6514	210.4
6574.6	212.1	6608.3	211.3	6668	214.4	7091.2	214.9	7237.9	216.2
7881	216.1	7921.3	216.7	7949.2	215.7	7957.9	212.1	7969.5	215.4
7988.3	216	8019.7	217	8048.3	218.8	8059.9	218.7	8073.4	217.8
8097.5	217.4	8127.2	215.7	8167.6	218.5	8245.7	218.6	8273.4	220

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3894.9	.07	3959.7	.043	6012.3	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3959.7	6012.3	490	490	490	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 14725

INPUT
Description: 14725

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3929.8	220.1	3964.1	209.8	3966.1	210.1	4007	211.7	4030.6	203.1
4035.2	201.5	4039.2	200.2	4069	195.9	4096	194.5	4106	194.6
4116	194.7	4126	194.8	4136	195	4146	195	4156	195.1
4176	195.1	4186	195.2	4226	195.2	4236	195.1	4266	195.3
4276	195.4	4286	195.5	4296	195.4	4306	195	4316	194.9
4326	194.7	4336	194.5	4346	194.3	4356	193.6	4366	193.3
4376	193	4386	192.7	4396	192.4	4426	191.9	4436	191.9
4446	192	4566	193.3	4586	193.3	4676	194.5	4686	194.6
4696	194.7	4706	194.7	4716	194.6	4726	194.5	4736	194.1
4746	193.5	4776	192.5	4786	192.3	4796	192.2	4806	192
4816	191.7	4826	191.5	4836	191.5	4846	191.6	4856	191.7
4866	192.1	4876	192.2	4946	194.2	4956	194.3	4976	194.3

4986	194.2	5076	193.6	5116	193.2	5166	193.2	5176	193.3
5186	193.5	5246	196.5	5266	196.5	5276	196.4	5286	196.3
5356	196.3	5426	195.7	5508	195.7	5517.4	195.5	5557.4	195.5
5567.4	195.4	5577.4	195.5	5677.4	195.5	5837.4	193.7	5877.4	194.3
5887.4	194.5	5897.4	194.6	5907.4	194.9	5917.4	195.4	5927.4	197.3
5936.2	198.2	5946	199.7	5956.2	200.7	5964.9	201.4	5975.2	205.8
5985.9	207.9	6001.7	209	6004.4	208.1	6057.8	209.4	6124.8	210.6
6145	210.5	6163.8	211.6	6191.3	212.7	6216.1	211.6	6294.8	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3929.8	.07	4035.2	.043	5964.9	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4035.2	5964.9	405	405	405	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 14320

INPUT
Description: 14320

Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4099.2	220.3	4137.6	219	4175.3	218.2	4204.5	216.5	4232.2	215.2
4263.5	213.6	4297.2	212	4334.1	210.4	4356	209.9	4394.8	208.6
4410.6	207.3	4421	205.1	4427	202	4430	201.2	4435	200.2
4442	199.2	4450.6	197.2	4470.6	193.2	4490.6	193	4510.6	192.4
4530.6	192.8	4550.6	193.2	4570.6	193.3	4590.6	193.4	4610.6	193.4
4630.6	193.3	4650.6	193.2	4670.6	193.4	4690.6	193.6	4710.6	193.6
4730.6	193.8	4750.6	194	4770.6	194	4790.6	193.9	4810.6	193.9
4830.6	193.8	4850.6	193.8	4870.6	193.6	4890.6	193.6	4910.6	193.8
4930.6	193.8	4950.6	194	4970.6	194.2	4990.6	194.2	5010.6	194
5030.6	194	5050.6	194.2	5070.6	194.2	5090.6	194.3	5110.6	194.4
5130.6	194.5	5150.6	194.6	5170.6	193.3	5190.6	193.8	5210.6	193.2
5230.6	192	5250.6	191.7	5270.6	191.2	5290.6	193.6	5310.6	196.2
5330.6	196.2	5350.6	196.2	5370.6	195.9	5390.6	195.6	5410	195.5
5430.6	195	5450.6	194.8	5470.6	194.7	5490.6	194.5	5510.6	193.7
5530.6	193.5	5550.6	193.2	5570.6	193.2	5590.6	193.4	5610.6	193.6
5630.6	194.4	5650.6	195.2	5678	199.6	5684	200.3	5690	201
5692	203.9	5697	203.6	5710	205	5730.8	207.2	5758.5	210.1
5804	218.1	5836.4	220.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4099.2	.07	4430	.043	5690	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4430	5690	310.2	514.8	745.25	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 13805

INPUT
Description: 13805

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4632.3	220	4655.5	215	4674.8	210	4706.4	206	4744.8	205.4
4751	205	4776	204.4	4791	204.2	4811	201.2	4821	195.7
4841	196.7	4851	195.2	4861	194.2	4881	192.2	4901	189.2
4921	190.2	4941	189.3	4961	189.7	4981	190	5001	190.2
5021	190.7	5041	190.7	5061	189.2	5081	187.2	5101	187.2
5121	188	5141	188.4	5161	192.4	5181	197.2	5189	201.1
5219	219.9	5239	221.6	5249	225				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4632.3	.07	4811	.043	5189	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4811	5189	414.9	413.1	414.9	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 13392

INPUT
Description: 13392

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4577.9	220	4600.8	215	4639.5	212.4	4691.7	210.4	4725.4	208.3
4757.2	205.1	4761	205.1	4786	203.5	4815	202.5	4816	201.4
4830	199.1	4850	198.2	4870	196.4	4890	194.7	4910	193.4
4930	192.8	4950	192.2	4970	191.7	4990	190.2	5010	190.3
5030	187.6	5050	186.6	5070	186.4	5090	186.4	5110	187
5130	188	5140	191.7	5150	196.7	5184	201.2	5185	202.5
5195	209.8	5217	218.3	5245	225.4				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4577.9	.07	4815	.043	5185	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4815	5185	550	547.25	550	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 12845

INPUT
Description: 12845

Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4771	219.2	4772	217.3	4778	216.6	4785	216.7	4802	209
4815	203.2	4818	201.4	4835	198.9	4855	196.8	4875	195.2
4895	193.7	4915	193	4935	192	4955	191.2	4975	189.2
4995	187	5015	186.4	5035	186.2	5055	186	5075	187
5095	188	5115	191.6	5135	194	5155	197	5175	199.7
5182	201	5183	201.9	5212	202.8	5237	204.3	5248.9	205.4

5266.3	208	5286.6	212.1	5324.3	215.3	5353.9	217.1	5429.9	215.2
5484.2	220.1								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4771	.07	4818	.043	5182	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4818	5182	595.1	545.05	499.95	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 12300

INPUT
Description: 12300
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4617.4	220	4664	216.4	4726.5	210.1	4766	208.3	4797	208.1
4810	201.1	4821	203.6	4824	204.2	4841	206.9	4874	208.1
4884	191.2	4904	190	4924	187	4944	184.8	4964	184
4984	184.7	5004	186.1	5024	188.2	5044	190	5064	191.4
5084	193.2	5104	194.7	5124	196.4	5164	198.6	5184	199.8
5280	201.7	5284	201.2	5291	200.8	5301	200.4	5311	200.2
5320	200	5327.5	199.6	5334	200.2	5338	201.1	5343	201.1
5348.5	201.2	5366	202.1	5385.9	209.2	5417.5	220.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4617.4	.07	4874	.043	5366	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4874	5366	475	488	500	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 11812

INPUT
Description: 11812

Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4414.1	220	4441.7	219.6	4451.9	217.9	4469.5	216.7	4483	216.1
4506.6	216.3	4530.3	216.4	4571.1	212.1	4584.9	211.3	4594.5	209.9
4612.2	208.3	4628.8	207	4654	204.3	4673.4	203.9	4687.2	203.4
4709.3	202	4710.4	201	4721	199	4741	197.9	4761	197.2
4781	196	4801	194.5	4821	192.9	4841	191.9	4861	190.8
4881	189.9	4901	188.5	4921	186	4941	184.2	4961	184.2
4981	184.7	5001	185.2	5021	187.1	5041	189.2	5051	192.2
5061	195.2	5071	195.7	5101	195.8	5121	196	5141	196
5161	195.9	5181	195.8	5201	195.5	5221	195.2	5241	195.2
5261	197.1	5281	199	5288.8	201.1	5320.9	212.8	5343.9	226.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4414.1	.07	4710.4	.043	5288.8	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4710.4	5288.8	655	488	375	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 11324

INPUT
Description: 11324

Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4446.9	220	4469	219.1	4557.7	214.7	4597.9	210	4619.3	210.5
4636.4	210.5	4673.9	209.1	4685.8	208	4712.6	206	4715	201.6
4735.1	203.7	4747	201.3	4755.2	198.2	4775.2	193.2	4795.2	192.9
4815	192.6	4835	192	4855	191.1	4875	190.2	4895	189.2
4915	190	4935	188.2	4955	190.2	4975	189.2	4995	189.5
5015	189.6	5035	187	5055	189.5	5058.5	201.2	5065	192.1
5075	194.4	5095	195.1	5115	195.1	5135	194.8	5155	194.3
5175	193.6	5195	192.9	5215	192.4	5235	192.9	5245	196
5253	201.1	5255	198	5283	214.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4446.9	.07	4747	.043	5255	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4747	5255	374.85	302.05	260.05	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 11022

INPUT
Description: 11022

Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4680	210.6	4685	210.6	4706	210.4	4722	210.6	4732	210.4
4749	201.4	4755	198.9	4765	196.2	4771	192.7	4780	190.4
4798	187	4814	183.6	4830.7	183.2	4848	182.2	4866	182.2
4886	184.4	4905	186.4	4923	189.2	4945	190.9	4966	191.6
4985	190.3	5003	190.5	5021	191.8	5039	192.7	5058	192.7
5078	192.7	5099	192.7	5117	192.7	5132	192.2	5150	192.2
5170	192.7	5187	193.2	5207	193.4	5223	193.8	5232	194.9
5237	196.2	5241	198.2	5244	199.9	5250	201.3	5252	203.1
5259	206.1	5261	205.8	5267	206.2	5274	206.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4680	.07	4749	.043	5250	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4749	5250	130	92	55	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10930

INPUT
Description: 10930

Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4708	212	4713	210	4730	210.1	4747	209.8	4747.1	210
4756	210.8	4770	201.2	4785	200	4787	196.7	4797	189.9
4810	185.2	4824	184	4834	183.6	4853	182.7	4866	182.7
4884	184	4908	187.4	4926	188.8	4942	189.4	4967	190.2
4981	191.6	4997	192.4	5017	192.6	5033	192.2	5051	192.6
5066	192.2	5082	192.2	5097	192.2	5113	192.5	5129	192.6
5146	192.5	5161	193.3	5175	194.2	5188	194	5200	193.9
5210	193.7	5212	193.7	5219	198.2	5224	200.2	5230	201.1
5230.1	203.5	5234	205.1	5236	205.5	5239	205.1	5246	205.4
5253	205.6	5257	207.6						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4708	.07	4756	.043	5230	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4756	5230	135	102.96	65.04	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10827

INPUT
Description: 10827

Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4731	211	4736	209.4	4753	209.5	4770	209	4770.1	209
4775	208.9	4783	202.1	4789	201.4	4800	197.1	4810	191.2
4830	185.9	4850	184.8	4870	184.2	4890	184.4	4910	185.4
4930	188.2	4950	190.4	4970	191.2	4990	192.1	5010	192.3
5030	192.7	5050	192.7	5090	193.1	5110	193.5	5130	194.2
5150	194.9	5170	195.2	5190	195.4	5211.1	201.2	5211.2	201.4
5214	205.1	5217.1	205.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4731	.07	4789	.043	5214	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4789	5214		104.96	74	44.96	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10753

INPUT
Description: 10753

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4721.5	220	4743	210.2	4748	209.1	4765	209.1	4782.4	208.8
4782.5	209	4788	208.8	4795	201.4	4802.5	198.2	4822.5	188
4842.5	185.4	4862.5	184.6	4882.5	184.5	4902.5	184.8	4922.5	186.2
4942.5	188.7	4962.5	189.7	4982.5	191	5002.5	191.9	5022.5	192.2
5042.5	194.1	5062.5	193.1	5082.5	193.4	5102.5	194	5122.5	194.6
5142.5	195.2	5162.5	195.2	5172.5	195.2	5182.5	196.2	5191.5	192.8
5196.5	197.8	5204.5	205.5	5214.5	205.3	5218.5	201.3	5220.3	205.7
5235.3	210	5247.5	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4721.5	.07	4788	.043	5196.5	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4788	5196.5	60	45	30	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10708

INPUT
Description: 10708

Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4753	209.4	4758	208.7	4774	208.7	4789.9	208.3	4790	208.4
4800	207.5	4808	201.2	4817	196.8	4824	191.3	4830	187.7
4844	184.9	4855	184.2	4870	182	4886	183.8	4900	183.2
4917	183.2	4934	184.7	4950	185.8	4967	187.6	4980	188.8
4994	189.8	5011	190.5	5026	191.2	5042	191.8	5058	192.2
5073	192.6	5090	193.2	5109	193.6	5128	194.2	5144	194.2
5160	194.2	5173	195.7	5179	197.7	5187	200.2	5192	201.2
5193	202.2	5201	207.2	5205	207.1	5213	206.3	5219	206.7
5225	208.9								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4753	.07	4800	.043	5201	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4800	5201	46.98	51	49.98	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10657

INPUT
Description: 10657

Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4765	210.1	4770	208.3	4786	208.4	4801.9	208.1	4802	208.3

4809	208.2	4814	202.4	4818	201.3	4829	197.2	4837	194.6
4846	188.7	4857	185.6	4873	184.2	4888	183.7	4904	184.2
4924	184.5	4945	184.7	4965	184.5	4981	186.4	4995	187.6
5015	189.2	5032	190.4	5051	191.7	5071	192.4	5086	193
5102	193.3	5119	193.8	5137	193.8	5151	194	5163	195.9
5170	198.1	5174	199.9	5182	201.2	5183	201.7	5190	206.2
5192	206.1	5194	207.4	5197	208.8	5201	208.9	5209	208.8
5215	208.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4765	.07	4809	.043	5197	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4809	5197	52	45	45	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10612

INPUT
Description: 10612

Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4774	209.2	4779	208.1	4796	208.2	4813	207.9	4820	207.7
4823	209.2	4834	198.7	4842	193	4853	186.6	4866	185.4
4883	185.2	4902	184.7	4918	185	4938	185.2	4958	185.2
4981	184.7	5001	185.8	5022	187.2	5041	189.2	5063	191.6
5085	192.2	5108	193.2	5128	194.4	5145	193.7	5155	194.6
5163	196.2	5166	199.9	5172	200.2	5177	201.2	5178	201.9
5184	202.6	5188	205.2	5202	209.5	5203	209.5	5212	209.5
5223	210.3								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4774	.07	4823	.043	5202	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4823	5202	70	50	70	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10562

INPUT
Description: 10562

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4739.3	220	4758.8	208	4772.9	208.3	4789.5	206.5	4789.9	206.8
4790	206.5	4800	205.8	4805	205.6	4808	201.5	4810	198.6
4812	196.7	4815	194.4	4821	192.6	4827	190.8	4839	190.9
4848	190.8	4858	192.8	4869	193.4	4880	193.5	4889	193.6
4897	193.8	4911	192.1	4933	191.4	4942	190.6	4950	189.4
4961	188.9	4974	188.5	4983	188.7	4992	188.8	5000	189.1
5008	189.4	5018	189.5	5027	189.4	5029	189.7	5035	189.4

5045	189.7	5055	191.3	5065	192.8	5075	191.5	5080	193.6
5085	195	5094	195.7	5097	195.7	5098.5	192.4	5102	191.8
5114	192.5	5123	193.4	5131	194.4	5135	196.1	5145	197.6
5150	198.5	5155	199.9	5163	200.9	5174	201.7	5183	207.6
5205.9	208.2	5239.4	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4739.3	.07	4805	.043	5097	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4805	5097	12	12	12	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10550

INPUT
Description: 10550

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4739.3	220	4758.8	208	4772.9	208.3	4789.5	206.5	4789.9	206.8
4790	206.5	4800	205.8	4805	205.6	4808	201.5	4810	198.6
4812	196.7	4815	194.4	4821	192.6	4827	190.8	4839	190.9
4848	190.8	4858	192.8	4869	193.4	4880	193.5	4889	193.6
4897	193.8	4911	192.1	4933	191.4	4942	190.6	4950	189.4
4961	188.9	4974	188.5	4983	188.7	4992	188.8	5000	189.1
5008	189.4	5018	189.5	5027	189.4	5029	189.7	5035	189.4
5045	189.7	5055	191.3	5065	192.8	5075	191.5	5080	193.6
5085	195	5094	195.7	5097	195.7	5098.5	192.4	5102	191.8
5114	192.5	5123	193.4	5131	194.4	5135	196.1	5145	197.6
5150	198.5	5155	199.9	5163	200.9	5174	201.7	5183	207.6
5205.9	208.2	5239.4	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4739.3	.07	4805	.02	5097	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4805	5097	9	9	9	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10541

INPUT
Description: 10541
POMPTON LAKES DAM
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4801.1	220	4822.8	206.5	4831.5	206.5	4848.8	206.1	4848.9	206.5
4852	206	4861.8	202.8	4865.7	196.2	4879.5	188.9	4886.8	180.9
4896.7	180.9	4906.3	180.5	4912.7	180.6	4921.5	181.5	4925.9	182.1
4933.4	180.2	4944.3	193.8	4950.5	193.6	4953.3	195.3	4961.3	196.9
4962.3	198.3	4970.7	198.3	4981.4	198.3	4982.7	199.7	4992.3	200.3
5006	199.6	5016.4	198.3	5024.6	195.8	5031.3	193	5032.9	192.1

5038.9	189.7	5043.3	187.2	5046	185.6	5051.7	185.8	5057	185.9
5062.7	185.6	5072	185.5	5082.4	185.8	5091.5	185.8	5098.4	185.7
5099.4	185.6	5102.1	185.5	5107.7	185.6	5114.2	185.6	5121.2	185.6
5127.8	185.6	5133.7	185.6	5140.2	186.1	5145.7	193.5	5150.5	194.5
5156.6	194.1	5158.5	204.8	5158.7	207.5	5209.3	207.5	5255.7	207.7
5262.9	210.1	5292.7	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4801.1	.07	4848.9	.03	5158.5	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4848.9	5158.5	11	11	11	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4801.1	4859	205.3	F
5161	5292.7	201	F

Sediment Elevation = 0

INLINE STRUCTURE

RIVER: Ramapo River
REACH: Reach-1 RS: 10540

INPUT
Description: Pompton Lake Dam
Distance from Upstream XS = .5
Deck/Roadway Width = 10
Weir Coefficient = 3.6
Weir Embankment Coordinates num = 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4740	220	4760	206.9	4772	207.1	4783	206.7	4834.5	207
4859	205.3	4859	205.3	4866	201	5161	201	5161	201
5161.1	207.5	5210	207.5	5210.1	210.5	5260	210.5	5300	220

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Weir crest shape = Ogee

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10530

INPUT
Description: 10530

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4801.1	220	4822.8	206.5	4831.5	206.5	4848.8	206.1	4848.9	206.5
4852	206	4861.8	202.8	4865.7	196.2	4879.5	188.9	4886.8	180.9
4896.7	180.9	4906.3	180.5	4912.7	180.6	4921.5	181.5	4925.9	182.1
4933.4	180.2	4944.3	193.8	4950.5	193.6	4953.3	195.3	4961.3	196.9
4962.3	198.3	4970.7	198.3	4981.4	198.3	4982.7	199.7	4992.3	200.3
5006	199.6	5016.4	198.3	5024.6	195.8	5031.3	193	5032.9	192.1
5038.9	189.7	5043.3	187.2	5046	185.6	5051.7	185.8	5057	185.9
5062.7	185.6	5072	185.5	5082.4	185.8	5091.5	185.8	5098.4	185.7
5099.4	185.6	5102.1	185.5	5107.7	185.6	5114.2	185.6	5121.2	185.6

5127.8	185.6	5133.7	185.6	5140.2	186.1	5145.7	193.5	5150.5	194.5
5156.6	194.1	5158.5	204.8	5158.7	207.5	5209.3	207.5	5255.7	207.7
5262.9	210.1	5292.7	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4801.1	.07	4848.9	.03	5158.5	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4848.9	5158.5	42	42	42	.05	.2

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4801.1	4848.9	206.5	F
5158.5	5292.7	204.8	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10488

INPUT
Description: 10488

Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4796.1	220	4812.7	206	4827.4	205.9	4839.5	205.7	4861.3	202.8
4865.7	199	4880.6	189	4885.1	182.6	4889.1	179.9	4899	178.6
4903.7	180.6	4907.4	184.3	4916.9	183.5	4931.2	181.2	4942.6	185.2
4963.9	191.1	4984.1	193.1	4993.3	187.3	5000.9	185.9	5017.3	183.6
5037.4	178.8	5051.5	178.9	5063	179.2	5074.7	179.2	5081.9	178.9
5094.9	177.2	5101.5	177.7	5126.8	186.3	5133.3	185.9	5138.6	201.3
5144.7	202	5206.9	207.1	5231.3	207.3	5249.4	210	5260.6	220

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4796.1	.05	4839.5	.028	5144.7	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4839.5	5144.7	102.96	102.96	102.96	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10385

INPUT
Description: 10385

Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4743.3	220	4777.3	202.6	4791.2	202.2	4809.4	201.4	4819.2	200.1
4837.9	186.1	4848	185.3	4861	179.6	4872.3	179.8	4878	179.4
4888	178.7	4898	178.6	4908	178.6	4918	178.8	4928	178.9
4938	178.6	4943	178.2	4948	177.4	4953	176.7	4955	175.6
4958	174.2	4960	171.7	4963	170.3	4968	169.3	4973	167.6
4978	162.8	4985	160.7	4991	160.3	4998	161.1	5005	159.5
5012	158	5020	157.2	5028	155.9	5037	156.1	5043	158
5050	158.2	5055	157.8	5060	159.5	5065	159.6	5070	161.2
5073	163.1	5075	164.7	5078	166.3	5080	166.6	5085	165.8

5090	165.2	5095	166.3	5100	169.7	5103	172	5106	173.2
5111	175.9	5114	177.2	5122	179.4	5141	186.5	5165.5	191.2
5169.5	192.3	5175.5	194.1	5175.6	194.6	5187.8	199	5203.3	206.9
5211.1	206.6	5222.3	210.1	5236.8	220				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4743.3	.07	4861	.03	5122	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4861	5122	120	114.96	110.04	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10270

INPUT
Description: 10270
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4592.4	220	4637.2	203.9	4665.7	198.4	4706.2	194.1	4728.2	193.7
4754.1	192.7	4758.9	192.6	4778	192	4820	191.7	4828	191.6
4843	190.8	4853	190.4	4868	188.1	4880	187.6	4891	181.3
4948	161.7	4953	161.4	4960	161	4968	160.7	4976	159.9
4984	159.5	4989	160.3	4998	162.3	5009	163.8	5015	164.8
5025	165.5	5033	166.6	5041	165.6	5051	165.5	5062	165.4
5069	165.4	5076	168.7	5082	170.1	5085	174.9	5095	178
5097	179.6	5104	184.4	5108	186	5118	188.3	5128	190.8
5130	191.7	5139	193.5	5147.3	200	5169.9	207.4	5178.7	206.9
5190.8	210	5217.4	215.2	5234.8	220				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4592.4	.07	4891	.03	5097	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4891	5097	45	45	45	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10225

INPUT
Description: 10225

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4853.34	195.06	4860.3	190.6	4870.3	190.4	4880.3	190.3	4885.3	186.8
4897.3	182.4	4907.3	179.7	4911.3	179.4	4911.4	178	4913.3	177.9
4918.3	177.7	4921.3	177	4925.3	174.9	4930.3	174.1	4935.3	172.3
4945.3	169.9	4955.3	168.1	4962.3	167.1	4969.3	164.8	4976.3	164.6
4982.3	164.3	4995.3	164.2	5006.3	163.8	5009.3	164.5	5019.3	166.3
5031.3	166.4	5037.3	167.3	5047.3	168.6	5055.3	169	5061.3	170.7
5065.3	172.9	5072.3	174.3	5076.3	176.1	5079.3	179	5082.3	178.2
5082.9	179.2	5095.9	187.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4853.34	.07	4911.3	.035	5079.3	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4911.3	5079.3	50	43	40	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10182

INPUT
Description: 10182

Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4902	187.8	4909	186.6	4923	184.7	4929	185.1	4946	184.3
4953	179.4	4956	178.7	4960	177.6	4962	177.8	4963	178.8
4966	179.1	4970	178.7	4976	178.5	4982	177.8	4983	177.4
4989	178	4999	177.8	5006	177.8	5015	177	5021	176.4
5031	176.6	5038	176.9	5046	178.8	5047	177.7	5047.1	178.5
5050	179.6	5052	179.5	5068	180.1	5078	182.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4902	.07	4956	.035	5047.1	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4956	5047.1	40.02	55.02	64.98	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10127

INPUT
Description: 10127

Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4903.5	189.8	4923.5	189.6	4935.5	189.2	4940.5	189.3	4960.5	177.9
4962.5	177.6	4967.5	177.1	4973.5	175.8	4980.5	176.3	4985.5	176.1
4991.5	176.5	5004.5	176.1	5012.5	176.3	5020.5	176.8	5025.5	176.4
5029.5	176.1	5037.5	176.7	5038.5	177.1	5038.6	178.2	5039.5	179.1
5046.5	179.2	5053.5	178.8	5063.5	177	5067.5	176.1	5071.5	175.1
5078.3	193.1	5079.3	192.1	5103.3	192.8				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4903.5	.15	4960.5	.035	5071.5	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4960.5	5071.5	41	41	41	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River

REACH: Reach-1 RS: 10086

INPUT
Description: 10085
PATERSON HAMBURG TURNPIKE
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4407.4	220	4456.8	196.8	4513	194.2	4513.5	194.2	4544.7	193.3
4586.8	192.1	4624.8	190.9	4677.8	189.3	4756.2	190.1	4789.5	190
4839.1	189.8	4884	190.2	4900	191.1	4933	190.4	4940	188.6
4941	177.2	4941.1	177.3	4942	176.9	4945	177.3	4947	177.5
4950	177.3	4955	176.3	4960	174.3	4970	173.6	4976	175.9
4980	176.9	4980.1	176.9	4984	178.7	4984.1	178.7	4989	176.9
4990	175.7	5000	174.4	5010	174.4	5020	176.6	5022	176.6
5022.1	176.6	5025	178.2	5025.1	178.2	5029	176.5	5030	175.4
5040	173.9	5050	174.2	5060	175	5060.1	176.4	5062	188.5
5065	188.9	5070	191.1	5080	191	5100	191.2	5133.2	190.4
5195.5	191.2	5267.7	193.6	5353.1	195.2	5400.5	195.4	5432.6	200

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4407.4	.2	4544.7	.04	4940	.03	5062	.06	5070	.2

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4940	5062	64	64	64	.6	.8

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 10053.5

INPUT
Description: PATERSON HAMBURG TURNPIKE

Distance from Upstream XS = .5
Deck/Roadway Width = 63
Weir Coefficient = 2.5
Upstream Deck/Roadway Coordinates
num= 32

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4407.4	220	220	4456.8	196.8	196.8	4513.5	194.2	194.2
4544.7	193.3	193.3	4586.8	192.1	192.1	4624.8	190.9	190.9
4677.8	189.3	189.3	4756.2	190.1	190.1	4789.5	190	190
4839.1	189.8	189.8	4884	190.2	190.2	4900	191.1	
4933	193.7		4940	193.7		4941	193.8	187.3
4980	194	187.3	4984.1	194	187.3	5022	194	187.3
5025.1	194	187.3	5060.1	193.7	187.3	5060.1	193.7	
5062	193.7	188.5	5065	193.6	188.9	5070	193.6	191.1
5080	191	191	5100	191.2	191.2	5133.2	190.4	190.4
5195.5	191.2	191.2	5267.7	193.6	193.6	5353.1	195.2	195.2
5400.5	195.4	195.4	5432.6	200	200			

Upstream Bridge Cross Section Data
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4407.4	220	4456.8	196.8	4513	194.2	4513.5	194.2	4544.7	193.3
4586.8	192.1	4624.8	190.9	4677.8	189.3	4756.2	190.1	4789.5	190
4839.1	189.8	4884	190.2	4900	191.1	4933	190.4	4940	188.6
4941	177.2	4941.1	177.3	4942	176.9	4945	177.3	4947	177.5
4950	177.3	4955	176.3	4960	174.3	4970	173.6	4976	175.9
4980	176.9	4980.1	176.9	4984	178.7	4984.1	178.7	4989	176.9

4990	175.7	5000	174.4	5010	174.4	5020	176.6	5022	176.6
5022.1	176.6	5025	178.2	5025.1	178.2	5029	176.5	5030	175.4
5040	173.9	5050	174.2	5060	175	5060.1	176.4	5062	188.5
5065	188.9	5070	191.1	5080	191	5100	191.2	5133.2	190.4
5195.5	191.2	5267.7	193.6	5353.1	195.2	5400.5	195.4	5432.6	200

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4407.4	.2	4544.7	.04	4940	.03	5062	.06	5070	.2

Bank Sta: Left	Right	Coeff Contr.	Expan.
4940	5062	.6	.8

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 26

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4677.8	189.3	189.3	4756.2	190.1	190.1	4789.5	190	190
4839.1	189.8	189.8	4884	190.2	190.2	4900	191.1	
4933	193.7		4940	193.7		4941	193.8	187.3
4980	194	187.3	4984.1	194	187.3	5022	194	187.3
5025.1	194	187.3	5060.1	193.7	187.3	5060.1	193.7	
5062	193.7		5065	193.6	188.9	5070	193.6	191.1
5080	191		5100	191.2		5133.2	190.4	
5195.5	191.2	191.2	5267.7	193.6	193.6	5353.1	195.2	195.2
5400.5	195.4	195.4	5432.6	200	200			

Downstream Bridge Cross Section Data
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4331	220	4360.2	200.3	4422.4	194.2	4480.5	192.7	4544	189.8
4691.7	190.6	4769.9	190.2	4856.8	191.2	4906	191	4916	191
4926	183.3	4936	177.2	4946	176.4	4956	176.5	4966	175.5
4976	174.9	4986	176	4996	175.5	5006	175.3	5016	172.7
5026	175.3	5036	174.6	5046	173.2	5056	173.3	5060	175.2
5063	175.7	5063.1	176.5	5064	194.4	5066	191	5086.5	190.1
5160.7	190.9	5195.5	191.2	5267.7	193.6	5353.1	195.2	5400.5	195.4
5432.6	200								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4331	.15	4916	.03	5064	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
4916	5064	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4331	4916	191	F
5064	5432.6	194.4	F

Sediment Elevation = 0

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 189.5
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 2

Pier Data
Pier Station Upstream= 4982 Downstream= 4982

```
Upstream     num=       2
    Width   Elev    Width   Elev
       4     150       4     194
Downstream     num=       2
    Width   Elev    Width   Elev
       4     150       4     194

Pier Data
Pier Station     Upstream=  5023.5    Downstream=  5023.5
Upstream     num=       2
    Width   Elev    Width   Elev
       3     150       3     194
Downstream     num=       2
    Width   Elev    Width   Elev
       3     150       3     194

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 10022

INPUT
Description: 10022
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4331     220  4360.2   200.3  4422.4   194.2  4480.5   192.7    4544   189.8
  4691.7   190.6  4769.9   190.2  4856.8   191.2    4906     191    4916     191
    4926   183.3    4936   177.2    4946   176.4    4956   176.5    4966   175.5
    4976   174.9    4986     176    4996   175.5    5006   175.3    5016   172.7
    5026   175.3    5036   174.6    5046   173.2    5056   173.3    5060   175.2
    5063   175.7  5063.1   176.5    5064   194.4    5066     191  5086.5   190.1
  5160.7   190.9  5195.5   191.2  5267.7   193.6  5353.1   195.2  5400.5   195.4
  5432.6     200

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4331     .15    4916     .03    5064     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4916    5064            19.98  441.99  700.02             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4331    4916     191       F
    5064  5432.6   194.4       F
Sediment Elevation = 0
```

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 9580

INPUT
Description: 9580

Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4294.2	210	4313.4	198	4429	194.1	4477.9	192.1	4508.5	191.8
4535.3	190.9	4565.1	191.6	4593.3	191.5	4633	190.2	4691	189.7
4702.6	189.6	4740.3	188.5	4771.7	189.1	4836.8	187.8	4847	186.8
4882.4	185.9	4882.5	185.3	4894.5	184.1	4909	177.4	4937	177
4945	176.1	4952	175.3	4962	174.4	4972	173.6	4982	174.3
4992	174.2	5002	174.1	5012	174.3	5022	174	5032	174.2
5042	174.9	5054	176.1	5057	178.3	5070	185.1	5097	186.4
5107.2	187	5147.3	182.1	5186.3	179.5	5212.4	180.9	5246.2	184.4
5267.4	187.2	5285.8	186.6	5302.2	187.1	5331.6	188.9	5389.3	189.5
5427.4	189.5	5474.4	190.1	5534.1	191	5581.9	190.2	5596.6	189.9
5612.8	189.7	5629.9	189.9	5649.2	190.2	5712.1	191.1	5765.1	190.8
5822.4	190.9	5869.6	190.6	5896.4	189.9	5911	189.7	5928	189.9
5951.6	190.5	6027.3	192.4	6046.7	194.7	6062.6	196.1	6120	201.8
6142.1	201.7	6168.1	202	6194.1	201.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4294.2	.065	4882.4	.033	5070	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4882.4	5070	770.1	829.94	819.91	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 8750

INPUT
Description: 8750
Station Elevation Data num= 91

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4454.9	210	4479.3	199.7	4515.4	195.7	4581	195.4	4622.3	194.4
4671.3	196	4709.6	196.4	4731.4	196.9	4747.8	196.5	4756.6	197.4
4775.9	196.9	4790.2	197.3	4809.9	196.9	4846.8	197	4879.6	193.8
4887.8	191.3	4887.9	191.3	4897	195.8	4897.5	195.2	4898	192.1
4907	190.8	4907.5	188.3	4918	187.1	4923.5	181.7	4932	176
4937	174.5	4947	172.8	4957	172.4	4967	173.1	4977	172.7
4987	172.9	4997	172.6	5007	172.4	5017	172.9	5027	173.3
5037	173.1	5047	174.9	5057	175.4	5068	176.2	5089.1	176.8
5131.9	177.9	5177.1	178.1	5225.1	180.4	5264	181.2	5321.9	181.7
5364	181.8	5412.5	182	5480.4	182.2	5537.9	183.6	5548.1	184.2
5613.9	183.4	5656.1	184.5	5701.5	189.4	5755.1	188.8	5812.7	186.8
5878.8	186.1	5918.1	188.1	5964.1	190.1	5978.9	191	6048.4	190.1
6063.2	188.8	6076.7	187.9	6109.1	187.8	6164.7	188.6	6244	189.1
6305.3	188.5	6356.7	189.8	6371.9	189.9	6382.8	190	6405.5	190.2
6454.2	190.3	6479.3	194	6547.5	195.7	6599.9	195.8	6636.5	196.1
6734.7	194.2	6888.9	194.7	6992.4	193.3	7046.3	194.1	7091.9	192.5
7172.8	194.1	7269.5	194.6	7398.8	194.7	7538.9	193.3	7617.6	194.6
7712.8	192.5	7833.4	194.3	7947.4	194.4	8144.3	192.3	8254.8	194.4
8313.1	195.3								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4454.9	.065	4898	.05	6479.3	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4898	6479.3	830.08	795.04	680	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 7955

INPUT
Description: 7955

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4272.3	210	4304.8	203.7	4332.3	198.4	4357.9	198	4415.6	192.3
4490.9	192.3	4557.2	192.7	4621.3	192.9	4688.3	192.8	4711.1	193.2
4731.8	192.7	4784.6	192.1	4837.8	190.4	4869.9	189.9	4896.9	186.5
4907	186.4	4926	185.7	4939	176.2	4941	174.8	4943	174.1
4946	172.8	4949	171.7	4959	170.5	4969	170.4	4979	170.1
4989	169.5	4999	168.4	5009	168.5	5019	168.7	5029	169.6
5039	171.3	5044	172.9	5048	173.6	5054	174.5	5061	176.1
5072	178.2	5105	181.9	5129	182	5139	181.8	5177.9	181.9
5193.8	181.6	5210.9	181.9	5238.7	182.7	5291.3	182.4	5326.9	183.2
5364.1	185.5	5387.2	187.3	5451.3	186.4	5471.4	185.9	5489	185.9
5512.7	186.3	5573.6	187.4	5629.6	187.8	5670.7	188	5696.4	188.3
5737.6	187.8	5761.5	187.1	5774.9	187.3	5793.7	186.8	5824.8	187.6
5878.2	187.8	5935.6	188	6000.8	188.8	6043.7	188.6	6068.1	186.7
6082.7	186.4	6100.3	186.6	6124.8	188	6189	188.1	6274.1	187.3
6287.2	187.4	6350.4	186.8	6379.1	186	6394.5	185.7	6411.8	185.9
6444.7	186.4	6512.6	185.8	6550.4	183.8	6601.2	183.6	6648.5	185.2
6688.9	187.1	6734.7	187.9	6759.6	187.9	6771.5	187.5	6785	187.8
6820	187.8	6918.9	185.9	7012.6	186.8	7112.1	186.7	7261.2	187.5
7400.2	189.6	7496.3	190.4	7617.8	192.8	7782.9	194.3	7884.5	195
8039.6	192.6	8188.8	192.3	8308.6	192.6	8425.4	192.7		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4272.3	.2	4926	.045	5129	.5

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4926	5129	390	355.04	330	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 7600

INPUT
Description: 7600
This is a REPEATED section.

Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3935.5	226.1	4007.6	217	4022.6	217.8	4100.6	210.4	4135.6	201.7
4280.9	201.6	4293.5	200.8	4310.2	201	4320.3	200.4	4341.8	200.4

4416.8	198.1	4441.4	198.6	4463.1	197.4	4471.1	198.1	4506.5	193.9
4589.1	189.9	4675.4	187.7	4766.4	187.7	4846.9	185.2	4874.7	186.5
4892.9	186.5	4903	187.6	4932	187.6	4932.1	187.6	4941	181.3
4947	177	4950	174.7	4950.1	174.7	4953	172.6	4953.1	172.6
4958	170.6	4963	169.2	4973	167.3	4983	167.6	4993	167.8
4999	168.5	5003	168.9	5013	170	5023	171.2	5028	172.3
5033	174	5043	175.1	5046	175.8	5046.1	175.8	5048	176.3
5049	176.5	5049.1	176.5	5053	177	5054	177.9	5058	180.9
5058.1	181	5066	183.5	5066.1	183.5	5068	184.2	5073	185
5093	185.9	5093.1	185.9	5104.5	186.2	5160	185	5192.9	184.3
5470.3	183.9	5531.1	185	5555.6	186.6	5592.6	185.8	5941.7	186.7
5969.3	187.5	6033.7	187.1	6070.2	186.3	6127.6	188	6174.1	188.5
6238.6	186.6	6316.5	187.1	6342.3	186.6	6352.4	185.7	6380.2	185.6
6389.5	185.6	6403	186	6569.4	181.7	6589.1	182.5	6611.5	183.7
6639.8	185.8	6824.8	186.9	6933.1	187.5	7054.4	187	7087.7	186.2
7195.6	187.7	7312.6	188.7	7436.2	187	7546.6	187.4	7681.4	187.4
7799.1	188.2	7957.2	192.5	8093	193	8247.8	191.1	8369	191.2
8498.9	194								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3935.5	.2	4932	.045	5104.5	.5

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4932	5104.5	110.01	110.01	110.01	.5	.7

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 7490

INPUT
Description: 7490
DAWES HIGHWAY

Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3935.5	225.1	4007.6	216	4022.6	216.8	4100.6	209.4	4135.6	200.7
4280.9	200.6	4293.5	199.8	4310.2	200	4320.3	199.4	4341.8	199.4
4416.8	197.1	4441.4	197.6	4463.1	196.4	4471.1	197.1	4506.5	192.9
4589.1	188.9	4675.4	186.7	4766.4	186.7	4846.9	184.2	4874.7	185.5
4892.9	185.5	4903	186.6	4932	186.6	4932.1	186.6	4941	180.3
4947	176	4950	173.7	4950.1	173.7	4953	171.6	4953.1	171.6
4958	169.6	4963	168.2	4973	166.3	4983	166.6	4993	166.8
4999	167.5	5003	167.9	5013	169	5023	170.2	5028	171.3
5033	173	5043	174.1	5046	174.8	5046.1	174.8	5048	175.3
5049	175.5	5049.1	175.5	5053	176	5054	176.9	5058	179.9
5058.1	180	5066	182.5	5066.1	182.5	5068	183.2	5073	184
5093	184.9	5093.1	184.9	5104.5	185.2	5160	184	5192.9	183.3
5470.3	182.9	5531.1	184	5555.6	185.6	5592.6	184.8	5941.7	185.7
5969.3	186.5	6033.7	186.1	6070.2	185.3	6127.6	187	6174.1	187.5
6238.6	185.6	6316.5	186.1	6342.3	185.6	6352.4	184.7	6380.2	184.6
6389.5	184.6	6403	185	6569.4	180.7	6589.1	181.5	6611.5	182.7
6639.8	184.8	6824.8	185.9	6933.1	186.5	7054.4	186	7087.7	185.2
7195.6	186.7	7312.6	187.7	7436.2	186	7546.6	186.4	7681.4	186.4
7799.1	187.2	7957.2	191.5	8093	192	8247.8	190.1	8369	190.2
8498.9	193								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3935.5	.2	4932	.045	5104.5	.5

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4932	5104.5	38	38	38	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3935.5	4932	186.6	F
5104.5	8498.9	185.2	F

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 7471

INPUT
Description: DAWES HIGHWAY

Distance from Upstream XS = 7.5
Deck/Roadway Width = 23
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 65

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4874.7	185.5	185.5	4892.9	185.5		4903	189.5	
4932	189.5		4932.1	191		4941	200	180.3
4950	200	173.7	4950.1	191	173.7	4953	191.2	171.6
4953.1	191.2	179.8	4958	191.6	181.8	4963	192.1	183.5
4973	192.6	185.2	4993	193.5	187.5	4999	193.5	187.7
5013	193.5	187	5023	193.2	185.8	5033	192.8	183.9
5046	191.8	179.8	5046.1	191.8	174.8	5049	191.5	175.5
5049.1	200	175.5	5058	200		5058.1	191	
5066	191	182.5	5066.1	189.5	182.5	5093	189.5	184.9
5093.1	186	184.9	5104.5	185.8	185.2	5160	184	184
5192.9	183.3	183.3	5470.3	182.9	182.9	5531.1	184	184
5555.6	185.6	185.6	5592.6	184.8	184.8	5941.7	185.7	185.7
5969.3	186.5	186.5	6033.7	186.1	186.1	6070.2	185.3	185.3
6127.6	187	187	6174.1	187.5	187.5	6238.6	185.6	185.6
6316.5	186.1	186.1	6342.3	185.6	185.6	6352.4	184.7	184.7
6380.2	184.6	184.6	6389.5	184.6	184.6	6403	185	185
6569.4	180.7	180.7	6589.1	181.5	181.5	6611.5	182.7	182.7
6639.8	184.8	184.8	6824.8	185.9	185.9	6933.1	186.5	186.5
7054.4	186	186	7087.7	185.2	185.2	7195.6	186.7	186.7
7312.6	187.7	187.7	7436.2	186	186	7546.6	186.4	186.4
7681.4	186.4	186.4	7799.1	187.2	187.2	7957.2	191.5	191.5
8093	192	192	8247.8	190.1	190.1			

Upstream Bridge Cross Section Data
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3935.5	225.1	4007.6	216	4022.6	216.8	4100.6	209.4	4135.6	200.7
4280.9	200.6	4293.5	199.8	4310.2	200	4320.3	199.4	4341.8	199.4
4416.8	197.1	4441.4	197.6	4463.1	196.4	4471.1	197.1	4506.5	192.9
4589.1	188.9	4675.4	186.7	4766.4	186.7	4846.9	184.2	4874.7	185.5
4892.9	185.5	4903	186.6	4932	186.6	4932.1	186.6	4941	180.3
4947	176	4950	173.7	4950.1	173.7	4953	171.6	4953.1	171.6
4958	169.6	4963	168.2	4973	166.3	4983	166.6	4993	166.8
4999	167.5	5003	167.9	5013	169	5023	170.2	5028	171.3
5033	173	5043	174.1	5046	174.8	5046.1	174.8	5048	175.3
5049	175.5	5049.1	175.5	5053	176	5054	176.9	5058	179.9
5058.1	180	5066	182.5	5066.1	182.5	5068	183.2	5073	184
5093	184.9	5093.1	184.9	5104.5	185.2	5160	184	5192.9	183.3
5470.3	182.9	5531.1	184	5555.6	185.6	5592.6	184.8	5941.7	185.7

5969.3	186.5	6033.7	186.1	6070.2	185.3	6127.6	187	6174.1	187.5
6238.6	185.6	6316.5	186.1	6342.3	185.6	6352.4	184.7	6380.2	184.6
6389.5	184.6	6403	185	6569.4	180.7	6589.1	181.5	6611.5	182.7
6639.8	184.8	6824.8	185.9	6933.1	186.5	7054.4	186	7087.7	185.2
7195.6	186.7	7312.6	187.7	7436.2	186	7546.6	186.4	7681.4	186.4
7799.1	187.2	7957.2	191.5	8093	192	8247.8	190.1	8369	190.2
8498.9	193								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3935.5	.2	4932	.045	5104.5	.5

Bank Sta: Left	Right	Coeff Contr.	Expan.
4932	5104.5	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3935.5	4932	186.6	F
5104.5	8498.9	185.2	F

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 31

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4874.7	185.5	185.5	4892.9	185.5		4903	189.5	
4932	189.5		4932.1	191		4941	200	180.3
4950	200	173.7	4950.1	191	173.7	4953	191.2	171.6
4953.1	191.2	179.8	4958	191.6	181.8	4963	192.1	183.5
4973	192.6	185.2	4993	193.5	187.5	4999	193.5	187.7
5013	193.5	187	5023	193.2	185.8	5033	192.8	183.9
5046	191.8	179.8	5046.1	191.8	174.8	5049	191.5	175.5
5049.1	200	175.5	5058	200		5058.1	191	
5066	191	182.5	5066.1	189.5	182.5	5093	189.5	184.9
5093.1	186	184.9	5104.5	185.8		5161.76	184	
5192.9	183.3							

Downstream Bridge Cross Section Data
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3911.5	225	3989.3	210	4009	212.3	4020.8	211.1	4040.2	216.5
4063.7	213.8	4124.2	200	4327.2	199.2	4384.9	197.6	4406.6	198
4428.7	197.6	4606	188.1	4719.2	186.8	4807.5	186.2	4858.1	186.1
4893	185.2	4924	184.8	4936	184.5	4943	183.3	4946	176.4
4949	176	4952	175.4	4955	174.8	4960	173.9	4964	172.1
4970	169.3	4980	167.1	4990	167.2	5000	167.2	5010	168
5020	170.1	5030	171.4	5039	173.2	5044	173.8	5050	176
5056	180.5	5062	182.3	5067	184.1	5070	185.5	5090	184.8
5122	184.5	5160.4	183.7	5190.1	182.9	5230	182.9	5278.2	182.7
5332.5	182	5378.8	182.7	5414.1	182.4	5460.1	182.3	5528.4	183.8
5619.8	184.3	5712.3	185.6	5733	185.1	5739.8	184.5	5768.6	184.7
5777.5	184.8	5802.8	185.4	5843.4	184.8	5920	185.3	5962.4	185.2
6003.7	186.3	6022.6	185.7	6031.4	185.4	6058.5	185.6	6067.4	186
6097.1	186.8	6121.5	187.5	6154.5	186.9	6180.8	186.5	6206.1	185.5
6226.3	185	6252.2	185.6	6304.4	185.6	6334	184.2	6368.7	184.2
6407	184.7	6514.7	182	6568.7	180.8	6602.4	182.7	6640.5	184.6
6731.8	185.1	6755.1	185.1	6761.9	184.8	6788.4	185.7	6829.1	186
6927.7	186.5	7033.8	185.9	7073.9	185	7188.5	186.7	7284.6	187.2
7348.8	186.9	7476.7	184.3	7599.6	185.8	7722.6	186.2	7888.3	189
8046	191	8195.4	189.7	8341.8	191.7	8498.3	193		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3911.5	.2	4924	.045	5070	.5

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
          4924    5070            .5       .7
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  3911.5    4924   184.8       F
    5070  8498.3   185.5       F
Sediment Elevation = 0

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =     185
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =       2
Selected Low Flow Methods = Energy

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =.7352146
           Max Low Cord                =   187.5

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 7452

INPUT
Description: 7452
Station Elevation Data    num=      99
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3911.5	225	3989.3	210	4009	212.3	4020.8	211.1	4040.2	216.5
4063.7	213.8	4124.2	200	4327.2	199.2	4384.9	197.6	4406.6	198
4428.7	197.6	4606	188.1	4719.2	186.8	4807.5	186.2	4858.1	186.1
4893	185.2	4924	184.8	4936	184.5	4943	183.3	4946	176.4
4949	176	4952	175.4	4955	174.8	4960	173.9	4964	172.1
4970	169.3	4980	167.1	4990	167.2	5000	167.2	5010	168
5020	170.1	5030	171.4	5039	173.2	5044	173.8	5050	176
5056	180.5	5062	182.3	5067	184.1	5070	185.5	5090	184.8
5122	184.5	5160.4	183.7	5190.1	182.9	5230	182.9	5278.2	182.7
5332.5	182	5378.8	182.7	5414.1	182.4	5460.1	182.3	5528.4	183.8
5619.8	184.3	5712.3	185.6	5733	185.1	5739.8	184.5	5768.6	184.7
5777.5	184.8	5802.8	185.4	5843.4	184.8	5920	185.3	5962.4	185.2
6003.7	186.3	6022.6	185.7	6031.4	185.4	6058.5	185.6	6067.4	186
6097.1	186.8	6121.5	187.5	6154.5	186.9	6180.8	186.5	6206.1	185.5
6226.3	185	6252.2	185.6	6304.4	185.6	6334	184.2	6368.7	184.2
6407	184.7	6514.7	182	6568.7	180.8	6602.4	182.7	6640.5	184.6
6731.8	185.1	6755.1	185.1	6761.9	184.8	6788.4	185.7	6829.1	186

6927.7	186.5	7033.8	185.9	7073.9	185	7188.5	186.7	7284.6	187.2
7348.8	186.9	7476.7	184.3	7599.6	185.8	7722.6	186.2	7888.3	189
8046	191	8195.4	189.7	8341.8	191.7	8498.3	193		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3911.5	.2	4924	.045	5070	.5

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4924	5070	650.02	651.98	479.92	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3911.5	4924	184.8	F
5070	8498.3	185.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 6800

INPUT
Description: 6800

Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3288.1	232.5	3320	223.3	3354.8	211.4	3382.3	210	3469.7	208.7
3577.4	208.6	3619.8	205.5	3679.3	205.5	3742.7	207.3	3849.7	207.3
3906.4	200	3964.2	182.7	4002.5	184.1	4070.1	184.3	4126.4	182.6
4169.2	181.9	4201.8	181.4	4264	180.6	4298.4	181.6	4331.6	182.4
4396.5	181.6	4458.4	182.3	4516.5	183	4636.3	183.2	4731.3	182.9
4779.5	182.8	4830.6	183.1	4881.4	183.1	4901.6	182.9	4911.5	183.5
4938.5	183.6	4950.5	178.5	4951.5	175.9	4952.5	175.6	4956.5	174.9
4958.5	173.6	4960.5	171.9	4965.5	170	4970.5	170.2	4980.5	170.2
4990.5	169.8	5000.5	169.7	5010.5	168.9	5020.5	168.7	5030.5	169.6
5040.5	171.6	5043.5	173	5045.5	175.1	5048.5	175.4	5048.6	175.9
5048.7	177.7	5056.5	178.5	5064.5	181.7	5072.5	181.9	5092.5	181.4
5141.5	180.4	5196.5	179.6	5224.6	179.6	5304.2	180	5346.1	180.1
5432.9	180.4	5496.2	180.8	5603.6	181.2	5631.6	181.2	5662.7	181.3
5772.5	183.8	5896.3	183.7	5993.3	182.9	6114.7	184.3	6258.5	182.8
6290.7	182.7	6351.6	186.7	6469.4	184	6556.9	183.3	6642.6	184.2
6746.9	183.9	6820.4	184.2	6901	184.6	7005.2	184.3	7099.9	182.6
7170.1	184.5	7225.1	183	7291.3	183.6	7356.7	185.3	7433.8	187.1
7497.1	189.2	7593.4	190.3	7623.6	191.1	7659.1	190.3	7725.7	190.5
7822.8	189.3	7884.6	188.5	7947.4	190	8022	191.3	8097.4	193.9
8159	191.5	8209.8	191.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3288.1	.2	4938.5	.045	5064.5	.5

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4938.5	5064.5	690	744.9	799.95	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 6055

INPUT

Description: 6055

Station Elevation Data num= 81

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3151.8	210.1	3208.1	208.1	3314.4	205.8	3378.6	204	3438.6	202.4
3522.3	202.7	3545.8	199	3595.9	199.1	3674	200.5	3754.2	202.5
3812.3	201.1	3871.8	204.5	4023.8	203.5	4055.1	202.8	4110.1	203.7
4175.8	201.9	4237.6	196.2	4278.9	178.7	4361.7	178.8	4436.1	179.9
4546.2	177.4	4633.5	176.4	4695.3	176.4	4776.1	178.5	4841.6	177.4
4912.1	179.1	4922.5	179.7	4936.5	180.4	4941.5	179.1	4944.5	176.7
4947.5	176.1	4952.5	175.3	4957.5	174.1	4962.5	173.4	4972.5	171.4
4982.5	170.6	4992.5	169.6	5002.5	168.7	5012.5	166.1	5022.5	165.2
5032.5	164.9	5042.5	168.7	5046.5	170.6	5048.5	173.6	5050.5	175.3
5052.5	176.1	5060.5	180.6	5062.5	180.6	5082.5	181.2	5092.4	181.2
5152.8	180.3	5259.4	178.8	5329	180.2	5410.5	180.4	5496.4	180.4
5536.9	180.1	5569.1	180.1	5665.3	180.1	5738.3	178.2	5800.2	181.4
5853	181.5	5919.4	178.4	5988.5	178.7	5995.7	177.2	6020.3	182.8
6057.6	183.1	6145.6	180.6	6285.5	179.5	6393.2	178.9	6436.5	179.7
6530.8	182.6	6613.5	182.8	6747	186.2	6906.3	190.9	6963.7	188.4
7047.1	191.5	7197.7	190.1	7339.9	191.3	7519.3	192.6	7640.2	191.5
7689.7	191.6								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3151.8	.2	4936.5	.045	5082.5	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4936.5	5082.5	380	370	360	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 5685

INPUT
Description: 5685

Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3150.5	210	3225.4	209.1	3248.9	207.9	3280.5	207.7	3321.2	206.3
3362.1	202.3	3427.9	201.3	3466.3	201.3	3601.7	200	3622.9	198.4
3659.3	199.5	3715.6	200.4	3752.3	202.4	3797.8	203.4	3861.7	204
3939	205.3	4015.5	205.2	4062.6	205.2	4124.2	204.9	4215.1	204.7
4274.5	204.3	4336.4	204.5	4380.5	202.8	4438.9	195.3	4510.9	187.5
4561.9	179	4606.8	181.9	4711	182.2	4764	181.9	4786	181.7
4807	181.2	4818.5	180.3	4819	176.2	4890	176	4916	178.7
4931	178.9	4934	179.2	4938	179.8	4945.5	176.2	4945.6	174.7
4949	172.6	4951	170.8	4956	170.6	4958	167.1	4966	165.1
4976	164.6	4986	164.8	4996	165.1	5006	165.3	5026	167.7
5028	168.8	5033	170.6	5036	172.6	5036.1	174.6	5040	175.9
5053	180.9	5082.3	182.4	5118.6	184	5300	190	5500	195
5600	185	5689.2	180.2	5749.6	178.6	5876.2	178.6	6023.6	178.7
6146.5	178.1	6217.8	177	6362	177.1	6441	180.8	6510.9	178.7
6610.8	179.7	6723.5	178.5	6836.9	180.4	6920.9	186.6	7013.2	190.1
7181	190.7	7358.5	190.7	7529.7	191.4	7613.3	193		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3150.5	.5	4938	.045	5082.3	.15

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

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          4938  5082.3          1585.08     900  730.08             .2       .4
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 4785

INPUT
Description: 4785

Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  2812.4   210.3  2897.4   206.7  2970.1   191.4  3089.9   181.9  3145.2   183.4
  3314.3     184  3572.1   183.4  3694.4   185.5  3796.2   182.9  4075.1   186.8
  4337.9   186.8  4380.7   186.8    4499   181.5    4613     181  4760.6   180.4
  4833.8     180    4894   180.6    4914   179.9    4936   179.6    4940   177.3
    4942     176    4944   175.1    4949   173.7    4959   171.9    4969   171.3
    4999     171    5009   170.6    5019   170.5    5039     172    5049   173.2
    5055   175.2    5070   177.5  5102.6   178.5  5110.7   177.3    5132     177
    5137   178.3    5165   178.4    5190   178.5    5199   177.6    5240   176.4
    5266   177.1    5270   177.6    5292     177  5319.5   177.1    5321   177.2
    5333     177    5336   176.4    5347   175.6    5358     175    5368   174.9
    5375   175.3    5382   175.5    5389   175.7    5397   176.1    5405   176.3
    5418   175.9    5424   176.2    5428   176.3    5431   175.8    5438   174.9
    5443   174.1    5447   173.4    5457   171.8    5467   173.6    5471   173.9
    5474   176.4    5478   177.1    5499   177.6    5520   177.3    5547   176.9
    5581   177.1    5610   176.9    5645     177    5678   176.3    5685   176.1
    5693   176.4    5714   177.1    5719   175.9    5745   177.4    5779   177.7
  5791.7     178    5826   177.7    5851   177.7    5886   177.4    5933     177
    5941   176.7    5947   176.3    5953   176.7    5960   177.1    5985   177.1
    5996   176.9    6006   176.7    6026   176.7    6038   177.1    6069   177.5
    6113   176.6    6153   177.9  6320.3   178.3  6535.7   177.4 6635.68  183.22
 6741.99  192.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  2812.4      .5    4936    .045    5070     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4936    5070              270  410.04  950.04             .2       .4
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 4375

INPUT
Description: 4375

Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  2815.8   211.7  2858.2   205.2  2898.8   204.4  3035.3   182.2  3087.2   181.7
    3254     183  3415.4   181.2  3452.6   182.9  3516.2     182  3581.7   183.8
  3657.7     184  3715.3   183.1    3759   185.1  3809.9   182.7  3973.9   184.4
  4161.4     185  4897.3   183.8  4929.1   183.1  4944.1   182.2  4951.7   179.8
  4954.9   176.5  4956.7   175.5  4960.7   173.2  4970.7   170.2  5015.7     170
  5025.7   169.8  5035.7   169.5  5045.1   175.8  5045.2   176.5  5048.4   178.8
  5094.3   176.3  5111.5   177.4  5209.2   176.9    5252   177.7  5299.2   179.4
  5307.5   179.5  5327.5   171.3  5337.5   171.5  5357.5   170.7  5387.5   173.3
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5397.5	173.5	5427.5	173.1	5455.9	178.8	5477.6	178.7	5488.9	177.6
5492.4	176.6	5496.5	175.7	5501.5	174.2	5507.5	172.9	5512.5	173.3
5517.5	172.8	5522.5	173	5527.5	173.7	5532.9	175.4	5535.3	176.1
5536.1	176.6	5539	177.7	5553.4	177.4	5558.1	178.3	5577.2	177.4
5586.9	178.1	5622.2	178.3	5649.5	178.8	5693.6	178.2	5728.9	177.7
5751.6	177.5	5761.8	178.6	5793.1	180.3	5835.2	181.4	5881.1	180.8
5913.2	180.2	5939.6	179.2	5980.6	178.8	6000	176	6014.5	177.1
6027.1	177.1	6044.3	175.7	6123.3	173.2	6149.6	173.2	6193.4	174.6
6270.5	175.5	6636.2	177.5	6841.1	176.1	6885.2	189.7	6954.9	189.6
7040.8	186.9	7074	186.9	7104.3	191.6	7170.1	188.4	7406.1	180.9
7441.8	173.3	7538.9	173.3	7582.1	179.5	7658.3	182.4	7723.7	178.2
7984.8	176.2	8144.3	178	8200	180	8400	200		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2815.8	.5	4929.1	.045	5455.9	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4929.1	5455.9	300	595.08	800.04	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 3780

INPUT
Description: 3780

Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2727.5	210.1	2765.7	200.3	2799.1	200.6	2873.4	183.9	2913.5	181.5
3030.8	181.7	3118	184.6	3170.6	183.2	3296.2	184.8	3437.9	183.7
3617	184.2	4264.6	183	4342.4	182.3	4422.4	184.5	4586.9	185.6
4613	185.6	4641	184.9	4661	180	4666	176.9	4676	176.5
4691	174.3	4703	174.3	4724	175.8	4728	178.6	4735.8	179.1
4782	178.2	4811	176.2	4876	177.2	4917	175.9	4940	177.2
4949	175.8	4984	171.5	4994	171.9	5034	167.7	5057	177.7
5066	178	5106	171.5	5116	171.9	5136	175	5176	173.4
5186	173.5	5196	173	5206	173.4	5210	175.1	5213	176.4
5215	177.5	5220	177.9	5238.8	184.1	5625	183.7	5625.9	185.1
5626.9	176.5	5896.6	176.5	5897.5	185	5898.5	184.6	6318.5	184.6
6417.5	187.6	6574.7	182.1	6638.6	183.9	6725.5	188.4	6788.7	185.3
6960.4	186.2	7198.6	188	7357.5	186.8	7456	185.6	7518.5	184
7642.9	180.9	7731.5	183.5	7833.7	182.1	7962.5	180.1	8136.7	177.8
8290.4	176.5	8313.9	176.5	8404.5	188.8	8534.6	190	8705.6	190.9
8798.3	193.1	8914.6	195.1	9027.5	195.4	9146.9	194	9197.9	193.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2727.5	.5	4613	.045	5238.8	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4613	5238.8	320.04	565.08	500.04	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 3215

INPUT
Description: 3215

Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3266.5	210	3379.9	196.8	3404.6	196.6	3457.6	182.5	3513	180.3
3607.3	179.7	3712.3	182.8	3906.2	182.1	3929.6	184.4	4069.2	183.4
4144.6	184.2	4643	185.5	4861	184.9	4869	180.4	4884	180
4888.1	175.8	4903	174.2	4944	174	4954	172.7	4964	173
4974	172	4984	172	4994	170.6	5004	171.1	5014	170.5
5044	170.4	5054	170	5064	169.6	5092	174.4	5097	174.6
5102	175.4	5120	176.9	5130	176.8	5138.9	177.5	5178	177.5
5204	176.4	5212	175.4	5217	173.3	5227	173.3	5237	172.3
5254.6	176.3	5255	177.2	5269	183.9	5272.6	183.7	5277	183.6
5318.7	177.9	5478.5	176.6	5572.6	174.3	5675.5	177.6	5721.1	176.4
5745.8	177.5	5876.6	177.9	5941.4	176.4	6006.9	177.6	6067.4	176.7
6097.6	177.6	6115	176.9	6123	171.3	6137	172.2	6151	169.3
6154	170.1	6158	170.5	6164	169.5	6172	167.7	6205	167.2
6210	167.5	6215	169.1	6217	170.1	6217.1	171.6	6223	173.8
6231	176.1	6266	176.2	6277.1	179.6	6367.8	175.2	6404.3	176.5
6448.8	170.2	6539.2	181.9	6561.2	180.8	6678.7	187.7	6892.1	179.4
6936.1	184	7095.2	187.5	7138.6	183.4	7243.6	181.5	7326	181.8
7702.8	187.7	7828.6	187.8	7894.2	187.1	8034.9	184.8	8118	186.2
8239.6	181.5	8360.3	186.5	8511.4	188.4	8790.2	189.1	9343.8	197.9
9704.9	199	9872.8	198.1	9918.7	199				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3266.5	.5	4861	.045	5269	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4861	5269	930.02	689.92	210	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 2525

INPUT
Description: 2525

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3524.3	210.1	3546.6	208	3583.6	193.1	3619.3	192.5	3639	187.1
3684.2	185.9	3702.5	180.2	3716.7	184.5	4102.9	181.6	4144.1	182.3
4235.8	181.5	4425.3	181.9	4470.7	183.5	4579.2	180.3	4626.1	182.9
4753	180.5	4773	181.9	4789	181.2	4798	178.2	4799	176.5
4824	168.8	4834	168.2	4844	169.6	4874	172.5	4885	174.5
4891	176.5	4893	177.8	4929	176.5	4930	175.2	4934	174.5
4946	170.3	4966	169.2	4996	170.4	5006	170.2	5016	170.5
5026	170.8	5036	169.9	5072	176.5	5096	183.6	5103.6	180.5
5107	183.6	5149.4	176.2	5280.8	174.9	5328.5	176	5704.4	174.2
5755	175.7	5829.7	173.6	6005.4	175.3	6221.2	174.1	6257.6	176
6273	176.7	6294	176.2	6307	172.8	6313.1	170	6331	167.9
6349	167.6	6358	168.1	6368	169.1	6371	170	6377	171.5
6382	176.4	6391	176.5	6405	175.6	6415	177.1	6483.3	173.3
6557.3	177.6	6586.1	183.9	6601	187.2	6626.2	177.5	6669.4	175.8
6737.9	181.4	6790.9	180	6849.3	182.8	6923.4	182.5	7019.2	178.9
7152.9	187.1	7339	186	7484.8	181.4	7576.3	187.7	7650.8	188.1
7711.5	189.7	7834.1	188.6	7904.2	189.1	7973.1	189.4	8080.8	187.6
8188.7	190.5	8299	188.9	8469.6	190	8592.1	189.1	8740.9	188.9

8894.2	189.5	9143	190.6	9285.1	192.3	9414.7	194.3	9570.1	196.3
9728.9	198.4	9875.3	198.3	10092.1	196.5	10180	199.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3524.3	.5	4773	.045	5096	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4773	5096	1185.03	1010.1	460.11	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3524.3	4773	181	F
5096	10180	184	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 1515

INPUT
Description: 1515
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3222	200	3387	187.2	3393	188.5	3430.4	184.2	3505.5	185.9
3613	186.1	3837.2	189.7	4115.7	182.3	4229.8	180.5	4361.9	180.7
4551.7	180.6	4607	181.6	4640	179.8	4666	180.9	4694	170.3
4714	166.2	4724	167.9	4744	168	4753	172.7	4770	179.4
4835	177	4904	176.6	4940	176.9	4944	176.5	4949	170.3
4967	168.5	5013	169.6	5026	169.5	5042	170.3	5057	176.7
5058	177.9	5066	178.5	5081	177.3	5096	183.2	5106	183.2
5112	178.1	5179.8	175.6	5242.1	176.4	5428.2	175.2	5546.3	173.5
5618	175.5	5860.4	174.6	5953.5	176	6087.6	173.1	6156.9	174.5
6166	174.3	6186	174.1	6189	173.8	6201	171.9	6207	167.7
6211	167.4	6216	167.9	6226	168.3	6232	169	6252	169.1
6262	169	6272	168	6282	169.3	6286	169.3	6296	169.3
6306	169	6313	168.8	6315	170.2	6319	175.2	6323	175.3
6326	175.4	6329	173.5	6422.6	187.7	6492.4	178.8	6560.4	178.2
6621.3	180.6	6666.7	179.3	6805.9	184	6860.7	183.8	6927.5	182.1
7259.7	184.6	7328.6	190.1	7393.8	188.5	7589.1	189.8	7744	189.4
7819.7	190.7	7977.7	192.3	8089.1	192.4	8305.4	193	8447	189.9
8571.2	191.9	8646.3	192.3	8757.1	190.4	8852.5	192.2	9107.6	196.1
9230.6	196	9361.5	194.2	9602.1	194.2	9695.7	198	9770.9	197.5
9886.6	198.3	10011.4	196.4	10192.6	198.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3222	.15	4666	.045	5106	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4666	5106	655.02	430.02	15.03	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3222	4666	182	F
5106	10192.6	184	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 1085

INPUT
Description: 1085

Station Elevation Data num= 70

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3222	200	3387	187.2	3393	188.5	3430.4	184.2	3505.5	185.9
3613	186.1	3837.2	189.7	4115.7	182.3	4229.8	180.5	4361.9	180.7
4551.7	180.6	4607	181.6	4640	179.8	4666	180.9	4694	170.3
4714	166.2	4967	168.5	5013	169.5	5042	170.3	5057	176.7
5058	177.9	5066	178.5	5081	177.3	5096	183.2	5106	183.2
5112	178.1	5179.8	175.6	5242.1	176.4	5428.2	175.2	5546.3	173.5
5618	175.5	5860.4	174.6	5953.5	176	6087.6	173.1	6156.9	174.5
6166	174.3	6186	174.1	6189	173.8	6201	171.9	6207	167.7
6211	167.4	6216	167.9	6226	168.3	6232	169	6252	169.1
6262	169	6272	168	6282	169.3	6286	169.3	6296	169.3
6306	169	6313	168.8	6315	170.2	6319	175.2	6323	175.3
6326	175.4	6329	173.5	6422.6	187.7	6492.4	178.8	6560.4	178.2
6621.3	180.6	6666.7	179.3	6805.9	184	6860.7	183.8	6927.5	182.1
7259.7	184.6	7328.6	190.1	7393.8	188.5	7589.1	189.8	7744	189.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3222	.15	4666	.045	5106	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4666	5106	5	5	5	.4	.6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3222	4666	184.7	F
5106	7744	185	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 1080

INPUT
Description: 1080

Station Elevation Data num= 70

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4205	188.1	4475	182.4	4477	188.5	4672	183.2	4862	181.5
4863	184.1	4865	184.2	4865.7	176.5	4865.8	174.6	4880	173.9
4974	173.8	4998	173.1	5072	173.6	5097	174.1	5115	174.3
5123	174.3	5135.6	174.8	5135.7	176.5	5135.8	184.2	5138.3	184.2
5157	182.6	5165	182.7	5175	177	5205	175.3	5245	175.2
5333	176.2	5483	174.8	5583	175.3	5605	174.2	5733.7	174.8
5807.3	174.4	6067	176	6116.7	175.9	6174.1	174.2	6230.9	174.6
6241	174.9	6261.3	174.2	6273	173.8	6280	170.1	6282	168.2
6285	167.5	6295	167.8	6301	168.5	6306	169.2	6316	169.1
6326	169.2	6336	169.3	6346	169.4	6356	169.3	6361	169.1
6369	167.9	6372	168.1	6375.5	170.2	6376	175.1	6382.5	175.2
6385	175	6391	173.4	6397	173.4	6402	174.9	6411.9	174.7
6515.2	182.3	6651.7	177.8	6721.8	180.1	6842.2	179.5	6904.5	184.4
6990.3	182.2	7064.4	183.3	7132.56	184.25	7204.18	185.83	7222.86	186.93

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4205	.15	4865	.025	5138.3	.15

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4865 5138.3 5 5 5 .4 .6
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4205	4865	184.5	F
5138.3	7222.86	184.86	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 1075

INPUT
Description: 1075
This is a REPEATED section.

Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2554.6	200	2754.6	182.3	3561.1	183.3	4037.4	188.1	4151.9	177.9
4420.9	172	4434	172	4534	171.3	4584	170.6	4634	171.1
4684	170.4	4734	178.1	4784	177.7	4844	174.9	4884	176.1
4914	174	4928	172.5	4939	170.2	4939.1	169.7	4941	168.1
4945	168.2	4951	166.5	4971	164.7	4981	164.7	4991	163.7
5001	163.7	5011	166.2	5031	166.8	5041	167.4	5051	167.9
5056	168.2	5061	169.7	5061	170	5067	171.3	5076	176.5
5102	175.3	5112	175.7	5132	175.5	5172	173.7	5237	174.3
5299.7	174	5632.7	175.1	5682	176.1	5834.5	176	5912.3	173.9
5921	174.1	5940.7	174.5	5955	173.9	5960	170.2	5961	168.2
5965	167.2	5967	166.9	5977	167.4	5987	168.2	5997	168.4
6007	168	6012	167.9	6015	167.5	6017	167.6	6023	170.1
6026	172	6033	172.7	6034	170.1	6041	169.8	6044	169.5
6047	170	6048	170.1	6054.5	171.2	6061	174.3	6081	174.4
6159.2	179.5	6220	180.6	6333.5	178.1	6489	176.3	6530.2	183.7
6657.7	182.2	6797.5	184.5	7038.9	183.8	7173.6	186.7		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2554.6	.15	4884	.04	5076	.15

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4884 5076 160.02 304.99 24.99 .4 .6

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 770

INPUT
Description: 770

Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2554.6	200	2754.6	182.3	3561.1	183.3	4037.4	188.1	4151.9	177.9
4420.9	172	4434	172	4534	171.3	4584	170.6	4634	171.1
4684	170.4	4734	178.1	4784	177.7	4844	174.9	4884	176.1
4914	174	4928	172.5	4939	170.2	4939.1	169.7	4941	168.1
4945	168.2	4951	166.5	4971	164.7	4981	164.7	4991	163.7
5001	163.7	5011	166.2	5031	166.8	5041	167.4	5051	167.9
5056	168.2	5061	169.7	5061	170	5067	171.3	5076	176.5
5102	175.3	5112	175.7	5132	175.5	5172	173.7	5237	174.3

5299.7	174	5632.7	175.1	5682	176.1	5834.5	176	5912.3	173.9
5921	174.1	5940.7	174.5	5955	173.9	5960	170.2	5961	168.2
5965	167.2	5967	166.9	5977	167.4	5987	168.2	5997	168.4
6007	168	6012	167.9	6015	167.5	6017	167.6	6023	170.1
6026	172	6033	172.7	6034	170.1	6041	169.8	6044	169.5
6047	170	6048	170.1	6054.5	171.2	6061	174.3	6081	174.4
6159.2	179.5	6220	180.6	6333.5	178.1	6489	176.3	6530.2	183.7
6657.7	182.2	6797.5	184.5	7038.9	183.8	7173.6	186.7		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2554.6	.07	4884	.04	5076	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4884	5076	415.04	769.92	289.92	.1	.3

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 0

INPUT
Description: 0 Confluence with Pequannock River
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2554.6	200	2654.6	185.2	2754.6	182.3	2814.6	182.2	2852.1	180.3
2897.9	182.4	2979.2	182.3	3363.9	185.7	3450.5	184.4	3493.2	184.3
3561.1	183.3	3898.9	184.6	4002.1	188.1	4037.4	188.1	4084.3	185.8
4115.5	180	4151.9	177.9	4176	177.9	4240.2	175.4	4291.8	173.8
4334.1	173	4371.1	172.3	4420.9	172	4452.4	172.6	4506	178.8
4582.2	187	4645.7	186.2	4721.3	182.6	4812.4	175.1	4876.5	176.3
4904.4	182.1	4918	182.4	4934	171.9	4937	171.7	4943	169.6
4945	165.5	4962	164.5	4972	164.6	4982	164.7	4992	164.6
5002	165.6	5012	166.1	5022	166.2	5032	166	5042	166.7
5049	166.9	5052	167.5	5057	169.6	5058	170.4	5074	171.7
5076	175.2	5082	175.3	5085	173.8	5101	174	5107	175.3
5114	175.7	5126.2	176.1	5200	177	5268.8	172.4	5323.6	172.4
5419.6	174.3	5468.1	171	5498.4	171	5535.1	177.8	5586.8	175.9
5615.2	177.7	5685.2	182.3	5759.5	184.4	5844.8	182.4	5927.8	184.4
6023.7	182.7	6125.6	183.6	6208.4	184.1	6272.6	187.8	6378	188.3
6466.4	188.8	6622.5	189.2	6679	189.2	6773.3	188.9	6874.2	191.4
7017.4	192.1	7109.2	192.1	7200.1	193.4	7289.1	190	7321.9	189.4
7407.5	191.9	7531.4	192.6	7633.6	190.9	7729.3	192.2	7859.7	194.1
8015.4	196.1	8151.2	196.1	8354	194.9	8619.9	198	8687	196.7
8804.3	198.3	8922	196.3	9137.4	198.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2554.6	.065	4918	.033	5082	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4918	5082	790.08	790.08	790.08	.1	.3

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: -790

INPUT
Description: 790 Pompton River

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2717.8	200.3	2809.1	187.3	3029.2	180.4	3037.3	178.6	3076	182
3358.3	180.4	3491.7	183.1	3671	183.9	3959.7	179.7	4007.3	180.7
4107.2	182.2	4153.3	173.9	4174.5	173.9	4194.5	177.9	4217.9	176.8
4292.9	180.4	4383.9	180	4483.9	179.9	4681.2	186.6	4762.5	188.1
4777.2	188.8	4792.5	186.8	4812.5	187.2	4812.6	187.7	4816.1	188
4839.5	180.3	4839.6	180.3	4842.2	180.4	4875.9	167.3	4877	167
4877.1	167.1	4880.9	166.5	4882	167.2	4882.1	167.2	4887.9	168.5
4918.6	168.7	4936.7	166.9	4942.8	166.2	4965	161.5	4965.1	161.5
4967.3	161.4	4969	162	4969.1	162	4979.8	164.1	5029.8	163.4
5038.6	166.9	5043.7	165.8	5052.2	166.4	5053	166.8	5053.1	166.8
5057	167.3	5057.1	167.3	5057.2	167.2	5067	168.7	5133.2	169.6
5139	168.5	5139.1	168.5	5139.5	168.2	5143	168.5	5143.1	168.5
5150.3	169	5177.6	180.4	5180.8	180.4	5182.5	181.5	5182.6	181.5
5191	185.1	5201.8	186.7	5221.8	186.7	5231.9	187.8	5295.6	185.9
5347.8	185.2	5426	185.1	5509.2	183.9	5574.3	184	5650.4	184.3
5739.1	183	5841.9	183	5927.1	183.8	5994.4	185	6068.2	185.2
6136.3	183.4	6220.9	181.7	6308.3	180.9	6393.9	180.9	6475.9	181.4
6553.9	181.2	6676.2	182.4	6999.5	182.3	7093.7	182.4	7266.9	181.2
7414.3	180.9	7515.5	180.4	7636.1	181.9	7867.1	182.6	7965.6	183.1
8142.1	192.3	8201.8	193.4	8339	193.6	8571.5	193.7	8785.3	197

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2717.8	.065	4777.2	.027	5201.8	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4777.2	5201.8	10	10	10	.1	.3

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: -800

INPUT
Description: 800 Pompton River

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2717.8	200.3	2809.1	187.3	3029.2	180.4	3037.3	178.6	3076	182
3358.3	180.4	3491.7	183.1	3671	183.9	3959.7	179.7	4007.3	180.7
4107.2	182.2	4153.3	173.9	4174.5	173.9	4194.5	177.9	4217.9	176.8
4292.9	180.4	4383.9	180	4483.9	179.9	4681.2	186.6	4762.5	188.1
4777.2	188.8	4792.5	186.8	4812.5	187.2	4812.6	187.7	4816.1	188
4839.5	180.3	4839.6	180.3	4842.2	180.4	4875.9	168.5	5067	168.5
5133.2	169.6	5139.1	168.5	5139.5	168.2	5143	168.5	5143.1	168.5
5150.3	169	5177.6	180.4	5180.8	180.4	5182.5	181.5	5182.6	181.5
5191	185.1	5201.8	186.7	5221.8	186.7	5231.9	187.8	5295.6	185.9
5347.8	185.2	5426	185.1	5509.2	183.9	5574.3	184	5650.4	184.3
5739.1	183	5841.9	183	5927.1	183.8	5994.4	185	6068.2	185.2
6136.3	183.4	6220.9	181.7	6308.3	180.9	6393.9	180.9	6475.9	181.4
6553.9	181.2	6676.2	182.4	6999.5	182.3	7093.7	182.4	7266.9	181.2
7414.3	180.9	7515.5	180.4	7636.1	181.9	7867.1	182.6	7965.6	183.1
8142.1	192.3	8201.8	193.4	8339	193.6	8571.5	193.7	8785.3	197

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2717.8	.065	4777.2	.027	5201.8	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4777.2	5201.8	20	9	1	.1	.3

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: -809

INPUT
Description: 810 Pompton River
JACKSON AVE. BRIDGE

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2717.8	200.3	2809.1	187.3	3029.2	180.4	3037.3	178.6	3076	182
3358.3	180.4	3491.7	183.1	3671	183.9	3959.7	179.7	4007.3	180.7
4107.2	182.2	4153.3	173.9	4174.5	173.9	4194.5	177.9	4217.9	176.8
4292.9	180.4	4383.9	180	4483.9	179.9	4681.2	186.6	4762.5	188.1
4777.2	188.8	4792.5	186.8	4812.5	187.2	4812.6	187.7	4816.1	188
4839.5	180.3	4839.6	180.3	4842.2	180.4	4875.9	167.3	4877	167
4877.1	167.1	4880.9	166.5	4882	167.2	4882.1	167.2	4887.9	168.5
4918.6	168.7	4936.7	166.9	4942.8	166.2	4965	161.5	4965.1	161.5
4967.3	161.4	4969	162	4969.1	162	4979.8	164.1	5029.8	163.4
5038.6	166.9	5043.7	165.8	5052.2	166.4	5053	166.8	5053.1	166.8
5057	167.3	5057.1	167.3	5057.2	167.2	5067	168.7	5133.2	169.6
5139	168.5	5139.1	168.5	5139.5	168.2	5143	168.5	5143.1	168.5
5150.3	169	5177.6	180.4	5180.8	180.4	5182.5	181.5	5182.6	181.5
5191	185.1	5201.8	186.7	5221.8	186.7	5231.9	187.8	5295.6	185.9
5347.8	185.2	5426	185.1	5509.2	183.9	5574.3	184	5650.4	184.3
5739.1	183	5841.9	183	5927.1	183.8	5994.4	185	6068.2	185.2
6136.3	183.4	6220.9	181.7	6308.3	180.9	6393.9	180.9	6475.9	181.4
6553.9	181.2	6676.2	182.4	6999.5	182.3	7093.7	182.4	7266.9	181.2
7414.3	180.9	7515.5	180.4	7636.1	181.9	7867.1	182.6	7965.6	183.1
8142.1	192.3	8201.8	193.4	8339	193.6	8571.5	193.7	8785.3	197

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2717.8	.065	4777.2	.027	5201.8	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4777.2	5201.8	40	82	60	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2717.8	4777.2	188.8	F
5201.8	8785.3	186.7	F

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: -850

INPUT
Description: Jackson Avenue Bridge - Bridge #1

Distance from Upstream XS = 1
Deck/Roadway Width = 80
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 71

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
2717.8	200.3	200.3	2809.1	187.3	187.3	3029.2	180.4	180.4
3037.3	178.6	178.6	3076	182	182	3358.3	180.4	180.4
3491.7	183.1	183.1	3671	183.9	183.9	3959.7	179.7	179.7

4007.3	180.7	180.7	4107.2	182.2	182.2	4153.3	173.9	173.9
4174.5	173.9	173.9	4194.5	177.9	177.9	4217.9	176.8	176.8
4292.9	180.4	180.4	4383.9	180	180	4483.9	179.9	179.9
4681.2	186.6	186.6	4762.5	188.1	188.1	4777.2	188.8	188.8
4792.5	186.8	186.8	4812.5	187.2	187.2	4812.6	187.7	187.7
4816.1	188	188	4839.5	188.2	180.3	4839.6	189	184.5
4877	188.7	185.1	4882.1	188.7	185.1	4965	189.6	185.6
4969.1	189.6	185.6	5053	189.7	185.3	5057.1	189.7	185.2
5139	189.2	184.2	5143.1	189.2	184.2	5182.5	188.5	183.4
5182.6	187.6	100	5201.8	188	100	5221.8	186.7	186.7
5231.9	187.8	187.8	5295.6	185.9	185.9	5347.8	185.2	185.2
5426	185.1	185.1	5509.2	183.9	183.9	5574.3	184	184
5650.4	184.3	184.3	5739.1	183	183	5841.9	183	183
5927.1	183.8	183.8	5994.4	185	185	6068.2	185.2	185.2
6136.3	183.4	183.4	6220.9	181.7	181.7	6308.3	180.9	180.9
6393.9	180.9	180.9	6475.9	181.4	181.4	6553.9	181.2	181.2
6676.2	182.4	182.4	6999.5	182.3	182.3	7093.7	182.4	182.4
7266.9	181.2	181.2	7414.3	180.9	180.9	7515.5	180.4	180.4
7636.1	181.9	181.9	7867.1	182.6	182.6	7965.6	183.1	183.1
8142.1	192.3	192.3	8201.8	193.4	193.4	8339	193.6	193.6
8571.5	193.7	193.7	8785.3	197	197			

Upstream Bridge Cross Section Data
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2717.8	200.3	2809.1	187.3	3029.2	180.4	3037.3	178.6	3076	182
3358.3	180.4	3491.7	183.1	3671	183.9	3959.7	179.7	4007.3	180.7
4107.2	182.2	4153.3	173.9	4174.5	173.9	4194.5	177.9	4217.9	176.8
4292.9	180.4	4383.9	180	4483.9	179.9	4681.2	186.6	4762.5	188.1
4777.2	188.8	4792.5	186.8	4812.5	187.2	4812.6	187.7	4816.1	188
4839.5	180.3	4839.6	180.3	4842.2	180.4	4875.9	167.3	4877	167
4877.1	167.1	4880.9	166.5	4882	167.2	4882.1	167.2	4887.9	168.5
4918.6	168.7	4936.7	166.9	4942.8	166.2	4965	161.5	4965.1	161.5
4967.3	161.4	4969	162	4969.1	162	4979.8	164.1	5029.8	163.4
5038.6	166.9	5043.7	165.8	5052.2	166.4	5053	166.8	5053.1	166.8
5057	167.3	5057.1	167.3	5057.2	167.2	5067	168.7	5133.2	169.6
5139	168.5	5139.1	168.5	5139.5	168.2	5143	168.5	5143.1	168.5
5150.3	169	5177.6	180.4	5180.8	180.4	5182.5	181.5	5182.6	181.5
5191	185.1	5201.8	186.7	5221.8	186.7	5231.9	187.8	5295.6	185.9
5347.8	185.2	5426	185.1	5509.2	183.9	5574.3	184	5650.4	184.3
5739.1	183	5841.9	183	5927.1	183.8	5994.4	185	6068.2	185.2
6136.3	183.4	6220.9	181.7	6308.3	180.9	6393.9	180.9	6475.9	181.4
6553.9	181.2	6676.2	182.4	6999.5	182.3	7093.7	182.4	7266.9	181.2
7414.3	180.9	7515.5	180.4	7636.1	181.9	7867.1	182.6	7965.6	183.1
8142.1	192.3	8201.8	193.4	8339	193.6	8571.5	193.7	8785.3	197

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2717.8	.065	4777.2	.027	5201.8	.065

Bank Sta: Left	Right	Coeff Contr.	Expan.
4777.2	5201.8	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2717.8	4777.2	188.8	F
5201.8	8785.3	186.7	F

Downstream Deck/Roadway Coordinates
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4792.5	186.8	186.8	4812.5	187.2	187.2	4812.6	187.7	185
4816.1	188	100	4839.5	188.2	180.3	4839.6	189	184.5
4877	188.7	185.1	4882.1	188.7	185.1	4965	189.6	185.6

4969.1	189.6	185.6	5053	189.7	185.3	5057.1	189.7	185.2
5139	189.2	184.2	5143.1	189.2	184.2	5182.5	188.5	183.4
5182.6	187.6	100	5201.8	188	100	5221.8	186.7	186.7
5231.9	187.8	187.8	5295.6	185.9	185.9	5347.8	185.2	185.2

Downstream Bridge Cross Section Data
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2797.7	200	2940.6	184.2	3032.7	182.3	3120.2	178.3	3129.2	178.3
3143	181.3	3164.5	182	3219.9	181	3447.3	179.7	3728.6	183.4
4020.7	179.8	4124	182.8	4179.2	182.3	4214.3	173.9	4224.1	173.9
4239.8	178.2	4260.7	175.8	4350	183.3	4389.1	181.1	4448	181.8
4626.1	181	4674.8	180.8	4757.2	183.9	4788.3	187.9	4799.5	187.4
4809.6	187	4829.6	187.7	4849.1	180.3	4853.3	180.3	4881.2	168.9
4891.8	168.2	4916.4	168.6	4927.9	167.9	4936.2	168.4	4946.5	166.9
4952	166.1	4959.3	164.5	4964.3	164	4969.3	164	4972.3	163.2
4976.3	162.4	4983.3	162.3	4993.3	162.2	5003.3	161.6	5013.3	160.7
5023	159.7	5033	159.7	5038	161.2	5043.3	162.6	5048.3	164.8
5051.4	165.6	5054.2	166.9	5064.6	168.4	5084.5	168.5	5111.9	169.1
5139	169.7	5161.9	169.2	5189	180.3	5194	180.4	5215.3	187.9
5235.3	187.9	5252.4	189.2	5423.6	184.3	5667.8	184.7	5746.3	183.4
5790.1	184.1	5819.9	183.5	5874.7	183.5	5964.6	183.6	6008.2	184.2
6053.3	185	6102.9	185.4	6167.1	184.2	6236.3	182.3	6313.8	180.9
6348.1	180.6	6385.1	181	6449.6	182	6513.9	181.4	6584.2	182
6718	182.6	6876.3	184	6985.9	184.1	7084.9	182.7	7228.4	182
7304.2	181.4	7427.8	180.3	7507	175.5	7539	175.5	7606.9	181.7
7779.1	181.5	7923.6	183.2	8088.1	186.8	8201.2	193.4	8268.7	192.7
8391.1	193.6	8517.8	193.7	8658.6	196.1	8852.8	197.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2797.7	.065	4829.6	.027	5252.4	.065

Bank Sta: Left	Right	Coeff Contr.	Expan.
4829.6	5252.4	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2797.7	4829.6	187.7	F
5252.4	8852.8	189.2	F

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 179
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 4

Pier Data
Pier Station Upstream= 4879.5 Downstream= 4879.5
Upstream num= 2

Width	Elev	Width	Elev
5	160	5	188

Downstream num= 2

Width	Elev	Width	Elev
5	160	5	188

Pier Data
Pier Station Upstream= 4967 Downstream= 4967
Upstream num= 2

Width	Elev	Width	Elev

```
       4     160       4     188
Downstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188

Pier Data
Pier Station     Upstream=    5055    Downstream=    5055
Upstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188
Downstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188

Pier Data
Pier Station     Upstream=    5141    Downstream=    5141
Upstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188
Downstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.6
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =.8164966
           Max Low Cord                =   185.5

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: -891

INPUT
Description: 890 Pompton River
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  2797.7     200  2940.6   184.2  3032.7   182.3  3120.2   178.3  3129.2   178.3
    3143   181.3  3164.5     182  3219.9     181  3447.3   179.7  3728.6   183.4
  4020.7   179.8    4124   182.8  4179.2   182.3  4214.3   173.9  4224.1   173.9
  4239.8   178.2  4260.7   175.8    4350   183.3  4389.1   181.1    4448   181.8
  4626.1     181  4674.8   180.8  4757.2   183.9  4788.3   187.9  4799.5   187.4
  4809.6     187  4829.6   187.7  4849.1   180.3  4853.3   180.3  4881.2   168.9
  4891.8   168.2  4916.4   168.6  4927.9   167.9  4936.2   168.4  4946.5   166.9
    4952   166.1  4959.3   164.5  4964.3     164  4969.3     164  4972.3   163.2
  4976.3   162.4  4983.3   162.3  4993.3   162.2  5003.3   161.6  5013.3   160.7
```

5023	159.7	5033	159.7	5038	161.2	5043.3	162.6	5048.3	164.8
5051.4	165.6	5054.2	166.9	5064.6	168.4	5084.5	168.5	5111.9	169.1
5139	169.7	5161.9	169.2	5189	180.3	5194	180.4	5215.3	187.9
5235.3	187.9	5252.4	189.2	5423.6	184.3	5667.8	184.7	5746.3	183.4
5790.1	184.1	5819.9	183.5	5874.7	183.5	5964.6	183.6	6008.2	184.2
6053.3	185	6102.9	185.4	6167.1	184.2	6236.3	182.3	6313.8	180.9
6348.1	180.6	6385.1	181	6449.6	182	6513.9	181.4	6584.2	182
6718	182.6	6876.3	184	6985.9	184.1	7084.9	182.7	7228.4	182
7304.2	181.4	7427.8	180.3	7507	175.5	7539	175.5	7606.9	181.7
7779.1	181.5	7923.6	183.2	8088.1	186.8	8201.2	193.4	8268.7	192.7
8391.1	193.6	8517.8	193.7	8658.6	196.1	8852.8	197.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2797.7	.065	4829.6	.027	5252.4	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4829.6	5252.4	10	10	10	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2797.7	4829.6	187.7	F
5252.4	8852.8	189.2	F

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: -900

INPUT
Description: 890 Pompton River

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2797.7	200	2940.6	184.2	3032.7	182.3	3120.2	178.3	3129.2	178.3
3143	181.3	3164.5	182	3219.9	181	3447.3	179.7	3728.6	183.4
4020.7	179.8	4124	182.8	4179.2	182.3	4214.3	173.9	4224.1	173.9
4239.8	178.2	4260.7	175.8	4350	183.3	4389.1	181.1	4448	181.8
4626.1	181	4674.8	180.8	4757.2	183.9	4788.3	187.9	4799.5	187.4
4809.6	187	4829.6	187.7	4849.1	180.3	4853.3	180.3	4881.2	168.9
4891.8	168.2	4916.4	168.6	4927.9	167.9	4936.2	168.4	4946.5	166.9
4952	166.1	4959.3	164.5	4964.3	164	4969.3	164	4972.3	163.2
4976.3	162.4	4983.3	162.3	4993.3	162.2	5003.3	161.6	5013.3	160.7
5023	159.7	5033	159.7	5038	161.2	5043.3	162.6	5048.3	164.8
5051.4	165.6	5054.2	166.9	5064.6	168.4	5084.5	168.5	5111.9	169.1
5139	169.7	5161.9	169.2	5189	180.3	5194	180.4	5215.3	187.9
5235.3	187.9	5252.4	189.2	5423.6	184.3	5667.8	184.7	5746.3	183.4
5790.1	184.1	5819.9	183.5	5874.7	183.5	5964.6	183.6	6008.2	184.2
6053.3	185	6102.9	185.4	6167.1	184.2	6236.3	182.3	6313.8	180.9
6348.1	180.6	6385.1	181	6449.6	182	6513.9	181.4	6584.2	182
6718	182.6	6876.3	184	6985.9	184.1	7084.9	182.7	7228.4	182
7304.2	181.4	7427.8	180.3	7507	175.5	7539	175.5	7606.9	181.7
7779.1	181.5	7923.6	183.2	8088.1	186.8	8201.2	193.4	8268.7	192.7
8391.1	193.6	8517.8	193.7	8658.6	196.1	8852.8	197.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2797.7	.065	4829.6	.027	5252.4	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4829.6	5252.4	0	0	0	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

2797.7	4829.6	187.7	F
5252.4	8852.8	189.2	F

SUMMARY OF MANNING'S N VALUES

River:Ramapo River

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
Reach-1	34312	.055	.035	.055						
Reach-1	32867	.055	.035	.055						
Reach-1	32750	.055	.035	.055						
Reach-1	32710	.055	.035	.055						
Reach-1	32690	Bridge								
Reach-1	32670	.055	.035	.055						
Reach-1	32100	.08	.04	.055	.035	.08	.03	.07	.045	.08
Reach-1	31640	.08	.04	.055	.035	.08				
Reach-1	31220	.08	.04	.055	.035	.08				
Reach-1	30756	.07	.04	.055	.035	.07				
Reach-1	30300	.055	.035	.055						
Reach-1	29622	.055	.035	.055						
Reach-1	28480	.055	.035	.055						
Reach-1	27992	.05	.032	.05						
Reach-1	27964.5	Bridge								
Reach-1	27937	.05	.034	.05						
Reach-1	27620	.04	.03	.05						
Reach-1	27272	.04	.03	.05						
Reach-1	27047	.04	.03	.05						
Reach-1	26812	.04	.03	.05						
Reach-1	26762	.04	.03	.05						
Reach-1	26721	.04	.03	.05						
Reach-1	26632	.07	.045	.07						
Reach-1	26533	.07	.045	.07						
Reach-1	26157	.07	.045	.07						

Reach-1	25890	.07	.045	.07		
Reach-1	25657	.07	.045	.07		
Reach-1	25420	.07	.045	.07		
Reach-1	25165	.06	.045	.06		
Reach-1	25145	.2	.025	.1		
Reach-1	25130	.055	.04	.055		
Reach-1	25087	.055	.04	.055		
Reach-1	24950	.055	.04	.055		
Reach-1	24822	.055	.04	.055		
Reach-1	24735	.2	.04	.055	.04	.055
Reach-1	24690	.2	.04	.055	.04	.055
Reach-1	24477	.2	.048	.08		
Reach-1	24405	.2	.048	.08		
Reach-1	24350	.2	.048	.08		
Reach-1	24210	.2	.048	.08		
Reach-1	24032	.2	.048	.08		
Reach-1	23860	.2	.048	.08		
Reach-1	23715	.2	.048	.08		
Reach-1	23600	.2	.048	.08		
Reach-1	23440	.2	.048	.08		
Reach-1	23300	.2	.048	.07		
Reach-1	23120	.2	.048	.07		
Reach-1	23090	.2	.048	.07		
Reach-1	23027	.07	.042	.1		
Reach-1	23005	.07	.03	.06		
Reach-1	22990	.06	.028	.06		
Reach-1	22930	.06	.028	.06		
Reach-1	22820	.06	.028	.06		
Reach-1	22575	.06	.028	.06		
Reach-1	22365	.06	.028	.06		
Reach-1	22173	.06	.028	.06		

Reach-1	22110	.06	.03	.07			
Reach-1	22093.5	Bridge					
Reach-1	22077	.06	.037	.06			
Reach-1	21957	.7	.043	.09			
Reach-1	21825	.9	.075	.037	.09	.9	
Reach-1	21600	.9	.075	.037	.09	.9	
Reach-1	21417	.9	.075	.038	.09	.9	
Reach-1	21152	.9	.075	.038	.09	.9	
Reach-1	20930	.9	.075	.037	.09	.9	
Reach-1	20700	.9	.075	.037	.09	.9	
Reach-1	20495	.9	.075	.04	.065	.035	.09 .9
Reach-1	20348	.9	.07	.04	.06	.035	.075 .9
Reach-1	20332	.9	.075	.04	.065	.035	.075 .9
Reach-1	20330	.9	.075	.04	.065	.035	.075 .9
Reach-1	20070	.9	.075	.04	.065	.035	.075 .9
Reach-1	19810	.9	.075	.04	.065	.035	.075 .9
Reach-1	19720	.075	.043	.1			
Reach-1	19425	.075	.043	.1			
Reach-1	19280	.075	.043	.1			
Reach-1	19071	.075	.043	.1			
Reach-1	18916	.075	.043	.1			
Reach-1	18682	.075	.043	.1			
Reach-1	18447	.075	.043	.1			
Reach-1	18280	.075	.043	.1			
Reach-1	17884	.075	.043	.1			
Reach-1	17467	.075	.043	.1			
Reach-1	17160	.075	.043	.1			
Reach-1	16750	.075	.043	.1			
Reach-1	16657	.075	.043	.1			
Reach-1	16630.5	Bridge					
Reach-1	16605	.075	.043	.1			
Reach-1	16186	.07	.043	.07			

Reach-1	15696	.07	.043	.07		
Reach-1	15215	.07	.043	.07		
Reach-1	14725	.07	.043	.07		
Reach-1	14320	.07	.043	.07		
Reach-1	13805	.07	.043	.07		
Reach-1	13392	.07	.043	.07		
Reach-1	12845	.07	.043	.07		
Reach-1	12300	.07	.043	.07		
Reach-1	11812	.07	.043	.07		
Reach-1	11324	.07	.043	.07		
Reach-1	11022	.07	.043	.07		
Reach-1	10930	.07	.043	.07		
Reach-1	10827	.07	.043	.07		
Reach-1	10753	.07	.043	.07		
Reach-1	10708	.07	.043	.07		
Reach-1	10657	.07	.043	.07		
Reach-1	10612	.07	.043	.07		
Reach-1	10562	.07	.043	.07		
Reach-1	10550	.07	.02	.07		
Reach-1	10541	.07	.03	.07		
Reach-1	10540	Inl Struct				
Reach-1	10530	.07	.03	.07		
Reach-1	10488	.05	.028	.05		
Reach-1	10385	.07	.03	.07		
Reach-1	10270	.07	.03	.07		
Reach-1	10225	.07	.035	.07		
Reach-1	10182	.07	.035	.07		
Reach-1	10127	.15	.035	.15		
Reach-1	10086	.2	.04	.03	.06	.2
Reach-1	10053.5	Bridge				
Reach-1	10022	.15	.03	.15		

Reach-1	9580	.065	.033	.07
Reach-1	8750	.065	.05	.065
Reach-1	7955	.2	.045	.5
Reach-1	7600	.2	.045	.5
Reach-1	7490	.2	.045	.5
Reach-1	7471	Bridge		
Reach-1	7452	.2	.045	.5
Reach-1	6800	.2	.045	.5
Reach-1	6055	.2	.045	.15
Reach-1	5685	.5	.045	.15
Reach-1	4785	.5	.045	.15
Reach-1	4375	.5	.045	.15
Reach-1	3780	.5	.045	.15
Reach-1	3215	.5	.045	.15
Reach-1	2525	.5	.045	.15
Reach-1	1515	.15	.045	.15
Reach-1	1085	.15	.045	.15
Reach-1	1080	.15	.025	.15
Reach-1	1075	.15	.04	.15
Reach-1	770	.07	.04	.06
Reach-1	0	.065	.033	.065
Reach-1	-790	.065	.027	.065
Reach-1	-800	.065	.027	.065
Reach-1	-809	.065	.027	.065
Reach-1	-850	Bridge		
Reach-1	-891	.065	.027	.065
Reach-1	-900	.065	.027	.065

SUMMARY OF REACH LENGTHS

River: Ramapo River

Reach	River Sta.	Left	Channel	Right
Reach-1	34312	1445.07	1445.07	1445.07
Reach-1	32867	117	117	117
Reach-1	32750	40	40	40
Reach-1	32710	40	40	40
Reach-1	32690	Bridge		
Reach-1	32670	559.92	570	600
Reach-1	32100	450	460	570
Reach-1	31640	50.04	420.03	414.99
Reach-1	31220	540	464	520
Reach-1	30756	675	456	350
Reach-1	30300	689.92	678.02	570.08
Reach-1	29622	1055.01	1141.95	1109.98
Reach-1	28480	480	488	490
Reach-1	27992	55	55	55
Reach-1	27964.5	Bridge		
Reach-1	27937	310.03	317.03	319.97
Reach-1	27620	339.99	347.97	350
Reach-1	27272	225	225	225
Reach-1	27047	170	235	300
Reach-1	26812	25	50	55
Reach-1	26762	40	41	45
Reach-1	26721	130	89	50
Reach-1	26632	90	99	120
Reach-1	26533	400	376	340
Reach-1	26157	279.96	267	240
Reach-1	25890	350	233	180
Reach-1	25657	270	237	15
Reach-1	25420	180	255	6.96
Reach-1	25165	15	20	7
Reach-1	25145	10	15	7
Reach-1	25130	10	43	90
Reach-1	25087	150	137.01	120
Reach-1	24950	179.01	128.01	240
Reach-1	24822	1	87	650
Reach-1	24735	1	45	50
Reach-1	24690	1	213	525
Reach-1	24477	10	72	72
Reach-1	24405	55	55	55
Reach-1	24350	129.99	140.01	170.01
Reach-1	24210	130	178	315
Reach-1	24032	140	172	175
Reach-1	23860	135	144.99	140.01
Reach-1	23715	159.99	114.99	155.01
Reach-1	23600	370	160	145
Reach-1	23440	.99	140.01	159.99
Reach-1	23300	180	180	180
Reach-1	23120	30	30	30
Reach-1	23090	63	63	63
Reach-1	23027	22	22	22
Reach-1	23005	15	15	15
Reach-1	22990	35	60	80
Reach-1	22930	150	110.01	189.99
Reach-1	22820	240	245	150
Reach-1	22575	210	210	160
Reach-1	22365	230	192	20
Reach-1	22173	115	63	40
Reach-1	22110	33	33	33
Reach-1	22093.5	Bridge		
Reach-1	22077	105	120	80.01
Reach-1	21957	159.99	132	50.01
Reach-1	21825	250	225	90

Reach-1	21600		260	183	70
Reach-1	21417		110.1	264.9	200.1
Reach-1	21152		50	222	270
Reach-1	20930		180	230	280
Reach-1	20700		290	205	150
Reach-1	20495		148.05	147	157.95
Reach-1	20348		16	16	16
Reach-1	20332		2	2	2
Reach-1	20330		260.1	260.1	260.1
Reach-1	20070		159.9	260.1	245.1
Reach-1	19810		180	90	385
Reach-1	19720		435	294.9	159.9
Reach-1	19425		130.05	145.05	205.05
Reach-1	19280		475	209	180
Reach-1	19071		150.08	155.04	304.96
Reach-1	18916		245	234	170
Reach-1	18682		260	235	285
Reach-1	18447		150	167	310
Reach-1	18280		435.2	396	430
Reach-1	17884		419.85	417.15	419.85
Reach-1	17467		299.95	306.95	540.05
Reach-1	17160		409.95	409.95	409.95
Reach-1	16750		93	93	93
Reach-1	16657		52	52	52
Reach-1	16630.5	Bridge			
Reach-1	16605		440.1	418.95	450
Reach-1	16186		505	490	510
Reach-1	15696		505	481	875
Reach-1	15215		490	490	490
Reach-1	14725		405	405	405
Reach-1	14320		310.2	514.8	745.25
Reach-1	13805		414.9	413.1	414.9
Reach-1	13392		550	547.25	550
Reach-1	12845		595.1	545.05	499.95
Reach-1	12300		475	488	500
Reach-1	11812		655	488	375
Reach-1	11324		374.85	302.05	260.05
Reach-1	11022		130	92	55
Reach-1	10930		135	102.96	65.04
Reach-1	10827		104.96	74	44.96
Reach-1	10753		60	45	30
Reach-1	10708		46.98	51	49.98
Reach-1	10657		52	45	45
Reach-1	10612		70	50	70
Reach-1	10562		12	12	12
Reach-1	10550		9	9	9
Reach-1	10541		11	11	11
Reach-1	10540	Inl Struct			
Reach-1	10530		42	42	42
Reach-1	10488		102.96	102.96	102.96
Reach-1	10385		120	114.96	110.04
Reach-1	10270		45	45	45
Reach-1	10225		50	43	40
Reach-1	10182		40.02	55.02	64.98
Reach-1	10127		41	41	41
Reach-1	10086		64	64	64
Reach-1	10053.5	Bridge			
Reach-1	10022		19.98	441.99	700.02
Reach-1	9580		770.1	829.94	819.91
Reach-1	8750		830.08	795.04	680
Reach-1	7955		390	355.04	330
Reach-1	7600		110.01	110.01	110.01
Reach-1	7490		38	38	38

Reach-1	7471	Bridge		
Reach-1	7452	650.02	651.98	479.92
Reach-1	6800	690	744.9	799.95
Reach-1	6055	380	370	360
Reach-1	5685	1585.08	900	730.08
Reach-1	4785	270	410.04	950.04
Reach-1	4375	300	595.08	800.04
Reach-1	3780	320.04	565.08	500.04
Reach-1	3215	930.02	689.92	210
Reach-1	2525	1185.03	1010.1	460.11
Reach-1	1515	655.02	430.02	15.03
Reach-1	1085	5	5	5
Reach-1	1080	5	5	5
Reach-1	1075	160.02	304.99	24.99
Reach-1	770	415.04	769.92	289.92
Reach-1	0	790.08	790.08	790.08
Reach-1	-790	10	10	10
Reach-1	-800	20	9	1
Reach-1	-809	40	82	60
Reach-1	-850	Bridge		
Reach-1	-891	10	10	10
Reach-1	-900	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Ramapo River

Reach	River Sta.		Contr.	Expan.
Reach-1	34312		.3	.5
Reach-1	32867		.3	.5
Reach-1	32750		.3	.5
Reach-1	32710		.3	.5
Reach-1	32690	Bridge		
Reach-1	32670		.3	.5
Reach-1	32100		.1	.3
Reach-1	31640		.1	.3
Reach-1	31220		.1	.3
Reach-1	30756		.1	.3
Reach-1	30300		.1	.3
Reach-1	29622		.1	.3
Reach-1	28480		.3	.5
Reach-1	27992		.3	.5
Reach-1	27964.5	Bridge		
Reach-1	27937		.3	.5
Reach-1	27620		.1	.3
Reach-1	27272		.1	.3
Reach-1	27047		.1	.3
Reach-1	26812		.1	.3
Reach-1	26762		.4	.6
Reach-1	26721		.4	.6
Reach-1	26632		.4	.6
Reach-1	26533		.1	.3
Reach-1	26157		.1	.3
Reach-1	25890		.1	.3
Reach-1	25657		.1	.3
Reach-1	25420		.1	.3
Reach-1	25165		.3	.5
Reach-1	25145		.7	.9
Reach-1	25130		.7	.9

Reach-1	25087		.3	.5
Reach-1	24950		.3	.5
Reach-1	24822		.3	.5
Reach-1	24735		.3	.5
Reach-1	24690		.3	.5
Reach-1	24477		.1	.3
Reach-1	24405		.1	.3
Reach-1	24350		.1	.3
Reach-1	24210		.1	.3
Reach-1	24032		.1	.3
Reach-1	23860		.1	.3
Reach-1	23715		.1	.3
Reach-1	23600		.1	.3
Reach-1	23440		.3	.5
Reach-1	23300		.6	.8
Reach-1	23120		.6	.8
Reach-1	23090		.6	.8
Reach-1	23027		.6	.8
Reach-1	23005		.05	.2
Reach-1	22990		.05	.2
Reach-1	22930		.05	.2
Reach-1	22820		.05	.2
Reach-1	22575		.05	.2
Reach-1	22365		.05	.2
Reach-1	22173		.05	.2
Reach-1	22110		.5	.7
Reach-1	22093.5	Bridge		
Reach-1	22077		.5	.7
Reach-1	21957		.1	.3
Reach-1	21825		.1	.3
Reach-1	21600		.1	.3
Reach-1	21417		.3	.5
Reach-1	21152		.3	.5
Reach-1	20930		.1	.3
Reach-1	20700		.1	.3
Reach-1	20495		.1	.3
Reach-1	20348		.3	.5
Reach-1	20332		.3	.5
Reach-1	20330		.3	.5
Reach-1	20070		.3	.5
Reach-1	19810		.3	.5
Reach-1	19720		.3	.5
Reach-1	19425		.3	.5
Reach-1	19280		.3	.5
Reach-1	19071		.1	.3
Reach-1	18916		.1	.3
Reach-1	18682		.1	.3
Reach-1	18447		.1	.3
Reach-1	18280		.1	.3
Reach-1	17884		.1	.3
Reach-1	17467		.1	.3
Reach-1	17160		.4	.6
Reach-1	16750		.4	.6
Reach-1	16657		.4	.6
Reach-1	16630.5	Bridge		
Reach-1	16605		.4	.6
Reach-1	16186		.1	.3
Reach-1	15696		.1	.3
Reach-1	15215		.1	.3
Reach-1	14725		.1	.3
Reach-1	14320		.3	.5
Reach-1	13805		.3	.5
Reach-1	13392		.3	.5

Reach-1	12845		.3	.5
Reach-1	12300		.3	.5
Reach-1	11812		.3	.5
Reach-1	11324		.3	.5
Reach-1	11022		.1	.3
Reach-1	10930		.1	.3
Reach-1	10827		.1	.3
Reach-1	10753		.1	.3
Reach-1	10708		.1	.3
Reach-1	10657		.1	.3
Reach-1	10612		.1	.3
Reach-1	10562		.1	.3
Reach-1	10550		.1	.3
Reach-1	10541		.1	.3
Reach-1	10540	Inl Struct		
Reach-1	10530		.05	.2
Reach-1	10488		.1	.3
Reach-1	10385		.1	.3
Reach-1	10270		.1	.3
Reach-1	10225		.1	.3
Reach-1	10182		.1	.3
Reach-1	10127		.1	.3
Reach-1	10086		.6	.8
Reach-1	10053.5	Bridge		
Reach-1	10022		.6	.8
Reach-1	9580		.1	.3
Reach-1	8750		.1	.3
Reach-1	7955		.1	.3
Reach-1	7600		.5	.7
Reach-1	7490		.5	.7
Reach-1	7471	Bridge		
Reach-1	7452		.5	.7
Reach-1	6800		.2	.4
Reach-1	6055		.2	.4
Reach-1	5685		.2	.4
Reach-1	4785		.2	.4
Reach-1	4375		.2	.4
Reach-1	3780		.2	.4
Reach-1	3215		.2	.4
Reach-1	2525		.2	.4
Reach-1	1515		.2	.4
Reach-1	1085		.4	.6
Reach-1	1080		.4	.6
Reach-1	1075		.4	.6
Reach-1	770		.1	.3
Reach-1	0		.1	.3
Reach-1	-790		.1	.3
Reach-1	-800		.1	.3
Reach-1	-809		.3	.5
Reach-1	-850	Bridge		
Reach-1	-891		.3	.5
Reach-1	-900		.3	.5

RamapoRiverPost.rep

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Ramapo River Improved
Project File : RamapoRiverPost.prj
Run Date and Time: 4/4/2012 11:17:03 AM

Project in English units

Project Description:
RAMAPO RIVER GDM @ OAKLAND, NJ
 IMPROVED CONDITION; IMPROVED CHANNEL THROUGH
POTASH LAKE
 FILE = "RAMIM1", YEAR 2040, 1 YEAR FLOW

PLAN DATA

Plan Title: Imported Geometry Modified
Plan File : g:\New Jersey Prompton Lake Dam\Pre HEC-2 Conversion\RamapoRiverPost.p05

Geometry Title: Imported Geometry Post Conditions Mod
Geometry File : g:\New Jersey Prompton Lake Dam\Pre HEC-2 Conversion\RamapoRiverPost.g04

Flow Title : USACE Improved
Flow File : g:\New Jersey Prompton Lake Dam\Pre HEC-2 Conversion\RamapoRiverPost.f02

Plan Summary Information:

Number of:	Cross Sections	= 214	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	3
	Bridges	= 8	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options
Critical depth computed only where necessary

Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: USACE Improved
Flow File : g:\New Jersey Prompton Lake Dam\Pre HEC-2 Conversion\RamapoRiverPost.f02

Flow Data (cfs)

River	Reach	RS	1-YR	10-YR	40-YR	DESIGN FLOW	100-YR	500-YR	SPF
Ramapo River	Reach-1	34312	3400	9200	15200	20600	35400	38500	
Ramapo River	Reach-1	34145	3400	9200	15200	20600	35400	38500	
Ramapo River	Reach-1	28313	3500	9400	15400	20800	35600	39000	
Ramapo River	Reach-1	20494	3700	9700	15700	21200	36100	40100	
Ramapo River	Reach-1	15696	3700	9700	15700	21200	36100	40100	
Ramapo River	Reach-1	4785	4600	14800	26300	36400	61700	70000	

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Ramapo River	Reach-1	1-YR	Critical	Critical
Ramapo River	Reach-1	10-YR	Critical	Critical
Ramapo River	Reach-1	40-YR DESIGN FLOW	Critical	Critical
Ramapo River	Reach-1	100-YR	Critical	Critical
Ramapo River	Reach-1	500-YR	Critical	Critical
Ramapo River	Reach-1	SPF	Critical	Critical

GEOMETRY DATA

Geometry Title: Imported Geometry Post Conditions Mod
Geometry File : g:\New Jersey Prompton Lake Dam\Pre HEC-2 Conversion\RamapoRiverPost.g04

CROSS SECTION

```
RIVER: Ramapo River
REACH: Reach-1            RS: 34312

INPUT
Description: 34312

Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000     250    1079     220    1134     217    1168   214.5    1202   214.5
    1234     217    1450     250

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .055    1134    .035    1234    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1134    1234           199.36  199.36  199.36             .3       .5
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 34145

INPUT
Description: 34145
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000     250    1079     220    1134     217    1168   214.5    1202   214.5
    1234     217    1450     250

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .055    1134    .035    1234    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1134    1234          2691.35 2691.35 2691.35             .3       .5
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 32867

INPUT
Description: 32867

Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000     250    1060   216.1    1085   212.5    1120   212.5    1148   216.1
    1228     220    1578     226  1592.7  240.34

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .055    1060    .035    1148    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1060    1148              117     117     117             .3       .5
Sediment Elevation = 0
```

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 32750

INPUT
Description: 32750
This is a REPEATED section.

Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4712	243.2	4723.3	242	4736.9	241.1	4737.1	241.1	4750.4	240.1
4772.5	238	4791.1	236.6	4815.6	232.9	4836.7	231.9	4854	230.2
4874.7	228.5	4891.4	227.9	4903.9	226	4909.6	226	4913.6	227.1
4913.7	225.1	4925	216	4925.1	216	4929.6	214.4	4940	213
4954.8	212.5	4962	212.3	4962.1	212.3	4965	212.5	4965.1	212.5
4971.4	213.1	4991.4	212.8	5002	212.5	5002.1	212.5	5005	212.5
5005.1	212.5	5012.7	212.9	5030.8	213.7	5042	213.2	5042.1	213.5
5045	213.1	5045.1	213.1	5047.2	213.5	5060.2	213.5	5070.4	214.2
5082	219.5	5082.1	219.5	5092.7	223.8	5092.8	227.1	5096.4	226
5107.1	226.4	5138.9	226.2	5157.2	225.9	5176.6	224.9	5184.7	226.4
5201.3	226.6	5225.8	226.6	5258.5	227.2	5289.9	239.57		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4712	.055	4913.6	.035	5092.8	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913.6	5092.8	40	40	40	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 32710

INPUT
Description: 32710
LENAPE LANE BRIDGE

Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4712	243.2	4723.3	242	4736.9	241.1	4737.1	241.1	4750.4	240.1
4772.5	238	4791.1	236.6	4815.6	232.9	4836.7	231.9	4854	230.2
4874.7	228.5	4891.4	227.9	4903.9	226	4909.6	226	4913.6	227.1
4913.7	225.1	4925	216	4925.1	216	4929.6	214.4	4940	213
4954.8	212.5	4962	212.3	4962.1	212.3	4965	212.5	4965.1	212.5
4971.4	213.1	4991.4	212.8	5002	212.5	5002.1	212.5	5005	212.5
5005.1	212.5	5012.7	212.9	5030.8	213.7	5042	213.2	5042.1	213.5
5045	213.1	5045.1	213.1	5047.2	213.5	5060.2	213.5	5070.4	214.2
5082	219.5	5082.1	219.5	5092.7	223.8	5092.8	227.1	5096.4	226
5107.1	226.4	5138.9	226.2	5157.2	225.9	5176.6	224.9	5184.7	226.4
5201.3	226.6	5225.8	226.6	5258.5	227.2	5286.53	238.09		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4712	.055	4913.6	.035	5092.8	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913.6	5092.8	40	40	40	.3	.5

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4712  4913.6     243       F
  5092.8 5286.53   227.1       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 32700

INPUT
Description: 32700
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    1000     250    1060   216.1    1085   212.5    1120   212.5    1148   216.1
    1228     220    1578     226 1594.39  241.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    1000    .055    1060    .035    1148    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          1060    1148              157     117     157             .3       .5
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 32670

INPUT
Description: 32670
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4712   243.2    4723     242  4736.9   241.1  4737.1   241.1  4750.4   240.1
  4772.5     238  4791.1   236.6  4815.6   232.9  4836.7   231.9    4854   230.2
  4874.7     229  4891.4     228  4913.6   227.4  4916.5   215.9  4920.4   214.4
  4933.9   213.2    4952   213.2  4966.2   212.3  4980.1   212.8  5000.8   213.5
  5019.7   213.2    5036   212.8  5055.9     213  5079.6   213.9  5084.4   215.6
  5092.7   223.8  5096.4   227.1  5107.1   227.1  5138.9   227.1  5167.2   226.2
  5175.7   226.7  5195.8   227.2  5217.4   227.2  5233.7   227.1    5249   227.3
  5275.1   228.3  5298.2   228.3  5315.2     230  5341.1     232  5383.2   235.7
  5399.5   236.8  5418.9   238.5  5439.6   240.2  5463.1   241.1    5499   243.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4712    .055  4913.6    .035  5096.4    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4913.6  5096.4             93.32      95     100             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
    4712  4916.4     241       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 32583
```

INPUT
Description: 32583
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4712	243.2	4723.3	242	4736.9	241.1	4737.1	241.1	4750.4	240.1
4772.5	238	4791.1	236.6	4815.6	232.9	4836.7	231.9	4854	230.2
4874.7	228.5	4891.4	227.9	4903.9	226	4909.6	226	4913.6	227.1
4913.7	225.1	4925	216	4925.1	216	4929.6	214.4	4940	213
4954.8	212.5	4962	212.3	4962.1	212.3	4965	212.5	4965.1	212.5
4971.4	213.1	4991.4	212.8	5002	212.5	5002.1	212.5	5005	212.5
5005.1	212.5	5012.7	212.9	5030.8	213.7	5042	213.2	5042.1	213.5
5045	213.1	5045.1	213.1	5047.2	213.5	5060.2	213.5	5070.4	214.2
5082	219.5	5082.1	219.5	5092.7	223.8	5092.8	227.1	5096.4	226
5107.1	226.4	5138.9	226.2	5157.2	225.9	5176.6	224.9	5184.7	226.4
5201.3	226.6	5225.8	226.6	5258.5	227.2	5357.44	239.7	5371.84	242.32

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4712	.055	4913.6	.035	5092.8	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913.6	5092.8	86.68	87.52	90	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 32543

INPUT
Description: 32543
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4712	243.2	4723.3	242	4736.9	241.1	4737.1	241.1	4750.4	240.1
4772.5	238	4791.1	236.6	4815.6	232.9	4836.7	231.9	4854	230.2
4874.7	228.5	4891.4	227.9	4903.9	226	4909.6	226	4913.6	227.1
4913.7	225.1	4925	216	4925.1	216	4929.6	214.4	4940	213
4954.8	212.5	4962	212.3	4962.1	212.3	4965	212.5	4965.1	212.5
4971.4	213.1	4991.4	212.8	5002	212.5	5002.1	212.5	5005	212.5
5005.1	212.5	5012.7	212.9	5030.8	213.7	5042	213.2	5042.1	213.5
5045	213.1	5045.1	213.1	5047.2	213.5	5060.2	213.5	5070.4	214.2
5082	219.5	5082.1	219.5	5092.7	223.8	5092.8	227.1	5096.4	226
5107.1	226.4	5138.9	226.2	5157.2	225.9	5176.6	224.9	5184.7	226.4
5201.3	226.6	5225.8	226.6	5258.5	227.2	5296.07	240.64		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4712	.055	4913.6	.035	5092.8	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913.6	5092.8	86.66	87.5	90	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4712	4913.6	243	F
5092.8	5296.07	227.1	F

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River

REACH: Reach-1 RS: 32523

INPUT
Description: LENAPE LANE BRIDGE
Distance from Upstream XS = 11
Deck/Roadway Width = 18
Weir Coefficient = 2.7
Upstream Deck/Roadway Coordinates
num= 37

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4712	243.2	243.2	4723	242	242	4736.9	241.1	241.1
4737	241.1	241.1	4750.4	240.1	240.1	4772.5	238	238
4791.1	236.6	236.6	4815.6	232.9	232.9	4836.7	231.9	231.9
4854	230.2	230.2	4874.7	229	228.5	4891.4	228	227.9
4903.9	227.6	226	4910	227.5	226	4913.6	227.4	227.1
4913.7	227.4	225.1	4925	230	216	4925	230	224
4962	230.1	224	4962.1	230.1	0	4965	230.2	0
4965	230.2	224	5002	230.5	224.5	5002	230.5	0
5005	230.5	0	5005.1	230.5	224.5	5042	230.4	224.2
5042.1	230.4	0	5045	230.3	0	5045.1	230.3	224.2
5082	230.1	224	5082.1	230.1	219.5	5092.7	227.1	223.8
5093	227.1	227.1	5096.4	227.1	226	5107.1	227.1	226.4
5138.9	227.1	226.2						

Upstream Bridge Cross Section Data
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4712	243.2	4723.3	242	4736.9	241.1	4737.1	241.1	4750.4	240.1
4772.5	238	4791.1	236.6	4815.6	232.9	4836.7	231.9	4854	230.2
4874.7	228.5	4891.4	227.9	4903.9	226	4909.6	226	4913.6	227.1
4913.7	225.1	4925	216	4925.1	216	4929.6	214.4	4940	213
4954.8	212.5	4962	212.3	4962.1	212.3	4965	212.5	4965.1	212.5
4971.4	213.1	4991.4	212.8	5002	212.5	5002.1	212.5	5005	212.5
5005.1	212.5	5012.7	212.9	5030.8	213.7	5042	213.2	5042.1	213.5
5045	213.1	5045.1	213.1	5047.2	213.5	5060.2	213.5	5070.4	214.2
5082	219.5	5082.1	219.5	5092.7	223.8	5092.8	227.1	5096.4	226
5107.1	226.4	5138.9	226.2	5157.2	225.9	5176.6	224.9	5184.7	226.4
5201.3	226.6	5225.8	226.6	5258.5	227.2	5296.07	240.64		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4712	.055	4913.6	.035	5092.8	.055

Bank Sta: Left	Right	Coeff Contr.	Expan.
4913.6	5092.8	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4712	4913.6	243	F
5092.8	5296.07	227.1	F

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 27

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4882.6	228.4	228.4	4891.4	228	227.9	4903.9	227.6	226
4910	227.5	226	4913.6	227.4	227.1	4913.7	227.4	225.1
4925	230		4925	230	224	4962	230.1	224
4962.1	230.1	0	4965	230.2	0	4965	230.2	224
5002	230.5	224.5	5002	230.5	0	5005	230.5	0
5005.1	230.5	224.5	5042	230.4	224.2	5042.1	230.4	0
5045	230.3	0	5045.1	230.3	224.2	5082	230.1	224
5082.1	230.1		5092.7	227.1	223.8	5093	227.1	227.1
5096.4	227.1	226	5107.1	227.1	226.4	5138.9	227.1	226.2

```
Downstream Bridge Cross Section Data
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  4654.3     243  4676.6   242.3  4692.4     241  4706.2   241.2  4721.8   241.1
  4744.3   239.1  4760.9     239  4781.9   236.8  4800.4   233.6  4809.4   232.5
  4829.2   230.5  4882.6   228.4  4906.2   227.2  4907.4   227.2  4916.4   226.9
  4916.5   215.9  4920.4   214.4  4933.9   213.2    4952   213.2  4966.2   212.3
  4980.1   212.8  5000.8   213.5  5019.7   213.2    5036   212.8  5055.9     213
  5079.6   213.9  5084.4   215.6  5084.5   227.3  5093.9     226  5108.7   226.6
  5125.9   226.5  5140.5   226.8  5167.2   226.2  5175.7   226.7  5195.8   227.2
  5217.4   227.2  5233.7   227.1    5249   227.3  5275.1   228.3  5298.2   228.3
  5315.2     230  5341.1     232  5383.2   235.7  5399.5   236.8  5418.9   238.5
  5439.6   240.2  5463.1   241.1    5499   243.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  4654.3    .055  4916.4    .035  5084.5    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
        4916.4  5084.5             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  4654.3  4916.4     241       F
  5084.5    5499   227.3       F
Sediment Elevation = 0

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =   227.4
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  3

Pier Data
Pier Station     Upstream=  4963.5    Downstream=  4963.5
Upstream     num=       2
    Width   Elev    Width   Elev
        3     210       3     230
Downstream     num=       2
    Width   Elev    Width   Elev
        3     210       3     230

Pier Data
Pier Station     Upstream=  5003.5    Downstream=  5003.5
Upstream     num=       2
    Width   Elev    Width   Elev
        3     210       3     230
Downstream     num=       2
    Width   Elev    Width   Elev
        3     210       3     230

Pier Data
Pier Station     Upstream=  5043.5    Downstream=  5043.5
Upstream     num=       2
    Width   Elev    Width   Elev
        3     210       3     230
Downstream     num=       2
    Width   Elev    Width   Elev
        3     210       3     230
```

```
Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Yarnell                KVal =    1.25
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd = .766965
           Max Low Cord                =   224.5

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 32503

INPUT
Description: 32503
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  4654.3     243  4676.6   242.3  4692.4     241  4706.2   241.2  4721.8   241.1
  4744.3   239.1  4760.9     239  4781.9   236.8  4800.4   233.6  4809.4   232.5
  4829.2   230.5  4882.6   228.4  4906.2   227.2  4907.4   227.2  4916.4   226.9
  4916.5   215.9  4920.4   214.4  4933.9   213.2    4952   213.2  4966.2   212.3
  4980.1   212.8  5000.8   213.5  5019.7   213.2    5036   212.8  5055.9     213
  5079.6   213.9  5084.4   215.6  5084.5   227.3  5093.9     226  5108.7   226.6
  5125.9   226.5  5140.5   226.8  5167.2   226.2  5175.7   226.7  5195.8   227.2
  5217.4   227.2  5233.7   227.1    5249   227.3  5275.1   228.3  5298.2   228.3
  5315.2     230  5341.1     232  5383.2   235.7  5399.5   236.8  5418.9   238.5
  5439.6   240.2  5463.1   241.1    5499   243.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  4654.3    .055  4916.4    .035  5084.5    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4916.4  5084.5           933.28     950 1000.16             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  4654.3  4916.4     241       F
  5084.5    5499   227.3       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 32100

INPUT
Description: 32100

Station Elevation Data    num=      99
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3359.9	243.2	3412.3	238.7	3441.9	233.8	3531.2	229.4	3658.2	230.5
3717.5	229.2	3804.6	217.5	3814.6	216.5	3824.6	215.4	3834.6	214.5
3844.6	213.3	3854.6	212	3864.6	211.1	3874.6	210.9	3884.6	210.8
3894.6	210.7	3904.6	210.8	3914.6	211.1	3924.6	211.2	3934.6	211
3944.6	209.6	3954.6	208.1	3964.6	207.5	3974.6	207.2	3984.6	207.3
3994.6	207.5	4004.6	208	4014.6	208.3	4024.6	208.1	4034.6	208.1
4044.6	208.1	4054.6	208.1	4064.6	208.4	4074.6	208.5	4084.6	208.6
4094.6	208.7	4114.6	208.8	4124.6	208.5	4134.6	208.6	4154.6	208.5
4194.6	208.5	4204.6	208.5	4214.6	208.5	4224.6	208.3	4234.6	208.1
4244.6	208	4254.6	208	4264.6	208.1	4274.6	208.9	4284.6	209.7
4294.6	210	4304.6	210.8	4314.6	211.1	4324.6	211.7	4334.6	212
4344.6	212.5	4354.6	213	4364.6	213.2	4374.6	213.8	4384.6	214
4394.6	214.5	4404.6	214.8	4414.6	215.1	4424.6	215.5	4436.6	217.2
4447	219.1	4452	220.9	4457	221.2	4457.9	222.2	4458	222.8
4466.8	224	4496.2	229.5	4552.1	237.4	4623.6	235.5	4699.7	225.3
4776.5	225.6	4818.9	223	4854.6	220.8	4872.6	220.1	4892.7	220.2
4910	219.7	4931	218.4	4936	214	4964	211.4	4977	211.1
5002	211	5026	210.9	5039	211.2	5059	213.2	5067	214.8
5076.5	218.3	5086	219.2	5105	219	5107	219.3	5139.3	216.2
5179	217.5	5207	229	5240.4	240	5248	243		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3359.9	.08	3804.6	.04	4452	.055	4776.5	.035	5179	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4776.5	5179	180	184	228	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3359.9	4550.51	237.8	F
5179	5248	217.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 31933

INPUT
Description: 31933
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3359.9	243.2	3412.3	238.7	3441.9	233.8	3531.2	229.4	3658.2	230.5
3717.5	229.2	3804.6	217.5	3814.6	216.5	3824.6	215.4	3834.6	214.5
3844.6	213.3	3854.6	212	3864.6	211.1	3874.6	210.9	3884.6	210.8
3894.6	210.7	3904.6	210.8	3914.6	211.1	3924.6	211.2	3934.6	211
3944.6	209.6	3954.6	208.1	3964.6	207.5	3974.6	207.2	3984.6	207.3
3994.6	207.5	4004.6	208	4014.6	208.3	4024.6	208.1	4034.6	208.1
4044.6	208.1	4054.6	208.1	4064.6	208.4	4074.6	208.5	4084.6	208.6
4094.6	208.7	4114.6	208.8	4124.6	208.5	4134.6	208.6	4154.6	208.5
4194.6	208.5	4204.6	208.5	4214.6	208.5	4224.6	208.3	4234.6	208.1
4244.6	208	4254.6	208	4264.6	208.1	4274.6	208.9	4284.6	209.7
4294.6	210	4304.6	210.8	4314.6	211.1	4324.6	211.7	4334.6	212
4344.6	212.5	4354.6	213	4364.6	213.2	4374.6	213.8	4384.6	214
4394.6	214.5	4404.6	214.8	4414.6	215.1	4424.6	215.5	4436.6	217.2
4447	219.1	4452	220.9	4457	221.2	4457.9	222.2	4458	222.8
4466.8	224	4496.2	229.5	4552.1	237.4	4623.6	235.5	4699.7	225.3
4776.5	225.6	4818.9	223	4854.6	220.8	4872.6	220.1	4892.7	220.2
4910	219.7	4931	218.4	4936	214	4964	211.4	4977	211.1
5002	211	5026	210.9	5039	211.2	5059	213.2	5067	214.8
5076.5	218.3	5086	219.2	5105	219	5107	219.3	5139.3	216.2

5179	217.5	5207	229	5240.4	240	5248	243

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3359.9	.08	3804.6	.04	4452	.055	4776.5	.035	5179	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4776.5	5179	720	736.2	912	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3359.9	4552.85	237.87	F
5179	5248	217.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 31640

INPUT
Description: 31640

Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3185.4	243	3281	236	3307.5	235.4	3345.4	232.4	3387.9	232.4
3454.6	233.2	3522.5	231.5	3575.8	231.9	3761.6	230.9	3783	229.7
3796.4	224.1	3833.6	222.6	3844	231.2	3865.2	231.2	3871.3	224.5
3893.6	228.8	3919.1	229.5	3964	228.2	4047.2	224	4677.2	224.2
4704.8	223.9	4721.1	225	4781.2	225.3	4809.7	224	4827.4	223.2
4839.2	221.7	4854.2	221.8	4866.8	221.6	4881.2	221	4895.3	220.8
4919	220.2	4937.8	218.3	4942.8	215.8	4947.3	213.2	4955.8	212
4964.3	211	4974.3	210.1	4984.8	210.2	4994.8	210.3	5003.3	210.3
5012.8	209.9	5019.3	209.9	5026.3	209.9	5034.3	210.3	5042.8	210.8
5052.7	212.3	5052.8	213.2	5058.9	213.5	5124.2	243		

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3185.4	.08	3761.6	.04	3844	.055	3865.2	.035	3893.6	.08
4047.2	.03	4677.2	.07	4964.3	.045	5058.9	.08		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5003.3	5052.7	22.24	186.64	184.47	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
3185.4	3862.96	231.36	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 31473

INPUT
Description: 31473
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3185.4	243	3281	236	3307.5	235.4	3345.4	232.4	3387.9	232.4
3454.6	233.2	3522.5	231.5	3575.8	231.9	3761.6	230.9	3783	229.7
3796.4	224.1	3833.6	222.6	3844	231.2	3865.2	231.2	3871.3	224.5
3893.6	228.8	3919.1	229.5	3964	228.2	4047.2	222	4073.9	220.5
4096.3	218.1	4146.3	209.9	4166.3	208	4186.3	208.1	4206.3	210

4236.3	212.2	4266.3	213.9	4286.3	216	4311.7	223.3	4316.8	223.3
4318.5	222	4330.9	220.3	4336.3	219.1	4346.3	219	4356.3	218.3
4366.3	218	4376.3	217.5	4386.3	217.2	4396.3	215.5	4406.3	215.4
4416.3	215.4	4426.3	215.3	4431.3	215.3	4436.3	213.8	4446.3	211.5
4456.3	210.5	4466.3	210	4476.3	210	4486.3	210.1	4496.3	210.2
4506.3	210.3	4516.3	210.6	4526.3	210.8	4536.3	210.9	4546.3	211
4556.3	211.2	4566.3	211.5	4576.3	211.7	4586.3	212	4596.3	212
4606.3	212	4616.3	212.9	4626.3	215.8	4636.3	217.2	4646.3	218.4
4651.4	219.6	4655.3	220.6	4657.6	222.1	4660.6	224	4677.2	224.2
4704.8	223.9	4721.1	225	4781.2	225.3	4809.7	224	4827.4	223.2
4839.2	221.7	4854.2	221.8	4866.8	221.6	4881.2	221	4895.3	220.8
4919	220.2	4937.8	218.3	4942.8	215.8	4947.3	213.2	4955.8	212
4964.3	211	4974.3	210.1	4984.8	210.2	4994.8	210.3	5003.3	210.3
5012.8	209.9	5019.3	209.9	5026.3	209.9	5034.3	210.3	5042.8	210.8
5048.42	211.87	5052.8	213.2	5058.9	213.5	5124.2	243		

Manning's n Values num= 9

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3185.4	.08	3761.6	.04	3844	.055	3865.2	.035	3893.6	.08
4047.2	.03	4660.6	.07	4964.3	.045	5058.9	.08		

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5003.3	5052.8	77.76	653.4	645.57	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
3185.4	4782.04	225.38	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 31220

INPUT
Description: 31220

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3402.2	243	3540	232.6	3574.4	231.1	3639.7	230.1	3669.5	228.7
3682.7	228.9	3739.2	230.2	3776.9	230.3	3842.6	229	3856.7	230.1
3864	221.5	3879.3	221.5	3887.3	230.7	4064.9	223.6	4075	227
4140	222.7	4193.9	219.2	4215	219	4245	216.8	4255	215.1
4275	212	4285	211.1	4305	210	4335	208.8	4355	207.3
4365	207	4375	207.3	4385	208	4395	208	4405	208
4410	207.5	4415	206.6	4425	206.2	4435	206.2	4445	206.3
4455	206.5	4465	206.5	4475	206.5	4485	206.4	4495	206
4505	205.9	4515	205.8	4525	205.7	4535	205.7	4545	205.7
4555	205.8	4565	205.9	4575	206	4585	206	4595	206.8
4605	207	4615	207	4625	208	4635	207.7	4645	208.2
4655	209.9	4665	210.8	4675	211.5	4685	212	4695	212.5
4705	213	4715	213.3	4725	213.7	4735	214	4745	214.5
4755	215	4760	215.8	4765	217.3	4768	218.1	4773.1	219.9
4777.2	221	4777.3	222	4777.4	224.5	4796	225.2	4895	224.5
4913	224	4921	216.5	4927	214.3	4933	213.3	4938	210.5
4944	210.4	4956	210.4	4969	210	4979	209.7	4991	209.3
5001	209.3	5012	209.1	5024	209	5034	209.4	5045	211.7
5057	213.3	5067	219.3	5079	221.3	5087	220.5	5095	220.3
5125	222.6	5151	224	5229.7	240	5269.3	243		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3402.2	.08	4140	.04	4765	.055	4913	.035	5125	.08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4913 5125 216 185.6 208 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3402.2	4800.75	225.61	F
5125	5269.3	222.6	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 31053

INPUT
Description: 31053
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3402.2	243	3540	232.6	3574.4	231.1	3639.7	230.1	3669.5	228.7
3682.7	228.9	3739.2	230.2	3776.9	230.3	3842.6	229	3856.7	230.1
3864	221.5	3879.3	221.5	3887.3	230.7	4064.9	223.6	4075	227
4140	222.7	4193.9	219.2	4215	219	4245	216.8	4255	215.1
4275	212	4285	211.1	4305	210	4335	208.8	4355	207.3
4365	207	4375	207.3	4385	208	4395	208	4405	208
4410	207.5	4415	206.6	4425	206.2	4435	206.2	4445	206.3
4455	206.5	4465	206.5	4475	206.5	4485	206.4	4495	206
4505	205.9	4515	205.8	4525	205.7	4535	205.7	4545	205.7
4555	205.8	4565	205.9	4575	206	4585	206	4595	206.8
4605	207	4615	207	4625	208	4635	207.7	4645	208.2
4655	209.9	4665	210.8	4675	211.5	4685	212	4695	212.5
4705	213	4715	213.3	4725	213.7	4735	214	4745	214.5
4755	215	4760	215.8	4765	217.3	4768	218.1	4773.1	219.9
4777.2	221	4777.3	222	4777.4	224.5	4796	225.2	4895	224.5
4913	224	4921	216.5	4927	214.3	4933	213.3	4938	210.5
4944	210.4	4956	210.4	4969	210	4979	209.7	4991	209.3
5001	209.3	5012	209.1	5024	209	5034	209.4	5045	211.7
5057	213.3	5067	219.3	5079	221.3	5087	220.5	5095	220.3
5125	222.6	5151	224	5229.7	240	5269.3	243		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3402.2	.08	4140	.04	4765	.055	4913	.035	5125	.08

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4913 5125 864 742.2 832.2 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3402.2	4791.39	225.54	F
5125	5269.3	222.6	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 30756

INPUT
Description: 30756

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

3449.5	243	3463.6	240.8	3476.6	232.3	3502.5	232.3	3522.2	241.7
3553.3	241.1	3592	240.3	3636.5	239.9	3673.9	237.8	3764.5	238.2
3807.1	240.1	3849.2	238.1	3874.2	238.1	3945.5	240.9	4034.8	237.9
4066.8	240.1	4098.7	240.1	4133.2	237	4137.8	234.6	4157.5	234.5
4174.5	233.5	4263.9	227.8	4304.3	226.2	4310.6	225.3	4321.2	222.1
4365.6	214.1	4380.6	207.1	4410.6	206	4430.6	206.1	4460.6	208
4470.6	208.2	4480.6	208	4490.6	207.1	4560.6	207.2	4580.6	209
4590.6	210.2	4600.6	212.1	4610.6	210	4620.6	209.3	4630.6	209.7
4640.6	209.1	4650.6	209.1	4660.6	209.2	4670.6	209.3	4680.6	209.5
4690.6	209.8	4700.6	210.2	4710.6	210.7	4720.6	211.8	4730.6	213
4740.6	214	4750.6	215	4760.6	216.5	4761.6	216.4	4771.6	218.1
4776.6	219.4	4781.6	220.8	4787.5	222.2	4788.7	223.7	4809.6	224.9
4875.5	227.1	4896.5	225.8	4915	225.1	4928.3	216.1	4939.3	215.6
4945.3	213.1	4956.8	212.7	4968.3	212.3	4980.3	211.8	4990.8	211.6
5000.8	211.3	5011.8	211.3	5023.8	210.9	5036.3	210.7	5047.8	211.5
5054.8	213.1	5059.8	215.5	5072.8	216.2	5078.8	218.1	5082.5	217.5
5110	217.8	5124.8	217.5	5154.6	220.1	5216.9	232.4	5262.1	235.5
5277.3	234.7	5314	238.7	5363.5	239	5397.6	238.2	5473.5	239.8
5553.3	239.6	5732.1	235.9	5793.5	235.3	5846.6	234	5878.3	234
5898.1	237.8	5902.8	234.4	5933	236.4	5983.1	243.1		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3449.5	.07	4321.2	.04	4781.6	.055	4896.5	.035	5054.8	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4915	5054.8	270	182.4	140	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3449.5	4874.65	227.22	F
5054.8	5983.1	213.1	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 30589

INPUT
Description: 30589
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3449.5	243	3463.6	240.8	3476.6	232.3	3502.5	232.3	3522.2	241.7
3553.3	241.1	3592	240.3	3636.5	239.9	3673.9	237.8	3764.5	238.2
3807.1	240.1	3849.2	238.1	3874.2	238.1	3945.5	240.9	4034.8	237.9
4066.8	240.1	4098.7	240.1	4133.2	237	4137.8	234.6	4157.5	234.5
4174.5	233.5	4263.9	227.8	4304.3	226.2	4310.6	225.3	4321.2	222.1
4365.6	214.1	4380.6	207.1	4410.6	206	4430.6	206.1	4460.6	208
4470.6	208.2	4480.6	208	4490.6	207.1	4560.6	207.2	4580.6	209
4590.6	210.2	4600.6	212.1	4610.6	210	4620.6	209.3	4630.6	209.7
4640.6	209.1	4650.6	209.1	4660.6	209.2	4670.6	209.3	4680.6	209.5
4690.6	209.8	4700.6	210.2	4710.6	210.7	4720.6	211.8	4730.6	213
4740.6	214	4750.6	215	4760.6	216.5	4761.6	216.4	4771.6	218.1
4776.6	219.4	4781.6	220.8	4787.5	222.2	4788.7	223.7	4809.6	224.9
4875.5	227.1	4896.5	225.8	4915	225.1	4928.3	216.1	4939.3	215.6
4945.3	213.1	4956.8	212.7	4968.3	212.3	4980.3	211.8	4990.8	211.6
5000.8	211.3	5011.8	211.3	5023.8	210.9	5036.3	210.7	5047.8	211.5
5054.8	213.1	5059.8	215.5	5072.8	216.2	5078.8	218.1	5082.5	217.5
5110	217.8	5124.8	217.5	5154.6	220.1	5216.9	232.4	5262.1	235.5
5277.3	234.7	5314	238.7	5363.5	239	5397.6	238.2	5473.5	239.8
5553.3	239.6	5732.1	235.9	5793.5	235.3	5846.6	234	5878.3	234
5898.1	237.8	5902.8	234.4	5933	236.4	5983.1	243.1		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
3449.5	.07	4321.2	.04	4781.6	.055	4896.5	.035	5054.8	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4915	5054.8	1080	729.6	559.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3449.5	4877.46	227.15	F
5054.8	5983.1	213.1	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 30300

INPUT
Description: 30300

Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4813.5	243	4833.7	242	4866.3	241.7	4902.6	240	4924.5	228.4
4931.3	214.8	4943.8	214.2	4954.8	212.3	4965.8	211.6	4976.8	210.7
4987.3	209.4	4998.8	209.5	5008.3	209.8	5019.3	210.3	5031.3	210.8
5041.3	211.4	5045.3	212.3	5046.8	213.8	5068.8	214.8	5088.8	214.9
5156.2	218.2	5195	217.6	5237.3	217.9	5270.3	216.7	5301.3	217
5317.8	217.6	5332.4	215.7	5357.7	218.9	5407.8	225.9	5427.6	226.3
5443.1	228.5	5463.7	230.3	5483.9	230.3	5487.7	230.8	5496.1	231.6
5517.5	234.3	5535.9	235.4	5569.2	237.4	5620.2	237.7	5655.9	239.2
5694.5	240	5725	239.2	5770.3	238.6	5809.6	238.8	5844.6	237.4
5880.9	236.9	5919.4	237.2	5958.1	237.3	5985.2	237.3	6010.5	237.3
6028.4	238.9	6043	243.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4813.5	.055	4931.3	.035	5156.2	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4931.3	5156.2	197.12	193.76	162.88	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4813.5	4931.3	214.8	F
5156.2	6043	218.2	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 30133

INPUT
Description: 30133
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4813.5	243	4833.7	242	4866.3	241.7	4902.6	240	4924.5	228.4
4931.3	214.8	4943.8	214.2	4954.8	212.3	4965.8	211.6	4976.8	210.7
4987.3	209.4	4998.8	209.5	5008.3	209.8	5019.3	210.3	5031.3	210.8
5041.3	211.4	5045.3	212.3	5046.8	213.8	5068.8	214.8	5088.8	214.9
5156.2	218.2	5195	217.6	5237.3	217.9	5270.3	216.7	5301.3	217

5317.8	217.6	5332.4	215.7	5357.7	218.9	5407.8	225.9	5427.6	226.3
5443.1	228.5	5463.7	230.3	5483.9	230.3	5487.7	230.8	5496.1	231.6
5517.5	234.3	5535.9	235.4	5569.2	237.4	5620.2	237.7	5655.9	239.2
5694.5	240	5725	239.2	5770.3	238.6	5809.6	238.8	5844.6	237.4
5880.9	236.9	5919.4	237.2	5958.1	237.3	5985.2	237.3	6010.5	237.3
6028.4	238.9	6043	243.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4813.5	.055	4931.3	.035	5156.2	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4931.3	5156.2	1182.52	1162.31	977.13	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4813.5	4931.3	214.8	F
5156.2	6043	218.2	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 29622

INPUT
Description: 29622

Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4861.7	243.2	4873.4	239	4883	231.2	4891	232.4	4911	215.3
4919	211.8	4920	210.8	4926	208.2	4931	208.4	4936	208.5
4940	209	4946	208.2	4953	208.5	4962	209.1	4972	209.4
4983	209.8	4993	210.7	5005	211.3	5019	211.3	5029	211.8
5044	211.7	5062	211.1	5070	210.8	5078	210.4	5081	210.9
5095	213.5	5114	216.1	5139	216.8	5149.1	217.2	5182.7	217.7
5219.1	218.5	5252.5	217.7	5279.2	216.7	5320.4	217.5	5360.7	218.8
5393.6	221.3	5432.8	224.1	5465.8	226.4	5504.8	228.8	5550.9	230.8
5598.1	233.2	5645.3	233.8	5688.5	233.6	5738.2	232.4	5769.3	232.3
5790	234.1	5807.5	236.1	5845.4	237.9	5870.9	243.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4861.7	.055	4919	.035	5095	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4919	5095	183.44	198.64	193.04	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 29455

INPUT
Description: 29455 RAILROAD
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4861.7	243.2	4873.4	239	4883	231.2	4891	232.4	4911	215.3
4919	211.8	4920	210.8	4926	208.2	4931	208.4	4936	208.5
4940	209	4946	208.2	4953	208.5	4962	209.1	4972	209.4
4983	209.8	4993	210.7	5005	211.3	5019	211.3	5029	211.8

5044	211.7	5062	211.1	5070	210.8	5078	210.4	5081	210.9
5095	213.5	5114	216.1	5139	216.8	5149.1	217.2	5182.7	217.7
5219.1	218.5	5252.5	217.7	5279.2	216.7	5320.4	217.5	5360.7	218.8
5393.6	221.3	5432.8	224.1	5465.8	226.4	5504.8	228.8	5550.9	230.8
5598.1	233.2	5645.3	233.8	5688.5	233.6	5738.2	232.4	5769.3	232.3
5790	234.1	5807.5	236.1	5845.4	237.9	5870.9	243.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4861.7	.055	4919	.035	5095	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4919	5095	1926.95	2085.72	2026.92	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 28480

INPUT
Description: 28480

Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4758.5	230	4803.3	214.7	4857.3	213.7	4896.1	215.4	4910.9	216.4
4923	214.5	4931.8	210.2	4946	206.8	4956	205.4	4970	204.6
4985	204.6	4999	204.5	5011	203.4	5023	203.5	5042	203.4
5046	202.1	5054	206.8	5063.5	210.9	5077	215.7	5096.4	223.6
5125.4	230								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4758.5	.055	4946	.035	5054	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4946	5054	192	195.2	196	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 28313

INPUT
Description: 28313
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4758.5	230	4803.3	214.7	4857.3	213.7	4896.1	215.4	4910.9	216.4
4923	214.5	4931.8	210.2	4946	206.8	4956	205.4	4970	204.6
4985	204.6	4999	204.5	5011	203.4	5023	203.5	5042	203.4
5046	202.1	5054	206.8	5063.5	210.9	5077	215.7	5096.4	223.6
5125.4	230								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4758.5	.055	4946	.035	5054	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4946	5054	768	780.8	784	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27992

INPUT
Description: 27992
OAKLAND AVE. BRIDGE

Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4473.5	230	4530.7	226.5	4585.7	224.2	4652.2	221.2	4713.8	220.5
4765.3	220.2	4806.1	220.2	4857.7	220.1	4927.4	221.8	4928.5	206.8
4932	206.8	4932.1	206.8	4936.5	206.7	4947.5	205.2	4957.5	204.9
4967.5	204.8	4977.5	204.8	4987.5	205.2	4997.5	205.2	5007.5	204.5
5012.5	203.6	5012.6	203.6	5014.6	203.4	5014.7	203.4	5017.5	203
5027.5	204.6	5037.5	205.2	5047.5	204.9	5057.5	206	5063.7	206.7
5067.5	208.2	5074.5	209.1	5088.5	214.4	5094	215.7	5094.1	215.7
5096.5	215.7	5097.5	223.3	5143.7	222.2	5221.4	223	5307.1	230

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4473.5	.05	4927.4	.032	5097.5	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4927.4	5097.5	54.99	54.99	54.99	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4473.5	4927.4	221.8	F
5097.5	5307.1	223.3	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27937

INPUT
Description: 27937

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4456.7	230	4478.3	229.2	4556.2	225.2	4635.7	221.6	4731.4	220.8
4793.2	220.2	4868.6	220.7	4935.5	222	4936.5	206.7	4936.6	206.2
4944.5	204.9	4954.5	205.1	4964.5	205.3	4974.5	205.3	4984.5	205
4994.5	204.5	4998.5	205	5004.5	206.1	5009.5	206.2	5014.5	205.9
5024.5	205.4	5034.5	205.8	5044.5	206.3	5054.5	205.9	5063.5	206.7
5065.5	207.7	5066.5	209.5	5093.5	216.1	5094.5	223.5	5155.2	224
5185.1	225	5229.3	227	5263.2	230				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4456.7	.05	4935.5	.034	5094.5	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4935.5	5094.5	132.84	135.84	137.16	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4456.7	4935.5	222	F
5094.5	5263.2	223.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27825

INPUT
Description: 27825
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4473.5	230	4530.7	226.5	4585.7	224.2	4652.2	221.2	4713.8	220.5
4765.3	220.2	4806.1	220.2	4857.7	220.1	4927.4	221.8	4928.5	206.8
4932	206.8	4932.1	206.8	4936.5	206.7	4947.5	205.2	4957.5	204.9
4967.5	204.8	4977.5	204.8	4987.5	205.2	4997.5	205.2	5007.5	204.5
5012.5	203.6	5012.6	203.6	5014.6	203.4	5014.7	203.4	5017.5	203
5027.5	204.6	5037.5	205.2	5047.5	204.9	5057.5	206	5063.7	206.7
5067.5	208.2	5074.5	209.1	5088.5	214.4	5094	215.7	5094.1	215.7
5096.5	215.7	5097.5	223.3	5143.7	222.2	5221.4	223	5307.1	230

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4473.5	.05	4927.4	.032	5097.5	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4927.4	5097.5	99.29	100.29	100.71	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4473.5	4927.4	221.8	F
5097.5	5307.1	223.3	F

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 27797.5

INPUT
Description: OAKLAND AVE. BRIDGE
Distance from Upstream XS = 14
Deck/Roadway Width = 27
Weir Coefficient = 2.7
Upstream Deck/Roadway Coordinates
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4473.5	230	230	4530.7	226.5	226.5	4585.7	224.2	224.2
4652	221.2	221.2	4713.8	220.5	220.5	4765.3	220.2	220.2
4806.1	220.2	220.2	4857.7	220.1	220.1	4927.4	221.8	221.8
4928.5	221.8	206.8	4932	222	206.8	4932.1	222	217
5012.5	222.6	217.7	5014.7	222.6	217.8	5094	223.2	218.5
5094.1	223.2	215.7	5096.5	223.2	215.7	5097.5	223.3	223.3
5143.7	222.2	222.2	5221.4	223	223	5307.1	230	230

Upstream Bridge Cross Section Data
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4473.5	230	4530.7	226.5	4585.7	224.2	4652.2	221.2	4713.8	220.5
4765.3	220.2	4806.1	220.2	4857.7	220.1	4927.4	221.8	4928.5	206.8
4932	206.8	4932.1	206.8	4936.5	206.7	4947.5	205.2	4957.5	204.9
4967.5	204.8	4977.5	204.8	4987.5	205.2	4997.5	205.2	5007.5	204.5
5012.5	203.6	5012.6	203.6	5014.6	203.4	5014.7	203.4	5017.5	203

5027.5	204.6	5037.5	205.2	5047.5	204.9	5057.5	206	5063.7	206.7
5067.5	208.2	5074.5	209.1	5088.5	214.4	5094	215.7	5094.1	215.7
5096.5	215.7	5097.5	223.3	5143.7	222.2	5221.4	223	5307.1	230

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4473.5	.05	4927.4	.032	5097.5	.05

Bank Sta: Left	Right	Coeff Contr.	Expan.
4927.4	5097.5	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4473.5	4927.4	221.8	F
5097.5	5307.1	223.3	F

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4473.5	230	230	4530.7	226.5	226.5	4585.7	224.2	224.2
4652	221.2	221.2	4713.8	220.5	220.5	4765.3	220.2	220.2
4806.1	220.2	220.2	4857.7	220.1	220.1	4927.4	221.8	221.8
4928.5	221.8	206.8	4932	222	206.8	4932.1	222	217
5012.5	222.6	217.7	5014.7	222.6	217.8	5094	223.2	218.5
5094.1	223.2	215.7	5096.5	223.2	215.7	5097.5	223.3	223.3
5143.7	222.2	222.2	5221.4	223	223	5307.1	230	230

Downstream Bridge Cross Section Data
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4456.7	230	4478.3	229.2	4556.2	225.2	4635.7	221.6	4731.4	220.8
4793.2	220.2	4868.6	220.7	4935.5	222	4936.5	206.7	4936.6	206.2
4944.5	204.9	4954.5	205.1	4964.5	205.3	4974.5	205.3	4984.5	205
4994.5	204.5	4998.5	205	5004.5	206.1	5009.5	206.2	5014.5	205.9
5024.5	205.4	5034.5	205.8	5044.5	206.3	5054.5	205.9	5063.5	206.7
5065.5	207.7	5066.5	209.5	5093.5	216.1	5094.5	223.5	5155.2	224
5185.1	225	5229.3	227	5263.2	230				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4456.7	.05	4935.5	.034	5094.5	.05

Bank Sta: Left	Right	Coeff Contr.	Expan.
4935.5	5094.5	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4456.7	4935.5	222	F
5094.5	5263.2	223.5	F

Sediment Elevation = 0

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 220.1
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 1

Pier Data
Pier Station Upstream= 5012.45 Downstream= 5012.45
Upstream num= 2

```
    Width   Elev    Width   Elev
       3     203       3   218.5
Downstream     num=       2
    Width   Elev    Width   Elev
       3     203       3   218.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Yarnell                KVal =      .9
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =.8164966
           Max Low Cord                =   218.5

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 27770

INPUT
Description: 27770
Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  4456.7     230  4478.3   229.2  4556.2   225.2  4635.7   221.6  4731.4   220.8
  4793.2   220.2  4868.6   220.7  4935.5     222  4936.5   206.7  4936.6   206.2
  4944.5   204.9  4954.5   205.1  4964.5   205.3  4974.5   205.3  4984.5     205
  4994.5   204.5  4998.5     205  5004.5   206.1  5009.5   206.2  5014.5   205.9
  5024.5   205.4  5034.5   205.8  5044.5   206.3  5054.5   205.9  5063.5   206.7
  5065.5   207.7  5066.5   209.5  5093.5   216.1  5094.5   223.5  5155.2     224
  5185.1     225  5229.3     227  5263.2     230

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  4456.7     .05  4935.5    .034  5094.5     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4935.5  5094.5           442.89  452.96  457.14             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  4456.7  4935.5     222       F
  5094.5  5263.2   223.5       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 27620

INPUT
Description: 27620
```

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4155.7	230.1	4195.4	221.3	4264.3	224.8	4291.8	219.7	4301.8	220.2
4313.6	219.5	4355.3	221.5	4449.8	220.4	4499.1	220.3	4532.4	217.1
4542.3	217.5	4550.6	217.2	4568.4	217.6	4639.9	214.2	4742.8	214.2
4770.1	213.3	4780.9	213.4	4790.8	213	4861.9	213.1	4914.5	213.2
4927.4	213.2	4935.4	208.1	4939.4	206.6	4954	205.8	4967.1	205.4
4980	205.1	4998.4	204.8	4999.9	204.9	5015	204.5	5033.5	204.1
5048.4	203.2	5057.5	205.5	5060.6	206.6	5063.2	211.8	5091.7	214.4
5106.9	220	5124.6	230						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4155.7	.04	4927.4	.03	5091.7	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4927.4	5091.7	194.24	198.81	200	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27453

INPUT
Description: 27453

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4155.7	230.1	4195.4	221.3	4264.3	224.8	4291.8	219.7	4301.8	220.2
4313.6	219.5	4355.3	221.5	4449.8	220.4	4499.1	220.3	4532.4	217.1
4542.3	217.5	4550.6	217.2	4568.4	217.6	4639.9	214.2	4742.8	214.2
4770.1	213.3	4780.9	213.4	4790.8	213	4861.9	213.1	4914.5	213.2
4927.4	213.2	4935.4	208.1	4939.4	206.6	4954	205.8	4967.1	205.4
4980	205.1	4998.4	204.8	4999.9	204.9	5015	204.5	5033.5	204.1
5048.4	203.2	5057.5	205.5	5060.6	206.6	5063.2	211.8	5091.7	214.4
5106.9	220	5124.6	230						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4155.7	.04	4927.4	.03	5091.7	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4927.4	5091.7	485.6	497	500	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27272

INPUT
Description: 27272

Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4355	230	4360	229	4366	228	4528	226	4592	224
4630	222	4682	220	4704	218	4729	216	4754	214
4875	213.5	4903.2	211.8	4926	206.4	4941.5	205.4	4952.3	205.5
4960.4	205.7	4972.4	205.5	4983.2	205.5	4997	204.7	5008.4	204.7
5032.7	204.5	5049	204.4	5063.7	204.3	5074.2	206.5	5082.7	213.5

5105.5	213.5	5125	213.5	5137	214	5169	216	5176	218
5182	220	5205	230						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4355	.04	4875	.03	5082.7	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4875	5082.7	180	180	180	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27105

INPUT
Description: 27105
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4355	230	4360	229	4366	228	4528	226	4592	224
4630	222	4682	220	4704	218	4729	216	4754	214
4875	213.5	4903.2	211.8	4926	206.4	4941.5	205.4	4952.3	205.5
4960.4	205.7	4972.4	205.5	4983.2	205.5	4997	204.7	5008.4	204.7
5032.7	204.5	5049	204.4	5063.7	204.3	5074.2	206.5	5082.7	213.5
5105.5	213.5	5125	213.5	5137	214	5169	216	5176	218
5182	220	5205	230						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4355	.04	4875	.03	5082.7	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4875	5082.7	464.97	270.05	554.95	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 27047

INPUT
Description: 27047

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4642	230	4686	220	4694	218	4710	214	4808	214
4850	214.7	4870	214.3	4870.1	213.3	4894	212.7	4908	211.3
4927	206.6	4935	205.9	4945	205.3	4955	205.1	4968	205.3
4982	205.3	4996	205.1	5010	204.9	5020	204.4	5034	204.1
5048	203.9	5060	204.3	5073	206.5	5097	208.8	5100	214.4
5127	213.1	5174	212.6	5243	213.1	5263	214	5283	216
5298	218	5307	220	5322	230				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4642	.04	4935	.03	5073	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4935	5073	136	188	240	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26880

INPUT
Description: 26880
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4642	230	4686	220	4694	218	4710	214	4808	214
4850	214.7	4870	214.3	4870.1	213.3	4894	212.7	4908	211.3
4927	206.6	4935	205.9	4945	205.3	4955	205.1	4968	205.3
4982	205.3	4996	205.1	5010	204.9	5020	204.4	5034	204.1
5048	203.9	5060	204.3	5073	206.5	5097	208.8	5100	214.4
5127	213.1	5174	212.6	5243	213.1	5263	214	5283	216
5298	218	5307	220	5322	230				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4642	.04	4935	.03	5073	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4935	5073	204	282	360	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26812

INPUT
Description: 26812

Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4810	230	4840	220	4848	218	4854	216	4862	214
4871	212.5	4890	211.9	4907.3	211.8	4923	206.5	4925	205.3
4937	204.3	4952	204.8	4967	204.4	4999	203.9	5024	203.1
5037	202.1	5053	206.6	5066	204.5	5075	206.2	5087	215.1
5100	215.5	5111	216	5212	216	5224	214	5244	214
5248	216	5250	218	5261	220	5296	230		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4810	.04	4925	.03	5053	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4925	5053	25	50	55	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26762

INPUT
Description: 26762
RAILROAD BRIDGE

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4828.23	221.86	4842	217.54	4852	214.5	4852.1	214.5	4866	211.2
4890	211.4	4900.8	209	4920.1	209	4933.5	206.6	4947	205.8
4947.1	205.8	4950	205.7	4951.8	204.2	4954	204.2	4954.1	204.2
4970.6	203.8	4986.9	203.4	5000.6	202.9	5015.8	202.9	5025	202.9
5035.3	202.4	5049.2	203.3	5049.3	203.3	5057	203.6	5057.1	203.6
5063.2	203.8	5066.5	206.5	5076.5	210.4	5105.1	212.3	5130.4	213.5
5139	213.8	5144.6	214.9	5151	224.1				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4828.23	.04	4950	.03	5066.5	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4950	5066.5	40	41	45	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26721

INPUT
Description: RAILROAD BRIDGE

Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4805.99	224.66	4818.67	219.48	4831.93	215.55	4843.1	212.4	4872.8	212
4884.2	211.5	4891.3	209	4908.1	206.5	4916.6	205.7	4929.3	206.4
4940.3	204.9	4951.2	204.7	4960.2	206.5	4967.9	206.6	4982.7	205.2
4985.5	203.3	5002.6	202	5005.2	201.5	5022.4	198.5	5045.5	201.5
5078.2	203.7	5091.9	206.5	5093.3	209.5	5103.6	213	5110.3	212.7
5118.6	212.5	5126	213.6	5135.54	215.03	5146.39	218.17	5150.6	219.61

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4805.99	.04	4908.1	.03	5091.9	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4908.1	5091.9	130	89	50	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26645

INPUT
Description: 26645
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4810	230	4840	220	4848	218	4854	216	4862	214
4871	212.5	4890	211.9	4907.3	211.8	4923	206.5	4925	205.3
4937	204.3	4952	204.8	4967	204.4	4999	203.9	5024	203.1
5037	202.1	5053	206.6	5066	204.5	5075	206.2	5087	215.1
5100	215.5	5111	216	5212	216	5224	214	5244	214
5248	216	5250	218	5261	220	5296	230		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

4810	.04	4925	.03	5053	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4925	5053	25	49	55	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26632

INPUT
Description: 26632

Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4586.3	228	4624.7	221.3	4666.5	220.5	4732.1	220.3	4775.6	221
4804.1	220.2	4822.5	214.3	4872.5	213.5	4890.5	211.9	4899.5	208.7
4911	206.3	4922.5	205.3	4934.5	204.8	4946.5	204.3	4959.5	203.5
4966.5	202.7	4974.5	202.6	4982.5	202.3	4989.5	202.6	4996.5	203
5004.5	203.7	5012.5	204.6	5018.5	205.4	5025.5	206.3	5033.5	206.9
5040.5	206.3	5052.5	204.9	5060.5	203.4	5065.5	202.4	5071.5	201.1
5084.8	203.8	5089.1	206.4	5100.3	213.1	5109.7	212.8	5133	212.8
5154.2	213.2	5181.5	213.4	5202	220	5238.5	228		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4586.3	.07	4872.5	.045	5100.3	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4872.5	5100.3	45	49.5	60	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26596

INPUT
Description: 26596
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4840.18	223.32	4852	214.5	4852.1	214.5	4866	211.2	4890	211.4
4900.8	209	4920.1	209	4933.5	206.6	4947	205.8	4947.1	205.8
4950	205.7	4951.8	204.2	4954	204.2	4954.1	204.2	4970.6	203.8
4980	203.5	4985	201.7	5025	201.7	5028	202.7	5035.3	202.4
5049.2	203.3	5049.3	203.3	5057	203.6	5057.1	203.6	5063.2	203.8
5066.5	206.5	5076.5	210.4	5105.1	212.3	5130.4	213.5	5139	213.8
5144.6	214.9	5151	224.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4840.18	.04	4950	.03	5066.5	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4950	5066.5	85	84.48	105	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26561

INPUT
Description: 26561
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4818.01	222.53	4843.1	212.4	4872.8	212	4884.2	211.5	4891.3	209
4908.1	206.5	4916.6	205.7	4929.3	206.4	4940.3	204.9	4951.2	204.7
4953	205	4962	201.3	4980	201.3	5002	201.3	5003	201.8
5005.2	201.5	5022.4	198.5	5045.5	201.5	5078.2	203.7	5091.9	206.5
5093.3	209.5	5103.6	213	5110.3	212.7	5118.6	212.5	5126	213.6
5144.43	222.07								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4818.01	.04	4908.1	.03	5091.9	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4908.1	5091.9	130	99	50	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26533

INPUT
Description: 26533

Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4598.8	228	4653.3	220.6	4718.5	220.6	4798.5	224.4	4840.8	222
4864.5	217.7	4877	217.7	4891	217.2	4905.1	213.3	4907.5	206.8
4920.2	206.2	4932.5	206.6	4944.7	206.4	4955.8	205.7	4966.4	205
4977.6	203.1	4988	203.1	4996.6	203	5011.8	202.8	5028.3	202.3
5040.9	202.2	5056.8	203.1	5067.5	205.9	5082.4	206.4	5089.7	205.4
5111	206.3	5139	209.3	5148.4	215.7	5161	215.7	5210.5	212.2
5278.8	212.3	5357.7	212.3	5411.3	212.4	5450	212.7	5487.1	220
5517	228								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4598.8	.07	4891	.045	5148.4	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4891	5148.4	100	94	85	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26462

INPUT
Description: 26462
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4586.3	228	4624.7	221.3	4666.5	220.5	4732.1	220.3	4775.6	221
4804.1	220.2	4822.5	214.3	4872.5	213.5	4890.5	211.9	4899.5	208.7
4911	206.3	4922.5	205.3	4941	204.6	4952	204	4992	202.8

4998	203.1	5004.5	203.7	5012.5	204.6	5018.5	205.4	5025.5	206.3
5040.5	206.3	5052.5	204.9	5060.5	203.4	5065.5	202.4	5071.5	201.1
5084.8	203.8	5089.1	206.4	5100.3	213.1	5109.7	212.8	5133	212.8
5154.2	213.2	5181.5	213.4	5202	220	5238.5	228		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4586.3	.055	4872.5	.035	5100.3	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4872.5	5100.3	190	191.04	204.96	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26365

INPUT
Description: 26365
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4598.8	228	4653.3	220.6	4718.5	220.6	4798.5	224.4	4840.8	222
4864.5	217.7	4877	217.7	4891	217.2	4905.1	213.3	4907.5	206.8
4917	206.5	4947	201.65	4987	201.65	4990	203	5028.3	202.3
5040.9	202.2	5056.8	203.1	5067.5	205.9	5082.4	206.4	5089.7	205.4
5111	206.3	5139	209.3	5148.4	215.7	5161	215.7	5210.5	212.2
5278.8	212.3	5357.7	212.3	5411.3	212.4	5450	212.7	5487.1	220
5517	228								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4598.8	.055	4891	.035	5148.4	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4891	5148.4	600.07	564.88	509.91	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 26157

INPUT
Description: 26157

Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4738.4	228	4771.4	224	4812	212.9	4850.7	212	4920.7	213.7
4931.8	206.5	4951.9	203.7	4968.9	204.9	4990.7	204.9	5010.6	203.5
5031.9	203.4	5052.1	204.3	5068.3	206.4	5080.4	209.2	5081.1	212.1
5097.9	212	5183.5	212.2	5204.4	212.5	5219.5	212.3	5303.7	210
5334.3	209.7	5373.6	212.2	5479.2	212.6	5493.5	210.8	5507	210.9
5521.9	210.8	5617.5	210.3	5697	220	5716	228		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4738.4	.07	4920.7	.045	5081.1	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4920.7	5081.1	186.64	178	160	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25988

INPUT
Description: 25988
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4738.4	228	4771.4	224	4812	212.9	4850.7	212	4920.7	213.7
4931.8	206.5	4951.9	203.7	4966	204.4	4982	197.88	5022	197.88
5037	204	5052.1	204.3	5068.3	206.4	5080.4	209.2	5081.1	212.1
5097.9	212	5183.5	212.2	5204.4	212.5	5219.5	212.3	5303.7	210
5334.3	209.7	5373.6	212.2	5479.2	212.6	5493.5	210.8	5507	210.9
5521.9	210.8	5617.5	210.3	5697	220	5716	228		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4738.4	.055	4920.7	.035	5081.1	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4920.7	5081.1	381.29	376.96	368	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25890

INPUT
Description: 25890

Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4337.5	228	4411.1	222	4459.9	218.6	4532.3	213	4575.8	214
4608.3	220.4	4664.1	222.7	4704.5	214.3	4725.2	212.4	4801.4	212.2
4872.4	212.3	4916.4	211.4	4916.5	210.9	4947.4	206.5	4957.4	204.4
4972.4	203.9	4987.4	203.8	4999.4	203.5	5017.4	204	5032.4	204.1
5052.7	206.5	5060.2	211.9	5091.7	212.8	5169.9	212.5	5184.7	212.4
5228.6	212.3	5288	212	5385.8	211.2	5460.8	210.8	5534.7	210.8
5571.5	211.3	5640.5	210.2	5699.6	208	5714	210.3	5754.3	228

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4337.5	.07	4947.4	.045	5060.2	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4947.4	5060.2	350	233	180	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
4337.5	4663.98	222.82	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25700

INPUT
Description: 25700
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4337.5	228	4411.1	222	4459.9	218.6	4532.3	213	4575.8	214
4608.3	220.4	4664.1	222.7	4704.5	214.3	4725.2	212.4	4801.4	212.2
4872.4	212.3	4916.4	211.4	4916.5	210.9	4947.4	206.5	4949	206
4977	195	5017	195	5060	211.8	5091.7	212.8	5184.7	212.4
5228.6	212.3	5288	212	5385.8	211.2	5460.8	210.8	5534.7	210.8
5571.5	211.3	5640.5	210.2	5699.6	208	5714	210.3	5754.3	228

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4337.5	.055	4947.4	.035	5060	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4947.4	5060	350.01	214.02	180	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
4337.5	4663.98	222.96	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25657

INPUT
Description: 25657

Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3370.3	228	3439.1	222	3524.1	220.5	3575.4	220.5	3602.4	224
3641.6	226	3687.7	222	3723.3	216.4	3803.9	214.3	3890.9	212.9
4007.9	211.7	4097.4	211.5	4112.3	210.1	4148.2	210	4228.8	210.2
4304.1	210.7	4404.6	211.5	4561.2	211.4	4691	211.5	4733.7	212.2
4775.6	213.2	4837.8	212.3	4902.2	212.9	4935.7	212.6	4948.7	206.4
4954.7	204.6	4963.7	204.4	4975.7	203.9	4984.7	203.9	4995.7	204.9
5006.7	205.4	5039.7	205.9	5051.3	206.4	5062.8	210.9	5062.9	213.3
5063.5	213	5079.3	212.4	5165.5	210.9	5182	211	5192.9	210.6
5274	210.7	5312.8	210.4	5415.4	210.6	5527	210.4	5541.8	210.5
5555.2	210.2	5574	210.8	5679	210.2	5740.8	210	5780.2	228

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3370.3	.07	4935.7	.045	5062.9	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4935.7	5062.9	216	189.6	12	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25486

INPUT
Description: 25486
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3370.3	228	3439.1	222	3524.1	220.5	3575.4	220.5	3602.4	224

3641.6	226	3687.7	222	3723.3	216.4	3803.9	214.3	3890.9	212.9
4007.9	211.7	4097.4	211.5	4112.3	210.1	4148.2	210	4228.8	210.2
4304.1	210.7	4404.6	211.5	4561.2	211.4	4691	211.5	4733.7	212.2
4775.6	213.2	4837.8	212.3	4902.2	212.9	4934	212.6	4978	194.9
5018	194.9	5064	213.1	5079.3	212.4	5165.5	210.9	5192.9	210.6
5274	210.7	5312.8	210.4	5415.4	210.6	5527	210.4	5541.8	210.5
5555.2	210.2	5574	210.8	5679	210.2	5740.8	210	5780.2	228

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3370.3	.055	4934	.035	5064	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4934	5064	324	287.4	18	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25420

INPUT
Description: 25420

Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3579.51	219.76	3818.06	216.56	3898.13	213.28	3985.9	209.5	4137.2	209.2
4266.8	209.1	4334.8	210.2	4474.4	212.3	4669.9	211.6	4730.7	212.1
4795	211.4	4825.7	212.2	4880	212.2	4933.9	211.9	4938.8	211.9
4938.9	213.5	4949.4	206.2	4949.9	205.2	4956.9	203.3	4965.9	203.4
4979.9	203.8	4995.9	204.4	5016.9	204.9	5037.9	205.2	5050.6	206.2
5052.3	213.3	5053	212.7	5065.3	212.1	5124.8	212.1	5171.3	211
5304.6	210.6	5390.3	210.4	5467.9	210.5	5521.3	210.7	5544.4	210.2
5563.5	210.6	5689.7	210.3	5755.34	210.98	5802.05	212.7	5839.86	214.51
5884.34	216.87	5964.92	219.72						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3579.51	.07	4938.9	.045	5052.3	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4938.9	5052.3	150.03	212.49	5.76	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25246

INPUT
Description: 25246
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3839.29	219.43	3985.9	209.5	4137.2	209.2	4266.8	209.1	4334.8	210.2
4474.4	212.3	4669.9	211.6	4730.7	212.1	4795	211.4	4825.7	212.2
4880	212.2	4920	212	4970	194.8	5010	194.8	5025.44	201.55
5055	212.7	5065.3	212.1	5083.44	202.01	5124.8	212.1	5171.3	211
5304.6	210.6	5390.3	210.4	5467.9	210.5	5521.3	210.7	5544.4	210.2
5563.5	210.6	5689.7	210.3	5822.26	219.31				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3839.29	.055	4920	.035	5055	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4920	5055	210	297.48	8.16	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
5057.53	5822.26	212.82	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25165

INPUT
Description: 25165

Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3944.06	221.41	4006.41	216.97	4078.9	206.5	4094.11	210.7	4109.68	208.8
4152.43	208.8	4205.89	209	4223.98	210.1	4260.43	212.2	4290.76	212.4
4345.66	211	4380.31	211.1	4416.49	211.2	4457.8	210.5	4502.89	210.5
4555	210.7	4594.51	210.3	4647.16	210.9	4699.54	211	4749.76	211
4777.48	210.7	4810.24	207.3	4817.71	207.3	4832.29	211	4845.79	211.5
4847.59	213.9	4849.39	210.5	4863.79	212	4876.39	212	4890.79	212
4893.49	212	4895.29	204.1	4897.09	202.7	4915.99	201.9	4929.49	201.8
4933.99	203.8	4943.89	203.8	4951.99	205	4957.39	205.7	4973.59	206.7
4997.89	206.6	5025.88	206.7	5042.98	207.8	5061.61	211	5079.52	211.5
5101.57	211.8	5109.31	212.6	5126.32	212	5158.72	212	5185	212.8
5206.78	211.8	5229.73	211.5	5240.35	210.5	5259.88	210.7	5288.32	210.3
5334.22	210.8	5401.63	210.5	5439.34	210.6	5495.95	210.4	5555.17	210.9
5582.62	210.6	5601.52	211.5	5635.05	212.52	5665.48	214.41	5715.12	216.97
5777.83	220.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3944.06	.06	4847.59	.045	5079.52	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4847.59	5079.52	15	20	7	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3944.06	4847.59	210	F
5079.52	5777.83	210	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 25145

INPUT
Description: 25145

Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2940.9	228	3069.435	224.4	3254.59	224.2	3425.875	225.1	3473.09	225
3758.47	216.1	3866.2	220	3953.125	216	4013.83	206.2	4086.695	208.3
4203.165	210.9	4324.1	210.9	4431.64	210.6	4614.61	210.7	4733.55	210.6
4789.41	207.8	4822.945	210.9	4833.395	210.8	4850.495	211.7	4851.445	213.9

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4852.395     2134859.995     2134863.795     2134882.795     2134883.745   203.2
4894.195   202.24900.845   200.74914.145   201.14924.595   201.64930.295   202.3
4931.245   204.94932.195   206.14942.645   205.9 4942.74   208.55007.245   208.7
5105.855   211.25163.045     2125200.095   212.25261.655   210.55365.015   210.3
5473.695   210.3 5589.12   210.8 5715.09   210.75825.385     2105843.815   220.1
 5926.75     228

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  2940.9      .24851.445    .025 4942.74      .1

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      4851.445 4942.74               10      15       7              .7       .9
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  2940.94851.445     210       F
 4942.74 5926.75     210       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 25130

INPUT
Description: 25130

Station Elevation Data    num=      44
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  3919.7   219.83921.908     2104008.404   206.54091.348   208.7 4202.42   211.2
4384.628   210.74497.236   210.5 4650.74   210.74766.132   211.14790.612   208.2
4830.068   210.64843.412   208.74843.508   210.64858.868     2114864.628   204.3
4874.228   201.94885.748   202.54891.508   201.54897.268   198.54927.988   201.5
4937.588   202.24941.428   203.24961.588   203.24976.948     2035002.868   203.7
5022.068   203.75033.588   203.55047.988   204.75057.588     2065068.148   206.1
5121.908   211.25142.068   211.95189.396   212.15212.148   212.1 5266.58   210.5
 5428.34   210.45528.756   210.25597.876   210.95632.724   211.6 5659.43  212.24
 5682.56  213.01 5741.99   214.4 5775.36  215.88 5830.96  217.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  3919.7    .0554858.868     .045121.908    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      4858.8685121.908               10      43      90              .7       .9
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 25087

INPUT
Description: 25087

Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 4004.49  219.62 4017.44  216.74 4059.79  211.14  4102.3   208.4    4141     210
  4208.4   210.3    4293   210.6  4422.2   210.1  4559.4   210.2  4688.6     211
  4785.6   210.3  4821.6   210.4  4835.2   208.4    4852   211.9    4909   210.5
    4912   206.9    4919   204.9    4931     202    4945   199.8    4951   197.7
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4965	197.1	4981	196.5	4998	200.6	5018	201.5	5031	203.1
5043	201.8	5051	200.5	5063	199.6	5070	198.9	5079	199.5
5080	204.9	5081	208.5	5124	209.3	5169.2	210.2	5242.6	210.7
5306.3	210.8	5352.8	210.6	5368.1	210.5	5397.51	211.19	5411.21	213.44
5444.84	215.59	5470.46	217.56	5502.71	219.38				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4004.49	.055	4931	.04	5080	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4931	5080	150	136.98	120	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24991

INPUT
Description: 24991
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4013.47	219.31	4078.9	206.5	4095.8	210.7	4113.1	208.8	4160.6	208.8
4220	209	4240.1	210.1	4280.6	212.2	4314.3	212.4	4375.3	211
4413.8	211.1	4454	211.2	4499.9	210.5	4550	210.5	4607.9	210.7
4651.8	210.3	4710.3	210.9	4768.5	211	4824.3	211	4855.1	210.7
4891.5	207.3	4899.8	207.3	4916	211	4931	211.5	4933	213.9
4935	210.5	4951	212	4965	212	4981	212	4984	212
4986	204.1	4988	202.7	5022	201.9	5040	194.69	5080	194.69
5110	206.7	5150.1	207.8	5170.8	211	5190.7	211.5	5215.2	211.8
5223.8	212.6	5242.7	212	5278.7	212	5307.9	212.8	5332.1	211.8
5357.6	211.5	5369.4	210.5	5391.1	210.7	5422.7	210.3	5473.7	210.8
5548.6	210.5	5590.5	210.6	5653.4	210.4	5719.2	210.9	5749.7	210.6
5770.7	211.5	5827.88	218.91						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4013.47	.055	4933	.035	5190.7	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4933	5190.7	30	35	22	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24956

INPUT
Description: 24956
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3919.7	219.8	3922	210	4012.1	206.5	4098.5	208.7	4214.2	211.2
4404	210.7	4521.3	210.5	4681.2	210.7	4801.4	211.1	4826.9	208.2
4868	210.6	4881.9	208.7	4882	210.6	4898	211	4904	204.3
4914	201.9	4926	202.5	4932	201.5	4938	198.5	4955	200.5
4970	194.7	4980	194.67	5000	194.67	5010	194.67	5033	203.7
5068	203.7	5080	203.5	5095	204.7	5105	206	5116	206.1
5172	211.2	5193	211.9	5242.3	212.1	5266	212.1	5322.7	210.5
5491.2	210.4	5595.8	210.2	5667.8	210.9	5704.1	211.6	5812.91	219.14

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3919.7	.055	4898	.035	5172	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4898	5172	6	26	53	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24950

INPUT
Description: 24950

Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3757.25	219.46	3820.82	216.72	3843.24	214.76	3880.07	212.28	3936.6	209
4084.1	210.7	4259.4	210.3	4446.4	210.7	4581.5	210.7	4640	210.6
4671.5	207.8	4731.1	211	4814.5	210.1	4873	210	4913	209.8
4914	204.8	4915	202	4926	201.2	4929	202	4940	203.4
4951	204.3	4977	204.8	4993	204.8	5009	204.2	5024	202.8
5032	201.8	5042	201.8	5055	202.8	5067	202.4	5075	202.8
5085	204.8	5103	209.7	5121	210	5232.1	210.6	5260.1	210.3
5293.1	210.4	5400.7	210.2	5439.6	210.5	5469.9	210.5	5505.6	211.3
5542.35	211.97	5572.78	214.03	5621.89	216.03	5668.59	217.17	5719.36	219.39

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3757.25	.055	4915	.04	5024	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4915	5024	59.66	42.66	80	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24930

INPUT
Description: 24930
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4053.7	219.02	4102.3	208.4	4141	210	4208.4	210.3	4293	210.6
4422.2	210.1	4559.4	210.2	4688.6	211	4785.6	210.3	4821.6	210.4
4835.2	208.4	4852	211.9	4909	210.5	4912	206.9	4919	204.9
4931	202	4945	199.8	4951	197.7	4965	197.1	4981	196.5
4995	198.8	5005	194.7	5020	194.65	5045	194.65	5058	199.9
5063	199.6	5070	198.9	5079	199.5	5080	204.9	5081	208.5
5124	209.3	5169.2	210.2	5242.6	210.7	5306.3	210.8	5352.8	210.6
5368.1	210.5	5388.21	219.31						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4053.7	.055	4931	.035	5080	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4931	5080	4	17	37	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24913

INPUT
Description: 24913
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4065.48	219.43	4102.3	208.4	4141	210	4208.4	210.3	4293	210.6
4422.2	210.1	4559.4	210.2	4688.6	211	4785.6	210.3	4821.6	210.4
4835.2	208.4	4852	211.9	4909	210.5	4912	206.9	4919	204.9
4931	202	4945	199.8	4951	197.7	4965	197.1	4981	196.5
4995	198.8	5005	194.7	5020	194.65	5045	194.65	5058	199.9
5063	199.6	5070	198.9	5079	199.5	5080	204.9	5081	208.5
5124	209.3	5169.2	210.2	5242.6	210.7	5306.3	210.8	5352.8	210.6
5368.1	210.5	5393.45	219.14						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4065.48	.055	4931	.035	5080	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4931	5080	178.38	138.36	202.98	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24860

INPUT
Description: 24860
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3867.35	219.6	3936.6	209	4084.1	210.7	4259.4	210.3	4446.4	210.7
4581.5	210.7	4640	210.6	4671.5	207.8	4731.1	211	4814.5	210.1
4873	210	4913	209.8	4914	204.8	4915	202	4926	201.2
4948	203.5	4970	194.6	5010	194.6	5029	202	5055	202.8
5067	202.4	5075	202.8	5085	204.8	5103	209.7	5121	210
5232.1	210.6	5260.1	210.3	5293.1	210.4	5400.7	210.2	5439.6	210.5
5469.9	210.5	5505.6	211.3	5554.54	219.25				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3867.35	.055	4913	.035	5103	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913	5103	56	49	42	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24822

INPUT
Description: 24822

Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3047.71	219.04	3096	216.9	3143.5	210	3211.2	209.3	3314.6	210.2
3429.4	210.3	3562.7	210.3	3733.8	210.5	3855.1	210.6	3938.5	207.8
4082.5	209.8	4196.6	209.1	4248.4	207	4320	211.7	4365	211.5
4400	203.3	4450	203.3	4480	208	4550	212.8	4600	209
4637.9	209.8	4701.8	209.3	4754.9	208.9	4833.6	208.4	4903	208.1
4935	207.6	4947	206.4	4949	204.8	4953	199.6	4972	198.4
4981	199.6	4995	200.1	5010	202.8	5024	201.6	5031	201.3
5051	204.8	5069	208.8	5099	209.2	5159	208	5229	206
5248	204	5262	204	5276	206	5294	208	5334	208
5394	208.2	5446.62	208.55	5475.53	209.89	5491.1	212.34	5517.79	214.25
5604.98	216.6	5671.66	219.09						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3047.71	.055	4972	.04	5051	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4972	5051	.5	43.5	325	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24811

INPUT
Description: 24811
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3850.51	219.08	3936.6	209	4084.1	210.7	4259.4	210.3	4446.4	210.7
4581.5	210.7	4640	210.6	4671.5	207.8	4731.1	211	4814.5	210.1
4873	210	4913	209.8	4914	204.8	4915	202	4926	201.2
4948	203.5	4970	194.6	5010	194.6	5029	202	5055	202.8
5067	202.4	5075	202.8	5085	204.8	5103	209.7	5121	210
5232.1	210.6	5260.1	210.3	5293.1	210.4	5400.7	210.2	5439.6	210.5
5469.9	210.5	5505.6	211.3	5554.54	218.85				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3850.51	.055	4913	.035	5103	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913	5103	35.52	78.48	360	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24776

INPUT
Description: 24776
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3872.4	219.14	3936.6	209	4084.1	210.7	4259.4	210.3	4446.4	210.7
4581.5	210.7	4640	210.6	4671.5	207.8	4731.1	211	4814.5	210.1
4873	210	4913	209.8	4914	204.8	4915	202	4926	201.2
4939	203.5	4961	194.6	5020	194.6	5039	202	5055	202.8

5067	202.4	5075	202.8	5085	204.8	5103	209.7	5121	210
5232.1	210.6	5260.1	210.3	5293.1	210.4	5400.7	210.2	5439.6	210.5
5469.9	210.5	5505.6	211.3	5559.59	218.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3872.4	.055	4913	.035	5103	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913	5103	76	76	76	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24735

INPUT
Description: 24735
This is a REPEATED section.

Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1992.8	228	2124	224.3	2533.6	224.4	2901	215.9	3003.9	215.4
3096	216.9	3143.5	210	3211.2	209.3	3314.6	210.2	3429.4	210.3
3562.7	210.3	3733.8	210.5	3855.1	210.6	3938.5	207.8	4082.5	209.8
4196.6	209.1	4248.4	207	4320	211.7	4365	211.5	4400	203.3
4450	203.3	4480	208	4550	212.8	4600	209	4637.9	209.8
4701.8	209.3	4754.9	208.9	4833.6	208.4	4895.1	209.2	4932	211.6
4946.5	212.1	4952	212.2	4965	203.1	4973	202	4983	200.8
4990	203	5010	203.1	5018	200.8	5024	200.3	5028	201
5035	202.8	5037	203	5109	205	5149	206.3	5160	209.5
5173	209	5179	211.4	5227	212.3	5283	212.7	5303	212.6
5344	212.1	5357	212	5364	207.9	5368	207.7	5390	211.7
5411	211	5425	211	5440	207.8	5484	207.5	5509	205.7
5514	202.1	5521	200.9	5534	200.3	5541	198	5551	198.2
5562	198.2	5572	198.4	5582	198	5590	200	5593	202.1
5597	205.3	5612	217.2	5628	226.3				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1992.8	.2	4637.9	.04	4833.6	.055	4965	.04	5037	.055
5509	.04								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4965	5035	1	45	50	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1992.8	4965	209	F
5035	5628	202.3	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24700

INPUT
Description: 24700
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

3860.62	218.91	3936.6	209	4084.1	210.7	4259.4	210.3	4446.4	210.7
4581.5	210.7	4640	210.6	4671.5	207.8	4731.1	211	4814.5	210.1
4873	210	4913	209.8	4914	204.8	4915	202	4923	201.5
4924	201.4	4945	194.6	5035	194.55	5054	202.7	5055	202.8
5067	202.4	5075	202.8	5085	204.8	5103	209.7	5121	210
5232.1	210.6	5260.1	210.3	5293.1	210.4	5400.7	210.2	5439.6	210.5
5469.9	210.5	5505.6	211.3	5573.06	218.85				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3860.62	.055	4913	.035	5103	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4913	5103	42	51.99	62.01	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24690

INPUT
Description: 24690

Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1992.8	228	2124	224.3	2533.6	224.4	2901	215.9	3003.9	215.4
3096	216.9	3143.5	210	3211.2	209.3	3314.6	210.2	3429.4	210.3
3562.7	210.3	3733.8	210.5	3855.1	210.6	3938.5	207.8	4082.5	209.8
4196.6	209.1	4248.4	207	4320	211.7	4365	211.5	4400	203.3
4450	203.3	4480	208	4550	212.8	4600	209	4637.9	209.8
4701.8	209.3	4754.9	208.9	4833.6	208.4	4895.1	209.2	4932	211.6
4946.5	212.1	4952	212.2	4965	203.1	4973	202	4983	200.8
4990	203	5010	203.1	5018	200.8	5024	200.3	5028	201
5035	202.8	5037	203	5109	205	5149	206.3	5160	209.5
5173	209	5179	211.4	5227	212.3	5283	212.7	5303	212.6
5344	212.1	5357	212	5364	207.9	5368	207.7	5390	211.7
5411	211	5425	211	5440	207.8	5484	207.5	5509	205.7
5514	202.1	5521	200.9	5534	200.3	5541	198	5551	198.2
5562	198.2	5572	198.4	5582	198	5590	200	5593	202.1
5597	205.3	5612	217.2	5628	226.3				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1992.8	.2	4637.9	.04	4833.6	.055	4965	.04	5037	.055
5509	.04								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4965	5035	.2	42.6	105	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1992.8	4965	209	F
5035	5628	205.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24648

INPUT

Description: 24648
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3049.11	219.31	3096	216.9	3143.5	210	3211.2	209.3	3314.6	210.2
3429.4	210.3	3562.7	210.3	3733.8	210.5	3855.1	210.6	3938.5	207.8
4082.5	209.8	4196.6	209.1	4248.4	207	4320	211.7	4365	211.5
4400	203.3	4450	203.3	4480	208	4550	212.8	4600	209
4637.9	209.8	4701.8	209.3	4754.9	208.9	4833.6	208.4	4898	208
4932	194.5	5060	194.5	5096	209	5159	208	5229	206
5248	204	5262	204	5276	206	5294	208	5334	208
5394	208.2	5443.87	218.91						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3049.11	.055	4898	.035	5096	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4898	5096	1.4	168.21	860.02	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24565

INPUT
Description: 24565
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1992.8	228	2124	224.3	2533.6	224.4	2901	215.9	3003.9	215.4
3096	216.9	3143.5	210	3211.2	209.3	3314.6	210.2	3429.4	210.3
3562.7	210.3	3733.8	210.5	3855.1	210.6	3938.5	207.8	4082.5	209.8
4196.6	209.1	4248.4	207	4320	211.7	4365	211.5	4400	203.3
4450	203.3	4480	208	4550	212.8	4600	209	4637.9	209.8
4701.8	209.3	4754.9	208.9	4833.6	208.4	4895.1	209.2	4932	211.6
4946.5	212.1	4952	212.2	4954	194.5	4973	194.5	4984	194.5
5005	194.5	5045	194.5	5127	194.5	5149	206.3	5160	209.5
5173	209	5179	211.4	5227	212.3	5283	212.7	5303	212.6
5344	212.1	5357	212	5364	207.9	5368	207.7	5390	211.7
5411	211	5425	211	5440	207.8	5484	207.5	5509	205.7
5514	202.1	5521	200.9	5534	200.3	5541	198	5551	198.2
5562	198.2	5572	198.4	5582	198	5590	200	5593	202.1
5597	205.3	5612	217.2	5628	226.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1992.8	.055	4952	.035	5149	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4952	5149	4.2	46.6	109	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24561

INPUT
Description: 24561
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

1992.8	228	2124	224.3	2533.6	224.4	2901	215.9	3003.9	215.4
3096	216.9	3143.5	210	3211.2	209.3	3314.6	210.2	3429.4	210.3
3562.7	210.3	3733.8	210.5	3855.1	210.6	3938.5	207.8	4082.5	209.8
4196.6	209.1	4248.4	207	4320	211.7	4365	211.5	4400	203.3
4450	203.3	4480	208	4550	212.8	4600	209	4637.9	209.8
4701.8	209.3	4754.9	208.9	4833.6	208.4	4895.1	209.2	4932	211.6
4946.5	212.1	4952	212.2	4953	202.75	4973	202.75	4984	202.75
5005	202.8	5045	202.75	5128	202.75	5149	206.3	5160	209.5
5173	209	5179	211.4	5227	212.3	5283	212.7	5303	212.6
5344	212.1	5357	212	5364	207.9	5368	207.7	5390	211.7
5411	211	5425	211	5440	207.8	5484	207.5	5509	205.7
5514	202.1	5521	200.9	5534	200.3	5541	198	5551	198.2
5562	198.2	5572	198.4	5582	198	5590	200	5593	202.1
5597	205.3	5612	217.2	5628	226.3				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1992.8	.2	4637.9	.055	4952	.02	5128	.055	5509	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4952	5128	1.2	87.6	155	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1992.8	4952	209	F
5128	5628	202.3	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24516

INPUT
Description: 24516
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1992.8	228	2124	224.3	2533.6	224.4	2901	215.9	3003.9	215.4
3096	216.9	3143.5	210	3211.2	209.3	3314.6	210.2	3429.4	210.3
3562.7	210.3	3733.8	210.5	3855.1	210.6	3938.5	207.8	4082.5	209.8
4196.6	209.1	4248.4	207	4320	211.7	4365	211.5	4400	203.3
4450	203.3	4480	208	4550	212.8	4600	209	4637.9	209.8
4701.8	209.3	4754.9	208.9	4833.6	208.4	4895.1	209.2	4932	211.6
4946.5	212.1	4952	212.2	4965	203.1	4973	202	4984	200.7
5005	192.5	5045	192.5	5075	204.3	5149	206.3	5160	209.5
5173	209	5179	211.4	5227	212.3	5283	212.7	5303	212.6
5344	212.1	5357	212	5364	207.9	5368	207.7	5390	211.7
5411	211	5425	211	5440	207.8	5484	207.5	5509	205.7
5514	202.1	5521	200.9	5534	200.3	5541	198	5551	198.2
5562	198.2	5572	198.4	5582	198	5590	200	5593	202.1
5597	205.3	5612	217.2	5628	226.3				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
1992.8	.2	4637.9	.055	4965	.04	5075	.055	5509	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4965	5075	.99	213.03	524.97	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
1992.8	4965	209	F
5075	5628	205.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24477

INPUT
Description: 24477

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2785.5	228	2903.2	225.3	3288.6	224.3	3309.1	225.9	3323.8	216.9
3337.5	217.3	3727.4	217	3731.3	217.4	3743.4	215.2	3793.7	215.6
3819.5	216.9	3847	217	3855.8	218.3	3914.9	213	3927.2	207.2
3939.5	207.2	3963.8	209.1	3980.5	207.3	4010.1	209.6	4082.5	210.7
4104.9	210.7	4579.9	210.9	4599	210.6	4715.8	205.9	4735.2	210.4
4767.5	211	4814.7	210	4850.3	210.2	4857	209.3	4915.8	209.7
4971.1	208.7	4971.6	210.3	4972.5	205.1	5006.7	207.4	5027.5	207.1
5030.2	210.2	5064.1	210.7	5068.5	212.9	5082.4	213.4	5087.3	213.2
5093	210	5123	208	5131	206	5151	205	5181	206
5221	206.5	5254	206	5258	204	5266	202.5	5277	187.6
5287	186.8	5297	186.6	5307	186.8	5317	186.8	5327	186.8
5337	187.5	5347	188	5357	188.3	5367	188.8	5377	189.3
5387	189.8	5397	190.8	5407	191.8	5417	193.3	5427	194.8
5437	195.8	5447	196.8	5457	196.8	5467	195.3	5477	195.8
5487	195.5	5497	196.3	5507	197.3	5517	197.7	5527	199.1
5538	200.5	5542.3	201.9	5548.5	202.8	5572.7	205.6	5592.7	210.8
5597.9	209.1	5645.8	212	5650.3	213.3	5650.4	213.3	5655	210.8
5666	206	5666.1	206	5675.3	202.4	5692.6	201.4	5700	201
5707.4	200.7	5718.1	202.1	5727	205	5727.1	205.1	5759.6	214.1
5759.7	214.1	5783.9	213.9	5853.6	216.3	5945	223	5955.2	228.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2785.5	.2	5266	.048	5542.3	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5266	5542.3	9.99	72	72	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2785.5	5266	209	F
5542.3	5955.2	205.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24405

INPUT
Description: TIMBER BRIDGE
TIMBER BRIDGE

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2785.5	228	2903.2	225.3	3288.6	224.3	3309.1	225.9	3323.8	216.9
3337.5	217.3	3727.4	217	3731.3	217.4	3743.4	215.2	3793.7	215.6
3819.5	216.9	3847	217	3855.8	218.3	3914.9	213	3927.2	207.2
3939.5	207.2	3963.8	209.1	3980.5	207.3	4010.1	209.6	4082.5	210.7
4104.9	210.7	4579.9	210.9	4599	210.6	4715.8	205.9	4735.2	210.4
4767.5	211	4814.7	210	4850.3	210.2	4857	209.3	4915.8	209.7

4971.1	208.7	4971.6	210.3	4972.5	205.1	5006.7	207.4	5027.5	207.1
5030.2	210.2	5064.1	210.7	5068.5	212.9	5082.4	213.4	5087.3	213.2
5127.3	193.4	5167	184	5207	191.4	5217	191.8	5227	191
5237	189.6	5247	188.8	5257	188.3	5267	187.8	5277	187.6
5287	186.8	5297	186.6	5307	186.8	5317	186.8	5327	186.8
5337	187.5	5347	188	5357	188.3	5367	188.8	5377	189.3
5387	189.8	5397	190.8	5407	191.8	5417	193.3	5427	194.8
5437	195.8	5447	196.8	5457	196.8	5467	195.3	5477	195.8
5487	195.5	5497	196.3	5507	197.3	5517	197.7	5527	199.1
5538	200.5	5542.3	201.9	5548.5	202.8	5572.7	205.6	5592.7	210.8
5597.9	209.1	5645.8	212	5650.3	213.3	5650.4	213.3	5655	210.8
5666	206	5666.1	206	5675.3	202.4	5692.6	201.4	5700	201
5707.4	200.7	5718.1	202.1	5727	205	5727.1	205.1	5759.6	214.1
5759.7	214.1	5783.9	213.9	5853.6	216.3	5945	223	5955.2	228.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2785.5	.2	5087.3	.048	5548.5	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5087.3	5548.5	54.99	54.99	54.99	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2785.5	5087.3	209	F
5548.5	5955.2	204.7	F

Cross Section Lid
num= 9

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
5650.3	213.3	213.3	5650.4	214.6	213.3	5655	214.6	210.8
5666	214.6	206	5666.1	214.6	210.8	5700	214.8	210.8
5727	214.6	210.8	5727.1	214.6	205.1	5759.6	214.6	214.1

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24350

INPUT
Description: 24350

Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3173.2	228	3299.3	224.4	3323.8	225.3	3720.7	224.6	3723.4	226.7
3737.8	217.7	4031.1	216.9	4082.4	217.8	4142.5	217.5	4161.5	215.2
4269.7	217.1	4340.3	214.5	4360.6	206.4	4380.6	206.4	4400.6	212.7
4419.1	209.1	4449.6	208.8	4521.5	210.6	4565.2	210.6	4646	210.1
4818.7	211	4854.8	211	4861.1	209.2	4933.6	209.5	4974.8	208.5
4975.5	210.3	4976.1	205.2	5001	206.6	5023.9	206.8	5027.7	209.9
5063.7	210.4	5068	212.8	5079	213.2	5104.1	202.8	5189	177.7
5199	177.7	5222	181.3	5249	182.9	5279	185.8	5299	185.9
5309	186.5	5319	186.6	5329	186.9	5339	187.2	5349	187.6
5379	187.8	5389	188	5409	188.1	5419	189.7	5429	190
5439	190.7	5449	192.2	5459	193.5	5464	194	5469	193.4
5474	192.8	5479	194.3	5484	193.3	5489	193	5496	193.5
5499	193.3	5502	193.5	5506	193.3	5509	193.7	5516	193
5519	193	5529	191.3	5539	190	5541	189.8	5549	191.9
5559	195.3	5564	195.9	5570.3	196.9	5579.6	199.3	5589.6	201.9
5594.1	202.9	5612.2	207	5638	207.3	5650.2	210.3	5655.8	210.6
5662.8	212.5	5669	212.6	5675.8	212.4	5685.6	204.1	5695	201.5
5707.1	201.3	5718.6	200.9	5731.7	201.3	5744	201.6	5756.4	203.1
5779.8	207.1	5834.3	214	5857.4	214.7	5934.7	215.7	5951	220.4

5954	220.3	5999.8	222.8	6010.7	228

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3173.2	.2	5104.1	.048	5594.1	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5104.1	5594.1	86.68	93.32	113.32	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3173.2	5104.1	209	F
5594.1	6010.7	204.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24303

INPUT
Description: 24303
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2785.5	228	2903.2	225.3	3288.6	224.3	3309.1	225.9	3323.8	216.9
3337.5	217.3	3727.4	217	3731.3	217.4	3743.4	215.2	3793.7	215.6
3819.5	216.9	3847	217	3855.8	218.3	3914.9	213	3927.2	207.2
3939.5	207.2	3963.8	209.1	3980.5	207.3	4010.1	209.6	4082.5	210.7
4104.9	210.7	4579.9	210.9	4599	210.6	4715.8	205.9	4735.2	210.4
4767.5	211	4814.7	210	4850.3	210.2	4857	209.3	4915.8	209.7
4971.1	208.7	4971.6	210.3	4972.5	205.1	5006.7	207.4	5027.5	207.1
5030.2	210.2	5064.1	210.7	5068.5	212.9	5082.4	213.4	5087.3	213.2
5093	210	5123	208	5131	206	5182	192.2	5190	192.2
5200	192.2	5210	192.2	5242	192.2	5267	202	5277	187.6
5287	186.8	5297	186.6	5307	186.8	5317	186.8	5327	186.8
5337	187.5	5347	188	5357	188.3	5367	188.8	5377	189.3
5387	189.8	5397	190.8	5407	191.8	5417	193.3	5427	194.8
5437	195.8	5447	196.8	5457	196.8	5467	195.3	5477	195.8
5487	195.5	5497	196.3	5507	197.3	5517	197.7	5527	199.1
5538	200.5	5542.3	201.9	5548.5	202.8	5572.7	205.6	5592.7	210.8
5597.9	209.1	5645.8	212	5650.3	213.3	5650.4	213.3	5655	210.8
5666	206	5666.1	206	5675.3	202.4	5692.6	201.4	5700	201
5707.4	200.7	5718.1	202.1	5727	205	5727.1	205.1	5759.6	214.1
5759.7	214.1	5783.9	213.9	5853.6	216.3	5945	223	5955.2	228.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2785.5	.07	5131	.048	5542.3	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5131	5542.3	53.35	118.7	128.65	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2785.5	5131	209	F
5542.3	5955.2	205.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24231

INPUT
Description: 24231 Timber Bridge
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2785.5	228	2903.2	225.3	3288.6	224.3	3309.1	225.9	3323.8	216.9
3337.5	217.3	3727.4	217	3731.3	217.4	3743.4	215.2	3793.7	215.6
3819.5	216.9	3847	217	3855.8	218.3	3914.9	213	3927.2	207.2
3939.5	207.2	3963.8	209.1	3980.5	207.3	4010.1	209.6	4082.5	210.7
4104.9	210.7	4579.9	210.9	4599	210.6	4715.8	205.9	4735.2	210.4
4767.5	211	4814.7	210	4850.3	210.2	4857	209.3	4915.8	209.7
4971.1	208.7	4971.6	210.3	4972.5	205.1	5006.7	207.4	5027.5	207.1
5030.2	210.2	5064.1	210.7	5068.5	212.9	5082.4	213.4	5087.3	213.2
5127.3	193.4	5167	184	5207	191.4	5217	191.8	5227	191
5237	189.6	5247	188.8	5257	188.3	5267	187.8	5277	187.6
5287	186.8	5297	186.6	5307	186.8	5317	186.8	5327	186.8
5337	187.5	5347	188	5357	188.3	5367	188.8	5377	189.3
5387	189.8	5397	190.8	5407	191.8	5417	193.3	5427	194.8
5437	195.8	5447	196.8	5457	196.8	5467	195.3	5477	195.8
5487	195.5	5497	196.3	5507	197.3	5517	197.7	5527	199.1
5538	200.5	5542.3	201.9	5548.5	202.8	5572.7	205.6	5592.7	210.8
5597.9	209.1	5645.8	212	5650.3	213.3	5650.4	213.3	5655	210.8
5666	206	5666.1	206	5675.3	202.4	5692.6	201.4	5700	201
5707.4	200.7	5718.1	202.1	5727	205	5727.1	205.1	5759.6	214.1
5759.7	214.1	5783.9	213.9	5853.6	216.3	5945	223	5955.2	228.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2785.5	.07	5087.3	.048	5548.5	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5087.3	5548.5	54.99	54.99	54.99	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2785.5	5087.3	209	F
5548.5	5955.2	204.7	F

Cross Section Lid
num= 9

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
5650.3	213.3	213.3	5650.4	214.6	213.3	5655	214.6	210.8
5666	214.6	206	5666.1	214.6	210.8	5700	214.8	210.8
5727	214.6	210.8	5727.1	214.6	205.1	5759.6	214.6	214.1

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24210

INPUT
Description: 24210

Station Elevation Data num= 91

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2833.9	227	2957.7	224.3	3366.9	224.4	3695.5	216.9	3811.9	218
3978	216.2	4039.4	210	4062.1	206.2	4137.6	209.4	4252.5	209.9
4369	210.2	4465	210.1	4538	211.6	4599	211.3	4660	207.4
4734	204.3	4735	203.9	4739	203.5	4745	202.8	4749	202.5
4759	201.9	4769	201.9	4779	201.9	4789	203.9	4792	204
4797	204.3	4799	210.3	4799.1	205.8	4801	210.4	4801.1	205.9
4881	209.9	4952	208.8	4975.9	207.9	4976	205.5	5006	206.1
5014	205.2	5024	204.4	5035	208.9	5082	210.4	5090	212.4
5101	212.7	5121	202.7	5143	196.4	5146	194.9	5166	188.9

5186	181.9	5206	176.4	5226	177.9	5246	182.1	5266	182.9
5286	183.7	5306	184.6	5326	184.9	5346	185.2	5366	185.4
5386	185.8	5406	185.9	5426	185.9	5446	185.9	5466	186.4
5486	187.4	5506	188.2	5526	188.9	5546	188.9	5566	188.9
5586	189.1	5606	188.9	5626	188.7	5646	189	5666	189.1
5686	188.4	5706	187.4	5726	186.4	5746	184.9	5766	186.9
5786	191.9	5796	194.4	5806	194.4	5826	196.7	5836	202.9
5861	211.9	5881	211.5	5901	201.4	5911	200.3	5923	200.6
5933	201.5	5953	202.6	6070.2	223.4	6088.2	223.5	6103	223.3
6108.8	227								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2833.9	.2	5121	.048	5836	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5121	5836	32.5	44.5	78.76	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2833.9	5121	209	F
5836	6108.8	204.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 24176

INPUT
Description: 24176
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3173.2	228	3299.3	224.4	3323.8	225.3	3720.7	224.6	3723.4	226.7
3737.8	217.7	4031.1	216.9	4082.4	217.8	4142.5	217.5	4161.5	215.2
4269.7	217.1	4340.3	214.5	4360.6	206.4	4380.6	206.4	4400.6	212.7
4419.1	209.1	4449.6	208.8	4521.5	210.6	4565.2	210.6	4646	210.1
4818.7	211	4854.8	211	4861.1	209.2	4933.6	209.5	4974.8	208.5
4975.5	210.3	4976.1	205.2	5001	206.6	5023.9	206.8	5027.7	209.9
5063.7	210.4	5068	212.8	5079	213.2	5104.1	202.8	5189	177.7
5199	177.7	5222	181.3	5249	182.9	5279	185.8	5299	185.9
5309	186.5	5319	186.6	5329	186.9	5339	187.2	5349	187.6
5379	187.8	5389	188	5409	188.1	5419	189.7	5429	190
5439	190.7	5449	192.2	5459	193.5	5464	194	5469	193.4
5474	192.8	5479	194.3	5484	193.3	5489	193	5496	193.5
5499	193.3	5502	193.5	5506	193.3	5509	193.7	5516	193
5519	193	5529	191.3	5539	190	5541	189.8	5549	191.9
5559	195.3	5564	195.9	5570.3	196.9	5579.6	199.3	5589.6	201.9
5594.1	202.9	5612.2	207	5638	207.3	5650.2	210.3	5655.8	210.6
5662.8	212.5	5669	212.6	5675.8	212.4	5685.6	204.1	5695	201.5
5707.1	201.3	5718.6	200.9	5731.7	201.3	5744	201.6	5756.4	203.1
5779.8	207.1	5834.3	214	5857.4	214.7	5934.7	215.7	5951	220.4
5954	220.3	5999.8	222.8	6010.7	228				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3173.2	.07	5104.1	.048	5594.1	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5104.1	5594.1	227.48	273.46	406.23	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3173.2	5104.1	209	F

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  5594.1  6010.7   204.7       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 24036

INPUT
Description: 24036
Station Elevation Data    num=      91
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  2833.9     227  2957.7   224.3  3366.9   224.4  3695.5   216.9  3811.9     218
    3978   216.2  4039.4     210  4062.1   206.2  4137.6   209.4  4252.5   209.9
    4369   210.2    4465   210.1    4538   211.6    4599   211.3    4660   207.4
    4734   204.3    4735   203.9    4739   203.5    4745   202.8    4749   202.5
    4759   201.9    4769   201.9    4779   201.9    4789   203.9    4792     204
    4797   204.3    4799   210.3  4799.1   205.8    4801   210.4  4801.1   205.9
    4881   209.9    4952   208.8  4975.9   207.9    4976   205.5    5006   206.1
    5014   205.2    5024   204.4    5035   208.9    5082   210.4    5090   212.4
    5101   212.7    5121   202.7    5143   196.4    5146   194.9    5166   188.9
    5186   181.9    5206   176.4    5226   177.9    5246   182.1    5266   182.9
    5286   183.7    5306   184.6    5326   184.9    5346   185.2    5366   185.4
    5386   185.8    5406   185.9    5426   185.9    5446   185.9    5466   186.4
    5486   187.4    5506   188.2    5526   188.9    5546   188.9    5566   188.9
    5586   189.1    5606   188.9    5626   188.7    5646     189    5666   189.1
    5686   188.4    5706   187.4    5726   186.4    5746   184.9    5766   186.9
    5786   191.9    5796   194.4    5806   194.4    5826   196.7    5836   202.9
    5861   211.9    5881   211.5    5901   201.4    5911   200.3    5923   200.6
    5933   201.5    5953   202.6  6070.2   223.4  6088.2   223.5    6103   223.3
  6108.8     227

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  2833.9     .07    5121    .048    5836     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          5121    5836              130     178  315.04              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  2833.9    5121     209       F
    5836  6108.8   204.7       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 24032

INPUT
Description: 24032

Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 4408.01  217.78 4419.22  214.48 4451.25  212.72    4492   211.8    4567   212.5
    4642   211.4    4682   206.5    4747     204    4757   203.1    4767   202.3
    4777   201.2    4787   200.6    4797   199.9    4807   200.3    4817   201.5
    4822   202.6    4907   210.2    4967   208.3    4983   203.4    4988   202.2
    5002   202.4    5007   202.9    5017   203.5    5024   208.2    5063   208.6
    5071   212.1    5083   212.2    5102   202.9    5112   193.9    5120   192.4
    5140   188.4    5160   182.4    5180   184.6    5200   186.9    5220   186.9
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5240	186.9	5260	187.4	5280	187.9	5300	185.4	5320	184.9
5340	182.9	5360	181.4	5380	180.4	5400	180.1	5420	180.8
5440	184.4	5460	184.8	5480	183.9	5500	183.7	5520	183.9
5540	184.4	5560	184.9	5580	186.7	5590	187.4	5600	186.7
5620	186.7	5640	186.9	5660	187.1	5680	187.1	5700	187.4
5720	187.7	5740	187.4	5760	187.4	5780	188.1	5800	189.3
5820	189.1	5840	186.9	5860	185.9	5880	190.9	5900	192.2
5910	193.4	5920	192.1	5940	191.9	5960	195.9	5963	202.9
5980	210.1	5994	210	6006	203.6	6018	202.9	6029	201.4
6038	200.8	6047	200.1	6059	200.1	6068	201.6	6073	203.9
6090	213.4	6123.13	218.08						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4408.01	.2	5102	.048	5963	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5102	5963	140	171.99	175	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4408.01	5102	209	F
5963	6123.13	204.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23860

INPUT
Description: 23860

Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2891.2	227	2989.9	224.5	3383.7	223.7	3423.9	224.5	3536.2	220.2
3601.7	222.1	3637.3	222.8	3715	221.1	3853	221.8	3879.1	215.2
4068.4	214.1	4150.2	211.3	4324.6	209.1	4416.5	211.4	4449	211.5
4521	211.1	4586	211	4664	210.1	4733	207.2	4796	207
4848	206.1	4869	210.8	4902	210.9	4969	209	4976	203.9
5003	203.4	5024	204.2	5036	211	5053	211.8	5057	212.7
5068	212.7	5084	206.7	5089	207.1	5095	202.7	5115	198
5131	194.2	5142	191.7	5162	187.7	5182	181.9	5192	181.7
5202	182.7	5222	187.4	5242	187.4	5262	187.4	5282	186.7
5302	186.7	5322	185.7	5342	181.2	5362	183.5	5382	183.7
5402	184.2	5422	184.7	5442	185.7	5462	186.5	5482	187.2
5502	188.2	5522	187.7	5542	186.9	5562	186.6	5582	184.7
5602	183.2	5622	182.7	5642	182.7	5662	183.7	5682	184.4
5702	185.6	5722	186.4	5742	185.7	5752	184.4	5762	185.4
5782	185.9	5802	186.8	5822	187.7	5842	187.6	5862	188.7
5872	189.7	5882	188.7	5902	183.7	5922	184.3	5942	190.2
5962	190.9	5982	195.2	5987.4	202.7	5994	209.2	6003	209
6027	203.1	6040	202.6	6052	201.4	6060	200.7	6070	200.3
6083	200.4	6088	201.6	6092	203.9	6108	213.7	6129.1	227

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2891.2	.2	5095	.048	5987.4	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5095	5987.4	45	48.34	46.66	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

2891.2	5095	209	F
5987.4	6129.1	204.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23858

INPUT
Description: 23858
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4492	211.8	4567	212.5	4642	211.4	4682	206.5	4747	204
4757	203.1	4767	202.3	4777	201.2	4787	200.6	4797	199.9
4807	200.3	4817	201.5	4822	202.6	4907	210.2	4967	208.3
4983	203.4	4988	202.2	5002	202.4	5007	202.9	5017	203.5
5024	208.2	5063	208.6	5071	212.1	5083	212.2	5102	202.9
5112	193.9	5120	192.4	5140	188.4	5160	182.4	5180	184.6
5200	186.9	5220	186.9	5240	186.9	5260	187.4	5280	187.9
5300	185.4	5320	184.9	5340	182.9	5360	181.4	5380	180.4
5400	180.1	5420	180.8	5440	184.4	5460	184.8	5480	183.9
5500	183.7	5520	183.9	5540	184.4	5560	184.9	5580	186.7
5590	187.4	5600	186.7	5620	186.7	5640	186.9	5660	187.1
5680	187.1	5700	187.4	5720	187.7	5740	187.4	5760	187.4
5780	188.1	5800	189.3	5820	189.1	5840	186.9	5860	185.9
5880	190.9	5900	192.2	5910	193.4	5920	192.1	5940	191.9
5960	195.9	5963	202.9	5980	210.1	5994	210	6006	203.6
6018	202.9	6029	201.4	6038	200.8	6047	200.1	6059	200.1
6068	201.6	6073	203.9	6090	213.4				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4492	.07	5102	.048	5963	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5102	5963	230.01	268.73	268.29	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4492	5102	209	F
5963	6090	204.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23715

INPUT
Description: 23715

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3041	227.1	3096.2	224.4	3199.6	228.8	3358.7	224.6	3427.6	223.6
3530.4	224.6	3615.7	224.1	3657.5	223.4	3708.2	223.8	3888.7	222.9
3927.2	215.3	4070.8	214.1	4149.2	213.5	4202.6	210.7	4402	208.9
4476.3	210.1	4535.4	210.3	4585.1	210.7	4626	210.3	4658	210.2
4711	210.8	4744	210.3	4785	210.4	4822	210.3	4855	210.6
4886	210.7	4911	210.2	4937	209.7	4965	205.6	4982	202.9
4989	202.2	4996	201.8	5002	201.4	5009	201.6	5018	203
5027	208.3	5037	207.8	5046	211.2	5079.8	202.6	5080	202.7

5123	189.7	5143	187.7	5163	187.7	5183	187.2	5203	185.2
5223	182.2	5243	181.7	5263	181.7	5283	180.2	5303	180.2
5323	181.2	5343	181.9	5363	182.7	5383	184.2	5403	183.7
5423	183.9	5443	185.2	5463	188.7	5483	188.7	5503	188.4
5523	187.7	5543	187.9	5563	188.3	5583	187.9	5603	187.7
5623	187.5	5643	187.2	5663	186.9	5683	186.8	5703	186.8
5723	186.7	5743	186.7	5763	186.4	5783	187	5803	187
5823	187.5	5843	188.7	5853	189.2	5863	188.7	5883	187.7
5903	185.7	5913	185.2	5923	185.1	5943	188.7	5963	192.1
5983	195.2	5987	202.7	5998	209.1	6012	208.7	6024	202.4
6039	201.5	6050	200.8	6060	200.3	6070	199.8	6080	199.9
6090	201.5	6099	209.8	6110	216.2	6122.3	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3041	.2	5079.8	.048	5987	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5079.8	5987	53.34	38.34	51.66	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3041	5079.8	209	F
5987	6122.3	205.2	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23686

INPUT
Description: 23686
Station Elevation Data num= 95

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2891.2	227	2989.9	224.5	3383.7	223.7	3423.9	224.5	3536.2	220.2
3601.7	222.1	3637.3	222.8	3715	221.1	3853	221.8	3879.1	215.2
4068.4	214.1	4150.2	211.3	4324.6	209.1	4416.5	211.4	4449	211.5
4521	211.1	4586	211	4664	210.1	4733	207.2	4796	207
4848	206.1	4869	210.8	4902	210.9	4969	209	4976	203.9
5003	203.4	5024	204.2	5036	211	5053	211.8	5057	212.7
5068	212.7	5084	206.7	5089	207.1	5095	202.7	5115	198
5131	194.2	5142	191.7	5162	187.7	5182	181.9	5192	181.7
5202	182.7	5222	187.4	5242	187.4	5262	187.4	5282	186.7
5302	186.7	5322	185.7	5342	181.2	5362	183.5	5382	183.7
5402	184.2	5422	184.7	5442	185.7	5462	186.5	5482	187.2
5502	188.2	5522	187.7	5542	186.9	5562	186.6	5582	184.7
5602	183.2	5622	182.7	5642	182.7	5662	183.7	5682	184.4
5702	185.6	5722	186.4	5742	185.7	5752	184.4	5762	185.4
5782	185.9	5802	186.8	5822	187.7	5842	187.6	5862	188.7
5872	189.7	5882	188.7	5902	183.7	5922	184.3	5942	190.2
5962	190.9	5982	195.2	5987.4	202.7	5994	209.2	6003	209
6027	203.1	6040	202.6	6052	201.4	6060	200.7	6070	200.3
6083	200.4	6088	201.6	6092	203.9	6108	213.7	6129.1	227

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2891.2	.07	5095	.048	5987.4	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5095	5987.4	241.65	221.67	243.36	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

2891.2	5095	209	F
5987.4	6129.1	204.7	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23600

INPUT
Description: 23600
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3464	227	3580.2	227	3660.1	228	3708.2	226.7	3759.2	226.2
3837.7	225.6	3952.5	223.8	3998.5	223	4035.3	222.9	4100.2	221.6
4186.4	210	4271.7	208.3	4377	207.6	4434.7	208.1	4523.9	208.2
4574.6	209.6	4674	209.6	4741	209.4	4806	210.1	4888	209.9
4964	209.5	4978	203.3	4994	200.9	5016	200.5	5022	203.3
5035	210	5053	210	5069	202.7	5072	196.9	5077	192.1
5087	189.6	5097	189.6	5107	189.6	5127	189.1	5147	189.1
5167	186.6	5187	181.6	5207	178.6	5227	176.6	5247	175.6
5267	175.1	5287	175.1	5307	175.3	5327	175.8	5347	177.6
5367	180.4	5387	183.2	5407	183.8	5427	183.2	5447	183.8
5467	186.6	5487	188.1	5507	188.6	5527	188.6	5547	188.8
5567	189.3	5587	189.3	5607	188.8	5627	188.6	5647	188.1
5667	187.7	5687	187.7	5707	187.6	5727	187.6	5747	187.4
5767	187.6	5787	188.2	5807	191.9	5827	189.4	5847	190.6
5867	186.6	5887	184.6	5907	185.1	5927	189.6	5947	191.1
5967	192.2	5977	194.1	5982	195.9	5987	198.6	5990.3	202.6
6001.8	208.4	6020.1	208.2	6029.3	205.5	6034	204.9	6040.5	201.6
6050.2	200.6	6061.8	199.8	6079.4	199.1	6083.9	199	6087.6	201.6
6091.7	204.8	6117	206	6118.1	202.6	6162.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3464	.2	5069	.048	5990.3	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5069	5990.3	185	80	72.48	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3464	5069	209	F
5990.3	6162.8	205.2	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23541

INPUT
Description: 23541
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3041	227.1	3096.2	224.4	3199.6	228.8	3358.7	224.6	3427.6	223.6
3530.4	224.6	3615.7	224.1	3657.5	223.4	3708.2	223.8	3888.7	222.9
3927.2	215.3	4070.8	214.1	4149.2	213.5	4202.6	210.7	4402	208.9
4476.3	210.1	4535.4	210.3	4585.1	210.7	4626	210.3	4658	210.2
4711	210.8	4744	210.3	4785	210.4	4822	210.3	4855	210.6
4886	210.7	4911	210.2	4937	209.7	4965	205.6	4982	202.9
4989	202.2	4996	201.8	5002	201.4	5009	201.6	5018	203

5027	208.3	5037	207.8	5046	211.2	5079.8	202.6	5080	202.7
5123	189.7	5143	187.7	5163	187.7	5183	187.2	5203	185.2
5223	182.2	5243	181.7	5263	181.7	5283	180.2	5303	180.2
5323	181.2	5343	181.9	5363	182.7	5383	184.2	5403	183.7
5423	183.9	5443	185.2	5463	188.7	5483	188.7	5503	188.4
5523	187.7	5543	187.9	5563	188.3	5583	187.9	5603	187.7
5623	187.5	5643	187.2	5663	186.9	5683	186.8	5703	186.8
5723	186.7	5743	186.7	5763	186.4	5783	187	5803	187
5823	187.5	5843	188.7	5853	189.2	5863	188.7	5883	187.7
5903	185.7	5913	185.2	5923	185.1	5943	188.7	5963	192.1
5983	195.2	5987	202.7	5998	209.1	6012	208.7	6024	202.4
6039	201.5	6050	200.8	6060	200.3	6070	199.8	6080	199.9
6090	201.5	6099	209.8	6110	216.2	6122.3	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3041	.07	5079.8	.048	5987	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5079.8	5987	344.96	195.04	227.52	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3041	5079.8	209	F
5987	6122.3	205.2	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23440

INPUT
Description: 23440

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3330.5	227	3536.3	222.8	3777	211.6	3837.4	210.5	3918.1	209.8
4063	209	4202	207.5	4317.7	207.7	4375.5	209	4404	209.3
4412	209.3	4462	208.9	4512	209.1	4562	208.5	4612	208
4662	208.6	4712	208.7	4762	208.9	4812	208.6	4861.8	206.6
4863	206.7	4883	206.1	4898	205	4911	202.8	4922	202.9
4924	204.9	4940	206	4943	202.8	4946	202.6	4948	202.3
4952	202.6	4955	203	4964	202.6	4971	202	4978	202.6
4985	203.1	4993	202.6	4998	201.5	5003	201.5	5007	202.6
5019	209.1	5024	209.4	5031	209.3	5041.1	202.7	5047	196.9
5062	194.6	5082	191.4	5102	188.9	5122	185.4	5142	181.2
5162	178.4	5182	176.4	5202	177.6	5222	181.9	5242	186.4
5262	191.1	5282	193.4	5302	189.2	5322	186.2	5342	185.6
5362	185.7	5382	186.1	5402	186.9	5422	186.9	5442	186.6
5462	186.9	5482	187.2	5502	187.2	5522	187.2	5542	187.6
5562	186.9	5582	187.9	5602	188.9	5622	185.4	5642	184.1
5662	186.2	5682	191.4	5702	190.4	5722	192.2	5732	194.2
5742	202.4	5752	207.3	5766.8	208.3	5786	208.4	5805	204.1
5807	201.3	5817	199.1	5827	198.5	5837	198.3	5847	198.4
5860	201.4	5867	204.9	5887	205.6	5906.4	205	5971.5	220
6000	222	6015.3	221.8	6031	221.1	6050.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3330.5	.2	5041.1	.048	5742	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.

```
        5041.1    5742              .34   46.66   53.34             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  3330.5  5041.1     209       F
    5742  6050.8   205.5       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 23426

INPUT
Description: 23426
Station Elevation Data    num=      94
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    3464     227  3580.2     227  3660.1     228  3708.2   226.7  3759.2   226.2
  3837.7   225.6  3952.5   223.8  3998.5     223  4035.3   222.9  4100.2   221.6
  4186.4     210  4271.7   208.3    4377   207.6  4434.7   208.1  4523.9   208.2
  4574.6   209.6    4674   209.6    4741   209.4    4806   210.1    4888   209.9
    4964   209.5    4978   203.3    4994   200.9    5016   200.5    5022   203.3
    5035     210    5053     210    5069   202.7    5072   196.9    5077   192.1
    5087   189.6    5097   189.6    5107   189.6    5127   189.1    5147   189.1
    5167   186.6    5187   181.6    5207   178.6    5227   176.6    5247   175.6
    5267   175.1    5287   175.1    5307   175.3    5327   175.8    5347   177.6
    5367   180.4    5387   183.2    5407   183.8    5427   183.2    5447   183.8
    5467   186.6    5487   188.1    5507   188.6    5527   188.6    5547   188.8
    5567   189.3    5587   189.3    5607   188.8    5627   188.6    5647   188.1
    5667   187.7    5687   187.7    5707   187.6    5727   187.6    5747   187.4
    5767   187.6    5787   188.2    5807   191.9    5827   189.4    5847   190.6
    5867   186.6    5887   184.6    5907   185.1    5927   189.6    5947   191.1
    5967   192.2    5977   194.1    5982   195.9    5987   198.6  5990.3   202.6
  6001.8   208.4  6020.1   208.2  6029.3   205.5    6034   204.9  6040.5   201.6
  6050.2   200.6  6061.8   199.8  6079.4   199.1  6083.9     199  6087.6   201.6
  6091.7   204.8    6117     206  6118.1   202.6  6162.8     227

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    3464     .07    5069    .048  5990.3     .08

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          5069  5990.3            370.7  253.33  251.68             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    3464    5069     209       F
  5990.3  6162.8   205.2       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 23300

INPUT
Description: 23300

Station Elevation Data    num=      69
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  3330.5     227  3536.3   222.8    3777   211.6  3837.4   210.5  3918.1   209.8
    4063     209    4202   207.5  4317.7   207.7  4375.5     209    4404   209.3
    4412   209.3    4462   208.9    4512   209.1    4562   208.5    4612     208
```

4662	208.6	4712	208.7	4762	208.9	4812	208.6	4861.8	206.6
4863	206.7	4883	206.1	4898	205	4911	202.8	4922	202.9
4924	204.9	4940	206	4943	202.8	4946	202.6	4948	202.3
4952	202.6	4955	203	4964	202.6	4971	202	4978	202.6
4985	203.1	4993	202.6	4998	201.5	5003	201.5	5007	202.6
5019	209.1	5024	209.4	5031	209.3	5041.1	202.7	5045.1	196.9
5135.7	176.4	5202.8	193.4	5417.7	188.9	5444.6	184.1	5484.8	190.4
5512	202.4	5522	207.3	5536.8	208.3	5556	208.4	5575	204.1
5577	201.3	5587	199.1	5597	198.5	5607	198.3	5617	198.4
5630	201.4	5637	204.9	5657	205.6	5676.4	205	5741.5	220
5770	222	5785.3	221.8	5801	221.1	5820.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3330.5	.2	5041.1	.048	5512	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5041.1	5512	45	45	45	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3330.5	5041.1	208	F
5512	5820.8	205.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23266

INPUT
Description: 23266
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3330.5	227	3536.3	222.8	3777	211.6	3837.4	210.5	3918.1	209.8
4063	209	4202	207.5	4317.7	207.7	4375.5	209	4404	209.3
4412	209.3	4462	208.9	4512	209.1	4562	208.5	4612	208
4662	208.6	4712	208.7	4762	208.9	4812	208.6	4861.8	206.6
4863	206.7	4883	206.1	4898	205	4911	202.8	4922	202.9
4924	204.9	4940	206	4943	202.8	4946	202.6	4948	202.3
4952	202.6	4955	203	4964	202.6	4971	202	4978	202.6
4985	203.1	4993	202.6	4998	201.5	5003	201.5	5007	202.6
5019	209.1	5024	209.4	5031	209.3	5041.1	202.7	5047	196.9
5062	194.6	5082	191.4	5102	188.9	5122	185.4	5142	181.2
5162	178.4	5182	176.4	5202	177.6	5222	181.9	5242	186.4
5262	191.1	5282	193.4	5302	189.2	5322	186.2	5342	185.6
5362	185.7	5382	186.1	5402	186.9	5422	186.9	5442	186.6
5462	186.9	5482	187.2	5502	187.2	5522	187.2	5542	187.6
5562	186.9	5582	187.9	5602	188.9	5622	185.4	5642	184.1
5662	186.2	5682	191.4	5702	190.4	5722	192.2	5732	194.2
5742	202.4	5752	207.3	5766.8	208.3	5786	208.4	5805	204.1
5807	201.3	5817	199.1	5827	198.5	5837	198.3	5847	198.4
5860	201.4	5867	204.9	5887	205.6	5906.4	205	5971.5	220
6000	222	6015.3	221.8	6031	221.1	6050.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3330.5	.07	5041.1	.048	5742	.08

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5041.1	5742	136.07	275	295.02	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

3330.5	5041.1	209	F
5742	6050.8	205.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23126

INPUT
Description: 23126
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3330.5	227	3536.3	222.8	3777	211.6	3837.4	210.5	3918.1	209.8
4063	209	4202	207.5	4317.7	207.7	4375.5	209	4404	209.3
4412	209.3	4462	208.9	4512	209.1	4562	208.5	4612	208
4662	208.6	4712	208.7	4762	208.9	4812	208.6	4861.8	206.6
4863	206.7	4883	206.1	4898	205	4911	202.8	4922	202.9
4924	204.9	4940	206	4943	202.8	4946	202.6	4948	202.3
4952	202.6	4955	203	4964	202.6	4971	202	4978	202.6
4985	203.1	4993	202.6	4998	201.5	5003	201.5	5007	202.6
5019	209.1	5024	209.4	5031	209.3	5041.1	202.7	5045.1	196.9
5135.7	176.4	5202.8	193.4	5417.7	188.9	5444.6	184.1	5484.8	190.4
5512	202.4	5522	207.3	5536.8	208.3	5556	208.4	5575	204.1
5577	201.3	5587	199.1	5597	198.5	5607	198.3	5617	198.4
5630	201.4	5637	204.9	5657	205.6	5676.4	205	5741.5	220
5770	222	5785.3	221.8	5801	221.1	5820.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3330.5	.07	5041.1	.048	5512	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5041.1	5512	180	180	180	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3330.5	5041.1	208	F
5512	5820.8	205.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23120

INPUT
Description: 23120
This is a REPEATED section.

Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3245	224	3346.1	222.2	3431.5	222.1	3528.6	220.8	3589.7	213.3
3703.1	210.7	3781.9	210.1	3852.2	208.6	3939.6	208.1	4005.5	208.7
4110.3	209.7	4136.4	209.9	4180.2	208.9	4202.5	209.1	4234.4	208.9
4298	209.2	4348.5	208.3	4398.5	208.3	4448.5	208	4498.5	207.4
4548.5	206.2	4598.5	206.5	4648.5	205.7	4698	205.4	4748.5	205.1
4798.5	205.5	4848.5	205.5	4898.5	205.2	4948.5	205.4	4971	204.5
4975	202.6	5023.9	202.7	5027.1	206.5	5048.5	202.6	5068.4	207.8
5086.9	202.8	5095.9	200.7	5100.5	199.8	5125.4	199.7	5130.4	202
5135.6	202.8	5145.2	205.5	5151	206.1	5173.7	207.5	5176.2	206.6
5192.7	205.9	5197.9	207.5	5224.2	208.2	5256.5	205	5270	206.7

5272	208.6	5346	208.9	5385.4	208.4	5411.7	206.7	5448.7	208.3
5492.5	209	5504.7	208.7	5507.7	208.7	5511.2	208.3	5523.4	208.3
5530.4	199.5	5543.3	199.3	5554.5	207.9	5567.3	202.2	5568.4	205
5569.4	203	5586.2	204.4	5611.6	204.2	5623.8	204.2	5625.7	203.9
5687.4	203.4	5691.5	201.5	5703	201.1	5710	203	5716	200.9
5724	201.5	5726.5	203	5767	203.2	5839.5	206.2	5867.5	209.1
5907.4	212	5945.5	216.1	5967.1	217.3	5987.6	217.4	5997.4	220.4
6011.2	227								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3245	.2	5048.5	.048	5130.4	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5048.5	5130.4	30	30	30	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3245	5048.5	207.9	F
5130.4	6011.2	205	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23090

INPUT
Description: 23090

Station Elevation Data num= 86

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3245	224	3346.1	222.2	3431.5	222.1	3528.6	220.8	3589.7	213.3
3703.1	210.7	3781.9	210.1	3852.2	208.6	3939.6	208.1	4005.5	208.7
4110.3	209.7	4136.4	209.9	4180.2	208.9	4202.5	209.1	4234.4	208.9
4298	209.2	4348.5	208.3	4398.5	208.3	4448.5	208	4498.5	207.4
4548.5	206.2	4598.5	206.5	4648.5	205.7	4698	205.4	4748.5	205.1
4798.5	205.5	4848.5	205.5	4898.5	205.2	4948.5	205.4	4971	204.5
4975	202.6	5023.9	202.7	5027.1	206.5	5048.5	202.6	5068.4	207.8
5086.9	202.8	5095.9	200.7	5100.5	199.8	5125.4	199.7	5130.4	202
5135.6	202.8	5145.2	205.5	5151	206.1	5173.7	207.5	5176.2	206.6
5192.7	205.9	5197.9	207.5	5224.2	208.2	5256.5	205	5270	206.7
5272	208.6	5346	208.9	5385.4	208.4	5411.7	206.7	5448.7	208.3
5492.5	209	5504.7	208.7	5507.7	208.7	5511.2	208.3	5523.4	208.3
5530.4	199.5	5543.3	199.3	5554.5	207.9	5567.3	202.2	5568.4	205
5569.4	203	5586.2	204.4	5611.6	204.2	5623.8	204.2	5625.7	203.9
5687.4	203.4	5691.5	201.5	5703	201.1	5710	203	5716	200.9
5724	201.5	5726.5	203	5767	203.2	5839.5	206.2	5867.5	209.1
5907.4	212	5945.5	216.1	5967.1	217.3	5987.6	217.4	5997.4	220.4
6011.2	227								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3245	.2	5048.5	.048	5130.4	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5048.5	5130.4	63	63	63	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3245	5048.5	207.5	F
5130.4	6011.2	204.9	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23027

INPUT
Description: 23027

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2952.3	231.2	3083.8	222	3117.6	221.8	3125.1	223.7	3138	223
3148.3	223.6	3315.6	221.6	3329	222.2	3395.9	222.1	3490.6	213.3
3558.8	211.2	3631.2	210.5	3680.9	209.3	3806.5	208	3813.9	208.4
3823.4	208.1	3860.9	208.1	3870.2	208.3	3905.9	209.3	3947.3	209.7
3979.3	210.2	3996.6	210.6	4012.7	210.4	4038.1	210.4	4051.4	209.3
4077.1	209.3	4117.6	209.5	4151.4	209.2	4179	208.9	4238	208.5
4270	208.3	4334	208.5	4383	208	4440	207.7	4488	206.8
4532	207.2	4545	206.8	4599	207.2	4622	206.6	4648	205.3
4698	205	4751	204.7	4794	205.6	4827	204.5	4871	205.5
4890	205.2	4902	206	4919	205.8	4920	203.6	4923	202.5
4929	201.3	4932	200.5	4936	198.5	4942	196.5	4947	195
4955	195	4962	197	4970	198.3	4978	199.2	4988	200.3
4995	201.4	5001	202	5008	200.4	5015	199.6	5022	199
5026	198.8	5029	198.8	5037	199.1	5045	199.3	5052	199.5
5062	200.1	5069	200.9	5077	201.8	5081	202.5	5087	204.2
5102	204.9	5623	204.1	5632.8	203.5	5646	203.8	5649	201.2
5662	199.6	5675	199.6	5694	198.9	5701	198.7	5709	201.2
5710	202.6	5715	205.9	5723	206.3	5723.1	206.3	5748.9	205.4
5761.8	205	5811	205	5844.6	204.7	5859.8	205.8	5875.5	206.2
5884	209.2	5905.7	209.2	5923.4	219.9	5939.6	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2952.3	.07	4919	.042	5081	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4919	5081	22	22	22	.6	.8

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 23005

INPUT
Description: TERRACE ISLAND BRIDGE
TERRACE ISLAND BRIDGE

Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2966.4	231	3096.4	221.9	3121.1	221.2	3166.4	222.9	3190	222
3267.9	222.1	3308.2	221.5	3412.9	221.5	3442.7	220.3	3494.7	213.2
3534.5	212.6	3649.4	210.4	3813.1	207.9	3875.5	208	4056.9	210.2
4078	209.3	4143.5	209.1	4184.3	209.3	4537.7	207.5	4572	206.9
4623.4	206.2	4676.7	205.3	4715.6	205.6	4744.6	205.4	4773.1	205.4
4790.8	205.5	4811.5	205.9	4840.8	205.4	4870.5	204.9	4913	205.6
4933	205.1	4934	202.5	4934.1	200.7	4937	198.9	4947	196.4
4957	195.8	4967	194	4977	197.5	4987	198.8	4997	201.6
5003	202.5	5007	202.8	5009	202.5	5010	202	5017	201.1
5027	201	5037	200.4	5047	200.6	5057	200.5	5062	201
5065	202.5	5065.5	203.6	5077	204.6	5575	206.9	5595	206.7

5598	204.6	5598.1	204.6	5601	202.8	5604	201.2	5612	199.2
5622	198.4	5635	198.7	5643	201.2	5647	202.5	5648.4	204
5648.5	204	5651	206.6	5651.1	207	5652.5	206.5	5658	206.5
5663.1	206.8	5689.9	205.9	5715	205.6	5733.1	205.7	5789.2	205.1
5821.8	205.3	5846.3	205.3	5879.9	205.4	5925.6	205.2	5955.6	205.7
5977.2	205.2	5999.7	205.1	6037.3	204.7	6043.1	206.1	6062.6	208
6089.8	209.2	6096.6	209.2	6125.6	209.1	6140.3	210.3	6164.5	212
6204.6	213.9	6219.8	214.8	6363.4	214	6422.3	216.4	6442.2	218
6456.1	220.4	6478.2	227						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2966.4	.07	4933	.03	5663.1	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4933	5663.1	15	15	15	.05	.2

Cross Section Lid
num= 92

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
2966.4	231	231	3096.4	221.9	221.9	3121.1	221.2	221.2
3166.4	222.9	222.9	3190	222	222	3267.9	222.1	222.1
3308.2	221.5	221.5	3412.9	221.5	221.5	3442.7	220.3	220.3
3494.7	213.2	213.2	3534.5	212.6	212.6	3649.4	210.4	210.4
3813.1	207.9	207.9	3875.5	208	208	4056.9	210.2	210.2
4078	209.3	209.3	4143.5	209.1	209.1	4184.3	209.3	209.3
4537.7	207.5	207.5	4572	206.9	206.9	4623.4	206.2	206.2
4676.7	205.3	205.3	4715.6	205.6	205.6	4744.6	205.4	205.4
4773.1	205.4	205.4	4790.8	205.5	205.5	4811.5	205.9	205.9
4840.8	205.4	205.4	4870.5	204.9	204.9	4913	205.6	205.6
4933	205.1	205.1	4934	202.5	202.5	4934.1	200.7	200.7
4937	198.9	198.9	4947	196.4	196.4	4957	195.8	195.8
4967	194	194	4977	197.5	197.5	4987	198.8	198.8
4997	201.6	201.6	5003	202.5	202.5	5007	202.8	202.8
5009	202.5	202.5	5010	202	202	5017	201.1	201.1
5027	201	201	5037	200.4	200.4	5047	200.6	200.6
5057	200.5	200.5	5062	201	201	5065	202.5	202.5
5065.5	203.6	203.6	5077	204.6	204.6	5575	206.9	206.9
5595	207	206.7	5598	207	204.6	5598.1	210	204.6
5601	210	202.8	5604	210	204.6	5648.4	209.8	204.7
5648.5	209.8	204	5651	209.8	207	5651.1	207	207
5652.5	206.5	206.5	5658	206.5	206.5	5663.1	206.8	206.8
5689.9	205.9	205.9	5715	205.6	205.6	5733.1	205.7	205.7
5789.2	205.1	205.1	5821.8	205.3	205.3	5846.3	205.3	205.3
5879.9	205.4	205.4	5925.6	205.2	205.2	5955.6	205.7	205.7
5977.2	205.2	205.2	5999.7	205.1	205.1	6037.3	204.7	204.7
6043.1	206.1	206.1	6062.6	208	208	6089.8	209.2	209.2
6096.6	209.2	209.2	6125.6	209.1	209.1	6140.3	210.3	210.3
6164.5	212	212	6204.6	213.9	213.9	6219.8	214.8	214.8
6363.4	214	214	6422.3	216.4	216.4	6442.2	218	218
6456.1	220.4	220.4	6478.2	227	227			

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22990

INPUT
Description: 22990

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

2959.4	231	3110	221.1	3162.7	222.2	3285.1	220.9	3318	221.2
3416.7	220.7	3535	211.7	3784.6	208.9	3861	207.3	3871.6	208.5
3909.3	208	3941.5	208.5	3967	208.7	3989.3	209	4006	209
4023.1	209.8	4048.1	210.2	4067.6	209.2	4092.9	209.1	4126.6	209.1
4169.4	209.3	4176.9	209.2	4202.9	209.2	4244.4	209.1	4306	209.1
4355.9	208.7	4414	208.1	4470.2	207.2	4516.9	207.2	4565.7	207.1
4615.1	206.1	4656.1	205.2	4684.3	205.4	4760	206	4795.7	206.6
4818.1	207	4850.3	205.4	4915	205.5	4935	204.8	4936	202.4
4940	199.8	4945	197.2	4955	195.4	4965	193.9	4975	195.6
4985	197.9	4995	200.5	5000	201.5	5009	202.5	5012	202.7
5015	202.5	5020	201.8	5025	201.8	5031	201.4	5035	200.6
5045	200.5	5055	199.3	5058	199.8	5062	201.9	5085	204.9
5575	207.5	5594	206.7	5601	201.2	5607	199.6	5621	198.9
5633	198.8	5644	201.2	5645	202.6	5652	206.3	5654	206.7
5655.2	206.5	5675	206.5	5704.5	206.2	5735	205.7	5781.6	206
5809.3	205.1	5840.4	205.5	5868.5	205.5	5907.9	205.8	5939.4	205.2
5973.5	205.3	5992.7	205.6	6012.7	204.4	6040.3	204.4	6057.2	205.9
6077.6	208.2	6108.7	209.3	6135.3	209.1	6143	208.2	6160.3	210.1
6200.9	212.6	6234.3	213.9	6255.9	214.1	6304.8	214.4	6369.7	214
6420.7	216	6454.4	218	6464.6	220	6491.6	227.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2959.4	.06	4935	.028	5655.2	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4935	5655.2	35.01	60	80.01	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22946

INPUT
Description: 22946
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3245	224	3346.1	222.2	3431.5	222.1	3528.6	220.8	3589.7	213.3
3703.1	210.7	3781.9	210.1	3852.2	208.6	3939.6	208.1	4005.5	208.7
4110.3	209.7	4136.4	209.9	4180.2	208.9	4202.5	209.1	4234.4	208.9
4298	209.2	4348.5	208.3	4398.5	208.3	4448.5	208	4498.5	207.4
4548.5	206.2	4598.5	206.5	4648.5	205.7	4698	205.4	4748.5	205.1
4798.5	205.5	4848.5	205.5	4898.5	205.2	4948.5	205.4	4971	204.5
4975	202.6	5023.9	202.7	5027.1	206.5	5030	207.8	5072	191.2
5172	191.2	5215	208.2	5224.2	208.2	5256.5	205	5270	206.7
5272	208.6	5346	208.9	5385.4	208.4	5411.7	206.7	5448.7	208.3
5492.5	209	5504.7	208.7	5507.7	208.7	5511.2	208.3	5523.4	208.3
5530.4	199.5	5543.3	199.3	5554.5	207.9	5567.3	202.2	5568.4	205
5569.4	203	5586.2	204.4	5611.6	204.2	5623.8	204.2	5625.7	203.9
5687.4	203.4	5691.5	201.5	5703	201.1	5710	203	5716	200.9
5724	201.5	5726.5	203	5767	203.2	5839.5	206.2	5867.5	209.1
5907.4	212	5945.5	216.1	5967.1	217.3	5987.6	217.4	5997.4	220.4
6011.2	227								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3245	.07	5030	.048	5215	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5030	5215	30	30	30	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3245	5030	207.9	F
5215	6011.2	205	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22930

