

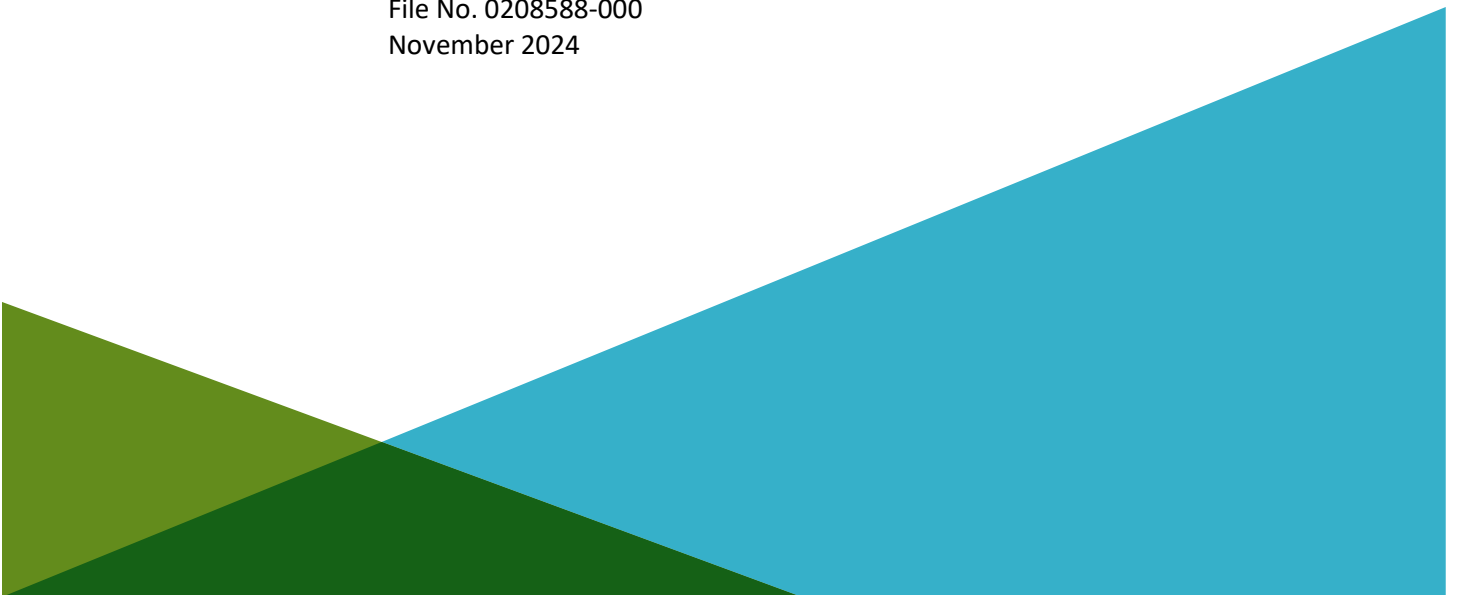
DRAINAGE REPORT  
SOLBERG PLANT  
PEYTON, COLORADO

by  
Haley & Aldrich, Inc.  
Greenwood Village, Colorado

for  
Holcim US  
Golden, Colorado

PCD FILE: PPR2432

File No. 0208588-000  
November 2024





HALEY & ALDRICH, INC.  
8101 E. Prentice Avenue  
Suite 600  
Greenwood Village, CO 80111  
720.616.4400

25 November 2024  
File No. 0208588-000

Holcim US  
Solberg Plant Aggregate Mine  
Peyton, Colorado 80831

Attention: Dr. Angela Bellantoni

Subject: Drainage Report  
Solberg Plant  
Peyton, Colorado

Dear Dr. Bellantoni:

On behalf of Holcim US, Haley & Aldrich, Inc. is pleased to submit the accompanying drainage report. This document is a component of the comprehensive permit application for the ongoing sand and gravel extraction operation located in Peyton, Colorado. The report details our stormwater analysis for the current, transitional, and ultimate configurations of the site, which underpins the El Paso County permit application related to the anticipated enlargement of the current operation. We are grateful for the chance to contribute to this significant endeavor for Holcim US. For any inquiries, kindly reach out to Chris Langham at 520.289.8604.

Sincerely yours,  
**HALEY & ALDRICH, INC.**

A handwritten signature in black ink, reading "Jonathan M. Thibault".

Jonathan M. Thibault, P.E. (CO)  
Senior Technical Specialist

A handwritten signature in black ink, reading "Chris Langham".

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

Enclosures:  
Drainage Report, Solberg Plant, Peyton, Colorado

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**SIGNATURE PAGE FOR****DRAINAGE REPORT  
SOLBERG PLANT  
PEYTON, COLORADO****PREPARED FOR  
HOLCIM US  
GOLDEN, COLORADO****DESIGN ENGINEER'S STATEMENT:**

THE ATTACHED DRAINAGE PLAN AND REPORT WERE PREPARED UNDER MY DIRECTION AND SUPERVISION AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. SAID DRAINAGE REPORT HAS BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR DRAINAGE REPORTS, AND SAID REPORT IS IN CONFORMITY WITH THE APPLICABLE MASTER PLAN OF THE DRAINAGE BASIN. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS, OR OMISSIONS ON MY PART IN PREPARING THIS REPORT.

  
[JONATHAN M. THIBAULT, P.E. # 51178]25 NOVEMBER 2024  
DATE**OWNER/DEVELOPER'S STATEMENT:**

I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH ALL OF THE REQUIREMENTS SPECIFIED IN THIS DRAINAGE REPORT AND PLAN.

---

[NAME, TITLE]  
[BUSINESS NAME]  
[ADDRESS]

---

DATE**EL PASO COUNTY:**

FILED IN ACCORDANCE WITH THE REQUIREMENTS OF THE DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, EL PASO COUNTY ENGINEERING CRITERIA MANUAL AND LAND DEVELOPMENT CODE AS AMENDED.

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COUNTY ENGINEER / ECM ADMINISTRATOR

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DATE**CONDITIONS:**

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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 6<sup>th</sup> 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. A Creek Location Map has been included as Figure 2.

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 current mining operation for construction materials is authorized to cover an area of roughly 234 acres. An additional area of about 79 acres was approved on 28 December 2023, by El Paso County as Special Use Permit (SUP) AL-22-18, bringing the total area to an estimated 313 acres. The landscape is characterized by gentle rolling hills, with elevations ranging from 6,724 to 6,628-feet North American Vertical Datum of 1988 (NAVD88).

The Site has been mined since 1982 and is recognized as a legal, mining operation by SUP AL-22-18. The operational plan for the Site involves digging up loose surface materials to a depth of approximately 40 feet below ground surface. The excavated materials from the pit are transported to the on-site processing plants in the east portion of the Site. Here, the material is screened and washed to eliminate undesirable clays and to produce sand and gravel. These stockpiled materials are subsequently transported off the Site using haul trucks.

Mining activities initially took place in the eastern part of the Site and are gradually moving westward. The Site includes an existing quarry along with associated processing, washing, and material stockpiling areas. Operational areas encompass maintenance and fueling zones, truck scales and a scale house, and several ponds for settling process water.

## **1.3 PROPOSED SITE ACTIVITIES**

The proposed operations at the Site are confined to the extraction of surface materials and associated processing activities. These activities encompass the construction of temporary structures, the construction of haul roads, the excavation of materials, and the processing and stockpiling of materials. The existing mining operation is situated on the eastern 234 acres of the Site. The proposed expansion of the Site includes a single 79-acre parcel to the west, where surface mining will continue.

Upon the Site's closure, a final reclamation process will be implemented. In line with the existing reclamation plan, the Site will be restored to rangeland. The reclaimed open space will be revegetated, and the Site's drainage systems will be reestablished. Pit slopes and other excavations at the Site will be graded to a final reclamation slope of 3H:1V (Horizontal:Vertical). The Site will not require importation of inert backfill.

## **2. Drainage Basin and Sub-Basins**

Per county Geographic Information System (GIS), the 79-acre parcel is located primarily within the Curtis Ranch Drainage Basin, with a portion within the Solberg Ranch Drainage Basin. This sub-basin comprises various existing districts, developed regions, and rural/agricultural areas. It is predominantly a rural area, with a few small clusters of single-family residences.

Black Squirrel Creek, which originates in Black Forest, drains into Chico Creek. Chico Creek subsequently flows into the Arkansas River in Pueblo County. The upper and middle sections of Black Squirrel Creek are ephemeral streams, flowing only in response to thunderstorms, snowmelt, and extended periods of rainfall. Perennial flow is observed only along the creek's lower sections outside the permit boundary.

The Site is situated 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 dated 7 December 2018. No fill is proposed within the existing floodplain, hence there is no expected increase in the water surface due to the current or proposed mining activities.

There are no known irrigation facilities or other obstructions within or near the Site that could impact or be impacted by the local drainage.

### 3. Drainage Design Criteria

#### 3.1 DEVELOPMENT CRITERIA REFERENCE

The hydrologic and hydraulic analyses for the Site were conducted in accordance with the procedures specified in the El Paso County Drainage Criteria Manual (Drainage Criteria Manual). The Site's topography, delineated with a 2-foot contour interval, is depicted in the Grading and Erosion Control Plan included in Appendix A. This plan outlines the current, interim, and planned drainage routes for the Site. Design considerations have been made to ensure the Site can manage the stormwater runoff from both the 100-year, two-hour, and 100-year, 24-hour design storms.

#### 3.2 HYDROLOGIC CRITERIA

The design storm and associated modeling have been developed based on the 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 (NOAA) Atlas 14, Volume 8, Version 2 for Peyton, Colorado, USA. The precipitation depth for storms of one-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-year 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 the United States Army Corps of Engineers Hydrologic Engineering Center-Hydrologic Modeling System (HEC-HMS) model.

Design storms have been modelled to be representative of the rainstorms typical to Colorado's Front Range. These are known to occur as either short-duration, high-intensity, localized, convection thunderstorms or lower-intensity, longer-duration, broader frontal storms, as described in the Drainage Criteria Manual. The thunderstorm design distribution was developed using the two-hour design storm distribution for less than 1 square mile and provided in Table 6-3 of the Drainage Criteria Manual. To depict the broader frontal storms and estimate the potential for larger storm volumes, the NRCS 24-hour Type II Design Storm Distribution was employed.

##### 3.2.2 Catchment Areas

Prior to the revegetation process, the watershed impacting the Site has been simulated as natural terrain and bare soil, reflecting the pit's present condition. Post-reclamation, the watershed is projected as either natural or restored land. The Site's most extensive potential drainage areas during both operational and reclamation phases are depicted in Figure 3. Water flow external to the pit will proceed

southeastward, adhering to its existing drainage course. Meanwhile, the modest northern, upstream watersheds are captured by roadside ditches along Garrett Road and are prevented from entering the Site. The Site's drainage basin has been segmented into two distinct watersheds: WS-1, which channels flow from the pit towards the northeast boundary of the Site, exiting through the pre-existing culvert; and WS-2, which directs flow from the mining zone to the southeast edge of the pit, joining the established roadside ditch on Curtis Road. A synopsis of these watersheds is presented in Table 3-2.

**Table 3-2: Site Watershed Areas**

<b>Watershed Name</b>	<b>Area acres</b>	<b>Area square miles</b>
WS-1	241.5	0.38
WS-2	40.5	0.06
<b>Total</b>	282.0	0.44

The NRCS runoff Curve Number (CN) has been utilized to simulate the natural and reclaimed ground conditions expected during the construction phase. The selection of values and conditions was informed by aerial imagery, on-site evaluations of soil and subsoil, and the hydrologic soil group classifications from the United States Department of Agriculture Web Soil Survey. The projected and modeled conditions for each watershed are concisely outlined in Table 3-3 below.

**Table 3-3: Anticipated Watershed Conditions**

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

The criteria for these conditions were established in line with the guidance from the Drainage Criteria Manual, particularly as detailed in Section 4.1.2 and Table 6-9 within Chapter 6.

### **3.2.3 Initial Abstraction**

The CN methodology was employed to determine the initial and infiltration losses for each watershed, adhering to the protocols specified in the Drainage Criteria Manual. The initial abstraction, which encompasses surface storage, interception, and infiltration before runoff, was utilized in the computation of initial losses.

### **3.2.4 Lag Time**

The calculation of the watershed's time of concentration and lag time was performed in accordance with NRCS TR-55 (1986), as recommended by the United States Bureau of Reclamation Flood Hydrology Manual (1989). These computations align with the guidelines set forth in the Drainage Criteria Manual. Within the Site, water flow was categorized into three distinct types: sheet flow, shallow flow, and

channel flow. The derived CN, initial loss estimates, and lag times are detailed in Table 3-4 presented below.

**Table 3-4: Watershed Parameters**

<b>Watershed Name</b>	<b>Curve Number</b>	<b>Initial Losses, inches</b>	<b>Lag Time, minutes</b>
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**

HEC-HMS software was utilized to simulate rainfall across the watershed and transform surplus rainfall into runoff from the surrounding contributing watershed. The results of the HEC-HMS simulation, based on the previously mentioned inputs, are documented in Tables 3-5 through 3-8 for both the 100-year, two-hour, and 100-year, 24-hour design storms. The corresponding hydrographs for each watershed and storm event can be found in Appendix B.

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

<b>Value</b>	<b>Units</b>	<b>WS-1</b>	<b>WS-2</b>
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	14.2	2.3

**Table 3-6: Result Summary of Two-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	1.6	0.3

**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 drainage strategy for the Site is engineered to effectively manage the 100-year design storm (major), while also managing the five-year (minor) storm, as outlined in the preceding section. The off-site stormwater management system aligns with the Drainage Criteria Manual. During the mining phase, the Site will maintain a current/interim layout, and following mining activities, it will transition to a reclamation design, which includes regrading and revegetation.

Surface drainage patterns at the Site predominantly move from northwest to southeast. The management of stormwater ensures separation; unaffected stormwater is rerouted around the mining and processing disturbances, while stormwater within the disturbed zones will largely percolate into the soil, or the remainder is channeled to the sediment basin via a culvert, then flows off-site. The on-site ponds, linked sequentially, feature an emergency spillway that funnels stormwater to a sediment basin situated in the Site's northeast corner, as depicted in Appendix A. Stormwater then exits the Site through an established culvert in the same corner. No modifications to the current drainage system are planned during the mining phase.

The proposed grading does not affect flows and follows the El Paso County 4-step process as outlined in Appendix I of the Engineering Criteria Manual.

Post-mining, the Site will undergo reclamation and regrading in accordance with the Colorado Division of Reclamation, Mining and Safety approved Reclamation Plan M-1981-044. During reclamation, the existing ponds will be decommissioned, and two swales will be constructed to facilitate stormwater egress from the Site. The ultimate drainage blueprint for the Site is detailed in Appendix A. The new grading scheme will channel the bulk of stormwater to the pre-existing culvert at the Site's northeast corner, which discharges under Curtis Road into an unnamed watercourse. A minor segment of the flow will exit at the Site's southeast corner, entering the current roadside ditch along Curtis Road, maintaining the pre-mining discharge levels to the ditch. The residual Site flow that bypasses the reclaimed pit will persist along the established southeastern drainage routes.

Post-development discharge will be mitigated to pre-development levels, ensuring no increase in runoff. Additionally, there is an existing water quality permit in place for the Site.

An Erosion and Stormwater Quality Control Permit is not needed because the proposed grading and stormwater management measures comply with the El Paso County requirements and effectively mitigate any potential impacts.

### 4.2 DESIGN DETAILS

The hydrologic and hydraulic assessments for the Site were executed following the methodologies prescribed in the Drainage Criteria Manual. The Site's topographical details, mapped at a 2-foot contour interval, are featured in the Grading and Erosion Control Plan, which is included in Appendix A. This plan delineates the current, interim, and envisioned final drainage routes for the Site. The design of the Site has been predicated on the peak flow rates determined in the preceding analysis.

#### 4.2.1 Existing/Interim Site Drainage

The current design of the Site permits stormwater from the disturbed areas, such as the mining areas and processing plants, to either infiltrate into the soil or be channeled off-site via a culvert situated in the Site's northwest corner. The stormwater that travels through this culvert passes through a sediment basin to facilitate sediment settlement. The Site predominantly consists of sandy soils classified as types A and B, which enable stormwater infiltration within a timeframe of less than 72 hours.

For the operational needs of the Site, ponds have been constructed for dust suppression/control and material washing. Should these ponds reach capacity and overflow, the excess water is redirected to the Site's northeast section. Here, a sediment basin precedes an established culvert that guides the flow beneath the roadway and into an existing off-site watercourse. The modeling details for this culvert are elaborated in subsequent sections. The interim drainage plan for the Site, applicable during the mining phase, is outlined in sheet C-100 within Appendix A, adhering to the Drainage Criteria Manual.

#### 4.2.2 Swale Geometry

The design for the Site includes two planned vegetated swales, which will channel water from the pit's western extremity to the eastern boundary of the Site. These swales are scheduled for construction upon the completion of mining activities, in line with the reclamation strategy. The specific placement of each swale is illustrated on sheet C-200 in Appendix A. The structural design of the swales is encapsulated in Table 4-1. Typically, the swales are designed to commence as broad and shallow channels, gradually transitioning to narrower and deeper channels as they approach the Site's discharge points. The northern swale is designed to merge with an existing culvert, while the southern swale will connect to the current roadside ditch.

**Table 4-1: Swale Geometry**

<b>Geometry</b>	<b>North Swale</b>	<b>South Swale</b>
Length (feet)	5550	1350
Average Slope (%)	1.5	3.0
Maximum Width (feet)	355	180
Minimum Width (feet)	25	25
Maximum Depth (feet)	8	8
Minimum Depth (feet)	1	2

#### 4.2.3 Culvert Geometry

An established culvert is situated at the Site's northeast corner, facilitating flow from west to east beneath Curtis Road, near the intersection with Garrett Road. This culvert's design was informed by an on-site inspection and LiDAR data specific to the Site. The dimensions and characteristics of the modeled culvert are concisely detailed in Table 4-2, below.

**Table 4-2: Culvert Geometry**

Geometry	Curtis Road Culvert
Culvert Length (feet)	125
Entrance Loss Coefficient	0.2
Exit Loss Coefficient	1.0
Manning's n	0.013
Culvert Slope (%)	1.6

#### 4.2.4 Channel Roughness

The design of the Site and the geometry of the downstream off-site model have been developed using three distinct Manning's roughness coefficients. These coefficients are used to differentiate between the reclaimed swale, the existing off-site drainage, and the soil characteristics beyond the existing drainage area. The swale channel is expected to be clear and unobstructed, conforming to the specifications of the Drainage Design Manual, resulting in a Manning's roughness coefficient of 0.022. The existing downstream drainage is modeled similarly but with additional stones and vegetation, leading to a Manning's n value of 0.035. The areas outside the diversion channel, which are undeveloped, are predicted to have scattered brush as observed in Google Earth imagery from 24 November 2017, resulting in a Manning's roughness coefficient of 0.050, as referenced by Ven Te Chow in "Open-Channel Hydraulics" (1959).

#### 4.2.5 HEC-RAS Modeling Results

A HEC-River Analysis System (RAS) model was developed to assess the flow dynamics within the Site's swales and the movement of stormwater through the existing culvert. The four storms detailed in Section 3.0 were simulated as steady flows, utilizing the maximal flow rates established by the Site's model geometry as described earlier. The inputs for the model and its findings are compiled in Appendix C.

The simulation revealed that for each design storm, the water will be contained within the designated swales, ensuring it reaches the intended exit points of the Site. The analysis determined that the water would flow through the swales at sub-critical speeds, typically under 3 feet per second, indicating that the stormwater is unlikely to cause erosion. The outcomes of the flow analysis for the swales leading to the culvert are summarized in Table 4-3.

