PRELIMINARY DRAINAGE REPORT

STORYROCK PHASE 1B

SEPTEMBER 2107

Prepared By:

Kimley»Horn

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INTRODUCTION

PROJECT DESCRIPTION

This Preliminary Drainage report has been prepared for the proposed Storyrock Phase 1B residential development. StoryRock Phase 1B (Phase 1B) is part of the StoryRock Master Planned Community (formerly named Cavalliere Ranch), a development consisting of 462-acres of single family residential construction. A Conceptual Master Drainage report was approved October 2014 with the project Zoning Case (13-ZN-2014).

StoryRock Phase 1B is a proposed 83-acre single family residential subdivision consisting of 96 single family residential units. Phase 1B is zoned for R1-18, R1-35, and R1-43 development. All R1-18 areas are proposed to be mass-graded and R1-35, R1-43, and R1-70 areas will require separate single lot grading plans for each lot developed. The proposed site is located within the City of Scottsdale and falls under the City's Environmentally Sensitive Lands Ordinance (ESLO).

PROJECT LOCATION AND DESCRIPTION

StoryRock is located within Section 12 of Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. The site is bound to the north by the Happy Valley Road Alignment and to the west by 128th Street. The Pinnacle Peak Road Alignment borders the site to the south. The McDowell Sonoran Preserve borders the site to the east and portions of the site to the north and south. Phase 1B is located in the northern portion of the site, generally south of Ranch Gate Road. (See **Figure 1: Location Map**).

The development is located within one flood zone as shown on Flood Insurance Rate Map (FIRM) panel number 04013C1335L, dated October 16, 2013 (see **Appendix A** for FIRM). The flood zones that pertain to the site are as follows:

"Other Areas" Zone D – "Areas in which flood hazards are undetermined, but possible"

The property is undeveloped natural desert, characterized by braided washes and rock features of varying sizes. Undeveloped desert is also characterized by native desert grasses and brush.

SCOPE OF DRAINAGE REPORT

The approved master drainage report and associated zoning material established the general drainage parameter and criteria for site planning. This report for Phase 1B further establishes drainage parameters and criteria for preliminary design. This report establishes a hydrologic plan for the development of the site as well as preliminary hydraulic analysis for the washes crossing the site.

All drainage criteria presented in this report will conform to the City of Scottsdale Design Standards & Polices Manual (DS&PM).

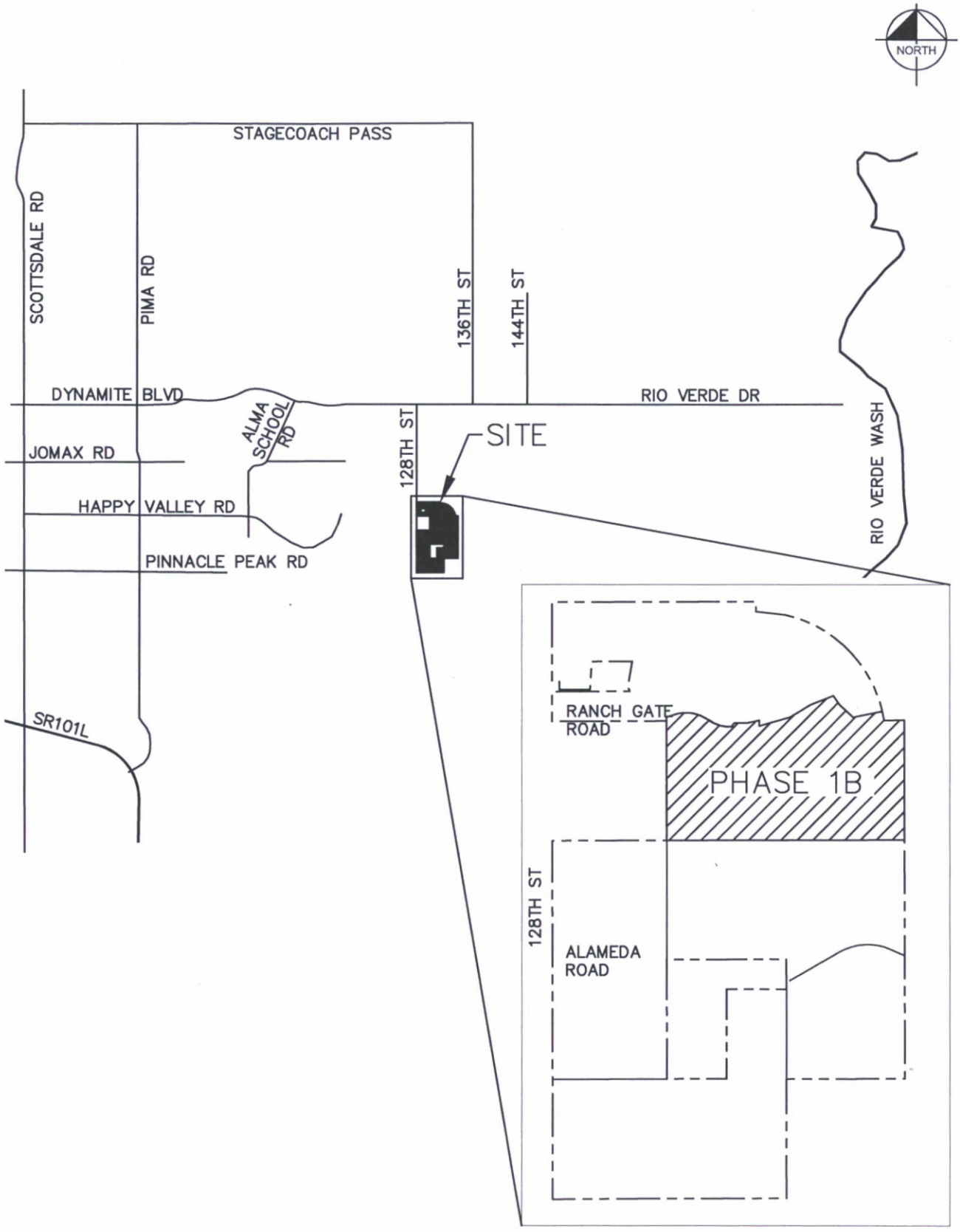

FIGURE 1
VICINITY MAP
STORYROCK

Kimley»Horn

DESCRIPTION OF EXISTING DRAINAGE CONDITIONS AND CHARACTERISTICS

EXISTING SITE CONDITIONS

The site is characterized by many washes and rock features of varying sizes. The on-site washes vary in size and depth, but generally flow from the southwest to northeast or east through the site. Phase 1B is located in the northern portion of the Storyrock development. Phase 1B is bound by other phases of Storyrock to the north and south, an undeveloped residential property to the west, the McDowell Sonoran Preserve to the east. Storm water runoff impacts Phase 1B from the west and south, and is conveyed through the site in existing washes. Runoff is discharged into the adjacent Storyrock Phase to the north, and to the Preserve to the east. Multiple ridgelines run though the site, in the general direction of southwest to northeast.

The site falls within the City of Scottsdale Environmentally Sensitive Lands (ESL) and is subject to the design criteria of the Environmentally Sensitive Lands Ordinance (ELSO). Specifically, the site is categorized as Upper Desert Landform of ESL. Per the DS&PM "The ordinance requires that a percentage of each property be permanently preserved as natural area open space (NAOS) and the specific environmental features, including vegetation, washes, mountain ridges and peaks be protected for inappropriate development".

EXISTING OFF-SITE DRAINAGE CONDITIONS

Off-site flows impact the site from the south, and west. Off-site flows originate from large undeveloped sub-basins. The areas to the west of 128th Street are mostly undeveloped residential properties. The sub-basins to the south of Phase 1B are part of other Storyrock Phases. Refer to **Figure 2: Offsite Drainage Map.**

Off-site flows vary from local low flows up to large wash flows over 250 cfs. Most off-site flows will be conveyed through the site by the existing washes. 128th Street from Ranch Gate Road south to the Tom's Thumb trailhead consists of a two-lane paved road with several at-grade drainage crossings. A few locations provide low flow pipe culvert crossings that are undersized to accommodate larger storm events from overtopping the roadway section. No curb exists along the roadway and runoff generated along 128th Street sheet flows in the eastwardly direction through the StoryRock development.

An existing conditions hydrologic model was completed to develop peak discharges for the offsite runoff contributing to the Site. Offsite sub-basins were delineated based on the City of Scottsdale Quarter Section Topography. Significant washes are defined as having a 100-year flow of 50 cfs or more. There are no washes with 100-year peak flows of 750 cfs or greater, which indicates that no Vista Corridors exist within the project area. Significant washes been identified on **Figure 3: Existing Drainage Condition.** Hydrologic results can be found in **Appendix B**.

EXISTING ON-SITE DRAINAGE CONDITIONS

Five significant offsite washes cross Phase 1B and have been identified **Figure 3: Existing Drainage Condition**.

An existing conditions hydrologic model was completed to determine the peak stormwater discharges leaving the site. The existing condition discharges will be compared to the proposed condition discharges in a "pre-vs-post" analysis. The proposed condition discharges must be equal to or below the existing condition.

An existing conditions hydraulic model was completed for the five significant washes crossing the site. The existing conditions hydraulic analysis was used as the basis for a post-conditions analysis. Hydraulic analysis has been performed on the significant washes to determine the 100 year Base Flood Elevations (BFEs) at specific cross sections. These elevations are used to map the existing 100 year limits of inundation.

The 100-year flow within Wash75 is not fully contained within the main channel section between river stations 14+45 and 8+31. The left overbank in this section diverts away from the main channel section. A lateral weir was modelled to calculate the quantity of flow diverting from Wash75. A minor diversion flow of 11 cfs occurs in this location and has been added to the hydrologic model. Because this occurs at the phase boundary, the diversion is considered a phase exit point for the pre vs post analysis.

Hydrology and hydraulic results can be found in **Appendix B** and **Appendix C** respectively.

PROPOSED PRELIMINARY DRAINAGE PLAN

PROPOSED ON-SITE DRAINAGE PLAN

The proposed Phase 1B development consists of 96 single family residential units. Lots located along the washes will have finished floor elevations a minimum of one foot above the 100-year base flood elevation (BFE). In general, lots will drain to the street system and runoff will be conveyed in the streets and/or in on-site swales and storm drain systems to detention basins or wash crossing locations located throughout the project. Due to the steep and undulating terrain, some lots will require rear or side yard drainage into adjacent washes or drainage swales within the development in order to minimize impacts to environmental features, existing natural area open space, and meet design criteria as required with the Environmentally Sensitive Lands Ordinance for the project. Specific lots that drain via rear or side yard locations within the project have been identified on **Figure 4** and on the preliminary grading and drainage plan in **Appendix E**. Detention basins will detain runoff before discharging into the existing washes and will be sized to meet first flush criteria. Specific areas that discharge into existing washes and are not routed through drainage basins will provide for alternative methods to meet first flush criteria. A further discussion regarding alternative methods to first flush is provided in the "Stormwater Storage Method" section below. Post development flows exiting the site will be attenuated though detention basins to a level equal to or less than pre-development flows. See **Figure 4: Proposed Conditions Drainage Map.**

Lots that are zoned R1-18 will be mass graded with the roadway improvements as part of this project. All other lots zoned as R1-35 and R1-43, will require single lot grading plans in the future for separate review and permit. The roadways and drainage facilities will be graded as part of this project to account for existing undisturbed areas located within future lot locations. Limits of grading have been shown on the preliminary grading and drainage plan in **Appendix E.**

PROPOSED OFF-SITE DRAINAGE PLAN

Offsite flows impact the site from the south, and west. Flows will be conveyed through the site and will discharge at their historic locations on the east and north side of the Site. In most cases, off-site flows are conveyed within the existing washes. All of the significant washes are maintained within their existing wash corridors.

Associated with the development of Storyrock, 128th Street and Ranch Gate Road roadway infrastructure will be constructed. These roadway improvements will be completed under a separate plan from the on-site improvements, and will include final drainage reports, however, the run-off from the off-site roadways is included within the on-site drainage plans.

128th Street consists of a median divided roadway with curb, and will include multiple culvert crossings to convey flow under the proposed roadway. Ranch Gate road consists for a median divided road with curb for the west portion, and a crowned two lane road with curb for the eastern portion.

The proposed 128th Street Road improvements includes multiple culvert crossings to convey off-site flow under the proposed roadway. In the existing condition, 128tth Street roadway flows sheet flow to the east. The proposed 128th Street roadway design consolidates the roadway discharges locations to major wash crossings. The proposed Ranch Gate Road will utilize detention basins located within Phase 1A. These

basins; DB58, DB60, and DB61, will be constructed with Ranch Gate Road improvements. Basin DB60 collects run-off from Ranch Gate Road and a portion of development in Phase 1A.

Any increased run-off created by the off-site roadways from either the increased imperious area or changes to the drainage patterns are accounted for with the Phase 1A drainage plan. The pre-vs post analysis for Phase 1A includes the 128th Street and Ranch Gate proposed sub basins and land uses. It should be noted that the southern portions of 128th Street are included within the Storyrock Phase 2 drainage plan.

PROPOSED ON-SITE HYDROLOGY

On-site runoff from the proposed development maintains post-development flows at or below pre-development conditions at each of the Phase 1B exit points, for the three design storms (2-year, 10-year, and 100-year). Except for three location, CP10, CP12 and CP13, in which the 2- year post development flow exceeds the existing condition flow by approximately 1-2 cfs. This is within the level of accuracy of the analysis, and should be considered incidental and in conformance with the design. Furthermore, the downstream condition is undeveloped McDowell Sonoran Preserve and the minor increase does not negatively impact any downstream properties. For a summary of pre- and post-development peak discharges is provided in **Table 1.** Multiple detention basins are used to attenuate peak discharge from on-site runoff. A basin summary table has been provided in **Appendix B** indicating basin volumes, maximum depths, orifice sizes, side slopes, peak inflow and outflow rates, drain times, and storage volumes provided for the 2, 10, and 100 year events. Each basin utilizes a bleed-off pipe with orifice plate with the intent to control post-development runoff exiting the development, with a spillway for larger storm events. The total drain time for all basins is less than 36 hours. Detention Basin 60 (DB60) and DB61 are located within Phase 1A, but considered part of the Ranch Gate Road drainage system. If not already constructed, these basins must be completed with the development of Phase 1B. Refer to **Appendix B** for the detailed hydrologic model results.

Table 1: Peak Discharge Summary

Concentration Pont	Prop. Cond. 2-Year (cfs)	Ex. Cond. 2-Year (cfs)	Prop. Cond. 10-Year (cfs)	Ex. Cond. 10-Year (cfs)	Prop. Cond. 100-Year (cfs)	Ex. Cond. 100-Year (cfs)
CP1	39	39	113	113	289	289
CP2	12	12	36	36	96	96
CP3	1	1	4	4	8	8
CP4	17	17	48	48	124	124
CP5	3	3	8	8	20	20
CP6	20	20	61	61	153	153
CP7	2	2	6	6	15	15
CP8	10	10	32	32	81	81
CP9	0	0	0	0	9	11
CP10	58	57	168	173	421	437
CP11	1	1	1	1	1	1
CP12	48	46	141	141	358	361
CP13	9	8	19	24	49	58
CP14	1	1	1	2	2	5
CP15	11	11	34	34	88	89

PROPOSED ON-SITE HYDRAULICS

On-site runoff will be conveyed in the local streets, swales, storm drains, and culverts to the detention basin or wash discharge locations. Per the DS&PM all interior streets will be designed to convey the peak

discharge from the 10-year storm event at or below the top of curb elevation. Additionally, the streets will convey the 100-year runoff within the proposed tracts and maintain a maximum flow depth of eight inches above the gutter flow line. Catch basins with storm drains or scuppers will capture pavement runoff and outfall to the proposed detention basins. A basin summary table has been provided in **Appendix B** indicating basin volumes, maximum depths, orifice sizes, side slopes, peak inflow and outflow rates, drain times, and storage volumes provided for the 2, 10, and 100 year events. Each basin utilizes a bleed-off pipe with orifice plate with the intent to control post-development runoff exiting the development, with a spillway for larger storm events. The scupper, catch basins and storm drains will be designed per the DS&PM and FCDMC's Drainage Policies and Standards. Detailed catch basin and street capacity analysis will be completed as part of the final design.

The existing hydraulic model was revised for a proposed hydraulic model to determine the proposed condition 100-year BFE and limits of inundation. Development of the site, including roadway, culverts and lots encroach into the existing BFE. The proposed hydraulic model includes these encroachments and modifications to calculate the proposed BFEs and proposed 100-year limits of inundations. The proposed BFEs at the boundary of the site, both upstream and downstream cannot be higher than the existing condition. **Table 2** provides a summary of the existing and proposed 100-year BFE at the boundary conditions of the site. The preliminary grading plan shows the HEC-RAS cross sections and BFEs for the proposed conditions. The plan also includes information on the proposed detentions basins, fished floor elevations and culvert sizes. Refer to **Appendix C** for a complete HEC-RAS Summary Table.

Table 2: Boundary Base Flood Elevation Summary

Wash	HEC-RAS Cross Sections	Ex. Cond BFE	Prop. Cond BFE	Note:
Wash 60	576	2603.16	2603.13	Site Entrance
Wash 65	608	2605.07	2605.07	Site Entrance
Wash 75	197	2536.54	2536.53	Site Exit
Wash 80	1537	2613.19	2613.17	Site Entrance
Wash 85	814	2597.20	2597.24	Site Entrance
Wash 90	198	2527.96	2527.93	Site Exit
Wash 160	708	2561.03	2561.08	Site Entrance
Wash 160	84	2540.35	2540.35	Site Exit

Roadway culvert crossings of significant washes were designed. The proposed culverts are designed to pass at least the 10-year flow without overtopping. The culverts will pass the 100-year flow with a maximum overtopping of 12-inches. Culverts will include design measures to protect the roadway from erosion during overtopping events. All lots and structures will be accessible by at least one route with a depth of flow no greater than 1 foot during the 100-year event. The proposed culverts are included in the hydraulic analysis, Refer to **Appendix C** for hydraulic results.

Minor flows less than 50 cfs impact lots, driveways, and roadways within the development. These flows will be routed around the lots in swales, and under driveways and roadways in culverts. The flows will discharge at their historic location onsite. The swales will be designed to be natural in appearance and match the existing topography of the site. For areas that will require future R1-35, R1,43, and R1-70 single lot grading plans, flows will be routed around and match existing drainage discharge locations. A typical lot grading detail has been provided on the preliminary grading and drainage plan in **Appendix E** for reference.

ADEQ WATER QUALITY REQUIEMENTS

Development of the project will impact a large enough area to require a submittal of a Notice of Intent (NOI) to the Arizona Department of Environmental Quality (ADEQ). The NOI will be submitted to ADEQ and an approved NOI certificate with an AZCON number will be provided to the city before approval of any improvement plans.

CULVERT SEDIMENTATION

Sedimentation reduces the hydraulic performance of culverts and can lead to safety, erosion, and maintenance issues. The proposed culverts and storm drains within the project have been designed to minimize sedimentation when possible, as well as providing solutions to reduce the impact of sedimentation. Culverts are designed to match the slope of the existing channel. Additionally, the majority of the culverts are "inlet" control, with flow velocity greater than 10 ft/s. These "self-cleaning" velocities help clear the culverts of sedimentation in larger storm events.

Storm drains which receive natural channel flow are susceptible to sedimentation. Storm drains will be designed with sediment traps prior to the storm drain to capture sediment.

Sedimentation is inevitable given the natural condition of the existing washes traversing the property. To help alleviate the potential concerns that arise from sediment build-up in culverts and storm drains on the project, it is recommended that the HOA implement a culvert and storm drain maintenance program. The scheduled program will inspect and clean the culverts to limit sedimentation and ensure proper operation of the drainage facilities. The program will inspect all culverts and storm drains bi-annually, and after significant storm events.

DATA ANALYSIS METHODS

GENERAL DISCUSSION

A detailed hydrologic model was prepared for the existing and proposed site condition. A hydraulic model was prepared for the significant washes that traverse the site. The sections below provide the hydrology and hydraulic methodology.

HYDROLOGY

The U.S. Army Corps of Engineers HEC-1 hydrologic computer program was used to determine the 2-, 10-, and 100-year peak discharges for off-site and on-site flows. HEC-1 models were prepared for the existing and proposed development conditions. The Drainage Design Management System for Windows (DDMSW) program was used to develop the hydrologic parameters for the on-site drainage areas and off-site drainage areas east of the site. Green and Ampt rainfall loss parameters were estimated using DDMSW, the City of Scottsdale parameters, and the Flood Control District of Maricopa County (FCDMC) Drainage Design Manual – Hydrology. Time of Concentration calculations were calculated using DDMSW. Values that show non-default values or out-of-range results are due to the NMIN parameter selected for the HEC-1 Model. Because of the varying sub-basin sizes, the selected NMIN parameter will not meet the time of concentration requirements specified in the FCDMC Drainage Design Manual - Hydrology for each sub-basin. The HEC-1 models were run with varying NMIN parameters to confirm that the hydrograph shape and peaks were valid. The HEC-1 models were prepared using the Clark Unit Hydrograph. Rainfall depth were estimated for the site from the National Oceanic and Atmospheric Administration Atlas 14 (NOAA14).

Two different soil types were identified for the on-site and off-site sub-basins using the web soil survey from the National Resource Conservation Service (NRCS). A list of the soils found in the watershed is shown below:

- Gran-Wickenburg complex, 1 to 10 percent slopes
- Gran-Wickenburg-Rock outcrop complex, 10 to 65 percent slopes

The majority of the site, with the exception of a small portion of a few offsite sub-basins, falls within the 1 to 10 percent range. A map showing the different soil types, which was developed as part of the approved master drainage report, along with web soil survey results is included within **Appendix B**.

Land use parameters for the HEC-1 models were determined for each of the project zoning types, roadway and natural desert. The initial abstraction (IA) and Vegetation cover parameters are based on matching land use types from Table 4.2 of the County Hydrology Manual. The RTIMP for each zoning case was calculated by taking a sample area of roadway and lots and determining the percent of hydraulically connected area. See **Table 4** below for complete Land Use Parameters. The sample areas and RTIMP calculations are included in **Appendix B**. Land use maps for the existing and proposed development conditions are provided in **Appendix B**.

Table 4 Land Use Parameters

Land Use Code	Description	IA	RTIMP	Vegetation Cover
R1-18	Min Lot Size = 13,500 Sq Ft	0.30	27	50.0
R1-35	Min Lot Size = 26,2500 Sq Ft	0.30	21	50.0
R1-43	Min Lot Size = 32,250 Sq Ft	0.30	17	20.0
Road	24' Roadway, 40' Tract/ROW	0.10	60	75.0
Natural Desert	Natural Desert	0.35	0	25.0

A stage storage and outfall rate calculation spreadsheet was prepared for the proposed detention basins. The state storage volume is based on end-area calculations at 1-foot intervals. The basin discharge rates through the proposed bleed pipes is calculated from Manning and Orifice equations. Overflow for larger storm events are provided in an overflow weir, which will be sized at final design. Stage storage and discharge rate tables are provided in **Appendix B**.

HYDRAULICS

100-year BFEs for the significant washes were established using the U.S. Army Corps of Engineers HEC-RAS (v4.1.1) computer program. Cross sections were cut for the existing washes using the 1' flown aerial topography. The hydraulic models were run using mixed flow regime conditions with the normal depth boundary condition. Manning's 'n' coefficients for the channels was set at 0.035 and values for the overbanks are 0.050. Values were selected from Table 3-1 of the HEC-RAS Reference Manual. See **Appendix C** for Table 3-1. Based on field observations and aerial photography the washes are an undisturbed natural desert with an impervious weed barrier. One flow profile is used in the existing condition model representing the design flow. The proposed condition model uses two flow profiles. The first is a baseline of the design flow, the second is the same base design flow with the development encroachments included in the model.

Culvert crossing of the significant washes were sized using the Federal Highway Administration HY-8 version 7.30 computer program. Culverts were preliminary size to convey at least the 10-year storm through the structure, and convey the 100-year flow with a maximum roadway overtopping of 12-inches.

Refer to **Appendix C** for the results of the hydraulic modeling for the existing and proposed condition. See the attached CD for copy of the HEC-RAS report for the existing and proposed condition.

STORMWATER STORAGE METHOD

The existing property is a part of the ESLO. Based on new City ordinances, a waiver will need to be obtained for any volume less than the 100-year, 2-hour volume. However, there is no waiver fee associated with the volumes that do not result in an increase in downstream runoff. See **Appendix D** for a copy of the waiver. Refer to **Appendix B** for the pre- and post-development hydrologic model results.

Where detention basins are provided within the development to capture runoff generated on-site and discharged from roadway improvements, the basins have been sized to meet first flush storage requirements (See First Flush Summary Table in **Appendix B**). In specific areas within the development, a detention basin is not feasible to meet the first flush criteria. As outlined in the City's Stormwater and Floodplain Management Ordinance, an alternative stormwater control can be provided if the development is located within the upper desert landform and runoff has no additional adverse impact on other properties. The locations where an alternative method is proposed are identified on the preliminary grading and drainage plan (**Appendix E**) and do not adversely impact any adjacent properties. In various areas, a rip-rap spillway and small dissipation basin is proposed as an alternative stormwater control. The rip-rap basins are proposed to be 1-foot deep and sized to reduce the velocity entering the basin for better capture of sedimentation and potential contaminants that may be present. The basin bottom was calculated using the rip-rap apron dimension requirements as outlined in the Drainage Design Manual for Maricopa County, Table 8.6. The spillways will be designed for a median rip-rap size (D50) of 6 inches to convey flow at 6-inch flow depth for the 2-year, 10-minute design storm. The higher frequency storm events are appropriate when evaluating water quality and represents the first-half inch of rainfall within the street network. Refer to **Appendix C** for the spillway and dissipation basin calculations.

There are other options for stormwater quality that could be considered for this project such as a Stormceptor system or other oil grit separators on the market. If a particular area on the project warrants this type of application in the future, specific stormwater control design measures will be provided for the City's review and approval during final design.

CONCLUSIONS

- Multiple significant washes cross the development. Proposed development will encroach on the washes. Hydraulic models for the existing and proposed conditions were prepared to determine the BFE. The BFE was used to set the finished floor elevations for each lot.

- Significant washes are maintained in their existing corridors.

- Onsite runoff will be conveyed through the local streets and storm drains to the detention basins and wash corridors. Culverts will convey the flow under the new roads. The conveyance facilities will be sized during final design.

- Hydrologic models were prepared for the on-site and off-site areas for the pre- and post-development conditions. Onsite detention basins were sized to ensure that the post-development runoff exiting the site are equal or less than pre-development conditions. Basins are design to drain within 36 hours.

- A Level 1 Erosion Setback analysis was performed for each major wash corridor. Locations where the setback is located within future development will require an erosion protection. The erosion protection will be designed as part of the final design. The Erosion Setback is shown on the Preliminary Grading Plan.

- Where detention basins are provided within the development to capture runoff generated on-site and discharged from roadway improvements, the basins have been sized to meet first flush storage requirements (See First Flush Summary Table in Appendix **B**). In specific areas within the development, a detention basin is not feasible to meet the first flush criteria. As outlined in the City's Stormwater and Floodplain Management Ordinance, an alternative stormwater control can be provided if the development is located within the upper desert landform and runoff has no additional adverse impact on other properties. In various areas, a rip-rap spillway and small dissipation basin is proposed as an alternative stormwater control.

REFERENCES

City of Scottsdale, *Design Standards and Policies Manual,* January 2010.

City of Scottsdale, Stormwater and Floodplain Management Ordinance, Chapter 37, July 2016.

Federal Emergency Management Agency, Flood Insurance Rate Map Panel No04013C1331M, dated November 4, 2015

Flood Control District of Maricopa County, Drainage Design Manual – Hydrology, updated August 15, 2013.

U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-RAS, River Analysis System Hydraulic Reference Manual Version 4.1, January 2010.

U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-RAS, River Analysis System User's Manual Version 4.1, January 2010.

City of Scottsdale Topography Quarter Section Maps.

Appendix A – Flood Insurance Rate Map

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

METE

PANEL 1335L

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1335 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1335	L
SCOTTSDALE, CITY OF	045012	1335	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C1335L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: STORYROCK PH1B EX

Area ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
OFF80	0.044	0.59	188.0	188.0	NATURAL	0.060	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.503	0.469	0.418	0.368	0.338	0.314
												Vel (f/s)	1.72	1.85	2.07	2.35	2.56	2.76
												R (Hrs)	0.672	0.621	0.547	0.475	0.432	0.399
OFF85	0.002	0.06	406.8	289.7	NATURAL	0.079	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.162*	0.151*	0.135*	0.118*	0.109*	0.101 *
												Vel (f/s)	0.54	0.58	0.65	0.75	0.81	0.87
												R (Hrs)	0.178	0.165	0.145	0.126	0.115	0.106
OFF90	0.003	0.05	369.6	282.4	NATURAL	0.076	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.146*	0.136*	0.121*	0.107*	0.098*	0.091 *
												Vel (f/s)	0.50	0.54	0.61	0.69	0.75	0.81
												R (Hrs)	0.109	0.101	0.089	0.077	0.070	0.065
OFF95	0.064	0.74	197.8	197.8	NATURAL	0.058	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.545	0.508	0.453	0.399	0.366	0.341
												Vel (f/s)	1.99	2.14	2.40	2.72	2.97	3.18
												R (Hrs)	0.711	0.657	0.579	0.502	0.457	0.422
OFF100	0.011	0.23	253.3	241.8	NATURAL	0.068	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.310	0.289*	0.258*	0.227*	0.208*	0.194 *
												Vel (f/s)	1.09	1.17	1.31	1.49	1.62	1.74
												R (Hrs)	0.407	0.376	0.331	0.288	0.262	0.241
ON60	0.010	0.26	268.5	250.1	NATURAL	0.069	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.329	0.306	0.273*	0.240*	0.221*	0.205 *
												Vel (f/s)	1.16	1.25	1.40	1.59	1.73	1.86
												R (Hrs)	0.506	0.468	0.412	0.357	0.325	0.300
ON65	0.004	0.15	153.3	153.3	NATURAL	0.074	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.301	0.281*	0.250*	0.220*	0.202*	0.188 *
												Vel (f/s)	0.73	0.78	0.88	1.00	1.09	1.17
												R (Hrs)	0.499	0.461	0.406	0.352	0.321	0.296
ON70	0.014	0.28	194.2	194.2	NATURAL	0.067	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.364	0.339	0.302	0.266*	0.244*	0.227 *
												Vel (f/s)	1.13	1.21	1.36	1.54	1.68	1.81
												R (Hrs)	0.495	0.458	0.403	0.350	0.318	0.294
ON75	0.013	0.25	55.1	55.1	NATURAL	0.067	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.508	0.473	0.422	0.371	0.341	0.317
												Vel (f/s)	0.72	0.78	0.87	0.99	1.08	1.16
												R (Hrs)	0.683	0.632	0.556	0.483	0.439	0.405

* Non default value or value out of range

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: STORYROCK PH1B EX

Area ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
ON76	0.014	0.20	264.7	248.2	NATURAL	0.067	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.285*	0.265*	0.237*	0.208*	0.191*	0.178 *
												Vel (f/s)	1.03	1.11	1.24	1.41	1.54	1.65
												R (Hrs)	0.289	0.267	0.235	0.204	0.185	0.171
ON77	0.002	0.58	43.1	43.1	NATURAL	0.079	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.909	0.847	0.755	0.665	0.610	0.568
												Vel (f/s)	0.94	1.00	1.13	1.28	1.39	1.50
												R (Hrs)	7.435	6.873	6.052	5.253	4.780	4.410
ON80	0.024	0.37	160.3	160.3	NATURAL	0.064	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.433	0.403	0.360	0.317	0.291*	0.271 *
												Vel (f/s)	1.25	1.35	1.51	1.71	1.86	2.00
												R (Hrs)	0.553	0.511	0.450	0.391	0.355	0.328
ON85	0.011	0.29	184.3	184.3	NATURAL	0.068	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.379	0.353	0.315	0.277*	0.254*	0.237 *
												Vel (f/s)	1.12	1.20	1.35	1.54	1.67	1.79
												R (Hrs)	0.612	0.566	0.498	0.432	0.393	0.363
ON90	0.024	0.36	180.1	180.1	NATURAL	0.064	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.412	0.384	0.342	0.301	0.277*	0.257 *
												Vel (f/s)	1.28	1.38	1.54	1.75	1.91	2.05
												R (Hrs)	0.512	0.473	0.417	0.362	0.329	0.304
ON95	0.019	0.38	181.6	181.6	NATURAL	0.065	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.426	0.397	0.354	0.311	0.286*	0.266 *
												Vel (f/s)	1.31	1.40	1.57	1.79	1.95	2.10
												R (Hrs)	0.633	0.585	0.515	0.447	0.407	0.375
ON100	0.011	0.32	188.1	188.1	NATURAL	0.068	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.395	0.368	0.329	0.289*	0.266*	0.247 *
												Vel (f/s)	1.19	1.28	1.43	1.62	1.76	1.90
												R (Hrs)	0.694	0.642	0.565	0.491	0.446	0.412
ON105	0.002	0.07	250.0	239.9	NATURAL	0.079	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.185*	0.173*	0.154*	0.136*	0.125*	0.116 *
												Vel (f/s)	0.55	0.59	0.67	0.75	0.82	0.89
												R (Hrs)	0.235	0.217	0.191	0.166	0.151	0.139
ON115	0.004	0.12	283.3	256.9	NATURAL	0.074	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.230*	0.214*	0.191*	0.168*	0.154*	0.144 *
												Vel (f/s)	0.77	0.82	0.92	1.05	1.14	1.22
												R (Hrs)	0.309	0.285	0.251	0.218	0.198	0.183

* Non default value or value out of range

Area ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
Major Basin ID: 01																		
ON120	0.001	0.09	341.2	275.8	NATURAL	0.083	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.207*	0.192*	0.172*	0.151*	0.139*	0.129 *
												Vel (f/s)	0.64	0.69	0.77	0.87	0.95	1.02
												R (Hrs)	0.480	0.444	0.391	0.339	0.309	0.285
ON125	0.017	0.33	198.2	198.2	NATURAL	0.066	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.389	0.363	0.323	0.285*	0.261*	0.243 *
												Vel (f/s)	1.24	1.33	1.50	1.70	1.85	1.99
												R (Hrs)	0.545	0.504	0.444	0.385	0.351	0.323
ON130	0.012	0.30	285.2	257.7	NATURAL	0.068	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.347	0.324	0.289*	0.254*	0.233*	0.217 *
												Vel (f/s)	1.27	1.36	1.52	1.73	1.89	2.03
												R (Hrs)	0.543	0.502	0.442	0.384	0.349	0.322
ON135	0.008	0.20	225.6	222.8	NATURAL	0.070	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.301	0.281*	0.250*	0.220*	0.202*	0.188 *
												Vel (f/s)	0.97	1.04	1.17	1.33	1.45	1.56
												R (Hrs)	0.422	0.391	0.344	0.298	0.272	0.251
ON140	0.017	0.36	195.6	195.6	NATURAL	0.066	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.408	0.380	0.339	0.298*	0.274*	0.255 *
												Vel (f/s)	1.29	1.39	1.56	1.77	1.93	2.07
												R (Hrs)	0.616	0.570	0.502	0.435	0.396	0.366
ON145	0.014	0.32	214.3	213.3	NATURAL	0.067	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.377	0.352	0.314	0.276*	0.254*	0.236 *
												Vel (f/s)	1.24	1.33	1.49	1.70	1.85	1.99
												R (Hrs)	0.575	0.531	0.468	0.406	0.369	0.341
ON150	0.007	0.16	250.0	239.9	NATURAL	0.071	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.265*	0.247*	0.220*	0.194*	0.178*	0.166 *
												Vel (f/s)	0.89	0.95	1.07	1.21	1.32	1.41
												R (Hrs)	0.331	0.306	0.270	0.234	0.213	0.196
ON155	0.017	0.28	190.0	190.0	NATURAL	0.066	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.363	0.338	0.302	0.266*	0.244*	0.227 *
												Vel (f/s)	1.13	1.21	1.36	1.54	1.68	1.81
												R (Hrs)	0.443	0.409	0.360	0.313	0.285	0.263
ON160	0.037	0.61	183.5	183.5	NATURAL	0.061	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.520	0.485	0.432	0.380	0.349	0.325
												Vel (f/s)	1.72	1.84	2.07	2.35	2.56	2.75
												R (Hrs)	0.790	0.730	0.643	0.558	0.508	0.468

* Non default value or value out of range

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: STORYROCK PH1B EX

Area ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
ON165	0.008	0.22	236.1	230.7	NATURAL	0.070	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.312	0.291*	0.260*	0.229*	0.210*	0.195 *
												Vel (f/s)	1.03	1.11	1.24	1.41	1.54	1.65
												R (Hrs)	0.475	0.439	0.387	0.336	0.305	0.282
ON170	0.006	0.14	216.8	215.5	NATURAL	0.072	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.258*	0.241*	0.215*	0.189*	0.174*	0.161 *
												Vel (f/s)	0.80	0.85	0.96	1.09	1.18	1.28
												R (Hrs)	0.316	0.292	0.257	0.223	0.203	0.187

* Non default value or value out of range

Flood Control District of Maricopa County
Drainage Design Management System
LAND USE
Project Reference: STORYROCK PH1B EX

n	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb	Description
or Basin ID: 01									
100	DESERT	0.0107	100.0	0.35	0	25.0	DRY	0.068	Desert
		0.0107	**100.0**						
30	DESERT	0.1487	100.0	0.35	0	25.0	DRY	0.053	Desert
		0.1487	**100.0**						
35	DESERT	0.0318	100.0	0.35	0	25.0	DRY	0.062	Desert
		0.0318	**100.0**						
40	DESERT	0.0018	100.0	0.35	0	25.0	DRY	0.079	Desert
		0.0018	**100.0**						
45	DESERT	0.0255	100.0	0.35	0	25.0	DRY	0.063	Desert
		0.0255	**100.0**						
50	DESERT	0.0631	100.0	0.35	0	25.0	DRY	0.058	Desert
		0.0631	**100.0**						
55	DESERT	0.0027	100.0	0.35	0	25.0	DRY	0.076	Desert
		0.0027	**100.0**						
60	DESERT	0.0181	100.0	0.35	0	25.0	DRY	0.065	Desert
		0.0181	**100.0**						
5	DESERT	0.0041	100.0	0.35	0	25.0	DRY	0.074	Desert
		0.0041	**100.0**						
0	DESERT	0.0131	100.0	0.35	0	25.0	DRY	0.067	Desert
		0.0131	**100.0**						

* Non default value

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
OFF100	645	61	64561	0.011	100.00	0.150	-	100	
OFF30	645	61	64561	0.149	100.00	0.150	-	100	
OFF35	645	61	64561	0.032	100.00	0.150	-	100	
OFF40	645	61	64561	0.002	100.00	0.150	-	100	
OFF45	645	61	64561	0.026	100.00	0.150	-	100	
OFF50	645	61	64561	0.063	100.00	0.150	-	100	
OFF55	645	61	64561	0.003	100.00	0.150	-	100	
OFF60	645	61	64561	0.018	100.00	0.150	-	100	
OFF65	645	61	64561	0.004	100.00	0.150	-	100	
OFF70	645	61	64561	0.013	100.00	0.150	-	100	
OFF80	645	61	64561	0.044	100.00	0.150	-	100	
OFF85	645	61	64561	0.002	100.00	0.150	-	100	
OFF90	645	61	64561	0.003	100.00	0.150	-	100	
OFF95	645	61	64561	0.064	100.00	0.150	-	100	
ON100	645	61	64561	0.011	100.00	0.150	-	100	
ON105	645	61	64561	0.002	100.00	0.150	-	100	
ON115	645	61	64561	0.004	100.00	0.150	-	100	
ON120	645	61	64561	0.001	100.00	0.150	-	100	
ON125	645	61	64561	0.017	100.00	0.150	-	100	
ON130	645	61	64561	0.012	100.00	0.150	-	100	
ON135	645	61	64561	0.008	100.00	0.150	-	100	
ON140	645	61	64561	0.017	100.00	0.150	-	100	
ON145	645	61	64561	0.014	100.00	0.150	-	100	
ON150	645	61	64561	0.007	100.00	0.150	-	100	
ON155	645	61	64561	0.018	100.00	0.150	-	100	
ON160	645	61	64561	0.037	100.00	0.150	-	100	
ON165	645	61	64561	0.008	100.00	0.150	-	100	
ON170	645	61	64561	0.006	100.00	0.150	-	100	
ON60	645	61	64561	0.010	100.00	0.150	-	100	
ON65	645	61	64561	0.004	100.00	0.150	-	100	
ON70	645	61	64561	0.014	100.00	0.150	-	100	
ON75	645	61	64561	0.013	100.00	0.150	-	100	
ON76	645	61	64561	0.014	100.00	0.150	-	100	
ON77	645	61	64561	0.002	100.00	0.150	-	100	
ON80	645	61	64561	0.024	100.00	0.150	-	100	
ON85	645	61	64561	0.011	100.00	0.150	-	100	
ON90	645	61	64561	0.024	100.00	0.150	-	100	
ON95	645	61	64561	0.019	100.00	0.150	-	100	

Kimley»Horn

Engineering, Planning and Environmental Consultants
7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

NO	REVISION	BY	DATE	APPR.

SCALE(H):1"= 1800'
SCALE(V): N/A
DESIGNED BY: MAW
DRAWN BY: DWT
CHECKED BY: MAW
DATE: AUGUST 2014

CAVALLIERE
EXISTING SOILS MAP

PROJECT NO.
191069013

DRAWING NAME
Existing_Soils.mxd

Flood Control District of Maricopa County
Drainage Design Management System
HEC-1 ROUTING DATA
Project Reference: STORYROCK PH1B EX

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
NORMAL DEPTH															
Major Basin 01															
RF45	0.050	0.035	0.050	980.00	0.0260	-	X:	-	14.00	21.00	25.00	31.00	35.00	41.00	45.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF60A	0.050	0.035	0.050	1,076.00	0.0300	-	X:	-	8.00	18.00	55.00	71.00	78.00	83.00	90.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF60B	0.050	0.035	0.050	1,200.00	0.0320	-	X:	-	9.00	14.00	16.00	16.50	22.00	26.00	33.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF60C	0.050	0.035	0.050	650.00	0.0280	-	X:	-	25.00	38.00	48.00	49.00	57.00	67.00	80.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF70A	0.050	0.035	0.050	720.00	0.0290	-	X:	-	13.00	24.00	33.00	34.00	80.00	85.00	89.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF70B	0.050	0.035	0.050	275.00	0.0290	-	X:	-	26.00	40.00	60.00	95.00	103.00	107.00	115.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF70C	0.050	0.035	0.050	410.00	0.0270	-	X:	-	8.00	12.00	17.00	17.50	34.00	42.00	48.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO100	0.050	0.035	0.050	980.00	0.0290	-	X:	-	14.00	28.00	40.00	41.00	51.00	58.00	64.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO115	0.050	0.035	0.050	540.00	0.0260	-	X:	-	12.00	18.00	18.50	19.00	27.00	29.00	34.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO125A	0.050	0.035	0.050	525.00	0.0400	-	X:	-	6.00	13.00	16.00	16.10	19.00	22.00	28.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO125B	0.050	0.035	0.050	525.00	0.0400	-	X:	-	6.00	13.00	16.00	16.10	19.00	22.00	28.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
RO125B	0.050	0.035	0.050	900.00	0.0400	-	X:	-	6.00	8.00	11.00	11.20	13.00	19.00	27.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO125C	0.050	0.035	0.050	720.00	0.0280	-	X:	-	8.00	14.00	19.00	19.10	26.00	29.00	34.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO140A	0.050	0.035	0.050	333.00	0.0270	-	X:	-	27.00	30.00	34.00	34.20	40.00	47.00	82.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO140B	0.050	0.035	0.050	626.00	0.0340	-	X:	-	7.00	8.00	11.00	11.20	14.00	16.00	31.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO140C	0.050	0.035	0.050	1,210.00	0.0320	-	X:	-	3.00	6.00	11.00	11.20	17.00	23.00	48.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO155A	0.050	0.035	0.050	805.00	0.2900	-	X:	-	9.00	18.00	22.00	22.10	27.00	32.00	43.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO155B	0.050	0.035	0.050	910.00	0.0350	-	X:	-	16.00	61.00	76.00	90.00	121.00	200.00	226.00
							Y:	2.00	0.50	1.00	-	-	1.00	-	2.00
RO155C	0.050	0.035	0.050	392.00	0.0330	-	X:	-	14.00	22.00	30.00	42.00	54.00	68.00	90.00
							Y:	2.00	0.50	1.00	-	-	1.00	-	2.00
RO160A	0.050	0.035	0.050	860.00	0.0300	-	X:	-	9.00	16.00	19.00	19.10	22.00	25.00	32.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO160B	0.050	0.035	0.050	1,090.00	0.0300	-	X:	-	6.00	10.00	14.00	16.00	18.00	22.00	28.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO160C	0.050	0.035	0.050	1,952.00	0.0300	-	X:	-	12.00	20.00	29.00	36.00	40.00	50.00	54.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO170	0.050	0.035	0.050	585.00	0.0310	-	X:	-	1.00	3.00	4.00	10.00	11.00	15.00	20.00
							Y:	2.00	2.00	2.00	-	-	2.00	2.00	2.00

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
RO60	0.050	0.035	0.050	625.00	0.0220	-	X:	-	6.00	10.00	14.00	27.00	38.00	57.00	83.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO65	0.050	0.035	0.050	756.00	0.0250	-	X:	-	5.00	7.00	8.50	9.00	19.00	24.00	29.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO70	0.050	0.035	0.050	1,280.00	0.0250	-	X:	-	14.00	27.00	31.50	32.00	36.00	40.00	46.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO75A	0.050	0.035	0.050	553.00	0.0240	-	X:	-	18.00	20.00	23.00	34.00	38.00	41.00	44.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO75B	0.050	0.035	0.050	690.00	0.0260	-	X:	-	15.00	26.00	32.00	43.00	46.00	50.00	55.00
							Y:	2.00	1.50	1.00	-	-	1.00	2.00	3.00
RO76	0.050	0.035	0.050	908.00	0.0260	-	X:	-	2.00	5.00	8.00	25.00	29.00	32.00	35.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO80A	0.050	0.035	0.050	400.00	0.0250	-	X:	-	5.00	14.00	20.00	20.50	34.00	50.00	68.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO80B	0.050	0.035	0.050	534.00	0.0260	-	X:	-	8.00	14.00	16.00	16.10	22.00	28.00	36.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO80C	0.050	0.035	0.050	1,200.00	0.0270	-	X:	-	9.00	19.00	31.00	41.00	51.00	75.00	83.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO85	0.050	0.035	0.050	763.00	0.0250	-	X:	-	6.00	10.00	17.00	24.00	27.00	31.00	34.00
							Y:	2.00	0.50	1.00	-	-	1.00	-	2.00
RO90	0.050	0.035	0.050	1,525.00	0.0300	-	X:	-	4.00	11.00	18.00	31.00	33.00	60.00	82.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO95	0.050	0.035	0.050	231.00	0.0300	-	X:	-	11.00	35.00	41.00	42.00	44.00	47.00	82.00
							Y:	2.00	1.00	1.00	-	-	1.00	2.00	2.00

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)	1.	2.	3.	4.	5.	6.	7.	8.

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   25JUL16  TIME  09:35:18   *
*                                       *
*****************************************
```

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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

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

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1           ID       Flood Control District of Maricopa County
  2           ID       STORYROCK PH1B EX - STORYROCK PHASE 1B EXISTING CONDITION
  3           ID       2 YEAR
  4           ID       6 Hour  Storm
  5           ID       Unit Hydrograph: Clark
  6           ID       Storm: Multiple
  7           ID       07/25/2016
              *DIAGRAM
  8           IT      5  1JAN99      0    2000
  9           IO      5
 10           IN     15
              *
 11           JD   1.419  0.0001
 12           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 13           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 14           PC   0.962   0.972   0.983   0.991   1.000
 15           JD   1.410  0.5000
 16           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 17           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 18           PC   0.962   0.972   0.983   0.991   1.000
 19           JD   1.384     2.8
 20           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 21           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 22           PC   0.950   0.963   0.975   0.988   1.000
              *

 23           KK   OFF30   BASIN
 24           BA   0.149
 25           LG    0.35    0.40    6.00    0.18       0
 26           UC   0.660   0.702
 27           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 28           UA     100
              *

 29           KK   OFF35   BASIN
 30           BA   0.032
 31           LG    0.35    0.40    6.00    0.18       0
 32           UC   0.382   0.408
 33           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
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      35          KK   OFF40   BASIN
      36          BA   0.002
      37          LG    0.35    0.40    6.00    0.18       0
      38          UC   0.186   0.235
      39          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      40          UA     100
                  *
1                                        HEC-1 INPUT                                          PAGE  2

    LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

      41          KK   CF45A COMBINE
      42          HC       3
                  *
      43          KK    RF45   ROUTE
      44          RS       1    FLOW
      45          RC   0.050   0.035   0.050     980  0.0260    0.00
      46          RX    0.00   14.00   21.00   25.00   31.00   35.00   41.00   45.00
      47          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *
      48          KK   OFF45   BASIN
      49          BA   0.025
      50          LG    0.35    0.40    6.00    0.18       0
      51          UC   0.393   0.443
      52          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      53          UA     100
                  *
      54          KK   CF45B COMBINE
      55          HC       2
                  *
      56          KK    RO60   ROUTE
      57          RS       1    FLOW
      58          RC   0.050   0.035   0.050     625  0.0220    0.00
      59          RX    0.00    6.00   10.00   14.00   27.00   38.00   57.00   83.00
      60          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *
      61          KK   OFF50   BASIN
      62          BA   0.063
      63          LG    0.35    0.40    6.00    0.18       0
      64          UC   0.608   0.913
      65          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      66          UA     100
                  *
      67          KK   RF60A   ROUTE
      68          RS       1    FLOW
      69          RC   0.050   0.035   0.050    1076  0.0300    0.00
      70          RX    0.00    8.00   18.00   55.00   71.00   78.00   83.00   90.00
      71          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *
      72          KK   OFF55   BASIN
      73          BA   0.003
      74          LG    0.35    0.40    6.00    0.18       0
      75          UC   0.203   0.252
      76          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      77          UA     100
                  *
1                                        HEC-1 INPUT                                          PAGE  3

    LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

      78          KK   RF60B   ROUTE
      79          RS       1    FLOW
      80          RC   0.050   0.035   0.050    1200  0.0320    0.00
      81          RX    0.00    9.00   14.00   16.00   16.50   22.00   26.00   33.00
      82          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *
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```
                *
 85             KK   RF60C   ROUTE
 86             RS      1     FLOW
 87             RC  0.050   0.035  0.050     650  0.0280    0.00
 88             RX   0.00   25.00  38.00   48.00   49.00   57.00   67.00   80.00
 89             RY   3.00    2.00   1.00    0.00    0.00    1.00    2.00    3.00
                *
 90             KK   OFF60   BASIN
 91             BA  0.018
 92             LG   0.35    0.40   6.00    0.18       0
 93             UC  0.425   0.639
 94             UA      0     3.0    5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 95             UA    100
                *
 96             KK   CF60B COMBINE
 97             HC      2
                *
 98             KK    RO65   ROUTE
 99             RS      1     FLOW
100             RC  0.050   0.035  0.050     756  0.0250    0.00
101             RX   0.00    5.00   7.00    8.50    9.00   19.00   24.00   29.00
102             RY   3.00    2.00   1.00    0.00    0.00    1.00    2.00    3.00
                *
103             KK    ON60   BASIN
104             BA  0.010
105             LG   0.35    0.40   6.00    0.18       0
106             UC  0.329   0.506
107             UA      0     3.0    5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
108             UA    100
                *
109             KK    ON65   BASIN
110             BA  0.004
111             LG   0.35    0.40   6.00    0.18       0
112             UC  0.301   0.499
113             UA      0     3.0    5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
114             UA    100
                *
1                                        HEC-1 INPUT                                    PAGE  4

LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

115             KK    CO65 COMBINE
116             HC      4
                *
117             KK   RO75A   ROUTE
118             RS      1     FLOW
119             RC  0.050   0.035  0.050     553  0.0240    0.00
120             RX   0.00   18.00  20.00   23.00   34.00   38.00   41.00   44.00
121             RY   3.00    2.00   1.00    0.00    0.00    1.00    2.00    3.00
                *
122             KK   OFF65   BASIN
123             BA  0.004
124             LG   0.35    0.40   6.00    0.18       0
125             UC  0.252   0.386
126             UA      0     3.0    5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
127             UA    100
                *
128             KK    RO70   ROUTE
129             RS      1     FLOW
130             RC  0.050   0.035  0.050    1280  0.0250    0.00
131             RX   0.00   14.00  27.00   31.50   32.00   36.00   40.00   46.00
132             RY   3.00    2.00   1.00    0.00    0.00    1.00    2.00    3.00
                *
133             KK    ON70   BASIN
134             BA  0.014
135             LG   0.35    0.40   6.00    0.18       0
```

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138          UA     100
             *

139          KK   CO75A COMBINE
140          HC       3
             *

141          KK   RO75B   ROUTE
142          RS       1    FLOW
143          RC   0.050   0.035   0.050     690  0.0260    0.00
144          RX    0.00   15.00   26.00   32.00   43.00   46.00   50.00   55.00
145          RY    2.00    1.50    1.00    0.00    0.00    1.00    2.00    3.00
             *

146          KK    ON75   BASIN
147          BA   0.013
148          LG    0.35    0.40    6.00    0.18       0
149          UC   0.508   0.683
150          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
151          UA     100
             *
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

152          KK   CO75B COMBINE
153          HC       2
             *

154          KK     DT1  DIVERT
155          DT     D45     0.0     0.0
156          DI     0.0    50.0   100.0   150.0   200.0   250.0   300.0   350.0   400.0   432.0
157          DQ     0.0     0.0     0.0     0.0     0.0     0.3     1.5     4.0     7.5    11.0
             *

158          KK    RO76   ROUTE
159          RS       1    FLOW
160          RC   0.050   0.035   0.050     908  0.0260    0.00
161          RX    0.00    2.00    5.00    8.00   25.00   29.00   32.00   35.00
162          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

163          KK    ON76   BASIN
164          BA   0.014
165          LG    0.35    0.40    6.00    0.18       0
166          UC   0.285   0.289
167          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
168          UA     100
             *

169          KK    CO76 COMBINE
170          HC       2
             *

171          KK     DT1RETRIEVE
172          DR     D45
             *

173          KK    ON77   BASIN
174          BA   0.002
175          LG    0.35    0.40    6.00    0.18       0
176          UC   0.909   7.435
177          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
178          UA     100
             *

179          KK   OFF80   BASIN
180          BA   0.044
181          LG    0.35    0.40    6.00    0.18       0
182          UC   0.503   0.672
183          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
184          UA     100
             *
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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```
185          KK   RO115   ROUTE
186          RS       1    FLOW
187          RC   0.050   0.035   0.050     540  0.0260    0.00
188          RX    0.00   12.00   18.00   18.50   19.00   27.00   29.00   34.00
189          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

190          KK   ON115   BASIN
191          BA   0.004
192          LG    0.35    0.40    6.00    0.18       0
193          UC   0.230   0.309
194          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
195          UA     100
             *

196          KK   CO115 COMBINE
197          HC       2
             *

198          KK   RF70A   ROUTE
199          RS       1    FLOW
200          RC   0.050   0.035   0.050     720  0.0290    0.00
201          RX    0.00   13.00   24.00   33.00   34.00   80.00   85.00   89.00
202          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

203          KK   ON120   BASIN
204          BA   0.001
205          LG    0.35    0.40    6.00    0.18       0
206          UC   0.207   0.480
207          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
208          UA     100
             *

209          KK   OFF85   BASIN
210          BA   0.002
211          LG    0.35    0.40    6.00    0.18       0
212          UC   0.162   0.178
213          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
214          UA     100
             *

215          KK  RO125A   ROUTE
216          RS       1    FLOW
217          RC   0.050   0.035   0.050     525  0.0400    0.00
218          RX    0.00    6.00   13.00   16.00   16.10   19.00   22.00   28.00
219          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *
```



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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

220          KK   OFF90   BASIN
221          BA   0.003
222          LG    0.35    0.40    6.00    0.18       0
223          UC   0.146   0.109
224          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
225          UA     100
             *

226          KK  RO125B   ROUTE
227          RS       1    FLOW
228          RC   0.050   0.035   0.050     525  0.0400    0.00
229          RX    0.00    6.00   13.00   16.00   16.10   19.00   22.00   28.00
230          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

231          KK  CO125A COMBINE
232          HC       2
             *

233          KK  RO125C   ROUTE
234          RS       1    FLOW
235          RC   0.050   0.035   0.050     720  0.0280    0.00
236          RX    0.00    8.00   14.00   19.00   19.10   26.00   29.00   34.00
237          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
```

```
238          KK  ON125   BASIN
239          BA  0.017
240          LG   0.35    0.40    6.00    0.18       0
241          UC  0.389   0.545
242          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
243          UA     100
             *

244          KK  CO125B COMBINE
245          HC       2
             *

246          KK   RF70B   ROUTE
247          RS       1    FLOW
248          RC   0.050   0.035   0.050     275  0.0290    0.00
249          RX    0.00   26.00   40.00   60.00   95.00  103.00  107.00  115.00
250          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

251          KK   CF70A COMBINE
252          HC       3
             *
1                                        HEC-1 INPUT                                    PAGE  8

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

253          KK   RF70C   ROUTE
254          RS       1    FLOW
255          RC   0.050   0.035   0.050     410  0.0270    0.00
256          RX    0.00    8.00   12.00   17.00   17.50   34.00   42.00   48.00
257          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

258          KK   OFF70   BASIN
259          BA  0.013
260          LG   0.35    0.40    6.00    0.18       0
261          UC  0.327   0.406
262          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
263          UA     100
             *

264          KK   CF70B COMBINE
265          HC       2
             *

266          KK   RO80A   ROUTE
267          RS       3    FLOW
268          RC   0.050   0.035   0.050     400  0.0250    0.00
269          RX    0.00    5.00   14.00   20.00   20.50   34.00   50.00   68.00
270          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

271          KK   ON130   BASIN
272          BA  0.012
273          LG   0.35    0.40    6.00    0.18       0
274          UC  0.347   0.543
275          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
276          UA     100
             *

277          KK   RO80B   ROUTE
278          RS       1    FLOW
279          RC   0.050   0.035   0.050     534  0.0260    0.00
280          RX    0.00    8.00   14.00   16.00   16.10   22.00   28.00   36.00
281          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

282          KK    CO80 COMBINE
283          HC       2
             *

284          KK   RO80C   ROUTE
285          RS       1    FLOW
286          RC   0.050   0.035   0.050    1200  0.0270    0.00
287          RX    0.00    9.00   19.00   31.00   41.00   51.00   75.00   83.00
288          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
```

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 289          KK    ON80   BASIN
 290          BA   0.024
 291          LG    0.35    0.40    6.00    0.18       0
 292          UC   0.433   0.553
 293          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 294          UA     100
              *

 295          KK    ON85   BASIN
 296          BA   0.011
 297          LG    0.35    0.40    6.00    0.18       0
 298          UC   0.379   0.612
 299          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 300          UA     100
              *

 301          KK   OFF95   BASIN
 302          BA   0.064
 303          LG    0.35    0.40    6.00    0.18       0
 304          UC   0.545   0.711
 305          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 306          UA     100
              *

 307          KK  RO140A   ROUTE
 308          RS       1    FLOW
 309          RC   0.050   0.035   0.050     333  0.0270    0.00
 310          RX    0.00   27.00   30.00   34.00   34.20   40.00   47.00   82.00
 311          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
              *

 312          KK  OFF100   BASIN
 313          BA   0.011
 314          LG    0.35    0.40    6.00    0.18       0
 315          UC   0.310   0.407
 316          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 317          UA     100
              *

 318          KK  RO140B   ROUTE
 319          RS       1    FLOW
 320          RC   0.050   0.035   0.050     626  0.0340    0.00
 321          RX    0.00    7.00    8.00   11.00   11.20   14.00   16.00   31.00
 322          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
              *

 323          KK  CO140A COMBINE
 324          HC       2
              *
```

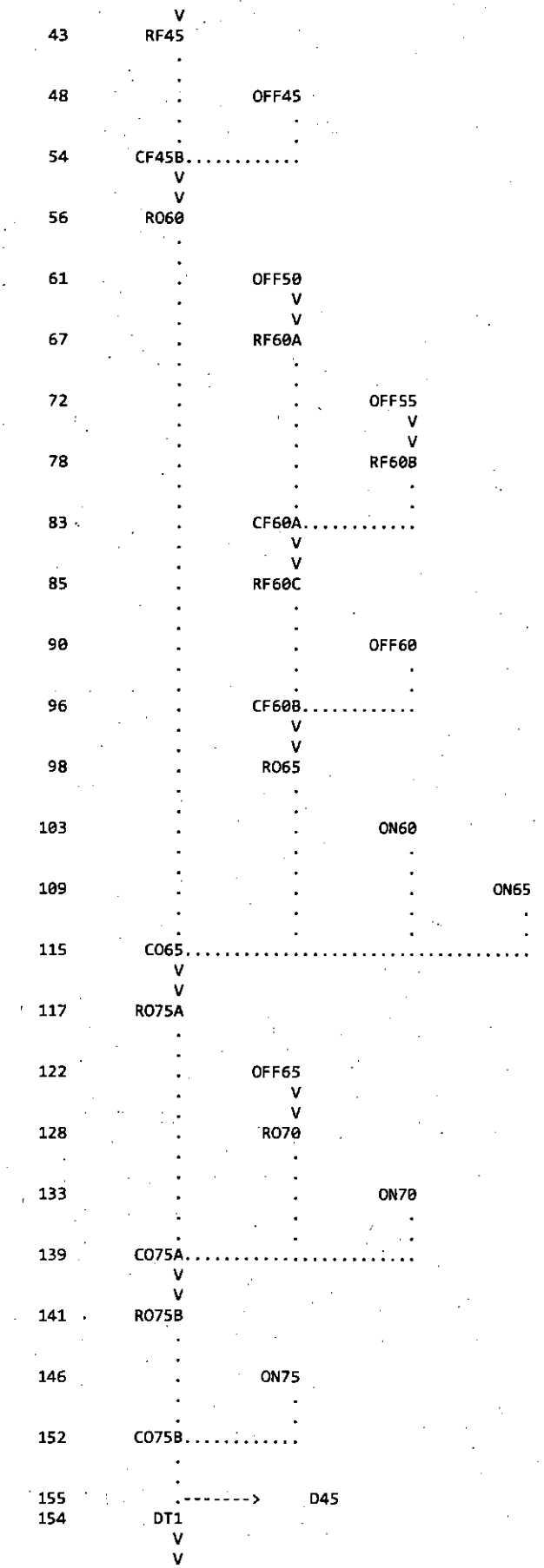


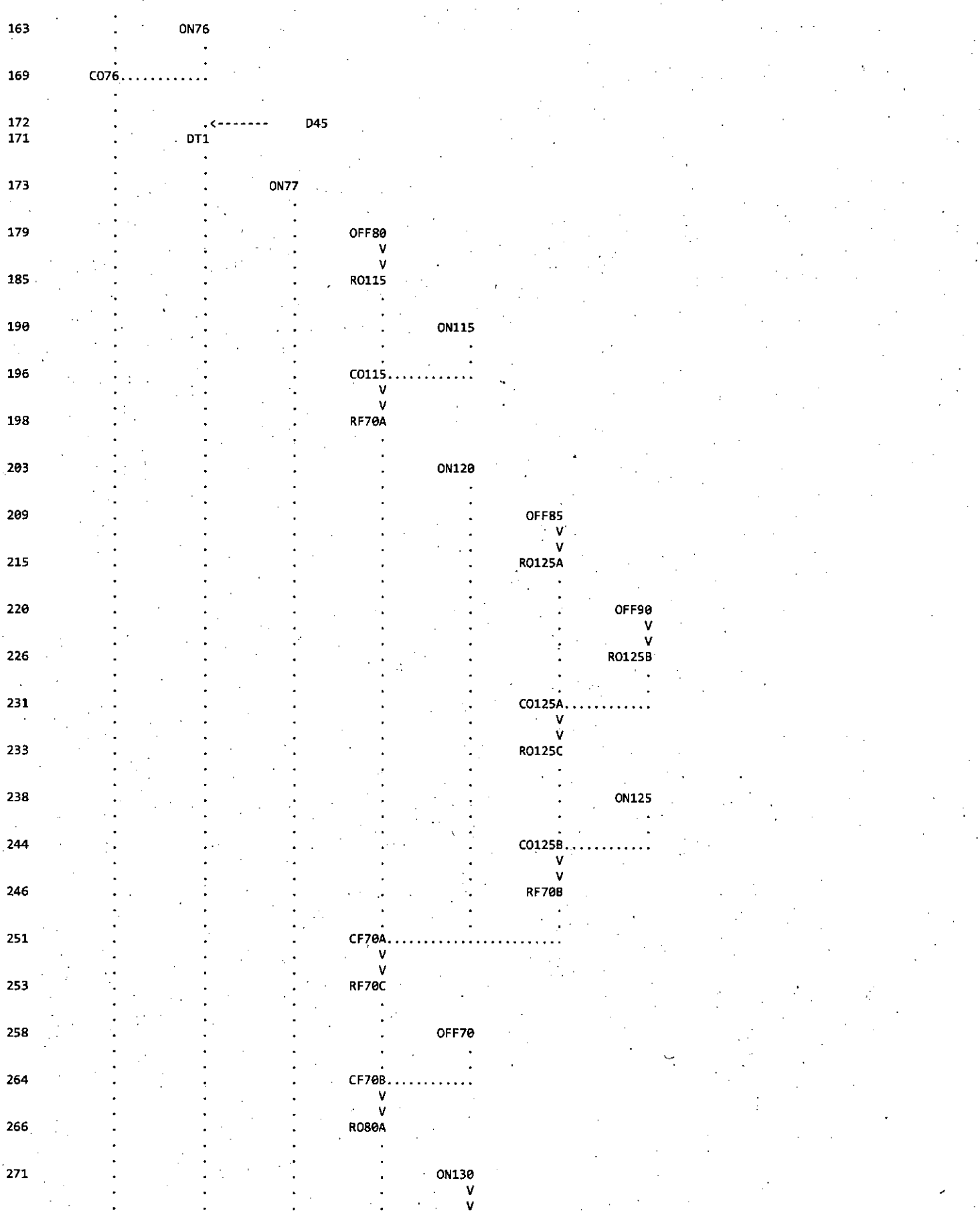
```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 325          KK  RO140C   ROUTE
 326          RS       1    FLOW
 327          RC   0.050   0.035   0.050    1210  0.0320    0.00
 328          RX    0.00    3.00    6.00   11.00   11.20   17.00   23.00   48.00
 329          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
              *

 330          KK   ON140   BASIN
 331          BA   0.017
 332          LG    0.35    0.40    6.00    0.18       0
 333          UC   0.408   0.616
 334          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 335          UA     100
              *

 336          KK  CO140B COMBINE
 337          HC       2
              *
```

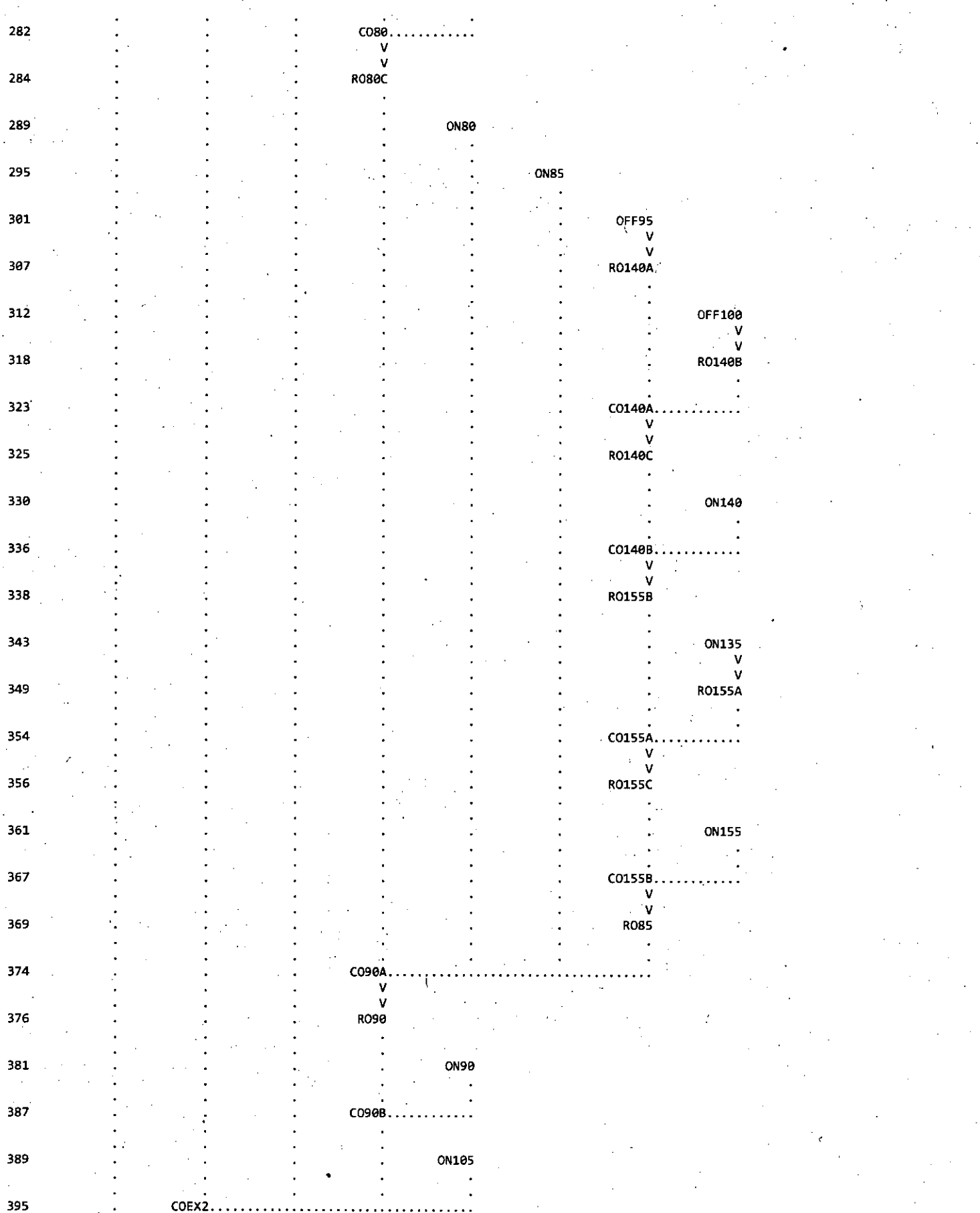
```
       340        RC   0.050   0.035   0.050     910  0.0350    0.00
       341        RX    0.00   16.00   61.00   76.00   90.00  121.00  200.00  226.00
       342        RY    2.00    0.50    1.00    0.00    0.00    1.00    0.00    2.00
                  *

       343        KK   ON135   BASIN
       344        BA   0.008
       345        LG    0.35    0.40    6.00    0.18       0
       346        UC   0.301   0.422
       347        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       348        UA     100
                  *

       349        KK  RO155A   ROUTE
       350        RS       1    FLOW
       351        RC   0.050   0.035   0.050     805  0.2900    0.00
       352        RX    0.00    9.00   18.00   22.00   22.10   27.00   32.00   43.00
       353        RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *

       354        KK  CO155A COMBINE
       355        HC       2
                  *

       356        KK  RO155C   ROUTE
       357        RS       1    FLOW
       358        RC   0.050   0.035   0.050     392  0.0330    0.00
       359        RX    0.00   14.00   22.00   30.00   42.00   54.00   68.00   90.00
       360        RY    2.00    0.50    1.00    0.00    0.00    1.00    0.00    2.00
                  *
1                                    HEC-1 INPUT                                       PAGE 11

      LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


       361        KK   ON155   BASIN
       362        BA   0.017
       363        LG    0.35    0.40    6.00    0.18       0
       364        UC   0.363   0.443
       365        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       366        UA     100
                  *

       367        KK  CO155B COMBINE
       368        HC       2
                  *

       369        KK    RO85   ROUTE
       370        RS       1    FLOW
       371        RC   0.050   0.035   0.050     763  0.0250    0.00
       372        RX    0.00    6.00   10.00   17.00   24.00   27.00   31.00   34.00
       373        RY    2.00    0.50    1.00    0.00    0.00    1.00    0.00    2.00
                  *

       374        KK   CO90A COMBINE
       375        HC       4
                  *

       376        KK    RO90   ROUTE
       377        RS       1    FLOW
       378        RC   0.050   0.035   0.050    1525  0.0300    0.00
       379        RX    0.00    4.00   11.00   18.00   31.00   33.00   60.00   82.00
       380        RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *

       381        KK    ON90   BASIN
       382        BA   0.024
       383        LG    0.35    0.40    6.00    0.18       0
       384        UC   0.412   0.512
       385        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       386        UA     100
                  *

       387        KK   CO90B COMBINE
       388        HC       2
                  *
```

```
391          LG    0.35    0.40    6.00    0.18       0
392          UC   0.185   0.235
393          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
394          UA     100
             *
1                                        HEC-1 INPUT                                        PAGE 12

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


395          KK   COEX2 COMBINE
396          HC       4
             *

397          KK   ON145   BASIN
398          BA   0.014
399          LG    0.35    0.40    6.00    0.18       0
400          UC   0.377   0.575
401          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
402          UA     100
             *

403          KK  RO160A   ROUTE
404          RS       1    FLOW
405          RC   0.050   0.035   0.050     860  0.0300    0.00
406          RX    0.00    9.00   16.00   19.00   19.10   22.00   25.00   32.00
407          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

408          KK   ON150   BASIN
409          BA   0.007
410          LG    0.35    0.40    6.00    0.18       0
411          UC   0.265   0.331
412          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
413          UA     100
             *

414          KK  RO160B   ROUTE
415          RS       1    FLOW
416          RC   0.050   0.035   0.050    1090  0.0300    0.00
417          RX    0.00    6.00   10.00   14.00   16.00   18.00   22.00   28.00
418          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

419          KK  CO160A COMBINE
420          HC       2
             *

421          KK  RO160C   ROUTE
422          RS       1    FLOW
423          RC   0.050   0.035   0.050    1952  0.0300    0.00
424          RX    0.00   12.00   20.00   29.00   36.00   40.00   50.00   54.00
425          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

426          KK   ON160   BASIN
427          BA   0.037
428          LG    0.35    0.40    6.00    0.18       0
429          UC   0.520   0.790
430          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
431          UA     100
             *
1                                        HEC-1 INPUT                                        PAGE 13

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


432          KK  CO160B COMBINE
433          HC       2
             *

434          KK   RO170   ROUTE
435          RS       1    FLOW
436          RC   0.050   0.035   0.050     585  0.0310    0.00
437          RX    0.00    1.00    3.00    4.00   10.00   11.00   15.00   20.00
438          RY    2.00    2.00    2.00    0.00    0.00    2.00    2.00    2.00
             *
```

```
        440          BA   0.006
        441          LG    0.35    0.40    6.00    0.18       0
        442          UC   0.258   0.316
        443          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        444          UA     100
                     *

        445          KK   CO170 COMBINE
        446          HC       2
                     *

        447          KK   ON165   BASIN
        448          BA   0.008
        449          LG    0.35    0.40    6.00    0.18       0
        450          UC   0.312   0.475
        451          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        452          UA     100
                     *

        453          KK   RO100   ROUTE
        454          RS       1    FLOW
        455          RC   0.050   0.035   0.050     980  0.0290    0.00
        456          RX    0.00   14.00   28.00   40.00   41.00   51.00   58.00   64.00
        457          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                     *

        458          KK   ON100   BASIN
        459          BA   0.011
        460          LG    0.35    0.40    6.00    0.18       0
        461          UC   0.395   0.694
        462          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        463          UA     100
                     *

        464          KK   CO100 COMBINE
        465          HC       2
                     *
1                                            HEC-1 INPUT                                             PAGE 14

       LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


        466          KK    RO95   ROUTE
        467          RS       1    FLOW
        468          RC   0.050   0.035   0.050     231  0.0300    0.00
        469          RX    0.00   11.00   35.00   41.00   42.00   44.00   47.00   82.00
        470          RY    2.00    1.00    1.00    0.00    0.00    1.00    2.00    2.00
                     *

        471          KK    ON95   BASIN
        472          BA   0.019
        473          LG    0.35    0.40    6.00    0.18       0
        474          UC   0.426   0.633
        475          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        476          UA     100
                     *

        477          KK    CO95 COMBINE
        478          HC       2
                     *
        479          ZZ
1
           SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    23      OFF30
              .
              .
    29        .         OFF35
              .           .
              .           .
    35        .           .         OFF40
              .           .           .
              .           .           .
```


43 RF45
48 OFF45
54 CF45B
56 RO60
61 OFF50
67 RF60A
72 OFF55
78 RF60B
83 CF60A
85 RF60C
90 OFF60
96 CF60B
98 RO65
103 ON60
109 ON65
115 CO65
117 RO75A
122 OFF65
128 RO70
133 ON70
139 CO75A
141 RO75B
146 ON75
152 CO75B
155
154 DT1
D45


163
ON76
169
CO76
172
<-------
D45
171
DT1
173
ON77
179
OFF80
185
RO115
190
ON115
196
CO115
198
RF70A
203
ON120
209
OFF85
215
RO125A
220
OFF90
226
RO125B
231
CO125A
233
RO125C
238
ON125
244
CO125B
246
RF70B
251
CF70A
253
RF70C
258
OFF70
264
CF70B
266
RO80A
271
ON130


282
CO80
284
RO80C
289
ON80
295
ON85
301
OFF95
307
RO140A
312
OFF100
318
RO140B
323
CO140A
325
RO140C
330
ON140
336
CO140B
338
RO155B
343
ON135
349
RO155A
354
CO155A
356
RO155C
361
ON155
367
CO155B
369
RO85
374
CO90A
376
RO90
381
ON90
387
CO90B
389
ON105
395
COEX2

```
  397       .         .         ON145
            .         .             V
            .         .             V
  403       .         .        RO160A
            .         .             .
            .         .             .
  408       .         .             .        ON150
            .         .             .            V
            .         .             .            V
  414       .         .             .       RO160B
            .         .             .            .
            .         .             .            .
  419       .         .        CO160A............
            .         .             V
            .         .             V
  421       .         .        RO160C
            .         .             .
            .         .             .
  426       .         .             .        ON160
            .         .             .            .
            .         .             .            .
  432       .         .        CO160B............
            .         .             V
            .         .             V
  434       .         .         RO170
            .         .             .
            .         .             .
  439       .         .             .        ON170
            .         .             .            .
            .         .             .            .
  445       .         .         CO170............
            .         .             .
            .         .             .
  447       .         .             .        ON165
            .         .             .            V
            .         .             .            V
  453       .         .             .        RO100
            .         .             .            .
            .         .             .            .
  458       .         .             .            .        ON100
            .         .             .            .            .
            .         .             .            .            .
  464       .         .             .        CO100............
            .         .             .            V
            .         .             .            V
  466       .         .             .         RO95
            .         .             .            .
            .         .             .            .
  471       .         .             .            .         ON95
            .         .             .            .            .
            .         .             .            .            .
  477       .         .             .         CO95............