INPUT
Description: 22930

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2996.4	231.4	3110.9	221.3	3151.1	221.3	3160.5	220.7	3190.1	221.7
3215.5	221.7	3291	220.2	3339.8	221.1	3454.2	220	3497.2	214.2
3607.8	211.6	3808.6	209.2	3841.4	208.5	3884.7	208	3948.8	209.2
3987.2	209.3	4074.1	211.2	4093.1	209.8	4187.5	209.5	4194	209
4238	208.5	4291	208.4	4345	208.5	4415	207.9	4475	207.4
4540	206.8	4605	206.5	4654	205.4	4682	205.9	4714.4	205.3
4761	205.3	4812	205.6	4860	205.8	4891	203.6	4902	203.3
4914	204.5	4922	204.7	4931	203.7	4943	203.3	4944	202.6
4945	201.7	4949	198.6	4956	197.4	4961	197.3	4971	197.2
4981	198.6	4991	199.9	5001	199.9	5011	200.2	5021	200.9
5031	200.7	5041	201.5	5051	201.3	5055	201.9	5055.1	202.6
5058	204.4	5071	204.7	5497	203	5515	203.6	5516	201.2
5521	200.7	5527	199.1	5535	198.8	5545	198	5554	198.3
5561	201.2	5571	207.9	5574	207.7	5596.7	208.6	5672	206.4
5795.6	205.2	5816.4	205.2	5870	205.7	5945.8	204.8	6012	205.9
6034	205.3	6055.8	205.9	6077.3	205.8	6100.4	207.9	6163.8	208.2
6181.8	209.1	6193.3	208.6	6202.9	208.5	6227	210.1	6249.8	211.6
6295.9	213.8	6327.3	215.2	6362.8	215.9	6384.5	216.9	6386.9	218.3
6393.8	218.1	6412.7	220.7	6448.4	221	6453.1	219.2	6463	219.8
6464.7	223.7	6477.6	223.7	6502.2	225.3	6622.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2996.4	.06	4914	.028	5596.7	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4914	5596.7	50	36.66	63.34	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22916

INPUT
Description: 22916
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3245	224	3346.1	222.2	3431.5	222.1	3528.6	220.8	3589.7	213.3
3703.1	210.7	3781.9	210.1	3852.2	208.6	3939.6	208.1	4005.5	208.7
4110.3	209.7	4136.4	209.9	4180.2	208.9	4202.5	209.1	4234.4	208.9
4298	209.2	4348.5	208.3	4398.5	208.3	4448.5	208	4498.5	207.4
4548.5	206.2	4598.5	206.5	4648.5	205.7	4698	205.4	4748.5	205.1
4798.5	205.5	4848.5	205.5	4898.5	205.2	4948.5	205.4	4971	204.5
4975	202.6	5023.9	202.7	5027.1	206.5	5030	207.8	5072	191.2
5172	191.2	5215	208.2	5224.2	208.2	5256.5	205	5270	206.7

5272	208.6	5346	208.9	5385.4	208.4	5411.7	206.7	5448.7	208.3
5492.5	209	5504.7	208.7	5507.7	208.7	5511.2	208.3	5523.4	208.3
5530.4	199.5	5543.3	199.3	5554.5	207.9	5567.3	202.2	5568.4	205
5569.4	203	5586.2	204.4	5611.6	204.2	5623.8	204.2	5625.7	203.9
5687.4	203.4	5691.5	201.5	5703	201.1	5710	203	5716	200.9
5724	201.5	5726.5	203	5767	203.2	5839.5	206.2	5867.5	209.1
5907.4	212	5945.5	216.1	5967.1	217.3	5987.6	217.4	5997.4	220.4
6011.2	227								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3245	.07	5030	.048	5215	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
5030	5215	125.04	136.38	476.7	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3245	5030	207.5	F
5215	6011.2	204.9	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22853

INPUT
Description: 22853
Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2952.3	231.2	3083.8	222	3117.6	221.8	3125.1	223.7	3138	223
3148.3	223.6	3315.6	221.6	3329	222.2	3395.9	222.1	3490.6	213.3
3558.8	211.2	3631.2	210.5	3680.9	209.3	3806.5	208	3813.9	208.4
3823.4	208.1	3860.9	208.1	3870.2	208.3	3905.9	209.3	3947.3	209.7
3979.3	210.2	3996.6	210.6	4012.7	210.4	4038.1	210.4	4051.4	209.3
4077.1	209.3	4117.6	209.5	4151.4	209.2	4179	208.9	4238	208.5
4270	208.3	4334	208.5	4383	208	4440	207.7	4488	206.8
4532	207.2	4545	206.8	4599	207.2	4622	206.6	4648	205.3
4698	205	4751	204.7	4794	205.6	4827	204.5	4871	205
4906	191.1	5006	191.1	5026	199	5045	199.3	5052	199.5
5062	200.1	5069	200.9	5077	201.8	5081	202.5	5087	204.2
5102	204.9	5623	204.1	5632.8	203.5	5646	203.8	5649	201.2
5662	199.6	5675	199.6	5694	198.9	5701	198.7	5709	201.2
5710	202.6	5715	205.9	5723	206.3	5723.1	206.3	5748.9	205.4
5761.8	205	5811	205	5844.6	204.7	5859.8	205.8	5875.5	206.2
5884	209.2	5905.7	209.2	5923.4	219.9	5939.6	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2952.3	.07	4871	.042	5081	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4871	5081	20	22	35	.6	.8

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22831

INPUT

Description: 22831 Terrace Island Bridge

Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2966.4	231	3096.4	221.9	3121.1	221.2	3166.4	222.9	3190	222
3267.9	222.1	3308.2	221.5	3412.9	221.5	3442.7	220.3	3494.7	213.2
3534.5	212.6	3649.4	210.4	3813.1	207.9	3875.5	208	4056.9	210.2
4078	209.3	4143.5	209.1	4184.3	209.3	4537.7	207.5	4572	206.9
4623.4	206.2	4676.7	205.3	4715.6	205.6	4744.6	205.4	4773.1	205.4
4790.8	205.5	4811.5	205.9	4840.8	205.4	4871	205	4906	191.1
5006	191.1	5030	201	5047	200.6	5057	200.5	5062	201
5065	202.5	5065.5	203.6	5077	204.6	5575	206.9	5595	206.7
5598	204.6	5598.1	204.6	5601	202.8	5604	201.2	5612	199.2
5622	198.4	5635	198.7	5643	201.2	5647	202.5	5648.4	204
5648.5	204	5651	206.6	5651.1	207	5652.5	206.5	5658	206.5
5663.1	206.8	5689.9	205.9	5715	205.6	5733.1	205.7	5789.2	205.1
5821.8	205.3	5846.3	205.3	5879.9	205.4	5925.6	205.2	5955.6	205.7
5977.2	205.2	5999.7	205.1	6037.3	204.7	6043.1	206.1	6062.6	208
6089.8	209.2	6096.6	209.2	6125.6	209.1	6140.3	210.3	6164.5	212
6204.6	213.9	6219.8	214.8	6363.4	214	6422.3	216.4	6442.2	218
6456.1	220.4	6478.2	227						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2966.4	.07	4871	.03	5663.1	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4871	5663.1	15	15	15	.05	.2

Cross Section Lid

num= 13

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
5065	202.5	202.5	5065.5	203.6	203.6	5077	204.6	204.6
5575	206.9	206.9	5595	207	206.7	5598	207	204.6
5598.1	210	204.6	5601	210	202.8	5604	210	204.6
5648.4	209.8	204.7	5648.5	209.8	204	5651	209.8	207
5651.1	207	207						

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River

REACH: Reach-1 RS: 22820

INPUT

Description: 22820

Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2960.5	227.9	2963.9	223.7	3005.5	223.7	3010.3	220.3	3031	220.3
3075.8	222.2	3098.3	221.1	3119.3	220.9	3159.8	222.2	3182.9	222
3217.2	219	3238.2	220.1	3248.2	220	3266	219.4	3303.7	219.2
3359.2	217.2	3401	213.6	3431.1	213.8	3470.9	217.8	3513.7	214.1
3577.3	212	3602.1	212.3	3670.9	209.8	3700.1	210	3794.1	208.3
3849.9	207.2	4011	208	4047.2	207.3	4086.7	209.5	4110.5	209.5
4151.2	208.3	4192	209	4242	208.5	4392	208.4	4442	208.2
4492	207.5	4592	205.6	4603	205.1	4635	206.5	4671	207
4707	204	4728	205.1	4755	205.3	4792	205.5	4824	205.5
4881	204.4	4886	202.6	4900	202.7	4919	202	5025	200.1
5059	204.6	5284.4	203.8	5304.4	203.5	5308.4	201.3	5316.4	199.2
5328.4	198	5338.4	198	5349.4	198	5362.4	199.3	5369.4	201.3
5370.4	202.2	5378.4	202.4	5387.4	206.1	5394.4	206	5395.1	206.5
5408.4	206.5	5426.8	205.6	5474.2	205.4	5486.1	206.1	5524.1	206.6
5536.6	206.6	5546.3	205.7	5557.8	206.4	5622.5	206.7	5655.2	205.6

5745	205.5	5760.4	204	5858.4	204.5	5898.7	205.6	5931.7	205.5
5952.5	204.3	6063.2	204.4	6073.2	206.5	6118.8	207.7	6146.9	206.8
6176.9	207.8	6198.2	207	6374.6	215.2	6383.3	217.3	6416.9	220.7
6438.1	217.9	6452.2	222.2	6470.2	223.4	6602.2	227.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2960.5	.06	4824	.028	5387.4	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4824	5387.4	48	49	30	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22816

INPUT
Description: 22816
Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2959.4	231	3110	221.1	3162.7	222.2	3285.1	220.9	3318	221.2
3416.7	220.7	3535	211.7	3784.6	208.9	3861	207.3	3871.6	208.5
3909.3	208	3941.5	208.5	3967	208.7	3989.3	209	4006	209
4023.1	209.8	4048.1	210.2	4067.6	209.2	4092.9	209.1	4126.6	209.1
4169.4	209.3	4176.9	209.2	4202.9	209.2	4244.4	209.1	4306	209.1
4355.9	208.7	4414	208.1	4470.2	207.2	4516.9	207.2	4565.7	207.1
4615.1	206.1	4656.1	205.2	4684.3	205.4	4760	206	4795.7	206.6
4818.1	207	4850.3	205.4	4871	205	4906	191.1	5006	191.1
5030	201	5055	199.3	5058	199.8	5062	201.9	5085	204.9
5575	207.5	5594	206.7	5601	201.2	5607	199.6	5621	198.9
5633	198.8	5644	201.2	5645	202.6	5652	206.3	5654	206.7
5655.2	206.5	5675	206.5	5704.5	206.2	5735	205.7	5781.6	206
5809.3	205.1	5840.4	205.5	5868.5	205.5	5907.9	205.8	5939.4	205.2
5973.5	205.3	5992.7	205.6	6012.7	204.4	6040.3	204.4	6057.2	205.9
6077.6	208.2	6108.7	209.3	6135.3	209.1	6143	208.2	6160.3	210.1
6200.9	212.6	6234.3	213.9	6255.9	214.1	6304.8	214.4	6369.7	214
6420.7	216	6454.4	218	6464.6	220	6491.6	227.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2959.4	.06	4871	.028	5655.2	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4871	5655.2	83	109	110	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22756

INPUT
Description: 22756
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2996.4	231.4	3110.9	221.3	3151.1	221.3	3160.5	220.7	3190.1	221.7
3215.5	221.7	3291	220.2	3339.8	221.1	3454.2	220	3497.2	214.2
3607.8	211.6	3808.6	209.2	3841.4	208.5	3884.7	208	3948.8	209.2
3987.2	209.3	4074.1	211.2	4093.1	209.8	4187.5	209.5	4194	209

4238	208.5	4291	208.4	4345	208.5	4415	207.9	4475	207.4
4540	206.8	4605	206.5	4654	205.4	4682	205.9	4714.4	205.3
4761	205.3	4812	205.6	4845	205.9	4882	191.1	4900	191.1
4925	191.1	4982	191.1	5005	200.2	5011	200.2	5021	200.9
5031	200.7	5041	201.5	5051	201.3	5055	201.9	5055.1	202.6
5058	204.4	5071	204.7	5497	203	5515	203.6	5516	201.2
5521	200.7	5527	199.1	5535	198.8	5545	198	5554	198.3
5561	201.2	5571	207.9	5574	207.7	5596.7	208.6	5672	206.4
5795.6	205.2	5816.4	205.2	5870	205.7	5945.8	204.8	6012	205.9
6034	205.3	6055.8	205.9	6077.3	205.8	6100.4	207.9	6163.8	208.2
6181.8	209.1	6193.3	208.6	6202.9	208.5	6227	210.1	6249.8	211.6
6295.9	213.8	6327.3	215.2	6362.8	215.9	6384.5	216.9	6386.9	218.3
6393.8	218.1	6412.7	220.7	6448.4	221	6453.1	219.2	6463	219.8
6464.7	223.7	6477.6	223.7	6502.2	225.3	6622.8	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2996.4	.06	4845	.028	5596.7	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4845	5596.7	245.97	207.99	250.02	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22646

INPUT
Description: 22646
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2960.5	227.9	2963.9	223.7	3005.5	223.7	3010.3	220.3	3031	220.3
3075.8	222.2	3098.3	221.1	3119.3	220.9	3159.8	222.2	3182.9	222
3217.2	219	3238.2	220.1	3248.2	220	3266	219.4	3303.7	219.2
3359.2	217.2	3401	213.6	3431.1	213.8	3470.9	217.8	3513.7	214.1
3577.3	212	3602.1	212.3	3670.9	209.8	3700.1	210	3794.1	208.3
3849.9	207.2	4011	208	4047.2	207.3	4086.7	209.5	4110.5	209.5
4151.2	208.3	4192	209	4242	208.5	4392	208.4	4442	208.2
4492	207.5	4592	205.6	4603	205.1	4635	206.5	4671	207
4707	204	4728	205.1	4755	205.3	4792	205.5	4798	205
4833	191.1	4883	191.1	4933	191.1	4960	201.8	5025	200.1
5059	204.6	5284.4	203.8	5304.4	203.5	5308.4	201.3	5316.4	199.2
5328.4	198	5338.4	198	5349.4	198	5362.4	199.3	5369.4	201.3
5370.4	202.2	5378.4	202.4	5387.4	206.1	5394.4	206	5395.1	206.5
5408.4	206.5	5426.8	205.6	5474.2	205.4	5486.1	206.1	5524.1	206.6
5536.6	206.6	5546.3	205.7	5557.8	206.4	5622.5	206.7	5655.2	205.6
5745	205.5	5760.4	204	5858.4	204.5	5898.7	205.6	5931.7	205.5
5952.5	204.3	6063.2	204.4	6073.2	206.5	6118.8	207.7	6146.9	206.8
6176.9	207.8	6198.2	207	6374.6	215.2	6383.3	217.3	6416.9	220.7
6438.1	217.9	6452.2	222.2	6470.2	223.4	6602.2	227.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2960.5	.06	4798	.028	5387.4	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4798	5387.4	288	294	180	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22575

INPUT
Description: 22575

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3968	227	4042	211	4063	209.5	4088	208.7	4280	207.6
4316	207.2	4411	207.2	4439	207.9	4472	207.5	4500	208.2
4591	208.2	4607.3	206.8	4629	207.2	4674	206.4	4688	206.1
4692	203	4697	202.7	4704	202.6	4711	202.3	4713	202.6
4715	203.9	4720	204.9	4839	205.7	4850	202.9	4896.3	203.4
4920	203.2	4941	203.8	4966	204.3	4972	204.5	4977	198.5
4979	197	4986	195.8	5007	200.3	5024	201.8	5033	202
5041	203.9	5262	203	5272	204.1	5282	203.3	5285	202.4
5289	200.7	5294	200.2	5310	199.9	5324	199.7	5335	199.4
5346.7	201	5346.8	202.3	5347	203.3	5347.9	203.3	5348	206
5381	206.4	5464	205.2	5474	204.3	5486	204.7	5497	204.7
5510	205.8	5536	205.9	5563	205.3	5573	205.9	5584	206.2
5599	205.9	5618	204.6	5641	204.7	5686	206	5700	207.1
5737	207	5746	207.4	5775	207.1	5847	206.3	5865	207.1
5889	206.8	5920	207.4	5964	204.8	5982	205.1	5992	205.9
6011	206	6075	206.1	6103	205.3	6132	205.4	6160	205.9
6233	204.6	6260	207.3	6280	207.7	6309	207.4	6330	207.6
6342	208.4	6353	207.8	6402	211.8	6502	216.3	6522	216.4
6524	219	6550	222.1	6575	221.7	6580	218.9	6592	218.9
6594	224.1	6598	222.1	6630	225.1	6738	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3968	.06	4972	.028	5348	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4972	5348	209.97	209.97	160.02	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22401

INPUT
Description: 22401
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3968	227	4042	211	4063	209.5	4088	208.7	4280	207.6
4316	207.2	4411	207.2	4439	207.9	4472	207.5	4500	208.2
4591	208.2	4607.3	206.8	4629	207.2	4674	206.4	4688	206.1
4692	203	4697	202.7	4704	202.6	4711	202.3	4713	202.6
4715	203.9	4720	204.9	4839	205.7	4850	202.9	4889	203.3
4920	191	5020	191	5052	203.8	5282	203.3	5285	202.4
5289	200.7	5294	200.2	5310	199.9	5324	199.7	5335	199.4
5346.7	201	5346.8	202.3	5347	203.3	5347.9	203.3	5348	206
5381	206.4	5464	205.2	5474	204.3	5486	204.7	5497	204.7
5510	205.8	5536	205.9	5563	205.3	5573	205.9	5584	206.2
5599	205.9	5618	204.6	5641	204.7	5686	206	5700	207.1
5737	207	5746	207.4	5775	207.1	5847	206.3	5865	207.1
5889	206.8	5920	207.4	5964	204.8	5982	205.1	5992	205.9
6011	206	6075	206.1	6103	205.3	6132	205.4	6160	205.9
6233	204.6	6260	207.3	6280	207.7	6309	207.4	6330	207.6

6342	208.4	6353	207.8	6402	211.8	6502	216.3	6522	216.4
6524	219	6550	222.1	6575	221.7	6580	218.9	6592	218.9
6594	224.1	6598	222.1	6630	225.1	6738	227		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3968	.06	4889	.028	5348	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4889	5348	209.97	209.97	160.02	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22365

INPUT
Description: 22365

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4362	227.1	4400	210	4431	207.3	4484	206.9	4515	206.6
4542	206.9	4602	207.3	4607	207.1	4622	207.5	4635	207
4640	208.6	4660	208.1	4695	202.9	4718	202.9	4752	208.9
4763	209.8	4777	207.3	4822	206.4	4855	206.2	4866	205.7
4890	206.2	4918	207.3	4936	206.6	4957	204.1	4959	201.4
4962	200.9	4970	199.6	4982	200.1	4992	200.5	5002	200.7
5012	200.7	5022	200.8	5032	201.2	5039	201	5041	201.4
5041.1	203.3	5175	203.3	5195	202.8	5197	201.2	5203	200
5250	197.2	5260	197.2	5273	197.6	5288	198.2	5303	199.8
5307.7	201.2	5307.9	203.9	5400	204.4	5476	204.6	5511	204.9
5525	204	5553	204.5	5577	204.8	5613	205.4	5645	206.5
5666	206.5	5725	207.2	5739	207	5767	207	5805	207.4
5838	207.4	5868	206.5	5895	206.1	5929	206.1	5940	207
5989	204.6	6011	204.6	6028	205	6042	205	6064	205.6
6116	204.9	6141	204.7	6182	204.7	6250	205	6292	204.5
6315	204.5	6327	206.3	6353	207.5	6376	207	6415	206.6
6423	207.4	6438	208	6451	207.9	6478	209	6508	210.1
6543	212	6585	214.1	6622	214.8	6631	217.3	6662	219.2
6671	220.1	6691	221.6	6726	221	6732.8	217.5	6742	217.5
6744	222.4	6750	222.4	6915	225.8	6936	227.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4362	.06	4936	.028	5307.9	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4936	5307.9	230	192	20	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22191

INPUT
Description: 22191
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4362	227.1	4400	210	4431	207.3	4484	206.9	4515	206.6

4542	206.9	4602	207.3	4607	207.1	4622	207.5	4635	207
4640	208.6	4660	208.1	4695	202.9	4718	202.9	4752	208.9
4763	209.8	4777	207.3	4822	206.4	4855	206.2	4866	205.7
4890	206.2	4910	205.5	4947	190.7	5047	190.7	5083	205
5091	205	5181	204	5190	201.2	5196	200	5243	197.2
5253	197.2	5266	197.6	5281	198.2	5296	199.8	5300.7	201.2
5300.9	203.9	5393	204.4	5469	204.6	5504	204.9	5518	204
5546	204.5	5570	204.8	5606	205.4	5638	206.5	5659	206.5
5718	207.2	5732	207	5760	207	5798	207.4	5831	207.4
5861	206.5	5888	206.1	5922	206.1	5933	207	5982	204.6
6003	204.6	6021	205	6035	205	6057	205.6	6109	204.9
6320	206.3	6346	207.5	6369	207	6408	206.6	6416	207.4
6431	208	6444	207.9	6471	209	6501	210.1	6536	212
6578	214.1	6615	214.8	6624	217.3	6655	219.2	6664	220.1
6684	221.6	6719	221	6725	217.5	6735	217.5	6737	222.4
6743	222.4	6908	225.8	6929	227.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4362	.06	4947	.028	5300.9	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4947	5300.9	230	191.04	20	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22173

INPUT
Description: 22173

Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4552.7	225	4569.6	224.1	4577.8	220	4590	213.4	4600.2	208.1
4607.4	205.8	4628.7	205.6	4661.1	205.5	4687.2	205.4	4706.6	205.4
4726.7	205.1	4752.7	205.9	4764.7	205.9	4777.8	205.8	4798.4	205.5
4811.1	205.6	4820.6	205.6	4830.1	205.5	4855	205.6	4861	205.6
4898	205.2	4930	205.3	4938	201.2	4949	200	4961	198.8
4973	198.5	4987	200.1	4999	200.4	5006	197.7	5016	196.3
5031	194.9	5037	194.9	5055	198.2	5061	201.3	5071	203.9
5129	204.4	5200	204.5	5240.2	205.2	5277.1	204.6	5295.7	203.8
5310.4	203.9	5325	204.2	5336.2	204.6	5351.4	205.9	5395.7	205.6
5409.9	205.3	5435.7	204.6	5457.1	205.5	5486.8	203.6	5520.3	204.6
5549.5	205.2	5563.7	205.8	5590.5	206.3	5605.5	206.5	5619.7	207.2
5631.1	207.1	5649.4	207.3	5661.7	207.5	5704.3	207.5	5725.4	207.3
5742.1	207.2	5767.6	206.5	5783.6	206.2	5812.7	205.7	5838.5	204.9
5858.2	204.2	5867	205.1	5878.5	205.1	5890.2	205.3	5896.6	205.4
5962.5	205.5	6002.3	205.2	6029.7	204.9	6062.8	204.7	6092.5	204.3
6109.9	204.3	6119.5	204.2	6131.9	204.2	6140	205.8	6158	207.6
6198.3	207.5	6224.7	207.4	6236	207.7	6249.8	207.6	6262.8	208.4
6283.1	209.5	6295.9	210.7	6312.3	212	6336.5	213.5	6349	214.3
6369	215.8	6390	218.2	6413.4	220.3	6429.4	221.5	6441	222.1
6654.2	224.7	6667.1	225.9	6672.7	227.1				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4552.7	.06	4930	.028	5071	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4930	5071	114.99	63	39.99	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22110

INPUT
Description: 22110
DOTY RD. BRIDGE (GRATE BRIDGE DECK, MAY NOT DEVELOP
PRES-FLOW)

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4546.1	225	4555.2	225.5	4566.9	226	4579.5	225.6	4590.9	224.8
4596.7	220.1	4610.7	214.6	4630.1	213.3	4646.9	211.5	4660.2	209.5
4676.3	207.7	4706.7	205.6	4724.1	205.5	4746.1	205.5	4779.5	205.5
4899	206	4910	206.3	4949	207.6	4957	207.6	4957.1	207.6
4960	207.7	4961	201.2	4962	199.8	4962.1	199.6	4962.3	199.6
4970	197.6	4973	197	4977	195.9	4993	195.5	5008	196.8
5020	196.7	5023	196.8	5034	199	5034.1	199	5036	199.4
5036.1	199.4	5038	201.3	5038.1	207.4	5055	207.3	5074.8	207.3
5082.2	210.8	5102.5	209.7	5133.9	207.8	5149.8	205.6	5173.8	204.6
5194.7	204.1	5225.4	203.5	5257.4	203.1	5286.6	203.7	5308.3	203.7
5330.2	204.6	5355.6	205.4	5385.4	204.6	5414	204.2	5431	203.8
5465.5	203.6	5495.5	203.6	5523.1	204.5	5548.7	205.5	5584.5	206.3
5598.5	207.2	5612.3	207.7	5626	206.6	5652.3	207.4	5679	207.3
5705.8	206.4	5739.8	206.4	5776.3	206.7	5789.9	206.7	5836.8	204.5
5855.2	204.2	5862.4	205.4	5873.1	205.4	5883.4	204.9	5902.1	205.5
5926.1	205.5	5959.7	205.4	5996.8	205.4	6027.6	205.5	6101.8	204.6
6110.5	205.1	6121.2	204.9	6141.1	206	6186.7	206.2	6208.1	207.2
6215.1	207.4	6225.1	208	6235.6	207.6	6247	208.2	6262.8	209.3
6276.7	210.3	6295.2	212	6313.2	213.4	6334.8	214.5	6352.8	216.3
6379.5	220	6431.2	221.9	6643.4	224.1	6653.3	224.8	6662.2	227.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4546.1	.06	4960	.03	5082.2	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4960	5082.2	33	33	33	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4546.1	4960	204.5	F
5082.2	6662.2	204.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22077

INPUT
Description: 22077

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4559.3	225	4569	225.2	4580.3	226	4592.5	225.7	4602.8	223.7
4611.1	220	4629.5	210	4653.2	207.9	4667	206.1	4688.9	206.1
4716.9	206.3	4752.9	205.8	4795	206.1	4828.6	206.1	4849.2	206.1
4865.2	206.3	4880.9	206.3	4899.3	206.5	4923.7	206.6	4944.3	207

4955.1	208.2	4962.1	207.5	4963	201.2	4963.1	198.8	4979.6	195.2
4995.3	194	5010	195.2	5025.5	197.5	5036.4	199.9	5036.9	201.2
5040.2	207.5	5060.7	207.3	5073.2	206.4	5090.9	206.6	5116.1	203.6
5134.6	203.1	5156.1	202.5	5173	203.8	5198.3	203.6	5228.7	202.5
5247.8	202.8	5274.3	202.5	5295	204.1	5322.5	204	5355.1	204
5385.7	202.9	5411.4	203	5456.8	203.6	5480.1	204.4	5506.9	205
5530.8	205.9	5556.9	205.9	5598.2	206.9	5611.3	207.4	5625.4	206.4
5638.3	206.3	5697.4	206.3	5720.6	206.3	5755.2	206.4	5795.6	205.8
5822.2	205	5845.9	204.7	5857.5	204.5	5868.9	205	5878.9	204.8
5892	205.4	5909.3	204.7	5932.2	204.5	5959.1	204.9	5989.8	204.6
6015.8	205.4	6034.5	204.5	6052	205.4	6082	203.9	6092.4	203.5
6099.9	203.8	6108.5	204.5	6117.7	204	6130.6	206.1	6147.4	206.4
6174	206.1	6189.6	207.2	6204.5	207	6212.3	207.1	6220.9	207.9
6233.1	207	6238.4	207.6	6250.7	209	6267.6	210	6285.8	211.4
6313.1	214.1	6331.6	216	6356.1	219	6369.9	220	6387.5	221.2
6417.4	221.6	6627.8	223.2	6644	221.3	6657.7	227.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4559.3	.06	4962.1	.037	5040.2	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4962.1	5040.2	70	80	53.35	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4559.3	4962.1	204.5	F
5040.2	6657.7	204.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 22000

INPUT
Description: 22000
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4552.7	225	4569.6	224.1	4577.8	220	4590	213.4	4600.2	208.1
4607.4	205.8	4628.7	205.6	4661.1	205.5	4687.2	205.4	4706.6	205.4
4726.7	205.1	4752.7	205.9	4764.7	205.9	4777.8	205.8	4798.4	205.5
4811.1	205.6	4820.6	205.6	4830.1	205.5	4855	205.6	4861	205.6
4898	205.2	4930	205.3	4938	201.2	4949	200	4961	198.8
4970	198.6	4990	190.6	5090	190.6	5124	204.4	5125	204.4
5129	204.4	5200	204.5	5240.2	205.2	5277.1	204.6	5295.7	203.8
5310.4	203.9	5325	204.2	5336.2	204.6	5351.4	205.9	5395.7	205.6
5409.9	205.3	5435.7	204.6	5457.1	205.5	5486.8	203.6	5520.3	204.6
5549.5	205.2	5563.7	205.8	5590.5	206.3	5605.5	206.5	5619.7	207.2
5631.1	207.1	5649.4	207.3	5661.7	207.5	5704.3	207.5	5725.4	207.3
5742.1	207.2	5767.6	206.5	5783.6	206.2	5812.7	205.7	5838.5	204.9
5858.2	204.2	5867	205.1	5878.5	205.1	5890.2	205.3	5896.6	205.4
5962.5	205.5	6002.3	205.2	6029.7	204.9	6062.8	204.7	6092.5	204.3
6109.9	204.3	6119.5	204.2	6131.9	204.2	6140	205.8	6158	207.6
6198.3	207.5	6224.7	207.4	6236	207.7	6249.8	207.6	6262.8	208.4
6283.1	209.5	6295.9	210.7	6312.3	212	6336.5	213.5	6349	214.3
6369	215.8	6390	218.2	6413.4	220.3	6429.4	221.5	6441	222.1
6654.2	224.7	6667.1	225.9	6672.7	227.1				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4552.7	.06	4930	.028	5124	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4930 5124 150 100 66.68 .05 .2
Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21957

INPUT
Description: 21957

Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4609	225.2	4613.9	225.5	4626.5	225.8	4636.6	225.5	4646.5	223
4657.4	220	4693.2	210	4711.3	206.3	4733.5	203.9	4766.4	204.3
4813.1	203.6	4831.2	204.6	4844.4	204.6	4868.3	205.6	4884.6	205.5
4904	204.2	4929	204.4	4949	202.2	4950	201.3	4953	200.9
4960	198.8	4970	196.4	4985	194.2	4997	193.2	5010	192.2
5025	193.8	5036	196.6	5049	201.2	5051	202.3	5076	203.2
5082	203.7	5107.7	203	5147.2	202.6	5210.1	202.1	5267.1	202.9
5318.1	202.7	5370	202.6	5424.6	202.9	5457.9	203	5480.3	204
5504.9	204.3	5526.2	205.6	5556.9	205.5	5593.4	206.3	5612.1	206.5
5623.1	207.1	5635.2	206.8	5660.7	207.1	5717.5	206.7	5745.7	205.9
5778.9	207.7	5812.8	206.3	5826.2	205.9	5846.5	205	5867.9	205.1
5876.1	205.3	5886.3	204.7	5910.7	204.2	5941.3	203.8	5970.1	203.2
6002.8	203.5	6048.2	203.5	6081.8	203.8	6103.5	204.4	6113.4	204.7
6123.4	204.4	6132.5	204.7	6147.7	206.3	6183.4	206.3	6201.7	207.2
6216.3	207.5	6232.3	207.2	6240.9	206.5	6254.4	208.4	6268.4	210.1
6289.3	212	6310.2	215	6332.8	217.7	6362	220	6393.4	221.3
6414.7	221.8	6623.3	219.9	6633.7	219.9	6645	222.6	6654.8	227.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4609	.7	4929	.043	5082	.09

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4929 5082 53.34 44 16.68 .1 .3
Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21940

INPUT
Description: 21939
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4546.1	225	4555.2	225.5	4566.9	226	4579.5	225.6	4590.9	224.8
4596.7	220.1	4610.7	214.6	4630.1	213.3	4646.9	211.5	4660.2	209.5
4676.3	207.7	4706.7	205.6	4724.1	205.5	4746.1	205.5	4779.5	205.5
4899	206	4906	206.3	4912.7	206.5	4944.5	190.6	4957.1	190.6
4960	190.6	4961	190.6	5000	190.6	5044.5	190.6	5082	209.4
5083	210.8	5102.5	209.7	5133.9	207.8	5149.8	205.6	5173.8	204.6
5194.7	204.1	5225.4	203.5	5257.4	203.1	5286.6	203.7	5308.3	203.7
5330.2	204.6	5355.6	205.4	5385.4	204.6	5414	204.2	5431	203.8
5465.5	203.6	5495.5	203.6	5523.1	204.5	5548.7	205.5	5584.5	206.3
5598.5	207.2	5612.3	207.7	5626	206.6	5652.3	207.4	5679	207.3
5705.8	206.4	5739.8	206.4	5776.3	206.7	5789.9	206.7	5836.8	204.5
5855.2	204.2	5862.4	205.4	5873.1	205.4	5883.4	204.9	5902.1	205.5

5926.1	205.5	5959.7	205.4	5996.8	205.4	6027.6	205.5	6101.8	204.6
6110.5	205.1	6121.2	204.9	6141.1	206	6186.7	206.2	6208.1	207.2
6215.1	207.4	6225.1	208	6235.6	207.6	6247	208.2	6262.8	209.3
6276.7	210.3	6295.2	212	6313.2	213.4	6334.8	214.5	6352.8	216.3
6379.5	220	6431.2	221.9	6643.4	224.1	6653.3	224.8	6662.2	227.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4546.1	.06	4906	.03	5083	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4906	5083	83.33	79	26.67	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4546.1	4906	204.5	F
5083	6662.2	204.5	F

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 21922.5

INPUT
Description: DOTY RD. BRIDGE
Distance from Upstream XS = 1
Deck/Roadway Width = 33
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 43

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4555.2	225.5	225.5	4566.9	226	226	4579.5	225.6	225.6
4591	224.8	224.8	4596.7	220.1	220.1	4610.7	214.6	214.6
4630.1	213.3	213.3	4646.9	211.5	211.5	4660.2	209.5	209.5
4676.3	207.7	207.7	4706.7	206.5	205.6	4724.1	206.5	205.5
4746.1	206.5	205.5	4780	206.5	205.5	4899	206.5	206
4906	206.3	206.3	4912.7	218.5	213	4944.5	218.5	213
4957.1	218.5	213	4960	218.5	213	4961	218.5	213
5000	218.5	213	5044.5	218.5	213	5082	218.5	213
5083	210.8	210.8	5102.5	209.7	209.7	5133.9	207.8	207.8
5149.8	205.6	205.6	5173.8	204.6	204.6	5194.7	204.1	204.1
5225.4	203.5	203.5	5257.4	203.1	203.1	5286.6	203.7	203.7
5308	203.7	203.7	5330.2	204.6	204.6	5355.6	205.4	205.4
5385.4	204.6	204.6	5414	204.2	204.2	5431	203.8	203.8
5465.5	203.6	203.6	5495.5	203.6	203.6	5523.1	204.5	204.5
5548.7	205.5	205.5						

Upstream Bridge Cross Section Data
Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4546.1	225	4555.2	225.5	4566.9	226	4579.5	225.6	4590.9	224.8
4596.7	220.1	4610.7	214.6	4630.1	213.3	4646.9	211.5	4660.2	209.5
4676.3	207.7	4706.7	205.6	4724.1	205.5	4746.1	205.5	4779.5	205.5
4899	206	4906	206.3	4912.7	206.5	4944.5	190.6	4957.1	190.6
4960	190.6	4961	190.6	5000	190.6	5044.5	190.6	5082	209.4
5083	210.8	5102.5	209.7	5133.9	207.8	5149.8	205.6	5173.8	204.6
5194.7	204.1	5225.4	203.5	5257.4	203.1	5286.6	203.7	5308.3	203.7
5330.2	204.6	5355.6	205.4	5385.4	204.6	5414	204.2	5431	203.8
5465.5	203.6	5495.5	203.6	5523.1	204.5	5548.7	205.5	5584.5	206.3
5598.5	207.2	5612.3	207.7	5626	206.6	5652.3	207.4	5679	207.3
5705.8	206.4	5739.8	206.4	5776.3	206.7	5789.9	206.7	5836.8	204.5
5855.2	204.2	5862.4	205.4	5873.1	205.4	5883.4	204.9	5902.1	205.5

5926.1	205.5	5959.7	205.4	5996.8	205.4	6027.6	205.5	6101.8	204.6
6110.5	205.1	6121.2	204.9	6141.1	206	6186.7	206.2	6208.1	207.2
6215.1	207.4	6225.1	208	6235.6	207.6	6247	208.2	6262.8	209.3
6276.7	210.3	6295.2	212	6313.2	213.4	6334.8	214.5	6352.8	216.3
6379.5	220	6431.2	221.9	6643.4	224.1	6653.3	224.8	6662.2	227.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4546.1	.06	4906	.03	5083	.07

Bank Sta: Left	Right	Coeff Contr.	Expan.
4906	5083	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4546.1	4906	204.5	F
5083	6662.2	204.5	F

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 15

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4706.7	206.5	205.6	4724.1	206.5	205.5	4746.1	206.5	205.5
4780	206.5	205.5	4899	206.5	206	4906	206.3	206.3
4912.7	218.5	213	4944.5	218.5	213	4957.1	218.5	213
4960	218.5	213	4961	218.5	213	5000	218.5	213
5044.5	218.5	213	5082	218.5	213	5083	210.8	

Downstream Bridge Cross Section Data
Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4559.3	225	4569	225.2	4580.3	226	4592.5	225.7	4602.8	223.7
4611.1	220	4629.5	210	4653.2	207.9	4667	206.1	4688.9	206.1
4716.9	206.3	4752.9	205.8	4795	206.1	4828.6	206.1	4849.2	206.1
4865.2	206.3	4880.9	206.3	4899.3	206.5	4912.7	206.5	4944.5	190.6
5000	190.6	5044.5	190.6	5076.3	206.5	5090.9	206.6	5116.1	203.6
5134.6	203.1	5156.1	202.5	5173	203.8	5198.3	203.6	5228.7	202.5
5247.8	202.8	5274.3	202.5	5295	204.1	5322.5	204	5355.1	204
5385.7	202.9	5411.4	203	5456.8	203.6	5480.1	204.4	5506.9	205
5530.8	205.9	5556.9	205.9	5598.2	206.9	5611.3	207.4	5625.4	206.4
5638.3	206.3	5697.4	206.3	5720.6	206.3	5755.2	206.4	5795.6	205.8
5822.2	205	5845.9	204.7	5857.5	204.5	5868.9	205	5878.9	204.8
5892	205.4	5909.3	204.7	5932.2	204.5	5959.1	204.9	5989.8	204.6
6015.8	205.4	6034.5	204.5	6052	205.4	6082	203.9	6092.4	203.5
6099.9	203.8	6108.5	204.5	6117.7	204	6130.6	206.1	6147.4	206.4
6174	206.1	6189.6	207.2	6204.5	207	6212.3	207.1	6220.9	207.9
6233.1	207	6238.4	207.6	6250.7	209	6267.6	210	6285.8	211.4
6313.1	214.1	6331.6	216	6356.1	219	6369.9	220	6387.5	221.2
6417.4	221.6	6627.8	223.2	6644	221.3	6657.7	227.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4559.3	.06	4912.7	.037	5076.3	.06

Bank Sta: Left	Right	Coeff Contr.	Expan.
4912.7	5076.3	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4559.3	4912.7	204.5	F
5076.3	6657.7	204.5	F

Sediment Elevation = 0

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical

```
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =     213
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  1

Pier Data
Pier Station     Upstream=  4994.5    Downstream=  4994.5
Upstream     num=       2
    Width   Elev    Width   Elev
    10.5   190.6    10.5   218.5
Downstream     num=       2
    Width   Elev    Width   Elev
    10.5   190.6    10.5   218.5

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Yarnell                KVal =     1.1
Selected Low Flow Methods = Yarnell

High Flow Method
       Pressure and Weir flow
           Submerged Inlet Cd          =
           Submerged Inlet + Outlet Cd =.7905694
           Max Low Cord                =   218.5

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 21905

INPUT
Description: 21906
Station Elevation Data    num=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  4559.3     225    4569   225.2  4580.3     226  4592.5   225.7  4602.8   223.7
  4611.1     220  4629.5     210  4653.2   207.9    4667   206.1  4688.9   206.1
  4716.9   206.3  4752.9   205.8    4795   206.1  4828.6   206.1  4849.2   206.1
  4865.2   206.3  4880.9   206.3  4899.3   206.5  4912.7   206.5  4944.5   190.6
    5000   190.6  5044.5   190.6  5076.3   206.5  5090.9   206.6  5116.1   203.6
  5134.6   203.1  5156.1   202.5    5173   203.8  5198.3   203.6  5228.7   202.5
  5247.8   202.8  5274.3   202.5    5295   204.1  5322.5     204  5355.1     204
  5385.7   202.9  5411.4     203  5456.8   203.6  5480.1   204.4  5506.9     205
  5530.8   205.9  5556.9   205.9  5598.2   206.9  5611.3   207.4  5625.4   206.4
  5638.3   206.3  5697.4   206.3  5720.6   206.3  5755.2   206.4  5795.6   205.8
  5822.2     205  5845.9   204.7  5857.5   204.5  5868.9     205  5878.9   204.8
    5892   205.4  5909.3   204.7  5932.2   204.5  5959.1   204.9  5989.8   204.6
  6015.8   205.4  6034.5   204.5    6052   205.4    6082   203.9  6092.4   203.5
  6099.9   203.8  6108.5   204.5  6117.7     204  6130.6   206.1  6147.4   206.4
    6174   206.1  6189.6   207.2  6204.5     207  6212.3   207.1  6220.9   207.9
  6233.1     207  6238.4   207.6  6250.7     209  6267.6     210  6285.8   211.4
  6313.1   214.1  6331.6     216  6356.1     219  6369.9     220  6387.5   221.2
```

6417.4	221.6	6627.8	223.2	6644	221.3	6657.7	227.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4559.3	.06	4912.7	.037	5076.3	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4912.7	5076.3	158.34	164.01	96.67	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4559.3	4912.7	204.5	F
5076.3	6657.7	204.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21825

INPUT
Description: 21825

Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4683.7	225	4710.3	210	4732.5	203.9	4782.9	203.8	4804.6	203.7
4823.3	203.7	4844	205	4914	203.6	4941	204	4945	201.2
4957	197.3	4970	196.6	4988	196.5	5005	196.6	5020	198.4
5035	198.5	5041	199.9	5054	201.2	5055	202.5	5084	202.8
5110	202.5	5165	202	5182	201.9	5200	201.7	5222	201.2
5226	201	5233	200.4	5235	200.2	5240	199.4	5245	199
5250	198.5	5255	198.1	5265	198	5275	198.4	5285	198.3
5295	198.7	5305	198.7	5315	198.6	5325	198.2	5335	197.6
5345	197.6	5355	197.9	5365	198	5375	198.5	5385	198.3
5395	197.7	5405	197.4	5415	196.5	5425	196	5435	195.7
5445	196.1	5455	197.2	5460	198.4	5464.3	201	5464.4	201.2
5465	203.4	5484.9	204.8	5494.2	204.8	5519	205.1	5555.9	205.9
5591.6	206.8	5604.3	207.4	5616	206.5	5656.1	207	5693.2	206
5733.3	205.7	5771.1	204.8	5805.4	204.7	5828.3	204.4	5841	204.6
5849.7	204.6	5859.7	204.6	5880.6	204.1	5913.2	204.6	5965.6	204.6
5985.6	204.4	6014.6	203.9	6063.3	204.4	6076.2	204.2	6087.1	204.6
6097.3	204.4	6121.9	205.8	6152.4	206.4	6171.5	207.3	6188.3	208
6201.2	207.7	6207.5	207.4	6224.5	209.4	6239.1	210.1	6254.3	211.7
6273.6	214	6292.4	216.3	6317.7	219.7	6369.3	222.1	6585.8	220.5
6606.1	223.6	6609.6	227.2						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4683.7	.9	4782.9	.075	4945	.037	5054	.09	6207.5	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4941	5055	50	45	18	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4683.7	4941	204	F
5055	6609.6	202.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21785

INPUT
Description: 21785
Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4609	225.2	4613.9	225.5	4626.5	225.8	4636.6	225.5	4646.5	223
4657.4	220	4693.2	210	4711.3	206.3	4733.5	203.9	4766.4	204.3
4813.1	203.6	4831.2	204.6	4844.4	204.6	4868.3	205.6	4884.6	205.5
4904	204.2	4929	204.4	4949	202.2	4950	201.3	4953	200.9
4960	198.8	4964	198	4982	190.6	5000	190.6	5030	190.6
5082	190.6	5113	202.9	5147.2	202.6	5210.1	202.1	5267.1	202.9
5318.1	202.7	5370	202.6	5424.6	202.9	5457.9	203	5480.3	204
5504.9	204.3	5526.2	205.6	5556.9	205.5	5593.4	206.3	5612.1	206.5
5623.1	207.1	5635.2	206.8	5660.7	207.1	5717.5	206.7	5745.7	205.9
5778.9	207.7	5812.8	206.3	5826.2	205.9	5846.5	205	5867.9	205.1
5876.1	205.3	5886.3	204.7	5910.7	204.2	5941.3	203.8	5970.1	203.2
6002.8	203.5	6048.2	203.5	6081.8	203.8	6103.5	204.4	6113.4	204.7
6123.4	204.4	6132.5	204.7	6147.7	206.3	6183.4	206.3	6201.7	207.2
6216.3	207.5	6232.3	207.2	6240.9	206.5	6254.4	208.4	6268.4	210.1
6289.3	212	6310.2	215	6332.8	217.7	6362	220	6393.4	221.3
6414.7	221.8	6623.3	219.9	6633.7	219.9	6645	222.6	6654.8	227.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4609	.06	4929	.037	5113	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4929	5113	309.98	266.97	103.95	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21653

INPUT
Description: 21653
Station Elevation Data num= 92

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4683.7	225	4710.3	210	4732.5	203.9	4782.9	203.8	4804.6	203.7
4823.3	203.7	4844	205	4914	203.6	4941	204	4945	201.2
4957	197.3	4964	197	4980	190.5	5030	190.5	5080	190.5
5110	202.5	5165	202	5182	201.9	5200	201.7	5222	201.2
5226	201	5233	200.4	5235	200.2	5240	199.4	5245	199
5250	198.5	5255	198.1	5265	198	5275	198.4	5285	198.3
5295	198.7	5305	198.7	5315	198.6	5325	198.2	5335	197.6
5345	197.6	5355	197.9	5365	198	5375	198.5	5385	198.3
5395	197.7	5405	197.4	5415	196.5	5425	196	5435	195.7
5445	196.1	5455	197.2	5460	198.4	5464.3	201	5464.4	201.2
5465	203.4	5484.9	204.8	5494.2	204.8	5519	205.1	5555.9	205.9
5591.6	206.8	5604.3	207.4	5616	206.5	5656.1	207	5693.2	206
5733.3	205.7	5771.1	204.8	5805.4	204.7	5828.3	204.4	5841	204.6
5849.7	204.6	5859.7	204.6	5880.6	204.1	5913.2	204.6	5965.6	204.6
5985.6	204.4	6014.6	203.9	6063.3	204.4	6076.2	204.2	6087.1	204.6
6097.3	204.4	6121.9	205.8	6152.4	206.4	6171.5	207.3	6188.3	208
6201.2	207.7	6207.5	207.4	6224.5	209.4	6239.1	210.1	6254.3	211.7
6273.6	214	6292.4	216.3	6317.7	219.7	6369.3	222.1	6585.8	220.5
6606.1	223.6	6609.6	227.2						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4683.7	.07	4782.9	.075	4945	.037	5110	.09	6207.5	.07

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4941    5110           299.97  257.95  108.02             .1       .3
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 21600

INPUT
Description: 21600

Station Elevation Data    num=      93
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  4685.6     225    4693   223.6  4702.5   223.7  4715.8   223.5  4731.8     220
  4743.3     210  4767.5   205.8  4792.3   204.6  4813.6   203.8  4831.1   203.8
  4860.5   203.9  4884.6   203.8  4911.1   203.9    4915   203.3    4942   203.5
    4943   201.3    4953   200.7    4966   198.9    4977   194.9    4995   194.3
    5011   195.2    5028   196.2    5041   197.1    5056   198.1  5056.1   198.7
    5059   201.1    5082   203.1    5114   202.8    5158     202    5184   202.1
    5202   201.2    5204   200.5    5210   200.1    5216   200.6    5221   200.7
    5226   200.8    5231   201.2    5239   201.6    5254   201.9    5270   201.6
    5282   201.3    5297   201.2    5304   200.9    5314   200.8    5321   200.6
    5324   199.9    5334   198.8    5344   198.2    5354   196.9    5364   196.4
    5374   195.7    5384   195.8    5394   196.5    5404   199.5    5409   200.2
    5414   200.8    5419   201.2    5421   203.4    5424   203.8    5449   204.4
  5450.1   205.2    5470   205.2  5488.7   205.2    5552     207  5563.6   207.2
  5599.9   206.3    5640   206.3  5683.1   205.7  5737.1   205.2  5796.4   205.2
  5809.5   205.5  5832.2   204.3    5860   204.3  5905.5   204.4  5953.5   205.1
    6006   204.8  6029.7   205.1    6044   204.9  6089.5   205.7  6132.8   207.5
  6142.9   207.9  6154.5   207.5  6162.7   207.2  6173.2   209.2  6189.4     210
  6207.8     212  6226.2   214.1  6256.1   217.5  6274.1   220.2  6301.2   221.8
  6325.7   221.8  6332.5   221.9  6545.4   227.6

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
  4685.6      .9  4813.6    .075    4943    .037    5059     .09  6162.7      .9

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4942    5082              260  183.04      70             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  4685.6    4942   203.5       F
    5082  6545.4   203.1       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 21440

