HALEY ALDRICH

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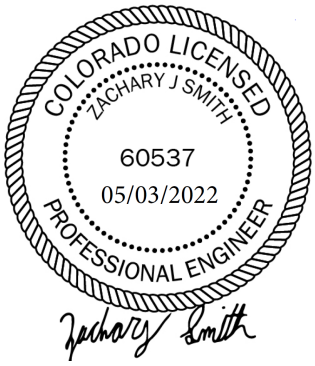
REPORT ON

DRAINAGE REPORT
SOLBERG PIT
PEYTON, COLORADO



by
Haley & Aldrich, Inc.
Greenwood Village, Colorado

for
Pioneer Landscaping Materials, Inc.
Peyton, Colorado

File No. 0204990-001
May 2022

HALEY & ALDRICH, INC.
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3 May 2022
File No. 0204990-001

Pioneer Landscaping Materials, Inc.
Solberg Aggregate Mine
Peyton, Colorado 80831

Attention: Dr. Angela Bellantoni

Subject: Drainage Report
Solberg Aggregate Mine
Peyton, Colorado

Dear Dr. Bellantoni:

Haley & Aldrich, Inc., on behalf of Pioneer Landscaping Materials, Inc., is submitting this drainage report as part of the greater permit submittal for an existing sand and gravel mining operation in Peyton, Colorado. The enclosed drainage report presents our stormwater analysis of the existing, interim, and final site plan in support of the El Paso County permit submittal for the proposed expansion of the existing operation. Thank you for the opportunity to assist Pioneer Landscaping Materials, Inc. with this important project. Please direct any questions to Zach Smith at (720) 621-6536.

Sincerely yours,
HALEY & ALDRICH, INC.

Zachary J. Smith, P.E. (CO)
Senior Engineer

Christopher G. Langham, P.E. (AZ), CFM
Technical Expert

Enclosures:
Report on Drainage Report Solberg Pit Peyton Colorado

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SIGNATURE PAGE FOR

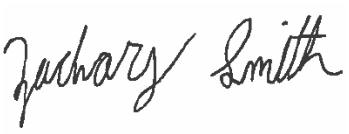
REPORT ON

DRAINAGE REPORT
SOLBERG PIT
PEYTON, COLORADO

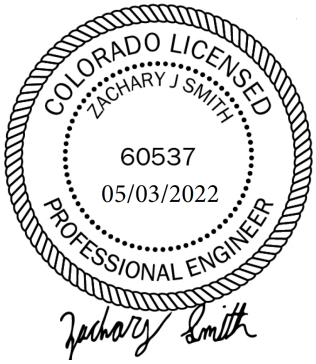
PREPARED FOR

PIONEER LANDSCAPING MATERIALS, INC.
PEYTON, COLORADO

PREPARED BY:



Zachary J Smith PE
Senior Engineer
Haley & Aldrich, Inc.



REVIEWED AND APPROVED BY:

Christopher G. Langham, P.E. (AZ), CFM
Technical Expert
Haley & Aldrich, Inc.

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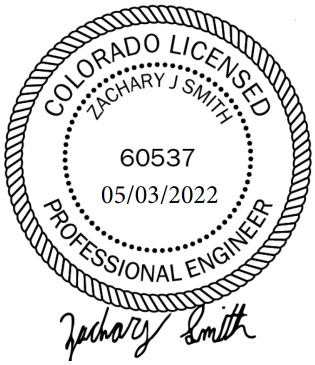

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1. General Location and Description

1.1 LOCATION

The proposed 80-acre expansion (Site) adjoins the existing permitted mining area located on Curtis Road in Peyton, EL Paso County, Colorado. The mine entrance is on Curtis Road south of Garrett Road. Other nearby streets to the Site include Jones Road to the south and McCandlish Road, Renneberger Road, and Good Fortune Road to the north. The legal description of the Site is The West ½ of the Northwest ¼ of Section 21, Township 13 South, Range 64 West of the 6th P.M. in El Paso County, Colorado. A site location map has been included as Figure 1.

The Site is generally located within the Chico Creek (CH) drainage basin and the current and expanded mine area is between two unnamed tributaries of the West Black Squirrel Creek (WS). The Site is in a rural portion of the county with widely-spaced residential homes and farming/ranch land.

Current land use along the Site is rural, with surrounding properties shown on drawing C-100 of the drawing set provided in Appendix A. The existing land use and proposed expansion is to be used for construction aggregate mining.

1.2 DESCRIPTION OF PROPERTY

The existing construction materials mining operation has a permitted area of approximately 234 acres, and the proposed amendment area is approximately 79 acres, for a total area of approximately 313 acres. The area is generally composed of slightly rolling hills with an elevation range of 6,724 feet to 6,628 feet.

Mining at the Site began in 1982 and is considered an existing, legal, non-conforming land use. The plan of operations for the Site consists of excavating unconsolidated surficial materials down to a depth of approximately 35 feet below ground surface (bgs). Materials excavated from the pit area are taken to the processing plant. At the processing plant, the materials are washed and sorted to remove unwanted silts and clays and to separate out the sand and gravel. Sand and gravels separated during this process are dewatered and stockpiled. The stockpiled sands and gravels are then transported from the Site via haul truck.

Mining has occurred in the eastern portion of the Site and is gradually expanding towards the west. Site features include an existing quarry and associated processing, washing, and material stockpile areas. Operations areas include maintenance and fueling areas, truck scales and scale house, and multiple process water settling ponds.

1.3 PROPOSED SITE ACTIVITIES

Proposed activities at the Site are limited to the mining of surficial materials and related mineral processing activities. These include the use of temporary structures, construction of haul roads, excavation of materials, and the processing and stockpiling of materials. Existing mining occurs on the eastern 234 acres of the Site. The proposed expansion of the Site includes a single 79-acre parcel to the west. In the expansion area surficial mining and related mineral processing activities will continue to occur.

At closure of the Site, final reclamation of the Site will occur. In accordance with the existing reclamation plan, the Site will be returned to a rangeland. The naturalized open space will be revegetated, and the drainages of the Site will be re-established. Pit slopes and other excavations at the Site are to be graded to a final reclamation slope of 3H:1V (Horizontal:Vertical). The Site is not proposing any importation of inert back fill onsite.

2. Drainage Basin and Sub-Basins

The Chico Creek drainage basin is about 736 square miles and is located in the southeastern portion of El Paso County and the northeastern portion of Pueblo County, east of the Fountain Creek Watershed. The Site is located in the Upper Black Squirrel Subbasin of the Chico Creek drainage basin. The upper Black Squirrel Subbasin is made up of many existing districts, developed areas, and rural/agricultural areas. The Upper Black Squirrel Subbasin is primarily a rural area, with a couple of small clusters of single-family homes.

Black Squirrel Creek originates in Black Forest and drains into Chico Creek. Chico Creek then flows into the Arkansas River in Pueblo County. The upper and middle portions of Black Squirrel Creek are ephemeral streams that flow only in response to thunderstorms, snowmelt, and prolonged rainfall. There is perennial flow only along the lower portions of the creek.

The site is located within a designated Federal Emergency Management Agency (FEMA) effective zone A floodplain as identified on FEMA Flood Insurance Rate Map (FIRM) Nos. 08041C0562G, 08041C0564G, 08041C0566G, and 08041C0568G, all of which are dated 7 December 2018. No fill is proposed within the existing floodplain, as such there is no anticipated increase in the water surface as a result from the existing or proposed mining.

No known irrigation facilities or other obstructions are located within or near the Site which could influence or be influenced by the local drainage.

3. Drainage Design Criteria

3.1 DEVELOPMENT CRITERIA REFERENCE

Hydrologic and hydraulics calculations for the Site were performed using the methods outlined in the El Paso County Drainage Criteria Manual. Topography for the Site was developed using a 2-foot contour interval and is presented in the Grading and Erosion Plan as part of Appendix A. The Grading and Erosion Plan provides the existing/interim and proposed drainage paths for the Site. The Site has been designed to accommodate the 24-hour 100-year and 2-hour 100-year design storms.

3.2 HYDROLOGIC CRITERIA

The design storm and associated modeling has been developed based on the El Paso County Drainage Criteria Manual requirements. The results of the modeling are provided in the following sections below.

3.2.1 Design Storm

Haley & Aldrich, Inc. evaluated multiple rainfall events per Chapter 6 Hydrology of the Drainage Criteria Manual Volume 1 of El Paso County. The precipitation values were obtained from the National Oceanic and Atmospheric Administration Atlas 14, Volume 8, Version 2 for Peyton, Colorado, USA. The precipitation depth for storms of 1-hour and 24-hour duration are shown in Table 3-1 below.

Table 3-1: Precipitation Summary

Storm Duration	1-hour (Thunderstorms)	24-hour (Frontal Storms)
100 yr. Rainfall Depth, inches	2.56	4.90

Hydrographs for the storm durations were developed following the guidance provided in the Drainage Criteria Manual. The guidance recommends using the Natural Resources Conservation Service (NRCS) Curve Number Loss Method and Unit Hydrograph as implemented in United States Army Corps of Engineers HEC-HMS model.

Design storms have been modelled to be representative of the rainstorms experienced in the Front Range of Colorado that tend to occur as either short-duration, high-intensity, localized, convection thunderstorms or longer-duration, lower-intensity, broader frontal storms, as described in the Drainage Criteria Manual. The thunderstorm design distribution was developed using the 2-hour design storm distribution for less than 1 square mile and provided in Table 6-3 of the Drainage Criteria Manual. The NRCS 24-hour Type II Design Storm Distribution was used to represent the larger frontal storms and to calculate a possible larger storm volume.

3.2.2 Catchment Areas

The contributing watershed affecting the Site during the time prior to revegetation has been modeled as a natural ground based and bare earth, this is the current state of the pit. The contributing watershed affecting the Site at the time of reclamation has been modeled as natural or reclaimed earth. The largest possible catchments during the time of operation and reclamation have been modeled for the Site as shown on Figure 2. Flow outside of the pit will continue to the southeast and remain in its natural

drainage path. Flow from the north is collected in roadside ditches along Garrett Road and do not enter the Site. The basin representing the Site has been divided into two watersheds. WS-1 represents the area for flow from the pit that will report to the northeast corner of the Site and flow out of the existing culvert. WS-2 represents the mining area that will report to the southeast corner of the pit and enter the existing roadside ditch along Curtis Road. Table 3-2 provides a summary of these two watersheds.

Table 3-2: Site Watershed Areas

Watershed Name	Area acres	Area square miles
WS-1	241.5	0.38
WS-2	40.5	0.06
Total	282.1	0.44

A NRCS runoff Curve Number (CN) was applied to represent natural/reclaimed ground based on the anticipated ground conditions during construction. The values and conditions selected below were developed for aerial imagery, observations of soil and subsoil conditions during Site visits, and the hydrologic soil group delineated using the United States Department of Agriculture Web Soil Survey. The anticipated and modeled conditions for each watershed are summarized in Table 3-3 below

Table 3-3: Anticipated Watershed Conditions

Soil Conditions	WS-1 (Pre-Vegetation)	WS-1 (Post-Reclamation)	WS-2 (Pre-Vegetation)	WS-2 (Post-Reclamation)
Antecedent Runoff Condition (ARC)	I (per 4.1.2)	I (per 4.1.2)	I (per 4.1.2)	I (per 4.1.2)
Cover Type	A/B	B	A/B	B
Hydrologic condition	Poor	Fair	Poor	Fair
Hydraulic Soil Group	Dirt	Herbaceous-mixture	Dirt	Herbaceous-mixture
Curve Number (Tables 6-9)	66	51	66	51

These conditions have been developed following the recommendations provided in the Drainage Criteria Manual, specifically Section 4.1.2 and Table 6 of Chapter 6.

3.2.3 Initial Abstraction

The CN was used to calculate initial losses and infiltration losses for each watershed following the procedures outlined in the El Paso County Drainage Criteria Manual . The initial abstraction, including surface storage, interception, and infiltration prior to runoff, was used to calculate initial losses.

3.2.4 Lag Time

Watershed time of concentration and lag time were computed using NRCS TR-55 (1986), per the United States Bureau of Reclamation Flood Hydrology Manual, (1989). This was completed following the recommendations provided in the El Paso County Drainage Criteria Manual. Flows within the Site were divided into three flow types, shallow flow, sheet flow, and channel flow. The resulting CN, initial losses, and lag time are provided in Table 3-4 below.

Table 3-4: Watershed Parameters

Watershed Name	Curve Number	Initial Losses, inches	Lag Time, minutes
WS-1 (Pre-Vegetation)	66	1.03	16.68
WS-2 (Pre- Vegetation)	66	1.03	8.25
WS-1 (Post-Reclamation	51	1.92	23.51
WS-2 (Post-Reclamation)	51	1.92	11.00

3.3 MODELING RESULTS

The HEC-HMS computer program was used to model rainfall over the watershed and convert rainfall excess to runoff from the contributing watershed surroundings. Using the inputs described above, the results of the HEC-HMS model are provided in Tables 3-5, 3-6, 3-7, and 3-8 below for the 2-hour and 24-hour, 100-year design storm. The resulting hydrographs for each watershed and storm are provided in Appendix B.

Table 3-5: Result Summary of 2-Hour 100-Year Storm (Pre-Vegetation)

Value	Units	WS-1	WS-2
Area	Sq. mi.	0.38	0.06
Total Rainfall	in	2.86	2.86
Time of Peak Rainfall	hr:min	0:40	0:40
Initial Loss	in	1.03	1.03
Curve Number	-	66	66
Impervious Area	%	10	10
Rainfall Loss	in	2.16	2.13
Rainfall Excess	in	0.70	0.73
Lag Time	min	16.68	8.25
Peak Flow	cfs	140.2	46.0
Time of Peak Flow	hr:min	01:25	00:50
Runoff Volume	Acre-ft	10.8	2.2

Table 3-6: Result Summary of 2-Hour 100-Year Storm (Post-Reclamation)

Value	Units	WS-1	WS-2
Area	Sq. mi.	0.38	0.06
Total Rainfall	in	2.86	2.86
Time of Peak Rainfall	hr:min	0:40	0:40
Initial Loss	in	1.92	1.92
Curve Number	-	51	51
Impervious Area	%	0	0
Rainfall Loss	in	2.78	2.77
Rainfall Excess	in	0.08	0.09
Lag Time	min	23.51	11.00
Peak Flow	cfs	14.2	4.0
Time of Peak Flow	hr:min	1:45	1:05
Runoff Volume	Acre-ft	0.9	0.2

Table 3-7: Result Summary of 24-Hour 100-Year Storm (Pre-Vegetation)

Value	Units	WS-1	WS-2
Area	Sq. mi.	0.38	0.06
Total Rainfall	in	4.90	4.90
Time of Peak Rainfall	hr:min	12:00	12:00
Initial Loss	in	1.03	1.03
Curve Number	-	66	66
Impervious Area	%	10	10
Rainfall Loss	in	2.95	2.92
Rainfall Excess	in	1.95	1.98
Lag Time	min	16.68	8.25
Peak Flow	cfs	213.8	73.8
Time of Peak Flow	hr:min	12:30	12:00
Runoff Volume	Acre-ft	39.5	6.3

Table 3-8: Result Summary of 24-Hour 100-Year Storm (Post-Reclamation)

Value	Units	WS-1	WS-2
Area	Sq. mi.	0.38	0.06
Total Rainfall	in	4.90	4.90
Time of Peak Rainfall	hr:min	12:00	12:00
Initial Loss	in	1.92	1.92
Curve Number	-	51	51
Impervious Area	%	0	0
Rainfall Loss	in	4.21	4.20
Rainfall Excess	in	0.69	0.70
Lag Time	min	23.51	11.00
Peak Flow	cfs	54.2	17.6
Time of Peak Flow	hr:min	12:45	12:00
Runoff Volume	Acre-ft	13.9	2.2

4. Drainage Design

4.1 GENERAL CONCEPT

The following drainage plan for the Site has been designed to safely manage the 100-year design storm, provided in the section above. Stormwater diversion offsite has been designed to meet the design criteria provided in the El Paso County Drainage Criteria Manual. The Site will have an existing/interim design during mining (pre-vegetation) and a post-mining reclamation design after regrading and revegetating the Site.

Existing surface drainage at the Site generally flows from the northwest to the southeast. Flow at the Site is kept separated between the unaffected stormwater which is directed around the disturbed mining and processing areas and stormwater that lands within in the disturbed area. Stormwater that lands outside of the disturbed areas flows to the southeast in existing natural drainages. Stormwater that falls within the disturbed area infiltrates into the ground or is diverted to the sediment basin through the culvert and offsite. Onsite operating ponds are connected in series and have an emergency spillway which directs flow to a sediment basin in the northeast corner of the Site, as shown in Appendix A, before exiting the Site through an existing culvert located in the northeast corner of the Site. There are no proposed changes to the existing drainage plan during mining operations.

Once mining at the Site has been completed the Site will be reclaimed and regraded in accordance with the existing Reclamation Plan. Once the Site has been reclaimed, the existing Site ponds will be removed and two swales will be established to direct stormwater off the Site. The final drainage plan for the Site has been provided in Appendix A. The proposed grading plan will direct a majority of the flow to the existing culvert in the northeast corner of the Site. This existing culvert flows under Curtis Road into an unnamed drainage. A small portion of the flow will exit the Site in the southeast corner and flow into the existing roadside ditch adjacent to Curtis Road as it does so currently. This flow will ultimately result in no net change to the road ditch as discharge from this area was flowing into the ditch prior to mining operations. The remaining flow on the Site that does not enter the reclaimed pit area will continue to flow down the existing drainage paths to the southeast.

4.2 DESIGN DETAILS

Hydrologic and hydraulics calculations for the Site were performed using the methods outlines in the El Paso County Drainage Criteria Manual. Topography for the Site was developed using a 2-foot contour interval and is presented in the Grading and Erosion Plan as part of Appendix A. The Grading and Erosion Plan provides the existing/interim and proposed final drainage paths for the Site. The Site has been designed based on the maximum flowrates calculated in the previous section.

4.2.1 Existing/Interim Site Drainage

The Site currently allows all stormwater from the disturbed areas (mining pits and process area) to infiltrate into the ground or flow offsite through the culvert located in the northwest corner of the Site. Flow that exits through the culvert, first travels through the sediment basin to allow sediments to drop out. The Site is primarily made up of sandy cover types A and B. These soil types allow for infiltration of the stormwater to occur in less than 72 hours.

Operating ponds are located on Site for on-Site mining activities including dust control and material washing. In the event one or multiple of the operating ponds overflow, flow is directed from the ponds to the northeast corner of the Site. At the northeast corner of the Site there is a sediment basin followed by an existing culvert which allows flow under the road and into an existing offsite drainage. The modeling of this culvert is provided in the following sections below. The existing/interim Site drainage plan has been provided as sheets C-100 through C-104 of Appendix A.

4.2.2 Swale Geometry

The Site has two proposed vegetated swales that take flow from the west side of the pit floor to the east side of the Site. The swales will be constructed at the end of mining in accordance with the reclamation plan. The location of each swale can be seen on sheet C-105 of Appendix A. The model geometry of each swale is summarized below in Table 4-1. In general, each swale starts wide and shallow and then as water is directed downstream it becomes deeper and narrower until the swale meets the exit point from the Site. The north swale flows into an existing culvert and the south swale flows into the existing roadside ditch.

Table 4-1: Swale Geometry

Geometry	North Swale	South Swale
Length (ft)	5550	1350
Average Slope (%)	1.5%	3.0%
Maximum width (ft)	355	180
Minimum width (ft)	25	25
Maximum depth (ft)	8	8
Minimum depth (ft)	1	2

4.2.3 Culvert Geometry

There is an existing culvert located at the northeast corner of the site. The culvert flows from west to east under Curtis Road at the intersections of Curtis Road and Garrett Road. The culvert has been modeled based on the site visit and lidar data for the site. Table 4-2 below summarizes the modeled culvert geometry.

Table 4-2: Culvert Geometry

Geometry	Curtis Road Culvert
Culvert Length (ft)	125
Entrance Loss Coefficient	0.2
Exit Loss Coefficient	1.0
Manning N	0.013
Culvert Slope (%)	1.6%

4.2.4 Channel Roughness

The Site design and downstream offsite model geometry has been modeled using three Manning's roughness coefficients. These three values delineate the difference between the reclaimed swale, the existing off-site drainage, and the characterization of soils outside the existing drainage. The swale

channel is anticipated to be clean, straight, with no rifts or deep pools as defined by El Paso Drainage Design Manual. The resulting Manning's roughness coefficient is 0.022. The existing downstream drainage has been modeled as a clean, straight, no rifts or deep pools, with more stones and weeds than the reclaimed swale. This feature has been modeled with a Manning's n value of 0.035. Outside of the diversion channel undeveloped lands are anticipated to have scattered brush based on the Google Earth imagery dated 24 November 2017. The resulting Manning's roughness coefficient is 0.050 per Chow, Ven Te, 1959: Open-channel Hydraulics.

4.2.5 HEC-RAS Modeling Results

A HEC-RAS model was developed to calculate the flow parameters in the swales on Site and flow from the design storm traveling through the existing culvert. The four storms described in Section 3.0 above were modeled as steady state flows using the maximum flowrate for the model geometry described in the sections above. The model inputs and results are provided in Appendix C.

The model indicated flow in each of the design storms will stay within the proposed swale and allow flow to travel to its designated Site exit point. It has been found that flow through the swales will travel as sub-critical flow at velocities generally less than 3 feet per second. As such, stormwater modeled for the Site has been considered non-erosive. Table 4-3 below summarizes the results of the model for the swale up to the existing culvert.

Table 4-3: On Site Modeling Results

River station	100-yr 2-hr Event			100-yr 24-hr Event			100-yr 2-hr Event			100-yr 24-hr Event		
	Pre-Vegetation			Pre-Vegetation			After Reclamation			After Reclamation		
	Depth (ft)	Channel Velocity (ft/s)	Froude No.	Depth (ft)	Channel Velocity (ft/s)	Froude No.	Depth (ft)	Channel Velocity (ft/s)	Froude No.	Depth (ft)	Channel Velocity (ft/s)	Froude No.
7274.1	0.3	0.7	0.2	0.4	0.8	0.2	0.1	0.3	0.2	0.2	0.5	0.2
7200.0	0.3	0.6	0.2	0.4	0.7	0.2	0.1	0.2	0.1	0.2	0.4	0.2
7100.0	0.3	0.6	0.2	0.4	0.7	0.2	0.1	0.2	0.1	0.2	0.4	0.1
7000.0	0.3	0.6	0.2	0.4	0.7	0.2	0.1	0.2	0.1	0.2	0.4	0.2
6900.0	0.3	0.6	0.2	0.4	0.7	0.2	0.1	0.2	0.1	0.2	0.4	0.2
6800.0	0.3	0.6	0.2	0.3	0.7	0.2	0.1	0.2	0.1	0.2	0.4	0.2
6700.0	0.2	0.7	0.3	0.3	0.8	0.3	0.1	0.3	0.2	0.1	0.5	0.2
6600.0	0.2	1.1	0.5	0.2	1.2	0.5	0.1	0.5	0.4	0.1	0.8	0.5
6500.0	0.2	1.1	0.5	0.2	1.3	0.5	0.0	0.6	0.5	0.1	0.8	0.5
6400.0	0.2	1.2	0.5	0.2	1.4	0.5	0.1	0.5	0.3	0.1	0.8	0.5
6300.0	0.2	1.2	0.5	0.2	1.4	0.5	0.1	0.8	0.7	0.1	1.0	0.5
6200.0	0.2	1.4	0.6	0.3	1.6	0.6	0.1	0.5	0.3	0.1	0.9	0.4
6100.0	0.3	1.2	0.4	0.3	1.3	0.4	0.1	1.2	0.9	0.1	1.2	0.6
6000.0	0.4	0.8	0.2	0.4	0.9	0.2	0.1	0.3	0.1	0.3	0.5	0.2
5900.0	0.4	0.7	0.2	0.4	0.9	0.2	0.1	0.3	0.1	0.2	0.5	0.2
5800.0	0.4	0.7	0.2	0.4	0.8	0.2	0.1	0.2	0.1	0.2	0.5	0.2
5700.0	0.3	0.7	0.2	0.4	0.8	0.2	0.1	0.2	0.1	0.2	0.4	0.2
5600.0	0.3	0.7	0.2	0.4	0.8	0.2	0.1	0.2	0.1	0.2	0.4	0.2
5500.0	0.3	0.7	0.2	0.3	0.8	0.3	0.1	0.2	0.1	0.2	0.4	0.2
5400.0	0.2	0.8	0.3	0.3	1.0	0.3	0.1	0.3	0.2	0.1	0.5	0.3
5300.0	0.2	1.2	0.5	0.2	1.4	0.5	0.1	0.7	0.6	0.1	1.0	0.5
5200.0	0.2	1.2	0.5	0.2	1.4	0.5	0.1	0.5	0.3	0.1	0.8	0.4
5100.0	0.2	1.3	0.5	0.3	1.5	0.5	0.1	0.9	0.7	0.1	1.1	0.6
5000.0	0.2	1.4	0.5	0.3	1.6	0.5	0.1	0.5	0.3	0.2	0.9	0.4
4900.0	0.3	1.4	0.5	0.3	1.4	0.4	0.1	1.4	1.1	0.1	1.5	0.8
4800.0	0.4	0.9	0.3	0.5	1.0	0.3	0.2	0.4	0.2	0.3	0.7	0.2

River station	100-yr 2-hr Event			100-yr 24-hr Event			100-yr 2-hr Event			100-yr 24-hr Event		
	Pre-Vegetation			Pre-Vegetation			After Reclamation			After Reclamation		
	Depth	Channel Velocity	Froude No.	Depth	Channel Velocity	Froude No.	Depth	Channel Velocity	Froude No.	Depth	Channel Velocity	Froude No.
	(ft)	(ft/s)		(ft)	(ft/s)		(ft)	(ft/s)		(ft)	(ft/s)	
4700.0	0.4	0.8	0.2	0.5	0.9	0.2	0.2	0.3	0.1	0.3	0.6	0.2
4600.0	0.4	0.7	0.2	0.5	0.9	0.2	0.2	0.3	0.1	0.3	0.5	0.2
4500.0	0.4	0.7	0.2	0.5	0.8	0.2	0.2	0.3	0.1	0.3	0.5	0.2
4400.0	0.4	0.7	0.2	0.5	0.8	0.2	0.1	0.2	0.1	0.3	0.4	0.2
4300.0	0.4	0.7	0.2	0.5	0.8	0.2	0.1	0.2	0.1	0.2	0.4	0.2
4200.0	0.4	0.7	0.2	0.4	0.8	0.2	0.1	0.3	0.1	0.2	0.5	0.2
4100.0	0.3	0.7	0.2	0.4	0.8	0.2	0.1	0.3	0.1	0.2	0.5	0.2
4000.0	0.3	0.9	0.3	0.4	1.1	0.3	0.1	0.3	0.2	0.2	0.6	0.2
3900.0	0.1	1.1	0.9	0.2	1.7	1.0	0.1	0.0	0.0	0.2	0.0	0.0
3700.0	0.6	1.7	0.4	0.7	2.0	0.4	0.2	0.7	0.3	0.4	1.2	0.3
3600.0	0.6	1.4	0.3	0.7	1.6	0.4	0.2	0.5	0.2	0.4	0.9	0.3
3500.0	0.5	1.4	0.3	0.6	1.7	0.4	0.2	0.5	0.2	0.4	0.9	0.3
3400.0	0.3	2.6	0.8	0.5	2.4	0.6	0.1	0.8	0.4	0.2	2.2	1.0
3300.0	0.6	1.4	0.3	0.8	1.5	0.3	0.1	1.6	1.0	0.3	1.1	0.3
3200.0	0.8	1.0	0.2	0.9	1.1	0.2	0.3	0.6	0.2	0.6	0.6	0.1
3100.0	0.8	0.9	0.2	1.0	1.0	0.2	0.2	0.6	0.2	0.6	0.5	0.1
3000.0	0.8	0.8	0.2	1.0	0.9	0.2	0.2	0.5	0.2	0.6	0.5	0.1
2900.0	0.8	0.7	0.1	1.0	0.8	0.2	0.1	1.6	1.0	0.6	0.4	0.1
2800.0	1.0	0.5	0.1	1.1	0.7	0.1	0.2	0.6	0.2	0.8	0.3	0.1
2700.0	1.0	0.5	0.1	1.2	0.6	0.1	0.2	0.7	0.3	0.9	0.3	0.1
2600.0	0.9	0.4	0.1	1.0	0.5	0.1	0.2	1.4	0.4	0.8	0.2	0.1
2500.0	1.1	0.4	0.1	1.3	0.5	0.1	0.1	1.0	0.3	0.9	0.2	0.0
2400.0	1.4	0.3	0.1	1.6	0.4	0.1	0.2	1.9	0.7	1.2	0.2	0.0
2300.0	1.1	0.8	0.1	1.3	1.1	0.2	0.3	1.1	0.4	1.3	0.4	0.1
2200.0	1.7	0.8	0.1	1.8	1.0	0.1	0.1	2.2	1.0	1.4	0.3	0.1
2166.0	0.7	1.8	0.2	0.8	2.3	0.3	1.1	1.3	0.2	0.5	0.8	0.1

The flow through the culvert was modeled for the four conditions. Based on the modeling results, the existing culvert will over top Curtis Road during three of the four cases. The maximum depth of water over the road is approximately 0.5 foot. A flow depth of 0.5 foot is compliant with El Paso County regulations for a Type A & B (local/residential) road in which the maximum allowable depth is 6 inches at the street. A full summary of the culvert modeling is provided in Table 4-4 below.

Table 4-4: Culvert Analysis

Model Geometry and Design Storm	Flowrate through Culvert	Flowrate over Road	Upstream Velocity Channel	Max Depth Over Road
	(cfs)	(cfs)	(ft/s)	(ft)
100-year 2-hour Event; Pre-vegetation	54.3	85.9	9.0	0.3
100-year 24-hour Event; Pre-vegetation	56.7	157.1	8.0	0.5
100-year 2-hour Event; After Reclamation	14.2	0.0	5.4	0.0
100-year 24-hour Event; After Reclamation	51.1	4.1	8.7	0.1

Notes:
cfs = cubic feet per second
ft = feet
ft/s = feet per second

5. Summary and Conclusions

The Solberg Pit is located in Peyton, Colorado within El Paso County. Mining at the Site has occurred since 1982 and Pioneer is proposing a 79-acre expansion of contiguous lands to the west. Proposed activities at the Site are limited to the mining of surficial unconsolidated materials and related aggregate processing activities. Materials on the Site are generally excavated to a maximum depth of 35 feet bgs. The Site drainage plan for existing conditions and proposed post-mining reclamation has been developed with the following results:

- The Site is located in the Upper Black Squirrel Subbasin located within the greater Chico Creek drainage basin. The Upper Black Squirrel Subbasin is primarily a rural ranching area, with isolated small clusters of single-family homes.
- During operations and prior to reclamation the existing on-site ponds will collect affected water. In the event one of the ponds overtops, flow will continue into a sediment basin prior to leaving the Site through the existing culvert located in the northeast corner of the Site as shown in the Erosion and Grading plan of Appendix A.
- Unaffected waters will continue to flow on the native ground into the existing unaltered drainages towards the southeast.
- The reclamation drainage plan shows the grading will collect stormwater within the reclaimed pit and direct a majority of flow towards the existing culvert to the northeast. Calculations showed that flow through the culvert has capacity for both the 2-hour 100-year and 24-hour 100-year design storm events. Incidental overflow on the road will be less than 6 inches meeting the El Paso County drainage requirements.
- Following reclamation, a portion of the stormwater previously flowing into the Curtis Road roadside ditch will again be diverted into the ditch. This stormwater prior to mining was reporting to the roadside ditch and as a result there will be net no increase in flow when compared to conditions prior to mining.

This drainage report has been developed for Pioneer Solberg Pit as part of the greater permit submittal package for the expansion of the Pioneer Solberg Quarry. On the basis of the information contained in this document, it is the opinion of the undersigned that the Site drainage plan has been developed to meet the standards required in the Engineering Criteria Manual developed by the County of El Paso.

References

1. El Paso County Drainage Criteria Manual (Volumes 1 and 2) and Engineering Criteria Manual, current editions.

2. Soil Survey of El Paso County Area, Colorado, prepared by United States Department of Agriculture Soil Conservation Service, dated June 1981

3. HEC-RAS River Analysis System User's Manual Version 6.0, US Army Corps of Engineers Hydrologic Engineering Center. May 2021

4. HEC-HMS User's Manual Version 4.9, US Army Corps of Engineers Hydrologic Engineering Center. January 2022

5. South Central Comprehensive Plan, El Paso County Land Use Department. 1988

6. Pikes Peak Area Water Quality Plan Chapter 21 Chico Creek Watershed, Pikes Peak Area Council of Governments. August 2020

7. Chico Creek, Geographics Names Information System, United States Geological Survey. February 2011

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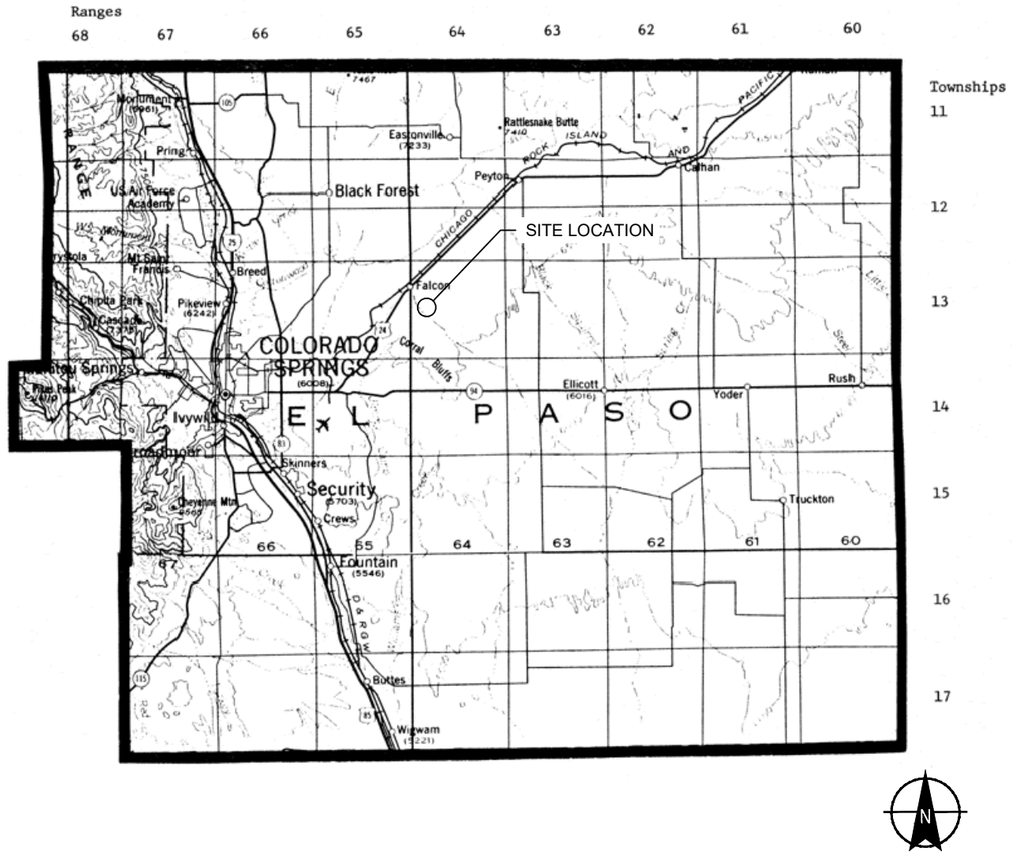
FIGURES



SITE LOCUS
TOPO SOURCE: EL PASO COUNTY MAP FROM COLORADO DIRECTORY (2021)

SITE AERIAL
MAP SOURCE:IMAGE DATED 6 OCTOBER 2019
TAKEN ELECTRONICALLY FROM GOOGLE EARTH PRO.