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                     *****************************************
 *                                       *                                     *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                     *   U.S. ARMY CORPS OF ENGINEERS        *
 *              JUN   1998               *                                     *   HYDROLOGIC ENGINEERING CENTER       *
 *           VERSION 4.1                 *                                     *        609 SECOND STREET              *
 *                                       *                                     *     DAVIS, CALIFORNIA 95616           *
 *  RUN DATE   25JUL16  TIME  09:35:18   *                                     *          (916) 756-1104               *
 *                                       *                                     *                                       *
*****************************************                                      *****************************************



                              Flood Control District of Maricopa County
                              STORYROCK PH1B EX - STORYROCK PHASE 1B EXISTING CONDITION
                              2 YEAR
                              6 Hour  Storm
                              Unit Hydrograph: Clark
                              Storm: Multiple
                              07/25/2016

   9 IO            OUTPUT CONTROL VARIABLES
```

```
                  QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT        HYDROGRAPH TIME DATA
                   NMIN          5  MINUTES IN COMPUTATION INTERVAL
                  IDATE     1JAN99  STARTING DATE
                  ITIME       0000  STARTING TIME
                     NQ       2000  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE     7JAN99  ENDING DATE
                 NDTIME       2235  ENDING TIME
                  ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL     0.08 HOURS
                   TOTAL TIME BASE   166.58 HOURS

         ENGLISH UNITS
              DRAINAGE AREA          SQUARE MILES
              PRECIPITATION DEPTH    INCHES
              LENGTH, ELEVATION      FEET
              FLOW                   CUBIC FEET PER SECOND
              STORAGE VOLUME         ACRE-FEET
              SURFACE AREA           ACRES
              TEMPERATURE            DEGREES FAHRENHEIT

 11 JD        INDEX STORM NO. 1
                   STRM        1.42  PRECIPITATION DEPTH
                   TRDA        0.00  TRANSPOSITION DRAINAGE AREA

 12 PI          PRECIPITATION PATTERN
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                 0.03      0.03      0.05      0.05      0.05      0.15      0.15      0.15      0.03      0.03
                 0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00

 15 JD        INDEX STORM NO. 2
                   STRM        1.41  PRECIPITATION DEPTH
                   TRDA        0.50  TRANSPOSITION DRAINAGE AREA

 16 PI          PRECIPITATION PATTERN
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                 0.03      0.03      0.05      0.05      0.05      0.15      0.15      0.15      0.03      0.03
                 0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00

 19 JD        INDEX STORM NO. 3
                   STRM        1.38  PRECIPITATION DEPTH
                   TRDA        2.80  TRANSPOSITION DRAINAGE AREA

 20 PI          PRECIPITATION PATTERN
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                 0.03      0.03      0.07      0.07      0.07      0.08      0.08      0.08      0.05      0.05
                 0.05      0.02      0.02      0.02      0.01      0.01      0.01      0.00      0.00      0.00
                 0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                 0.00      0.00
1
                                          RUNOFF SUMMARY
                                    FLOW IN CUBIC FEET PER SECOND
                                 TIME IN HOURS,  AREA IN SQUARE MILES

                                  PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN     MAXIMUM     TIME OF
          OPERATION      STATION   FLOW    PEAK                                            AREA      STAGE    MAX STAGE
+                                                    6-HOUR     24-HOUR     72-HOUR

          HYDROGRAPH AT
+                          OFF30      28.    4.50        5.          1.          0.       0.15

          HYDROGRAPH AT
```

	HYDROGRAPH AT						
+		OFF40	1.	4.08	0.	0.	0.	0.00
	3 COMBINED AT						
+		CF45A	35.	4.50	6.	1.	0.	0.18
	ROUTED TO						
+		RF45	34.	4.50	6.	1.	0.	0.18
	HYDROGRAPH AT						
+		OFF45	7.	4.25	1.	0.	0.	0.03
	2 COMBINED AT						
+		CF45B	39.	4.50	7.	2.	1.	0.21
	ROUTED TO						
+		RO60	39.	4.50	7.	2.	1.	0.21
	HYDROGRAPH AT						
+		OFF50	10.	4.50	2.	0.	0.	0.06
	ROUTED TO						
+		RF60A	9.	4.58	2.	0.	0.	0.06
	HYDROGRAPH AT						
+		OFF55	1.	4.17	0.	0.	0.	0.00
	ROUTED TO						
+		RF60B	1.	4.25	0.	0.	0.	0.00
	2 COMBINED AT						
+		CF60A	10.	4.58	2.	1.	0.	0.07
	ROUTED TO						
+		RF60C	9.	4.67	2.	1.	0.	0.07
	HYDROGRAPH AT						
+		OFF60	4.	4.33	1.	0.	0.	0.02
	2 COMBINED AT						
+		CF60B	12.	4.58	3.	1.	0.	0.08
	ROUTED TO						
+		RO65	12.	4.67	3.	1.	0.	0.08
	HYDROGRAPH AT						
+		ON60	3.	4.25	0.	0.	0.	0.01
	HYDROGRAPH AT						
+		ON65	1.	4.25	0.	0.	0.	0.00
	4 COMBINED AT						
+		CO65	52.	4.58	10.	2.	1.	0.31
	ROUTED TO						
+		RO75A	52.	4.58	10.	2.	1.	0.31
	HYDROGRAPH AT						
+		OFF65	1.	4.17	0.	0.	0.	0.00
	ROUTED TO						
+		RO70	1.	4.33	0.	0.	0.	0.00
	HYDROGRAPH AT						
+		ON70	4.	4.25	0.	0.	0.	0.01
	3 COMBINED AT						
+		CO75A	54.	4.58	10.	3.	1.	0.32
	ROUTED TO						
+		RO75B	54.	4.58	10.	3.	1.	0.32
	HYDROGRAPH AT						
+		ON75	3.	4.42	0.	0.	0.	0.01
	2 COMBINED AT						
+		CO75B	56.	4.58	11.	3.	1.	0.34

+	D45	0.	0.00	0.	0.	0.	0.34
	HYDROGRAPH AT						
+	DT1	56.	4.58	11.	3.	1.	0.34
	ROUTED TO						
+	RO76	56.	4.67	11.	3.	1.	0.34
	HYDROGRAPH AT						
+	ON76	5.	4.17	0.	0.	0.	0.01
	2 COMBINED AT						
+	CO76	57.	4.58	11.	3.	1.	0.35
	HYDROGRAPH AT						
+	DT1	0.	0.00	0.	0.	0.	0.34
	HYDROGRAPH AT						
+	ON77	0.	4.75	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF80	9.	4.42	1.	0.	0.	0.04
	ROUTED TO						
+	RO115	9.	4.42	1.	0.	0.	0.04
	HYDROGRAPH AT						
+	ON115	2.	4.17	0.	0.	0.	0.00
	2 COMBINED AT						
+	CO115	10.	4.42	2.	0.	0.	0.05
	ROUTED TO						
+	RF70A	9.	4.50	2.	0.	0.	0.05
	HYDROGRAPH AT						
+	ON120	0.	4.17	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF85	1.	4.08	0.	0.	0.	0.00
	ROUTED TO						
+	RO125A	1.	4.17	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF90	2.	4.08	0.	0.	0.	0.00
	ROUTED TO						
+	RO125B	2.	4.08	0.	0.	0.	0.00
	2 COMBINED AT						
+	CO125A	3.	4.17	0.	0.	0.	0.00
	ROUTED TO						
+	RO125C	2.	4.17	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	ON125	4.	4.25	1.	0.	0.	0.02
	2 COMBINED AT						
+	CO125B	6.	4.25	1.	0.	0.	0.02
	ROUTED TO						
+	RF70B	6.	4.25	1.	0.	0.	0.02
	3 COMBINED AT						
+	CF70A	14.	4.42	2.	1.	0.	0.07
	ROUTED TO						
+	RF70C	14.	4.42	2.	1.	0.	0.07
	HYDROGRAPH AT						
+	OFF70	4.	4.25	0.	0.	0.	0.01
	2 COMBINED AT						
+	CF70B	17.	4.42	3.	1.	0.	0.08

	HYDROGRAPH AT						
+		ON130	3.	4.25	0.	0.	0.	0.01
	ROUTED TO						
+		RO80B	3.	4.33	0.	0.	0.	0.01
	2 COMBINED AT						
+		CO80	19.	4.42	3.	1.	0.	0.10
	ROUTED TO						
+		RO80C	18.	4.50	3.	1.	0.	0.10
	HYDROGRAPH AT						
+		ON80	6.	4.33	1.	0.	0.	0.02
	HYDROGRAPH AT						
+		ON85	2.	4.25	0.	0.	0.	0.01
	HYDROGRAPH AT						
+		OFF95	12.	4.42	2.	1.	0.	0.06
	ROUTED TO						
+		RO140A	12.	4.42	2.	1.	0.	0.06
	HYDROGRAPH AT						
+		OFF100	3.	4.25	0.	0.	0.	0.01
	ROUTED TO						
+		RO140B	3.	4.25	0.	0.	0.	0.01
	2 COMBINED AT						
+		CO140A	15.	4.42	2.	1.	0.	0.08
	ROUTED TO						
+		RO140C	14.	4.50	2.	1.	0.	0.08
	HYDROGRAPH AT						
+		ON140	4.	4.33	1.	0.	0.	0.02
	2 COMBINED AT						
+		CO140B	17.	4.50	3.	1.	0.	0.09
	ROUTED TO						
+		RO155B	16.	4.58	3.	1.	0.	0.09
	HYDROGRAPH AT						
+		ON135	2.	4.25	0.	0.	0.	0.01
	ROUTED TO						
+		RO155A	2.	4.25	0.	0.	0.	0.01
	2 COMBINED AT						
+		CO155A	18.	4.58	3.	1.	0.	0.10
	ROUTED TO						
+		RO155C	18.	4.58	3.	1.	0.	0.10
	HYDROGRAPH AT						
+		ON155	5.	4.25	1.	0.	0.	0.02
	2 COMBINED AT						
+		CO155B	20.	4.58	4.	1.	0.	0.12
	ROUTED TO						
+		RO85	20.	4.58	4.	1.	0.	0.12
	4 COMBINED AT						
+		CO90A	43.	4.58	8.	2.	1.	0.25
	ROUTED TO						
+		RO90	42.	4.58	8.	2.	1.	0.25
	HYDROGRAPH AT						
+		ON90	6.	4.33	1.	0.	0.	0.02
	2 COMBINED AT						

	HYDROGRAPH AT								
+		ON105	1.	4.08	0.	0.	0.	0.00	
	4 COMBINED AT								
+		COEX2	46.	4.58	9.	2.	1.	0.28	
	HYDROGRAPH AT								
+		ON145	3.	4.25	0.	0.	0.	0.01	
	ROUTED TO								
+		RO160A	3.	4.33	0.	0.	0.	0.01	
	HYDROGRAPH AT								
+		ON150	2.	4.17	0.	0.	0.	0.01	
	ROUTED TO								
+		RO160B	2.	4.25	0.	0.	0.	0.01	
	2 COMBINED AT								
+		CO160A	5.	4.33	1.	0.	0.	0.02	
	ROUTED TO								
+		RO160C	4.	4.50	1.	0.	0.	0.02	
	HYDROGRAPH AT								
+		ON160	7.	4.42	1.	0.	0.	0.04	
	2 COMBINED AT								
+		CO160B	10.	4.42	2.	0.	0.	0.06	
	ROUTED TO								
+		RO170	10.	4.50	2.	0.	0.	0.06	
	HYDROGRAPH AT								
+		ON170	2.	4.17	0.	0.	0.	0.01	
	2 COMBINED AT								
+		CO170	11.	4.50	2.	1.	0.	0.06	
	HYDROGRAPH AT								
+		ON165	2.	4.25	0.	0.	0.	0.01	
	ROUTED TO								
+		RO100	2.	4.33	0.	0.	0.	0.01	
	HYDROGRAPH AT								
+		ON100	2.	4.33	0.	0.	0.	0.01	
	2 COMBINED AT								
+		CO100	4.	4.33	1.	0.	0.	0.02	
	ROUTED TO								
+		RO95	4.	4.33	1.	0.	0.	0.02	
	HYDROGRAPH AT								
+		ON95	4.	4.33	1.	0.	0.	0.02	
	2 COMBINED AT								
+		CO95	8.	4.33	1.	0.	0.	0.04	

*** NORMAL END OF HEC-1 ***

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN   1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   25JUL16  TIME  09:35:21   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1       ID    ,   Flood Control District of Maricopa County
  2       ID        STORYROCK PH1B EX - STORYROCK PHASE 1B EXISTING CONDITION
  3       ID        10 YEAR
  4       ID        6 Hour  Storm
  5       ID        Unit Hydrograph: Clark
  6       ID        Storm: Multiple
  7       ID        07/25/2016
          *DIAGRAM
  8       IT      5  1JAN99      0    2000
  9       IO      5
 10       IN     15
          *
 11       JD   2.105  0.0001
 12       PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 13       PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 14       PC   0.962   0.972   0.983   0.991   1.000
 15       JD   2.092  0.5000
 16       PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 17       PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 18       PC   0.962   0.972   0.983   0.991   1.000
 19       JD   2.052     2.8
 20       PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 21       PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 22       PC   0.950   0.963   0.975   0.988   1.000
          *

 23       KK   OFF30   BASIN
 24       BA   0.149
 25       LG    0.35    0.40    6.00    0.18       0
 26       UC   0.548   0.571
 27       UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 28       UA     100
          *

 29       KK   OFF35   BASIN
 30       BA   0.032
 31       LG    0.35    0.40    6.00    0.18       0
 32       UC   0.317   0.332
 33       UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
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          35              KK    OFF40   BASIN
          36              BA    0.002
          37              LG     0.35    0.40    6.00    0.18       0
          38              UC    0.154   0.192
          39              UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          40              UA      100
                          *
1                                               HEC-1 INPUT                                                   PAGE  2

        LINE              ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          41              KK    CF45A COMBINE
          42              HC        3
                          *

          43              KK     RF45   ROUTE
          44              RS        1    FLOW
          45              RC    0.050   0.035   0.050     980  0.0260    0.00
          46              RX     0.00   14.00   21.00   25.00   31.00   35.00   41.00   45.00
          47              RY     3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                          *

          48              KK    OFF45   BASIN
          49              BA    0.025
          50              LG     0.35    0.40    6.00    0.18       0
          51              UC    0.327   0.360
          52              UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          53              UA      100
                          *

          54              KK    CF45B COMBINE
          55              HC        2
                          *

          56              KK     RO60   ROUTE
          57              RS        1    FLOW
          58              RC    0.050   0.035   0.050     625  0.0220    0.00
          59              RX     0.00    6.00   10.00   14.00   27.00   38.00   57.00   83.00
          60              RY     3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                          *

          61              KK    OFF50   BASIN
          62              BA    0.063
          63              LG     0.35    0.40    6.00    0.18       0
          64              UC    0.505   0.743
          65              UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          66              UA      100
                          *

          67              KK    RF60A   ROUTE
          68              RS        1    FLOW
          69              RC    0.050   0.035   0.050    1076  0.0300    0.00
          70              RX     0.00    8.00   18.00   55.00   71.00   78.00   83.00   90.00
          71              RY     3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                          *

          72              KK    OFF55   BASIN
          73              BA    0.003
          74              LG     0.35    0.40    6.00    0.18       0
          75              UC    0.169   0.205
          76              UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          77              UA      100
                          *
1                                               HEC-1 INPUT                                                   PAGE  3

        LINE              ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          78              KK    RF60B   ROUTE
          79              RS        1    FLOW
          80              RC    0.050   0.035   0.050    1200  0.0320    0.00
          81              RX     0.00    9.00   14.00   16.00   16.50   22.00   26.00   33.00
          82              RY     3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                          *
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```
185          KK   RO115   ROUTE
186          RS      1    FLOW
187          RC  0.050  0.035  0.050    540  0.0260   0.00
188          RX   0.00  12.00  18.00  18.50   19.00  27.00  29.00  34.00
189          RY   3.00   2.00   1.00   0.00    0.00   1.00   2.00   3.00
             *

190          KK   ON115   BASIN
191          BA  0.004
192          LG   0.35   0.40   6.00   0.18       0
193          UC  0.191  0.251
194          UA      0    3.0    5.0    8.0    12.0   20.0   43.0   75.0   90.0   96.0
195          UA    100
             *

196          KK   CO115 COMBINE
197          HC      2
             *

198          KK   RF70A   ROUTE
199          RS      1    FLOW
200          RC  0.050  0.035  0.050    720  0.0290   0.00
201          RX   0.00  13.00  24.00  33.00   34.00  80.00  85.00  89.00
202          RY   3.00   2.00   1.00   0.00    0.00   1.00   2.00   3.00
             *

203          KK   ON120   BASIN
204          BA  0.001
205          LG   0.35   0.40   6.00   0.18       0
206          UC  0.172  0.391
207          UA      0    3.0    5.0    8.0    12.0   20.0   43.0   75.0   90.0   96.0
208          UA    100
             *

209          KK   OFF85   BASIN
210          BA  0.002
211          LG   0.35   0.40   6.00   0.18       0
212          UC  0.135  0.145
213          UA      0    3.0    5.0    8.0    12.0   20.0   43.0   75.0   90.0   96.0
214          UA    100
             *

215          KK  RO125A   ROUTE
216          RS      1    FLOW
217          RC  0.050  0.035  0.050    525  0.0400   0.00
218          RX   0.00   6.00  13.00  16.00   16.10  19.00  22.00  28.00
219          RY   3.00   2.00   1.00   0.00    0.00   1.00   2.00   3.00
             *
```



```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

220          KK   OFF90   BASIN
221          BA  0.003
222          LG   0.35   0.40   6.00   0.18       0
223          UC  0.121  0.089
224          UA      0    3.0    5.0    8.0    12.0   20.0   43.0   75.0   90.0   96.0
225          UA    100
             *

226          KK  RO125B   ROUTE
227          RS      1    FLOW
228          RC  0.050  0.035  0.050    525  0.0400   0.00
229          RX   0.00   6.00  13.00  16.00   16.10  19.00  22.00  28.00
230          RY   3.00   2.00   1.00   0.00    0.00   1.00   2.00   3.00
             *

231          KK  CO125A COMBINE
232          HC      2
             *

233          KK  RO125C   ROUTE
234          RS      1    FLOW
235          RC  0.050  0.035  0.050    720  0.0280   0.00
236          RX   0.00   8.00  14.00  19.00   19.10  26.00  29.00  34.00
237          RY   3.00   2.00   1.00   0.00    0.00   1.00   2.00   3.00
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```
238          KK   ON125   BASIN
239          BA   0.017
240          LG    0.35    0.40    6.00    0.18       0
241          UC   0.323   0.444
242          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
243          UA     100
             *

244          KK  CO125B COMBINE
245          HC       2
             *

246          KK   RF70B   ROUTE
247          RS       1    FLOW
248          RC   0.050   0.035   0.050     275  0.0290    0.00
249          RX    0.00   26.00   40.00   60.00   95.00  103.00  107.00  115.00
250          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

251          KK   CF70A COMBINE
252          HC       3
             *
1                                        HEC-1 INPUT                                    PAGE  8

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

253          KK   RF70C   ROUTE
254          RS       1    FLOW
255          RC   0.050   0.035   0.050     410  0.0270    0.00
256          RX    0.00    8.00   12.00   17.00   17.50   34.00   42.00   48.00
257          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

258          KK   OFF70   BASIN
259          BA   0.013
260          LG    0.35    0.40    6.00    0.18       0
261          UC   0.272   0.331
262          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
263          UA     100
             *

264          KK   CF70B COMBINE
265          HC       2
             *

266          KK   RO80A   ROUTE
267          RS       2    FLOW
268          RC   0.050   0.035   0.050     400  0.0250    0.00
269          RX    0.00    5.00   14.00   20.00   20.50   34.00   50.00   68.00
270          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

271          KK   ON130   BASIN
272          BA   0.012
273          LG    0.35    0.40    6.00    0.18       0
274          UC   0.289   0.442
275          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
276          UA     100
             *

277          KK   RO80B   ROUTE
278          RS       1    FLOW
279          RC   0.050   0.035   0.050     534  0.0260    0.00
280          RX    0.00    8.00   14.00   16.00   16.10   22.00   28.00   36.00
281          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

282          KK    CO80 COMBINE
283          HC       2
             *

284          KK   RO80C   ROUTE
285          RS       1    FLOW
286          RC   0.050   0.035   0.050    1200  0.0270    0.00
287          RX    0.00    9.00   19.00   31.00   41.00   51.00   75.00   83.00
288          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
```

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 289          KK    ON80   BASIN
 290          BA   0.024
 291          LG    0.35    0.40    6.00    0.18       0
 292          UC   0.360   0.450
 293          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 294          UA     100
              *

 295          KK    ON85   BASIN
 296          BA   0.011
 297          LG    0.35    0.40    6.00    0.18       0
 298          UC   0.315   0.498
 299          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 300          UA     100
              *

 301          KK   OFF95   BASIN
 302          BA   0.064
 303          LG    0.35    0.40    6.00    0.18       0
 304          UC   0.453   0.579
 305          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 306          UA     100
              *

 307          KK  RO140A   ROUTE
 308          RS       1    FLOW
 309          RC   0.050   0.035   0.050     333  0.0270    0.00
 310          RX    0.00   27.00   30.00   34.00   34.20   40.00   47.00   82.00
 311          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
              *

 312          KK  OFF100   BASIN
 313          BA   0.011
 314          LG    0.35    0.40    6.00    0.18       0
 315          UC   0.258   0.331
 316          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 317          UA     100
              *

 318          KK  RO140B   ROUTE
 319          RS       1    FLOW
 320          RC   0.050   0.035   0.050     626  0.0340    0.00
 321          RX    0.00    7.00    8.00   11.00   11.20   14.00   16.00   31.00
 322          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
              *

 323          KK  CO140A COMBINE
 324          HC       2
              *
```



```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 325          KK  RO140C   ROUTE
 326          RS       1    FLOW
 327          RC   0.050   0.035   0.050    1210  0.0320    0.00
 328          RX    0.00    3.00    6.00   11.00   11.20   17.00   23.00   48.00
 329          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
              *

 330          KK   ON140   BASIN
 331          BA   0.017
 332          LG    0.35    0.40    6.00    0.18       0
 333          UC   0.339   0.502
 334          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 335          UA     100
              *

 336          KK  CO140B COMBINE
 337          HC       2
              *
```

```
340          RC   0.050   0.035   0.050     910  0.0350    0.00
341          RX    0.00   16.00   61.00   76.00   90.00  121.00  200.00  226.00
342          RY    2.00    0.50    1.00    0.00    0.00    1.00    0.00    2.00
             *

343          KK   ON135   BASIN
344          BA   0.008
345          LG    0.35    0.40    6.00    0.18       0
346          UC   0.250   0.344
347          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
348          UA     100
             *

349          KK  RO155A   ROUTE
350          RS       1    FLOW
351          RC   0.050   0.035   0.050     805  0.2900    0.00
352          RX    0.00    9.00   18.00   22.00   22.10   27.00   32.00   43.00
353          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

354          KK  CO155A COMBINE
355          HC       2
             *

356          KK  RO155C   ROUTE
357          RS       1    FLOW
358          RC   0.050   0.035   0.050     392  0.0330    0.00
359          RX    0.00   14.00   22.00   30.00   42.00   54.00   68.00   90.00
360          RY    2.00    0.50    1.00    0.00    0.00    1.00    0.00    2.00
             *
1                                        HEC-1 INPUT                                    PAGE 11

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

361          KK   ON155   BASIN
362          BA   0.017
363          LG    0.35    0.40    6.00    0.18       0
364          UC   0.302   0.360
365          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
366          UA     100
             *

367          KK  CO155B COMBINE
368          HC       2
             *

369          KK    RO85   ROUTE
370          RS       1    FLOW
371          RC   0.050   0.035   0.050     763  0.0250    0.00
372          RX    0.00    6.00   10.00   17.00   24.00   27.00   31.00   34.00
373          RY    2.00    0.50    1.00    0.00    0.00    1.00    0.00    2.00
             *

374          KK   CO90A COMBINE
375          HC       4
             *

376          KK    RO90   ROUTE
377          RS       1    FLOW
378          RC   0.050   0.035   0.050    1525  0.0300    0.00
379          RX    0.00    4.00   11.00   18.00   31.00   33.00   60.00   82.00
380          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

381          KK    ON90   BASIN
382          BA   0.024
383          LG    0.35    0.40    6.00    0.18       0
384          UC   0.342   0.417
385          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
386          UA     100
             *

387          KK   CO90B COMBINE
388          HC       2
             *

389          KK   ON195   BASIN
```

```
391          LG    0.35    0.40    6.00    0.18       0
392          UC   0.154   0.191
393          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
394          UA     100
             *
```

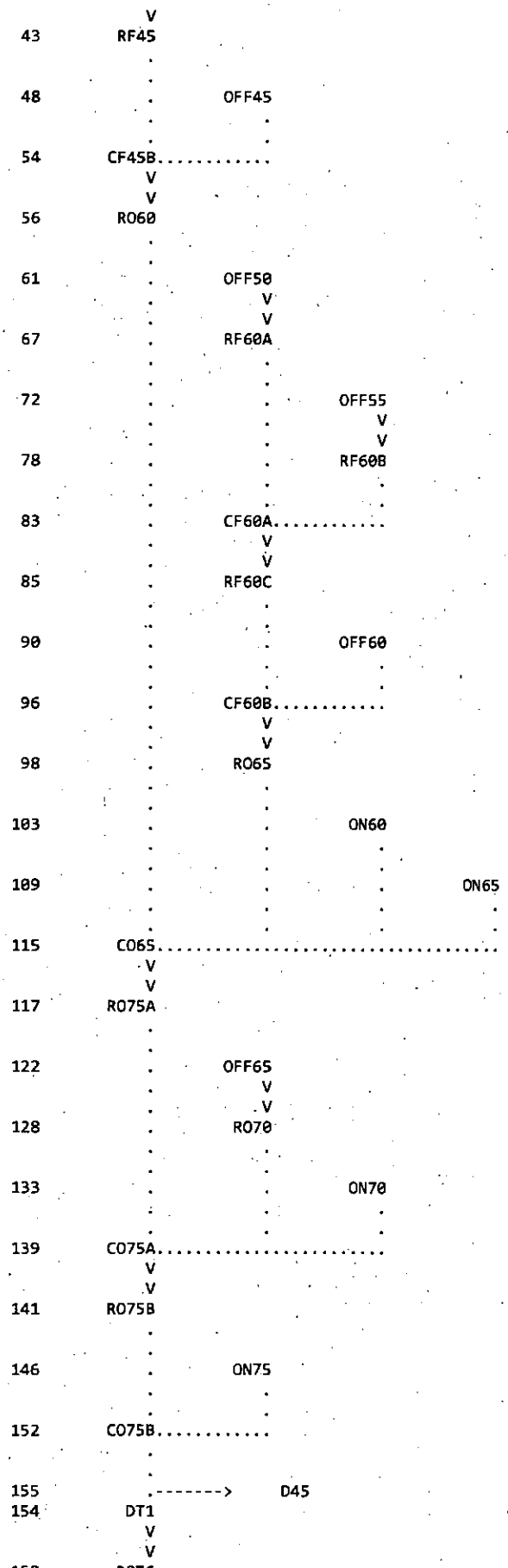
1 HEC-1 INPUT PAGE 12

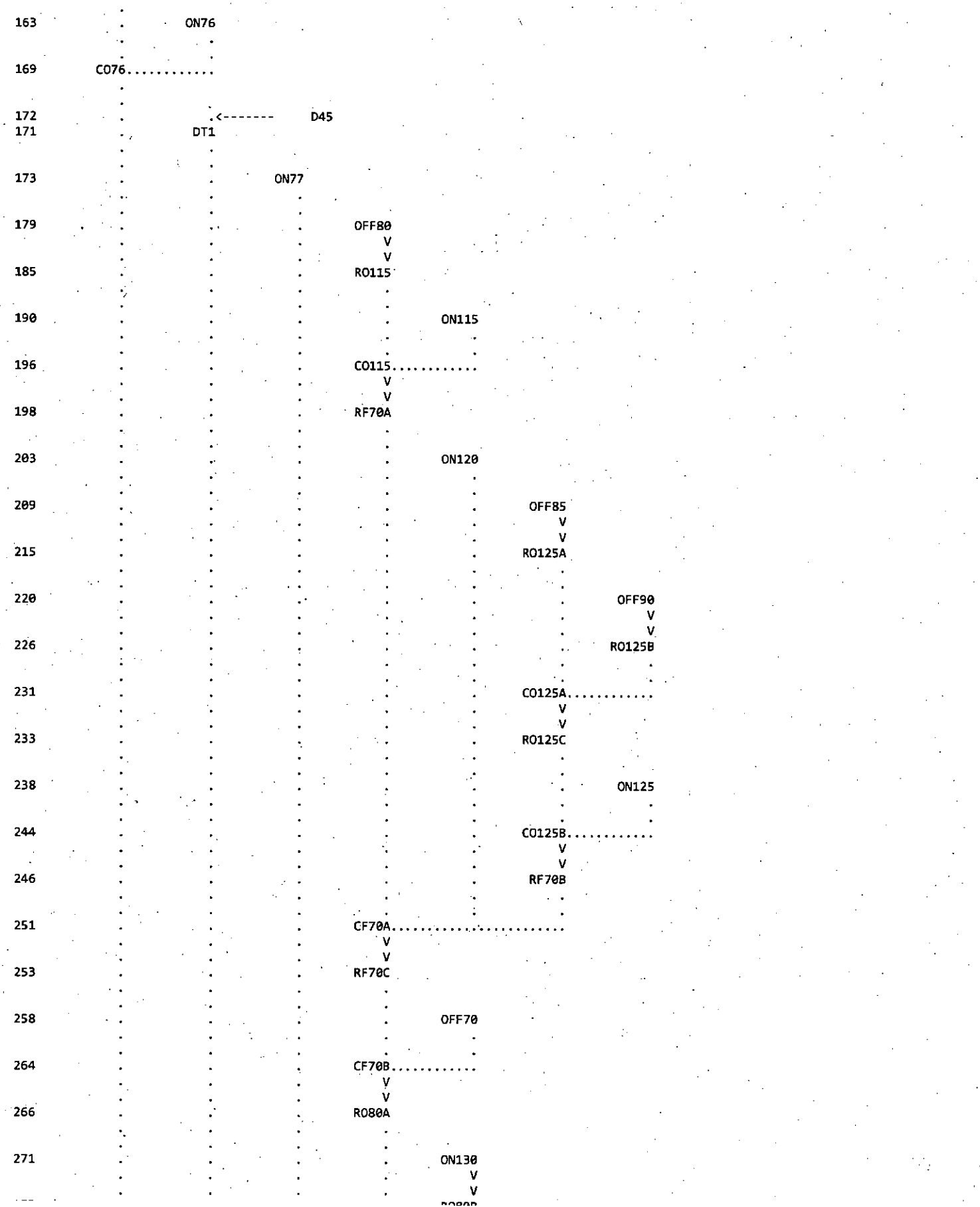
```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

395          KK   COEX2 COMBINE
396          HC       4
             *

397          KK   ON145   BASIN
398          BA   0.014
399          LG    0.35    0.40    6.00    0.18       0
400          UC   0.314   0.468
401          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
402          UA     100
             *

403          KK  RO160A   ROUTE
404          RS       1    FLOW
405          RC   0.050   0.035   0.050     860  0.0300    0.00
406          RX    0.00    9.00   16.00   19.00   19.10   22.00   25.00   32.00
407          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

408          KK   ON150   BASIN
409          BA   0.007
410          LG    0.35    0.40    6.00    0.18       0
411          UC   0.220   0.270
412          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
413          UA     100
             *

414          KK  RO160B   ROUTE
415          RS       1    FLOW
416          RC   0.050   0.035   0.050    1090  0.0300    0.00
417          RX    0.00    6.00   10.00   14.00   16.00   18.00   22.00   28.00
418          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

419          KK  CO160A COMBINE
420          HC       2
             *

421          KK  RO160C   ROUTE
422          RS       1    FLOW
423          RC   0.050   0.035   0.050    1952  0.0300    0.00
424          RX    0.00   12.00   20.00   29.00   36.00   40.00   50.00   54.00
425          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

426          KK   ON160   BASIN
427          BA   0.037
428          LG    0.35    0.40    6.00    0.18       0
429          UC   0.432   0.643
430          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
431          UA     100
             *
```

1 HEC-1 INPUT PAGE 13

```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

432          KK  CO160B COMBINE
433          HC       2
             *

434          KK   RO170   ROUTE
435          RS       1    FLOW
436          RC   0.050   0.035   0.050     585  0.0310    0.00
437          RX    0.00    1.00    3.00    4.00   10.00   11.00   15.00   20.00
438          RY    2.00    2.00    2.00    0.00    0.00    2.00    2.00    2.00
             *
```

```
          440            BA   0.006
          441            LG    0.35    0.40    6.00    0.18       0
          442            UC   0.215   0.257
          443            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          444            UA     100
                         *

          445            KK   CO170 COMBINE
          446            HC       2
                         *

          447            KK   ON165   BASIN
          448            BA   0.008
          449            LG    0.35    0.40    6.00    0.18       0
          450            UC   0.260   0.387
          451            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          452            UA     100
                         *

          453            KK   RO100   ROUTE
          454            RS       1    FLOW
          455            RC   0.050   0.035   0.050     980  0.0290    0.00
          456            RX    0.00   14.00   28.00   40.00   41.00   51.00   58.00   64.00
          457            RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                         *

          458            KK   ON100   BASIN
          459            BA   0.011
          460            LG    0.35    0.40    6.00    0.18       0
          461            UC   0.329   0.565
          462            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          463            UA     100
                         *

          464            KK   CO100 COMBINE
          465            HC       2
                         *
1                                                 HEC-1 INPUT                                                 PAGE 14

         LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          466            KK    RO95   ROUTE
          467            RS       1    FLOW
          468            RC   0.050   0.035   0.050     231  0.0300    0.00
          469            RX    0.00   11.00   35.00   41.00   42.00   44.00   47.00   82.00
          470            RY    2.00    1.00    1.00    0.00    0.00    1.00    2.00    2.00
                         *

          471            KK    ON95   BASIN
          472            BA   0.019
          473            LG    0.35    0.40    6.00    0.18       0
          474            UC   0.354   0.515
          475            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          476            UA     100
                         *

          477            KK    CO95 COMBINE
          478            HC       2
                         *
          479            ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    23      OFF30
              .
              .
    29        .      OFF35
              .        .
              .        .
    35        .        .      OFF40
              .        .        .
              .        .        .
```


43 RF45
48 OFF45
54 CF45B
56 RO60
61 OFF50
67 RF60A
72 OFF55
78 RF60B
83 CF60A
85 RF60C
90 OFF60
96 CF60B
98 RO65
103 ON60
109 ON65
115 CO65
117 RO75A
122 OFF65
128 RO70
133 ON70
139 CO75A
141 RO75B
146 ON75
152 CO75B
155 D45
154 DT1


163
ON76
169
CO76
172
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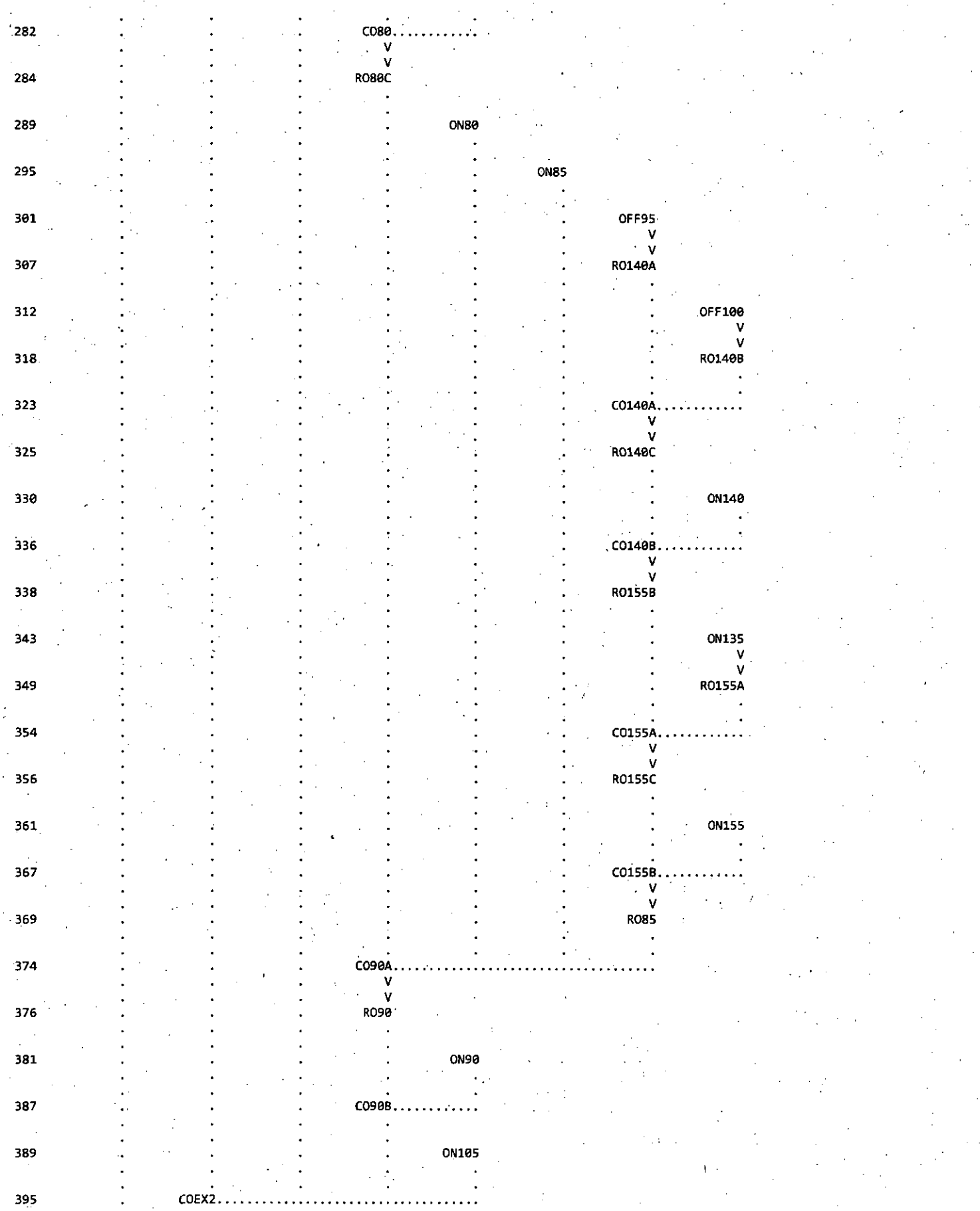
D45
171
DT1
173
ON77
179
OFF80
185
RO115
190
ON115
196
CO115
198
RF70A
203
ON120
209
OFF85
215
RO125A
220
OFF90
226
RO125B
231
CO125A
233
RO125C
238
ON125
244
CO125B
246
RF70B
251
CF70A
253
RF70C
258
OFF70
264
CF70B
266
RO80A
271
ON130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CO80
284
RO80C
289
ON80
295
ON85
301
OFF95
307
RO140A
312
OFF100
318
RO140B
323
CO140A
325
RO140C
330
ON140
336
CO140B
338
RO155B
343
ON135
349
RO155A
354
CO155A
356
RO155C
361
ON155
367
CO155B
369
RO85
374
CO90A
376
RO90
381
ON90
387
CO90B
389
ON105
395
COEX2

```
 397          .             .          ON145
              .             .              V
              .             .              V
 403          .             .         RO160A
              .             .              .
              .             .              .
 408          .             .              .          ON150
              .             .              .              V
              .             .              .              V
 414          .             .              .         RO160B
              .             .              .              .
              .             .              .              .
 419          .             .         CO160A.............
              .             .              V
              .             .              V
 421          .             .         RO160C
              .             .              .
              .             .              .
 426          .             .              .          ON160
              .             .              .              .
              .             .              .              .
 432          .             .         CO160B.............
              .             .              V
              .             .              V
 434          .             .          RO170
              .             .              .
              .             .              .
 439          .             .              .          ON170
              .             .              .              .
              .             .              .              .
 445          .             .          CO170.............
              .             .              .
              .             .              .
 447          .             .              .          ON165
              .             .              .              V
              .             .              .              V
 453          .             .              .          RO100
              .             .              .              .
              .             .              .              .
 458          .             .              .              .          ON100
              .             .              .              .              .
              .             .              .              .              .
 464          .             .              .          CO100.............
              .             .              .              V
              .             .              .              V
 466          .             .              .           RO95
              .             .              .              .
              .             .              .              .
 471          .             .              .              .           ON95
              .             .              .              .              .
              .             .              .              .              .
 477          .             .              .           CO95.............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                   *****************************************
 *                                       *                                   *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                   *   U.S. ARMY CORPS OF ENGINEERS        *
 *              JUN   1998               *                                   *   HYDROLOGIC ENGINEERING CENTER       *
 *             VERSION 4.1               *                                   *        609 SECOND STREET              *
 *                                       *                                   *     DAVIS, CALIFORNIA 95616           *
 * RUN DATE   25JUL16  TIME  09:35:21    *                                   *        (916) 756-1104                 *
 *                                       *                                   *                                       *
 *****************************************                                   *****************************************



                         Flood Control District of Maricopa County
                         STORYROCK PH1B EX - STORYROCK PHASE 1B EXISTING CONDITION
                         10 YEAR
                         6 Hour  Storm
                         Unit Hydrograph: Clark
                         Storm: Multiple
                         07/25/2016

   9 IO         OUTPUT CONTROL VARIABLES
```

QSCAL 0. HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	5	MINUTES IN COMPUTATION INTERVAL
IDATE	1JAN99	STARTING DATE
ITIME	0000	STARTING TIME
NQ	2000	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	7JAN99	ENDING DATE
NDTIME	2235	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 166.58 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

11 JD INDEX STORM NO. 1

STRM 2.11 PRECIPITATION DEPTH
TRDA 0.00 TRANSPOSITION DRAINAGE AREA

12 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03
0.03	0.03	0.05	0.05	0.05	0.15	0.15	0.15	0.03	0.03
0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00								

15 JD INDEX STORM NO. 2

STRM 2.09 PRECIPITATION DEPTH
TRDA 0.50 TRANSPOSITION DRAINAGE AREA

16 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03
0.03	0.03	0.05	0.05	0.05	0.15	0.15	0.15	0.03	0.03
0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00								

19 JD INDEX STORM NO. 3

STRM 2.05 PRECIPITATION DEPTH
TRDA 2.80 TRANSPOSITION DRAINAGE AREA

20 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03
0.03	0.03	0.07	0.07	0.07	0.08	0.08	0.08	0.05	0.05
0.05	0.02	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00								

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT									
+		OFF30	81.	4.42	12.	3.	1.	0.15		
	HYDROGRAPH AT									

	HYDROGRAPH AT						
+		OFF40	2.	4.08	0.	0.	0.	0.00
	3 COMBINED AT						
+		CF45A	100.	4.33	14.	4.	1.	0.18
	ROUTED TO						
+		RF45	99.	4.42	14.	4.	1.	0.18
	HYDROGRAPH AT						
+		OFF45	20.	4.25	2.	0.	0.	0.03
	2 COMBINED AT						
+		CF45B	113.	4.33	16.	4.	1.	0.21
	ROUTED TO						
+		RO60	113.	4.42	16.	4.	1.	0.21
	HYDROGRAPH AT						
+		OFF50	29.	4.33	5.	1.	0.	0.06
	ROUTED TO						
+		RF60A	27.	4.50	5.	1.	0.	0.06
	HYDROGRAPH AT						
+		OFF55	4.	4.08	0.	0.	0.	0.00
	ROUTED TO						
+		RF60B	3.	4.17	0.	0.	0.	0.00
	2 COMBINED AT						
+		CF60A	29.	4.42	5.	1.	0.	0.07
	ROUTED TO						
+		RF60C	29.	4.50	5.	1.	0.	0.07
	HYDROGRAPH AT						
+		OFF60	11.	4.25	1.	0.	0.	0.02
	2 COMBINED AT						
+		CF60B	36.	4.50	6.	2.	1.	0.08
	ROUTED TO						
+		RO65	36.	4.50	6.	2.	1.	0.08
	HYDROGRAPH AT						
+		ON60	7.	4.17	1.	0.	0.	0.01
	HYDROGRAPH AT						
+		ON65	3.	4.17	0.	0.	0.	0.00
	4 COMBINED AT						
+		CO65	154.	4.42	24.	6.	2.	0.31
	ROUTED TO						
+		RO75A	154.	4.42	24.	6.	2.	0.31
	HYDROGRAPH AT						
+		OFF65	4.	4.17	0.	0.	0.	0.00
	ROUTED TO						
+		RO70	3.	4.25	0.	0.	0.	0.00
	HYDROGRAPH AT						
+		ON70	10.	4.25	1.	0.	0.	0.01
	3 COMBINED AT						
+		CO75A	164.	4.42	25.	6.	2.	0.32
	ROUTED TO						
+		RO75B	163.	4.42	25.	6.	2.	0.32
	HYDROGRAPH AT						
+		ON75	7.	4.33	1.	0.	0.	0.01
	2 COMBINED AT						
+		CO75B	169.	4.42	26.	7.	2.	0.34

+	D45	0.	0.00	0.	0.	0.	0.34
	HYDROGRAPH AT						
+	DT1	169.	4.42	26.	7.	2.	0.34
	ROUTED TO						
+	RO76	167.	4.42	26.	7.	2.	0.34
	HYDROGRAPH AT						
+	ON76	14.	4.17	1.	0.	0.	0.01
	2 COMBINED AT						
+	CO76	173.	4.42	27.	7.	2.	0.35
	HYDROGRAPH AT						
+	DT1	0.	0.00	0.	0.	0.	0.34
	HYDROGRAPH AT						
+	ON77	0.	4.67	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF80	26.	4.33	3.	1.	0.	0.04
	ROUTED TO						
+	RO115	26.	4.33	3.	1.	0.	0.04
	HYDROGRAPH AT						
+	ON115	4.	4.08	0.	0.	0.	0.00
	2 COMBINED AT						
+	CO115	28.	4.33	4.	1.	0.	0.05
	ROUTED TO						
+	RF70A	27.	4.33	4.	1.	0.	0.05
	HYDROGRAPH AT						
+	ON120	1.	4.17	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF85	3.	4.08	0.	0.	0.	0.00
	ROUTED TO						
+	RO125A	3.	4.08	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF90	5.	4.00	0.	0.	0.	0.00
	ROUTED TO						
+	RO125B	4.	4.08	0.	0.	0.	0.00
	2 COMBINED AT						
+	CO125A	7.	4.08	0.	0.	0.	0.00
	ROUTED TO						
+	RO125C	7.	4.08	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	ON125	12.	4.25	1.	0.	0.	0.02
	2 COMBINED AT						
+	CO125B	17.	4.17	2.	0.	0.	0.02
	ROUTED TO						
+	RF70B	17.	4.17	2.	0.	0.	0.02
	3 COMBINED AT						
+	CF70A	41.	4.33	5.	1.	0.	0.07
	ROUTED TO						
+	RF70C	41.	4.33	5.	1.	0.	0.07
	HYDROGRAPH AT						
+	OFF70	11.	4.17	1.	0.	0.	0.01
	2 COMBINED AT						
+	CF70B	48.	4.33	6.	2.	1.	0.08

	HYDROGRAPH AT							
+		ON130	8.	4.17	1.	0.	0.	0.01
	ROUTED TO							
+		RO80B	8.	4.25	1.	0.	0.	0.01
	2 COMBINED AT							
+		CO80	56.	4.33	7.	2.	1.	0.10
	ROUTED TO							
+		RO80C	55.	4.33	7.	2.	1.	0.10
	HYDROGRAPH AT							
+		ON80	16.	4.25	2.	0.	0.	0.02
	HYDROGRAPH AT							
+		ON85	7.	4.25	1.	0.	0.	0.01
	HYDROGRAPH AT							
+		OFF95	36.	4.33	5.	1.	0.	0.06
	ROUTED TO							
+		RO140A	36.	4.33	5.	1.	0.	0.06
	HYDROGRAPH AT							
+		OFF100	9.	4.17	1.	0.	0.	0.01
	ROUTED TO							
+		RO140B	9.	4.17	1.	0.	0.	0.01
	2 COMBINED AT							
+		CO140A	43.	4.33	6.	1.	0.	0.08
	ROUTED TO							
+		RO140C	42.	4.33	6.	1.	0.	0.08
	HYDROGRAPH AT							
+		ON140	11.	4.25	1.	0.	0.	0.02
	2 COMBINED AT							
+		CO140B	52.	4.33	7.	2.	1.	0.09
	ROUTED TO							
+		RO155B	49.	4.42	7.	2.	1.	0.09
	HYDROGRAPH AT							
+		ON135	7.	4.17	1.	0.	0.	0.01
	ROUTED TO							
+		RO155A	7.	4.17	1.	0.	0.	0.01
	2 COMBINED AT							
+		CO155A	52.	4.42	8.	2.	1.	0.10
	ROUTED TO							
+		RO155C	52.	4.42	8.	2.	1.	0.10
	HYDROGRAPH AT							
+		ON155	13.	4.17	1.	0.	0.	0.02
	2 COMBINED AT							
+		CO155B	61.	4.42	9.	2.	1.	0.12
	ROUTED TO							
+		RO85	59.	4.50	9.	2.	1.	0.12
	4 COMBINED AT							
+		CO90A	130.	4.42	19.	5.	2.	0.25
	ROUTED TO							
+		RO90	128.	4.42	19.	5.	2.	0.25
	HYDROGRAPH AT							
+		ON90	17.	4.25	2.	0.	0.	0.02
	2 COMBINED AT							

```
238          KK   ON125   BASIN
239          BA   0.017
240          LG    0.35    0.40    6.00    0.18       0
241          UC   0.243   0.323
242          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
243          UA     100
             *

244          KK  CO125B COMBINE
245          HC       2
             *

246          KK   RF70B   ROUTE
247          RS       1    FLOW
248          RC   0.050   0.035   0.050     275  0.0290    0.00
249          RX    0.00   26.00   40.00   60.00   95.00  103.00  107.00  115.00
250          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

251          KK   CF70A COMBINE
252          HC       3
             *
1                                        HEC-1 INPUT                                    PAGE  8

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

253          KK   RF70C   ROUTE
254          RS       1    FLOW
255          RC   0.050   0.035   0.050     410  0.0270    0.00
256          RX    0.00    8.00   12.00   17.00   17.50   34.00   42.00   48.00
257          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

258          KK   OFF70   BASIN
259          BA   0.013
260          LG    0.35    0.40    6.00    0.18       0
261          UC   0.204   0.241
262          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
263          UA     100
             *

264          KK   CF70B COMBINE
265          HC       2
             *

266          KK   RO80A   ROUTE
267          RS       1    FLOW
268          RC   0.050   0.035   0.050     400  0.0250    0.00
269          RX    0.00    5.00   14.00   20.00   20.50   34.00   50.00   68.00
270          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

271          KK   ON130   BASIN
272          BA   0.012
273          LG    0.35    0.40    6.00    0.18       0
274          UC   0.217   0.322
275          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
276          UA     100
             *

277          KK   RO80B   ROUTE
278          RS       1    FLOW
279          RC   0.050   0.035   0.050     534  0.0260    0.00
280          RX    0.00    8.00   14.00   16.00   16.10   22.00   28.00   36.00
281          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

282          KK    CO80 COMBINE
283          HC       2
             *

284          KK   RO80C   ROUTE
285          RS       1    FLOW
286          RC   0.050   0.035   0.050    1200  0.0270    0.00
287          RX    0.00    9.00   19.00   31.00   41.00   51.00   75.00   83.00
288          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
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LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

289       KK    ON80   BASIN
290       BA   0.024
291       LG    0.35    0.40    6.00    0.18       0
292       UC   0.271   0.328
293       UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
294       UA     100
          *

295       KK    ON85   BASIN
296       BA   0.011
297       LG    0.35    0.40    6.00    0.18       0
298       UC   0.237   0.363
299       UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
300       UA     100
          *

301       KK   OFF95   BASIN
302       BA   0.064
303       LG    0.35    0.40    6.00    0.18       0
304       UC   0.341   0.422
305       UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
306       UA     100
          *

307       KK  RO140A   ROUTE
308       RS       1    FLOW
309       RC   0.050   0.035   0.050     333  0.0270    0.00
310       RX    0.00   27.00   30.00   34.00   34.20   40.00   47.00   82.00
311       RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
          *

312       KK  OFF100   BASIN
313       BA   0.011
314       LG    0.35    0.40    6.00    0.18       0
315       UC   0.194   0.241
316       UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
317       UA     100
          *

318       KK  RO140B   ROUTE
319       RS       1    FLOW
320       RC   0.050   0.035   0.050     626  0.0340    0.00
321       RX    0.00    7.00    8.00   11.00   11.20   14.00   16.00   31.00
322       RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
          *

323       KK  CO140A COMBINE
324       HC       2
          *
```



```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

325       KK  RO140C   ROUTE
326       RS       1    FLOW
327       RC   0.050   0.035   0.050    1210  0.0320    0.00
328       RX    0.00    3.00    6.00   11.00   11.20   17.00   23.00   48.00
329       RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
          *

330       KK   ON140   BASIN
331       BA   0.017
332       LG    0.35    0.40    6.00    0.18       0
333       UC   0.255   0.366
334       UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
335       UA     100
          *

336       KK  CO140B COMBINE
337       HC       2
          *
```

```
 340          RC   0.050   0.035   0.050     910  0.0350    0.00
 341          RX    0.00   16.00   61.00   76.00   90.00  121.00  200.00  226.00
 342          RY    2.00    0.50    1.00    0.00    0.00    1.00    0.00    2.00
              *

 343          KK   ON135   BASIN
 344          BA   0.008
 345          LG    0.35    0.40    6.00    0.18       0
 346          UC   0.188   0.251
 347          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 348          UA     100
              *

 349          KK  RO155A   ROUTE
 350          RS       1    FLOW
 351          RC   0.050   0.035   0.050     805  0.2900    0.00
 352          RX    0.00    9.00   18.00   22.00   22.10   27.00   32.00   43.00
 353          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
              *

 354          KK  CO155A COMBINE
 355          HC       2
              *

 356          KK  RO155C   ROUTE
 357          RS       1    FLOW
 358          RC   0.050   0.035   0.050     392  0.0330    0.00
 359          RX    0.00   14.00   22.00   30.00   42.00   54.00   68.00   90.00
 360          RY    2.00    0.50    1.00    0.00    0.00    1.00    0.00    2.00
              *
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1                                            HEC-1 INPUT                                                PAGE 11

       LINE       ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 361          KK   ON155   BASIN
 362          BA   0.017
 363          LG    0.35    0.40    6.00    0.18       0
 364          UC   0.227   0.263
 365          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 366          UA     100
              *

 367          KK  CO155B COMBINE
 368          HC       2
              *

 369          KK    RO85   ROUTE
 370          RS       1    FLOW
 371          RC   0.050   0.035   0.050     763  0.0250    0.00
 372          RX    0.00    6.00   10.00   17.00   24.00   27.00   31.00   34.00
 373          RY    2.00    0.50    1.00    0.00    0.00    1.00    0.00    2.00
              *

 374          KK   CO90A COMBINE
 375          HC       4
              *

 376          KK    RO90   ROUTE
 377          RS       1    FLOW
 378          RC   0.050   0.035   0.050    1525  0.0300    0.00
 379          RX    0.00    4.00   11.00   18.00   31.00   33.00   60.00   82.00
 380          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
              *

 381          KK    ON90   BASIN
 382          BA   0.024
 383          LG    0.35    0.40    6.00    0.18       0
 384          UC   0.257   0.304
 385          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 386          UA     100
              *

 387          KK   CO90B COMBINE
 388          HC       2
              *

 389          KK   ON105   BASIN
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```
391          LG    0.35    0.40    6.00    0.18       0
392          UC   0.116   0.139
393          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
394          UA     100
             *
```

1 HEC-1 INPUT PAGE 12

```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

395          KK   COEX2 COMBINE
396          HC       4
             *

397          KK   ON145   BASIN
398          BA   0.014
399          LG    0.35    0.40    6.00    0.18       0
400          UC   0.236   0.341
401          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
402          UA     100
             *

403          KK  RO160A   ROUTE
404          RS       1    FLOW
405          RC   0.050   0.035   0.050     860  0.0300    0.00
406          RX    0.00    9.00   16.00   19.00   19.10   22.00   25.00   32.00
407          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

408          KK   ON150   BASIN
409          BA   0.007
410          LG    0.35    0.40    6.00    0.18       0
411          UC   0.166   0.196
412          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
413          UA     100
             *

414          KK  RO160B   ROUTE
415          RS       1    FLOW
416          RC   0.050   0.035   0.050    1090  0.0300    0.00
417          RX    0.00    6.00   10.00   14.00   16.00   18.00   22.00   28.00
418          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

419          KK  CO160A COMBINE
420          HC       2
             *

421          KK  RO160C   ROUTE
422          RS       1    FLOW
423          RC   0.050   0.035   0.050    1952  0.0300    0.00
424          RX    0.00   12.00   20.00   29.00   36.00   40.00   50.00   54.00
425          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

426          KK   ON160   BASIN
427          BA   0.037
428          LG    0.35    0.40    6.00    0.18       0
429          UC   0.325   0.468
430          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
431          UA     100
             *
```

1 HEC-1 INPUT PAGE 13

```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

432          KK  CO160B COMBINE
433          HC       2
             *

434          KK   RO170   ROUTE
435          RS       1    FLOW
436          RC   0.050   0.035   0.050     585  0.0310    0.00
437          RX    0.00    1.00    3.00    4.00   10.00   11.00   15.00   20.00
438          RY    2.00    2.00    2.00    0.00    0.00    2.00    2.00    2.00
             *
```

```
          440          BA   0.006
          441          LG    0.35    0.40    6.00    0.18       0
          442          UC   0.161   0.187
          443          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          444          UA     100
                       *

          445          KK   CO170 COMBINE
          446          HC       2
                       *

          447          KK   ON165   BASIN
          448          BA   0.008
          449          LG    0.35    0.40    6.00    0.18       0
          450          UC   0.195   0.282
          451          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          452          UA     100
                       *

          453          KK   RO100   ROUTE
          454          RS       1    FLOW
          455          RC   0.050   0.035   0.050     980  0.0290    0.00
          456          RX    0.00   14.00   28.00   40.00   41.00   51.00   58.00   64.00
          457          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                       *

          458          KK   ON100   BASIN
          459          BA   0.011
          460          LG    0.35    0.40    6.00    0.18       0
          461          UC   0.247   0.412
          462          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          463          UA     100
                       *

          464          KK   CO100 COMBINE
          465          HC       2
                       *
1                                           HEC-1 INPUT                                                  PAGE 14

         LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

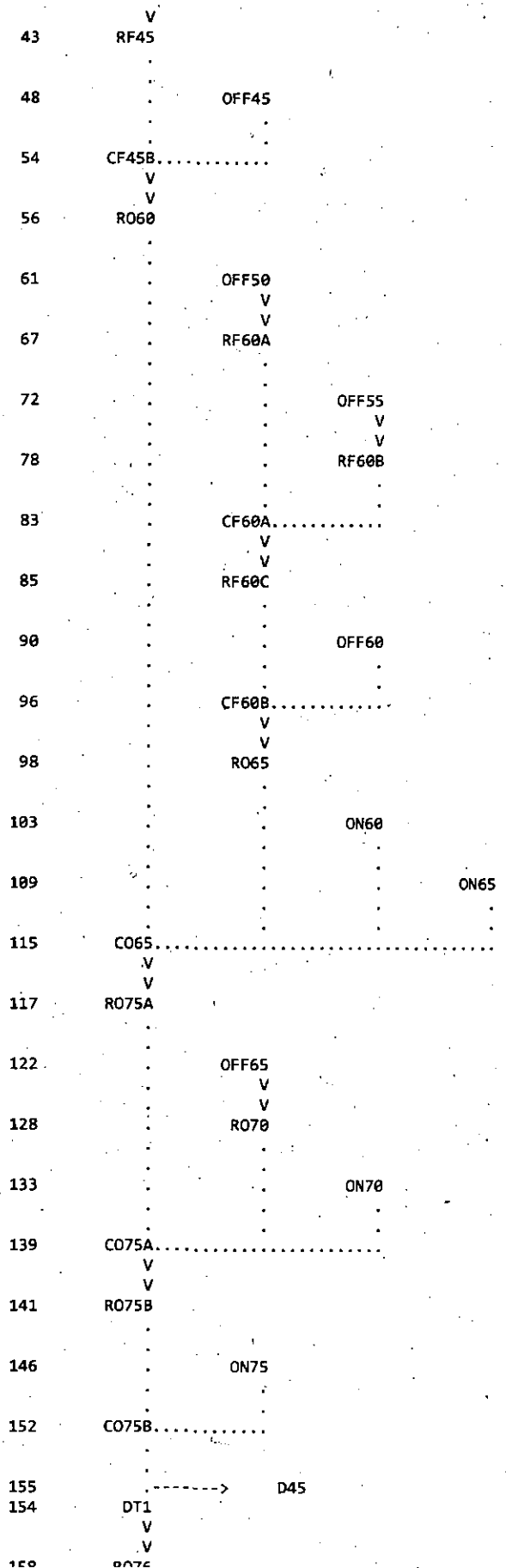

          466          KK    RO95   ROUTE
          467          RS       1    FLOW
          468          RC   0.050   0.035   0.050     231  0.0300    0.00
          469          RX    0.00   11.00   35.00   41.00   42.00   44.00   47.00   82.00
          470          RY    2.00    1.00    1.00    0.00    0.00    1.00    2.00    2.00
                       *

          471          KK    ON95   BASIN
          472          BA   0.019
          473          LG    0.35    0.40    6.00    0.18       0
          474          UC   0.266   0.375
          475          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          476          UA     100
                       *

          477          KK    CO95 COMBINE
          478          HC       2
                       *
          479          ZZ
1
              SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.     (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   23       OFF30
              .
              .
   29         .          OFF35
              ..           .
              .            .
   35         .            .          OFF40
              .            .            .
              .            .            .
   41       CF45A
```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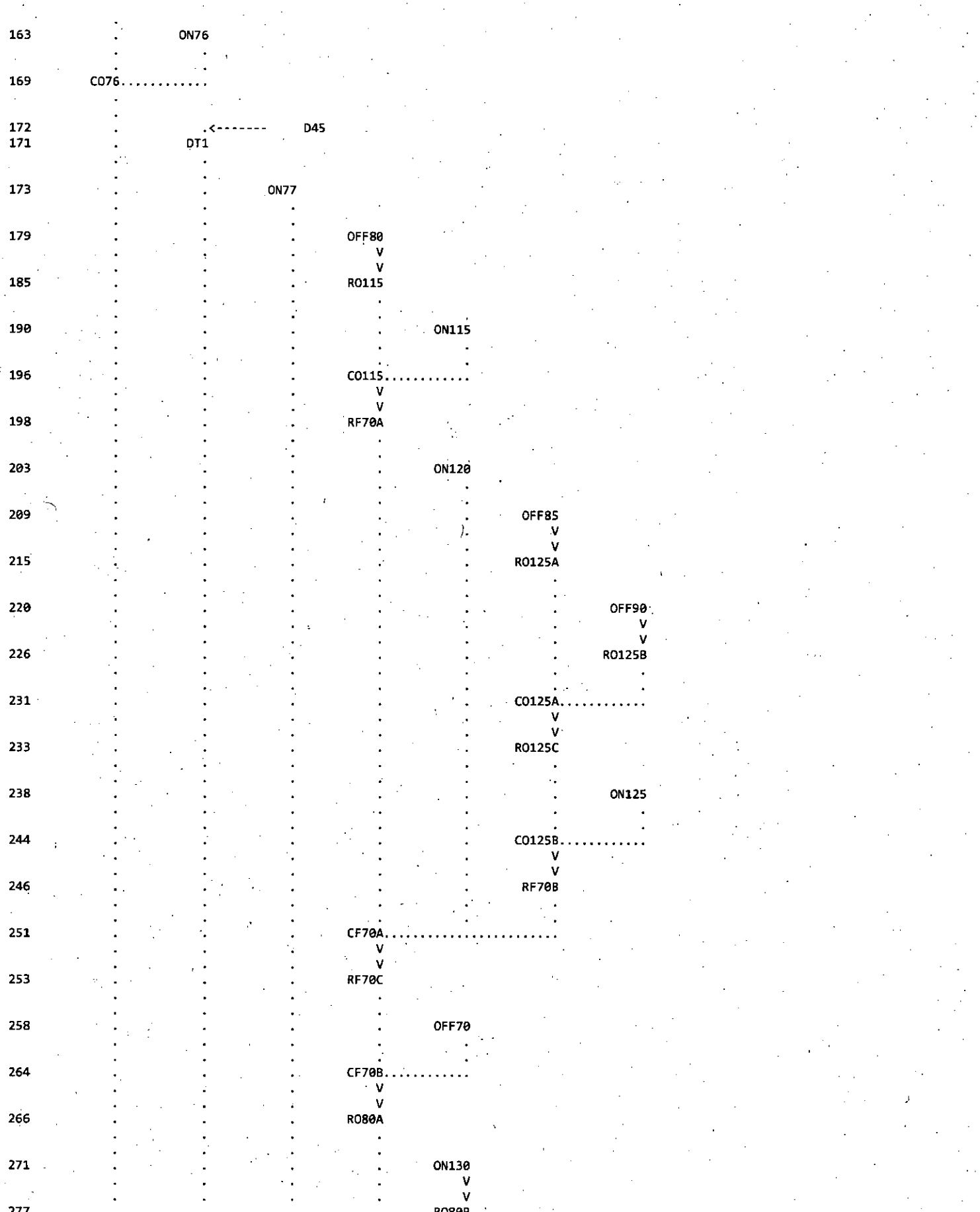
48 OFF45
54 CF45B
56 RO60
61 OFF50
67 RF60A
72 OFF55
78 RF60B
83 CF60A
85 RF60C
90 OFF60
96 CF60B
98 RO65
103 ON60
109 ON65
115 CO65
117 RO75A
122 OFF65
128 RO70
133 ON70
139 CO75A
141 RO75B
146 ON75
152 CO75B
155 D45
154 DT1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190 ON115
196 CO115
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203 ON120
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215 RO125A
220 OFF90
226 RO125B
231 CO125A
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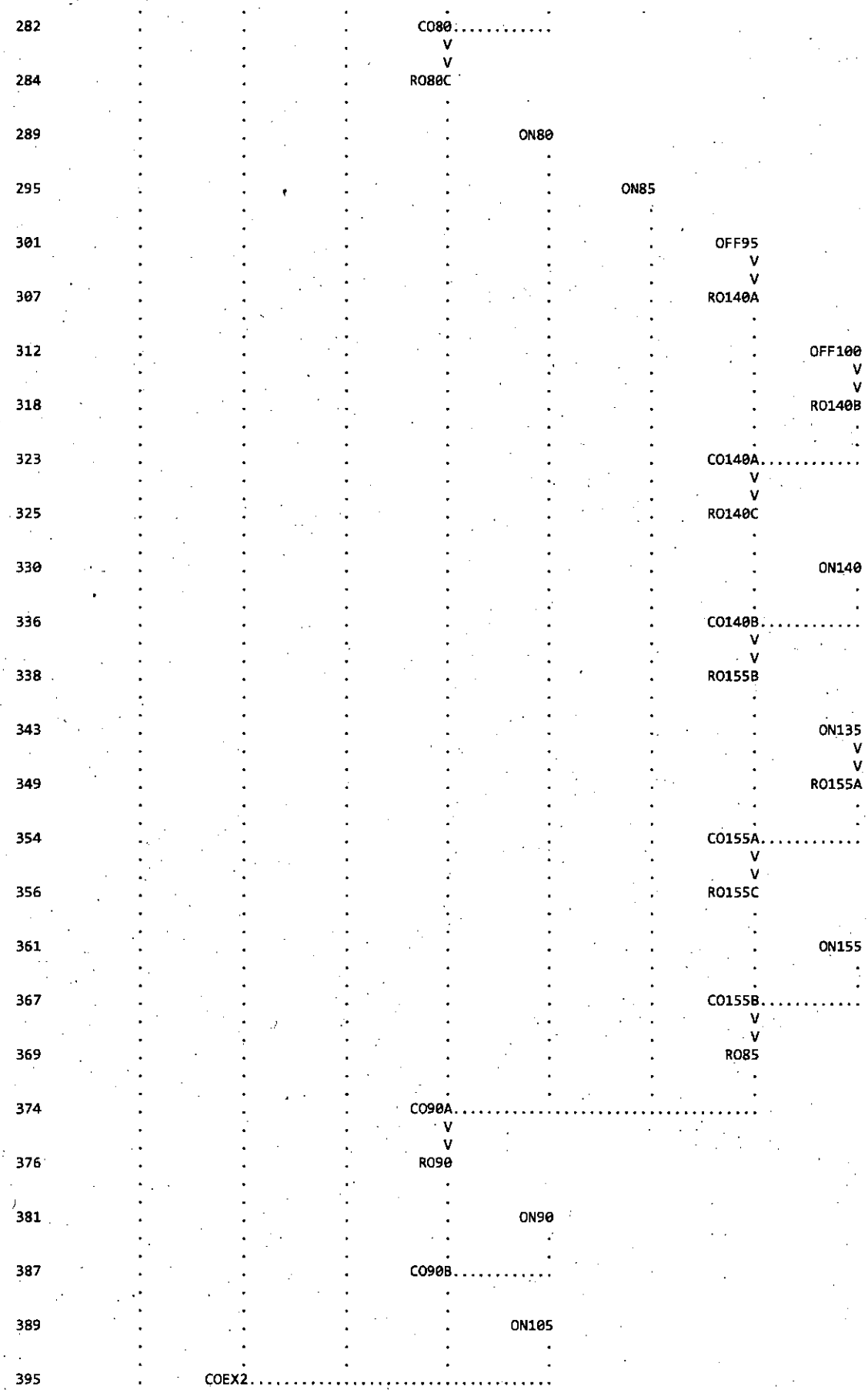
246 RF70B
251 CF70A
253 RF70C
258 OFF70
264 CF70B
266 RO80A
271 ON130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ON80
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ON85
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RO140B
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CO140A
325
RO140C
330
ON140
336
CO140B
338
RO155B
343
ON135
349
RO155A
354
CO155A
356
RO155C
361
ON155
367
CO155B
369
RO85
374
CO90A
376
RO90
381
ON90
387
CO90B
389
ON105
395
COEX2

```
397                ON145
                     V
                     V
403                RO160A
                     .
                     .
408                     .       ON150
                        .          V
                        .          V
414                     .       RO160B
                        .          .
                        .          .
419                CO160A.............
                     V
                     V
421                RO160C
                     .
                     .
426                     .       ON160
                        .          .
                        .          .
432                CO160B.............
                     V
                     V
434                RO170
                     .
                     .
439                     .       ON170
                        .          .
                        .          .
445                CO170.............
                     .
                     .
447                     .       ON165
                        .          V
                        .          V
453                     .       RO100
                        .          .
                        .          .
458                     .          .          ON100
                        .          .             .
                        .          .             .
464                     .       CO100.............
                        .          V
                        .          V
466                     .       RO95
                        .          .
                        .          .
471                     .          .          ON95
                        .          .             .
                        .          .             .
477                     .       CO95..............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
1*****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*              JUN  1998                *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   25JUL16  TIME  09:35:23   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

Flood Control District of Maricopa County
STORYROCK PH1B EX - STORYROCK PHASE 1B EXISTING CONDITION
100 YEAR
6 Hour Storm
Unit Hydrograph: Clark
Storm: Multiple
07/25/2016

```
 9 IO          OUTPUT CONTROL VARIABLES
                  IPRNT         5  PRINT CONTROL
```

```
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT         HYDROGRAPH TIME DATA
                    NMIN           5  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1JAN99  STARTING DATE
                   ITIME        0000  STARTING TIME
                      NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      7JAN99  ENDING DATE
                  NDTIME        2235  ENDING TIME
                   ICENT          19  CENTURY MARK

                COMPUTATION INTERVAL     0.08 HOURS
                     TOTAL TIME BASE   166.58 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

    11 JD      INDEX STORM NO. 1
                     STRM        3.17  PRECIPITATION DEPTH
                     TRDA        0.00  TRANSPOSITION DRAINAGE AREA

    12 PI        PRECIPITATION PATTERN
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                   0.03      0.03      0.05      0.05      0.05      0.15      0.15      0.15      0.03      0.03
                   0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00

    15 JD      INDEX STORM NO. 2
                     STRM        3.15  PRECIPITATION DEPTH
                     TRDA        0.50  TRANSPOSITION DRAINAGE AREA

    16 PI        PRECIPITATION PATTERN
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                   0.03      0.03      0.05      0.05      0.05      0.15      0.15      0.15      0.03      0.03
                   0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00

    19 JD      INDEX STORM NO. 3
                     STRM        3.10  PRECIPITATION DEPTH
                     TRDA        2.80  TRANSPOSITION DRAINAGE AREA

    20 PI        PRECIPITATION PATTERN
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                   0.03      0.03      0.07      0.07      0.07      0.08      0.08      0.08      0.05      0.05
                   0.05      0.02      0.02      0.02      0.01      0.01      0.01      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00
1

                                                RUNOFF SUMMARY
                                        FLOW IN CUBIC FEET PER SECOND
                                     TIME IN HOURS,  AREA IN SQUARE MILES

                                      PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD       BASIN     MAXIMUM     TIME OF
          OPERATION      STATION      FLOW     PEAK                                            AREA      STAGE     MAX STAGE
+                                                          6-HOUR      24-HOUR     72-HOUR

          HYDROGRAPH AT
+                          OFF30       205.    4.25          25.          6.          2.       0.15

          HYDROGRAPH AT
+                          OFF3E        61.    4.17           5.          1.          0.       0.03
```

	HYDROGRAPH AT						
+		OFF40	5.	4.00	0.	0.	0.	0.00
	3 COMBINED AT						
+		CF45A	255.	4.25	30.	8.	3.	0.18
	ROUTED TO						
+		RF45	251.	4.25	30.	8.	3.	0.18
	HYDROGRAPH AT						
+		OFF45	46.	4.17	4.	1.	0.	0.03
	2 COMBINED AT						
+		CF45B	289.	4.25	35.	9.	3.	0.21
	ROUTED TO						
+		RO60	287.	4.25	35.	9.	3.	0.21
	HYDROGRAPH AT						
+		OFF50	74.	4.25	10.	3.	1.	0.06
	ROUTED TO						
+		RF60A	72.	4.33	10.	3.	1.	0.06
	HYDROGRAPH AT						
+		OFF55	7.	4.00	1.	0.	0.	0.00
	ROUTED TO						
+		RF60B	6.	4.08	1.	0.	0.	0.00
	2 COMBINED AT						
+		CF60A	75.	4.33	11.	3.	1.	0.07
	ROUTED TO						
+		RF60C	75.	4.33	11.	3.	1.	0.07
	HYDROGRAPH AT						
+		OFF60	27.	4.17	3.	1.	0.	0.02
	2 COMBINED AT						
+		CF60B	96.	4.33	14.	3.	1.	0.08
	ROUTED TO						
+		RO65	96.	4.33	14.	3.	1.	0.08
	HYDROGRAPH AT						
+		ON60	17.	4.08	2.	0.	0.	0.01
	HYDROGRAPH AT						
+		ON65	7.	4.08	1.	0.	0.	0.00
	4 COMBINED AT						
+		CO65	395.	4.25	51.	13.	4.	0.31
	ROUTED TO						
+		RO75A	394.	4.33	51.	13.	4.	0.31
	HYDROGRAPH AT						
+		OFF65	8.	4.08	1.	0.	0.	0.00
	ROUTED TO						
+		RO70	7.	4.17	1.	0.	0.	0.00
	HYDROGRAPH AT						
+		ON70	24.	4.17	2.	1.	0.	0.01
	3 COMBINED AT						
+		CO75A	416.	4.25	54.	13.	4.	0.32
	ROUTED TO						
+		RO75B	418.	4.33	54.	13.	4.	0.32
	HYDROGRAPH AT						
+		ON75	19.	4.25	2.	1.	0.	0.01
	2 COMBINED AT						
+		CO75B	434.	4.33	56.	14.	5.	0.34

+	D45	11.	4.33	1.	0.	0.	0.34
	HYDROGRAPH AT						
+	DT1	423.	4.33	55.	14.	5.	0.34
	ROUTED TO						
+	RO76	424.	4.33	55.	14.	5.	0.34
	HYDROGRAPH AT						
+	ON76	33.	4.08	2.	1.	0.	0.01
	2 COMBINED AT						
+	CO76	437.	4.33	58.	14.	5.	0.35
	HYDROGRAPH AT						
+	DT1	11.	4.33	1.	0.	0.	0.34
	HYDROGRAPH AT						
+	ON77	0.	4.50	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF80	63.	4.25	7.	2.	1.	0.04
	ROUTED TO						
+	RO115	64.	4.25	7.	2.	1.	0.04
	HYDROGRAPH AT						
+	ON115	9.	4.08	1.	0.	0.	0.00
	2 COMBINED AT						
+	CO115	69.	4.25	8.	2.	1.	0.05
	ROUTED TO						
+	RF70A	68.	4.25	8.	2.	1.	0.05
	HYDROGRAPH AT						
+	ON120	2.	4.08	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF85	6.	4.00	0.	0.	0.	0.00
	ROUTED TO						
+	RO125A	5.	4.00	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF90	9.	4.00	1.	0.	0.	0.00
	ROUTED TO						
+	RO125B	9.	4.00	1.	0.	0.	0.00
	2 COMBINED AT						
+	CO125A	15.	4.00	1.	0.	0.	0.00
	ROUTED TO						
+	RO125C	14.	4.08	1.	0.	0.	0.00
	HYDROGRAPH AT						
+	ON125	28.	4.17	3.	1.	0.	0.02
	2 COMBINED AT						
+	CO125B	40.	4.08	4.	1.	0.	0.02
	ROUTED TO						
+	RF70B	39.	4.17	4.	1.	0.	0.02
	3 COMBINED AT						
+	CF70A	102.	4.17	12.	3.	1.	0.07
	ROUTED TO						
+	RF70C	102.	4.25	12.	3.	1.	0.07
	HYDROGRAPH AT						
+	OFF70	26.	4.08	2.	1.	0.	0.01
	2 COMBINED AT						
+	CF70B	124.	4.17	14.	3.	1.	0.08
	ROUTED TO						

	HYDROGRAPH AT						
+		ON130	20.	4.17	2.	1.	0.	0.01
	ROUTED TO						
+		RO80B	20.	4.17	2.	1.	0.	0.01
	2 COMBINED AT						
+		CO80	142.	4.17	16.	4.	1.	0.10
	ROUTED TO						
+		RO80C	141.	4.25	16.	4.	1.	0.10
	HYDROGRAPH AT						
+		ON80	39.	4.17	4.	1.	0.	0.02
	HYDROGRAPH AT						
+		ON85	17.	4.17	2.	0.	0.	0.01
	HYDROGRAPH AT						
+		OFF95	89.	4.25	11.	3.	1.	0.06
	ROUTED TO						
+		RO140A	90.	4.25	11.	3.	1.	0.06
	HYDROGRAPH AT						
+		OFF100	22.	4.08	2.	0.	0.	0.01
	ROUTED TO						
+		RO140B	21.	4.17	2.	0.	0.	0.01
	2 COMBINED AT						
+		CO140A	107.	4.25	12.	3.	1.	0.08
	ROUTED TO						
+		RO140C	107.	4.25	12.	3.	1.	0.08
	HYDROGRAPH AT						
+		ON140	26.	4.17	3.	1.	0.	0.02
	2 COMBINED AT						
+		CO140B	130.	4.25	15.	4.	1.	0.09
	ROUTED TO						
+		RO155B	124.	4.33	15.	4.	1.	0.09
	HYDROGRAPH AT						
+		ON135	16.	4.08	1.	0.	0.	0.01
	ROUTED TO						
+		RO155A	15.	4.17	1.	0.	0.	0.01
	2 COMBINED AT						
+		CO155A	133.	4.33	17.	4.	1.	0.10
	ROUTED TO						
+		RO155C	134.	4.33	17.	4.	1.	0.10
	HYDROGRAPH AT						
+		ON155	31.	4.17	3.	1.	0.	0.02
	2 COMBINED AT						
+		CO155B	153.	4.25	19.	5.	2.	0.12
	ROUTED TO						
+		RO85	154.	4.33	19.	5.	2.	0.12
	4 COMBINED AT						
+		CO90A	340.	4.25	41.	10.	3.	0.25
	ROUTED TO						
+		RO90	333.	4.33	41.	10.	3.	0.25
	HYDROGRAPH AT						
+		ON90	41.	4.17	4.	1.	0.	0.02
	2 COMBINED AT						
+		CO90B	361.	4.33	45.	11.	4.	0.27

	HYDROGRAPH AT						
+		ON105	5.	4.00	0.	0.	0.	0.00
	4 COMBINED AT						
+		COEX2	374.	4.33	46.	12.	4.	0.28
	HYDROGRAPH AT						
+		ON145	23.	4.17	2.	1.	0.	0.01
	ROUTED TO						
+		RO160A	22.	4.17	2.	1.	0.	0.01
	HYDROGRAPH AT						
+		ON150	16.	4.08	1.	0.	0.	0.01
	ROUTED TO						
+		RO160B	14.	4.17	1.	0.	0.	0.01
	2 COMBINED AT						
+		CO160A	37.	4.17	4.	1.	0.	0.02
	ROUTED TO						
+		RO160C	33.	4.25	4.	1.	0.	0.02
	HYDROGRAPH AT						
+		ON160	49.	4.25	6.	2.	1.	0.04
	2 COMBINED AT						
+		CO160B	81.	4.25	10.	2.	1.	0.06
	ROUTED TO						
+		RO170	81.	4.25	10.	2.	1.	0.06
	HYDROGRAPH AT						
+		ON170	14.	4.08	1.	0.	0.	0.01
	2 COMBINED AT						
+		CO170	89.	4.25	11.	3.	1.	0.06
	HYDROGRAPH AT						
+		ON165	15.	4.08	1.	0.	0.	0.01
	ROUTED TO						
+		RO100	14.	4.17	1.	0.	0.	0.01
	HYDROGRAPH AT						
+		ON100	16.	4.17	2.	0.	0.	0.01
	2 COMBINED AT						
+		CO100	30.	4.17	3.	1.	0.	0.02
	ROUTED TO						
+		RO95	29.	4.17	3.	1.	0.	0.02
	HYDROGRAPH AT						
+		ON95	29.	4.17	3.	1.	0.	0.02
	2 COMBINED AT						
+		CO95	58.	4.17	6.	2.	1.	0.04