INPUT
Description: 21440
Station Elevation Data    num=      88
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  4685.6     225    4693   223.6  4702.5   223.7  4715.8   223.5  4731.8     220
  4743.3     210  4767.5   205.8  4792.3   204.6  4813.6   203.8  4831.1   203.8
  4860.5   203.9  4884.6   203.8  4911.1   203.9    4915   203.3    4942   203.5
    4943   201.3    4953   200.7    4966   198.9    4977   194.9    4995   194.3
    5011   195.2    5026   196.2    5040   190.4    5140   190.4    5169     202
```

5202	201.2	5204	200.5	5210	200.1	5216	200.6	5221	200.7
5226	200.8	5231	201.2	5239	201.6	5254	201.9	5270	201.6
5282	201.3	5297	201.2	5304	200.9	5314	200.8	5321	200.6
5324	199.9	5334	198.8	5344	198.2	5354	196.9	5364	196.4
5374	195.7	5384	195.8	5394	196.5	5404	199.5	5409	200.2
5414	200.8	5419	201.2	5421	203.4	5424	203.8	5449	204.4
5450.1	205.2	5470	205.2	5488.7	205.2	5552	207	5563.6	207.2
5599.9	206.3	5640	206.3	5683.1	205.7	5737.1	205.2	5796.4	205.2
5809.5	205.5	5832.2	204.3	5860	204.3	5905.5	204.4	5953.5	205.1
6006	204.8	6029.7	205.1	6044	204.9	6089.5	205.7	6132.8	207.5
6142.9	207.9	6154.5	207.5	6162.7	207.2	6173.2	209.2	6189.4	210
6207.8	212	6226.2	214.1	6256.1	217.5	6274.1	220.2	6301.2	221.8
6325.7	221.8	6332.5	221.9	6545.4	227.6				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4685.6	.07	4813.6	.075	4943	.037	5169	.09	6162.7	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4942	5169	260.04	144	69.96	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4685.6	4942	203.5	F
5169	6545.4	202	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21417

INPUT
Description: 21417

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4580.8	225	4590.6	220.3	4601.6	220.6	4617.6	220.7	4622.9	221.3
4638	216.1	4653.8	210	4688.8	204.3	4719.1	205	4754.4	205.5
4782.7	205.2	4804.3	205.2	4817.3	205.4	4849.5	205	4865.7	204.6
4879.1	204.8	4895.7	204.7	4923.6	203.7	4931	203.8	4951	203.3
4954	202.9	4955	201.2	4962.6	199.7	4962.7	196	4972	195.2
4982	194.5	4992	194.1	5002	193.8	5012	195	5022	196.2
5032	198.9	5044	201.1	5046	202.3	5066	202.4	5092	202.3
5125.5	201.8	5149.5	201.2	5154.5	200.1	5163.5	199.1	5173.5	198.4
5183.5	198.2	5193.5	198.1	5203.5	198	5213.5	198.3	5223.5	198.4
5233.5	198.4	5243.5	198.2	5253.5	198	5263.5	197.7	5273.5	196.9
5283.5	194.9	5293.5	194.4	5303.5	194.4	5313.5	194.4	5323.5	195.2
5332.5	196.6	5337.5	197.7	5342.4	199.4	5342.5	201.2	5343.5	203.7
5358	205.3	5368.5	204.9	5388.5	202.2	5431.5	205.4	5603.5	205.8
5691.5	204.2	5769.5	204.7	5832	203.3	5870	204.2	5992	203.8
6094	209.7	6118	209.5	6130	208.8	6290	222.8	6516	225.1

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4580.8	.9	4601.6	.075	4955	.038	5044	.09	6130	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4951	5046	55.02	132.42	100.08	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21296

INPUT
Description: 21296
Station Elevation Data num= 70

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4580.8	225	4590.6	220.3	4601.6	220.6	4617.6	220.7	4622.9	221.3
4638	216.1	4653.8	210	4688.8	204.3	4719.1	205	4754.4	205.5
4782.7	205.2	4804.3	205.2	4817.3	205.4	4849.5	205	4865.7	204.6
4879.1	204.8	4895.7	204.7	4923.6	203.7	4931	203.8	4951	203.3
4954	202.9	4955	201.2	4962.6	199.7	4962.7	196	4972	195.2
4982	194.5	4992	194.1	5001	194	5010	190.4	5110	190.4
5138	201.7	5149.5	201.2	5154.5	200.1	5163.5	199.1	5173.5	198.4
5183.5	198.2	5193.5	198.1	5203.5	198	5213.5	198.3	5223.5	198.4
5233.5	198.4	5243.5	198.2	5253.5	198	5263.5	197.7	5273.5	196.9
5283.5	194.9	5293.5	194.4	5303.5	194.4	5313.5	194.4	5323.5	195.2
5332.5	196.6	5337.5	197.7	5342.4	199.4	5342.5	201.2	5343.5	203.7
5358	205.3	5368.5	204.9	5388.5	202.2	5431.5	205.4	5603.5	205.8
5691.5	204.2	5769.5	204.7	5832	203.3	5870	204.2	5992	203.8
6094	209.7	6118	209.5	6130	208.8	6290	222.8	6516	225.1

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4580.8	.07	4601.6	.075	4955	.038	5149.5	.09	6130	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4951	5138	165	360.45	300.15	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21152

INPUT
Description: 21152

Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4397.3	225	4407.4	221.2	4410.1	222.1	4415.9	222.7	4428.9	222.7
4435.7	222.4	4445.2	220	4458	210	4477.5	204.5	4497.8	204.7
4524.7	205.1	4549.7	205.4	4581.4	205.8	4602	205.9	4625.3	205.5
4650.6	204.8	4674.9	205.3	4696.1	205	4713.5	203.9	4743.3	203
4792.7	204.5	4854.7	204.4	4885.4	203.8	4889	201.6	4911	202
4912	202.2	4919	201.3	4929	199.6	4939	196.6	4949	195.1
4959	194.3	4969	193.7	4979	193.6	4989	194.2	4999	195.2
5009	195.5	5019	194.7	5029	194.5	5039	194.4	5049	194
5059	193.8	5069	194.8	5074	195.8	5077	197.3	5079	199.4
5081	201.3	5083	204.1	5090	204.7	5100.2	204.2	5134.1	205.1
5179	205.7	5206.1	204.7	5225.4	204.1	5237.3	204.6	5249.7	204.3
5276.8	204.3	5314.1	204.2	5351.9	204.5	5373.6	205.2	5390.5	205.1
5438.2	205.8	5461.3	204.5	5472.1	204.8	5485.7	204.5	5505	205.3
5577.6	206.5	5619.1	206.2	5639.5	208.1	5670.3	208.9	5679.5	208.9
5695.3	212	5713.3	213.2	5751.7	212.1	5780.2	212.4	5800.5	215.6
5814.1	216	5829.6	215.8	5852.8	216.1	5883.4	217.5	5895.3	218.3
5913.3	220	5935.9	221	5952.2	222.5	5999.2	225		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4397.3	.9	4428.9	.075	4919	.038	5081	.09	5679.5	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4911	5090	20	88.8	108	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 21068

INPUT
Description: 21068
Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4397.3	225	4407.4	221.2	4410.1	222.1	4415.9	222.7	4428.9	222.7
4435.7	222.4	4445.2	220	4458	210	4477.5	204.5	4497.8	204.7
4524.7	205.1	4549.7	205.4	4581.4	205.8	4602	205.9	4625.3	205.5
4650.6	204.8	4674.9	205.3	4696.1	205	4713.5	203.9	4743.3	203
4792.7	204.5	4809	204.7	4845	190.3	4945	190.3	4955	194.3
4959	194.3	4969	193.7	4979	193.6	4989	194.2	4999	195.2
5009	195.5	5019	194.7	5029	194.5	5039	194.4	5049	194
5059	193.8	5069	194.8	5074	195.8	5077	197.3	5079	199.4
5081	201.3	5083	204.1	5090	204.7	5100.2	204.2	5134.1	205.1
5179	205.7	5206.1	204.7	5225.4	204.1	5237.3	204.6	5249.7	204.3
5276.8	204.3	5314.1	204.2	5351.9	204.5	5373.6	205.2	5390.5	205.1
5438.2	205.8	5461.3	204.5	5472.1	204.8	5485.7	204.5	5505	205.3
5577.6	206.5	5619.1	206.2	5639.5	208.1	5670.3	208.9	5679.5	208.9
5695.3	212	5713.3	213.2	5751.7	212.1	5780.2	212.4	5800.5	215.6
5814.1	216	5829.6	215.8	5852.8	216.1	5883.4	217.5	5895.3	218.3
5913.3	220	5935.9	221	5952.2	222.5	5999.2	225		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4397.3	.07	4428.9	.075	4809	.038	5081	.09	5679.5	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4809	5090	80.04	279.12	432	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20930

INPUT
Description: 20930

Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4370.3	225	4382.5	220.8	4393.3	220.7	4407.3	220.8	4415.8	219.7
4433.8	214.1	4446.1	210.1	4459.7	204.8	4485	205	4519	205.3
4555	205.3	4592.8	205.3	4632.2	205.1	4672.1	203.9	4696.7	202.2
4727.9	202.2	4751.2	202.8	4779.8	203.8	4799.5	203.3	4827.5	203.1
4848.1	203.2	4869.4	203.4	4893.9	202.2	4907	202.1	4914	202.2
4915	201.4	4922	201.4	4924	201.9	4930	202	4931	201.3
4931.1	200.7	4937	199.5	4942	198.4	4947	197.4	4957	197.4
4967	197.4	4977	197.4	4987	196.3	4997	195.3	5007	193.3
5017	191.4	5027	190.1	5037	190.6	5047	191.9	5052	194.3
5057	195.3	5062	198	5067	198.8	5069	199.1	5069.1	201.3
5069.2	203	5087	203.7	5092.2	203.1	5111	203.7	5159.5	203.8
5172.5	204.3	5188.1	203.5	5211.9	204.3	5236	204.4	5265.1	205.4

5293.4	204.5	5333.1	205	5377.3	205.8	5394.9	205.8	5408.1	205.9
5420.4	205.9	5442.7	207	5483.3	207.9	5493.7	209.6	5504.5	210.4
5516.6	211.7	5541	212.5	5574	213.1	5598	214.8	5630.7	216.6
5684	216.4	5723.3	217.8	5746.8	221.3	5761.3	222.5	5773.3	222.3
5792.7	223.2	5822.8	223.4	5859.1	225.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4370.3	.9	4415.8	.075	4931	.037	5069.1	.09	5420.4	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4930	5069.2	36	46	56	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20922

INPUT
Description: 20922
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4370.3	225	4382.5	220.8	4393.3	220.7	4407.3	220.8	4415.8	219.7
4433.8	214.1	4446.1	210.1	4459.7	204.8	4485	205	4519	205.3
4555	205.3	4592.8	205.3	4632.2	205.1	4672.1	203.9	4696.7	202.2
4727.9	202.2	4751.2	202.8	4779.8	203.8	4787	203.3	4820	190.2
4920	190.2	4940	198	4942	198.4	4947	197.4	4957	197.4
4967	197.4	4977	197.4	4987	196.3	4997	195.3	5007	193.3
5017	191.4	5027	190.1	5037	190.6	5047	191.9	5052	194.3
5057	195.3	5062	198	5067	198.8	5069	199.1	5069.1	201.3
5069.2	203	5087	203.7	5092.2	203.1	5111	203.7	5159.5	203.8
5172.5	204.3	5188.1	203.5	5211.9	204.3	5236	204.4	5265.1	205.4
5293.4	204.5	5333.1	205	5377.3	205.8	5394.9	205.8	5408.1	205.9
5420.4	205.9	5442.7	207	5483.3	207.9	5493.7	209.6	5504.5	210.4
5516.6	211.7	5541	212.5	5574	213.1	5598	214.8	5630.7	216.6
5684	216.4	5723.3	217.8	5746.8	221.3	5761.3	222.5	5773.3	222.3
5792.7	223.2	5822.8	223.4	5859.1	225.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4370.3	.07	4415.8	.075	4787	.037	5069.1	.09	5420.4	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4787	5069.2	324.02	403.07	504.05	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20703

INPUT
Description: 20703
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4402.5	225	4414.1	218.1	4427.7	216.9	4441.7	216.6	4457.3	215.2
4479.7	214.7	4508.8	215	4536.4	214.5	4563.2	213.2	4591.1	210
4608.4	204.9	4683.2	204	4741.3	203.8	4786	203.5	4831.2	202.3
4871	203.9	4905	190.2	5005	190.2	5013	193.2	5023.7	192.83
5033.7	192.6	5038.7	192.4	5043.7	193.8	5048.7	193.7	5053.7	195

5058.7	196.5	5060.2	200.9	5061	200.9	5061.1	201.3	5061.7	203.4
5066.7	203.9	5077	203.8	5123	204.7	5150.4	205.1	5173.6	203.8
5187.1	204.2	5198.7	203.9	5222.7	203.5	5256	203.5	5296.5	202.2
5311.4	201.1	5340.9	201.2	5380.6	201.1	5414.6	201.5	5446.3	202.6
5456.8	203.9	5476.2	210	5501.2	213	5516.6	213.8	5537.5	214.3
5565.4	215.3	5597.4	214.7	5625.1	214.7	5645.6	217.5	5663.9	221.2
5706.3	224	5737.3	225						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4402.5	.07	4441.7	.075	4871	.037	5061.1	.09	5256	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4871	5066.7	289.98	208.98	150.03	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20700

INPUT
Description: 20700

Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4402.5	225	4414.1	218.1	4427.7	216.9	4441.7	216.6	4457.3	215.2
4479.7	214.7	4508.8	215	4536.4	214.5	4563.2	213.2	4591.1	210
4608.4	204.9	4683.2	204	4741.3	203.8	4786	203.5	4831.2	202.3
4875.1	203.6	4913.7	204.7	4915.7	204.6	4933.7	202.5	4938.7	201.3
4943.7	200.8	4948.7	199.9	4953.7	198.5	4963.7	196.6	4973.7	194.8
4983.7	194.3	4993.7	194.5	5003.7	193.8	5013.7	193.3	5023.7	192.8
5033.7	192.6	5038.7	192.4	5043.7	193.8	5048.7	193.7	5053.7	195
5058.7	196.5	5060.2	200.9	5061	200.9	5061.1	201.3	5061.7	203.4
5066.7	203.9	5077	203.8	5123	204.7	5150.4	205.1	5173.6	203.8
5187.1	204.2	5198.7	203.9	5222.7	203.5	5256	203.5	5296.5	202.2
5311.4	201.1	5340.9	201.2	5380.6	201.1	5414.6	201.5	5446.3	202.6
5456.8	203.9	5476.2	210	5501.2	213	5516.6	213.8	5537.5	214.3
5565.4	215.3	5597.4	214.7	5625.1	214.7	5645.6	217.5	5663.9	221.2
5706.3	224	5737.3	225						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4402.5	.9	4441.7	.075	4938.7	.037	5061.1	.09	5256	.9

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4915.7	5066.7	289.98	205.02	150.03	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20495

INPUT
Description: 20495

Station Elevation Data num= 70

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4428.6	225	4434.7	222	4446.3	222.6	4462.2	221.6	4487.4	220.3
4526.3	219.5	4554.2	218.2	4582.5	214.7	4607.4	210	4642.9	204.8

4706.4	202.8	4746	202.4	4753	202.4	4777	202.4	4782	201.8
4783	201.3	4788	199.8	4797	198.8	4807	199.3	4817	200
4827	200.3	4837	200.3	4847	200.7	4849	201.3	4852	202.4
4862	202.8	4877	202.8	4897	202.8	4908	202.8	4917	203.2
4931	202.9	4934	201.2	4935	201.2	4940	200.4	4948	198.8
4953	197.2	4958	196.7	4968	196.1	4978	193.5	4988	193
4998	193.1	5008	193.3	5018	193.4	5028	193.2	5038	193.8
5043	194	5048	194.1	5053	194.4	5058	195.9	5061	197.9
5065	199.4	5065.1	201.1	5066	202.9	5079.9	203.8	5102.5	203.8
5124.5	203.9	5176.5	204	5199.8	203.9	5223.9	203.6	5261.3	202.6
5305.4	202.6	5362.3	202.6	5426	201	5500.7	201	5519.4	209.8
5536.7	215.7	5586.3	215.8	5601.2	218.2	5620.1	222.4	5661.8	225

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4428.6	.9	4526.3	.075	4783	.04	4849	.065	4931	.035
5065.1	.09	5223.9	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4782	5066	49.34	49	52.66	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20494

INPUT
Description: 20494
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4428.6	225	4434.7	222	4446.3	222.6	4462.2	221.6	4487.4	220.3
4526.3	219.5	4554.2	218.2	4582.5	214.7	4607.4	210	4642.9	204.8
4706.4	202.8	4746	202.4	4753	202.4	4777	202.4	4782	201.8
4783	201.3	4788	199.8	4797	198.8	4807	199.3	4817	200
4827	200.3	4837	200.3	4847	200.7	4849	201.3	4852	202.4
4862	202.8	4897	202.8	4898	203	4930	190	5030	190
5040	194	5043	194	5053	194.4	5058	195.9	5061	197.9
5065	199.4	5065.1	201.1	5066	202.9	5079.9	203.8	5102.5	203.8
5124.5	203.9	5176.5	204	5199.8	203.9	5223.9	203.6	5261.3	202.6
5305.4	202.6	5362.3	202.6	5426	201	5500.7	201	5519.4	209.8
5536.7	215.7	5586.3	215.8	5601.2	218.2	5620.1	222.4	5661.8	225

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4428.6	.07	4526.3	.075	4783	.04	4849	.065	4898	.035
5065	.09	5223.9	.07						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4782	5066	246.7	246	263.3	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20348

INPUT
Description: 20348
This is a REPEATED section.

Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4381.8	225.1	4406.3	220	4437.4	218.2	4511.1	218.7	4544.4	220.1
4576.8	220.2	4599.8	215.9	4657.8	202.8	4686.4	203	4722	202.9
4742	202.8	4745	202.8	4746	201.3	4752	200	4762	199.2
4762.5	198.9	4764	199	4764.1	199	4772	198.8	4783	199.6
4783.5	199.6	4784.5	199.6	4785	199.6	4792	199.8	4802	200.5
4812	200.7	4813	201.3	4818	202.2	4818.1	202.2	4832	202.3
4851	202.7	4872	202.4	4881	202.6	4910.5	203.1	4930.5	202.7
4932.5	201.4	4938.5	200.6	4945.5	198.6	4955.5	197.3	4960.5	196.1
4970.5	194	4980.5	193.7	4990.5	193.6	5000.5	193.4	5010.5	193.6
5020.5	193.4	5030.5	193.2	5040.5	193.4	5050.5	193.8	5055.5	194.4
5060.5	196	5064.5	197.2	5065.5	199.9	5066.5	200.2	5066.6	201.2
5066.7	202.7	5078.5	203.2	5103.1	202.7	5135.8	203.2	5158.4	203.7
5181.6	203.5	5208.8	203.2	5244	203.8	5435.7	199.9	5474.1	200.2
5523.7	200.7	5552.7	200.7	5568.4	201.7	5581.1	202.8	5614.3	214.3
5625.5	214	5640.1	219.6	5658.4	222.1	5682.9	224.4	5694.8	224.4
5733.4	224.8	5765	224.3	5800.7	225				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4381.8	.9	4576.8	.07	4746	.04	4813	.06	4932.5	.035
5066.6	.075	5208.8	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4722	5066.7	16	16	16	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20346

INPUT
Description: 20346
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4381.8	225.1	4406.3	220	4437.4	218.2	4511.1	218.7	4544.4	220.1
4576.8	220.2	4599.8	215.9	4657.8	202.8	4686.4	203	4722	202.9
4742	202.8	4745	202.8	4746	201.3	4752	200	4762	199.2
4762.5	198.9	4764	199	4764.1	199	4772	198.8	4783	199.6
4783.5	199.6	4784.5	199.6	4785	199.6	4792	199.8	4802	200.5
4812	200.7	4813	201.3	4818	202.2	4818.1	202.2	4832	202.3
4851	202.7	4872	202.4	4881	202.6	4891.5	203	4923	190
5023	190	5031	193.4	5040.5	193.4	5050.5	193.8	5055.5	194.4
5060.5	196	5064.5	197.2	5065.5	199.9	5066.5	200.2	5066.6	201.2
5066.7	202.7	5078.5	203.2	5103.1	202.7	5135.8	203.2	5158.4	203.7
5181.6	203.5	5208.8	203.2	5244	203.8	5435.7	199.9	5474.1	200.2
5523.7	200.7	5552.7	200.7	5568.4	201.7	5581.1	202.8	5614.3	214.3
5625.5	214	5640.1	219.6	5658.4	222.1	5682.9	224.4	5694.8	224.4
5733.4	224.8	5765	224.3	5800.7	225				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4381.8	.07	4576.8	.07	4746	.04	4813	.06	4891.5	.035
5066.6	.075	5208.8	.07						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4722	5066.7	16	16	16	.1	.3

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 20338

INPUT
Description: CON. PED. BRIDGE
Distance from Upstream XS = 1
Deck/Roadway Width = 14
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 20

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4742	202.8	202.8	4745	202.8	202.8	4746	204.2	202.5
4752	204.6	202.9	4762	205.9	204.4	4762.5	208	198.9
4764	208	199	4764.1	206	204.5	4772	205.8	204.5
4783	205.6	204.2	4783.5	207.7	199.6	4784.5	207.7	199.6
4785	205.5	204.2	4792	205.3	203.4	4802	204	202
4812	202.2	201.6	4813	202.2	201.6	4818	202.2	201.6
4818.1	202.2	202.2	4832	202.3	202.3			

Upstream Bridge Cross Section Data
Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4381.8	225.1	4406.3	220	4437.4	218.2	4511.1	218.7	4544.4	220.1
4576.8	220.2	4599.8	215.9	4657.8	202.8	4686.4	203	4722	202.9
4742	202.8	4745	202.8	4746	201.3	4752	200	4762	199.2
4762.5	198.9	4764	199	4764.1	199	4772	198.8	4783	199.6
4783.5	199.6	4784.5	199.6	4785	199.6	4792	199.8	4802	200.5
4812	200.7	4813	201.3	4818	202.2	4818.1	202.2	4832	202.3
4851	202.7	4872	202.4	4881	202.6	4891.5	203	4923	190
5023	190	5031	193.4	5040.5	193.4	5050.5	193.8	5055.5	194.4
5060.5	196	5064.5	197.2	5065.5	199.9	5066.5	200.2	5066.6	201.2
5066.7	202.7	5078.5	203.2	5103.1	202.7	5135.8	203.2	5158.4	203.7
5181.6	203.5	5208.8	203.2	5244	203.8	5435.7	199.9	5474.1	200.2
5523.7	200.7	5552.7	200.7	5568.4	201.7	5581.1	202.8	5614.3	214.3
5625.5	214	5640.1	219.6	5658.4	222.1	5682.9	224.4	5694.8	224.4
5733.4	224.8	5765	224.3	5800.7	225				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4381.8	.07	4576.8	.07	4746	.04	4813	.06	4891.5	.035
5066.6	.075	5208.8	.07						

Bank Sta: Left	Right	Coeff Contr.	Expan.
4722	5066.7	.1	.3

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 19

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4741	202.8	202.8	4745	202.9	202.9	4745.1	201.3	201.3
4745.2	204.1	202.4	4751	204.7	203	4764	206	204.5
4764.1	208	198.7	4765.4	208	198.7	4765.5	206	198.6
4771	204.9	204.5	4785	205.7	204.3	4785.1	207.7	199.3
4786.4	207.7	199.3	4786.5	205.6	204.3	4791	205.6	204
4803	204	201.9	4803.1	202.3	199	4811	202.3	200.6
4818	202.4	202.4						

Downstream Bridge Cross Section Data
Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4374.3	225	4404.8	218.4	4435.8	218.4	4465	218.5	4503.7	218.6

4542.6	220.3	4568.2	220	4711.8	202.6	4721	202.8	4741	202.8
4745	202.9	4745.1	201.3	4745.2	199.8	4751	199.1	4764	199
4764.1	198.7	4765.4	198.7	4765.5	198.6	4771	198.4	4785	199.3
4785.1	199.3	4786.4	199.3	4786.5	199.3	4791	198.6	4803	199
4803.1	199	4811	200.6	4818	201.3	4824	202.4	4841	202
4861	202.2	4881	202.5	4895	202.4	4909	202.9	4931	202.8
4934	201.1	4939	200.4	4944	198.7	4949	198.1	4954	197.1
4959	195.8	4969	194	4979	193.8	4989	193.3	4999	193.4
5009	193.2	5019	193.1	5029	192.9	5039	193.1	5049	193.5
5054	194.4	5064	196.9	5066	200.2	5066.1	201.1	5066.2	202.6
5079	203.2	5081.1	202.1	5112.9	202.7	5139.5	203.7	5161.6	203.9
5172.8	203.7	5184.7	203.1	5201.3	203.4	5233.3	203.2	5263	203
5299.3	202.2	5337.7	202.1	5373.8	201.1	5418.6	201.1	5447.1	200.4
5485.5	200	5516.7	200	5546.7	200.6	5594.1	204.8	5609.9	207.2
5679	225								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4374.3	.9	4568.2	.075	4745.1	.04	4818	.065	4934	.035
5066.1	.075	5201.3	.9						

Bank Sta: Left Right Coeff Contr. Expan.
4745 5066.1 .3 .5
Sediment Elevation = 0

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Energy

High Flow Method
Energy Only

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20332

INPUT
Description: 20332
This is a REPEATED section.

Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4374.3	225	4404.8	218.4	4435.8	218.4	4465	218.5	4503.7	218.6
4542.6	220.3	4568.2	220	4711.8	202.6	4721	202.8	4741	202.8

4745	202.9	4745.1	201.3	4745.2	199.8	4751	199.1	4764	199
4764.1	198.7	4765.4	198.7	4765.5	198.6	4771	198.4	4785	199.3
4785.1	199.3	4786.4	199.3	4786.5	199.3	4791	198.6	4803	199
4803.1	199	4811	200.6	4818	201.3	4824	202.4	4841	202
4861	202.2	4881	202.5	4895	202.4	4909	202.9	4931	202.8
4934	201.1	4939	200.4	4944	198.7	4949	198.1	4954	197.1
4959	195.8	4969	194	4979	193.8	4989	193.3	4999	193.4
5009	193.2	5019	193.1	5029	192.9	5039	193.1	5049	193.5
5054	194.4	5064	196.9	5066	200.2	5066.1	201.1	5066.2	202.6
5079	203.2	5081.1	202.1	5112.9	202.7	5139.5	203.7	5161.6	203.9
5172.8	203.7	5184.7	203.1	5201.3	203.4	5233.3	203.2	5263	203
5299.3	202.2	5337.7	202.1	5373.8	201.1	5418.6	201.1	5447.1	200.4
5485.5	200	5516.7	200	5546.7	200.6	5594.1	204.8	5609.9	207.2
5679	225								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4374.3	.9	4568.2	.075	4745.1	.04	4818	.065	4934	.035
5066.1	.075	5201.3	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4745	5066.1	2	2	2	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20330

INPUT
Description: 20330

Station Elevation Data num= 76

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4374.3	225	4404.8	218.4	4435.8	218.4	4465	218.5	4503.7	218.6
4542.6	220.3	4568.2	220	4711.8	202.6	4721	202.8	4741	202.8
4745	202.9	4745.1	201.3	4745.2	199.8	4751	199.1	4764	199
4764.1	198.7	4765.4	198.7	4765.5	198.6	4771	198.4	4785	199.3
4785.1	199.3	4786.4	199.3	4786.5	199.3	4791	198.6	4803	199
4803.1	199	4811	200.6	4818	201.3	4824	202.4	4841	202
4861	202.2	4881	202.5	4895	202.4	4909	202.9	4931	202.8
4934	201.1	4939	200.4	4944	198.7	4949	198.1	4954	197.1
4959	195.8	4969	194	4979	193.8	4989	193.3	4999	193.4
5009	193.2	5019	193.1	5029	192.9	5039	193.1	5049	193.5
5054	194.4	5064	196.9	5066	200.2	5066.1	201.1	5066.2	202.6
5079	203.2	5081.1	202.1	5112.9	202.7	5139.5	203.7	5161.6	203.9
5172.8	203.7	5184.7	203.1	5201.3	203.4	5233.3	203.2	5263	203
5299.3	202.2	5337.7	202.1	5373.8	201.1	5418.6	201.1	5447.1	200.4
5485.5	200	5516.7	200	5546.7	200.6	5594.1	204.8	5609.9	207.2
5679	225								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4374.3	.9	4568.2	.075	4745.1	.04	4818	.065	4934	.035
5066.1	.075	5201.3	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4745.1	5066.1	43.34	43.34	43.34	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4374.3	4745.1	201.3	F
5066.1	5679	201.1	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20328

INPUT
Description: 20328
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4374.3	225	4404.8	218.4	4435.8	218.4	4465	218.5	4503.7	218.6
4542.6	220.3	4568.2	220	4711.8	202.6	4721	202.8	4741	202.8
4745	202.9	4745.1	201.3	4745.2	199.8	4751	199.1	4764	199
4764.1	198.7	4765.4	198.7	4765.5	198.6	4771	198.4	4785	199.3
4785.1	199.3	4786.4	199.3	4786.5	199.3	4791	198.6	4803	199
4803.1	199	4811	200.6	4818	201.3	4824	202.4	4841	202
4861	202.2	4881	202.5	4882	202.5	4892	202.6	4923	190
5023	190	5031	193.1	5032	193.1	5039	193.1	5049	193.5
5054	194.4	5064	196.9	5066	200.2	5066.1	201.1	5066.2	202.6
5079	203.2	5081.1	202.1	5112.9	202.7	5139.5	203.7	5161.6	203.9
5172.8	203.7	5184.7	203.1	5201.3	203.4	5233.3	203.2	5263	203
5299.3	202.2	5337.7	202.1	5373.8	201.1	5418.6	201.1	5447.1	200.4
5485.5	200	5516.7	200	5546.7	200.6	5594.1	204.8	5609.9	207.2
5679	225								

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4374.3	.07	4568.2	.075	4745.1	.04	4818	.065	4892	.035
5066	.075	5201.3	.07						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4745.1	5066.1	489.8	481.8	519.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4374.3	4745.1	201.3	F
5066.1	5679	201.1	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20070

INPUT
Description: 20070

Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4411.7	225	4439.1	222	4452.7	220	4539.9	219.7	4562.3	214.7
4592.4	210	4629.7	203.1	4637	201.2	4638	203.1	4641	203.1
4643	200	4647	199	4655	197.9	4661	197.5	4670	197.2
4676	197	4682	197.8	4686	198.4	4691	198.9	4696	199.9
4701	201.2	4707	201.4	4710	202.3	4742	201.9	4752	201.4
4757	201	4766	201.4	4776	201.6	4801	201.4	4809	200.9
4820	201.8	4827	201.4	4859	202.1	4922.5	201.6	4934.5	201.4
4939.5	202.1	4941.5	201.2	4942.5	200.6	4947.5	199.5	4952.5	197.1
4962.5	195.2	4972.5	192.7	4982.5	192.7	4992.5	192.7	5002.5	192.6
5012.5	192.5	5022.5	192.2	5032.5	192.6	5042.5	194.2	5047.5	195
5052.5	197.3	5056.5	199.2	5058.5	201.2	5060.5	202.6	5082.5	203.3
5148	204.6	5162.5	203	5181.3	203.5	5210.5	203.4	5252.9	204.1

5283.7	204.5	5324.3	204.7	5370.6	204.4	5405.6	204.5	5421.7	204.4
5485.9	203.5	5517.2	203.1	5556.9	204	5593.4	200.3	5609.4	198.7
5621.4	200.4	5666.1	201	5704.3	201.9	5753.4	201.7	5794	203.2
5806.7	210	5843.8	222.1	5854.8	223	5884.8	227.6		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4411.7	.9	4592.4	.075	4643	.04	4701	.065	4941.5	.035
5058.5	.075	5210.5	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4638	5060.5	26.64	43.34	40.84	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4411.7	4638	203.1	F
5060.5	5884.8	202.6	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 20063

INPUT
Description: 20063
Station Elevation Data num= 69

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4411.7	225	4439.1	222	4452.7	220	4539.9	219.7	4562.3	214.7
4592.4	210	4629.7	203.1	4637	201.2	4638	203.1	4641	203.1
4643	200	4647	199	4655	197.9	4661	197.5	4670	197.2
4676	197	4682	197.8	4686	198.4	4691	198.9	4696	199.9
4701	201.2	4707	201.4	4710	202.3	4742	201.9	4752	201.4
4757	201	4766	201.4	4776	201.6	4801	201.4	4809	200.9
4820	201.8	4827	201.4	4859	202.1	4886	202	4917	189.7
5017	189.7	5024	192.6	5032.5	192.6	5042.5	194.2	5047.5	195
5052.5	197.3	5056.5	199.2	5058.5	201.2	5060.5	202.6	5082.5	203.3
5148	204.6	5162.5	203	5181.3	203.5	5210.5	203.4	5252.9	204.1
5283.7	204.5	5324.3	204.7	5370.6	204.4	5405.6	204.5	5421.7	204.4
5485.9	203.5	5517.2	203.1	5556.9	204	5593.4	200.3	5609.4	198.7
5621.4	200.4	5666.1	201	5704.3	201.9	5753.4	201.7	5794	203.2
5806.7	210	5843.8	222.1	5854.8	223	5884.8	227.6		

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4411.7	.07	4592.4	.075	4643	.04	4701	.065	4886	.035
5059	.075	5210.5	.07						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4638	5060.5	293.36	467.78	449.35	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4411.7	4638	203.1	F
5060.5	5884.8	202.6	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19812

INPUT

Description: 19812
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4408.3	225	4426	222.1	4439.8	222	4455	220	4472.5	217.6
4487.1	214.6	4496	215.5	4519	207	4553	202.9	4554	201.2
4555	199.7	4560	199.4	4565	198.4	4575	198.1	4583	197.7
4590	197.7	4595	198.1	4600	198.4	4602	198.9	4609	201.1
4610	203.6	4614	203.7	4623	201.8	4637	201.4	4688	201.5
4697	201.4	4709	200.7	4722	199.4	4782	200	4832	200.6
4872	201.2	4873	201.2	4890	201.5	4920	189.6	5020	189.6
5025	191.6	5029	191.5	5039	191.6	5049	194.8	5054	196.3
5059	199.9	5061	201.2	5063	202.9	5089	204.6	5177	206.1
5228	204	5297	203.3	5313	202.8	5365	201.2	5375	200.5
5380	198.6	5399	191	5409	188.2	5415	187.3	5423	188.7
5428	188.1	5433	188.4	5439	187.2	5449	184.2	5454	184.2
5459	185.2	5469	186.6	5479	185.7	5485	187.2	5489	186.5
5499	184.9	5509	184	5514	183.6	5521	184	5529	184.1
5539	183.9	5544	184.2	5549	184.2	5554	185.2	5559	184.1
5569	183.4	5579	183.3	5589	183.2	5599	183.1	5604	183
5799	187.3	5847	197.7	5850	198.8	5856	200.4	5857	201.2
5867	204.4	5879	213.4	5910.7	225.8				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4408.3	.07	4519	.075	4554	.04	4609	.065	4873	.035
5061	.075	5089	.07						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4554	5061	180	90	385	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19810

INPUT
Description: 19810

Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4408.3	225	4426	222.1	4439.8	222	4455	220	4472.5	217.6
4487.1	214.6	4496	215.5	4519	207	4553	202.9	4554	201.2
4555	199.7	4560	199.4	4565	198.4	4575	198.1	4583	197.7
4590	197.7	4595	198.1	4600	198.4	4602	198.9	4609	201.1
4610	203.6	4614	203.7	4623	201.8	4637	201.4	4688	201.5
4697	201.4	4709	200.7	4722	199.4	4782	200	4832	200.6
4872	201.2	4919	201.7	4938	201.8	4939	201.2	4943	200.4
4944	199.4	4949	198	4954	196.6	4959	195	4964	192.5
4969	192.2	4979	192.2	4989	192.5	4999	192.2	5009	192
5019	191.8	5029	191.5	5039	191.6	5049	194.8	5054	196.3
5059	199.9	5061	201.2	5063	202.9	5089	204.6	5177	206.1
5228	204	5297	203.3	5313	202.8	5365	201.2	5375	200.5
5380	198.6	5399	191	5409	188.2	5415	187.3	5423	188.7
5428	188.1	5433	188.4	5439	187.2	5449	184.2	5454	184.2
5459	185.2	5469	186.6	5479	185.7	5485	187.2	5489	186.5
5499	184.9	5509	184	5514	183.6	5521	184	5529	184.1
5539	183.9	5544	184.2	5549	184.2	5554	185.2	5559	184.1
5569	183.4	5579	183.3	5589	183.2	5599	183.1	5604	183
5799	187.3	5847	197.7	5850	198.8	5856	200.4	5857	201.2
5867	204.4	5879	213.4	5910.7	225.8				

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4408.3	.9	4519	.075	4554	.04	4609	.065	4939	.035
5061	.075	5089	.9						

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4554	5061	180	90	385	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19722

INPUT
Description: 19722
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4367	232	4405	220.7	4419	216.9	4428	210.2	4456	200.9
4458	199.9	4464	199.4	4470	199.8	4476	199.8	4483	199.3
4491	198.9	4496	198.4	4506	198.8	4513	198.9	4515	199
4517	201.3	4519	201.7	4528	201.6	4533	202.3	4576	202.1
4614	201.5	4850	201.6	4933	201.4	4934	201.3	4937	200.3
4943	199	4948	196.5	4953	195.9	4958	193.2	4963	192.6
4973	192.1	5033	192.3	5043	193.8	5053	195.1	5058	195.9
5063	200	5066	201.3	5068	203.2	5142	203.3	5176	189.6
5235	189.6	5237	189.5	5238	189.5	5245	188	5250	188
5258	186.1	5263	185.2	5268	186	5272	184.8	5278	184.6
5288	184.5	5298	183.4	5303	182.4	5308	184	5310	184
5318	181.2	5320	181.2	5328	183.2	5332	183.7	5338	181.9
5348	181	5358	180.1	5378	180.1	5386	179.3	5408	179.3
5428	180	5430	180.1	5438	182.3	5448	188.2	5458	192.3
5464	199.2	5493	200	5501	201.2	5550	202.6	5645	203.4
5753	203.1	5796	202.9	5796.5	201.8	5808	203.4	5848	203.7
5880	202.8	5889	201.2	5891	199.9	5899	196.3	5901	194.2
5909	194	5914	196	5919	198.7	5922	200.2	5922.1	201.2
5924	204.8	5939	205.3	5971.38	221.9				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4367	.06	4456	.035	5501	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4456	5501	435	297	160.07	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19720

INPUT
Description: 19720

Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4367	232	4405	220.7	4419	216.9	4428	210.2	4456	200.9
4458	199.9	4464	199.4	4470	199.8	4476	199.8	4483	199.3
4491	198.9	4496	198.4	4506	198.8	4513	198.9	4515	199
4517	201.3	4519	201.7	4528	201.6	4533	202.3	4576	202.1
4614	201.5	4850	201.6	4933	201.4	4934	201.3	4937	200.3

4943	199	4948	196.5	4953	195.9	4958	193.2	4963	192.6
4973	192.1	5033	192.3	5043	193.8	5053	195.1	5058	195.9
5063	200	5066	201.3	5069	203.2	5157	203.2	5173	202.9
5202	201.4	5204	200.6	5205	201.9	5207	201.2	5210	200.7
5215	198.6	5220	193.3	5228	192.1	5238	189.5	5245	188
5250	188	5258	186.1	5263	185.2	5268	186	5272	184.8
5278	184.6	5288	184.5	5298	183.4	5303	182.4	5308	184
5310	184	5318	181.2	5320	181.2	5328	183.2	5332	183.7
5338	181.9	5348	181	5358	180.1	5378	180.1	5386	179.3
5408	179.3	5428	180	5430	180.1	5438	182.3	5448	188.2
5458	192.3	5464	199.2	5493	200	5501	201.2	5550	202.6
5645	203.4	5753	203.1	5796	202.9	5796.5	201.8	5808	203.4
5848	203.7	5880	202.8	5889	201.2	5891	199.9	5899	196.3
5901	194.2	5909	194	5914	196	5919	198.7	5922	200.2
5922.1	201.2	5924	204.8	5939	205.3	5969.57	205.8	5995.2	210.1
6008.01	216								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4367	.075	4456	.043	5501	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4456	5501	435	294.85	159.85	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19425

INPUT
Description: 19425

Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3799.4	231.2	3819	234.3	3841	219.9	3870.6	201.3	3875.9	200.3
3888.6	199.2	3897.8	198.9	3908.7	199	3920.6	199.3	3934.5	199.5
3944.6	199.9	3955.1	199.8	3962.6	200.5	3970	201.2	3978	204.4
3988.4	205.2	3992.6	204.6	4045.2	204.8	4102.7	204.7	4156	204.8
4218.8	205.3	4245.6	204.8	4256	202	4258	201.2	4261	200.6
4265	199.7	4284	198.8	4295	198.3	4305	199.3	4315	199.8
4327	201.1	4327.5	200.5	4347	200.3	4366	201	4387	200.9
4422	201.1	4446	201.3	4494	200.9	4498	200.7	4504	200.1
4509	199.3	4514	197.5	4519	193.2	4529	193.2	4619	194.1
4629	194.5	4707	195	4779	187.9	4840	187.7	4871	185
4909	180	5020	178	5112	180.1	5149	183.4	5242	201.1
5270.6	202.2	5290.9	202.1	5314.8	202.4	5326.7	201.1	5337	200.8
5347	200.6	5360	200.1	5366	199.3	5370	198.7	5384	197.4
5395	195.3	5409	192.8	5427	188.6	5433	184.6	5507.4	201.2
5534.4	210.5	5564	222.6	6010.4	224.1	6023.2	225.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3799.4	.075	4258	.043	5507.4	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4258	5507.4	130.08	145.08	205.08	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19280

INPUT
Description: 19280

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4444.84	215.88	4465.12	210.33	4506	201.2	4519	201.2	4524	200.4
4529	200.1	4534	199.5	4544	198.6	4554	197.5	4564	197
4574	197	4584	195.7	4594	194	4604	192.2	4614	192.6
4624	193	4627	193.2	4760	192.2	4825	190.7	4843	190
4890	185	4950	180	4970	179.9	5025	180	5025.1	180
5126	180.1	5159	178.7	5167	180.1	5169	179.8	5171	179.7
5177	181.2	5179	181.3	5183	181.2	5189	180.4	5193	180
5199	180.8	5201	180.9	5205	181	5209	180.7	5219	181.5
5228	182.7	5231	184.3	5235	184.4	5289	188.6	5323	184.8
5351	189	5362	186.7	5399	190	5409	190	5459	197.7
5470	198.3	5472	198.9	5476	200.3	5478	200.9	5480	201.3
5532	212.1	5562	219.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4444.84	.075	4825	.043	5478	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4825	5478	475.02	208.98	180	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 19071

INPUT
Description: 19071
Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3961	225	3981	224	3999.9	221.8	4020.1	220.9	4053	218.9
4072.6	219.7	4083.2	219.9	4095.7	219.3	4127.6	220.8	4151.1	219.6
4177.6	210.2	4207.5	208.1	4242.5	210.2	4293.7	211.8	4322.6	211.7
4352.5	211	4388.8	210	4412.2	208.3	4436.3	207.9	4452	206.6
4476.1	206.3	4478.8	206.6	4495.2	206.6	4498.7	206	4508.6	201.7
4604	192.8	4615	189.5	4653	188.9	4671	190	4700	193.5
4844	192.5	4870	193.2	4920	190	4986	190	5011	190.7
5165	191.5	5330	191.5	5420	190	5455	190	5460	196
5491.5	201.2	5517.5	208.1	5542.2	215.5	5550.2	216.9	5560	217.7
5581.5	219	5609.5	219.5	5644.2	220.1	5718.2	221.5	5749.4	222
5798.3	222.7	5901.3	224.8	5930.7	223.9	5935.8	223.2	5954.3	223.7
5969.1	222.7	5978.6	223.4	6016.4	223.9	6061.9	224	6107.7	224.5
6144.3	224.5	6181.7	225.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3961	.075	4508.6	.043	5491.5	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4508.6	5491.5	150.08	155.05	304.99	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 18916

INPUT
Description: 18916

Station Elevation Data num= 89

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4334.71	214.53	4374	209.7	4381	201.2	4386	200.5	4391	198.8
4395	198	4407	194.7	4418	194.5	4428	194.3	4438	194.4
4443	194.7	4492	193.5	4518	184.2	4528	184.2	4548	186.5
4561	191.7	4642	191.3	4703	192.4	4749	192.8	4758	192.2
4798	184.4	4818	184.1	4828	185.1	4838	185.3	4843	185.4
4865	189.2	4878	189	4898	186.7	4908	189	4932	189.5
4971	189	4990	191.1	5051	188.2	5163	188.4	5168	188.9
5171	189.2	5176	189.1	5178	189	5184	189.1	5188	188
5198	188.2	5208	189.9	5211	189.9	5216	189.3	5218	189.3
5226	189.7	5228	189.5	5234	188.9	5238	188.9	5248	189.2
5258	189.9	5263	190.1	5268	189.9	5276	189.3	5278	189.2
5288	189.2	5298	189.2	5308	189.3	5316	189.8	5318	189.6
5328	188.6	5331	188.4	5338	188.3	5348	187.7	5358	187.6
5365	188.8	5368	188.8	5375	188.4	5378	188.3	5388	188.1
5390	188.1	5398	189.2	5408	188.9	5418	188.6	5428	188.4
5430	188.5	5448	188.8	5450	188.9	5458	188.6	5463	188.5
5468	188.8	5473	189.1	5478	189	5488	188.5	5558	192
5610	198.9	5618	201.2	5625	202.8	5699.72	214.53		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4334.71	.075	4381	.043	5618	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4381	5618	245	234	170	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 18682

INPUT
Description: 18682

Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3948.1	225.1	3968.6	222	3998.4	220.3	4144.1	220.3	4171.5	221.1
4224.6	222	4243.3	222.4	4299.4	222.7	4328.5	221	4356.9	202.2
4361.3	201.2	4384	192.7	4397	192.4	4417	192.4	4427	193
4447	194.6	4457	194.5	4487	184.3	4497	184.7	4507	185.1
4527	186.8	4547	190.4	4571	191.4	4692	190.7	4708	190
4762	185	4798	183.5	4826	185	4871	188	4970	187.5
5070	185.1	5259	185	5267	186.2	5317	188	5327	187.6
5337	187.4	5347	187.4	5357	187.5	5367	187.5	5377	187.7
5387	187.7	5397	187.8	5407	187.9	5417	187.9	5427	187.7
5437	187.7	5441	187.4	5447	188	5457	187.5	5467	187.4
5477	187	5487	186.8	5490	186.8	5495	187.5	5497	187.5
5499	187.5	5506	187.1	5507	187.1	5509	187.4	5517	184.2
5522	182.1	5527	182	5537	182.1	5631.6	200.6	5647.6	201.2
5713.9	205	5737.3	206.9	5794.6	217.8	5821.1	218.1	5849.1	220.8
5885.1	222.9	5902	223.7	5917	222.9	5936.4	223.5	5967.6	223.7
6011.1	224	6054.2	223.3	6092.5	223.6	6124.7	223.4	6137.8	225.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3948.1	.075	4361.3	.043	5647.6	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4361.3	5647.6	260	235	285	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 18447

INPUT
Description: 18447

Station Elevation Data num= 102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4186	219.7	4193	219.2	4219	203	4233	201.2	4240	199.9
4245	198.7	4250	198.9	4255	200.4	4260	201.2	4407	201.7
4433	201.6	4439	199.3	4476	196.6	4492	192.5	4572	191.6
4674	191.2	4706	190.5	4713	190.7	4758	183.5	4766	183.4
4776	182.9	4786	182.6	4791	182.5	4796	183	4806	182.3
4816	182.3	4818	182.3	4826	182.6	4836	183.1	4846	183.7
4856	184.1	4875	188.2	4930	188.3	4936	188.9	4944	188.3
4946	188.3	4952	188.3	4956	188.9	4966	188.2	4974	189.1
4976	188.4	4986	187.2	4989	187.1	4996	187.2	4999	187.4
5004	187.7	5006	188.2	5008	188.3	5015	187.5	5016	187.3
5026	187.6	5033	187.7	5036	186.4	5040	186.3	5046	186.4
5053	186.6	5056	188.2	5065	186.5	5066	186.4	5072	186.1
5076	186.1	5078	186.2	5086	186.5	5096	186.8	5098	186.9
5106	186.8	5116	186.4	5120	186.3	5126	186.4	5129	186.5
5136	186.3	5146	186.1	5156	185.9	5166	185.8	5176	185.9
5186	186	5194	186.2	5196	186.2	5206	186.3	5216	186.9
5218	187	5226	187.8	5236	188.1	5246	187.5	5256	187.4
5264	187.4	5266	187.3	5268	187.2	5276	187.7	5284	187
5286	186.2	5294	187	5296	186.4	5298	186.3	5306	186.2
5551	200.9	5561	200.2	5566	201.2	5567	202.4	5652	207.2
5707.12	211.26	5732.74	215.17						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4186	.075	4407	.043	5566	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4407	5566	150.01	167.02	310.03	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 18280

INPUT
Description: 18280

Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4139.6	225.2	4157	222.8	4191.5	219.8	4222.5	219.6	4248.6	219.7
4272	220.4	4296.9	220.6	4322.2	221.6	4325	221.6	4345	221.1

4383	202.7	4398	201.2	4403	200.8	4408	200.2	4418	200.4
4423	201.2	4427	201.8	4442	201.7	4450	201.3	4470	200.9
4493	200.8	4503	201	4518	201.1	4533	201.1	4548	200.9
4563	200.8	4583	200.8	4588	200.2	4593	199.7	4598	199.1
4604	199.8	4694	199	4787	188.9	4794	189.4	4800	191.5
4865	190.6	4946	191.9	5005	190	5005.1	190	5034	188.3
5062	187.2	5066	188.5	5074	189.7	5107	190.3	5114	190.4
5118	190.1	5124	190.9	5134	192.2	5144	194.2	5154	195.2
5159	195.5	5164	195.4	5174	193.5	5184	190.3	5194	187.9
5204	186.9	5214	187	5222	187.4	5224	186.7	5264	186.3
5274	186.4	5284	186.5	5294	186.6	5300	186.7	5304	187.2
5314	187.4	5324	187.3	5334	187.4	5546	199.2	5549	201.2
5613	222.9	5622.6	223.4	5647.8	223.3	5663.7	224.1	5692.1	224.4
5715.5	224.3	5742.3	224.4	5779.5	224.9	5815.7	225.3		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4139.6	.075	4398	.043	5549	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4398	5549	435.2	396	430.08	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 17884

INPUT
Description: 17884
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4685.6	220	4703	218.3	4722.7	215.1	4738	212.2	4753.2	208.2
4799	203.5	4803	202.1	4807	201.2	4811	200.2	4816	198.7
4824	198	4830	197.3	4847	197.3	4861	197.4	4875	197.8
4891	197.7	4904	198.4	4919	198.9	4934	199.3	4951	199.2
4967	199.1	4982	198.7	4997	198.4	5011	197.9	5024	197.7
5041	197.7	5059	197.9	5073	197.7	5088	196	5091	195.4
5096	192	5108	188	5121	186.6	5134	185.8	5147	186.2
5160	188.2	5167	190	5173	190.5	5193	190	5200	190
5210	190	5225	190	5245	191.4	5258	191.5	5268	190.1
5289	189.1	5317	190.7	5340	193.9	5347	192.8	5365	193.5
5370	191.8	5396	192	5474	190.7	5540	191.1	5561	193.5
5567	196.3	5586	198.5	5596	198.6	5600	198.4	5606	199.8
5611	201.2	5620.4	206	5702	222.6				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4685.6	.075	4807	.043	5611	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4807	5611	419.9	417.18	419.9	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 17467

INPUT
Description: 17467

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4691.7	220	4706.3	219.3	4725	220.1	4742.5	214.6	4761	202.1
4766.5	201.2	4771.5	200.2	4777.5	199	4787.5	198.1	4802.5	197.3
4816.5	197.1	4826.5	197.1	4839.5	197.4	4850.5	197.6	4865.5	198.1
4879.5	198.7	4898.5	198.7	4917.5	198.7	4934.5	198.4	4948.5	198.5
4965.5	198.2	4984.5	198.2	4997.5	197.7	5009.5	197.5	5021.5	197.9
5042.5	198.6	5062.5	198.1	5079.5	197.7	5097.5	197.7	5112.5	197.8
5127.5	198	5140.5	197.9	5149.5	197.7	5150.5	197.2	5151.5	195.4
5159.5	192.9	5169.5	191.7	5184.5	191	5196.5	191	5203	190.4
5210	190.4	5220	190.4	5273	190.4	5403	194.9	5430	195
5640.5	198.6	5650.5	198.8	5657.5	198.8	5663.5	199.5	5668.5	200.2
5669.5	201.1	5670.5	202	5680.5	204.6	5694.3	208.7	5709.7	214.5
5724	216.9	5731.4	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4691.7	.075	4766.5	.043	5669.5	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4766.5	5669.5	299.91	306.93	540.02	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 17160

INPUT
Description: 17160

Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4606.1	220.2	4631.8	218.3	4665.9	217.6	4690.5	219.2	4725.9	217.1
4748.4	216	4766.6	216.2	4777.5	213.4	4791.8	212.3	4812.1	209.2
4830	207.4	4839	205.5	4847	203.5	4850	201.2	4855	200.2
4865	198	4875	194.6	4880	193.6	4890	193.6	4900	194.1
4915	194.7	4925	194.9	4940	195	4960	195	4980	194.8
5000	195.2	5020	195.2	5040	194.9	5050	194.9	5062	195.4
5080	195.7	5096	195.7	5107	195.8	5118	195.8	5328	197
5349	205.2	5492	206.7	5524	206.3	5539	206.4	5553	208.1
5644	207	5669	208.3	5690	207.5	5722	220		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4606.1	.075	4850	.043	5669	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4850	5669	409.87	409.87	409.87	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 16750

INPUT
Description: 16750
This is a REPEATED section.

Station Elevation Data num= 62

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4537.6	220	4555.8	218.6	4564.9	218.6	4577.6	217.2	4601.4	215.3
4622	214.1	4726	213.1	4746	215.4	4762	202.9	4774	201.5
4802	200.6	4812	200.6	4822	199.9	4852	196.4	4872	195.9
4887.9	195	4888	195	4956	189	4956.1	189	4959.9	189
4960	189	5024	189	5024.1	189	5027.9	189	5028	189
5096	195	5096.1	195	5122	194.1	5132	193.8	5142	193.8
5152	194.1	5202	199	5217	200.4	5222	201.3	5228	202
5231.9	202.2	5236	203.1	5240	212.1	5243.5	212.1	5243.6	209.1
5256.9	208.7	5258.5	208.2	5264.4	208.8	5285.4	209.7	5306.1	209.9
5334.2	211.5	5375.4	212.9	5396.1	213.1	5424	212.9	5457.5	214.2
5495	214.4	5556	215.1	5567.3	215.5	5611.3	214.5	5635.8	215.3
5690.9	215.2	5719.5	214.5	5738.3	215.2	5779.2	213.5	5802.6	214.3
5823	217.5	5846.7	220.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4537.6	.075	4774	.043	5222	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4774	5222	93	93	93	.4	.6

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 16657

INPUT
Description: 16656
LAKESIDE AVE. BRIDGE

Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4537.6	220	4555.8	218.6	4564.9	218.6	4577.6	217.2	4601.4	215.3
4622	214.1	4726	213.1	4746	215.4	4762	202.9	4774	201.5
4802	200.6	4812	200.6	4822	199.9	4852	196.4	4872	195.9
4887.9	195	4888	195	4956	189	4956.1	189	4959.9	189
4960	189	5024	189	5024.1	189	5027.9	189	5028	189
5096	195	5096.1	195	5122	194.1	5132	193.8	5142	193.8
5152	194.1	5202	199	5217	200.4	5222	201.3	5228	202
5231.9	202.2	5236	203.1	5243.6	209.1	5256.9	208.7	5258.5	208.2
5264.4	208.8	5285.4	209.7	5306.1	209.9	5334.2	211.5	5375.4	212.9
5396.1	213.1	5424	212.9	5457.5	214.2	5495	214.4	5556	215.1
5567.3	215.5	5611.3	214.5	5635.8	215.3	5690.9	215.2	5719.5	214.5
5738.3	215.2	5779.2	213.5	5802.6	214.3	5823	217.5	5846.7	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4537.6	.075	4774	.043	5222	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4774	5222	52	52	52	.4	.6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4537.6	4774	201.5	F
5222	5846.7	201.3	F

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 16630.5

INPUT
Description: LAKESIDE AVE. BRIDGE
Distance from Upstream XS = 2
Deck/Roadway Width = 40
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 29

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4537.6	220	220	4555.8	218.6	218.6	4564.9	218.6	218.6
4578	217.2	217.2	4601.4	215.3	215.3	4622	214.1	214.1
4726	213.1	213.1	4746	215.4	215.4	4762	214	202.9
4774	213.8	201.5	4802	213.5	200.6	4812	213.2	200.6
4822	213	199.7	4852	212.6	196.4	4887.9	212	195
4888	212	208.8	4956	211	207.8	4960	211	207.8
5024	210.4	207.5	5028	210.4	207.5	5096	210	207
5096.1	210	195	5142	209.7	193.8	5152	210.6	194.1
5202	209	199	5217	209	200.4	5232	208.8	202.2
5236	208.7	203.1	5240	212.1				

Upstream Bridge Cross Section Data
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4537.6	220	4555.8	218.6	4564.9	218.6	4577.6	217.2	4601.4	215.3
4622	214.1	4726	213.1	4746	215.4	4762	202.9	4774	201.5
4802	200.6	4812	200.6	4822	199.9	4852	196.4	4872	195.9
4887.9	195	4888	195	4956	189	4956.1	189	4959.9	189
4960	189	5024	189	5024.1	189	5027.9	189	5028	189
5096	195	5096.1	195	5122	194.1	5132	193.8	5142	193.8
5152	194.1	5202	199	5217	200.4	5222	201.3	5228	202
5231.9	202.2	5236	203.1	5243.6	209.1	5256.9	208.7	5258.5	208.2
5264.4	208.8	5285.4	209.7	5306.1	209.9	5334.2	211.5	5375.4	212.9
5396.1	213.1	5424	212.9	5457.5	214.2	5495	214.4	5556	215.1
5567.3	215.5	5611.3	214.5	5635.8	215.3	5690.9	215.2	5719.5	214.5
5738.3	215.2	5779.2	213.5	5802.6	214.3	5823	217.5	5846.7	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4537.6	.075	4774	.043	5222	.1

Bank Sta: Left	Right	Coeff Contr.	Expan.
4774	5222	.4	.6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4537.6	4774	201.5	F
5222	5846.7	201.3	F

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 28

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4537.6	220	220	4555.8	218.6	218.6	4564.9	218.6	218.6
4578	217.2	217.2	4601.4	215.3	215.3	4622	214.1	214.1
4726	213.1	213.1	4746	215.4	215.4	4762	214	202.9
4774	213.8	201.5	4802	213.5	200.6	4812	213.2	200.6
4822	213	199.7	4852	212.6	196.4	4887.9	212	195
4888	212	208.8	4956	211	207.8	4960	211	207.8
5024	210.4	207.5	5028	210.4	207.5	5096	210	207
5096.1	210	195	5142	209.7	193.8	5152	210.6	194.1
5202	209	199	5217	209	200.4	5232	208.8	202.2
5236	208.7	203.1						

Downstream Bridge Cross Section Data
Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4584.2	220	4613.8	218.1	4634.4	217.4	4657.6	216.9	4681.9	215.5
4703	215.3	4719.4	215.1	4736	213.9	4754.9	216	4755	213.2
4773	211	4786	202.2	4792	202.1	4796	202.3	4816	202.2
4826	201.7	4833	201.3	4836	199.9	4846	198	4856	197.2
4866	196.6	4876	197.1	4886	196.5	4896	196.7	4906	196.7
4916	196.4	4926	197.5	4936	196.8	4946	197.2	4956	197.4
4966	196.4	4976	194.4	4986	192	4996	189.5	5006	188.1
5013.9	187.9	5014	188.9	5015.9	188.9	5021	189.9	5026	189.1
5036	188.2	5046	188	5056	188.2	5062.9	188.9	5063	192.6
5064.9	192.6	5069	192.9	5070.9	192.9	5071	188.5	5076	188.1
5086	189.6	5095.9	189.8	5096.82	190.17	5106	192.8	5116	193.4
5126	194.4	5136	193.2	5146	194.1	5156	194.4	5165.8	195
5165.9	201.3	5173	209.8	5186	209.5	5199.9	209.1	5200	209.1
5211	209.4	5245.8	209.5	5287.5	208.9	5328.2	208.5	5341.9	209.7
5362.8	211.4	5392.1	212.9	5420	213.4	5444.4	213.2	5465.2	213.6
5489.7	214.1	5528.9	213.9	5571.4	213.9	5609.8	214.2	5657.7	213.9
5690.7	213	5755.9	212.5	5780.3	213.3	5813.9	213.5	5838.7	213.4
5864.8	215.2	5884.8	216.2	5911.8	218.3	5966.5	220.4	5976.3	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4584.2	.075	4833	.043	5165.9	.1

Bank Sta: Left	Right	Coeff Contr.	Expan.
4833	5165.9	.4	.6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4584.2	4833	208.9	F
5165.9	5976.3	207	F

Sediment Elevation = 0

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 213
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 2

Pier Data
Pier Station Upstream= 4958 Downstream= 4958
Upstream num= 2

Width	Elev	Width	Elev
4	180	4	220

Downstream num= 2

Width	Elev	Width	Elev
4	180	4	220

Pier Data
Pier Station Upstream= 5026 Downstream= 5026
Upstream num= 2

Width	Elev	Width	Elev
4	180	4	220

Downstream num= 2

Width	Elev	Width	Elev
4	180	4	220

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Yarnell KVal = 1.05
Selected Low Flow Methods = Yarnell

High Flow Method
Pressure and Weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd =.7559289
Max Low Cord = 207

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 16605

INPUT
Description: 16605
Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4584.2	220	4613.8	218.1	4634.4	217.4	4657.6	216.9	4681.9	215.5
4703	215.3	4719.4	215.1	4736	213.9	4754.9	216	4755	213.2
4773	211	4786	202.2	4792	202.1	4796	202.3	4816	202.2
4826	201.7	4833	201.3	4836	199.9	4846	198	4856	197.2
4866	196.6	4876	197.1	4886	196.5	4896	196.7	4906	196.7
4916	196.4	4926	197.5	4936	196.8	4946	197.2	4956	197.4
4966	196.4	4976	194.4	4986	192	4996	189.5	5006	188.1
5013.9	187.9	5014	188.9	5015.9	188.9	5021	189.9	5026	189.1
5036	188.2	5046	188	5056	188.2	5062.9	188.9	5063	192.6
5064.9	192.6	5069	192.9	5070.9	192.9	5071	188.5	5076	188.1
5086	189.6	5095.9	189.8	5096.82	190.17	5106	192.8	5116	193.4
5126	194.4	5136	193.2	5146	194.1	5156	194.4	5165.8	195
5165.9	201.3	5173	209.8	5186	209.5	5199.9	209.1	5200	209.1
5211	209.4	5245.8	209.5	5287.5	208.9	5328.2	208.5	5341.9	209.7
5362.8	211.4	5392.1	212.9	5420	213.4	5444.4	213.2	5465.2	213.6
5489.7	214.1	5528.9	213.9	5571.4	213.9	5609.8	214.2	5657.7	213.9
5690.7	213	5755.9	212.5	5780.3	213.3	5813.9	213.5	5838.7	213.4
5864.8	215.2	5884.8	216.2	5911.8	218.3	5966.5	220.4	5976.3	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4584.2	.075	4833	.043	5165.9	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4833	5165.9	48.9	46.54	50	.4	.6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4584.2	4833	208.9	F
5165.9	5976.3	207	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 16604

INPUT
Description: 16605
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4584.2	220	4613.8	218.1	4634.4	217.4	4657.6	216.9	4681.9	215.5
4703	215.3	4719.4	215.1	4736	213.9	4754.9	216	4755	213.2
4773	211	4786	202.2	4792	202.1	4796	202.3	4816	202.2
4826	201.7	4833	201.3	4836	199.9	4846	198	4856	197.2
4866	196.6	4876	197.1	4886	196.5	4896	196.7	4906	196.7
4916	196.4	4926	197.5	4936	196.8	5006	185	5076	185
5136	195	5146	194.1	5156	194.4	5165.8	195	5165.9	201.3
5166	213.2	5172.9	213.1	5173	209.8	5186	209.5	5199.9	209.1
5200	209.1	5211	209.4	5245.8	209.5	5287.5	208.9	5328.2	208.5
5341.9	209.7	5362.8	211.4	5392.1	212.9	5420	213.4	5444.4	213.2
5465.2	213.6	5489.7	214.1	5528.9	213.9	5571.4	213.9	5609.8	214.2
5657.7	213.9	5690.7	213	5755.9	212.5	5780.3	213.3	5813.9	213.5
5838.7	213.4	5864.8	215.2	5884.8	216.2	5911.8	218.3	5966.5	220.4
5976.3	220.1								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4584.2	.075	4833	.04	5165.9	.1

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4833	5165.9	831.36	790.4	849.92	.4	.6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4584.2	4833	208.9	F
5165.9	5976.3	207	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 16186

INPUT
Description: 16186

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4426.3	220.1	4564	210.1	4594	213.4	4626	209.7	4649	201.1
4676	198.3	4716	197.5	4726	197.4	4736	197.4	4746	197.5
4756	197.6	4766	197.7	4776	197.8	4786	198	4796	198.1
4806	198.2	4816	198.2	4826	198.1	4836	198	4846	197.9
4856	197.8	4866	197.7	4876	197.5	4886	197.2	4896	197
4906	196.7	4916	196.2	4926	195.7	4976	191.4	4986	190.9
4996	190.5	5006	190.3	5016	190.7	5026	191.2	5036	192
5046	192.4	5056	192.3	5066	192.2	5076	192.2	5086	192.3
5096	192.7	5106	193	5116	193.2	5126	193.2	5136	193.2
5146	193.2	5156	193.2	5166	193.2	5176	193.3	5186	193.4
5196	193.6	5206	193.7	5216	193.8	5226	193.9	5236	194
5246	193.7	5256	193.3	5266	193.2	5276	193	5286	192.9
5296	192.7	5306	192.6	5316	192.5	5326	192.6	5336	192.8
5346	193.2	5351	201.4	5351.1	202.1	5366	210.1	5368	209.5
5383	209.9	5398	209.6	5398.1	210	5414	211.5	5447.2	212.2
5469.8	212.1	5513.7	212	5552.4	211.8	5583.6	211.4	5620.8	211.8
5652.5	211.5	5686.3	211.2	5714.8	211.5	5761.3	211.6	5801.1	211.7
5821.7	212.2	5859.4	211.6	5888.3	213.3	5911.4	213.8	5953.6	213

5997.7	213.9	6008.3	213.9	6053.3	214.4	6082.8	215.6	6108.8	214.8
6138.2	215.5	6176.7	216	6230.6	216.7	6268.1	217.8	6296.9	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4426.3	.07	4649	.043	5351	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4649	5351	505	490	510	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 15696

INPUT
Description: 15696

Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4308.7	220	4335.5	215.7	4358.5	214.6	4390.5	212.3	4407.5	202.8
4411.5	201.4	4430.5	198.4	4450.5	197	4650.5	193.2	4690.5	193.4
4698	193.8	4928	196.1	4968	196.1	5028	193.8	5038	193.6
5048	193.4	5058	193.3	5068	193.2	5078	193.2	5088	193.1
5098	193	5108	192.9	5118	192.8	5128	192.9	5168	193.6
5178	193.7	5258	195.9	5278	195.9	5288	196	5308	196.1
5318	196	5328	195.9	5388	192.5	5398	192.3	5408	192.3
5418	192.5	5428	193.4	5438	196.3	5458	197.5	5478	197.5
5488	197.6	5588.5	201.1	5591.5	201.6	5601.5	203.5	5624.5	205.5
5651.5	206.9	5651.6	204.6	5670.8	206.9	5701.1	208.4	5724.2	208.9
5736.7	208.6	5761.5	209.1	5816.9	208.9	5870.3	208	5915.8	207.8
6001.7	208.2	6089.3	208	6149.4	207.2	6220	208.1	6248.9	208.2
6396.7	218.2	6452	218.4	6536.9	218.2	6595.8	219.2	6684.4	218.4
6771.3	218.8	6847.8	218.8	6915.9	216.6	7062.4	215.4	7116	217.8
7177.2	218.8	7267.4	219.9	7351.4	219.8	7536.4	219.7	7560.8	219.9
7584.7	221.6	7650.9	217.4	7681.8	216.5	7700.9	221.1	7722.9	219.6
7776.5	216.3	7848.5	217	7916.5	218.3	7944.8	218.6	7967.4	218.4
7999.7	218.3	8001.7	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4308.7	.07	4411.5	.043	5591.5	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4411.5	5591.5	505	481	875	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 15215

INPUT
Description: 15215

Station Elevation Data num= 85

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3894.9	217.6	3952.3	204.6	3959.7	201	3992.3	197	4032.3	194.8
4072.3	195	4092.3	195.2	4152.3	195.2	4232.3	195.4	4272.3	193.4
4292.3	193.2	4332.3	193.2	4352.3	193.6	4392.3	193.6	4412.3	193.4

4492.3	193.6	4572.3	193	4592.3	193	4632.3	192.7	4652.3	191.7
4672.3	190.7	4692.3	190.6	4712.3	191.2	4732.3	191.8	4752.3	192.6
4772.3	193	4792.3	193.2	4812.3	193.4	4832.3	194.2	4852.3	194.6
4872.3	194.8	4892.3	195	4912.3	195.2	4932.3	195.8	4952.3	195.2
4972.3	195.4	4992.3	195	5012.3	195.2	5032.3	196.2	5052.3	196.4
5072.3	196.6	5092.3	196.8	5112.3	196.8	5132.3	196.4	5152.3	197.8
5172.3	197.8	5192.3	197.7	5212.3	197.6	5232.3	197.6	5252.3	197.5
5952.3	198.2	5972.3	198.5	5992.3	199.3	6012.3	199.8	6084.9	208.5
6101	208.7	6116.6	208.7	6131.9	207.8	6140.7	208	6170.6	209
6189.5	210.3	6340.7	211.2	6402.5	210.9	6458.3	210.1	6514	210.4
6574.6	212.1	6608.3	211.3	6668	214.4	7091.2	214.9	7237.9	216.2
7881	216.1	7921.3	216.7	7949.2	215.7	7957.9	212.1	7969.5	215.4
7988.3	216	8019.7	217	8048.3	218.8	8059.9	218.7	8073.4	217.8
8097.5	217.4	8127.2	215.7	8167.6	218.5	8245.7	218.6	8273.4	220

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3894.9	.07	3959.7	.043	6012.3	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
3959.7	6012.3	490	490	490	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 14725

INPUT
Description: 14725

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3929.8	220.1	3964.1	209.8	3966.1	210.1	4007	211.7	4030.6	203.1
4035.2	201.5	4039.2	200.2	4069	195.9	4096	194.5	4106	194.6
4116	194.7	4126	194.8	4136	195	4146	195	4156	195.1
4176	195.1	4186	195.2	4226	195.2	4236	195.1	4266	195.3
4276	195.4	4286	195.5	4296	195.4	4306	195	4316	194.9
4326	194.7	4336	194.5	4346	194.3	4356	193.6	4366	193.3
4376	193	4386	192.7	4396	192.4	4426	191.9	4436	191.9
4446	192	4566	193.3	4586	193.3	4676	194.5	4686	194.6
4696	194.7	4706	194.7	4716	194.6	4726	194.5	4736	194.1
4746	193.5	4776	192.5	4786	192.3	4796	192.2	4806	192
4816	191.7	4826	191.5	4836	191.5	4846	191.6	4856	191.7
4866	192.1	4876	192.2	4946	194.2	4956	194.3	4976	194.3
4986	194.2	5076	193.6	5116	193.2	5166	193.2	5176	193.3
5186	193.5	5246	196.5	5266	196.5	5276	196.4	5286	196.3
5356	196.3	5426	195.7	5508	195.7	5517.4	195.5	5557.4	195.5
5567.4	195.4	5577.4	195.5	5677.4	195.5	5837.4	193.7	5877.4	194.3
5887.4	194.5	5897.4	194.6	5907.4	194.9	5917.4	195.4	5927.4	197.3
5936.2	198.2	5946	199.7	5956.2	200.7	5964.9	201.4	5975.2	205.8
5985.9	207.9	6001.7	209	6004.4	208.1	6057.8	209.4	6124.8	210.6
6145	210.5	6163.8	211.6	6191.3	212.7	6216.1	211.6	6294.8	220.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3929.8	.07	4035.2	.043	5964.9	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4035.2	5964.9	404.94	404.94	404.94	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 14320

INPUT
Description: 14320

Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4099.2	220.3	4137.6	219	4175.3	218.2	4204.5	216.5	4232.2	215.2
4263.5	213.6	4297.2	212	4334.1	210.4	4356	209.9	4394.8	208.6
4410.6	207.3	4421	205.1	4427	202	4430	201.2	4435	200.2
4442	199.2	4450.6	197.2	4470.6	193.2	4490.6	193	4510.6	192.4
4530.6	192.8	4550.6	193.2	4570.6	193.3	4590.6	193.4	4610.6	193.4
4630.6	193.3	4650.6	193.2	4670.6	193.4	4690.6	193.6	4710.6	193.6
4730.6	193.8	4750.6	194	4770.6	194	4790.6	193.9	4810.6	193.9
4830.6	193.8	4850.6	193.8	4870.6	193.6	4890.6	193.6	4910.6	193.8
4930.6	193.8	4950.6	194	4970.6	194.2	4990.6	194.2	5010.6	194
5030.6	194	5050.6	194.2	5070.6	194.2	5090.6	194.3	5110.6	194.4
5130.6	194.5	5150.6	194.6	5170.6	193.3	5190.6	193.8	5210.6	193.2
5230.6	192	5250.6	191.7	5270.6	191.2	5290.6	193.6	5310.6	196.2
5330.6	196.2	5350.6	196.2	5370.6	195.9	5390.6	195.6	5410	195.5
5430.6	195	5450.6	194.8	5470.6	194.7	5490.6	194.5	5510.6	193.7
5530.6	193.5	5550.6	193.2	5570.6	193.2	5590.6	193.4	5610.6	193.6
5630.6	194.4	5650.6	195.2	5678	199.6	5684	200.3	5690	201
5692	203.9	5697	203.6	5710	205	5730.8	207.2	5758.5	210.1
5804	218.1	5836.4	220.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4099.2	.07	4430	.043	5690	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4430	5690	310.17	514.71	745.29	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 13805

INPUT
Description: 13805

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4632.3	220	4655.5	215	4674.8	210	4706.4	206	4744.8	205.4
4751	205	4776	204.4	4791	204.2	4811	201.2	4821	195.7
4841	196.7	4851	195.2	4861	194.2	4881	192.2	4901	189.2
4921	190.2	4941	189.3	4961	189.7	4981	190	5001	190.2
5021	190.7	5041	190.7	5061	189.2	5081	187.2	5101	187.2
5121	188	5141	188.4	5161	192.4	5181	197.2	5189	201.1
5219	219.9	5239	221.6	5249	225				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4632.3	.07	4811	.043	5189	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4811	5189	414.97	413.1	414.97	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 13392

INPUT
Description: 13392

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4577.9	220	4600.8	215	4639.5	212.4	4691.7	210.4	4725.4	208.3
4757.2	205.1	4761	205.1	4786	203.5	4815	202.5	4816	201.4
4830	199.1	4850	198.2	4870	196.4	4890	194.7	4910	193.4
4930	192.8	4950	192.2	4970	191.7	4990	190.2	5010	190.3
5030	187.6	5050	186.6	5070	186.4	5090	186.4	5110	187
5130	188	5140	191.7	5150	196.7	5184	201.2	5185	202.5
5195	209.8	5217	218.3	5245	225.4				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4577.9	.07	4815	.043	5185	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4815	5185	550	547.36	550	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 12845

INPUT
Description: 12845

Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4771	219.2	4772	217.3	4778	216.6	4785	216.7	4802	209
4815	203.2	4818	201.4	4835	198.9	4855	196.8	4875	195.2
4895	193.7	4915	193	4935	192	4955	191.2	4975	189.2
4995	187	5015	186.4	5035	186.2	5055	186	5075	187
5095	188	5115	191.6	5135	194	5155	197	5175	199.7
5182	201	5183	201.9	5212	202.8	5237	204.3	5248.9	205.4
5266.3	208	5286.6	212.1	5324.3	215.3	5353.9	217.1	5429.9	215.2
5484.2	220.1								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4771	.07	4818	.043	5182	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4818	5182	595.1	544.94	500.06	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 12300

INPUT
Description: 12300
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4617.4	220	4664	216.4	4726.5	210.1	4766	208.3	4797	208.1
4810	201.1	4821	203.6	4824	204.2	4841	206.9	4874	208.1
4884	191.2	4904	190	4924	187	4944	184.8	4964	184
4984	184.7	5004	186.1	5024	188.2	5044	190	5064	191.4
5084	193.2	5104	194.7	5124	196.4	5164	198.6	5184	199.8
5280	201.7	5284	201.2	5291	200.8	5301	200.4	5311	200.2
5320	200	5327.5	199.6	5334	200.2	5338	201.1	5343	201.1
5348.5	201.2	5366	202.1	5385.9	209.2	5417.5	220.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4617.4	.07	4874	.043	5366	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4874	5366	475	488	500	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 11812

INPUT
Description: 11812

Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4414.1	220	4441.7	219.6	4451.9	217.9	4469.5	216.7	4483	216.1
4506.6	216.3	4530.3	216.4	4571.1	212.1	4584.9	211.3	4594.5	209.9
4612.2	208.3	4628.8	207	4654	204.3	4673.4	203.9	4687.2	203.4
4709.3	202	4710.4	201	4721	199	4741	197.9	4761	197.2
4781	196	4801	194.5	4821	192.9	4841	191.9	4861	190.8
4881	189.9	4901	188.5	4921	186	4941	184.2	4961	184.2
4981	184.7	5001	185.2	5021	187.1	5041	189.2	5051	192.2
5061	195.2	5071	195.7	5101	195.8	5121	196	5141	196
5161	195.9	5181	195.8	5201	195.5	5221	195.2	5241	195.2
5261	197.1	5281	199	5288.8	201.1	5320.9	212.8	5343.9	226.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4414.1	.07	4710.4	.043	5288.8	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4710.4	5288.8	655	488	375	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 11324

INPUT
Description: 11324

Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4446.9	220	4469	219.1	4557.7	214.7	4597.9	210	4619.3	210.5

4636.4	210.5	4673.9	209.1	4685.8	208	4712.6	206	4715	201.6
4735.1	203.7	4747	201.3	4755.2	198.2	4775.2	193.2	4795.2	192.9
4815	192.6	4835	192	4855	191.1	4875	190.2	4895	189.2
4915	190	4935	188.2	4955	190.2	4975	189.2	4995	189.5
5015	189.6	5035	187	5055	189.5	5058.5	201.2	5065	192.1
5075	194.4	5095	195.1	5115	195.1	5135	194.8	5155	194.3
5175	193.6	5195	192.9	5215	192.4	5235	192.9	5245	196
5253	201.1	5255	198	5283	214.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4446.9	.07	4747	.043	5255	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4747	5255	374.79	301.99	260	.3	.5

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 11022

INPUT
Description: 11022

Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4666.79	213.52	4680	210.6	4685	210.6	4706	210.4	4722	210.6
4732	210.4	4749	201.4	4755	198.9	4765	196.2	4771	192.7
4780	190.4	4798	187	4814	183.6	4830.7	183.2	4848	182.2
4866	182.2	4886	184.4	4905	186.4	4923	189.2	4945	190.9
4966	191.6	4985	190.3	5003	190.5	5021	191.8	5039	192.7
5058	192.7	5078	192.7	5099	192.7	5117	192.7	5132	192.2
5150	192.2	5170	192.7	5187	193.2	5207	193.4	5223	193.8
5232	194.9	5237	196.2	5241	198.2	5244	199.9	5250	201.3
5252	203.1	5259	206.1	5261	205.8	5267	206.2	5274	206.5
5289.52	212.52								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4666.79	.07	4749	.043	5250	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4749	5250	130	92	55	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10930

INPUT
Description: 10930

Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4708	212	4713	210	4730	210.1	4747	209.8	4747.1	210
4756	210.8	4770	201.2	4785	200	4787	196.7	4797	189.9
4810	185.2	4824	184	4834	183.6	4853	182.7	4866	182.7
4884	184	4908	187.4	4926	188.8	4942	189.4	4967	190.2
4981	191.6	4997	192.4	5017	192.6	5033	192.2	5051	192.6

5066	192.2	5082	192.2	5097	192.2	5113	192.5	5129	192.6
5146	192.5	5161	193.3	5175	194.2	5188	194	5200	193.9
5210	193.7	5212	193.7	5219	198.2	5224	200.2	5230	201.1
5230.1	203.5	5234	205.1	5236	205.5	5239	205.1	5246	205.4
5253	205.6	5257	207.6	5274.18	213.26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4708	.07	4756	.043	5230	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4756	5230	135	102.95	65.05	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10827

INPUT
Description: 10827

Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4731	211	4736	209.4	4753	209.5	4770	209	4770.1	209
4775	208.9	4783	202.1	4789	201.4	4800	197.1	4810	191.2
4830	185.9	4850	184.8	4870	184.2	4890	184.4	4910	185.4
4930	188.2	4950	190.4	4970	191.2	4990	192.1	5010	192.3
5030	192.7	5050	192.7	5090	193.1	5110	193.5	5130	194.2
5150	194.9	5170	195.2	5190	195.4	5211.1	201.2	5211.2	201.4
5214	205.1	5217.1	205.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4731	.07	4789	.043	5214	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4789	5214	104.97	74.01	44.97	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10753

INPUT
Description: 10753

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4721.5	220	4743	210.2	4748	209.1	4765	209.1	4782.4	208.8
4782.5	209	4788	208.8	4795	201.4	4802.5	198.2	4822.5	188
4842.5	185.4	4862.5	184.6	4882.5	184.5	4902.5	184.8	4922.5	186.2
4942.5	188.7	4962.5	189.7	4982.5	191	5002.5	191.9	5022.5	192.2
5042.5	194.1	5062.5	193.1	5082.5	193.4	5102.5	194	5122.5	194.6
5142.5	195.2	5162.5	195.2	5172.5	195.2	5182.5	196.2	5191.5	192.8
5196.5	197.8	5204.5	205.5	5214.5	205.3	5218.5	201.3	5220.3	205.7
5235.3	210	5247.5	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

4721.5	.07	4788	.043	5196.5	.07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4788 5196.5 60 45 30 .1 .3
Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10708

INPUT
Description: 10708

Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4746.02	213.19	4753	209.4	4758	208.7	4774	208.7	4789.9	208.3
4790	208.4	4800	207.5	4808	201.2	4817	196.8	4824	191.3
4830	187.7	4844	184.9	4855	184.2	4870	182	4886	183.8
4900	183.2	4917	183.2	4934	184.7	4950	185.8	4967	187.6
4980	188.8	4994	189.8	5011	190.5	5026	191.2	5042	191.8
5058	192.2	5073	192.6	5090	193.2	5109	193.6	5128	194.2
5144	194.2	5160	194.2	5173	195.7	5179	197.7	5187	200.2
5192	201.2	5193	202.2	5201	207.2	5205	207.1	5213	206.3
5219	206.7	5225	208.9	5238.82	213.06				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4746.02	.07	4800	.043	5201	.07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4800 5201 46.98 51 49.98 .1 .3
Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10657

INPUT
Description: 10657

Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4758.37	212.65	4765	210.1	4770	208.3	4786	208.4	4801.9	208.1
4802	208.3	4809	208.2	4814	202.4	4818	201.3	4829	197.2
4837	194.6	4846	188.7	4857	185.6	4873	184.2	4888	183.7
4904	184.2	4924	184.5	4945	184.7	4965	184.5	4981	186.4
4995	187.6	5015	189.2	5032	190.4	5051	191.7	5071	192.4
5086	193	5102	193.3	5119	193.8	5137	193.8	5151	194
5163	195.9	5170	198.1	5174	199.9	5182	201.2	5183	201.7
5190	206.2	5192	206.1	5194	207.4	5197	208.8	5201	208.9
5209	208.8	5215	208.8	5227.6	212.39				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4758.37	.07	4809	.043	5197	.07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4809 5197 52 45 45 .1 .3
Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10612

INPUT
Description: 10612

Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4767.35	212.79	4774	209.2	4779	208.1	4796	208.2	4813	207.9
4820	207.7	4823	209.2	4834	198.7	4842	193	4853	186.6
4866	185.4	4883	185.2	4902	184.7	4918	185	4938	185.2
4958	185.2	4981	184.7	5001	185.8	5022	187.2	5041	189.2
5063	191.6	5085	192.2	5108	193.2	5128	194.4	5145	193.7
5155	194.6	5163	196.2	5166	199.9	5172	200.2	5177	201.2
5178	201.9	5184	202.6	5188	205.2	5202	209.5	5203	209.5
5212	209.5	5223	210.3	5230.4	212.72				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4767.35	.07	4823	.043	5202	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4823	5202	70	50	70	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10562

INPUT
Description: 10562

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4739.3	220	4758.8	208	4772.9	208.3	4789.5	206.5	4789.9	206.8
4790	206.5	4800	205.8	4805	205.6	4808	201.5	4810	198.6
4812	196.7	4815	194.4	4821	192.6	4827	190.8	4839	190.9
4848	190.8	4858	192.8	4869	193.4	4880	193.5	4889	193.6
4897	193.8	4911	192.1	4933	191.4	4942	190.6	4950	189.4
4961	188.9	4974	188.5	4983	188.7	4992	188.8	5000	189.1
5008	189.4	5018	189.5	5027	189.4	5029	189.7	5035	189.4
5045	189.7	5055	191.3	5065	192.8	5075	191.5	5080	193.6
5085	195	5094	195.7	5097	195.7	5098.5	192.4	5102	191.8
5114	192.5	5123	193.4	5131	194.4	5135	196.1	5145	197.6
5150	198.5	5155	199.9	5163	200.9	5174	201.7	5183	207.6
5205.9	208.2	5239.4	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4739.3	.07	4805	.043	5097	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4805	5097	12	12	12	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10550

INPUT
Description: 10550

Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4739.3	220	4758.8	208	4772.9	208.3	4789.5	206.5	4789.9	206.8
4790	206.5	4800	205.8	4805	205.6	4808	201.5	4810	198.6
4812	196.7	4815	194.4	4821	192.6	4827	190.8	4839	190.9
4848	190.8	4858	192.8	4869	193.4	4880	193.5	4889	193.6
4897	193.8	4911	192.1	4933	191.4	4942	190.6	4950	189.4
4961	188.9	4974	188.5	4983	188.7	4992	188.8	5000	189.1
5008	189.4	5018	189.5	5027	189.4	5029	189.7	5035	189.4
5045	189.7	5055	191.3	5065	192.8	5075	191.5	5080	193.6
5085	195	5094	195.7	5097	195.7	5098.5	192.4	5102	191.8
5114	192.5	5123	193.4	5131	194.4	5135	196.1	5145	197.6
5150	198.5	5155	199.9	5163	200.9	5174	201.7	5183	207.6
5205.9	208.2	5239.4	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4739.3	.07	4805	.02	5097	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4805	5097	9	9	9	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10541

INPUT
Description: 10541
POMPTON LAKES DAM
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4801.1	220	4822.8	206.5	4831.5	206.5	4848.8	206.1	4848.9	206.5
4852	206	4861.8	202.8	4865.7	196.2	4879.5	188.9	4886.8	180.9
4896.7	180.9	4906.3	180.5	4912.7	180.6	4921.5	181.5	4925.9	182.1
4933.4	180.2	4944.3	193.8	4950.5	193.6	4953.3	195.3	4961.3	196.9
4962.3	198.3	4970.7	198.3	4981.4	198.3	4982.7	199.7	4992.3	200.3
5006	199.6	5016.4	198.3	5024.6	195.8	5031.3	193	5032.9	192.1
5038.9	189.7	5043.3	187.2	5046	185.6	5051.7	185.8	5057	185.9
5062.7	185.6	5072	185.5	5082.4	185.8	5091.5	185.8	5098.4	185.7
5099.4	185.6	5102.1	185.5	5107.7	185.6	5114.2	185.6	5121.2	185.6
5127.8	185.6	5133.7	185.6	5140.2	186.1	5145.7	193.5	5150.5	194.5
5156.6	194.1	5158.5	204.8	5158.7	207.5	5209.3	207.5	5255.7	207.7
5262.9	210.1	5292.7	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4801.1	.07	4848.9	.03	5158.5	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4848.9	5158.5	11	11	11	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4801.1	4859	205.3	F