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SCALE IN FEET

HALEY ALDRICH

SOLBERG PIT SITE GEOLOGY REPORT
PEYTON, COLORADO

SITE LOCATION MAP

SCALE: AS SHOWN
MAY 2022

FIGURE 1

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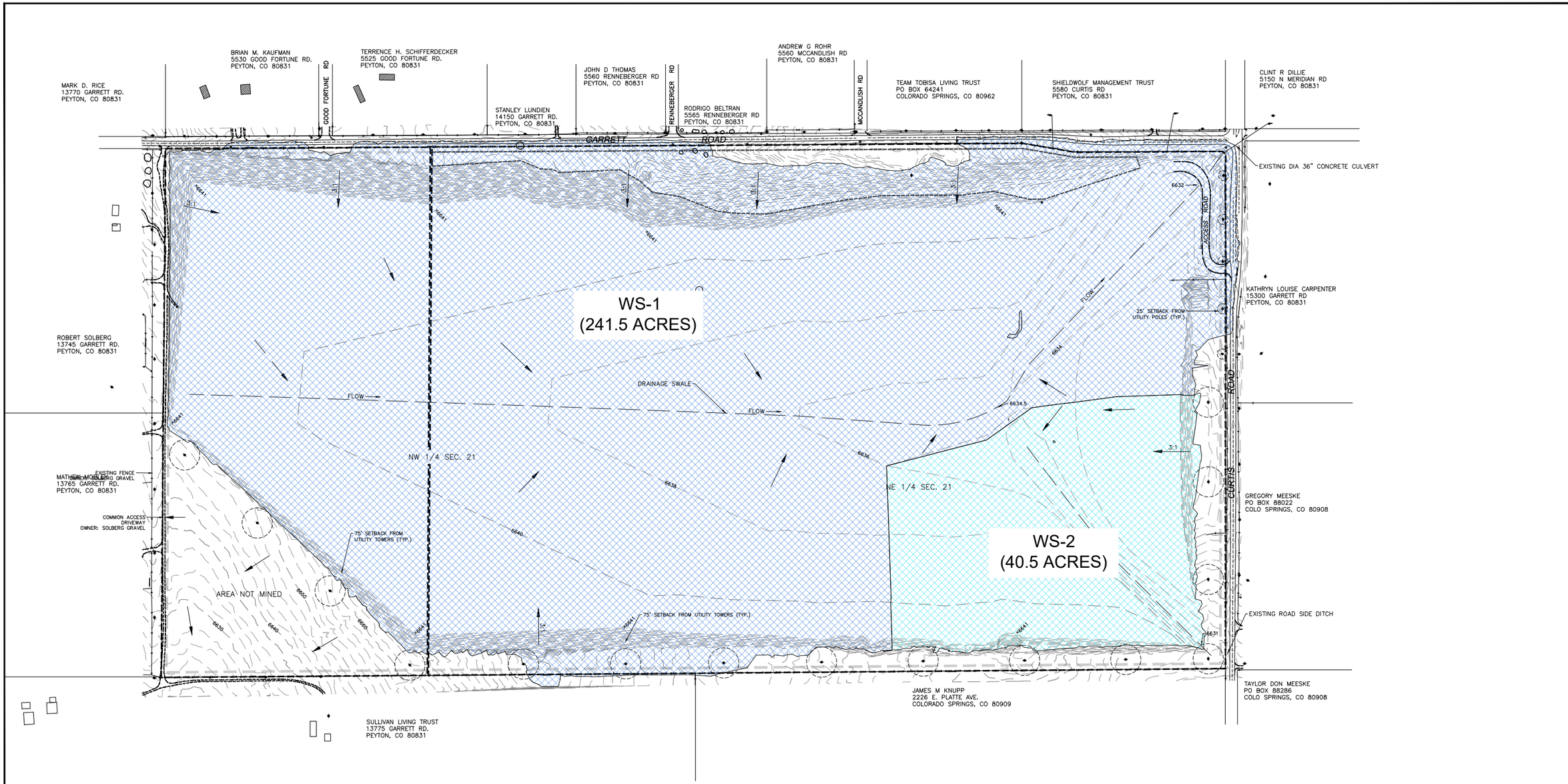
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0204990\CADWORKING\135330-FIG-1.DWG



NOTES

1. GENERAL ARRANGEMENT DEVELOPED FROM MAP AND AUTOCAD FILE MADE IN AMERICA BY LANDMARK MAPPING, LTD.
2. EXISTING VEGETATION AT THE SITE IS LIMITED TO GRASS/WEEDS BEYOND THE EXISTING PIT AND HAS BEEN STRIPPED WITHIN THE PIT BOUNDARY.

LEGEND

- CURRENT PERMIT BOUNDARY (234 ACRES)
- PROPOSED AMENDMENT BOUNDARY (79 ACRES)
- AFFECTED AREA BOUNDARY (305 ACRES)
- PREVIOUSLY RECLAIMED
- EXISTING FENCE
- TRANSMISSION POLES (NEXTERA ENERGY)
- DISTRIBUTION POLES (MOUNTAIN VALLEY ELECTRIC)

N

0 250 500 750 1000

SCALE IN FEET

HALEY ALDRICH

SOLBERG PIT SITE DRAINAGE REPORT
PEYTON, COLORADO

WATERSHED CATCHMENT MAP

SCALE: AS SHOWN
MAY 2022

FIGURE 2

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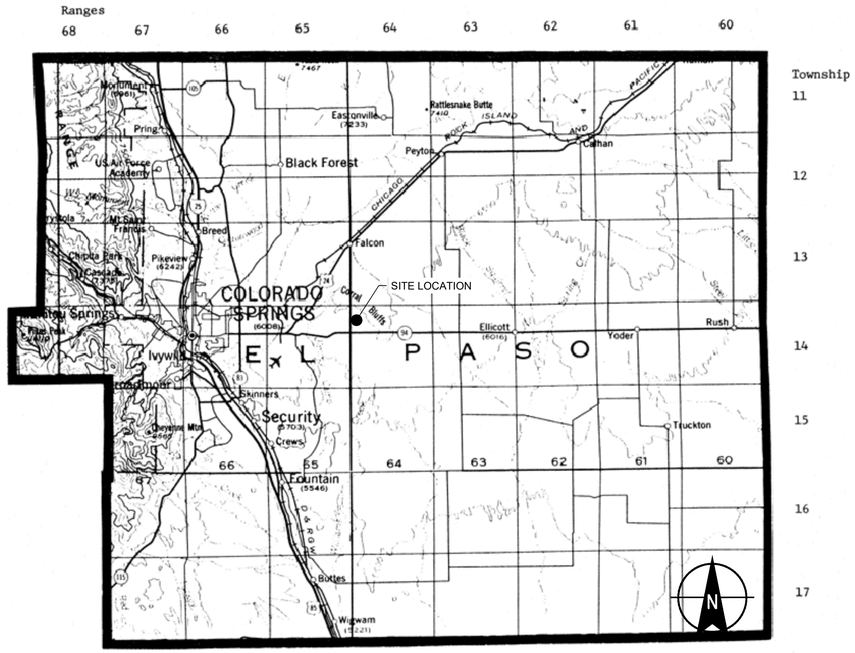
APPENDIX A
Grading and Erosion Plan

PIONEER LANDSCAPING MATERIALS INC.
SOLBERG PIT
PIONEER MATERIALS SOLBERG PIT

13745 GARRETT ROAD
PEYTON, COLORADO 80831



SITE LOCUS
TOPO SOURCE: EL PASO COUNTY MAP FROM COLORADO CEMETERY DIRECTORY (2021)

SITE AERIAL
MAP SOURCE:IMAGE DATED 6 OCTOBER 2019
TAKEN ELECTRONICALLY FROM GOOGLE EARTH PRO.

0 3000 6000 9000 12000
SCALE IN FEET

DRAWING INDEX

SHEET NO.	SHEET TITLE	DESCRIPTION
01	G-100	COVER SHEET
02	G-101	LEGEND & NOTES
03	C-100	EXISTING/INTERIM GENERAL ARRANGEMENT
04	C-101	EXISTING/INTERIM GENERAL ARRANGEMENT (1 OF 4)
05	C-102	EXISTING/INTERIM GENERAL ARRANGEMENT(2 OF 4)
06	C-103	EXISTING/INTERIM GENERAL ARRANGEMENT (3 OF 4)
07	C-104	EXISTING/INTERIM GENERAL ARRANGEMENT (4 OF 4)
08	C-105	FINAL GRADING PLAN
09	C-106	FINAL GRADING PLAN (1 OF 4)
10	C-107	FINAL GRADING PLAN (2 OF 4)
11	C-108	FINAL GRADING PLAN (3 OF 4)
12	C-109	FINAL GRADING PLAN (4 OF 4)
13	C-200	PROPOSED GRADING PROFILES

HALEY & ALDRICH, INC.
8101 E Prentice Ave, Suite 600
Greenwood Village, CO. 80111
Tel: 720-616-4400
www.haleyaldrich.com

Project No.:	0204990
Scale:	SHOWN
Date:	MAY 2022
Drawn By:	CO
Designed By:	CO
Checked By:	CL
Approved By:	ZS

Stamp:
COLORADO LICENSED
ZACHARY J SMITH
60537
05/03/2022
PROFESSIONAL ENGINEER

Rev.	Description	By	Date
0	ISSUE FOR PERMIT	ZS	05/03/22

PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

COVER SHEET

G-100

Sheet: 01 of 13

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SURVEY NOTES:

1. SURVEY HAS BEEN COMPLETED BY RED ROCK LAND SURVEYS, INC. LAND INFORMATION SHOWN IS FROM FIELD OBSERVATION COMPLETED ON JULY 6, 2021.
2. THE LEGAL DESCRIPTION OF THE SITE IS THE WEST ½ OF THE NORTHWEST ¼ OF SECTION 21, TOWNSHIP 13 SOUTH, RANGE 64 WEST OF THE 6TH P.M. IN EL PASO COUNTY, CO.
3. THE MINE ENTRANCE FOR THE SITE WILL REMAIN UNCHANGED FROM CURTIS ROAD IN PEYTON, CO: LONGITUDE 104.553437° W AND LATITUDE 38.909057° N.

EL PASO COUNTY GRADING AND EROSION CONTROL PLAN NOTES:

1. STORMWATER DISCHARGES FROM CONSTRUCTION SITES SHALL NOT CAUSE OR THREATEN TO CAUSE POLLUTION, CONTAMINATION, OR DEGRADATION OF STATE WATERS. ALL WORK AND EARTH DISTURBANCE SHALL BE DONE IN A MANNER THAT MINIMIZES POLLUTION OF ANY ON-SITE OR OFF-SITE WATERS, INCLUDING WETLANDS.
2. NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING.
3. A SEPARATE STORMWATER MANAGEMENT PLAN (SMWP) FOR THIS PROJECT SHALL BE COMPLETED AND AN EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP) ISSUED PRIOR TO COMMENCING CONSTRUCTION. MANAGEMENT OF THE SWMP DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE DESIGNATED QUALIFIED STORMWATER MANAGER OR CERTIFIED EROSION CONTROL INSPECTOR. THE SWMP SHALL BE LOCATED ON SITE AT ALL TIMES DURING CONSTRUCTION AND SHALL BE KEPT UP TO DATE WITH WORK PROGRESS AND CHANGES IN THE FIELD.
4. ONCE THE ESQCP IS APPROVED AND A "NOTICE TO PROCEED" HAS BEEN ISSUED, THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL MEASURES AS INDICATED ON THE APPROVED GEC. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY STAFF.
5. CONTROL MEASURES MUST BE INSTALLED PRIOR TO COMMENCEMENT OF ACTIVITIES THAT COULD CONTRIBUTE POLLUTANTS TO STORMWATER. CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, AND DISTURBED LAND AREAS SHALL BE INSTALLED IMMEDIATELY UPON COMPLETION OF THE DISTURBANCE.
6. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED AND REMAIN IN EFFECTIVE OPERATING CONDITION UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND FINAL STABILIZATION IS ESTABLISHED. ALL PERSONS ENGAGED IN LAND DISTURBANCE ACTIVITIES SHALL ASSESS THE ADEQUACY OF CONTROL MEASURES AT THE SITE AND IDENTIFY IF CHANGES TO THOSE CONTROL MEASURES ARE NEEDED TO ENSURE THE CONTINUED EFFECTIVE PERFORMANCE OF THE CONTROL MEASURES. ALL CHANGES TO TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST BE INCORPORATED INTO THE STORMWATER MANAGEMENT PLAN.
7. TEMPORARY STABILIZATION SHALL BE IMPLEMENTED ON DISTURBED AREAS AND STOCKPILES WHERE GROUND DISTURBING CONSTRUCTION ACTIVITY HAS PERMANENTLY CEASED OR TEMPORARILY CEASED FOR LONGER THAN 14 DAYS.
8. FINAL STABILIZATION MUST BE IMPLEMENTED AT ALL APPLICABLE CONSTRUCTION SITES. FINAL STABILIZATION IS ACHIEVED WHEN ALL GROUND DISTURBING ACTIVITIES ARE COMPLETE AND ALL DISTURBED AREAS EITHER HAVE A UNIFORM VEGETATIVE COVER WITH INDIVIDUAL PLANT DENSITY OF 70 PERCENT OF PRE-DISTURBANCE LEVELS ESTABLISHED OR EQUIVALENT PERMANENT ALTERNATIVE STABILIZATION METHOD IS IMPLEMENTED. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED UPON FINAL STABILIZATION AND BEFORE PERMIT CLOSURE.
9. ALL PERMANENT STORMWATER MANAGEMENT FACILITIES SHALL BE INSTALLED AS DESIGNED IN THE APPROVED PLANS. ANY PROPOSED CHANGES THAT EFFECT THE DESIGN OR FUNCTION OF PERMANENT STORMWATER MANAGEMENT STRUCTURES MUST BE APPROVED BY THE ECM ADMINISTRATOR PRIOR TO IMPLEMENTATION.
10. EARTH DISTURBANCES SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY MINIMIZE ACCELERATED SOIL EROSION AND RESULTING SEDIMENTATION. ALL DISTURBANCES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST PRACTICAL PERIOD OF TIME. PRE-EXISTING VEGETATION SHALL BE PROTECTED AND MAINTAINED WITHIN 50 HORIZONTAL FEET OF A WATERS OF THE STATE UNLESS SHOWN TO BE INFEASIBLE AND SPECIFICALLY REQUESTED AND APPROVED.
11. COMPACTION OF SOIL MUST BE PREVENTED IN AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES OR WHERE FINAL STABILIZATION WILL BE ACHIEVED BY VEGETATIVE COVER. AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES SHALL ALSO BE PROTECTED FROM SEDIMENTATION DURING CONSTRUCTION UNTIL FINAL STABILIZATION IS ACHIEVED. IF COMPACTION PREVENTION IS NOT FEASIBLE DUE TO SITE CONSTRAINTS, ALL AREAS DESIGNATED FOR INFILTRATION AND VEGETATION CONTROL MEASURES MUST BE LOOSENED PRIOR TO INSTALLATION OF THE CONTROL MEASURE(S).
12. ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF STORMWATER AROUND, THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE A STABILIZED CONVEYANCE DESIGNED TO MINIMIZE EROSION AND THE DISCHARGE OF SEDIMENT OFF SITE.
13. CONCRETE WASH WATER SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE SWMP. NO WASH WATER SHALL BE DISCHARGED TO OR ALLOWED TO ENTER STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES. CONCRETE WASHOUTS SHALL NOT BE LOCATED IN AN AREA WHERE SHALLOW GROUNDWATER MAY BE PRESENT, OR WITHIN 50 FEET OF A SURFACE WATER BODY, CREEK OR STREAM.
14. DURING DEWATERING OPERATIONS OF UNCONTAMINATED GROUND WATER MAY BE DISCHARGED ON SITE, BUT SHALL NOT LEAVE THE SITE IN THE FORM OF SURFACE RUNOFF UNLESS AN APPROVED STATE DEWATERING PERMIT IS IN PLACE.
15. EROSION CONTROL BLANKETING OR OTHER PROTECTIVE COVERING SHALL BE USED ON SLOPES STEEPER THAN 3:1.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL WASTES FROM THE CONSTRUCTION SITE FOR DISPOSAL IN ACCORDANCE WITH LOCAL AND STATE REGULATORY REQUIREMENTS. NO CONSTRUCTION DEBRIS, TREE SLASH, BUILDING MATERIAL WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, OR DISCHARGED AT THE SITE.
17. WASTE MATERIALS SHALL NOT BE TEMPORARILY PLACED OR STORED IN THE STREET, ALLEY, OR OTHER PUBLIC WAY, UNLESS IN ACCORDANCE WITH AN APPROVED TRAFFIC CONTROL PLAN. CONTROL MEASURES MAY BE REQUIRED BY EL PASO COUNTY ENGINEERING IF DEEMED NECESSARY, BASED ON SPECIFIC CONDITIONS AND CIRCUMSTANCES.
18. TRACKING OF SOILS AND CONSTRUCTION DEBRIS OFF-SITE SHALL BE MINIMIZED. MATERIALS TRACKED OFF-SITE SHALL BE CLEANED UP AND PROPERLY DISPOSED OF IMMEDIATELY.
19. THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL CONSTRUCTION DEBRIS, DIRT, TRASH, ROCK, SEDIMENT, SOIL, AND SAND THAT MAY ACCUMULATE IN ROADS, STORM DRAINS AND OTHER DRAINAGE CONVEYANCE SYSTEMS AND STORMWATER APPURTENANCES AS A RESULT OF SITE DEVELOPMENT.
20. THE QUANTITY OF MATERIALS STORED ON THE PROJECT SITE SHALL BE LIMITED, AS MUCH AS PRACTICAL, TO THAT QUANTITY REQUIRED TO PERFORM THE WORK IN AN ORDERLY SEQUENCE. ALL MATERIALS STORED ON-SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER, IN THEIR ORIGINAL CONTAINERS, WITH ORIGINAL MANUFACTURER'S LABELS.
21. NO CHEMICAL(S) HAVING THE POTENTIAL TO BE RELEASED IN STORMWATER ARE TO BE STORED OR USED ONSITE UNLESS PERMISSION FOR THE USE OF SUCH CHEMICAL(S) IS GRANTED IN WRITING BY THE ECM ADMINISTRATOR. IN GRANTING APPROVAL FOR THE USE OF SUCH CHEMICAL(S), SPECIAL CONDITIONS AND MONITORING MAY BE REQUIRED.
22. BULK STORAGE OF ALLOWED PETROLEUM PRODUCTS OR OTHER ALLOWED LIQUID CHEMICALS IN EXCESS OF 55 GALLONS SHALL REQUIRE ADEQUATE SECONDARY CONTAINMENT PROTECTION TO CONTAIN ALL SPILLS ONSITE AND TO PREVENT ANY SPILLED MATERIALS FROM ENTERING STATE WATERS, ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR OTHER FACILITIES.
23. NO PERSON SHALL CAUSE THE IMPEDIMENT OF STORMWATER FLOW IN THE CURB AND GUTTER OR DITCH EXCEPT WITH APPROVED SEDIMENT CONTROL MEASURES.
24. OWNER/DEVELOPER AND THEIR AGENTS SHALL COMPLY WITH THE "COLORADO WATER QUALITY CONTROL ACT" (TITLE 25, ARTICLE 8, CRS), AND THE "CLEAN WATER ACT" (33 USC 1344), IN ADDITION TO THE REQUIREMENTS OF THE LAND DEVELOPMENT CODE, DCM VOLUME II AND THE ECM APPENDIX I. ALL APPROPRIATE PERMITS MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION (1041, NPDES, FLOODPLAIN, 404, FUGITIVE DUST, ETC.). IN THE EVENT OF CONFLICTS BETWEEN THESE REQUIREMENTS AND OTHER LAWS, RULES, OR REGULATIONS OF OTHER FEDERAL, STATE, LOCAL, OR COUNTY AGENCIES, THE MOST RESTRICTIVE LAWS, RULES, OR REGULATIONS SHALL APPLY.
25. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE ONLY AT APPROVED CONSTRUCTION ACCESS POINTS.
26. PRIOR TO CONSTRUCTION THE PERMITTEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES.
27. A WATER SOURCE SHALL BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND SHALL BE UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
28. THE SOILS REPORT FOR THIS SITE HAS BEEN PREPARED BY HALEY & ALDRICH INC. AND SHALL BE CONSIDERED A PART OF THESE PLANS.
29. AT LEAST TEN (10) DAYS PRIOR TO THE ANTICIPATED START OF CONSTRUCTION, FOR PROJECTS THAT WILL DISTURB ONE (1) ACRE OR MORE, THE OWNER OR OPERATOR OF CONSTRUCTION ACTIVITY SHALL SUBMIT A PERMIT APPLICATION FOR STORMWATER DISCHARGE TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, WATER QUALITY DIVISION. THE APPLICATION CONTAINS CERTIFICATION OF COMPLETION OF A STORMWATER MANAGEMENT PLAN (SWMP), OF WHICH THIS GRADING AND EROSION CONTROL PLAN MAY BE A PART.FOR INFORMATION OR APPLICATION MATERIALS CONTACT:

    COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT
    WATER QUALITY CONTROL DIVISION
    WQCD - PERMITS
    4300 CHERRY CREEK DRIVE SOUTH DENVER, CO 80246-1530
    ATTN:PERMITS UNIT

This Grading and Erosion Control Plan was prepared under my direction and supervision and is correct to the best of my knowledge and belief. Said Plan has been prepared according to the criteria established by the County for Grading and Erosion Control Plans. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this plan.

Zachary Smith _____ 05/03/2022

Engineer of Record Signature _____ Date

I, the owner/developer have read and will comply with the requirements of the Grading and Erosion Control Plan.

_____ _____

Owner Signature _____ Date

County plan review is provided only for general conformance with County Design Criteria. The County is not responsible for the accuracy and adequacy of the design, dimensions, and/ or elevations which shall be confirmed at the job site. The County through the approval of this document assumes no responsibility for completeness and/ or accuracy of this document.
Filed in accordance with the requirements of the El Paso County Land Development Code, Drainage Criteria Manual Volumes 1 and 2, and Engineering Criteria Manual, as amended.

In accordance with ECM Section 1.12, these construction documents will be valid for construction for a period of 2 years from the date signed by the El Paso County Engineer. If construction has not started within those 2 years, the plans will need to be resubmitted for approval, including payment of review fees at the Planning and Community Development Director's Discretion.

_____ _____

County Project Engineer Signature _____ Date

HALEY ALDRICH

HALEY & ALDRICH, INC.
8101 E Prentice Ave, Suite 600
Greenwood Village, CO. 80111
Tel: 720-616-4400
www.haleyaldrich.com

Project No.:	0204990
Scale:	SHOWN
Date:	MAY 2022
Drawn By:	CO
Designed By:	CO
Checked By:	CL
Approved By:	ZS

Stamp:

COLORADO LICENSED
ZACHARY J SMITH
60537
05/03/2022
PROFESSIONAL ENGINEER

Zachary Smith

Rev.	Description	By	Date
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PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

LEGEND & NOTES

G-101

Sheet: 02 of 13

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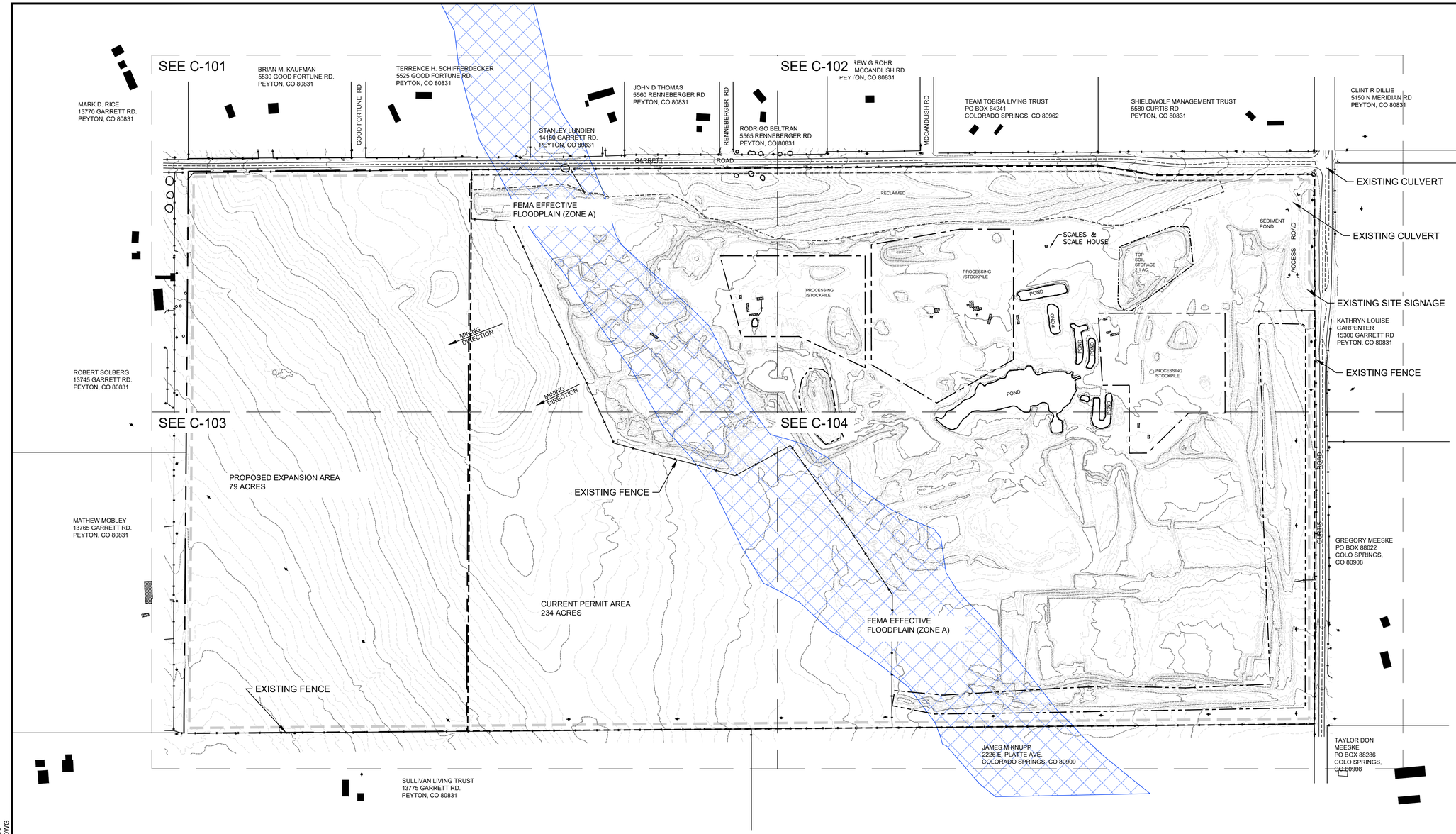

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2. EXISTING VEGETATION AT THE SITE IS LIMITED TO GRASS/WEEDS BEYOND THE EXISTING PIT AND HAS BEEN STRIPPED WITHIN THE PIT BOUNDARY.

LEGEND

- CURRENT PERMIT BOUNDARY (234 ACRES)
- PROPOSED AMENDMENT BOUNDARY (80 ACRES)
- AFFECTED AREA BOUNDARY (305 ACRES)
- PROCESSING / STOCKPILE AREAS (23 ACRES)
- TOP SOIL STOCKPILE
- RECLAIMED AREA (16 ACRES)
- PONDS (3 ACRES APPROX.)
- EXISTING BUILDINGS

- FIRE
- LPOLE
- MANHOLE
- SIGN
- UPOLE
- FENCE
- MISC
- TOWER
- PILE
- CULVERT
- ROCK
- IRRIGATION
- MAILBOX
- TREE
- TRAFFIC
- RIP-RAP
- POLE-ANCHOR

0 250 500 750 1000
SCALE IN FEET

HALEY ALDRICH

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PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

EXISTING/INTERIM GENERAL ARRANGEMENT

C-100

Sheet: 03 of 13

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TERRENCE H. SCHIFFERDECKER
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GOOD FORTUNE RD

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14150 GARRETT RD.
PEYTON, CO 80831

JOHN D THOMAS
5560 RENNEBERGER RD
PEYTON, CO 80831

RENNEBERGER RD

RODRIGO BE
5565 RENNE
PEYTON, CO

GARRETT ROAD

FEMA EFFECTIVE
FLOODPLAIN (ZONE A)

MINING DIRECTION

MINING DIRECTION

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TRAFFIC
RIP-RAP
POLE-ANCHOR

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SCALE IN FEET

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PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

EXISTING/INTERIM GENERAL ARRANGEMENT (1 OF 4)

C-101

Sheet: 04 of 13

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PO BOX 64241
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SHIELDWOLF MANAGEMENT TRUST
5580 CURTIS RD
PEYTON, CO 80831

CLINT R DILLIE
5150 N MERIDIAN
PEYTON, CO 8083

ELTRAN
BERGER RD
80831

RECLAIMED

SCALES &
SCALE HOUSE

SEDIMENT
POND

ACCESS ROAD

TOP
SOIL
STORAGE
2.1 AC.

PROCESSING
/STOCKPILE

PROCESSING
/STOCKPILE

POND

POND

POND

POND

POND

PROCESSING
/STOCKPILE

POND

KATHRYN LOUISE
CARPENTER
15300 GARRETT RD
PEYTON, CO 80831

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- RIP-RAP
- POLE-ANCHOR

N

0 100 200 300 400
SCALE IN FEET

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Tel: 720-616-4400
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PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

EXISTING/INTERIM GENERAL ARRANGEMENT(2 OF 4)

C-102

Sheet: 05 of 13

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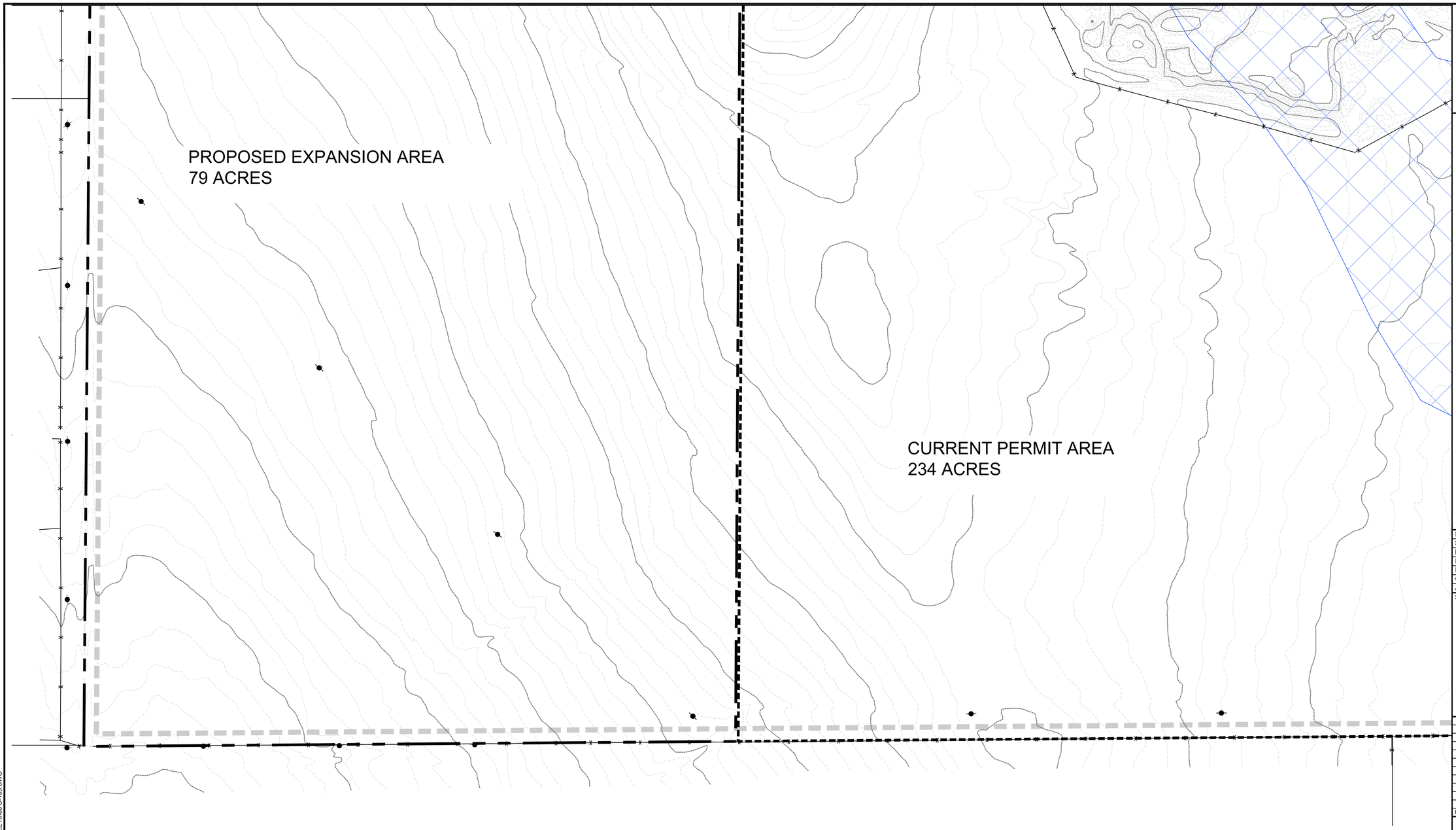

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PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

EXISTING/INTERIM GENERAL ARRANGEMENT (3 OF 4)

C-103

Sheet: 06 of 13

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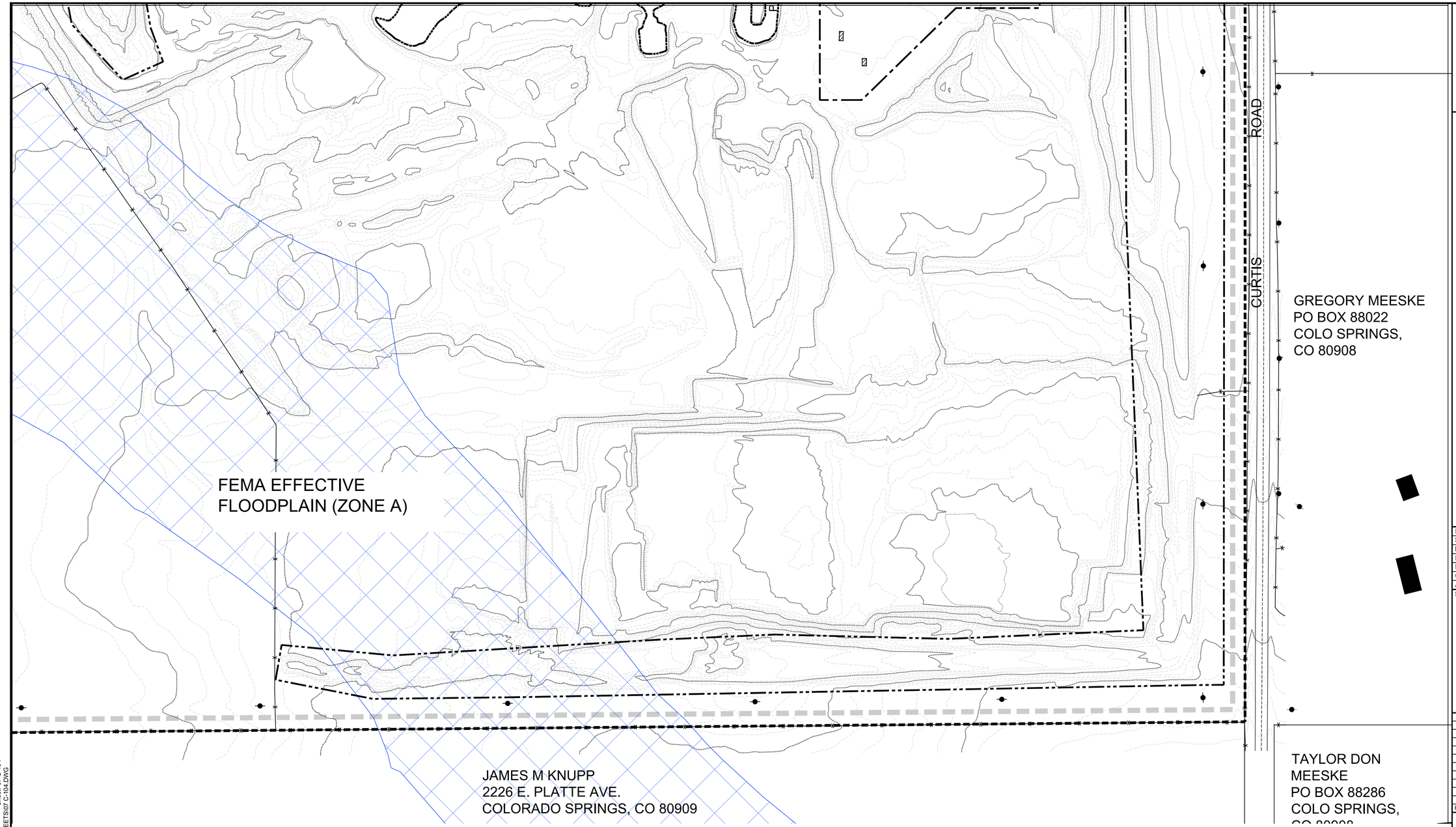

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PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

EXISTING/INTERIM GENERAL ARRANGEMENT (4 OF 4)

C-104

Sheet: 07 of 13

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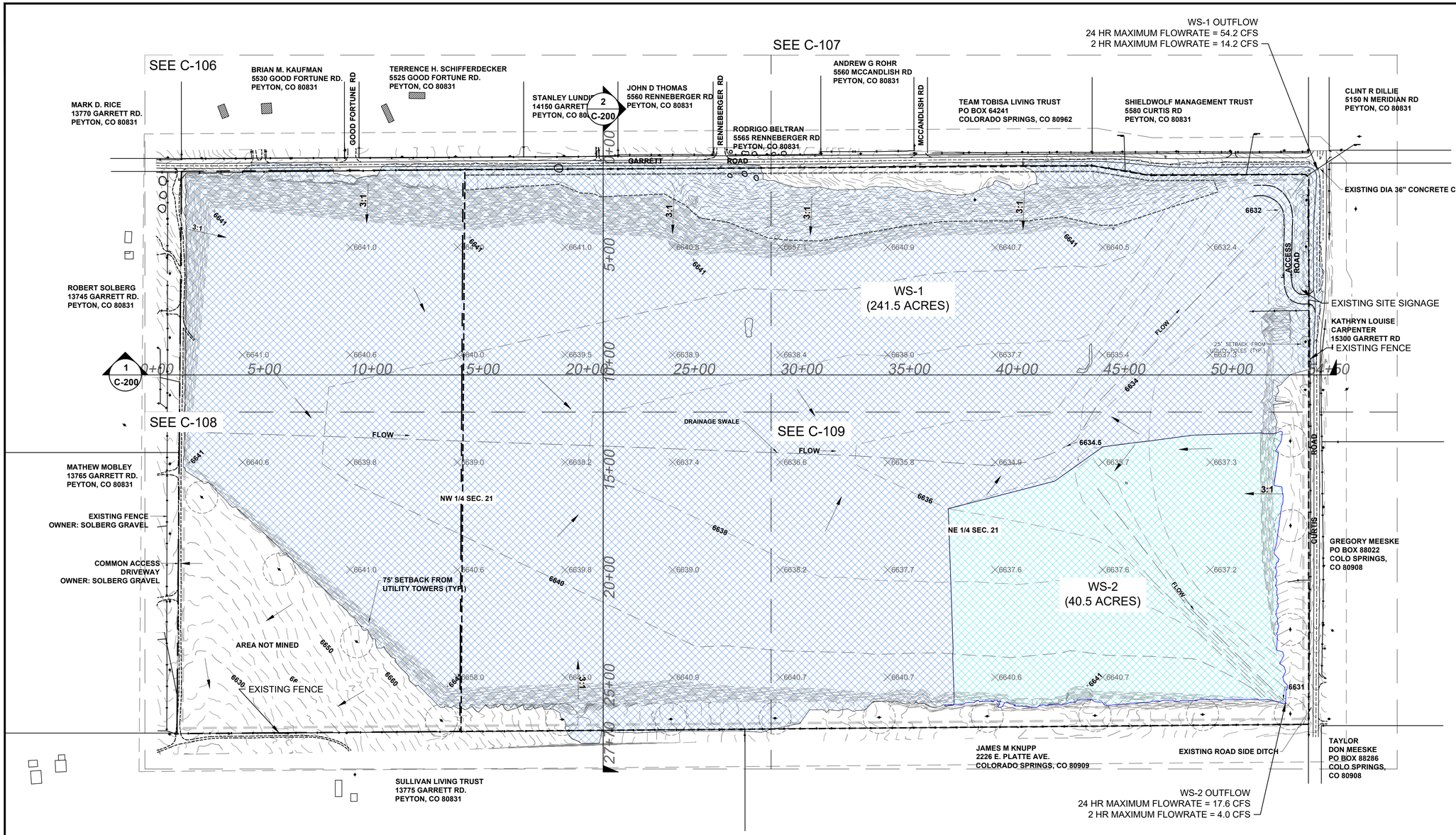

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- DISTRIBUTION POLES (MOUNTAIN VALLEY ELECTRIC)

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www.haleyaldrich.com

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PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

FINAL GRADING PLAN

C-105

Sheet: 08 of 13

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GOOD FORTUNE RD

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PEYTON, CO 80831

STANLEY LUNDIEN
14150 GARRETT RD.
PEYTON, CO 80831

JOHN D THOMAS
5560 RENNEBERGER RD
PEYTON, CO 80831

RENNEBERGER RD

RODRIGO
5565 RENN
PEYTON, C

GARRETT ROAD

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www.haleyaldrich.com

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PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

FINAL GRADING PLAN (1 OF 4)

C-106

Sheet: 09 of 13

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MCCANDLISH RD

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SHIELDWOLF MANAGEMENT TRUST
5580 CURTIS RD
PEYTON, CO 80831

CLINT R DILLIE
5150 N MERIDIA
PEYTON, CO 80

BELTRAN
IEBERGER RD
O 80831

EXISTING DIA 3

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6641

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ACCESS ROAD

FLOW

6634

25' SETBACK FROM
UTILITY POLES (TYP.)