*** NORMAL END OF HEC-1 ***

Proposed Condition

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: STORYROCK PH1B PROP

Area ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
OFF30	0.149	1.02	154.6	154.6	NATURAL	0.053	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.660	0.615	0.548	0.483	0.443	0.412
												Vel (f/s)	2.27	2.43	2.73	3.10	3.38	3.63
												R (Hrs)	0.702	0.649	0.571	0.496	0.451	0.416
OFF35	0.032	0.37	232.4	228.0	NATURAL	0.062	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.382	0.356	0.317	0.279*	0.257*	0.239 *
												Vel (f/s)	1.42	1.52	1.71	1.95	2.11	2.27
												R (Hrs)	0.408	0.377	0.332	0.288	0.262	0.242
OFF40	0.002	0.07	246.6	237.7	NATURAL	0.079	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.186*	0.173*	0.154*	0.136*	0.125*	0.116 *
												Vel (f/s)	0.55	0.59	0.67	0.75	0.82	0.89
												R (Hrs)	0.235	0.218	0.192	0.166	0.151	0.140
OFF45	0.025	0.33	177.2	177.2	NATURAL	0.063	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.393	0.366	0.327	0.288*	0.264*	0.246 *
												Vel (f/s)	1.23	1.32	1.48	1.68	1.83	1.97
												R (Hrs)	0.443	0.409	0.360	0.313	0.285	0.263
OFF50	0.063	0.86	177.6	177.6	NATURAL	0.058	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.608	0.566	0.505	0.445	0.408	0.380
												Vel (f/s)	2.07	2.23	2.50	2.83	3.09	3.32
												R (Hrs)	0.913	0.844	0.743	0.645	0.587	0.541
OFF55	0.003	0.09	269.7	250.7	NATURAL	0.076	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.203*	0.189*	0.169*	0.149*	0.137*	0.127 *
												Vel (f/s)	0.65	0.70	0.78	0.89	0.96	1.04
												R (Hrs)	0.252	0.233	0.205	0.178	0.162	0.150
OFF60	0.018	0.37	174.3	174.3	NATURAL	0.065	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.425	0.396	0.353	0.311	0.286*	0.266 *
												Vel (f/s)	1.28	1.37	1.54	1.74	1.90	2.04
												R (Hrs)	0.639	0.590	0.520	0.451	0.411	0.379
OFF65	0.004	0.14	260.6	246.0	NATURAL	0.074	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.252*	0.234*	0.209*	0.184*	0.169*	0.157 *
												Vel (f/s)	0.81	0.88	0.98	1.12	1.21	1.31
												R (Hrs)	0.386	0.357	0.314	0.273	0.248	0.229
OFF70	0.013	0.24	214.0	213.0	NATURAL	0.067	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.327	0.305	0.272*	0.239*	0.220*	0.204 *
												Vel (f/s)	1.08	1.15	1.29	1.47	1.60	1.73
												R (Hrs)	0.406	0.375	0.331	0.287	0.261	0.241

* Non default value or value out of range

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: STORYROCK PH1B PROP

Area ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
ON65	0.001	0.15	153.3	153.3	NATURAL	0.083	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.320	0.298*	0.266*	0.234*	0.215*	0.200 *
												Vel (f/s)	0.69	0.74	0.83	0.94	1.02	1.10
												R (Hrs)	1.174	1.086	0.956	0.830	0.755	0.697
ON70	0.008	0.23	129.3	129.3	NATURAL	0.036	0.30	0.25	6.00	0.216	23	**Tc (Hrs)**	0.234*	0.222*	0.203*	0.182*	0.170*	0.160 *
												Vel (f/s)	1.44	1.52	1.66	1.85	1.98	2.11
												R (Hrs)	0.356	0.337	0.304	0.270	0.251	0.235
ON71	0.003	0.15	246.8	237.9	NATURAL	0.076	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.267*	0.249*	0.222*	0.195*	0.179*	0.167 *
												Vel (f/s)	0.82	0.88	0.99	1.13	1.23	1.32
												R (Hrs)	0.513	0.474	0.418	0.362	0.330	0.304
ON75	0.009	0.25	55.1	55.1	NATURAL	0.057	0.33	0.34	6.00	0.191	8	**Tc (Hrs)**	0.439	0.413	0.372	0.331	0.305	0.286 *
												Vel (f/s)	0.84	0.89	0.99	1.11	1.20	1.28
												R (Hrs)	0.718	0.671	0.598	0.524	0.480	0.445
ON76	0.019	0.28	161.9	161.9	NATURAL	0.047	0.32	0.31	6.00	0.200	12	**Tc (Hrs)**	0.293*	0.277*	0.251*	0.223*	0.207*	0.194 *
												Vel (f/s)	1.40	1.48	1.64	1.84	1.98	2.12
												R (Hrs)	0.328	0.308	0.275	0.242	0.223	0.207
ON77	0.001	0.59	42.7	42.7	NATURAL	0.066	0.27	0.34	6.00	0.198	22	**Tc (Hrs)**	0.733	0.696	0.635	0.571	0.532	0.501
												Vel (f/s)	1.18	1.24	1.36	1.52	1.63	1.73
												R (Hrs)	8.812	8.327	7.515	6.677	6.173	5.771
ON80	0.033	0.39	158.4	158.4	NATURAL	0.041	0.32	0.30	6.00	0.204	18	**Tc (Hrs)**	0.316	0.299*	0.272*	0.244*	0.226*	0.213 *
												Vel (f/s)	1.81	1.91	2.10	2.34	2.53	2.69
												R (Hrs)	0.339	0.319	0.287	0.254	0.234	0.219
ON85	0.006	0.29	184.0	184.0	NATURAL	0.072	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.390	0.364	0.324	0.286*	0.262*	0.244 *
												Vel (f/s)	1.09	1.17	1.31	1.49	1.62	1.74
												R (Hrs)	0.894	0.826	0.728	0.632	0.575	0.530
ON90	0.018	0.34	208.2	207.8	NATURAL	0.053	0.32	0.34	6.00	0.188	10	**Tc (Hrs)**	0.322	0.304	0.274*	0.244*	0.226*	0.211 *
												Vel (f/s)	1.55	1.64	1.82	2.04	2.21	2.36
												R (Hrs)	0.438	0.411	0.367	0.322	0.295	0.275

* Non default value or value out of range

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: STORYROCK PH1B PROP

Area ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
ON95	0.010	0.23	318.8	269.5	NATURAL	0.069	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.302	0.282*	0.251*	0.221*	0.203*	0.189 *
												Vel (f/s)	1.12	1.20	1.34	1.53	1.66	1.78
												R (Hrs)	0.418	0.386	0.340	0.295	0.268	0.248
ON100	0.003	0.26	186.8	186.8	NATURAL	0.076	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.379	0.353	0.314	0.277*	0.254*	0.236 *
												Vel (f/s)	1.01	1.08	1.21	1.38	1.50	1.62
												R (Hrs)	1.175	1.086	0.956	0.830	0.755	0.697
ON101	0.005	0.14	160.6	160.6	NATURAL	0.044	0.31	0.28	6.00	0.209	22	**Tc (Hrs)**	0.191*	0.182*	0.166*	0.149*	0.139*	0.131 *
												Vel (f/s)	1.08	1.13	1.24	1.38	1.48	1.57
												R (Hrs)	0.251	0.237	0.214	0.190	0.175	0.164
ON102	0.015	0.26	152.1	152.1	NATURAL	0.036	0.30	0.26	6.00	0.215	25	**Tc (Hrs)**	0.235*	0.224*	0.204*	0.184*	0.172*	0.162 *
												Vel (f/s)	1.62	1.70	1.87	2.07	2.22	2.35
												R (Hrs)	0.276	0.262	0.237	0.211	0.195	0.183
ON105	0.001	0.08	95.2	95.2	NATURAL	0.041	0.30	0.25	6.00	0.167	17	**Tc (Hrs)**	0.162*	0.154*	0.139*	0.125*	0.117*	0.110 *
												Vel (f/s)	0.72	0.76	0.84	0.94	1.00	1.07
												R (Hrs)	0.333	0.314	0.281	0.249	0.232	0.217
ON115	0.004	0.12	283.3	256.9	NATURAL	0.074	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.230*	0.214*	0.191*	0.168*	0.154*	0.144 *
												Vel (f/s)	0.77	0.82	0.92	1.05	1.14	1.22
												R (Hrs)	0.309	0.285	0.251	0.218	0.198	0.183
ON120	0.001	0.09	341.2	275.8	NATURAL	0.083	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.207*	0.192*	0.172*	0.151*	0.139*	0.129 *
												Vel (f/s)	0.64	0.69	0.77	0.87	0.95	1.02
												R (Hrs)	0.480	0.444	0.391	0.339	0.309	0.285
ON125	0.017	0.33	198.2	198.2	NATURAL	0.066	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.389	0.363	0.323	0.285*	0.261*	0.243 *
												Vel (f/s)	1.24	1.33	1.50	1.70	1.85	1.99
												R (Hrs)	0.545	0.504	0.444	0.385	0.351	0.323
ON130	0.012	0.30	285.2	257.7	NATURAL	0.068	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.347	0.324	0.289*	0.254*	0.233*	0.217 *
												Vel (f/s)	1.27	1.36	1.52	1.73	1.89	2.03
												R (Hrs)	0.543	0.502	0.442	0.384	0.349	0.322

* Non default value or value out of range

Flood Control District of Maricopa County
Drainage Design Management System
SUB BASINS
Project Reference: STORYROCK PH1B PROP

Area ID	Sub Basin Parameters						Rainfall Losses						Return Period Parameters					
	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
Major Basin ID: 01																		
ON135	0.008	0.20	225.6	222.8	NATURAL	0.070	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.301	0.281*	0.250*	0.220*	0.202*	0.188 *
												Vel (f/s)	0.97	1.04	1.17	1.33	1.45	1.56
												R (Hrs)	0.422	0.391	0.344	0.298	0.272	0.251
ON140	0.017	0.36	195.6	195.6	NATURAL	0.066	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.408	0.380	0.339	0.298*	0.274*	0.255 *
												Vel (f/s)	1.29	1.39	1.56	1.77	1.93	2.07
												R (Hrs)	0.616	0.570	0.502	0.435	0.396	0.366
ON145	0.014	0.32	214.3	213.3	NATURAL	0.067	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.377	0.352	0.314	0.276*	0.254*	0.236 *
												Vel (f/s)	1.24	1.33	1.49	1.70	1.85	1.99
												R (Hrs)	0.575	0.531	0.468	0.406	0.369	0.341
ON150	0.007	0.16	250.0	239.9	NATURAL	0.071	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.265*	0.247*	0.220*	0.194*	0.178*	0.166 *
												Vel (f/s)	0.89	0.95	1.07	1.21	1.32	1.41
												R (Hrs)	0.331	0.306	0.270	0.234	0.213	0.196
ON155	0.017	0.28	190.0	190.0	NATURAL	0.066	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.363	0.338	0.302	0.266*	0.244*	0.227 *
												Vel (f/s)	1.13	1.21	1.36	1.54	1.68	1.81
												R (Hrs)	0.443	0.409	0.360	0.313	0.285	0.263
ON160	0.037	0.61	183.5	183.5	NATURAL	0.061	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.520	0.485	0.432	0.380	0.349	0.325
												Vel (f/s)	1.72	1.84	2.07	2.35	2.56	2.75
												R (Hrs)	0.790	0.730	0.643	0.558	0.508	0.468
ON165	0.008	0.22	236.1	230.7	NATURAL	0.070	0.35	0.40	6.00	0.176		**Tc (Hrs)**	0.312	0.291*	0.260*	0.229*	0.210*	0.195 *
												Vel (f/s)	1.03	1.11	1.24	1.41	1.54	1.65
												R (Hrs)	0.475	0.439	0.387	0.336	0.305	0.282
ON170	0.005	0.14	216.8	215.5	NATURAL	0.066	0.34	0.37	6.00	0.174	3	**Tc (Hrs)**	0.239*	0.224*	0.200*	0.177*	0.163*	0.152 *
												Vel (f/s)	0.86	0.92	1.03	1.16	1.26	1.35
												R (Hrs)	0.320	0.298	0.264	0.230	0.210	0.195

* Non default value or value out of range

Flood Control District of Maricopa County
Drainage Design Management System
LAND USE
Project Reference: STORYROCK PH1B PROP

	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb	Description
or Basin ID: 01									
100	DESERT	0.0107	100.0	0.35	0	25.0	DRY	0.068	Desert
		0.0107	**100.0**						
30	DESERT	0.1487	100.0	0.35	0	25.0	DRY	0.053	Desert
		0.1487	**100.0**						
35	DESERT	0.0318	100.0	0.35	0	25.0	DRY	0.062	Desert
		0.0318	**100.0**						
0	DESERT	0.0018	100.0	0.35	0	25.0	DRY	0.079	Desert
		0.0018	**100.0**						
5	DESERT	0.0255	100.0	0.35	0	25.0	DRY	0.063	Desert
		0.0255	**100.0**						
0	DESERT	0.0631	100.0	0.35	0	25.0	DRY	0.058	Desert
		0.0631	**100.0**						
5	DESERT	0.0027	100.0	0.35	0	25.0	DRY	0.076	Desert
		0.0027	**100.0**						
0	DESERT	0.0181	100.0	0.35	0	25.0	DRY	0.065	Desert
		0.0181	**100.0**						
5	DESERT	0.0041	100.0	0.35	0	25.0	DRY	0.074	Desert
		0.0041	**100.0**						
0	DESERT	0.0131	100.0	0.35	0	25.0	DRY	0.067	Desert
		0.0131	**100.0**						
0	DESERT	0.0438	100.0	0.35	0	25.0	DRY	0.060	Desert

* Non default value

Flood Control District of Maricopa County
Drainage Design Management System
LAND USE
Project Reference: STORYROCK PH1B PROP

n	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb	Description
or Basin ID: 01									
		0.0438	**100.0**						
35	DESERT	0.0016	100.0	0.35	0	25.0	DRY	0.079	Desert
		0.0016	**100.0**						
90	DESERT	0.0026	100.0	0.35	0	25.0	DRY	0.076	Desert
		0.0026	**100.0**						
05	DESERT	0.0642	100.0	0.35	0	25.0	DRY	0.058	Desert
		0.0642	**100.0**						
00	DESERT	0.0030	100.0	0.35	0	25.0	DRY	0.076	Desert
		0.0030	**100.0**						
01	DESERT	0.0010	20.0	0.35	0	25.0	DRY	0.073	Desert
	R1-18	0.0040	80.0	0.30	27	50.0	NORMAL	0.037	Residential 18,000 sq-ft lots
		0.0050	**100.0**						
2	DESERT	0.0010	6.7	0.35	0	25.0	DRY	0.066	Desert
	R1-18	0.0140	93.3	0.30	27	50.0	NORMAL	0.034	Residential 18,000 sq-ft lots
		0.0150	**100.0**						
5	R1-43	0.0010	100.0	0.30	17	20.0	NORMAL	0.041	Residential 43,000 sq-ft lots
		0.0010	**100.0**						
5	DESERT	0.0036	100.0	0.35	0	25.0	DRY	0.074	Desert
		0.0036	**100.0**						
0	DESERT	0.0014	100.0	0.35	0	25.0	DRY	0.083	Desert

* Non default value

Flood Control District of Maricopa County
Drainage Design Management System
LAND USE
Project Reference: STORYROCK PH1B PROP

n	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb	Description
or Basin ID: 01									
		0.0014	**100.0**						
25	DESERT	0.0173	100.0	0.35	0	25.0	DRY	0.066	Desert
		0.0173	**100.0**						
30	DESERT	0.0118	100.0	0.35	0	25.0	DRY	0.068	Desert
		0.0118	**100.0**						
35	DESERT	0.0082	100.0	0.35	0	25.0	DRY	0.070	Desert
		0.0082	**100.0**						
40	DESERT	0.0167	100.0	0.35	0	25.0	DRY	0.066	Desert
		0.0167	**100.0**						
45	DESERT	0.0137	100.0	0.35	0	25.0	DRY	0.067	Desert
		0.0137	**100.0**						
50	DESERT	0.0067	100.0	0.35	0	25.0	DRY	0.071	Desert
		0.0067	**100.0**						
5	DESERT	0.0175	100.0	0.35	0	25.0	DRY	0.066	Desert
		0.0175	**100.0**						
0	DESERT	0.0372	100.0	0.35	0	25.0	DRY	0.061	Desert
		0.0372	**100.0**						
5	DESERT	0.0079	100.0	0.35	0	25.0	DRY	0.070	Desert
		0.0079	**100.0**						
0	DESERT	0.0040	80.0	0.35	0	25.0	DRY	0.073	Desert
	R1-43	0.0010	20.0	0.30	17	20.0	NORMAL	0.037	Residential 43,000 sq-ft lots

* Non default value

Flood Control District of Maricopa County
Drainage Design Management System
LAND USE
Project Reference: STORYROCK PH1B PROP

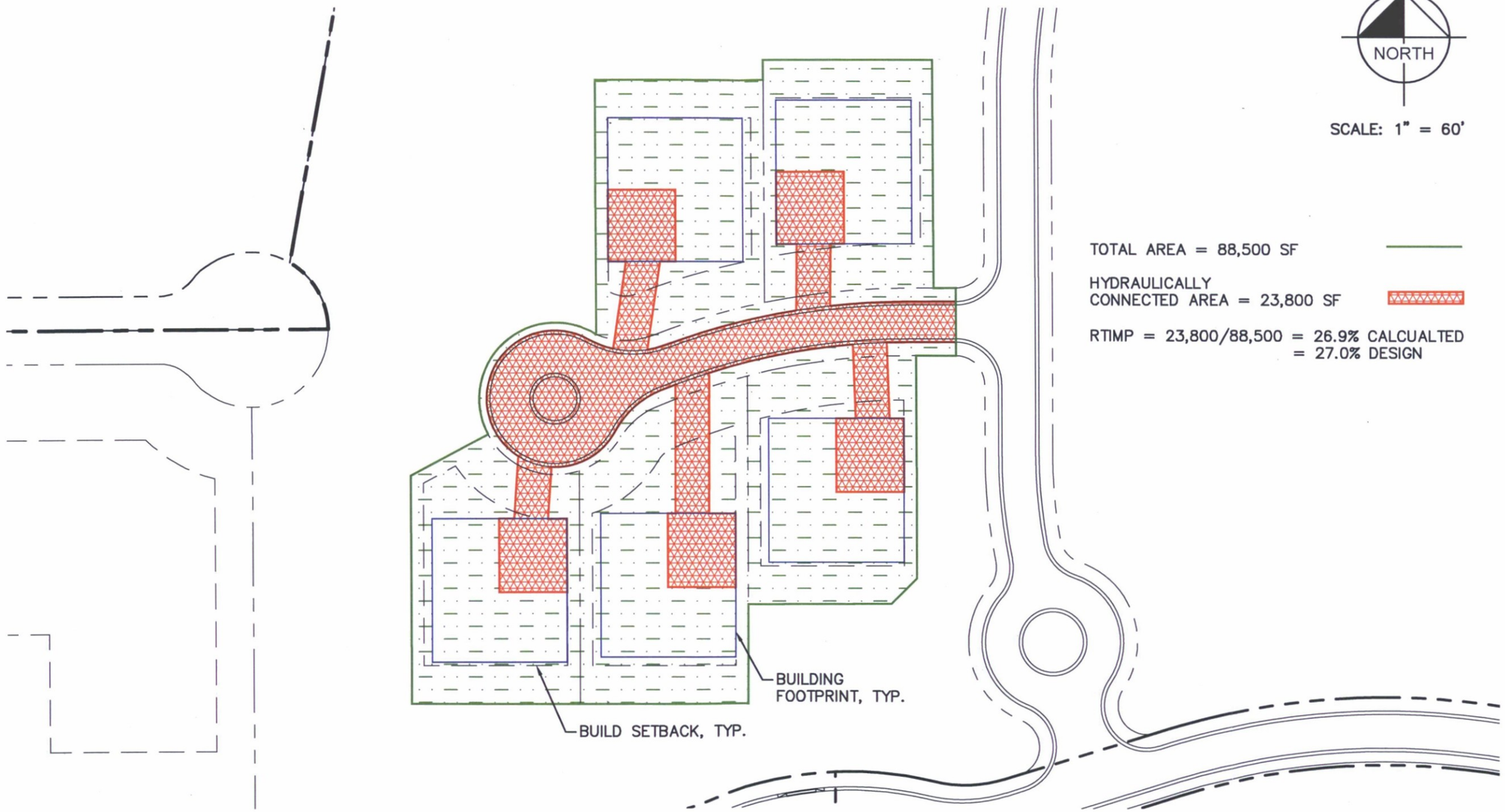
n	Land Use Code	Area (sq mi)	Area (%)	Initial Loss (IA)	Percent Impervious (RTIMP)	Vegetation Cover (%)	DTHETA	Kb	Description
or Basin ID: 01									
6	DESERT	0.0080	42.1	0.35	0	25.0	DRY	0.065	Desert
	R1-35	0.0110	57.9	0.30	21	50.0	NORMAL	0.033	Residential 35,000 sq-ft lots
		0.0190	**100.0**						
7	DESERT	0.0006	60.0	0.35	0	25.0	DRY	0.083	Desert
	IND	0.0004	40.0	0.15	55	60.0	NORMAL	0.041	Industrial
		0.0010	**100.0**						
)	DESERT	0.0100	30.3	0.35	0	25.0	DRY	0.062	Desert
	R1-18	0.0200	60.6	0.30	27	50.0	NORMAL	0.032	Residential 18,000 sq-ft lots
	R1-35	0.0030	9.1	0.30	21	50.0	NORMAL	0.032	Residential 35,000 sq-ft lots
		0.0330	**100.0**						
	DESERT	0.0060	100.0	0.35	0	25.0	DRY	0.072	Desert
		0.0060	**100.0**						
	DESERT	0.0110	61.1	0.35	0	25.0	DRY	0.065	Desert
	R1-35	0.0040	22.2	0.30	21	50.0	NORMAL	0.033	Residential 35,000 sq-ft lots
	R1-43	0.0020	11.1	0.30	17	20.0	NORMAL	0.033	Residential 43,000 sq-ft lots
	ROAD	0.0010	5.6	0.10	60	75.0	NORMAL	0.033	Local Roadway 40' Tract 24' BC
		0.0180	**100.0**						
	DESERT	0.0100	100.0	0.35	0	25.0	DRY	0.069	Desert
		0.0100	**100.0**						

* Non default value

Project ***Storyrock***
Subject **Land Use Summary Table**
Designed by **ZJH** Date 2/5/2016 Project No. 191069020
Checked by **JMB** Date 2/5/2016

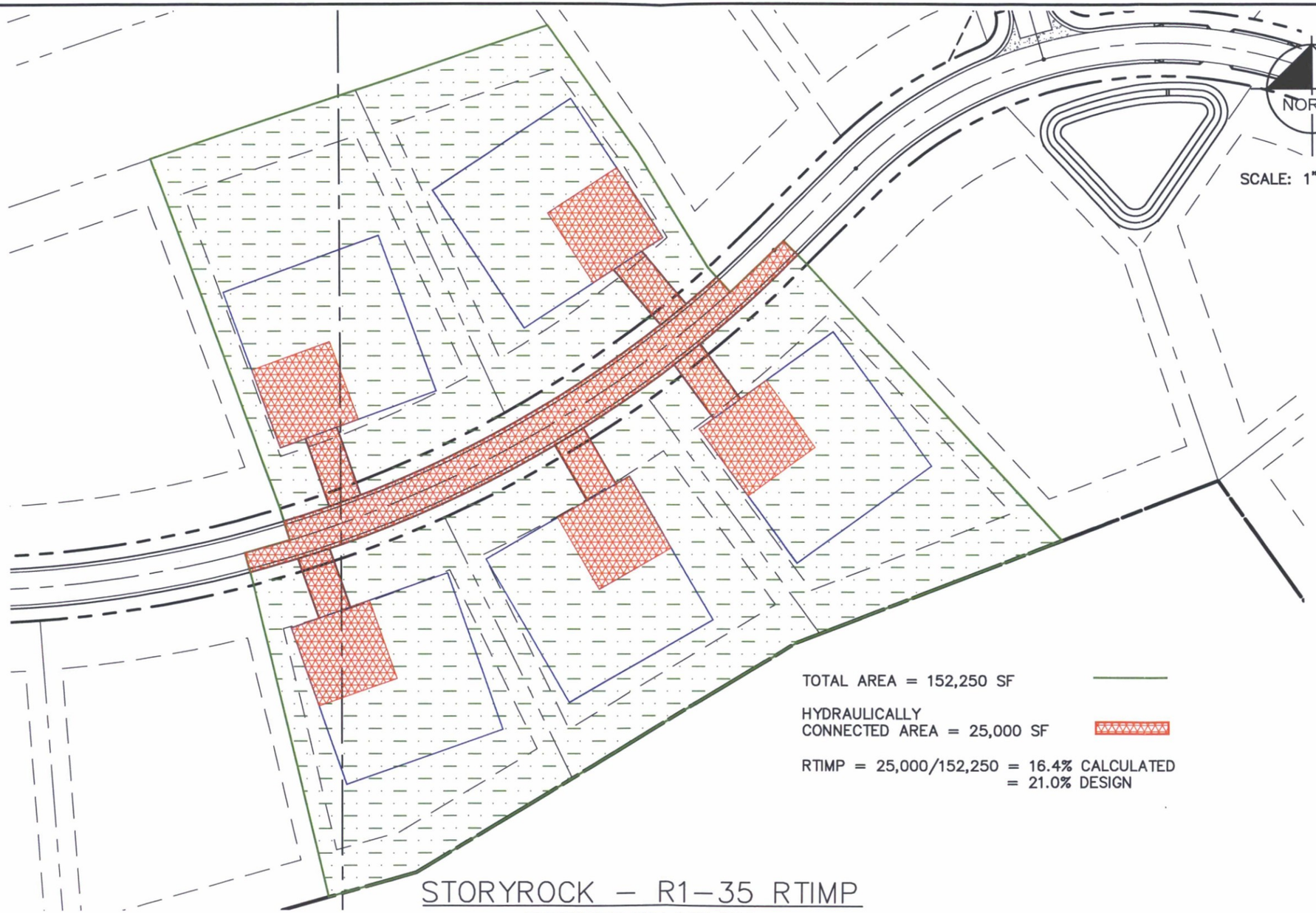
Objective: Land Use Hec-1 Values

Land Use Code	Description	IA	RTIMP	Vegetation Cover
R1-18	Min Lot Size = 13,500 Sq Ft	0.30	27	50.0
R1-35	Min Lot Size = 26,2500 Sq Ft	0.30	21	50.0
R1-43	Min Lot Size = 32,250 Sq Ft	0.30	17	20.0
R1-70	Min Lot Size = 52,500 Sq Ft	0.30	14	20.0
Road	24' Roadway, 40' Tract/ROW	0.10	60	75.0
Natural Desert	Natural Desert	0.35	0	25.0



STORYROCK – R1–18 RTIMP DETERMINATION

Kimley»Horn



STORYROCK – R1–35 RTIMP
DETERMINATION

Kimley»Horn

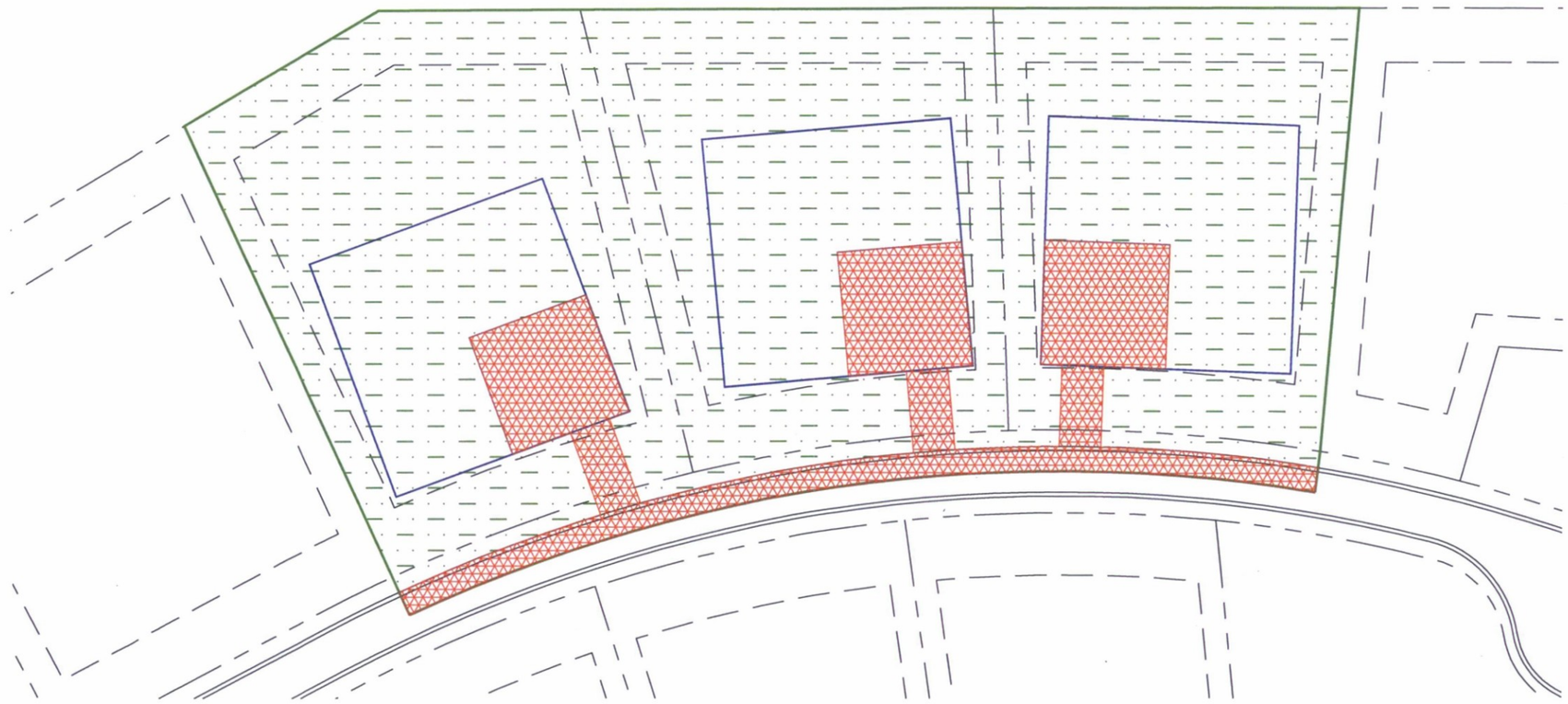
NORTH

SCALE: 1" = 60'

TOTAL AREA = 123,750 SF

HYDRAULICALLY
CONNECTED AREA = 19,000 SF

RTIMP = 19,000/123,750 = 15.4% CALCULATED
17.0% DESIGN



STORYROCK – R1–43 RTIMP
DETERMINATION

Kimley»Horn

Area ID	Book Number	Map Unit	Soil ID	Area (sq mi)	Area (%)	XKSAT	Rock Percent (%)	Effective Rock (%)	Comments
Major Basin ID: 01									
OFF100	645	61	64561	0.011	100.00	0.150	-	100	
OFF30	645	61	64561	0.149	100.00	0.150	-	100	
OFF35	645	61	64561	0.032	100.00	0.150	-	100	
OFF40	645	61	64561	0.002	100.00	0.150	-	100	
OFF45	645	61	64561	0.026	100.00	0.150	-	100	
OFF50	645	61	64561	0.063	100.00	0.150	-	100	
OFF55	645	61	64561	0.003	100.00	0.150	-	100	
OFF60	645	61	64561	0.018	100.00	0.150	-	100	
OFF65	645	61	64561	0.004	100.00	0.150	-	100	
OFF70	645	61	64561	0.013	100.00	0.150	-	100	
OFF80	645	61	64561	0.044	100.00	0.150	-	100	
OFF85	645	61	64561	0.002	100.00	0.150	-	100	
OFF90	645	61	64561	0.003	100.00	0.150	-	100	
OFF95	645	61	64561	0.064	100.00	0.150	-	100	
ON100	645	61	64561	0.003	100.00	0.150	-	100	
ON101	645	61	64561	0.005	100.00	0.150	-	100	
ON102	645	61	64561	0.015	100.00	0.150	-	100	
ON105	645	61	64561	0.001	100.00	0.150	-	100	
ON115	645	61	64561	0.004	100.00	0.150	-	100	
ON120	645	61	64561	0.001	100.00	0.150	-	100	
ON125	645	61	64561	0.017	100.00	0.150	-	100	
ON130	645	61	64561	0.012	100.00	0.150	-	100	
ON135	645	61	64561	0.008	100.00	0.150	-	100	
ON140	645	61	64561	0.017	100.00	0.150	-	100	
ON145	645	61	64561	0.014	100.00	0.150	-	100	
ON150	645	61	64561	0.007	100.00	0.150	-	100	
ON155	645	61	64561	0.018	100.00	0.150	-	100	
ON160	645	61	64561	0.037	100.00	0.150	-	100	
ON165	645	61	64561	0.008	100.00	0.150	-	100	
ON170	645	61	64561	0.005	100.00	0.150	-	100	
ON58	645	61	64561	0.002	100.00	0.150	-	100	
ON59	645	61	64561	0.001	100.00	0.150	-	100	
ON60	645	61	64561	0.004	100.00	0.150	-	100	
ON61	645	61	64561	0.005	100.00	0.150	-	100	
ON65	645	61	64561	0.001	100.00	0.150	-	100	
ON70	645	61	64561	0.008	100.00	0.150	-	100	
ON71	645	61	64561	0.003	100.00	0.150	-	100	
ON75	645	61	64561	0.009	100.00	0.150	-	100	
ON76	645	61	64561	0.019	100.00	0.150	-	100	
ON77	645	61	64561	0.001	100.00	0.150	-	100	
ON80	645	61	64561	0.033	100.00	0.150	-	100	
ON85	645	61	64561	0.006	100.00	0.150	-	100	
ON90	645	61	64561	0.018	100.00	0.150	-	100	
ON95	645	61	64561	0.010	100.00	0.150	-	100	

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn

Engineering, Planning and Environmental Consultants
7740 North 16th Street, Suite 300
Phoenix, Arizona 85020 (602) 944-5500

SCALE(H):1" = 1800'
SCALE(V): N/A
DESIGNED BY: MAW
DRAWN BY: DWT
CHECKED BY: MAW
DATE: AUGUST 2014

CAVALLIERE
EXISTING SOILS MAP

PROJECT NO.
191069013

DRAWING NAME
Existing_Soils.mxd

Flood Control District of Maricopa County
Drainage Design Management System
HEC-1 ROUTING DATA
Project Reference: STORYROCK PH1B PROP

2/20/2017

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
NORMAL DEPTH															
Major Basin 01															
RF45	0.050	0.035	0.050	980.00	0.0260	-	X:	-	14.00	21.00	25.00	31.00	35.00	41.00	45.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF60A	0.050	0.035	0.050	1,076.00	0.0300	-	X:	-	8.00	18.00	55.00	71.00	78.00	83.00	90.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF60B	0.050	0.035	0.050	1,200.00	0.0320	-	X:	-	9.00	14.00	16.00	16.50	22.00	26.00	33.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF60C	0.050	0.035	0.050	650.00	0.0280	-	X:	-	25.00	38.00	48.00	49.00	57.00	67.00	80.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF70A	0.050	0.035	0.050	720.00	0.0290	-	X:	-	13.00	24.00	33.00	34.00	80.00	85.00	89.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF70B	0.050	0.035	0.050	275.00	0.0290	-	X:	-	26.00	40.00	60.00	95.00	103.00	107.00	115.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RF70C	0.050	0.035	0.050	410.00	0.0270	-	X:	-	8.00	12.00	17.00	17.50	34.00	42.00	48.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO100	0.050	0.035	0.050	1,091.00	0.0290	-	X:	-	14.00	28.00	40.00	41.00	51.00	58.00	64.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO10A	0.050	0.035	0.050	522.00	0.0250	-	X:	-	12.00	29.00	31.00	31.50	42.00	59.00	62.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO10B	0.050	0.035	0.050	675.00	0.0270	-	X:	-	8.00	13.00	17.00	17.50	22.00	26.00	29.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO10C	0.050	0.035	0.050	1,625.00	0.0220	-	X:	-	5.00	10.00	28.00	32.00	68.00	78.00	83.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00

Flood Control District of Maricopa County
Drainage Design Management System
HEC-1 ROUTING DATA
Project Reference: STORYROCK PH1B PROP

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
RO115	0.050	0.035	0.050	540.00	0.0260	-	X:	-	12.00	18.00	18.50	19.00	27.00	29.00	34.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO125A	0.050	0.035	0.050	525.00	0.0400	-	X:	-	6.00	13.00	16.00	16.10	19.00	22.00	28.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO125B	0.050	0.035	0.050	525.00	0.0400	-	X:	-	6.00	13.00	16.00	16.10	19.00	22.00	28.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO125B	0.050	0.035	0.050	900.00	0.0400	-	X:	-	6.00	8.00	11.00	11.20	13.00	19.00	27.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO125C	0.050	0.035	0.050	720.00	0.0280	-	X:	-	8.00	14.00	19.00	19.10	26.00	29.00	34.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO140A	0.050	0.035	0.050	333.00	0.0270	-	X:	-	27.00	30.00	34.00	34.20	40.00	47.00	82.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO140B	0.050	0.035	0.050	626.00	0.0340	-	X:	-	7.00	8.00	11.00	11.20	14.00	16.00	31.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO140C	0.050	0.035	0.050	1,210.00	0.0320	-	X:	-	3.00	6.00	11.00	11.20	17.00	23.00	48.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO155A	0.050	0.035	0.050	805.00	0.2900	-	X:	-	9.00	18.00	22.00	22.10	27.00	32.00	43.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO155B	0.050	0.035	0.050	910.00	0.0350	-	X:	-	16.00	61.00	76.00	90.00	121.00	200.00	226.00
							Y:	2.00	0.50	1.00	-	-	1.00	-	2.00
RO155C	0.050	0.035	0.050	392.00	0.0330	-	X:	-	14.00	22.00	30.00	42.00	54.00	68.00	90.00
							Y:	2.00	0.50	1.00	-	-	1.00	-	2.00
RO160A	0.050	0.035	0.050	860.00	0.0300	-	X:	-	9.00	16.00	19.00	19.10	22.00	25.00	32.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
RO160B	0.050	0.035	0.050	1,090.00	0.0300	-	X:	-	6.00	10.00	14.00	16.00	18.00	22.00	28.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO160C	0.050	0.035	0.050	1,952.00	0.0300	-	X:	-	12.00	20.00	29.00	36.00	40.00	50.00	54.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO170	0.050	0.035	0.050	585.00	0.0310	-	X:	-	1.00	3.00	4.00	10.00	11.00	15.00	20.00
							Y:	2.00	2.00	2.00	-	-	2.00	2.00	2.00
RO60	0.050	0.035	0.050	625.00	0.0220	-	X:	-	6.00	10.00	14.00	27.00	38.00	57.00	83.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO65	0.050	0.035	0.050	756.00	0.0250	-	X:	-	5.00	7.00	8.50	9.00	19.00	24.00	29.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO71	0.050	0.035	0.050	590.00	0.0250	-	X:	-	14.00	27.00	31.50	32.00	36.00	40.00	46.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO75A	0.050	0.035	0.050	421.00	0.0240	-	X:	-	18.00	20.00	23.00	34.00	38.00	41.00	44.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO75B	0.050	0.035	0.050	606.00	0.0240	-	X:	-	18.00	20.00	23.00	34.00	38.00	41.00	44.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO75C	0.050	0.035	0.050	821.00	0.0260	-	X:	-	15.00	26.00	32.00	43.00	46.00	50.00	55.00
							Y:	2.00	1.50	1.00	-	-	1.00	2.00	3.00
RO76	0.050	0.035	0.050	908.00	0.0260	-	X:	-	2.00	5.00	8.00	25.00	29.00	32.00	35.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO80A	0.050	0.035	0.050	400.00	0.0250	-	X:	-	5.00	14.00	20.00	20.50	34.00	50.00	68.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO80B	0.050	0.035	0.050	534.00	0.0260	-	X:	-	8.00	14.00	16.00	16.10	22.00	28.00	36.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00

Route ID	LOB N	Chan N	ROB N	Length (ft)	Slope (ft/ft)	Max Elev (ft)		1.	2.	3.	4.	5.	6.	7.	8.
RO80C	0.050	0.035	0.050	1,378.00	0.0270	-	X:	-	9.00	19.00	31.00	41.00	51.00	75.00	83.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO85	0.050	0.035	0.050	913.00	0.0250	-	X:	-	6.00	10.00	17.00	24.00	27.00	31.00	34.00
							Y:	2.00	0.50	1.00	-	-	1.00	-	2.00
RO90	0.050	0.035	0.050	1,523.00	0.0300	-	X:	-	4.00	11.00	18.00	31.00	33.00	60.00	82.00
							Y:	3.00	2.00	1.00	-	-	1.00	2.00	3.00
RO95	0.050	0.035	0.050	231.00	0.0300	-	X:	-	11.00	35.00	41.00	42.00	44.00	47.00	82.00
							Y:	2.00	1.00	1.00	-	-	1.00	2.00	2.00

Flood Control District of Maricopa County
Drainage Design Management System
HEC-1 STORAGE FACILITIES

2/20/2017

Storage Basin ID:	**DB101**											
Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**		-	0.1	0.2	0.2	0.3	0.4			
Spillway Length:	-NA-	**Discharge (cfs)**	0	1	1	1	2	2	3	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	0.5	1.0	1.5	2.0	2.5	3.0	-	-	-
Weir Coefficient:	-NA-											
Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											
Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr				
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	0.04	0.00	0.04	0.00	0.00	0.40				
Length of Dam:	-NA-	**Peak Stage (ft)**	0.50	0.00	0.50	0.00	0.00	3.00				
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	1.00	0.00	1.00	0.00	0.00	3.00				
Weir Coefficient:	-NA-											

Storage Basin ID:	**DB102**											
Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**		0.1	0.3	0.4	0.6	0.7	0.9	0.9		
Spillway Length:	-NA-	**Discharge (cfs)**	0	2	3	4	5	6	6	22	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	0.5	1.0	1.5	2.0	2.5	3.0	3.0	-	-
Weir Coefficient:	-NA-											
Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											
Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr				
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	0.25	0.00	0.55	0.00	0.00	0.88				
Length of Dam:	-NA-	**Peak Stage (ft)**	1.00	0.00	2.00	0.00	0.00	3.00				
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	3.00	0.00	5.00	0.00	0.00	22.00				
Weir Coefficient:	-NA-											

Storage Basin ID:	**DB58**										
Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**		0.1	0.1							
Spillway Length:	-NA-	**Discharge (cfs)**	0	1	1	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	0.5	1.0	-	-	-	-	-	-	-
Weir Coefficient:	-NA-											
Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											
Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr				
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	0.07	0.00	0.07	0.00	0.00	0.07				
Length of Dam:	-NA-	**Peak Stage (ft)**	0.50	0.00	0.50	0.00	0.00	0.50				
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	1.00	0.00	1.00	0.00	0.00	1.00				
Weir Coefficient:	-NA-											

Storage Basin ID:	**DB60**										
Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	**Volume (ac-ft)**		0.1	0.1	0.2	0.3	0.4	0.5	0.5		
Spillway Length:	-NA-	**Discharge (cfs)**	0	1	2	3	3	4	4	13	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	0.5	1.0	1.5	2.0	2.5	3.0	3.0	-	-
Weir Coefficient:	-NA-											
Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	**Volume (ac-ft)**	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	**Discharge (cfs)**	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	**Elevation (ft)**	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											
Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr				
Elevation Top of Dam:	-NA-	**Peak Volume (ac-ft)**	0.06	0.00	0.12	0.00	0.00	0.18				
Length of Dam:	-NA-	**Peak Stage (ft)**	0.50	0.00	1.00	0.00	0.00	1.50				
Discharge Coefficient:	-NA-	**Peak Discharge (cfs)**	1.00	0.00	2.00	0.00	0.00	3.00				
Weir Coefficient:	-NA-											

Storage Basin ID:	DB61										
Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	Volume (ac-ft)		-	0.1	0.2	0.2	0.3	0.3	0.3		
Spillway Length:	-NA-	Discharge (cfs)	0	1	1	1	1	1	2	2	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	0.5	1.0	1.5	2.0	2.5	3.0	3.0	-	-
Weir Coefficient:	-NA-											
Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											
Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr				
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.04	0.00	0.04	0.00	0.00	0.34				
Length of Dam:	-NA-	Peak Stage (ft)	0.50	0.00	0.50	0.00	0.00	3.00				
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	1.00	0.00	1.00	0.00	0.00	2.00				
Weir Coefficient:	-NA-											

Storage Basin ID:	DB70										
Spillway Characteristics (SS)			1	2	3	4	5	6	7	8	9	10
Spillway Crest Elevation:	-NA-	Volume (ac-ft)		0.1	0.1	0.2	0.2	0.3	0.4	0.4		
Spillway Length:	-NA-	Discharge (cfs)	0	0	2	3	4	5	6	6	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	0.5	1.0	1.5	2.0	2.5	3.0	3.0	-	-
Weir Coefficient:	-NA-											
Low-Level Outlet (SL)			11	12	13	14.	15	16	17	18	19	20
Centerline Elevation:	-NA-	Volume (ac-ft)	-	-	-	-	-	-	-	-	-	-
Cross-Section Area:	-NA-	Discharge (cfs)	0	0	0	0	0	0	0	0	0	0
Discharge Coefficient:	-NA-	Elevation (ft)	-	-	-	-	-	-	-	-	-	-
Orifice Equation Exponent:	-NA-											
Top of Dam Overflow (ST)			2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr				
Elevation Top of Dam:	-NA-	Peak Volume (ac-ft)	0.12	0.00	0.24	0.00	0.00	0.36				
Length of Dam:	-NA-	Peak Stage (ft)	1.00	0.00	2.00	0.00	0.00	3.00				
Discharge Coefficient:	-NA-	Peak Discharge (cfs)	2.00	0.00	4.00	0.00	0.00	6.00				
Weir Coefficient:	-NA-											

Kimley»Horn

Project ***Storyrock Phase 1B***
Subject **Detention Basin Calculations**
Designed by **ZJH** Date 2/5/2016 Project No. 191069020
Checked by **JMB** Date 2/5/2016

Objective: to determine the storage-flow relationship for small detention basins

DB58 ***Drains in 4.05 hours***

Outlet Diameter 0.50 ft
Outlet Elevation 0 ft
Outlet X-Sect Area 0.196 ft^2
No. of Outlet Barrels 1
Outlet Pipe Slope 0.005 ft/ft

Elevation [ft]	Surface Storage Area [ft^2]	Surface Storage Area [acre]	Average Area [acre]	Δ Elev [ft]	Δ Vol [ac-ft]	Σ Vol [ac-ft]	Δ Time to Drain [hr]	Q_{pipe} [cfs]	Q_{weir} [cfs]	Total Q_{out} [cfs]
0	4,896	0.11				0		0	0	0
			0.14	1.0	0.14		4.05			
1	7,051	0.16				0.14		1	0	1

Notes:
Q_{pipe} goes from Mannings Eqn to Orifice Eqn when water surface exceeds 1.2*(Outlet Diameter)
per Linsley et al. *Water Resources Engineering* 4th Edition, pg 652.

Kimley»Horn

Project ***Storyrock Phase 1B***
Subject **Detention Basin Calculations**
Designed by **ZJH** Date 2/5/2016 Project No. 191069020
Checked by **JMB** Date 2/5/2016

Objective: to determine the storage-flow relationship for small detention basins

DB60 ***Drains in 2.85 hours***

Outlet Diameter 0.80 ft
Outlet Elevation 0 ft
Outlet X-Sect Area 0.503 ft^2
No. of Outlet Barrels 1
Outlet Pipe Slope 0.005 ft/ft

Elevation [ft]	Surface Storage Area [ft^2]	Surface Storage Area [acre]	Average Area [acre]	Δ Elev [ft]	Δ Vol [ac-ft]	Σ Vol [ac-ft]	Δ Time to Drain [hr]	Q_{pipe} [cfs]	Q_{weir} [cfs]	Total Q_{out} [cfs]
0	4,368	0.10				0		0	0	0
			0.12	1.0	0.12		1.49			
1	5,719	0.13				0.12		2	0	2
			0.15	1.0	0.15		0.73			
2	7,170	0.16				0.26		3	0	3
			0.18	1.0	0.18		0.63			
3	8,722	0.20				0.45		4	0	4

Notes:
Q_{pipe} goes from Mannings Eqn to Orifice Eqn when water surface exceeds 1.2*(Outlet Diameter)
per Linsley et al. *Water Resources Engineering* 4th Edition, pg 652.

Kimley»Horn

Project ***Storyrock Phase 1B***
Subject **Detention Basin Calculations**
Designed by **ZJH** Date 2/5/2016 Project No. 191069020
Checked by **JMB** Date 2/5/2016

Objective: to determine the storage-flow relationship for small detention basins

DB61 ***Drains in 5.03 hours***

Outlet Diameter 0.50 ft
Outlet Elevation 0 ft
Outlet X-Sect Area 0.196 ft^2
No. of Outlet Barrels 1
Outlet Pipe Slope 0.005 ft/ft

Elevation [ft]	Surface Storage Area [ft^2]	Surface Storage Area [acre]	Average Area [acre]	Δ Elev [ft]	Δ Vol [ac-ft]	Σ Vol [ac-ft]	Δ Time to Drain [hr]	Q_{pipe} [cfs]	Q_{weir} [cfs]	Total Q_{out} [cfs]
0	3,218	0.07				0		0	0	0
			0.09	1.0	0.09		2.54			
1	4,269	0.10				0.09		1	0	1
			0.11	1.0	0.11		1.30			
2	5,421	0.12				0.20		1	0	1
			0.14	1.0	0.14		1.19			
3	6,673	0.15				0.34		2	0	2

Notes:
Q_{pipe} goes from Mannings Eqn to Orifice Eqn when water surface exceeds 1.2*(Outlet Diameter)
per Linsley et al. *Water Resources Engineering* 4th Edition, pg 652.

Kimley»Horn

Project ***Storyrock Phase 1B***
Subject **Detention Basin Calculations**
Designed by **ZJH** Date 2/5/2016 Project No. 191069020
Checked by **JMB** Date 2/5/2016

Objective: to determine the storage-flow relationship for small detention basins

DB70 ***Drains in 1.69 hours***

Outlet Diameter 1.00 ft
Outlet Elevation 0 ft
Outlet X-Sect Area 0.785 ft^2
No. of Outlet Barrels 1
Outlet Pipe Slope 0.005 ft/ft

Elevation [ft]	Surface Storage Area [ft^2]	Surface Storage Area [acre]	Average Area [acre]	Δ Elev [ft]	Δ Vol [ac-ft]	Σ Vol [ac-ft]	Δ Time to Drain [hr]	Q_{pipe} [cfs]	Q_{weir} [cfs]	Total Q_{out} [cfs]
0	3,564	0.08				0		0	0	0
			0.10	1.0	0.10		0.92			
1	4,750	0.11				0.10		3	0	3
			0.12	1.0	0.12		0.42			
2	6,034	0.14				0.22		5	0	5
			0.15	1.0	0.15		0.35			
3	7,418	0.17				0.37		6	0	6

Notes:
Q_{pipe} goes from Mannings Eqn to Orifice Eqn when water surface exceeds 1.2*(Outlet Diameter)
per Linsley et al. *Water Resources Engineering* 4th Edition, pg 652.

Kimley»Horn

Project ***Storyrock Phase 1B***
Subject **Detention Basin Calculations**
Designed by **ZJH** Date 2/5/2016 Project No. 191069020
Checked by **JMB** Date 2/5/2016

Objective: to determine the storage-flow relationship for small detention basins

DB101 ***Drains in 3.50 hours***

Outlet Diameter 0.65 ft
Outlet Elevation 0 ft
Outlet X-Sect Area 0.332 ft^2
No. of Outlet Barrels 1
Outlet Pipe Slope 0.005 ft/ft

Elevation [ft]	Surface Storage Area [ft^2]	Surface Storage Area [acre]	Average Area [acre]	Δ Elev [ft]	Δ Vol [ac-ft]	Σ Vol [ac-ft]	Δ Time to Drain [hr]	Q_{pipe} [cfs]	Q_{weir} [cfs]	Total Q_{out} [cfs]
0	3,042	0.07				0		0	0	0
			0.09	1.0	0.09		1.64			
1	4,731	0.11				0.09		1	0	1
			0.13	1.0	0.13		0.94			
2	6,648	0.15				0.22		2	0	2
			0.18	1.0	0.18		0.92			
3	8,793	0.20				0.40		3	0	3

Notes:
Q_{pipe} goes from Mannings Eqn to Orifice Eqn when water surface exceeds 1.2*(Outlet Diameter)
per Linsley et al. *Water Resources Engineering* 4th Edition, pg 652.

Kimley»Horn

Project ***Storyrock Phase 1B***
Subject **Detention Basin Calculations**
Designed by **ZJH** Date 2/5/2016 Project No. 191069020
Checked by **JMB** Date 2/5/2016

Objective: to determine the storage-flow relationship for small detention basins

DB102 ***Drains in 3.72 hours***

Outlet Diameter	1.00 ft	Outlet X-Sect Area	0.785 ft^2
Outlet Elevation	0 ft	No. of Outlet Barrels	1
		Outlet Pipe Slope	0.005 ft/ft

Elevation [ft]	Surface Storage Area [ft^2]	Surface Storage Area [acre]	Average Area [acre]	Δ Elev [ft]	Δ Vol [ac-ft]	Σ Vol [ac-ft]	Δ Time to Drain [hr]	Q_{pipe} [cfs]	Q_{weir} [cfs]	Total Q_{out} [cfs]
0	10,134	0.23				0		0	0	0
			0.25	1.0	0.25		2.42			
1	11,845	0.27				0.25		3	0	3
			0.29	1.0	0.29		0.99			
2	13,657	0.31				0.55		5	0	5
			0.34	1.0	0.34		0.31			
3	15,569	0.36				0.88		6	16	22

Notes:
Q_{pipe} goes from Mannings Eqn to Orifice Eqn when water surface exceeds 1.2*(Outlet Diameter)
per Linsley et al. *Water Resources Engineering* 4th Edition, pg 652.

Kimley»Horn

Project ***Storyrock Phase 1B***
Subject **Basin Summary Table**
Designed by **ZJH** Date 2/5/2016 Project No. 191069020
Checked by **JMB** Date 2/5/2016

Objective: Basin Summary Table

Basin ID	Volume (ac-ft)	Max Depth (ft)	Max Side Slope (ft, H:V)	100 Yr Peak Inflow Rate (cfs)	100 Yr Peak Outflow Rate (cfs)	100 Yr Peak Flow Attenuation (cfs)	Orifice Size (ft)	Drain Time (hr)	Type	2 Year Storage Volume (ac-ft)
DB58	0.14	1.00	4:1	4	1	3	0.50	4.05	Standard	0.07
DB60	0.45	3.00	4:1	11	4	7	0.80	2.85	Standard	0.06
DB61	0.34	3.00	4:1	10	2	8	0.50	5.03	Standard	0.04
DB70	0.37	3.00	4:1	18	6	12	1.00	1.69	Standard	0.12
DB101	0.40	3.00	4:1	12	3	9	0.65	3.50	Standard	0.04
DB102	0.88	3.00	4:1	37	22	15	1.00	3.72	Standard	0.25

Kimley»Horn

Project ***Storyrock Phase 1B***
Subject **First Flush Summary**
Designed by **ZJH** Date 2/5/2016 Project No. 191069020
Checked by **JMB** Date 2/5/2016

Objective: First Flush Summary

First Flush Volume = A*C*P/12

Contributing Sub Basin	First Flush Method	Contributing Developed Area (sf)	Contributing Developed Area (ac)	First Flush Volume Req. (ac-ft)	Basin Volume Prov. (ac-ft)
ON58	Basin	58,703	1.35	0.05	0.14
ON59	Basin	40,197	0.92	0.04	-
ON60	Basin	123,115	2.83	0.11	-
			Total	0.15	0.45
ON61	Basin	135,275	3.11	0.12	0.34
ON65	N/A*	N/A	N/A	N/A	N/A
ON70	Basin	235,386	5.40	0.21	0.37
ON75	Stormceptor /Alternate First Flush Method	N/A	N/A	N/A	N/A
ON76	Stormceptor /Alternate First Flush Method	N/A	N/A	N/A	N/A
ON80	Stormceptor /Alternate First Flush Method	N/A	N/A	N/A	N/A
ON101	Basin	138,853	3.19	0.13	0.40
ON102	Basin	418,222	9.60	0.38	0.88
ON95	N/A*	N/A	N/A	N/A	N/A
ON105	N/A*	N/A	N/A	N/A	N/A

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN  1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   18FEB17  TIME  17:09:39   *
*                                       *
*****************************************
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*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*     DAVIS, CALIFORNIA 95616           *
*         (916) 756-1104                *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID        Flood Control District of Maricopa County
   2          ID        STORYROCK PH1B PROP - STORYROCK PHASE 1B PROP CONDITION
   3          ID        2 YEAR
   4          ID        6 Hour  Storm
   5          ID        Unit Hydrograph: Clark
   6          ID        Storm: Multiple
   7          ID        02/18/2017
              *DIAGRAM
   8          IT       5  1JAN99       0    2000
   9          IO       5
  10          IN      15
              *
  11          JD   1.419  0.0001
  12          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  13          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  14          PC   0.962   0.972   0.983   0.991   1.000
  15          JD   1.410  0.5000
  16          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
  17          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
  18          PC   0.962   0.972   0.983   0.991   1.000
  19          JD   1.384     2.8
  20          PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
  21          PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
  22          PC   0.950   0.963   0.975   0.988   1.000
              *

  23          KK   OFF30   BASIN
  24          BA   0.149
  25          LG    0.35    0.40    6.00    0.18       0
  26          UC   0.660   0.702
  27          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  28          UA     100
              *

  29          KK   OFF35   BASIN
  30          BA   0.032
  31          LG    0.35    0.40    6.00    0.18       0
  32          UC   0.382   0.408
  33          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
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  35         KK   OFF40   BASIN
  36         BA   0.002
  37         LG    0.35    0.40    6.00    0.18       0
  38         UC   0.186   0.235
  39         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  40         UA     100
             *
1                                         HEC-1 INPUT                                         PAGE  2

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


  41         KK   CF45A COMBINE
  42         HC       3
             *

  43         KK    RF45   ROUTE
  44         RS       1    FLOW
  45         RC   0.050   0.035   0.050     980  0.0260    0.00
  46         RX    0.00   14.00   21.00   25.00   31.00   35.00   41.00   45.00
  47         RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

  48         KK   OFF45   BASIN
  49         BA   0.025
  50         LG    0.35    0.40    6.00    0.18       0
  51         UC   0.393   0.443
  52         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  53         UA     100
             *

  54         KK   CF45B COMBINE
  55         HC       2
             *

  56         KK    RO60   ROUTE
  57         RS       1    FLOW
  58         RC   0.050   0.035   0.050     625  0.0220    0.00
  59         RX    0.00    6.00   10.00   14.00   27.00   38.00   57.00   83.00
  60         RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

  61         KK   OFF50   BASIN
  62         BA   0.063
  63         LG    0.35    0.40    6.00    0.18       0
  64         UC   0.608   0.913
  65         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  66         UA     100
             *

  67         KK   RF60A   ROUTE
  68         RS       1    FLOW
  69         RC   0.050   0.035   0.050    1076  0.0300    0.00
  70         RX    0.00    8.00   18.00   55.00   71.00   78.00   83.00   90.00
  71         RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

  72         KK   OFF55   BASIN
  73         BA   0.003
  74         LG    0.35    0.40    6.00    0.18       0
  75         UC   0.203   0.252
  76         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  77         UA     100
             *
1                                         HEC-1 INPUT                                         PAGE  3

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


  78         KK   RF60B   ROUTE
  79         RS       1    FLOW
  80         RC   0.050   0.035   0.050    1200  0.0320    0.00
  81         RX    0.00    9.00   14.00   16.00   16.50   22.00   26.00   33.00
  82         RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

  83         KK   CF60A COMBINE
```

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                  *

     85           KK   RF60C   ROUTE
     86           RS       1    FLOW
     87           RC   0.050   0.035   0.050     650  0.0280    0.00
     88           RX    0.00   25.00   38.00   48.00   49.00   57.00   67.00   80.00
     89           RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *

     90           KK   OFF60   BASIN
     91           BA   0.018
     92           LG    0.35    0.40    6.00    0.18       0
     93           UC   0.425   0.639
     94           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
     95           UA     100
                  *

     96           KK   CF60B COMBINE
     97           HC       2
                  *

     98           KK    RO65   ROUTE
     99           RS       1    FLOW
    100           RC   0.050   0.035   0.050     756  0.0250    0.00
    101           RX    0.00    5.00    7.00    8.50    9.00   19.00   24.00   29.00
    102           RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *

    103           KK    ON65   BASIN
    104           BA   0.001
    105           LG    0.35    0.40    6.00    0.18       0
    106           UC   0.320   1.174
    107           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
    108           UA     100
                  *

    109           KK    ON60   BASIN
    110           BA   0.004
    111           LG    0.35    0.40    6.00    0.18       0
    112           UC   0.235   0.295
    113           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
    114           UA     100
                  *
1                                       HEC-1 INPUT                                           PAGE  4

 LINE             ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


    115           KK    ON59   BASIN
    116           BA   0.001
    117           LG    0.10    0.25    6.00    0.26      60
    118           UC   0.148   0.390
    119           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
    120           UA     100
                  *

    121           KK    CO60 COMBINE
    122           HC       2
                  *

    123           KK    DB60 STORAGE
    124           KO
    125           RS       1    STOR
    126           SV            0.06    0.12    0.18    0.26    0.35    0.45    0.45
    127           SQ            1.00    2.00    3.00    3.00    4.00    4.00   13.00
    128           SE            0.50    1.00    1.50    2.00    2.50    2.95    3.00
                  *

    129           KK    CO65 COMBINE
    130           HC       4
                  *

    131           KK   RO75A   ROUTE
    132           RS       1    FLOW
    133           RC   0.050   0.035   0.050     421  0.0240    0.00
    134           RX    0.00   18.00   20.00   23.00   34.00   38.00   41.00   44.00
    135           RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *
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```
136          KK   OFF65   BASIN
137          BA   0.004
138          LG    0.35    0.40    6.00    0.18       0
139          UC   0.252   0.386
140          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
141          UA     100
             *

142          KK    RO71   ROUTE
143          RS       1    FLOW
144          RC   0.050   0.035   0.050     590  0.0250    0.00
145          RX    0.00   14.00   27.00   31.50   32.00   36.00   40.00   46.00
146          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

147          KK    ON71   BASIN
148          BA   0.003
149          LG    0.35    0.40    6.00    0.18       0
150          UC   0.267   0.513
151          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
152          UA     100
             *
```

1 HEC-1 INPUT PAGE 5

```
LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

153          KK    CO71 COMBINE
154          HC       2
             *

155          KK   RO75B   ROUTE
156          RS       1    FLOW
157          RC   0.050   0.035   0.050     606  0.0240    0.00
158          RX    0.00   18.00   20.00   23.00   34.00   38.00   41.00   44.00
159          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

160          KK    ON70   BASIN
161          BA   0.008
162          LG    0.30    0.25    6.00    0.22      23
163          UC   0.234   0.356
164          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
165          UA     100
             *

166          KK    DB70 STORAGE
167          KO
168          RS       1    STOR
169          SV            0.06    0.12    0.18    0.24    0.30    0.36    0.37
170          SQ                    2.00    3.00    4.00    5.00    6.00    6.00
171          SE            0.50    1.00    1.50    2.00    2.50    3.00    3.01
             *

172          KK    ON61   BASIN
173          BA   0.005
174          LG    0.25    0.34    6.00    0.21      24
175          UC   0.262   0.436
176          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
177          UA     100
             *

178          KK    DB61 STORAGE
179          KO
180          RS       1    STOR
181          SV            0.04    0.09    0.15    0.20    0.27    0.34    0.34
182          SQ            1.00    1.00    1.00    1.00    1.00    2.00    2.00
183          SE            0.50    1.00    1.50    2.00    2.50    2.95    3.00
             *

184          KK   CO75A COMBINE
185          HC       4
             *

186          KK   RO75C   ROUTE
187          RS       1    FLOW
188          RC   0.050   0.035   0.050     821  0.0260    0.00
```

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              *
1                                         HEC-1 INPUT                                   PAGE  6

       LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

        191        KK    ON75   BASIN
        192        BA   0.009
        193        LG    0.33    0.34    6.00    0.19       8
        194        UC   0.439   0.718
        195        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        196        UA     100
                   *

        197        KK   CO75B COMBINE
        198        HC       2
                   *

        199        KK     DT1  DIVERT
        200        DT     D45     0.0     0.0
        201        DI     0.0    50.0   100.0   150.0   200.0   250.0   300.0   350.0   400.0   432.0
        202        DQ     0.0     0.0     0.0     0.0     0.0     0.3     1.5     4.0     8.0    11.0
                   *

        203        KK    RO76   ROUTE
        204        RS       1    FLOW
        205        RC   0.050   0.035   0.050     908  0.0260    0.00
        206        RX    0.00    2.00    5.00    8.00   25.00   29.00   32.00   35.00
        207        RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                   *

        208        KK    ON76   BASIN
        209        BA   0.019
        210        LG    0.32    0.31    6.00    0.20      12
        211        UC   0.293   0.328
        212        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        213        UA     100
                   *

        214        KK    CO76 COMBINE
        215        HC       2
                   *

        216        KK     DT1RETRIEVE
        217        DR     D45
                   *

        218        KK    ON77   BASIN
        219        BA   0.001
        220        LG    0.27    0.34    6.00    0.20      22
        221        UC   0.733   8.812
        222        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        223        UA     100
                   *
1                                         HEC-1 INPUT                                   PAGE  7

       LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

        224        KK   OFF80   BASIN
        225        BA   0.044
        226        LG    0.35    0.40    6.00    0.18       0
        227        UC   0.503   0.672
        228        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
        229        UA     100
                   *

        230        KK   RO115   ROUTE
        231        RS       1    FLOW
        232        RC   0.050   0.035   0.050     540  0.0260    0.00
        233        RX    0.00   12.00   18.00   18.50   19.00   27.00   29.00   34.00
        234        RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                   *

        235        KK   ON115   BASIN
        236        BA   0.004
        237        LG    0.35    0.40    6.00    0.18       0
```
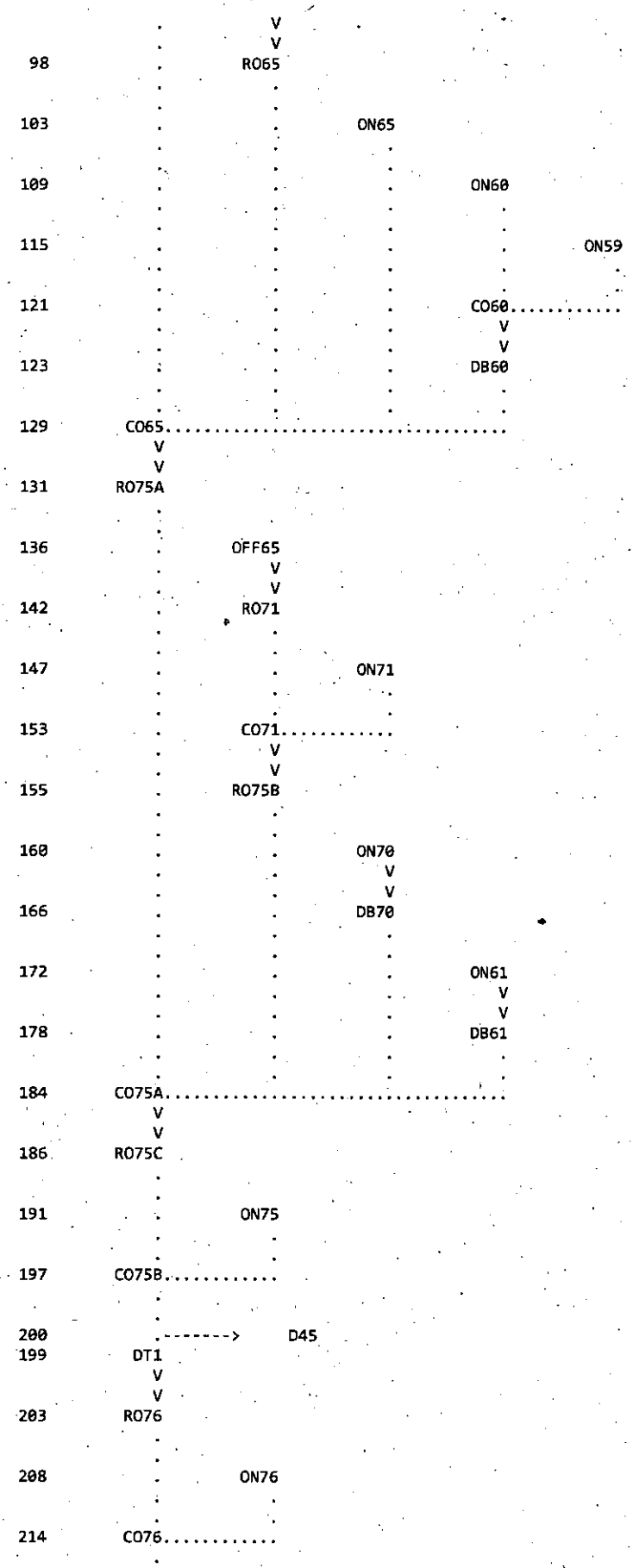
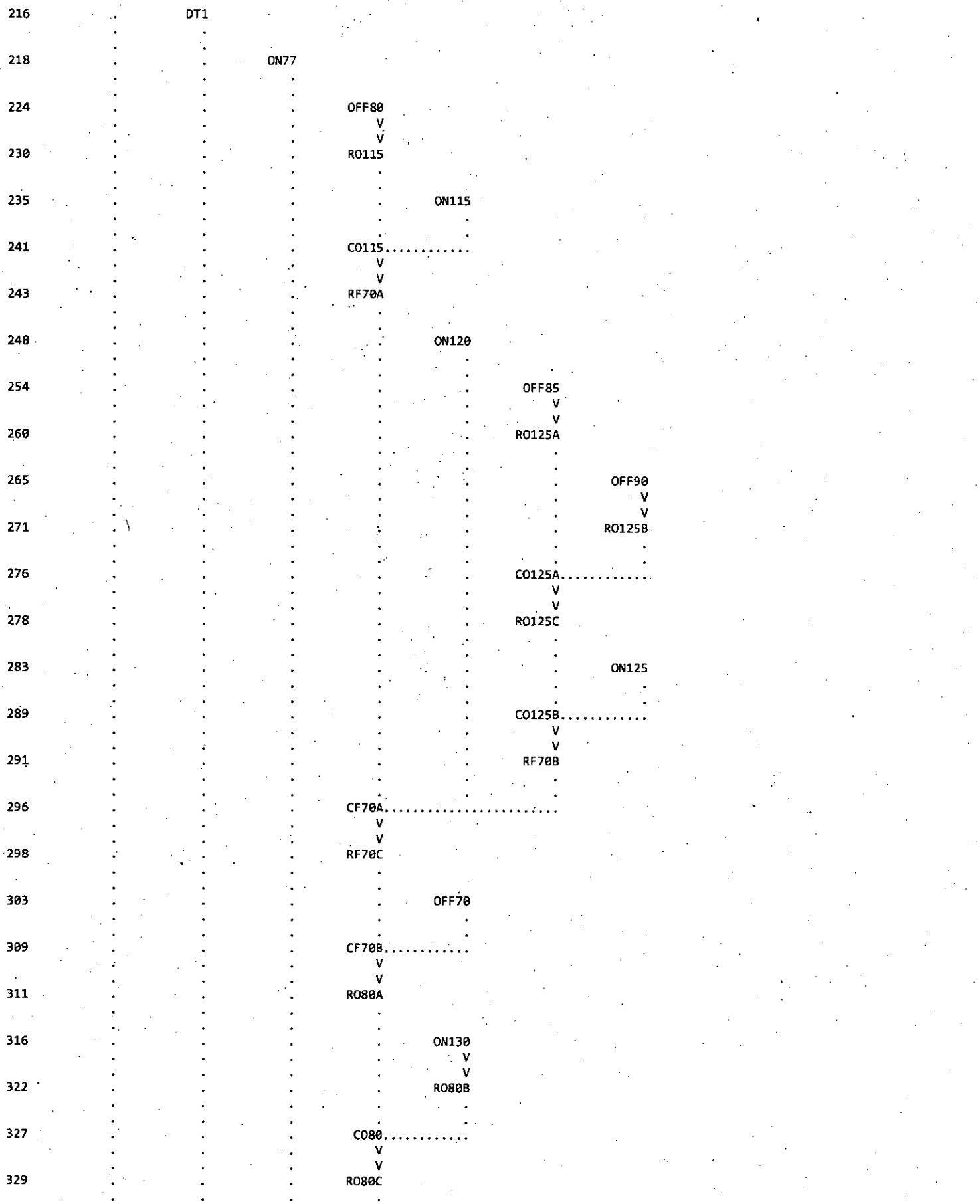
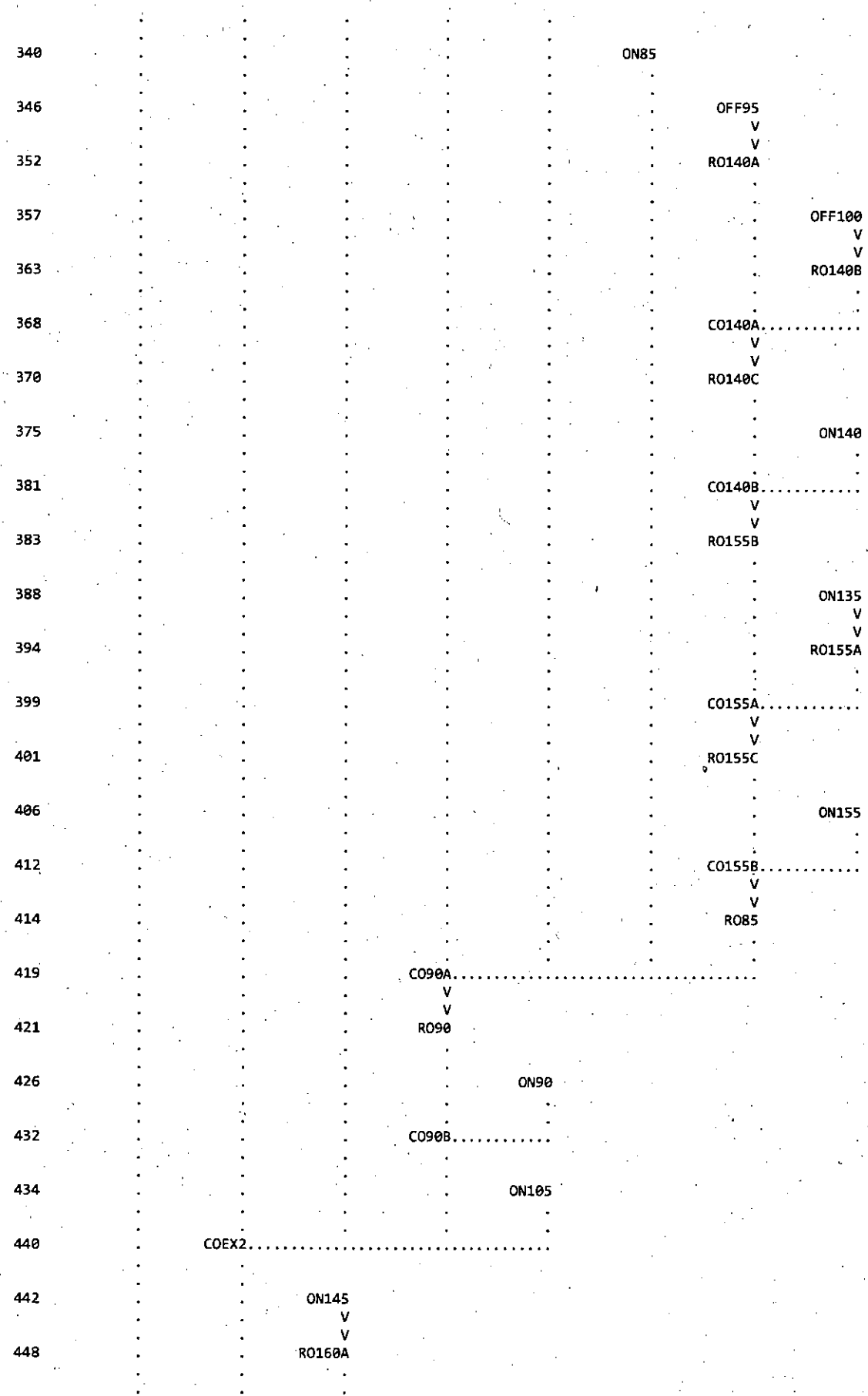

```
   240          UA      100
                *

   241          KK   CO115 COMBINE
   242          HC       2
                *

   243          KK   RF70A   ROUTE
   244          RS       1    FLOW
   245          RC   0.050   0.035   0.050     720  0.0290    0.00
   246          RX    0.00   13.00   24.00   33.00   34.00   80.00   85.00   89.00
   247          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                *

   248          KK   ON120   BASIN
   249          BA   0.001
   250          LG    0.35    0.40    6.00    0.18       0
   251          UC   0.207   0.480
   252          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
   253          UA     100
                *

   254          KK   OFF85   BASIN
   255          BA   0.002
   256          LG    0.35    0.40    6.00    0.18       0
   257          UC   0.162   0.178
   258          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
   259          UA     100
                *
1                                          HEC-1 INPUT                                          PAGE  8

 LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


   260          KK  RO125A   ROUTE
   261          RS       1    FLOW
   262          RC   0.050   0.035   0.050     525  0.0400    0.00
   263          RX    0.00    6.00   13.00   16.00   16.10   19.00   22.00   28.00
   264          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                *

   265          KK   OFF90   BASIN
   266          BA   0.003
   267          LG    0.35    0.40    6.00    0.18       0
   268          UC   0.146   0.109
   269          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
   270          UA     100
                *

   271          KK  RO125B   ROUTE
   272          RS       1    FLOW
   273          RC   0.050   0.035   0.050     525  0.0400    0.00
   274          RX    0.00    6.00   13.00   16.00   16.10   19.00   22.00   28.00
   275          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                *

   276          KK  CO125A COMBINE
   277          HC       2
                *

   278          KK  RO125C   ROUTE
   279          RS       1    FLOW
   280          RC   0.050   0.035   0.050     720  0.0280    0.00
   281          RX    0.00    8.00   14.00   19.00   19.10   26.00   29.00   34.00
   282          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                *

   283          KK   ON125   BASIN
   284          BA   0.017
   285          LG    0.35    0.40    6.00    0.18       0
   286          UC   0.389   0.545
   287          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
   288          UA     100
                *