```
    5161  5292.7     201       F
Sediment Elevation = 0

INLINE STRUCTURE


RIVER: Ramapo River
REACH: Reach-1            RS: 10540

INPUT
Description: Pompton Lake Dam
Distance from Upstream XS =      .5
Deck/Roadway Width        =      10
Weir Coefficient          =     3.6
 Weir Embankment Coordinates    num =       15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4740     220    4760   206.9    4772   207.1    4783   206.7  4834.5     207
    4859   205.3    4859   205.3    4866     201    5161     201    5161     201
  5161.1   207.5    5210   207.5  5210.1   210.5    5260   210.5    5300     220

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            =  Ogee


CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 10530

INPUT
Description: 10530

Station Elevation Data    num=      57
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  4801.1     220  4822.8   206.5  4831.5   206.5  4848.8   206.1  4848.9   206.5
    4852     206  4861.8   202.8  4865.7   196.2  4879.5   188.9  4886.8   180.9
  4896.7   180.9  4906.3   180.5  4912.7   180.6  4921.5   181.5  4925.9   182.1
  4933.4   180.2  4944.3   193.8  4950.5   193.6  4953.3   195.3  4961.3   196.9
  4962.3   198.3  4970.7   198.3  4981.4   198.3  4982.7   199.7  4992.3   200.3
    5006   199.6  5016.4   198.3  5024.6   195.8  5031.3     193  5032.9   192.1
  5038.9   189.7  5043.3   187.2    5046   185.6  5051.7   185.8    5057   185.9
  5062.7   185.6    5072   185.5  5082.4   185.8  5091.5   185.8  5098.4   185.7
  5099.4   185.6  5102.1   185.5  5107.7   185.6  5114.2   185.6  5121.2   185.6
  5127.8   185.6  5133.7   185.6  5140.2   186.1  5145.7   193.5  5150.5   194.5
  5156.6   194.1  5158.5   204.8  5158.7   207.5  5209.3   207.5  5255.7   207.7
  5262.9   210.1  5292.7     220

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  4801.1     .07  4848.9     .03  5158.5     .07

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        4848.9  5158.5               42      42      42            .05       .2
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  4801.1  4848.9   206.5       F
  5158.5  5292.7   204.8       F
Sediment Elevation = 0
```

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10529

INPUT
Description: 10530
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4801.1	220	4822.8	206.5	4831.5	206.5	4848.8	206.1	4849	206.5
4852	206	4861.8	202.8	4865.7	196.2	4879.5	188.9	4886.8	180.9
4896.7	180.9	4906.3	180.5	4912.7	180.6	4921.5	181.5	4925.9	182.1
4933.4	180.2	4944.3	193.8	4950.5	193.6	4953.3	195.3	4961.3	196.9
4962.3	198.3	4970.7	198.3	4981.4	198.3	4982.7	199.7	4992.3	200.3
5006	199.6	5016.4	198.3	5024.6	195.8	5031.3	193	5032.9	192.1
5038.9	189.7	5043.3	187.2	5046	185.6	5051.7	185.8	5057	185.9
5062.7	185.6	5072	185.5	5082.4	185.8	5091.5	185.8	5098.4	185.7
5099.4	185.6	5102.1	185.5	5107.7	185.6	5114.2	185.6	5121.2	185.6
5127.8	185.6	5133.7	185.6	5140.2	186.1	5145.7	193.5	5150.5	194.5
5156.6	194.1	5158.5	204.8	5159	207.5	5209.3	207.5	5255.7	207.7
5262.9	210.1	5292.7	220						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4801.1	.07	4849	.03	5159	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4849	5159	1	41	12	.05	.2

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10488

INPUT
Description: 10488

Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4796.1	220	4812.7	206	4827.4	205.9	4839.5	205.7	4861.3	202.8
4865.7	199	4880.6	189	4885.1	182.6	4889.1	179.9	4899	178.6
4903.7	180.6	4907.4	184.3	4916.9	183.5	4931.2	181.2	4942.6	185.2
4963.9	191.1	4984.1	193.1	4993.3	187.3	5000.9	185.9	5017.3	183.6
5037.4	178.8	5051.5	178.9	5063	179.2	5074.7	179.2	5081.9	178.9
5094.9	177.2	5101.5	177.7	5126.8	186.3	5133.3	185.9	5138.6	201.3
5144.7	202	5206.9	207.1	5231.3	207.3	5249.4	210	5260.6	220

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4796.1	.05	4839.5	.028	5144.7	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4839.5	5144.7	102.96	102.96	102.96	.1	.3

Sediment Elevation = 0

INLINE STRUCTURE

RIVER: Ramapo River
REACH: Reach-1 RS: 10487.5

INPUT
Description:
Distance from Upstream XS = 1
Deck/Roadway Width = 10
Weir Coefficient = 2.6
Weir Embankment Coordinates num = 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4865.7	199	4880.6	189	4885.1	182.6	4889.1	179.9	4899	178.6
4903.7	180.6	4907.4	184.3	4916.9	183.5	4931.2	181.2	4942.6	185.2
4963.9	191.1	4984.1	193.1	4993.3	187.3	5000.9	185.9	5017.3	183.6
5037.4	178.8	5051.5	178.9	5063	179.2	5074.7	179.2	5081.9	178.9
5094.9	177.2	5101.5	177.7	5126.8	186.3	5133.3	185.9	5138.6	201.3

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins =
Weir crest shape = Broad Crested

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10385

INPUT
Description: 10385

Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4743.3	220	4777.3	202.6	4791.2	202.2	4809.4	201.4	4819.2	200.1
4837.9	186.1	4848	185.3	4861	179.6	4872.3	179.8	4878	179.4
4888	178.7	4898	178.6	4908	178.6	4918	178.8	4928	178.9
4938	178.6	4943	178.2	4948	177.4	4953	176.7	4955	175.6
4958	174.2	4960	171.7	4963	170.3	4968	169.3	4973	167.6
4978	162.8	4985	160.7	4991	160.3	4998	161.1	5005	159.5
5012	158	5020	157.2	5028	155.9	5037	156.1	5043	158
5050	158.2	5055	157.8	5060	159.5	5065	159.6	5070	161.2
5073	163.1	5075	164.7	5078	166.3	5080	166.6	5085	165.8
5090	165.2	5095	166.3	5100	169.7	5103	172	5106	173.2
5111	175.9	5114	177.2	5122	179.4	5141	186.5	5165.5	191.2
5169.5	192.3	5175.5	194.1	5175.6	194.6	5187.8	199	5203.3	206.9
5211.1	206.6	5222.3	210.1	5236.8	220				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4743.3	.07	4861	.03	5122	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4861	5122	120	114.95	110.05	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10270

INPUT
Description: 10270
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4592.4	220	4637.2	203.9	4665.7	198.4	4706.2	194.1	4728.2	193.7
4754.1	192.7	4758.9	192.6	4778	192	4820	191.7	4828	191.6
4843	190.8	4853	190.4	4868	188.1	4880	187.6	4891	181.3
4948	161.7	4953	161.4	4960	161	4968	160.7	4976	159.9
4984	159.5	4989	160.3	4998	162.3	5009	163.8	5015	164.8
5025	165.5	5033	166.6	5041	165.6	5051	165.5	5062	165.4
5069	165.4	5076	168.7	5082	170.1	5085	174.9	5095	178
5097	179.6	5104	184.4	5108	186	5118	188.3	5128	190.8
5130	191.7	5139	193.5	5147.3	200	5169.9	207.4	5178.7	206.9
5190.8	210	5217.4	215.2	5234.8	220				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4592.4	.07	4891	.03	5097	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4891	5097	45	45	45	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10225

INPUT
Description: 10225

Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4842.7	223.83	4844.04	218.07	4853.34	195.06	4860.3	190.6	4870.3	190.4
4880.3	190.3	4885.3	186.8	4897.3	182.4	4907.3	179.7	4911.3	179.4
4911.4	178	4913.3	177.9	4918.3	177.7	4921.3	177	4925.3	174.9
4930.3	174.1	4935.3	172.3	4945.3	169.9	4955.3	168.1	4962.3	167.1
4969.3	164.8	4976.3	164.6	4982.3	164.3	4995.3	164.2	5006.3	163.8
5009.3	164.5	5019.3	166.3	5031.3	166.4	5037.3	167.3	5047.3	168.6
5055.3	169	5061.3	170.7	5065.3	172.9	5072.3	174.3	5076.3	176.1
5079.3	179	5082.3	178.2	5082.9	179.2	5095.9	187.2	5102.05	205.33
5113.26	220.08								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4842.7	.07	4911.3	.035	5079.3	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4911.3	5079.3	50	43	40	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10182

INPUT
Description: 10182

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4890.48	210.33	4892.26	207.64	4902	187.8	4909	186.6	4923	184.7
4929	185.1	4946	184.3	4953	179.4	4956	178.7	4960	177.6
4962	177.8	4963	178.8	4966	179.1	4970	178.7	4976	178.5

4982	177.8	4983	177.4	4989	178	4999	177.8	5006	177.8
5015	177	5021	176.4	5031	176.6	5038	176.9	5046	178.8
5047	177.7	5047.1	178.5	5050	179.6	5052	179.5	5068	180.1
5078	182.4	5090.88	198.52	5097.11	211.09				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4890.48	.07	4956	.035	5047.1	.07

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4956	5047.1	40.02	55.02	64.98	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10127

INPUT
Description: 10127

Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4900.94	198.95	4903.5	189.8	4923.5	189.6	4935.5	189.2	4940.5	189.3
4960.5	177.9	4962.5	177.6	4967.5	177.1	4973.5	175.8	4980.5	176.3
4985.5	176.1	4991.5	176.5	5004.5	176.1	5012.5	176.3	5020.5	176.8
5025.5	176.4	5029.5	176.1	5037.5	176.7	5038.5	177.1	5038.6	178.2
5039.5	179.1	5046.5	179.2	5053.5	178.8	5063.5	177	5067.5	176.1
5071.5	175.1	5078.3	193.1	5079.3	192.1	5103.3	192.8	5114.22	198.47

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4900.94	.15	4960.5	.035	5071.5	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4960.5	5071.5	41	41	41	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 10086

INPUT
Description: 10085
PATERSON HAMBURG TURNPIKE
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4407.4	220	4456.8	196.8	4513	194.2	4513.5	194.2	4544.7	193.3
4586.8	192.1	4624.8	190.9	4677.8	189.3	4756.2	190.1	4789.5	190
4839.1	189.8	4884	190.2	4900	191.1	4933	190.4	4940	188.6
4941	177.2	4941.1	177.3	4942	176.9	4945	177.3	4947	177.5
4950	177.3	4955	176.3	4960	174.3	4970	173.6	4976	175.9
4980	176.9	4980.1	176.9	4984	178.7	4984.1	178.7	4989	176.9
4990	175.7	5000	174.4	5010	174.4	5020	176.6	5022	176.6
5022.1	176.6	5025	178.2	5025.1	178.2	5029	176.5	5030	175.4
5040	173.9	5050	174.2	5060	175	5060.1	176.4	5062	188.5
5065	188.9	5070	191.1	5080	191	5100	191.2	5133.2	190.4
5195.5	191.2	5267.7	193.6	5353.1	195.2	5400.5	195.4	5432.6	200
5457.44	205.63								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4407.4	.2	4544.7	.04	4940	.03	5062	.06	5070	.2

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4940	5062	64	64	64	.6	.8

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 10053.5

INPUT
Description: PATERSON HAMBURG TURNPIKE

Distance from Upstream XS = .5
Deck/Roadway Width = 63
Weir Coefficient = 2.5
Upstream Deck/Roadway Coordinates
num= 32

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4407.4	220	220	4456.8	196.8	196.8	4513.5	194.2	194.2
4544.7	193.3	193.3	4586.8	192.1	192.1	4624.8	190.9	190.9
4677.8	189.3	189.3	4756.2	190.1	190.1	4789.5	190	190
4839.1	189.8	189.8	4884	190.2	190.2	4900	191.1	
4933	193.7		4940	193.7		4941	193.8	187.3
4980	194	187.3	4984.1	194	187.3	5022	194	187.3
5025.1	194	187.3	5060.1	193.7	187.3	5060.1	193.7	
5062	193.7	188.5	5065	193.6	188.9	5070	193.6	191.1
5080	191	191	5100	191.2	191.2	5133.2	190.4	190.4
5195.5	191.2	191.2	5267.7	193.6	193.6	5353.1	195.2	195.2
5400.5	195.4	195.4	5432.6	200	200			

Upstream Bridge Cross Section Data
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4407.4	220	4456.8	196.8	4513	194.2	4513.5	194.2	4544.7	193.3
4586.8	192.1	4624.8	190.9	4677.8	189.3	4756.2	190.1	4789.5	190
4839.1	189.8	4884	190.2	4900	191.1	4933	190.4	4940	188.6
4941	177.2	4941.1	177.3	4942	176.9	4945	177.3	4947	177.5
4950	177.3	4955	176.3	4960	174.3	4970	173.6	4976	175.9
4980	176.9	4980.1	176.9	4984	178.7	4984.1	178.7	4989	176.9
4990	175.7	5000	174.4	5010	174.4	5020	176.6	5022	176.6
5022.1	176.6	5025	178.2	5025.1	178.2	5029	176.5	5030	175.4
5040	173.9	5050	174.2	5060	175	5060.1	176.4	5062	188.5
5065	188.9	5070	191.1	5080	191	5100	191.2	5133.2	190.4
5195.5	191.2	5267.7	193.6	5353.1	195.2	5400.5	195.4	5432.6	200
5457.44	205.63								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
4407.4	.2	4544.7	.04	4940	.03	5062	.06	5070	.2

Bank Sta: Left	Right	Coeff Contr.	Expan.
4940	5062	.6	.8

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 26

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4677.8	189.3	189.3	4756.2	190.1	190.1	4789.5	190	190

4839.1	189.8	189.8	4884	190.2	190.2	4900	191.1	
4933	193.7		4940	193.7		4941	193.8	187.3
4980	194	187.3	4984.1	194	187.3	5022	194	187.3
5025.1	194	187.3	5060.1	193.7	187.3	5060.1	193.7	
5062	193.7		5065	193.6	188.9	5070	193.6	191.1
5080	191		5100	191.2		5133.2	190.4	
5195.5	191.2	191.2	5267.7	193.6	193.6	5353.1	195.2	195.2
5400.5	195.4	195.4	5432.6	200	200			

Downstream Bridge Cross Section Data
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4331	220	4360.2	200.3	4422.4	194.2	4480.5	192.7	4544	189.8
4691.7	190.6	4769.9	190.2	4856.8	191.2	4906	191	4916	191
4926	183.3	4936	177.2	4946	176.4	4956	176.5	4966	175.5
4976	174.9	4986	176	4996	175.5	5006	175.3	5016	172.7
5026	175.3	5036	174.6	5046	173.2	5056	173.3	5060	175.2
5063	175.7	5063.1	176.5	5064	194.4	5066	191	5086.5	190.1
5160.7	190.9	5195.5	191.2	5267.7	193.6	5353.1	195.2	5400.5	195.4
5432.6	200								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4331	.15	4916	.03	5064	.15

Bank Sta: Left	Right	Coeff Contr.	Expan.
4916	5064	.6	.8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4331	4916	191	F
5064	5432.6	194.4	F

Sediment Elevation = 0

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 189.5
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 2

Pier Data
Pier Station Upstream= 4982 Downstream= 4982
Upstream num= 2

Width	Elev	Width	Elev
4	150	4	194

Downstream num= 2

Width	Elev	Width	Elev
4	150	4	194

Pier Data
Pier Station Upstream= 5023.5 Downstream= 5023.5
Upstream num= 2

Width	Elev	Width	Elev
3	150	3	194

Downstream num= 2

Width	Elev	Width	Elev
3	150	3	194

Number of Bridge Coefficient Sets = 1

```
Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
       Do not add Weight component to Momentum
       Class B flow critical depth computations use critical depth
           inside the bridge at the upstream end
       Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 10022

INPUT
Description: 10022
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4331     220  4360.2   200.3  4422.4   194.2  4480.5   192.7    4544   189.8
  4691.7   190.6  4769.9   190.2  4856.8   191.2    4906     191    4916     191
    4926   183.3    4936   177.2    4946   176.4    4956   176.5    4966   175.5
    4976   174.9    4986     176    4996   175.5    5006   175.3    5016   172.7
    5026   175.3    5036   174.6    5046   173.2    5056   173.3    5060   175.2
    5063   175.7  5063.1   176.5    5064   194.4    5066     191  5086.5   190.1
  5160.7   190.9  5195.5   191.2  5267.7   193.6  5353.1   195.2  5400.5   195.4
  5432.6     200

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4331     .15    4916     .03    5064     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4916    5064             2.22   49.12   77.78             .6       .8
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4331    4916     191       F
    5064  5432.6   194.4       F
Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 10021

INPUT
Description: 10022
Station Elevation Data    num=      32
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4331     220  4360.2   200.3  4422.4   194.2  4480.5   192.7    4544   189.8
  4691.7   190.6  4769.9   190.2  4856.8   191.2    4906     191    4916     191
    4926   183.3    4936   177.2    4946   176.4    4956   176.5    4966   175.5
    4976   174.9    4986     176    4996   175.5    5006   175.3    5016   172.7
    5026   175.3    5036   174.6    5046   173.2    5056   173.3    5060   175.2
    5063   175.7  5063.1   176.5    5064   194.4    5066     191  5086.5   190.1
  5160.7   190.9 5183.16   205.34
```

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4331	.15	4916	.03	5064	.15

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4916 5064 37.74 833.68 1322.26 .6 .8

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
4331	4916	191	F
5064	5183.16	194.4	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 9580

INPUT
Description: 9580

Station Elevation Data num= 68

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4294.2	210	4313.4	198	4429	194.1	4477.9	192.1	4508.5	191.8
4535.3	190.9	4565.1	191.6	4593.3	191.5	4633	190.2	4691	189.7
4702.6	189.6	4740.3	188.5	4771.7	189.1	4836.8	187.8	4847	186.8
4882.4	185.9	4882.5	185.3	4894.5	184.1	4909	177.4	4937	177
4945	176.1	4952	175.3	4962	174.4	4972	173.6	4982	174.3
4992	174.2	5002	174.1	5012	174.3	5022	174	5032	174.2
5042	174.9	5054	176.1	5057	178.3	5070	185.1	5097	186.4
5107.2	187	5147.3	182.1	5186.3	179.5	5212.4	180.9	5246.2	184.4
5267.4	187.2	5285.8	186.6	5302.2	187.1	5331.6	188.9	5389.3	189.5
5427.4	189.5	5474.4	190.1	5534.1	191	5581.9	190.2	5596.6	189.9
5612.8	189.7	5629.9	189.9	5649.2	190.2	5712.1	191.1	5765.1	190.8
5822.4	190.9	5869.6	190.6	5896.4	189.9	5911	189.7	5928	189.9
5951.6	190.5	6027.3	192.4	6046.7	194.7	6062.6	196.1	6120	201.8
6142.1	201.7	6168.1	202	6194.1	201.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4294.2	.065	4882.4	.033	5070	.07

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
4882.4 5070 770.1 829.94 819.74 .1 .3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 8750

INPUT
Description: 8750

Station Elevation Data num= 92

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4454.9	210	4479.3	199.7	4515.4	195.7	4581	195.4	4622.3	194.4
4671.3	196	4709.6	196.4	4731.4	196.9	4747.8	196.5	4756.6	197.4
4775.9	196.9	4790.2	197.3	4809.9	196.9	4846.8	197	4879.6	193.8
4887.8	191.3	4887.9	191.3	4897	195.8	4897.5	195.2	4898	192.1
4907	190.8	4907.5	188.3	4918	187.1	4923.5	181.7	4932	176
4937	174.5	4947	172.8	4957	172.4	4967	173.1	4977	172.7
4987	172.9	4997	172.6	5007	172.4	5017	172.9	5027	173.3

5037	173.1	5047	174.9	5057	175.4	5068	176.2	5089.1	176.8
5131.9	177.9	5177.1	178.1	5225.1	180.4	5264	181.2	5321.9	181.7
5364	181.8	5412.5	182	5480.4	182.2	5537.9	183.6	5548.1	184.2
5613.9	183.4	5656.1	184.5	5701.5	189.4	5755.1	188.8	5812.7	186.8
5878.8	186.1	5918.1	188.1	5964.1	190.1	5978.9	191	6048.4	190.1
6063.2	188.8	6076.7	187.9	6109.1	187.8	6164.7	188.6	6244	189.1
6305.3	188.5	6356.7	189.8	6371.9	189.9	6382.8	190	6405.5	190.2
6454.2	190.3	6479.3	194	6547.5	195.7	6599.9	195.8	6636.5	196.1
6734.7	194.2	6888.9	194.7	6992.4	193.3	7046.3	194.1	7091.9	192.5
7172.8	194.1	7269.5	194.6	7398.8	194.7	7538.9	193.3	7617.6	194.6
7712.8	192.5	7833.4	194.3	7947.4	194.4	8144.3	192.3	8254.8	194.4
8313.1	195.3	8546.3	201.65						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4454.9	.065	4898	.05	6479.3	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4898	6479.3	830.08	794.89	680	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 7955

INPUT
Description: 7955

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4272.3	210	4304.8	203.7	4332.3	198.4	4357.9	198	4415.6	192.3
4490.9	192.3	4557.2	192.7	4621.3	192.9	4688.3	192.8	4711.1	193.2
4731.8	192.7	4784.6	192.1	4837.8	190.4	4869.9	189.9	4896.9	186.5
4907	186.4	4926	185.7	4939	176.2	4941	174.8	4943	174.1
4946	172.8	4949	171.7	4959	170.5	4969	170.4	4979	170.1
4989	169.5	4999	168.4	5009	168.5	5019	168.7	5029	169.6
5039	171.3	5044	172.9	5048	173.6	5054	174.5	5061	176.1
5072	178.2	5105	181.9	5129	182	5139	181.8	5177.9	181.9
5193.8	181.6	5210.9	181.9	5238.7	182.7	5291.3	182.4	5326.9	183.2
5364.1	185.5	5387.2	187.3	5451.3	186.4	5471.4	185.9	5489	185.9
5512.7	186.3	5573.6	187.4	5629.6	187.8	5670.7	188	5696.4	188.3
5737.6	187.8	5761.5	187.1	5774.9	187.3	5793.7	186.8	5824.8	187.6
5878.2	187.8	5935.6	188	6000.8	188.8	6043.7	188.6	6068.1	186.7
6082.7	186.4	6100.3	186.6	6124.8	188	6189	188.1	6274.1	187.3
6287.2	187.4	6350.4	186.8	6379.1	186	6394.5	185.7	6411.8	185.9
6444.7	186.4	6512.6	185.8	6550.4	183.8	6601.2	183.6	6648.5	185.2
6688.9	187.1	6734.7	187.9	6759.6	187.9	6771.5	187.5	6785	187.8
6820	187.8	6918.9	185.9	7012.6	186.8	7112.1	186.7	7261.2	187.5
7400.2	189.6	7496.3	190.4	7617.8	192.8	7782.9	194.3	7884.5	195
8039.6	192.6	8188.8	192.3	8308.6	192.6	8425.4	192.7		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4272.3	.2	4926	.045	5129	.5

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4926	5129	390	355.05	330	.1	.3

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 7600

INPUT
Description: 7600
This is a REPEATED section.

Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3935.5	226.1	4007.6	217	4022.6	217.8	4100.6	210.4	4135.6	201.7
4280.9	201.6	4293.5	200.8	4310.2	201	4320.3	200.4	4341.8	200.4
4416.8	198.1	4441.4	198.6	4463.1	197.4	4471.1	198.1	4506.5	193.9
4589.1	189.9	4675.4	187.7	4766.4	187.7	4846.9	185.2	4874.7	186.5
4892.9	186.5	4903	187.6	4932	187.6	4932.1	187.6	4941	181.3
4947	177	4950	174.7	4950.1	174.7	4953	172.6	4953.1	172.6
4958	170.6	4963	169.2	4973	167.3	4983	167.6	4993	167.8
4999	168.5	5003	168.9	5013	170	5023	171.2	5028	172.3
5033	174	5043	175.1	5046	175.8	5046.1	175.8	5048	176.3
5049	176.5	5049.1	176.5	5053	177	5054	177.9	5058	180.9
5058.1	181	5066	183.5	5066.1	183.5	5068	184.2	5073	185
5093	185.9	5093.1	185.9	5104.5	186.2	5160	185	5192.9	184.3
5470.3	183.9	5531.1	185	5555.6	186.6	5592.6	185.8	5941.7	186.7
5969.3	187.5	6033.7	187.1	6070.2	186.3	6127.6	188	6174.1	188.5
6238.6	186.6	6316.5	187.1	6342.3	186.6	6352.4	185.7	6380.2	185.6
6389.5	185.6	6403	186	6569.4	181.7	6589.1	182.5	6611.5	183.7
6639.8	185.8	6824.8	186.9	6933.1	187.5	7054.4	187	7087.7	186.2
7195.6	187.7	7312.6	188.7	7436.2	187	7546.6	187.4	7681.4	187.4
7799.1	188.2	7957.2	192.5	8093	193	8247.8	191.1	8369	191.2
8498.9	194	8573.43	205.46						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3935.5	.2	4932	.045	5104.5	.5

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4932	5104.5	110	110	110	.5	.7

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 7490

INPUT
Description: 7490
DAWES HIGHWAY

Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3935.5	225.1	4007.6	216	4022.6	216.8	4100.6	209.4	4135.6	200.7
4280.9	200.6	4293.5	199.8	4310.2	200	4320.3	199.4	4341.8	199.4
4416.8	197.1	4441.4	197.6	4463.1	196.4	4471.1	197.1	4506.5	192.9
4589.1	188.9	4675.4	186.7	4766.4	186.7	4846.9	184.2	4874.7	185.5
4892.9	185.5	4903	186.6	4932	186.6	4932.1	186.6	4941	180.3
4947	176	4950	173.7	4950.1	173.7	4953	171.6	4953.1	171.6
4958	169.6	4963	168.2	4973	166.3	4983	166.6	4993	166.8
4999	167.5	5003	167.9	5013	169	5023	170.2	5028	171.3
5033	173	5043	174.1	5046	174.8	5046.1	174.8	5048	175.3
5049	175.5	5049.1	175.5	5053	176	5054	176.9	5058	179.9
5058.1	180	5066	182.5	5066.1	182.5	5068	183.2	5073	184
5093	184.9	5093.1	184.9	5104.5	185.2	5160	184	5192.9	183.3

5470.3	182.9	5531.1	184	5555.6	185.6	5592.6	184.8	5941.7	185.7
5969.3	186.5	6033.7	186.1	6070.2	185.3	6127.6	187	6174.1	187.5
6238.6	185.6	6316.5	186.1	6342.3	185.6	6352.4	184.7	6380.2	184.6
6389.5	184.6	6403	185	6569.4	180.7	6589.1	181.5	6611.5	182.7
6639.8	184.8	6824.8	185.9	6933.1	186.5	7054.4	186	7087.7	185.2
7195.6	186.7	7312.6	187.7	7436.2	186	7546.6	186.4	7681.4	186.4
7799.1	187.2	7957.2	191.5	8093	192	8247.8	190.1	8369	190.2
8498.9	193	8612.72	202.64						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3935.5	.2	4932	.045	5104.5	.5

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4932	5104.5	38	38	38	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3935.5	4932	186.6	F
5104.5	8612.72	185.2	F

Sediment Elevation = 0

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: 7471

INPUT
Description: DAWES HIGHWAY
Distance from Upstream XS = 7.5
Deck/Roadway Width = 23
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 79

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4280.9	200.6	200.6	4293.5	199.8	199.8	4310.2	200	200
4320.3	199.4	199.4	4341.8	199.4	199.4	4416.8	197.1	197.1
4441.4	197.6	197.6	4463.1	196.4	196.4	4471.1	197.1	197.1
4506.5	192.9	192.9	4589.1	188.9	188.9	4675.4	186.7	186.7
4766.4	186.7	186.7	4846.9	184.2	184.2	4874.7	185.5	185.5
4892.9	185.5	185.5	4903	189.5	186.6	4932	189.5	
4932.1	191		4941	200	180.3	4950	200	173.7
4950.1	191	173.7	4953	191.2	171.6	4953	191.2	179.8
4958	191.6	181.8	4963	192.1	183.5	4973	192.6	185.2
4993	193.5	187.5	4999	193.5	187.7	5013	193.5	187
5023	193.2	185.8	5033	192.8	183.9	5046	191.8	179.8
5046.1	191.8	174.8	5049	191.5	175.5	5049.1	200	175.5
5058	200	180	5058.1	191	180	5066	191	182.5
5066.1	189.5	182.5	5093	189.5	184.9	5093.1	186	184.9
5104.5	185.8	185.2	5160	184	184	5192.9	183.3	183.3
5470.3	182.9	182.9	5531.1	184	184	5555.6	185.6	185.6
5592.6	184.8	184.8	5941.7	185.7	185.7	5969.3	186.5	186.5
6033.7	186.1	186.1	6070.2	185.3	185.3	6127.6	187	187
6174.1	187.5	187.5	6238.6	185.6	185.6	6316.5	186.1	186.1
6342.3	185.6	185.6	6352.4	184.7	184.7	6380.2	184.6	184.6
6389.5	184.6	184.6	6403	185	185	6569.4	180.7	180.7
6589.1	181.5	181.5	6611.5	182.7	182.7	6639.8	184.8	184.8
6824.8	185.9	185.9	6933.1	186.5	186.5	7054.4	186	186
7087.7	185.2	185.2	7195.6	186.7	186.7	7312.6	187.7	187.7
7436.2	186	186	7546.6	186.4	186.4	7681.4	186.4	186.4
7799.1	187.2	187.2	7957.2	191.5	191.5	8093	192	192
8247.8	190.1	190.1						

Upstream Bridge Cross Section Data
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3935.5	225.1	4007.6	216	4022.6	216.8	4100.6	209.4	4135.6	200.7
4280.9	200.6	4293.5	199.8	4310.2	200	4320.3	199.4	4341.8	199.4
4416.8	197.1	4441.4	197.6	4463.1	196.4	4471.1	197.1	4506.5	192.9
4589.1	188.9	4675.4	186.7	4766.4	186.7	4846.9	184.2	4874.7	185.5
4892.9	185.5	4903	186.6	4932	186.6	4932.1	186.6	4941	180.3
4947	176	4950	173.7	4950.1	173.7	4953	171.6	4953.1	171.6
4958	169.6	4963	168.2	4973	166.3	4983	166.6	4993	166.8
4999	167.5	5003	167.9	5013	169	5023	170.2	5028	171.3
5033	173	5043	174.1	5046	174.8	5046.1	174.8	5048	175.3
5049	175.5	5049.1	175.5	5053	176	5054	176.9	5058	179.9
5058.1	180	5066	182.5	5066.1	182.5	5068	183.2	5073	184
5093	184.9	5093.1	184.9	5104.5	185.2	5160	184	5192.9	183.3
5470.3	182.9	5531.1	184	5555.6	185.6	5592.6	184.8	5941.7	185.7
5969.3	186.5	6033.7	186.1	6070.2	185.3	6127.6	187	6174.1	187.5
6238.6	185.6	6316.5	186.1	6342.3	185.6	6352.4	184.7	6380.2	184.6
6389.5	184.6	6403	185	6569.4	180.7	6589.1	181.5	6611.5	182.7
6639.8	184.8	6824.8	185.9	6933.1	186.5	7054.4	186	7087.7	185.2
7195.6	186.7	7312.6	187.7	7436.2	186	7546.6	186.4	7681.4	186.4
7799.1	187.2	7957.2	191.5	8093	192	8247.8	190.1	8369	190.2
8498.9	193	8612.72	202.64						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3935.5	.2	4932	.045	5104.5	.5

Bank Sta: Left	Right	Coeff Contr.	Expan.
4932	5104.5	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3935.5	4932	186.6	F
5104.5	8612.72	185.2	F

Sediment Elevation = 0

Downstream Deck/Roadway Coordinates
num= 79

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4280.9	200.6		4293.5	199.8		4310.2	200	
4320.3	199.4		4341.8	199.4		4416.8	197.1	
4441.4	197.6		4463.1	196.4		4471.1	197.1	
4506.5	192.9		4589.1	188.9		4675.4	186.7	
4766.4	186.7		4846.9	184.2	184.2	4874.7	185.5	185.5
4892.9	185.5	185.5	4903	189.5		4932	189.5	
4932.1	191		4941	200	180.3	4950	200	173.7
4950.1	191	173.7	4953	191.2	171.6	4953	191.2	179.8
4958	191.6	181.8	4963	192.1	183.5	4973	192.6	185.2
4993	193.5	187.5	4999	193.5	187.7	5013	193.5	187
5023	193.2	185.8	5033	192.8	183.9	5046	191.8	179.8
5046.1	191.8	174.8	5049	191.5	175.5	5049.1	200	175.5
5058	200	180	5058.1	191	180	5066	191	182.5
5066.1	189.5	182.5	5093	189.5	184.9	5093.1	186	
5104.5	185.8		5160	184		5192.9	183.3	
5470.3	182.9		5531.1	184		5555.6	185.6	
5592.6	184.8		5941.7	185.7		5969.3	186.5	
6033.7	186.1		6070.2	185.3		6127.6	187	
6174.1	187.5		6238.6	185.6		6316.5	186.1	
6342.3	185.6		6352.4	184.7		6380.2	184.6	
6389.5	184.6		6403	185		6569.4	180.7	
6589.1	181.5		6611.5	182.7		6639.8	184.8	
6824.8	185.9		6933.1	186.5		7054.4	186	
7087.7	185.2		7195.6	186.7		7312.6	187.7	

7436.2	186	7546.6	186.4	7681.4	186.4
7799.1	187.2	7957.2	191.5	8093	192
8247.8	190.1				

Downstream Bridge Cross Section Data
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3911.5	225	3989.3	210	4009	212.3	4020.8	211.1	4040.2	216.5
4063.7	213.8	4124.2	200	4327.2	199.2	4384.9	197.6	4406.6	198
4428.7	197.6	4606	188.1	4719.2	186.8	4807.5	186.2	4858.1	186.1
4893	185.2	4924	184.8	4936	184.5	4943	183.3	4946	176.4
4949	176	4952	175.4	4955	174.8	4960	173.9	4964	172.1
4970	169.3	4980	167.1	4990	167.2	5000	167.2	5010	168
5020	170.1	5030	171.4	5039	173.2	5044	173.8	5050	176
5056	180.5	5062	182.3	5067	184.1	5070	185.5	5090	184.8
5122	184.5	5160.4	183.7	5190.1	182.9	5230	182.9	5278.2	182.7
5332.5	182	5378.8	182.7	5414.1	182.4	5460.1	182.3	5528.4	183.8
5619.8	184.3	5712.3	185.6	5733	185.1	5739.8	184.5	5768.6	184.7
5777.5	184.8	5802.8	185.4	5843.4	184.8	5920	185.3	5962.4	185.2
6003.7	186.3	6022.6	185.7	6031.4	185.4	6058.5	185.6	6067.4	186
6097.1	186.8	6121.5	187.5	6154.5	186.9	6180.8	186.5	6206.1	185.5
6226.3	185	6252.2	185.6	6304.4	185.6	6334	184.2	6368.7	184.2
6407	184.7	6514.7	182	6568.7	180.8	6602.4	182.7	6640.5	184.6
6731.8	185.1	6755.1	185.1	6761.9	184.8	6788.4	185.7	6829.1	186
6927.7	186.5	7033.8	185.9	7073.9	185	7188.5	186.7	7284.6	187.2
7348.8	186.9	7476.7	184.3	7599.6	185.8	7722.6	186.2	7888.3	189
8046	191	8195.4	189.7	8341.8	191.7	8498.3	193		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3911.5	.2	4924	.045	5070	.5

Bank Sta: Left	Right	Coeff Contr.	Expan.
4924	5070	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3911.5	4924	184.8	F
5070	8498.3	185.5	F

Sediment Elevation = 0

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .98
Elevation at which weir flow begins = 185
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Energy

High Flow Method
Pressure and Weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd =.7352146
Max Low Cord = 187.5

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 7452

INPUT
Description: 7452
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3911.5	225	3989.3	210	4009	212.3	4020.8	211.1	4040.2	216.5
4063.7	213.8	4124.2	200	4327.2	199.2	4384.9	197.6	4406.6	198
4428.7	197.6	4606	188.1	4719.2	186.8	4807.5	186.2	4858.1	186.1
4893	185.2	4924	184.8	4936	184.5	4943	183.3	4946	176.4
4949	176	4952	175.4	4955	174.8	4960	173.9	4964	172.1
4970	169.3	4980	167.1	4990	167.2	5000	167.2	5010	168
5020	170.1	5030	171.4	5039	173.2	5044	173.8	5050	176
5056	180.5	5062	182.3	5067	184.1	5070	185.5	5090	184.8
5122	184.5	5160.4	183.7	5190.1	182.9	5230	182.9	5278.2	182.7
5332.5	182	5378.8	182.7	5414.1	182.4	5460.1	182.3	5528.4	183.8
5619.8	184.3	5712.3	185.6	5733	185.1	5739.8	184.5	5768.6	184.7
5777.5	184.8	5802.8	185.4	5843.4	184.8	5920	185.3	5962.4	185.2
6003.7	186.3	6022.6	185.7	6031.4	185.4	6058.5	185.6	6067.4	186
6097.1	186.8	6121.5	187.5	6154.5	186.9	6180.8	186.5	6206.1	185.5
6226.3	185	6252.2	185.6	6304.4	185.6	6334	184.2	6368.7	184.2
6407	184.7	6514.7	182	6568.7	180.8	6602.4	182.7	6640.5	184.6
6731.8	185.1	6755.1	185.1	6761.9	184.8	6788.4	185.7	6829.1	186
6927.7	186.5	7033.8	185.9	7073.9	185	7188.5	186.7	7284.6	187.2
7348.8	186.9	7476.7	184.3	7599.6	185.8	7722.6	186.2	7888.3	189
8046	191	8195.4	189.7	8341.8	191.7	8498.3	193		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3911.5	.2	4924	.045	5070	.5

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4924	5070	649.89	652.05	479.79	.5	.7

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3911.5	4924	184.8	F
5070	8498.3	185.5	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 6800

INPUT
Description: 6800

Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3288.1	232.5	3320	223.3	3354.8	211.4	3382.3	210	3469.7	208.7
3577.4	208.6	3619.8	205.5	3679.3	205.5	3742.7	207.3	3849.7	207.3
3906.4	200	3964.2	182.7	4002.5	184.1	4070.1	184.3	4126.4	182.6
4169.2	181.9	4201.8	181.4	4264	180.6	4298.4	181.6	4331.6	182.4
4396.5	181.6	4458.4	182.3	4516.5	183	4636.3	183.2	4731.3	182.9

4779.5	182.8	4830.6	183.1	4881.4	183.1	4901.6	182.9	4911.5	183.5
4938.5	183.6	4950.5	178.5	4951.5	175.9	4952.5	175.6	4956.5	174.9
4958.5	173.6	4960.5	171.9	4965.5	170	4970.5	170.2	4980.5	170.2
4990.5	169.8	5000.5	169.7	5010.5	168.9	5020.5	168.7	5030.5	169.6
5040.5	171.6	5043.5	173	5045.5	175.1	5048.5	175.4	5048.6	175.9
5048.7	177.7	5056.5	178.5	5064.5	181.7	5072.5	181.9	5092.5	181.4
5141.5	180.4	5196.5	179.6	5224.6	179.6	5304.2	180	5346.1	180.1
5432.9	180.4	5496.2	180.8	5603.6	181.2	5631.6	181.2	5662.7	181.3
5772.5	183.8	5896.3	183.7	5993.3	182.9	6114.7	184.3	6258.5	182.8
6290.7	182.7	6351.6	186.7	6469.4	184	6556.9	183.3	6642.6	184.2
6746.9	183.9	6820.4	184.2	6901	184.6	7005.2	184.3	7099.9	182.6
7170.1	184.5	7225.1	183	7291.3	183.6	7356.7	185.3	7433.8	187.1
7497.1	189.2	7593.4	190.3	7623.6	191.1	7659.1	190.3	7725.7	190.5
7822.8	189.3	7884.6	188.5	7947.4	190	8022	191.3	8097.4	193.9
8159	191.5	8209.8	191.1	8214.22	200.31				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3288.1	.2	4938.5	.045	5064.5	.5

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4938.5	5064.5	690	744.9	799.8	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 6055

INPUT
Description: 6055

Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3151.8	210.1	3208.1	208.1	3314.4	205.8	3378.6	204	3438.6	202.4
3522.3	202.7	3545.8	199	3595.9	199.1	3674	200.5	3754.2	202.5
3812.3	201.1	3871.8	204.5	4023.8	203.5	4055.1	202.8	4110.1	203.7
4175.8	201.9	4237.6	196.2	4278.9	178.7	4361.7	178.8	4436.1	179.9
4546.2	177.4	4633.5	176.4	4695.3	176.4	4776.1	178.5	4841.6	177.4
4912.1	179.1	4922.5	179.7	4936.5	180.4	4941.5	179.1	4944.5	176.7
4947.5	176.1	4952.5	175.3	4957.5	174.1	4962.5	173.4	4972.5	171.4
4982.5	170.6	4992.5	169.6	5002.5	168.7	5012.5	166.1	5022.5	165.2
5032.5	164.9	5042.5	168.7	5046.5	170.6	5048.5	173.6	5050.5	175.3
5052.5	176.1	5060.5	180.6	5062.5	180.6	5082.5	181.2	5092.4	181.2
5152.8	180.3	5259.4	178.8	5329	180.2	5410.5	180.4	5496.4	180.4
5536.9	180.1	5569.1	180.1	5665.3	180.1	5738.3	178.2	5800.2	181.4
5853	181.5	5919.4	178.4	5988.5	178.7	5995.7	177.2	6020.3	182.8
6057.6	183.1	6145.6	180.6	6285.5	179.5	6393.2	178.9	6436.5	179.7
6530.8	182.6	6613.5	182.8	6747	186.2	6906.3	190.9	6963.7	188.4
7047.1	191.5	7197.7	190.1	7339.9	191.3	7519.3	192.6	7640.2	191.5
7689.7	191.6	7724.04	195.52						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3151.8	.2	4936.5	.045	5082.5	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4936.5	5082.5	379.95	370.05	360	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 5685

INPUT
Description: 5685

Station Elevation Data num= 79

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3150.5	210	3225.4	209.1	3248.9	207.9	3280.5	207.7	3321.2	206.3
3362.1	202.3	3427.9	201.3	3466.3	201.3	3601.7	200	3622.9	198.4
3659.3	199.5	3715.6	200.4	3752.3	202.4	3797.8	203.4	3861.7	204
3939	205.3	4015.5	205.2	4062.6	205.2	4124.2	204.9	4215.1	204.7
4274.5	204.3	4336.4	204.5	4380.5	202.8	4438.9	195.3	4510.9	187.5
4561.9	179	4606.8	181.9	4711	182.2	4764	181.9	4786	181.7
4807	181.2	4818.5	180.3	4819	176.2	4890	176	4916	178.7
4931	178.9	4934	179.2	4938	179.8	4945.5	176.2	4945.6	174.7
4949	172.6	4951	170.8	4956	170.6	4958	167.1	4966	165.1
4976	164.6	4986	164.8	4996	165.1	5006	165.3	5026	167.7
5028	168.8	5033	170.6	5036	172.6	5036.1	174.6	5040	175.9
5053	180.9	5082.3	182.4	5118.6	184	5300	190	5500	195
5600	185	5689.2	180.2	5749.6	178.6	5876.2	178.6	6023.6	178.7
6146.5	178.1	6217.8	177	6362	177.1	6441	180.8	6510.9	178.7
6610.8	179.7	6723.5	178.5	6836.9	180.4	6920.9	186.6	7013.2	190.1
7181	190.7	7358.5	190.7	7529.7	191.4	7613.3	193		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3150.5	.5	4938	.045	5082.3	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4938	5082.3	1585.08	900	730.08	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 4785

INPUT
Description: 4785

Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2812.4	210.3	2897.4	206.7	2970.1	191.4	3089.9	181.9	3145.2	183.4
3314.3	184	3572.1	183.4	3694.4	185.5	3796.2	182.9	4075.1	186.8
4337.9	186.8	4380.7	186.8	4499	181.5	4613	181	4760.6	180.4
4833.8	180	4894	180.6	4914	179.9	4936	179.6	4940	177.3
4942	176	4944	175.1	4949	173.7	4959	171.9	4969	171.3
4999	171	5009	170.6	5019	170.5	5039	172	5049	173.2
5055	175.2	5070	177.5	5102.6	178.5	5110.7	177.3	5132	177
5137	178.3	5165	178.4	5190	178.5	5199	177.6	5240	176.4
5266	177.1	5270	177.6	5292	177	5319.5	177.1	5321	177.2
5333	177	5336	176.4	5347	175.6	5358	175	5368	174.9
5375	175.3	5382	175.5	5389	175.7	5397	176.1	5405	176.3
5418	175.9	5424	176.2	5428	176.3	5431	175.8	5438	174.9
5443	174.1	5447	173.4	5457	171.8	5467	173.6	5471	173.9
5474	176.4	5478	177.1	5499	177.6	5520	177.3	5547	176.9
5581	177.1	5610	176.9	5645	177	5678	176.3	5685	176.1
5693	176.4	5714	177.1	5719	175.9	5745	177.4	5779	177.7
5791.7	178	5826	177.7	5851	177.7	5886	177.4	5933	177
5941	176.7	5947	176.3	5953	176.7	5960	177.1	5985	177.1

5996	176.9	6006	176.7	6026	176.7	6038	177.1	6069	177.5
6113	176.6	6153	177.9	6320.3	178.3	6535.7	177.4	6635.68	183.22
6741.99	192.13								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2812.4	.5	4936	.045	5070	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4936	5070	269.96	410.04	950.13	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 4375

INPUT
Description: 4375

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2815.8	211.7	2858.2	205.2	2898.8	204.4	3035.3	182.2	3087.2	181.7
3254	183	3415.4	181.2	3452.6	182.9	3516.2	182	3581.7	183.8
3657.7	184	3715.3	183.1	3759	185.1	3809.9	182.7	3973.9	184.4
4161.4	185	4897.3	183.8	4929.1	183.1	4944.1	182.2	4951.7	179.8
4954.9	176.5	4956.7	175.5	4960.7	173.2	4970.7	170.2	5015.7	170
5025.7	169.8	5035.7	169.5	5045.1	175.8	5045.2	176.5	5048.4	178.8
5094.3	176.3	5111.5	177.4	5209.2	176.9	5252	177.7	5299.2	179.4
5307.5	179.5	5327.5	171.3	5337.5	171.5	5357.5	170.7	5387.5	173.3
5397.5	173.5	5427.5	173.1	5455.9	178.8	5477.6	178.7	5488.9	177.6
5492.4	176.6	5496.5	175.7	5501.5	174.2	5507.5	172.9	5512.5	173.3
5517.5	172.8	5522.5	173	5527.5	173.7	5532.9	175.4	5535.3	176.1
5536.1	176.6	5539	177.7	5553.4	177.4	5558.1	178.3	5577.2	177.4
5586.9	178.1	5622.2	178.3	5649.5	178.8	5693.6	178.2	5728.9	177.7
5751.6	177.5	5761.8	178.6	5793.1	180.3	5835.2	181.4	5881.1	180.8
5913.2	180.2	5939.6	179.2	5980.6	178.8	6000	176	6014.5	177.1
6027.1	177.1	6044.3	175.7	6123.3	173.2	6149.6	173.2	6193.4	174.6
6270.5	175.5	6636.2	177.5	6841.1	176.1	6885.2	189.7	6954.9	189.6
7040.8	186.9	7074	186.9	7104.3	191.6	7170.1	188.4	7406.1	180.9
7441.8	173.3	7538.9	173.3	7582.1	179.5	7658.3	182.4	7723.7	178.2
7984.8	176.2	8144.3	178	8200	180	8400	200		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2815.8	.5	4929.1	.045	5455.9	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4929.1	5455.9	300	595.19	799.92	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 3780

INPUT
Description: 3780

Station Elevation Data num= 80

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

2727.5	210.1	2765.7	200.3	2799.1	200.6	2873.4	183.9	2913.5	181.5
3030.8	181.7	3118	184.6	3170.6	183.2	3296.2	184.8	3437.9	183.7
3617	184.2	4264.6	183	4342.4	182.3	4422.4	184.5	4586.9	185.6
4613	185.6	4641	184.9	4661	180	4666	176.9	4676	176.5
4691	174.3	4703	174.3	4724	175.8	4728	178.6	4735.8	179.1
4782	178.2	4811	176.2	4876	177.2	4917	175.9	4940	177.2
4949	175.8	4984	171.5	4994	171.9	5034	167.7	5057	177.7
5066	178	5106	171.5	5116	171.9	5136	175	5176	173.4
5186	173.5	5196	173	5206	173.4	5210	175.1	5213	176.4
5215	177.5	5220	177.9	5238.8	184.1	5625	183.7	5625.9	185.1
5626.9	176.5	5896.6	176.5	5897.5	185	5898.5	184.6	6318.5	184.6
6417.5	187.6	6574.7	182.1	6638.6	183.9	6725.5	188.4	6788.7	185.3
6960.4	186.2	7198.6	188	7357.5	186.8	7456	185.6	7518.5	184
7642.9	180.9	7731.5	183.5	7833.7	182.1	7962.5	180.1	8136.7	177.8
8290.4	176.5	8313.9	176.5	8404.5	188.8	8534.6	190	8705.6	190.9
8798.3	193.1	8914.6	195.1	9027.5	195.4	9146.9	194	9197.9	193.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2727.5	.5	4613	.045	5238.8	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4613	5238.8	319.93	565.11	500.02	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 3215

INPUT
Description: 3215

Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3266.5	210	3379.9	196.8	3404.6	196.6	3457.6	182.5	3513	180.3
3607.3	179.7	3712.3	182.8	3906.2	182.1	3929.6	184.4	4069.2	183.4
4144.6	184.2	4643	185.5	4861	184.9	4869	180.4	4884	180
4888.1	175.8	4903	174.2	4944	174	4954	172.7	4964	173
4974	172	4984	172	4994	170.6	5004	171.1	5014	170.5
5044	170.4	5054	170	5064	169.6	5092	174.4	5097	174.6
5102	175.4	5120	176.9	5130	176.8	5138.9	177.5	5178	177.5
5204	176.4	5212	175.4	5217	173.3	5227	173.3	5237	172.3
5254.6	176.3	5255	177.2	5269	183.9	5272.6	183.7	5277	183.6
5318.7	177.9	5478.5	176.6	5572.6	174.3	5675.5	177.6	5721.1	176.4
5745.8	177.5	5876.6	177.9	5941.4	176.4	6006.9	177.6	6067.4	176.7
6097.6	177.6	6115	176.9	6123	171.3	6137	172.2	6151	169.3
6154	170.1	6158	170.5	6164	169.5	6172	167.7	6205	167.2
6210	167.5	6215	169.1	6217	170.1	6217.1	171.6	6223	173.8
6231	176.1	6266	176.2	6277.1	179.6	6367.8	175.2	6404.3	176.5
6448.8	170.2	6539.2	181.9	6561.2	180.8	6678.7	187.7	6892.1	179.4
6936.1	184	7095.2	187.5	7138.6	183.4	7243.6	181.5	7326	181.8
7702.8	187.7	7828.6	187.8	7894.2	187.1	8034.9	184.8	8118	186.2
8239.6	181.5	8360.3	186.5	8511.4	188.4	8790.2	189.1	9343.8	197.9
9704.9	199	9872.8	198.1	9918.7	199				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3266.5	.5	4861	.045	5269	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4861	5269	930.15	689.92	210	.2	.4

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 2525

INPUT
Description: 2525

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3524.3	210.1	3546.6	208	3583.6	193.1	3619.3	192.5	3639	187.1
3684.2	185.9	3702.5	180.2	3716.7	184.5	4102.9	181.6	4144.1	182.3
4235.8	181.5	4425.3	181.9	4470.7	183.5	4579.2	180.3	4626.1	182.9
4753	180.5	4773	181.9	4789	181.2	4798	178.2	4799	176.5
4824	168.8	4834	168.2	4844	169.6	4874	172.5	4885	174.5
4891	176.5	4893	177.8	4929	176.5	4930	175.2	4934	174.5
4946	170.3	4966	169.2	4996	170.4	5006	170.2	5016	170.5
5026	170.8	5036	169.9	5072	176.5	5096	183.6	5103.6	180.5
5107	183.6	5149.4	176.2	5280.8	174.9	5328.5	176	5704.4	174.2
5755	175.7	5829.7	173.6	6005.4	175.3	6221.2	174.1	6257.6	176
6273	176.7	6294	176.2	6307	172.8	6313.1	170	6331	167.9
6349	167.6	6358	168.1	6368	169.1	6371	170	6377	171.5
6382	176.4	6391	176.5	6405	175.6	6415	177.1	6483.3	173.3
6557.3	177.6	6586.1	183.9	6601	187.2	6626.2	177.5	6669.4	175.8
6737.9	181.4	6790.9	180	6849.3	182.8	6923.4	182.5	7019.2	178.9
7152.9	187.1	7339	186	7484.8	181.4	7576.3	187.7	7650.8	188.1
7711.5	189.7	7834.1	188.6	7904.2	189.1	7973.1	189.4	8080.8	187.6
8188.7	190.5	8299	188.9	8469.6	190	8592.1	189.1	8740.9	188.9
8894.2	189.5	9143	190.6	9285.1	192.3	9414.7	194.3	9570.1	196.3
9728.9	198.4	9875.3	198.3	10092.1	196.5	10180	199.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3524.3	.5	4773	.045	5096	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4773	5096	1184.9	1010.24	460.02	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3524.3	4773	181	F
5096	10180	184	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 1515

INPUT
Description: 1515
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3222	200	3387	187.2	3393	188.5	3430.4	184.2	3505.5	185.9
3613	186.1	3837.2	189.7	4115.7	182.3	4229.8	180.5	4361.9	180.7
4551.7	180.6	4607	181.6	4640	179.8	4666	180.9	4694	170.3
4714	166.2	4724	167.9	4744	168	4753	172.7	4770	179.4
4835	177	4904	176.6	4940	176.9	4944	176.5	4949	170.3
4967	168.5	5013	169.6	5026	169.5	5042	170.3	5057	176.7
5058	177.9	5066	178.5	5081	177.3	5096	183.2	5106	183.2

5112	178.1	5179.8	175.6	5242.1	176.4	5428.2	175.2	5546.3	173.5
5618	175.5	5860.4	174.6	5953.5	176	6087.6	173.1	6156.9	174.5
6166	174.3	6186	174.1	6189	173.8	6201	171.9	6207	167.7
6211	167.4	6216	167.9	6226	168.3	6232	169	6252	169.1
6262	169	6272	168	6282	169.3	6286	169.3	6296	169.3
6306	169	6313	168.8	6315	170.2	6319	175.2	6323	175.3
6326	175.4	6329	173.5	6422.6	187.7	6492.4	178.8	6560.4	178.2
6621.3	180.6	6666.7	179.3	6805.9	184	6860.7	183.8	6927.5	182.1
7259.7	184.6	7328.6	190.1	7393.8	188.5	7589.1	189.8	7744	189.4
7819.7	190.7	7977.7	192.3	8089.1	192.4	8305.4	193	8447	189.9
8571.2	191.9	8646.3	192.3	8757.1	190.4	8852.5	192.2	9107.6	196.1
9230.6	196	9361.5	194.2	9602.1	194.2	9695.7	198	9770.9	197.5
9886.6	198.3	10011.4	196.4	10192.6	198.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3222	.15	4666	.045	5106	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4666	5106	655.02	430.02	15.12	.2	.4

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3222	4666	182	F
5106	10192.6	184	F

Sediment Elevation = 0

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 1085

INPUT
Description: 1085

Station Elevation Data num= 70

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
3222	200	3387	187.2	3393	188.5	3430.4	184.2	3505.5	185.9
3613	186.1	3837.2	189.7	4115.7	182.3	4229.8	180.5	4361.9	180.7
4551.7	180.6	4607	181.6	4640	179.8	4666	180.9	4694	170.3
4714	166.2	4967	168.5	5013	169.5	5042	170.3	5057	176.7
5058	177.9	5066	178.5	5081	177.3	5096	183.2	5106	183.2
5112	178.1	5179.8	175.6	5242.1	176.4	5428.2	175.2	5546.3	173.5
5618	175.5	5860.4	174.6	5953.5	176	6087.6	173.1	6156.9	174.5
6166	174.3	6186	174.1	6189	173.8	6201	171.9	6207	167.7
6211	167.4	6216	167.9	6226	168.3	6232	169	6252	169.1
6262	169	6272	168	6282	169.3	6286	169.3	6296	169.3
6306	169	6313	168.8	6315	170.2	6319	175.2	6323	175.3
6326	175.4	6329	173.5	6422.6	187.7	6492.4	178.8	6560.4	178.2
6621.3	180.6	6666.7	179.3	6805.9	184	6860.7	183.8	6927.5	182.1
7259.7	184.6	7328.6	190.1	7393.8	188.5	7589.1	189.8	7744	189.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
3222	.15	4666	.045	5106	.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4666	5106	5	5	5	.4	.6

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
3222	4666	184.7	F
5106	7744	185	F

Pilot Channel Invert = 161.189

```
              Width       = 1
              Manning's n = 0.03

Sediment Elevation = 0

CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 1080

INPUT
Description: 1080

Station Elevation Data    num=      70
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
    4205   188.1    4475   182.4    4477   188.5    4672   183.2    4862   181.5
    4863   184.1    4865   184.2  4865.7   176.5  4865.8   174.6    4880   173.9
    4974   173.8    4998   173.1    5072   173.6    5097   174.1    5115   174.3
    5123   174.3  5135.6   174.8  5135.7   176.5  5135.8   184.2  5138.3   184.2
    5157   182.6    5165   182.7    5175     177    5205   175.3    5245   175.2
    5333   176.2    5483   174.8    5583   175.3    5605   174.2  5733.7   174.8
  5807.3   174.4    6067     176  6116.7   175.9  6174.1   174.2  6230.9   174.6
    6241   174.9  6261.3   174.2    6273   173.8    6280   170.1    6282   168.2
    6285   167.5    6295   167.8    6301   168.5    6306   169.2    6316   169.1
    6326   169.2    6336   169.3    6346   169.4    6356   169.3    6361   169.1
    6369   167.9    6372   168.1  6375.5   170.2    6376   175.1  6382.5   175.2
    6385     175    6391   173.4    6397   173.4    6402   174.9  6411.9   174.7
  6515.2   182.3  6651.7   177.8  6721.8   180.1  6842.2   179.5  6904.5   184.4
  6990.3   182.2  7064.4   183.3 7132.56  184.25 7204.18  185.83 7222.86  186.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    4205     .15    4865    .025  5138.3     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4865  5138.3                 5       5       5              .4       .6
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    4205    4865   184.5       F
  5138.3 7222.86  184.86       F
Pilot Channel Invert      = 161.186
              Width       = 1
              Manning's n = 0.03

Sediment Elevation = 0

INLINE STRUCTURE


RIVER: Ramapo River
REACH: Reach-1            RS: 1079.9

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =       1
Weir Coefficient          =     2.6
 Weir Embankment Coordinates    num =       11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  4865.7   176.5  4865.8   174.6    4880   173.9    4974   173.8    4998   173.1
    5072   173.6    5097   174.1    5115   174.3    5123   174.3  5135.6   174.8
  5135.7   176.5
```

```
Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Weir crest shape                            = Broad Crested


CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 1075

INPUT
Description: 1075
This is a REPEATED section.