KATHRYN LOUISE
CARPENTER
15300 GARRETT RD
PEYTON, CO 80831

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PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

FINAL GRADING
PLAN (2 OF 4)

C-107

Sheet: 10 of 13

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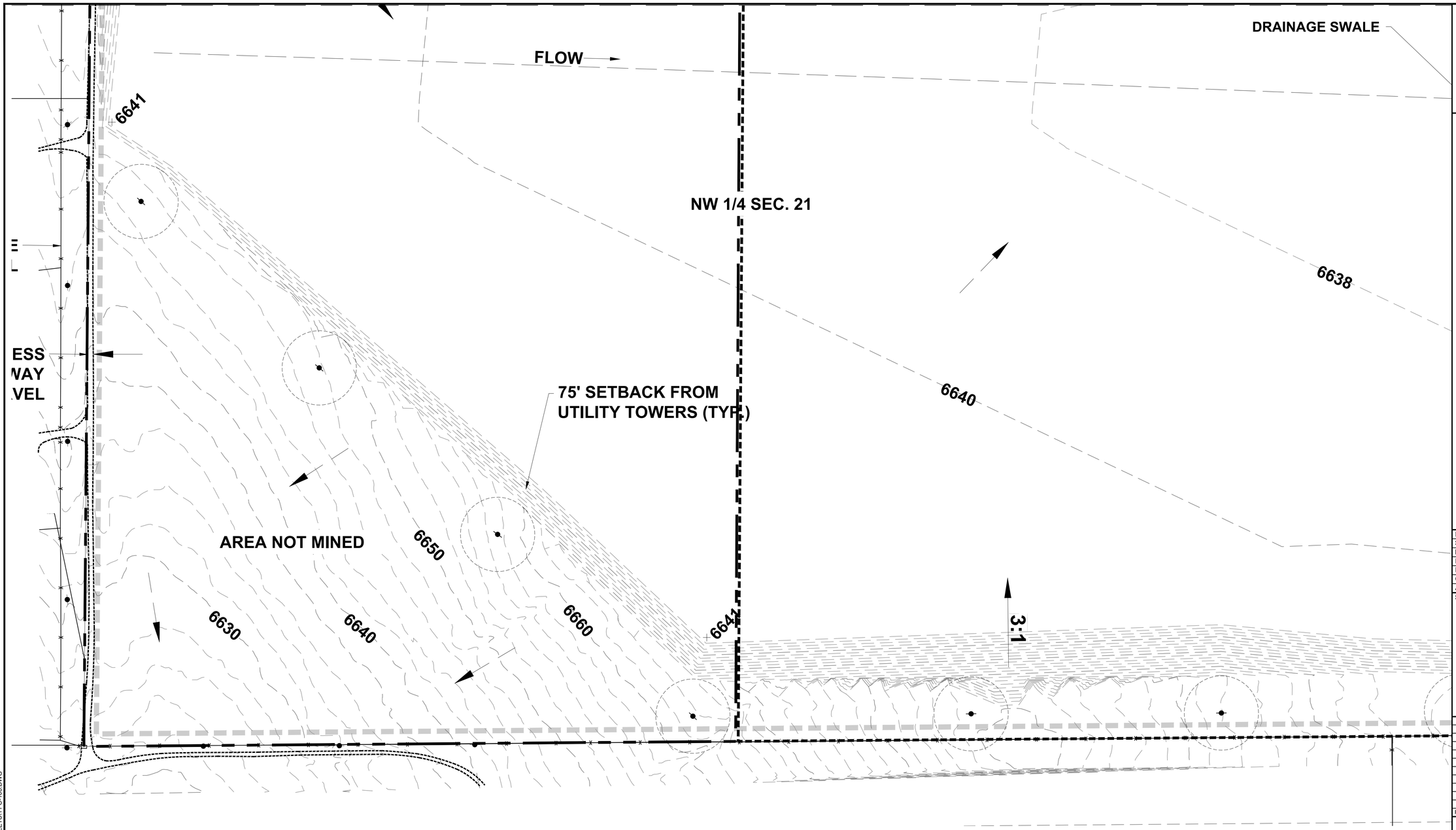

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PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
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FINAL GRADING PLAN (3 OF 4)

C-108

Sheet: 11 of 13

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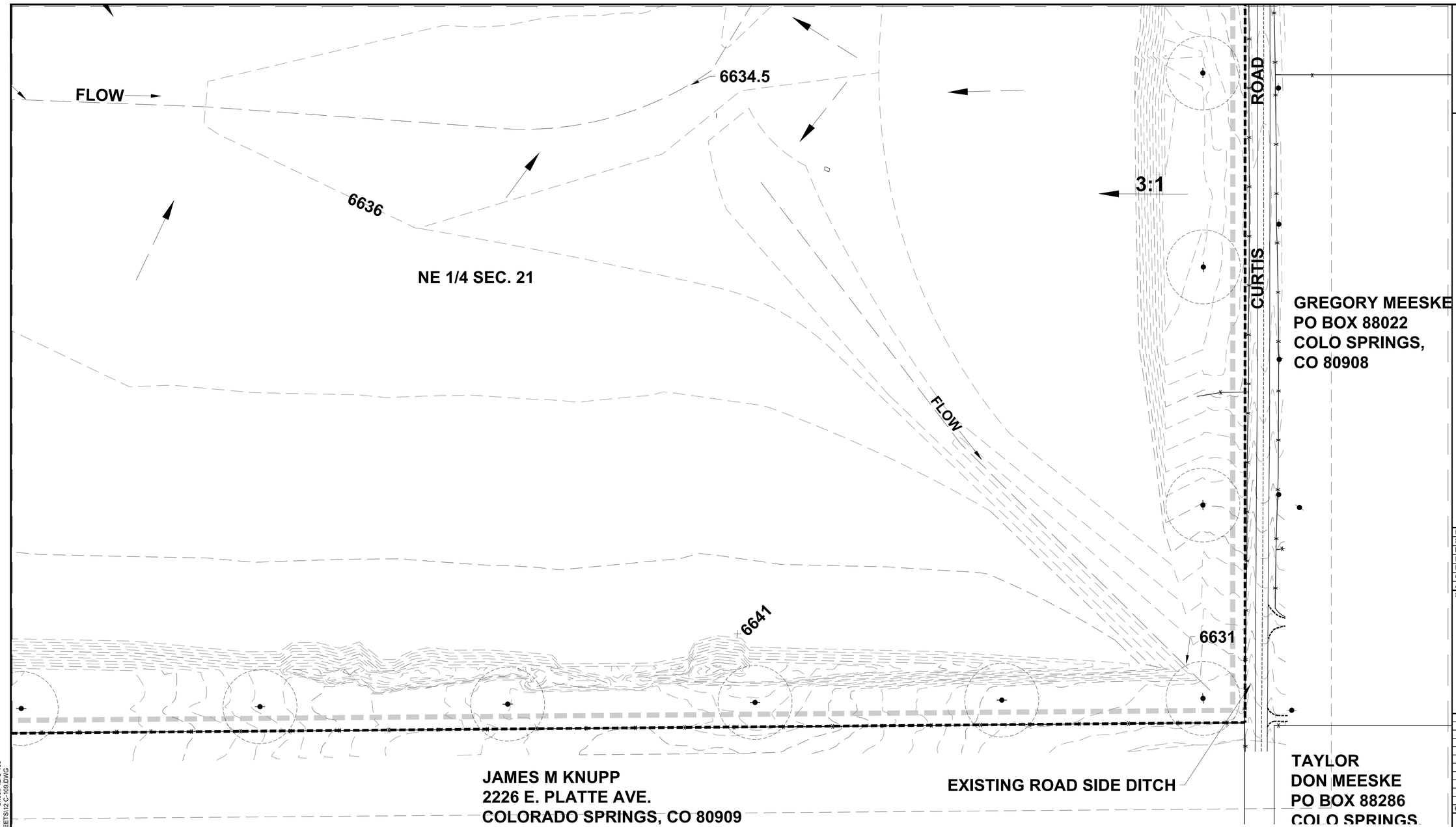

NOTES

1. GENERAL ARRANGEMENT DEVELOPED FROM MAP AND AUTOCAD FILE MADE IN AMERICA BY LANDMARK MAPPING, LTD.
2. EXISTING VEGETATION AT THE SITE IS LIMITED TO GRASS/WEEDS BEYOND THE EXISTING PIT AND HAS BEEN STRIPPED WITHIN THE PIT BOUNDARY.

LEGEND

- CURRENT PERMIT BOUNDARY (234 ACRES)
- PROPOSED AMENDMENT BOUNDARY (79 ACRES)
- AFFECTED AREA BOUNDARY (305 ACRES)
- PREVIOUSLY RECLAIMED
- EXISTING FENCE
- TRANSMISSION POLES (NEXTERA ENERGY)
- DISTRIBUTION POLES (MOUNTAIN VALLEY ELECTRIC)

0 100 200 300 400
SCALE IN FEET

HALEY ALDRICH

HALEY & ALDRICH, INC.
8101 E Prentice Ave, Suite 600
Greenwood Village, CO. 80111
Tel: 720-616-4400
www.haleyaldrich.com

Project No.:	0204990
Scale:	SHOWN
Date:	MAY 2022
Drawn By:	CO
Designed By:	CO
Checked By:	CL
Approved By:	ZS

Stamp:

COLORADO LICENSED
ZACHARY J SMITH
60537
05/03/2022
PROFESSIONAL ENGINEER

Rev.	Description	By	Date
0	ISSUE FOR PERMIT	ZS	05/03/22

PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

FINAL GRADING PLAN (4 OF 4)

C-109

Sheet: 12 of 13

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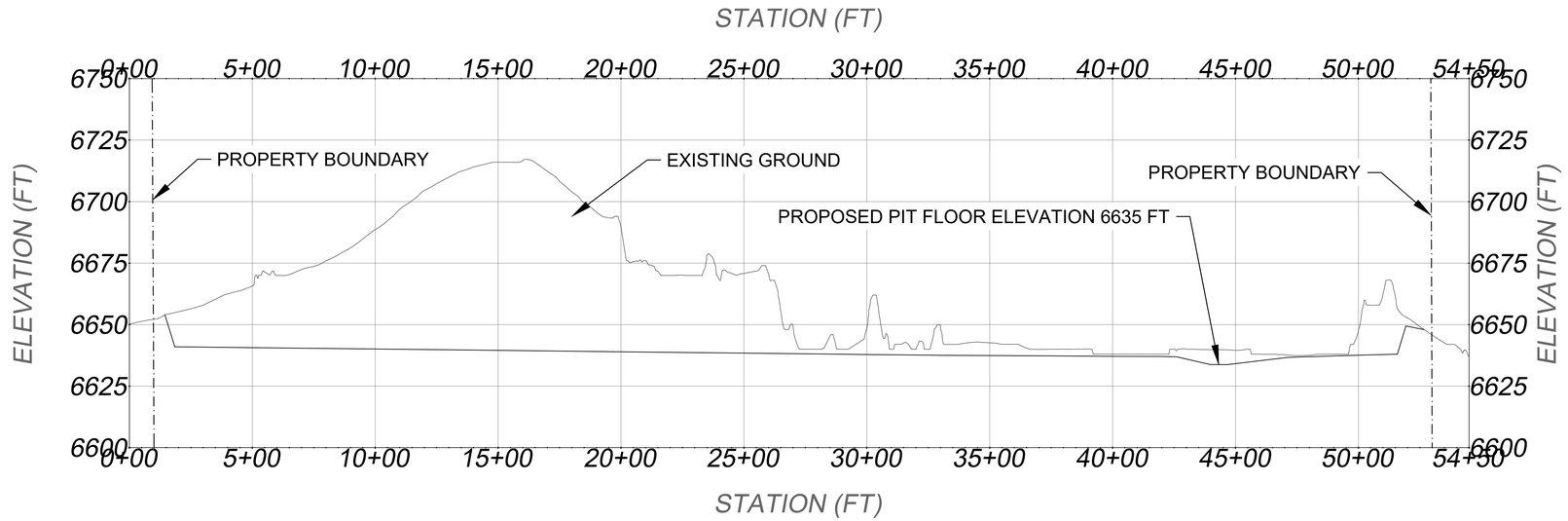
Sheet: 12 C-109

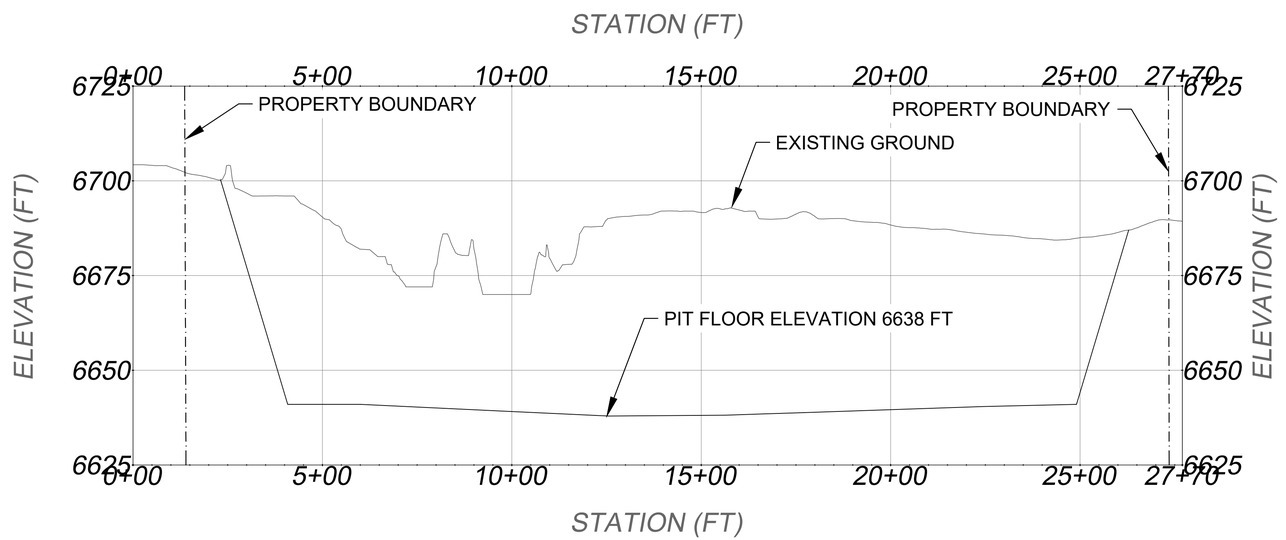


1 / C-101 **WEST TO EAST PROFILE**

SCALE: HORIZ. 0 200 400 600 800

VERT. 0 20 40 60 80

SCALE IN FEET



2 / C-101 **NORTH TO SOUTH PROFILE**

SCALE: HORIZ. 0 200 400 600 800

VERT. 0 20 40 60 80

SCALE IN FEET

LEGEND

- EXISTING GROUND
- PROPOSED PIT
- PROPERTY BOUNDARY

NOTES

1. ELEVATIONS PROVIDED ON THE FIGURE REFERENCE NAVD88.
2. SUB-GRADE SHALL BE PREPARED ON A FIRM SURFACE, REASONABLY EVEN AND SMOOTH, AND FREE OF OFF-SETS, ABRUPT INDENTATIONS, AND PROTRUDING MATERIALS.

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Project No.:	0204990
Scale:	SHOWN
Date:	MAY 2022
Drawn By:	CO
Designed By:	CO
Checked By:	CL
Approved By:	ZS

Stamp:

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ZACHARY J SMITH
60537
05/03/2022
PROFESSIONAL ENGINEER

Rev.	Description	By	Date
0	ISSUE FOR PERMIT	ZS	05/03/22

PIONEER MATERIALS SOLBERG PIT
GRADING AND EROSION PLAN

13745 GARRETT ROAD
PEYTON, COLORADO 80831

PROPOSED GRADING PROFILES

C-200

Sheet: 13 of 13

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APPENDIX B
HEC-HMS Modeling Results

NOAA Atlas 14, Volume 8, Version 2
Location name: Peyton, Colorado, USA*
Latitude: 38.9091°, Longitude: -104.5534°
Elevation: m/ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.239 (0.193-0.299)	0.291 (0.235-0.365)	0.382 (0.307-0.479)	0.462 (0.369-0.582)	0.579 (0.449-0.762)	0.676 (0.511-0.898)	0.777 (0.567-1.06)	0.884 (0.618-1.24)	1.03 (0.695-1.48)	1.15 (0.753-1.67)
10-min	0.350 (0.282-0.438)	0.426 (0.343-0.534)	0.559 (0.449-0.702)	0.676 (0.540-0.853)	0.848 (0.658-1.12)	0.989 (0.748-1.32)	1.14 (0.830-1.55)	1.30 (0.905-1.81)	1.52 (1.02-2.17)	1.69 (1.10-2.44)
15-min	0.426 (0.344-0.534)	0.520 (0.419-0.651)	0.682 (0.547-0.856)	0.825 (0.658-1.04)	1.03 (0.803-1.36)	1.21 (0.912-1.60)	1.39 (1.01-1.89)	1.58 (1.10-2.21)	1.85 (1.24-2.65)	2.06 (1.35-2.98)
30-min	0.615 (0.496-0.769)	0.749 (0.603-0.938)	0.981 (0.787-1.23)	1.19 (0.946-1.49)	1.49 (1.15-1.95)	1.73 (1.31-2.30)	1.99 (1.45-2.70)	2.26 (1.58-3.16)	2.64 (1.78-3.79)	2.95 (1.92-4.26)
60-min	0.791 (0.638-0.990)	0.950 (0.765-1.19)	1.23 (0.990-1.55)	1.49 (1.19-1.88)	1.88 (1.47-2.49)	2.21 (1.68-2.95)	2.56 (1.88-3.50)	2.95 (2.06-4.13)	3.49 (2.35-5.01)	3.92 (2.56-5.68)
2-hr	0.967 (0.786-1.20)	1.15 (0.934-1.43)	1.49 (1.20-1.85)	1.80 (1.45-2.25)	2.28 (1.80-3.01)	2.69 (2.06-3.58)	3.14 (2.32-4.27)	3.63 (2.57-5.06)	4.33 (2.94-6.19)	4.90 (3.22-7.04)
3-hr	1.06 (0.866-1.31)	1.25 (1.02-1.54)	1.60 (1.30-1.99)	1.94 (1.57-2.42)	2.47 (1.96-3.26)	2.94 (2.26-3.90)	3.45 (2.56-4.68)	4.01 (2.86-5.59)	4.83 (3.30-6.90)	5.51 (3.64-7.88)
6-hr	1.22 (1.00-1.50)	1.42 (1.17-1.75)	1.81 (1.48-2.23)	2.20 (1.79-2.72)	2.81 (2.25-3.69)	3.35 (2.61-4.43)	3.95 (2.97-5.35)	4.63 (3.32-6.41)	5.61 (3.87-7.96)	6.42 (4.28-9.13)
12-hr	1.39 (1.15-1.69)	1.62 (1.34-1.98)	2.07 (1.71-2.53)	2.50 (2.05-3.07)	3.18 (2.57-4.14)	3.78 (2.96-4.95)	4.44 (3.35-5.94)	5.17 (3.74-7.10)	6.23 (4.33-8.77)	7.10 (4.77-10.0)
24-hr	1.59 (1.32-1.91)	1.86 (1.55-2.25)	2.37 (1.97-2.87)	2.85 (2.35-3.46)	3.58 (2.90-4.60)	4.21 (3.32-5.46)	4.90 (3.73-6.50)	5.66 (4.12-7.70)	6.74 (4.72-9.42)	7.63 (5.17-10.7)
2-day	1.83 (1.54-2.19)	2.15 (1.80-2.57)	2.72 (2.28-3.27)	3.24 (2.70-3.91)	4.03 (3.28-5.11)	4.70 (3.72-6.02)	5.42 (4.14-7.11)	6.20 (4.55-8.35)	7.31 (5.15-10.1)	8.20 (5.61-11.4)
3-day	2.00 (1.69-2.38)	2.35 (1.99-2.80)	2.97 (2.50-3.55)	3.54 (2.96-4.25)	4.38 (3.57-5.51)	5.08 (4.04-6.47)	5.83 (4.48-7.61)	6.64 (4.89-8.90)	7.79 (5.51-10.7)	8.71 (5.98-12.1)
4-day	2.15 (1.82-2.55)	2.52 (2.13-2.99)	3.17 (2.68-3.78)	3.76 (3.16-4.50)	4.64 (3.80-5.82)	5.37 (4.29-6.81)	6.15 (4.74-7.99)	6.99 (5.16-9.33)	8.17 (5.80-11.2)	9.12 (6.29-12.6)
7-day	2.55 (2.17-3.00)	2.94 (2.51-3.47)	3.64 (3.10-4.31)	4.28 (3.61-5.08)	5.22 (4.30-6.49)	6.00 (4.81-7.55)	6.83 (5.29-8.81)	7.72 (5.74-10.2)	8.98 (6.42-12.3)	9.99 (6.94-13.8)
10-day	2.89 (2.48-3.39)	3.32 (2.85-3.91)	4.08 (3.48-4.81)	4.76 (4.04-5.63)	5.76 (4.76-7.12)	6.58 (5.30-8.24)	7.46 (5.80-9.57)	8.39 (6.26-11.1)	9.70 (6.96-13.2)	10.7 (7.49-14.8)
20-day	3.83 (3.31-4.46)	4.43 (3.82-5.16)	5.43 (4.67-6.35)	6.29 (5.38-7.38)	7.50 (6.22-9.13)	8.46 (6.85-10.5)	9.45 (7.40-12.0)	10.5 (7.87-13.7)	11.9 (8.58-16.0)	13.0 (9.12-17.7)
30-day	4.60 (4.00-5.34)	5.33 (4.63-6.19)	6.53 (5.64-7.60)	7.53 (6.47-8.80)	8.90 (7.39-10.7)	9.96 (8.09-12.2)	11.0 (8.65-13.9)	12.1 (9.12-15.7)	13.5 (9.81-18.1)	14.6 (10.3-19.9)
45-day	5.58 (4.87-6.44)	6.46 (5.63-7.46)	7.86 (6.83-9.10)	9.00 (7.77-10.5)	10.5 (8.76-12.6)	11.7 (9.52-14.2)	12.8 (10.1-16.0)	13.9 (10.5-17.9)	15.4 (11.2-20.4)	16.4 (11.7-22.2)
60-day	6.43 (5.62-7.39)	7.40 (6.47-8.51)	8.94 (7.79-10.3)	10.2 (8.81-11.8)	11.8 (9.85-14.0)	13.0 (10.6-15.7)	14.2 (11.2-17.6)	15.3 (11.6-19.6)	16.7 (12.2-22.1)	17.8 (12.7-24.0)

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

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

Please refer to NOAA Atlas 14 document for more information.

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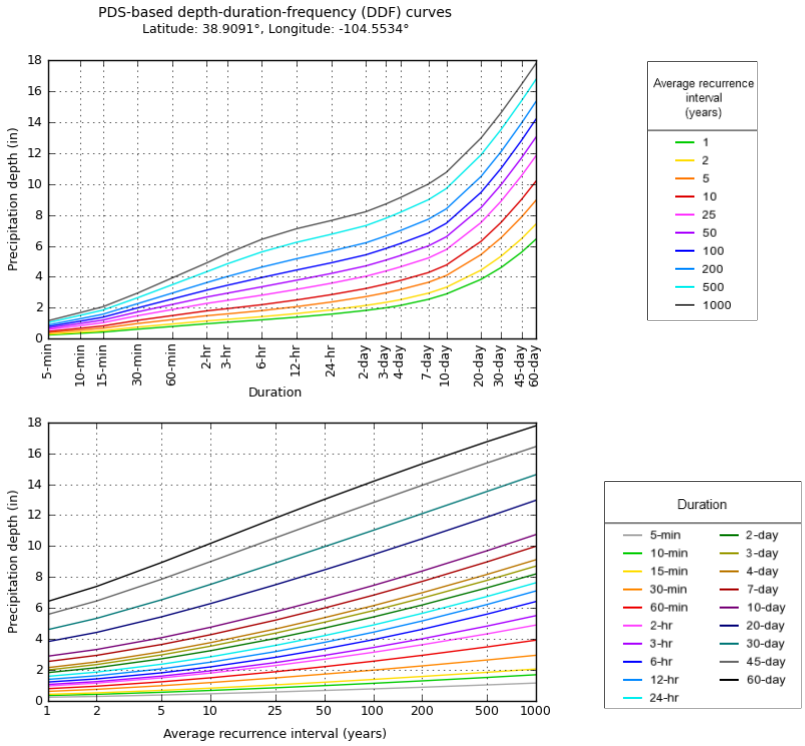
PF graphical



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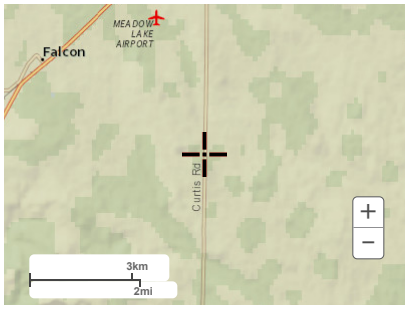
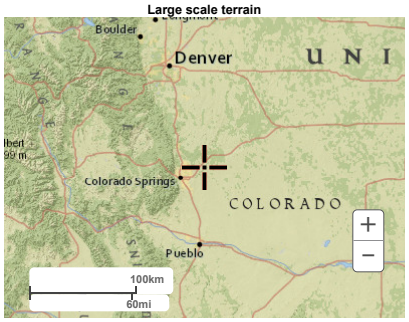
Maps & aerials

Small scale terrain



Large scale terrain



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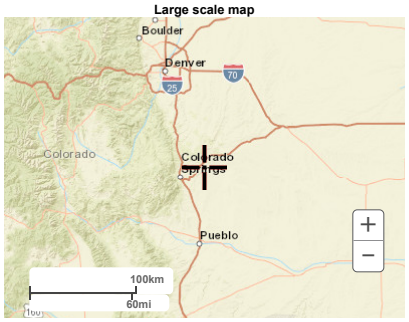
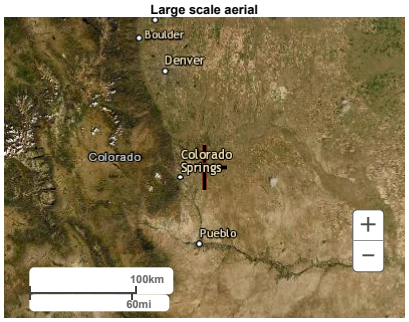


Large scale aerial



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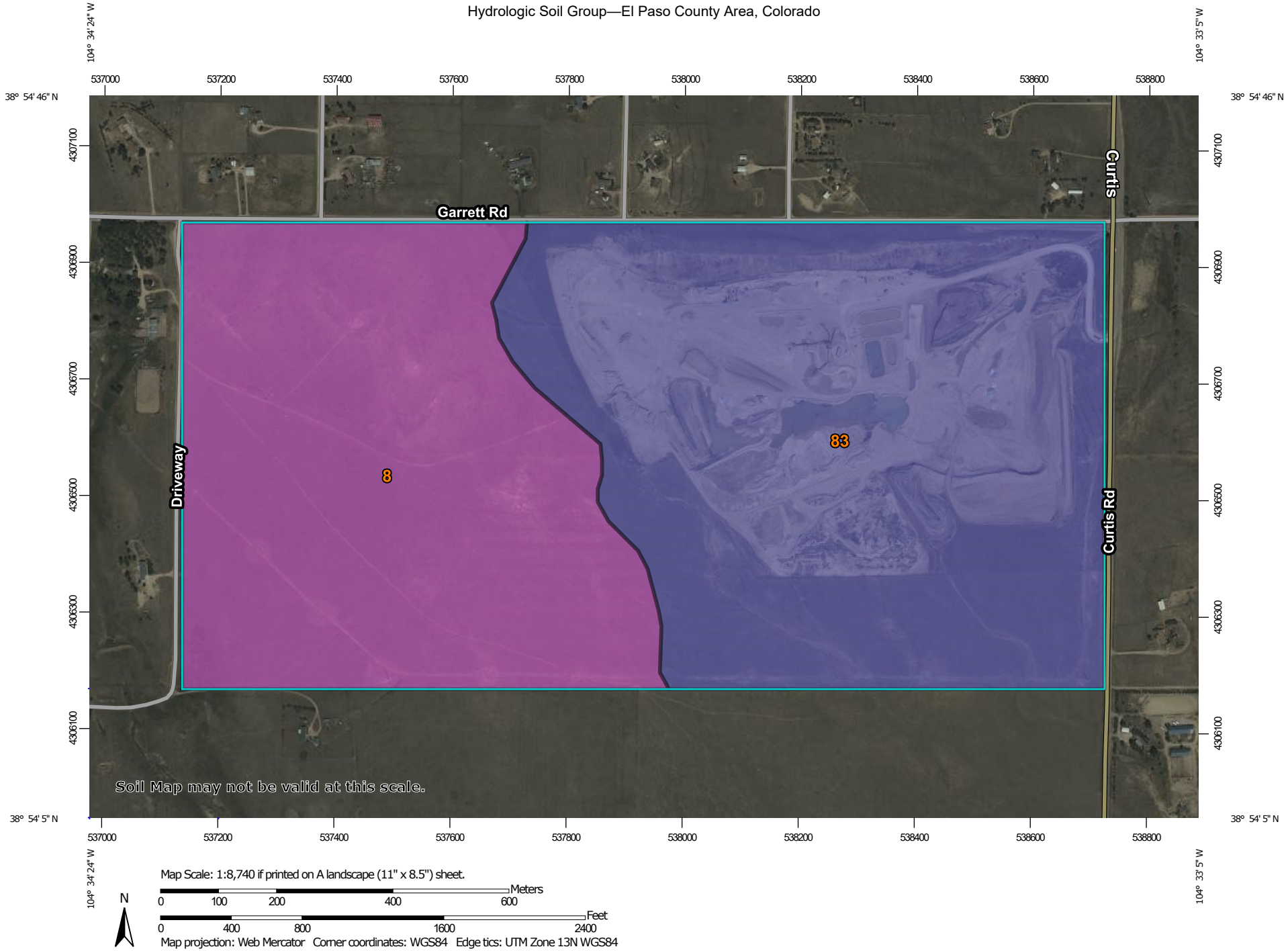
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer


104° 34' 24" W
104° 33' 5" W
38° 54' 46" N
38° 54' 5" N
537000
537200
537400
537600
537800
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538400
538600
538800
4307100
4306900
4306700
4306500
4306300
4306100
Garrett Rd
Curtis
Curtis Rd
Driveway
8
83
Soil Map may not be valid at this scale.
N
Map Scale: 1:8,740 if printed on A landscape (11" x 8.5") sheet.
Meters
0 100 200 400 600
Feet
0 400 800 1600 2400
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 19, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 11, 2018—Oct 20, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	137.0	43.4%
83	Stapleton sandy loam, 3 to 8 percent slopes	B	178.7	56.6%
Totals for Area of Interest			**315.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

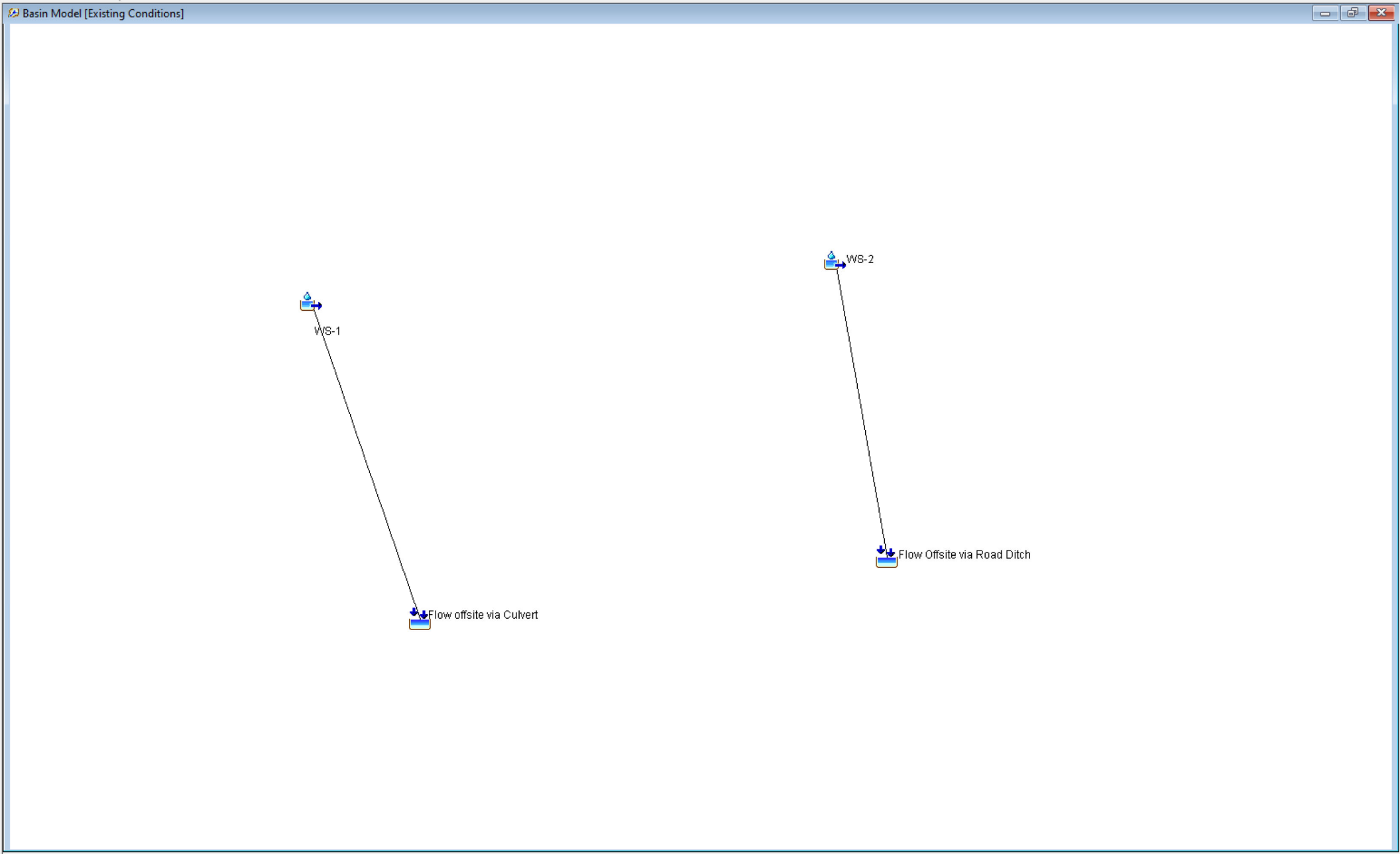
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher


Basin Model [Existing Conditions]
WS-1
Flow offsite via Culvert
WS-2
Flow Offsite via Road Ditch

100-YEAR 2-HOUR EXISTING CONDITIONS

Global Summary Results for Run "2-hr 100-yr"

Project: Solberg Simulation Run: 2-hr 100-yr

Start of Run: 23Feb2022, 00:00
End of Run: 23Feb2022, 03:00
Compute Time: 22Mar2022, 15:41:43

Basin Model: Existing Conditions
Meteorologic Model: 100-year 2-hr event
Control Specifications: 2-hr storm event