   289          KK  CO125B COMBINE
   290          HC       2
```

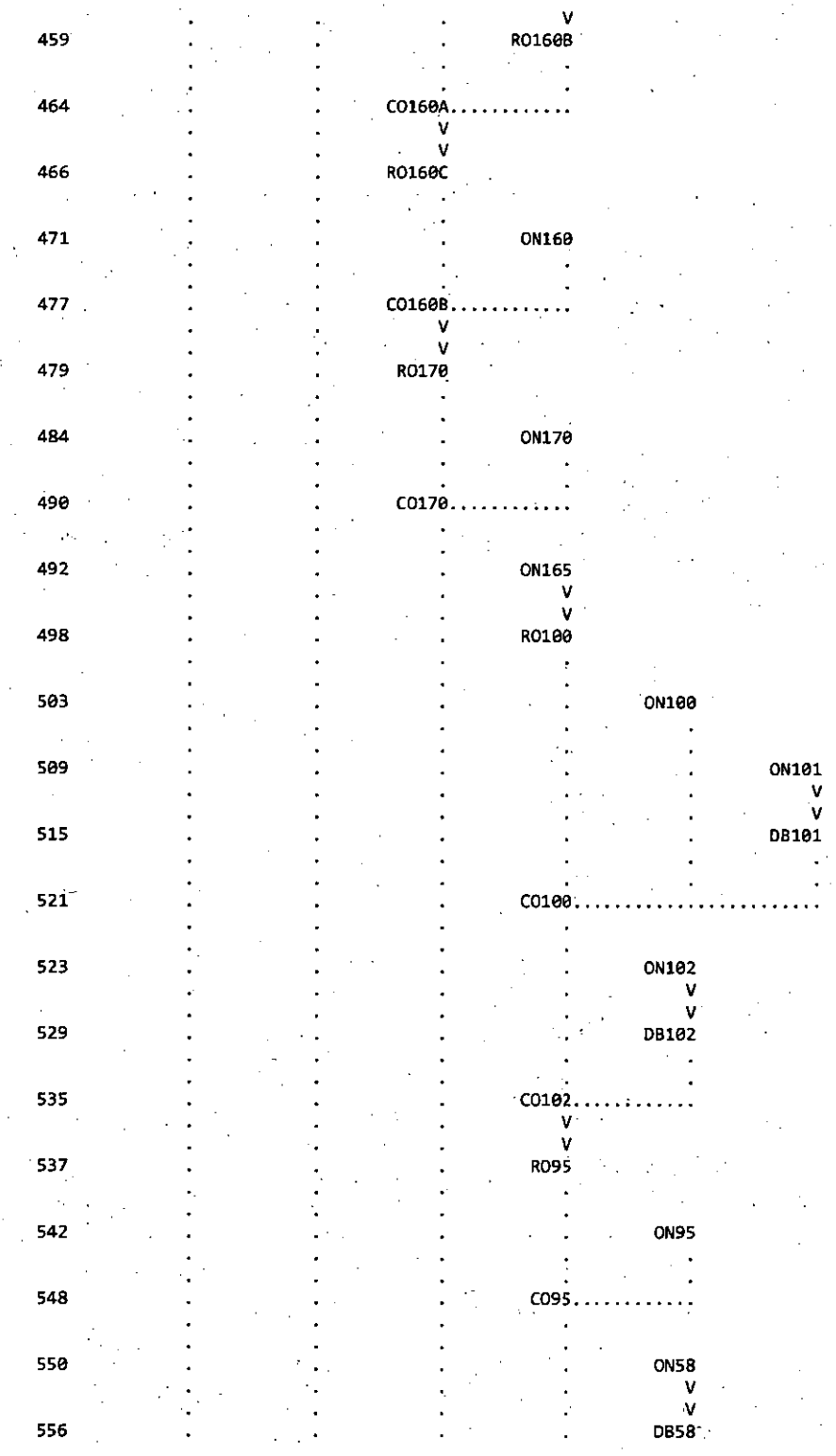
```
493          BA   0.008
494          LG    0.35    0.40    6.00    0.18       0
495          UC   0.312   0.475
496          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
497          UA     100
             *

498          KK   RO100   ROUTE
499          RS       1    FLOW
500          RC   0.050   0.035   0.050    1091  0.0290    0.00
501          RX    0.00   14.00   28.00   40.00   41.00   51.00   58.00   64.00
502          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

503          KK   ON100   BASIN
504          BA   0.003
505          LG    0.35    0.40    6.00    0.18       0
506          UC   0.379   1.175
507          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
508          UA     100
             *
1                                          HEC-1 INPUT                                    PAGE 15

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

509          KK   ON101   BASIN
510          BA   0.005
511          LG    0.31    0.28    6.00    0.21      22
512          UC   0.191   0.251
513          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
514          UA     100
             *

515          KK   DB101 STORAGE
516          KO
517          RS       1    STOR
518          SV            0.04    0.09    0.15    0.22    0.30    0.40
519          SQ            1.00    1.00    1.00    2.00    2.00    3.00
520          SE            0.50    1.00    1.50    2.00    2.50    3.00
             *

521          KK   CO100 COMBINE
522          HC       3
             *

523          KK   ON102   BASIN
524          BA   0.015
525          LG    0.30    0.26    6.00    0.22      25
526          UC   0.235   0.276
527          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
528          UA     100
             *

529          KK   DB102 STORAGE
530          KO
531          RS       1    STOR
532          SV            0.12    0.25    0.39    0.55    0.70    0.88    0.88
533          SQ            2.00    3.00    4.00    5.00    6.00    6.00   22.00
534          SE            0.50    1.00    1.50    2.00    2.50    2.95    3.00
             *

535          KK   CO102 COMBINE
536          HC       2
             *

537          KK    RO95   ROUTE
538          RS       1    FLOW
539          RC   0.050   0.035   0.050     231  0.0300    0.00
540          RX    0.00   11.00   35.00   41.00   42.00   44.00   47.00   82.00
541          RY    2.00    1.00    1.00    0.00    0.00    1.00    2.00    2.00
             *

542          KK    ON95   BASIN
543          BA   0.010
544          LG    0.35    0.40    6.00    0.18       0
545          UC   0.302   0.418
```

```
                    *
1                                    HEC-1 INPUT                                                   PAGE 16

        LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


         548        KK    CO95 COMBINE
         549        HC       2
                    *

         550        KK    ON58   BASIN
         551        BA   0.002
         552        LG    0.10    0.25    6.00    0.26      60
         553        UC   0.175   0.384
         554        UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
         555        UA     100
                    *

         556        KK    DB58 STORAGE
         557        KO
         558        RS       1    STOR
         559        SV            0.07    0.14
         560        SQ            1.00    1.00
         561        SE            0.50    1.00
                    *
         562        ZZ
1
           SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE     (V) ROUTING         (--->) DIVERSION OR PUMP FLOW

   NO.     (.) CONNECTOR       (<---) RETURN OF DIVERTED OR PUMPED FLOW

    23      OFF30
              .
              .
    29        .        OFF35
              .            .
              .            .
    35        .            .        OFF40
              .            .            .
              .            .            .
    41      CF45A.......................
              V
              V
    43      RF45
              .
              .
    48        .        OFF45
              .            .
              .            .
    54      CF45B...........
              V
              V
    56      RO60
              .
              .
    61        .        OFF50
              .            V
              .            V
    67        .        RF60A
              .            .
              .            .
    72        .            .        OFF55
              .            .            V
              .            .            V
    78        .            .        RF60B
              .            .            .
              .            .            .
    83        .        CF60A............
              .            V
              .            V
    85        .        RF60C
              .            .
              .            .
    90        .            .        OFF60
              .            .            .
```


98
RO65
103
ON65
109
ON60
115
ON59
121
CO60
123
DB60
129
CO65
131
RO75A
136
OFF65
142
RO71
147
ON71
153
CO71
155
RO75B
160
ON70
166
DB70
172
ON61
178
DB61
184
CO75A
186
RO75C
191
ON75
197
CO75B
200
D45
199
DT1
203
RO76
208
ON76
214
CO76


216
DT1
218
ON77
224
OFF80
230
RO115
235
ON115
241
CO115
243
RF70A
248
ON120
254
OFF85
260
RO125A
265
OFF90
271
RO125B
276
CO125A
278
RO125C
283
ON125
289
CO125B
291
RF70B
296
CF70A
298
RF70C
303
OFF70
309
CF70B
311
RO80A
316
ON130
322
RO80B
327
CO80
329
RO80C


340
ON85
346
OFF95
352
RO140A
357
OFF100
363
RO140B
368
CO140A
370
RO140C
375
ON140
381
CO140B
383
RO155B
388
ON135
394
RO155A
399
CO155A
401
RO155C
406
ON155
412
CO155B
414
RO85
419
CO90A
421
RO90
426
ON90
432
CO90B
434
ON105
440
COEX2
442
ON145
448
RO160A



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1**********

```
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   18FEB17  TIME  17:09:39  *
*                                      *
**************************************
```

```
**************************************
*                                    *
*  U.S. ARMY CORPS OF ENGINEERS      *
*  HYDROLOGIC ENGINEERING CENTER     *
*       609 SECOND STREET            *
*     DAVIS, CALIFORNIA 95616        *
*         (916) 756-1104             *
*                                    *
**************************************
```

Flood Control District of Maricopa County
STORYROCK PH1B PROP - STORYROCK PHASE 1B PROP CONDITION
2 YEAR
6 Hour Storm
Unit Hydrograph: Clark
Storm: Multiple
02/18/2017

9 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	5	MINUTES IN COMPUTATION INTERVAL
IDATE	1JAN99	STARTING DATE
ITIME	0000	STARTING TIME
NQ	2000	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	7JAN99	ENDING DATE
NDTIME	2235	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL 0.08 HOURS
TOTAL TIME BASE 166.58 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

11 JD INDEX STORM NO. 1

STRM	1.42	PRECIPITATION DEPTH
TRDA	0.00	TRANSPOSITION DRAINAGE AREA

12 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03
0.03	0.03	0.05	0.05	0.05	0.15	0.15	0.15	0.03	0.03
0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00								

15 JD INDEX STORM NO. 2

STRM	1.41	PRECIPITATION DEPTH
TRDA	0.50	TRANSPOSITION DRAINAGE AREA

16 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03
0.03	0.03	0.05	0.05	0.05	0.15	0.15	0.15	0.03	0.03
0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00								

19 JD INDEX STORM NO. 3

STRM	1.38	PRECIPITATION DEPTH
TRDA	2.80	TRANSPOSITION DRAINAGE AREA

20 PI PRECIPITATION PATTERN

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.03
0.03	0.03	0.07	0.07	0.07	0.08	0.08	0.08	0.05	0.05
0.05	0.02	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00								

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
123 KK    *     DB60   *      STORAGE
          *            *
          **************

124 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
166 KK    *     DB70   *      STORAGE
          *            *
          **************

167 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
178 KK    *     DB61   *      STORAGE
          *            *
          **************

179 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
515 KK    *    DB101   *      STORAGE
          *            *
          **************

516 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
529 KK    *    DB102   *      STORAGE
          *            *
          **************

530 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

              **************
              *            *
 556 KK       *     DB58   *      STORAGE
              *            *
              **************

 557 KO          OUTPUT CONTROL VARIABLES
                        IPRNT            5  PRINT CONTROL
                        IPLOT            0  PLOT CONTROL
                        QSCAL            0.  HYDROGRAPH PLOT SCALE
1
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	OFF30	28.	4.50	5.	1.	0.	0.15		
+	HYDROGRAPH AT	OFF35	10.	4.25	1.	0.	0.	0.03		
+	HYDROGRAPH AT	OFF40	1.	4.08	0.	0.	0.	0.00		
+	3 COMBINED AT	CF45A	35.	4.50	6.	1.	0.	0.18		
+	ROUTED TO	RF45	34.	4.50	6.	1.	0.	0.18		
+	HYDROGRAPH AT	OFF45	7.	4.25	1.	0.	0.	0.03		
+	2 COMBINED AT	CF45B	39.	4.50	7.	2.	1.	0.21		
+	ROUTED TO	RO60	39.	4.50	7.	2.	1.	0.21		
+	HYDROGRAPH AT	OFF50	10.	4.50	2.	0.	0.	0.06		
+	ROUTED TO	RF60A	9.	4.58	2.	0.	0.	0.06		
+	HYDROGRAPH AT	OFF55	1.	4.17	0.	0.	0.	0.00		
+	ROUTED TO	RF60B	1.	4.25	0.	0.	0.	0.00		
+	2 COMBINED AT	CF60A	10.	4.58	2.	1.	0.	0.07		
+	ROUTED TO	RF60C	9.	4.67	2.	1.	0.	0.07		
+	HYDROGRAPH AT	OFF60	4.	4.33	1.	0.	0.	0.02		
+	2 COMBINED AT	CF60B	12.	4.58	3.	1.	0.	0.08		
+	ROUTED TO	RO65	12.	4.67	3.	1.	0.	0.08		
+	HYDROGRAPH AT	ON65	0.	4.25	0.	0.	0.	0.00		

+	ON60	2.	4.17	0.	0.	0.	0.00
HYDROGRAPH AT							
+	ON59	1.	4.08	0.	0.	0.	0.00
2 COMBINED AT							
+	CO60	2.	4.17	0.	0.	0.	0.01
ROUTED TO							
+	DB60	1.	4.50	0.	0.	0.	0.01
4 COMBINED AT							
+	CO65	51.	4.58	9.	2.	1.	0.30
ROUTED TO							
+	RO75A	51.	4.58	9.	2.	1.	0.30
HYDROGRAPH AT							
+	OFF65	1.	4.17	0.	0.	0.	0.00
ROUTED TO							
+	RO71	1.	4.25	0.	0.	0.	0.00
HYDROGRAPH AT							
+	ON71	1.	4.17	0.	0.	0.	0.00
2 COMBINED AT							
+	CO71	2.	4.25	0.	0.	0.	0.01
ROUTED TO							
+	RO75B	2.	4.33	0.	0.	0.	0.01
HYDROGRAPH AT							
+	ON70	4.	4.17	1.	0.	0.	0.01
ROUTED TO							
+	DB70	2.	4.50	0.	0.	0.	0.01
HYDROGRAPH AT							
+	ON61	2.	4.17	0.	0.	0.	0.00
ROUTED TO							
+	DB61	1.	4.25	0.	0.	0.	0.00
4 COMBINED AT							
+	CO75A	55.	4.58	10.	3.	1.	0.32
ROUTED TO							
+	RO75C	55.	4.58	10.	3.	1.	0.32
HYDROGRAPH AT							
+	ON75	2.	4.33	0.	0.	0.	0.01
2 COMBINED AT							
+	CO75B	56.	4.58	11.	3.	1.	0.33
DIVERSION TO							
+	D45	0.	0.00	0.	0.	0.	0.33
HYDROGRAPH AT							
+	DT1	56.	4.58	11.	3.	1.	0.33
ROUTED TO							
+	RO76	56.	4.67	11.	3.	1.	0.33
HYDROGRAPH AT							
+	ON76	9.	4.17	1.	0.	0.	0.02
2 COMBINED AT							
+	CO76	58.	4.58	12.	3.	1.	0.35
HYDROGRAPH AT							
+	DT1	0.	0.00	0.	0.	0.	0.33
HYDROGRAPH AT							
+	ON77	0.	4.75	0.	0.	0.	0.00

	ROUTED TO						
+		RO115	9.	4.42	1.	0.	0.	0.04
	HYDROGRAPH AT						
+		ON115	2.	4.17	0.	0.	0.	0.00
	2 COMBINED AT						
+		CO115	10.	4.42	2.	0.	0.	0.05
	ROUTED TO						
+		RF70A	9.	4.50	2.	0.	0.	0.05
	HYDROGRAPH AT						
+		ON120	0.	4.17	0.	0.	0.	0.00
	HYDROGRAPH AT						
+		OFF85	1.	4.08	0.	0.	0.	0.00
	ROUTED TO						
+		RO125A	1.	4.17	0.	0.	0.	0.00
	HYDROGRAPH AT						
+		OFF90	2.	4.08	0.	0.	0.	0.00
	ROUTED TO						
+		RO125B	2.	4.08	0.	0.	0.	0.00
	2 COMBINED AT						
+		CO125A	3.	4.17	0.	0.	0.	0.00
	ROUTED TO						
+		RO125C	2.	4.17	0.	0.	0.	0.00
	HYDROGRAPH AT						
+		ON125	4.	4.25	1.	0.	0.	0.02
	2 COMBINED AT						
+		CO125B	6.	4.25	1.	0.	0.	0.02
	ROUTED TO						
+		RF70B	6.	4.25	1.	0.	0.	0.02
	3 COMBINED AT						
+		CF70A	14.	4.42	2.	1.	0.	0.07
	ROUTED TO						
+		RF70C	14.	4.42	2.	1.	0.	0.07
	HYDROGRAPH AT						
+		OFF70	4.	4.25	0.	0.	0.	0.01
	2 COMBINED AT						
+		CF70B	17.	4.42	3.	1.	0.	0.08
	ROUTED TO						
+		RO80A	17.	4.42	3.	1.	0.	0.08
	HYDROGRAPH AT						
+		ON130	3.	4.25	0.	0.	0.	0.01
	ROUTED TO						
+		RO80B	3.	4.33	0.	0.	0.	0.01
	2 COMBINED AT						
+		CO80	19.	4.42	3.	1.	0.	0.10
	ROUTED TO						
+		RO80C	18.	4.50	3.	1.	0.	0.10
	HYDROGRAPH AT						
+		ON80	16.	4.25	2.	0.	0.	0.03
	HYDROGRAPH AT						
+		ON85	1.	4.33	0.	0.	0.	0.01
	HYDROGRAPH AT						

	ROUTED TO						
+	RO140A	12.	4.42	2.	1.	0.	0.06
	HYDROGRAPH AT						
+	OFF100	3.	4.25	0.	0.	0.	0.01
	ROUTED TO						
+	RO140B	3.	4.25	0.	0.	0.	0.01
	2 COMBINED AT						
+	CO140A	15.	4.42	2.	1.	0.	0.08
	ROUTED TO						
+	RO140C	14.	4.50	2.	1.	0.	0.08
	HYDROGRAPH AT						
+	ON140	4.	4.33	1.	0.	0.	0.02
	2 COMBINED AT						
+	CO140B	17.	4.50	3.	1.	0.	0.09
	ROUTED TO						
+	RO155B	16.	4.58	3.	1.	0.	0.09
	HYDROGRAPH AT						
+	ON135	2.	4.25	0.	0.	0.	0.01
	ROUTED TO						
+	RO155A	2.	4.25	0.	0.	0.	0.01
	2 COMBINED AT						
+	CO155A	18.	4.58	3.	1.	0.	0.10
	ROUTED TO						
+	RO155C	18.	4.58	3.	1.	0.	0.10
	HYDROGRAPH AT						
+	ON155	5.	4.25	1.	0.	0.	0.02
	2 COMBINED AT						
+	CO155B	20.	4.58	4.	1.	0.	0.12
	ROUTED TO						
+	RO85	20.	4.67	4.	1.	0.	0.12
	4 COMBINED AT						
+	CO90A	45.	4.50	9.	2.	1.	0.25
	ROUTED TO						
+	RO90	45.	4.58	9.	2.	1.	0.25
	HYDROGRAPH AT						
+	ON90	7.	4.25	1.	0.	0.	0.02
	2 COMBINED AT						
+	CO90B	48.	4.58	10.	2.	1.	0.27
	HYDROGRAPH AT						
+	ON105	1.	4.08	0.	0.	0.	0.00
	4 COMBINED AT						
+	COEX2	48.	4.58	10.	2.	1.	0.27
	HYDROGRAPH AT						
+	ON145	3.	4.25	0.	0.	0.	0.01
	ROUTED TO						
+	RO160A	3.	4.33	0.	0.	0.	0.01
	HYDROGRAPH AT						
+	ON150	2.	4.17	0.	0.	0.	0.01
	ROUTED TO						
+	RO160B	2.	4.25	0.	0.	0.	0.01
	2 COMBINED AT						
+	CO160A	5.	4.33	1.	0.	0.	0.02

+	RO160C	4.	4.50	1.	0.	0.	0.02
HYDROGRAPH AT							
+	ON160	7.	4.42	1.	0.	0.	0.04
2 COMBINED AT							
+	CO160B	10.	4.42	2.	0.	0.	0.06
ROUTED TO							
+	RO170	10.	4.50	2.	0.	0.	0.06
HYDROGRAPH AT							
+	ON170	2.	4.17	0.	0.	0.	0.00
2 COMBINED AT							
+	CO170	11.	4.50	2.	1.	0.	0.06
HYDROGRAPH AT							
+	ON165	2.	4.25	0.	0.	0.	0.01
ROUTED TO							
+	RO100	2.	4.33	0.	0.	0.	0.01
HYDROGRAPH AT							
+	ON100	0.	4.33	0.	0.	0.	0.00
HYDROGRAPH AT							
+	ON101	3.	4.08	0.	0.	0.	0.00
ROUTED TO							
+	DB101	1.	4.17	0.	0.	0.	0.00
3 COMBINED AT							
+	CO100	3.	4.33	1.	0.	0.	0.02
HYDROGRAPH AT							
+	ON102	9.	4.17	1.	0.	0.	0.01
ROUTED TO							
+	DB102	3.	4.58	1.	0.	0.	0.01
2 COMBINED AT							
+	CO102	6.	4.42	2.	0.	0.	0.03
ROUTED TO							
+	RO95	6.	4.42	2.	0.	0.	0.03
HYDROGRAPH AT							
+	ON95	3.	4.25	0.	0.	0.	0.01
2 COMBINED AT							
+	CO95	9.	4.33	2.	0.	0.	0.04
HYDROGRAPH AT							
+	ON58	1.	4.08	0.	0.	0.	0.00
ROUTED TO							
+	DB58	1.	4.58	0.	0.	0.	0.00

*** NORMAL END OF HEC-1 ***

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   18FEB17  TIME  17:09:49   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1           ID        Flood Control District of Maricopa County
  2           ID        STORYROCK PH1B PROP - STORYROCK PHASE 1B PROP CONDITION
  3           ID        10 YEAR
  4           ID        6 Hour  Storm
  5           ID        Unit Hydrograph: Clark
  6           ID        Storm: Multiple
  7           ID        02/18/2017
              *DIAGRAM
  8           IT       5  1JAN99      0    2000
  9           IO       5
 10           IN      15
              *
 11           JD   2.105  0.0001
 12           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 13           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 14           PC   0.962   0.972   0.983   0.991   1.000
 15           JD   2.092  0.5000
 16           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 17           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 18           PC   0.962   0.972   0.983   0.991   1.000
 19           JD   2.052     2.8
 20           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 21           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 22           PC   0.950   0.963   0.975   0.988   1.000
              *

 23           KK   OFF30   BASIN
 24           BA   0.149
 25           LG    0.35    0.40    6.00    0.18       0
 26           UC   0.548   0.571
 27           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 28           UA     100
              *

 29           KK   OFF35   BASIN
 30           BA   0.032
 31           LG    0.35    0.40    6.00    0.18       0
 32           UC   0.317   0.332
 33           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
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      35          KK   OFF40   BASIN
      36          BA   0.002
      37          LG    0.35    0.40    6.00    0.18       0
      38          UC   0.154   0.192
      39          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      40          UA     100
                  *
1                                        HEC-1 INPUT                                          PAGE  2

    LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

      41          KK   CF45A COMBINE
      42          HC       3
                  *

      43          KK    RF45   ROUTE
      44          RS       1    FLOW
      45          RC   0.050   0.035   0.050     980  0.0260    0.00
      46          RX    0.00   14.00   21.00   25.00   31.00   35.00   41.00   45.00
      47          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *

      48          KK   OFF45   BASIN
      49          BA   0.025
      50          LG    0.35    0.40    6.00    0.18       0
      51          UC   0.327   0.360
      52          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      53          UA     100
                  *

      54          KK   CF45B COMBINE
      55          HC       2
                  *

      56          KK    RO60   ROUTE
      57          RS       1    FLOW
      58          RC   0.050   0.035   0.050     625  0.0220    0.00
      59          RX    0.00    6.00   10.00   14.00   27.00   38.00   57.00   83.00
      60          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *

      61          KK   OFF50   BASIN
      62          BA   0.063
      63          LG    0.35    0.40    6.00    0.18       0
      64          UC   0.505   0.743
      65          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      66          UA     100
                  *

      67          KK   RF60A   ROUTE
      68          RS       1    FLOW
      69          RC   0.050   0.035   0.050    1076  0.0300    0.00
      70          RX    0.00    8.00   18.00   55.00   71.00   78.00   83.00   90.00
      71          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *

      72          KK   OFF55   BASIN
      73          BA   0.003
      74          LG    0.35    0.40    6.00    0.18       0
      75          UC   0.169   0.205
      76          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
      77          UA     100
                  *
1                                        HEC-1 INPUT                                          PAGE  3

    LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

      78          KK   RF60B   ROUTE
      79          RS       1    FLOW
      80          RC   0.050   0.035   0.050    1200  0.0320    0.00
      81          RX    0.00    9.00   14.00   16.00   16.50   22.00   26.00   33.00
      82          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                  *
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                *
   85           KK   RF60C   ROUTE
   86           RS       1    FLOW
   87           RC   0.050   0.035   0.050     650  0.0280    0.00
   88           RX    0.00   25.00   38.00   48.00   49.00   57.00   67.00   80.00
   89           RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                *
   90           KK   OFF60   BASIN
   91           BA   0.018
   92           LG    0.35    0.40    6.00    0.18       0
   93           UC   0.353   0.520
   94           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
   95           UA     100
                *
   96           KK   CF60B COMBINE
   97           HC       2
                *
   98           KK    RO65   ROUTE
   99           RS       1    FLOW
  100           RC   0.050   0.035   0.050     756  0.0250    0.00
  101           RX    0.00    5.00    7.00    8.50    9.00   19.00   24.00   29.00
  102           RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                *
  103           KK    ON65   BASIN
  104           BA   0.001
  105           LG    0.35    0.40    6.00    0.18       0
  106           UC   0.266   0.956
  107           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  108           UA     100
                *
  109           KK    ON60   BASIN
  110           BA   0.004
  111           LG    0.35    0.40    6.00    0.18       0
  112           UC   0.195   0.240
  113           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  114           UA     100
                *
1                                        HEC-1 INPUT                                        PAGE  4

 LINE           ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  115           KK    ON59   BASIN
  116           BA   0.001
  117           LG    0.10    0.25    6.00    0.26      60
  118           UC   0.133   0.345
  119           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
  120           UA     100
                *
  121           KK    CO60 COMBINE
  122           HC       2
                *
  123           KK    DB60 STORAGE
  124           KO
  125           RS       1    STOR
  126           SV            0.06    0.12    0.18    0.26    0.35    0.45    0.45
  127           SQ            1.00    2.00    3.00    3.00    4.00    4.00   13.00
  128           SE            0.50    1.00    1.50    2.00    2.50    2.95    3.00
                *
  129           KK    CO65 COMBINE
  130           HC       4
                *
  131           KK   RO75A   ROUTE
  132           RS       1    FLOW
  133           RC   0.050   0.035   0.050     421  0.0240    0.00
  134           RX    0.00   18.00   20.00   23.00   34.00   38.00   41.00   44.00
  135           RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
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 136          KK    OFF65   BASIN
 137          BA    0.004
 138          LG     0.35    0.40    6.00    0.18       0
 139          UC    0.209   0.314
 140          UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 141          UA      100
              *

 142          KK     RO71   ROUTE
 143          RS        1    FLOW
 144          RC    0.050   0.035   0.050     590  0.0250    0.00
 145          RX     0.00   14.00   27.00   31.50   32.00   36.00   40.00   46.00
 146          RY     3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
              *

 147          KK     ON71   BASIN
 148          BA    0.003
 149          LG     0.35    0.40    6.00    0.18       0
 150          UC    0.222   0.418
 151          UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 152          UA      100
              *
1                                        HEC-1 INPUT                                        PAGE  5

LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 153          KK     CO71 COMBINE
 154          HC        2
              *

 155          KK    RO75B   ROUTE
 156          RS        1    FLOW
 157          RC    0.050   0.035   0.050     606  0.0240    0.00
 158          RX     0.00   18.00   20.00   23.00   34.00   38.00   41.00   44.00
 159          RY     3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
              *

 160          KK     ON70   BASIN
 161          BA    0.008
 162          LG     0.30    0.25    6.00    0.22      23
 163          UC    0.203   0.304
 164          UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 165          UA      100
              *

 166          KK     DB70 STORAGE
 167          KO
 168          RS        1    STOR
 169          SV             0.06    0.12    0.18    0.24    0.30    0.36    0.37
 170          SQ                     2.00    3.00    4.00    5.00    6.00    6.00
 171          SE             0.50    1.00    1.50    2.00    2.50    3.00    3.01
              *

 172          KK     ON61   BASIN
 173          BA    0.005
 174          LG     0.25    0.34    6.00    0.21      24
 175          UC    0.228   0.372
 176          UA        0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 177          UA      100
              *

 178          KK     DB61 STORAGE
 179          KO
 180          RS        1    STOR
 181          SV             0.04    0.09    0.15    0.20    0.27    0.34    0.34
 182          SQ             1.00    1.00    1.00    1.00    1.00    2.00    2.00
 183          SE             0.50    1.00    1.50    2.00    2.50    2.95    3.00
              *

 184          KK    CO75A COMBINE
 185          HC        4
              *

 186          KK    RO75C   ROUTE
 187          RS        1    FLOW
 188          RC    0.050   0.035   0.050     821  0.0260    0.00
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1                                          HEC-1 INPUT                                         PAGE  6

      LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

       191         KK    ON75   BASIN
       192         BA   0.009
       193         LG    0.33    0.34    6.00    0.19       8
       194         UC   0.372   0.598
       195         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       196         UA     100
                   *

       197         KK   CO75B COMBINE
       198         HC       2
                   *

       199         KK     DT1  DIVERT
       200         DT     D45     0.0     0.0
       201         DI     0.0    50.0   100.0   150.0   200.0   250.0   300.0   350.0   400.0   432.0
       202         DQ     0.0     0.0     0.0     0.0     0.0     0.3     1.5     4.0     8.0    11.0
                   *

       203         KK    RO76   ROUTE
       204         RS       1    FLOW
       205         RC   0.050   0.035   0.050     908  0.0260    0.00
       206         RX    0.00    2.00    5.00    8.00   25.00   29.00   32.00   35.00
       207         RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                   *

       208         KK    ON76   BASIN
       209         BA   0.019
       210         LG    0.32    0.31    6.00    0.20      12
       211         UC   0.251   0.275
       212         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       213         UA     100
                   *

       214         KK    CO76 COMBINE
       215         HC       2
                   *

       216         KK     DT1RETRIEVE
       217         DR     D45
                   *

       218         KK    ON77   BASIN
       219         BA   0.001
       220         LG    0.27    0.34    6.00    0.20      22
       221         UC   0.635   7.515
       222         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       223         UA     100
                   *
1                                          HEC-1 INPUT                                         PAGE  7

      LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

       224         KK   OFF80   BASIN
       225         BA   0.044
       226         LG    0.35    0.40    6.00    0.18       0
       227         UC   0.418   0.547
       228         UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       229         UA     100
                   *

       230         KK   RO115   ROUTE
       231         RS       1    FLOW
       232         RC   0.050   0.035   0.050     540  0.0260    0.00
       233         RX    0.00   12.00   18.00   18.50   19.00   27.00   29.00   34.00
       234         RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                   *

       235         KK   ON115   BASIN
       236         BA   0.004
       237         LG    0.35    0.40    6.00    0.18       0
```
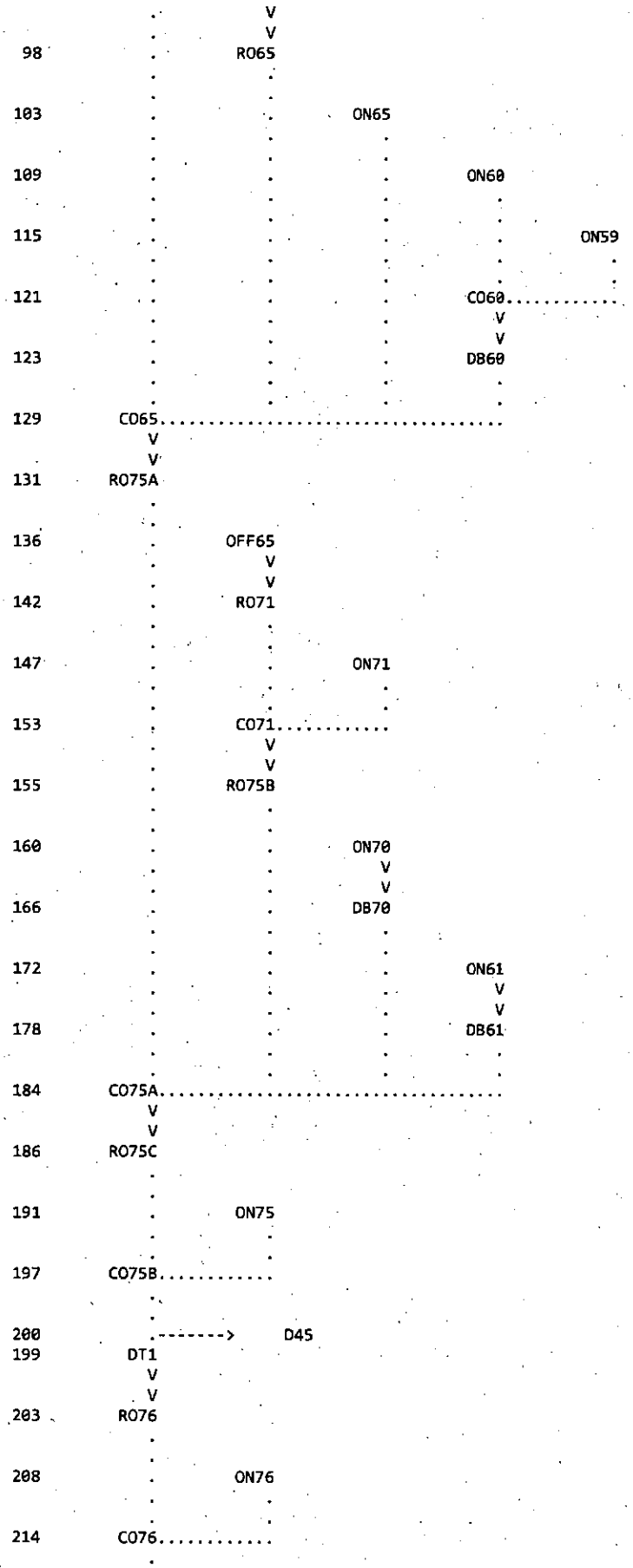
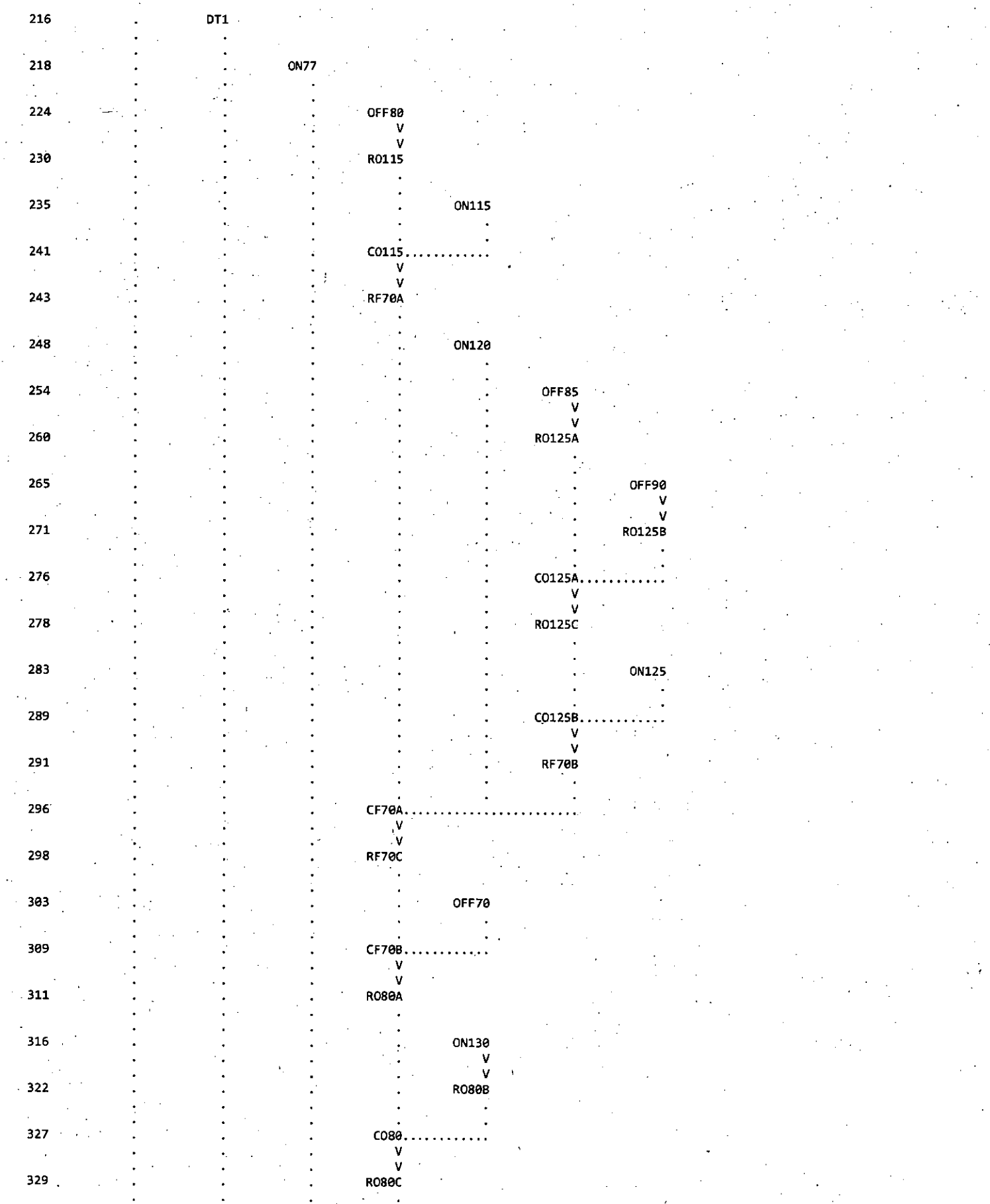
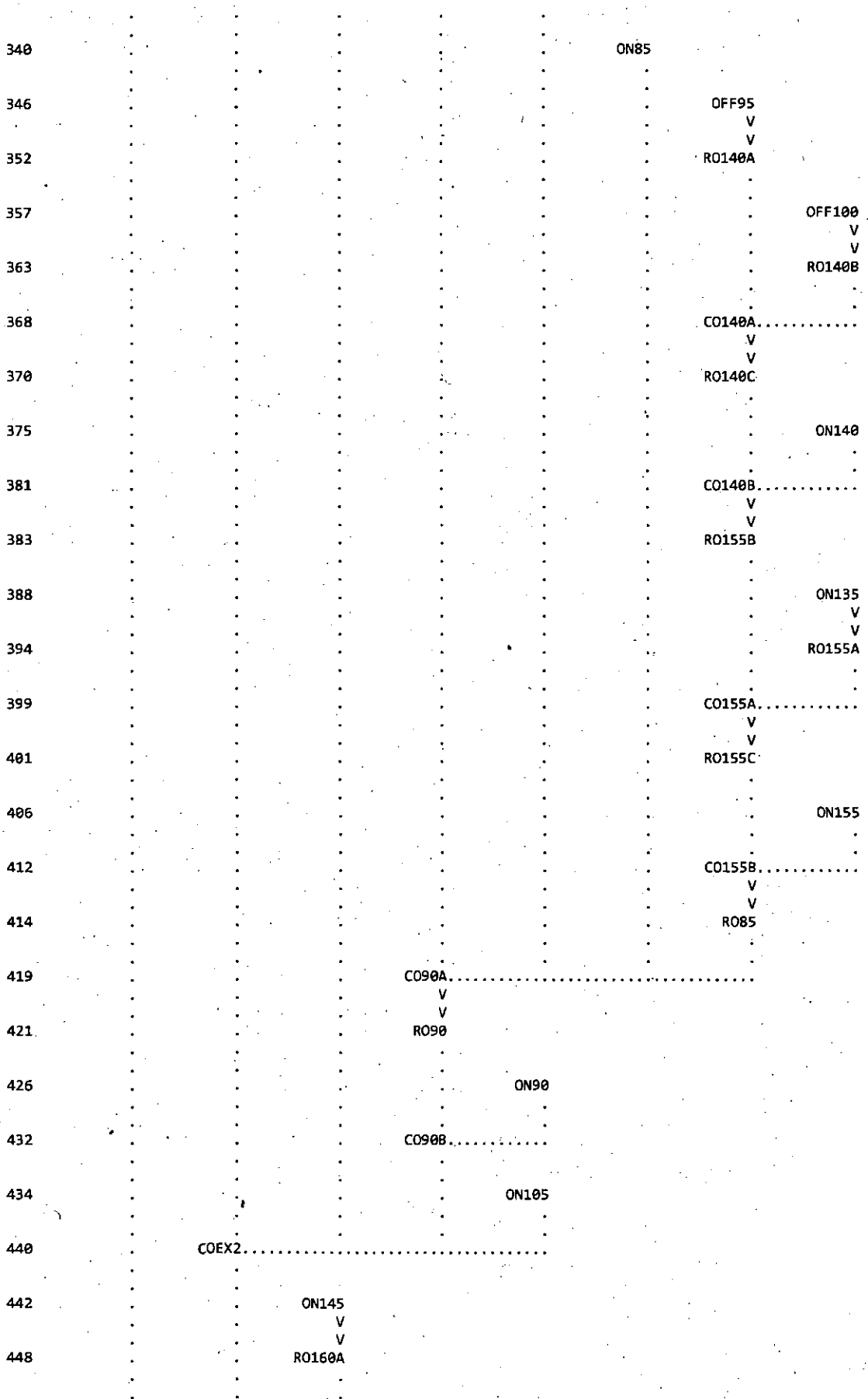
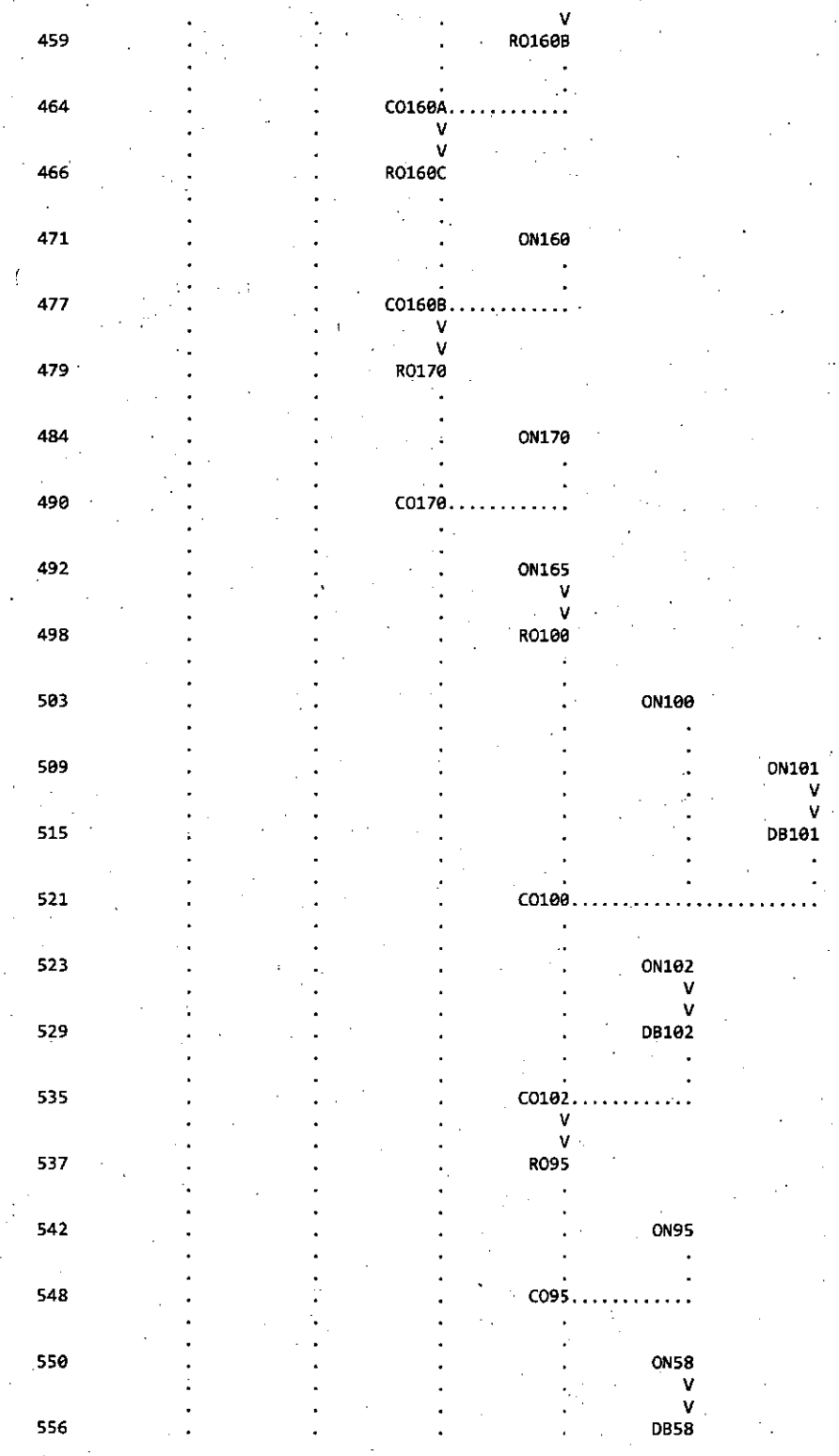

```
493          BA   0.008
494          LG    0.35    0.40    6.00    0.18       0
495          UC   0.260   0.387
496          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
497          UA     100
             *

498          KK   RO100   ROUTE
499          RS       1    FLOW
500          RC   0.050   0.035   0.050    1091  0.0290    0.00
501          RX    0.00   14.00   28.00   40.00   41.00   51.00   58.00   64.00
502          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

503          KK   ON100   BASIN
504          BA   0.003
505          LG    0.35    0.40    6.00    0.18       0
506          UC   0.314   0.956
507          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
508          UA     100
             *
1                                        HEC-1 INPUT                                    PAGE 15

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10


509          KK   ON101   BASIN
510          BA   0.005
511          LG    0.31    0.28    6.00    0.21      22
512          UC   0.166   0.214
513          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
514          UA     100
             *

515          KK   DB101 STORAGE
516          KO
517          RS       1    STOR
518          SV            0.04    0.09    0.15    0.22    0.30    0.40
519          SQ            1.00    1.00    1.00    2.00    2.00    3.00
520          SE            0.50    1.00    1.50    2.00    2.50    3.00
             *

521          KK   CO100 COMBINE
522          HC       3
             *

523          KK   ON102   BASIN
524          BA   0.015
525          LG    0.30    0.26    6.00    0.22      25
526          UC   0.204   0.237
527          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
528          UA     100
             *

529          KK   DB102 STORAGE
530          KO
531          RS       1    STOR
532          SV            0.12    0.25    0.39    0.55    0.70    0.88    0.88
533          SQ            2.00    3.00    4.00    5.00    6.00    6.00   22.00
534          SE            0.50    1.00    1.50    2.00    2.50    2.95    3.00
             *

535          KK   CO102 COMBINE
536          HC       2
             *

537          KK    RO95   ROUTE
538          RS       1    FLOW
539          RC   0.050   0.035   0.050     231  0.0300    0.00
540          RX    0.00   11.00   35.00   41.00   42.00   44.00   47.00   82.00
541          RY    2.00    1.00    1.00    0.00    0.00    1.00    2.00    2.00
             *

542          KK    ON95   BASIN
543          BA   0.010
544          LG    0.35    0.40    6.00    0.18       0
545          UC   0.251   0.340
```

```
                         *
1                                             HEC-1 INPUT                                                   PAGE 16

         LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          548            KK    CO95 COMBINE
          549            HC       2
                         *

          550            KK    ON58   BASIN
          551            BA   0.002
          552            LG    0.10    0.25    6.00    0.26      60
          553            UC   0.157   0.339
          554            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
          555            UA     100
                         *

          556            KK    DB58 STORAGE
          557            KO
          558            RS       1    STOR
          559            SV            0.07    0.14
          560            SQ            1.00    1.00
          561            SE            0.50    1.00
                         *
          562            ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE        (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.        (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    23        OFF30
                  .
                  .
    29            .         OFF35
                  .             .
                  .             .
    35            .             .         OFF40
                  .             .             .
                  .             .             .
    41        CF45A.......................
                  V
                  V
    43          RF45
                  .
                  .
    48            .         OFF45
                  .             .
                  .             .
    54        CF45B............
                  V
                  V
    56          RO60
                  .
                  .
    61            .         OFF50
                  .             V
                  .             V
    67            .         RF60A
                  .             .
                  .             .
    72            .             .         OFF55
                  .             .             V
                  .             .             V
    78            .             .         RF60B
                  .             .             .
                  .             .             .
    83            .         CF60A............
                  .             V
                  .             V
    85            .         RF60C
                  .             .
                  .             .
    90            .             .         OFF60
                  .             .             .
```


98 RO65
103 ON65
109 ON60
115 ON59
121 CO60
123 DB60
129 CO65
131 RO75A
136 OFF65
142 RO71
147 ON71
153 CO71
155 RO75B
160 ON70
166 DB70
172 ON61
178 DB61
184 CO75A
186 RO75C
191 ON75
197 CO75B
200 D45
199 DT1
203 RO76
208 ON76
214 CO76


216
DT1
218
ON77
224
OFF80
230
RO115
235
ON115
241
CO115
243
RF70A
248
ON120
254
OFF85
260
RO125A
265
OFF90
271
RO125B
276
CO125A
278
RO125C
283
ON125
289
CO125B
291
RF70B
296
CF70A
298
RF70C
303
OFF70
309
CF70B
311
RO80A
316
ON130
322
RO80B
327
CO80
329
RO80C


340
ON85
346
OFF95
352
RO140A
357
OFF100
363
RO140B
368
CO140A
370
RO140C
375
ON140
381
CO140B
383
RO155B
388
ON135
394
RO155A
399
CO155A
401
RO155C
406
ON155
412
CO155B
414
RO85
419
CO90A
421
RO90
426
ON90
432
CO90B
434
ON105
440
COEX2
442
ON145
448
RO160A



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1**********

* *
* FLOOD HYDROGRAPH PACKAGE (HEC-1) *
* JUN 1998 *
* VERSION 4.1 *
* *
* RUN DATE 18FEB17 TIME 17:09:49 *
* *
****

****

* *
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
* *
****

Flood Control District of Maricopa County
STORYROCK PH1B PROP - STORYROCK PHASE 1B PROP CONDITION
10 YEAR
6 Hour Storm
Unit Hydrograph: Clark
Storm: Multiple
02/18/2017

```
 9 IO        OUTPUT CONTROL VARIABLES
                   IPRNT          5  PRINT CONTROL
                   IPLOT          0  PLOT CONTROL
                   QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT        HYDROGRAPH TIME DATA
                    NMIN          5  MINUTES IN COMPUTATION INTERVAL
                   IDATE      1JAN99  STARTING DATE
                   ITIME        0000  STARTING TIME
                      NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                  NDDATE      7JAN99  ENDING DATE
                  NDTIME        2235  ENDING TIME
                   ICENT          19  CENTURY MARK

              COMPUTATION INTERVAL     0.08 HOURS
                   TOTAL TIME BASE  166.58 HOURS

       ENGLISH UNITS
            DRAINAGE AREA          SQUARE MILES
            PRECIPITATION DEPTH    INCHES
            LENGTH, ELEVATION      FEET
            FLOW                   CUBIC FEET PER SECOND
            STORAGE VOLUME         ACRE-FEET
            SURFACE AREA           ACRES
            TEMPERATURE            DEGREES FAHRENHEIT

11 JD       INDEX STORM NO. 1
                  STRM        2.11  PRECIPITATION DEPTH
                  TRDA        0.00  TRANSPOSITION DRAINAGE AREA

12 PI         PRECIPITATION PATTERN
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00  0.00  0.01  0.01  0.01  0.01  0.01  0.01  0.03
              0.03  0.03  0.05  0.05  0.05  0.15  0.15  0.15  0.03  0.03
              0.03  0.01  0.01  0.01  0.01  0.01  0.01  0.00  0.00  0.00
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00

15 JD       INDEX STORM NO. 2
                  STRM        2.09  PRECIPITATION DEPTH
                  TRDA        0.50  TRANSPOSITION DRAINAGE AREA

16 PI         PRECIPITATION PATTERN
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00  0.00  0.01  0.01  0.01  0.01  0.01  0.01  0.03
              0.03  0.03  0.05  0.05  0.05  0.15  0.15  0.15  0.03  0.03
              0.03  0.01  0.01  0.01  0.01  0.01  0.01  0.00  0.00  0.00
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00

19 JD       INDEX STORM NO. 3
                  STRM        2.05  PRECIPITATION DEPTH
                  TRDA        2.80  TRANSPOSITION DRAINAGE AREA

20 PI         PRECIPITATION PATTERN
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00  0.00  0.01  0.01  0.01  0.01  0.01  0.01  0.03
              0.03  0.03  0.07  0.07  0.07  0.08  0.08  0.08  0.05  0.05
              0.05  0.02  0.02  0.02  0.01  0.01  0.01  0.00  0.00  0.00
              0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
              0.00  0.00
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
123 KK    *      DB60  *      STORAGE
          *            *
          **************

124 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
166 KK    *      DB70  *      STORAGE
          *            *
          **************

167 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
178 KK    *      DB61  *      STORAGE
          *            *
          **************

179 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
515 KK    *     DB101  *      STORAGE
          *            *
          **************

516 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
529 KK    *     DB102  *      STORAGE
          *            *
          **************

530 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
```

*** ***

```
          **************
          *            *
556 KK    *     DB58   *     STORAGE
          *            *
          **************

557 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE
1
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	OFF30	81.	4.42	12.	3.	1.	0.15		
+	HYDROGRAPH AT	OFF35	26.	4.25	2.	1.	0.	0.03		
+	HYDROGRAPH AT	OFF40	2.	4.08	0.	0.	0.	0.00		
+	3 COMBINED AT	CF45A	100.	4.33	14.	4.	1.	0.18		
+	ROUTED TO	RF45	99.	4.42	14.	4.	1.	0.18		
+	HYDROGRAPH AT	OFF45	20.	4.25	2.	0.	0.	0.03		
+	2 COMBINED AT	CF45B	113.	4.33	16.	4.	1.	0.21		
+	ROUTED TO	RO60	113.	4.42	16.	4.	1.	0.21		
+	HYDROGRAPH AT	OFF50	29.	4.33	5.	1.	0.	0.06		
+	ROUTED TO	RF60A	27.	4.50	5.	1.	0.	0.06		
+	HYDROGRAPH AT	OFF55	4.	4.08	0.	0.	0.	0.00		
+	ROUTED TO	RF60B	3.	4.17	0.	0.	0.	0.00		
+	2 COMBINED AT	CF60A	29.	4.42	5.	1.	0.	0.07		
+	ROUTED TO	RF60C	29.	4.50	5.	1.	0.	0.07		
+	HYDROGRAPH AT	OFF60	11.	4.25	1.	0.	0.	0.02		
+	2 COMBINED AT	CF60B	36.	4.50	6.	2.	1.	0.08		
+	ROUTED TO	RO65	36.	4.50	6.	2.	1.	0.08		
+	HYDROGRAPH AT	ON65	0.	4.25	0.	0.	0.	0.00		

+	ON60	4.	4.08	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	ON59	1.	4.08	0.	0.	0.	0.00
	2 COMBINED AT						
+	CO60	5.	4.08	0.	0.	0.	0.01
	ROUTED TO						
+	DB60	2.	4.42	0.	0.	0.	0.01
	4 COMBINED AT						
+	CO65	150.	4.42	23.	6.	2.	0.30
	ROUTED TO						
+	RO75A	150.	4.42	23.	6.	2.	0.30
	HYDROGRAPH AT						
+	OFF65	4.	4.17	0.	0.	0.	0.00
	ROUTED TO						
+	RO71	3.	4.17	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	ON71	2.	4.17	0.	0.	0.	0.00
	2 COMBINED AT						
+	CO71	6.	4.17	1.	0.	0.	0.01
	ROUTED TO						
+	RO75B	5.	4.25	1.	0.	0.	0.01
	HYDROGRAPH AT						
+	ON70	9.	4.08	1.	0.	0.	0.01
	ROUTED TO						
+	DB70	4.	4.42	1.	0.	0.	0.01
	HYDROGRAPH AT						
+	ON61	5.	4.17	1.	0.	0.	0.00
	ROUTED TO						
+	DB61	1.	4.08	1.	0.	0.	0.00
	4 COMBINED AT						
+	CO75A	159.	4.42	25.	6.	2.	0.32
	ROUTED TO						
+	RO75C	157.	4.42	25.	6.	2.	0.32
	HYDROGRAPH AT						
+	ON75	6.	4.25	1.	0.	0.	0.01
	2 COMBINED AT						
+	CO75B	162.	4.42	26.	6.	2.	0.33
	DIVERSION TO						
+	D45	0.	0.00	0.	0.	0.	0.33
	HYDROGRAPH AT						
+	DT1	162.	4.42	26.	6.	2.	0.33
	ROUTED TO						
+	RO76	161.	4.50	26.	6.	2.	0.33
	HYDROGRAPH AT						
+	ON76	20.	4.17	2.	0.	0.	0.02
	2 COMBINED AT						
+	CO76	168.	4.50	28.	7.	2.	0.35
	HYDROGRAPH AT						
+	DT1	0.	0.00	0.	0.	0.	0.33
	HYDROGRAPH AT						
+	ON77	0.	4.58	0.	0.	0.	0.00

	ROUTED TO						
+	RO115	26.	4.33	3.	1.	0.	0.04
	HYDROGRAPH AT						
+	ON115	4.	4.08	0.	0.	0.	0.00
	2 COMBINED AT						
+	CO115	28.	4.33	4.	1.	0.	0.05
	ROUTED TO						
+	RF70A	27.	4.33	4.	1.	0.	0.05
	HYDROGRAPH AT						
+	ON120	1.	4.17	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF85	3.	4.08	0.	0.	0.	0.00
	ROUTED TO						
+	RO125A	3.	4.08	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	OFF90	5.	4.00	0.	0.	0.	0.00
	ROUTED TO						
+	RO125B	4.	4.08	0.	0.	0.	0.00
	2 COMBINED AT						
+	CO125A	7.	4.08	0.	0.	0.	0.00
	ROUTED TO						
+	RO125C	7.	4.08	0.	0.	0.	0.00
	HYDROGRAPH AT						
+	ON125	12.	4.25	1.	0.	0.	0.02
	2 COMBINED AT						
+	CO125B	17.	4.17	2.	0.	0.	0.02
	ROUTED TO						
+	RF70B	17.	4.17	2.	0.	0.	0.02
	3 COMBINED AT						
+	CF70A	41.	4.33	5.	1.	0.	0.07
	ROUTED TO						
+	RF70C	41.	4.33	5.	1.	0.	0.07
	HYDROGRAPH AT						
+	OFF70	11.	4.17	1.	0.	0.	0.01
	2 COMBINED AT						
+	CF70B	48.	4.33	6.	2.	1.	0.08
	ROUTED TO						
+	RO80A	49.	4.33	6.	2.	1.	0.08
	HYDROGRAPH AT						
+	ON130	8.	4.17	1.	0.	0.	0.01
	ROUTED TO						
+	RO80B	8.	4.25	1.	0.	0.	0.01
	2 COMBINED AT						
+	CO80	56.	4.33	7.	2.	1.	0.10
	ROUTED TO						
+	RO80C	54.	4.42	7.	2.	1.	0.10
	HYDROGRAPH AT						
+	ON80	35.	4.17	4.	1.	0.	0.03
	HYDROGRAPH AT						
+	ON85	3.	4.25	0.	0.	0.	0.01
	HYDROGRAPH AT						

	ROUTED TO						
+	RO140A	36.	4.33	5.	1.	0.	0.06
	HYDROGRAPH AT						
+	OFF100	9.	4.17	1.	0.	0.	0.01
	ROUTED TO						
+	RO140B	9.	4.17	1.	0.	0.	0.01
	2 COMBINED AT						
+	CO140A	43.	4.33	6.	1.	0.	0.08
	ROUTED TO						
+	RO140C	42.	4.33	6.	1.	0.	0.08
	HYDROGRAPH AT						
+	ON140	11.	4.25	1.	0.	0.	0.02
	2 COMBINED AT						
+	CO140B	52.	4.33	7.	2.	1.	0.09
	ROUTED TO						
+	RO155B	49.	4.42	7.	2.	1.	0.09
	HYDROGRAPH AT						
+	ON135	7.	4.17	1.	0.	0.	0.01
	ROUTED TO						
+	RO155A	7.	4.17	1.	0.	0.	0.01
	2 COMBINED AT						
+	CO155A	52.	4.42	8.	2.	1.	0.10
	ROUTED TO						
+	RO155C	52.	4.42	8.	2.	1.	0.10
	HYDROGRAPH AT						
+	ON155	13.	4.17	1.	0.	0.	0.02
	2 COMBINED AT						
+	CO155B	61.	4.42	9.	2.	1.	0.12
	ROUTED TO						
+	RO85	59.	4.50	9.	2.	1.	0.12
	4 COMBINED AT						
+	CO90A	133.	4.42	20.	5.	2.	0.25
	ROUTED TO						
+	RO90	131.	4.42	20.	5.	2.	0.25
	HYDROGRAPH AT						
+	ON90	16.	4.17	2.	0.	0.	0.02
	2 COMBINED AT						
+	CO90B	141.	4.42	22.	6.	2.	0.27
	HYDROGRAPH AT						
+	ON105	1.	4.08	0.	0.	0.	0.00
	4 COMBINED AT						
+	COEX2	142.	4.42	22.	6.	2.	0.27
	HYDROGRAPH AT						
+	ON145	9.	4.25	1.	0.	0.	0.01
	ROUTED TO						
+	RO160A	9.	4.25	1.	0.	0.	0.01
	HYDROGRAPH AT						
+	ON150	7.	4.17	1.	0.	0.	0.01
	ROUTED TO						
+	RO160B	6.	4.17	1.	0.	0.	0.01
	2 COMBINED AT						
+	CO160A	15.	4.25	2.	0.	0.	0.02

+		RO160C	12.	4.33	2.	0.	0.	0.02
	HYDROGRAPH AT							
+		ON160	19.	4.33	3.	1.	0.	0.04
	2 COMBINED AT							
+		CO160B	32.	4.33	4.	1.	0.	0.06
	ROUTED TO							
+		RO170	31.	4.33	4.	1.	0.	0.06
	HYDROGRAPH AT							
+		ON170	5.	4.08	0.	0.	0.	0.00
	2 COMBINED AT							
+		CO170	34.	4.33	5.	1.	0.	0.06
	HYDROGRAPH AT							
+		ON165	6.	4.17	1.	0.	0.	0.01
	ROUTED TO							
+		RO100	5.	4.25	1.	0.	0.	0.01
	HYDROGRAPH AT							
+		ON100	1.	4.25	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		ON101	7.	4.08	1.	0.	0.	0.00
	ROUTED TO							
+		DB101	1.	4.50	1.	0.	0.	0.00
	3 COMBINED AT							
+		CO100	8.	4.25	1.	0.	0.	0.02
	HYDROGRAPH AT							
+		ON102	19.	4.08	2.	0.	0.	0.01
	ROUTED TO							
+		DB102	5.	4.50	2.	0.	0.	0.01
	2 COMBINED AT							
+		CO102	12.	4.33	3.	1.	0.	0.03
	ROUTED TO							
+		RO95	12.	4.33	3.	1.	0.	0.03
	HYDROGRAPH AT							
+		ON95	8.	4.17	1.	0.	0.	0.01
	2 COMBINED AT							
+		CO95	19.	4.25	4.	1.	0.	0.04
	HYDROGRAPH AT							
+		ON58	3.	4.08	0.	0.	0.	0.00
	ROUTED TO							
+		DB58	1.	4.33	0.	0.	0.	0.00

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   18FEB17  TIME  17:09:58   *
*                                       *
*****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1           ID       Flood Control District of Maricopa County
  2           ID       STORYROCK PH1B PROP - STORYROCK PHASE 1B PROP CONDITION
  3           ID       100 YEAR
  4           ID       6 Hour  Storm
  5           ID       Unit Hydrograph: Clark
  6           ID       Storm: Multiple
  7           ID       02/18/2017
              *DIAGRAM
  8           IT      5  1JAN99       0    2000
  9           IO      5
 10           IN     15
              *
 11           JD   3.174  0.0001
 12           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 13           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 14           PC   0.962   0.972   0.983   0.991   1.000
 15           JD   3.155  0.5000
 16           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 17           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 18           PC   0.962   0.972   0.983   0.991   1.000
 19           JD   3.095     2.8
 20           PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
 21           PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
 22           PC   0.950   0.963   0.975   0.988   1.000
              *

 23           KK   OFF30   BASIN
 24           BA   0.149
 25           LG    0.35    0.40    6.00    0.18       0
 26           UC   0.412   0.416
 27           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
 28           UA     100
              *

 29           KK   OFF35   BASIN
 30           BA   0.032
 31           LG    0.35    0.40    6.00    0.18       0
 32           UC   0.239   0.242
 33           UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
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35          KK   OFF40   BASIN
36          BA   0.002
37          LG    0.35    0.40    6.00    0.18       0
38          UC   0.116   0.140
39          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
40          UA     100
            *
1                                        HEC-1 INPUT                                        PAGE  2

LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

41          KK   CF45A COMBINE
42          HC       3
            *

43          KK    RF45   ROUTE
44          RS       1    FLOW
45          RC   0.050   0.035   0.050     980  0.0260    0.00
46          RX    0.00   14.00   21.00   25.00   31.00   35.00   41.00   45.00
47          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
            *

48          KK   OFF45   BASIN
49          BA   0.025
50          LG    0.35    0.40    6.00    0.18       0
51          UC   0.246   0.263
52          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
53          UA     100
            *

54          KK   CF45B COMBINE
55          HC       2
            *

56          KK    RO60   ROUTE
57          RS       1    FLOW
58          RC   0.050   0.035   0.050     625  0.0220    0.00
59          RX    0.00    6.00   10.00   14.00   27.00   38.00   57.00   83.00
60          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
            *

61          KK   OFF50   BASIN
62          BA   0.063
63          LG    0.35    0.40    6.00    0.18       0
64          UC   0.380   0.541
65          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
66          UA     100
            *

67          KK   RF60A   ROUTE
68          RS       1    FLOW
69          RC   0.050   0.035   0.050    1076  0.0300    0.00
70          RX    0.00    8.00   18.00   55.00   71.00   78.00   83.00   90.00
71          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
            *

72          KK   OFF55   BASIN
73          BA   0.003
74          LG    0.35    0.40    6.00    0.18       0
75          UC   0.127   0.150
76          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
77          UA     100
            *
1                                        HEC-1 INPUT                                        PAGE  3

LINE        ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

78          KK   RF60B   ROUTE
79          RS       1    FLOW
80          RC   0.050   0.035   0.050    1200  0.0320    0.00
81          RX    0.00    9.00   14.00   16.00   16.50   22.00   26.00   33.00
82          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
            *
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*

KK   RF60C   ROUTE
RS       1    FLOW
RC   0.050   0.035   0.050     650  0.0280    0.00
RX    0.00   25.00   38.00   48.00   49.00   57.00   67.00   80.00
RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
*

KK   OFF60   BASIN
BA   0.018
LG    0.35    0.40    6.00    0.18       0
UC   0.266   0.379
UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
UA     100
*

KK   CF60B COMBINE
HC       2
*

KK    RO65   ROUTE
RS       1    FLOW
RC   0.050   0.035   0.050     756  0.0250    0.00
RX    0.00    5.00    7.00    8.50    9.00   19.00   24.00   29.00
RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
*

KK    ON65   BASIN
BA   0.001
LG    0.35    0.40    6.00    0.18       0
UC   0.200   0.697
UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
UA     100
*

KK    ON60   BASIN
BA   0.004
LG    0.35    0.40    6.00    0.18       0
UC   0.147   0.175
UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
UA     100
*
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1 HEC-1 INPUT PAGE 4

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LINE  ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

KK    ON59   BASIN
BA   0.001
LG    0.10    0.25    6.00    0.26      60
UC   0.110   0.281
UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
UA     100
*

KK    CO60 COMBINE
HC       2
*

KK    DB60 STORAGE
KO
RS       1    STOR
SV            0.06    0.12    0.18    0.26    0.35    0.45    0.45
SQ            1.00    2.00    3.00    3.00    4.00    4.00   13.00
SE            0.50    1.00    1.50    2.00    2.50    2.95    3.00
*

KK    CO65 COMBINE
HC       4
*

KK   RO75A   ROUTE
RS       1    FLOW
RC   0.050   0.035   0.050     421  0.0240    0.00
RX    0.00   18.00   20.00   23.00   34.00   38.00   41.00   44.00
RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
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136          KK   OFF65   BASIN
137          BA   0.004
138          LG    0.35    0.40    6.00    0.18       0
139          UC   0.157   0.229
140          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
141          UA     100
             *

142          KK    RO71   ROUTE
143          RS       1    FLOW
144          RC   0.050   0.035   0.050     590  0.0250    0.00
145          RX    0.00   14.00   27.00   31.50   32.00   36.00   40.00   46.00
146          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

147          KK    ON71   BASIN
148          BA   0.003
149          LG    0.35    0.40    6.00    0.18       0
150          UC   0.167   0.304
151          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
152          UA     100
             *
1                                        HEC-1 INPUT                                    PAGE  5

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

153          KK    CO71 COMBINE
154          HC       2
             *

155          KK   RO75B   ROUTE
156          RS       1    FLOW
157          RC   0.050   0.035   0.050     606  0.0240    0.00
158          RX    0.00   18.00   20.00   23.00   34.00   38.00   41.00   44.00
159          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

160          KK    ON70   BASIN
161          BA   0.008
162          LG    0.30    0.25    6.00    0.22      23
163          UC   0.160   0.235
164          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
165          UA     100
             *

166          KK    DB70 STORAGE
167          KO
168          RS       1    STOR
169          SV            0.06    0.12    0.18    0.24    0.30    0.36    0.37
170          SQ                    2.00    3.00    4.00    5.00    6.00    6.00
171          SE            0.50    1.00    1.50    2.00    2.50    3.00    3.01
             *

172          KK    ON61   BASIN
173          BA   0.005
174          LG    0.25    0.34    6.00    0.21      24
175          UC   0.180   0.287
176          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
177          UA     100
             *

178          KK    DB61 STORAGE
179          KO
180          RS       1    STOR
181          SV            0.04    0.09    0.15    0.20    0.27    0.34    0.34
182          SQ            1.00    1.00    1.00    1.00    1.00    2.00    2.00
183          SE            0.50    1.00    1.50    2.00    2.50    2.95    3.00
             *

184          KK   CO75A COMBINE
185          HC       4
             *

186          KK   RO75C   ROUTE
187          RS       1    FLOW
188          RC   0.050   0.035   0.050     821  0.0260    0.00
```

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                              *
1                                               HEC-1 INPUT                                            PAGE  6

      LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

       191          KK    ON75   BASIN
       192          BA   0.009
       193          LG    0.33    0.34    6.00    0.19       8
       194          UC   0.286   0.445
       195          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       196          UA     100
                    *

       197          KK   CO75B COMBINE
       198          HC       2
                    *

       199          KK     DT1  DIVERT
       200          DT     D45     0.0     0.0
       201          DI     0.0    50.0   100.0   150.0   200.0   250.0   300.0   350.0   400.0   432.0
       202          DQ     0.0     0.0     0.0     0.0     0.0     0.3     1.5     4.0     8.0    11.0
                    *

       203          KK    RO76   ROUTE
       204          RS       1    FLOW
       205          RC   0.050   0.035   0.050     908  0.0260    0.00
       206          RX    0.00    2.00    5.00    8.00   25.00   29.00   32.00   35.00
       207          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                    *

       208          KK    ON76   BASIN
       209          BA   0.019
       210          LG    0.32    0.31    6.00    0.20      12
       211          UC   0.194   0.207
       212          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       213          UA     100
                    *

       214          KK    CO76 COMBINE
       215          HC       2
                    *

       216          KK     DT1RETRIEVE
       217          DR     D45
                    *

       218          KK    ON77   BASIN
       219          BA   0.001
       220          LG    0.27    0.34    6.00    0.20      22
       221          UC   0.501   5.771
       222          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       223          UA     100
                    *
1                                               HEC-1 INPUT                                            PAGE  7

      LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

       224          KK   OFF80   BASIN
       225          BA   0.044
       226          LG    0.35    0.40    6.00    0.18       0
       227          UC   0.314   0.399
       228          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
       229          UA     100
                    *

       230          KK   RO115   ROUTE
       231          RS       1    FLOW
       232          RC   0.050   0.035   0.050     540  0.0260    0.00
       233          RX    0.00   12.00   18.00   18.50   19.00   27.00   29.00   34.00
       234          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
                    *