**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	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)	
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

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)	
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
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 culvert's flow capacity was assessed under four different scenarios. The modeling indicates that in three out of these four scenarios, the maximum water depth will overtop Curtis Road. The highest water level recorded above the road surface is approximately 0.5 foot, which is within the permissible limits set by El Paso County for Type A & B roads (local/residential), where the maximum depth allowed is up to 0.5 foot. Comprehensive details of the culvert's flow modeling are compiled in Table 4-4.

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, Two-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, Two-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
<b>Notes:</b> <i>cfs = cubic feet per second</i> <i>ft = feet</i> <i>ft/s = feet per second</i>				

## 5. Summary and Conclusions

Located in Peyton, Colorado, within El Paso County, the Solberg Plant has been operational since 1982. Holcim US was approved for an expansion of 79 acres to the west by SUP AL-22-18. The Site's activities are confined to the extraction of surficial unconsolidated materials and the processing of aggregates into construction materials. Excavation depths at the Site typically reach up to 35 feet below ground surface. The drainage plan for the Site, encompassing both current conditions and future reclamation efforts, has been formulated with the following outcomes:

- The Site is situated within the Upper Black Squirrel Creek sub-basin, part of the larger Chico Creek drainage basin. This sub-basin is predominantly a rural ranching community dotted with small clusters of single-family residences.
- Throughout the operational phase and before reclamation, the on-site ponds are designed to collect impacted water. Should any pond overflow, the water will be directed to a sediment basin before exiting the Site via the northeast culvert, as detailed in the Grading and Erosion Control Plan in Appendix A.
- Water not affected by the Site's activities will continue its natural course along the existing, unchanged southeastern drainages.
- The reclamation drainage plan indicates that stormwater will be gathered within the reclaimed pit and directed primarily toward the northeast culvert. Calculations confirm that this culvert can manage flows from both the 100-year, two-hour, and 100-year, 24-hour design storms, with any incidental overflow on the road not exceeding 6 inches, thus complying with El Paso County's drainage standards.
- Post-reclamation stormwater that was previously channeled into the Curtis Road roadside ditch will be redirected back into it. Since this flow was originally part of the ditch's catchment before mining, there will be no net increase in flow compared to pre-mining conditions.

The drainage plan ensures that Site activities will not adversely impact adjacent or downstream properties. The plan includes measures such as on-site ponds and sediment basins to manage water flow, and post-reclamation stormwater management that adheres to El Paso County's drainage standards, ensuring no net increase in flow compared to pre-mining conditions. This Drainage Report for the Holcim US Solberg Plant is a component of the Site Development Plan application for the expansion of the Holcim US Solberg Plant. Based on the details presented herein, it is assessed that the Site's drainage plan adheres to the criteria set out in the El Paso County Engineering Criteria Manual.

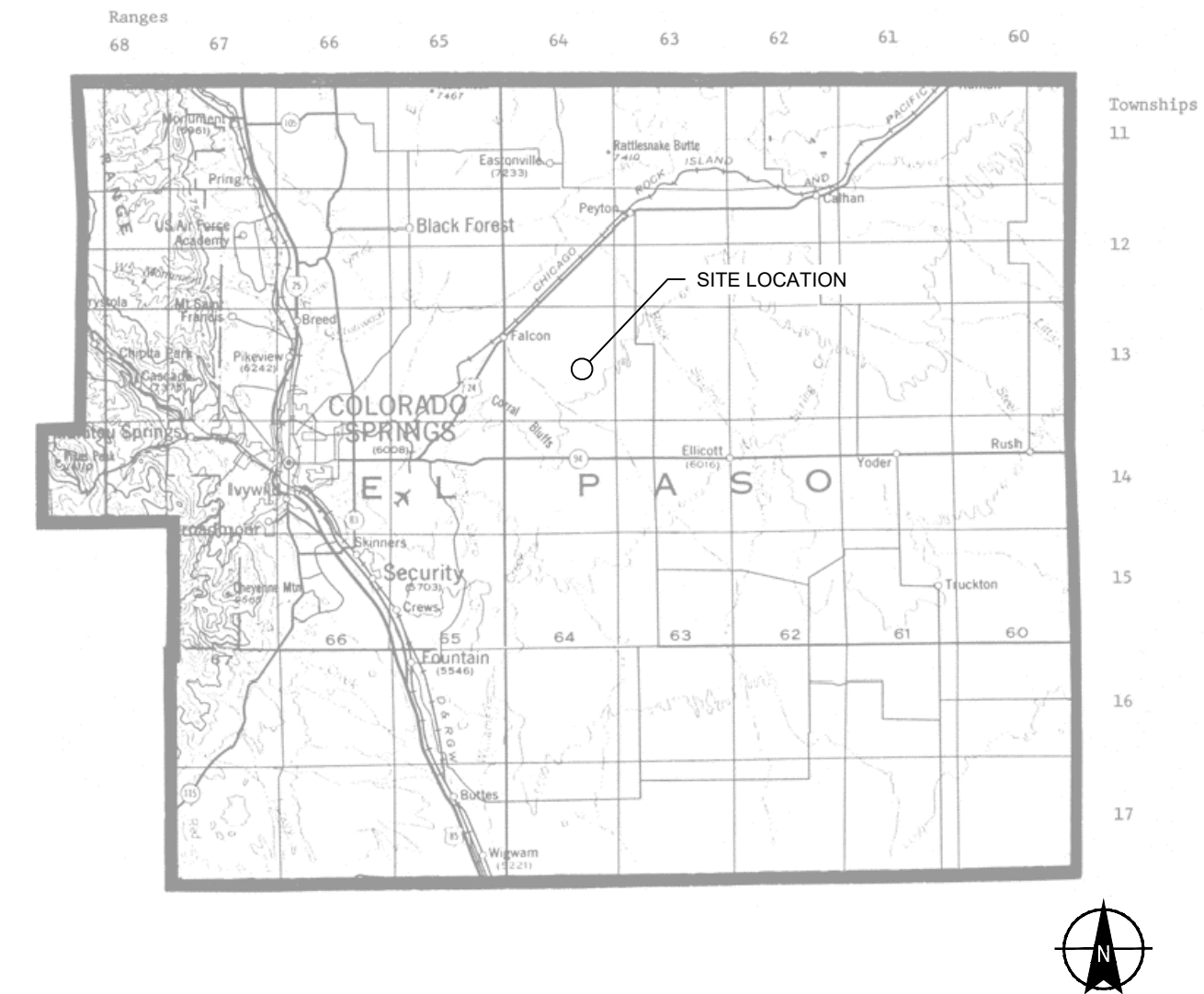
## References

1. El Paso County Drainage Criteria Manual (Volumes 1 and 2) and Engineering Criteria Manual, current editions.
2. El Paso County Land Use Department, 1988. South Central Comprehensive Plan, dated November.
3. Pikes Peak Area Council of Governments, 2020. Pikes Peak Area Water Quality Plan Chapter 21 Chico Creek Watershed, dated August.
4. United States Army Corps of Engineers Hydrologic Engineering Center, 2021. HEC-RAS User's Manual Version 6.0, dated May.
5. United States Army Corps of Engineers Hydrologic Engineering Center, 2022. HEC-HMS User's Manual Version 4.9, dated January.
6. United States Department of Agriculture Soil Conservation Service, 1981. Soil Survey of El Paso County Area, Colorado, dated June.
7. United States Geological Survey, 2011. Chico Creek, Geographic Names Information System, dated February.

\\haleyaldrich.com\share\CF\Projects\0208588\Deliverables\Drainage-Report\Word-Docs\2024-1125\_Solberg\_Drainage Report\_F.docx

## 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.

**HALEY  
ALDRICH**

SOLBERG PLANT SITE DRAINAGE REPORT  
PEYTON, COLORADO

SITE LOCATION MAP

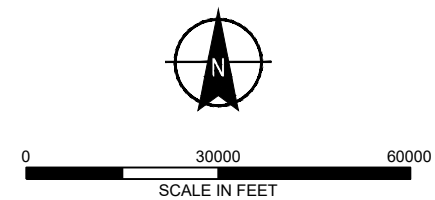
SCALE: AS SHOWN  
NOVEMBER 2024

FIGURE 1





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



**HALEY  
ALDRICH**

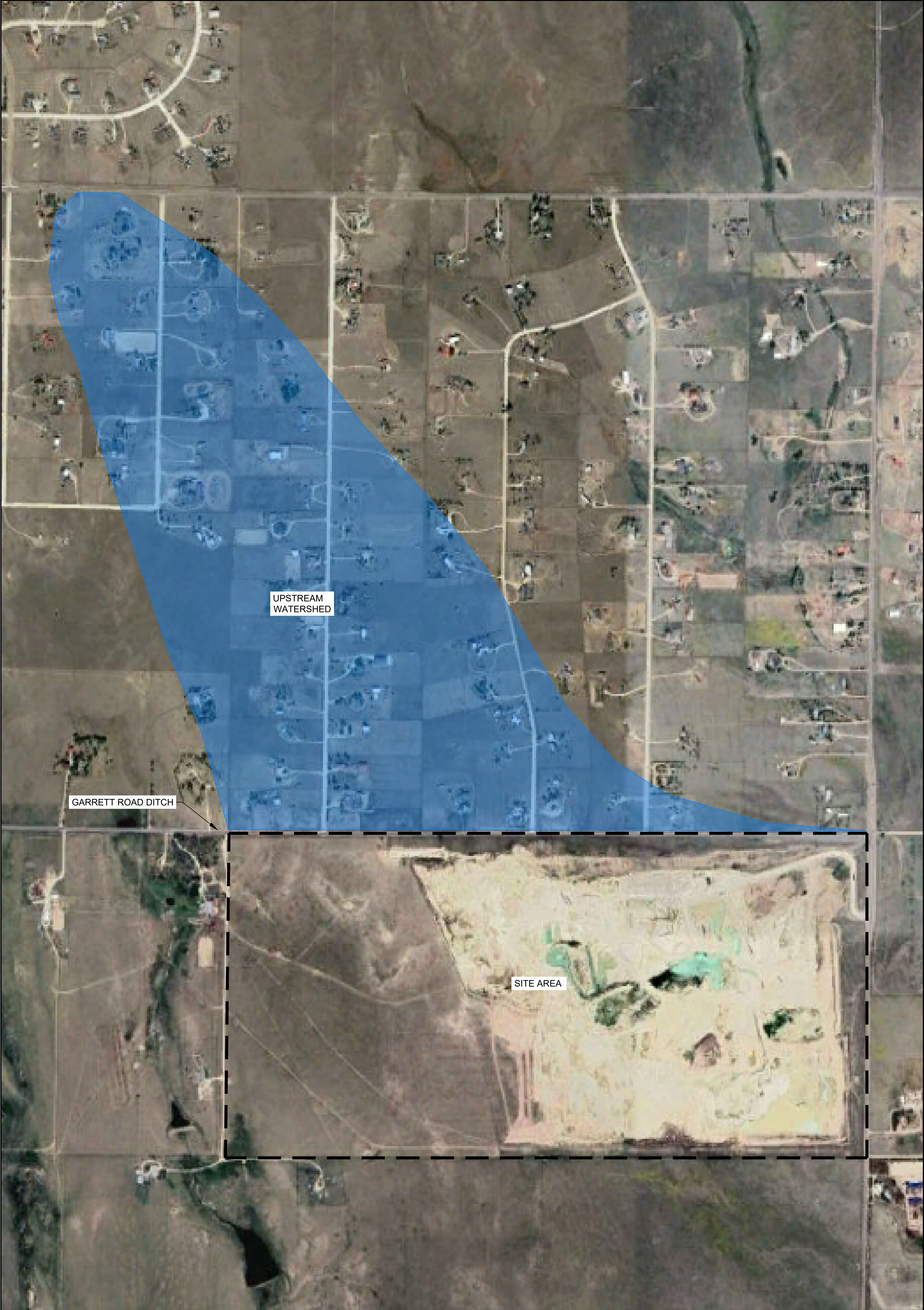
SOLBERG PLANT DRAINAGE REPORT  
PEYTON, COLORADO

CREEK LOCATION MAP

SCALE: AS SHOWN  
NOVEMBER 2024

FIGURE 2

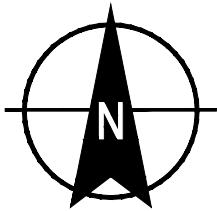




LEGEND

- — —

SITE AREA
- UPSTREAM WATERSHED



0 500 1000 1500 2000  
SCALE IN FEET

NOTES

1. AERIAL IMAGE PROVIDED BY GOOGLE EARTH, DATE CAPTURED: JUNE 20TH 2024
2. WATERSHED DELINEATION IS BASED ON EXISTING TOPOGRAPHY AS WELL AS CURRENT DRAINAGE INFRASTRUCTURE
3. AREA OF UPSTREAM WATERSHED 346 ACRES



SOLBERG PLANT SITE DRAINAGE REPORT  
PEYTON, COLORADO

WATERSHED DELINEATION MAP

SCALE: AS SHOWN  
NOVEMBER 2024

FIGURE 3



Project No.: 0208588-000  
Scale: AS SHOWN  
Date: NOVEMBER 2024  
Drawn By: H&A  
Designed By: H&A  
Checked By: CGL  
Approved By: JMT  
Stamp:

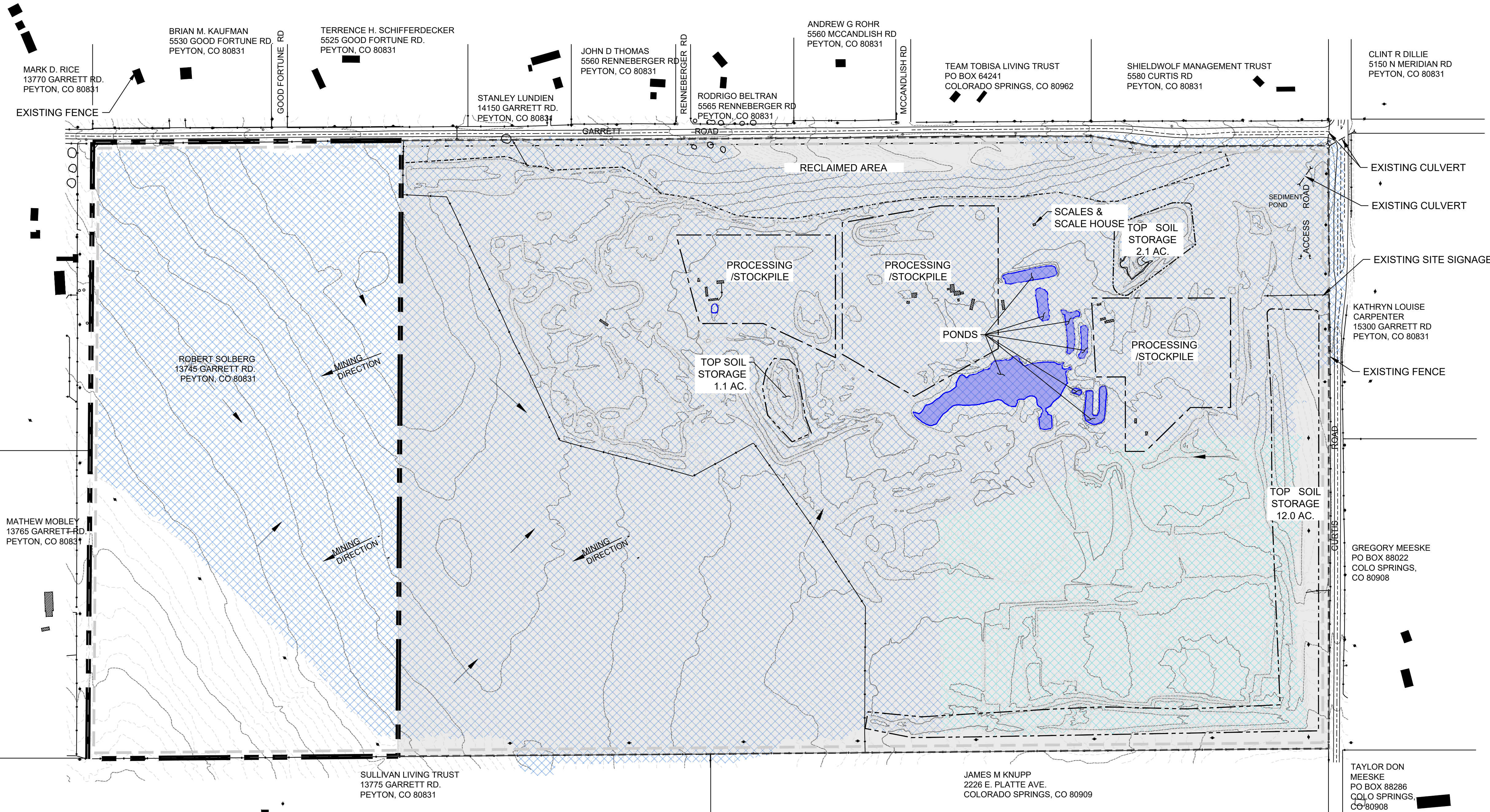
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S2	ISSUE FOR PERMIT 2ND	JMT 09/11/24
S1	ISSUE FOR PERMIT	ZS 05/03/22
Rev.	Description	By Date

HOLCIM US  
SOLBERG PLANT  
5445 CURTIS ROAD  
PEYTON, COLORADO 80831 -  
GRADING AND EROSION  
CONTROL PLAN

DRAINAGE MAP

FIG 4

Sheet: 3 of 6

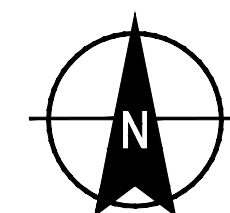


NOTES

- FEMA FLOODPLAIN SHOWN IN APPENDIX C
- PROPOSED CONTOURS SHOWN ON SHEET C-200 OF APPENDIX A
- FLows FROM OFFSITE ARE DIVERTED AROUND THE SITE VIA SWALES ALONG THE STREET

LEGEND

- CURRENT PERMIT BOUNDARY (234 ACRES)
- PROPOSED AMENDMENT BOUNDARY (79 ACRES)
- AFFECTED AREA BOUNDARY (305 ACRES)
- PROCESSING / STOCKPILE AREAS (23 ACRES)
- TOP SOIL STOCKPILE (15 ACRES)
- RECLAIMED AREA (16 ACRES)
- POB POND (3 ACRES APPROX.)
- EXISTING BUILDINGS
- WATERSHED 1 (241.5 ACRES)
- WATERSHED 2 (40.5 ACRES)
- FIRE
- LPOLE
- MANHOLE
- SIGN
- UPOLE
- FENCE
- MISC
- TOWER
- CULVERT
- ROCK
- IRRIGATION
- MAILBOX
- TREE
- TRAFFIC
- RIP-RAP
- POLE-ANCHOR