Station Elevation Data    num=      80
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  2554.6     200  2754.6   182.3  3561.1   183.3  4037.4   188.1  4151.9   177.9
  4420.9     172    4434     172    4534   171.3    4584   170.6    4634   171.1
    4684   170.4    4734   178.1    4784   177.7    4844   174.9    4884   176.1
    4914     174    4928   172.5    4939   170.2  4939.1   169.7    4941   168.1
    4945   168.2    4951   166.5    4971   164.7    4981   164.7    4991   163.7
    5001   163.7    5011   166.2    5031   166.8    5041   167.4    5051   167.9
    5056   168.2    5061   169.7    5061     170    5067   171.3    5076   176.5
    5102   175.3    5112   175.7    5132   175.5    5172   173.7    5237   174.3
  5299.7     174  5632.7   175.1    5682   176.1  5834.5     176  5912.3   173.9
    5921   174.1  5940.7   174.5    5955   173.9    5960   170.2    5961   168.2
    5965   167.2    5967   166.9    5977   167.4    5987   168.2    5997   168.4
    6007     168    6012   167.9    6015   167.5    6017   167.6    6023   170.1
    6026     172    6033   172.7    6034   170.1    6041   169.8    6044   169.5
    6047     170    6048   170.1  6054.5   171.2    6061   174.3    6081   174.4
  6159.2   179.5    6220   180.6  6333.5   178.1    6489   176.3  6530.2   183.7
  6657.7   182.2  6797.5   184.5  7038.9   183.8  7173.6   186.7 7231.06  191.57

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
  2554.6     .15    4884     .04    5076     .15

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          4884    5076           160.03  304.98   24.96             .4       .6
Pilot Channel Invert      = 161.184
              Width       = 1
              Manning's n = 0.03


CROSS SECTION


RIVER: Ramapo River
REACH: Reach-1            RS: 770

INPUT
Description: 770

Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
  2554.6     200  2754.6   182.3  3561.1   183.3  4037.4   188.1  4151.9   177.9
  4420.9     172    4434     172    4534   171.3    4584   170.6    4634   171.1
    4684   170.4    4734   178.1    4784   177.7    4844   174.9    4884   176.1
    4914     174    4928   172.5    4939   170.2  4939.1   169.7    4941   168.1
```

4945	168.2	4951	166.5	4971	164.7	4981	164.7	4991	163.7
5001	163.7	5011	166.2	5031	166.8	5041	167.4	5051	167.9
5056	168.2	5061	169.7	5061	170	5067	171.3	5076	176.5
5102	175.3	5112	175.7	5132	175.5	5172	173.7	5237	174.3
5299.7	174	5632.7	175.1	5682	176.1	5834.5	176	5912.3	173.9
5921	174.1	5940.7	174.5	5955	173.9	5960	170.2	5961	168.2
5965	167.2	5967	166.9	5977	167.4	5987	168.2	5997	168.4
6007	168	6012	167.9	6015	167.5	6017	167.6	6023	170.1
6026	172	6033	172.7	6034	170.1	6041	169.8	6044	169.5
6047	170	6048	170.1	6054.5	171.2	6061	174.3	6081	174.4
6159.2	179.5	6220	180.6	6333.5	178.1	6489	176.3	6530.2	183.7
6657.7	182.2	6797.5	184.5	7038.9	183.8	7173.6	186.7		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2554.6	.07	4884	.04	5076	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4884	5076	415.09	770.04	289.85	.1	.3

Pilot Channel Invert = 161.001
Width = 1
Manning's n = 0.03

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: 0

INPUT
Description: 0 Confluence with Pequannock River
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2554.6	200	2654.6	185.2	2754.6	182.3	2814.6	182.2	2852.1	180.3
2897.9	182.4	2979.2	182.3	3363.9	185.7	3450.5	184.4	3493.2	184.3
3561.1	183.3	3898.9	184.6	4002.1	188.1	4037.4	188.1	4084.3	185.8
4115.5	180	4151.9	177.9	4176	177.9	4240.2	175.4	4291.8	173.8
4334.1	173	4371.1	172.3	4420.9	172	4452.4	172.6	4506	178.8
4582.2	187	4645.7	186.2	4721.3	182.6	4812.4	175.1	4876.5	176.3
4904.4	182.1	4918	182.4	4934	171.9	4937	171.7	4943	169.6
4945	165.5	4962	164.5	4972	164.6	4982	164.7	4992	164.6
5002	165.6	5012	166.1	5022	166.2	5032	166	5042	166.7
5049	166.9	5052	167.5	5057	169.6	5058	170.4	5074	171.7
5076	175.2	5082	175.3	5085	173.8	5101	174	5107	175.3
5114	175.7	5126.2	176.1	5200	177	5268.8	172.4	5323.6	172.4
5419.6	174.3	5468.1	171	5498.4	171	5535.1	177.8	5586.8	175.9
5615.2	177.7	5685.2	182.3	5759.5	184.4	5844.8	182.4	5927.8	184.4
6023.7	182.7	6125.6	183.6	6208.4	184.1	6272.6	187.8	6378	188.3
6466.4	188.8	6622.5	189.2	6679	189.2	6773.3	188.9	6874.2	191.4
7017.4	192.1	7109.2	192.1	7200.1	193.4	7289.1	190	7321.9	189.4
7407.5	191.9	7531.4	192.6	7633.6	190.9	7729.3	192.2	7859.7	194.1
8015.4	196.1	8151.2	196.1	8354	194.9	8619.9	198	8687	196.7
8804.3	198.3	8922	196.3	9137.4	198.3				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2554.6	.065	4918	.033	5082	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4918	5082	790.08	790.08	790.08	.1	.3

Pilot Channel Invert = 160.54
Width = 1

Manning's n = 0.03

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: -790

INPUT
Description: 790 Pompton River

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2717.8	200.3	2809.1	187.3	3029.2	180.4	3037.3	178.6	3076	182
3358.3	180.4	3491.7	183.1	3671	183.9	3959.7	179.7	4007.3	180.7
4107.2	182.2	4153.3	173.9	4174.5	173.9	4194.5	177.9	4217.9	176.8
4292.9	180.4	4383.9	180	4483.9	179.9	4681.2	186.6	4762.5	188.1
4777.2	188.8	4792.5	186.8	4812.5	187.2	4812.6	187.7	4816.1	188
4839.5	180.3	4839.6	180.3	4842.2	180.4	4875.9	167.3	4877	167
4877.1	167.1	4880.9	166.5	4882	167.2	4882.1	167.2	4887.9	168.5
4918.6	168.7	4936.7	166.9	4942.8	166.2	4965	161.5	4965.1	161.5
4967.3	161.4	4969	162	4969.1	162	4979.8	164.1	5029.8	163.4
5038.6	166.9	5043.7	165.8	5052.2	166.4	5053	166.8	5053.1	166.8
5057	167.3	5057.1	167.3	5057.2	167.2	5067	168.7	5133.2	169.6
5139	168.5	5139.1	168.5	5139.5	168.2	5143	168.5	5143.1	168.5
5150.3	169	5177.6	180.4	5180.8	180.4	5182.5	181.5	5182.6	181.5
5191	185.1	5201.8	186.7	5221.8	186.7	5231.9	187.8	5295.6	185.9
5347.8	185.2	5426	185.1	5509.2	183.9	5574.3	184	5650.4	184.3
5739.1	183	5841.9	183	5927.1	183.8	5994.4	185	6068.2	185.2
6136.3	183.4	6220.9	181.7	6308.3	180.9	6393.9	180.9	6475.9	181.4
6553.9	181.2	6676.2	182.4	6999.5	182.3	7093.7	182.4	7266.9	181.2
7414.3	180.9	7515.5	180.4	7636.1	181.9	7867.1	182.6	7965.6	183.1
8142.1	192.3	8201.8	193.4	8339	193.6	8571.5	193.7	8785.3	197

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2717.8	.065	4777.2	.027	5201.8	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4777.2	5201.8	10	10	10	.1	.3

Pilot Channel Invert = 160.067
Width = 1
Manning's n = 0.03

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: -800

INPUT
Description: 800 Pompton River

Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2717.8	200.3	2809.1	187.3	3029.2	180.4	3037.3	178.6	3076	182
3358.3	180.4	3491.7	183.1	3671	183.9	3959.7	179.7	4007.3	180.7
4107.2	182.2	4153.3	173.9	4174.5	173.9	4194.5	177.9	4217.9	176.8
4292.9	180.4	4383.9	180	4483.9	179.9	4681.2	186.6	4762.5	188.1
4777.2	188.8	4792.5	186.8	4812.5	187.2	4812.6	187.7	4816.1	188
4839.5	180.3	4839.6	180.3	4842.2	180.4	4875.9	168.5	5067	168.5

5133.2	169.6	5139.1	168.5	5139.5	168.2	5143	168.5	5143.1	168.5
5150.3	169	5177.6	180.4	5180.8	180.4	5182.5	181.5	5182.6	181.5
5191	185.1	5201.8	186.7	5221.8	186.7	5231.9	187.8	5295.6	185.9
5347.8	185.2	5426	185.1	5509.2	183.9	5574.3	184	5650.4	184.3
5739.1	183	5841.9	183	5927.1	183.8	5994.4	185	6068.2	185.2
6136.3	183.4	6220.9	181.7	6308.3	180.9	6393.9	180.9	6475.9	181.4
6553.9	181.2	6676.2	182.4	6999.5	182.3	7093.7	182.4	7266.9	181.2
7414.3	180.9	7515.5	180.4	7636.1	181.9	7867.1	182.6	7965.6	183.1
8142.1	192.3	8201.8	193.4	8339	193.6	8571.5	193.7	8785.3	197

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2717.8	.065	4777.2	.027	5201.8	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4777.2	5201.8	20	9	1	.1	.3

Pilot Channel Invert = 160.061
Width = 1
Manning's n = 0.03

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: -809

INPUT
Description: 810 Pompton River
JACKSON AVE. BRIDGE

Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2717.8	200.3	2809.1	187.3	3029.2	180.4	3037.3	178.6	3076	182
3358.3	180.4	3491.7	183.1	3671	183.9	3959.7	179.7	4007.3	180.7
4107.2	182.2	4153.3	173.9	4174.5	173.9	4194.5	177.9	4217.9	176.8
4292.9	180.4	4383.9	180	4483.9	179.9	4681.2	186.6	4762.5	188.1
4777.2	188.8	4792.5	186.8	4812.5	187.2	4812.6	187.7	4816.1	188
4839.5	180.3	4839.6	180.3	4842.2	180.4	4875.9	167.3	4877	167
4877.1	167.1	4880.9	166.5	4882	167.2	4882.1	167.2	4887.9	168.5
4918.6	168.7	4936.7	166.9	4942.8	166.2	4965	161.5	4965.1	161.5
4967.3	161.4	4969	162	4969.1	162	4979.8	164.1	5029.8	163.4
5038.6	166.9	5043.7	165.8	5052.2	166.4	5053	166.8	5053.1	166.8
5057	167.3	5057.1	167.3	5057.2	167.2	5067	168.7	5133.2	169.6
5139	168.5	5139.1	168.5	5139.5	168.2	5143	168.5	5143.1	168.5
5150.3	169	5177.6	180.4	5180.8	180.4	5182.5	181.5	5182.6	181.5
5191	185.1	5201.8	186.7	5221.8	186.7	5231.9	187.8	5295.6	185.9
5347.8	185.2	5426	185.1	5509.2	183.9	5574.3	184	5650.4	184.3
5739.1	183	5841.9	183	5927.1	183.8	5994.4	185	6068.2	185.2
6136.3	183.4	6220.9	181.7	6308.3	180.9	6393.9	180.9	6475.9	181.4
6553.9	181.2	6676.2	182.4	6999.5	182.3	7093.7	182.4	7266.9	181.2
7414.3	180.9	7515.5	180.4	7636.1	181.9	7867.1	182.6	7965.6	183.1
8142.1	192.3	8201.8	193.4	8339	193.6	8571.5	193.7	8785.3	197

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2717.8	.065	4777.2	.027	5201.8	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4777.2	5201.8	40	82	60	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2717.8	4777.2	188.8	F

5201.8 8785.3 186.7 F

Pilot Channel Invert = 160.055
Width = 1
Manning's n = 0.03

BRIDGE

RIVER: Ramapo River
REACH: Reach-1 RS: -850

INPUT
Description: Jackson Avenue Bridge - Bridge #1

Distance from Upstream XS = 1
Deck/Roadway Width = 80
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 71

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
2717.8	200.3	200.3	2809.1	187.3	187.3	3029.2	180.4	180.4
3037.3	178.6	178.6	3076	182	182	3358.3	180.4	180.4
3491.7	183.1	183.1	3671	183.9	183.9	3959.7	179.7	179.7
4007.3	180.7	180.7	4107.2	182.2	182.2	4153.3	173.9	173.9
4174.5	173.9	173.9	4194.5	177.9	177.9	4217.9	176.8	176.8
4292.9	180.4	180.4	4383.9	180	180	4483.9	179.9	179.9
4681.2	186.6	186.6	4762.5	188.1	188.1	4777.2	188.8	188.8
4792.5	186.8	186.8	4812.5	187.2	187.2	4812.6	187.7	187.7
4816.1	188	188	4839.5	188.2	180.3	4839.6	189	184.5
4877	188.7	185.1	4882.1	188.7	185.1	4965	189.6	185.6
4969.1	189.6	185.6	5053	189.7	185.3	5057.1	189.7	185.2
5139	189.2	184.2	5143.1	189.2	184.2	5182.5	188.5	183.4
5182.6	187.6	100	5201.8	188	100	5221.8	186.7	186.7
5231.9	187.8	187.8	5295.6	185.9	185.9	5347.8	185.2	185.2
5426	185.1	185.1	5509.2	183.9	183.9	5574.3	184	184
5650.4	184.3	184.3	5739.1	183	183	5841.9	183	183
5927.1	183.8	183.8	5994.4	185	185	6068.2	185.2	185.2
6136.3	183.4	183.4	6220.9	181.7	181.7	6308.3	180.9	180.9
6393.9	180.9	180.9	6475.9	181.4	181.4	6553.9	181.2	181.2
6676.2	182.4	182.4	6999.5	182.3	182.3	7093.7	182.4	182.4
7266.9	181.2	181.2	7414.3	180.9	180.9	7515.5	180.4	180.4
7636.1	181.9	181.9	7867.1	182.6	182.6	7965.6	183.1	183.1
8142.1	192.3	192.3	8201.8	193.4	193.4	8339	193.6	193.6
8571.5	193.7	193.7	8785.3	197	197			

Upstream Bridge Cross Section Data
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2717.8	200.3	2809.1	187.3	3029.2	180.4	3037.3	178.6	3076	182
3358.3	180.4	3491.7	183.1	3671	183.9	3959.7	179.7	4007.3	180.7
4107.2	182.2	4153.3	173.9	4174.5	173.9	4194.5	177.9	4217.9	176.8
4292.9	180.4	4383.9	180	4483.9	179.9	4681.2	186.6	4762.5	188.1
4777.2	188.8	4792.5	186.8	4812.5	187.2	4812.6	187.7	4816.1	188
4839.5	180.3	4839.6	180.3	4842.2	180.4	4875.9	167.3	4877	167
4877.1	167.1	4880.9	166.5	4882	167.2	4882.1	167.2	4887.9	168.5
4918.6	168.7	4936.7	166.9	4942.8	166.2	4965	161.5	4965.1	161.5
4967.3	161.4	4969	162	4969.1	162	4979.8	164.1	5029.8	163.4
5038.6	166.9	5043.7	165.8	5052.2	166.4	5053	166.8	5053.1	166.8
5057	167.3	5057.1	167.3	5057.2	167.2	5067	168.7	5133.2	169.6
5139	168.5	5139.1	168.5	5139.5	168.2	5143	168.5	5143.1	168.5
5150.3	169	5177.6	180.4	5180.8	180.4	5182.5	181.5	5182.6	181.5
5191	185.1	5201.8	186.7	5221.8	186.7	5231.9	187.8	5295.6	185.9

5347.8	185.2	5426	185.1	5509.2	183.9	5574.3	184	5650.4	184.3
5739.1	183	5841.9	183	5927.1	183.8	5994.4	185	6068.2	185.2
6136.3	183.4	6220.9	181.7	6308.3	180.9	6393.9	180.9	6475.9	181.4
6553.9	181.2	6676.2	182.4	6999.5	182.3	7093.7	182.4	7266.9	181.2
7414.3	180.9	7515.5	180.4	7636.1	181.9	7867.1	182.6	7965.6	183.1
8142.1	192.3	8201.8	193.4	8339	193.6	8571.5	193.7	8785.3	197

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2717.8	.065	4777.2	.027	5201.8	.065

Bank Sta: Left	Right	Coeff Contr.	Expan.
4777.2	5201.8	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2717.8	4777.2	188.8	F
5201.8	8785.3	186.7	F

Pilot Channel Invert = 160.055
Width = 1
Manning's n = 0.03

Downstream Deck/Roadway Coordinates
num= 21

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
4792.5	186.8	186.8	4812.5	187.2	187.2	4812.6	187.7	185
4816.1	188	100	4839.5	188.2	180.3	4839.6	189	184.5
4877	188.7	185.1	4882.1	188.7	185.1	4965	189.6	185.6
4969.1	189.6	185.6	5053	189.7	185.3	5057.1	189.7	185.2
5139	189.2	184.2	5143.1	189.2	184.2	5182.5	188.5	183.4
5182.6	187.6	100	5201.8	188	100	5221.8	186.7	186.7
5231.9	187.8	187.8	5295.6	185.9	185.9	5347.8	185.2	185.2

Downstream Bridge Cross Section Data
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2797.7	200	2940.6	184.2	3032.7	182.3	3120.2	178.3	3129.2	178.3
3143	181.3	3164.5	182	3219.9	181	3447.3	179.7	3728.6	183.4
4020.7	179.8	4124	182.8	4179.2	182.3	4214.3	173.9	4224.1	173.9
4239.8	178.2	4260.7	175.8	4350	183.3	4389.1	181.1	4448	181.8
4626.1	181	4674.8	180.8	4757.2	183.9	4788.3	187.9	4799.5	187.4
4809.6	187	4829.6	187.7	4849.1	180.3	4853.3	180.3	4881.2	168.9
4891.8	168.2	4916.4	168.6	4927.9	167.9	4936.2	168.4	4946.5	166.9
4952	166.1	4959.3	164.5	4964.3	164	4969.3	164	4972.3	163.2
4976.3	162.4	4983.3	162.3	4993.3	162.2	5003.3	161.6	5013.3	160.7
5023	159.7	5033	159.7	5038	161.2	5043.3	162.6	5048.3	164.8
5051.4	165.6	5054.2	166.9	5064.6	168.4	5084.5	168.5	5111.9	169.1
5139	169.7	5161.9	169.2	5189	180.3	5194	180.4	5215.3	187.9
5235.3	187.9	5252.4	189.2	5423.6	184.3	5667.8	184.7	5746.3	183.4
5790.1	184.1	5819.9	183.5	5874.7	183.5	5964.6	183.6	6008.2	184.2
6053.3	185	6102.9	185.4	6167.1	184.2	6236.3	182.3	6313.8	180.9
6348.1	180.6	6385.1	181	6449.6	182	6513.9	181.4	6584.2	182
6718	182.6	6876.3	184	6985.9	184.1	7084.9	182.7	7228.4	182
7304.2	181.4	7427.8	180.3	7507	175.5	7539	175.5	7606.9	181.7
7779.1	181.5	7923.6	183.2	8088.1	186.8	8201.2	193.4	8268.7	192.7
8391.1	193.6	8517.8	193.7	8658.6	196.1	8852.8	197.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2797.7	.065	4829.6	.027	5252.4	.065

Bank Sta: Left	Right	Coeff Contr.	Expan.
4829.6	5252.4	.3	.5

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  2797.7  4829.6   187.7       F
  5252.4  8852.8   189.2       F
Pilot Channel Invert      = 160.006
              Width       = 1
              Manning's n = 0.03


Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =     179
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Piers =  4

Pier Data
Pier Station     Upstream=  4879.5    Downstream=  4879.5
Upstream     num=       2
    Width   Elev    Width   Elev
       5     160       5     188
Downstream     num=       2
    Width   Elev    Width   Elev
       5     160       5     188

Pier Data
Pier Station     Upstream=    4967    Downstream=    4967
Upstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188
Downstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188

Pier Data
Pier Station     Upstream=    5055    Downstream=    5055
Upstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188
Downstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188

Pier Data
Pier Station     Upstream=    5141    Downstream=    5141
Upstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188
Downstream     num=       2
    Width   Elev    Width   Elev
       4     160       4     188

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum               Cd   =     1.6
       Yarnell                KVal =    1.05
Selected Low Flow Methods = Yarnell
```

High Flow Method
Pressure and Weir flow
Submerged Inlet Cd =
Submerged Inlet + Outlet Cd =.8164966
Max Low Cord = 185.5

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: Ramapo River
REACH: Reach-1 RS: -891

INPUT
Description: 890 Pompton River
Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2797.7	200	2940.6	184.2	3032.7	182.3	3120.2	178.3	3129.2	178.3
3143	181.3	3164.5	182	3219.9	181	3447.3	179.7	3728.6	183.4
4020.7	179.8	4124	182.8	4179.2	182.3	4214.3	173.9	4224.1	173.9
4239.8	178.2	4260.7	175.8	4350	183.3	4389.1	181.1	4448	181.8
4626.1	181	4674.8	180.8	4757.2	183.9	4788.3	187.9	4799.5	187.4
4809.6	187	4829.6	187.7	4849.1	180.3	4853.3	180.3	4881.2	168.9
4891.8	168.2	4916.4	168.6	4927.9	167.9	4936.2	168.4	4946.5	166.9
4952	166.1	4959.3	164.5	4964.3	164	4969.3	164	4972.3	163.2
4976.3	162.4	4983.3	162.3	4993.3	162.2	5003.3	161.6	5013.3	160.7
5023	159.7	5033	159.7	5038	161.2	5043.3	162.6	5048.3	164.8
5051.4	165.6	5054.2	166.9	5064.6	168.4	5084.5	168.5	5111.9	169.1
5139	169.7	5161.9	169.2	5189	180.3	5194	180.4	5215.3	187.9
5235.3	187.9	5252.4	189.2	5423.6	184.3	5667.8	184.7	5746.3	183.4
5790.1	184.1	5819.9	183.5	5874.7	183.5	5964.6	183.6	6008.2	184.2
6053.3	185	6102.9	185.4	6167.1	184.2	6236.3	182.3	6313.8	180.9
6348.1	180.6	6385.1	181	6449.6	182	6513.9	181.4	6584.2	182
6718	182.6	6876.3	184	6985.9	184.1	7084.9	182.7	7228.4	182
7304.2	181.4	7427.8	180.3	7507	175.5	7539	175.5	7606.9	181.7
7779.1	181.5	7923.6	183.2	8088.1	186.8	8201.2	193.4	8268.7	192.7
8391.1	193.6	8517.8	193.7	8658.6	196.1	8852.8	197.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2797.7	.065	4829.6	.027	5252.4	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4829.6	5252.4	10	10	10	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2797.7	4829.6	187.7	F
5252.4	8852.8	189.2	F

Pilot Channel Invert = 160.006
Width = 1
Manning's n = 0.03

CROSS SECTION

RIVER: Ramapo River

REACH: Reach-1 RS: -900

INPUT
Description: 890 Pompton River

Station Elevation Data num= 99

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
2797.7	200	2940.6	184.2	3032.7	182.3	3120.2	178.3	3129.2	178.3
3143	181.3	3164.5	182	3219.9	181	3447.3	179.7	3728.6	183.4
4020.7	179.8	4124	182.8	4179.2	182.3	4214.3	173.9	4224.1	173.9
4239.8	178.2	4260.7	175.8	4350	183.3	4389.1	181.1	4448	181.8
4626.1	181	4674.8	180.8	4757.2	183.9	4788.3	187.9	4799.5	187.4
4809.6	187	4829.6	187.7	4849.1	180.3	4853.3	180.3	4881.2	168.9
4891.8	168.2	4916.4	168.6	4927.9	167.9	4936.2	168.4	4946.5	166.9
4952	166.1	4959.3	164.5	4964.3	164	4969.3	164	4972.3	163.2
4976.3	162.4	4983.3	162.3	4993.3	162.2	5003.3	161.6	5013.3	160.7
5023	159.7	5033	159.7	5038	161.2	5043.3	162.6	5048.3	164.8
5051.4	165.6	5054.2	166.9	5064.6	168.4	5084.5	168.5	5111.9	169.1
5139	169.7	5161.9	169.2	5189	180.3	5194	180.4	5215.3	187.9
5235.3	187.9	5252.4	189.2	5423.6	184.3	5667.8	184.7	5746.3	183.4
5790.1	184.1	5819.9	183.5	5874.7	183.5	5964.6	183.6	6008.2	184.2
6053.3	185	6102.9	185.4	6167.1	184.2	6236.3	182.3	6313.8	180.9
6348.1	180.6	6385.1	181	6449.6	182	6513.9	181.4	6584.2	182
6718	182.6	6876.3	184	6985.9	184.1	7084.9	182.7	7228.4	182
7304.2	181.4	7427.8	180.3	7507	175.5	7539	175.5	7606.9	181.7
7779.1	181.5	7923.6	183.2	8088.1	186.8	8201.2	193.4	8268.7	192.7
8391.1	193.6	8517.8	193.7	8658.6	196.1	8852.8	197.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
2797.7	.065	4829.6	.027	5252.4	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
4829.6	5252.4	0	0	0	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
2797.7	4829.6	187.7	F
5252.4	8852.8	189.2	F

Pilot Channel Invert = 160
Width = 1
Manning's n = 0.03

SUMMARY OF MANNING'S N VALUES

River:Ramapo River

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8	n9
Reach-1	34312	.055	.035	.055						
Reach-1	34145	.055	.035	.055						
Reach-1	32867	.055	.035	.055						
Reach-1	32750	.055	.035	.055						
Reach-1	32710	.055	.035	.055						

Reach-1	32700			.055	.035	.055		
Reach-1	32670			.055	.035	.055		
Reach-1	32583			.055	.035	.055		
Reach-1	32543			.055	.035	.055		
Reach-1	32523	Bridge						
Reach-1	32503			.055	.035	.055		
Reach-1	32100			.08	.04	.055	.035	.08
Reach-1	31933			.08	.04	.055	.035	.08
Reach-1	31640			.08	.04	.055	.035	.08
.03	.07	.045	.08					
Reach-1	31473			.08	.04	.055	.035	.08
.03	.07	.045	.08					
Reach-1	31220			.08	.04	.055	.035	.08
Reach-1	31053			.08	.04	.055	.035	.08
Reach-1	30756			.07	.04	.055	.035	.07
Reach-1	30589			.07	.04	.055	.035	.07
Reach-1	30300			.055	.035	.055		
Reach-1	30133			.055	.035	.055		
Reach-1	29622			.055	.035	.055		
Reach-1	29455			.055	.035	.055		
Reach-1	28480			.055	.035	.055		
Reach-1	28313			.055	.035	.055		
Reach-1	27992			.05	.032	.05		
Reach-1	27937			.05	.034	.05		
Reach-1	27825			.05	.032	.05		
Reach-1	27797.5	Bridge						
Reach-1	27770			.05	.034	.05		
Reach-1	27620			.04	.03	.05		
Reach-1	27453			.04	.03	.05		
Reach-1	27272			.04	.03	.05		
Reach-1	27105			.04	.03	.05		
Reach-1	27047			.04	.03	.05		
Reach-1	26880			.04	.03	.05		

Reach-1	26812	.04	.03	.05		
Reach-1	26762	.04	.03	.05		
Reach-1	26721	.04	.03	.05		
Reach-1	26645	.04	.03	.05		
Reach-1	26632	.07	.045	.07		
Reach-1	26596	.04	.03	.05		
Reach-1	26561	.04	.03	.05		
Reach-1	26533	.07	.045	.07		
Reach-1	26462	.055	.035	.055		
Reach-1	26365	.055	.035	.055		
Reach-1	26157	.07	.045	.07		
Reach-1	25988	.055	.035	.055		
Reach-1	25890	.07	.045	.07		
Reach-1	25700	.055	.035	.055		
Reach-1	25657	.07	.045	.07		
Reach-1	25486	.055	.035	.055		
Reach-1	25420	.07	.045	.07		
Reach-1	25246	.055	.035	.055		
Reach-1	25165	.06	.045	.06		
Reach-1	25145	.2	.025	.1		
Reach-1	25130	.055	.04	.055		
Reach-1	25087	.055	.04	.055		
Reach-1	24991	.055	.035	.055		
Reach-1	24956	.055	.035	.055		
Reach-1	24950	.055	.04	.055		
Reach-1	24930	.055	.035	.055		
Reach-1	24913	.055	.035	.055		
Reach-1	24860	.055	.035	.055		
Reach-1	24822	.055	.04	.055		
Reach-1	24811	.055	.035	.055		
Reach-1	24776	.055	.035	.055		
Reach-1	24735	.2	.04	.055	.04	.055

Reach-1	24700	.055	.035	.055		.04
Reach-1	24690	.2	.04	.055	.04	.055
Reach-1	24648	.055	.035	.055		.04
Reach-1	24565	.055	.035	.055		
Reach-1	24561	.2	.055	.02	.055	.04
Reach-1	24516	.2	.055	.04	.055	.04
Reach-1	24477	.2	.048	.08		
Reach-1	24405	.2	.048	.08		
Reach-1	24350	.2	.048	.08		
Reach-1	24303	.07	.048	.08		
Reach-1	24231	.07	.048	.08		
Reach-1	24210	.2	.048	.08		
Reach-1	24176	.07	.048	.08		
Reach-1	24036	.07	.048	.08		
Reach-1	24032	.2	.048	.08		
Reach-1	23860	.2	.048	.08		
Reach-1	23858	.07	.048	.08		
Reach-1	23715	.2	.048	.08		
Reach-1	23686	.07	.048	.08		
Reach-1	23600	.2	.048	.08		
Reach-1	23541	.07	.048	.08		
Reach-1	23440	.2	.048	.08		
Reach-1	23426	.07	.048	.08		
Reach-1	23300	.2	.048	.07		
Reach-1	23266	.07	.048	.08		
Reach-1	23126	.07	.048	.07		
Reach-1	23120	.2	.048	.07		
Reach-1	23090	.2	.048	.07		
Reach-1	23027	.07	.042	.1		
Reach-1	23005	.07	.03	.06		
Reach-1	22990	.06	.028	.06		

Reach-1	22946	.07	.048	.07		
Reach-1	22930	.06	.028	.06		
Reach-1	22916	.07	.048	.07		
Reach-1	22853	.07	.042	.07		
Reach-1	22831	.07	.03	.06		
Reach-1	22820	.06	.028	.06		
Reach-1	22816	.06	.028	.06		
Reach-1	22756	.06	.028	.06		
Reach-1	22646	.06	.028	.06		
Reach-1	22575	.06	.028	.06		
Reach-1	22401	.06	.028	.06		
Reach-1	22365	.06	.028	.06		
Reach-1	22191	.06	.028	.06		
Reach-1	22173	.06	.028	.06		
Reach-1	22110	.06	.03	.07		
Reach-1	22077	.06	.037	.06		
Reach-1	22000	.06	.028	.06		
Reach-1	21957	.7	.043	.09		
Reach-1	21940	.06	.03	.07		
Reach-1	21922.5	Bridge				
Reach-1	21905	.06	.037	.06		
Reach-1	21825	.9	.075	.037	.09	.9
Reach-1	21785	.06	.037	.06		
Reach-1	21653	.07	.075	.037	.09	.07
Reach-1	21600	.9	.075	.037	.09	.9
Reach-1	21440	.07	.075	.037	.09	.07
Reach-1	21417	.9	.075	.038	.09	.9
Reach-1	21296	.07	.075	.038	.09	.07
Reach-1	21152	.9	.075	.038	.09	.9
Reach-1	21068	.07	.075	.038	.09	.07
Reach-1	20930	.9	.075	.037	.09	.9
Reach-1	20922	.07	.075	.037	.09	.07

Reach-1	20703	.07	.075	.037	.09	.07	
Reach-1	20700	.9	.075	.037	.09	.9	
Reach-1	20495	.9	.075	.04	.065	.035	.09 .9
Reach-1	20494	.07	.075	.04	.065	.035	.09 .07
Reach-1	20348	.9	.07	.04	.06	.035	.075 .9
Reach-1	20346	.07	.07	.04	.06	.035	.075 .07
Reach-1	20338	Bridge					
Reach-1	20332	.9	.075	.04	.065	.035	.075 .9
Reach-1	20330	.9	.075	.04	.065	.035	.075 .9
Reach-1	20328	.07	.075	.04	.065	.035	.075 .07
Reach-1	20070	.9	.075	.04	.065	.035	.075 .9
Reach-1	20063	.07	.075	.04	.065	.035	.075 .07
Reach-1	19812	.07	.075	.04	.065	.035	.075 .07
Reach-1	19810	.9	.075	.04	.065	.035	.075 .9
Reach-1	19722	.06	.035	.06			
Reach-1	19720	.075	.043	.1			
Reach-1	19425	.075	.043	.1			
Reach-1	19280	.075	.043	.1			
Reach-1	19071	.075	.043	.1			
Reach-1	18916	.075	.043	.1			
Reach-1	18682	.075	.043	.1			
Reach-1	18447	.075	.043	.1			
Reach-1	18280	.075	.043	.1			
Reach-1	17884	.075	.043	.1			
Reach-1	17467	.075	.043	.1			
Reach-1	17160	.075	.043	.1			
Reach-1	16750	.075	.043	.1			
Reach-1	16657	.075	.043	.1			
Reach-1	16630.5	Bridge					
Reach-1	16605	.075	.043	.1			
Reach-1	16604	.075	.04	.1			

Reach-1	16186	.07	.043	.07		
Reach-1	15696	.07	.043	.07		
Reach-1	15215	.07	.043	.07		
Reach-1	14725	.07	.043	.07		
Reach-1	14320	.07	.043	.07		
Reach-1	13805	.07	.043	.07		
Reach-1	13392	.07	.043	.07		
Reach-1	12845	.07	.043	.07		
Reach-1	12300	.07	.043	.07		
Reach-1	11812	.07	.043	.07		
Reach-1	11324	.07	.043	.07		
Reach-1	11022	.07	.043	.07		
Reach-1	10930	.07	.043	.07		
Reach-1	10827	.07	.043	.07		
Reach-1	10753	.07	.043	.07		
Reach-1	10708	.07	.043	.07		
Reach-1	10657	.07	.043	.07		
Reach-1	10612	.07	.043	.07		
Reach-1	10562	.07	.043	.07		
Reach-1	10550	.07	.02	.07		
Reach-1	10541	.07	.03	.07		
Reach-1	10540	Inl Struct				
Reach-1	10530	.07	.03	.07		
Reach-1	10529	.07	.03	.07		
Reach-1	10488	.05	.028	.05		
Reach-1	10487.5	Inl Struct				
Reach-1	10385	.07	.03	.07		
Reach-1	10270	.07	.03	.07		
Reach-1	10225	.07	.035	.07		
Reach-1	10182	.07	.035	.07		
Reach-1	10127	.15	.035	.15		
Reach-1	10086	.2	.04	.03	.06	.2

Reach-1	10053.5	Bridge			
Reach-1	10022		.15	.03	.15
Reach-1	10021		.15	.03	.15
Reach-1	9580		.065	.033	.07
Reach-1	8750		.065	.05	.065
Reach-1	7955		.2	.045	.5
Reach-1	7600		.2	.045	.5
Reach-1	7490		.2	.045	.5
Reach-1	7471	Bridge			
Reach-1	7452		.2	.045	.5
Reach-1	6800		.2	.045	.5
Reach-1	6055		.2	.045	.15
Reach-1	5685		.5	.045	.15
Reach-1	4785		.5	.045	.15
Reach-1	4375		.5	.045	.15
Reach-1	3780		.5	.045	.15
Reach-1	3215		.5	.045	.15
Reach-1	2525		.5	.045	.15
Reach-1	1515		.15	.045	.15
Reach-1	1085		.15	.045	.15
Reach-1	1080		.15	.025	.15
Reach-1	1079.9	Inl Struct			
Reach-1	1075		.15	.04	.15
Reach-1	770		.07	.04	.06
Reach-1	0		.065	.033	.065
Reach-1	-790		.065	.027	.065
Reach-1	-800		.065	.027	.065
Reach-1	-809		.065	.027	.065
Reach-1	-850	Bridge			
Reach-1	-891		.065	.027	.065
Reach-1	-900		.065	.027	.065

SUMMARY OF REACH LENGTHS

River: Ramapo River

Reach	River Sta.	Left	Channel	Right
Reach-1	34312	199.36	199.36	199.36
Reach-1	34145	2691.35	2691.35	2691.35
Reach-1	32867	117	117	117
Reach-1	32750	40	40	40
Reach-1	32710	40	40	40
Reach-1	32700	157	117	157
Reach-1	32670	93.32	95	100
Reach-1	32583	86.68	87.52	90
Reach-1	32543	86.66	87.5	90
Reach-1	32523	Bridge		
Reach-1	32503	933.28	950	1000.16
Reach-1	32100	180	184	228
Reach-1	31933	720	736.2	912
Reach-1	31640	22.24	186.64	184.47
Reach-1	31473	77.76	653.4	645.57
Reach-1	31220	216	185.6	208
Reach-1	31053	864	742.2	832.2
Reach-1	30756	270	182.4	140
Reach-1	30589	1080	729.6	559.8
Reach-1	30300	197.12	193.76	162.88
Reach-1	30133	1182.52	1162.31	977.13
Reach-1	29622	183.44	198.64	193.04
Reach-1	29455	1926.95	2085.72	2026.92
Reach-1	28480	192	195.2	196
Reach-1	28313	768	780.8	784
Reach-1	27992	54.99	54.99	54.99
Reach-1	27937	132.84	135.84	137.16
Reach-1	27825	99.29	100.29	100.71
Reach-1	27797.5	Bridge		
Reach-1	27770	442.89	452.96	457.14
Reach-1	27620	194.24	198.81	200
Reach-1	27453	485.6	497	500
Reach-1	27272	180	180	180
Reach-1	27105	464.97	270.05	554.95
Reach-1	27047	136	188	240
Reach-1	26880	204	282	360
Reach-1	26812	25	50	55
Reach-1	26762	40	41	45
Reach-1	26721	130	89	50
Reach-1	26645	25	49	55
Reach-1	26632	45	49.5	60
Reach-1	26596	85	84.48	105
Reach-1	26561	130	99	50
Reach-1	26533	100	94	85
Reach-1	26462	190	191.04	204.96
Reach-1	26365	600.07	564.88	509.91
Reach-1	26157	186.64	178	160
Reach-1	25988	381.29	376.96	368
Reach-1	25890	350	233	180
Reach-1	25700	350.01	214.02	180
Reach-1	25657	216	189.6	12
Reach-1	25486	324	287.4	18

Reach-1	25420	150.03	212.49	5.76
Reach-1	25246	210	297.48	8.16
Reach-1	25165	15	20	7
Reach-1	25145	10	15	7
Reach-1	25130	10	43	90
Reach-1	25087	150	136.98	120
Reach-1	24991	30	35	22
Reach-1	24956	6	26	53
Reach-1	24950	59.66	42.66	80
Reach-1	24930	4	17	37
Reach-1	24913	178.38	138.36	202.98
Reach-1	24860	56	49	42
Reach-1	24822	.5	43.5	325
Reach-1	24811	35.52	78.48	360
Reach-1	24776	76	76	76
Reach-1	24735	1	45	50
Reach-1	24700	42	51.99	62.01
Reach-1	24690	.2	42.6	105
Reach-1	24648	1.4	168.21	860.02
Reach-1	24565	4.2	46.6	109
Reach-1	24561	1.2	87.6	155
Reach-1	24516	.99	213.03	524.97
Reach-1	24477	9.99	72	72
Reach-1	24405	54.99	54.99	54.99
Reach-1	24350	86.68	93.32	113.32
Reach-1	24303	53.35	118.7	128.65
Reach-1	24231	54.99	54.99	54.99
Reach-1	24210	32.5	44.5	78.76
Reach-1	24176	227.48	273.46	406.23
Reach-1	24036	130	178	315.04
Reach-1	24032	140	171.99	175
Reach-1	23860	45	48.34	46.66
Reach-1	23858	230.01	268.73	268.29
Reach-1	23715	53.34	38.34	51.66
Reach-1	23686	241.65	221.67	243.36
Reach-1	23600	185	80	72.48
Reach-1	23541	344.96	195.04	227.52
Reach-1	23440	.34	46.66	53.34
Reach-1	23426	370.7	253.33	251.68
Reach-1	23300	45	45	45
Reach-1	23266	136.07	275	295.02
Reach-1	23126	180	180	180
Reach-1	23120	30	30	30
Reach-1	23090	63	63	63
Reach-1	23027	22	22	22
Reach-1	23005	15	15	15
Reach-1	22990	35.01	60	80.01
Reach-1	22946	30	30	30
Reach-1	22930	50	36.66	63.34
Reach-1	22916	125.04	136.38	476.7
Reach-1	22853	20	22	35
Reach-1	22831	15	15	15
Reach-1	22820	48	49	30
Reach-1	22816	83	109	110
Reach-1	22756	245.97	207.99	250.02
Reach-1	22646	288	294	180
Reach-1	22575	209.97	209.97	160.02
Reach-1	22401	209.97	209.97	160.02
Reach-1	22365	230	192	20
Reach-1	22191	230	191.04	20
Reach-1	22173	114.99	63	39.99
Reach-1	22110	33	33	33
Reach-1	22077	70	80	53.35

Reach-1	22000	150	100	66.68
Reach-1	21957	53.34	44	16.68
Reach-1	21940	83.33	79	26.67
Reach-1	21922.5	Bridge		
Reach-1	21905	158.34	164.01	96.67
Reach-1	21825	50	45	18
Reach-1	21785	309.98	266.97	103.95
Reach-1	21653	299.97	257.95	108.02
Reach-1	21600	260	183.04	70
Reach-1	21440	260.04	144	69.96
Reach-1	21417	55.02	132.42	100.08
Reach-1	21296	165	360.45	300.15
Reach-1	21152	20	88.8	108
Reach-1	21068	80.04	279.12	432
Reach-1	20930	36	46	56
Reach-1	20922	324.02	403.07	504.05
Reach-1	20703	289.98	208.98	150.03
Reach-1	20700	289.98	205.02	150.03
Reach-1	20495	49.34	49	52.66
Reach-1	20494	246.7	246	263.3
Reach-1	20348	16	16	16
Reach-1	20346	16	16	16
Reach-1	20338	Bridge		
Reach-1	20332	2	2	2
Reach-1	20330	43.34	43.34	43.34
Reach-1	20328	489.8	481.8	519.8
Reach-1	20070	26.64	43.34	40.84
Reach-1	20063	293.36	467.78	449.35
Reach-1	19812	180	90	385
Reach-1	19810	180	90	385
Reach-1	19722	435	297	160.07
Reach-1	19720	435	294.85	159.85
Reach-1	19425	130.08	145.08	205.08
Reach-1	19280	475.02	208.98	180
Reach-1	19071	150.08	155.05	304.99
Reach-1	18916	245	234	170
Reach-1	18682	260	235	285
Reach-1	18447	150.01	167.02	310.03
Reach-1	18280	435.2	396	430.08
Reach-1	17884	419.9	417.18	419.9
Reach-1	17467	299.91	306.93	540.02
Reach-1	17160	409.87	409.87	409.87
Reach-1	16750	93	93	93
Reach-1	16657	52	52	52
Reach-1	16630.5	Bridge		
Reach-1	16605	48.9	46.54	50
Reach-1	16604	831.36	790.4	849.92
Reach-1	16186	505	490	510
Reach-1	15696	505	481	875
Reach-1	15215	490	490	490
Reach-1	14725	404.94	404.94	404.94
Reach-1	14320	310.17	514.71	745.29
Reach-1	13805	414.97	413.1	414.97
Reach-1	13392	550	547.36	550
Reach-1	12845	595.1	544.94	500.06
Reach-1	12300	475	488	500
Reach-1	11812	655	488	375
Reach-1	11324	374.79	301.99	260
Reach-1	11022	130	92	55
Reach-1	10930	135	102.95	65.05
Reach-1	10827	104.97	74.01	44.97
Reach-1	10753	60	45	30
Reach-1	10708	46.98	51	49.98

Reach-1	10657	52	45	45
Reach-1	10612	70	50	70
Reach-1	10562	12	12	12
Reach-1	10550	9	9	9
Reach-1	10541	11	11	11
Reach-1	10540	Inl Struct		
Reach-1	10530	42	42	42
Reach-1	10529	1	41	12
Reach-1	10488	102.96	102.96	102.96
Reach-1	10487.5	Inl Struct		
Reach-1	10385	120	114.95	110.05
Reach-1	10270	45	45	45
Reach-1	10225	50	43	40
Reach-1	10182	40.02	55.02	64.98
Reach-1	10127	41	41	41
Reach-1	10086	64	64	64
Reach-1	10053.5	Bridge		
Reach-1	10022	2.22	49.12	77.78
Reach-1	10021	37.74	833.68	1322.26
Reach-1	9580	770.1	829.94	819.74
Reach-1	8750	830.08	794.89	680
Reach-1	7955	390	355.05	330
Reach-1	7600	110	110	110
Reach-1	7490	38	38	38
Reach-1	7471	Bridge		
Reach-1	7452	649.89	652.05	479.79
Reach-1	6800	690	744.9	799.8
Reach-1	6055	379.95	370.05	360
Reach-1	5685	1585.08	900	730.08
Reach-1	4785	269.96	410.04	950.13
Reach-1	4375	300	595.19	799.92
Reach-1	3780	319.93	565.11	500.02
Reach-1	3215	930.15	689.92	210
Reach-1	2525	1184.9	1010.24	460.02
Reach-1	1515	655.02	430.02	15.12
Reach-1	1085	5	5	5
Reach-1	1080	5	5	5
Reach-1	1079.9	Inl Struct		
Reach-1	1075	160.03	304.98	24.96
Reach-1	770	415.09	770.04	289.85
Reach-1	0	790.08	790.08	790.08
Reach-1	-790	10	10	10
Reach-1	-800	20	9	1
Reach-1	-809	40	82	60
Reach-1	-850	Bridge		
Reach-1	-891	10	10	10
Reach-1	-900	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Ramapo River

Reach	River Sta.	Contr.	Expan.
Reach-1	34312	.3	.5
Reach-1	34145	.3	.5
Reach-1	32867	.3	.5
Reach-1	32750	.3	.5
Reach-1	32710	.3	.5
Reach-1	32700	.3	.5

Reach-1	32670		.3	.5
Reach-1	32583		.3	.5
Reach-1	32543		.3	.5
Reach-1	32523	Bridge		
Reach-1	32503		.3	.5
Reach-1	32100		.1	.3
Reach-1	31933		.1	.3
Reach-1	31640		.1	.3
Reach-1	31473		.1	.3
Reach-1	31220		.1	.3
Reach-1	31053		.1	.3
Reach-1	30756		.1	.3
Reach-1	30589		.1	.3
Reach-1	30300		.1	.3
Reach-1	30133		.1	.3
Reach-1	29622		.1	.3
Reach-1	29455		.1	.3
Reach-1	28480		.3	.5
Reach-1	28313		.3	.5
Reach-1	27992		.3	.5
Reach-1	27937		.3	.5
Reach-1	27825		.3	.5
Reach-1	27797.5	Bridge		
Reach-1	27770		.3	.5
Reach-1	27620		.1	.3
Reach-1	27453		.1	.3
Reach-1	27272		.1	.3
Reach-1	27105		.1	.3
Reach-1	27047		.1	.3
Reach-1	26880		.1	.3
Reach-1	26812		.1	.3
Reach-1	26762		.4	.6
Reach-1	26721		.4	.6
Reach-1	26645		.1	.3
Reach-1	26632		.4	.6
Reach-1	26596		.4	.6
Reach-1	26561		.4	.6
Reach-1	26533		.1	.3
Reach-1	26462		.4	.6
Reach-1	26365		.1	.3
Reach-1	26157		.1	.3
Reach-1	25988		.1	.3
Reach-1	25890		.1	.3
Reach-1	25700		.1	.3
Reach-1	25657		.1	.3
Reach-1	25486		.1	.3
Reach-1	25420		.1	.3
Reach-1	25246		.1	.3
Reach-1	25165		.3	.5
Reach-1	25145		.7	.9
Reach-1	25130		.7	.9
Reach-1	25087		.3	.5
Reach-1	24991		.1	.3
Reach-1	24956		.1	.3
Reach-1	24950		.3	.5
Reach-1	24930		.1	.3
Reach-1	24913		.1	.3
Reach-1	24860		.1	.3
Reach-1	24822		.3	.5
Reach-1	24811		.1	.3
Reach-1	24776		.1	.3
Reach-1	24735		.3	.5
Reach-1	24700		.1	.3

Reach-1	24690		.3	.5
Reach-1	24648		.1	.3
Reach-1	24565		.3	.5
Reach-1	24561		.3	.5
Reach-1	24516		.3	.5
Reach-1	24477		.1	.3
Reach-1	24405		.1	.3
Reach-1	24350		.1	.3
Reach-1	24303		.1	.3
Reach-1	24231		.1	.3
Reach-1	24210		.1	.3
Reach-1	24176		.1	.3
Reach-1	24036		.1	.3
Reach-1	24032		.1	.3
Reach-1	23860		.1	.3
Reach-1	23858		.1	.3
Reach-1	23715		.1	.3
Reach-1	23686		.1	.3
Reach-1	23600		.1	.3
Reach-1	23541		.1	.3
Reach-1	23440		.3	.5
Reach-1	23426		.1	.3
Reach-1	23300		.6	.8
Reach-1	23266		.3	.5
Reach-1	23126		.6	.8
Reach-1	23120		.6	.8
Reach-1	23090		.6	.8
Reach-1	23027		.6	.8
Reach-1	23005		.05	.2
Reach-1	22990		.05	.2
Reach-1	22946		.6	.8
Reach-1	22930		.05	.2
Reach-1	22916		.6	.8
Reach-1	22853		.6	.8
Reach-1	22831		.05	.2
Reach-1	22820		.05	.2
Reach-1	22816		.05	.2
Reach-1	22756		.05	.2
Reach-1	22646		.05	.2
Reach-1	22575		.05	.2
Reach-1	22401		.05	.2
Reach-1	22365		.05	.2
Reach-1	22191		.05	.2
Reach-1	22173		.05	.2
Reach-1	22110		.5	.7
Reach-1	22077		.5	.7
Reach-1	22000		.05	.2
Reach-1	21957		.1	.3
Reach-1	21940		.2	.4
Reach-1	21922.5	Bridge		
Reach-1	21905		.2	.4
Reach-1	21825		.1	.3
Reach-1	21785		.1	.3
Reach-1	21653		.1	.3
Reach-1	21600		.1	.3
Reach-1	21440		.1	.3
Reach-1	21417		.3	.5
Reach-1	21296		.3	.5
Reach-1	21152		.3	.5
Reach-1	21068		.3	.5
Reach-1	20930		.1	.3
Reach-1	20922		.1	.3
Reach-1	20703		.1	.3

Reach-1	20700		.1	.3
Reach-1	20495		.1	.3
Reach-1	20494		.1	.3
Reach-1	20348		.3	.5
Reach-1	20346		.1	.3
Reach-1	20338	Bridge		
Reach-1	20332		.3	.5
Reach-1	20330		.3	.5
Reach-1	20328		.1	.3
Reach-1	20070		.3	.5
Reach-1	20063		.1	.3
Reach-1	19812		.1	.3
Reach-1	19810		.3	.5
Reach-1	19722		.1	.3
Reach-1	19720		.3	.5
Reach-1	19425		.3	.5
Reach-1	19280		.3	.5
Reach-1	19071		.1	.3
Reach-1	18916		.1	.3
Reach-1	18682		.1	.3
Reach-1	18447		.1	.3
Reach-1	18280		.1	.3
Reach-1	17884		.1	.3
Reach-1	17467		.1	.3
Reach-1	17160		.4	.6
Reach-1	16750		.4	.6
Reach-1	16657		.4	.6
Reach-1	16630.5	Bridge		
Reach-1	16605		.4	.6
Reach-1	16604		.4	.6
Reach-1	16186		.1	.3
Reach-1	15696		.1	.3
Reach-1	15215		.1	.3
Reach-1	14725		.1	.3
Reach-1	14320		.3	.5
Reach-1	13805		.3	.5
Reach-1	13392		.3	.5
Reach-1	12845		.3	.5
Reach-1	12300		.3	.5
Reach-1	11812		.3	.5
Reach-1	11324		.3	.5
Reach-1	11022		.1	.3
Reach-1	10930		.1	.3
Reach-1	10827		.1	.3
Reach-1	10753		.1	.3
Reach-1	10708		.1	.3
Reach-1	10657		.1	.3
Reach-1	10612		.1	.3
Reach-1	10562		.1	.3
Reach-1	10550		.1	.3
Reach-1	10541		.1	.3
Reach-1	10540	Inl Struct		
Reach-1	10530		.05	.2
Reach-1	10529		.05	.2
Reach-1	10488		.1	.3
Reach-1	10487.5	Inl Struct		
Reach-1	10385		.1	.3
Reach-1	10270		.1	.3
Reach-1	10225		.1	.3
Reach-1	10182		.1	.3
Reach-1	10127		.1	.3
Reach-1	10086		.6	.8
Reach-1	10053.5	Bridge		

Reach-1	10022		.6	.8
Reach-1	10021		.6	.8
Reach-1	9580		.1	.3
Reach-1	8750		.1	.3
Reach-1	7955		.1	.3
Reach-1	7600		.5	.7
Reach-1	7490		.5	.7
Reach-1	7471	Bridge		
Reach-1	7452		.5	.7
Reach-1	6800		.2	.4
Reach-1	6055		.2	.4
Reach-1	5685		.2	.4
Reach-1	4785		.2	.4
Reach-1	4375		.2	.4
Reach-1	3780		.2	.4
Reach-1	3215		.2	.4
Reach-1	2525		.2	.4
Reach-1	1515		.2	.4
Reach-1	1085		.4	.6
Reach-1	1080		.4	.6
Reach-1	1079.9	Inl Struct		
Reach-1	1075		.4	.6
Reach-1	770		.1	.3
Reach-1	0		.1	.3
Reach-1	-790		.1	.3
Reach-1	-800		.1	.3
Reach-1	-809		.3	.5
Reach-1	-850	Bridge		
Reach-1	-891		.3	.5
Reach-1	-900		.3	.5