       235          KK   ON115   BASIN
       236          BA   0.004
       237          LG    0.35    0.40    6.00    0.18       0
```

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493          BA   0.008
494          LG    0.35    0.40    6.00    0.18       0
495          UC   0.195   0.282
496          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
497          UA     100
             *

498          KK   RO100   ROUTE
499          RS       1    FLOW
500          RC   0.050   0.035   0.050    1091  0.0290    0.00
501          RX    0.00   14.00   28.00   40.00   41.00   51.00   58.00   64.00
502          RY    3.00    2.00    1.00    0.00    0.00    1.00    2.00    3.00
             *

503          KK   ON100   BASIN
504          BA   0.003
505          LG    0.35    0.40    6.00    0.18       0
506          UC   0.236   0.697
507          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
508          UA     100
             *
1                                        HEC-1 INPUT                                    PAGE 15

LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

509          KK   ON101   BASIN
510          BA   0.005
511          LG    0.31    0.28    6.00    0.21      22
512          UC   0.131   0.164
513          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
514          UA     100
             *

515          KK   DB101 STORAGE
516          KO
517          RS       1    STOR
518          SV            0.04    0.09    0.15    0.22    0.30    0.40
519          SQ            1.00    1.00    1.00    2.00    2.00    3.00
520          SE            0.50    1.00    1.50    2.00    2.50    3.00
             *

521          KK   CO100 COMBINE
522          HC       3
             *

523          KK   ON102   BASIN
524          BA   0.015
525          LG    0.30    0.26    6.00    0.22      25
526          UC   0.162   0.183
527          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
528          UA     100
             *

529          KK   DB102 STORAGE
530          KO
531          RS       1    STOR
532          SV            0.12    0.25    0.39    0.55    0.70    0.88    0.88
533          SQ            2.00    3.00    4.00    5.00    6.00    6.00   22.00
534          SE            0.50    1.00    1.50    2.00    2.50    2.95    3.00
             *

535          KK   CO102 COMBINE
536          HC       2
             *

537          KK    RO95   ROUTE
538          RS       1    FLOW
539          RC   0.050   0.035   0.050     231  0.0300    0.00
540          RX    0.00   11.00   35.00   41.00   42.00   44.00   47.00   82.00
541          RY    2.00    1.00    1.00    0.00    0.00    1.00    2.00    2.00
             *

542          KK    ON95   BASIN
543          BA   0.010
544          LG    0.35    0.40    6.00    0.18       0
545          UC   0.189   0.248
```
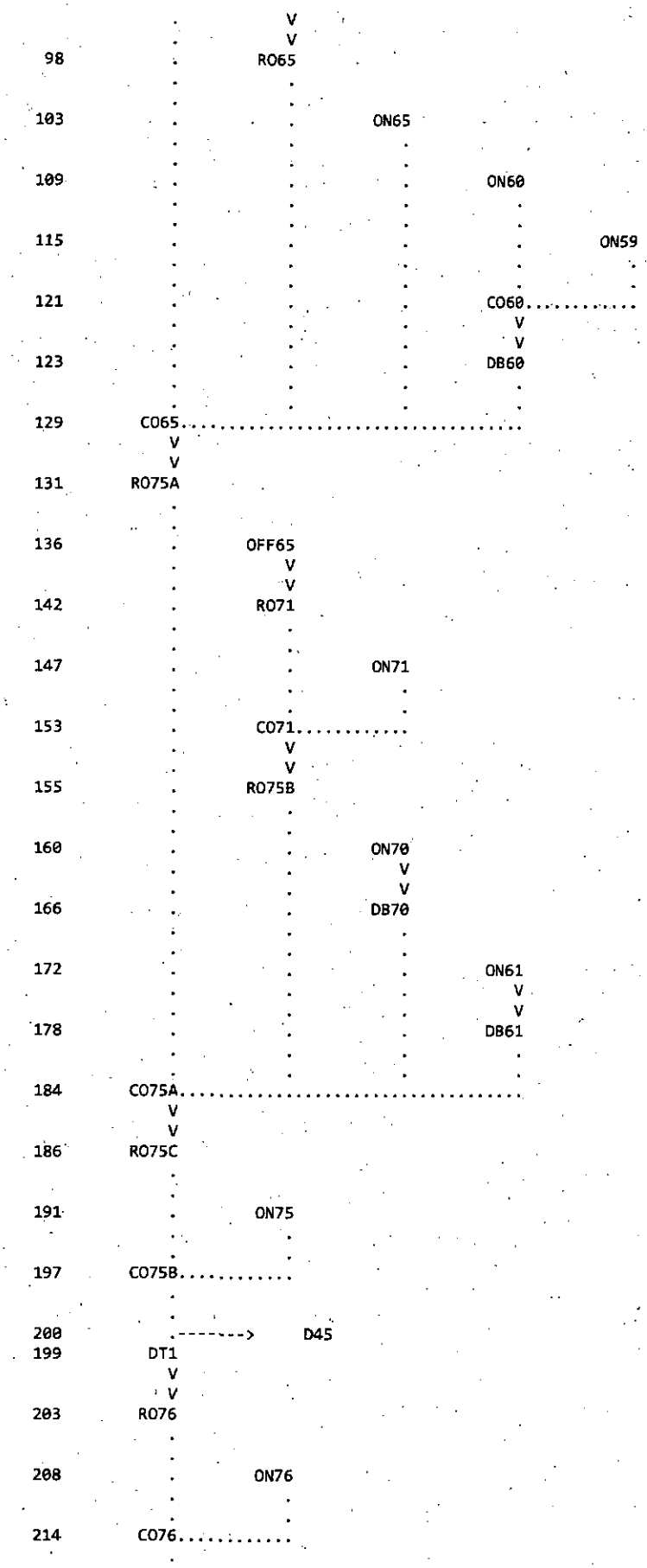
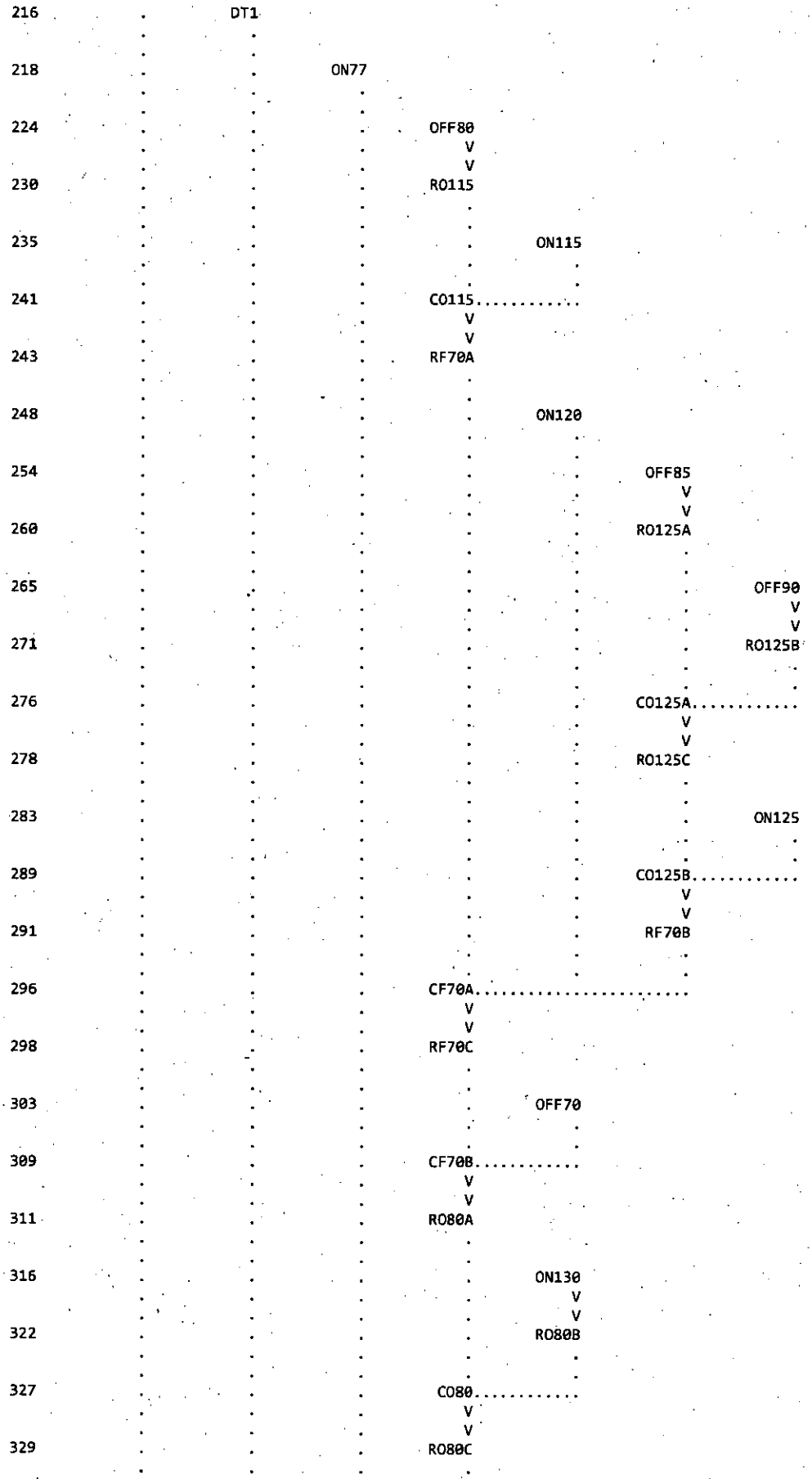
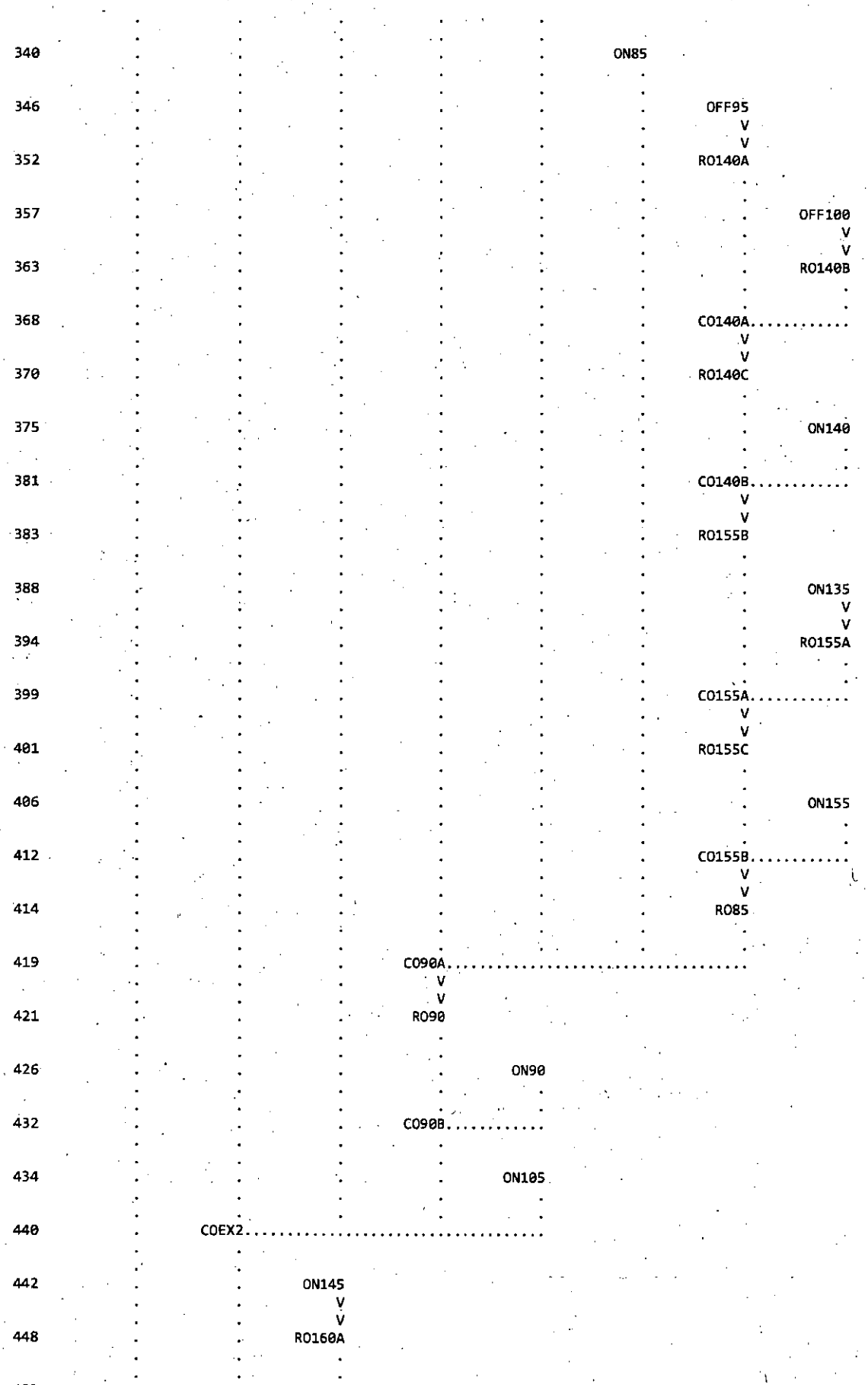
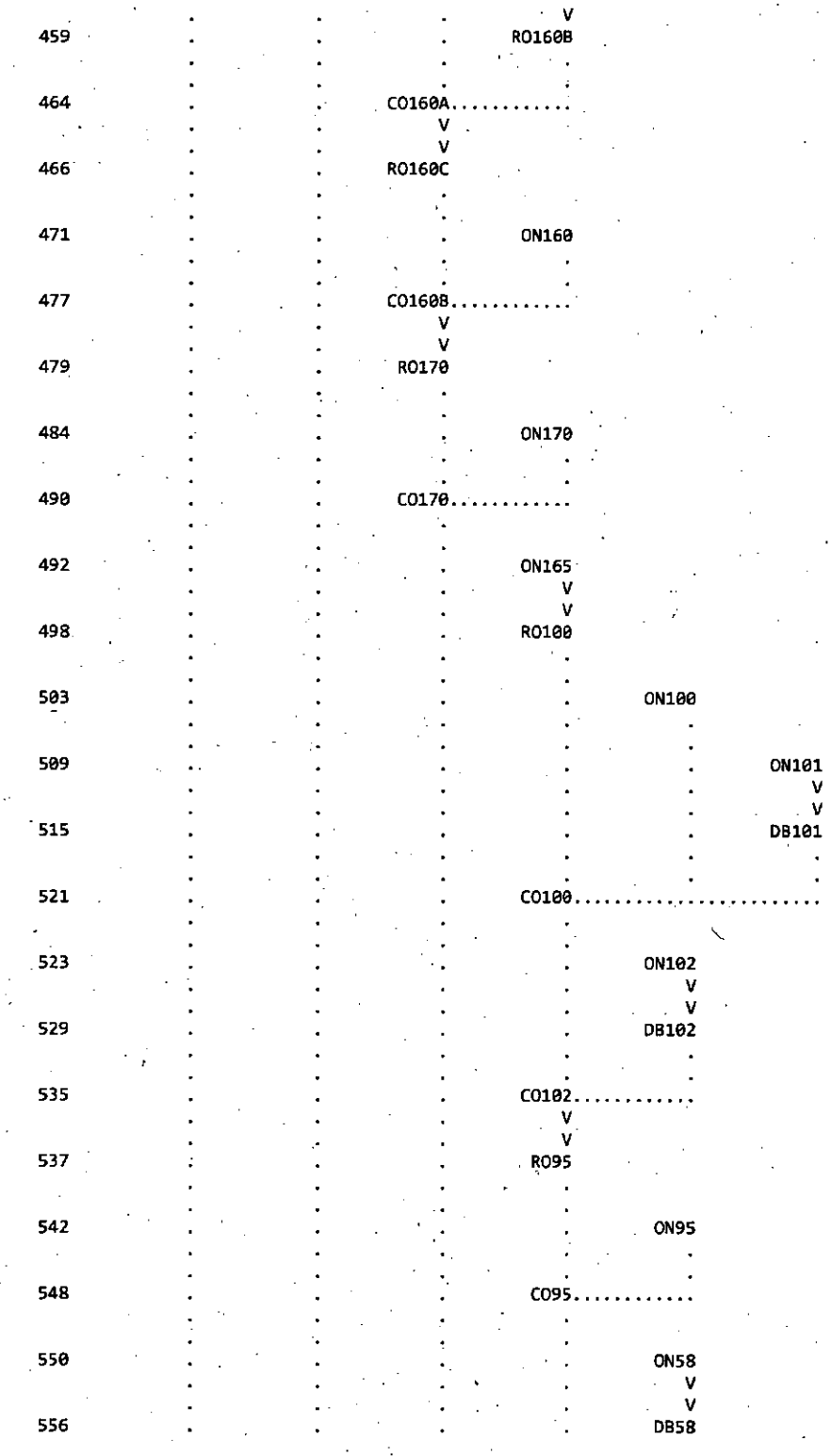

```
                  *
1                                                            HEC-1 INPUT                                             PAGE 16

          LINE            ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


           548            KK    CO95 COMBINE
           549            HC       2
                          *

           550            KK    ON58   BASIN
           551            BA   0.002
           552            LG    0.10    0.25    6.00    0.26      60
           553            UC   0.130   0.276
           554            UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
           555            UA     100
                          *

           556            KK    DB58 STORAGE
           557            KO
           558            RS       1    STOR
           559            SV            0.07    0.14
           560            SQ            1.00    1.00
           561            SE            0.50    1.00
                          *
           562            ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    23      OFF30
                .
                .
    29          .          OFF35
                .              .
                .              .
    35          .              .          OFF40
                .              .              .
                .              .              .
    41      CF45A.......................
                V
                V
    43       RF45
                .
                .
    48          .          OFF45
                .              .
                .              .
    54      CF45B............
                V
                V
    56       RO60
                .
                .
    61          .          OFF50
                .              V
                .              V
    67          .          RF60A
                .              .
                .              .
    72          .              .          OFF55
                .              .              V
                .              .              V
    78          .              .          RF60B
                .              .              .
                .              .              .
    83          .          CF60A............
                .              V
                .              V
    85          .          RF60C
                .              .
                .              .
    90          .              .          OFF60
                .              .              .
```


98 RO65
103 ON65
109 ON60
115 ON59
121 CO60
123 DB60
129 CO65
131 RO75A
136 OFF65
142 RO71
147 ON71
153 CO71
155 RO75B
160 ON70
166 DB70
172 ON61
178 DB61
184 CO75A
186 RO75C
191 ON75
197 CO75B
200 D45
199 DT1
203 RO76
208 ON76
214 CO76


216
DT1
218
ON77
224
OFF80
230
RO115
235
ON115
241
CO115
243
RF70A
248
ON120
254
OFF85
260
RO125A
265
OFF90
271
RO125B
276
CO125A
278
RO125C
283
ON125
289
CO125B
291
RF70B
296
CF70A
298
RF70C
303
OFF70
309
CF70B
311
RO80A
316
ON130
322
RO80B
327
CO80
329
RO80C


340
ON85
346
OFF95
352
RO140A
357
OFF100
363
RO140B
368
CO140A
370
RO140C
375
ON140
381
CO140B
383
RO155B
388
ON135
394
RO155A
399
CO155A
401
RO155C
406
ON155
412
CO155B
414
RO85
419
CO90A
421
RO90
426
ON90
432
CO90B
434
ON105
440
COEX2
442
ON145
448
RO160A



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN  1998                *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   18FEB17  TIME  17:09:58   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

Flood Control District of Maricopa County
STORYROCK PH1B PROP - STORYROCK PHASE 1B PROP CONDITION
100 YEAR
6 Hour Storm
Unit Hydrograph: Clark
Storm: Multiple
02/18/2017

```
 9 IO          OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT         HYDROGRAPH TIME DATA
                     NMIN          5  MINUTES IN COMPUTATION INTERVAL
                    IDATE      1JAN99  STARTING DATE
                    ITIME        0000  STARTING TIME
                       NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     7JAN99  ENDING DATE
                    NDTIME        2235  ENDING TIME
                    ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL    0.08 HOURS
                      TOTAL TIME BASE  166.58 HOURS

        ENGLISH UNITS
             DRAINAGE AREA         SQUARE MILES
             PRECIPITATION DEPTH   INCHES
             LENGTH, ELEVATION     FEET
             FLOW                  CUBIC FEET PER SECOND
             STORAGE VOLUME        ACRE-FEET
             SURFACE AREA          ACRES
             TEMPERATURE           DEGREES FAHRENHEIT

11 JD          INDEX STORM NO. 1
                     STRM       3.17  PRECIPITATION DEPTH
                     TRDA       0.00  TRANSPOSITION DRAINAGE AREA

12 PI            PRECIPITATION PATTERN
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                   0.03      0.03      0.05      0.05      0.05      0.15      0.15      0.15      0.03      0.03
                   0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00

15 JD          INDEX STORM NO. 2
                     STRM       3.15  PRECIPITATION DEPTH
                     TRDA       0.50  TRANSPOSITION DRAINAGE AREA

16 PI            PRECIPITATION PATTERN
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                   0.03      0.03      0.05      0.05      0.05      0.15      0.15      0.15      0.03      0.03
                   0.03      0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00

19 JD          INDEX STORM NO. 3
                     STRM       3.10  PRECIPITATION DEPTH
                     TRDA       2.80  TRANSPOSITION DRAINAGE AREA

20 PI            PRECIPITATION PATTERN
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.01      0.01      0.01      0.01      0.01      0.01      0.03
                   0.03      0.03      0.07      0.07      0.07      0.08      0.08      0.08      0.05      0.05
                   0.05      0.02      0.02      0.02      0.01      0.01      0.01      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00
```

*** ***

```
          **************
          *            *
123 KK    *      DB60  *      STORAGE
          *            *
          **************

124 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
```

*** ***

```
          **************
          *            *
166 KK    *      DB70  *      STORAGE
          *            *
          **************

167 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
```

*** ***

```
          **************
          *            *
178 KK    *      DB61  *      STORAGE
          *            *
          **************

179 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
```

*** ***

```
          **************
          *            *
515 KK    *     DB101  *      STORAGE
          *            *
          **************

516 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
```

*** ***

```
          **************
          *            *
529 KK    *     DB102  *      STORAGE
          *            *
          **************

530 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE
```