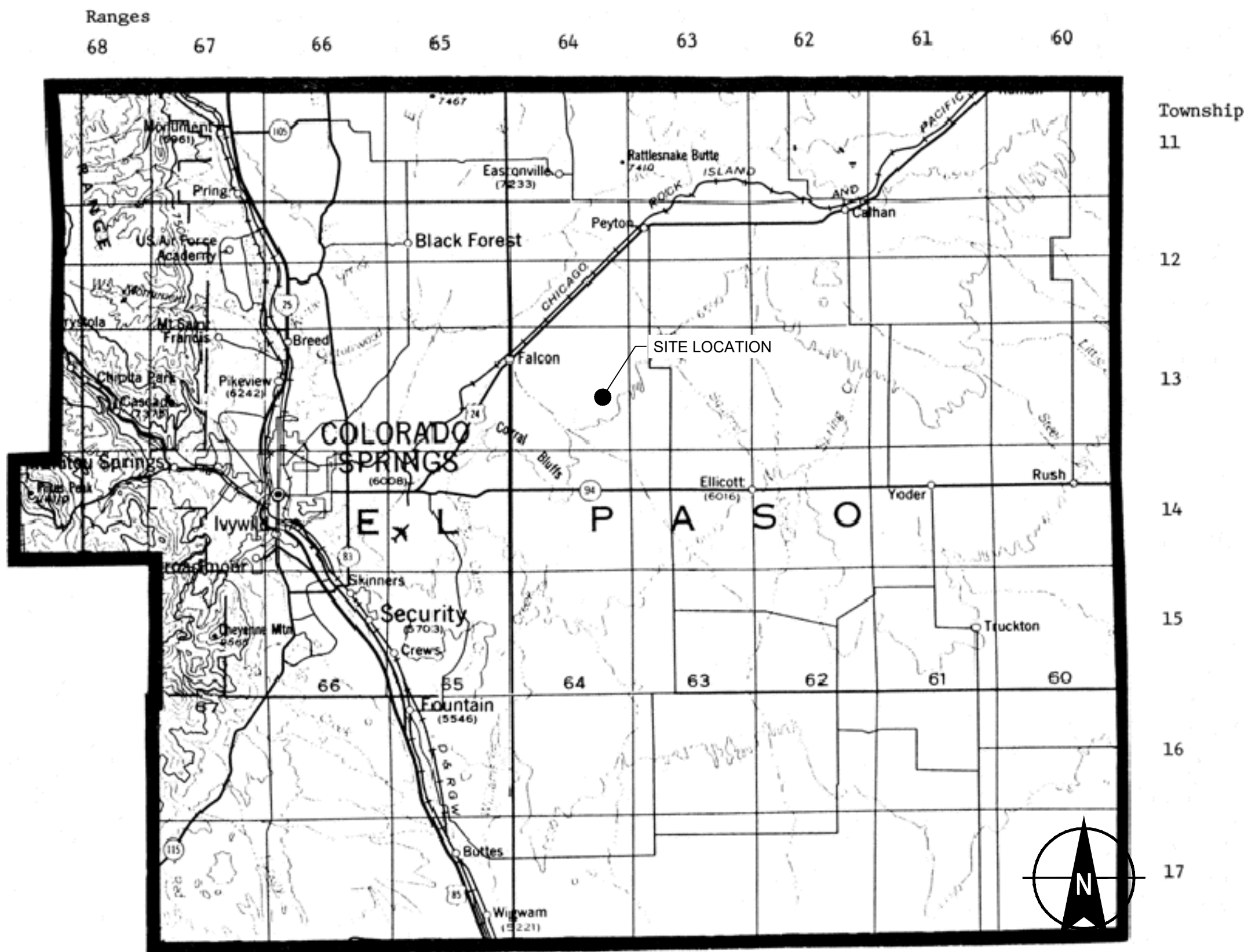


**APPENDIX A**  
**Grading and Erosion Control Plan**

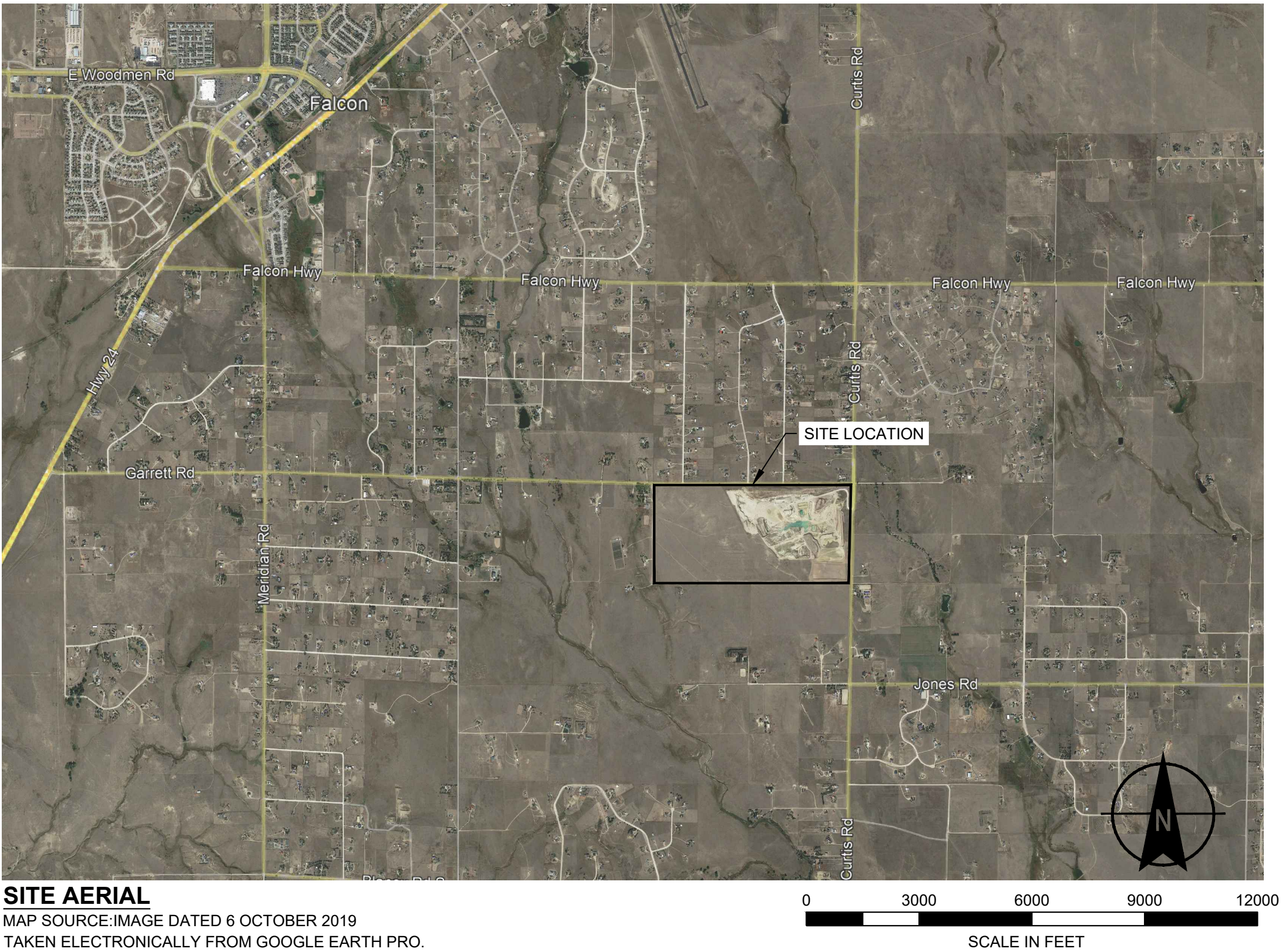


# HOLCIM US SOLBERG PLANT

5445 CURTIS 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.

DRAWING INDEX		
SHEET NO.	SHEET TITLE	DESCRIPTION
01	G-100	COVER SHEET
02	G-101	NOTES
03	C-100	EXISTING CONDITIONS MAP
04	C-101	PROPOSED EXPANSION GRADING PLAN
05	C-200	PROPOSED GRADING PLAN - COMPLETE SITE
06	C-201	PROPOSED GRADING PROFILES

Project No.: 0208588-000  
Scale: AS SHOWN  
Date: SEPTEMBER 2024  
Drawn By: H&A  
Designed By: H&A  
Checked By: CGL  
Approved By: JMT  
Stamp:



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#	#	#
S2	ISSUE FOR PERMIT 2ND	JMT 09/11/24
S1	ISSUE FOR PERMIT	ZS 05/03/22
Rev.	Description	By Date

HOLCIM US  
SOLBERG PLANT  
5445 CURTIS ROAD  
PEYTON, COLORADO 80831 -  
GRADING AND EROSION  
CONTROL PLAN

COVER SHEET

**G-100**  
Sheet: 1 of 6

PCD FILE #: EA21232



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Sheet: G-101

SURVEY NOTES:

1. SURVEY HAS BEEN COMPLETED BY RED ROCK LAND SURVEYS, INC. LAND INFORMATION SHOWN IS FROM FIELD OBSERVATION COMPLETED ON 6 JULY 2021.
2. THE LEGAL DESCRIPTION OF THE SITE IS THE WEST  $\frac{1}{2}$  OF THE NORTHWEST  $\frac{1}{4}$  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.
4. ELEVATIONS ARE IN FEET AND REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

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 (SWMP) 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 PRE-CONSTRUCTION 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 LOOSENEED 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., DATED 27 JULY 2022, 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

OWNER -  
SOLBERG GRAVEL LLC  
13745 GARRETT ROAD  
PEYTON, CO 80831-7620

OPERATOR -  
HOLCIM US  
1687 COLE BLVD, SUITE 300  
GOLDEN, CO 80401

ENGINEER -  
HALEY & ALDRICH, INC.  
8101 E. PRENTICE AVE., SUITE 600  
GREENWOOD VILLAGE, CO 80111

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.

 9/12/2024  
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.

JOSHUA PALMER, P.E.  
COUNTY ENGINEER/ECM ADMINISTRATOR 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.:	0208588-000
Scale:	AS SHOWN
Date:	SEPTEMBER 2024
Drawn By:	H&A
Designed By:	H&A
Checked By:	CGL
Approved By:	JMT

Stamp:



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S2	ISSUE FOR PERMIT 2ND	JMT	09/11/24
S1	ISSUE FOR PERMIT	ZS	05/03/22
Rev.	Description	By	Date

HOLCIM US  
SOLBERG PLANT  
5445 CURTIS ROAD  
PEYTON, COLORADO 80831 -  
GRADING AND EROSION  
CONTROL PLAN

NOTES

G-101



Project No.: 0208588-000  
Scale: AS SHOWN  
Date: SEPTEMBER 2024  
Drawn By: H&A  
Designed By: H&A  
Checked By: CGL  
Approved By: JMT  
Stamp:



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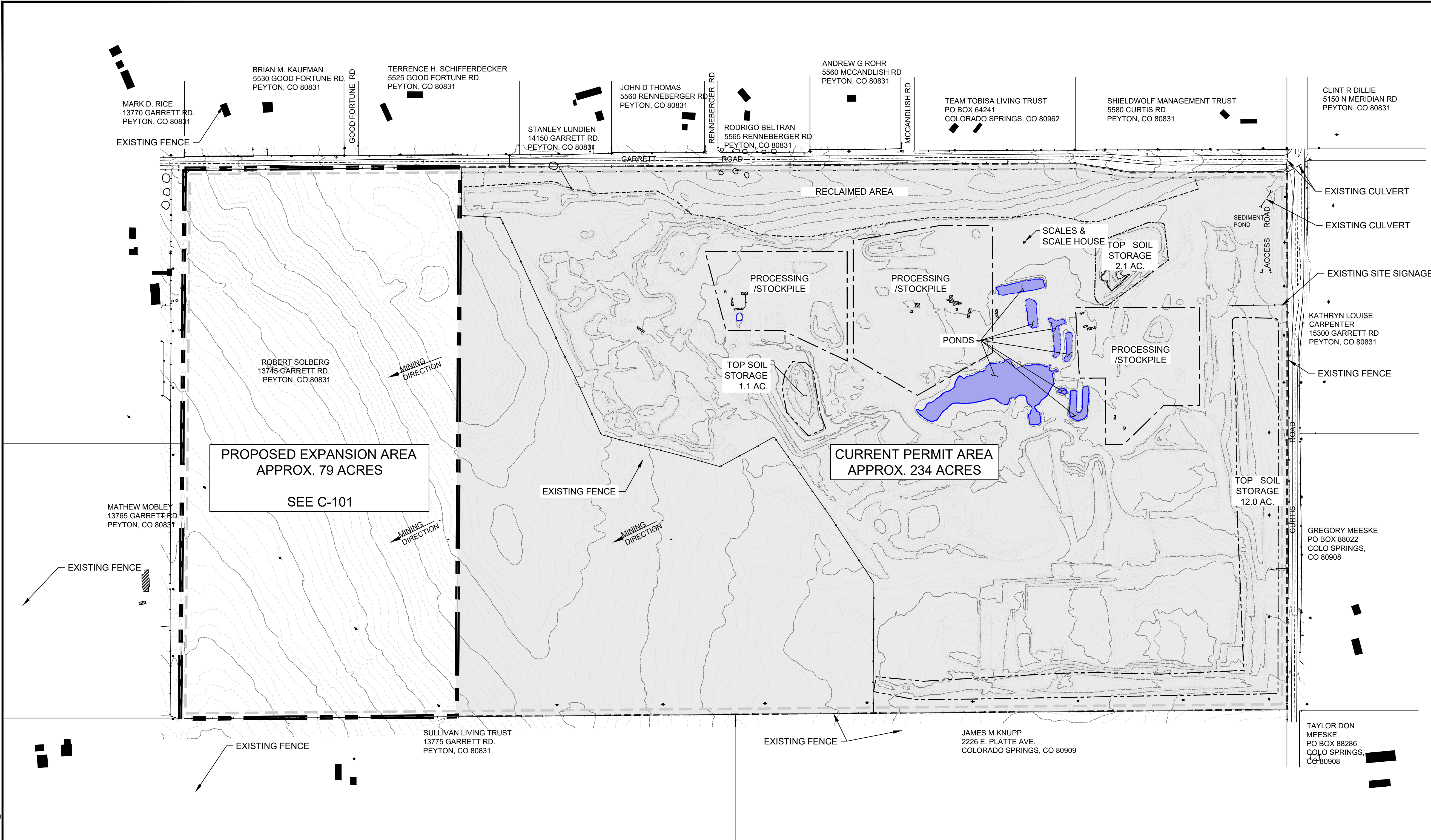
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S1	ISSUE FOR PERMIT	ZS	05/03/22
Rev.	Description	By	Date

HOLCIM US  
SOLBERG PLANT  
5445 CURTIS ROAD  
PEYTON, COLORADO 80831 -  
GRADING AND EROSION  
CONTROL PLAN

EXISTING  
CONDITIONS MAP

C-100

Sheet: 3 of 6



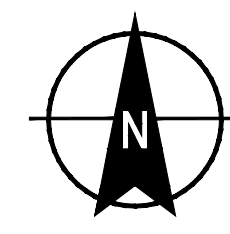
NOTES

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

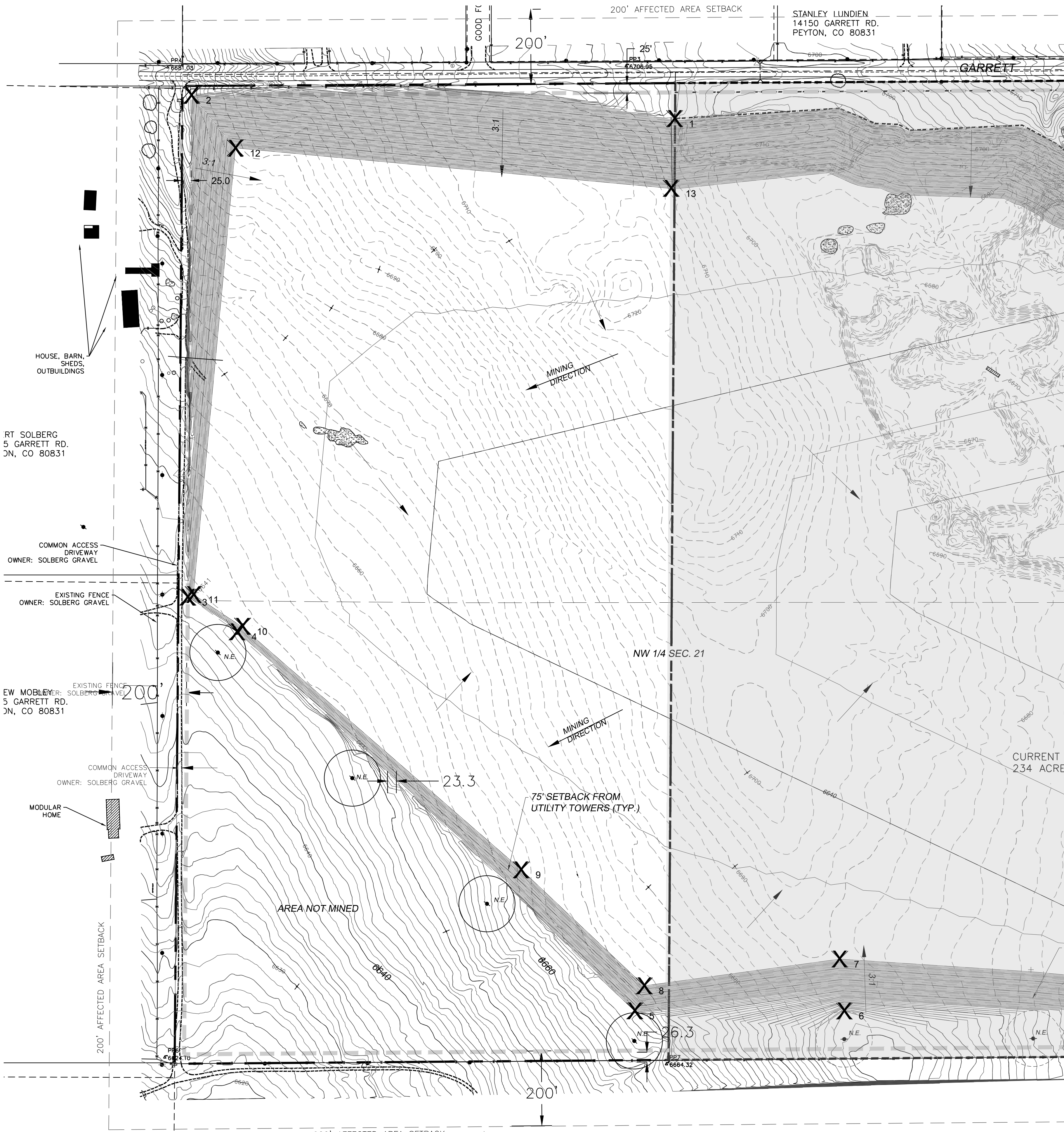
- CURRENT PERMIT BOUNDARY (234 ACRES)
- PROPOSED AMENDMENT BOUNDARY (79 ACRES)
- AFFECTED AREA BOUNDARY (305 ACRES)
- PROCESSING / STOCKPILE AREAS (23 ACRES)
- TOP SOIL STOCKPILE (15 ACRES)
- RECLAIMED AREA (16 ACRES)
- █ POND (3 ACRES APPROX.)
- █ EXISTING BUILDINGS

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





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Printed: 01/11/2024 2:55 PM  
Sheet: C-101



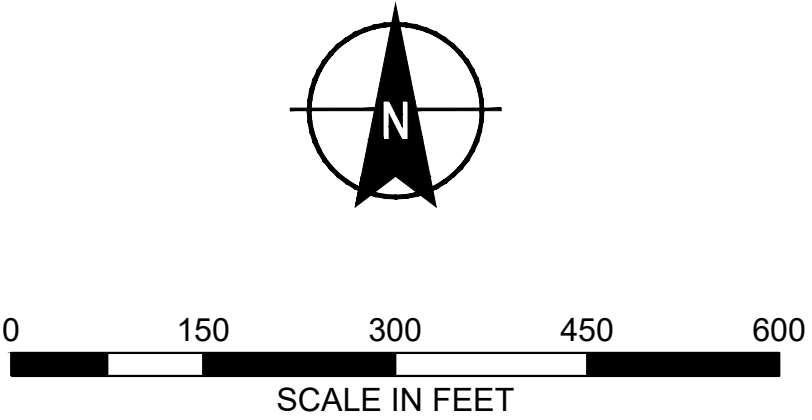
NOTES

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)
- PROCESSING / STOCKPILE AREAS (23 ACRES)
- TOP SOIL STOCKPILE (15 ACRES)
- RECLAIMED AREA (16 ACRES)
- █ PONDS (3 ACRES APPROX.)
- ▨ EXISTING BUILDINGS
- FIRE
- LPOLE
- MANHOLE
- SIGN
- UPOLE
- FENCE
- MISC
- TOWER
- CULVERT
- ROCK
- IRRIGATION
- MAILBOX
- TREE
- TRAFFIC
- RIP-RAP
- POLE-ANCHOR

Point Table				
Point #	Elevation	Northing	Easting	Description
1	6703.15	1393680.93	3265441.86	TOP
2	6684.26	1393743.34	3264150.35	TOP
3	6646.00	1392401.15	3264139.52	TOP
4	6648.00	1392307.96	3264271.15	TOP
5	6664.00	1391294.73	3265335.30	TOP
6	6688.00	1391294.29	3265895.62	TOP
7	6642.00	1391433.23	3265883.51	BOTTOM
8	6642.00	1391361.65	3265360.49	BOTTOM
9	6642.00	1391672.03	3265031.64	BOTTOM
12	6642.00	1393602.80	3264266.52	BOTTOM
13	6642.00	1393494.36	3265432.85	BOTTOM



Project No.: 0208588-000  
Scale: AS SHOWN  
Date: SEPTEMBER 2024  
Drawn By: H&A  
Designed By: H&A  
Checked By: CGL  
Approved By: JMT  
Stamp:



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S2	ISSUE FOR PERMIT 2ND	JMT 09/11/24
S1	ISSUE FOR PERMIT	ZS 05/03/22
Rev.	Description	By Date

HOLCIM US  
SOLBERG PLANT  
5445 CURTIS ROAD  
PEYTON, COLORADO 80831 -  
GRADING AND EROSION  
CONTROL PLAN

PROPOSED  
EXPANSION  
GRADING PLAN

C-101



Project No.: 0208588-000  
Scale: AS SHOWN  
Date: SEPTEMBER 2024  
Drawn By: H&A  
Designed By: H&A  
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Approved By: JMT  
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HOLCIM US  
SOLBERG PLANT  
5445 CURTIS ROAD  
PEYTON, COLORADO 80831 -  
GRADING AND EROSION  
CONTROL PLAN

PROPOSED  
GRADING PLAN -  
COMPLETE SITE

C-200

Sheet: 5 of 6

WS-1 OUTFLOW  
24 HR MAXIMUM FLOWRATE = 54.2 CFS  
2 HR MAXIMUM FLOWRATE = 14.2 CFS

EXISTING SITE SIGNAGE

EXISTING FENCE

25' SETBACK FROM  
UTILITY POLES (TYP.)