Show Elements: All Elements Volume Units: (•) IN ( ) AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
WS-2	0.06	46.0	23Feb2022, 00:50	0.73
Flow Offsite via Road Ditch	0.06	46.0	23Feb2022, 00:45	0.73
WS-1	0.38	140.2	23Feb2022, 01:25	0.70
Flow offsite via Culvert	0.38	140.2	23Feb2022, 01:20	0.70

Global Summary Results for Run "2-hr 100-yr"

Project: Solberg Simulation Run: 2-hr 100-yr

Start of Run: 23Feb2022, 00:00
End of Run: 23Feb2022, 03:00
Compute Time: 22Mar2022, 15:41:43

Basin Model: Existing Conditions
Meteorologic Model: 100-year 2-hr event
Control Specifications: 2-hr storm event

Show Elements: All Elements Volume Units: IN AC-FT Sorting: Hydrologic

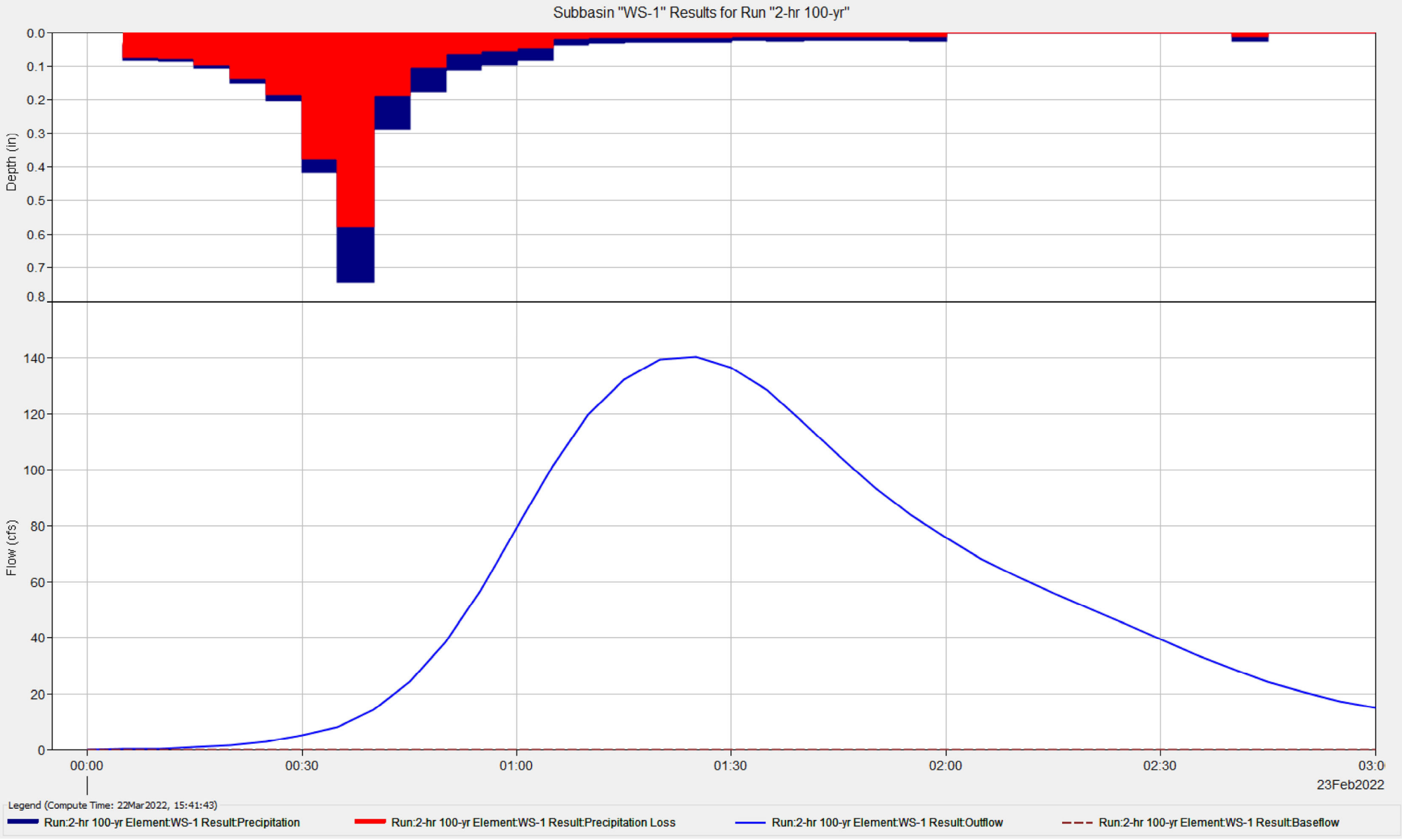
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WS-2	0.06	46.0	23Feb2022, 00:50	2.3
Flow Offsite via Road Ditch	0.06	46.0	23Feb2022, 00:45	2.3
WS-1	0.38	140.2	23Feb2022, 01:25	14.2
Flow offsite via Culvert	0.38	140.2	23Feb2022, 01:20	14.2

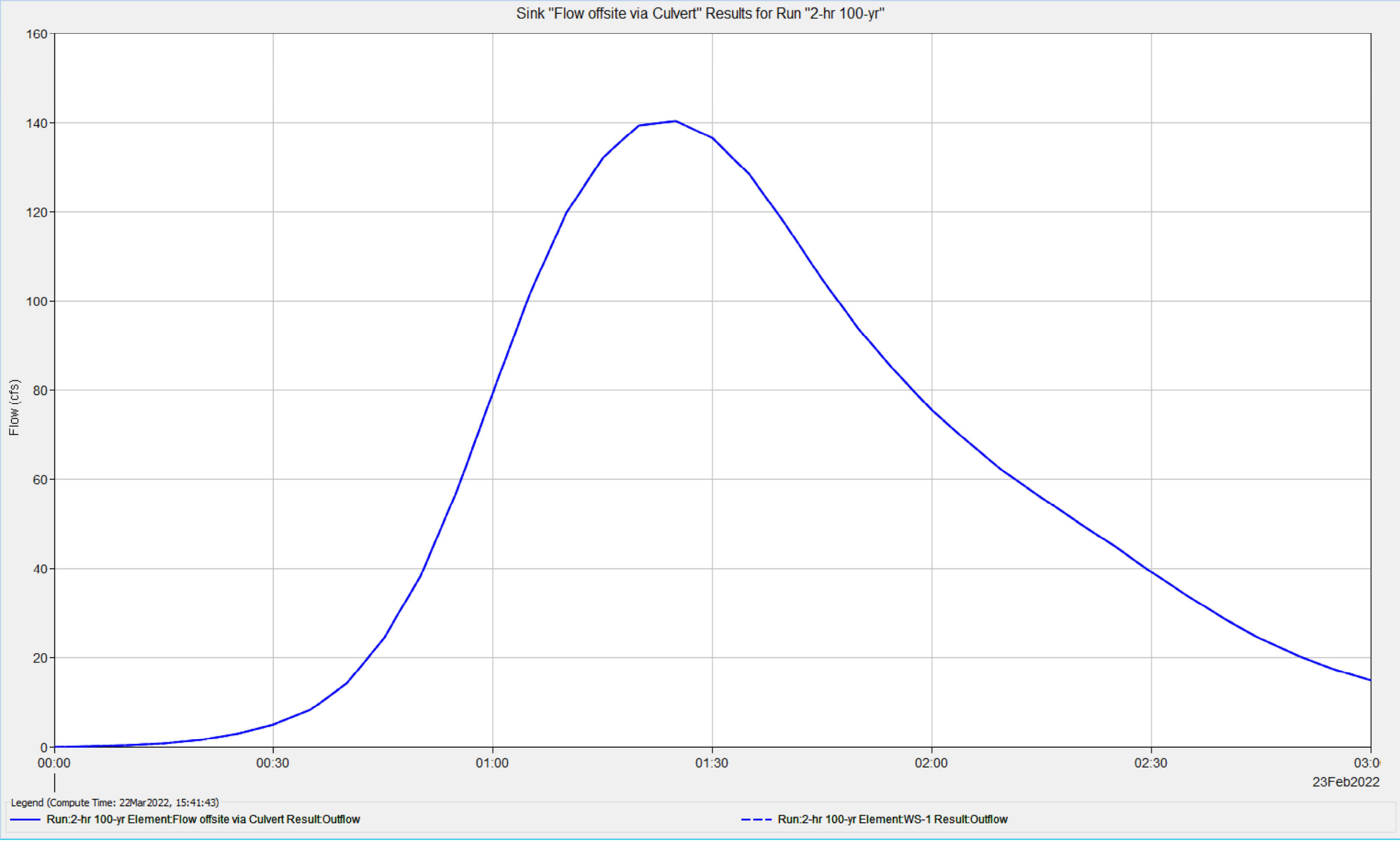
Time-Series Results for Subbasin "WS-1"

Project: Solberg Simulation Run: 2-hr 100-yr
Subbasin: WS-1

Start of Run: 23Feb2022, 00:00 Basin Model: Existing Conditions
End of Run: 23Feb2022, 03:00 Meteorologic Model: 100-year 2-hr event
Compute Time: 22Mar2022, 15:41:43 Control Specifications: 2-hr storm event

Date	Time	Precip (IN)	Loss (IN)	Excess (IN)	Direct Flow (CFS)	Baseflow (CFS)	Total Flow (CFS)
23Feb2022	00:00				0.0	0.0	0.0
23Feb2022	00:05	0.04	0.03	0.00	0.0	0.0	0.0
23Feb2022	00:10	0.08	0.07	0.01	0.2	0.0	0.2
23Feb2022	00:15	0.08	0.08	0.01	0.7	0.0	0.7
23Feb2022	00:20	0.10	0.09	0.01	1.5	0.0	1.5
23Feb2022	00:25	0.15	0.14	0.02	2.9	0.0	2.9
23Feb2022	00:30	0.20	0.18	0.02	5.1	0.0	5.1
23Feb2022	00:35	0.42	0.38	0.04	8.2	0.0	8.2
23Feb2022	00:40	0.74	0.58	0.17	14.2	0.0	14.2
23Feb2022	00:45	0.29	0.18	0.10	24.2	0.0	24.2
23Feb2022	00:50	0.17	0.10	0.07	38.3	0.0	38.3
23Feb2022	00:55	0.11	0.06	0.05	57.0	0.0	57.0
23Feb2022	01:00	0.09	0.05	0.04	79.5	0.0	79.5
23Feb2022	01:05	0.08	0.04	0.04	101.5	0.0	101.5
23Feb2022	01:10	0.04	0.02	0.02	119.7	0.0	119.7
23Feb2022	01:15	0.03	0.02	0.01	132.2	0.0	132.2
23Feb2022	01:20	0.03	0.01	0.01	139.3	0.0	139.3
23Feb2022	01:25	0.03	0.01	0.01	140.2	0.0	140.2
23Feb2022	01:30	0.03	0.01	0.01	136.4	0.0	136.4
23Feb2022	01:35	0.02	0.01	0.01	128.4	0.0	128.4
23Feb2022	01:40	0.03	0.01	0.01	117.0	0.0	117.0
23Feb2022	01:45	0.02	0.01	0.01	104.9	0.0	104.9
23Feb2022	01:50	0.02	0.01	0.01	93.9	0.0	93.9
23Feb2022	01:55	0.02	0.01	0.01	84.0	0.0	84.0
23Feb2022	02:00	0.03	0.01	0.01	75.6	0.0	75.6
23Feb2022	02:05	0.00	0.00	0.00	68.2	0.0	68.2
23Feb2022	02:10	0.00	0.00	0.00	61.7	0.0	61.7
23Feb2022	02:15	0.00	0.00	0.00	55.9	0.0	55.9
23Feb2022	02:20	0.00	0.00	0.00	50.4	0.0	50.4
23Feb2022	02:25	0.00	0.00	0.00	44.9	0.0	44.9
23Feb2022	02:30	0.00	0.00	0.00	39.3	0.0	39.3
23Feb2022	02:35	0.00	0.00	0.00	33.9	0.0	33.9
23Feb2022	02:40	0.00	0.00	0.00	28.8	0.0	28.8
23Feb2022	02:45	0.03	0.01	0.01	24.3	0.0	24.3
23Feb2022	02:50	0.00	0.00	0.00	20.5	0.0	20.5
23Feb2022	02:55	0.00	0.00	0.00	17.3	0.0	17.3
23Feb2022	03:00	0.00	0.00	0.00	14.9	0.0	14.9


Subbasin "WS-1" Results for Run "2-hr 100-yr"
Depth (in)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Flow (cfs)
140
120
100
80
60
40
20
0
00:00
00:30
01:00
01:30
02:00
02:30
03:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:41:43)
Run:2-hr 100-yr Element:WS-1 Result:Precipitation
Run:2-hr 100-yr Element:WS-1 Result:Precipitation Loss
Run:2-hr 100-yr Element:WS-1 Result:Outflow
Run:2-hr 100-yr Element:WS-1 Result:Baseflow

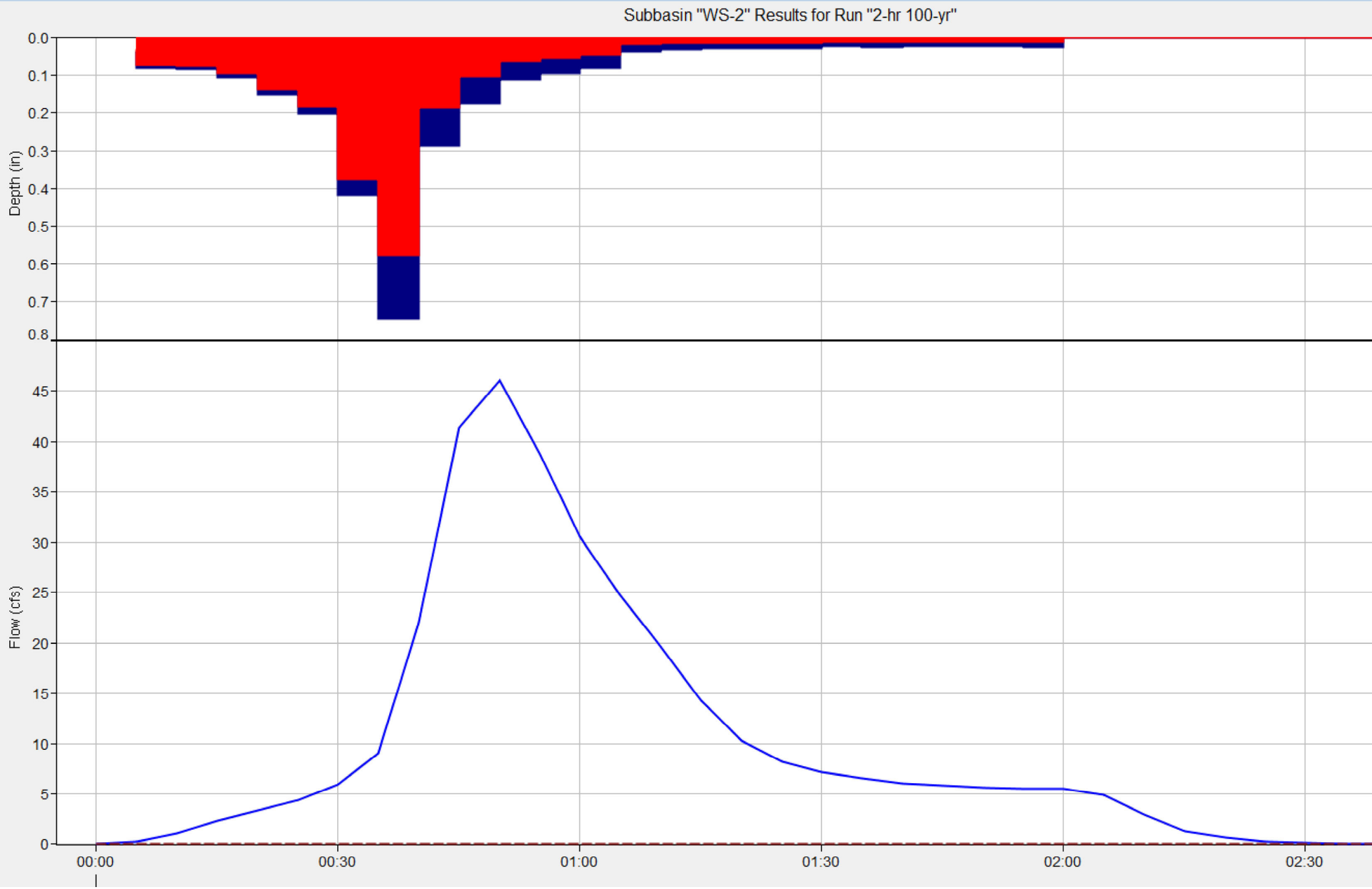

Sink "Flow offsite via Culvert" Results for Run "2-hr 100-yr"
Flow (cfs)
160
140
120
100
80
60
40
20
0
00:00
00:30
01:00
01:30
02:00
02:30
03:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:41:43)
Run:2-hr 100-yr Element:Flow offsite via Culvert Result:Outflow
Run:2-hr 100-yr Element:WS-1 Result:Outflow

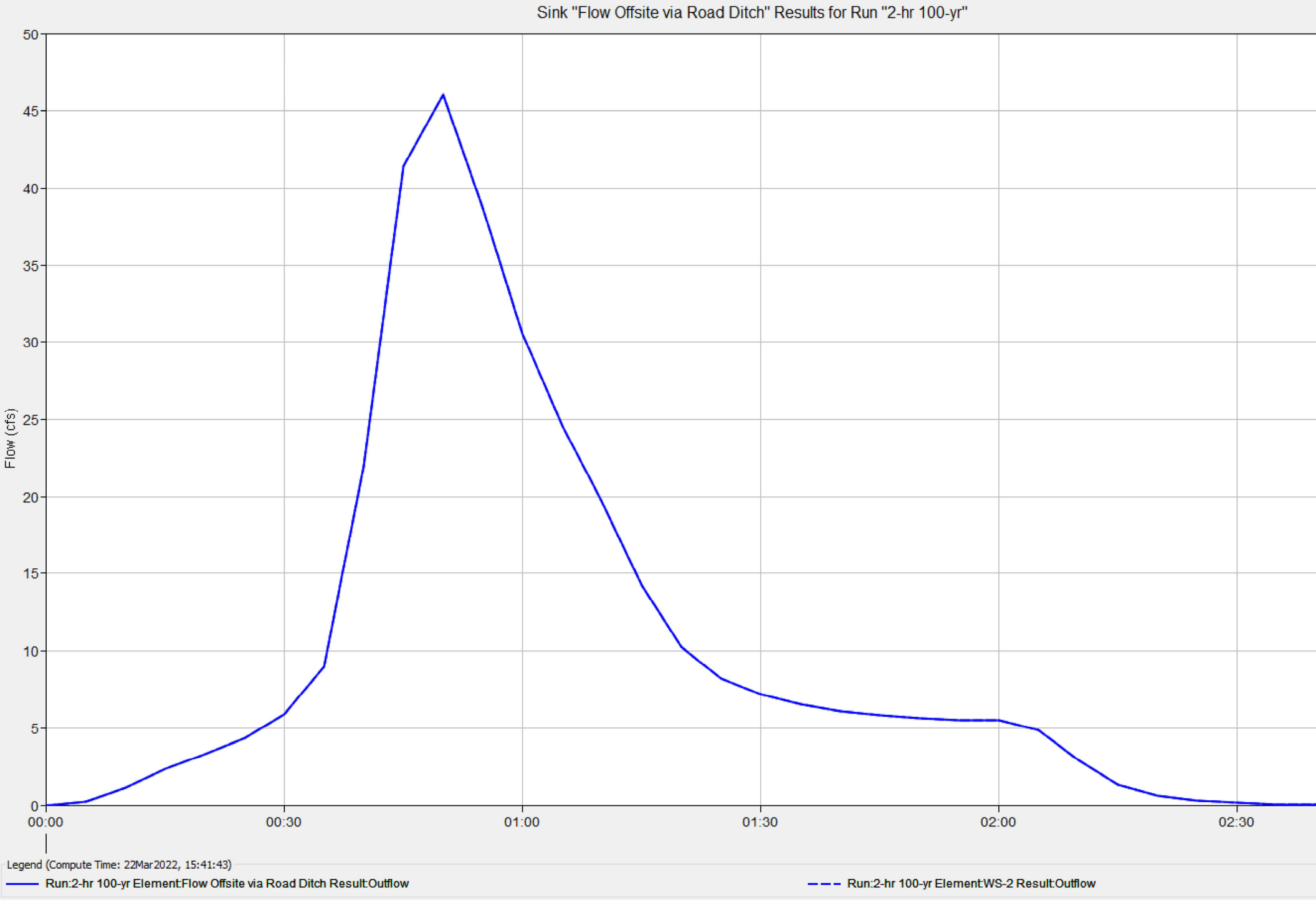
Time-Series Results for Subbasin "WS-2"

Project: Solberg Simulation Run: 2-hr 100-yr
Subbasin: WS-2

Start of Run: 23Feb2022, 00:00 Basin Model: Existing Conditions
End of Run: 23Feb2022, 03:00 Meteorologic Model: 100-year 2-hr event
Compute Time: 22Mar2022, 15:41:43 Control Specifications: 2-hr storm event

Date	Time	Precip (IN)	Loss (IN)	Excess (IN)	Direct Flow (CFS)	Baseflow (CFS)	Total Flow (CFS)
23Feb2022	00:00				0.0	0.0	0.0
23Feb2022	00:05	0.04	0.03	0.00	0.2	0.0	0.2
23Feb2022	00:10	0.08	0.07	0.01	1.1	0.0	1.1
23Feb2022	00:15	0.08	0.08	0.01	2.3	0.0	2.3
23Feb2022	00:20	0.10	0.09	0.01	3.3	0.0	3.3
23Feb2022	00:25	0.15	0.14	0.02	4.4	0.0	4.4
23Feb2022	00:30	0.20	0.18	0.02	5.9	0.0	5.9
23Feb2022	00:35	0.42	0.38	0.04	9.0	0.0	9.0
23Feb2022	00:40	0.74	0.58	0.17	22.0	0.0	22.0
23Feb2022	00:45	0.29	0.18	0.10	41.4	0.0	41.4
23Feb2022	00:50	0.17	0.10	0.07	46.0	0.0	46.0
23Feb2022	00:55	0.11	0.06	0.05	38.7	0.0	38.7
23Feb2022	01:00	0.09	0.05	0.04	30.5	0.0	30.5
23Feb2022	01:05	0.08	0.04	0.04	24.6	0.0	24.6
23Feb2022	01:10	0.04	0.02	0.02	19.7	0.0	19.7
23Feb2022	01:15	0.03	0.02	0.01	14.3	0.0	14.3
23Feb2022	01:20	0.03	0.01	0.01	10.3	0.0	10.3
23Feb2022	01:25	0.03	0.01	0.01	8.2	0.0	8.2
23Feb2022	01:30	0.03	0.01	0.01	7.2	0.0	7.2
23Feb2022	01:35	0.02	0.01	0.01	6.6	0.0	6.6
23Feb2022	01:40	0.03	0.01	0.01	6.1	0.0	6.1
23Feb2022	01:45	0.02	0.01	0.01	5.8	0.0	5.8
23Feb2022	01:50	0.02	0.01	0.01	5.6	0.0	5.6
23Feb2022	01:55	0.02	0.01	0.01	5.5	0.0	5.5
23Feb2022	02:00	0.03	0.01	0.01	5.5	0.0	5.5
23Feb2022	02:05	0.00	0.00	0.00	4.9	0.0	4.9
23Feb2022	02:10	0.00	0.00	0.00	2.9	0.0	2.9
23Feb2022	02:15	0.00	0.00	0.00	1.3	0.0	1.3
23Feb2022	02:20	0.00	0.00	0.00	0.6	0.0	0.6
23Feb2022	02:25	0.00	0.00	0.00	0.3	0.0	0.3
23Feb2022	02:30	0.00	0.00	0.00	0.1	0.0	0.1
23Feb2022	02:35	0.00	0.00	0.00	0.1	0.0	0.1
23Feb2022	02:40	0.00	0.00	0.00	0.0	0.0	0.0


Subbasin "WS-2" Results for Run "2-hr 100-yr"
Depth (in)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Flow (cfs)
45
40
35
30
25
20
15
10
5
0
00:00
00:30
01:00
01:30
02:00
02:30


Sink "Flow Offsite via Road Ditch" Results for Run "2-hr 100-yr"
Flow (cfs)
50
45
40
35
30
25
20
15
10
5
0
00:00
00:30
01:00
01:30
02:00
02:30
Legend (Compute Time: 22Mar2022, 15:41:43)
Run:2-hr 100-yr Element:Flow Offsite via Road Ditch Result:Outflow
Run:2-hr 100-yr Element:WS-2 Result:Outflow

100-YEAR 24-HOUR EXISTING CONDITIONS

Global Summary Results for Run "24-hr 100-yr"

Project: Solberg Simulation Run: 24-hr 100-yr

Start of Run: 23Feb2022, 00:00
End of Run: 24Feb2022, 00:00
Compute Time: 22Mar2022, 15:42:16

Basin Model: Existing Conditions
Meteorologic Model: 100-yr 24-hr event
Control Specifications: 24-hr storm event

Show Elements: All Elements Volume Units: (•) IN ( ) AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
WS-2	0.06	73.8	23Feb2022, 12:00	1.98
Flow Offsite via Road Ditch	0.06	73.8	23Feb2022, 11:45	1.98
WS-1	0.38	213.8	23Feb2022, 12:30	1.95
Flow offsite via Culvert	0.38	213.8	23Feb2022, 12:15	1.95

Global Summary Results for Run "24-hr 100-yr"

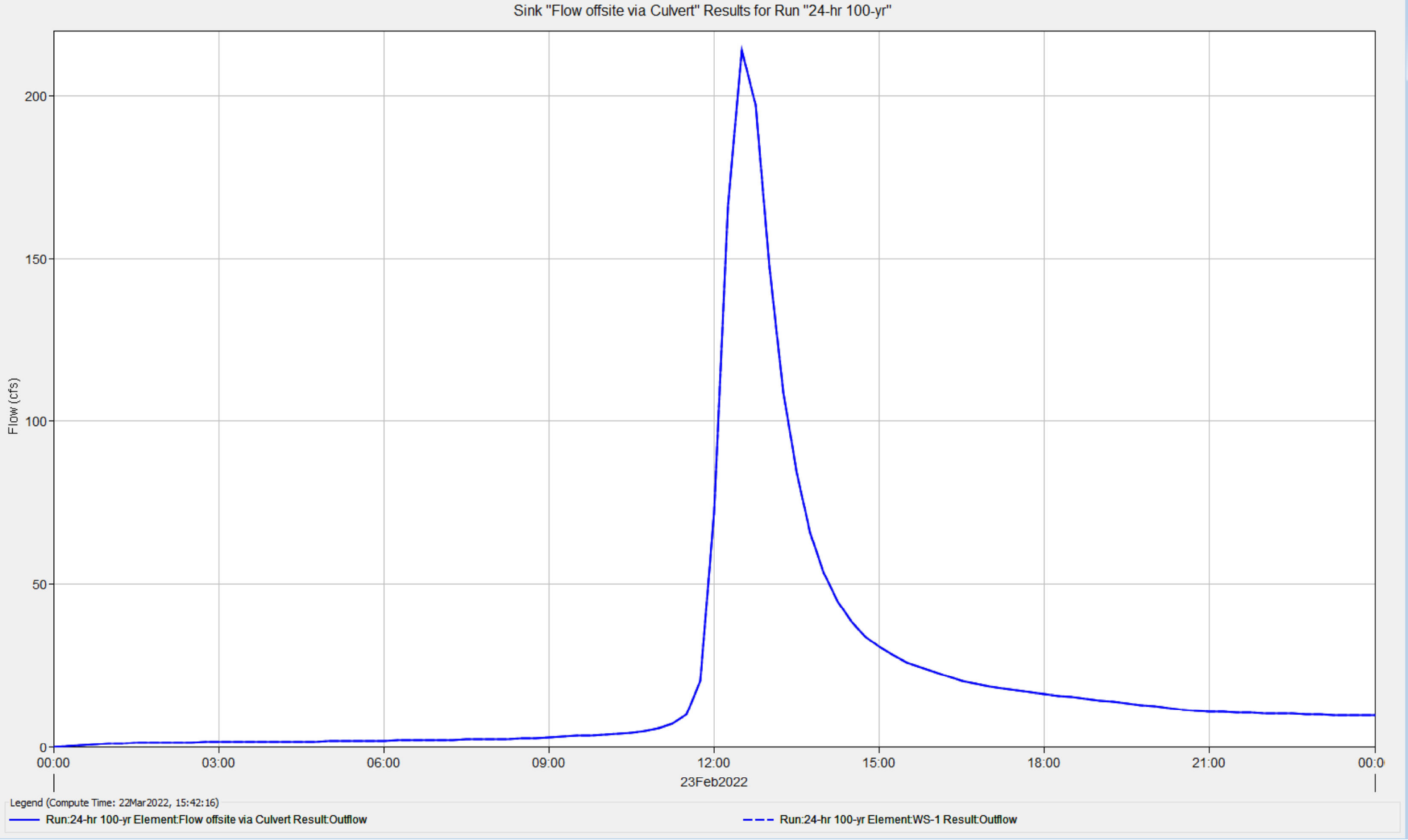
Project: Solberg Simulation Run: 24-hr 100-yr

Start of Run: 23Feb2022, 00:00
End of Run: 24Feb2022, 00:00
Compute Time: 22Mar2022, 15:42:16

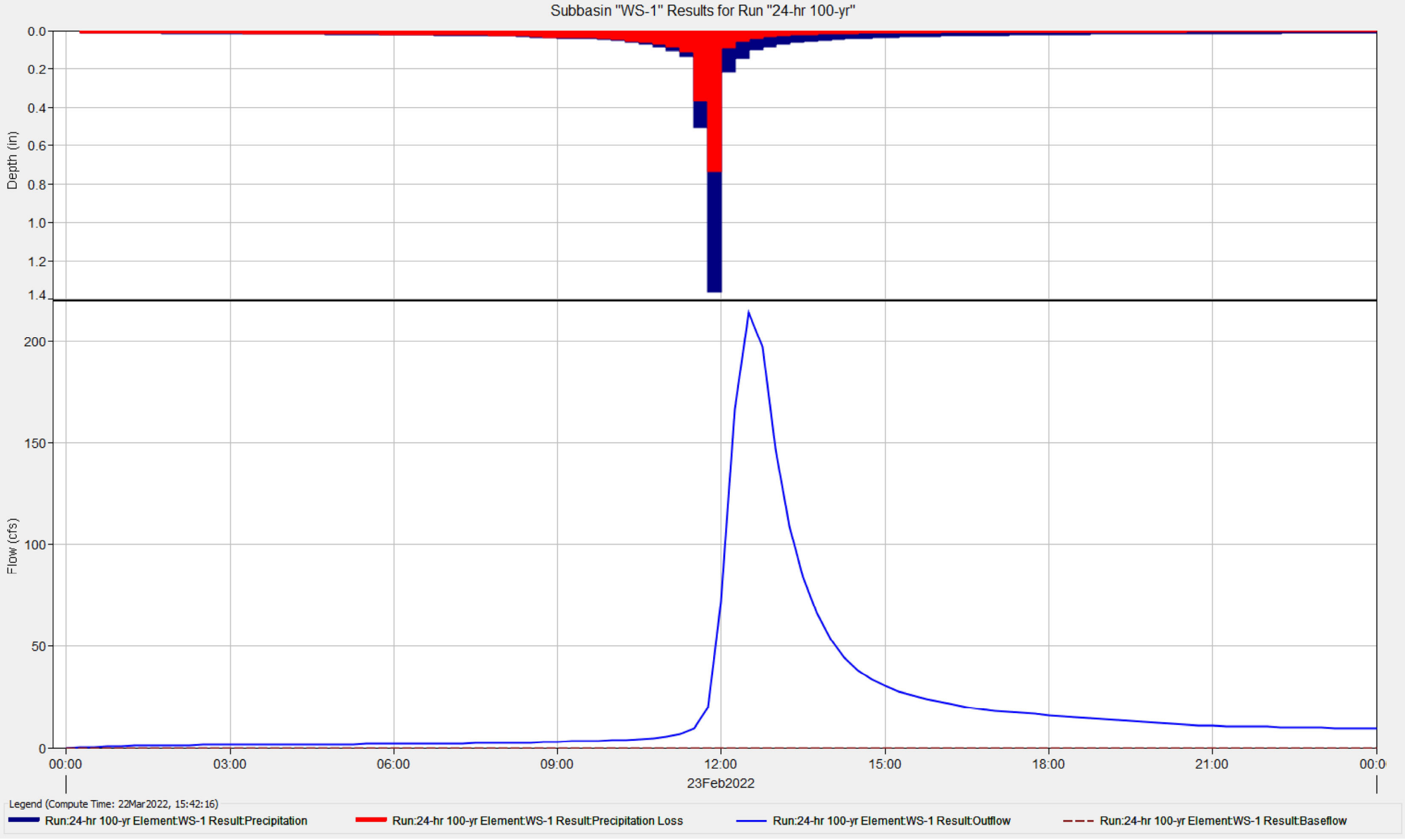
Basin Model: Existing Conditions
Meteorologic Model: 100-yr 24-hr event
Control Specifications: 24-hr storm event

Show Elements: All Elements Volume Units: IN AC-FT Sorting: Hydrologic

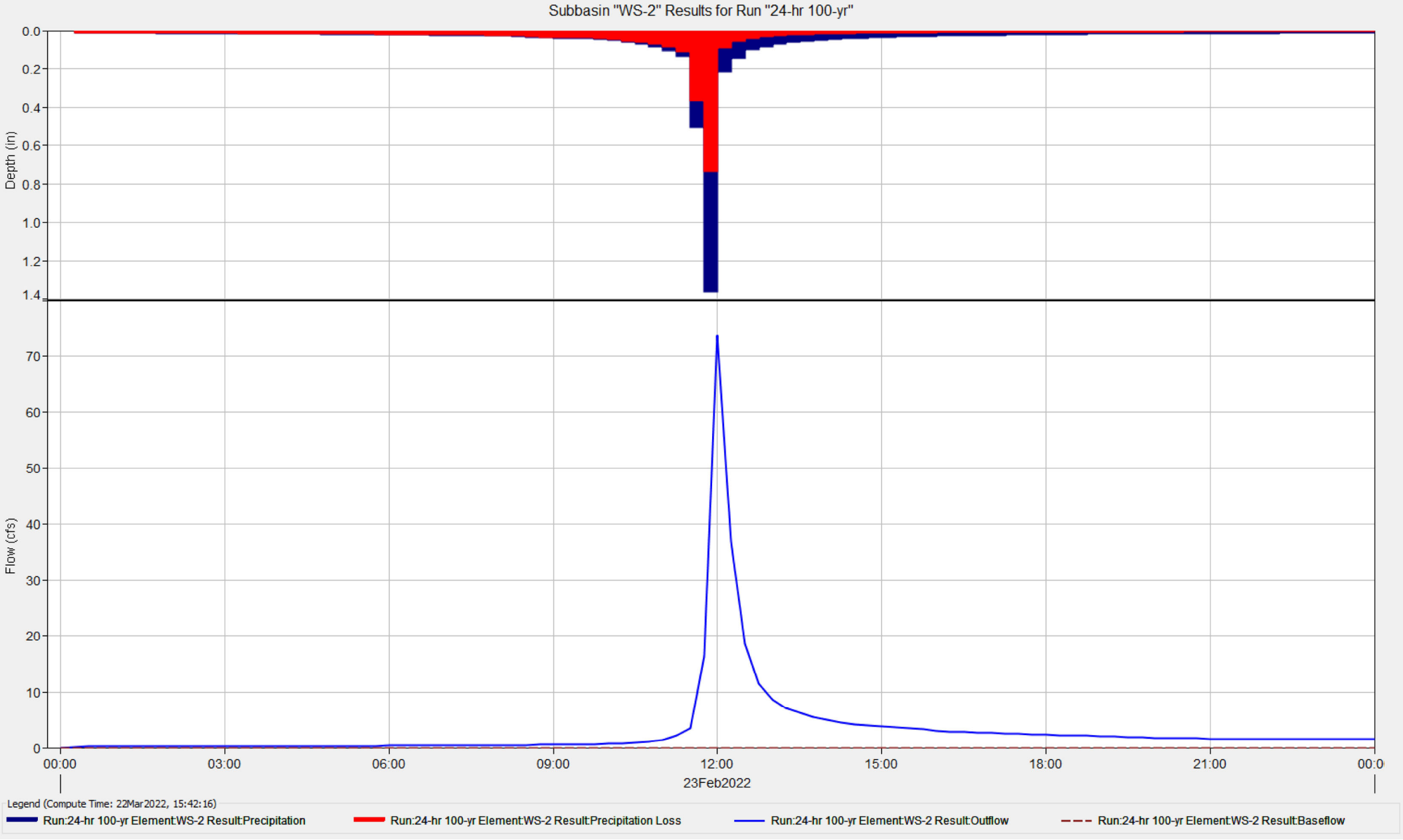
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WS-2	0.06	73.8	23Feb2022, 12:00	6.3
Flow Offsite via Road Ditch	0.06	73.8	23Feb2022, 11:45	6.3
WS-1	0.38	213.8	23Feb2022, 12:30	39.5
Flow offsite via Culvert	0.38	213.8	23Feb2022, 12:15	39.5