*** ***

```
          **************
          *            *
 556 KK   *    DB58    *      STORAGE
          *            *
          **************

 557 KO        OUTPUT CONTROL VARIABLES
                    IPRNT          5  PRINT CONTROL
                    IPLOT          0  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE
1
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	OFF30	205.	4.25	25.	6.	2.	0.15		
+	HYDROGRAPH AT	OFF35	61.	4.17	5.	1.	0.	0.03		
+	HYDROGRAPH AT	OFF40	5.	4.00	0.	0.	0.	0.00		
+	3 COMBINED AT	CF45A	255.	4.25	30.	8.	3.	0.18		
+	ROUTED TO	RF45	251.	4.25	30.	8.	3.	0.18		
+	HYDROGRAPH AT	OFF45	46.	4.17	4.	1.	0.	0.03		
+	2 COMBINED AT	CF45B	289.	4.25	35.	9.	3.	0.21		
+	ROUTED TO	RO60	287.	4.25	35.	9.	3.	0.21		
+	HYDROGRAPH AT	OFF50	74.	4.25	10.	3.	1.	0.06		
+	ROUTED TO	RF60A	72.	4.33	10.	3.	1.	0.06		
+	HYDROGRAPH AT	OFF55	7.	4.00	1.	0.	0.	0.00		
+	ROUTED TO	RF60B	6.	4.08	1.	0.	0.	0.00		
+	2 COMBINED AT	CF60A	75.	4.33	11.	3.	1.	0.07		
+	ROUTED TO	RF60C	75.	4.33	11.	3.	1.	0.07		
+	HYDROGRAPH AT	OFF60	27.	4.17	3.	1.	0.	0.02		
+	2 COMBINED AT	CF60B	96.	4.33	14.	3.	1.	0.08		
+	ROUTED TO	RO65	96.	4.33	14.	3.	1.	0.08		
+	HYDROGRAPH AT	ON65	1.	4.17	0.	0.	0.	0.00		

+	ON60	9.	4.08	1.	0.	0.	0.00
	HYDROGRAPH AT						
+	ON59	2.	4.08	0.	0.	0.	0.00
	2 COMBINED AT						
+	CO60	11.	4.08	1.	0.	0.	0.01
	ROUTED TO						
+	DB60	3.	4.42	1.	0.	0.	0.01
	4 COMBINED AT						
+	CO65	380.	4.25	50.	12.	4.	0.30
	ROUTED TO						
+	RO75A	382.	4.33	50.	12.	4.	0.30
	HYDROGRAPH AT						
+	OFF65	8.	4.08	1.	0.	0.	0.00
	ROUTED TO						
+	RO71	8.	4.17	1.	0.	0.	0.00
	HYDROGRAPH AT						
+	ON71	5.	4.08	1.	0.	0.	0.00
	2 COMBINED AT						
+	CO71	13.	4.08	1.	0.	0.	0.01
	ROUTED TO						
+	RO75B	13.	4.17	1.	0.	0.	0.01
	HYDROGRAPH AT						
+	ON70	18.	4.08	2.	0.	0.	0.01
	ROUTED TO						
+	DB70	6.	4.17	2.	0.	0.	0.01
	HYDROGRAPH AT						
+	ON61	10.	4.08	1.	0.	0.	0.00
	ROUTED TO						
+	DB61	2.	4.50	0.	0.	0.	0.00
	4 COMBINED AT						
+	CO75A	398.	4.33	53.	13.	4.	0.32
	ROUTED TO						
+	RO75C	400.	4.33	53.	13.	4.	0.32
	HYDROGRAPH AT						
+	ON75	13.	4.17	2.	0.	0.	0.01
	2 COMBINED AT						
+	CO75B	411.	4.33	54.	14.	5.	0.33
	DIVERSION TO						
+	D45	9.	4.33	0.	0.	0.	0.33
	HYDROGRAPH AT						
+	DT1	402.	4.33	54.	13.	4.	0.33
	ROUTED TO						
+	RO76	401.	4.33	54.	13.	4.	0.33
	HYDROGRAPH AT						
+	ON76	43.	4.08	4.	1.	0.	0.02
	2 COMBINED AT						
+	CO76	421.	4.33	57.	14.	5.	0.35
	HYDROGRAPH AT						
+	DT1	9.	4.33	0.	0.	0.	0.33
	HYDROGRAPH AT						
+	ON77	0.	4.50	0.	0.	0.	0.00
	HYDROGRAPH AT						

	ROUTED TO							
+		RO115	64.	4.25	7.	2.	1.	0.04
	HYDROGRAPH AT							
+		ON115	9.	4.08	1.	0.	0.	0.00
	2 COMBINED AT							
+		CO115	69.	4.25	8.	2.	1.	0.05
	ROUTED TO							
+		RF70A	68.	4.25	8.	2.	1.	0.05
	HYDROGRAPH AT							
+		ON120	2.	4.08	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		OFF85	6.	4.00	0.	0.	0.	0.00
	ROUTED TO							
+		RO125A	5.	4.00	0.	0.	0.	0.00
	HYDROGRAPH AT							
+		OFF90	9.	4.00	1.	0.	0.	0.00
	ROUTED TO							
+		RO125B	9.	4.00	1.	0.	0.	0.00
	2 COMBINED AT							
+		CO125A	15.	4.00	1.	0.	0.	0.00
	ROUTED TO							
+		RO125C	14.	4.08	1.	0.	0.	0.00
	HYDROGRAPH AT							
+		ON125	28.	4.17	3.	1.	0.	0.02
	2 COMBINED AT							
+		CO125B	40.	4.08	4.	1.	0.	0.02
	ROUTED TO							
+		RF70B	39.	4.17	4.	1.	0.	0.02
	3 COMBINED AT							
+		CF70A	102.	4.17	12.	3.	1.	0.07
	ROUTED TO							
+		RF70C	102.	4.25	12.	3.	1.	0.07
	HYDROGRAPH AT							
+		OFF70	26.	4.08	2.	1.	0.	0.01
	2 COMBINED AT							
+		CF70B	124.	4.17	14.	3.	1.	0.08
	ROUTED TO							
+		RO80A	122.	4.25	14.	3.	1.	0.08
	HYDROGRAPH AT							
+		ON130	20.	4.17	2.	1.	0.	0.01
	ROUTED TO							
+		RO80B	20.	4.17	2.	1.	0.	0.01
	2 COMBINED AT							
+		CO80	142.	4.17	16.	4.	1.	0.10
	ROUTED TO							
+		RO80C	140.	4.25	16.	4.	1.	0.10
	HYDROGRAPH AT							
+		ON80	72.	4.08	7.	2.	1.	0.03
	HYDROGRAPH AT							
+		ON85	7.	4.17	1.	0.	0.	0.01
	HYDROGRAPH AT							
+		OFF85	80.	4.25	11.	3.	1.	0.06

	ROUTED TO							
+		RO140A	90.	4.25	11.	3.	1.	0.06
	HYDROGRAPH AT							
+		OFF100	22.	4.08	2.	0.	0.	0.01
	ROUTED TO							
+		RO140B	21.	4.17	2.	0.	0.	0.01
	2 COMBINED AT							
+		CO140A	107.	4.25	12.	3.	1.	0.08
	ROUTED TO							
+		RO140C	107.	4.25	12.	3.	1.	0.08
	HYDROGRAPH AT							
+		ON140	26.	4.17	3.	1.	0.	0.02
	2 COMBINED AT							
+		CO140B	130.	4.25	15.	4.	1.	0.09
	ROUTED TO							
+		RO155B	124.	4.33	15.	4.	1.	0.09
	HYDROGRAPH AT							
+		ON135	16.	4.08	1.	0.	0.	0.01
	ROUTED TO							
+		RO155A	15.	4.17	1.	0.	0.	0.01
	2 COMBINED AT							
+		CO155A	133.	4.33	17.	4.	1.	0.10
	ROUTED TO							
+		RO155C	134.	4.33	17.	4.	1.	0.10
	HYDROGRAPH AT							
+		ON155	31.	4.17	3.	1.	0.	0.02
	2 COMBINED AT							
+		CO155B	153.	4.25	19.	5.	2.	0.12
	ROUTED TO							
+		RO85	154.	4.33	19.	5.	2.	0.12
	4 COMBINED AT							
+		CO90A	346.	4.25	43.	11.	4.	0.25
	ROUTED TO							
+		RO90	337.	4.33	43.	11.	4.	0.25
	HYDROGRAPH AT							
+		ON90	34.	4.08	3.	1.	0.	0.02
	2 COMBINED AT							
+		CO90B	358.	4.33	46.	12.	4.	0.27
	HYDROGRAPH AT							
+		ON105	2.	4.00	0.	0.	0.	0.00
	4 COMBINED AT							
+		COEX2	368.	4.33	47.	12.	4.	0.27
	HYDROGRAPH AT							
+		ON145	23.	4.17	2.	1.	0.	0.01
	ROUTED TO							
+		RO160A	22.	4.17	2.	1.	0.	0.01
	HYDROGRAPH AT							
+		ON150	16.	4.08	1.	0.	0.	0.01
	ROUTED TO							
+		RO160B	14.	4.17	1.	0.	0.	0.01
	2 COMBINED AT							
+		CO160A	37.	4.17	4.	1.	0.	0.02

+		RO160C	33.	4.25	4.	1.	0.	0.02
+	HYDROGRAPH AT	ON160	49.	4.25	6.	2.	1.	0.04
+	2 COMBINED AT	CO160B	81.	4.25	10.	2.	1.	0.06
+	ROUTED TO	RO170	81.	4.25	10.	2.	1.	0.06
+	HYDROGRAPH AT	ON170	11.	4.08	1.	0.	0.	0.00
+	2 COMBINED AT	CO170	88.	4.25	11.	3.	1.	0.06
+	HYDROGRAPH AT	ON165	15.	4.08	1.	0.	0.	0.01
+	ROUTED TO	RO100	13.	4.17	1.	0.	0.	0.01
+	HYDROGRAPH AT	ON100	3.	4.17	1.	0.	0.	0.00
+	HYDROGRAPH AT	ON101	12.	4.08	1.	0.	0.	0.00
+	ROUTED TO	DB101	3.	4.42	1.	0.	0.	0.00
+	3 COMBINED AT	CO100	19.	4.17	3.	1.	0.	0.02
+	HYDROGRAPH AT	ON102	37.	4.08	3.	1.	0.	0.01
+	ROUTED TO	DB102	22.	4.25	3.	1.	0.	0.01
+	2 COMBINED AT	CO102	40.	4.25	6.	2.	1.	0.03
+	ROUTED TO	RO95	35.	4.25	6.	2.	1.	0.03
+	HYDROGRAPH AT	ON95	20.	4.08	2.	0.	0.	0.01
+	2 COMBINED AT	CO95	49.	4.25	8.	2.	1.	0.04
+	HYDROGRAPH AT	ON58	4.	4.08	1.	0.	0.	0.00
+	ROUTED TO	DB58	1.	4.08	1.	0.	0.	0.00

*** NORMAL END OF HEC-1 ***

Appendix C – Hydraulics

HEC-RAS Output (Existing and Proposed Conditions)

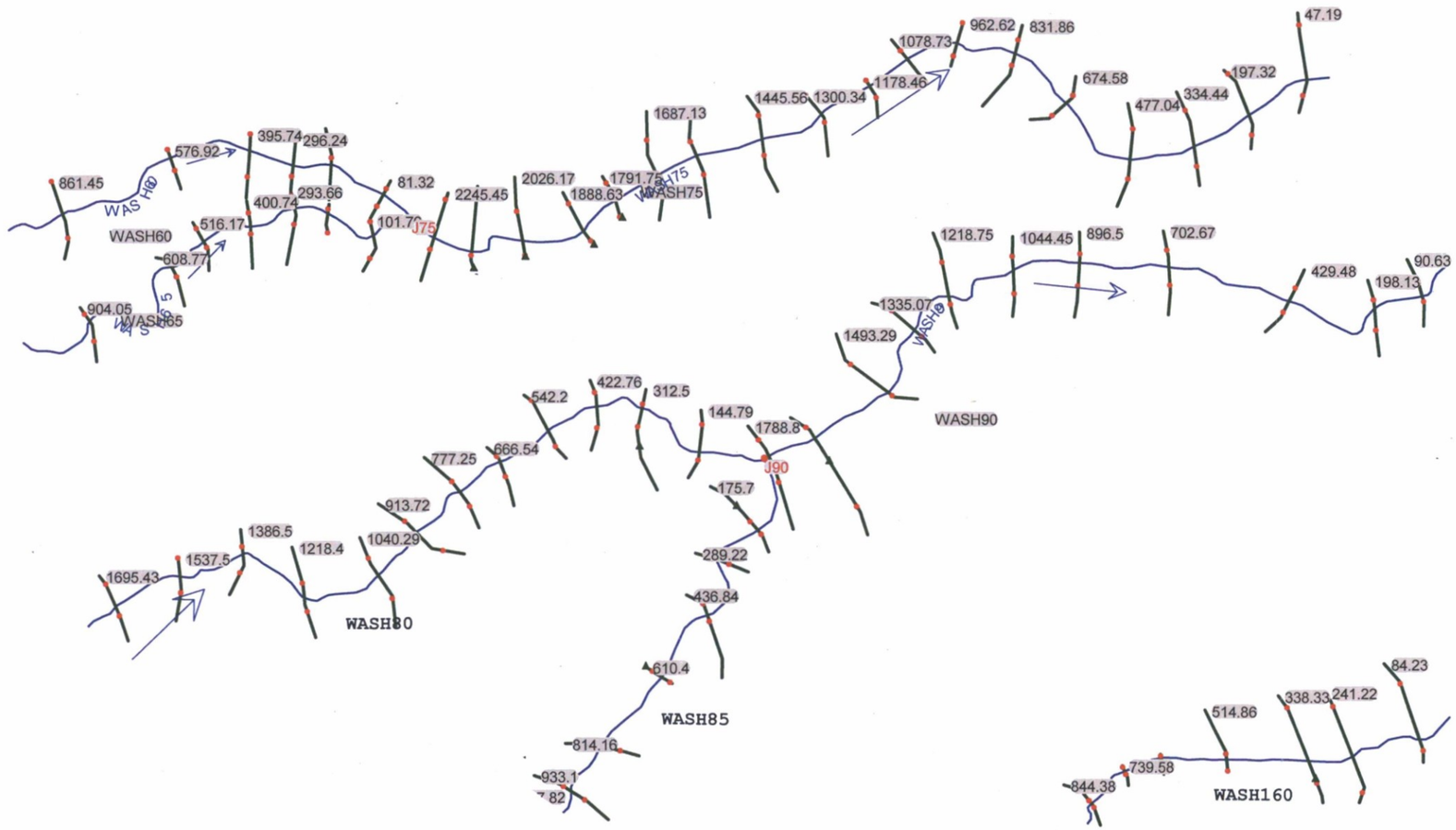
- Schematic Geometry
- Cross Sections
- Profiles
- Summary Table

HY-8 Output:

- Preliminary Culvert Calculations

First Flush Spillway/Dissipation Basin Design:

HEC-RAS Existing Condition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576.92
395.74
296.24
400.74
293.66
516.17
608.77
904.05
81.32
101.76
J75
2245.45
2026.17
1888.63
1791.75
1687.13
WASH75
1445.56
1300.34
1178.46
1078.73
962.62
831.86
674.58
477.04
334.44
197.32
47.19
WASH60
WASH65
1218.75
1044.45
896.5
702.67
429.48
198.13
90.63
1335.07
1493.29
WASH90
542.2
422.76
312.5
144.79
1788.8
777.25
666.54
913.72
J90
175.7
289.22
436.84
1386.5
1537.5
1218.4
1040.29
1695.43
WASH80
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WASH85
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514.86
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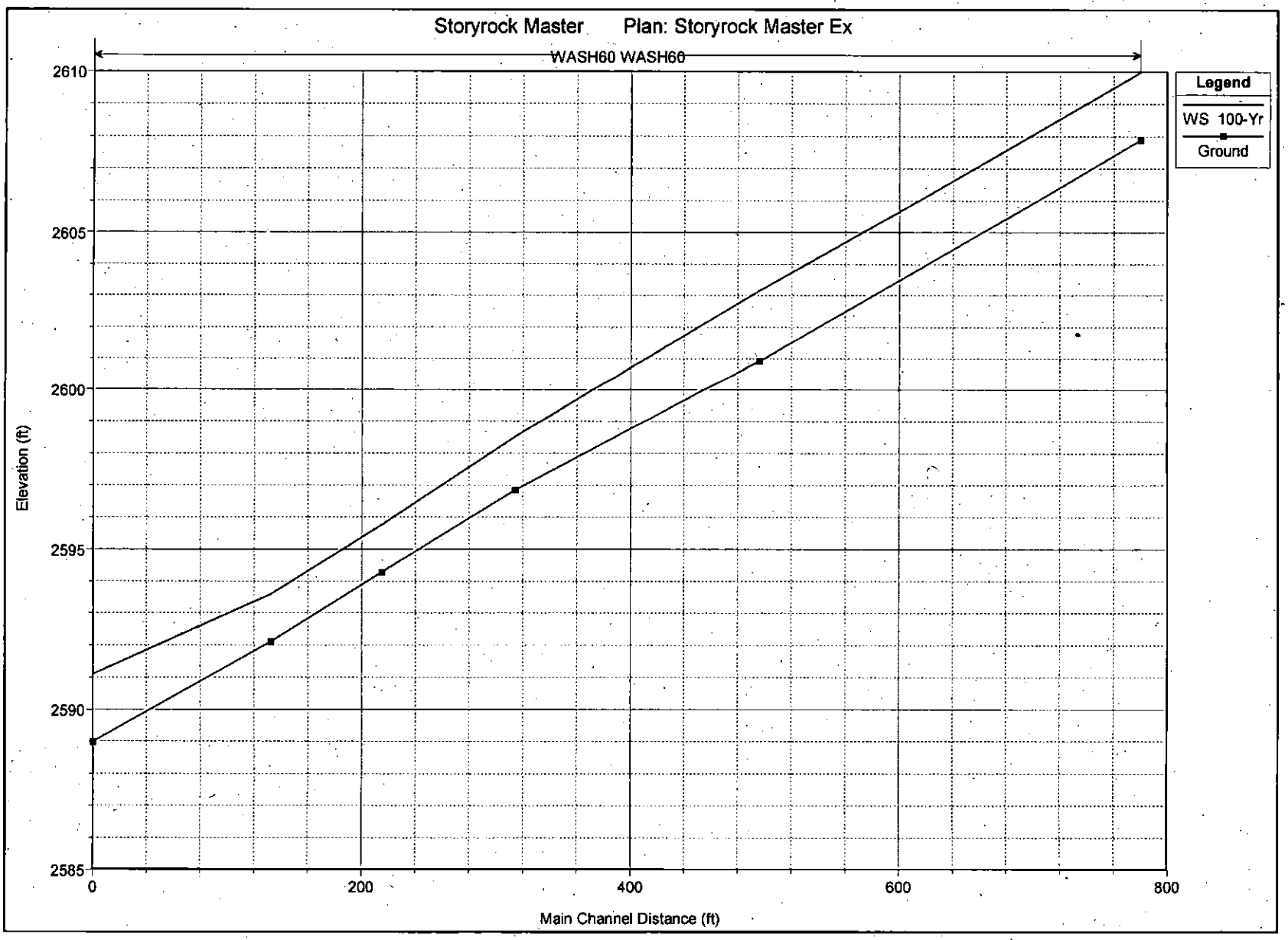
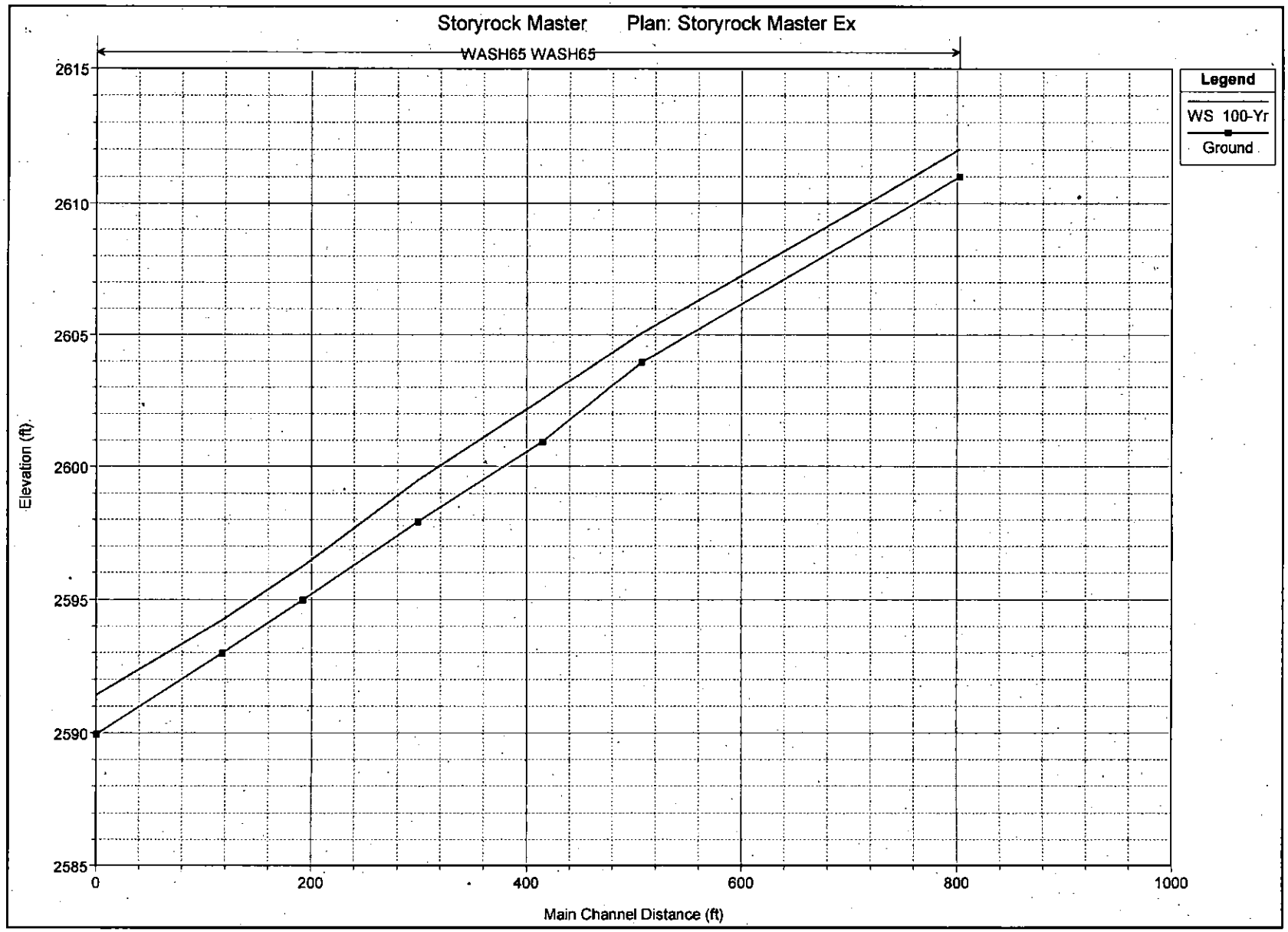
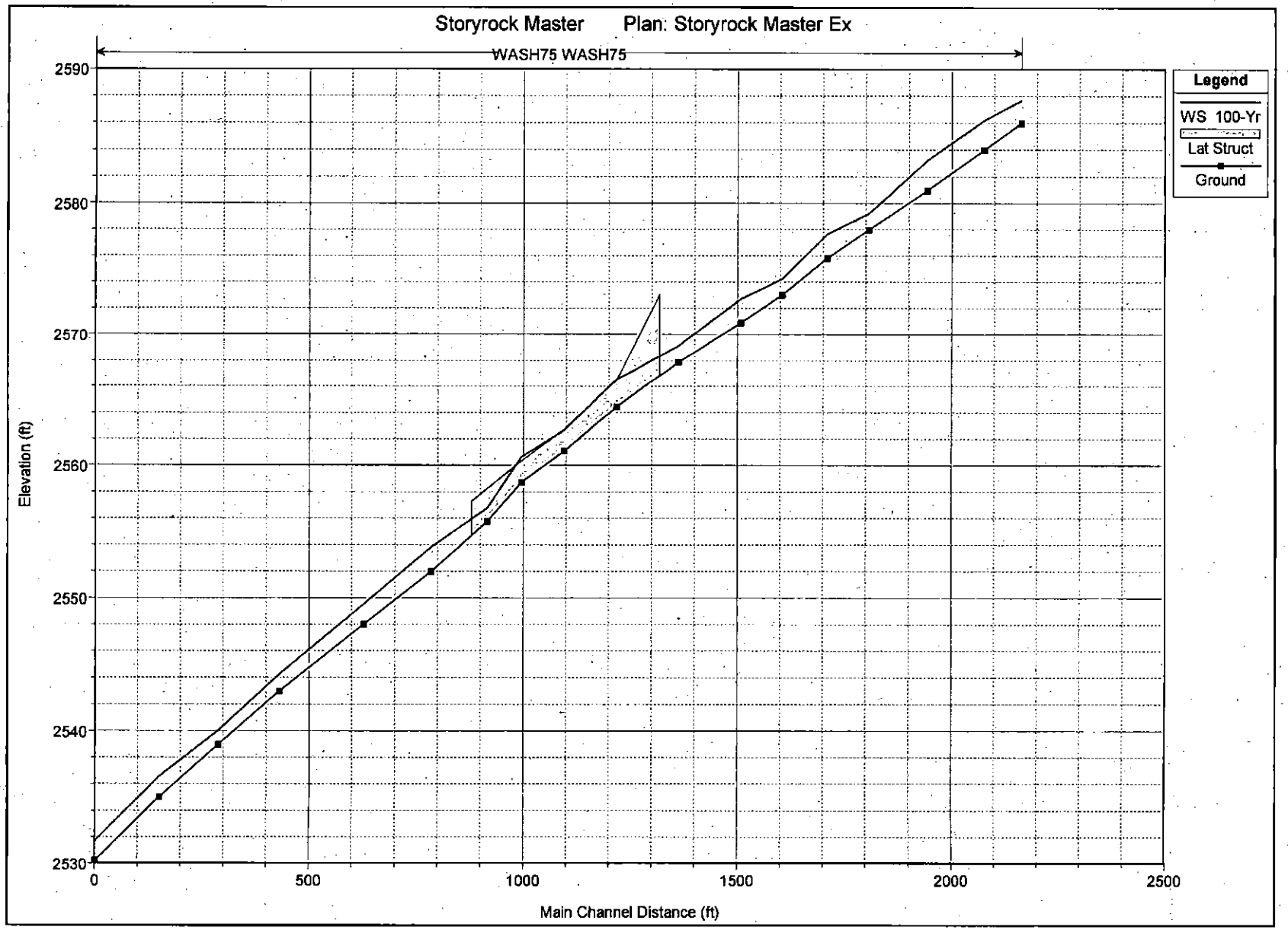
241.22
739.58
844.38
WASH160


Storyrock Master Plan: Storyrock Master Ex
WASH60 WASH60
Legend
WS 100-Yr
Ground
Elevation (ft)
2610
2605
2600
2595
2590
2585
0
200
400
600
800
Main Channel Distance (ft)


Storyrock Master Plan: Storyrock Master Ex
WASH65 WASH65
Legend
WS 100-Yr
Ground
Elevation (ft)
2615
2610
2605
2600
2595
2590
2585
0
200
400
600
800
1000
Main Channel Distance (ft)


Storyrock Master Plan: Storyrock Master Ex
WASH75 WASH75
Legend
WS 100-Yr
Lat Struct
Ground
Elevation (ft)
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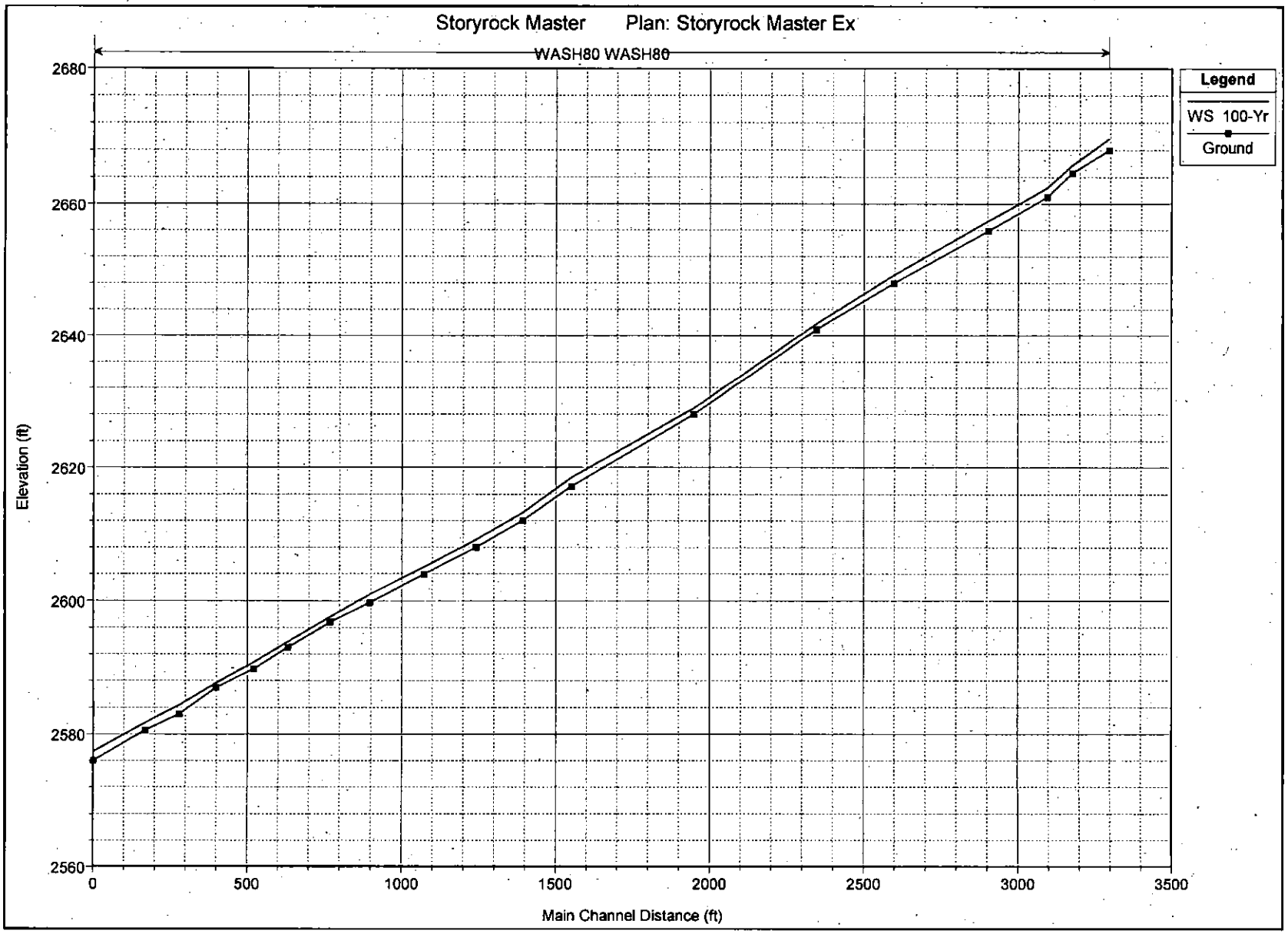
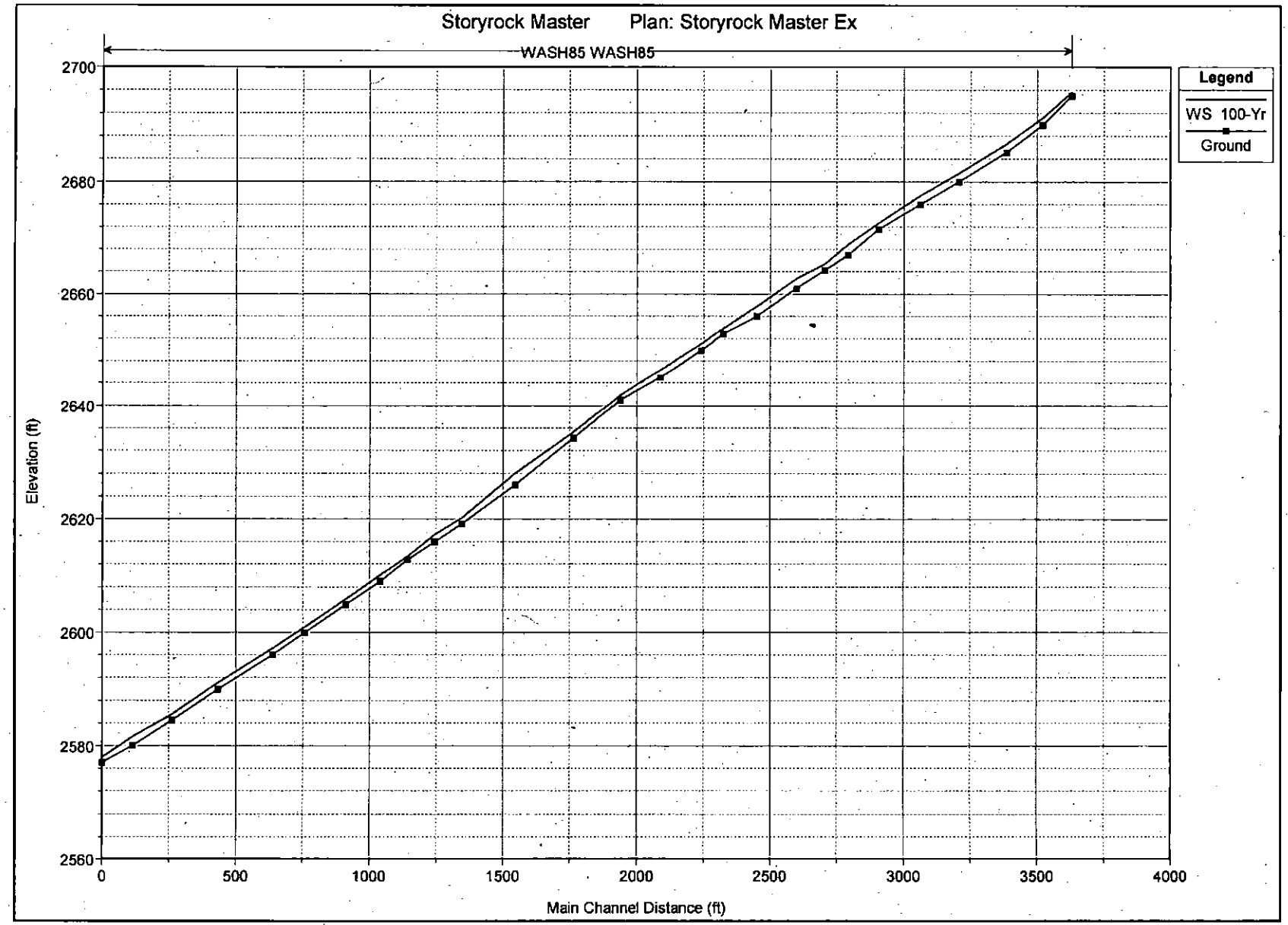
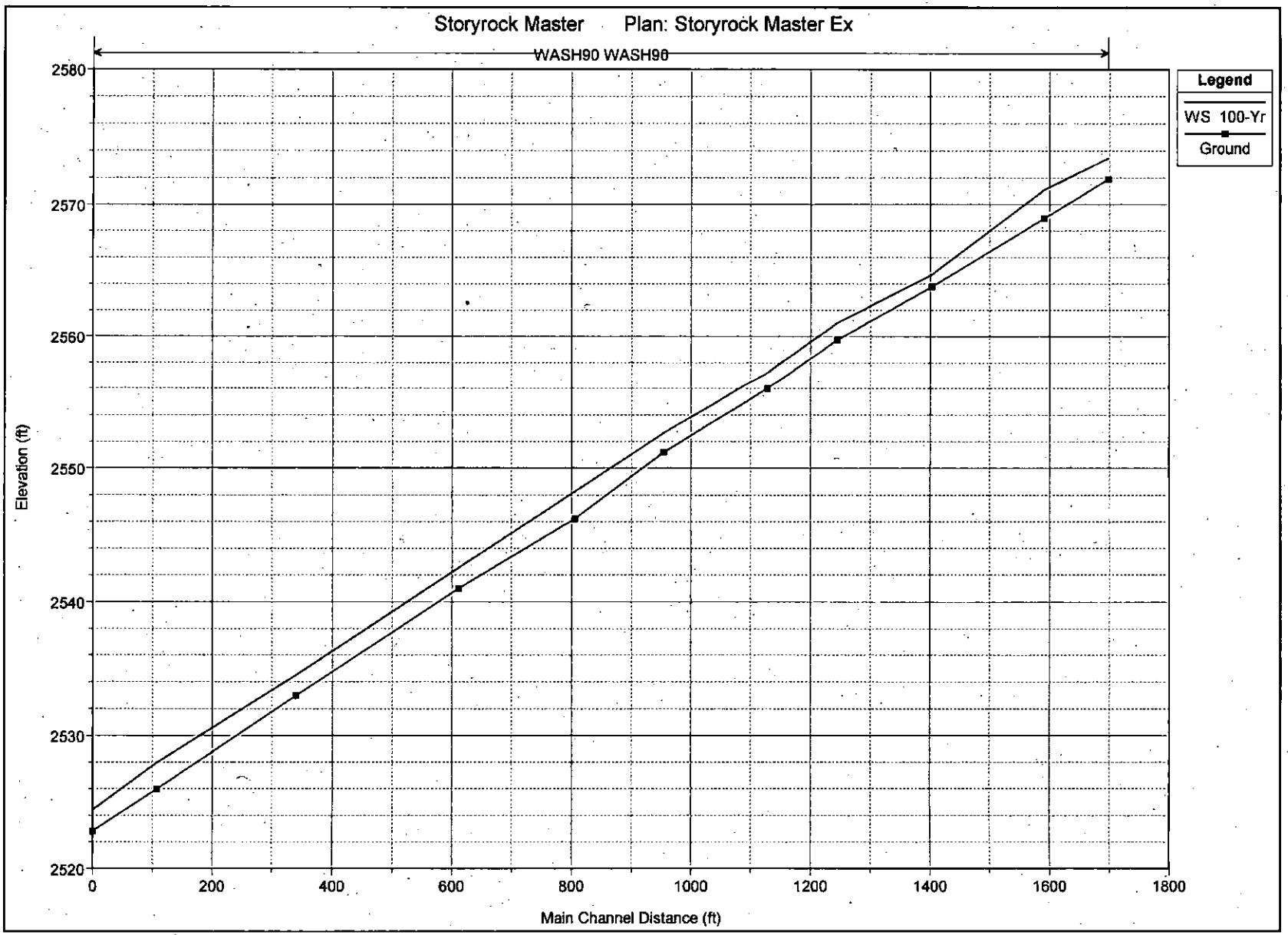
2580
2570
2560
2550
2540
2530
0
500
1000
1500
2000
2500
Main Channel Distance (ft)


Storyrock Master Plan: Storyrock Master Ex
WASH80 WASH80
Legend
WS 100-Yr
Ground
Elevation (ft)
2680
2660
2640
2620
2600
2580
2560
0
500
1000
1500
2000
2500
3000
3500
Main Channel Distance (ft)


Storyrock Master Plan: Storyrock Master Ex
WASH85 WASH85
Legend
WS 100-Yr
Ground
Elevation (ft)
2700
2680
2660
2640
2620
2600
2580
2560
0
500
1000
1500
2000
2500
3000
3500
4000
Main Channel Distance (ft)


Storyrock Master Plan: Storyrock Master Ex
WASH90 WASH90
Legend
WS 100-Yr
Ground
Elevation (ft)
2580
2570
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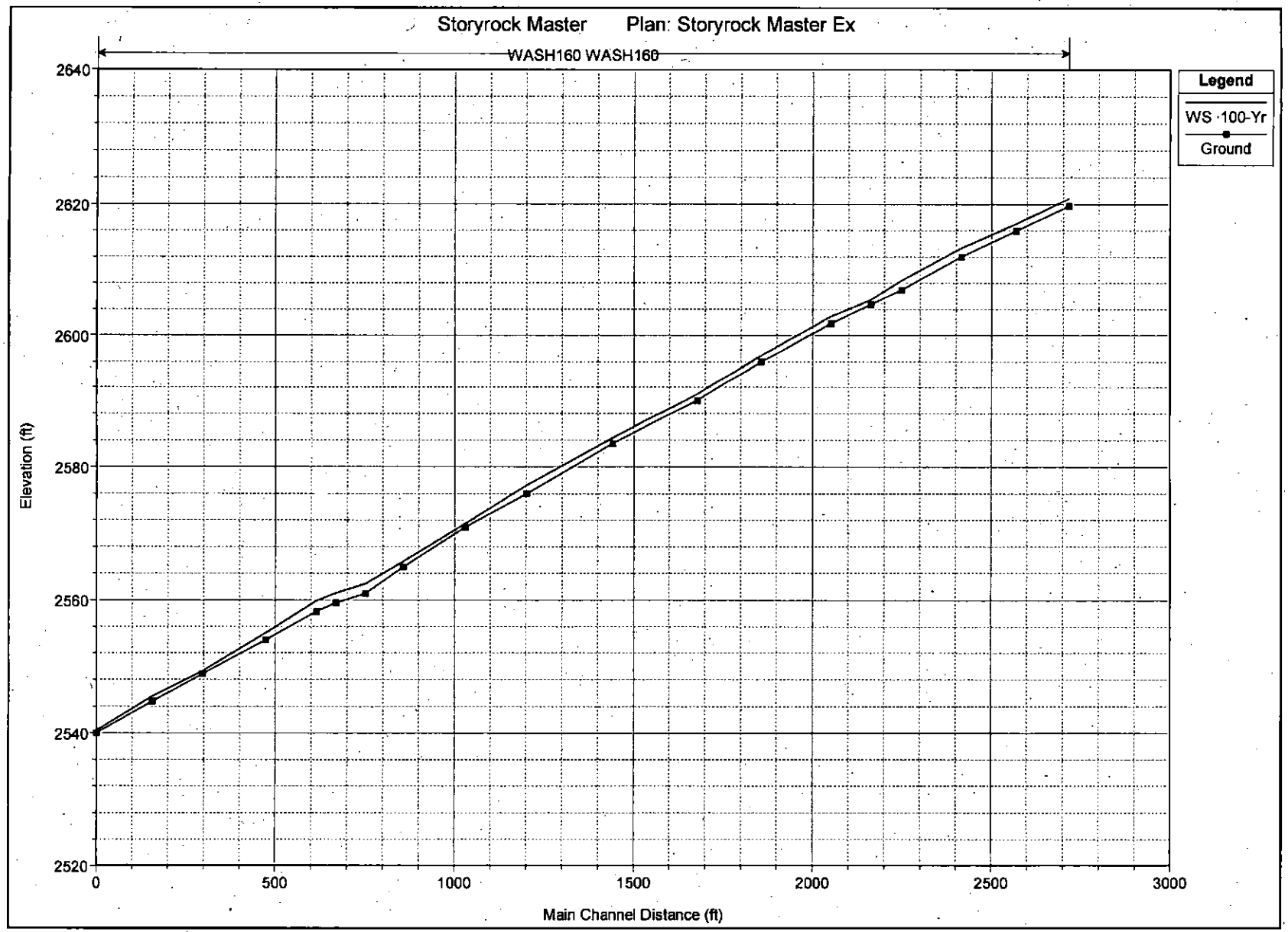
2530
2520
0
200
400
600
800
1000
1200
1400
1600
1800
Main Channel Distance (ft)


Storyrock Master Plan: Storyrock Master Ex
WASH160 WASH160
Legend
WS 100-Yr
Ground
Elevation (ft)
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2600
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2520
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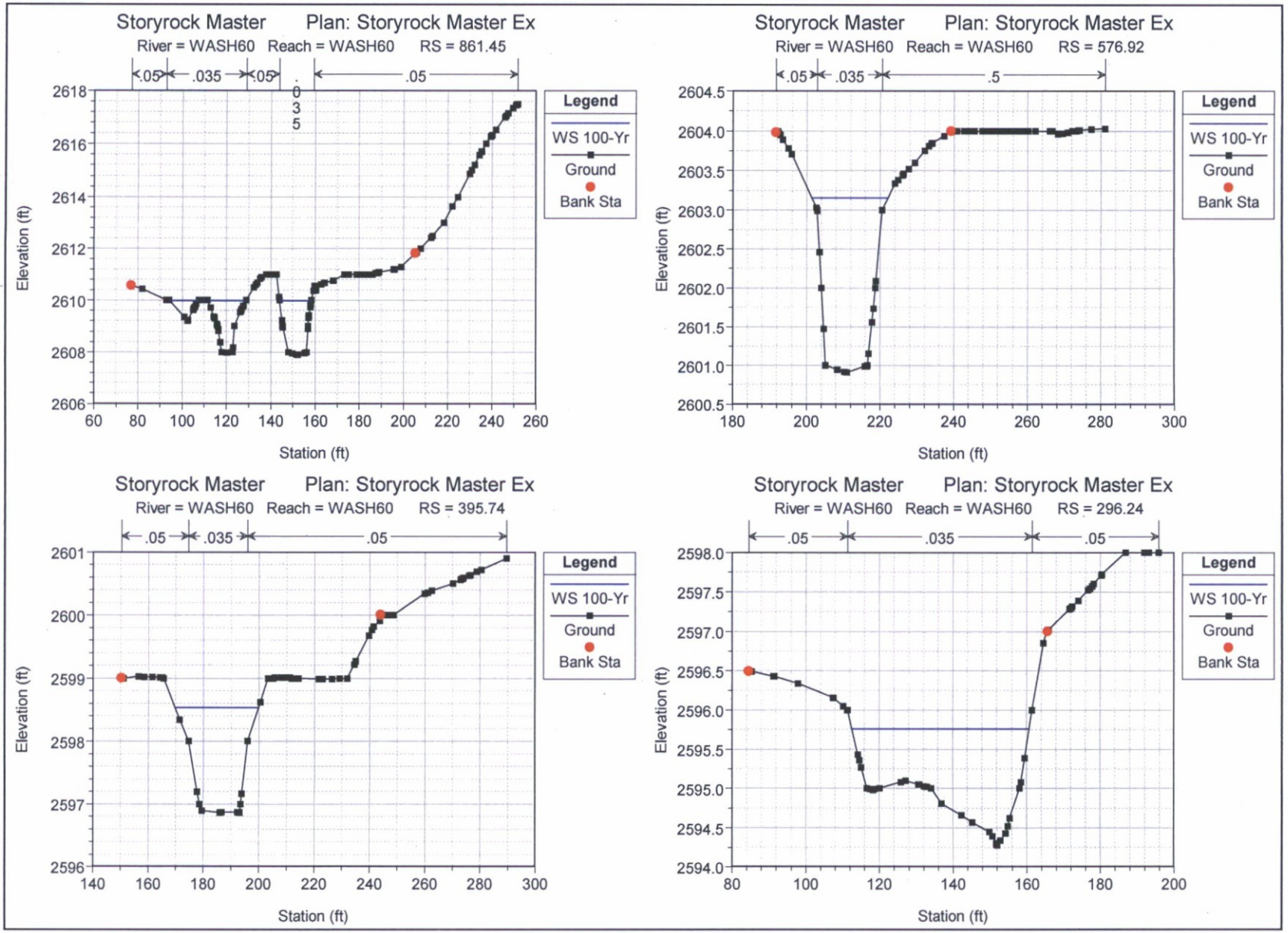
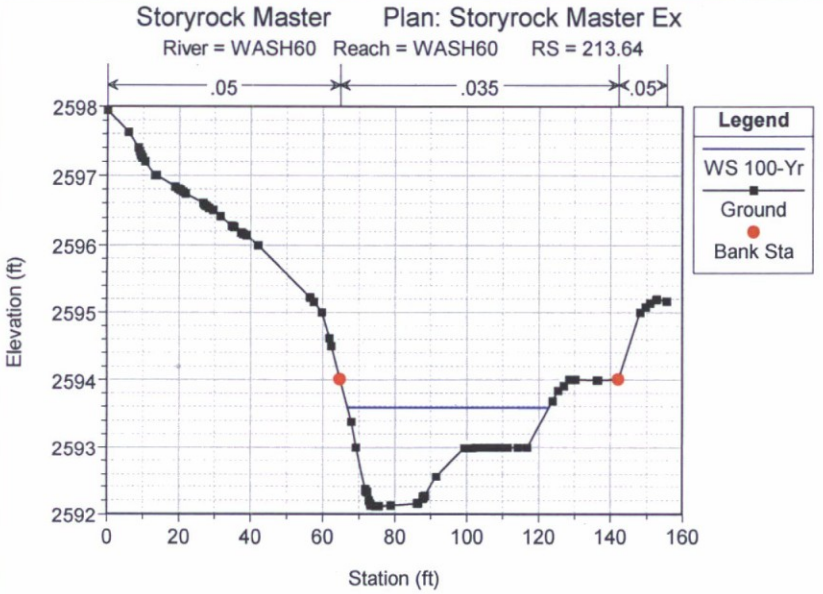
1000
1500
2000
2500
3000
Main Channel Distance (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH60 Reach = WASH60 RS = 861.45
.05
.035
.05
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH60 Reach = WASH60 RS = 576.92
.05
.035
.5
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH60 Reach = WASH60 RS = 395.74
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH60 Reach = WASH60 RS = 296.24
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH60 Reach = WASH60 RS = 213.64
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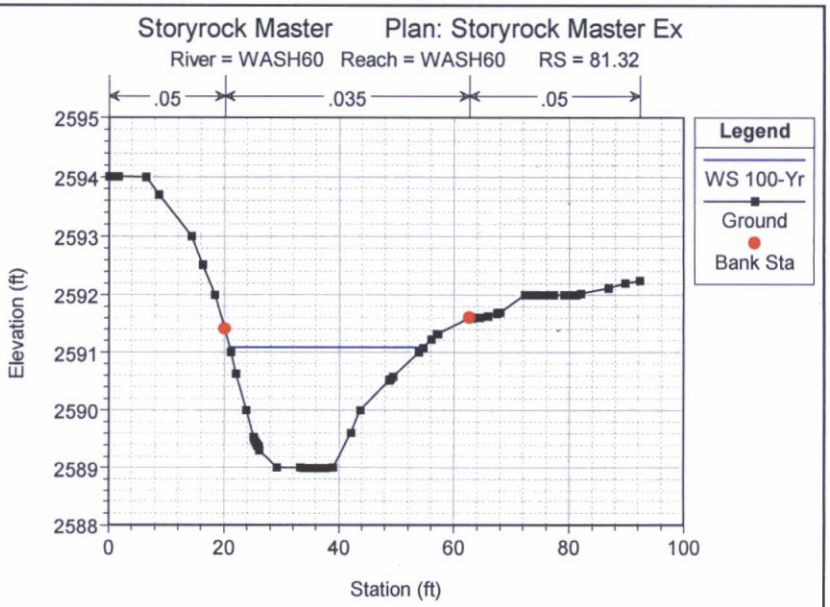
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta


Storyrock Master Plan: Storyrock Master Ex
River = WASH60 Reach = WASH60 RS = 81.32
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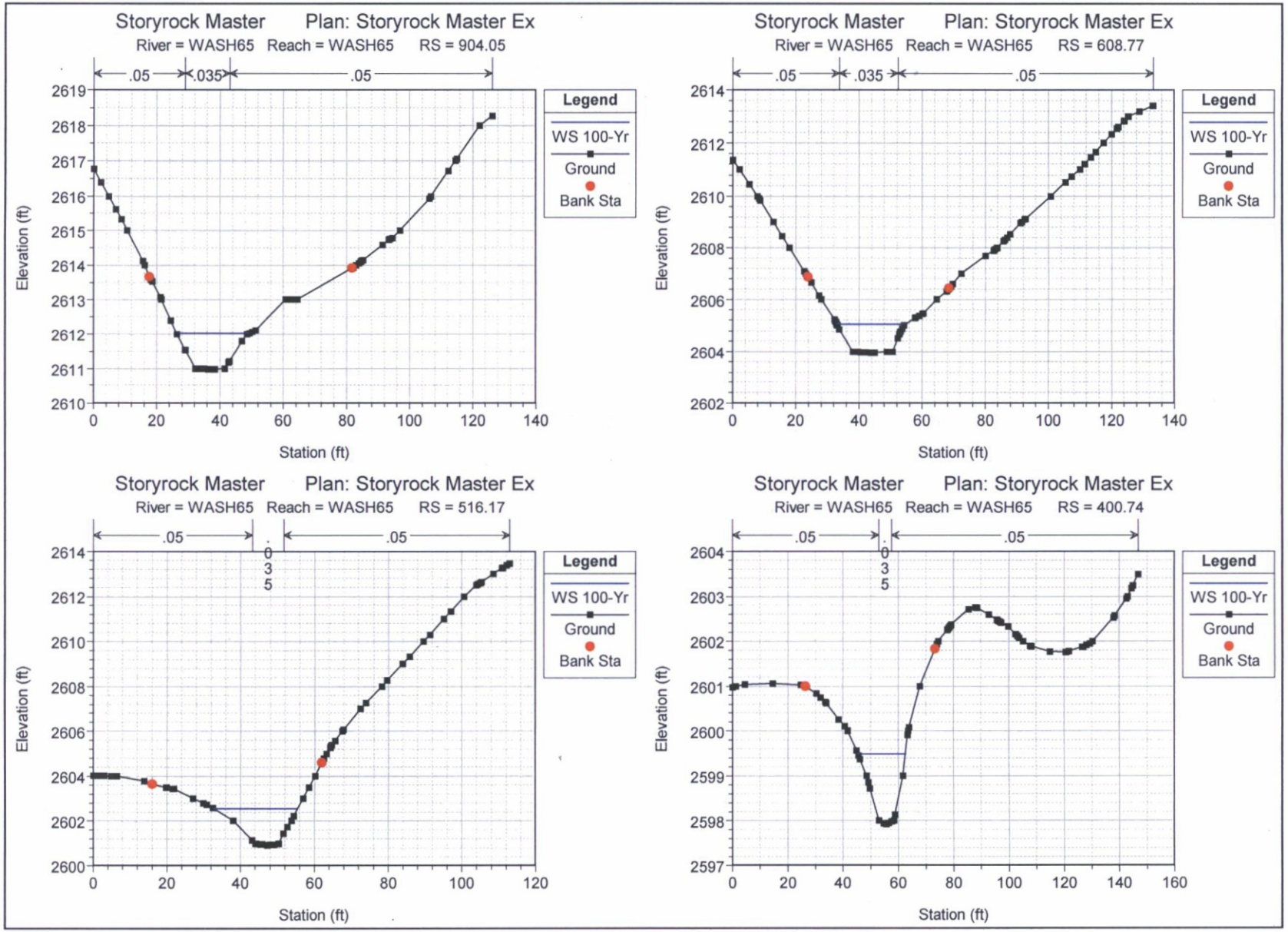
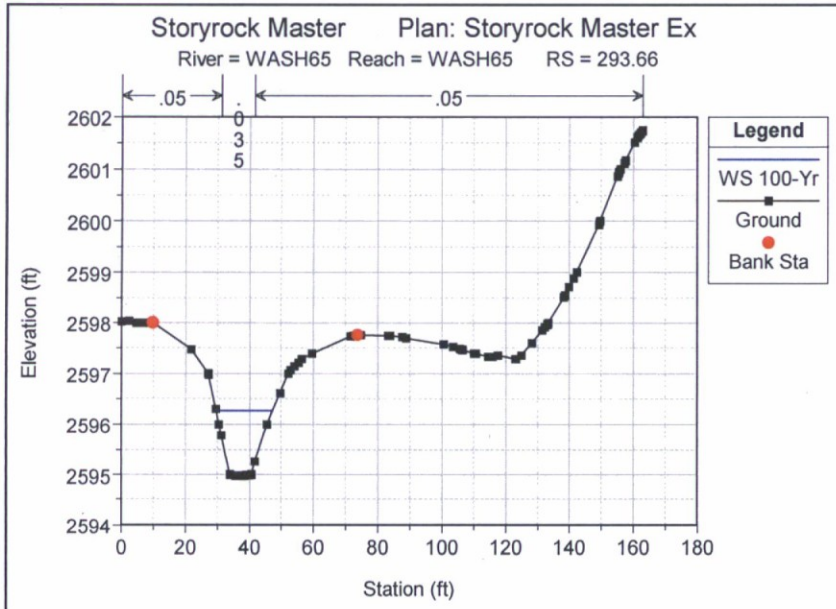
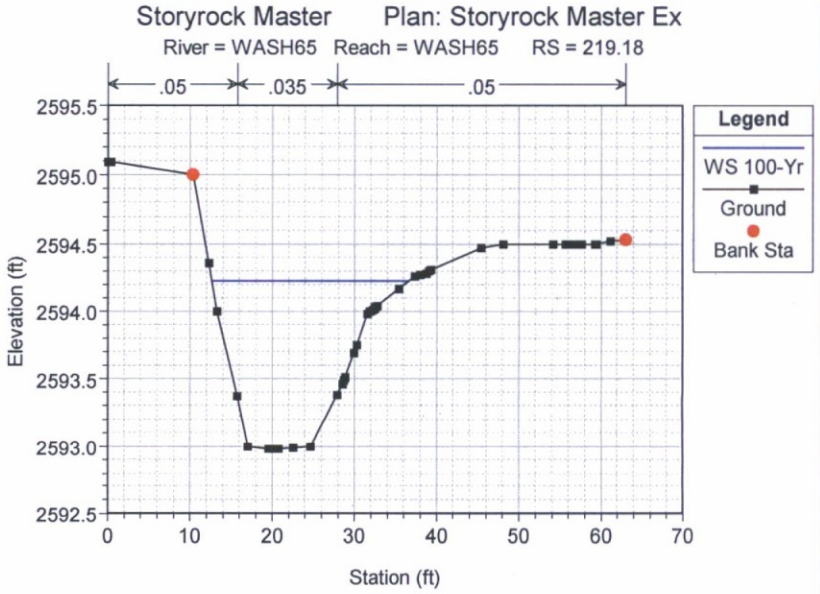
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta


Storyrock Master Plan: Storyrock Master Ex
River = WASH65 Reach = WASH65 RS = 904.05
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH65 Reach = WASH65 RS = 608.77
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH65 Reach = WASH65 RS = 516.17
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH65 Reach = WASH65 RS = 400.74
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta


Storyrock Master Plan: Storyrock Master Ex
River = WASH65 Reach = WASH65 RS = 293.66
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH65 Reach = WASH65 RS = 219.18
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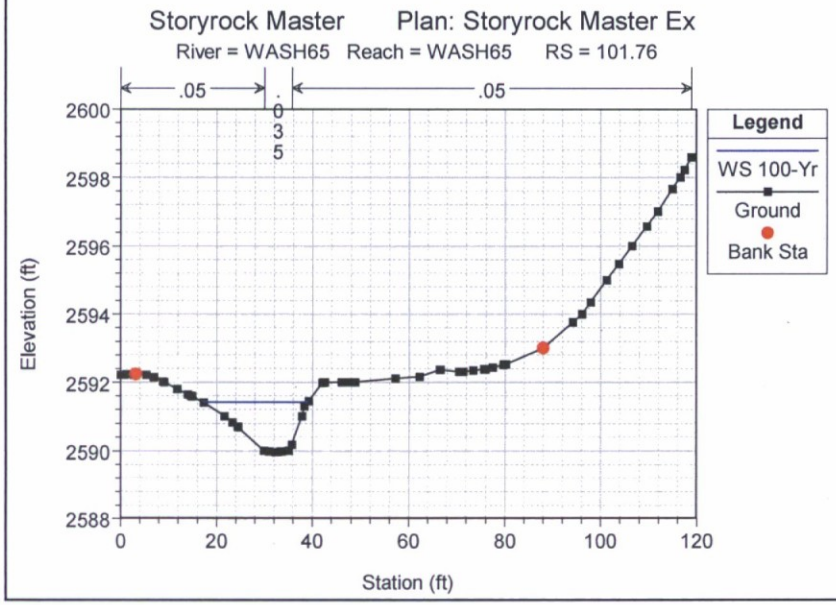
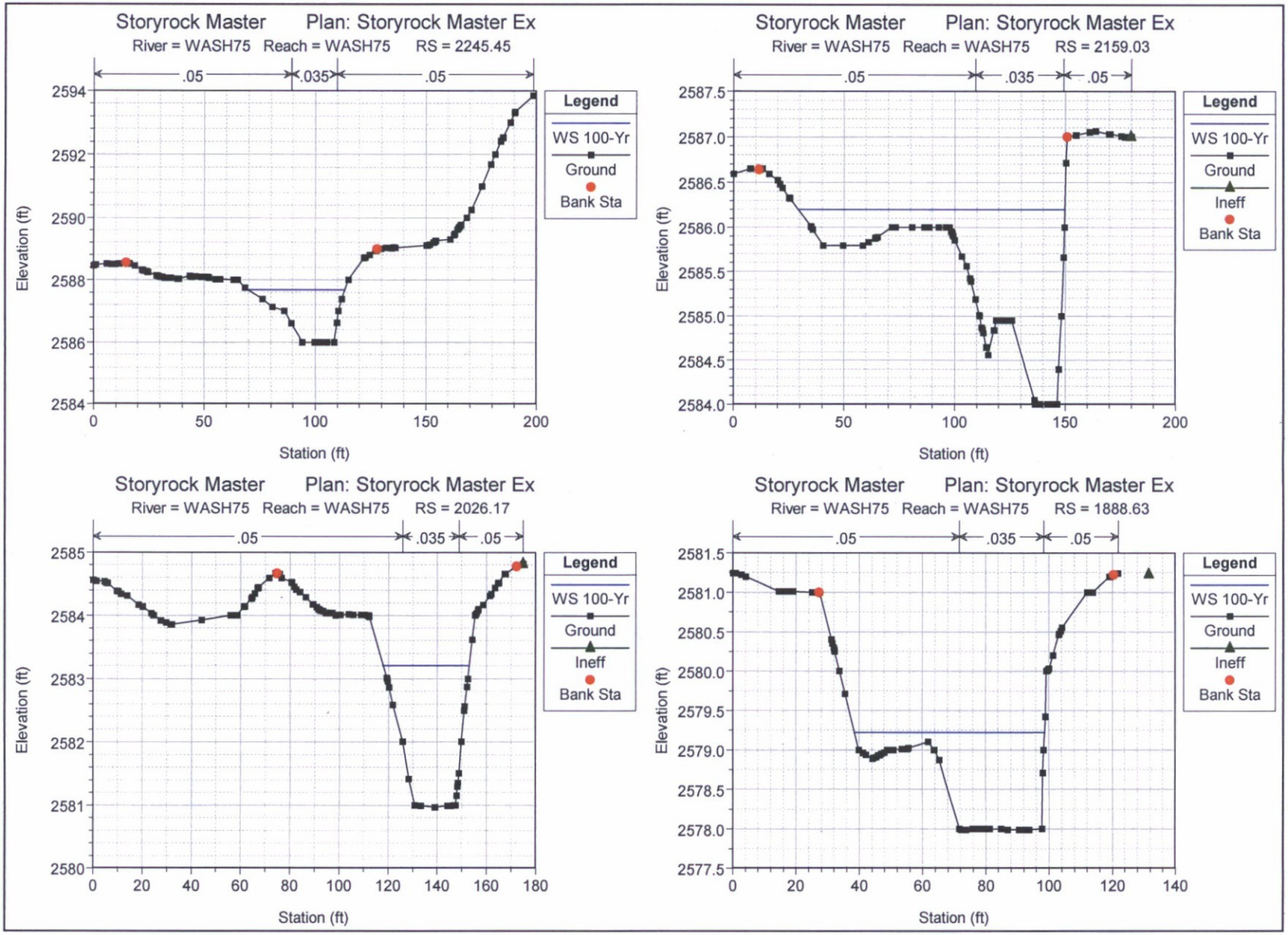
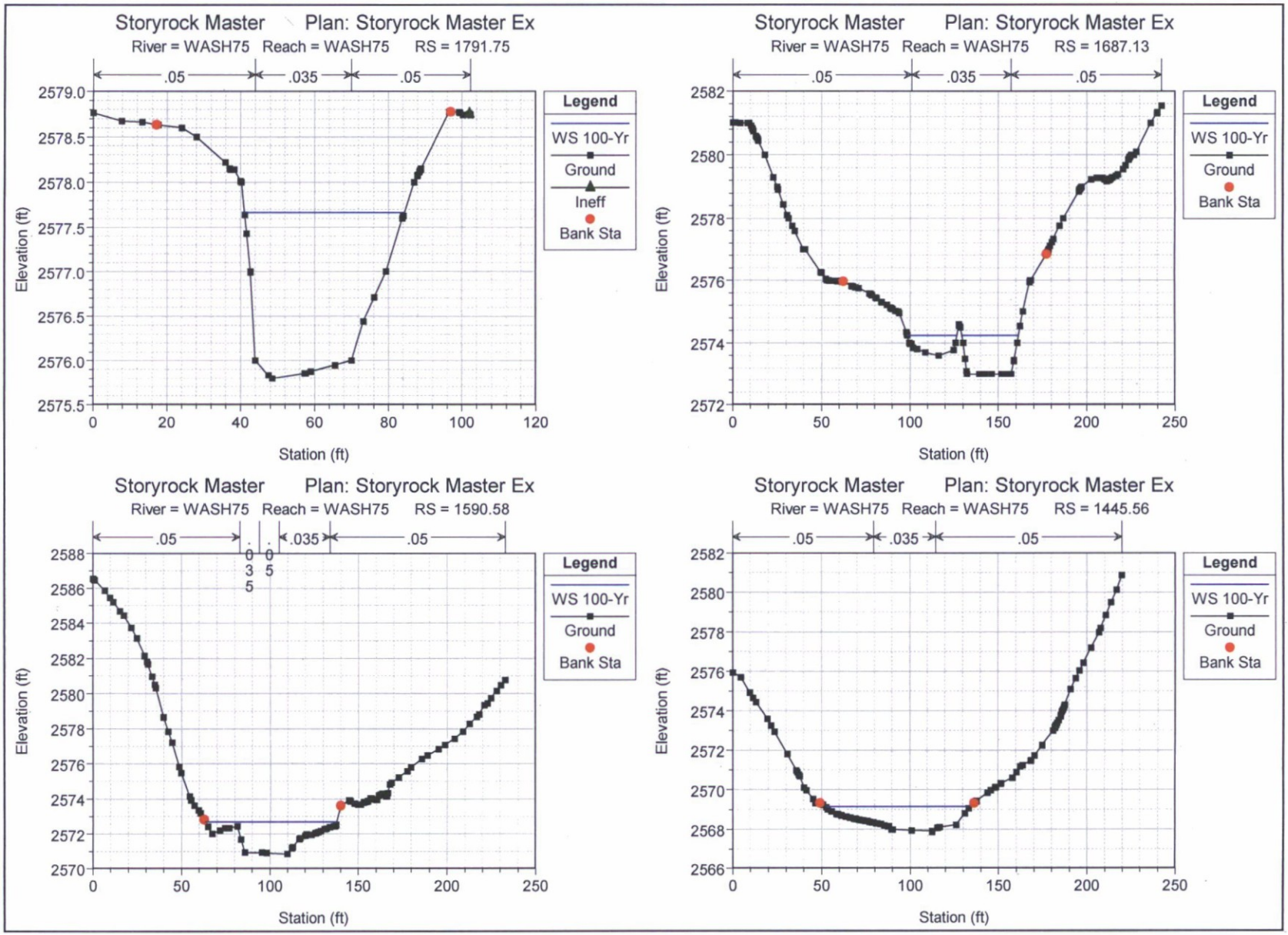
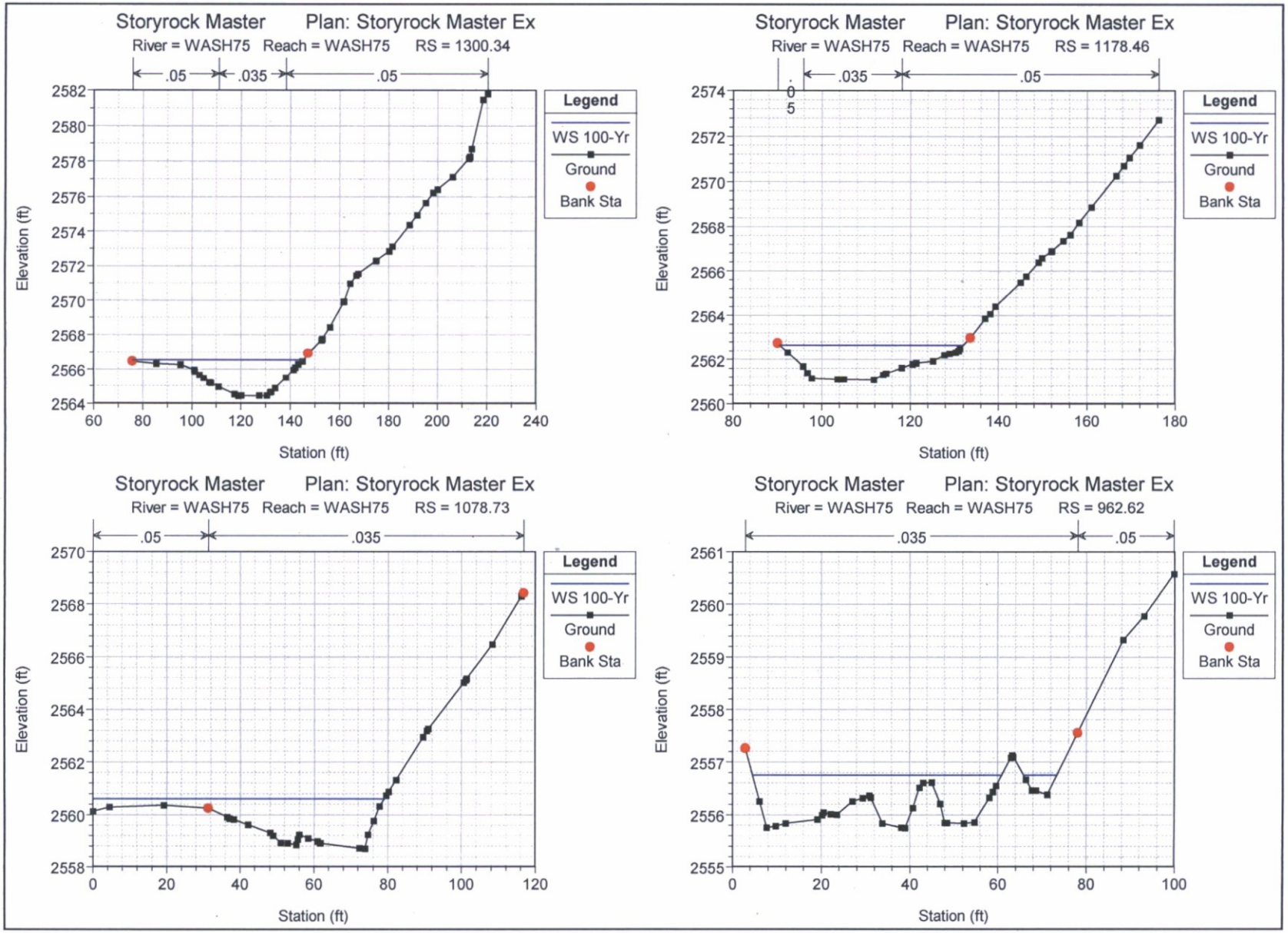
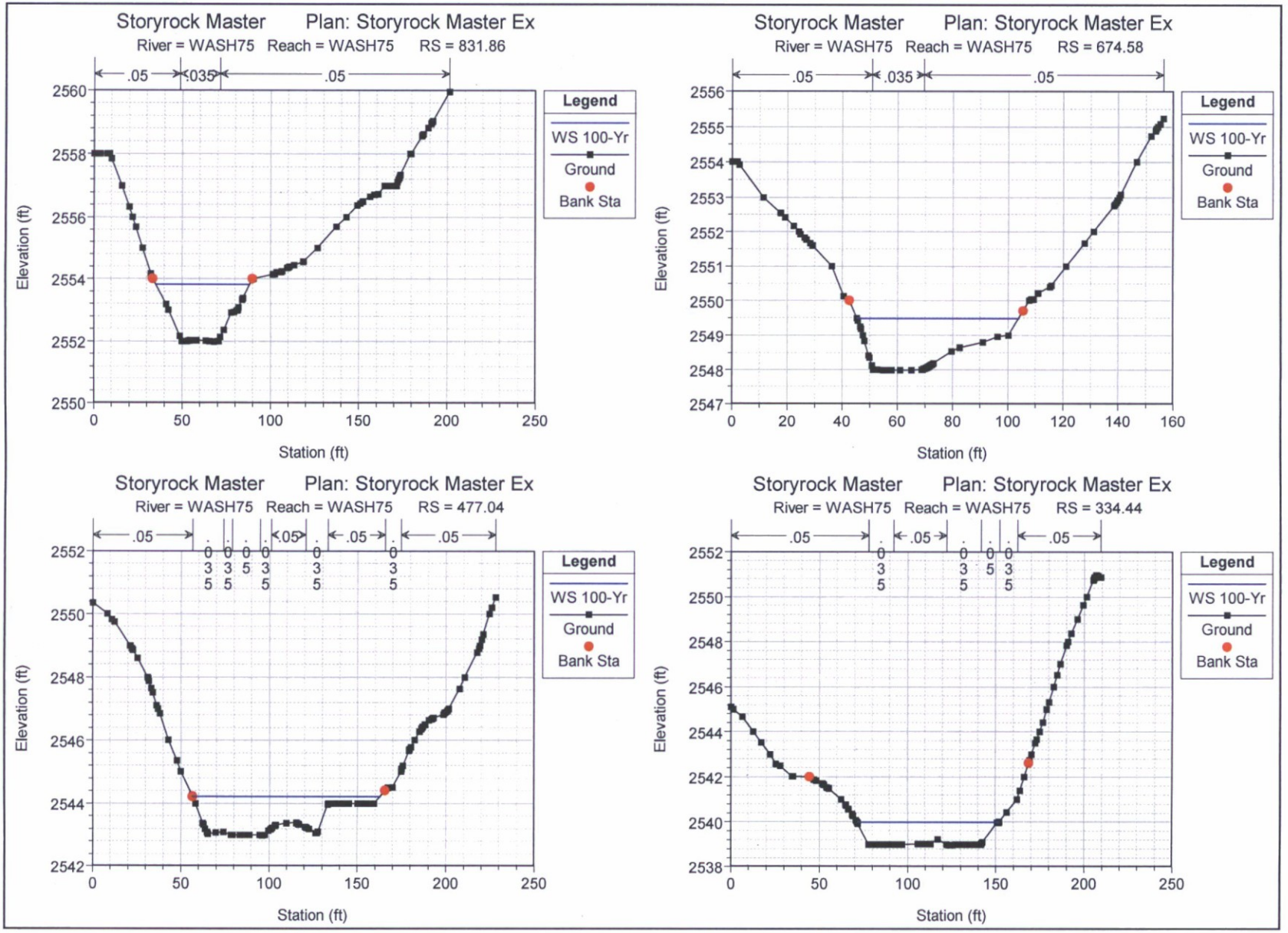
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH65 Reach = WASH65 RS = 101.76
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 2245.45
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 2159.03
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Ineff
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 2026.17
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Ineff
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 1888.63
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Ineff
Bank Sta


Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 1791.75
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Ineff
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 1687.13
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 1590.58
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 1445.56
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta


Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 1300.34
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 1178.46
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 1078.73
.05
.035
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 962.62
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 831.86
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 674.58
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 477.04
.05
.05
.05
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 334.44
.05
.05
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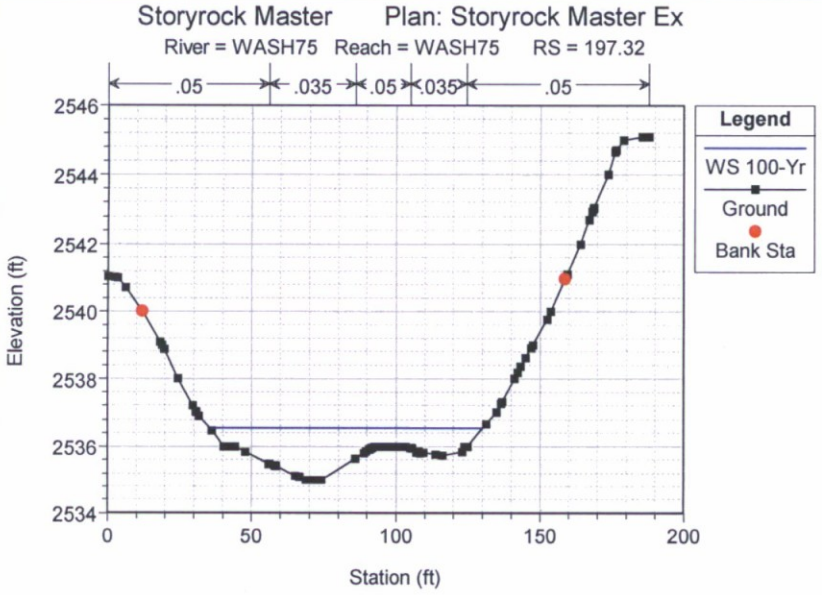
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta


Storyrock Master Plan: Storyrock Master Ex
River = WASH75 Reach = WASH75 RS = 197.32
.05
.035
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
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Station (ft)
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2544
2542
2540
2538
2536
2534
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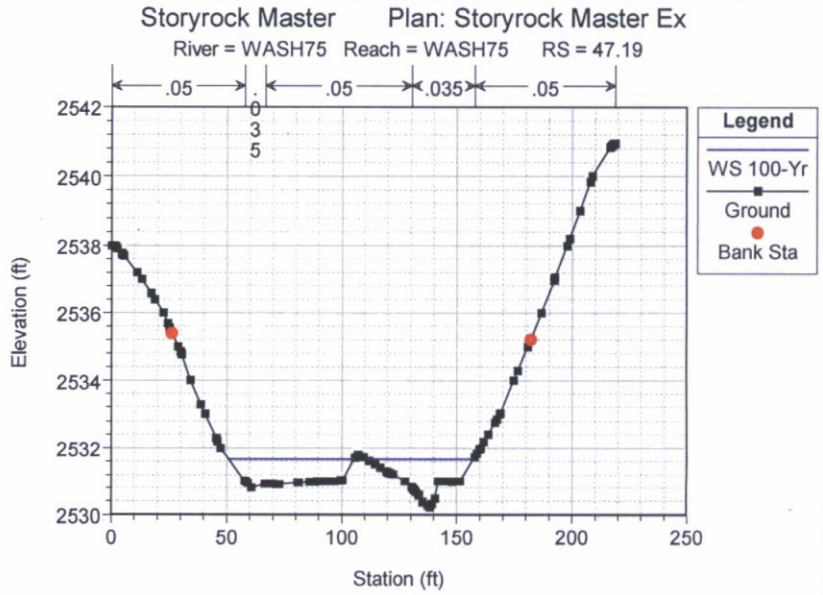
50
100
150
200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River = WASH75 Reach = WASH75 RS = 47.19
.05
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
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2540
2538
2536
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2532
2530
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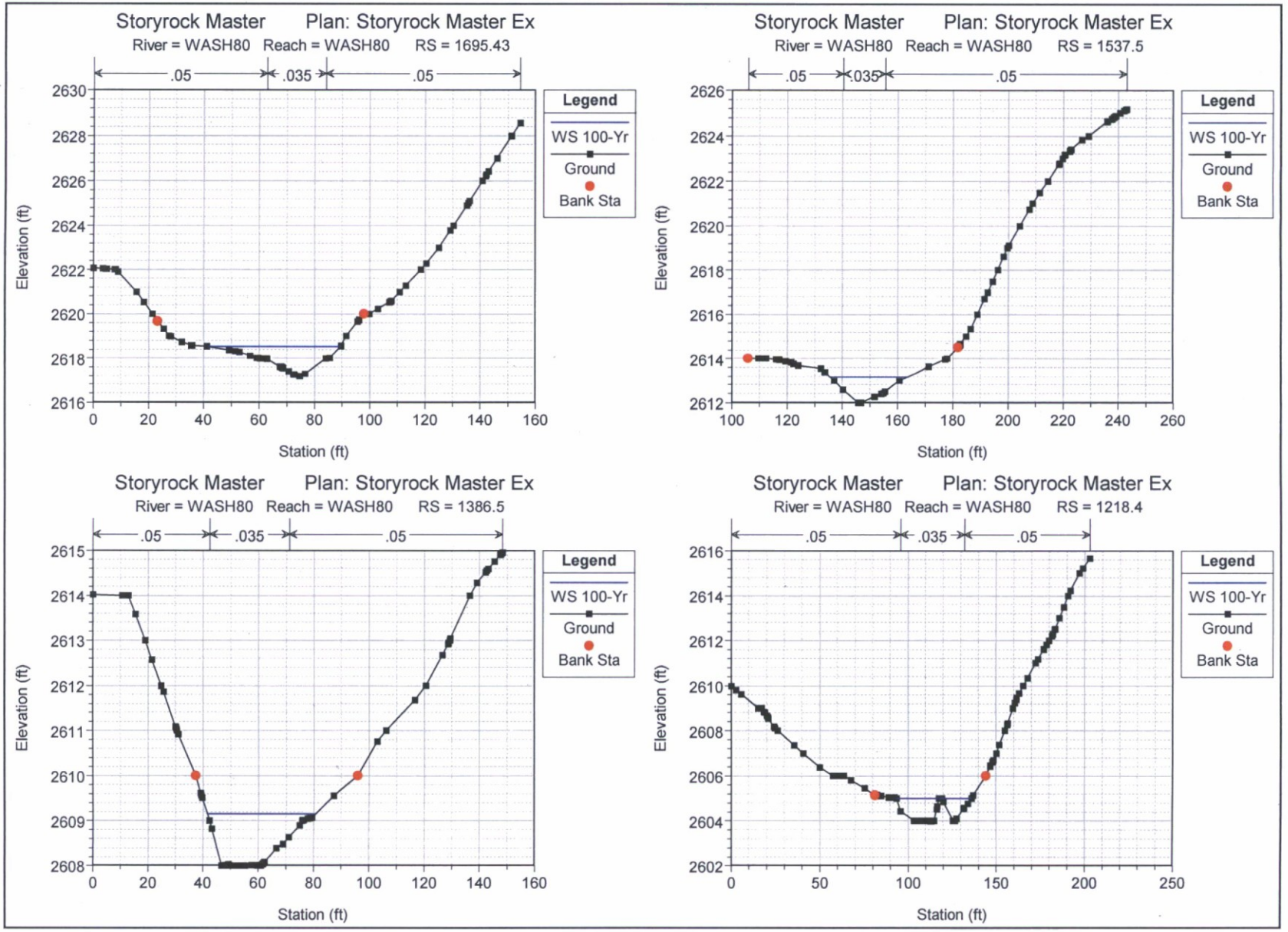
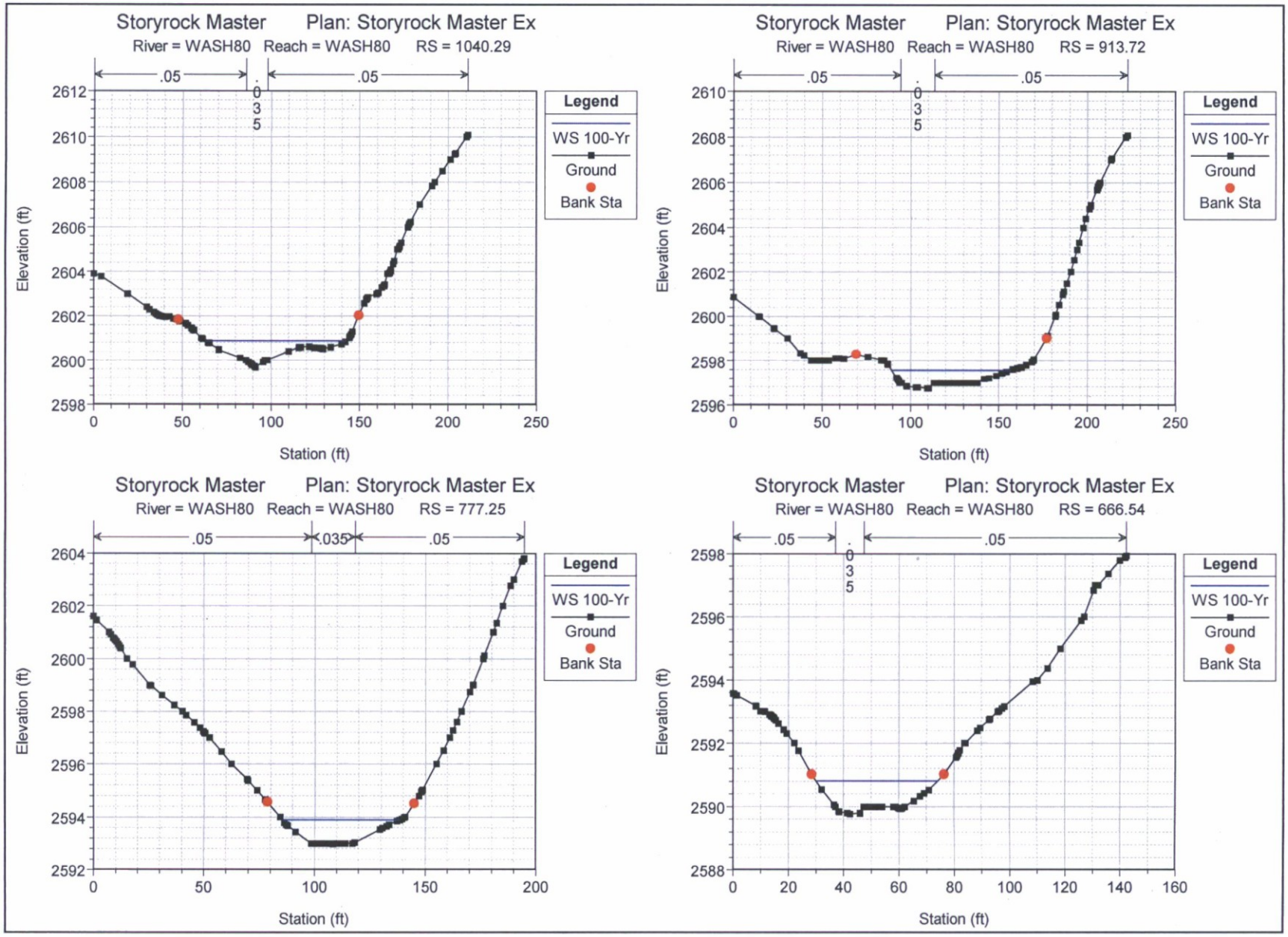
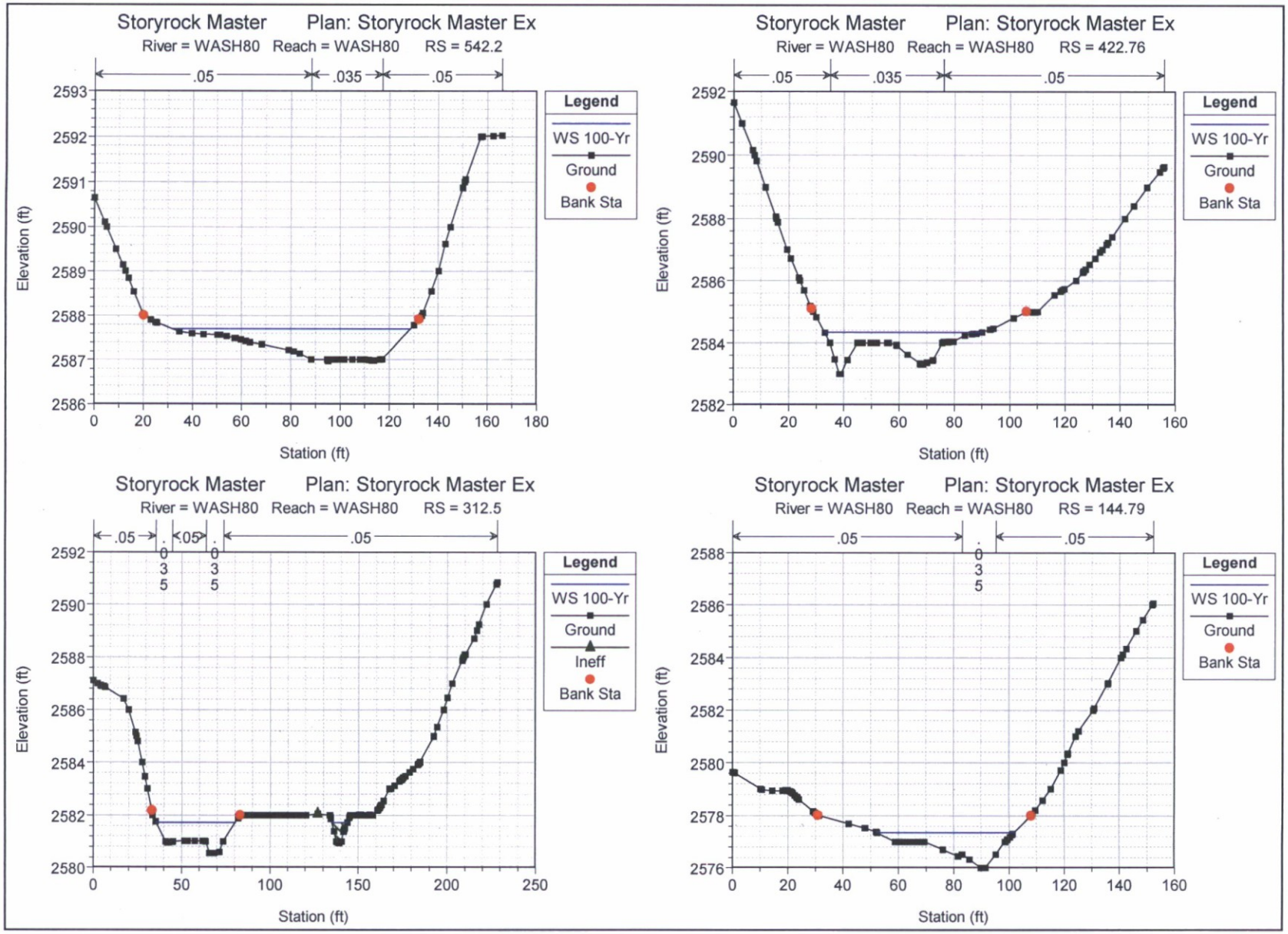
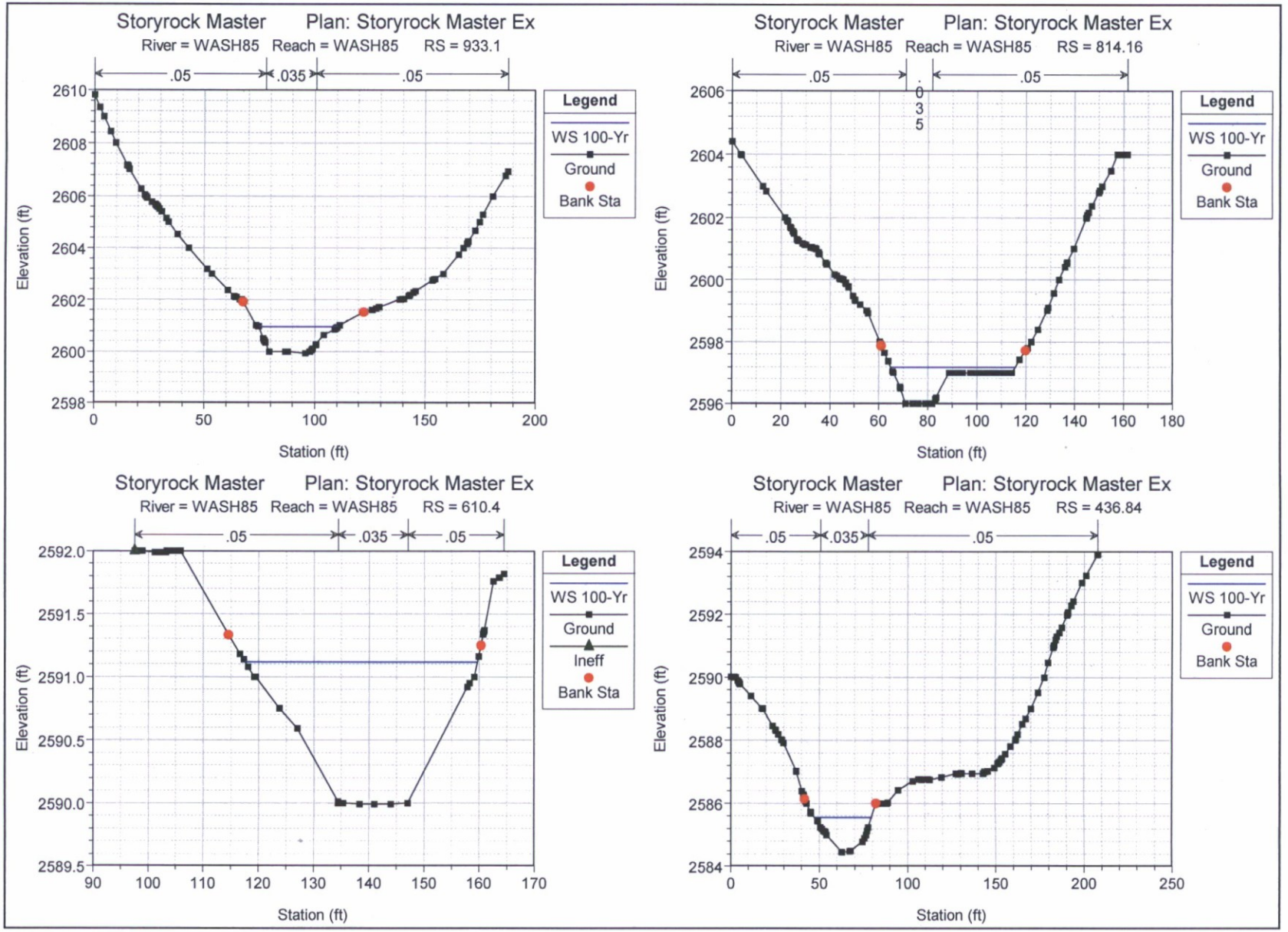
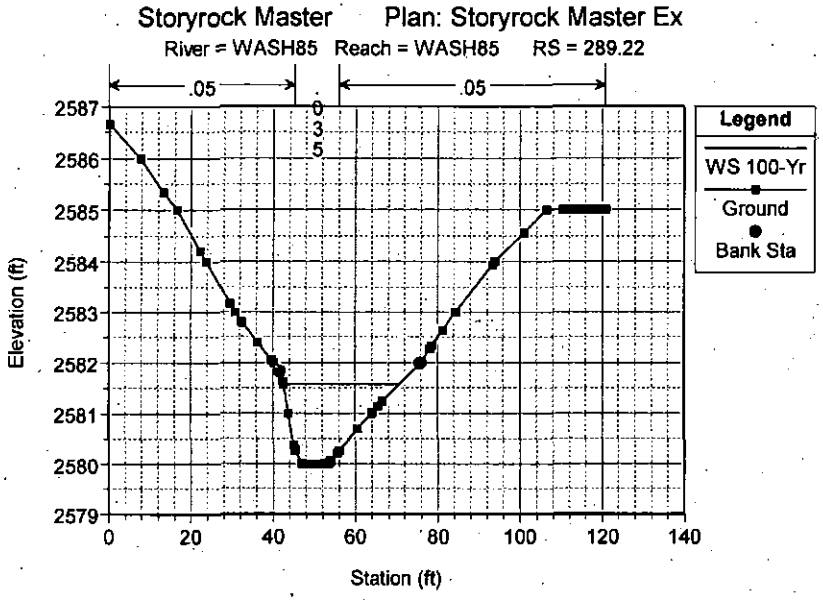
50
100
150
200
250

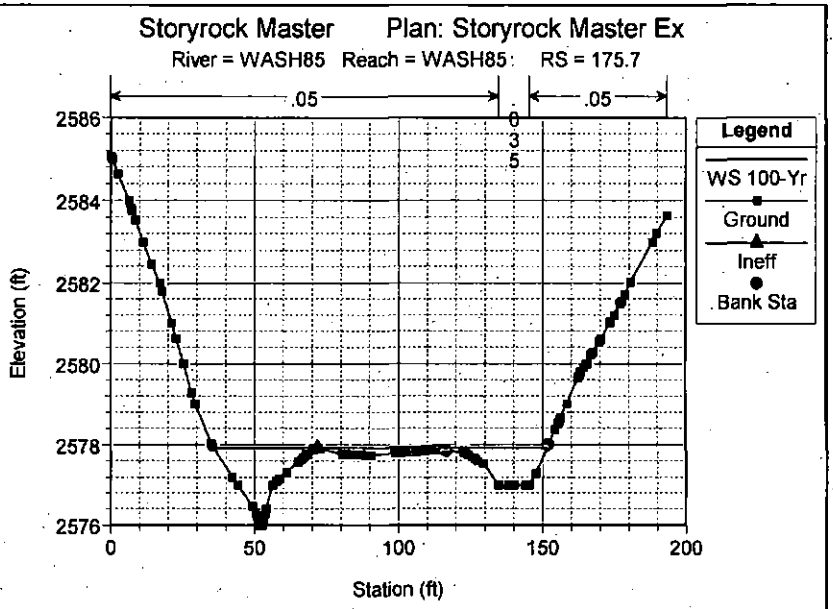

Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 1695.43
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 1537.5
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 1386.5
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 1218.4
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

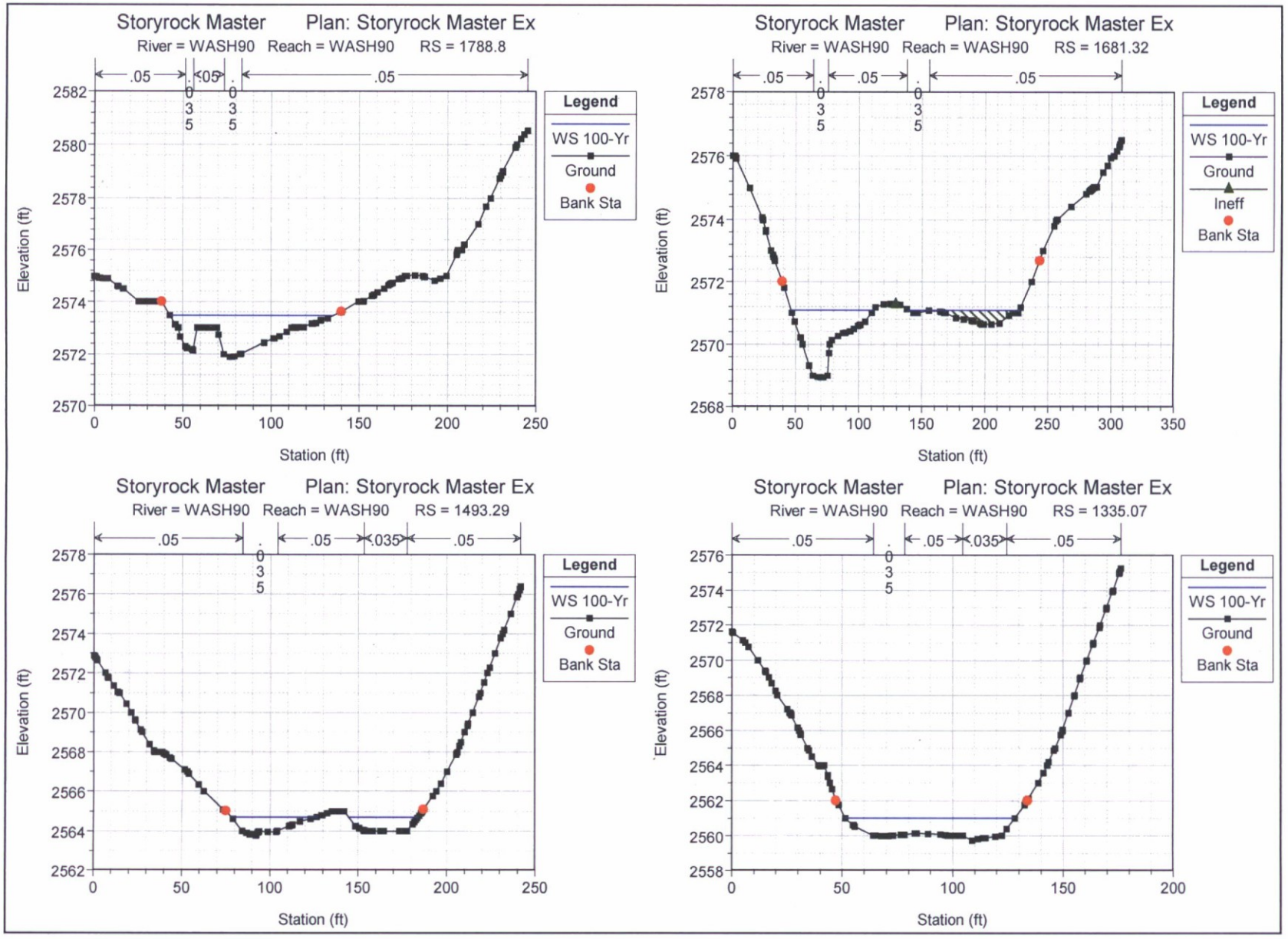

Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 1040.29
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 913.72
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 777.25
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 666.54
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

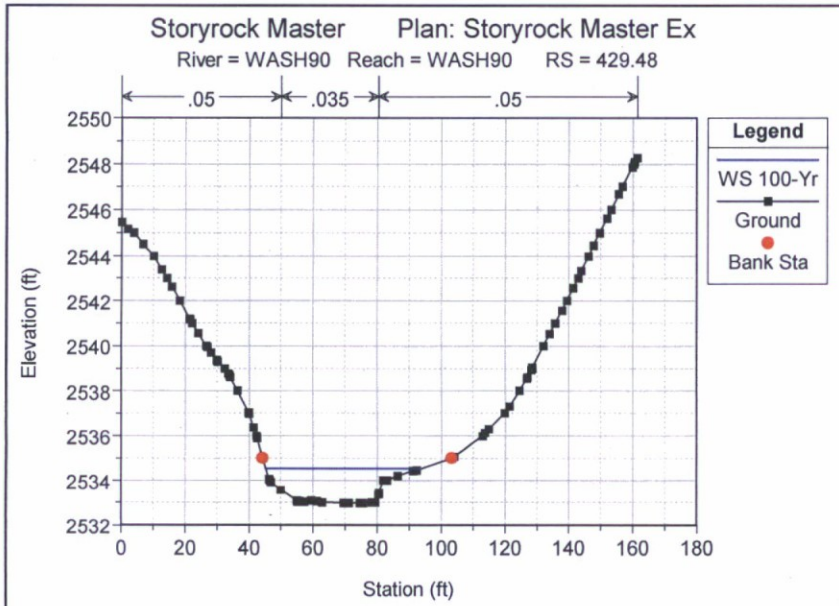

Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 542.2
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 422.76
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 312.5
.05
.05
.05
Legend
WS 100-Yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH80 Reach = WASH80 RS = 144.79
.05
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

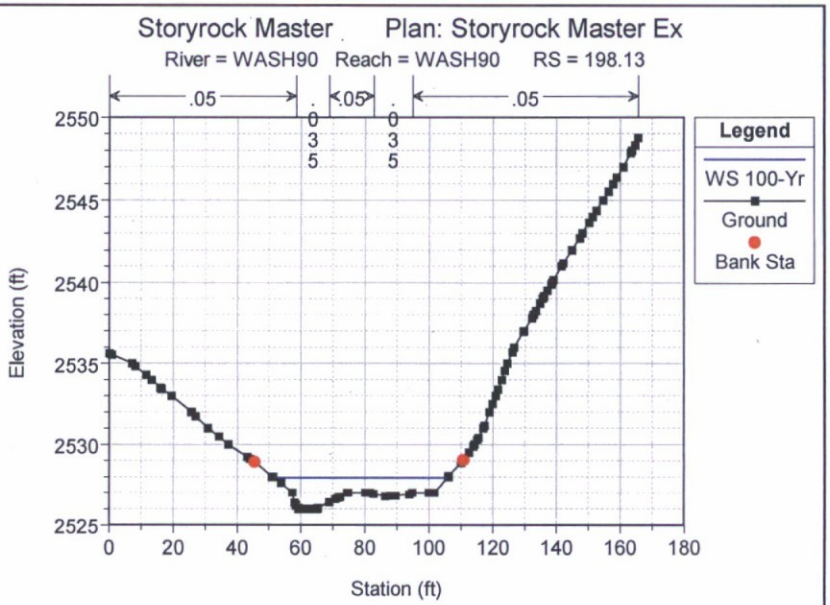

Storyrock Master Plan: Storyrock Master Ex
River = WASH85 Reach = WASH85 RS = 933.1
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH85 Reach = WASH85 RS = 814.16
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH85 Reach = WASH85 RS = 610.4
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Ineff
Bank Sta
Storyrock Master Plan: Storyrock Master Ex
River = WASH85 Reach = WASH85 RS = 436.84
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
Ground
Bank Sta

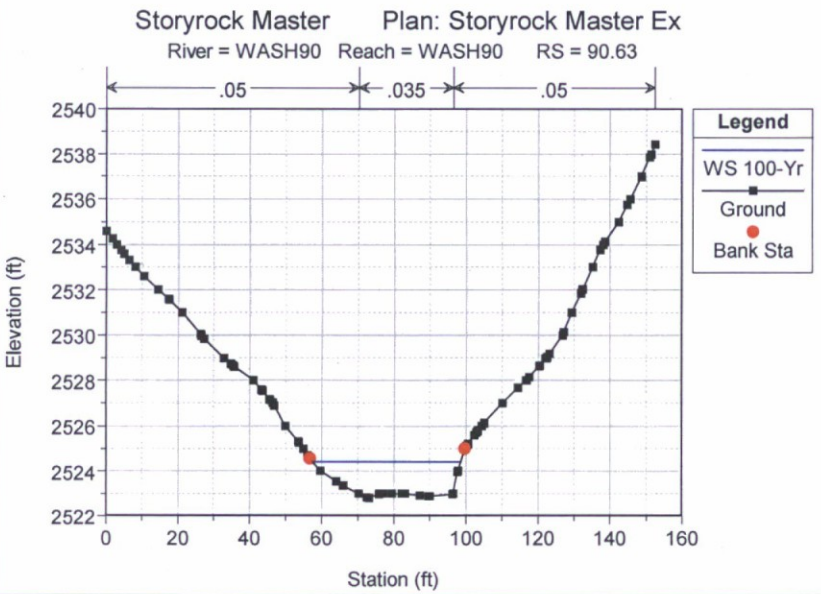

Storyrock Master Plan: Storyrock Master Ex
River = WASH85 Reach = WASH85 RS = 289.22
.05
.05
0
3
5
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
2587
2586
2585
2584
2583
2582
2581
2580
2579
0
20
40
60
80
100
120
140

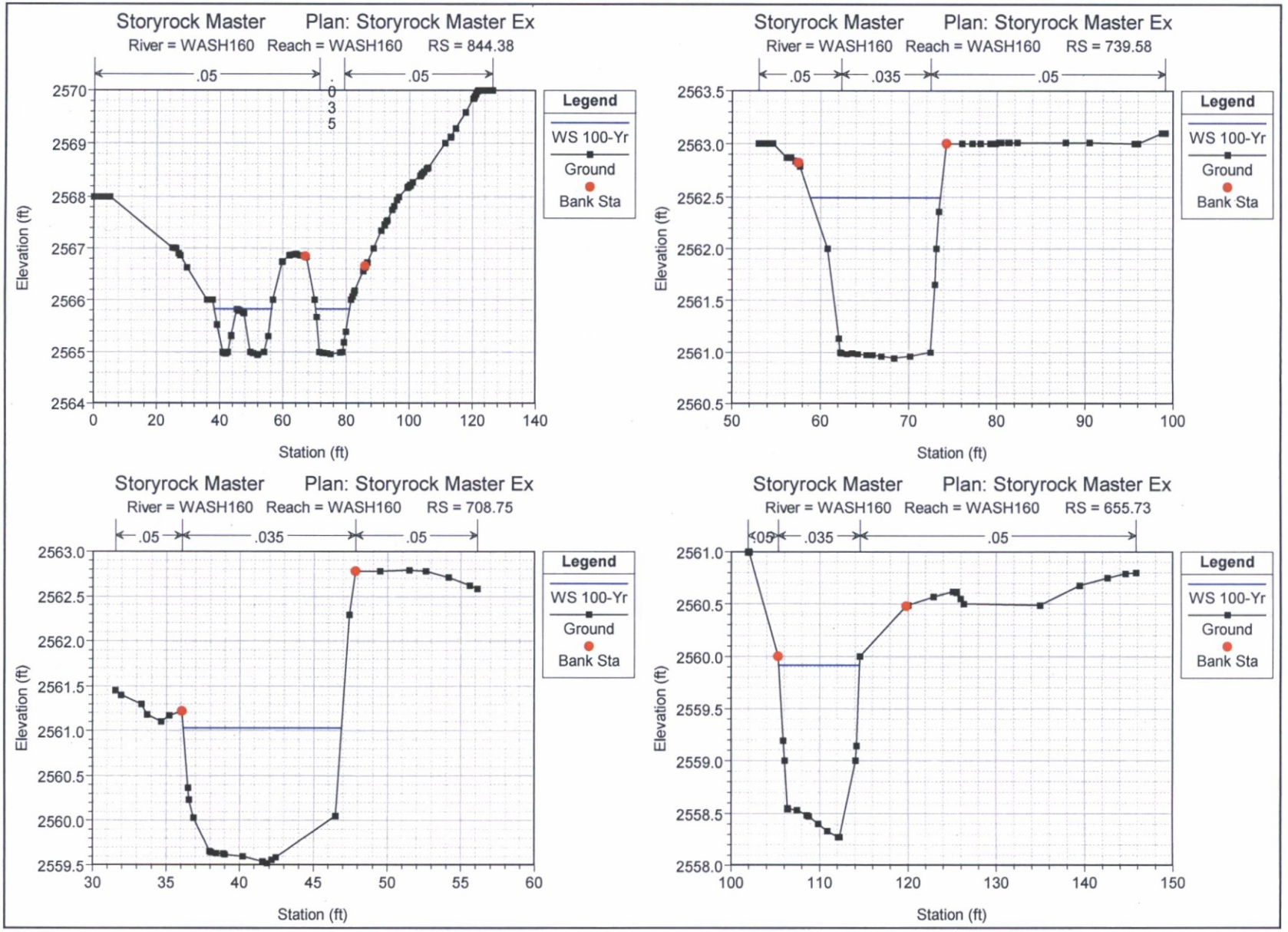

Storyrock Master Plan: Storyrock Master Ex
River = WASH85 Reach = WASH85 RS = 175.7
.05
.05
0
3
5
Legend
WS 100-Yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2586
2584
2582
2580
2578
2576
0
50
100
150
200

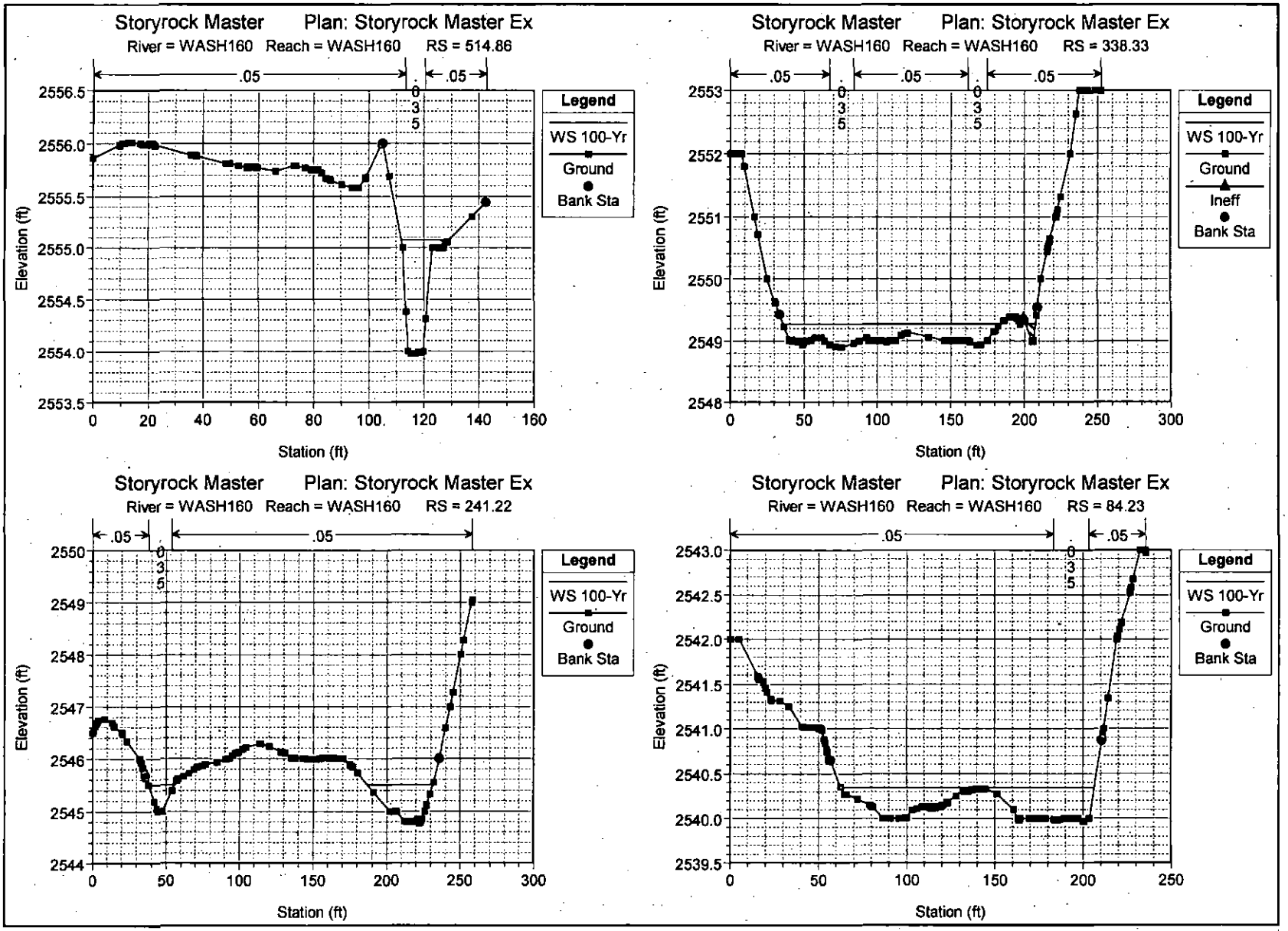

Storyrock Master Plan: Storyrock Master Ex
River = WASH90 Reach = WASH90 RS = 1788.8
.05
.05
.05
.035
.035
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH90 Reach = WASH90 RS = 1681.32
.05
.05
.05
.035
.035
Legend
WS 100-Yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH90 Reach = WASH90 RS = 1493.29
.05
.05
.035
.05
.035
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH90 Reach = WASH90 RS = 1335.07
.05
.05
.035
.05
.035
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH90 Reach = WASH90 RS = 429.48
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH90 Reach = WASH90 RS = 198.13
.05
.05
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH90 Reach = WASH90 RS = 90.63
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH160 Reach = WASH160 RS = 844.38
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH160 Reach = WASH160 RS = 739.58
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH160 Reach = WASH160 RS = 708.75
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH160 Reach = WASH160 RS = 655.73
.05
.035
.05
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Ex
River = WASH160 Reach = WASH160 RS = 514.86
.05
.05
0
3
5
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH160 Reach = WASH160 RS = 338.33
.05
.05
.05
0
3
5
Legend
WS 100-Yr
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH160 Reach = WASH160 RS = 241.22
.05
.05
0
3
5
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Ex
River = WASH160 Reach = WASH160 RS = 84.23
.05
.05
0
3
5
Legend
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)

Plan: Ex WASH75 WASH75 RS: 1400 Lateral Structure Profile: 100-Yr

E.G. US. (ft)	2568.93	Weir Sta US (ft)	0.00
W.S. US. (ft)	2568.32	Weir Sta DS (ft)	401.82
E.G. DS (ft)	2557.31	Min El Weir Flow (ft)	2557.27
W.S. DS (ft)	2555.96	Wr Top Wdth (ft)	156.94
Q US (cfs)	432.00	Weir Max Depth (ft)	0.26
Q Leaving Total (cfs)	11.00	Weir Avg Depth (ft)	0.09
Q DS (cfs)	421.15	Weir Flow Area (sq ft)	14.72
Perc Q Leaving	2.53	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	11.00	Weir Submerg	0.00
Q Gates (cfs)		Q Gate Group (cfs)	
Q Culv (cfs)		Gate Open Ht (ft)	
Q Lat RC (cfs)		Gate #Open	
Q Outlet TS (cfs)	0.00	Gate Area (sq ft)	
Q Breach (cfs)		Gate Submerg	
Breach Avg Velocity (ft/s)		Gate Invert (ft)	
Breach Flow Area (sq ft)		Gate Weir Coef	
Breach WD (ft)			
Breach Top El (ft)			
Breach Bottom El (ft)			
Breach SSL (ft)			
Breach SSR (ft)			

HEC-RAS Plan: Ex Profile: 100-Yr

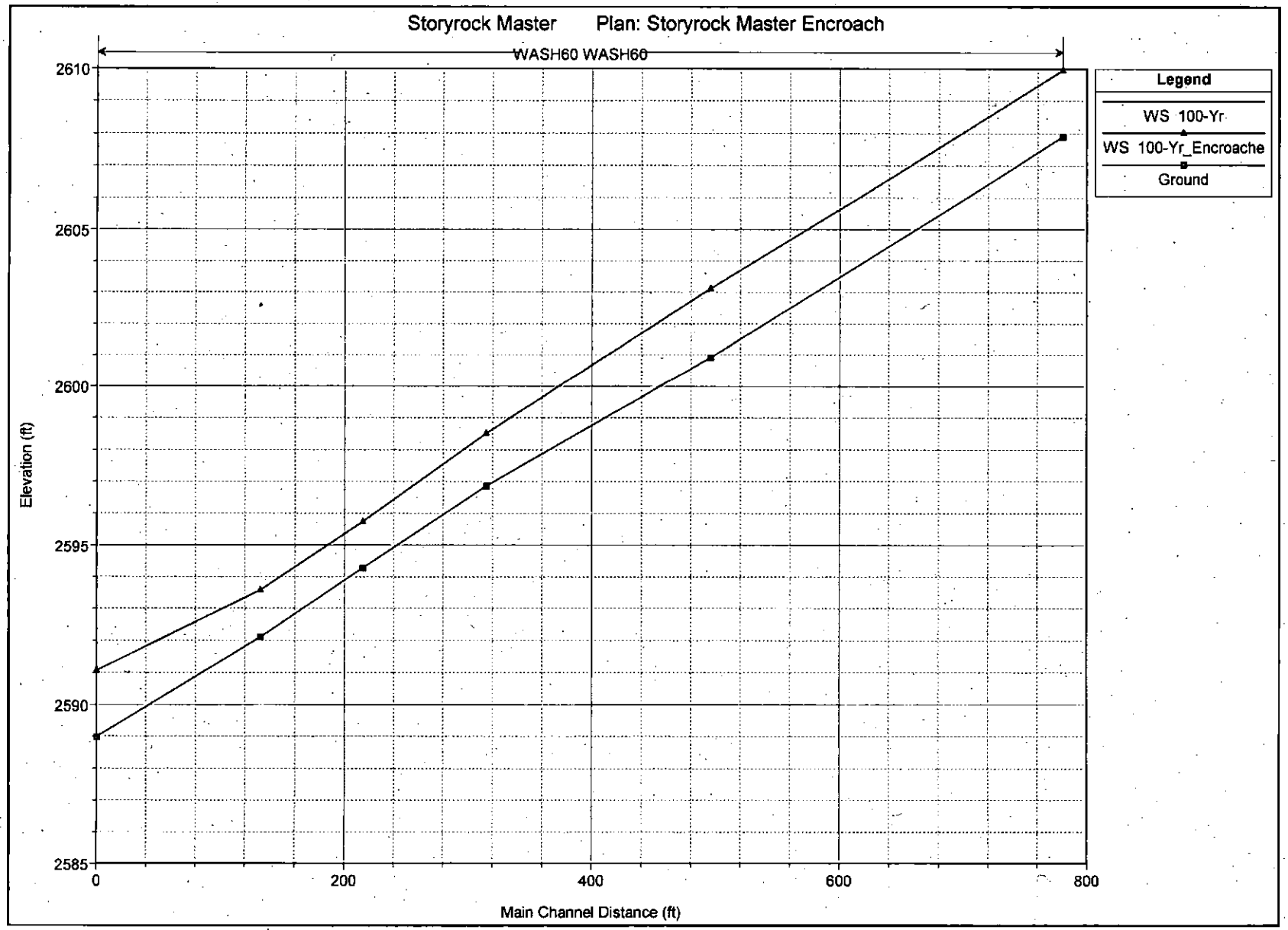
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
WASH90	WASH90	1788.8	100-Yr	372.00	2571.88	2573.47	2573.48	2573.89	0.026486	5.17	71.96	92.26	1.03
WASH90	WASH90	1681.32	100-Yr	372.00	2568.93	2571.09	2571.10	2571.58	0.017710	5.63	66.12	153.21	0.99
WASH90	WASH90	1493.29	100-Yr	372.00	2563.77	2564.72	2565.02	2565.62	0.070874	7.62	48.81	88.50	1.81
WASH90	WASH90	1335.07	100-Yr	372.00	2559.73	2561.01	2561.01	2561.46	0.023371	5.41	68.77	76.66	1.01
WASH90	WASH90	1218.75	100-Yr	372.00	2556.00	2557.24	2557.41	2557.91	0.040941	6.60	56.40	86.17	1.44
WASH90	WASH90	1044.45	100-Yr	372.00	2551.19	2552.64	2552.64	2553.13	0.022128	5.64	66.01	67.71	1.01
WASH90	WASH90	896.5	100-Yr	372.00	2546.23	2548.23	2548.30	2548.82	0.039825	6.19	60.07	66.52	1.15
WASH90	WASH90	702.67	100-Yr	372.00	2541.00	2542.53	2542.58	2543.12	0.022669	6.11	60.87	59.62	1.07
WASH90	WASH90	429.48	100-Yr	372.00	2532.99	2534.52	2534.70	2535.33	0.036692	7.20	51.65	48.56	1.23
WASH90	WASH90	198.13	100-Yr	372.00	2525.98	2527.96	2527.96	2528.53	0.028340	6.09	61.12	54.39	1.01
WASH90	WASH90	90.63	100-Yr	372.00	2522.82	2524.42	2524.57	2525.27	0.032206	7.38	50.39	41.24	1.18
WASH85	WASH85	3805.86	100-Yr	87.00	2694.99	2695.57	2695.67	2695.98	0.035645	5.10	17.05	35.97	1.31
WASH85	WASH85	3694.75	100-Yr	87.00	2689.88	2691.12	2691.41	2692.00	0.035032	7.53	11.56	17.72	1.64
WASH85	WASH85	3561.36	100-Yr	87.00	2685.13	2686.61	2686.69	2687.16	0.036123	5.96	14.60	17.75	1.16
WASH85	WASH85	3382.35	100-Yr	130.00	2680.00	2681.48	2681.64	2682.16	0.023832	6.61	19.66	22.88	1.26
WASH85	WASH85	3238.46	100-Yr	130.00	2676.00	2677.62	2677.66	2678.02	0.032415	5.08	25.61	34.85	1.04
WASH85	WASH85	3081.51	100-Yr	130.00	2671.56	2672.73	2672.78	2673.19	0.029180	5.40	24.08	31.44	1.09
WASH85	WASH85	2967.67	100-Yr	130.00	2666.99	2668.91	2668.91	2669.12	0.012310	3.72	34.91	55.51	0.83
WASH85	WASH85	2879.41	100-Yr	130.00	2664.22	2665.38	2665.80	2666.78	0.077635	9.49	13.69	17.59	1.90
WASH85	WASH85	2773.66	100-Yr	130.00	2660.98	2662.78	2662.78	2663.28	0.032922	5.70	22.81	22.79	1.00
WASH85	WASH85	2626.9	100-Yr	130.00	2656.00	2657.85	2658.17	2658.76	0.028494	7.65	16.98	17.26	1.36
WASH85	WASH85	2500	100-Yr	130.00	2652.89	2653.87	2654.09	2654.40	0.039686	5.81	22.36	30.70	1.20
WASH85	WASH85	2417.34	100-Yr	130.00	2649.90	2651.11	2651.22	2651.56	0.029500	5.39	24.13	43.26	1.27
WASH85	WASH85	2263.66	100-Yr	130.00	2644.94	2646.39	2646.62	2647.13	0.027938	6.92	18.77	34.36	1.44
WASH85	WASH85	2114.75	100-Yr	156.00	2640.97	2641.84	2641.97	2642.29	0.035912	5.41	28.85	60.34	1.38
WASH85	WASH85	1938.62	100-Yr	156.00	2634.26	2635.31	2635.33	2635.55	0.045016	3.91	39.90	94.34	1.06
WASH85	WASH85	1721.48	100-Yr	156.00	2625.94	2628.04	2628.04	2628.13	0.016134	2.36	66.09	151.35	0.62
WASH85	WASH85	1521.24	100-Yr	156.00	2619.06	2620.15	2620.44	2621.31	0.106785	8.64	18.05	58.86	2.75
WASH85	WASH85	1420.31	100-Yr	156.00	2615.94	2617.25	2617.27	2617.64	0.016565	5.02	31.08	42.79	1.04
WASH85	WASH85	1317.52	100-Yr	156.00	2612.77	2613.37	2613.57	2614.07	0.111026	6.69	23.33	71.72	2.07
WASH85	WASH85	1215.73	100-Yr	156.00	2609.00	2610.11	2610.12	2610.37	0.024461	4.11	37.99	75.96	1.02
WASH85	WASH85	1087.82	100-Yr	156.00	2604.91	2605.90	2606.10	2606.56	0.037294	6.55	23.82	37.92	1.46
WASH85	WASH85	933.1	100-Yr	156.00	2599.93	2600.95	2601.11	2601.54	0.028280	6.15	25.37	35.68	1.29
WASH85	WASH85	814.16	100-Yr	156.00	2596.00	2597.20	2597.33	2597.73	0.036231	5.88	26.51	50.93	1.44
WASH85	WASH85	610.4	100-Yr	156.00	2589.99	2591.12	2591.15	2591.53	0.025644	5.15	30.31	42.10	1.07
WASH85	WASH85	436.84	100-Yr	156.00	2584.46	2585.56	2585.77	2586.28	0.035690	6.82	22.86	32.37	1.43
WASH85	WASH85	289.22	100-Yr	156.00	2579.99	2581.57	2581.58	2582.07	0.030521	5.68	27.48	28.13	1.01
WASH85	WASH85	175.7	100-Yr	156.00	2577.00	2577.93	2577.93	2578.10	0.020509	4.10	52.25	115.99	0.98
WASH80	WASH80	3439.74	100-Yr	69.00	2668.00	2669.59	2669.72	2670.23	0.037910	6.43	10.74	12.36	1.22
WASH80	WASH80	3319.74	100-Yr	69.00	2664.55	2665.68	2665.79	2666.17	0.029773	5.61	12.31	23.18	1.17
WASH80	WASH80	3239.73	100-Yr	69.00	2660.98	2662.37	2662.61	2663.24	0.044781	7.49	9.21	10.31	1.40
WASH80	WASH80	3048.09	100-Yr	69.00	2655.91	2657.39	2657.42	2657.88	0.018479	5.63	12.26	13.94	1.06
WASH80	WASH80	2743.18	100-Yr	129.00	2647.99	2649.17	2649.33	2649.73	0.033615	6.02	21.44	35.23	1.36
WASH80	WASH80	2491.17	100-Yr	129.00	2640.97	2641.82	2641.88	2642.19	0.026452	4.87	26.49	46.66	1.14
WASH80	WASH80	2092.43	100-Yr	129.00	2628.00	2628.94	2628.99	2629.21	0.040838	4.13	31.23	81.75	1.18
WASH80	WASH80	1695.43	100-Yr	129.00	2617.18	2618.53	2618.57	2618.86	0.018064	4.55	28.38	48.15	1.04
WASH80	WASH80	1537.5	100-Yr	148.00	2612.00	2613.19	2613.50	2614.17	0.050501	7.90	18.73	28.47	1.72
WASH80	WASH80	1386.5	100-Yr	148.00	2608.00	2609.15	2609.15	2609.54	0.025259	4.98	29.69	39.21	1.01
WASH80	WASH80	1218.4	100-Yr	148.00	2603.99	2605.00	2605.09	2605.42	0.023763	5.17	28.64	42.75	1.11
WASH80	WASH80	1040.29	100-Yr	148.00	2599.70	2600.87	2600.84	2601.09	0.022787	3.71	39.90	78.99	0.92
WASH80	WASH80	913.72	100-Yr	148.00	2596.74	2597.59	2597.59	2597.86	0.028604	4.17	35.50	67.12	1.01
WASH80	WASH80	777.25	100-Yr	148.00	2592.98	2593.88	2593.90	2594.22	0.025057	4.63	31.98	52.89	1.05
WASH80	WASH80	666.54	100-Yr	148.00	2589.77	2590.80	2590.82	2591.17	0.030216	4.89	30.29	44.20	1.04
WASH80	WASH80	542.2	100-Yr	148.00	2586.97	2587.70	2587.70	2587.91	0.024793	3.70	40.04	96.71	1.01
WASH80	WASH80	422.76	100-Yr	148.00	2583.00	2584.35	2584.42	2584.74	0.028417	5.00	29.58	57.34	1.23
WASH80	WASH80	312.5	100-Yr	148.00	2580.57	2581.72	2581.72	2582.07	0.025336	4.79	30.91	53.52	1.02
WASH80	WASH80	144.79	100-Yr	148.00	2576.00	2577.35	2577.40	2577.73	0.026561	4.92	30.06	49.71	1.12
WASH75	WASH75	2245.45	100-Yr	407.00	2585.99	2587.68	2588.27	2589.07	0.039206	9.47	43.00	43.49	1.68
WASH75	WASH75	2159.03	100-Yr	407.00	2584.00	2586.20	2586.15	2586.51	0.027037	4.46	91.27	120.68	0.90
WASH75	WASH75	2026.17	100-Yr	407.00	2580.97	2583.21	2583.21	2584.02	0.013327	7.21	56.42	35.21	1.00
WASH75	WASH75	1888.63	100-Yr	407.00	2577.99	2579.22	2579.62	2580.60	0.057903	9.41	43.23	60.10	1.96
WASH75	WASH75	1791.75	100-Yr	407.00	2575.80	2577.67	2577.67	2578.37	0.015741	6.73	60.47	43.46	1.01
WASH75	WASH75	1687.13	100-Yr	432.00	2573.00	2574.24	2574.61	2575.44	0.056474	8.80	49.11	60.11	1.72
WASH75	WASH75	1590.58	100-Yr	432.00	2570.88	2572.69	2572.69	2573.21	0.018004	5.78	74.70	73.92	1.01
WASH75	WASH75	1445.56	100-Yr	432.00	2567.87	2569.13	2569.27	2569.77	0.032492	6.40	67.54	81.64	1.24
WASH75	WASH75	1400		Lat Struct									
WASH75	WASH75	1300.34	100-Yr	431.96	2564.42	2566.54	2566.54	2567.09	0.013402	5.92	72.92	69.70	1.02
WASH75	WASH75	1178.46	100-Yr	430.59	2561.07	2562.64	2563.10	2564.19	0.048437	9.97	43.18	41.53	1.72
WASH75	WASH75	1078.73	100-Yr	422.44	2558.71	2560.61	2560.70	2561.25	0.016817	6.52	72.03	79.03	1.01
WASH75	WASH75	962.62	100-Yr	421.15	2555.74	2556.76	2557.22	2558.38	0.105680	10.23	41.17	63.96	2.25
WASH75	WASH75	831.86	100-Yr	421.15	2551.98	2553.82	2553.82	2554.45	0.016999	6.37	66.10	53.20	1.01
WASH75	WASH75	674.58	100-Yr	421.15	2547.99	2549.49	2549.65	2550.27	0.046556	7.09	59.42	58.70	1.24
WASH75	WASH75	477.04	100-Yr	421.15	2542.98	2544.22	2544.22	2544.62	0.021451	5.09	82.80	106.28	1.02
WASH75	WASH75	334.44	100-Yr	421.15	2538.98	2539.98	2540.07	2540.56	0.039411	6.06	69.48	80.59	1.15
WASH75	WASH75	197.32	100-Yr	421.15	2535.00	2536.54	2536.54	2536.98	0.019286	5.29	79.57	94.69	1.02
WASH75	WASH75	47.19	100-Yr	421.15	2530.22	2531.67	2531.85	2532.34	0.057321	6.58	64.05	100.80	1.45
WASH65	WASH65	904.05	100-Yr	97.00	2610.99	2612.02	2612.16	2612.58	0.027402	5.99	16.19	22.74	1.25
WASH65	WASH65	608.77	100-Yr	97.00	2603.95	2605.07	2605.07	2605.50	0.022758	5.23	18.54	22.18	1.01
WASH65	WASH65	516.17	100-Yr	97.00	2600.94	2602.56	2602.38	2602.86	0.019186	4.44	21.86	22.72	0.80
WASH65	WASH65	400.74	100-Yr	97.00	2597.92	2599.50	2599.50	2600.00	0.032755	5.67	17.12	17.33	1.01
WASH65	WASH65	293.66	100-Yr	97.00	2594.98	2596.26	2596.40	2596.91	0.025243	6.44	15.07	17.63	1.23

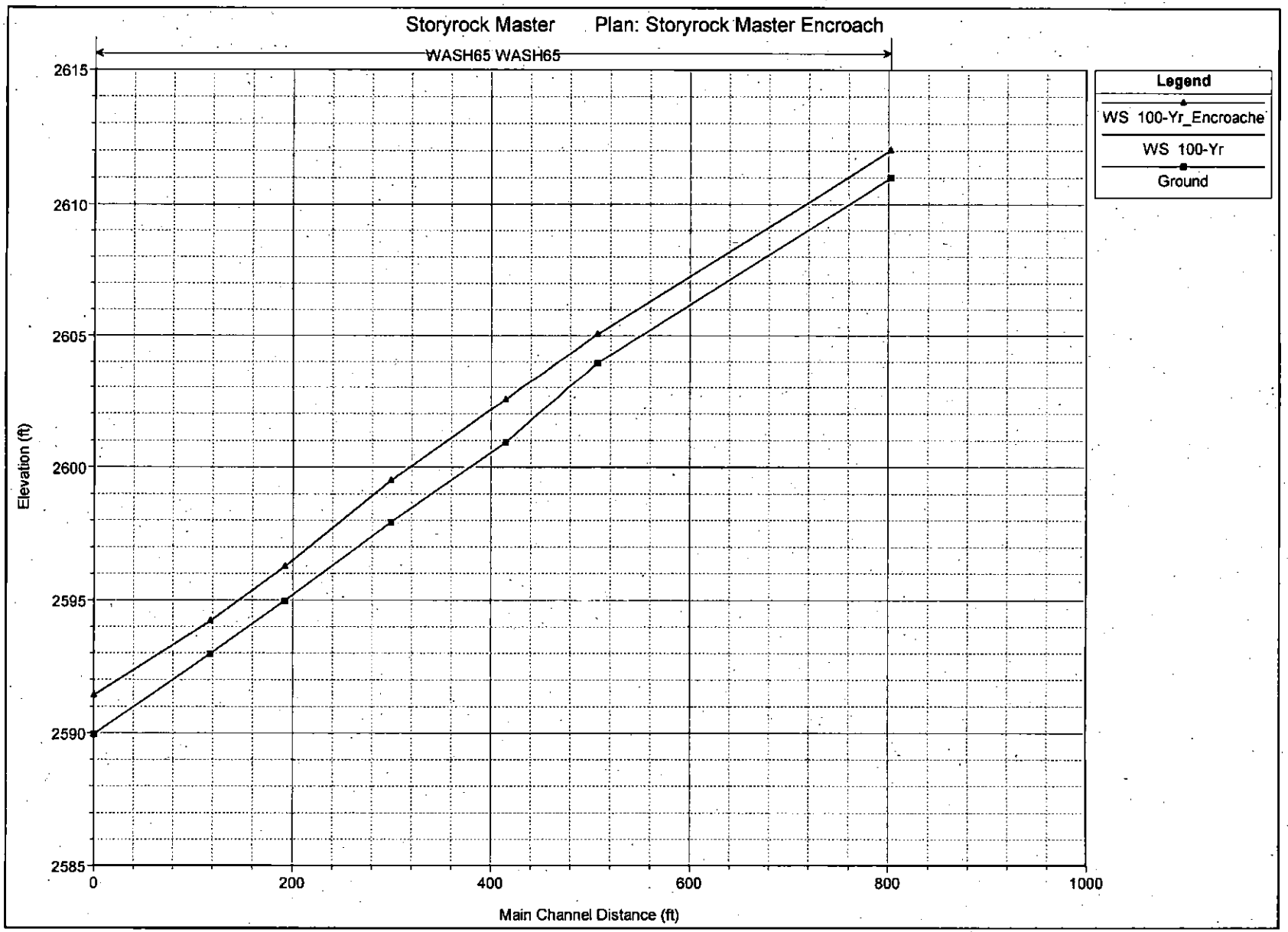
HEC-RAS Plan: Ex Profile: 100-Yr (Continued)

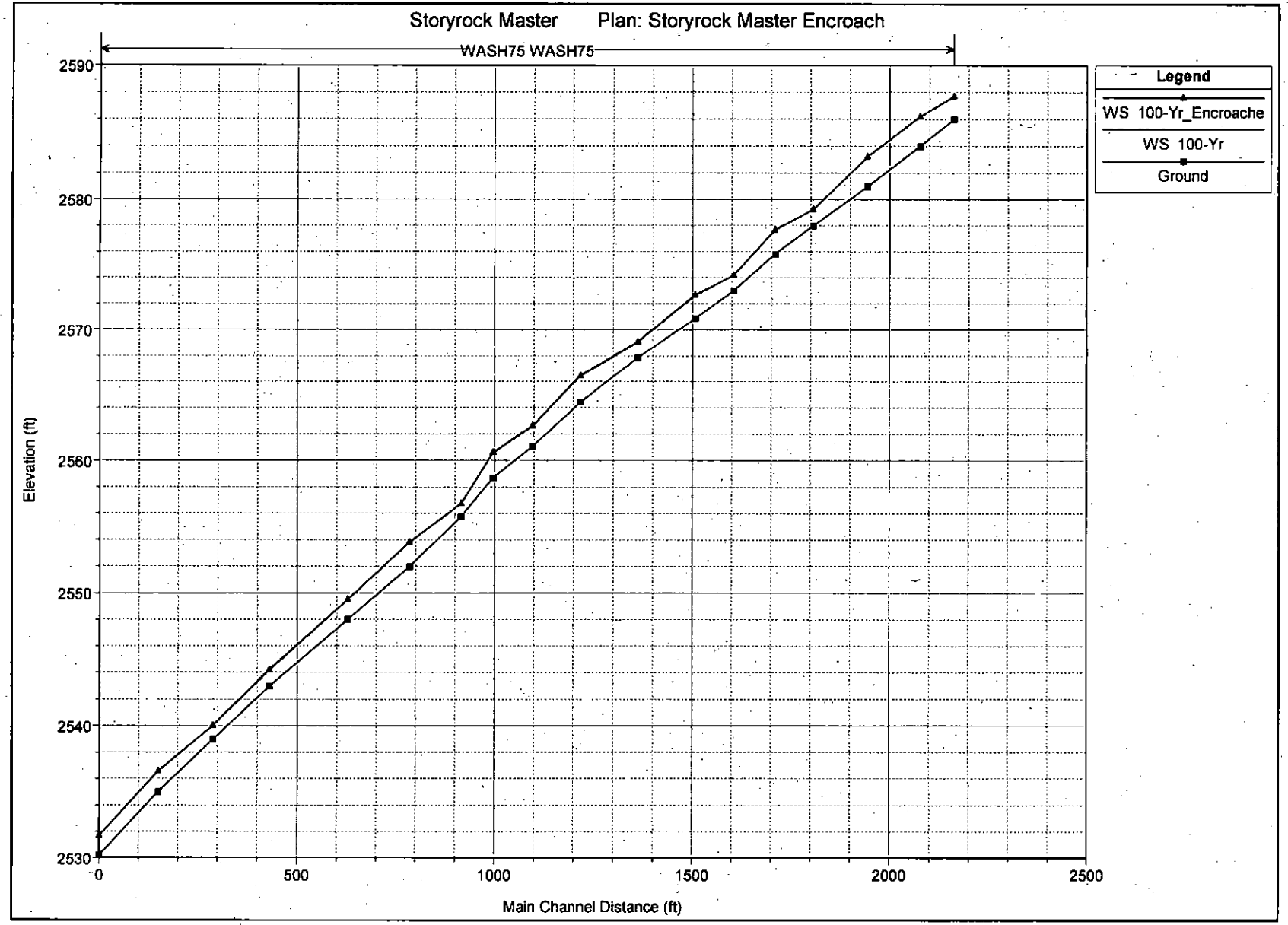
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
WASH65	WASH65	219.18	100-Yr	97.00	2592.98	2594.23	2594.28	2594.67	0.034257	5.33	18.21	23.94	1.08
WASH65	WASH65	101.76	100-Yr	97.00	2589.95	2591.42	2591.42	2591.85	0.021076	5.24	18.50	21.86	1.01