DRAINAGE SWALE

NW 1/4 SEC. 21

NE 1/4 SEC. 21

75' SETBACK FROM  
UTILITY TOWERS (TYP.)

75' SETBACK FROM UTILITY TOWERS (TYP.)

AREA NOT MINED

EXISTING FENCE

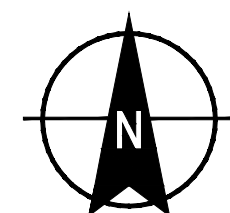
WS-2 OUTFLOW  
24 HR MAXIMUM FLOWRATE = 17.6 CFS  
2 HR MAXIMUM FLOWRATE = 4.0 CFS

## NOTES

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

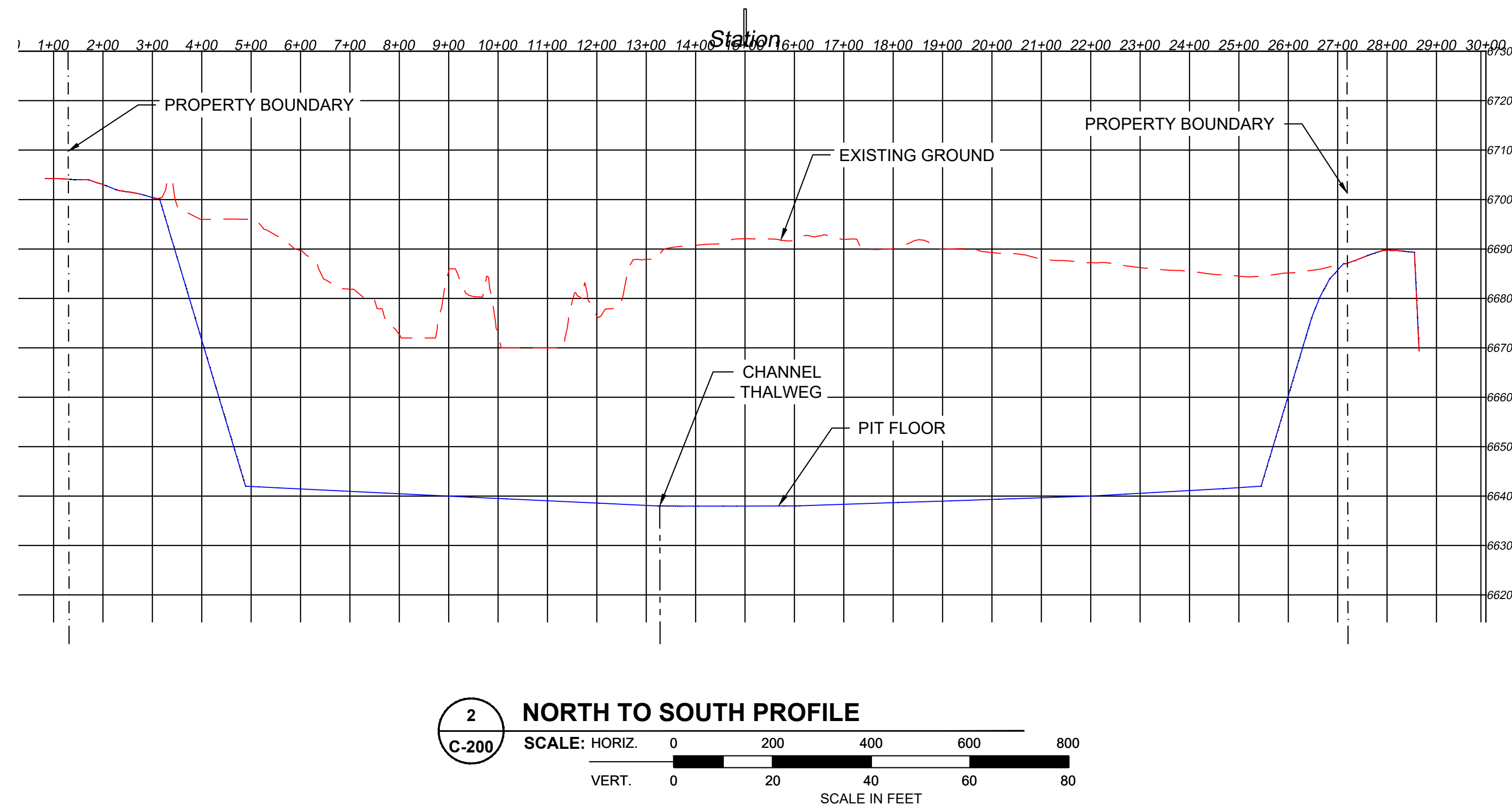
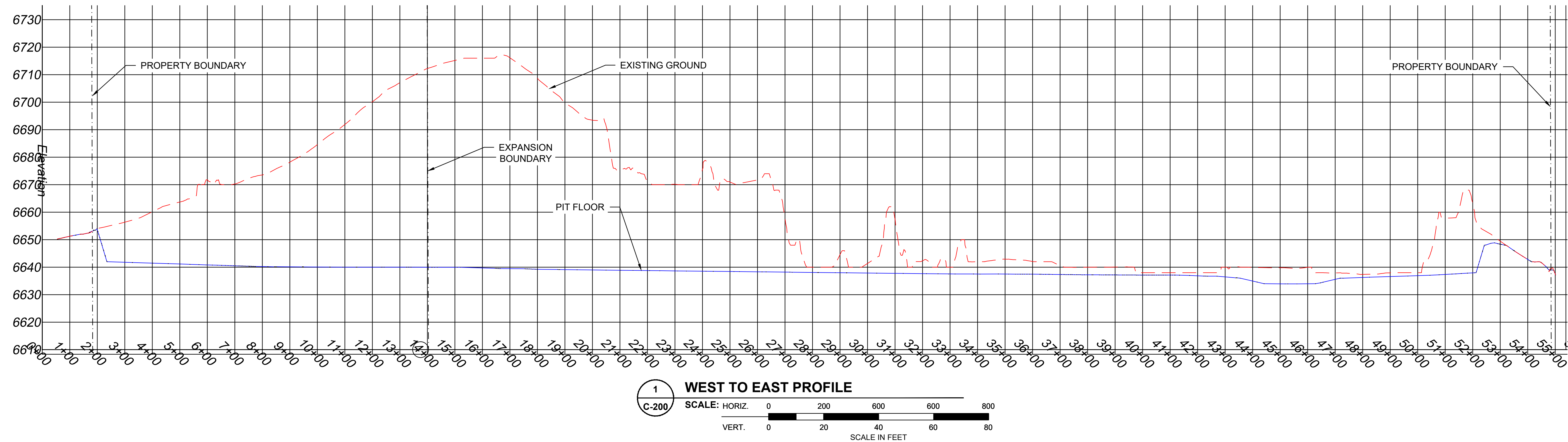
## LEGEND

- CURRENT PERMIT BOUNDARY (234 ACRES)
- PROPOSED AMENDMENT BOUNDARY (79 ACRES)
- AFFECTED AREA BOUNDARY (305 ACRES)
- WATERSHED 1 (241.5 ACRES)
- WATERSHED 2 (40.5 ACRES)



0 250 500 750 1000  
SCALE IN FEET





LEGEND

- EXISTING GROUND
- PROPOSED PIT
- PROPERTY BOUNDARY

NOTES

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

Project No.: 0208588-000  
Scale: AS SHOWN  
Date: SEPTEMBER 2024  
Drawn By: H&A  
Designed By: H&A  
Checked By: CGL  
Approved By: JMT

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HOLCIM US  
SOLBERG PLANT  
5445 CURTIS ROAD  
PEYTON, COLORADO 80831 -  
GRADING AND EROSION  
CONTROL PLAN


PROPOSED  
GRADING  
PROFILES

C-201


Sheet: 6 of 6

## **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 Yokta, Geoffrey Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF\\_tabular](#) | [PF\\_graphical](#) | [Maps\\_&\\_aerials](#)

PF tabular

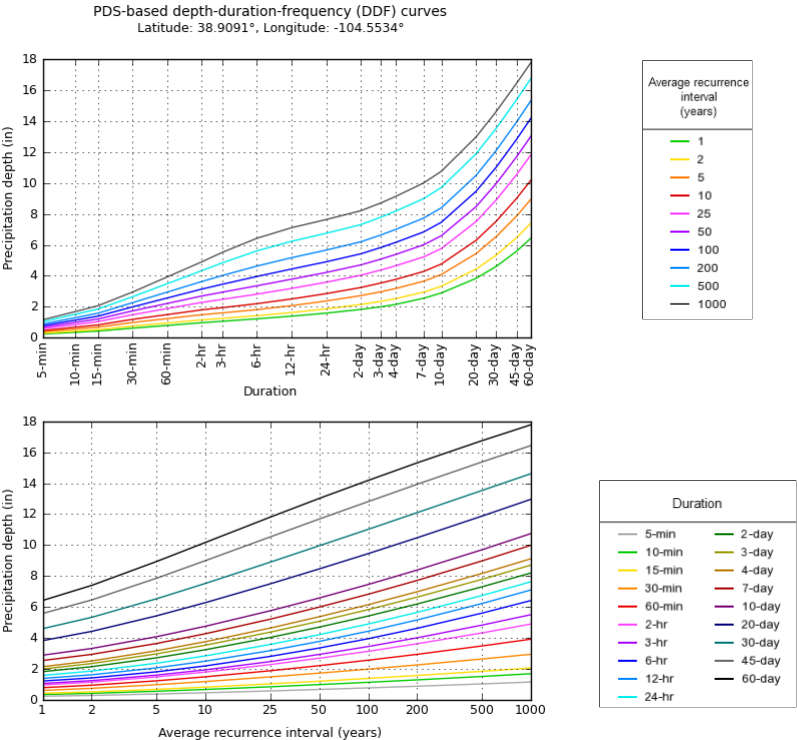
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.239 (0.193-0.299)	0.291 (0.235-0.365)	0.382 (0.307-0.479)	0.462 (0.369-0.582)	0.579 (0.449-0.762)	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)

<sup>1</sup> 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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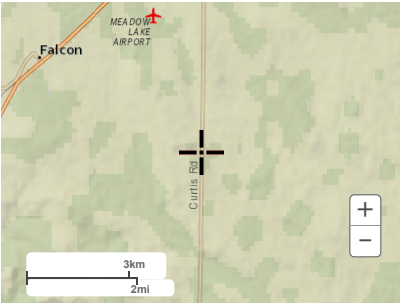
PF graphical



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Maps & aerials

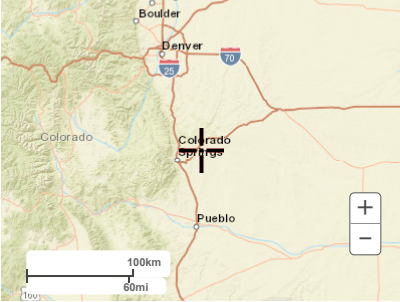
Small scale terrain



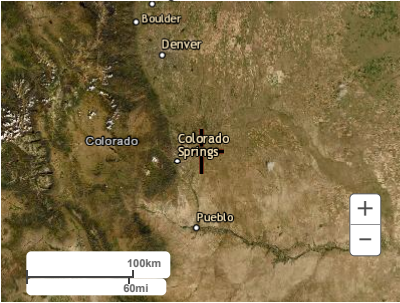
Large scale terrain



Large scale map



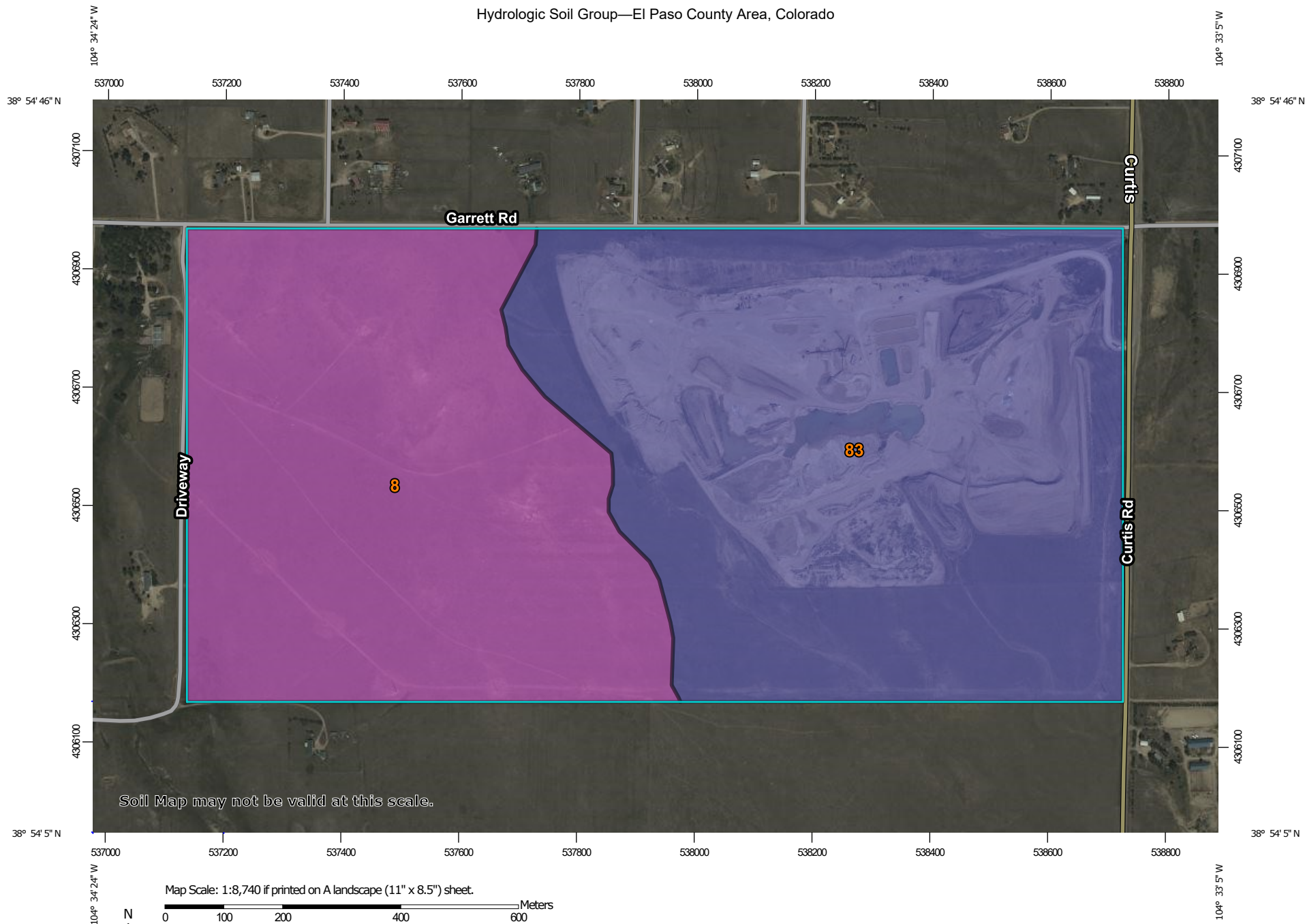
Large scale aerial



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National Oceanic and Atmospheric Administration  
National Weather Service  
National Water Center  
1325 East West Highway  
Silver Spring, MD 20910  
Questions?: [HDSC.Questions@noaa.gov](mailto:HDSC.Questions@noaa.gov)  
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# Hydrologic Soil Group—El Paso County Area, Colorado













**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%
<b>Totals for Area of Interest</b>			<b>315.8</b>	<b>100.0%</b>

## 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*

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: SolbergSimulation Run: 2-hr 100-yr

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

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    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