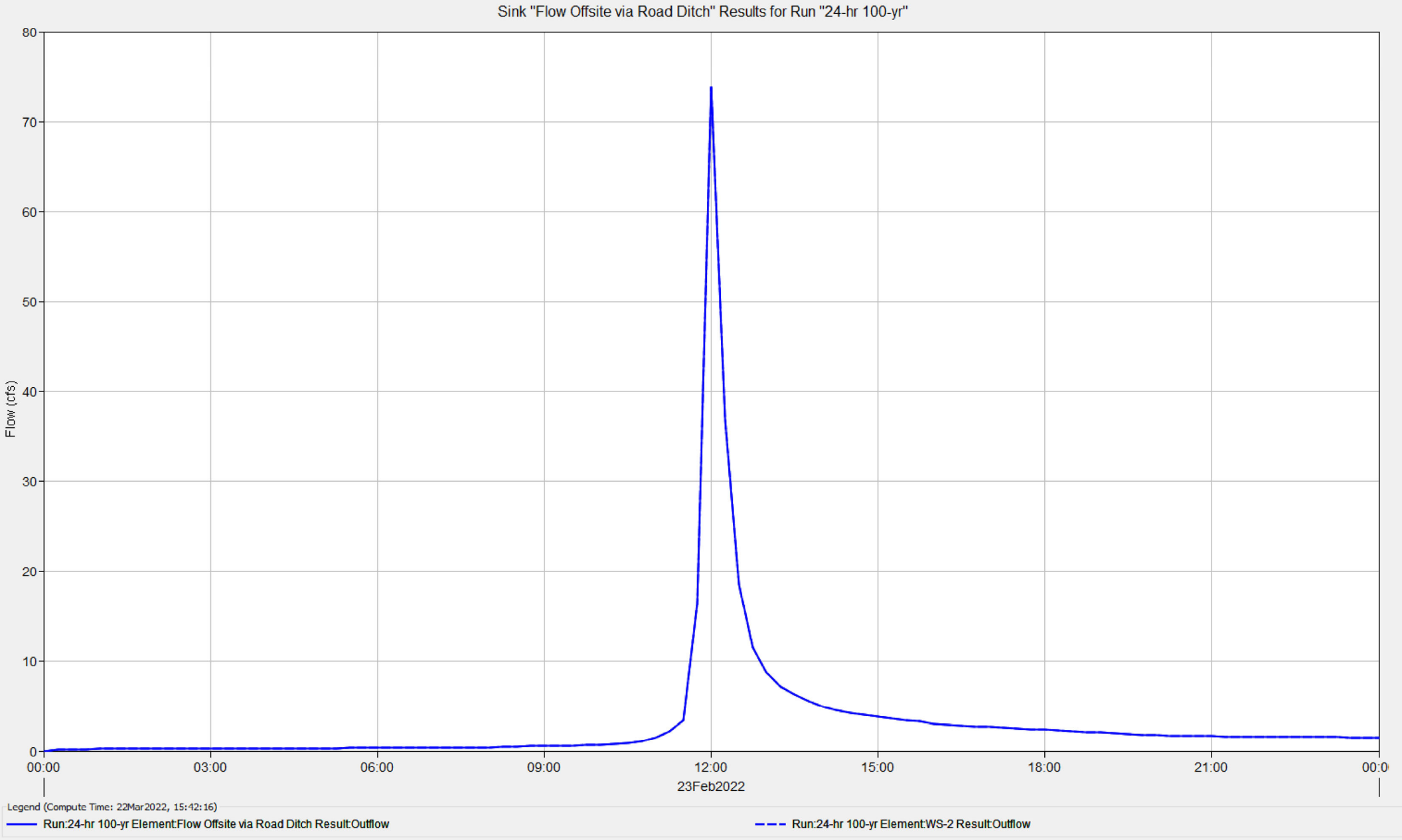

Sink "Flow offsite via Culvert" Results for Run "24-hr 100-yr"
Flow (cfs)
200
150
100
50
0
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:42:16)
Run:24-hr 100-yr Element:Flow offsite via Culvert Result:Outflow
Run:24-hr 100-yr Element:WS-1 Result:Outflow

Date	Time	Precip (in)	Loss (in)	Excess (in)	Direct Flow (cfs)	Baseflow (cfs)	Total Flow (cfs)
23-Feb-22	0:00				0	0	0
23-Feb-22	0:15	0.01	0.01	0	0.1	0	0.1
23-Feb-22	0:30	0.01	0.01	0	0.3	0	0.3
23-Feb-22	0:45	0.01	0.01	0	0.6	0	0.6
23-Feb-22	1:00	0.01	0.01	0	0.9	0	0.9
23-Feb-22	1:15	0.01	0.01	0	1.1	0	1.1
23-Feb-22	1:30	0.01	0.01	0	1.2	0	1.2
23-Feb-22	1:45	0.01	0.01	0	1.2	0	1.2
23-Feb-22	2:00	0.01	0.01	0	1.3	0	1.3
23-Feb-22	2:15	0.01	0.01	0	1.4	0	1.4
23-Feb-22	2:30	0.01	0.01	0	1.4	0	1.4
23-Feb-22	2:45	0.02	0.01	0	1.4	0	1.4
23-Feb-22	3:00	0.02	0.01	0	1.5	0	1.5
23-Feb-22	3:15	0.02	0.01	0	1.5	0	1.5
23-Feb-22	3:30	0.02	0.01	0	1.5	0	1.5
23-Feb-22	3:45	0.02	0.02	0	1.6	0	1.6
23-Feb-22	4:00	0.02	0.02	0	1.6	0	1.6
23-Feb-22	4:15	0.02	0.02	0	1.6	0	1.6
23-Feb-22	4:30	0.02	0.02	0	1.6	0	1.6
23-Feb-22	4:45	0.02	0.02	0	1.7	0	1.7
23-Feb-22	5:00	0.02	0.02	0	1.7	0	1.7
23-Feb-22	5:15	0.02	0.02	0	1.8	0	1.8
23-Feb-22	5:30	0.02	0.02	0	1.8	0	1.8
23-Feb-22	5:45	0.02	0.02	0	1.9	0	1.9
23-Feb-22	6:00	0.02	0.02	0	2	0	2
23-Feb-22	6:15	0.02	0.02	0	2	0	2
23-Feb-22	6:30	0.02	0.02	0	2.1	0	2.1
23-Feb-22	6:45	0.02	0.02	0	2.1	0	2.1
23-Feb-22	7:00	0.02	0.02	0	2.2	0	2.2
23-Feb-22	7:15	0.02	0.02	0	2.3	0	2.3
23-Feb-22	7:30	0.03	0.02	0	2.3	0	2.3
23-Feb-22	7:45	0.03	0.02	0	2.4	0	2.4
23-Feb-22	8:00	0.03	0.02	0	2.4	0	2.4
23-Feb-22	8:15	0.03	0.03	0	2.5	0	2.5
23-Feb-22	8:30	0.03	0.03	0	2.6	0	2.6
23-Feb-22	8:45	0.03	0.03	0	2.7	0	2.7
23-Feb-22	9:00	0.04	0.03	0	3	0	3
23-Feb-22	9:15	0.04	0.04	0	3.2	0	3.2
23-Feb-22	9:30	0.04	0.04	0	3.4	0	3.4
23-Feb-22	9:45	0.04	0.04	0	3.6	0	3.6
23-Feb-22	10:00	0.05	0.04	0	3.8	0	3.8
23-Feb-22	10:15	0.05	0.05	0.01	4	0	4
23-Feb-22	10:30	0.06	0.05	0.01	4.4	0	4.4
23-Feb-22	10:45	0.07	0.06	0.01	4.9	0	4.9
23-Feb-22	11:00	0.08	0.07	0.01	5.7	0	5.7
23-Feb-22	11:15	0.1	0.09	0.02	7.2	0	7.2
23-Feb-22	11:30	0.13	0.11	0.03	10	0	10
23-Feb-22	11:45	0.5	0.36	0.14	20.2	0	20.2
23-Feb-22	12:00	1.36	0.73	0.63	72	0	72
23-Feb-22	12:15	0.21	0.09	0.12	166.1	0	166.1
23-Feb-22	12:30	0.14	0.06	0.08	213.8	0	213.8
23-Feb-22	12:45	0.1	0.04	0.06	197.2	0	197.2
23-Feb-22	13:00	0.08	0.03	0.05	147.4	0	147.4
23-Feb-22	13:15	0.07	0.03	0.04	109	0	109
23-Feb-22	13:30	0.06	0.02	0.04	83.6	0	83.6
23-Feb-22	13:45	0.05	0.02	0.03	65.8	0	65.8
23-Feb-22	14:00	0.05	0.02	0.03	53.4	0	53.4
23-Feb-22	14:15	0.04	0.02	0.03	44.7	0	44.7
23-Feb-22	14:30	0.04	0.01	0.03	38.4	0	38.4
23-Feb-22	14:45	0.04	0.01	0.03	33.9	0	33.9
23-Feb-22	15:00	0.04	0.01	0.02	30.6	0	30.6
23-Feb-22	15:15	0.04	0.01	0.02	28.1	0	28.1
23-Feb-22	15:30	0.03	0.01	0.02	26	0	26
23-Feb-22	15:45	0.03	0.01	0.02	24.4	0	24.4
23-Feb-22	16:00	0.03	0.01	0.02	22.9	0	22.9
23-Feb-22	16:15	0.03	0.01	0.02	21.6	0	21.6
23-Feb-22	16:30	0.03	0.01	0.02	20.3	0	20.3
23-Feb-22	16:45	0.03	0.01	0.02	19.3	0	19.3
23-Feb-22	17:00	0.03	0.01	0.02	18.6	0	18.6
23-Feb-22	17:15	0.02	0.01	0.02	17.9	0	17.9
23-Feb-22	17:30	0.02	0.01	0.02	17.4	0	17.4
23-Feb-22	17:45	0.02	0.01	0.02	16.8	0	16.8
23-Feb-22	18:00	0.02	0.01	0.02	16.3	0	16.3
23-Feb-22	18:15	0.02	0.01	0.01	15.8	0	15.8
23-Feb-22	18:30	0.02	0.01	0.01	15.4	0	15.4
23-Feb-22	18:45	0.02	0.01	0.01	14.9	0	14.9
23-Feb-22	19:00	0.02	0.01	0.01	14.4	0	14.4
23-Feb-22	19:15	0.02	0.01	0.01	13.9	0	13.9
23-Feb-22	19:30	0.02	0.01	0.01	13.4	0	13.4
23-Feb-22	19:45	0.02	0.01	0.01	12.9	0	12.9
23-Feb-22	20:00	0.02	0.01	0.01	12.5	0	12.5
23-Feb-22	20:15	0.02	0	0.01	12	0	12
23-Feb-22	20:30	0.02	0	0.01	11.6	0	11.6
23-Feb-22	20:45	0.02	0	0.01	11.2	0	11.2
23-Feb-22	21:00	0.02	0	0.01	11	0	11
23-Feb-22	21:15	0.02	0	0.01	10.8	0	10.8
23-Feb-22	21:30	0.02	0	0.01	10.6	0	10.6
23-Feb-22	21:45	0.02	0	0.01	10.5	0	10.5
23-Feb-22	22:00	0.01	0	0.01	10.4	0	10.4
23-Feb-22	22:15	0.01	0	0.01	10.3	0	10.3
23-Feb-22	22:30	0.01	0	0.01	10.2	0	10.2
23-Feb-22	22:45	0.01	0	0.01	10.1	0	10.1
23-Feb-22	23:00	0.01	0	0.01	10	0	10
23-Feb-22	23:15	0.01	0	0.01	9.9	0	9.9
23-Feb-22	23:30	0.01	0	0.01	9.8	0	9.8
23-Feb-22	23:45	0.01	0	0.01	9.8	0	9.8
24-Feb-22	0:00	0.01	0	0.01	9.7	0	9.7


Subbasin "WS-1" Results for Run "24-hr 100-yr"
Depth (in)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Flow (cfs)
200
150
100
50
0
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:42:16)
Run:24-hr 100-yr Element:WS-1 Result:Precipitation
Run:24-hr 100-yr Element:WS-1 Result:Precipitation Loss
Run:24-hr 100-yr Element:WS-1 Result:Outflow
Run:24-hr 100-yr Element:WS-1 Result:Baseflow

Date	Time	Precip (in)	Loss (in)	Excess (in)	Direct Flow (cfs)	Baseflow (cfs)	Total Flow (cfs)
23-Feb-22	0:00				0	0	0
23-Feb-22	0:15	0.01	0.01	0	0.1	0	0.1
23-Feb-22	0:30	0.01	0.01	0	0.2	0	0.2
23-Feb-22	0:45	0.01	0.01	0	0.2	0	0.2
23-Feb-22	1:00	0.01	0.01	0	0.2	0	0.2
23-Feb-22	1:15	0.01	0.01	0	0.2	0	0.2
23-Feb-22	1:30	0.01	0.01	0	0.2	0	0.2
23-Feb-22	1:45	0.01	0.01	0	0.2	0	0.2
23-Feb-22	2:00	0.01	0.01	0	0.2	0	0.2
23-Feb-22	2:15	0.01	0.01	0	0.2	0	0.2
23-Feb-22	2:30	0.01	0.01	0	0.2	0	0.2
23-Feb-22	2:45	0.02	0.01	0	0.2	0	0.2
23-Feb-22	3:00	0.02	0.01	0	0.2	0	0.2
23-Feb-22	3:15	0.02	0.01	0	0.2	0	0.2
23-Feb-22	3:30	0.02	0.01	0	0.3	0	0.3
23-Feb-22	3:45	0.02	0.02	0	0.3	0	0.3
23-Feb-22	4:00	0.02	0.02	0	0.3	0	0.3
23-Feb-22	4:15	0.02	0.02	0	0.3	0	0.3
23-Feb-22	4:30	0.02	0.02	0	0.3	0	0.3
23-Feb-22	4:45	0.02	0.02	0	0.3	0	0.3
23-Feb-22	5:00	0.02	0.02	0	0.3	0	0.3
23-Feb-22	5:15	0.02	0.02	0	0.3	0	0.3
23-Feb-22	5:30	0.02	0.02	0	0.3	0	0.3
23-Feb-22	5:45	0.02	0.02	0	0.3	0	0.3
23-Feb-22	6:00	0.02	0.02	0	0.3	0	0.3
23-Feb-22	6:15	0.02	0.02	0	0.3	0	0.3
23-Feb-22	6:30	0.02	0.02	0	0.4	0	0.4
23-Feb-22	6:45	0.02	0.02	0	0.4	0	0.4
23-Feb-22	7:00	0.02	0.02	0	0.4	0	0.4
23-Feb-22	7:15	0.02	0.02	0	0.4	0	0.4
23-Feb-22	7:30	0.03	0.02	0	0.4	0	0.4
23-Feb-22	7:45	0.03	0.02	0	0.4	0	0.4
23-Feb-22	8:00	0.03	0.02	0	0.4	0	0.4
23-Feb-22	8:15	0.03	0.03	0	0.4	0	0.4
23-Feb-22	8:30	0.03	0.03	0	0.5	0	0.5
23-Feb-22	8:45	0.03	0.03	0	0.5	0	0.5
23-Feb-22	9:00	0.04	0.03	0	0.6	0	0.6
23-Feb-22	9:15	0.04	0.04	0	0.6	0	0.6
23-Feb-22	9:30	0.04	0.04	0	0.6	0	0.6
23-Feb-22	9:45	0.04	0.04	0	0.6	0	0.6
23-Feb-22	10:00	0.05	0.04	0	0.7	0	0.7
23-Feb-22	10:15	0.05	0.05	0.01	0.8	0	0.8
23-Feb-22	10:30	0.06	0.05	0.01	0.9	0	0.9
23-Feb-22	10:45	0.07	0.06	0.01	1.1	0	1.1
23-Feb-22	11:00	0.08	0.07	0.01	1.5	0	1.5
23-Feb-22	11:15	0.1	0.09	0.02	2.2	0	2.2
23-Feb-22	11:30	0.13	0.11	0.03	3.5	0	3.5
23-Feb-22	11:45	0.5	0.36	0.14	16.4	0	16.4
23-Feb-22	12:00	1.36	0.73	0.63	73.8	0	73.8
23-Feb-22	12:15	0.21	0.09	0.12	36.9	0	36.9
23-Feb-22	12:30	0.14	0.06	0.08	18.5	0	18.5
23-Feb-22	12:45	0.1	0.04	0.06	11.5	0	11.5
23-Feb-22	13:00	0.08	0.03	0.05	8.7	0	8.7
23-Feb-22	13:15	0.07	0.03	0.04	7.2	0	7.2
23-Feb-22	13:30	0.06	0.02	0.04	6.3	0	6.3
23-Feb-22	13:45	0.05	0.02	0.03	5.6	0	5.6
23-Feb-22	14:00	0.05	0.02	0.03	5	0	5
23-Feb-22	14:15	0.04	0.02	0.03	4.6	0	4.6
23-Feb-22	14:30	0.04	0.01	0.03	4.3	0	4.3
23-Feb-22	14:45	0.04	0.01	0.03	4.1	0	4.1
23-Feb-22	15:00	0.04	0.01	0.02	3.9	0	3.9
23-Feb-22	15:15	0.04	0.01	0.02	3.7	0	3.7
23-Feb-22	15:30	0.03	0.01	0.02	3.5	0	3.5
23-Feb-22	15:45	0.03	0.01	0.02	3.3	0	3.3
23-Feb-22	16:00	0.03	0.01	0.02	3.1	0	3.1
23-Feb-22	16:15	0.03	0.01	0.02	2.9	0	2.9
23-Feb-22	16:30	0.03	0.01	0.02	2.8	0	2.8
23-Feb-22	16:45	0.03	0.01	0.02	2.7	0	2.7
23-Feb-22	17:00	0.03	0.01	0.02	2.7	0	2.7
23-Feb-22	17:15	0.02	0.01	0.02	2.6	0	2.6
23-Feb-22	17:30	0.02	0.01	0.02	2.5	0	2.5
23-Feb-22	17:45	0.02	0.01	0.02	2.4	0	2.4
23-Feb-22	18:00	0.02	0.01	0.02	2.4	0	2.4
23-Feb-22	18:15	0.02	0.01	0.01	2.3	0	2.3
23-Feb-22	18:30	0.02	0.01	0.01	2.2	0	2.2
23-Feb-22	18:45	0.02	0.01	0.01	2.2	0	2.2
23-Feb-22	19:00	0.02	0.01	0.01	2.1	0	2.1
23-Feb-22	19:15	0.02	0.01	0.01	2	0	2
23-Feb-22	19:30	0.02	0.01	0.01	1.9	0	1.9
23-Feb-22	19:45	0.02	0.01	0.01	1.8	0	1.8
23-Feb-22	20:00	0.02	0.01	0.01	1.8	0	1.8
23-Feb-22	20:15	0.02	0	0.01	1.7	0	1.7
23-Feb-22	20:30	0.02	0	0.01	1.7	0	1.7
23-Feb-22	20:45	0.02	0	0.01	1.7	0	1.7
23-Feb-22	21:00	0.02	0	0.01	1.6	0	1.6
23-Feb-22	21:15	0.02	0	0.01	1.6	0	1.6
23-Feb-22	21:30	0.02	0	0.01	1.6	0	1.6
23-Feb-22	21:45	0.02	0	0.01	1.6	0	1.6
23-Feb-22	22:00	0.01	0	0.01	1.6	0	1.6
23-Feb-22	22:15	0.01	0	0.01	1.6	0	1.6
23-Feb-22	22:30	0.01	0	0.01	1.6	0	1.6
23-Feb-22	22:45	0.01	0	0.01	1.5	0	1.5
23-Feb-22	23:00	0.01	0	0.01	1.5	0	1.5
23-Feb-22	23:15	0.01	0	0.01	1.5	0	1.5
23-Feb-22	23:30	0.01	0	0.01	1.5	0	1.5
23-Feb-22	23:45	0.01	0	0.01	1.5	0	1.5
24-Feb-22	0:00	0.01	0	0.01	1.5	0	1.5


Subbasin "WS-2" Results for Run "24-hr 100-yr"
Depth (in)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Flow (cfs)
70
60
50
40
30
20
10
0
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:42:16)
Run:24-hr 100-yr Element:WS-2 Result:Precipitation
Run:24-hr 100-yr Element:WS-2 Result:Precipitation Loss
Run:24-hr 100-yr Element:WS-2 Result:Outflow
Run:24-hr 100-yr Element:WS-2 Result:Baseflow


Sink "Flow Offsite via Road Ditch" Results for Run "24-hr 100-yr"
Flow (cfs)
80
70
60
50
40
30
20
10
0
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:42:16)
Run:24-hr 100-yr Element:Flow Offsite via Road Ditch Result:Outflow
Run:24-hr 100-yr Element:WS-2 Result:Outflow

100-YEAR 2-HOUR RECLAIMED CONDITIONS

Global Summary Results for Run "2-hr 100-yr"

Project: Solberg Simulation Run: 2-hr 100-yr

Start of Run: 23Feb2022, 00:00
End of Run: 23Feb2022, 03:00
Compute Time: 22Mar2022, 15:09:49

Basin Model: Reclamied Conditions
Meteorologic Model: 100-year 2-hr event
Control Specifications: 2-hr storm event

Show Elements: All Elements Volume Units: (•) IN ( ) AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
WS-2	0.06	4.0	23Feb2022, 01:05	0.09
Flow Offsite via Road Ditch	0.06	4.0	23Feb2022, 01:00	0.09
WS-1	0.38	14.2	23Feb2022, 01:45	0.08
Flow offsite via Culvert	0.38	14.2	23Feb2022, 01:40	0.08

Global Summary Results for Run "2-hr 100-yr"

Project: Solberg Simulation Run: 2-hr 100-yr

Start of Run: 23Feb2022, 00:00
End of Run: 23Feb2022, 03:00
Compute Time: 22Mar2022, 15:09:49

Basin Model: Reclamied Conditions
Meteorologic Model: 100-year 2-hr event
Control Specifications: 2-hr storm event

Show Elements: All Elements Volume Units: IN AC-FT Sorting: Hydrologic

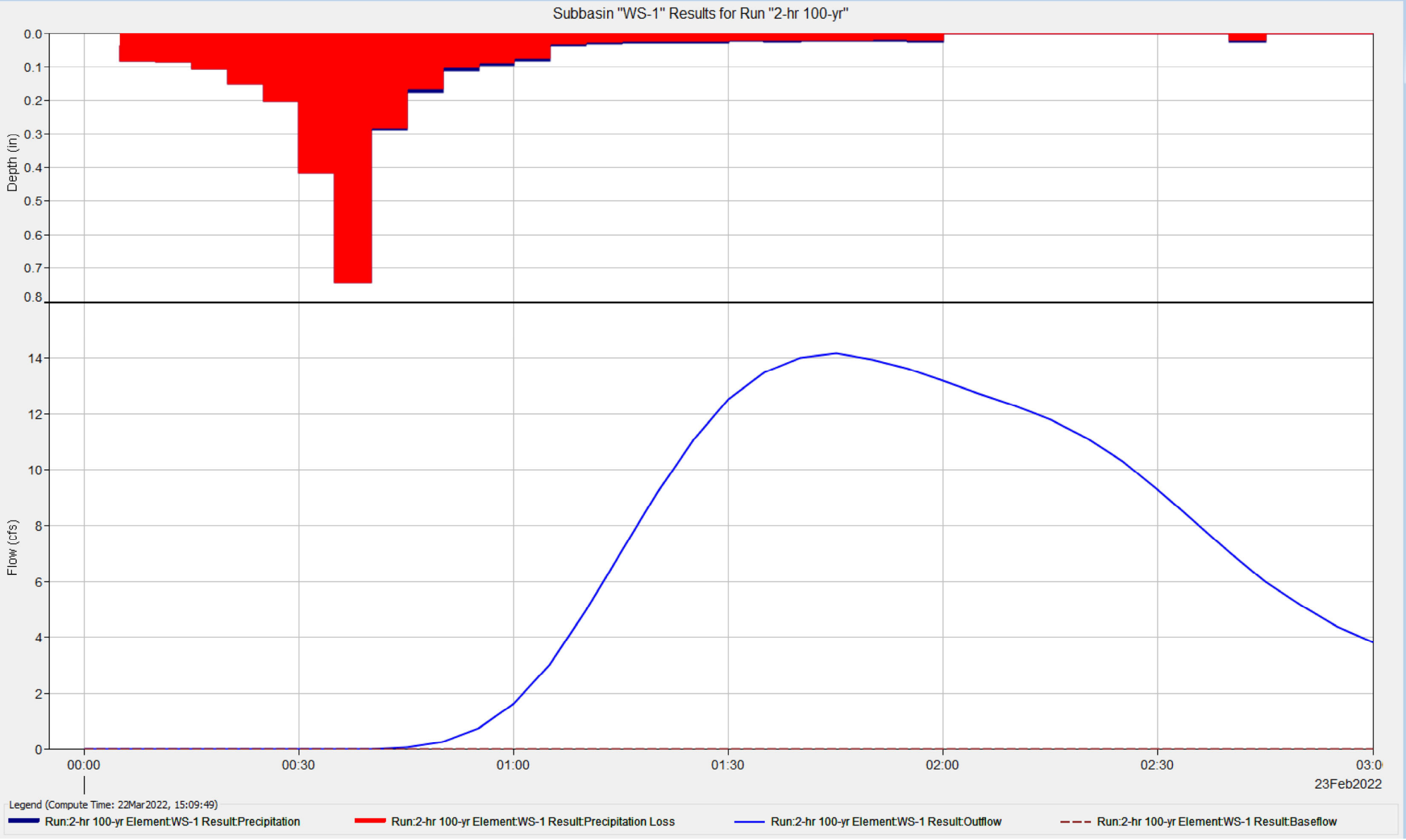
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WS-2	0.06	4.0	23Feb2022, 01:05	0.3
Flow Offsite via Road Ditch	0.06	4.0	23Feb2022, 01:00	0.3
WS-1	0.38	14.2	23Feb2022, 01:45	1.6
Flow offsite via Culvert	0.38	14.2	23Feb2022, 01:40	1.6

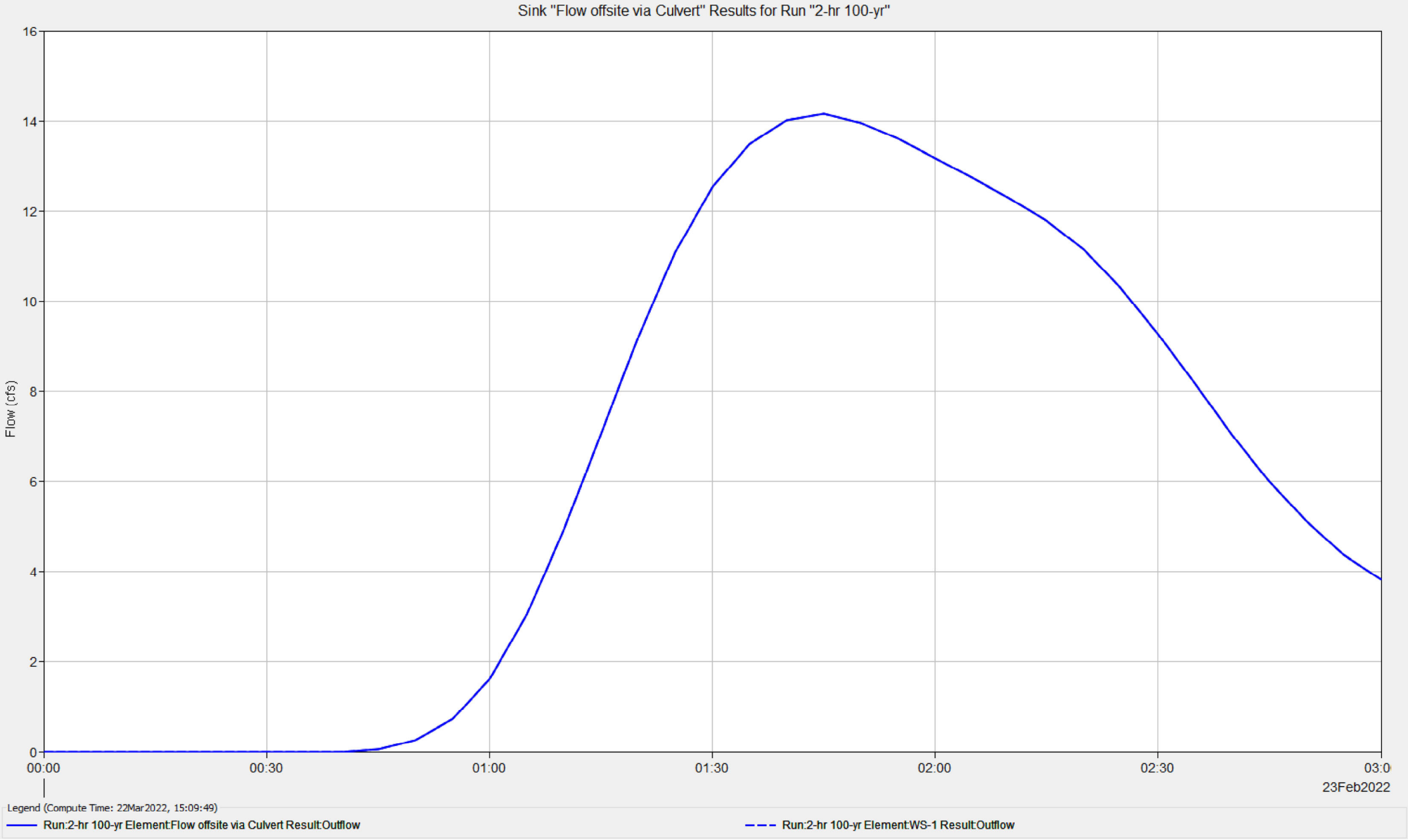
Time-Series Results for Subbasin "WS-1"

Project: Solberg Simulation Run: 2-hr 100-yr
Subbasin: WS-1

Start of Run: 23Feb2022, 00:00 Basin Model: Reclamied Conditions
End of Run: 23Feb2022, 03:00 Meteorologic Model: 100-year 2-hr event
Compute Time: 22Mar2022, 15:09:49 Control Specifications: 2-hr storm event

Date	Time	Precip (IN)	Loss (IN)	Excess (IN)	Direct Flow (CFS)	Baseflow (CFS)	Total Flow (CFS)
23Feb2022	00:00				0.0	0.0	0.0
23Feb2022	00:05	0.04	0.04	0.00	0.0	0.0	0.0
23Feb2022	00:10	0.08	0.08	0.00	0.0	0.0	0.0
23Feb2022	00:15	0.08	0.08	0.00	0.0	0.0	0.0
23Feb2022	00:20	0.10	0.10	0.00	0.0	0.0	0.0
23Feb2022	00:25	0.15	0.15	0.00	0.0	0.0	0.0
23Feb2022	00:30	0.20	0.20	0.00	0.0	0.0	0.0
23Feb2022	00:35	0.42	0.42	0.00	0.0	0.0	0.0
23Feb2022	00:40	0.74	0.74	0.00	0.0	0.0	0.0
23Feb2022	00:45	0.29	0.28	0.00	0.0	0.0	0.0
23Feb2022	00:50	0.17	0.16	0.01	0.3	0.0	0.3
23Feb2022	00:55	0.11	0.10	0.01	0.7	0.0	0.7
23Feb2022	01:00	0.09	0.09	0.01	1.6	0.0	1.6
23Feb2022	01:05	0.08	0.07	0.01	3.0	0.0	3.0
23Feb2022	01:10	0.04	0.03	0.00	4.9	0.0	4.9
23Feb2022	01:15	0.03	0.03	0.00	7.1	0.0	7.1
23Feb2022	01:20	0.03	0.02	0.00	9.2	0.0	9.2
23Feb2022	01:25	0.03	0.02	0.00	11.1	0.0	11.1
23Feb2022	01:30	0.03	0.02	0.00	12.5	0.0	12.5
23Feb2022	01:35	0.02	0.02	0.00	13.5	0.0	13.5
23Feb2022	01:40	0.03	0.02	0.00	14.0	0.0	14.0
23Feb2022	01:45	0.02	0.02	0.00	14.2	0.0	14.2
23Feb2022	01:50	0.02	0.02	0.00	14.0	0.0	14.0
23Feb2022	01:55	0.02	0.02	0.00	13.6	0.0	13.6
23Feb2022	02:00	0.03	0.02	0.00	13.2	0.0	13.2
23Feb2022	02:05	0.00	0.00	0.00	12.7	0.0	12.7
23Feb2022	02:10	0.00	0.00	0.00	12.3	0.0	12.3
23Feb2022	02:15	0.00	0.00	0.00	11.8	0.0	11.8
23Feb2022	02:20	0.00	0.00	0.00	11.1	0.0	11.1
23Feb2022	02:25	0.00	0.00	0.00	10.3	0.0	10.3
23Feb2022	02:30	0.00	0.00	0.00	9.3	0.0	9.3
23Feb2022	02:35	0.00	0.00	0.00	8.2	0.0	8.2
23Feb2022	02:40	0.00	0.00	0.00	7.0	0.0	7.0
23Feb2022	02:45	0.03	0.02	0.00	6.0	0.0	6.0
23Feb2022	02:50	0.00	0.00	0.00	5.1	0.0	5.1
23Feb2022	02:55	0.00	0.00	0.00	4.4	0.0	4.4
23Feb2022	03:00	0.00	0.00	0.00	3.8	0.0	3.8


Subbasin "WS-1" Results for Run "2-hr 100-yr"
Depth (in)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Flow (cfs)
14
12
10
8
6
4
2
0
00:00
00:30
01:00
01:30
02:00
02:30
03:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:09:49)
Run:2-hr 100-yr Element:WS-1 Result:Precipitation
Run:2-hr 100-yr Element:WS-1 Result:Precipitation Loss
Run:2-hr 100-yr Element:WS-1 Result:Outflow
Run:2-hr 100-yr Element:WS-1 Result:Baseflow

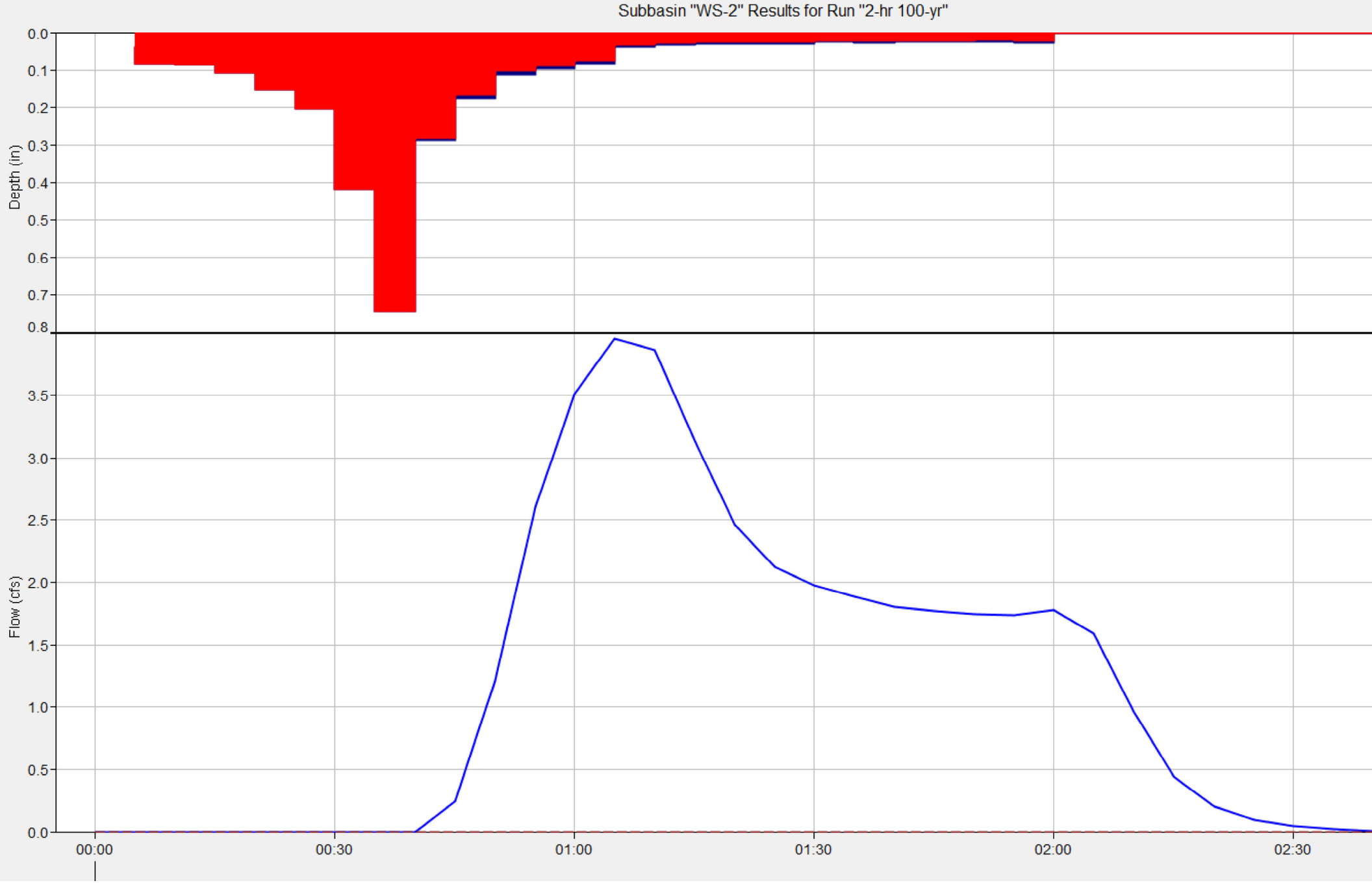

Sink "Flow offsite via Culvert" Results for Run "2-hr 100-yr"
Flow (cfs)
16
14
12
10
8
6
4
2
0
00:00
00:30
01:00
01:30
02:00
02:30
03:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:09:49)
Run:2-hr 100-yr Element:Flow offsite via Culvert Result:Outflow
Run:2-hr 100-yr Element:WS-1 Result:Outflow