WASH60	WASH60	861.45	100-Yr	296.00	2607.89	2609.98	2610.10	2610.62	0.020599	6.40	46.23	44.69	1.11
WASH60	WASH60	576.92	100-Yr	296.00	2600.91	2603.16	2603.61	2604.43	0.022484	9.06	32.66	20.74	1.27
WASH60	WASH60	395.74	100-Yr	296.00	2596.86	2598.53	2599.14	2599.74	0.029771	8.84	33.49	30.05	1.48
WASH60	WASH60	296.24	100-Yr	296.00	2594.28	2595.76	2595.94	2596.52	0.032422	6.99	42.33	48.14	1.31
WASH60	WASH60	213.64	100-Yr	296.00	2592.12	2593.59	2593.66	2594.16	0.024249	6.03	49.08	56.08	1.14
WASH60	WASH60	81.32	100-Yr	296.00	2588.99	2591.09	2591.09	2591.76	0.016737	6.58	44.98	33.82	1.01
WASH160	WASH160	2694.7	100-Yr	79.00	2619.72	2620.85	2621.03	2621.52	0.035097	6.56	12.04	16.71	1.36
WASH160	WASH160	2546.38	100-Yr	79.00	2615.97	2617.04	2617.08	2617.46	0.021204	5.20	15.19	20.13	1.05
WASH160	WASH160	2403.73	100-Yr	79.00	2611.97	2613.32	2613.28	2613.69	0.029571	4.87	16.22	19.88	0.95
WASH160	WASH160	2236.32	100-Yr	79.00	2606.95	2608.37	2608.37	2608.92	0.027301	5.94	13.31	12.27	1.00
WASH160	WASH160	2150.86	100-Yr	79.00	2604.69	2605.45	2605.59	2605.95	0.044906	5.68	13.92	28.66	1.44
WASH160	WASH160	2038.59	100-Yr	79.00	2601.77	2602.88	2602.88	2603.21	0.018211	4.66	16.97	25.62	1.01
WASH160	WASH160	1844.74	100-Yr	79.00	2595.97	2597.00	2597.02	2597.84	0.046021	7.37	10.72	28.81	1.51
WASH160	WASH160	1665.99	100-Yr	79.00	2589.97	2590.93	2590.93	2591.31	0.028593	4.94	16.00	21.79	1.02
WASH160	WASH160	1429.43	100-Yr	79.00	2583.51	2584.40	2584.40	2584.72	0.028489	4.58	17.24	27.08	1.01
WASH160	WASH160	1190.51	100-Yr	79.00	2575.99	2577.23	2577.26	2577.45	0.032863	3.76	21.02	60.29	1.12
WASH160	WASH160	1018.78	100-Yr	79.00	2570.91	2571.53	2571.60	2571.89	0.032270	4.90	17.30	37.54	1.21
WASH160	WASH160	844.38	100-Yr	79.00	2564.95	2565.83	2565.88	2566.19	0.036761	5.56	17.50	29.04	1.16
WASH160	WASH160	739.58	100-Yr	79.00	2560.94	2562.49	2562.16	2562.78	0.011687	4.33	18.26	14.72	0.68
WASH160	WASH160	708.75	100-Yr	79.00	2559.52	2561.03	2560.97	2561.58	0.017129	5.94	13.30	10.72	0.94
WASH160	WASH160	655.73	100-Yr	79.00	2558.27	2559.92	2559.92	2560.59	0.020115	6.56	12.04	9.14	1.01
WASH160	WASH160	514.86	100-Yr	79.00	2553.97	2555.08	2555.43	2556.17	0.052905	8.37	9.44	17.62	2.02
WASH160	WASH160	338.33	100-Yr	79.00	2548.90	2549.27	2549.22	2549.34	0.023075	2.09	37.76	154.84	0.73
WASH160	WASH160	241.22	100-Yr	79.00	2544.77	2545.51	2545.45	2545.66	0.030301	3.08	25.64	62.80	0.85
WASH160	WASH160	84.23	100-Yr	79.00	2539.96	2540.35	2540.33	2540.44	0.036395	2.43	32.49	144.05	0.90

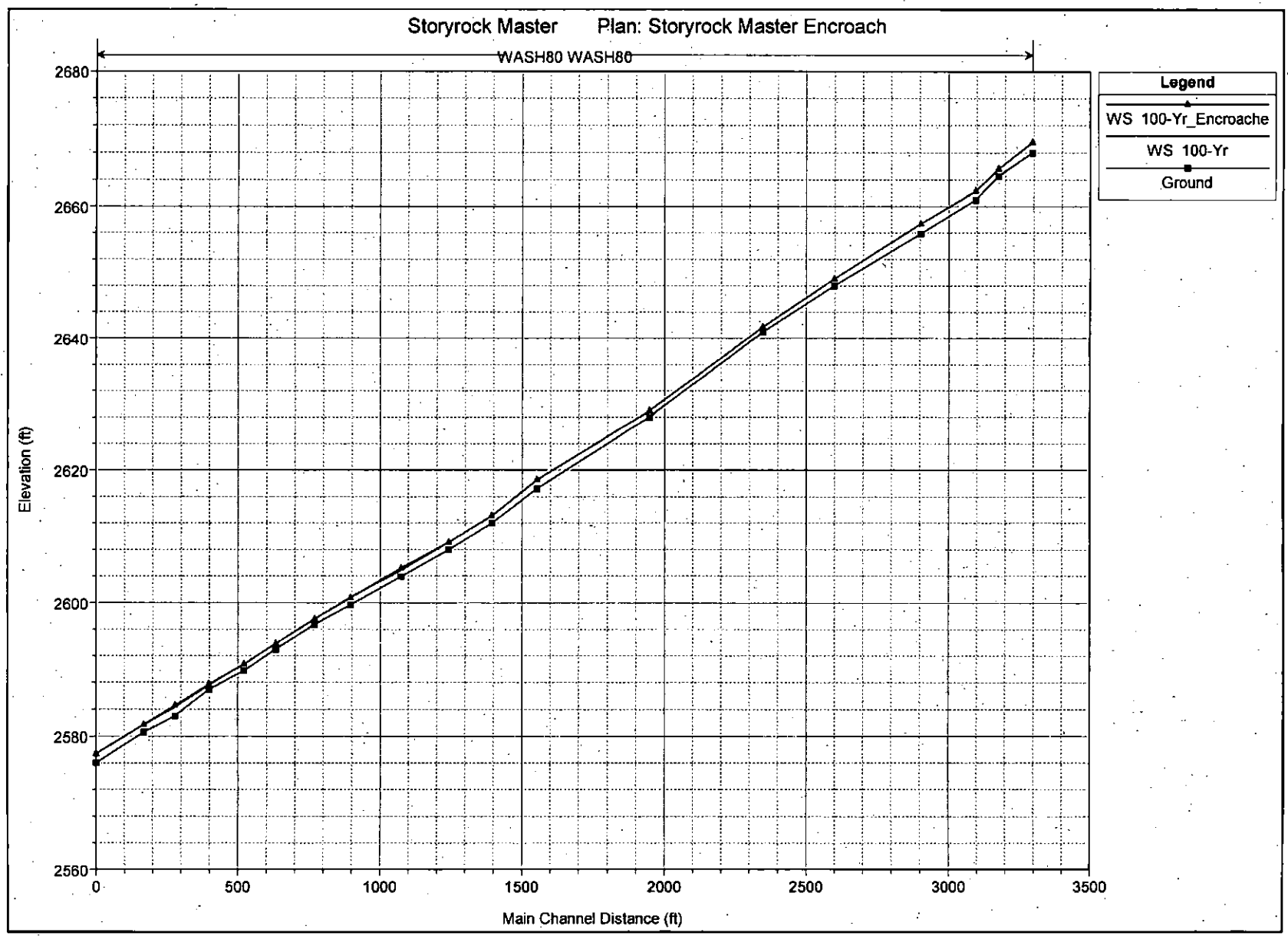
SITE BOUNDARY CROSS SECTION

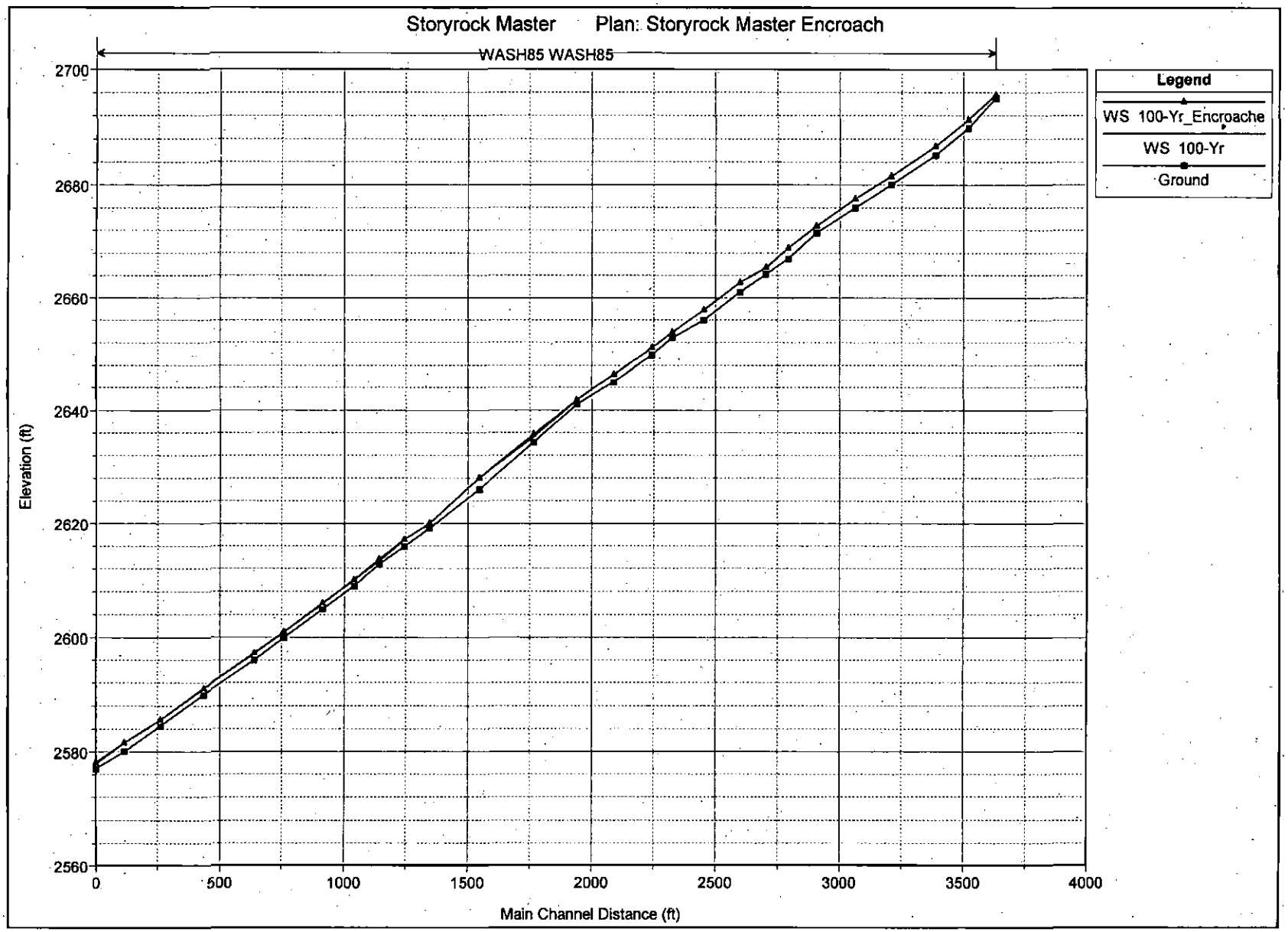
HEC-RAS Proposed Condition


Storyrock Master Plan: Storyrock Master Encroach
WASH60 WASH60
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Elevation (ft)
2610
2605
2600
2595
2590
2585
0
200
400
600
800
Main Channel Distance (ft)

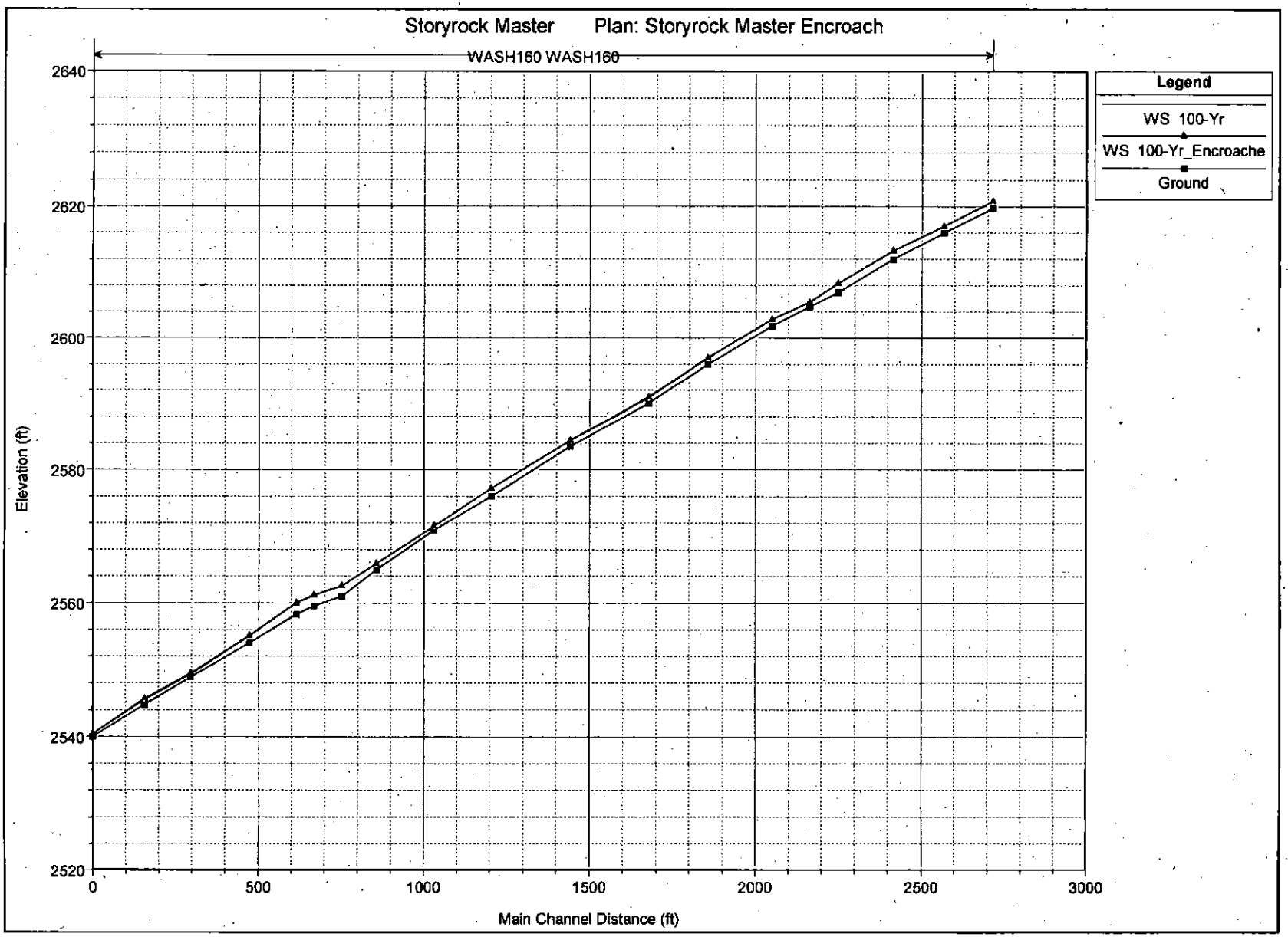

Storyrock Master Plan: Storyrock Master Encroach
WASH65 WASH65
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Elevation (ft)
2615
2610
2605
2600
2595
2590
2585
0
200
400
600
800
1000
Main Channel Distance (ft)

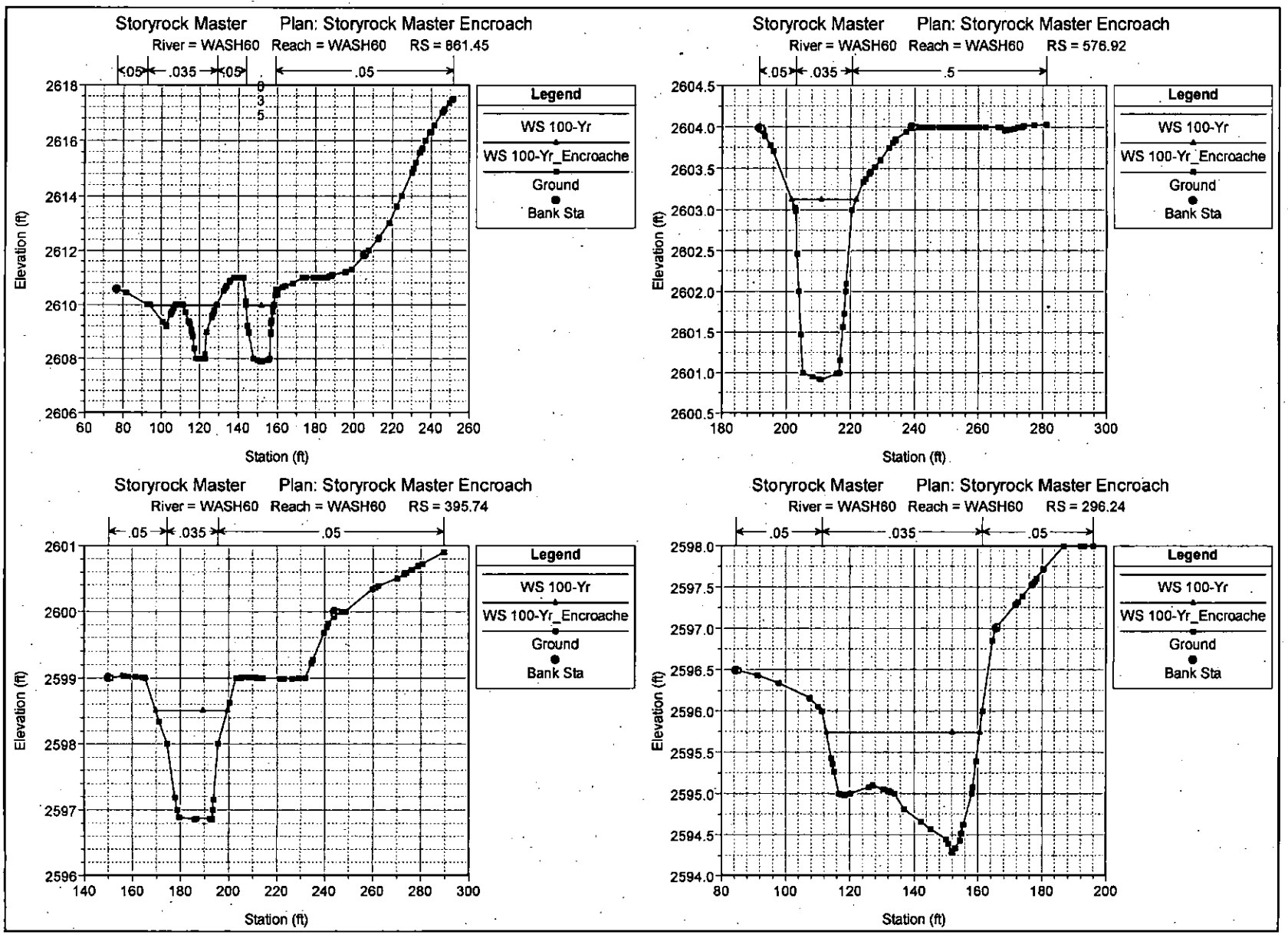

Storyrock Master Plan: Storyrock Master Encroach
WASH75 WASH75
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Elevation (ft)
2590
2580
2570
2560
2550
2540
2530
0
500
1000
1500
2000
2500
Main Channel Distance (ft)

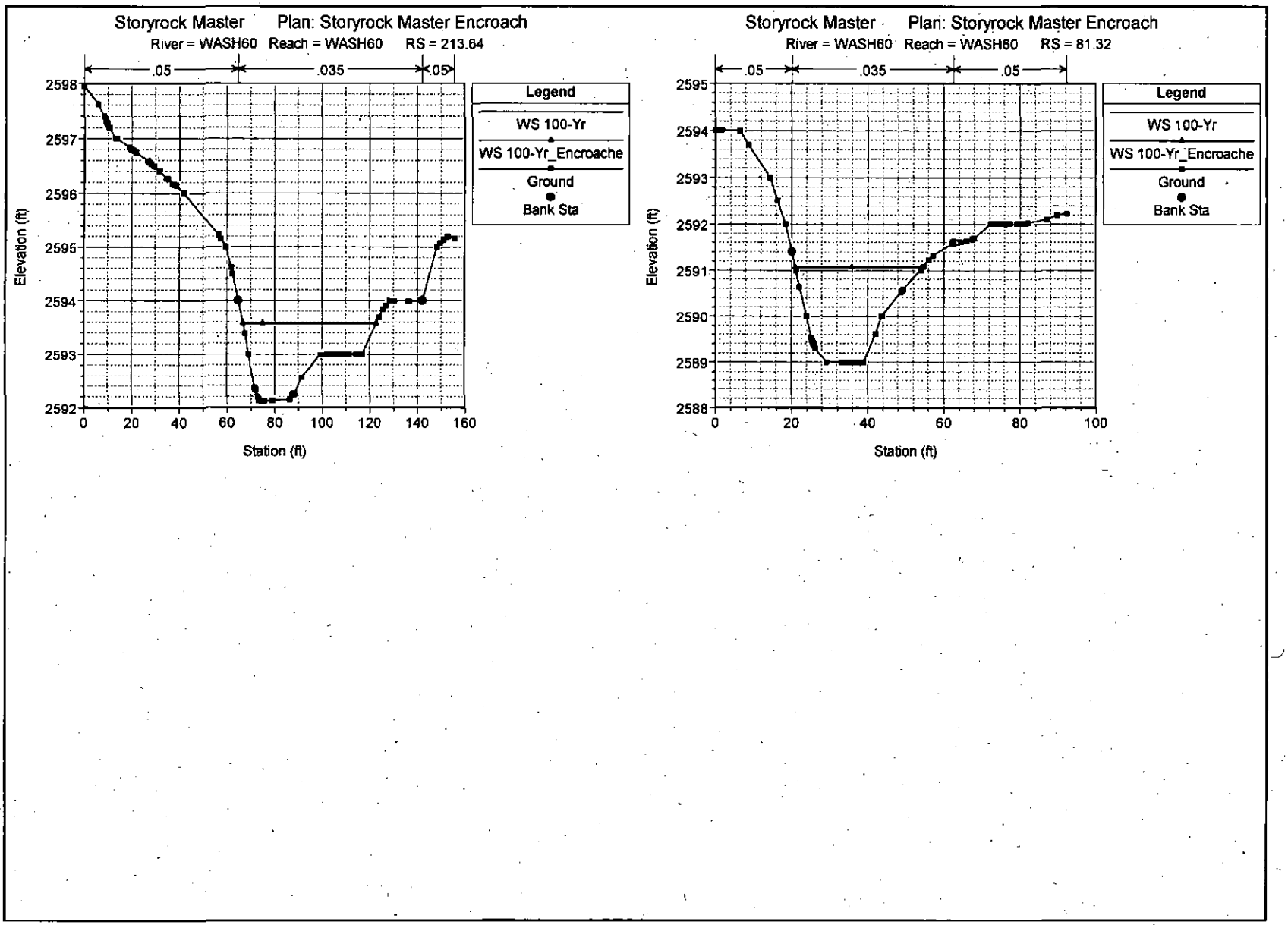

Storyrock Master Plan: Storyrock Master Encroach
WASH80 WASH80
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Elevation (ft)
2680
2660
2640
2620
2600
2580
2560
0
500
1000
1500
2000
2500
3000
3500
Main Channel Distance (ft)

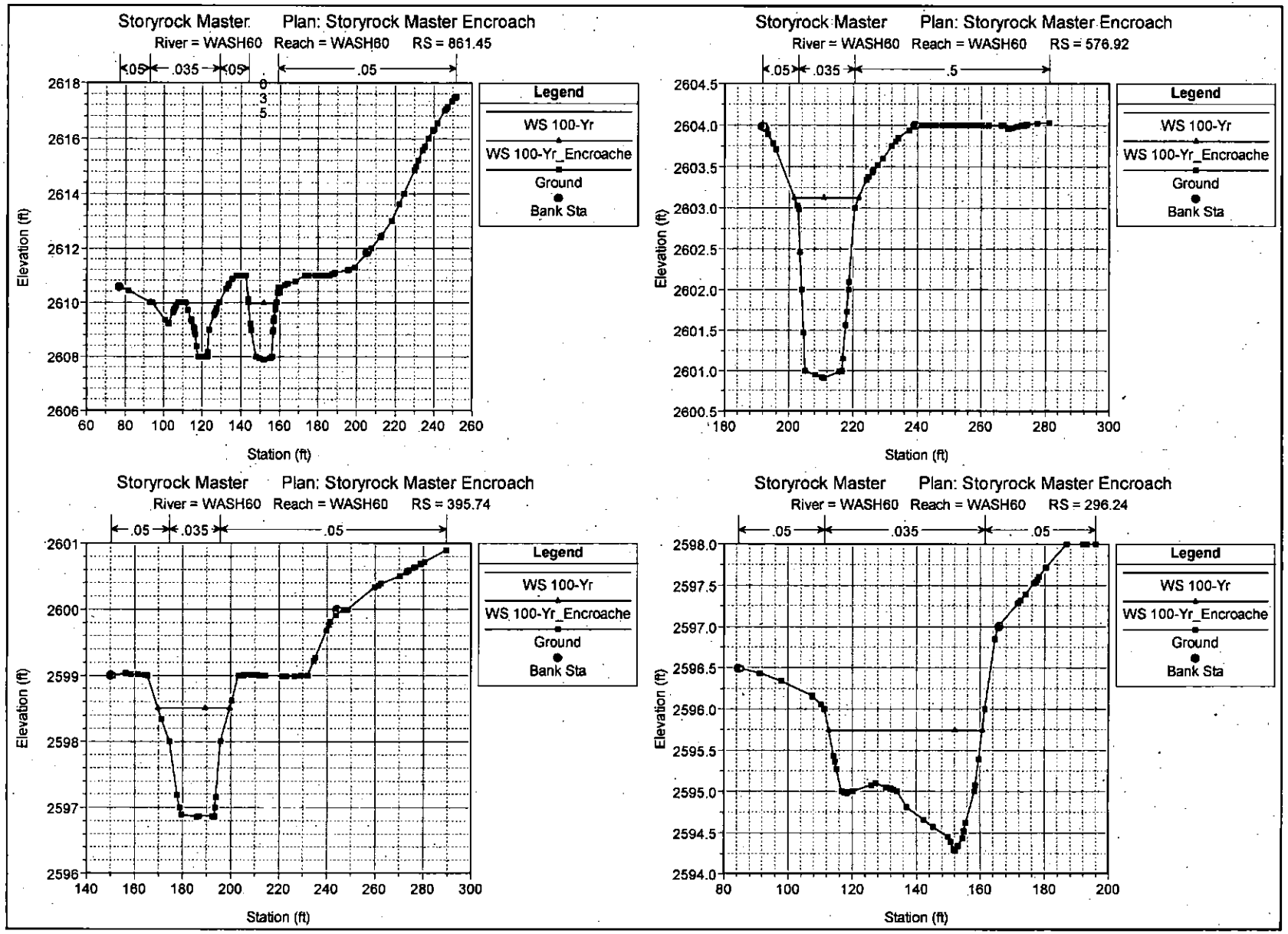

Storyrock Master Plan: Storyrock Master Encroach
WASH85 WASH85
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Elevation (ft)
2700
2680
2660
2640
2620
2600
2580
2560
0
500
1000
1500
2000
2500
3000
3500
4000
Main Channel Distance (ft)

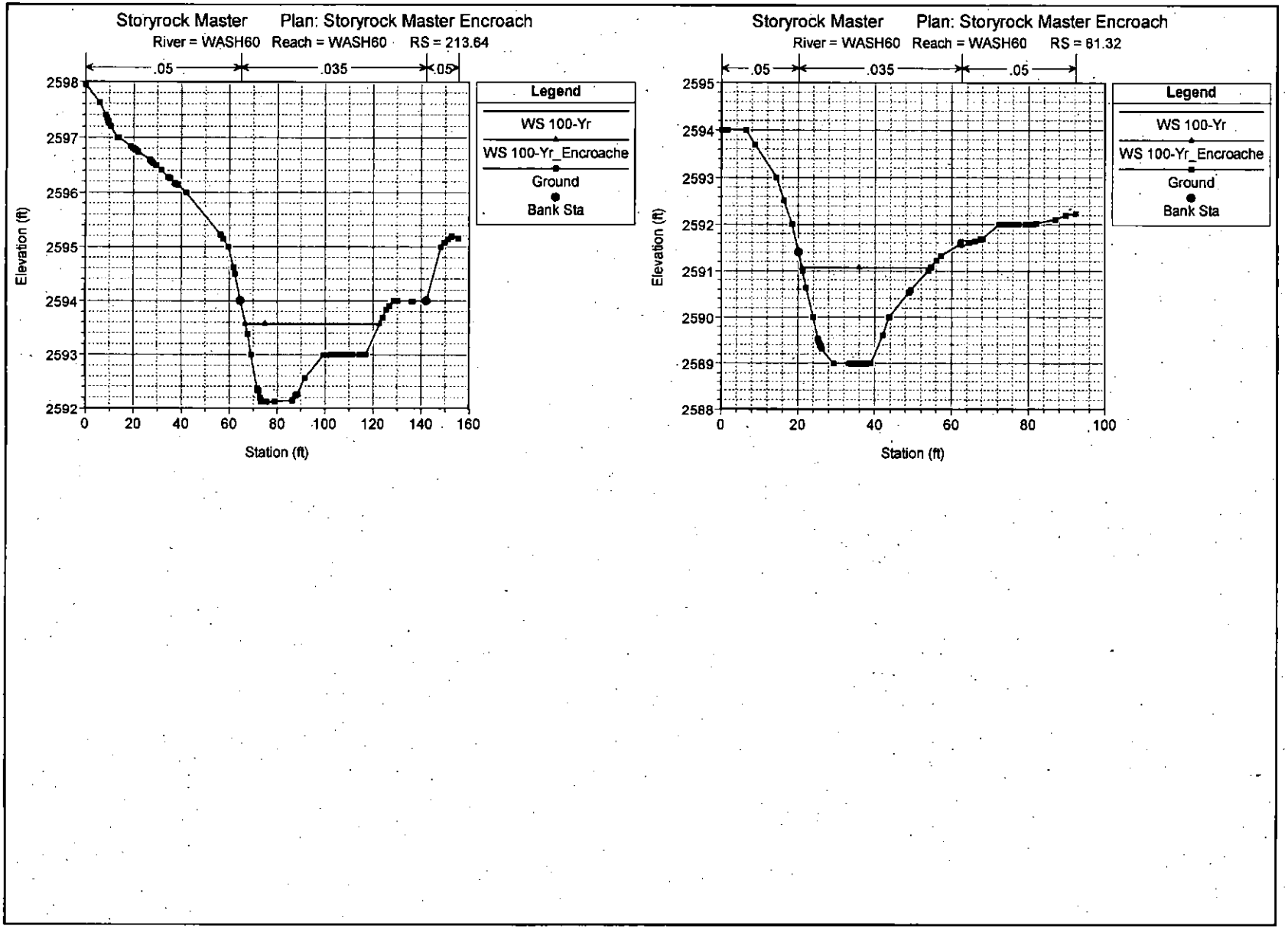

Storyrock Master Plan: Storyrock Master Encroach
WASH90 WASH90
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Elevation (ft)
2580
2570
2560
2550
2540
2530
2520
0
200
400
600
800
1000
1200
1400
1600
1800
Main Channel Distance (ft)

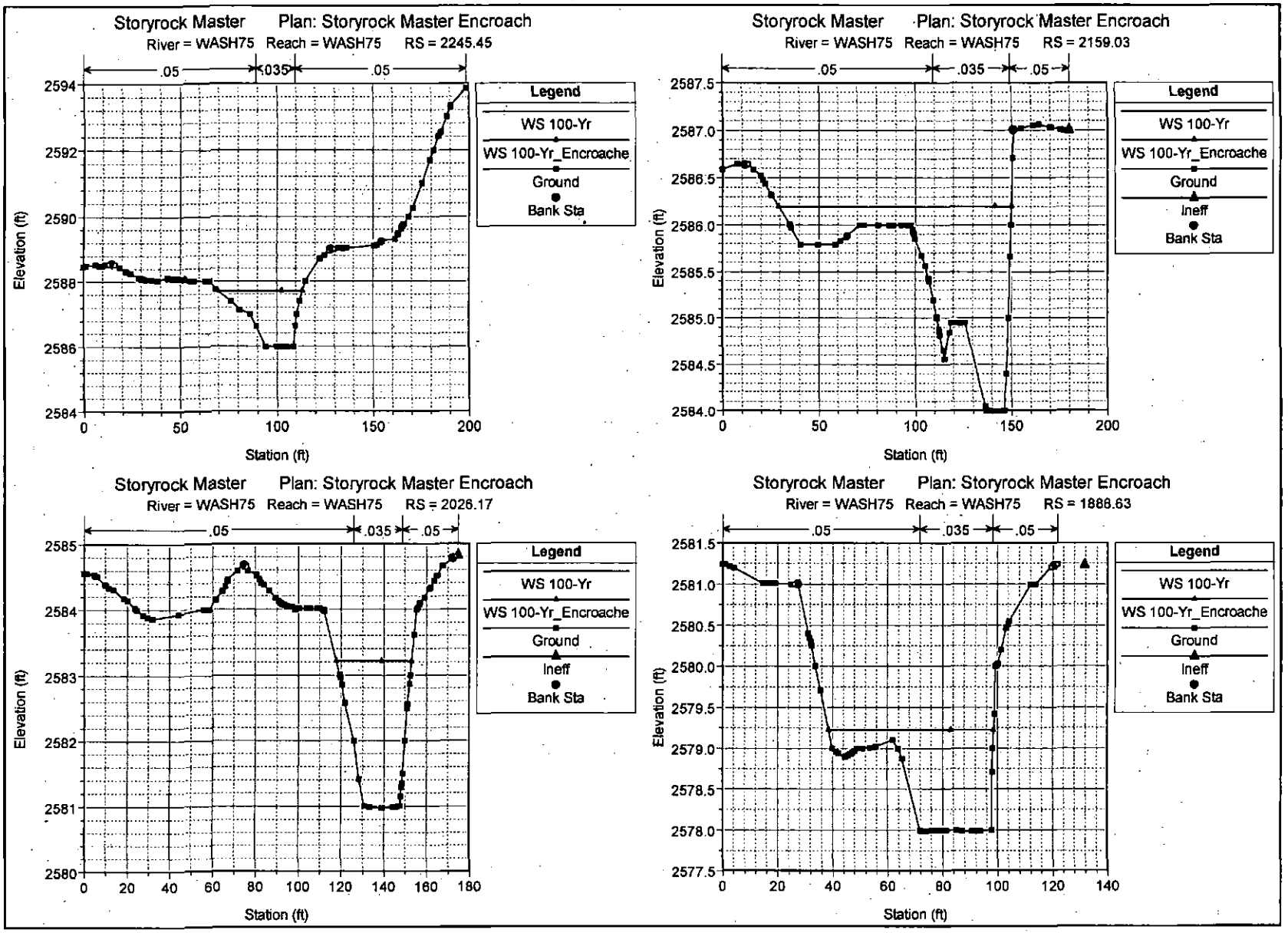

Storyrock Master Plan: Storyrock Master Encroach
WASH160 WASH160
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Elevation (ft)
2640
2620
2600
2580
2560
2540
2520
0
500
1000
1500
2000
2500
3000
Main Channel Distance (ft)

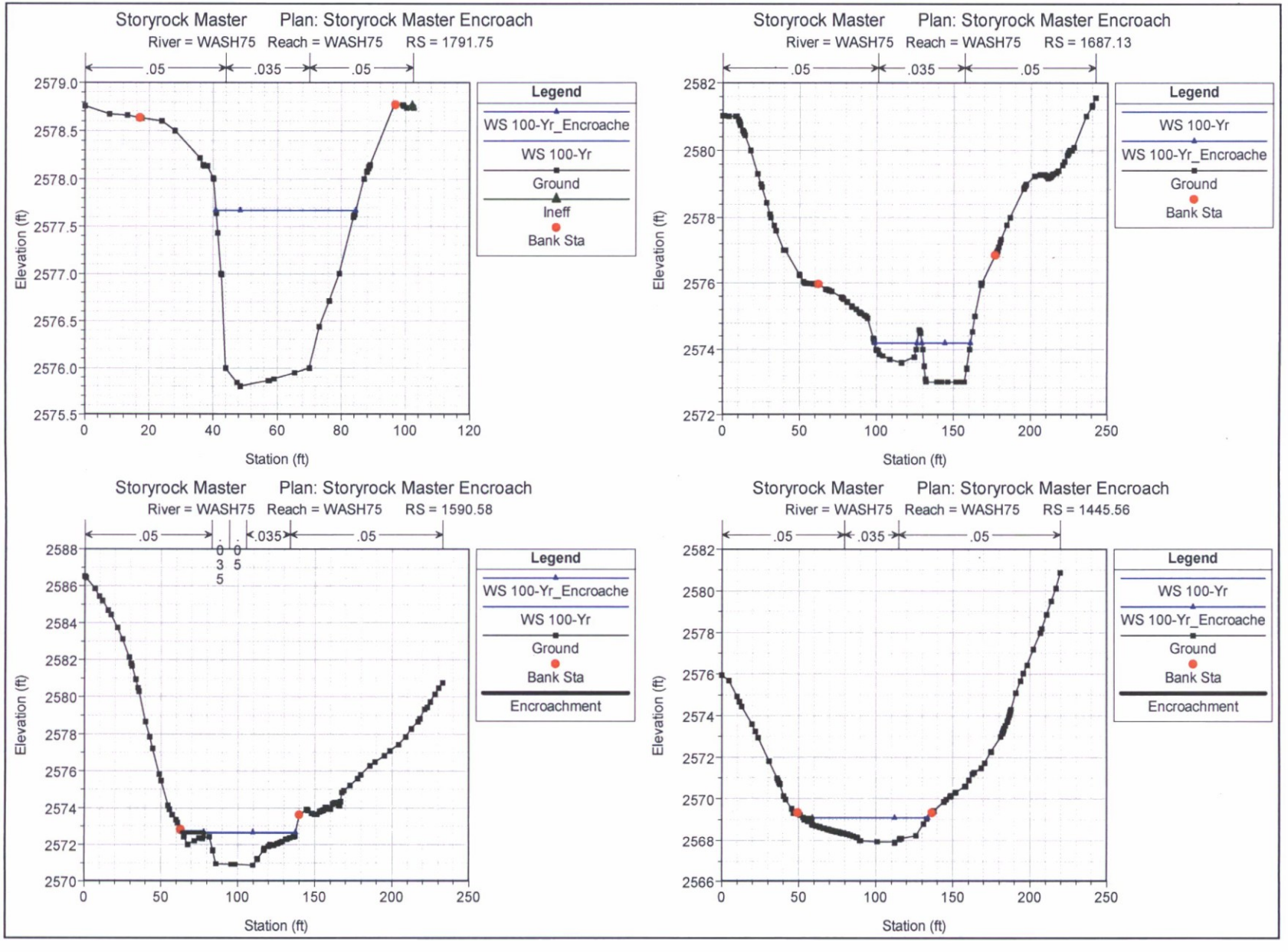

Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 861.45
.05 .035 .05 .05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 576.92
.05 .035 .5
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 395.74
.05 .035 .05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 296.24
.05 .035 .05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta

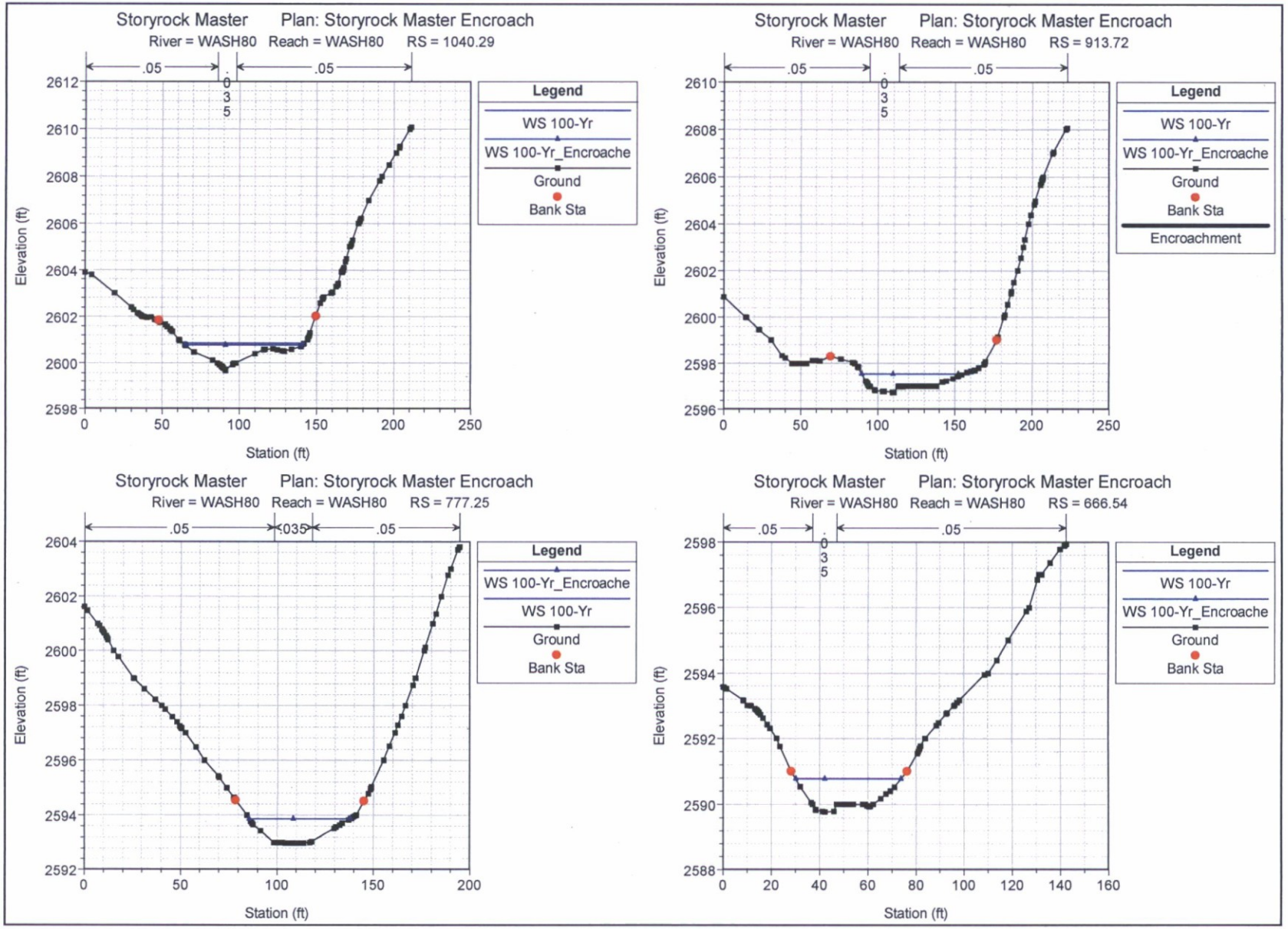

Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 213.64
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 81.32
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta

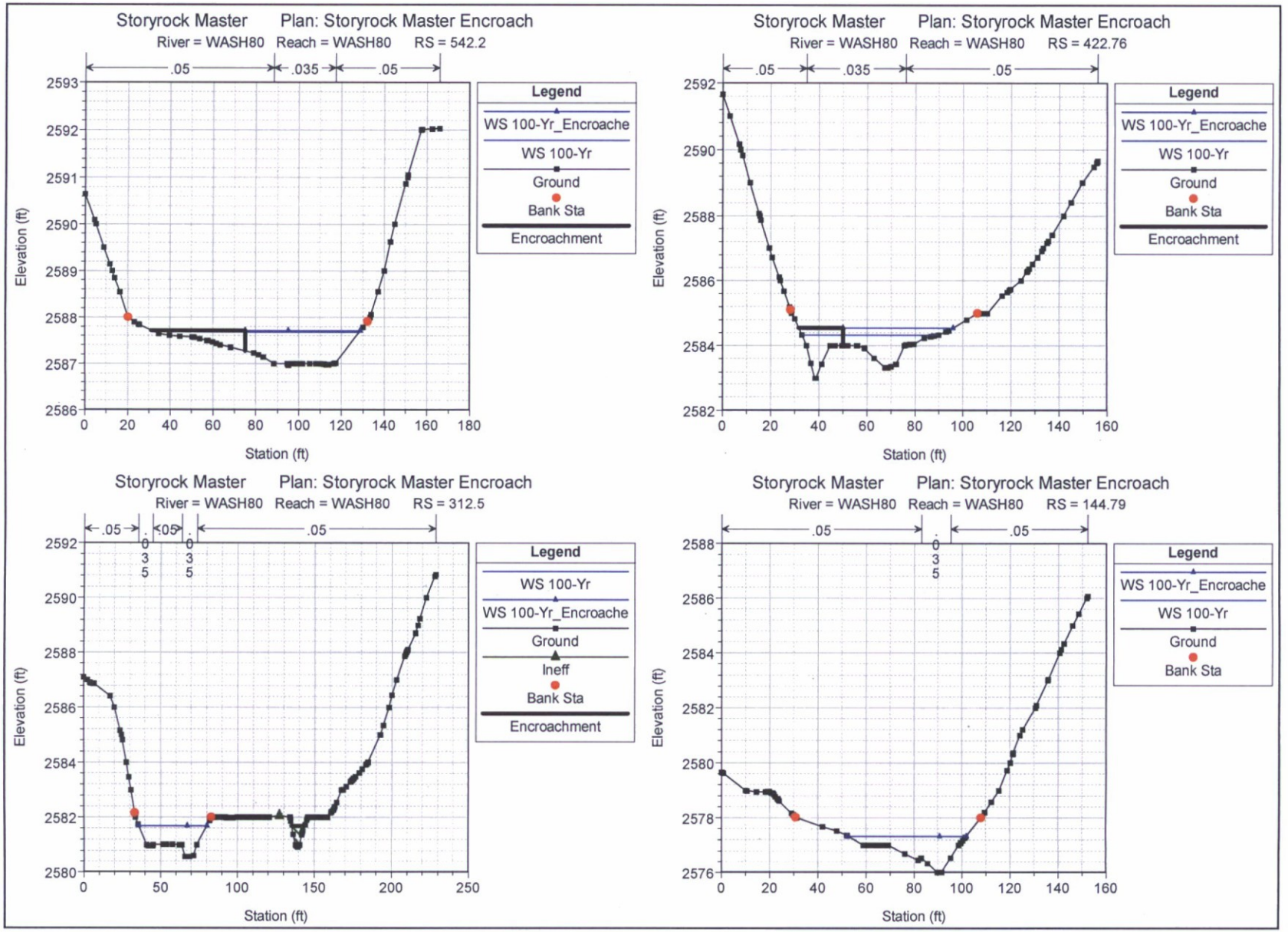

Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 861.45
.05 .035 .05 .05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 576.92
.05 .035 .5
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 395.74
.05 .035 .05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 296.24
.05 .035 .05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta

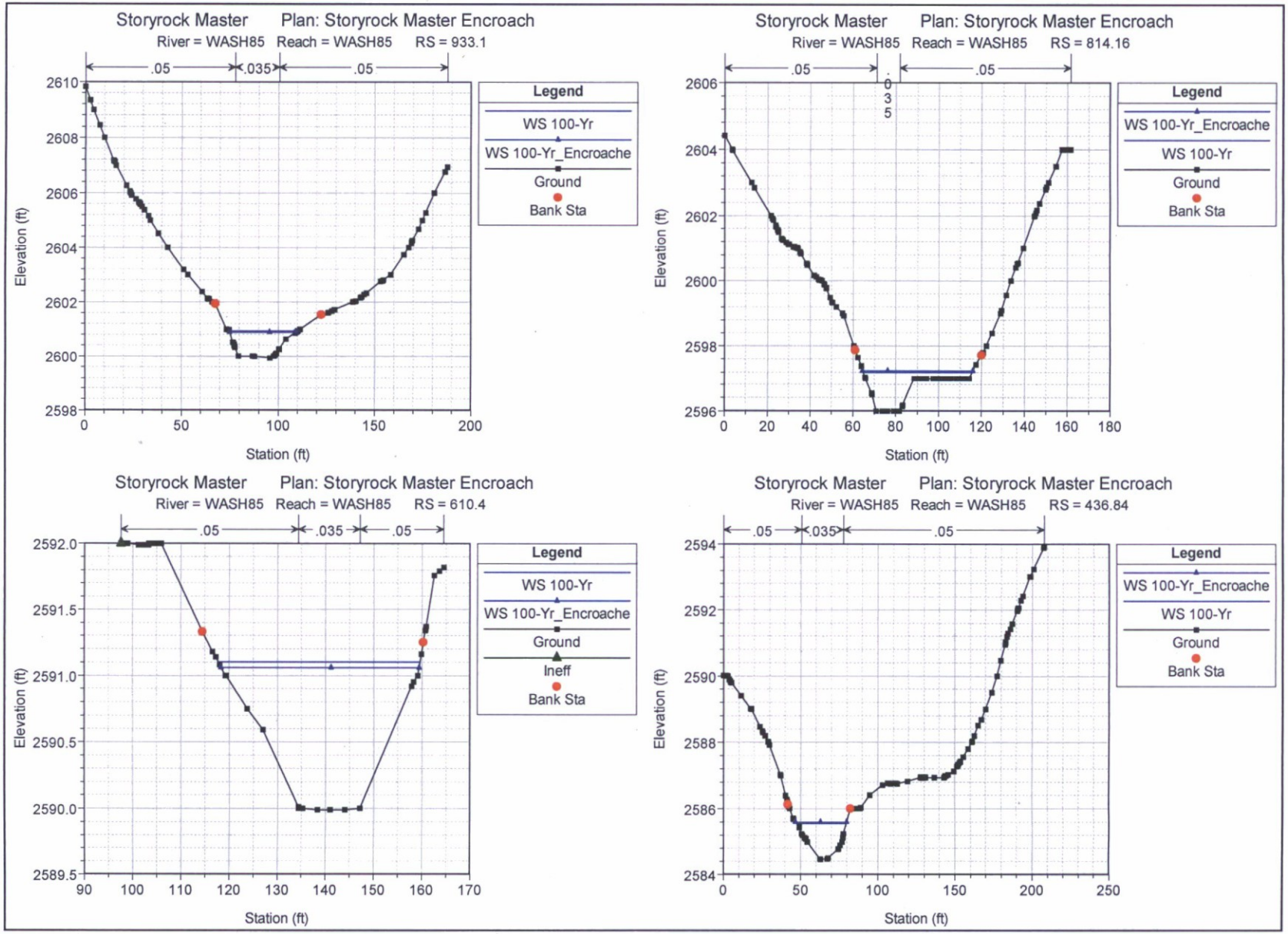

Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 213.64
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH60 Reach = WASH60 RS = 81.32
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta

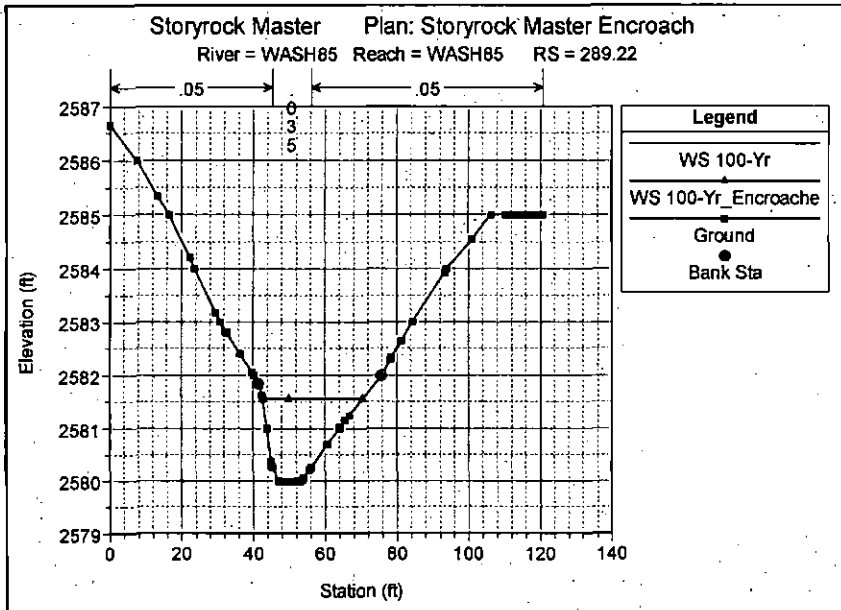

Storyrock Master Plan: Storyrock Master Encroach
River = WASH75 Reach = WASH75 RS = 2245.45
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH75 Reach = WASH75 RS = 2159.03
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Ineff
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH75 Reach = WASH75 RS = 2026.17
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Ineff
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH75 Reach = WASH75 RS = 1886.63
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Ineff
Bank Sta

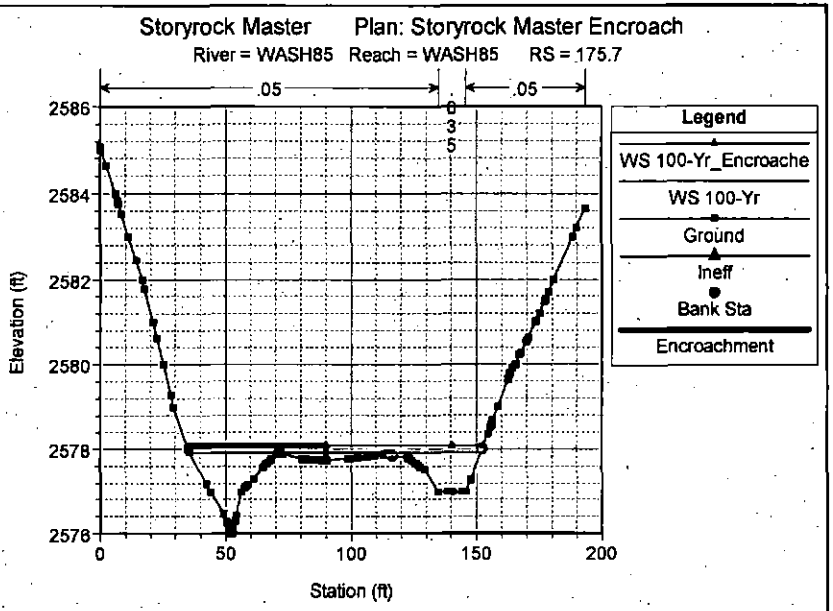

Storyrock Master Plan: Storyrock Master Encroach
River = WASH75 Reach = WASH75 RS = 1791.75
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Ineff
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH75 Reach = WASH75 RS = 1687.13
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH75 Reach = WASH75 RS = 1590.58
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Bank Sta
Encroachment
Storyrock Master Plan: Storyrock Master Encroach
River = WASH75 Reach = WASH75 RS = 1445.56
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Encroachment

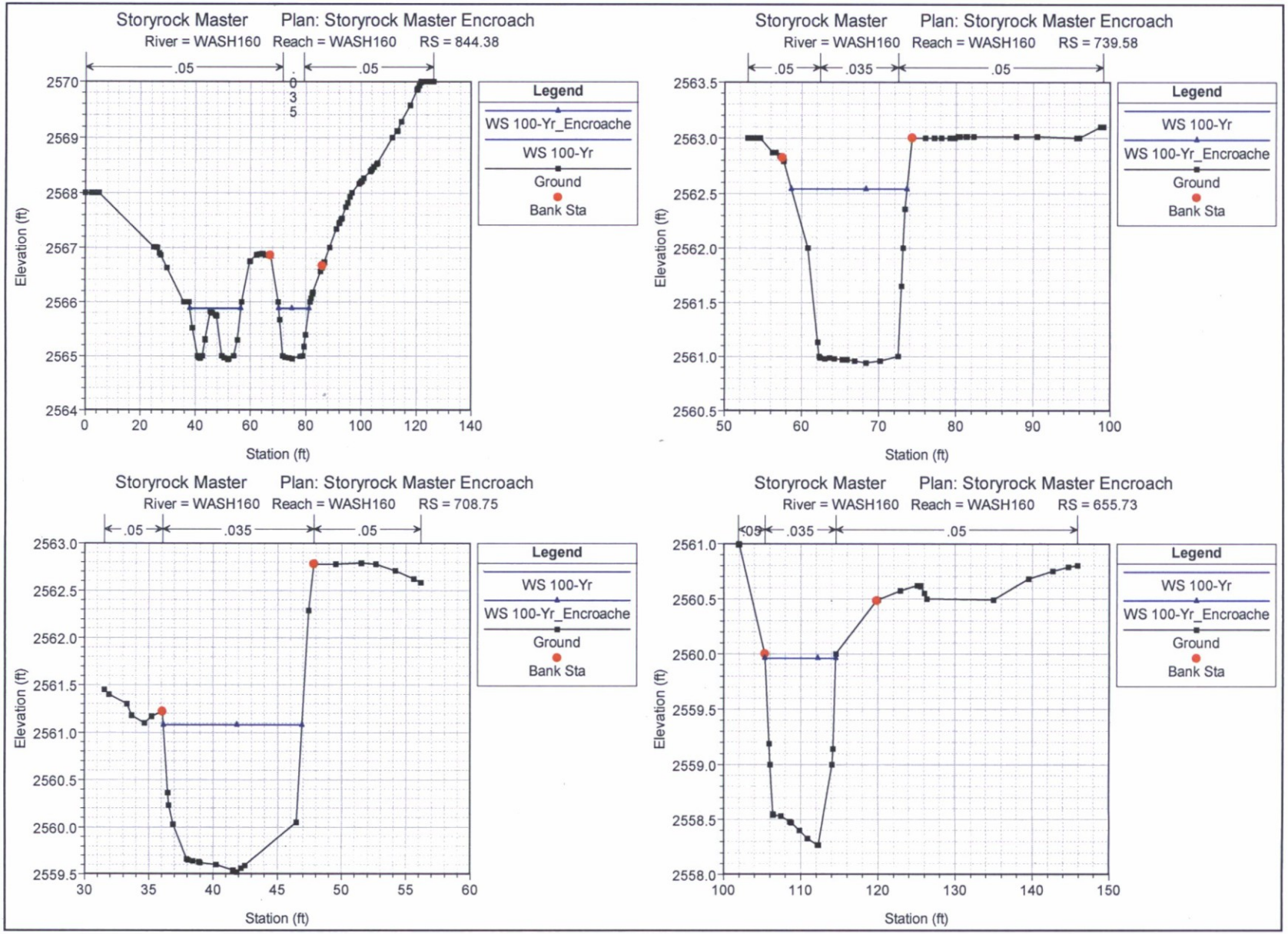

Storyrock Master Plan: Storyrock Master Encroach
River = WASH80 Reach = WASH80 RS = 1040.29
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH80 Reach = WASH80 RS = 913.72
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Encroachment
Storyrock Master Plan: Storyrock Master Encroach
River = WASH80 Reach = WASH80 RS = 777.25
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH80 Reach = WASH80 RS = 666.54
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta

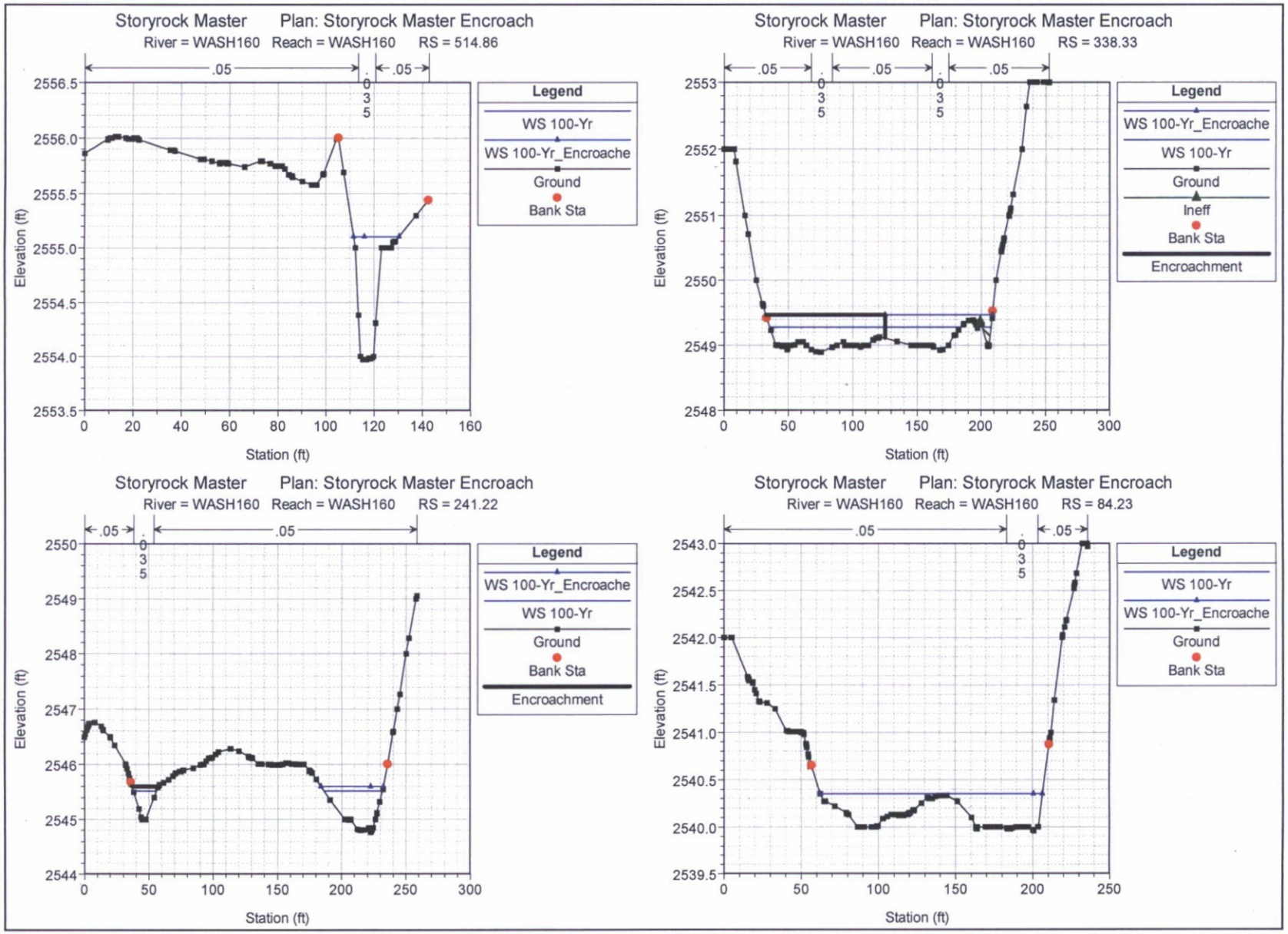

Storyrock Master Plan: Storyrock Master Encroach
River = WASH80 Reach = WASH80 RS = 542.2
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Bank Sta
Encroachment
Storyrock Master Plan: Storyrock Master Encroach
River = WASH80 Reach = WASH80 RS = 422.76
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Bank Sta
Encroachment
Storyrock Master Plan: Storyrock Master Encroach
River = WASH80 Reach = WASH80 RS = 312.5
.05
.035
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Ineff
Bank Sta
Encroachment
Storyrock Master Plan: Storyrock Master Encroach
River = WASH80 Reach = WASH80 RS = 144.79
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Bank Sta


Storyrock Master Plan: Storyrock Master Encroach
River = WASH85 Reach = WASH85 RS = 933.1
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH85 Reach = WASH85 RS = 814.16
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH85 Reach = WASH85 RS = 610.4
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Ineff
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH85 Reach = WASH85 RS = 436.84
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Bank Sta


Storyrock Master Plan: Storyrock Master Encroach
River = WASH85 Reach = WASH85 RS = 289.22
.05
.05
0
3
5
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta


Storyrock Master Plan: Storyrock Master Encroach
River = WASH85 Reach = WASH85 RS = 175.7
.05
.05
0
3
5
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Ineff
Bank Sta
Encroachment


Storyrock Master Plan: Storyrock Master Encroach
River = WASH160 Reach = WASH160 RS = 844.38
.05
.035
.05
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Encroach
River = WASH160 Reach = WASH160 RS = 739.58
.05
.035
.05
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Encroach
River = WASH160 Reach = WASH160 RS = 708.75
.05
.035
.05
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Elevation (ft)
Station (ft)
Storyrock Master Plan: Storyrock Master Encroach
River = WASH160 Reach = WASH160 RS = 655.73
.05
.035
.05
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Elevation (ft)
Station (ft)


Storyrock Master Plan: Storyrock Master Encroach
River = WASH160 Reach = WASH160 RS = 514.86
.05
.05
.035
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta
Storyrock Master Plan: Storyrock Master Encroach
River = WASH160 Reach = WASH160 RS = 338.33
.05
.05
.05
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Ineff
Bank Sta
Encroachment
Storyrock Master Plan: Storyrock Master Encroach
River = WASH160 Reach = WASH160 RS = 241.22
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr_Encroache
WS 100-Yr
Ground
Bank Sta
Encroachment
Storyrock Master Plan: Storyrock Master Encroach
River = WASH160 Reach = WASH160 RS = 84.23
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
WS 100-Yr
WS 100-Yr_Encroache
Ground
Bank Sta

HEC-RAS Plan: Encroach

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
WASH90	WASH90	1788.8	100-Yr	358.00	2571.88	2573.48	2573.48	2573.88	0.025950	5.08	70.41	91.55	1.02
WASH90	WASH90	1788.8	100-Yr_Encroache	358.00	2571.88	2573.42	2573.48	2573.88	0.029324	5.33	67.16	90.02	1.09
WASH90	WASH90	1681.32	100-Yr	358.00	2568.93	2571.05	2571.05	2571.55	0.018026	5.84	83.51	138.41	1.00
WASH90	WASH90	1681.32	100-Yr_Encroache	358.00	2568.93	2571.05	2571.05	2571.55	0.018015	5.84	83.53	84.58	1.00
WASH90	WASH90	1493.29	100-Yr	358.00	2563.77	2564.71	2564.99	2565.57	0.068856	7.46	47.97	88.00	1.78
WASH90	WASH90	1493.29	100-Yr_Encroache	358.00	2563.77	2564.71	2564.99	2565.58	0.068941	7.47	47.95	87.99	1.78
WASH90	WASH90	1335.07	100-Yr	358.00	2559.73	2560.98	2560.98	2561.43	0.023681	5.36	66.79	78.32	1.01
WASH90	WASH90	1335.07	100-Yr_Encroache	358.00	2559.73	2560.98	2560.98	2561.43	0.023681	5.36	66.79	78.32	1.01
WASH90	WASH90	1218.75	100-Yr	358.00	2556.00	2557.22	2557.40	2557.88	0.040325	6.50	55.06	85.33	1.43
WASH90	WASH90	1218.75	100-Yr_Encroache	358.00	2556.00	2557.22	2557.40	2557.88	0.040325	6.50	55.06	85.33	1.43
WASH90	WASH90	1044.45	100-Yr	358.00	2551.19	2552.61	2552.61	2553.09	0.022067	5.58	84.13	88.96	1.01
WASH90	WASH90	1044.45	100-Yr_Encroache	358.00	2551.19	2552.61	2552.61	2553.09	0.022067	5.58	84.13	88.96	1.01
WASH90	WASH90	896.6	100-Yr	358.00	2546.23	2548.20	2548.28	2548.78	0.040329	6.14	58.34	65.93	1.15
WASH90	WASH90	896.6	100-Yr_Encroache	358.00	2546.23	2548.20	2548.28	2548.79	0.040329	6.14	58.34	65.93	1.15
WASH90	WASH90	702.87	100-Yr	358.00	2541.00	2542.51	2542.55	2543.07	0.022482	6.03	59.41	59.27	1.06
WASH90	WASH90	702.87	100-Yr_Encroache	358.00	2541.00	2542.51	2542.55	2543.07	0.022482	6.03	59.41	59.27	1.06
WASH90	WASH90	429.48	100-Yr	358.00	2532.99	2534.49	2534.67	2535.29	0.037048	7.18	49.87	47.76	1.24
WASH90	WASH90	429.48	100-Yr_Encroache	358.00	2532.99	2534.49	2534.67	2535.29	0.037048	7.18	49.87	47.76	1.24
WASH90	WASH90	198.13	100-Yr	358.00	2525.98	2527.93	2527.93	2528.49	0.028579	6.03	59.36	54.03	1.01
WASH90	WASH90	198.13	100-Yr_Encroache	358.00	2525.98	2527.93	2527.93	2528.49	0.028579	6.03	59.36	54.03	1.01
WASH90	WASH90	80.63	100-Yr	358.00	2522.82	2524.39	2524.53	2525.21	0.032124	7.29	49.13	41.02	1.17
WASH90	WASH90	80.63	100-Yr_Encroache	358.00	2522.82	2524.39	2524.53	2525.21	0.032124	7.29	49.13	41.02	1.17
WASH85	WASH85	3805.86	100-Yr	89.00	2694.99	2695.58	2695.68	2695.99	0.035852	5.14	17.31	36.14	1.31
WASH85	WASH85	3805.86	100-Yr_Encroache	89.00	2694.99	2695.58	2695.68	2695.99	0.035852	5.14	17.31	36.14	1.31
WASH85	WASH85	3694.75	100-Yr	107.00	2689.88	2691.26	2691.54	2692.14	0.033152	7.51	14.25	20.48	1.59
WASH85	WASH85	3694.75	100-Yr_Encroache	107.00	2689.88	2691.26	2691.54	2692.14	0.033152	7.51	14.25	20.48	1.59
WASH85	WASH85	3581.36	100-Yr	107.00	2685.13	2686.73	2686.84	2687.36	0.037644	6.37	16.80	18.72	1.19
WASH85	WASH85	3581.36	100-Yr_Encroache	107.00	2685.13	2686.73	2686.84	2687.36	0.037644	6.37	16.80	18.72	1.19
WASH85	WASH85	3382.35	100-Yr	130.00	2680.00	2681.48	2681.64	2682.16	0.023941	6.62	19.63	22.86	1.26
WASH85	WASH85	3382.35	100-Yr_Encroache	130.00	2680.00	2681.48	2681.64	2682.16	0.023941	6.62	19.63	22.86	1.26
WASH85	WASH85	3236.46	100-Yr	130.00	2676.00	2677.61	2677.66	2678.02	0.033652	5.15	25.26	34.66	1.06
WASH85	WASH85	3236.46	100-Yr_Encroache	130.00	2676.00	2677.61	2677.66	2678.02	0.033652	5.15	25.26	34.66	1.06
WASH85	WASH85	3081.51	100-Yr	130.00	2671.56	2672.74	2672.78	2673.19	0.028258	5.34	24.35	31.54	1.07
WASH85	WASH85	3081.51	100-Yr_Encroache	130.00	2671.56	2672.74	2672.78	2673.19	0.028258	5.34	24.35	31.54	1.07
WASH85	WASH85	2987.67	100-Yr	130.00	2668.99	2668.91	2668.91	2669.12	0.012310	3.72	34.91	55.51	0.83
WASH85	WASH85	2987.67	100-Yr_Encroache	130.00	2668.99	2668.91	2668.91	2669.12	0.012310	3.72	34.91	55.51	0.83
WASH85	WASH85	2879.41	100-Yr	130.00	2664.22	2665.38	2665.80	2666.78	0.077635	9.49	13.69	17.59	1.90
WASH85	WASH85	2879.41	100-Yr_Encroache	130.00	2664.22	2665.38	2665.80	2666.78	0.077635	9.49	13.69	17.59	1.90
WASH85	WASH85	2773.66	100-Yr	130.00	2660.98	2662.78	2662.78	2663.28	0.032922	5.70	22.81	22.79	1.00
WASH85	WASH85	2773.66	100-Yr_Encroache	130.00	2660.98	2662.78	2662.78	2663.28	0.032922	5.70	22.81	22.79	1.00
WASH85	WASH85	2626.9	100-Yr	130.00	2656.00	2657.85	2658.17	2658.76	0.028494	7.65	16.98	17.26	1.36
WASH85	WASH85	2626.9	100-Yr_Encroache	130.00	2656.00	2657.85	2658.17	2658.76	0.028494	7.65	16.98	17.26	1.36
WASH85	WASH85	2500	100-Yr	130.00	2652.89	2653.87	2654.09	2654.40	0.039689	5.81	22.36	90.70	1.20
WASH85	WASH85	2500	100-Yr_Encroache	130.00	2652.89	2653.87	2654.09	2654.40	0.039689	5.81	22.36	90.70	1.20
WASH85	WASH85	2417.34	100-Yr	130.00	2649.90	2651.11	2651.22	2651.56	0.029500	5.39	24.13	43.26	1.27
WASH85	WASH85	2417.34	100-Yr_Encroache	130.00	2649.90	2651.11	2651.22	2651.56	0.029500	5.39	24.13	43.26	1.27
WASH85	WASH85	2263.66	100-Yr	130.00	2644.94	2646.39	2646.62	2647.13	0.027938	6.62	18.77	34.36	1.44
WASH85	WASH85	2263.66	100-Yr_Encroache	130.00	2644.94	2646.39	2646.62	2647.13	0.027938	6.62	18.77	34.36	1.44
WASH85	WASH85	2114.75	100-Yr	133.00	2640.97	2641.77	2641.90	2642.21	0.037910	5.33	24.93	56.52	1.42
WASH85	WASH85	2114.75	100-Yr_Encroache	133.00	2640.97	2641.77	2641.90	2642.21	0.037910	5.33	24.93	56.52	1.42
WASH85	WASH85	1938.62	100-Yr	133.00	2634.26	2635.27	2635.27	2635.48	0.039503	3.68	38.32	87.71	1.00
WASH85	WASH85	1938.62	100-Yr_Encroache	133.00	2634.95	2635.65	2635.68	2635.96	0.032925	4.48	29.70	57.39	1.10
WASH85	WASH85	1721.48	100-Yr	133.00	2625.94	2628.04	2628.04	2628.10	0.011727	2.02	66.09	151.35	0.53
WASH85	WASH85	1721.48	100-Yr_Encroache	133.00	2625.94	2628.04	2628.04	2628.10	0.011727	2.02	66.09	151.35	0.53
WASH85	WASH85	1521.24	100-Yr	133.00	2619.06	2620.04	2620.39	2621.96	0.177883	11.14	11.94	44.81	3.79
WASH85	WASH85	1521.24	100-Yr_Encroache	133.00	2619.06	2620.04	2620.39	2621.96	0.177883	11.14	11.94	44.81	3.79
WASH85	WASH85	1420.31	100-Yr	133.00	2615.94	2617.16	2617.17	2617.53	0.016802	4.88	27.23	38.78	1.03
WASH85	WASH85	1420.31	100-Yr_Encroache	133.00	2615.94	2617.16	2617.17	2617.53	0.016802	4.88	27.23	38.78	1.03

HEC-RAS Plan: Encroach (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
WASH85	WASH85	1317.52	100-Yr	153.00	2612.77	2613.39	2613.57	2613.98	0.087055	6.15	24.86	72.09	1.85
WASH85	WASH85	1317.52	100-Yr_Encroache	153.00	2612.82	2613.72	2614.01	2614.59	0.050705	7.49	20.43	28.66	1.56
WASH85	WASH85	1215.73	100-Yr	153.00	2609.00	2610.10	2610.10	2610.36	0.024562	4.10	37.35	75.81	1.03
WASH85	WASH85	1215.73	100-Yr_Encroache	153.00	2609.00	2610.05	2610.10	2610.38	0.032038	4.57	33.50	74.96	1.20
WASH85	WASH85	1087.82	100-Yr	153.00	2604.91	2605.90	2606.09	2606.54	0.036256	6.45	23.72	37.87	1.44
WASH85	WASH85	1087.82	100-Yr_Encroache	153.00	2604.91	2605.95	2606.09	2606.49	0.028652	5.89	25.97	40.48	1.30
WASH85	WASH85	933.1	100-Yr	153.00	2599.93	2600.94	2601.10	2601.53	0.028952	6.17	24.80	35.35	1.30
WASH85	WASH85	933.1	100-Yr_Encroache	153.00	2599.93	2600.89	2601.09	2601.57	0.035246	6.63	23.09	34.43	1.43
WASH85	WASH85	814.16	100-Yr	153.00	2596.00	2597.19	2597.33	2597.72	0.035255	5.80	26.38	50.90	1.42
WASH85	WASH85	814.16	100-Yr_Encroache	153.00	2596.00	2597.24	2597.33	2597.68	0.029494	5.36	28.54	51.44	1.27
WASH85	WASH85	610.4	100-Yr	153.00	2589.99	2591.10	2591.14	2591.52	0.026254	5.17	29.61	41.80	1.08
WASH85	WASH85	610.4	100-Yr_Encroache	153.00	2589.99	2591.06	2591.14	2591.53	0.030925	5.49	27.85	41.02	1.18
WASH85	WASH85	436.84	100-Yr	153.00	2584.46	2585.56	2585.76	2586.26	0.034896	6.73	22.74	32.28	1.41
WASH85	WASH85	436.84	100-Yr_Encroache	153.00	2584.46	2585.59	2585.76	2586.23	0.029990	6.39	23.94	33.09	1.32
WASH85	WASH85	289.22	100-Yr	153.00	2579.99	2581.56	2581.56	2582.05	0.030559	5.66	27.05	27.91	1.01
WASH85	WASH85	289.22	100-Yr_Encroache	153.00	2579.99	2581.56	2581.56	2582.05	0.030559	5.66	27.05	27.91	1.01
WASH85	WASH85	175.7	100-Yr	153.00	2577.00	2577.93	2577.93	2578.10	0.020132	4.05	51.89	115.94	0.97
WASH85	WASH85	175.7	100-Yr_Encroache	153.00	2577.00	2578.09	2578.20	2578.53	0.031021	5.55	31.99	62.68	1.17
WASH80	WASH80	3439.74	100-Yr	63.00	2668.00	2669.53	2669.66	2670.15	0.037908	6.29	10.01	12.04	1.22
WASH80	WASH80	3439.74	100-Yr_Encroache	63.00	2668.00	2669.53	2669.66	2670.15	0.037908	6.29	10.01	12.04	1.22
WASH80	WASH80	3319.74	100-Yr	63.00	2664.55	2665.64	2665.71	2666.10	0.029498	5.44	11.59	22.56	1.16
WASH80	WASH80	3319.74	100-Yr_Encroache	63.00	2664.55	2665.64	2665.71	2666.10	0.029498	5.44	11.59	22.56	1.16
WASH80	WASH80	3239.73	100-Yr	69.00	2660.98	2662.39	2662.61	2663.23	0.042624	7.35	9.39	10.37	1.36
WASH80	WASH80	3239.73	100-Yr_Encroache	69.00	2660.98	2662.39	2662.61	2663.23	0.042624	7.35	9.39	10.37	1.36
WASH80	WASH80	3048.09	100-Yr	69.00	2655.91	2657.38	2657.42	2657.88	0.019041	5.69	12.12	13.85	1.07
WASH80	WASH80	3048.09	100-Yr_Encroache	69.00	2655.91	2657.38	2657.42	2657.88	0.019041	5.69	12.12	13.85	1.07
WASH80	WASH80	2743.18	100-Yr	102.00	2647.99	2649.04	2649.20	2649.59	0.036051	5.96	17.11	31.50	1.43
WASH80	WASH80	2743.18	100-Yr_Encroache	102.00	2647.99	2649.04	2649.20	2649.59	0.036051	5.96	17.11	31.50	1.43
WASH80	WASH80	2491.17	100-Yr	102.00	2640.97	2641.75	2641.78	2642.05	0.024801	4.38	23.30	45.56	1.08
WASH80	WASH80	2491.17	100-Yr_Encroache	102.00	2640.97	2641.75	2641.78	2642.05	0.024801	4.38	23.30	45.56	1.08
WASH80	WASH80	2092.43	100-Yr	124.00	2628.00	2628.93	2628.99	2629.19	0.041120	4.09	30.29	81.44	1.18
WASH80	WASH80	2092.43	100-Yr_Encroache	124.00	2628.00	2628.93	2628.99	2629.19	0.041120	4.09	30.29	81.44	1.18
WASH80	WASH80	1695.43	100-Yr	124.00	2617.18	2618.52	2618.54	2618.83	0.018005	4.51	27.48	47.17	1.04
WASH80	WASH80	1695.43	100-Yr_Encroache	124.00	2617.18	2618.52	2618.54	2618.83	0.018005	4.51	27.48	47.17	1.04
WASH80	WASH80	1537.5	100-Yr	142.00	2612.00	2613.17	2613.48	2614.13	0.051049	7.87	18.05	27.87	1.72
WASH80	WASH80	1537.5	100-Yr_Encroache	142.00	2612.00	2613.17	2613.46	2614.14	0.050801	7.91	17.96	26.39	1.69
WASH80	WASH80	1386.5	100-Yr	142.00	2608.00	2609.12	2609.12	2609.51	0.025507	4.96	28.63	38.62	1.02
WASH80	WASH80	1386.5	100-Yr_Encroache	142.00	2608.00	2609.13	2609.13	2609.51	0.025253	4.94	28.74	38.68	1.01
WASH80	WASH80	1218.4	100-Yr	142.00	2603.99	2604.97	2605.06	2605.39	0.023421	5.18	27.41	40.51	1.11
WASH80	WASH80	1218.4	100-Yr_Encroache	142.00	2603.99	2605.23	2605.31	2605.73	0.019968	5.71	24.91	35.20	1.17
WASH80	WASH80	1040.29	100-Yr	142.00	2599.70	2600.86	2600.82	2601.07	0.023167	3.70	38.40	78.35	0.93
WASH80	WASH80	1040.29	100-Yr_Encroache	142.00	2599.70	2600.78	2600.82	2601.07	0.034589	4.33	32.78	75.61	1.16
WASH80	WASH80	913.72	100-Yr	142.00	2596.74	2597.57	2597.57	2597.83	0.028126	4.10	34.66	66.60	1.00
WASH80	WASH80	913.72	100-Yr_Encroache	142.00	2596.74	2597.56	2597.56	2597.84	0.029231	4.22	33.62	62.51	1.02
WASH80	WASH80	777.25	100-Yr	142.00	2592.98	2593.87	2593.88	2594.19	0.024530	4.54	31.25	52.36	1.04
WASH80	WASH80	777.25	100-Yr_Encroache	142.00	2592.98	2593.87	2593.88	2594.19	0.024503	4.54	31.26	52.37	1.04
WASH80	WASH80	666.54	100-Yr	142.00	2589.77	2590.78	2590.80	2591.15	0.030960	4.87	29.17	43.71	1.05
WASH80	WASH80	666.54	100-Yr_Encroache	142.00	2589.77	2590.78	2590.80	2591.15	0.030992	4.87	29.15	43.70	1.05
WASH80	WASH80	542.2	100-Yr	142.00	2586.97	2587.69	2587.69	2587.90	0.024718	3.66	38.81	95.92	1.01
WASH80	WASH80	542.2	100-Yr_Encroache	142.00	2586.97	2587.72	2587.72	2588.02	0.024373	4.41	32.17	53.86	1.01
WASH80	WASH80	422.76	100-Yr	142.00	2583.00	2584.33	2584.41	2584.71	0.028531	4.95	28.67	56.58	1.23
WASH80	WASH80	422.76	100-Yr_Encroache	142.00	2583.32	2584.54	2584.61	2584.96	0.026691	5.20	27.33	45.89	1.19
WASH80	WASH80	312.5	100-Yr	142.00	2580.57	2581.70	2581.70	2582.04	0.024706	4.69	30.30	53.16	1.00
WASH80	WASH80	312.5	100-Yr_Encroache	142.00	2580.57	2581.69	2581.70	2582.04	0.026029	4.77	29.76	44.42	1.03
WASH80	WASH80	144.79	100-Yr	142.00	2576.00	2577.33	2577.38	2577.70	0.027110	4.92	28.83	49.00	1.13
WASH80	WASH80	144.79	100-Yr_Encroache	142.00	2576.00	2577.34	2577.38	2577.70	0.025763	4.82	29.44	49.34	1.10
WASH75	WASH75	2245.45	100-Yr	409.00	2585.99	2587.70	2588.27	2589.06	0.038015	9.35	43.74	43.94	1.65
WASH75	WASH75	2245.45	100-Yr_Encroache	409.00	2585.99	2587.70	2588.27	2589.06	0.038015	9.35	43.74	43.94	1.65

HEC-RAS Plan: Encroach (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
WASH75	WASH75	2159.03	100-Yr	409.00	2584.00	2586.20	2586.15	2586.51	0.026880	4.46	91.74	120.80	0.90
WASH75	WASH75	2159.03	100-Yr_Encroache	409.00	2584.00	2586.20	2586.15	2586.51	0.026880	4.46	91.74	120.80	0.90
WASH75	WASH75	2026.17	100-Yr	409.00	2580.97	2583.21	2583.21	2584.03	0.013341	7.23	56.60	35.26	1.01
WASH75	WASH75	2026.17	100-Yr_Encroache	409.00	2580.97	2583.21	2583.21	2584.03	0.013341	7.23	56.60	35.26	1.01
WASH75	WASH75	1888.63	100-Yr	409.00	2577.99	2579.22	2579.83	2580.61	0.058184	9.44	43.32	60.11	1.96
WASH75	WASH75	1888.63	100-Yr_Encroache	409.00	2577.99	2579.22	2579.83	2580.61	0.058184	9.44	43.32	60.11	1.96
WASH75	WASH75	1791.75	100-Yr	409.00	2575.80	2577.67	2577.67	2578.38	0.015825	6.75	60.56	43.48	1.01
WASH75	WASH75	1791.75	100-Yr_Encroache	409.00	2575.80	2577.67	2577.67	2578.38	0.015817	6.75	60.57	43.46	1.01
WASH75	WASH75	1687.13	100-Yr	409.00	2573.00	2574.19	2574.56	2575.41	0.061508	8.87	46.11	59.40	1.78
WASH75	WASH75	1687.13	100-Yr_Encroache	409.00	2573.00	2574.19	2574.56	2575.41	0.061508	8.87	46.11	59.40	1.78
WASH75	WASH75	1590.58	100-Yr	409.00	2570.88	2572.65	2572.65	2573.15	0.018005	5.70	71.82	73.60	1.02
WASH75	WASH75	1590.58	100-Yr_Encroache	409.00	2570.88	2572.67	2572.67	2573.24	0.018380	6.10	67.10	59.54	1.01
WASH75	WASH75	1445.56	100-Yr	409.00	2567.87	2569.10	2569.23	2569.72	0.032571	6.30	84.92	80.92	1.24
WASH75	WASH75	1445.56	100-Yr_Encroache	409.00	2567.87	2569.09	2569.22	2569.74	0.033328	6.47	83.21	74.73	1.24
WASH75	WASH75	1300.34	100-Yr	420.00	2564.42	2566.54	2566.54	2567.06	0.012839	5.79	72.51	69.67	1.00
WASH75	WASH75	1300.34	100-Yr_Encroache	420.00	2564.42	2566.46	2566.46	2567.10	0.014810	6.43	65.29	52.03	1.01
WASH75	WASH75	1178.46	100-Yr	420.00	2561.07	2562.61	2563.08	2564.18	0.050592	10.06	41.73	41.16	1.76
WASH75	WASH75	1178.46	100-Yr_Encroache	420.00	2561.07	2562.65	2563.08	2564.10	0.045262	9.66	43.48	41.60	1.67
WASH75	WASH75	1078.73	100-Yr	420.00	2558.71	2560.62	2560.70	2561.24	0.016422	6.45	72.38	79.05	1.00
WASH75	WASH75	1078.73	100-Yr_Encroache	420.00	2558.71	2560.64	2560.66	2561.29	0.016845	6.55	68.19	58.13	1.00
WASH75	WASH75	962.62	100-Yr	420.00	2555.74	2556.75	2557.22	2558.40	0.108060	10.30	40.79	63.83	2.27
WASH75	WASH75	962.62	100-Yr_Encroache	420.00	2555.74	2556.75	2557.22	2558.41	0.109577	10.34	40.81	63.77	2.29
WASH75	WASH75	831.66	100-Yr	420.00	2551.98	2553.61	2553.61	2554.44	0.017013	6.37	65.94	53.15	1.01
WASH75	WASH75	831.66	100-Yr_Encroache	420.00	2551.98	2553.61	2553.61	2554.44	0.017013	6.37	65.94	53.15	1.01
WASH75	WASH75	674.58	100-Yr	420.00	2547.99	2549.49	2549.65	2550.27	0.048403	7.07	59.37	58.69	1.24
WASH75	WASH75	674.58	100-Yr_Encroache	420.00	2547.99	2549.49	2549.65	2550.27	0.048403	7.07	59.37	58.69	1.24
WASH75	WASH75	477.04	100-Yr	420.00	2542.98	2544.22	2544.22	2544.62	0.021483	5.08	82.60	106.23	1.02
WASH75	WASH75	477.04	100-Yr_Encroache	420.00	2542.98	2544.20	2544.20	2544.68	0.024085	5.59	75.20	78.47	1.01
WASH75	WASH75	334.44	100-Yr	420.00	2538.98	2539.98	2540.07	2540.55	0.039337	6.05	69.40	80.56	1.15
WASH75	WASH75	334.44	100-Yr_Encroache	420.00	2538.98	2540.01	2540.07	2540.55	0.035478	5.86	71.71	80.86	1.10
WASH75	WASH75	197.32	100-Yr	420.00	2535.00	2536.54	2536.54	2536.97	0.019307	5.29	79.38	94.65	1.02
WASH75	WASH75	197.32	100-Yr_Encroache	420.00	2535.00	2536.53	2536.54	2536.97	0.019708	5.33	78.81	94.53	1.03
WASH75	WASH75	47.19	100-Yr	420.00	2530.22	2531.87	2531.85	2532.33	0.056562	6.54	64.22	100.88	1.45
WASH75	WASH75	47.19	100-Yr_Encroache	420.00	2530.22	2531.87	2531.85	2532.33	0.054916	6.47	64.91	101.23	1.42
WASH65	WASH65	904.05	100-Yr	96.00	2610.99	2612.01	2612.15	2612.57	0.027420	5.98	16.06	22.58	1.25
WASH65	WASH65	904.05	100-Yr_Encroache	96.00	2610.99	2612.01	2612.15	2612.57	0.027420	5.98	16.06	22.58	1.25
WASH65	WASH65	808.77	100-Yr	96.00	2603.95	2605.07	2605.07	2605.49	0.022432	5.19	18.49	22.14	1.00