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

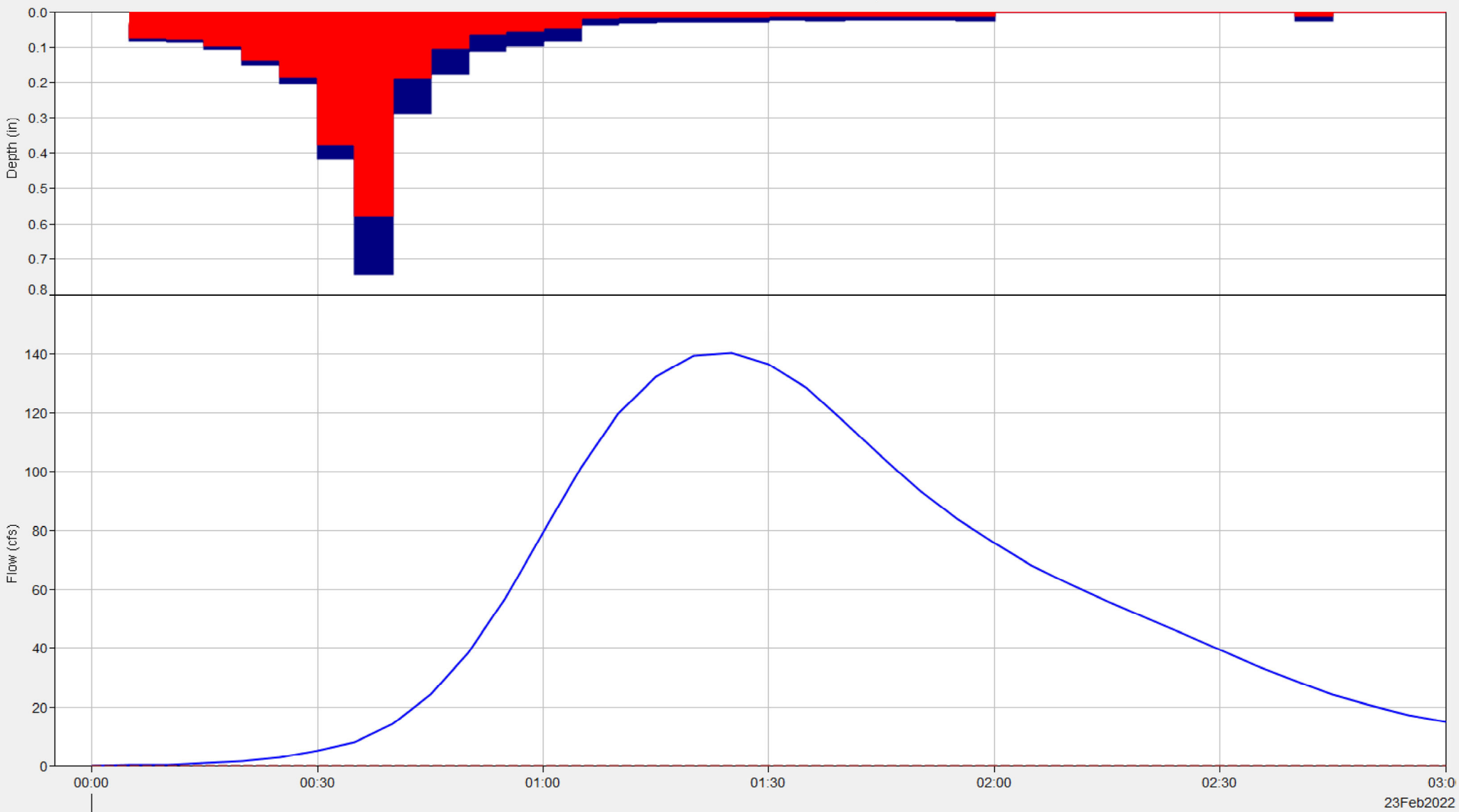
Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (AC-FT)
WS-2	0.06	46.0	23Feb2022, 00:50	2.3
Flow Offsite via Road Ditch	0.06	46.0	23Feb2022, 00:45	2.3
WS-1	0.38	140.2	23Feb2022, 01:25	14.2
Flow offsite via Culvert	0.38	140.2	23Feb2022, 01:20	14.2

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"

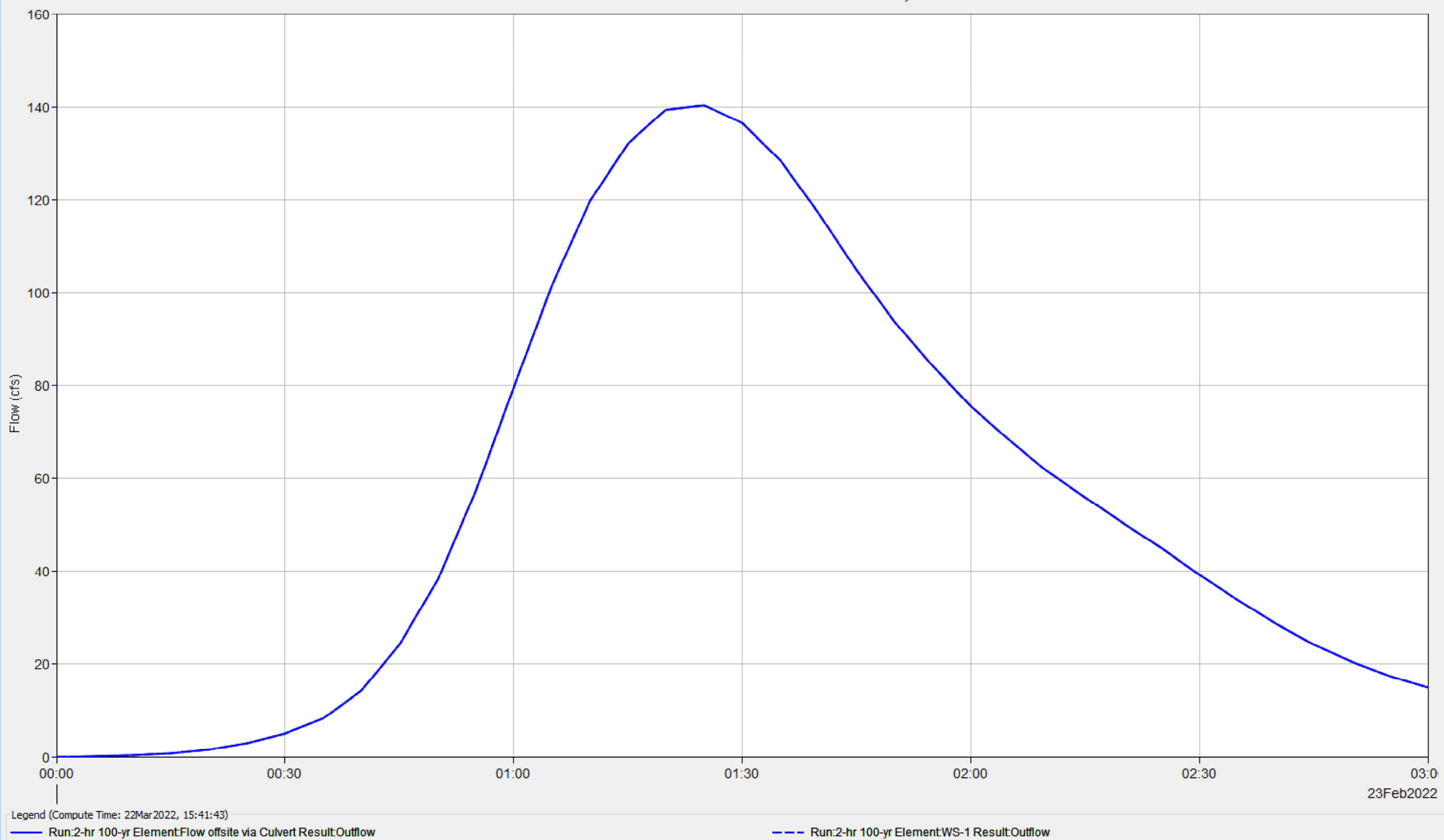


Legend (Compute Time: 22Mar2022, 15:41:43)

Run:2-hr 100-yr ElementWS-1 Result:Precipitation      Run:2-hr 100-yr ElementWS-1 Result:Precipitation Loss      Run:2-hr 100-yr ElementWS-1 Result:Outflow      Run:2-hr 100-yr ElementWS-1 Result:Baseflow

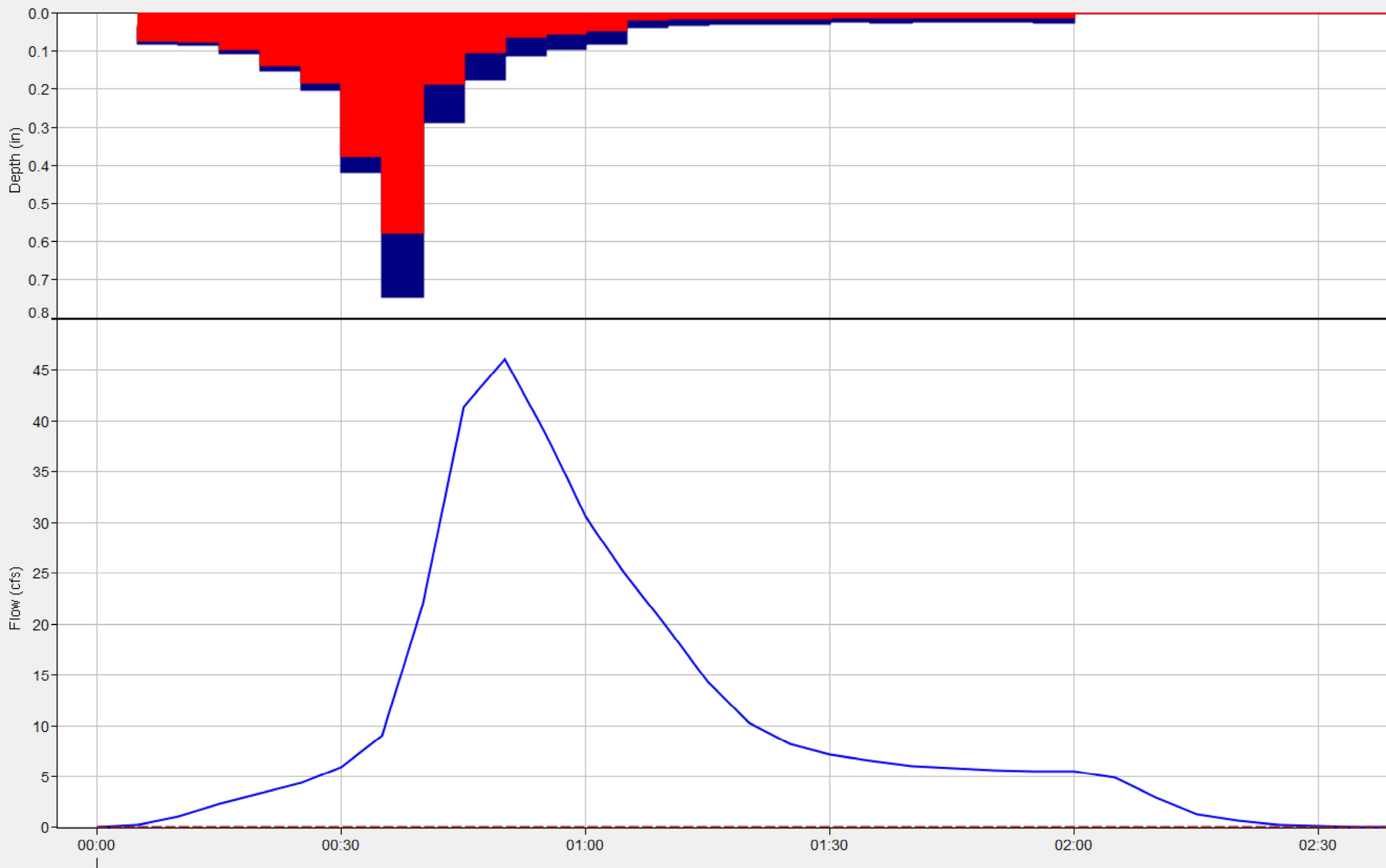


Sink "Flow offsite via Culvert" Results for Run "2-hr 100-yr"

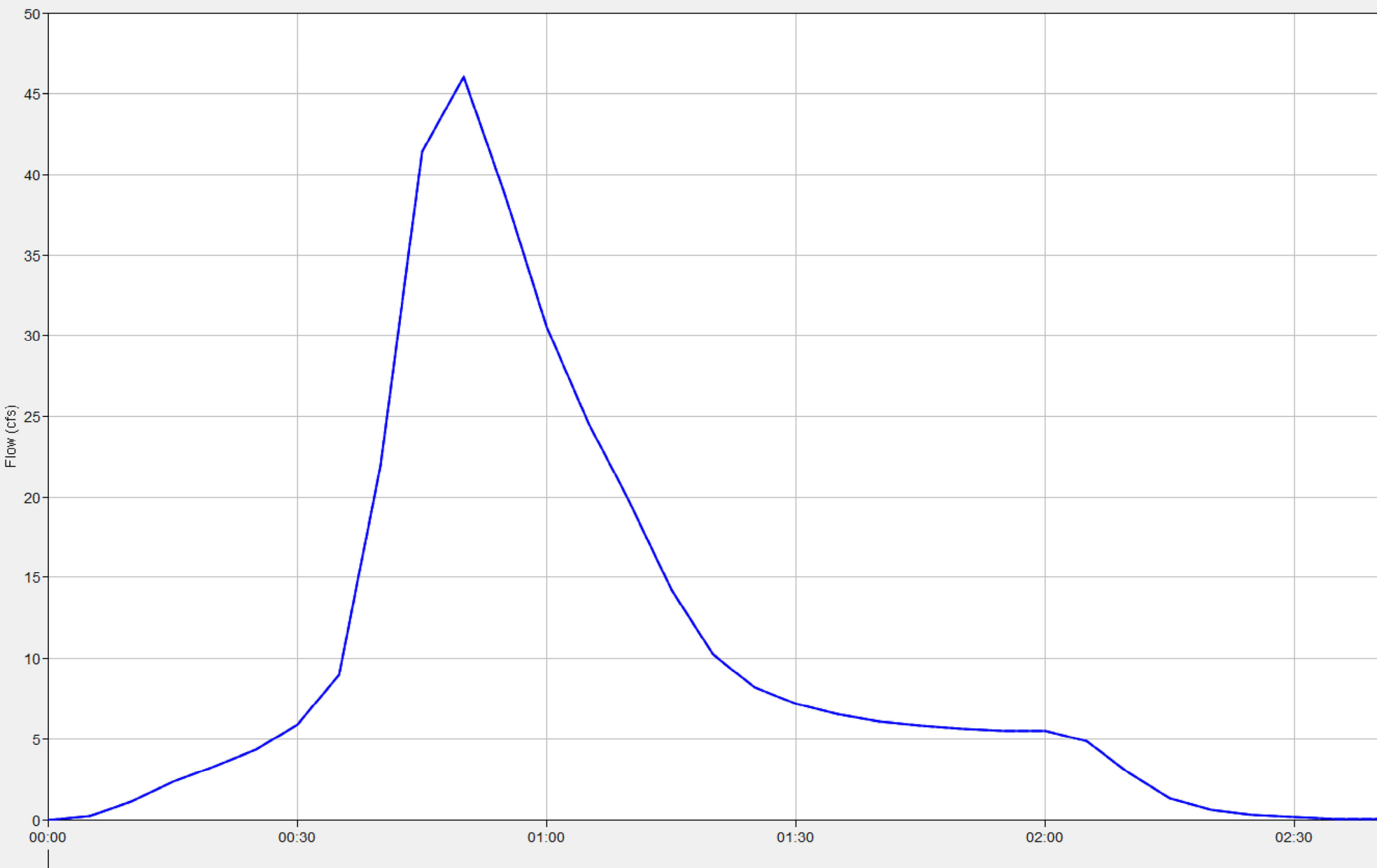


Time-Series Results for Subbasin "WS-2"							
Project: Solberg    Simulation Run: 2-hr 100-yr Subbasin: WS-2							
Start of Run: 23Feb2022, 00:00		Basin Model: Existing Conditions					
End of Run: 23Feb2022, 03:00		Meteorologic Model: 100-year 2-hr event					
Compute Time: 22Mar2022, 15:41:43		Control 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"



Sink "Flow Offsite via Road Ditch" Results for Run "2-hr 100-yr"



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

Basin Model: Existing Conditions

End of Run: 24Feb2022, 00:00

Meteorologic Model: 100-yr 24-hr event

Compute Time:22Mar2022, 15:42:16

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    Basin Model: Existing Conditions

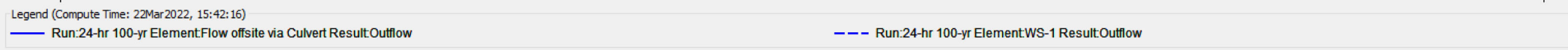
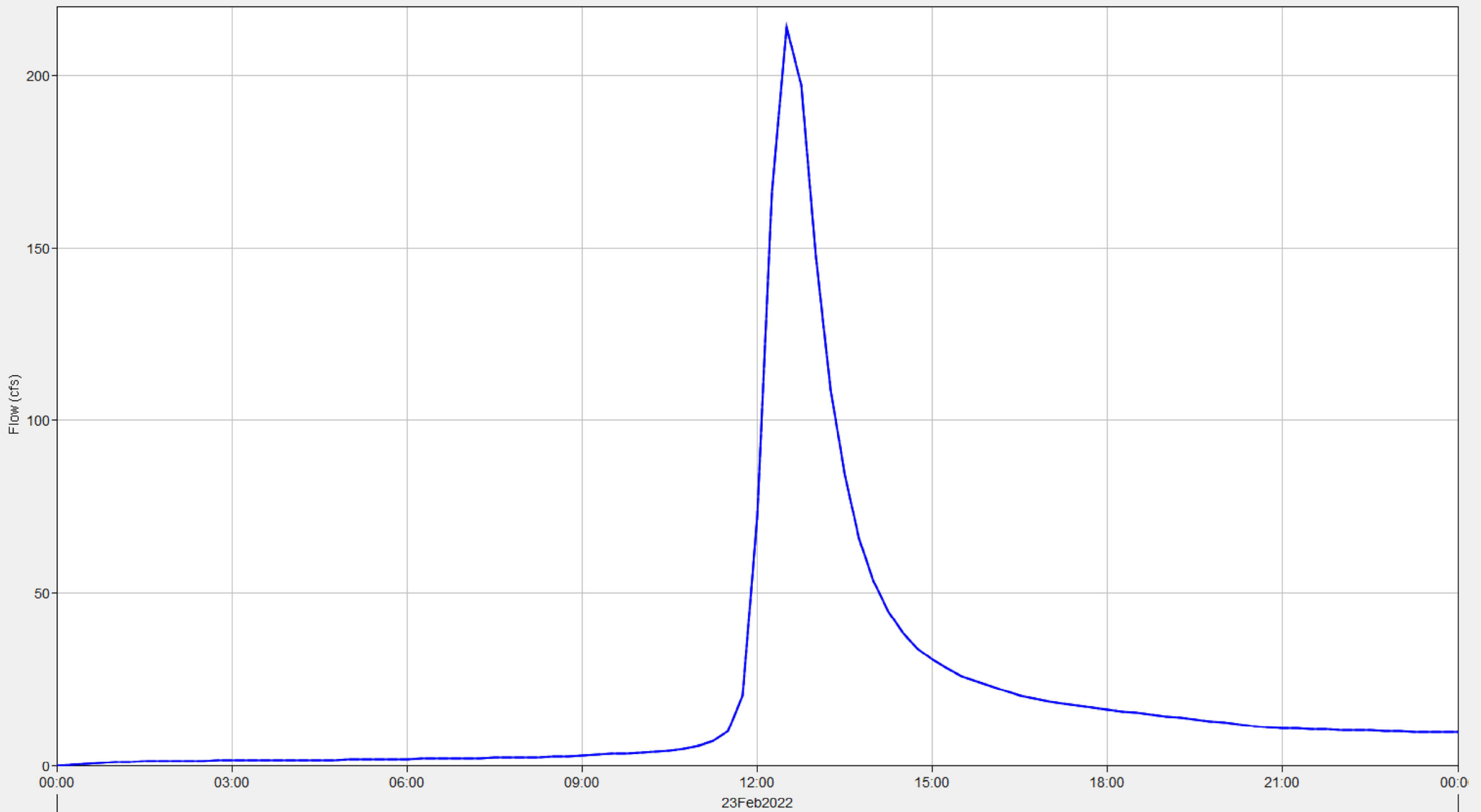
End of Run: 24Feb2022, 00:00    Meteorologic Model: 100-yr 24-hr event

Compute Time: 22Mar2022, 15:42:16    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