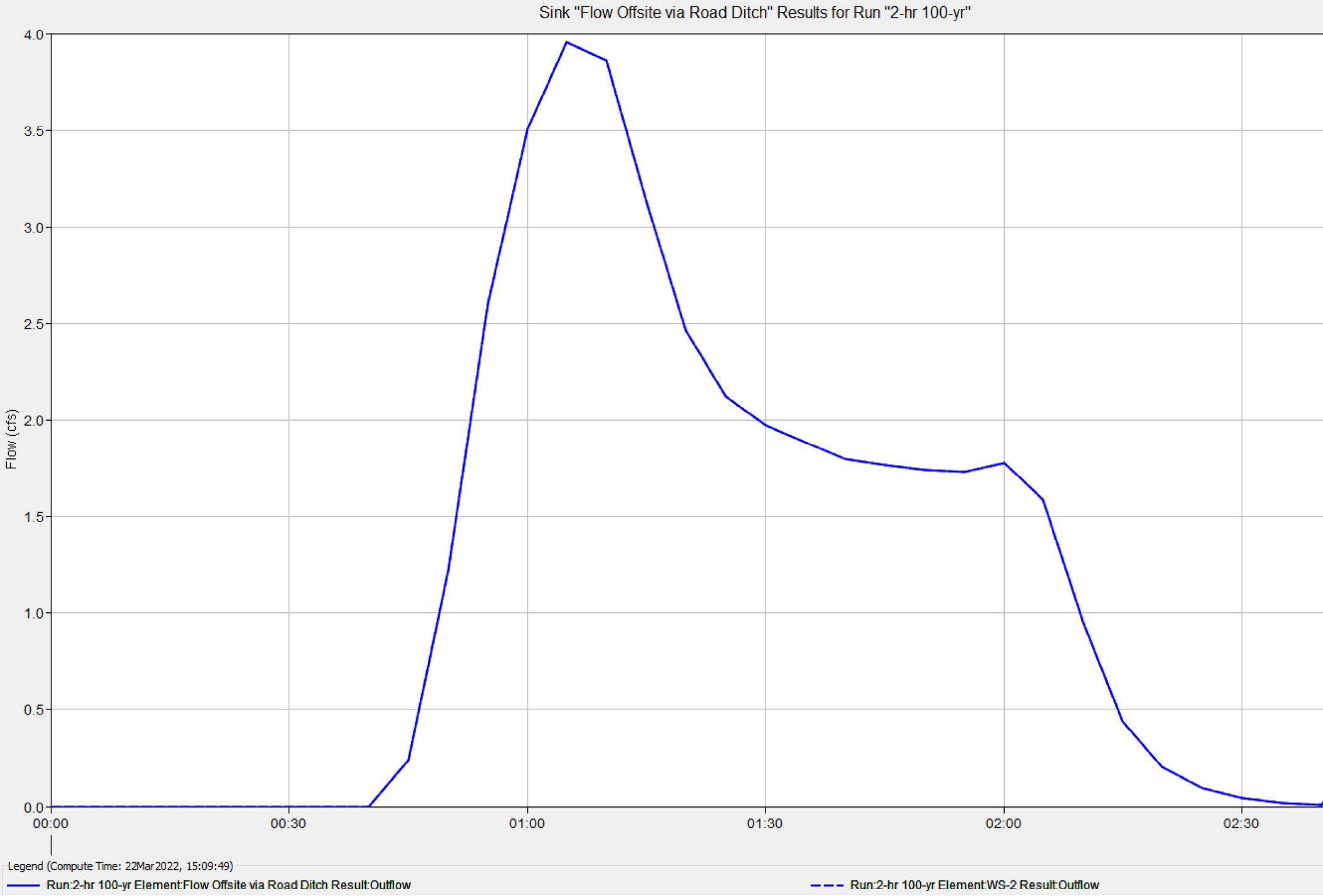
Time-Series Results for Subbasin "WS-2"

Project: Solberg Simulation Run: 2-hr 100-yr
Subbasin: WS-2

Start of Run: 23Feb2022, 00:00 Basin Model: Reclamied Conditions
End of Run: 23Feb2022, 03:00 Meteorologic Model: 100-year 2-hr event
Compute Time: 22Mar2022, 15:09:49 Control Specifications: 2-hr storm event

Date	Time	Precip (IN)	Loss (IN)	Excess (IN)	Direct Flow (CFS)	Baseflow (CFS)	Total Flow (CFS)
23Feb2022	00:00				0.0	0.0	0.0
23Feb2022	00:05	0.04	0.04	0.00	0.0	0.0	0.0
23Feb2022	00:10	0.08	0.08	0.00	0.0	0.0	0.0
23Feb2022	00:15	0.08	0.08	0.00	0.0	0.0	0.0
23Feb2022	00:20	0.10	0.10	0.00	0.0	0.0	0.0
23Feb2022	00:25	0.15	0.15	0.00	0.0	0.0	0.0
23Feb2022	00:30	0.20	0.20	0.00	0.0	0.0	0.0
23Feb2022	00:35	0.42	0.42	0.00	0.0	0.0	0.0
23Feb2022	00:40	0.74	0.74	0.00	0.0	0.0	0.0
23Feb2022	00:45	0.29	0.28	0.00	0.2	0.0	0.2
23Feb2022	00:50	0.17	0.16	0.01	1.2	0.0	1.2
23Feb2022	00:55	0.11	0.10	0.01	2.6	0.0	2.6
23Feb2022	01:00	0.09	0.09	0.01	3.5	0.0	3.5
23Feb2022	01:05	0.08	0.07	0.01	4.0	0.0	4.0
23Feb2022	01:10	0.04	0.03	0.00	3.9	0.0	3.9
23Feb2022	01:15	0.03	0.03	0.00	3.1	0.0	3.1
23Feb2022	01:20	0.03	0.02	0.00	2.5	0.0	2.5
23Feb2022	01:25	0.03	0.02	0.00	2.1	0.0	2.1
23Feb2022	01:30	0.03	0.02	0.00	2.0	0.0	2.0
23Feb2022	01:35	0.02	0.02	0.00	1.9	0.0	1.9
23Feb2022	01:40	0.03	0.02	0.00	1.8	0.0	1.8
23Feb2022	01:45	0.02	0.02	0.00	1.8	0.0	1.8
23Feb2022	01:50	0.02	0.02	0.00	1.7	0.0	1.7
23Feb2022	01:55	0.02	0.02	0.00	1.7	0.0	1.7
23Feb2022	02:00	0.03	0.02	0.00	1.8	0.0	1.8
23Feb2022	02:05	0.00	0.00	0.00	1.6	0.0	1.6
23Feb2022	02:10	0.00	0.00	0.00	1.0	0.0	1.0
23Feb2022	02:15	0.00	0.00	0.00	0.4	0.0	0.4
23Feb2022	02:20	0.00	0.00	0.00	0.2	0.0	0.2
23Feb2022	02:25	0.00	0.00	0.00	0.1	0.0	0.1
23Feb2022	02:30	0.00	0.00	0.00	0.0	0.0	0.0
23Feb2022	02:35	0.00	0.00	0.00	0.0	0.0	0.0
23Feb2022	02:40	0.00	0.00	0.00	0.0	0.0	0.0


Subbasin "WS-2" Results for Run "2-hr 100-yr"
Depth (in)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Flow (cfs)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
00:00
00:30
01:00
01:30
02:00
02:30


Sink "Flow Offsite via Road Ditch" Results for Run "2-hr 100-yr"
Flow (cfs)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
00:00
00:30
01:00
01:30
02:00
02:30
Legend (Compute Time: 22Mar2022, 15:09:49)
Run:2-hr 100-yr Element:Flow Offsite via Road Ditch Result:Outflow
Run:2-hr 100-yr Element:WS-2 Result:Outflow

100-YEAR 24-HOUR RECLAIMED CONDITIONS

Global Summary Results for Run "24-hr 100-yr"

Project: Solberg Simulation Run: 24-hr 100-yr

Start of Run: 23Feb2022, 00:00
End of Run: 24Feb2022, 00:00
Compute Time: 22Mar2022, 15:10:20

Basin Model: Reclamied Conditions
Meteorologic Model: 100-yr 24-hr event
Control Specifications: 24-hr storm event

Show Elements: All Elements Volume Units: (•) IN ( ) AC-FT Sorting: Hydrologic

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
WS-2	0.06	17.6	23Feb2022, 12:00	0.70
Flow Offsite via Road Ditch	0.06	17.6	23Feb2022, 11:45	0.70
WS-1	0.38	54.2	23Feb2022, 12:45	0.69
Flow offsite via Culvert	0.38	54.2	23Feb2022, 12:30	0.69

Global Summary Results for Run "24-hr 100-yr"

Project: Solberg Simulation Run: 24-hr 100-yr

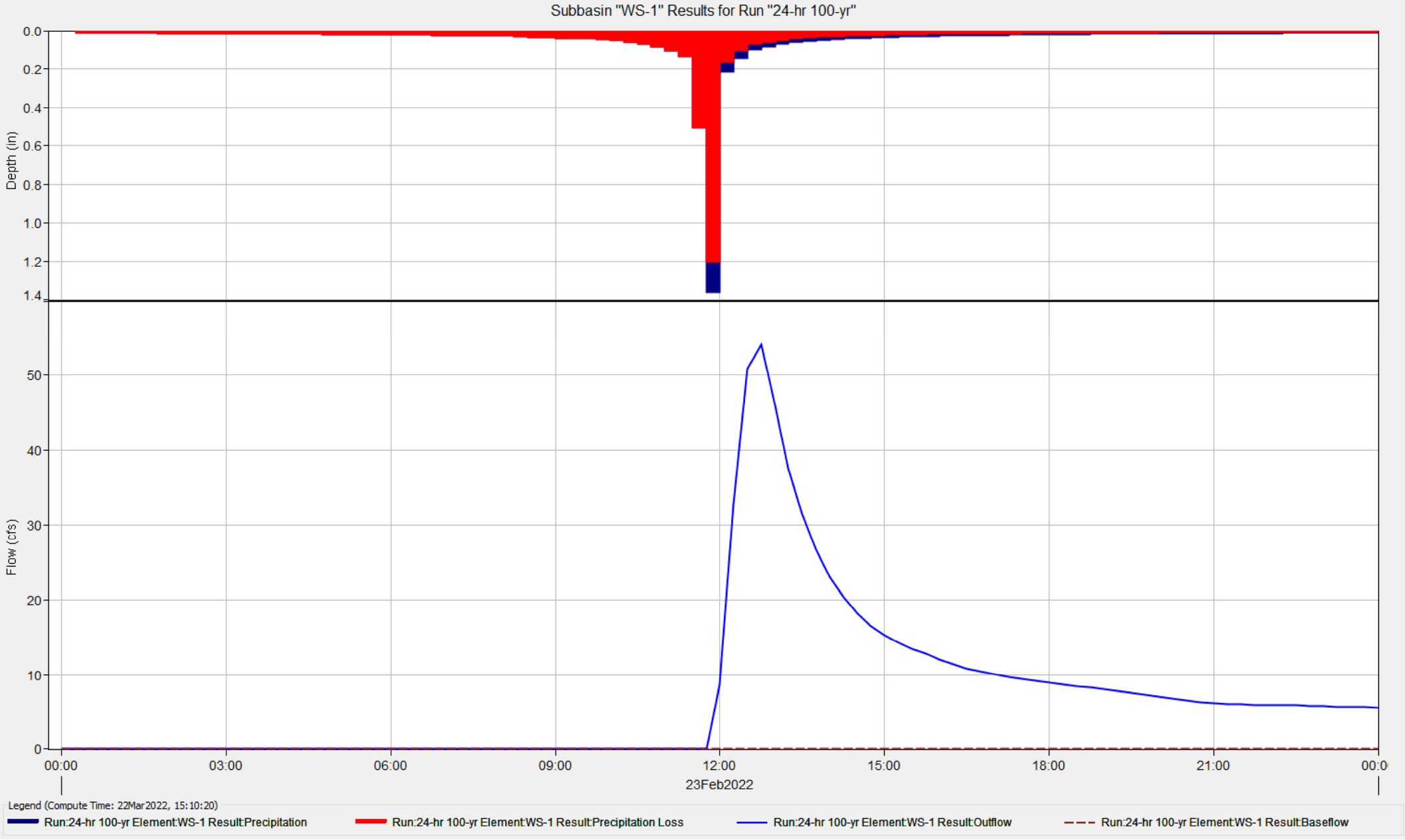
Start of Run: 23Feb2022, 00:00
End of Run: 24Feb2022, 00:00
Compute Time: 22Mar2022, 15:10:20

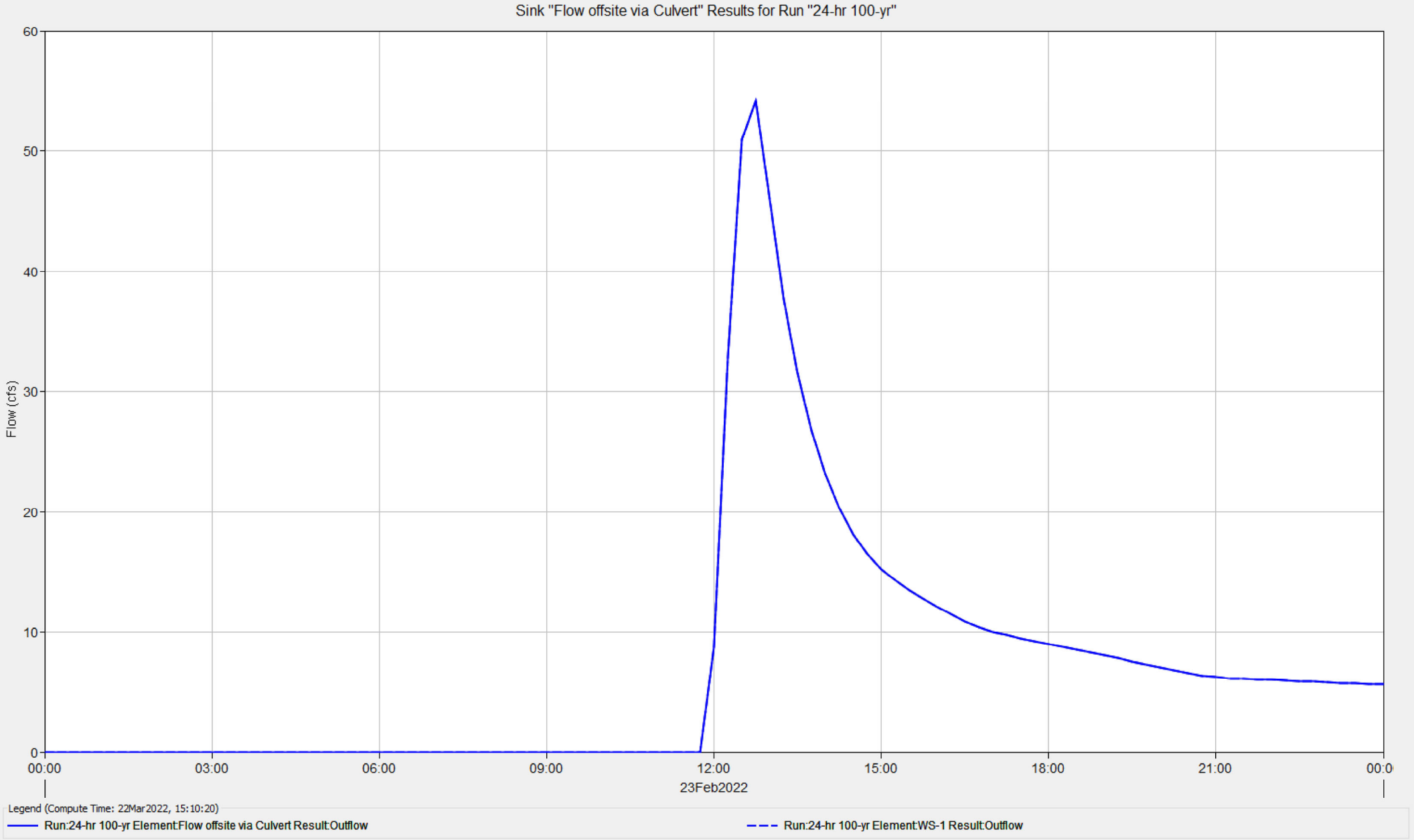
Basin Model: Reclamied Conditions
Meteorologic Model: 100-yr 24-hr event
Control Specifications: 24-hr storm event

Show Elements: All Elements Volume Units: (•) IN ( ) AC-FT Sorting: Hydrologic

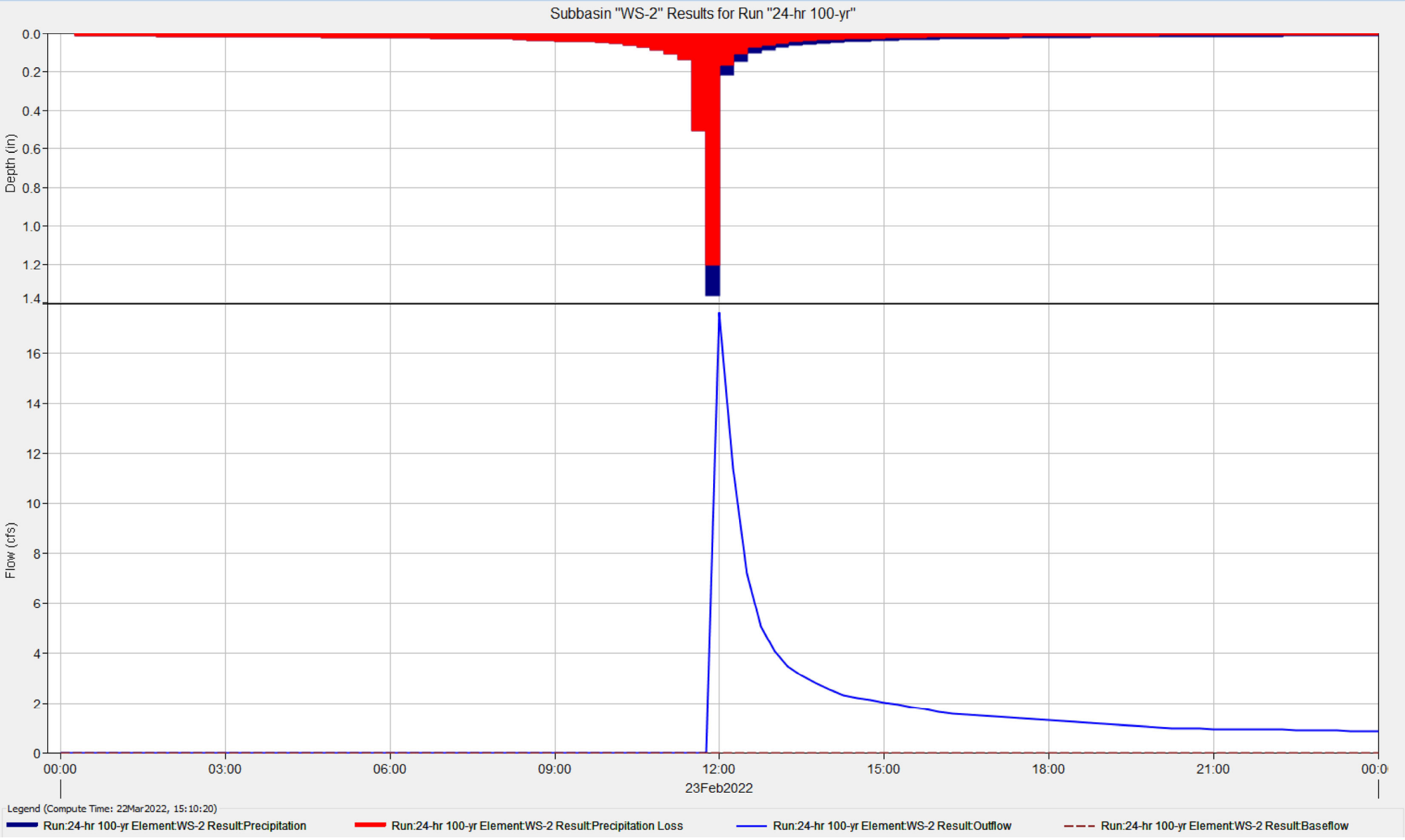
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
WS-2	0.06	17.6	23Feb2022, 12:00	0.70
Flow Offsite via Road Ditch	0.06	17.6	23Feb2022, 11:45	0.70
WS-1	0.38	54.2	23Feb2022, 12:45	0.69
Flow offsite via Culvert	0.38	54.2	23Feb2022, 12:30	0.69

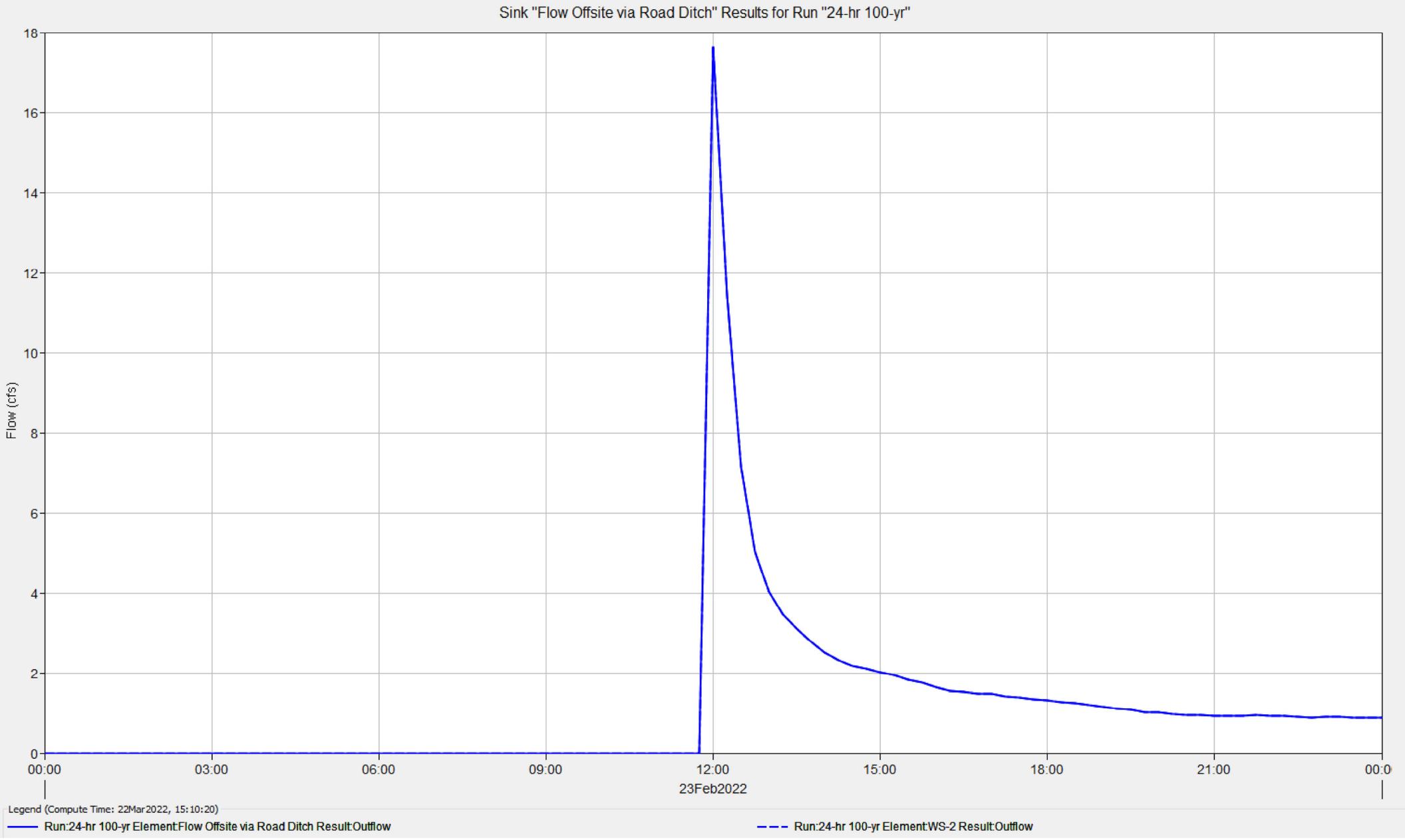
Date	Time	Precip (in)	Loss (in)	Excess (in)	Direct Flow (cfs)	Baseflow (cfs)	Total Flow (cfs)
23-Feb-22	0:00				0	0	0
23-Feb-22	0:15	0.01	0.01	0	0	0	0
23-Feb-22	0:30	0.01	0.01	0	0	0	0
23-Feb-22	0:45	0.01	0.01	0	0	0	0
23-Feb-22	1:00	0.01	0.01	0	0	0	0
23-Feb-22	1:15	0.01	0.01	0	0	0	0
23-Feb-22	1:30	0.01	0.01	0	0	0	0
23-Feb-22	1:45	0.01	0.01	0	0	0	0
23-Feb-22	2:00	0.01	0.01	0	0	0	0
23-Feb-22	2:15	0.01	0.01	0	0	0	0
23-Feb-22	2:30	0.01	0.01	0	0	0	0
23-Feb-22	2:45	0.02	0.02	0	0	0	0
23-Feb-22	3:00	0.02	0.02	0	0	0	0
23-Feb-22	3:15	0.02	0.02	0	0	0	0
23-Feb-22	3:30	0.02	0.02	0	0	0	0
23-Feb-22	3:45	0.02	0.02	0	0	0	0
23-Feb-22	4:00	0.02	0.02	0	0	0	0
23-Feb-22	4:15	0.02	0.02	0	0	0	0
23-Feb-22	4:30	0.02	0.02	0	0	0	0
23-Feb-22	4:45	0.02	0.02	0	0	0	0
23-Feb-22	5:00	0.02	0.02	0	0	0	0
23-Feb-22	5:15	0.02	0.02	0	0	0	0
23-Feb-22	5:30	0.02	0.02	0	0	0	0
23-Feb-22	5:45	0.02	0.02	0	0	0	0
23-Feb-22	6:00	0.02	0.02	0	0	0	0
23-Feb-22	6:15	0.02	0.02	0	0	0	0
23-Feb-22	6:30	0.02	0.02	0	0	0	0
23-Feb-22	6:45	0.02	0.02	0	0	0	0
23-Feb-22	7:00	0.02	0.02	0	0	0	0
23-Feb-22	7:15	0.02	0.02	0	0	0	0
23-Feb-22	7:30	0.03	0.03	0	0	0	0
23-Feb-22	7:45	0.03	0.03	0	0	0	0
23-Feb-22	8:00	0.03	0.03	0	0	0	0
23-Feb-22	8:15	0.03	0.03	0	0	0	0
23-Feb-22	8:30	0.03	0.03	0	0	0	0
23-Feb-22	8:45	0.03	0.03	0	0	0	0
23-Feb-22	9:00	0.04	0.04	0	0	0	0
23-Feb-22	9:15	0.04	0.04	0	0	0	0
23-Feb-22	9:30	0.04	0.04	0	0	0	0
23-Feb-22	9:45	0.04	0.04	0	0	0	0
23-Feb-22	10:00	0.05	0.05	0	0	0	0
23-Feb-22	10:15	0.05	0.05	0	0	0	0
23-Feb-22	10:30	0.06	0.06	0	0	0	0
23-Feb-22	10:45	0.07	0.07	0	0	0	0
23-Feb-22	11:00	0.08	0.08	0	0	0	0
23-Feb-22	11:15	0.1	0.1	0	0	0	0
23-Feb-22	11:30	0.13	0.13	0	0	0	0
23-Feb-22	11:45	0.5	0.5	0	0	0	0
23-Feb-22	12:00	1.36	1.2	0.16	8.8	0	8.8
23-Feb-22	12:15	0.21	0.16	0.05	32.8	0	32.8
23-Feb-22	12:30	0.14	0.1	0.04	50.9	0	50.9
23-Feb-22	12:45	0.1	0.07	0.03	54.2	0	54.2
23-Feb-22	13:00	0.08	0.06	0.02	45.9	0	45.9
23-Feb-22	13:15	0.07	0.05	0.02	37.7	0	37.7
23-Feb-22	13:30	0.06	0.04	0.02	31.5	0	31.5
23-Feb-22	13:45	0.05	0.04	0.02	26.8	0	26.8
23-Feb-22	14:00	0.05	0.03	0.02	23.1	0	23.1
23-Feb-22	14:15	0.04	0.03	0.01	20.3	0	20.3
23-Feb-22	14:30	0.04	0.03	0.01	18.1	0	18.1
23-Feb-22	14:45	0.04	0.03	0.01	16.5	0	16.5
23-Feb-22	15:00	0.04	0.02	0.01	15.2	0	15.2
23-Feb-22	15:15	0.04	0.02	0.01	14.3	0	14.3
23-Feb-22	15:30	0.03	0.02	0.01	13.5	0	13.5
23-Feb-22	15:45	0.03	0.02	0.01	12.8	0	12.8
23-Feb-22	16:00	0.03	0.02	0.01	12.1	0	12.1
23-Feb-22	16:15	0.03	0.02	0.01	11.5	0	11.5
23-Feb-22	16:30	0.03	0.02	0.01	10.9	0	10.9
23-Feb-22	16:45	0.03	0.02	0.01	10.4	0	10.4
23-Feb-22	17:00	0.03	0.02	0.01	10	0	10
23-Feb-22	17:15	0.02	0.02	0.01	9.8	0	9.8
23-Feb-22	17:30	0.02	0.02	0.01	9.5	0	9.5
23-Feb-22	17:45	0.02	0.01	0.01	9.2	0	9.2
23-Feb-22	18:00	0.02	0.01	0.01	9	0	9
23-Feb-22	18:15	0.02	0.01	0.01	8.8	0	8.8
23-Feb-22	18:30	0.02	0.01	0.01	8.5	0	8.5
23-Feb-22	18:45	0.02	0.01	0.01	8.3	0	8.3
23-Feb-22	19:00	0.02	0.01	0.01	8.1	0	8.1
23-Feb-22	19:15	0.02	0.01	0.01	7.8	0	7.8
23-Feb-22	19:30	0.02	0.01	0.01	7.6	0	7.6
23-Feb-22	19:45	0.02	0.01	0.01	7.3	0	7.3
23-Feb-22	20:00	0.02	0.01	0.01	7.1	0	7.1
23-Feb-22	20:15	0.02	0.01	0.01	6.8	0	6.8
23-Feb-22	20:30	0.02	0.01	0.01	6.6	0	6.6
23-Feb-22	20:45	0.02	0.01	0.01	6.4	0	6.4
23-Feb-22	21:00	0.02	0.01	0.01	6.3	0	6.3
23-Feb-22	21:15	0.02	0.01	0.01	6.2	0	6.2
23-Feb-22	21:30	0.02	0.01	0.01	6.1	0	6.1
23-Feb-22	21:45	0.02	0.01	0.01	6.1	0	6.1
23-Feb-22	22:00	0.01	0.01	0.01	6	0	6
23-Feb-22	22:15	0.01	0.01	0.01	6	0	6
23-Feb-22	22:30	0.01	0.01	0.01	5.9	0	5.9
23-Feb-22	22:45	0.01	0.01	0.01	5.9	0	5.9
23-Feb-22	23:00	0.01	0.01	0.01	5.8	0	5.8
23-Feb-22	23:15	0.01	0.01	0.01	5.8	0	5.8
23-Feb-22	23:30	0.01	0.01	0.01	5.8	0	5.8
23-Feb-22	23:45	0.01	0.01	0.01	5.7	0	5.7
24-Feb-22	0:00	0.01	0.01	0.01	5.7	0	5.7


Subbasin "WS-1" Results for Run "24-hr 100-yr"
Depth (in)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Flow (cfs)
50
40
30
20
10
0
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:10:20)
Run:24-hr 100-yr Element:WS-1 Result:Precipitation
Run:24-hr 100-yr Element:WS-1 Result:Precipitation Loss
Run:24-hr 100-yr Element:WS-1 Result:Outflow
Run:24-hr 100-yr Element:WS-1 Result:Baseflow


Sink "Flow offsite via Culvert" Results for Run "24-hr 100-yr"
Flow (cfs)
60
50
40
30
20
10
0
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:10:20)
Run:24-hr 100-yr Element:Flow offsite via Culvert Result:Outflow
Run:24-hr 100-yr Element:WS-1 Result:Outflow

Date	Time	Precip (in)	Loss (in)	Excess (in)	Direct Flow (cfs)	Baseflow (cfs)	Total Flow (cfs)
23-Feb-22	0:00				0	0	0
23-Feb-22	0:15	0.01	0.01	0	0	0	0
23-Feb-22	0:30	0.01	0.01	0	0	0	0
23-Feb-22	0:45	0.01	0.01	0	0	0	0
23-Feb-22	1:00	0.01	0.01	0	0	0	0
23-Feb-22	1:15	0.01	0.01	0	0	0	0
23-Feb-22	1:30	0.01	0.01	0	0	0	0
23-Feb-22	1:45	0.01	0.01	0	0	0	0
23-Feb-22	2:00	0.01	0.01	0	0	0	0
23-Feb-22	2:15	0.01	0.01	0	0	0	0
23-Feb-22	2:30	0.01	0.01	0	0	0	0
23-Feb-22	2:45	0.02	0.02	0	0	0	0
23-Feb-22	3:00	0.02	0.02	0	0	0	0
23-Feb-22	3:15	0.02	0.02	0	0	0	0
23-Feb-22	3:30	0.02	0.02	0	0	0	0
23-Feb-22	3:45	0.02	0.02	0	0	0	0
23-Feb-22	4:00	0.02	0.02	0	0	0	0
23-Feb-22	4:15	0.02	0.02	0	0	0	0
23-Feb-22	4:30	0.02	0.02	0	0	0	0
23-Feb-22	4:45	0.02	0.02	0	0	0	0
23-Feb-22	5:00	0.02	0.02	0	0	0	0
23-Feb-22	5:15	0.02	0.02	0	0	0	0
23-Feb-22	5:30	0.02	0.02	0	0	0	0
23-Feb-22	5:45	0.02	0.02	0	0	0	0
23-Feb-22	6:00	0.02	0.02	0	0	0	0
23-Feb-22	6:15	0.02	0.02	0	0	0	0
23-Feb-22	6:30	0.02	0.02	0	0	0	0
23-Feb-22	6:45	0.02	0.02	0	0	0	0
23-Feb-22	7:00	0.02	0.02	0	0	0	0
23-Feb-22	7:15	0.02	0.02	0	0	0	0
23-Feb-22	7:30	0.03	0.03	0	0	0	0
23-Feb-22	7:45	0.03	0.03	0	0	0	0
23-Feb-22	8:00	0.03	0.03	0	0	0	0
23-Feb-22	8:15	0.03	0.03	0	0	0	0
23-Feb-22	8:30	0.03	0.03	0	0	0	0
23-Feb-22	8:45	0.03	0.03	0	0	0	0
23-Feb-22	9:00	0.04	0.04	0	0	0	0
23-Feb-22	9:15	0.04	0.04	0	0	0	0
23-Feb-22	9:30	0.04	0.04	0	0	0	0
23-Feb-22	9:45	0.04	0.04	0	0	0	0
23-Feb-22	10:00	0.05	0.05	0	0	0	0
23-Feb-22	10:15	0.05	0.05	0	0	0	0
23-Feb-22	10:30	0.06	0.06	0	0	0	0
23-Feb-22	10:45	0.07	0.07	0	0	0	0
23-Feb-22	11:00	0.08	0.08	0	0	0	0
23-Feb-22	11:15	0.1	0.1	0	0	0	0
23-Feb-22	11:30	0.13	0.13	0	0	0	0
23-Feb-22	11:45	0.5	0.5	0	0	0	0
23-Feb-22	12:00	1.36	1.2	0.16	17.6	0	17.6
23-Feb-22	12:15	0.21	0.16	0.05	11.4	0	11.4
23-Feb-22	12:30	0.14	0.1	0.04	7.2	0	7.2
23-Feb-22	12:45	0.1	0.07	0.03	5	0	5
23-Feb-22	13:00	0.08	0.06	0.02	4.1	0	4.1
23-Feb-22	13:15	0.07	0.05	0.02	3.5	0	3.5
23-Feb-22	13:30	0.06	0.04	0.02	3.1	0	3.1
23-Feb-22	13:45	0.05	0.04	0.02	2.8	0	2.8
23-Feb-22	14:00	0.05	0.03	0.02	2.5	0	2.5
23-Feb-22	14:15	0.04	0.03	0.01	2.3	0	2.3
23-Feb-22	14:30	0.04	0.03	0.01	2.2	0	2.2
23-Feb-22	14:45	0.04	0.03	0.01	2.1	0	2.1
23-Feb-22	15:00	0.04	0.02	0.01	2	0	2
23-Feb-22	15:15	0.04	0.02	0.01	2	0	2
23-Feb-22	15:30	0.03	0.02	0.01	1.8	0	1.8
23-Feb-22	15:45	0.03	0.02	0.01	1.8	0	1.8
23-Feb-22	16:00	0.03	0.02	0.01	1.6	0	1.6
23-Feb-22	16:15	0.03	0.02	0.01	1.6	0	1.6
23-Feb-22	16:30	0.03	0.02	0.01	1.5	0	1.5
23-Feb-22	16:45	0.03	0.02	0.01	1.5	0	1.5
23-Feb-22	17:00	0.03	0.02	0.01	1.5	0	1.5
23-Feb-22	17:15	0.02	0.02	0.01	1.4	0	1.4
23-Feb-22	17:30	0.02	0.02	0.01	1.4	0	1.4
23-Feb-22	17:45	0.02	0.01	0.01	1.4	0	1.4
23-Feb-22	18:00	0.02	0.01	0.01	1.3	0	1.3
23-Feb-22	18:15	0.02	0.01	0.01	1.3	0	1.3
23-Feb-22	18:30	0.02	0.01	0.01	1.3	0	1.3
23-Feb-22	18:45	0.02	0.01	0.01	1.2	0	1.2
23-Feb-22	19:00	0.02	0.01	0.01	1.2	0	1.2
23-Feb-22	19:15	0.02	0.01	0.01	1.1	0	1.1
23-Feb-22	19:30	0.02	0.01	0.01	1.1	0	1.1
23-Feb-22	19:45	0.02	0.01	0.01	1	0	1
23-Feb-22	20:00	0.02	0.01	0.01	1	0	1
23-Feb-22	20:15	0.02	0.01	0.01	1	0	1
23-Feb-22	20:30	0.02	0.01	0.01	1	0	1
23-Feb-22	20:45	0.02	0.01	0.01	1	0	1
23-Feb-22	21:00	0.02	0.01	0.01	0.9	0	0.9
23-Feb-22	21:15	0.02	0.01	0.01	0.9	0	0.9
23-Feb-22	21:30	0.02	0.01	0.01	0.9	0	0.9
23-Feb-22	21:45	0.02	0.01	0.01	1	0	1
23-Feb-22	22:00	0.01	0.01	0.01	0.9	0	0.9
23-Feb-22	22:15	0.01	0.01	0.01	0.9	0	0.9
23-Feb-22	22:30	0.01	0.01	0.01	0.9	0	0.9
23-Feb-22	22:45	0.01	0.01	0.01	0.9	0	0.9
23-Feb-22	23:00	0.01	0.01	0.01	0.9	0	0.9
23-Feb-22	23:15	0.01	0.01	0.01	0.9	0	0.9
23-Feb-22	23:30	0.01	0.01	0.01	0.9	0	0.9
23-Feb-22	23:45	0.01	0.01	0.01	0.9	0	0.9
24-Feb-22	0:00	0.01	0.01	0.01	0.9	0	0.9