WASH65	WASH65	808.77	100-Yr_Encroache	96.00	2603.95	2605.07	2605.07	2605.49	0.022432	5.19	18.49	22.14	1.00
WASH65	WASH65	516.17	100-Yr	96.00	2600.94	2602.55	2602.37	2602.85	0.019153	4.43	21.69	22.63	0.80
WASH65	WASH65	516.17	100-Yr_Encroache	96.00	2600.94	2602.55	2602.37	2602.85	0.019153	4.43	21.69	22.63	0.80
WASH65	WASH65	400.74	100-Yr	96.00	2597.92	2599.49	2599.49	2599.99	0.032877	5.66	16.96	17.25	1.01
WASH65	WASH65	400.74	100-Yr_Encroache	96.00	2597.92	2599.49	2599.49	2599.99	0.032877	5.66	16.96	17.25	1.01
WASH65	WASH65	293.68	100-Yr	96.00	2594.98	2596.26	2596.40	2596.90	0.025146	6.41	14.98	17.57	1.22
WASH65	WASH65	293.68	100-Yr_Encroache	96.00	2594.98	2596.26	2596.40	2596.90	0.025146	6.41	14.98	17.57	1.22
WASH65	WASH65	219.18	100-Yr	96.00	2592.98	2594.21	2594.26	2594.66	0.034604	5.35	17.94	23.65	1.06
WASH65	WASH65	219.18	100-Yr_Encroache	96.00	2592.98	2594.22	2594.26	2594.66	0.034516	5.35	17.96	23.66	1.06
WASH65	WASH65	101.76	100-Yr	96.00	2589.95	2591.41	2591.41	2591.84	0.021132	5.24	18.31	21.68	1.01
WASH65	WASH65	101.76	100-Yr_Encroache	96.00	2589.95	2591.41	2591.41	2591.84	0.021104	5.24	18.32	21.69	1.01
WASH60	WASH60	881.45	100-Yr	289.00	2607.89	2609.98	2610.08	2610.59	0.020580	6.38	45.30	43.96	1.11
WASH60	WASH60	881.45	100-Yr_Encroache	289.00	2607.89	2609.98	2610.08	2610.59	0.020580	6.38	45.30	43.96	1.11
WASH60	WASH60	576.92	100-Yr	289.00	2600.91	2603.13	2603.58	2604.39	0.022638	9.02	32.05	20.14	1.26
WASH60	WASH60	576.92	100-Yr_Encroache	289.00	2600.91	2603.13	2603.58	2604.39	0.022638	9.02	32.05	20.14	1.26
WASH60	WASH60	395.74	100-Yr	289.00	2598.86	2598.51	2598.88	2599.70	0.029576	8.76	32.98	29.77	1.47
WASH60	WASH60	395.74	100-Yr_Encroache	289.00	2598.86	2598.51	2598.88	2599.70	0.029576	8.76	32.98	29.77	1.47
WASH60	WASH60	296.24	100-Yr	289.00	2594.28	2595.74	2595.91	2596.49	0.032485	6.94	41.67	48.03	1.31
WASH60	WASH60	296.24	100-Yr_Encroache	289.00	2594.28	2595.74	2595.91	2596.49	0.032485	6.94	41.67	48.03	1.31
WASH60	WASH60	213.84	100-Yr	289.00	2592.12	2593.58	2593.65	2594.13	0.024156	5.98	48.36	55.89	1.13
WASH60	WASH60	213.84	100-Yr_Encroache	289.00	2592.12	2593.58	2593.65	2594.13	0.024156	5.98	48.36	55.89	1.13

HEC-RAS Plan: Encroach (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
WASH60	WASH60	81.32	100-Yr	289.00	2588.99	2591.06	2591.06	2591.73	0.016870	6.56	44.05	33.47	1.01
WASH60	WASH60	81.32	100-Yr_Encroache	289.00	2588.99	2591.06	2591.06	2591.73	0.016870	6.56	44.05	33.47	1.01
WASH160	WASH160	2694.7	100-Yr	70.00	2619.72	2620.79	2620.95	2621.41	0.035115	6.35	11.03	16.14	1.35
WASH160	WASH160	2694.7	100-Yr_Encroache	70.00	2619.72	2620.79	2620.95	2621.41	0.035115	6.35	11.03	16.14	1.35
WASH160	WASH160	2546.38	100-Yr	70.00	2615.97	2616.97	2617.00	2617.37	0.021139	5.05	13.86	18.94	1.04
WASH160	WASH160	2546.38	100-Yr_Encroache	70.00	2615.97	2616.97	2616.99	2617.37	0.021158	5.05	13.86	18.94	1.04
WASH160	WASH160	2403.73	100-Yr	70.00	2611.97	2613.23	2613.20	2613.59	0.029929	4.79	14.61	18.69	0.96
WASH160	WASH160	2403.73	100-Yr_Encroache	70.00	2611.97	2613.23	2613.20	2613.59	0.029929	4.79	14.61	18.69	0.96
WASH160	WASH160	2236.32	100-Yr	70.00	2606.95	2608.27	2608.27	2608.79	0.027353	5.77	12.14	11.84	1.00
WASH160	WASH160	2236.32	100-Yr_Encroache	70.00	2606.95	2608.27	2608.27	2608.79	0.027353	5.77	12.14	11.84	1.00
WASH160	WASH160	2150.86	100-Yr	70.00	2604.69	2605.42	2605.54	2605.87	0.042990	5.36	13.05	28.30	1.39
WASH160	WASH160	2150.86	100-Yr_Encroache	70.00	2604.69	2605.42	2605.54	2605.87	0.043131	5.37	13.03	28.30	1.39
WASH160	WASH160	2038.59	100-Yr	70.00	2601.77	2602.81	2602.81	2603.14	0.018448	4.55	15.38	24.42	1.01
WASH160	WASH160	2038.59	100-Yr_Encroache	70.00	2601.77	2602.81	2602.81	2603.14	0.018467	4.55	15.38	24.41	1.01
WASH160	WASH160	1844.74	100-Yr	70.00	2595.97	2596.93	2597.02	2597.72	0.046114	7.13	9.82	27.41	1.50
WASH160	WASH160	1844.74	100-Yr_Encroache	70.00	2595.97	2596.94	2597.02	2597.72	0.046024	7.12	9.83	27.42	1.50
WASH160	WASH160	1665.99	100-Yr	70.00	2589.97	2590.88	2590.88	2591.22	0.026933	4.68	14.96	21.30	0.98
WASH160	WASH160	1665.99	100-Yr_Encroache	70.00	2589.97	2590.88	2590.87	2591.22	0.027163	4.69	14.92	21.28	0.99
WASH160	WASH160	1429.43	100-Yr	70.00	2583.51	2584.34	2584.34	2584.65	0.028594	4.43	15.80	26.23	1.01
WASH160	WASH160	1429.43	100-Yr_Encroache	70.00	2583.51	2584.34	2584.34	2584.65	0.028366	4.42	15.85	26.26	1.00
WASH160	WASH160	1190.51	100-Yr	70.00	2575.99	2577.20	2577.22	2577.40	0.031717	3.64	19.21	59.40	1.13
WASH160	WASH160	1190.51	100-Yr_Encroache	70.00	2575.99	2577.21	2577.25	2577.45	0.031463	3.89	17.97	48.32	1.13
WASH160	WASH160	1018.78	100-Yr	70.00	2570.91	2571.49	2571.56	2571.82	0.033633	4.76	15.69	36.45	1.23
WASH160	WASH160	1018.78	100-Yr_Encroache	70.00	2570.91	2571.48	2571.56	2571.83	0.034422	4.80	15.57	36.36	1.24
WASH160	WASH160	844.38	100-Yr	83.00	2564.95	2565.87	2565.91	2566.22	0.034366	5.47	18.54	29.36	1.12
WASH160	WASH160	844.38	100-Yr_Encroache	83.00	2564.95	2565.87	2565.91	2566.22	0.033723	5.43	18.66	29.40	1.11
WASH160	WASH160	739.58	100-Yr	83.00	2560.94	2562.54	2562.19	2562.84	0.011687	4.37	18.99	14.99	0.68
WASH160	WASH160	739.58	100-Yr_Encroache	83.00	2560.94	2562.54	2562.19	2562.84	0.011687	4.37	18.99	14.99	0.68
WASH160	WASH160	708.75	100-Yr	83.00	2559.52	2561.08	2561.02	2561.64	0.016944	6.02	13.79	10.76	0.94
WASH160	WASH160	708.75	100-Yr_Encroache	83.00	2559.52	2561.08	2561.02	2561.64	0.016944	6.02	13.79	10.76	0.94
WASH160	WASH160	655.73	100-Yr	83.00	2558.27	2559.96	2559.96	2560.65	0.020068	6.66	12.46	9.19	1.01
WASH160	WASH160	655.73	100-Yr_Encroache	83.00	2558.27	2559.96	2559.96	2560.65	0.020068	6.66	12.46	9.19	1.01
WASH160	WASH160	514.86	100-Yr	83.00	2553.97	2555.10	2555.45	2556.20	0.053459	8.40	9.88	18.67	2.04
WASH160	WASH160	514.86	100-Yr_Encroache	83.00	2553.97	2555.10	2555.45	2556.20	0.053459	8.40	9.88	18.67	2.04
WASH160	WASH160	338.33	100-Yr	83.00	2548.90	2549.28	2549.23	2549.35	0.022937	2.12	39.06	155.95	0.73
WASH160	WASH160	338.33	100-Yr_Encroache	83.00	2548.93	2549.47	2549.42	2549.59	0.023742	2.73	30.39	83.54	0.80
WASH160	WASH160	241.22	100-Yr	83.00	2544.77	2545.52	2545.47	2545.67	0.030227	3.12	26.57	63.81	0.85
WASH160	WASH160	241.22	100-Yr_Encroache	83.00	2544.77	2545.60	2545.53	2545.78	0.031461	3.36	24.72	48.59	0.83
WASH160	WASH160	84.23	100-Yr	83.00	2539.96	2540.35	2540.33	2540.45	0.036432	2.47	33.55	144.28	0.90
WASH160	WASH160	84.23	100-Yr_Encroache	83.00	2539.96	2540.35	2540.33	2540.45	0.036432	2.47	33.55	144.28	0.90

O SITE BOUNDARY CROSS SECTION

HY-8 Culvert Calculation Output

HY-8 Culvert Analysis Report
Culvert: ON-65

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 36 cfs

Maximum Flow: 96 cfs

Table 1 - Summary of Culvert Flows at Crossing: ON65

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2601.00	0.00	0.00	0.00	1
2601.91	9.60	9.60	0.00	1
2602.32	19.20	19.20	0.00	1
2602.67	28.80	28.80	0.00	1
2602.92	36.00	36.00	0.00	1
2603.27	48.00	48.00	0.00	1
2603.53	57.60	57.60	0.00	1
2603.78	67.20	67.20	0.00	1
2604.04	76.80	76.80	0.00	1
2604.32	86.40	86.40	0.00	1
2604.63	96.00	96.00	0.00	1
2605.00	106.25	106.25	0.00	Overtopping

Rating Curve Plot for Crossing: ON65

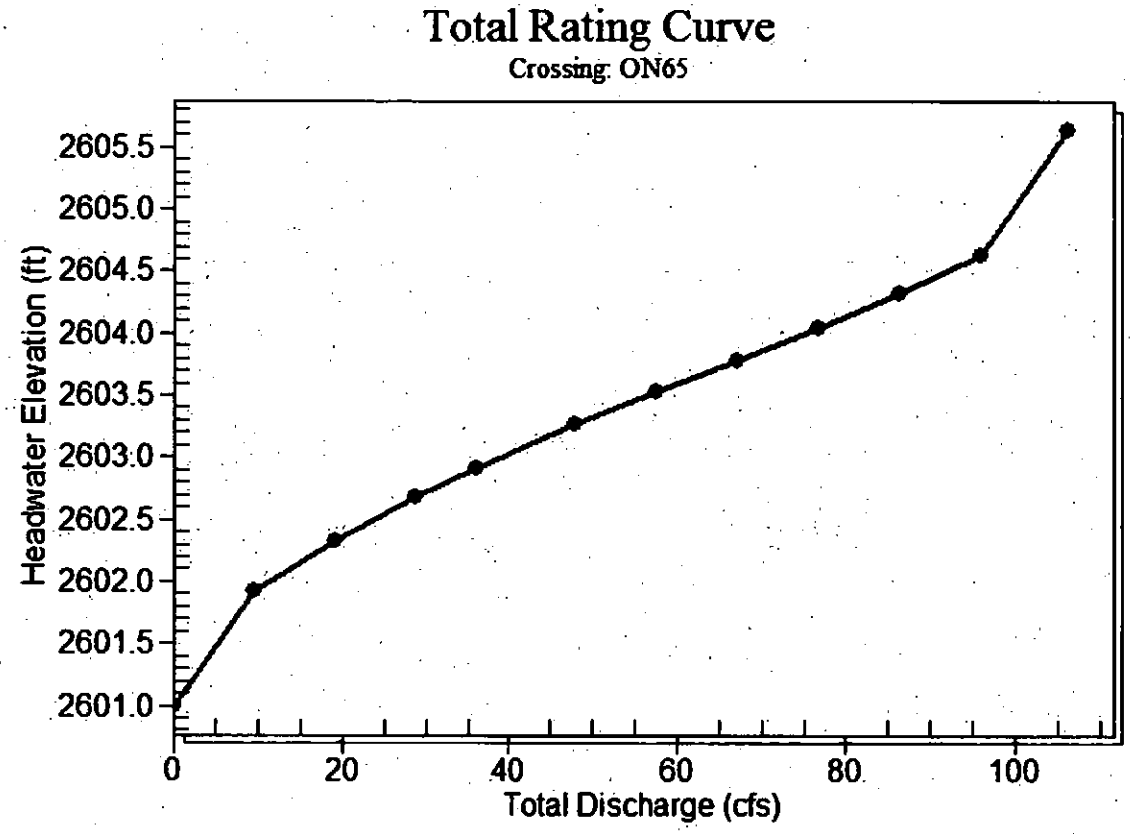


Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2601.00	0.000	0.000	0-NF	0.000	0.000	1.000	1.000	0.000	0.000
9.60	9.60	2601.91	0.914	0.012	1-JS1t	0.491	0.682	1.000	1.000	2.320	0.000
19.20	19.20	2602.32	1.321	0.049	1-S2n	0.696	0.976	0.720	1.000	7.299	0.000
28.80	28.80	2602.67	1.674	0.314	1-S2n	0.865	1.204	0.893	1.000	8.136	0.000
36.00	36.00	2602.92	1.918	0.531	1-S2n	0.970	1.358	1.010	1.000	8.587	0.000
48.00	48.00	2603.27	2.270	0.885	1-S2n	1.135	1.577	1.186	1.000	9.217	0.000
57.60	57.60	2603.53	2.526	1.177	1-S2n	1.253	1.733	1.321	1.000	9.598	0.000
67.20	67.20	2603.78	2.778	1.483	1-S2n	1.371	1.879	1.444	1.000	9.979	0.000
76.80	76.80	2604.04	3.041	1.800	5-S2n	1.479	2.011	1.561	1.000	10.331	0.000
86.40	86.40	2604.32	3.324	2.137	5-S2n	1.587	2.139	1.680	1.000	10.605	0.000
96.00	96.00	2604.63	3.634	2.859	5-S2n	1.695	2.253	1.794	1.000	10.894	0.000

****

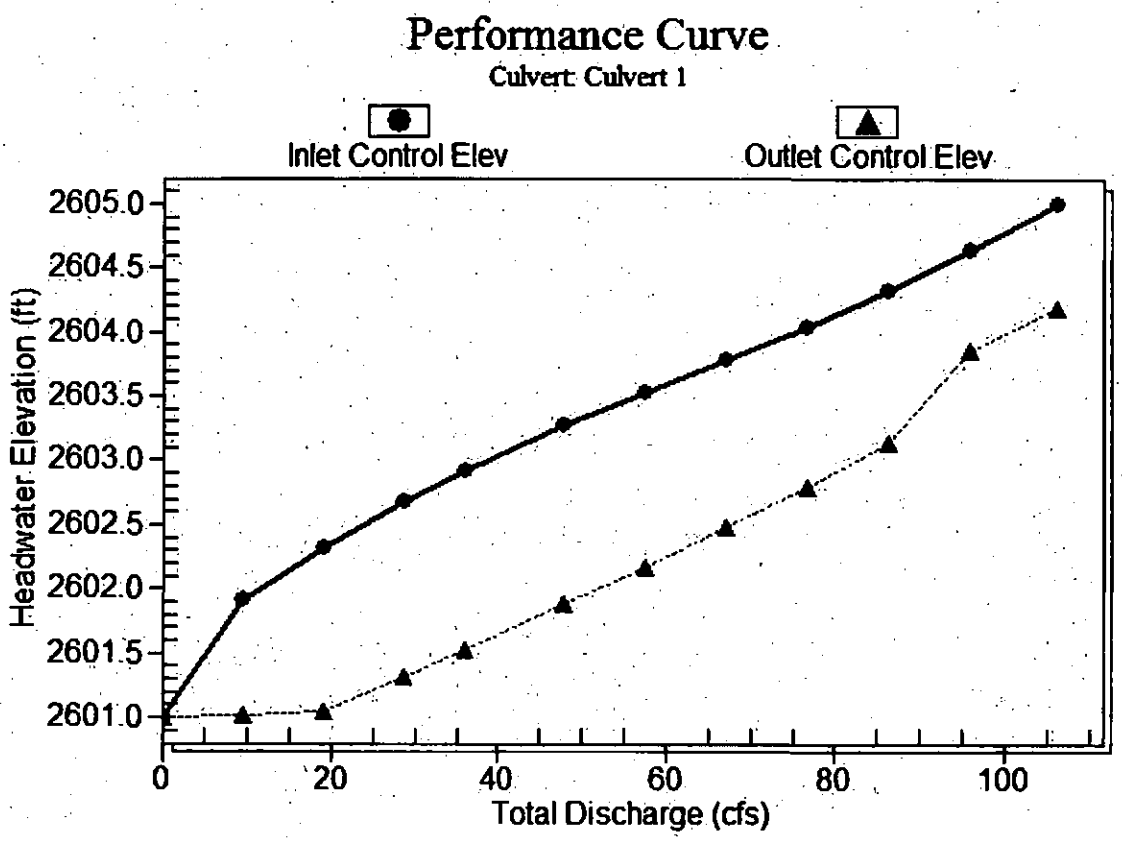
Straight Culvert

Inlet Elevation (invert): 2601.00 ft, Outlet Elevation (invert): 2600.00 ft

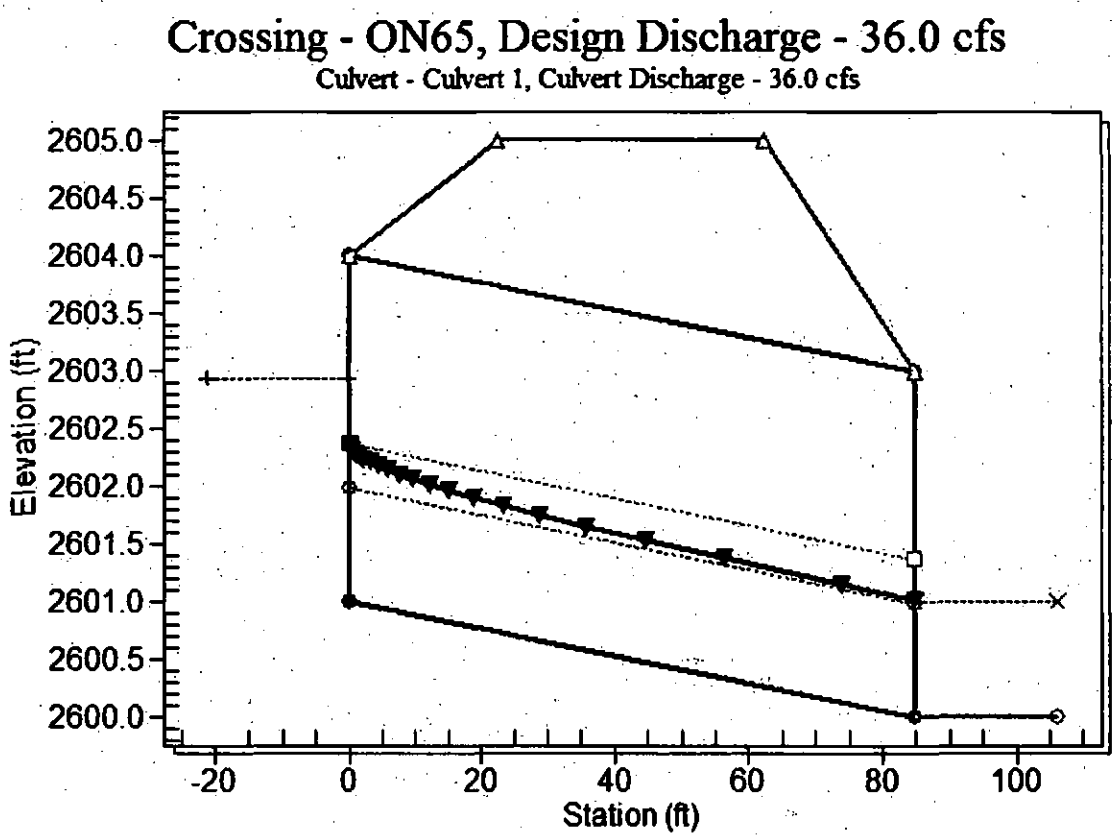
Culvert Length: 85.01 ft, Culvert Slope: 0.0118

****

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2601.00 ft

Outlet Station: 85.00 ft

Outlet Elevation: 2600.00 ft

Number of Barrels: 2

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Beveled Edge (1:1)

Inlet Depression: NONE

Table 3 - Downstream Channel Rating Curve (Crossing: ON65)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.00	2601.00	1.00
9.60	2601.00	1.00
19.20	2601.00	1.00
28.80	2601.00	1.00
36.00	2601.00	1.00
48.00	2601.00	1.00
57.60	2601.00	1.00
67.20	2601.00	1.00
76.80	2601.00	1.00
86.40	2601.00	1.00
96.00	2601.00	1.00

Tailwater Channel Data - ON65

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 2601.00 ft

Roadway Data for Crossing: ON65

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 90.00 ft

Crest Elevation: 2605.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Culvert: ON-90

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 130 cfs

Maximum Flow: 340 cfs

Table 4 - Summary of Culvert Flows at Crossing: ON90

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2572.00	0.00	0.00	0.00	1
2572.52	34.00	34.00	0.00	1
2573.13	68.00	68.00	0.00	1
2573.63	102.00	102.00	0.00	1
2574.00	130.00	130.00	0.00	1
2574.49	170.00	170.00	0.00	1
2574.89	204.00	204.00	0.00	1
2575.28	238.00	238.00	0.00	1
2575.60	272.00	272.00	0.00	1
2575.92	306.00	306.00	0.00	1
2576.24	340.00	340.00	0.00	1
2577.00	403.42	403.42	0.00	Overtopping

Rating Curve Plot for Crossing: ON90

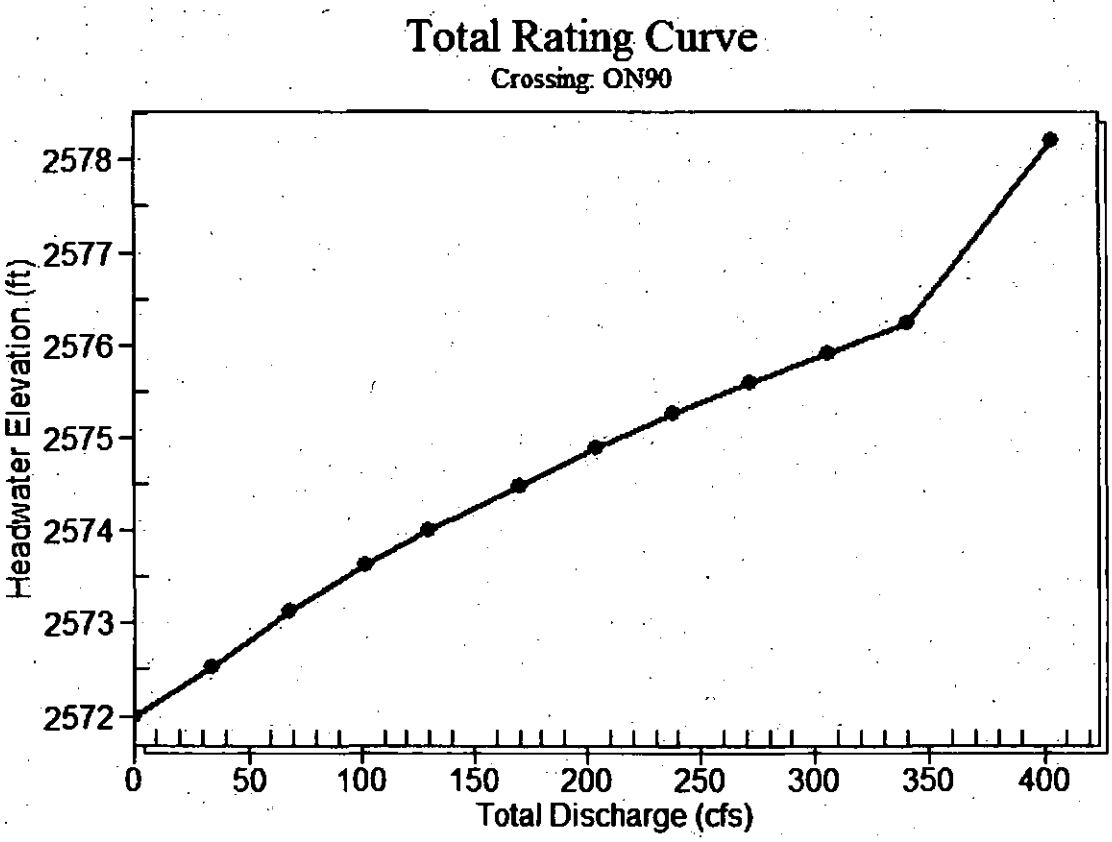


Table 5 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2572.00	0.000	0.500	0-NF	0.000	0.000	1.500	2.000	0.000	0.000
34.00	34.00	2572.52	1.023	0.509	1-S2n	0.347	0.700	0.420	2.000	6.981	0.000
68.00	68.00	2573.13	1.626	0.536	1-S2n	0.597	1.136	0.689	2.000	9.863	0.000
102.00	102.00	2573.63	2.131	0.581	1-S2n	0.771	1.487	0.934	2.000	10.926	0.000
130.00	130.00	2574.00	2.504	0.875	1-S2n	0.914	1.744	1.123	2.000	11.580	0.000
170.00	170.00	2574.49	2.989	1.308	1-S2n	1.091	2.084	1.375	2.000	12.360	0.000
204.00	204.00	2574.89	3.388	1.678	1-S2n	1.225	2.356	1.581	2.000	12.903	0.000
238.00	238.00	2575.28	3.779	2.048	1-S2n	1.360	2.609	1.778	2.000	13.384	0.000
272.00	272.00	2575.60	4.097	2.410	1-S2n	1.494	2.837	1.969	2.000	13.815	0.000
306.00	306.00	2575.92	4.416	2.794	1-S2n	1.610	3.069	2.153	2.000	14.210	0.000
340.00	340.00	2576.24	4.735	3.188	1-S2n	1.726	3.293	2.332	2.000	14.580	0.000

****

Straight Culvert

Inlet Elevation (invert): 2571.50 ft, Outlet Elevation (invert): 2570.50 ft

Culvert Length: 56.01 ft, Culvert Slope: 0.0179

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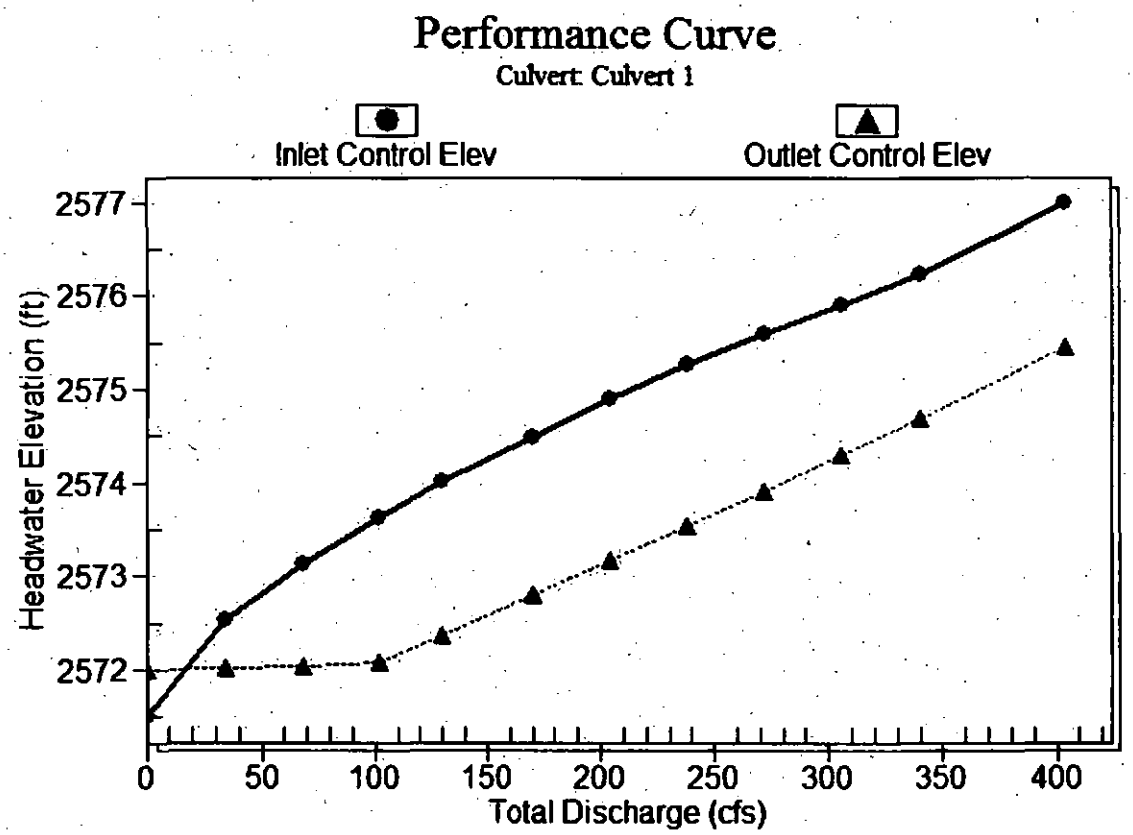
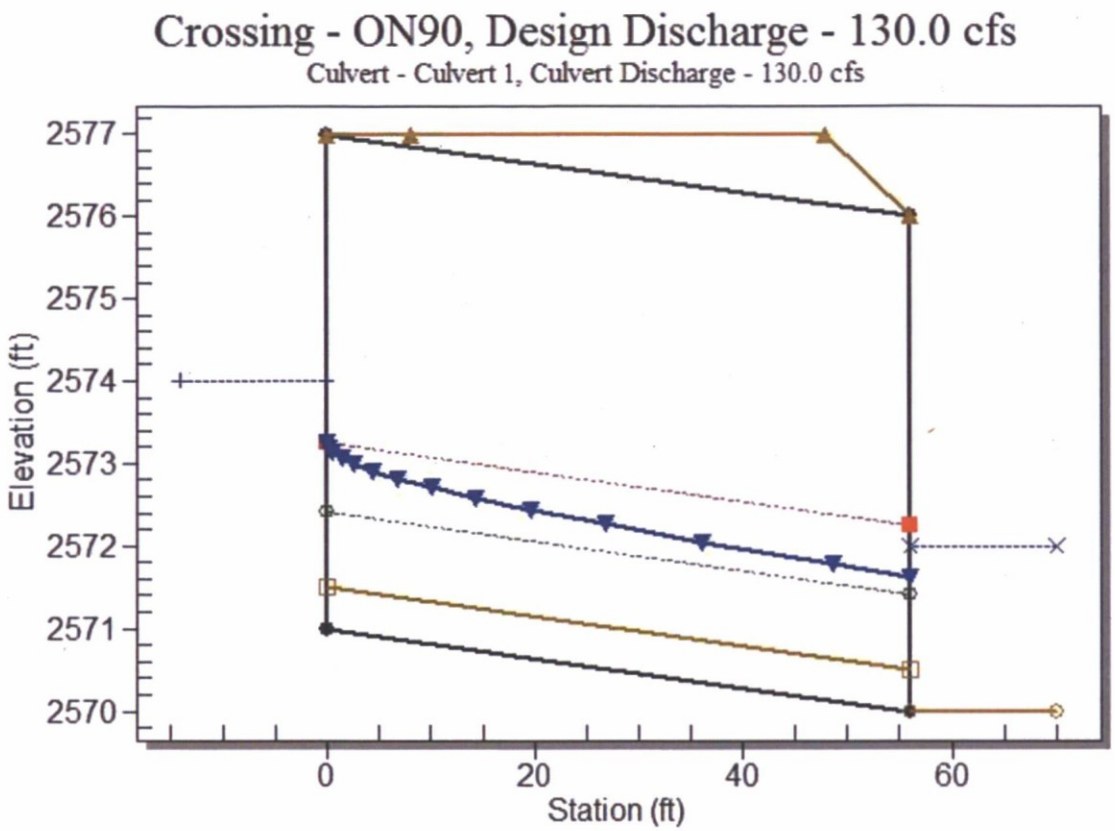
Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2571.00 ft

Outlet Station: 56.00 ft

Outlet Elevation: 2570.00 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 10.00 ft

Barrel Rise: 6.00 ft

Barrel Material: Concrete

Embedment: 6.00 in

Barrel Manning's n: 0.0120 (top and sides)

Manning's n: 0.0120 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Table 6 - Downstream Channel Rating Curve (Crossing: ON90)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.00	2572.00	2.00
34.00	2572.00	2.00
68.00	2572.00	2.00
102.00	2572.00	2.00
130.00	2572.00	2.00
170.00	2572.00	2.00
204.00	2572.00	2.00
238.00	2572.00	2.00
272.00	2572.00	2.00
306.00	2572.00	2.00
340.00	2572.00	2.00

Tailwater Channel Data - ON90

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 2572.00 ft

Roadway Data for Crossing: ON90

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 90.00 ft

Crest Elevation: 2577.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Culvert: ON-80A

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 60 cfs

Maximum Flow: 160 cfs

Table 7 - Summary of Culvert Flows at Crossing: ON80A

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2596.25	0.00	0.00	0.00	1
2596.85	16.00	16.00	0.00	1
2597.23	32.00	32.00	0.00	1
2597.54	48.00	48.00	0.00	1
2597.74	60.00	60.00	0.00	1
2598.03	80.00	80.00	0.00	1
2598.23	96.00	96.00	0.00	1
2598.44	112.00	112.00	0.00	1
2598.65	128.00	128.00	0.00	1
2598.86	144.00	144.00	0.00	1
2599.10	160.00	160.00	0.00	1
2600.00	210.41	210.41	0.00	Overtopping

Rating Curve Plot for Crossing: ON80A

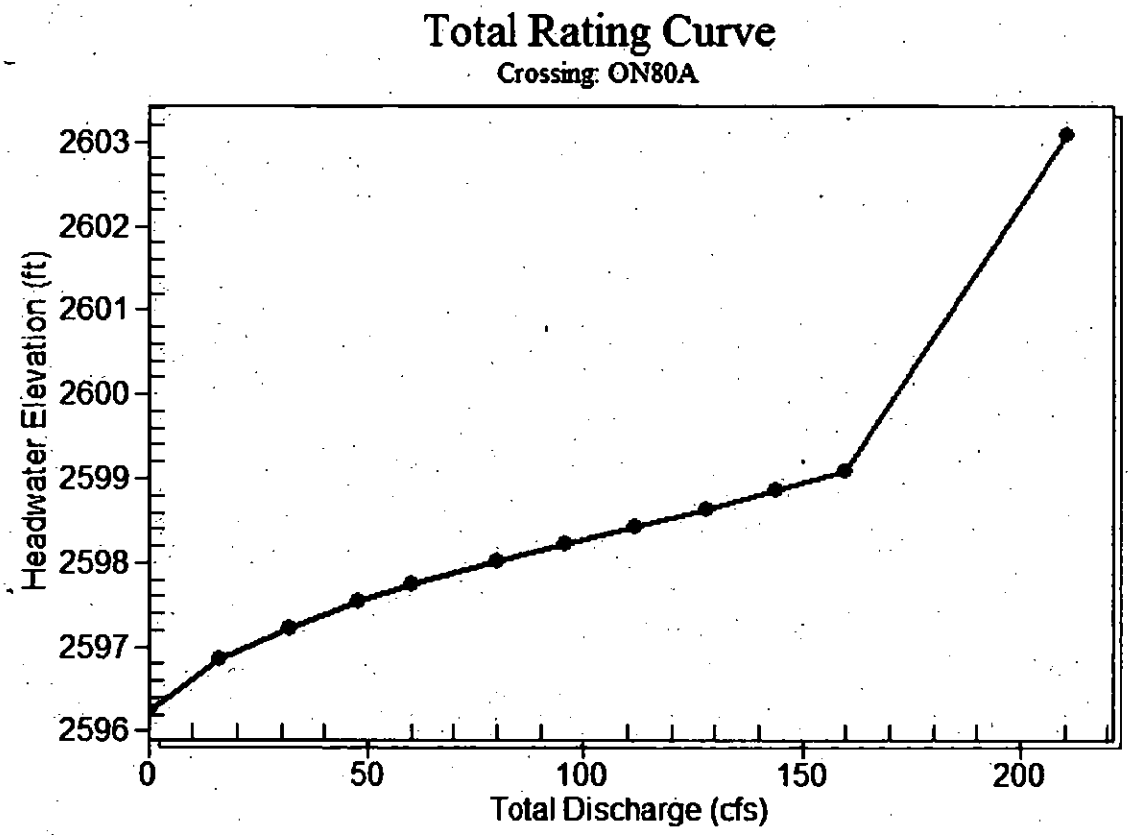


Table 8 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2596.25	0.000	0.000	0-NF	0.000	0.000	0.750	-1.000	0.000	0.000
16.00	16.00	2596.85	0.602	0.0*	1-S2n	0.510	0.586	0.510	-1.000	4.795	0.000
32.00	32.00	2597.23	0.979	0.0*	1-S2n	0.736	0.888	0.736	-1.000	6.167	0.000
48.00	48.00	2597.54	1.288	0.363	1-S2n	0.910	1.134	0.920	-1.000	7.081	0.000
60.00	60.00	2597.74	1.486	0.646	1-S2n	1.032	1.288	1.032	-1.000	7.742	0.000
80.00	80.00	2598.03	1.775	1.147	1-S2n	1.211	1.511	1.224	-1.000	8.447	0.000
96.00	96.00	2598.23	1.985	1.590	1-S2n	1.343	1.674	1.362	-1.000	8.968	0.000
112.00	112.00	2598.44	2.188	2.074	1-S2n	1.471	1.826	1.493	-1.000	9.432	0.000
128.00	128.00	2598.65	2.395	0.0*	1-S2n	1.595	1.963	1.623	-1.000	9.846	0.000
144.00	144.00	2598.86	2.614	0.0*	1-S2n	1.718	2.087	1.749	-1.000	10.217	0.000
160.00	160.00	2599.10	2.850	0.0*	5-S2n	1.844	2.204	1.874	-1.000	10.587	0.000

* Full Flow Headwater elevation is below inlet invert.

****

Straight Culvert

Inlet Elevation (invert): 2596.25 ft, Outlet Elevation (invert): 2595.25 ft

Culvert Length: 42.01 ft, Culvert Slope: 0.0238

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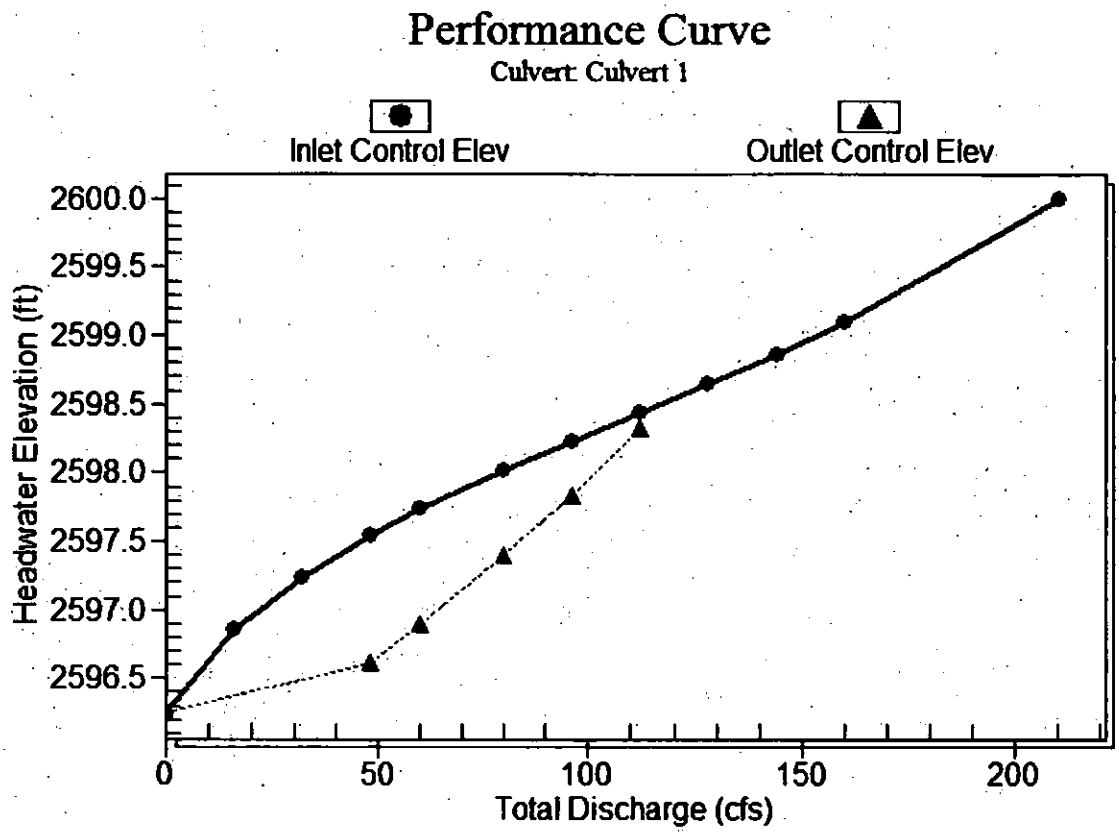
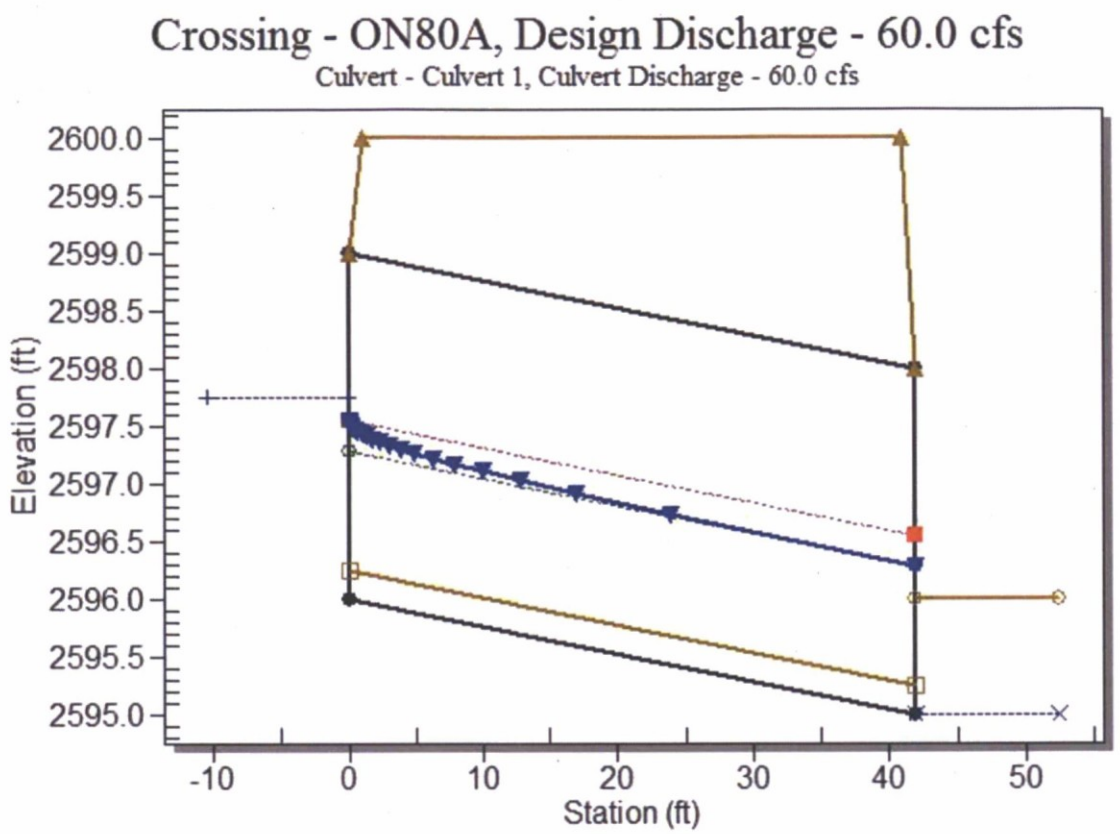
Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2596.00 ft

Outlet Station: 42.00 ft

Outlet Elevation: 2595.00 ft

Number of Barrels: 3

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 3.00 in

Barrel Manning's n: 0.0120 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 9 - Downstream Channel Rating Curve (Crossing: ON80A)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.00	2595.00	-1.00
16.00	2595.00	-1.00
32.00	2595.00	-1.00
48.00	2595.00	-1.00
60.00	2595.00	-1.00
80.00	2595.00	-1.00
96.00	2595.00	-1.00
112.00	2595.00	-1.00
128.00	2595.00	-1.00
144.00	2595.00	-1.00
160.00	2595.00	-1.00

Tailwater Channel Data - ON80A

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 2595.00 ft

Roadway Data for Crossing: ON80A

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 90.00 ft

Crest Elevation: 2600.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Culvert: ON-75

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 164 cfs

Maximum Flow: 416 cfs

Table 10 - Summary of Culvert Flows at Crossing: ON75

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2577.50	0.00	0.00	0.00	1
2578.55	41.60	41.60	0.00	1
2579.16	83.20	83.20	0.00	1
2579.68	124.80	124.80	0.00	1
2580.11	164.00	164.00	0.00	1
2580.56	208.00	208.00	0.00	1
2580.97	249.60	249.60	0.00	1
2581.31	291.20	291.20	0.00	1
2581.65	332.80	332.80	0.00	1
2582.02	374.40	374.40	0.00	1
2582.48	416.00	416.00	0.00	1
2583.00	463.01	463.01	0.00	Overtopping

Rating Curve Plot for Crossing: ON75

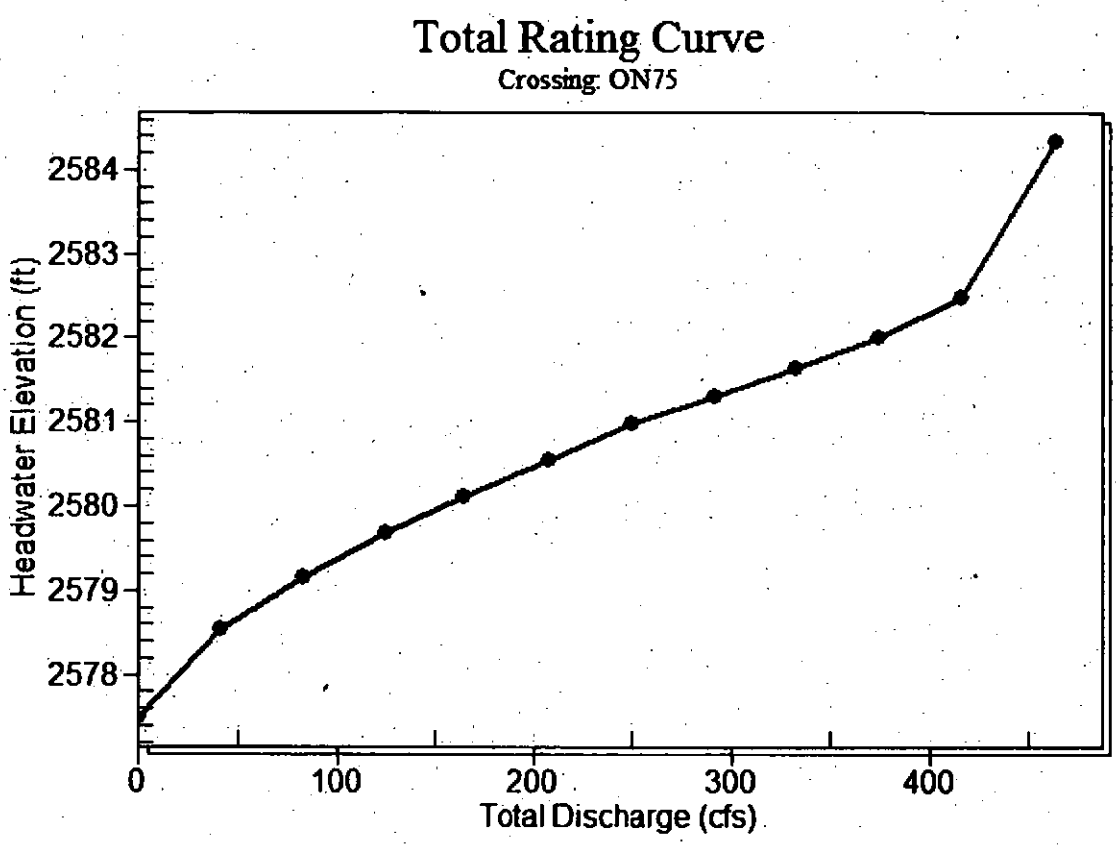


Table 11 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2577.50	0.000	0.000	0-NF	0.000	0.000	0.000	0.000	0.000	0.000
41.60	41.60	2578.55	1.045	0.224	1-S2n	0.475	0.713	0.504	0.000	7.717	0.000
83.20	83.20	2579.16	1.661	0.697	1-S2n	0.719	1.152	0.819	0.000	8.465	0.000
124.80	124.80	2579.68	2.176	1.103	1-S2n	0.950	1.503	1.098	0.000	9.474	0.000
164.00	164.00	2580.11	2.606	1.477	1-S2n	1.124	1.802	1.340	0.000	10.198	0.000
208.00	208.00	2580.56	3.057	1.894	1-S2n	1.320	2.114	1.595	0.000	10.871	0.000
249.60	249.60	2580.97	3.471	2.288	1-S2n	1.484	2.384	1.821	0.000	11.419	0.000
291.20	291.20	2581.31	3.813	2.675	1-S2n	1.641	2.625	2.036	0.000	11.920	0.000
332.80	332.80	2581.65	4.154	3.089	1-S2n	1.798	2.872	2.241	0.000	12.378	0.000
374.40	374.40	2582.02	4.519	3.516	1-S2n	1.932	3.108	2.438	0.000	12.797	0.000
416.00	416.00	2582.48	4.980	3.957	1-S2n	2.063	3.336	2.629	0.000	13.185	0.000

****

Straight Culvert

Inlet Elevation (invert): 2577.50 ft, Outlet Elevation (invert): 2577.00 ft

Culvert Length: 50.00 ft, Culvert Slope: 0.0100

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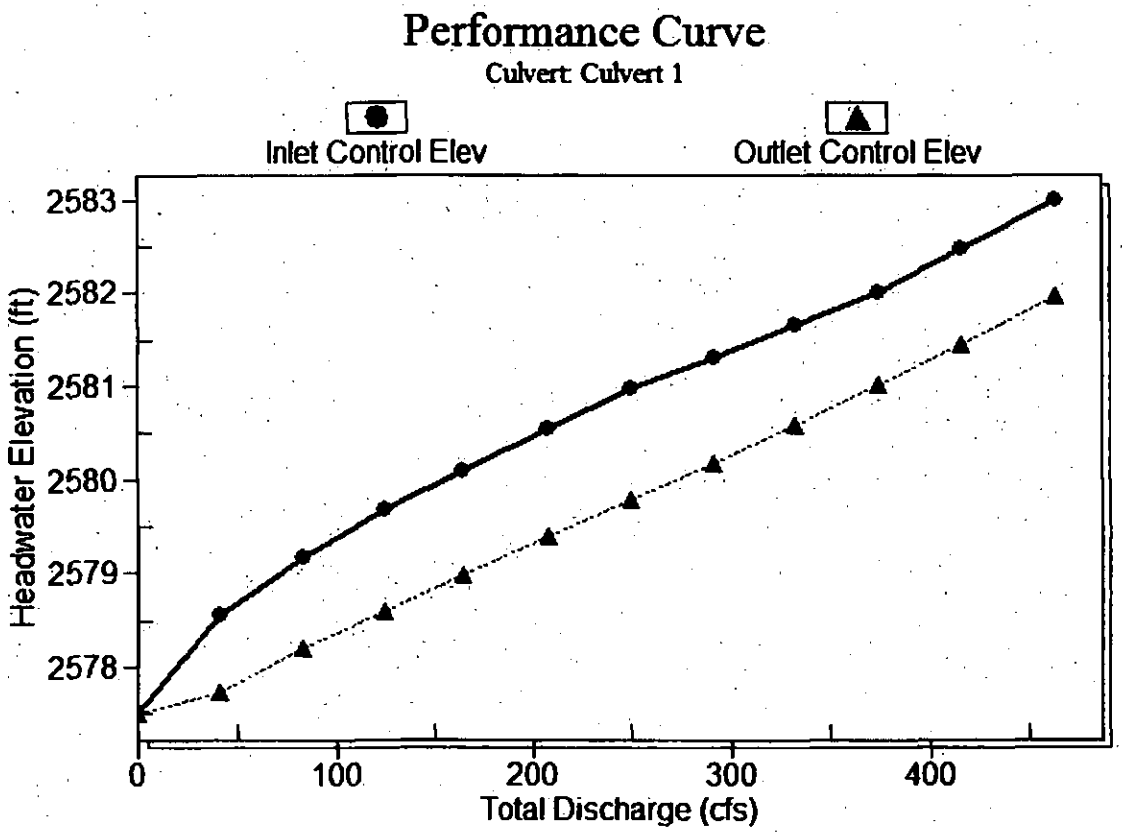
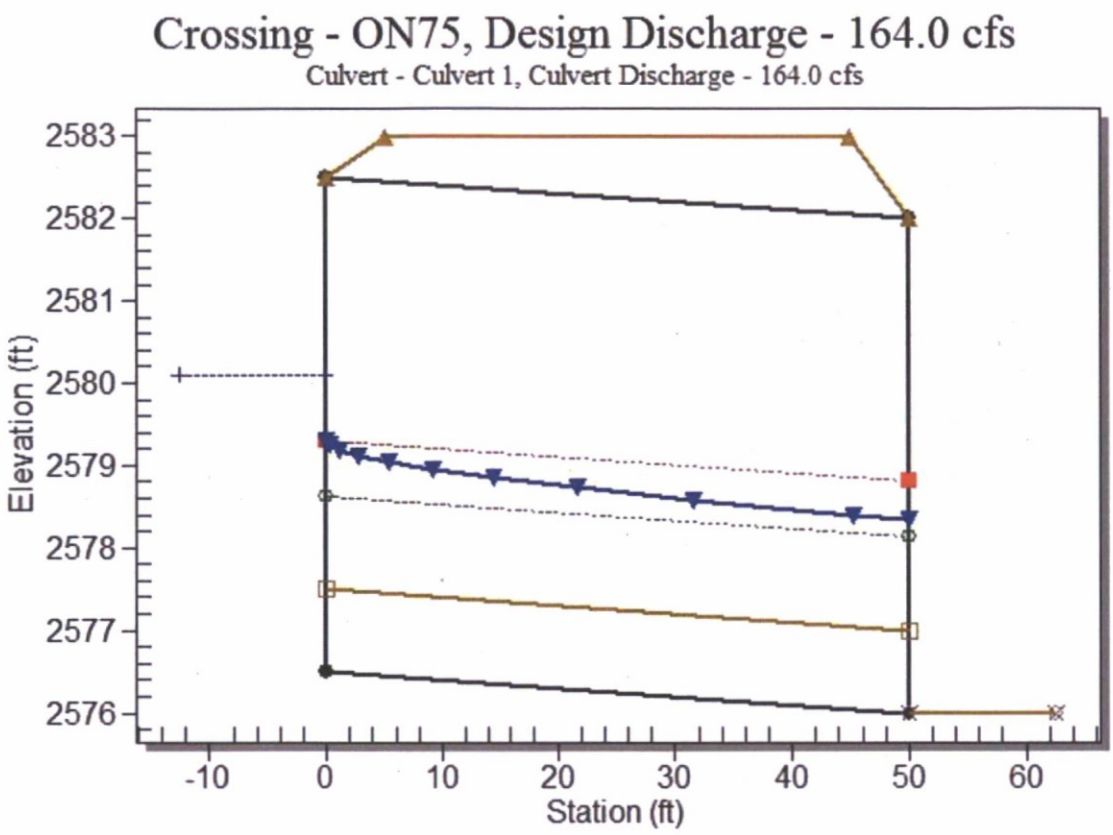
Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2576.50 ft

Outlet Station: 50.00 ft

Outlet Elevation: 2576.00 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Concrete Box

Barrel Span: 12.00 ft

Barrel Rise: 6.00 ft

Barrel Material: Concrete

Embedment: 12.00 in

Barrel Manning's n: 0.0120 (top and sides)

Manning's n: 0.0120 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge (30-75° flare) Wingwall

Table 12 - Downstream Channel Rating Curve (Crossing: ON75)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.00	2576.00	0.00
41.60	2576.00	0.00
83.20	2576.00	0.00
124.80	2576.00	0.00
164.00	2576.00	0.00
208.00	2576.00	0.00
249.60	2576.00	0.00
291.20	2576.00	0.00
332.80	2576.00	0.00
374.40	2576.00	0.00
416.00	2576.00	0.00

Tailwater Channel Data - ON75

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 2576.00 ft

Roadway Data for Crossing: ON75

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 90.00 ft

Crest Elevation: 2583.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

Culvert: ON-80B

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0 cfs

Design Flow: 60 cfs

Maximum Flow: 170 cfs

Table 13 - Summary of Culvert Flows at Crossing: ON80B

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
2577.50	0.00	0.00	0.00	1
2577.99	17.00	17.00	0.00	1
2578.31	34.00	34.00	0.00	1
2578.58	51.00	51.00	0.00	1
2578.70	60.00	60.00	0.00	1
2579.00	85.00	85.00	0.00	1
2579.18	102.00	102.00	0.00	1
2579.36	119.00	119.00	0.00	1
2579.53	136.00	136.00	0.00	1
2579.70	153.00	153.00	0.00	1
2579.89	170.00	170.00	0.00	1
2580.00	179.78	179.78	0.00	Overtopping

Rating Curve Plot for Crossing: ON80B

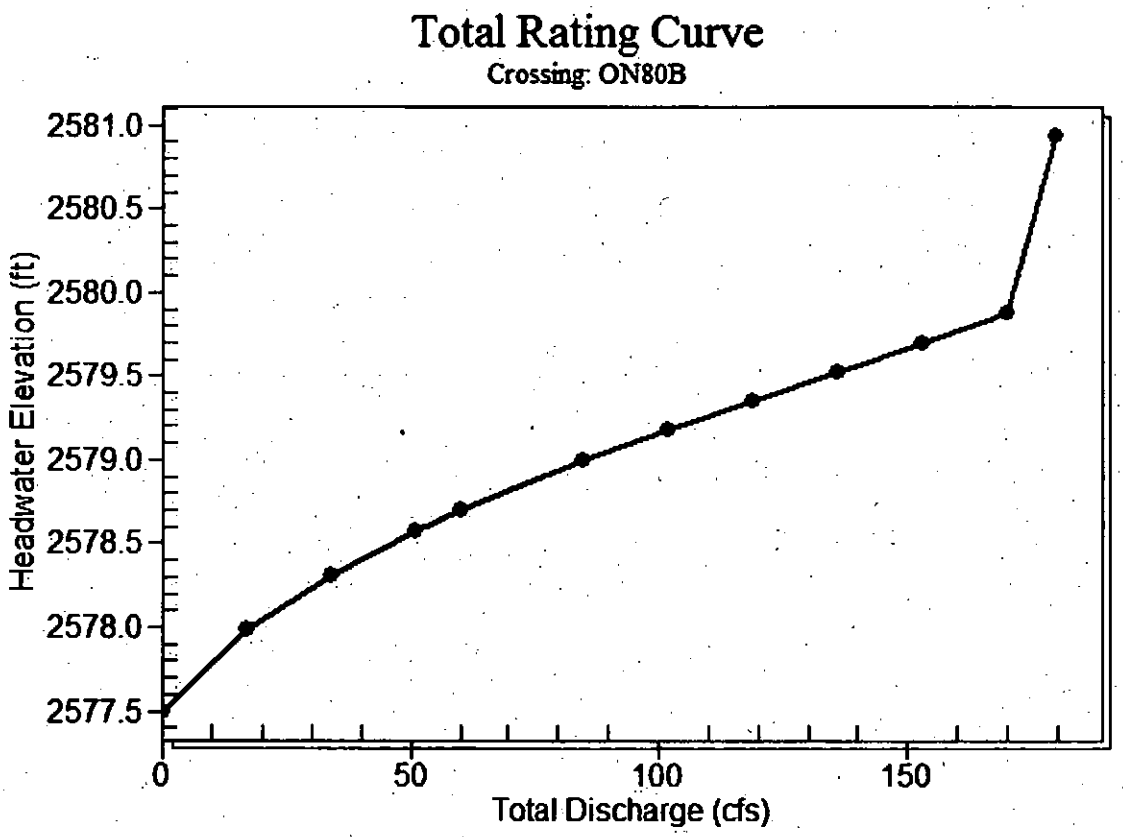


Table 14 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00	0.00	2577.50	0.000	0.000	0-NF	0.000	0.000	1.500	2.000	0.000	0.000
17.00	17.00	2577.99	0.487	0.0*	1-S2n	0.330	0.453	0.330	2.000	5.205	0.000
34.00	34.00	2578.31	0.810	0.0*	1-S2n	0.503	0.707	0.503	2.000	6.633	0.000
51.00	51.00	2578.58	1.078	0.0*	1-S2n	0.636	0.912	0.636	2.000	7.638	0.000
60.00	60.00	2578.70	1.202	0.0*	1-S2n	0.701	1.008	0.701	2.000	8.085	0.000
85.00	85.00	2579.00	1.503	0.0*	1-S2n	0.853	1.242	0.867	2.000	9.040	0.000
102.00	102.00	2579.18	1.684	0.203	1-S2n	0.950	1.377	0.950	2.000	9.820	0.000
119.00	119.00	2579.36	1.855	0.467	1-S2n	1.039	1.511	1.039	2.000	10.387	0.000
136.00	136.00	2579.53	2.026	0.883	1-S2n	1.128	1.634	1.153	2.000	10.617	0.000
153.00	153.00	2579.70	2.201	1.329	1-S2n	1.211	1.748	1.244	2.000	11.017	0.000
170.00	170.00	2579.89	2.387	1.803	1-S2n	1.292	1.850	1.330	2.000	11.406	0.000

* Full Flow Headwater elevation is below inlet invert.

****

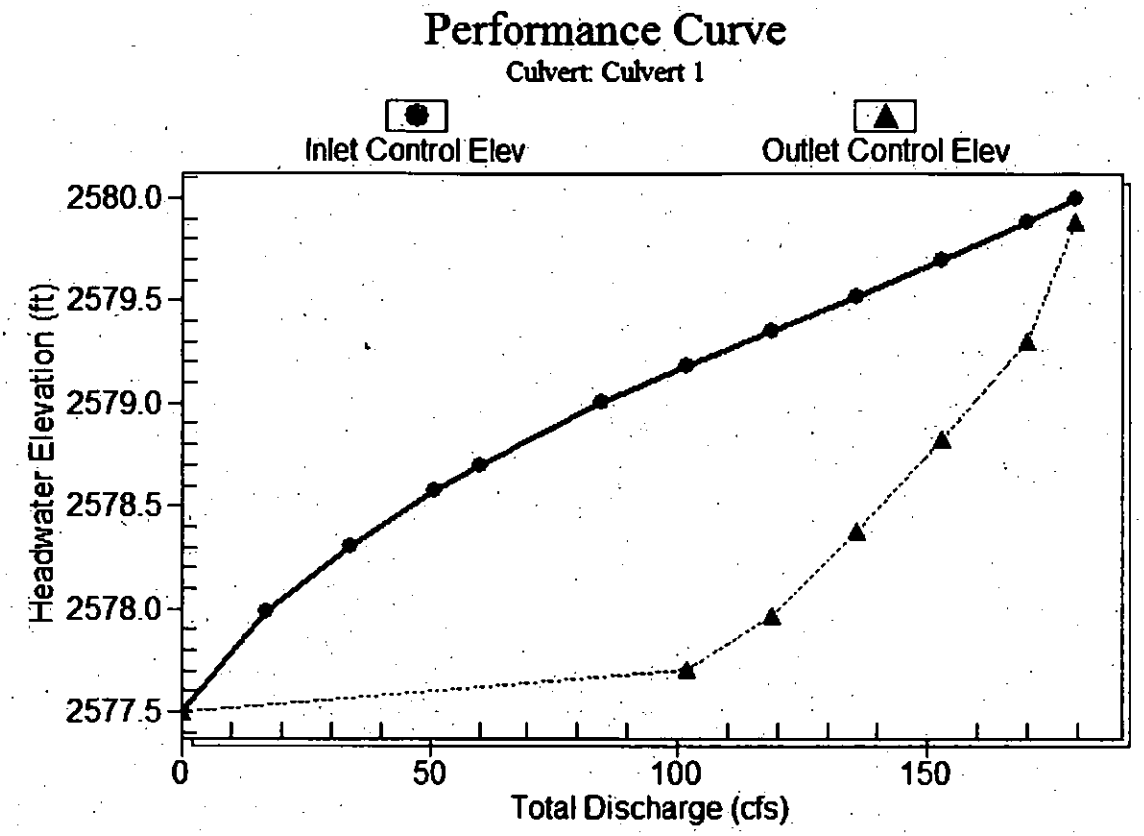
Straight Culvert

Inlet Elevation (invert): 2577.50 ft, Outlet Elevation (invert): 2575.50 ft

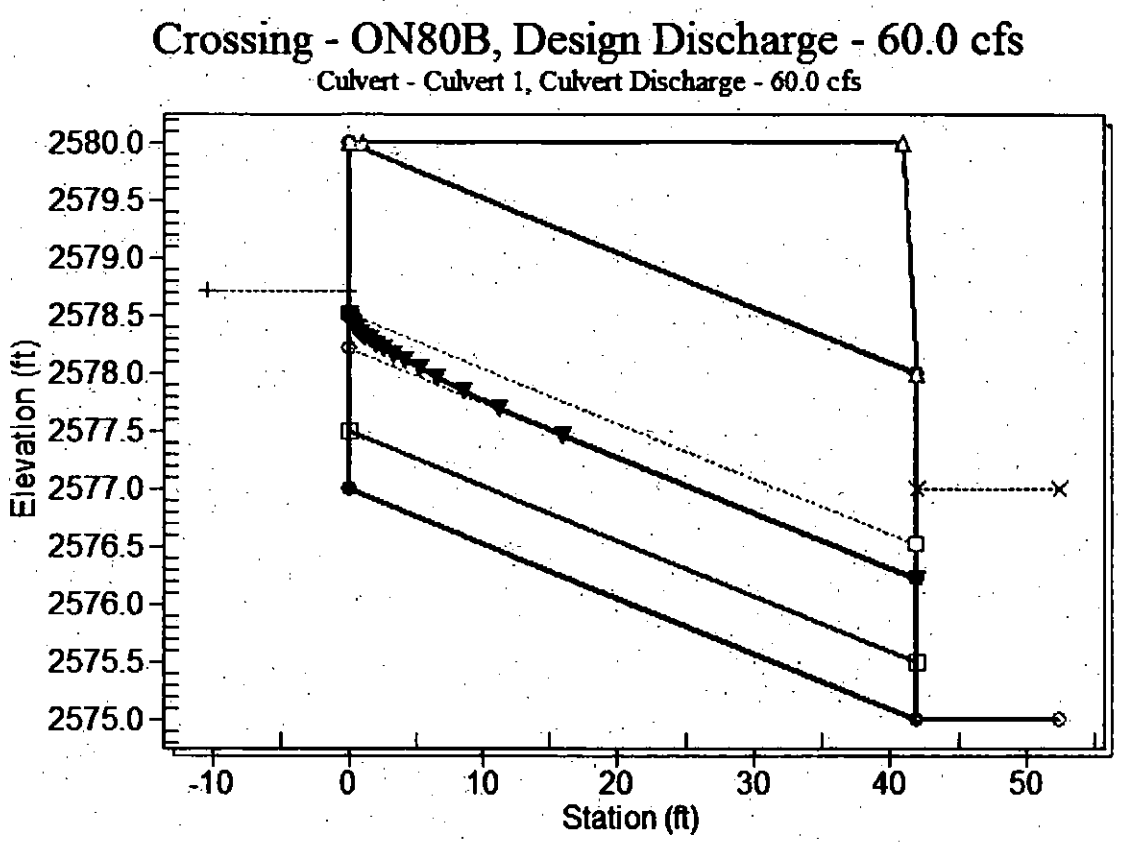
Culvert Length: 42.05 ft, Culvert Slope: 0.0476

****

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 2577.00 ft

Outlet Station: 42.00 ft

Outlet Elevation: 2575.00 ft

Number of Barrels: 4

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 6.00 in

Barrel Manning's n: 0.0120 (top and sides)

Manning's n: 0.0350 (bottom)

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall

Inlet Depression: NONE

Table 15 - Downstream Channel Rating Curve (Crossing: ON80B)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
0.00	2577.00	2.00
17.00	2577.00	2.00
34.00	2577.00	2.00
51.00	2577.00	2.00
60.00	2577.00	2.00
85.00	2577.00	2.00
102.00	2577.00	2.00
119.00	2577.00	2.00
136.00	2577.00	2.00
153.00	2577.00	2.00
170.00	2577.00	2.00

Tailwater Channel Data - ON80B

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 2577.00 ft

Roadway Data for Crossing: ON80B

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 90.00 ft

Crest Elevation: 2580.00 ft

Roadway Surface: Paved

Roadway Top Width: 40.00 ft

First Flush Spillway/Dissipation Basin Design

Project ***Storyrock***
Subject **First Flush Spillway/Dissipation Basin Design**
Designed by **ZJH** Date 2/5/2016 Project No. 191069020
Checked by **JMB** Date 2/5/2016

Objective: Design First Flush Spillway & Dissipation Basin for Typical Area

First Flush Equivalent Design Storm: 2 Year

Q_2 = 2-8 cfs

Spillway Design:

Top Width	8 Feet
Side Slopes	4:1 H:V
Flow Depth (2 year Design Storm)	0.5 Feet
Capacity[1] (2 year Design Storm)	5 CFS

Dissipation Basin Design:

V =Spillway Velocity[1]	5.25 ft/s
D =Equivalent Opening Width	4 Feet
Riprap $D_{50} = 0.0191*V^2*(0.61)$[2]	6 Inches
Basin Length = 4xD[3]	**16 Feet**

Notes:
(1) Refer to Attached Flowmaster Output for Spillway Hydraulic Design
(2) Per Drainage Design Manual - Hydraulics Equation 6.36, Specific Weight of Stone = 165 lb/ft3
(3) Per Drainage Design Manual - Hydraulics Table 8.6

Worksheet for First Flush Spillway

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.055	
Channel Slope	0.25000	ft/ft
Normal Depth	0.50	ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	0.00	ft

Results

Discharge	5.25	ft^3/s
Flow Area	1.00	ft^2
Wetted Perimeter	4.12	ft
Hydraulic Radius	0.24	ft
Top Width	4.00	ft
Critical Depth	0.64	ft
Critical Slope	0.06711	ft/ft
Velocity	5.25	ft/s
Velocity Head	0.43	ft
Specific Energy	0.93	ft
Froude Number	1.85	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.64	ft
Channel Slope	0.25000	ft/ft

Appendix D – Stormwater Storage Waiver

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ___ ____ - PP - ____ PC#_____

The applicant/developer must complete and submit this form to the city for processing and obtain approval of waiver request ***before submitting improvement plans***. Denial of the waiver may require the developer to submit a revised site plan to the Development Review Board.

Date 10/26/2016 **Project Name** Storyrock

Project Location 128th Street and Ranch Gate Road

Applicant Contact Jason Burm, PE **Company Name** Kimley-Horn and Associates

Phone 480-207-2667 Fax _____ E-mail jason.burm@kimley-horn.com

Address 1855 W. Baseline Road, Suite 200 Mesa, AZ 85202

Waiver Criteria

A project must meet at least one of three criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

☐ 1. The development is adjacent to a conveyance facility that an engineering analysis shows is designed and constructed to handle the additional runoff from the site as a result of development.

☐ 2. The development is on a parcel less than one-half acre in size.

☑ 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO).

For a full storage waiver, a conflict with ESLO is limited to:

- Property located in the hillside landform as defined in the city Zoning Ordinance
- Property in the upper desert landform that has a land slope steeper than 5% as defined in the city Zoning Ordinance
- Property within the ESL zoning overlay district where the only viable location for a stormwater storage basin requires blasting

This full waiver only applies to those portions of property meeting one of these three requirements.

Partial waivers are available for projects or portions of properties within the Environmentally Sensitive Lands Zoning Overlay District, not meeting any of the three full waiver criteria above, if post-development peak discharge rates do not exceed pre-development conditions, based on the 10- and 100-year storm events.

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

Engineer _____ Date 10.27.16

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7781

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC#_____

CITY STAFF TO COMPLETE THIS PAGE

Project Name _____

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐ 1 ☐ 2 ☐ 3

☐ Recommend approve waiver.

☐ Recommend deny waiver:
- ☐ None of waiver criteria met.
- ☐ Downstream conditions prohibit waiver of any storage.
- ☐ Other:

Explain: _____

_____

☐ Return waiver request:
- ☐ Insufficient data provided.
- ☐ Other: _____

Explain: _____

_____

Recommended Conditions of Waiver:
- ☐ All storage requirements waived.
- ☐ Post-development peak discharge rates do not exceed pre-development conditions.
- ☐ Other:

Explain: _____

_____

☐ **Waiver approved per above conditions.**

☐ **Waiver denied.**

_____ _____

Floodplain Administrator or Designee Date

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7781

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ___ ____ - PP - ____ PC#_____

In-Lieu Fee and In-Kind Contributions

In-lieu fees are only applicable to projects where post-development peak discharge rates exceed pre-development levels, based on the 10- and 100-year storm events. If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide a storage basin, sized as described below, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is $1.87 per cubic foot of stormwater storage for a virtual storage basin designed to mitigate the increase in runoff associated with the 100-year/2-hour storm event. The applicant may submit site-specific in-lieu fee calculations subject to the Floodplain Administrator's approval.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name StoryRock

The waived stormwater storage volume is calculated using a simplified approach as follows:

$V = \Delta CRA$; where

V = stormwater storage volume required, in cubic feet,
ΔC = increase in weighted average runoff coefficient over disturbed area ($C_{post} - C_{pre}$),
R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and
A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$; where
V_w = volume waived,
V = volume required, and
V_p = volume provided

R = _____
ΔC= _____
A = _____
V = _____
V_p= _____
V_w= _____

☐ An in-lieu fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $1.87 per cubic foot = _____

☐ An in-kind contribution will be made, as follows:

_____
_____
_____

☐ No in-lieu fee is required. Reason:

_____
_____

Approved by:

_____ _____
Floodplain Administrator or Designee Date

Planning, Neighborhood & Transportation Division
7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-2500 • Fax: 480-312-7781

Appendix E – Preliminary Grading Plan