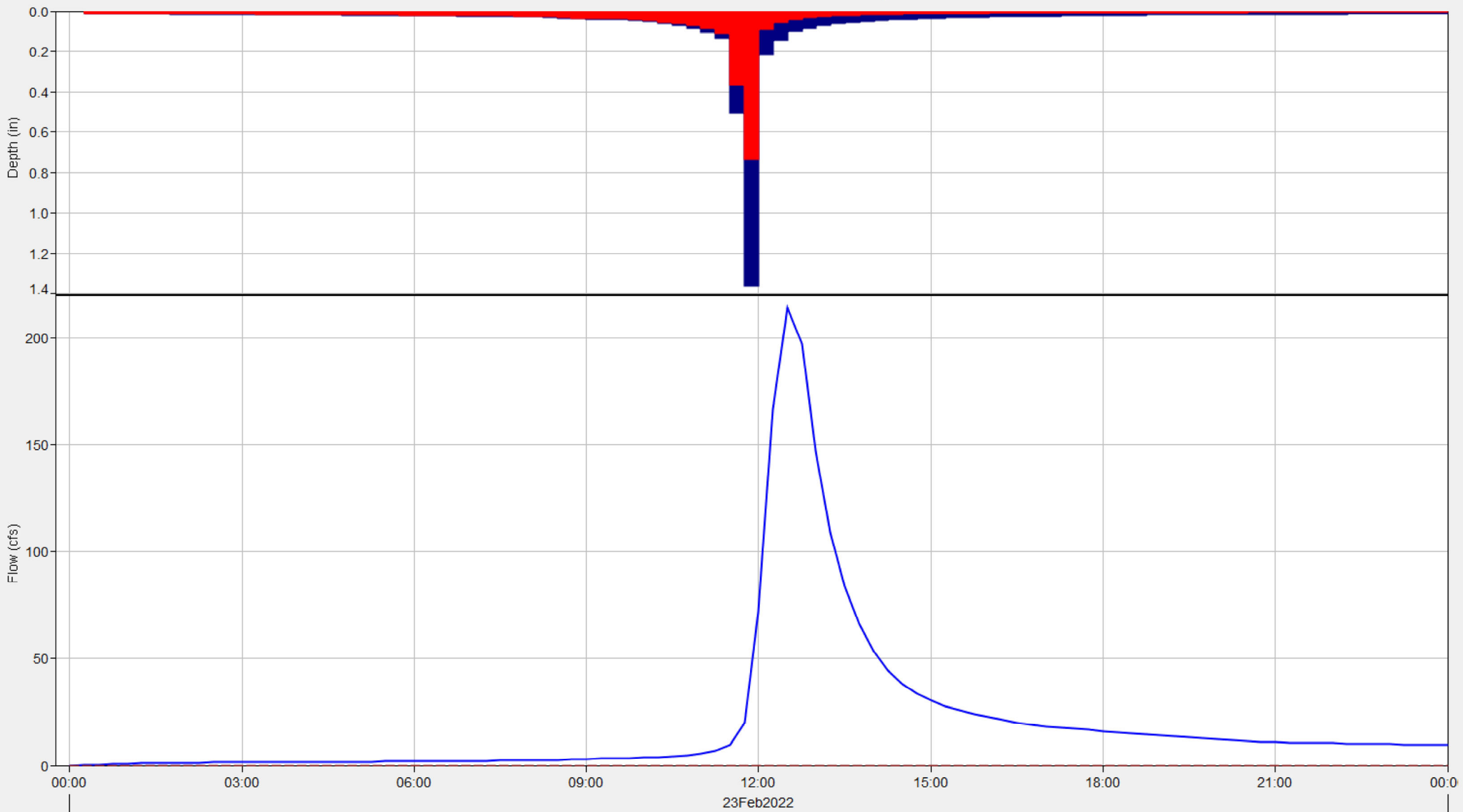
Sink "Flow offsite via Culvert" Results for Run "24-hr 100-yr"





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"

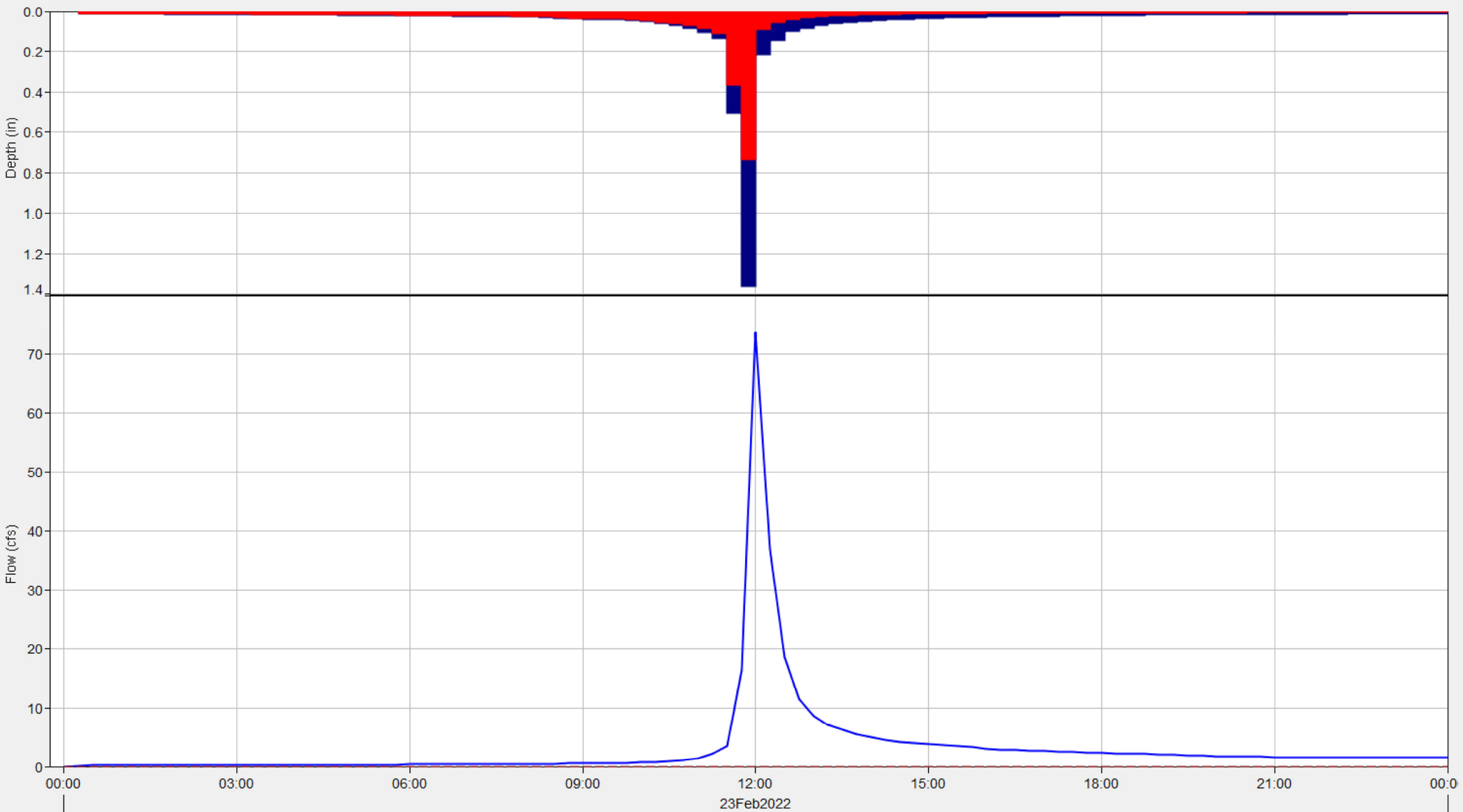


Legend (Compute Time: 22Mar2022, 15:42:16)

Run:24-hr 100-yr ElementWS-1 ResultPrecipitation      Run:24-hr 100-yr ElementWS-1 ResultPrecipitation Loss      Run:24-hr 100-yr ElementWS-1 ResultOutflow      Run:24-hr 100-yr ElementWS-1 ResultBaseflow

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

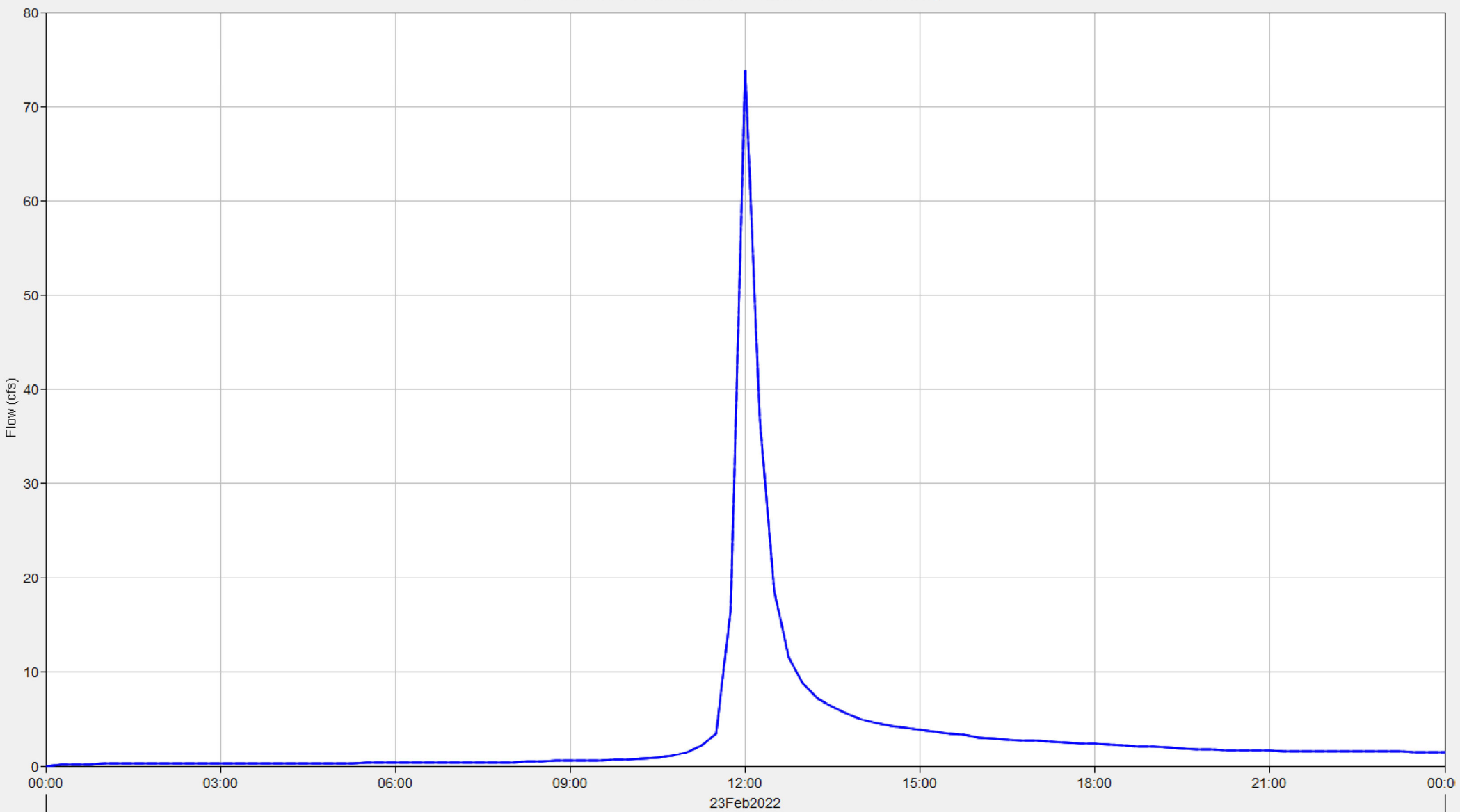
Subbasin "WS-2" Results for Run "24-hr 100-yr"



Legend (Compute Time: 22Mar2022, 15:42:16)

<span style="color: blue;">■</span> Run:24-hr 100-yr ElementWS-2 ResultPrecipitation	<span style="color: red;">■</span> Run:24-hr 100-yr ElementWS-2 ResultPrecipitation Loss	<span style="color: blue;">—</span> Run:24-hr 100-yr ElementWS-2 ResultOutflow	<span style="color: brown;">- - -</span> Run:24-hr 100-yr ElementWS-2 ResultBaseflow
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Sink "Flow Offsite via Road Ditch" Results for Run "24-hr 100-yr"

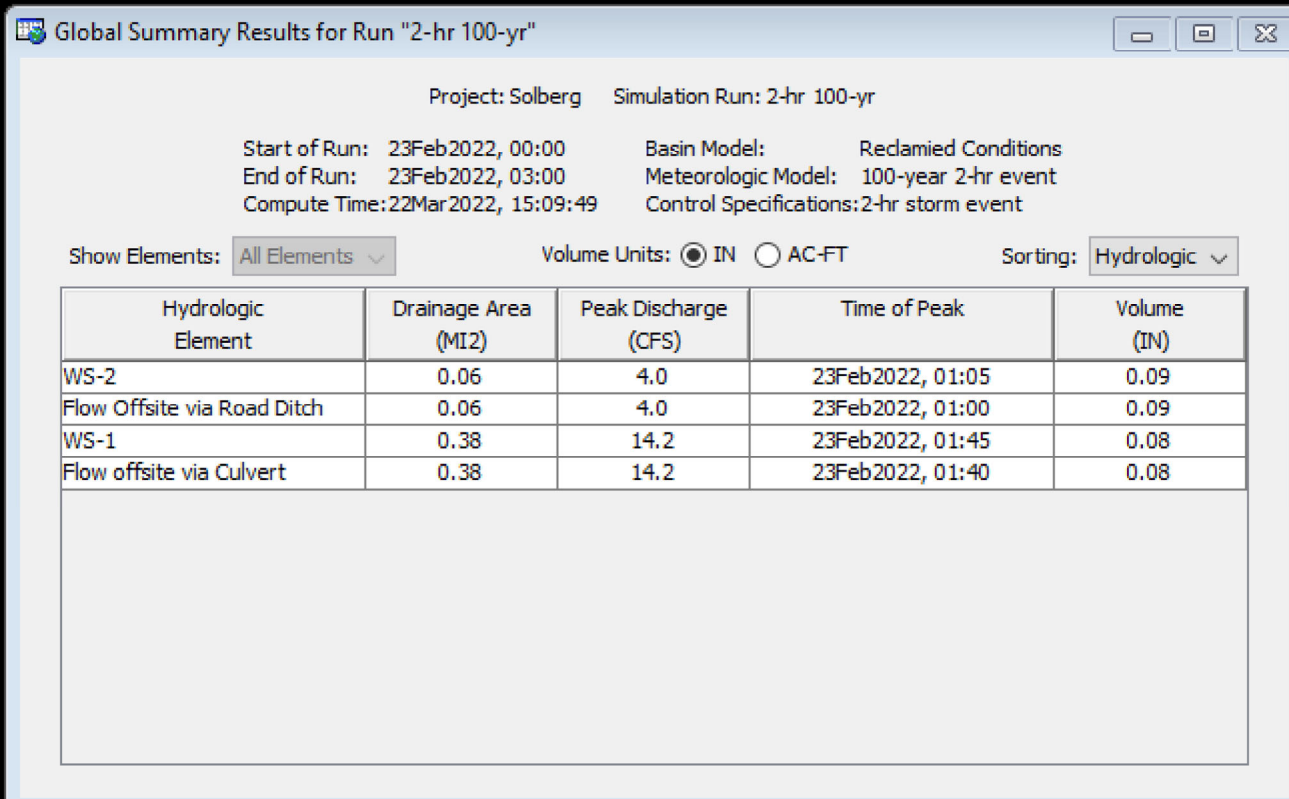


Legend (Compute Time: 22Mar2022, 15:42:16)

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    Basin Model: Reclaimed 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

Show Elements: All Elements

Volume Units: ☐ IN ☒ AC-FT

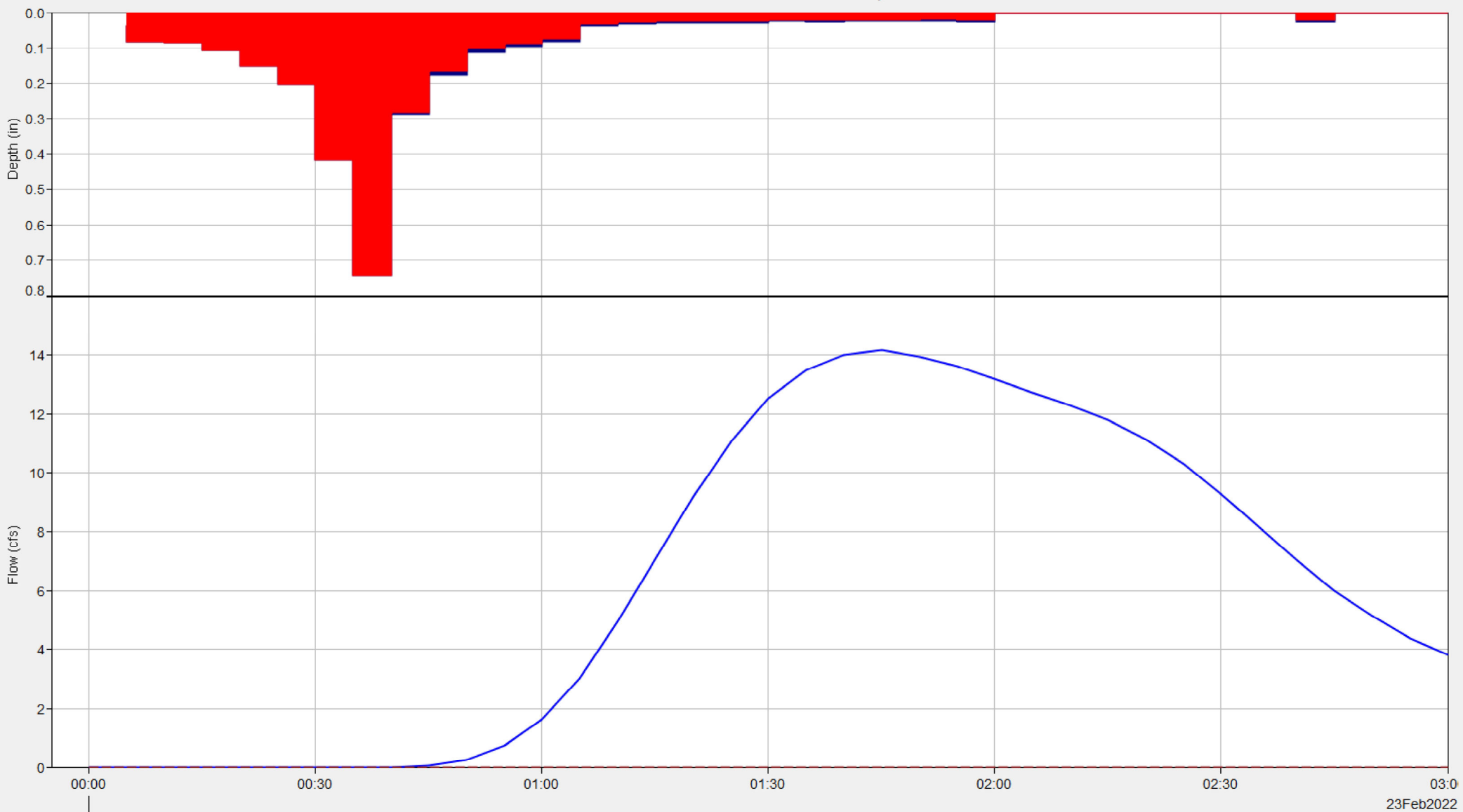
Sorting: Hydrologic

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"