Subbasin "WS-2" Results for Run "24-hr 100-yr"
Depth (in)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Flow (cfs)
16
14
12
10
8
6
4
2
0
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:10:20)
Run:24-hr 100-yr Element:WS-2 Result:Precipitation
Run:24-hr 100-yr Element:WS-2 Result:Precipitation Loss
Run:24-hr 100-yr Element:WS-2 Result:Outflow
Run:24-hr 100-yr Element:WS-2 Result:Baseflow


Sink "Flow Offsite via Road Ditch" Results for Run "24-hr 100-yr"
Flow (cfs)
18
16
14
12
10
8
6
4
2
0
00:00
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:0
23Feb2022
Legend (Compute Time: 22Mar2022, 15:10:20)
Run:24-hr 100-yr Element:Flow Offsite via Road Ditch Result:Outflow
Run:24-hr 100-yr Element:WS-2 Result:Outflow

APPENDIX C
HEC-RAS Modeling Results

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

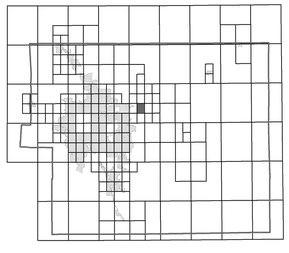
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 64 WEST.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D Boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 — 23	Transect line
97° 07' 30.00" 32° 22' 30.00"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN	1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT	5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

PANEL 0562G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 562 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0562	G

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
08041C0562G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

NOTES TO USERS

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To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

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NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
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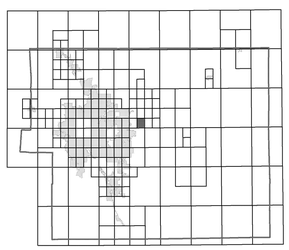
El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION	

Panel Location Map



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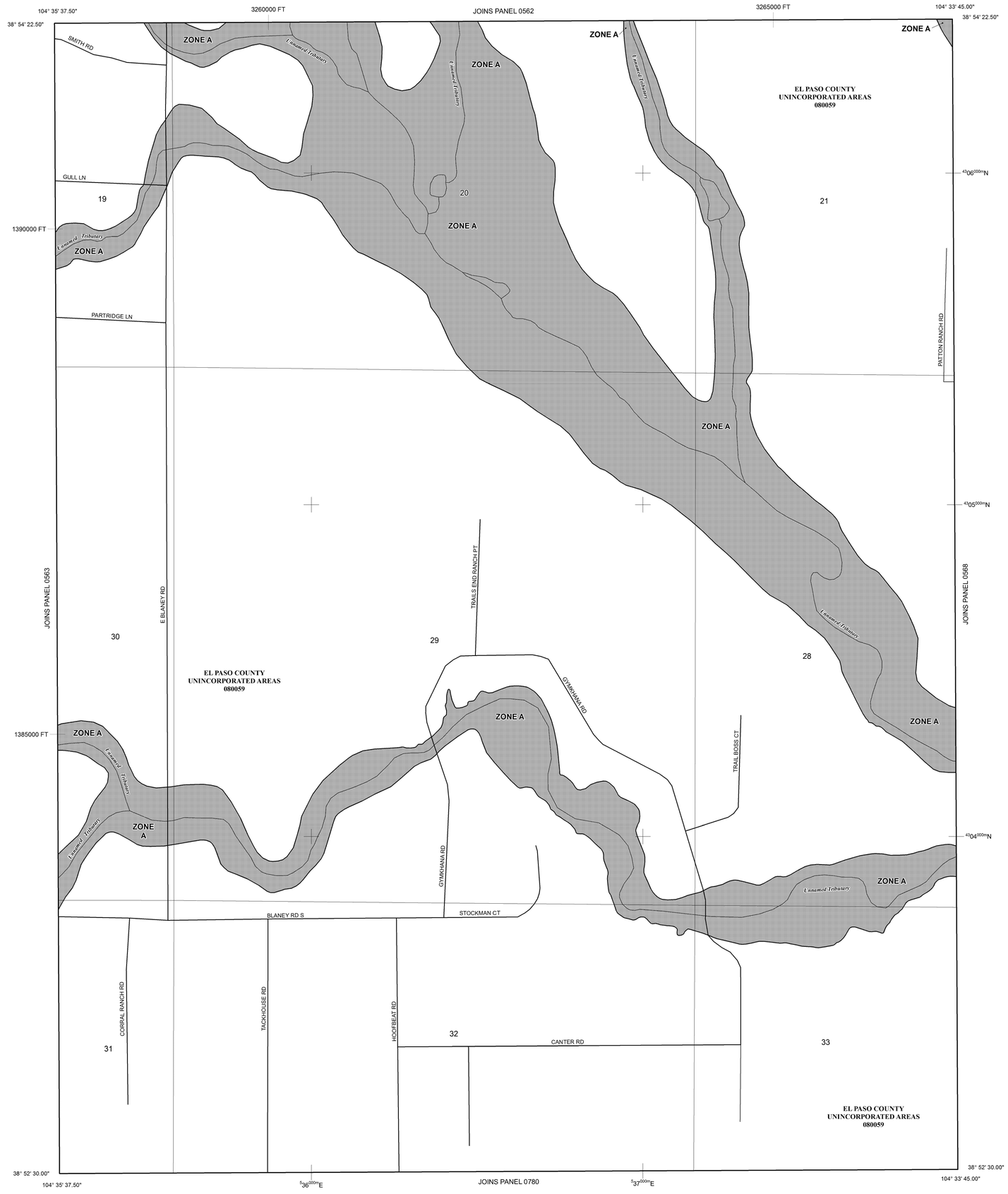

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain boundary
	Floodway boundary
	Zone D Boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
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* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
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M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

PANEL 0564G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 564 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0564	G

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
08041C0564G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

NOTES TO USERS

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El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

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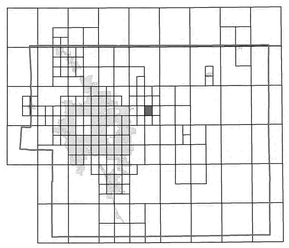
Panel Location Map



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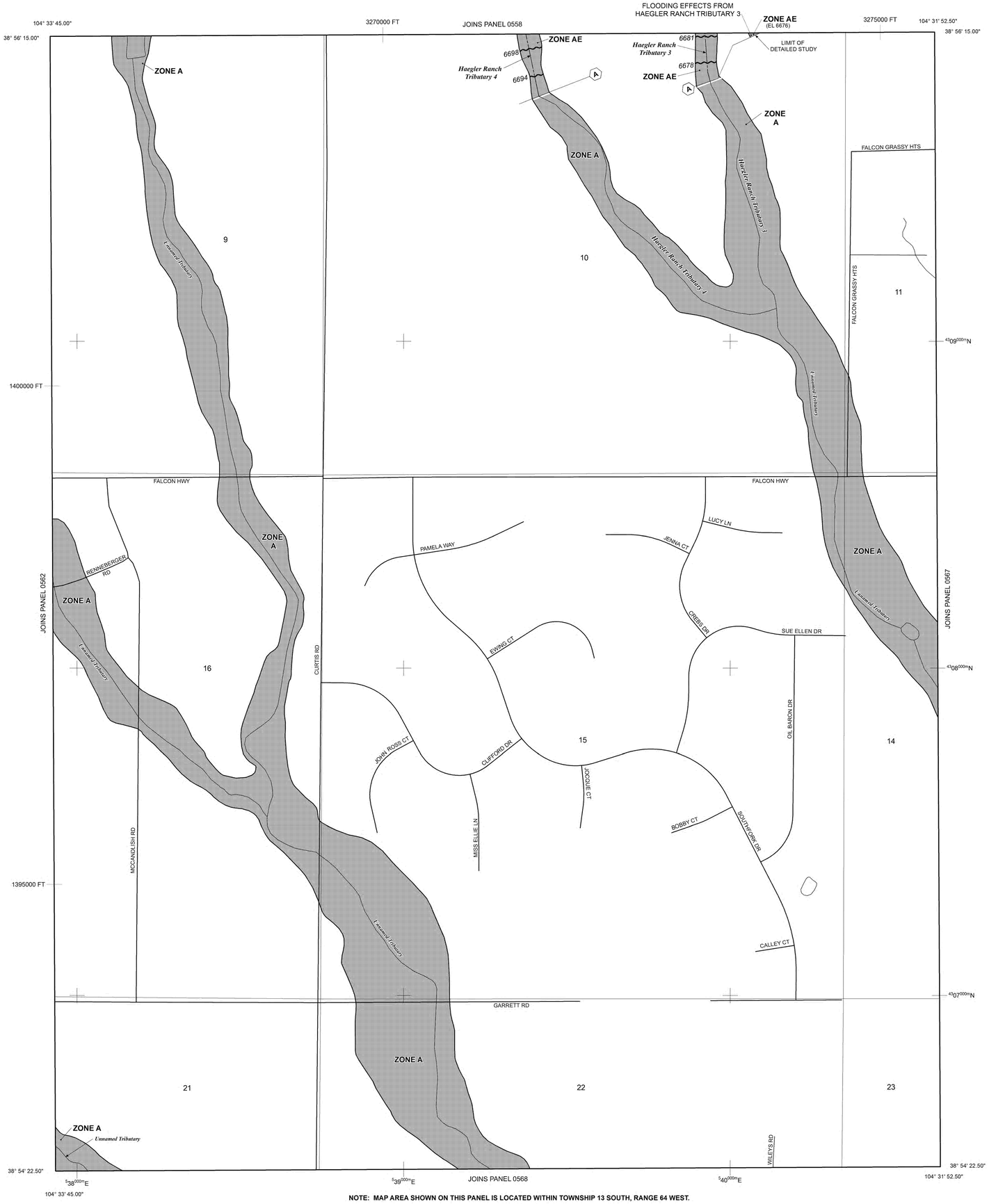

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 64 WEST.

LEGEND

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ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

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OTHER FLOOD AREAS

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MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

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MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

PANEL 0566G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 566 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0566	G

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MAP NUMBER 08041C0566G

MAP REVISED DECEMBER 7, 2018

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, and Anderson Consulting Engineers, Inc. These data are current as of 2008.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

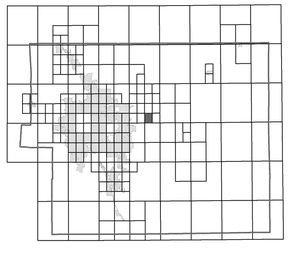
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

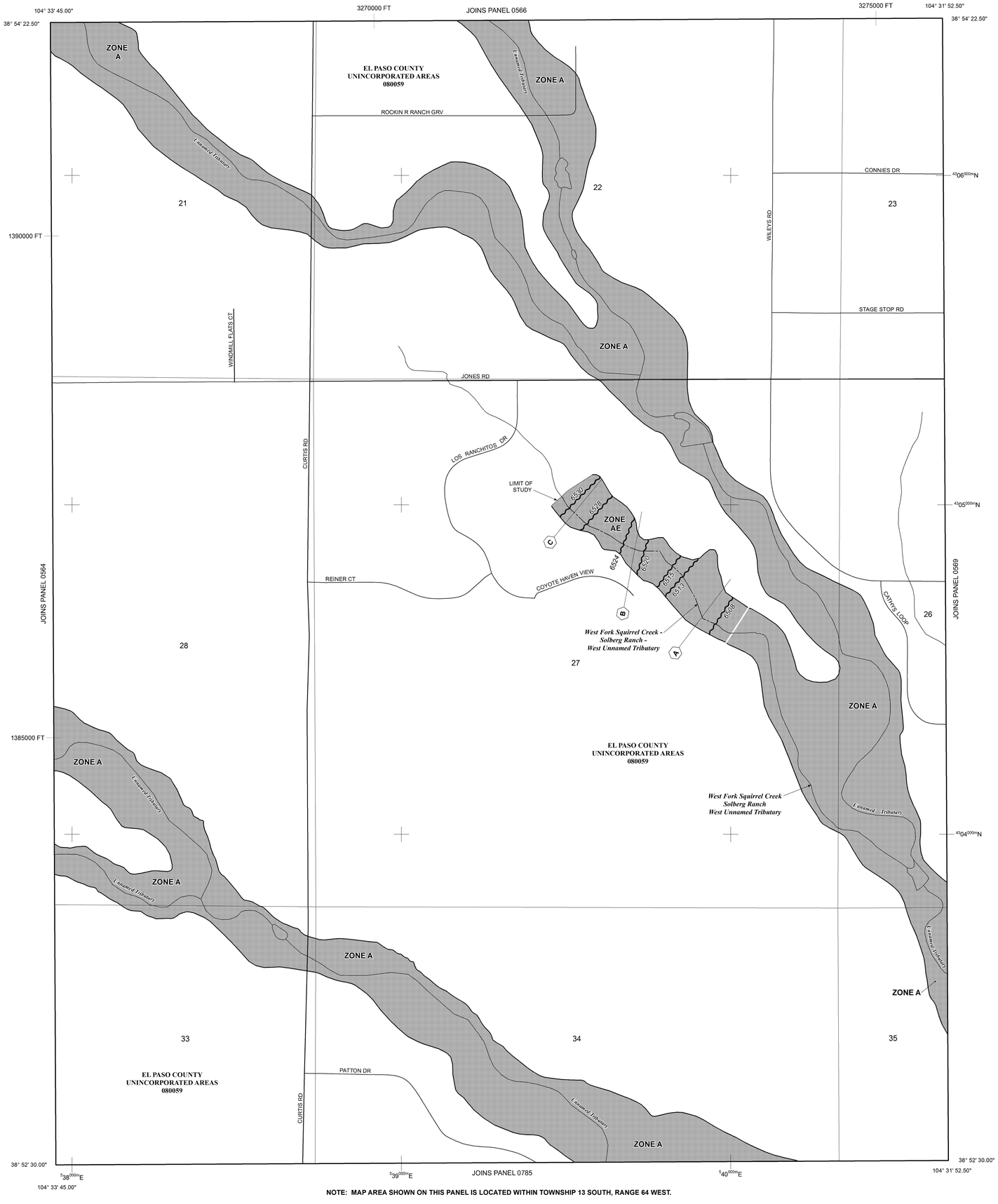
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 13 SOUTH, RANGE 64 WEST.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAS) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.
ZONE AE Base Flood Elevations determined.
ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR Special Flood Hazard Area Formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary
Floodway boundary
Zone D Boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 — Base Flood Elevation line and value; elevation in feet*
(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A — Cross section line
23 — 23 — Transect line
97° 07' 30.00" / 32° 22' 30.00" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4275000mN — 1000-meter Universal Transverse Mercator grid ticks, zone 13
6000000 FT — 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

PANEL 0568G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 568 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

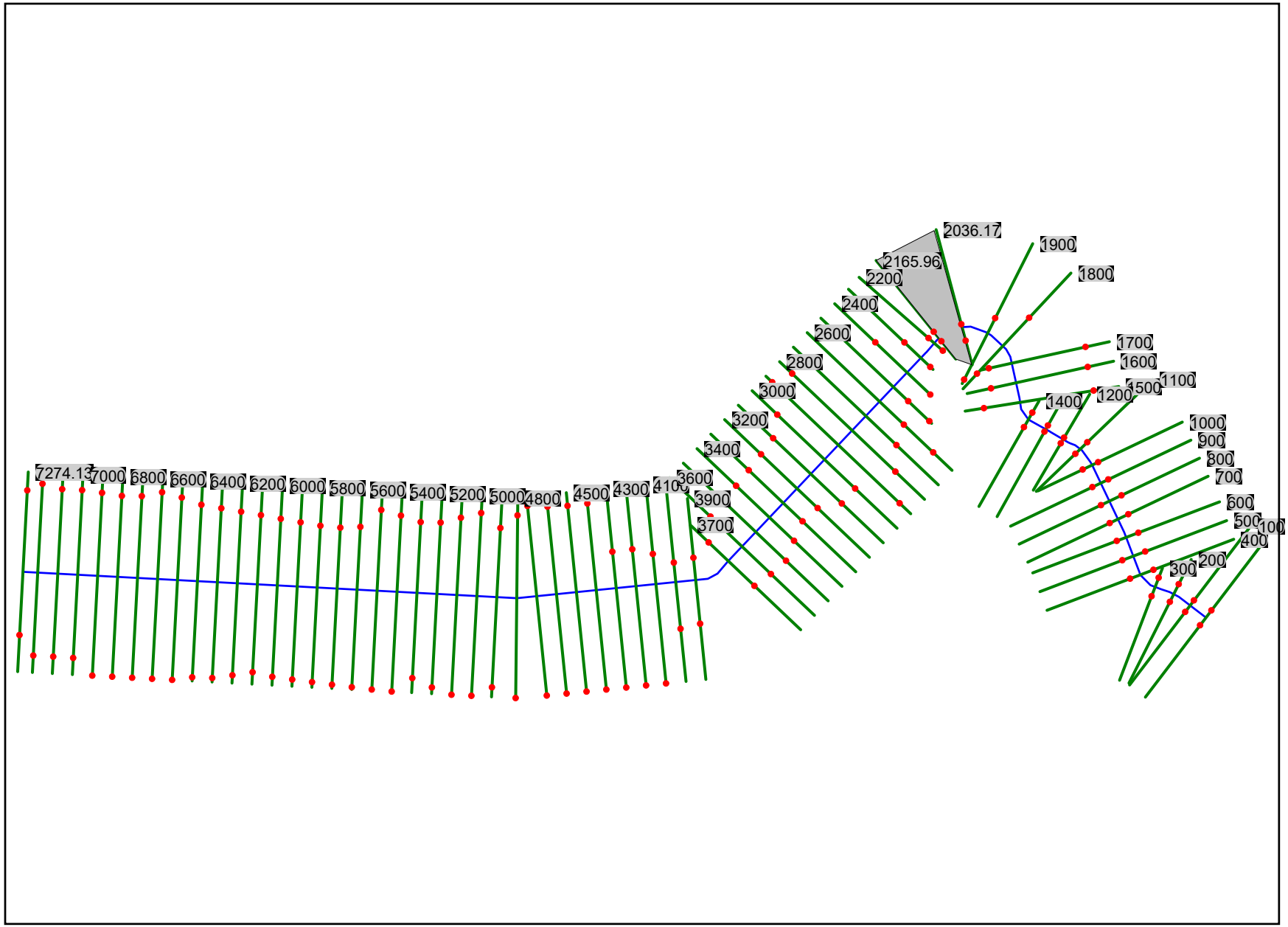
COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY	080059	0568	G

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
08041C0568G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency


7274.13
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6600
6400
6200
6000
5800
5600
5400
5200
5000
4800
4500
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3900
3700
3600
3400
3200
3000
2800
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2400
2200
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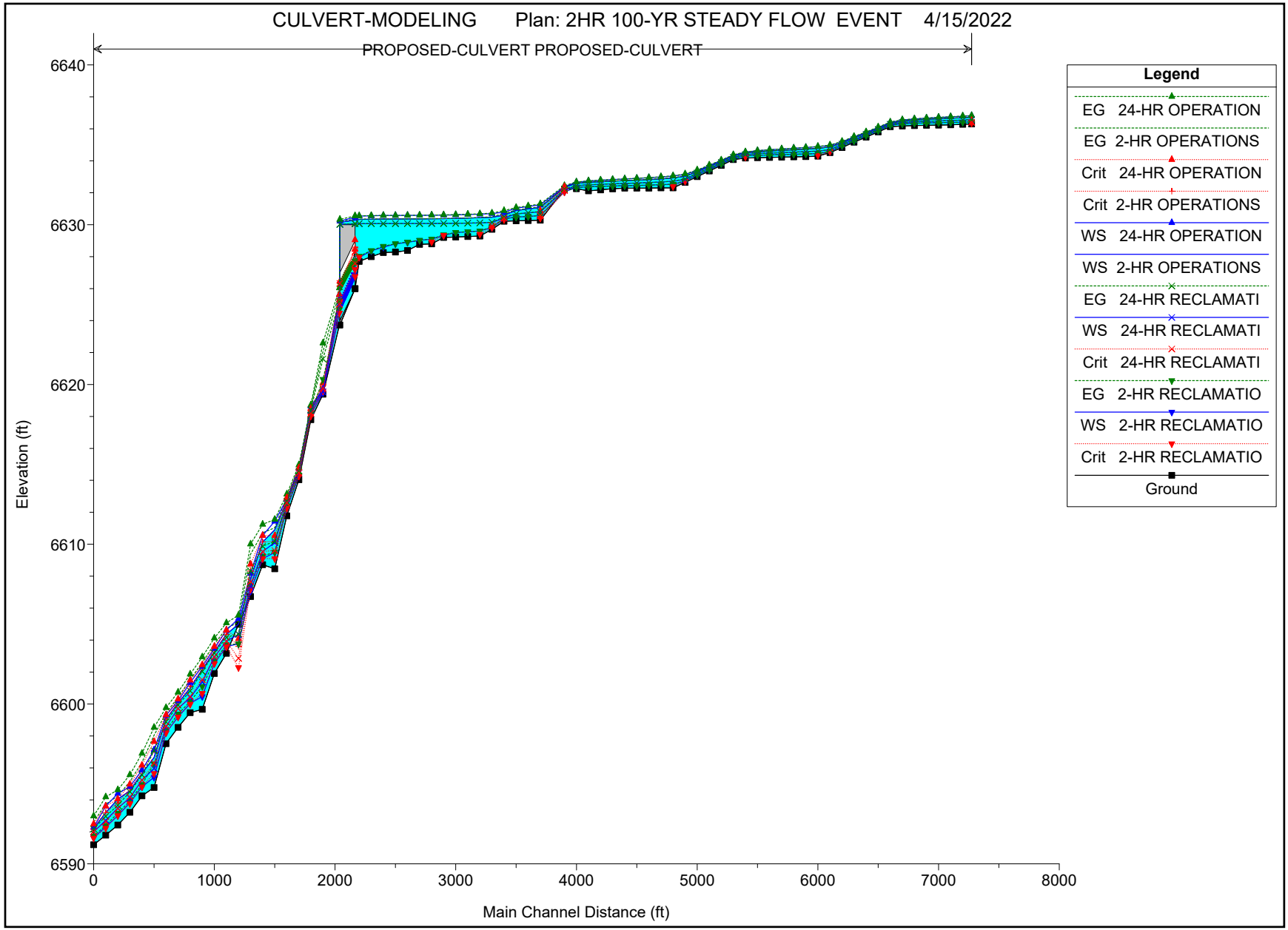
CULVERT-MODELING Plan: 2HR 100-YR STEADY FLOW EVENT 4/15/2022
PROPOSED-CULVERT PROPOSED-CULVERT
Elevation (ft)
6640
6630
6620
6610
6600
6590
0
1000
2000
3000
4000
5000
6000
7000
8000
Main Channel Distance (ft)
Legend
EG 24-HR OPERATION
EG 2-HR OPERATIONS
Crit 24-HR OPERATION
Crit 2-HR OPERATIONS
WS 24-HR OPERATION
WS 2-HR OPERATIONS
EG 24-HR RECLAMATI
WS 24-HR RECLAMATI
Crit 24-HR RECLAMATI
EG 2-HR RECLAMATIO
WS 2-HR RECLAMATIO
Crit 2-HR RECLAMATIO
Ground

HEC-RAS Plan: STEADY FLOW 2-HR 100-YR River: PROPOSED-CULVERT Reach: PROPOSED-CULVERT

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)	
PROPOSED-CULVERT	7274.13	2-HR OPERATIONS	140.20	6636.30	6636.73	6636.47	6636.74	0.000469	0.69	202.67	623.15	0.21
PROPOSED-CULVERT	7274.13	24-HR OPERATION	213.80	6636.30	6636.82	6636.52	6636.83	0.000511	0.81	263.89	682.77	0.23
PROPOSED-CULVERT	7274.13	2-HR RECLAMATIO	14.20	6636.30	6636.44	6636.36	6636.44	0.000382	0.30	47.51	441.05	0.16
PROPOSED-CULVERT	7274.13	24-HR RECLAMATI	54.20	6636.30	6636.57	6636.41	6636.57	0.000394	0.48	112.79	525.68	0.18
PROPOSED-CULVERT	7200	2-HR OPERATIONS	140.20	6636.28	6636.70		6636.70	0.000373	0.63	224.05	673.78	0.19
PROPOSED-CULVERT	7200	24-HR OPERATION	213.80	6636.28	6636.79		6636.80	0.000423	0.74	287.24	732.04	0.21
PROPOSED-CULVERT	7200	2-HR RECLAMATIO	14.20	6636.28	6636.42		6636.42	0.000201	0.24	60.22	493.57	0.12
PROPOSED-CULVERT	7200	24-HR RECLAMATI	54.20	6636.28	6636.55		6636.55	0.000280	0.42	129.58	575.21	0.16
PROPOSED-CULVERT	7100	2-HR OPERATIONS	140.20	6636.25	6636.66		6636.67	0.000341	0.59	236.99	726.23	0.18
PROPOSED-CULVERT	7100	24-HR OPERATION	213.80	6636.25	6636.75		6636.76	0.000393	0.71	300.96	779.01	0.20
PROPOSED-CULVERT	7100	2-HR RECLAMATIO	14.20	6636.25	6636.40		6636.40	0.000158	0.21	68.12	560.99	0.11
PROPOSED-CULVERT	7100	24-HR RECLAMATI	54.20	6636.25	6636.52		6636.52	0.000244	0.39	140.58	635.77	0.14
PROPOSED-CULVERT	7000	2-HR OPERATIONS	140.20	6636.23	6636.63		6636.63	0.000363	0.59	238.82	775.09	0.19
PROPOSED-CULVERT	7000	24-HR OPERATION	213.80	6636.23	6636.71		6636.72	0.000416	0.71	302.44	822.38	0.21
PROPOSED-CULVERT	7000	2-HR RECLAMATIO	14.20	6636.23	6636.38		6636.39	0.000176	0.21	68.72	621.82	0.11
PROPOSED-CULVERT	7000	24-HR RECLAMATI	54.20	6636.23	6636.50		6636.50	0.000263	0.38	142.13	691.84	0.15
PROPOSED-CULVERT	6900	2-HR OPERATIONS	140.20	6636.22	6636.59		6636.60	0.000390	0.59	238.96	818.62	0.19
PROPOSED-CULVERT	6900	24-HR OPERATION	213.80	6636.22	6636.67		6636.67	0.000453	0.71	300.64	864.36	0.21
PROPOSED-CULVERT	6900	2-HR RECLAMATIO	14.20	6636.22	6636.37		6636.37	0.000182	0.20	70.62	680.85	0.11
PROPOSED-CULVERT	6900	24-HR RECLAMATI	54.20	6636.22	6636.47		6636.47	0.000280	0.38	143.61	743.51	0.15
PROPOSED-CULVERT	6800	2-HR OPERATIONS	140.20	6636.20	6636.55		6636.56	0.000448	0.60	234.29	865.64	0.20
PROPOSED-CULVERT	6800	24-HR OPERATION	213.80	6636.20	6636.62		6636.63	0.000516	0.73	292.61	904.20	0.22
PROPOSED-CULVERT	6800	2-HR RECLAMATIO	14.20	6636.20	6636.35		6636.35	0.000191	0.20	72.07	742.03	0.11
PROPOSED-CULVERT	6800	24-HR RECLAMATI	54.20	6636.20	6636.44		6636.44	0.000322	0.38	141.65	798.09	0.16
PROPOSED-CULVERT	6700	2-HR OPERATIONS	140.20	6636.18	6636.49		6636.50	0.000729	0.68	205.52	898.38	0.25
PROPOSED-CULVERT	6700	24-HR OPERATION	213.80	6636.18	6636.55		6636.56	0.000805	0.83	258.59	923.71	0.27
PROPOSED-CULVERT	6700	2-HR RECLAMATIO	14.20	6636.18	6636.32		6636.32	0.000431	0.25	57.91	791.55	0.16
PROPOSED-CULVERT	6700	24-HR RECLAMATI	54.20	6636.18	6636.39		6636.40	0.000591	0.45	120.36	837.81	0.21
PROPOSED-CULVERT	6600	2-HR OPERATIONS	140.20	6636.13	6636.35		6636.37	0.003411	1.09	128.34	880.79	0.50
PROPOSED-CULVERT	6600	24-HR OPERATION	213.80	6636.13	6636.40		6636.42	0.003020	1.23	173.35	905.14	0.50
PROPOSED-CULVERT	6600	2-HR RECLAMATIO	14.20	6636.13	6636.22		6636.23	0.002324	0.45	31.58	615.44	0.35
PROPOSED-CULVERT	6600	24-HR RECLAMATI	54.20	6636.13	6636.28		6636.29	0.003177	0.77	70.35	772.81	0.45
PROPOSED-CULVERT	6500	2-HR OPERATIONS	140.20	6635.81	6636.04		6636.06	0.002961	1.11	126.87	769.45	0.48
PROPOSED-CULVERT	6500	24-HR OPERATION	213.80	6635.81	6636.08		6636.11	0.003044	1.30	164.34	796.75	0.50
PROPOSED-CULVERT	6500	2-HR RECLAMATIO	14.20	6635.81	6635.88		6635.89	0.005466	0.62	22.82	519.05	0.52
PROPOSED-CULVERT	6500	24-HR RECLAMATI	54.20	6635.81	6635.96		6635.97	0.003349	0.81	66.84	707.34	0.47
PROPOSED-CULVERT	6400	2-HR OPERATIONS	140.20	6635.48	6635.72		6635.74	0.003415	1.23	114.13	657.27	0.52
PROPOSED-CULVERT	6400	24-HR OPERATION	213.80	6635.48	6635.78		6635.81	0.003072	1.38	154.99	692.86	0.51
PROPOSED-CULVERT	6400	2-HR RECLAMATIO	14.20	6635.48	6635.58		6635.58	0.001864	0.46	31.08	501.22	0.32
PROPOSED-CULVERT	6400	24-HR RECLAMATI	54.20	6635.48	6635.64		6635.65	0.003057	0.84	64.84	612.33	0.45
PROPOSED-CULVERT	6300	2-HR OPERATIONS	140.20	6635.16	6635.43		6635.45	0.002563	1.20	116.87	562.37	0.46
PROPOSED-CULVERT	6300	24-HR OPERATION	213.80	6635.16	6635.49		6635.52	0.002813	1.38	154.39	642.36	0.50
PROPOSED-CULVERT	6300	2-HR RECLAMATIO	14.20	6635.16	6635.23		6635.24	0.008701	0.81	17.57	382.47	0.66
PROPOSED-CULVERT	6300	24-HR RECLAMATI	54.20	6635.16	6635.32		6635.33	0.003554	0.95	57.06	497.99	0.49
PROPOSED-CULVERT	6200	2-HR OPERATIONS	140.20	6634.83	6635.11		6635.14	0.003744	1.40	100.47	512.09	0.56
PROPOSED-CULVERT	6200	24-HR OPERATION	213.80	6634.83	6635.18		6635.22	0.003355	1.55	137.52	548.99	0.55
PROPOSED-CULVERT	6200	2-HR RECLAMATIO	14.20	6634.83	6634.94		6634.95	0.001480	0.49	28.98	353.84	0.30
PROPOSED-CULVERT	6200	24-HR RECLAMATI	54.20	6634.83	6635.03		6635.04	0.002400	0.87	62.33	462.67	0.42
PROPOSED-CULVERT	6100	2-HR OPERATIONS	140.20	6634.51	6634.86		6634.88	0.001917	1.19	117.95	462.75	0.42
PROPOSED-CULVERT	6100	24-HR OPERATION	213.80	6634.51	6634.96		6634.98	0.001588	1.27	168.22	518.41	0.39
PROPOSED-CULVERT	6100	2-HR RECLAMATIO	14.20	6634.51	6634.58	6634.58	6634.60	0.015981	1.22	11.63	214.91	0.93
PROPOSED-CULVERT	6100	24-HR RECLAMATI	54.20	6634.51	6634.69		6634.71	0.004764	1.16	46.63	374.51	0.58
PROPOSED-CULVERT	6000	2-HR OPERATIONS	140.20	6634.29	6634.78		6634.79	0.000490	0.76	183.64	503.46	0.22
PROPOSED-CULVERT	6000	24-HR OPERATION	213.80	6634.29	6634.88		6634.89	0.000548	0.90	237.94	555.47	0.24
PROPOSED-CULVERT	6000	2-HR RECLAMATIO	14.20	6634.29	6634.45	6634.34	6634.45	0.000276	0.30	46.86	333.55	0.14
PROPOSED-CULVERT	6000	24-HR RECLAMATI	54.20	6634.29	6634.60		6634.61	0.000380	0.52	103.65	413.93	0.18
PROPOSED-CULVERT	5900	2-HR OPERATIONS	140.20	6634.26	6634.73		6634.74	0.000436	0.71	197.19	550.53	0.21
PROPOSED-CULVERT	5900	24-HR OPERATION	213.80	6634.26	6634.83		6634.84	0.000496	0.85	252.76	599.01	0.23
PROPOSED-CULVERT	5900	2-HR RECLAMATIO	14.20	6634.26	6634.43		6634.43	0.000222	0.26	53.62	397.40	0.13
PROPOSED-CULVERT	5900	24-HR RECLAMATI	54.20	6634.26	6634.57		6634.57	0.000327	0.48	113.86	468.17	0.17
PROPOSED-CULVERT	5800	2-HR OPERATIONS	140.20	6634.24	6634.69		6634.70	0.000412	0.68	207.52	599.46	0.20
PROPOSED-CULVERT	5800	24-HR OPERATION	213.80	6634.24	6634.78		6634.79	0.000473	0.81	264.04	645.29	0.22
PROPOSED-CULVERT	5800	2-HR RECLAMATIO	14.20	6634.24	6634.41		6634.41	0.000200	0.24	58.44	455.94	0.12
PROPOSED-CULVERT	5800	24-HR RECLAMATI	54.20	6634.24	6634.54		6634.54	0.000303	0.45	121.79	522.37	0.16
PROPOSED-CULVERT	5700	2-HR OPERATIONS	140.20	6634.23	6634.65		6634.66	0.000424	0.66	212.18	648.17	0.20
PROPOSED-CULVERT	5700	24-HR OPERATION	213.80	6634.23	6634.73		6634.74	0.000486	0.79	269.42	692.49	0.22
PROPOSED-CULVERT	5700	2-HR RECLAMATIO	14.20	6634.23	6634.39		6634.39	0.000216	0.24	60.06	516.54	0.12
PROPOSED-CULVERT	5700	24-HR RECLAMATI	54.20	6634.23	6634.51		6634.51	0.000313	0.43	125.45	576.80	0.16
PROPOSED-CULVERT	5600	2-HR OPERATIONS	140.20	6634.21	6634.61		6634.61	0.000446	0.65	215.36	698.31	0.21
PROPOSED-CULVERT	5600	24-HR OPERATION	213.80	6634.21	6634.69		6634.70	0.000508	0.79	271.81	738.22	0.23
PROPOSED-CULVERT	5600	2-HR RECLAMATIO	14.20	6634.21	6634.37		6634.37	0.000219	0.23	62.49	576.83	0.12
PROPOSED-CULVERT	5600	24-HR RECLAMATI	54.20	6634.21	6634.48		6634.48	0.000326	0.42	128.60	632.30	0.16

HEC-RAS Plan: STEADY FLOW 2-HR 100-YR River: PROPOSED-CULVERT Reach: PROPOSED-CULVERT (Continued)