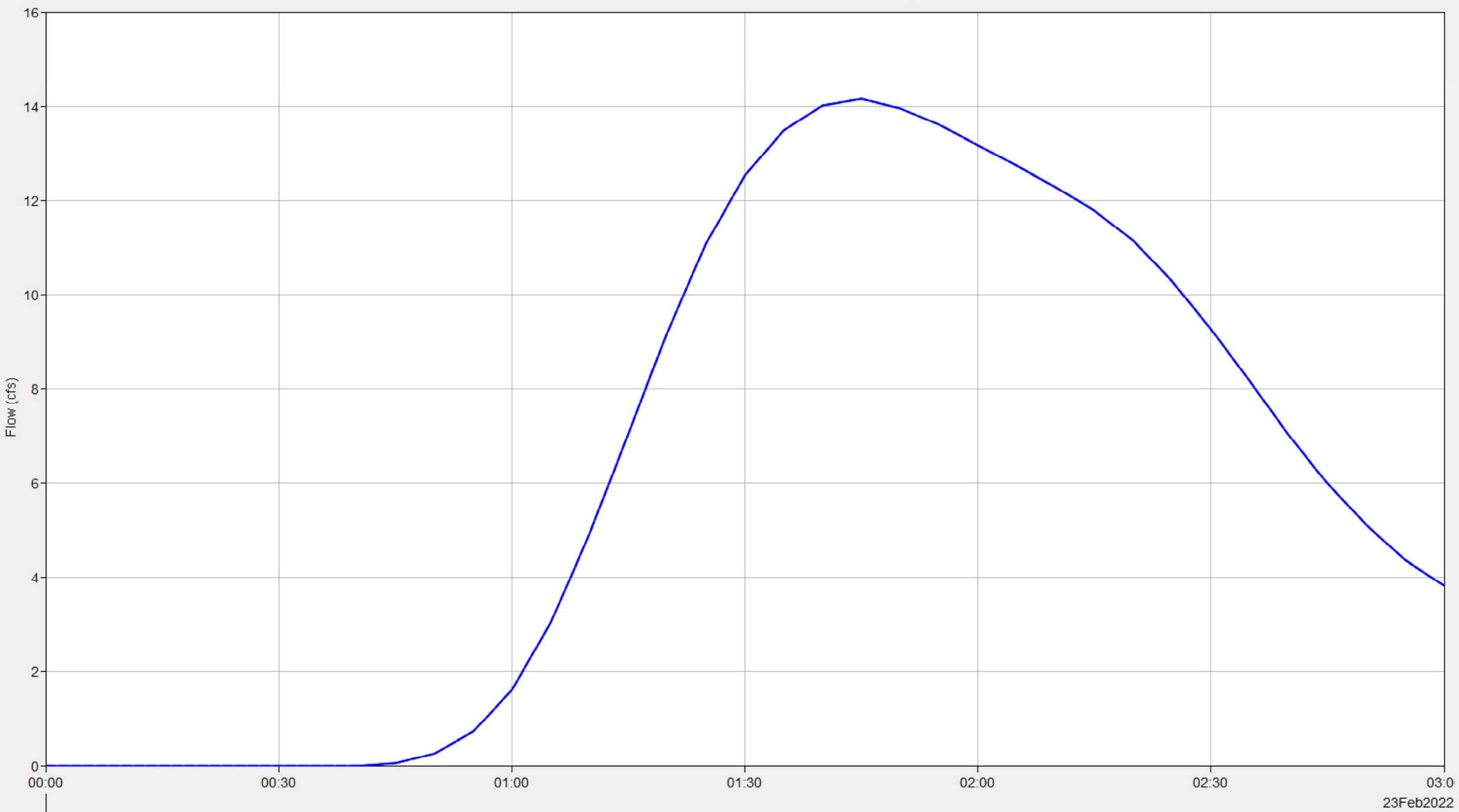


23Feb2022

Legend (Compute Time: 22Mar2022, 15:09:49)

Run:2-hr 100-yr ElementWS-1 ResultPrecipitation Run:2-hr 100-yr ElementWS-1 ResultPrecipitation Loss Run:2-hr 100-yr ElementWS-1 ResultOutflow Run:2-hr 100-yr ElementWS-1 ResultBaseflow

Sink "Flow offsite via Culvert" Results for Run "2-hr 100-yr"



23Feb2022

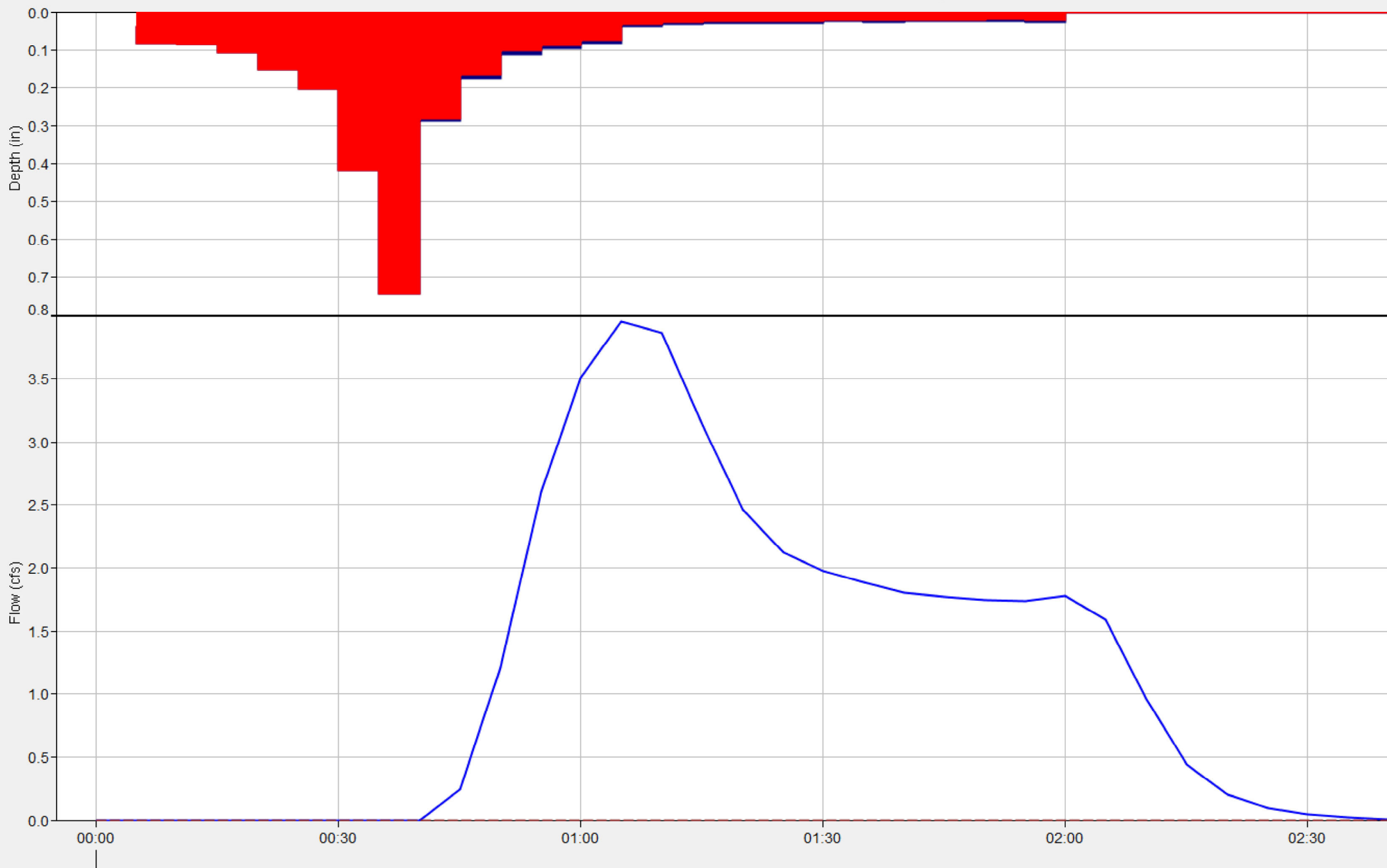
Legend (Compute Time: 22Mar2022, 15:09:49)

Run:2-hr 100-yr Element:Flow offsite via Culvert Result:Outflow

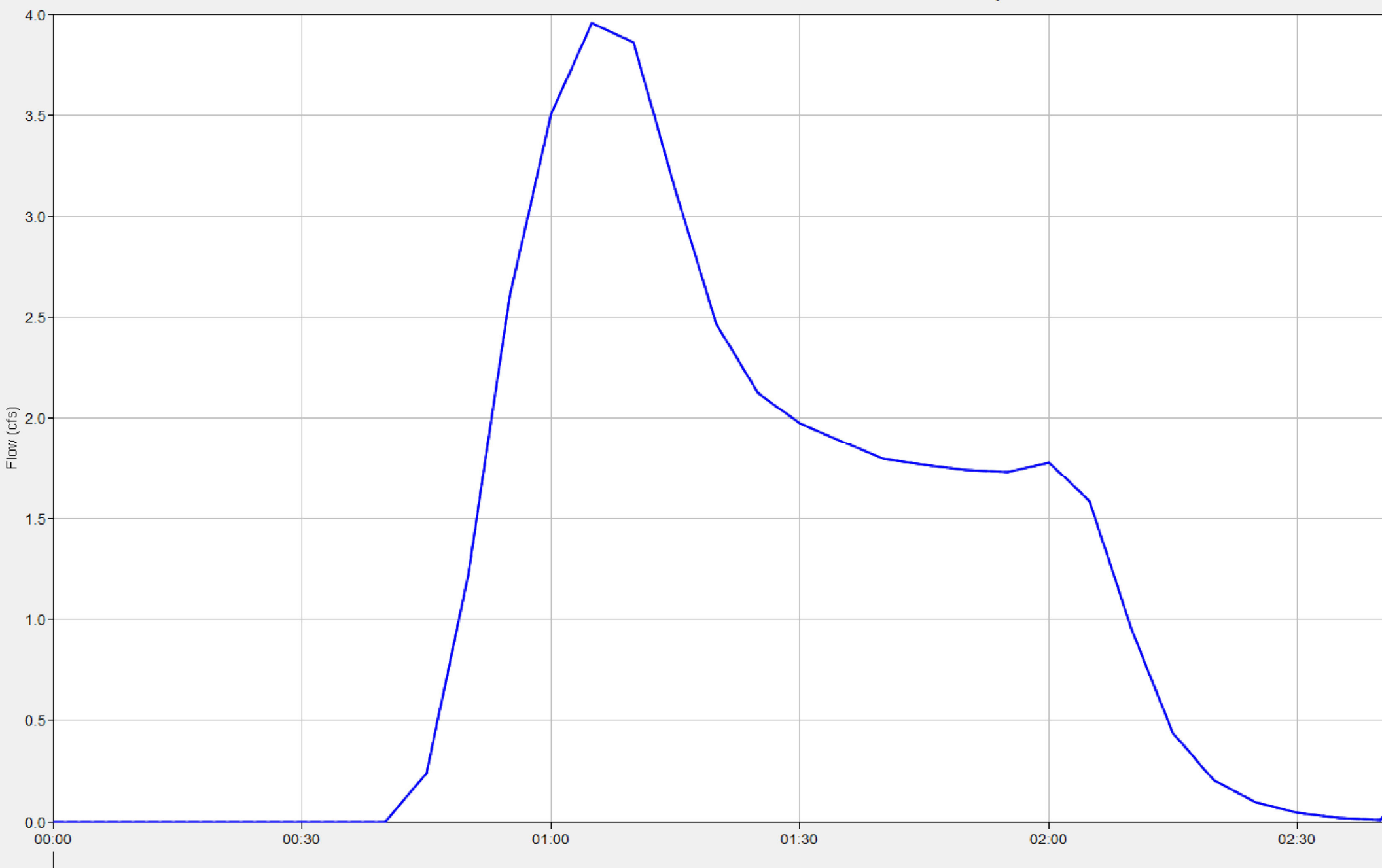
Run:2-hr 100-yr Element:WS-1 Result:Outflow

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: Reclaimed 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"



Sink "Flow Offsite via Road Ditch" Results for Run "2-hr 100-yr"



Legend (Compute Time: 22Mar2022, 15:09:49)

Run:2-hr 100-yr ElementFlow Offsite via Road Ditch Result:Outflow

Run:2-hr 100-yr ElementWS-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    Basin Model: Reclaimed Conditions

End of Run: 24Feb2022, 00:00    Meteorologic Model: 100-yr 24-hr event

Compute Time: 22Mar2022, 15:10:20    Control Specifications: 24-hr storm event

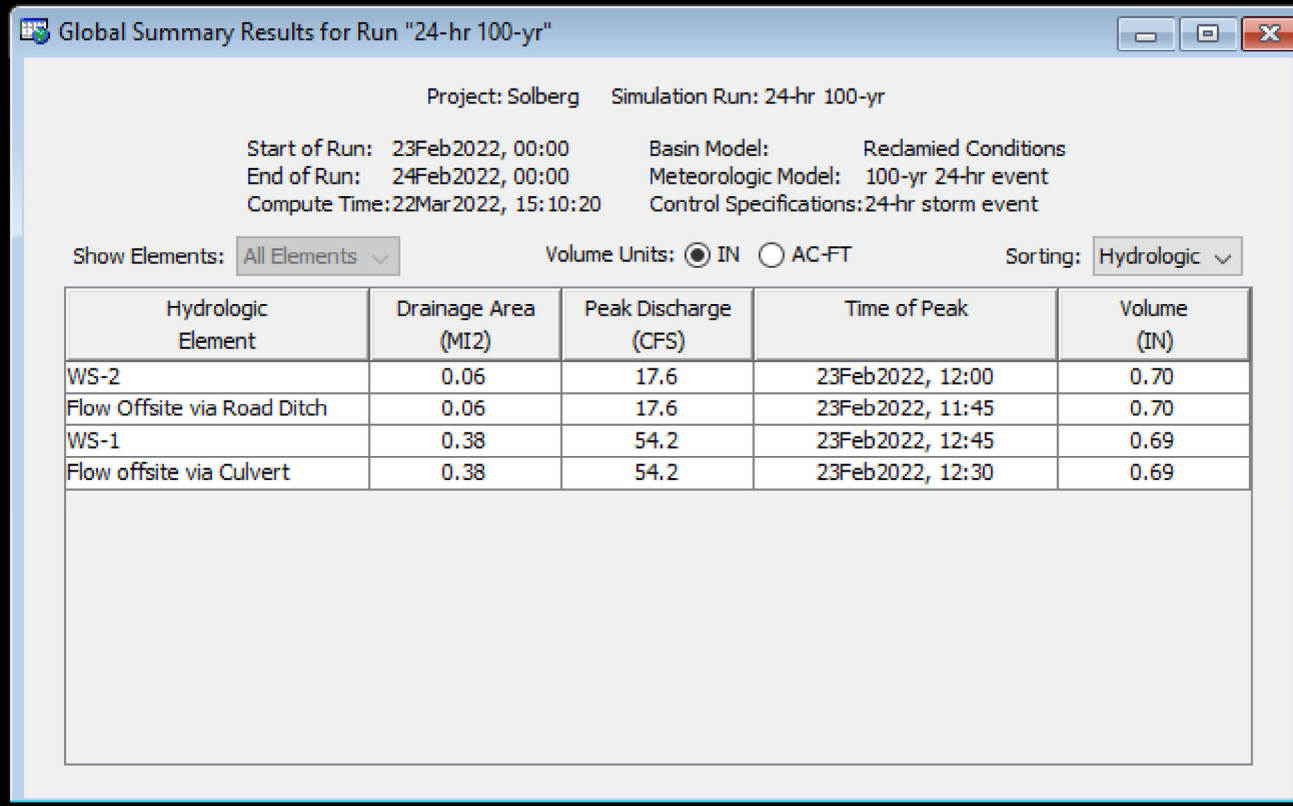
Show Elements: All Elements

Volume Units: ☒ IN    ☐ AC-FT

Sorting: Hydrologic

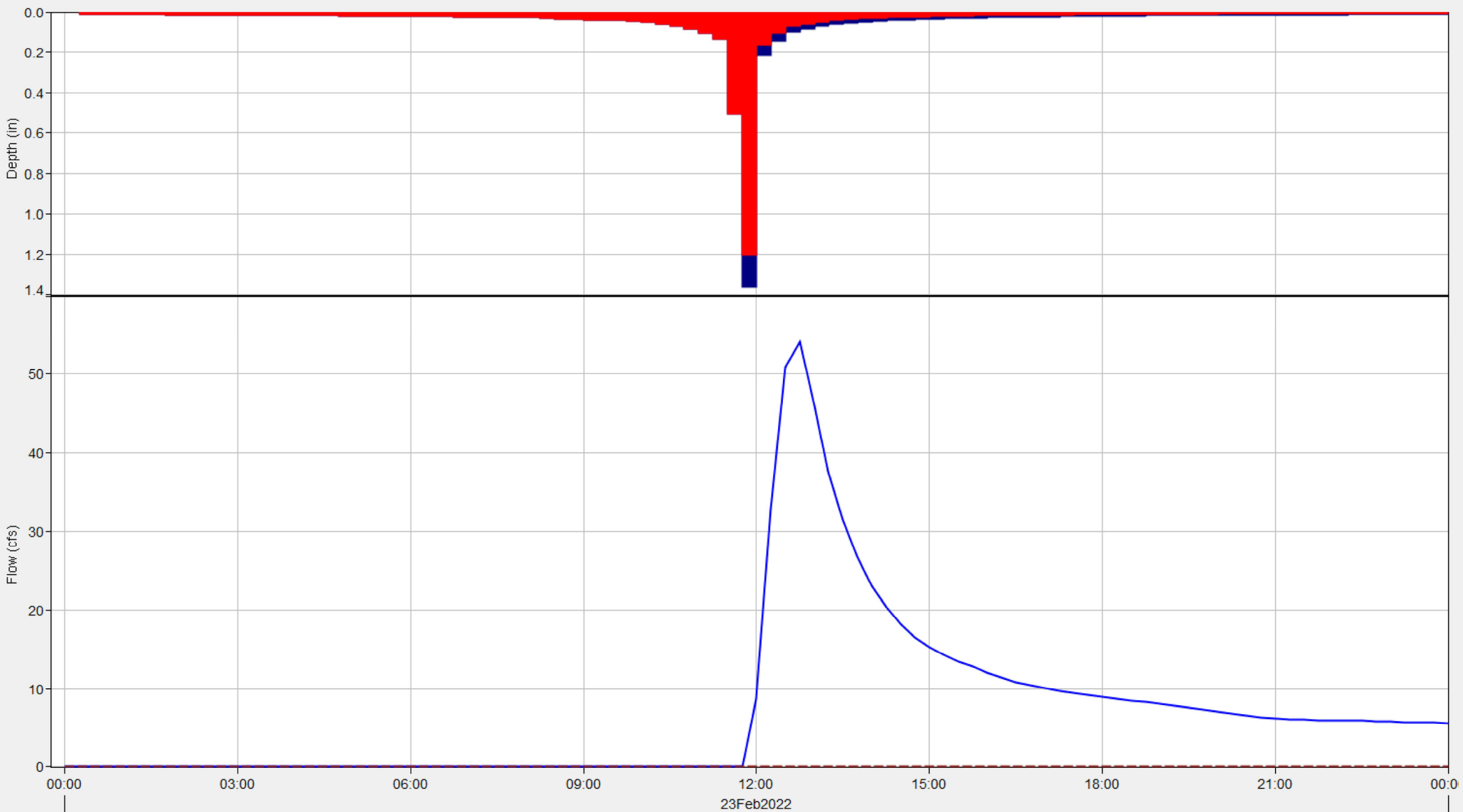
Hydrologic Element	Drainage Area (MI <sup>2</sup> )	Peak Discharge (CFS)	Time of Peak	Volume (IN)
WS-2	0.06	17.6	23Feb2022, 12:00	0.70
Flow Offsite via Road Ditch	0.06	17.6	23Feb2022, 11:45	0.70
WS-1	0.38	54.2	23Feb2022, 12:45	0.69
Flow offsite via Culvert	0.38	54.2	23Feb2022, 12:30	0.69





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

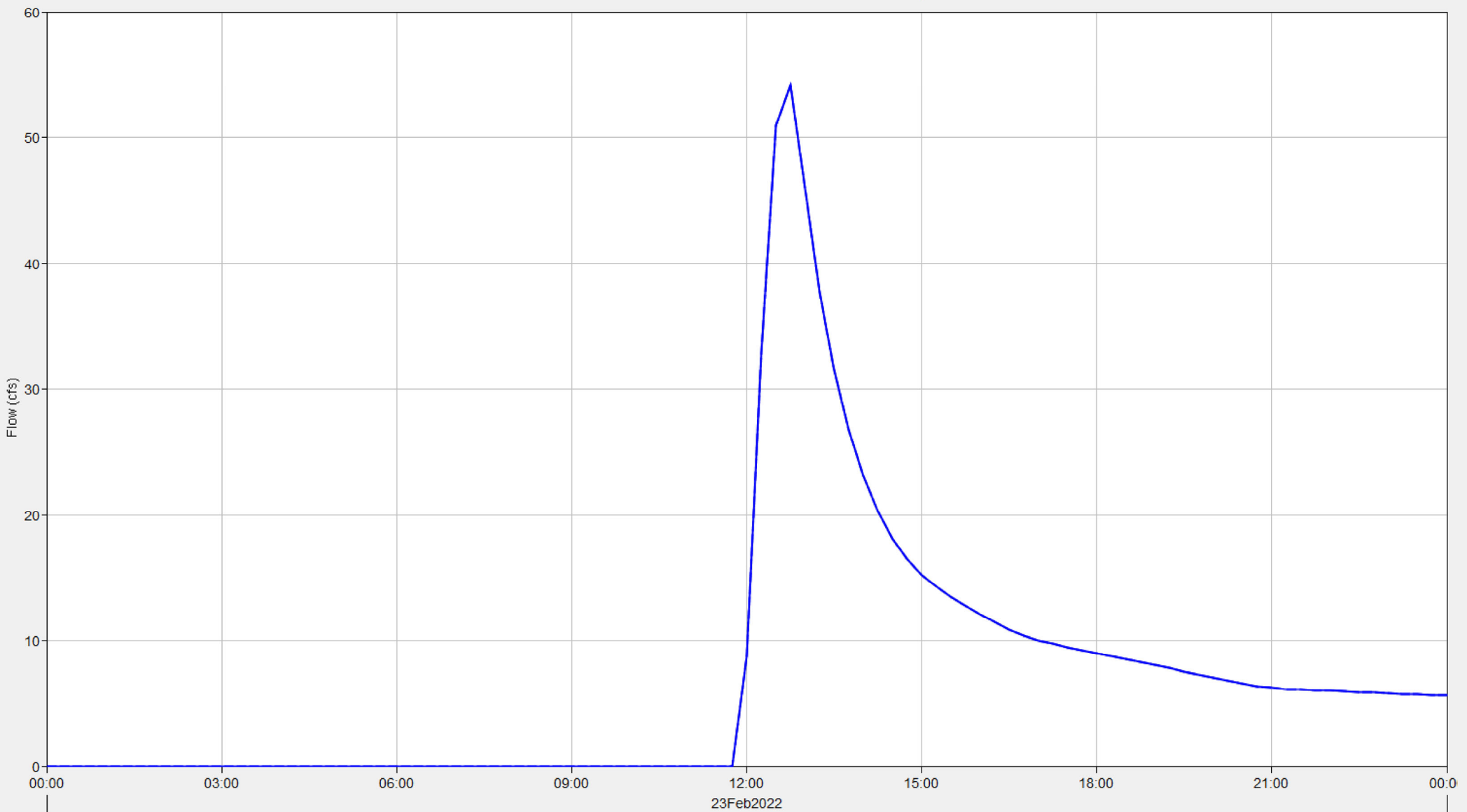
Subbasin "WS-1" Results for Run "24-hr 100-yr"



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
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Sink "Flow offsite via Culvert" Results for Run "24-hr 100-yr"



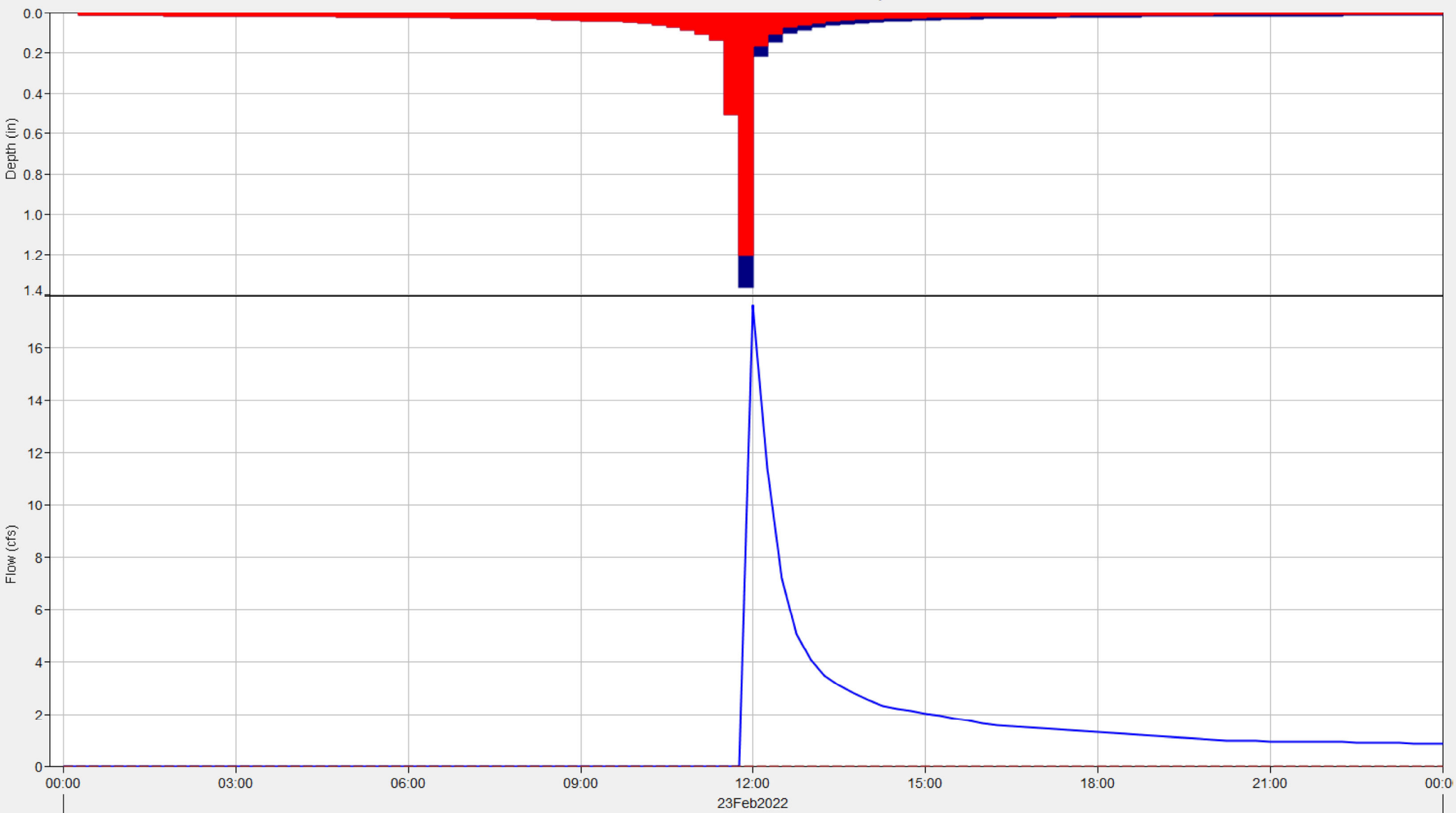
Legend (Compute Time: 22Mar2022, 15:10:20)

— Run:24-hr 100-yr ElementFlow offsite via Culvert Result:Outflow

--- Run:24-hr 100-yr ElementWS-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

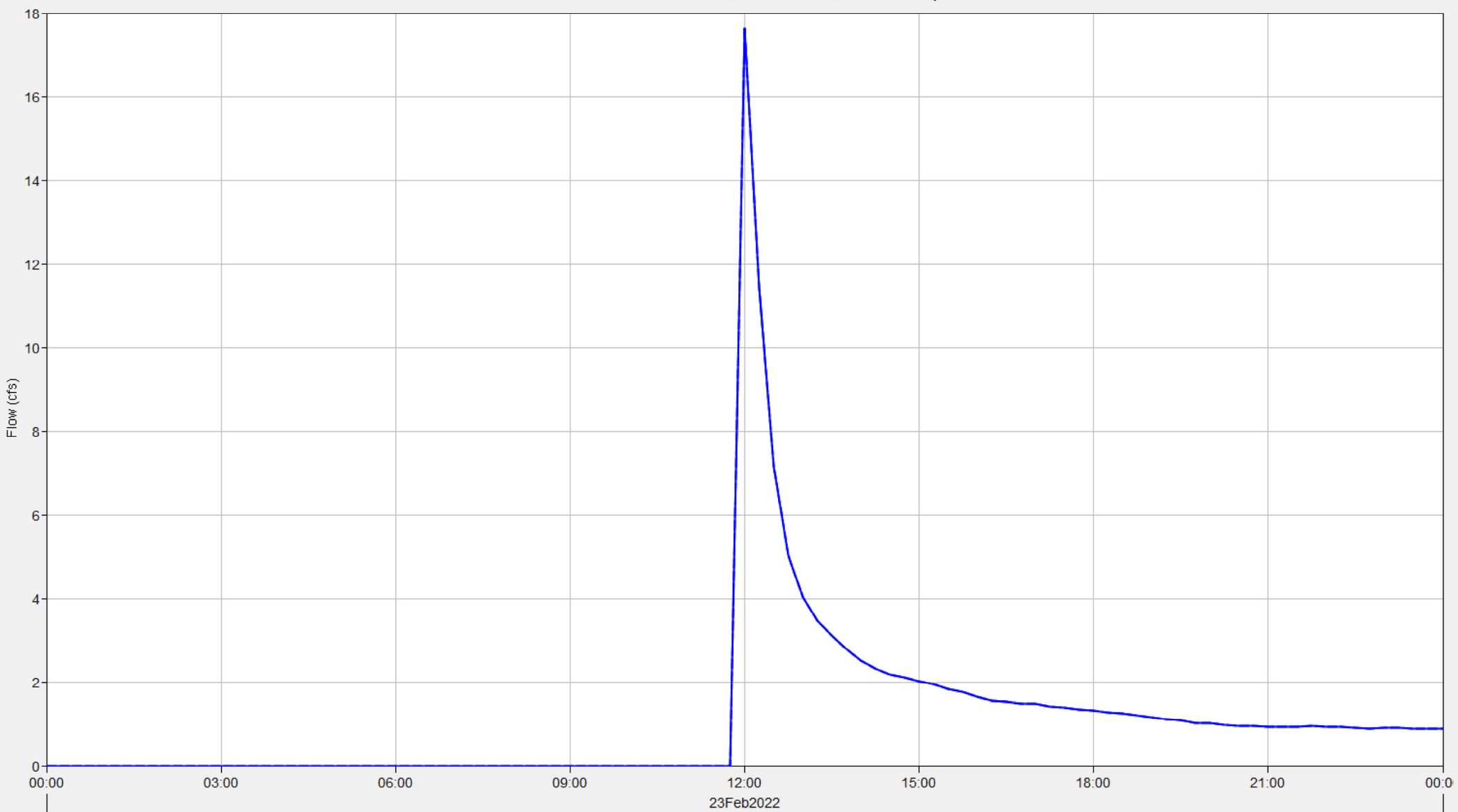
Subbasin "WS-2" Results for Run "24-hr 100-yr"



Legend (Compute Time: 22Mar2022, 15:10:20)

<span style="color: blue;">█</span> Run:24-hr 100-yr ElementWS-2 ResultPrecipitation	<span style="color: red;">█</span> Run:24-hr 100-yr ElementWS-2 ResultPrecipitation Loss	<span style="color: blue;">—</span> Run:24-hr 100-yr ElementWS-2 ResultOutflow	<span style="color: red;">---</span> Run:24-hr 100-yr ElementWS-2 ResultBaseflow
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Sink "Flow Offsite via Road Ditch" Results for Run "24-hr 100-yr"



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**







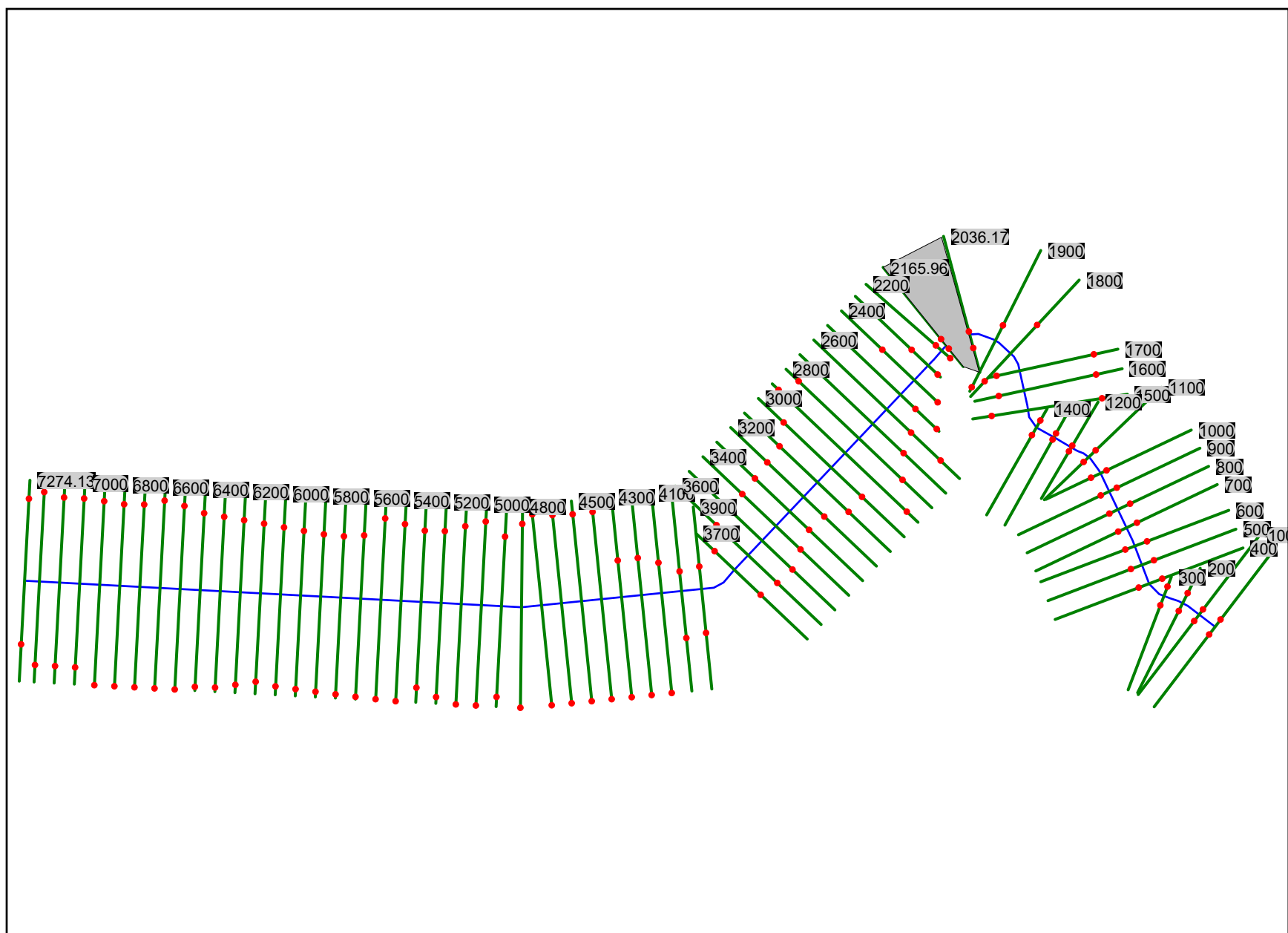






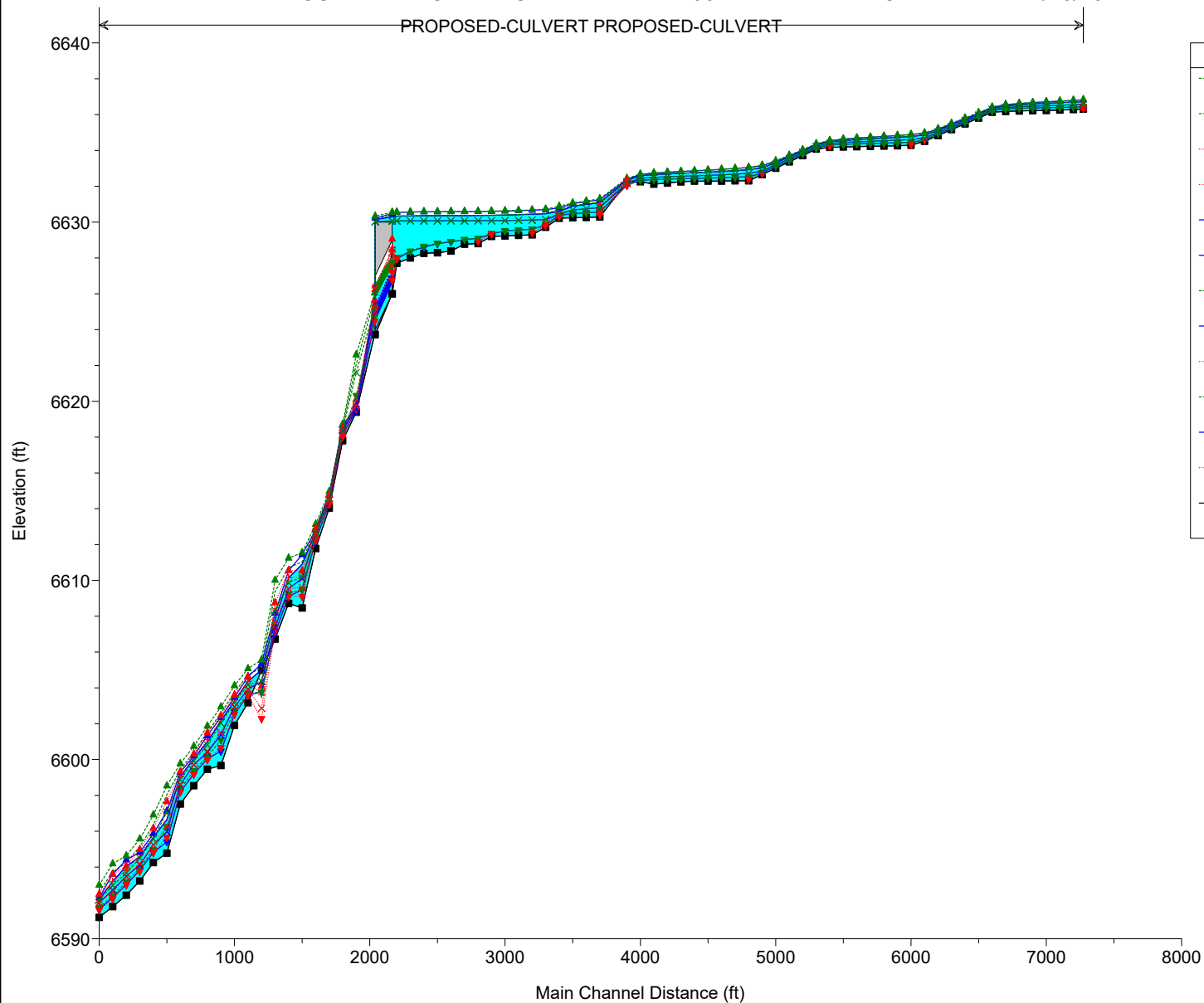






# CULVERT-MODELING Plan: 2HR 100-YR STEADY FLOW EVENT 4/15/2022

PROPOSED-CULVERT PROPOSED-CULVERT



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

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
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 (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
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	36.42	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 (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
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	6628.80		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	6619.85	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 (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
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	5.80	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 (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
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