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)	
PROPOSED-CULVERT	5500	2-HR OPERATIONS	140.20	6634.19	6634.56		6634.57	0.000543	0.67	208.40	745.56	0.22
PROPOSED-CULVERT	5500	24-HR OPERATION	213.80	6634.19	6634.63		6634.64	0.000620	0.81	262.85	781.82	0.25
PROPOSED-CULVERT	5500	2-HR RECLAMATIO	14.20	6634.19	6634.34		6634.34	0.000301	0.24	59.06	635.22	0.14
PROPOSED-CULVERT	5500	24-HR RECLAMATI	54.20	6634.19	6634.44		6634.44	0.000407	0.44	124.20	685.54	0.18
PROPOSED-CULVERT	5400	2-HR OPERATIONS	140.20	6634.17	6634.48		6634.49	0.001037	0.80	174.27	774.78	0.30
PROPOSED-CULVERT	5400	24-HR OPERATION	213.80	6634.17	6634.54		6634.56	0.001095	0.95	224.46	806.83	0.32
PROPOSED-CULVERT	5400	2-HR RECLAMATIO	14.20	6634.17	6634.31	6634.24	6634.31	0.000722	0.30	46.86	686.98	0.20
PROPOSED-CULVERT	5400	24-HR RECLAMATI	54.20	6634.17	6634.38		6634.39	0.000837	0.53	102.43	726.56	0.25
PROPOSED-CULVERT	5300	2-HR OPERATIONS	140.20	6634.07	6634.30		6634.32	0.003335	1.15	121.53	756.28	0.51
PROPOSED-CULVERT	5300	24-HR OPERATION	213.80	6634.07	6634.35		6634.38	0.003425	1.37	156.37	778.21	0.53
PROPOSED-CULVERT	5300	2-HR RECLAMATIO	14.20	6634.07	6634.13		6634.14	0.006541	0.70	20.29	442.30	0.58
PROPOSED-CULVERT	5300	24-HR RECLAMATI	54.20	6634.07	6634.21		6634.22	0.004247	0.95	57.28	574.68	0.53
PROPOSED-CULVERT	5200	2-HR OPERATIONS	140.20	6633.71	6633.96		6633.98	0.003351	1.23	113.83	643.82	0.52
PROPOSED-CULVERT	5200	24-HR OPERATION	213.80	6633.71	6634.02		6634.05	0.003354	1.43	149.18	672.75	0.54
PROPOSED-CULVERT	5200	2-HR RECLAMATIO	14.20	6633.71	6633.81		6633.81	0.001939	0.50	28.67	421.86	0.33
PROPOSED-CULVERT	5200	24-HR RECLAMATI	54.20	6633.71	6633.88		6633.89	0.002606	0.83	65.40	555.03	0.43
PROPOSED-CULVERT	5100	2-HR OPERATIONS	140.20	6633.36	6633.63		6633.66	0.003250	1.31	106.65	534.57	0.52
PROPOSED-CULVERT	5100	24-HR OPERATION	213.80	6633.36	6633.70		6633.73	0.003061	1.49	143.64	571.33	0.52
PROPOSED-CULVERT	5100	2-HR RECLAMATIO	14.20	6633.36	6633.43		6633.44	0.010251	0.92	15.40	311.20	0.73
PROPOSED-CULVERT	5100	24-HR RECLAMATI	54.20	6633.36	6633.52		6633.54	0.005315	1.09	49.56	473.52	0.60
PROPOSED-CULVERT	5000	2-HR OPERATIONS	140.20	6633.01	6633.32		6633.35	0.003039	1.36	103.11	467.31	0.51
PROPOSED-CULVERT	5000	24-HR OPERATION	213.80	6633.01	6633.38		6633.42	0.003197	1.59	134.25	498.52	0.54
PROPOSED-CULVERT	5000	2-HR RECLAMATIO	14.20	6633.01	6633.13		6633.13	0.001472	0.50	28.43	336.08	0.30
PROPOSED-CULVERT	5000	24-HR RECLAMATI	54.20	6633.01	6633.22		6633.23	0.001927	0.87	61.96	386.57	0.39
PROPOSED-CULVERT	4900	2-HR OPERATIONS	140.20	6632.65	6633.03		6633.06	0.002607	1.40	100.29	388.63	0.49
PROPOSED-CULVERT	4900	24-HR OPERATION	213.80	6632.65	6633.14		6633.18	0.001955	1.43	149.13	448.44	0.44
PROPOSED-CULVERT	4900	2-HR RECLAMATIO	14.20	6632.65	6632.73	6632.73	6632.76	0.022989	1.43	9.94	190.72	1.10
PROPOSED-CULVERT	4900	24-HR RECLAMATI	54.20	6632.65	6632.84		6632.87	0.008519	1.53	35.42	291.22	0.77
PROPOSED-CULVERT	4800	2-HR OPERATIONS	140.20	6632.30	6632.92		6632.94	0.000648	0.91	153.83	398.57	0.26
PROPOSED-CULVERT	4800	24-HR OPERATION	213.80	6632.30	6633.04		6633.06	0.000693	1.04	204.93	455.81	0.27
PROPOSED-CULVERT	4800	2-HR RECLAMATIO	14.20	6632.30	6632.53	6632.39	6632.53	0.000432	0.42	34.11	211.30	0.18
PROPOSED-CULVERT	4800	24-HR RECLAMATI	54.20	6632.30	6632.72		6632.72	0.000559	0.67	81.15	300.00	0.23
PROPOSED-CULVERT	4700	2-HR OPERATIONS	140.20	6632.30	6632.87		6632.88	0.000490	0.80	174.22	441.01	0.23
PROPOSED-CULVERT	4700	24-HR OPERATION	213.80	6632.30	6632.98		6633.00	0.000538	0.94	228.41	494.59	0.24
PROPOSED-CULVERT	4700	2-HR RECLAMATIO	14.20	6632.30	6632.50		6632.50	0.000263	0.33	43.44	266.65	0.14
PROPOSED-CULVERT	4700	24-HR RECLAMATI	54.20	6632.30	6632.67		6632.68	0.000389	0.57	95.90	347.28	0.19
PROPOSED-CULVERT	4600	2-HR OPERATIONS	140.20	6632.29	6632.83		6632.83	0.000408	0.74	189.43	473.98	0.21
PROPOSED-CULVERT	4600	24-HR OPERATION	213.80	6632.29	6632.94		6632.95	0.000454	0.87	244.57	516.71	0.22
PROPOSED-CULVERT	4600	2-HR RECLAMATIO	14.20	6632.29	6632.48		6632.48	0.000212	0.28	49.95	321.75	0.13
PROPOSED-CULVERT	4600	24-HR RECLAMATI	54.20	6632.29	6632.64		6632.64	0.000315	0.51	107.30	392.18	0.17
PROPOSED-CULVERT	4500	2-HR OPERATIONS	140.20	6632.29	6632.79		6632.80	0.000347	0.69	204.46	507.98	0.19
PROPOSED-CULVERT	4500	24-HR OPERATION	213.80	6632.29	6632.90		6632.91	0.000395	0.82	260.84	547.03	0.21
PROPOSED-CULVERT	4500	2-HR RECLAMATIO	14.20	6632.29	6632.46		6632.46	0.000175	0.25	56.59	380.57	0.11
PROPOSED-CULVERT	4500	24-HR RECLAMATI	54.20	6632.29	6632.61		6632.61	0.000265	0.46	118.33	440.43	0.16
PROPOSED-CULVERT	4400	2-HR OPERATIONS	140.20	6632.29	6632.76		6632.76	0.000319	0.65	215.66	545.50	0.18
PROPOSED-CULVERT	4400	24-HR OPERATION	213.80	6632.29	6632.86		6632.87	0.000369	0.78	272.54	579.96	0.20
PROPOSED-CULVERT	4400	2-HR RECLAMATIO	14.20	6632.29	6632.44		6632.44	0.000177	0.24	59.70	437.43	0.11
PROPOSED-CULVERT	4400	24-HR RECLAMATI	54.20	6632.29	6632.58		6632.58	0.000247	0.43	125.75	486.06	0.15
PROPOSED-CULVERT	4300	2-HR OPERATIONS	140.20	6632.24	6632.72		6632.73	0.000332	0.65	217.21	571.78	0.18
PROPOSED-CULVERT	4300	24-HR OPERATION	213.80	6632.24	6632.82		6632.83	0.000375	0.78	273.74	603.56	0.20
PROPOSED-CULVERT	4300	2-HR RECLAMATIO	14.20	6632.24	6632.42		6632.42	0.000204	0.24	58.95	471.88	0.12
PROPOSED-CULVERT	4300	24-HR RECLAMATI	54.20	6632.24	6632.56		6632.56	0.000266	0.43	126.05	516.82	0.15
PROPOSED-CULVERT	4200	2-HR OPERATIONS	140.20	6632.18	6632.69		6632.70	0.000389	0.67	208.23	579.39	0.20
PROPOSED-CULVERT	4200	24-HR OPERATION	213.80	6632.18	6632.78		6632.79	0.000451	0.82	261.93	609.67	0.22
PROPOSED-CULVERT	4200	2-HR RECLAMATIO	14.20	6632.18	6632.40		6632.40	0.000261	0.26	55.23	482.69	0.13
PROPOSED-CULVERT	4200	24-HR RECLAMATI	54.20	6632.18	6632.53		6632.53	0.000321	0.45	119.99	525.86	0.17
PROPOSED-CULVERT	4100	2-HR OPERATIONS	140.20	6632.12	6632.65		6632.66	0.000412	0.68	205.87	597.32	0.20
PROPOSED-CULVERT	4100	24-HR OPERATION	213.80	6632.12	6632.73		6632.74	0.000478	0.84	257.18	624.41	0.23
PROPOSED-CULVERT	4100	2-HR RECLAMATIO	14.20	6632.12	6632.37		6632.38	0.000298	0.26	54.18	508.39	0.14
PROPOSED-CULVERT	4100	24-HR RECLAMATI	54.20	6632.12	6632.50		6632.50	0.000354	0.46	118.37	547.60	0.17
PROPOSED-CULVERT	4000	2-HR OPERATIONS	140.20	6632.25	6632.59		6632.60	0.000769	0.86	191.10	600.77	0.27
PROPOSED-CULVERT	4000	24-HR OPERATION	213.80	6632.25	6632.66		6632.68	0.000931	1.09	235.02	623.20	0.31
PROPOSED-CULVERT	4000	2-HR RECLAMATIO	14.20	6632.25	6632.33		6632.33	0.000788	0.27	45.66	521.13	0.21
PROPOSED-CULVERT	4000	24-HR RECLAMATI	54.20	6632.25	6632.45		6632.45	0.000714	0.55	108.29	556.81	0.24
PROPOSED-CULVERT	3900	2-HR OPERATIONS	140.20	6632.23	6632.32	6632.32	6632.38	0.015158	1.14	74.73	560.31	0.89
PROPOSED-CULVERT	3900	24-HR OPERATION	213.80	6632.23	6632.37	6632.37	6632.44	0.013492	1.73	104.68	575.54	0.95
PROPOSED-CULVERT	3900	2-HR RECLAMATIO	14.20	6632.23	6632.05	6632.05	6632.08	0.034131		9.84	124.81	0.00
PROPOSED-CULVERT	3900	24-HR RECLAMATI	54.20	6632.23	6632.15	6632.15	6632.23	0.033786		24.50	162.23	0.00
PROPOSED-CULVERT	3700	2-HR OPERATIONS	140.20	6630.28	6631.08	6630.76	6631.13	0.001390	1.70	82.57	149.08	0.40
PROPOSED-CULVERT	3700	24-HR OPERATION	213.80	6630.28	6631.24	6630.89	6631.30	0.001529	1.98	108.21	167.19	0.43
PROPOSED-CULVERT	3700	2-HR RECLAMATIO	14.20	6630.28	6630.57	6630.41	6630.58	0.000732	0.68	20.87	91.84	0.25
PROPOSED-CULVERT	3700	24-HR RECLAMATI	54.20	6630.28	6630.81	6630.56	6630.83	0.001061	1.17	46.22	118.74	0.33

HEC-RAS Plan: STEADY FLOW 2-HR 100-YR River: PROPOSED-CULVERT Reach: PROPOSED-CULVERT (Continued)

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)	
PROPOSED-CULVERT	3600	2-HR OPERATIONS	140.20	6630.26	6630.98		6631.01	0.000843	1.35	104.17	183.20	0.31
PROPOSED-CULVERT	3600	24-HR OPERATION	213.80	6630.26	6631.14		6631.18	0.000963	1.61	133.16	198.56	0.35
PROPOSED-CULVERT	3600	2-HR RECLAMATIO	14.20	6630.26	6630.52		6630.52	0.000390	0.48	29.48	135.82	0.18
PROPOSED-CULVERT	3600	24-HR RECLAMATI	54.20	6630.26	6630.74		6630.75	0.000591	0.88	61.76	158.05	0.25
PROPOSED-CULVERT	3500	2-HR OPERATIONS	140.20	6630.24	6630.89		6630.92	0.001025	1.39	100.67	194.79	0.34
PROPOSED-CULVERT	3500	24-HR OPERATION	213.80	6630.24	6631.03		6631.07	0.001168	1.67	128.41	209.63	0.38
PROPOSED-CULVERT	3500	2-HR RECLAMATIO	14.20	6630.24	6630.47		6630.48	0.000486	0.49	28.70	149.98	0.20
PROPOSED-CULVERT	3500	24-HR RECLAMATI	54.20	6630.24	6630.67		6630.68	0.000703	0.90	60.55	171.26	0.27
PROPOSED-CULVERT	3400	2-HR OPERATIONS	140.20	6630.21	6630.60		6630.70	0.006640	2.56	54.72	172.28	0.80
PROPOSED-CULVERT	3400	24-HR OPERATION	213.80	6630.21	6630.79		6630.88	0.003502	2.42	88.21	186.78	0.62
PROPOSED-CULVERT	3400	2-HR RECLAMATIO	14.20	6630.21	6630.37	6630.32	6630.38	0.002546	0.80	17.69	154.67	0.42
PROPOSED-CULVERT	3400	24-HR RECLAMATI	54.20	6630.21	6630.42	6630.42	6630.49	0.013050	2.22	24.40	158.01	1.00
PROPOSED-CULVERT	3300	2-HR OPERATIONS	140.20	6629.71	6630.47		6630.50	0.000835	1.36	103.19	177.59	0.31
PROPOSED-CULVERT	3300	24-HR OPERATION	213.80	6629.71	6630.69		6630.73	0.000699	1.48	144.73	192.31	0.30
PROPOSED-CULVERT	3300	2-HR RECLAMATIO	14.20	6629.71	6629.82	6629.82	6629.86	0.016093	1.62	8.79	107.40	1.00
PROPOSED-CULVERT	3300	24-HR RECLAMATI	54.20	6629.71	6630.14	6629.94	6630.16	0.001173	1.11	48.76	146.41	0.34
PROPOSED-CULVERT	3200	2-HR OPERATIONS	140.20	6629.29	6630.43		6630.45	0.000283	0.95	147.56	193.11	0.19
PROPOSED-CULVERT	3200	24-HR OPERATION	213.80	6629.29	6630.66		6630.68	0.000298	1.11	193.04	208.43	0.20
PROPOSED-CULVERT	3200	2-HR RECLAMATIO	14.20	6629.29	6629.60	6629.40	6629.61	0.000478	0.58	24.31	97.65	0.21
PROPOSED-CULVERT	3200	24-HR RECLAMATI	54.20	6629.29	6630.11		6630.12	0.000174	0.60	89.76	160.62	0.14
PROPOSED-CULVERT	3100	2-HR OPERATIONS	140.20	6629.26	6630.41		6630.42	0.000222	0.85	164.02	209.38	0.17
PROPOSED-CULVERT	3100	24-HR OPERATION	213.80	6629.26	6630.64		6630.65	0.000238	1.00	213.04	225.23	0.18
PROPOSED-CULVERT	3100	2-HR RECLAMATIO	14.20	6629.26	6629.56		6629.56	0.000453	0.55	25.87	109.68	0.20
PROPOSED-CULVERT	3100	24-HR RECLAMATI	54.20	6629.26	6630.10		6630.10	0.000125	0.53	102.95	176.36	0.12
PROPOSED-CULVERT	3000	2-HR OPERATIONS	140.20	6629.23	6630.39		6630.40	0.000175	0.77	181.61	225.79	0.15
PROPOSED-CULVERT	3000	24-HR OPERATION	213.80	6629.23	6630.62		6630.63	0.000191	0.91	234.05	242.22	0.16
PROPOSED-CULVERT	3000	2-HR RECLAMATIO	14.20	6629.23	6629.51		6629.51	0.000495	0.54	26.26	121.74	0.21
PROPOSED-CULVERT	3000	24-HR RECLAMATI	54.20	6629.23	6630.09		6630.09	0.000091	0.46	117.16	193.23	0.10
PROPOSED-CULVERT	2900	2-HR OPERATIONS	140.20	6629.20	6630.38		6630.39	0.000141	0.70	199.33	242.64	0.14
PROPOSED-CULVERT	2900	24-HR OPERATION	213.80	6629.20	6630.60		6630.61	0.000157	0.84	255.38	259.76	0.15
PROPOSED-CULVERT	2900	2-HR RECLAMATIO	14.20	6629.20	6629.33	6629.33	6629.37	0.016237	1.56	9.08	117.24	0.99
PROPOSED-CULVERT	2900	24-HR RECLAMATI	54.20	6629.20	6630.08		6630.08	0.000069	0.41	131.73	209.38	0.09
PROPOSED-CULVERT	2800	2-HR OPERATIONS	140.20	6628.80	6630.37		6630.38	0.000066	0.54	257.82	260.06	0.10
PROPOSED-CULVERT	2800	24-HR OPERATION	213.80	6628.80	6630.59		6630.60	0.000083	0.67	317.45	277.84	0.11
PROPOSED-CULVERT	2800	2-HR RECLAMATIO	14.20	6628.80	6629.10	6628.92	6629.10	0.000605	0.62	22.87	100.13	0.23
PROPOSED-CULVERT	2800	24-HR RECLAMATI	54.20	6628.80	6630.08		6630.08	0.000024	0.29	185.89	227.06	0.06
PROPOSED-CULVERT	2700	2-HR OPERATIONS	140.20	6628.77	6630.37		6630.37	0.000051	0.49	285.42	277.30	0.09
PROPOSED-CULVERT	2700	24-HR OPERATION	213.80	6628.77	6630.59		6630.59	0.000066	0.61	348.53	295.86	0.10
PROPOSED-CULVERT	2700	2-HR RECLAMATIO	14.20	6628.77	6629.02		6629.03	0.000872	0.67	21.04	106.88	0.27
PROPOSED-CULVERT	2700	24-HR RECLAMATI	54.20	6628.77	6630.08		6630.08	0.000018	0.26	209.45	244.55	0.05
PROPOSED-CULVERT	2600	2-HR OPERATIONS	140.20	6628.38	6630.36		6630.36	0.000047	0.38	434.60	463.72	0.08
PROPOSED-CULVERT	2600	24-HR OPERATION	213.80	6628.38	6630.58		6630.58	0.000059	0.48	542.93	525.66	0.09
PROPOSED-CULVERT	2600	2-HR RECLAMATIO	14.20	6628.38	6628.89		6628.91	0.001708	1.37	18.33	126.03	0.41
PROPOSED-CULVERT	2600	24-HR RECLAMATI	54.20	6628.38	6630.07		6630.07	0.000017	0.21	312.25	380.40	0.05
PROPOSED-CULVERT	2500	2-HR OPERATIONS	140.20	6628.29	6630.36		6630.36	0.000030	0.40	475.73	423.95	0.07
PROPOSED-CULVERT	2500	24-HR OPERATION	213.80	6628.29	6630.58		6630.58	0.000039	0.52	569.37	433.87	0.08
PROPOSED-CULVERT	2500	2-HR RECLAMATIO	14.20	6628.29	6628.80		6628.81	0.000663	0.98	17.43	135.79	0.27
PROPOSED-CULVERT	2500	24-HR RECLAMATI	54.20	6628.29	6630.07		6630.07	0.000010	0.20	360.00	383.77	0.04
PROPOSED-CULVERT	2400	2-HR OPERATIONS	140.20	6628.26	6630.36		6630.36	0.000014	0.31	450.78	322.64	0.05
PROPOSED-CULVERT	2400	24-HR OPERATION	213.80	6628.26	6630.57		6630.58	0.000020	0.41	521.29	326.21	0.06
PROPOSED-CULVERT	2400	2-HR RECLAMATIO	14.20	6628.26	6628.60		6628.65	0.006011	1.91	7.44	33.82	0.72
PROPOSED-CULVERT	2400	24-HR RECLAMATI	54.20	6628.26	6630.07		6630.07	0.000004	0.15	361.81	305.72	0.02
PROPOSED-CULVERT	2300	2-HR OPERATIONS	140.20	6628.00	6630.34		6630.35	0.000136	0.84	167.51	152.81	0.14
PROPOSED-CULVERT	2300	24-HR OPERATION	213.80	6628.00	6630.55		6630.57	0.000181	1.07	199.84	155.89	0.17
PROPOSED-CULVERT	2300	2-HR RECLAMATIO	14.20	6628.00	6628.36		6628.38	0.001469	1.13	12.62	44.01	0.37
PROPOSED-CULVERT	2300	24-HR RECLAMATI	54.20	6628.00	6630.07		6630.07	0.000029	0.43	126.92	99.71	0.07
PROPOSED-CULVERT	2200	2-HR OPERATIONS	140.20	6627.70	6630.34		6630.34	0.000052	0.76	190.24	113.86	0.10
PROPOSED-CULVERT	2200	24-HR OPERATION	213.80	6627.70	6630.54		6630.56	0.000086	1.04	213.74	115.86	0.12
PROPOSED-CULVERT	2200	2-HR RECLAMATIO	14.20	6627.70	6627.95	6627.95	6628.03	0.014453	2.23	6.38	44.36	1.04
PROPOSED-CULVERT	2200	24-HR RECLAMATI	54.20	6627.70	6630.07		6630.07	0.000013	0.34	160.08	111.21	0.05
PROPOSED-CULVERT	2165.96	2-HR OPERATIONS	140.20	6626.00	6630.29	6628.59	6630.34	0.000344	1.76	103.79	157.62	0.24
PROPOSED-CULVERT	2165.96	24-HR OPERATION	213.80	6626.00	6630.47	6629.05	6630.54	0.000520	2.27	132.25	159.10	0.29
PROPOSED-CULVERT	2165.96	2-HR RECLAMATIO	14.20	6626.00	6627.71	6626.76	6627.74	0.000386	1.33	10.68	9.73	0.22
PROPOSED-CULVERT	2165.96	24-HR RECLAMATI	54.20	6626.00	6630.06	6627.57	6630.07	0.000089	0.84	67.33	145.97	0.12
PROPOSED-CULVERT	2165.46		Culvert									
PROPOSED-CULVERT	2036.17	2-HR OPERATIONS	140.20	6623.72	6625.39	6625.39	6625.73	0.008357	4.70	30.04	46.28	1.01
PROPOSED-CULVERT	2036.17	24-HR OPERATION	213.80	6623.72	6625.63	6625.63	6626.04	0.007724	5.16	42.02	53.45	1.01
PROPOSED-CULVERT	2036.17	2-HR RECLAMATIO	14.20	6623.72	6624.47	6624.47	6624.69	0.010422	3.76	3.78	9.23	1.03
PROPOSED-CULVERT	2036.17	24-HR RECLAMATI	54.20	6623.72	6625.01	6625.01	6625.22	0.009359	3.67	14.78	34.86	0.99
PROPOSED-CULVERT	1900	2-HR OPERATIONS	140.20	6619.39	6619.65	6620.03	6622.06	0.397587	12.44	11.27	71.32	5.52
PROPOSED-CULVERT	1900	24-HR OPERATION	213.80	6619.39	6619.71	6620.10	6622.59	0.369034	13.62	15.69	82.03	5.49
PROPOSED-CULVERT	1900	2-HR RECLAMATIO	14.20	6619.39	6619.48	6619.59	6620.33	0.471878	7.37	1.93	30.40	5.16

HEC-RAS Plan: STEADY FLOW 2-HR 100-YR River: PROPOSED-CULVERT Reach: PROPOSED-CULVERT (Continued)

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)	
PROPOSED-CULVERT	1900	24-HR RECLAMATI	54.20	6619.39	6619.55	6619.75	6621.60	0.816194	11.50	4.71	57.58	7.09
PROPOSED-CULVERT	1800	2-HR OPERATIONS	140.20	6617.80	6618.56	6618.41	6618.61	0.002689	1.82	78.09	215.08	0.52
PROPOSED-CULVERT	1800	24-HR OPERATION	213.80	6617.80	6618.64	6618.49	6618.72	0.003264	2.23	97.09	226.28	0.59
PROPOSED-CULVERT	1800	2-HR RECLAMATIO	14.20	6617.80	6618.15	6618.03	6618.16	0.001314	0.80	17.67	93.89	0.33
PROPOSED-CULVERT	1800	24-HR RECLAMATI	54.20	6617.80	6618.39	6618.19	6618.41	0.001799	1.18	46.02	177.17	0.40
PROPOSED-CULVERT	1700	2-HR OPERATIONS	140.20	6614.04	6614.65	6614.65	6614.82	0.013947	3.39	43.24	138.39	1.13
PROPOSED-CULVERT	1700	24-HR OPERATION	213.80	6614.04	6614.77	6614.77	6614.97	0.012934	3.74	61.24	167.94	1.13
PROPOSED-CULVERT	1700	2-HR RECLAMATIO	14.20	6614.04	6614.28	6614.26	6614.34	0.015324	1.96	7.21	48.33	1.03
PROPOSED-CULVERT	1700	24-HR RECLAMATI	54.20	6614.04	6614.46	6614.46	6614.57	0.017319	2.75	20.26	96.20	1.17
PROPOSED-CULVERT	1600	2-HR OPERATIONS	140.20	6611.78	6612.73	6612.77	6612.96	0.016352	3.91	35.84	117.34	1.25
PROPOSED-CULVERT	1600	24-HR OPERATION	213.80	6611.78	6612.82	6612.91	6613.14	0.016776	4.56	47.00	128.13	1.31
PROPOSED-CULVERT	1600	2-HR RECLAMATIO	14.20	6611.78	6612.25	6612.25	6612.38	0.012220	2.83	5.02	21.47	1.03
PROPOSED-CULVERT	1600	24-HR RECLAMATI	54.20	6611.78	6612.58	6612.59	6612.69	0.011828	2.64	20.56	95.43	1.00
PROPOSED-CULVERT	1500	2-HR OPERATIONS	140.20	6608.46	6610.90	6610.19	6611.03	0.001438	2.87	48.86	40.60	0.46
PROPOSED-CULVERT	1500	24-HR OPERATION	213.80	6608.46	6611.44	6610.53	6611.55	0.001256	2.62	81.59	70.52	0.43
PROPOSED-CULVERT	1500	2-HR RECLAMATIO	14.20	6608.46	6609.48	6609.10	6609.51	0.001078	1.49	9.53	17.04	0.35
PROPOSED-CULVERT	1500	24-HR RECLAMATI	54.20	6608.46	6610.11	6609.61	6610.19	0.001445	2.33	23.23	26.43	0.44
PROPOSED-CULVERT	1400	2-HR OPERATIONS	140.20	6608.72	6610.15	6610.15	6610.71	0.007083	6.05	23.17	20.67	1.01
PROPOSED-CULVERT	1400	24-HR OPERATION	213.80	6608.72	6610.54	6610.54	6611.25	0.006583	6.74	31.74	22.71	1.00
PROPOSED-CULVERT	1400	2-HR RECLAMATIO	14.20	6608.72	6609.11	6609.11	6609.26	0.010584	3.13	4.53	14.93	1.00
PROPOSED-CULVERT	1400	24-HR RECLAMATI	54.20	6608.72	6609.54	6609.54	6609.88	0.008381	4.66	11.62	17.54	1.01
PROPOSED-CULVERT	1300	2-HR OPERATIONS	140.20	6606.73	6607.85	6608.32	6609.38	0.027010	9.95	14.09	16.23	1.88
PROPOSED-CULVERT	1300	24-HR OPERATION	213.80	6606.73	6608.18	6608.75	6610.01	0.023124	10.86	19.69	17.60	1.81
PROPOSED-CULVERT	1300	2-HR RECLAMATIO	14.20	6606.73	6607.07	6607.19	6607.45	0.036321	4.95	2.87	12.02	1.78
PROPOSED-CULVERT	1300	24-HR RECLAMATI	54.20	6606.73	6607.37	6607.66	6608.33	0.035359	7.83	6.93	14.17	1.97
PROPOSED-CULVERT	1200	2-HR OPERATIONS	140.20	6604.99	6605.00	6603.61	6605.13	0.001875	0.10	49.09	24.39	0.22
PROPOSED-CULVERT	1200	24-HR OPERATION	213.80	6604.99	6605.35	6604.09	6605.56	0.002730	1.40	59.23	32.14	0.49
PROPOSED-CULVERT	1200	2-HR RECLAMATIO	14.20	6604.99	6603.76	6602.28	6603.77	0.000134		23.60	16.45	0.00
PROPOSED-CULVERT	1200	24-HR RECLAMATI	54.20	6604.99	6604.36	6602.86	6604.40	0.000778		34.42	21.16	0.00
PROPOSED-CULVERT	1100	2-HR OPERATIONS	140.20	6603.17	6604.37	6604.37	6604.74	0.008195	4.86	28.83	40.51	1.02
PROPOSED-CULVERT	1100	24-HR OPERATION	213.80	6603.17	6604.62	6604.62	6605.08	0.007419	5.41	39.52	43.88	1.01
PROPOSED-CULVERT	1100	2-HR RECLAMATIO	14.20	6603.17	6603.60	6603.59	6603.71	0.009810	2.68	5.30	20.83	0.94
PROPOSED-CULVERT	1100	24-HR RECLAMATI	54.20	6603.17	6603.94	6603.94	6604.17	0.009164	3.89	13.93	29.76	1.00
PROPOSED-CULVERT	1000	2-HR OPERATIONS	140.20	6601.91	6603.26	6603.35	6603.75	0.011996	5.61	24.98	37.64	1.21
PROPOSED-CULVERT	1000	24-HR OPERATION	213.80	6601.91	6603.47	6603.61	6604.13	0.012035	6.50	32.88	39.80	1.26
PROPOSED-CULVERT	1000	2-HR RECLAMATIO	14.20	6601.91	6602.54	6602.54	6602.70	0.010286	3.27	4.34	13.10	1.00
PROPOSED-CULVERT	1000	24-HR RECLAMATI	54.20	6601.91	6602.94	6602.96	6603.19	0.010677	4.05	13.38	30.15	1.07
PROPOSED-CULVERT	900	2-HR OPERATIONS	140.20	6599.67	6602.17	6602.22	6602.59	0.010912	5.23	26.80	41.03	1.14
PROPOSED-CULVERT	900	24-HR OPERATION	213.80	6599.67	6602.36	6602.45	6602.94	0.011272	6.13	34.87	43.13	1.20
PROPOSED-CULVERT	900	2-HR RECLAMATIO	14.20	6599.67	6600.47	6600.67	6601.10	0.026296	6.37	2.23	4.69	1.63
PROPOSED-CULVERT	900	24-HR RECLAMATI	54.20	6599.67	6601.38	6601.52	6602.04	0.011556	6.52	8.31	9.03	1.20
PROPOSED-CULVERT	800	2-HR OPERATIONS	140.20	6599.46	6600.99	6601.11	6601.53	0.010141	5.92	23.70	28.95	1.15
PROPOSED-CULVERT	800	24-HR OPERATION	213.80	6599.46	6601.34	6601.49	6601.87	0.010101	5.80	36.84	46.29	1.15
PROPOSED-CULVERT	800	2-HR RECLAMATIO	14.20	6599.46	6600.05	6599.98	6600.17	0.006323	2.80	5.08	13.42	0.80
PROPOSED-CULVERT	800	24-HR RECLAMATI	54.20	6599.46	6600.40	6600.48	6600.82	0.011538	5.16	10.51	17.36	1.17
PROPOSED-CULVERT	700	2-HR OPERATIONS	140.20	6598.54	6600.06	6600.12	6600.43	0.010951	4.86	28.85	50.36	1.13
PROPOSED-CULVERT	700	24-HR OPERATION	213.80	6598.54	6600.21	6600.32	6600.74	0.012594	5.87	36.43	53.23	1.25
PROPOSED-CULVERT	700	2-HR RECLAMATIO	14.20	6598.54	6599.20	6599.19	6599.38	0.009898	3.43	4.14	11.22	1.00
PROPOSED-CULVERT	700	24-HR RECLAMATI	54.20	6598.54	6599.72	6599.72	6599.94	0.009881	3.75	14.45	34.41	1.02
PROPOSED-CULVERT	600	2-HR OPERATIONS	140.20	6597.52	6599.05	6599.07	6599.43	0.009015	4.98	28.14	40.62	1.06
PROPOSED-CULVERT	600	24-HR OPERATION	213.80	6597.52	6599.29	6599.32	6599.78	0.008616	5.60	38.21	44.75	1.07
PROPOSED-CULVERT	600	2-HR RECLAMATIO	14.20	6597.52	6598.20	6598.20	6598.35	0.010636	3.09	4.60	15.46	1.00
PROPOSED-CULVERT	600	24-HR RECLAMATI	54.20	6597.52	6598.59	6598.62	6598.88	0.011123	4.36	12.43	25.67	1.10
PROPOSED-CULVERT	500	2-HR OPERATIONS	140.20	6594.78	6596.66	6597.11	6598.04	0.020037	9.45	14.84	14.57	1.65
PROPOSED-CULVERT	500	24-HR OPERATION	213.80	6594.78	6597.12	6597.64	6598.53	0.016117	9.54	22.41	18.43	1.53
PROPOSED-CULVERT	500	2-HR RECLAMATIO	14.20	6594.78	6595.41	6595.66	6596.25	0.052398	7.35	1.93	5.72	2.23
PROPOSED-CULVERT	500	24-HR RECLAMATI	54.20	6594.78	6595.96	6596.32	6597.08	0.030018	8.49	6.38	10.00	1.87
PROPOSED-CULVERT	400	2-HR OPERATIONS	140.20	6594.25	6595.65	6595.80	6596.35	0.011440	6.70	20.91	23.10	1.24
PROPOSED-CULVERT	400	24-HR OPERATION	213.80	6594.25	6595.87	6596.16	6596.92	0.014071	8.21	26.04	24.74	1.41
PROPOSED-CULVERT	400	2-HR RECLAMATIO	14.20	6594.25	6594.81	6594.81	6594.96	0.010704	3.09	4.60	15.57	1.00
PROPOSED-CULVERT	400	24-HR RECLAMATI	54.20	6594.25	6595.24	6595.24	6595.55	0.008456	4.49	12.08	19.48	1.00
PROPOSED-CULVERT	300	2-HR OPERATIONS	140.20	6593.22	6594.58	6594.69	6595.15	0.011701	6.07	23.11	30.28	1.22
PROPOSED-CULVERT	300	24-HR OPERATION	213.80	6593.22	6594.83	6594.98	6595.57	0.011228	6.92	30.88	32.12	1.24
PROPOSED-CULVERT	300	2-HR RECLAMATIO	14.20	6593.22	6593.84	6593.77	6593.94	0.005963	2.57	5.53	15.91	0.77
PROPOSED-CULVERT	300	24-HR RECLAMATI	54.20	6593.22	6594.12	6594.20	6594.50	0.013518	4.93	10.98	21.89	1.23
PROPOSED-CULVERT	200	2-HR OPERATIONS	140.20	6592.43	6594.04	6593.81	6594.24	0.003307	3.56	39.33	44.48	0.67
PROPOSED-CULVERT	200	24-HR OPERATION	213.80	6592.43	6594.40	6594.05	6594.63	0.002644	3.85	55.59	47.36	0.63
PROPOSED-CULVERT	200	2-HR RECLAMATIO	14.20	6592.43	6593.01	6593.01	6593.17	0.010219	3.20	4.44	13.78	0.99
PROPOSED-CULVERT	200	24-HR RECLAMATI	54.20	6592.43	6593.49	6593.45	6593.66	0.007665	3.33	16.30	38.51	0.90
PROPOSED-CULVERT	100	2-HR OPERATIONS	140.20	6591.79	6593.21	6593.21	6593.74	0.007330	5.82	24.10	23.59	1.01
PROPOSED-CULVERT	100	24-HR OPERATION	213.80	6591.79	6593.61	6593.61	6594.19	0.006871	6.12	34.91	30.11	1.00
PROPOSED-CULVERT	100	2-HR RECLAMATIO	14.20	6591.79	6592.32	6592.23	6592.41	0.004778	2.36	6.01	16.65	0.69

HEC-RAS Plan: STEADY FLOW 2-HR 100-YR River: PROPOSED-CULVERT Reach: PROPOSED-CULVERT (Continued)

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)	
PROPOSED-CULVERT	100	24-HR RECLAMATI	54.20	6591.79	6592.72	6592.65	6592.98	0.006136	4.03	13.46	20.10	0.87
PROPOSED-CULVERT	0	2-HR OPERATIONS	140.20	6591.19	6592.20	6592.31	6592.63	0.017911	5.24	26.77	60.52	1.39
PROPOSED-CULVERT	0	24-HR OPERATION	213.80	6591.19	6592.28	6592.49	6593.00	0.024685	6.77	31.58	61.77	1.67
PROPOSED-CULVERT	0	2-HR RECLAMATIO	14.20	6591.19	6591.63	6591.62	6591.74	0.010003	2.67	5.32	21.42	0.94
PROPOSED-CULVERT	0	24-HR RECLAMATI	54.20	6591.19	6592.01	6592.01	6592.18	0.009960	3.32	16.33	47.16	0.99

HEC-RAS Plan: STEADY FLOW 2-HR 100-YR River: PROPOSED-CULVERT Reach: PROPOSED-CULVERT

Reach	River Sta	Profile	E.G. US.	W.S. US.	E.G. IC	E.G. OC	Min El Weir Flow	Q Culv Group	Q Weir	Delta WS	Culv Vel US	Culv Vel DS
			(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(ft)	(ft/s)	(ft/s)
PROPOSED-CULVERT	2165.46 Culvert #1	2-HR OPERATIONS	6630.34	6630.29	6630.34	6629.90	6630.01	54.32	85.88	4.90	8.98	12.19
PROPOSED-CULVERT	2165.46 Culvert #1	24-HR OPERATION	6630.54	6630.47	6630.54	6630.02	6630.01	56.66	157.14	4.84	8.02	12.80
PROPOSED-CULVERT	2165.46 Culvert #1	2-HR RECLAMATIO	6627.74	6627.71	6627.67	6627.74	6630.01	14.20		3.24	5.38	8.87
PROPOSED-CULVERT	2165.46 Culvert #1	24-HR RECLAMATI	6630.07	6630.06	6630.07	6629.74	6630.01	51.12	4.14	5.04	8.69	12.02