

# EAST BOULDER MINE - TAILINGS STORAGE FACILITY EMERGENCY PREPAREDNESS PLAN (EPP)

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Approvals	Title	Signature	Date Signed



COMMITMENT



ACCOUNTABILITY



RESPECT



ENABLING



SAFETY

## Stillwater Mine

### East Boulder Mine - Tailings Storage Facility Emergency Preparedness Plan (EPP)

2022/12/19



#### CONFIDENTIALITY STATEMENT

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## ABBREVIATIONS

DBA.....	dam breach assessment
EBM.....	East Boulder Mine
EOR.....	Engineer of Record
EPP.....	Emergency Preparedness Plan
FMEA.....	Failure Modes and Effects Analysis
GISTM.....	Global Industry Standard on Tailings Management
IC.....	Incident Command
KP.....	Knight Piésold Ltd.
LEPC.....	Local Emergency Planning Committee
MCA.....	Montana Code Annotated
MDEQ.....	Montana Department of Environmental Quality
MT.....	Montana
TERT.....	Tailings Emergency Response Team
TSF.....	Tailings Storage Facility
UC.....	Unified Command
USFS.....	United States Department of Agriculture and Forest Service
VP.....	Vice President

## **EAST BOULDER MINE - TAILINGS STORAGE FACILITY EMERGENCY PREPAREDNESS PLAN (EPP)**

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### **1.0 INTRODUCTION**

#### **1.1 PURPOSE**

The purpose of this Emergency Preparedness Plan (EPP) is to reduce the risk of human life loss and injury, and minimize property damage in the event of the occurrence of a potential emergency or emergency event at the East Boulder Mine (EBM) Tailings Storage Facility (TSF).

#### **1.2 INSTRUCTIONS**

Step 1: Refer to Section 2 for definition of the appropriate Emergency Level and initial actions. Select the appropriate Emergency Level for the event.

Step 2: Refer to the Emergency Level section that corresponds with the Emergency Level selected for the event.

- For Level 1, Potential Emergency Condition, refer to Section 3
- For Level 2, Emergency Event, refer to Section 4

#### **1.3 CONTROL AND REVISIONS TO THE EPP**

The EPP is a controlled document and specific procedures have been defined for the distribution, revision, and review as outlined below.

##### **1.3.1 DISTRIBUTION**

The EPP will be controlled by the Environmental Compliance Supervisor. The Environmental Compliance Supervisor will be responsible for keeping a record of the location of each copy of the EPP and ensuring that these copies are kept up to date. Copies of the EPP will be maintained at the locations listed on Table 1.1.

##### **1.3.2 REVISIONS**

The EPP is reviewed on an annual basis to ensure that it reflects the current operating conditions.

A letter of transmittal that clearly identifies the distribution list must accompany each revision. An update will consist of the entire EPP. A copy of each transmittal letter and the updated EPP will be kept on record as electronic copies within Sibanye Stillwater's electronic filing system. The document holders are responsible for replacing outdated copies of the document whenever revisions are received. Outdated plans shall be immediately discarded to avoid any confusion with revisions.

#### **1.4 EPP PERIODIC TEST**

Sibanye Stillwater, with the assistance of appropriate regulatory or government authorities, will host and facilitate a periodic test of the EPP at least once every 5 years. A review of the EPP was last completed with the Stillwater County Local Emergency Planning Committee (LEPC) on May 13, 2021.

Table 1.1 EPP Distribution (May 2020)

Copy No.	Organization	Person Receiving Copy
1	Sweet Grass County, Disaster and Emergency Services Sweet Grass County, PO Box 567 Big Timber, MT 59011 Office: 1-406-932-3011 Cell: 1-406-595-8068 Fax: 1-406-932-4777	Cliff Brophy, 911/DES Coordinator (40) <a href="mailto:sgdes@itstriangle.com">sgdes@itstriangle.com</a>
2	Sibanye Stillwater 536 East Pike Avenue, P.O. Box 1330 Columbus, MT 59019 Office: 1-406-328-8627	Randy Weimer Corporate Environmental Manager
3	Sibanye Stillwater 536 East Pike Avenue, P.O. Box 1330 Columbus, MT 59019 Office: 1-406-322-8700	Matt McManamen Safety Manager
4	Sibanye Stillwater 517 West First Street, P.O. Box 1227 Big Timber, MT 59011 Office: 1-406-932-8259	Zane Leonard Tailings Engineer
5	Sibanye Stillwater 536 East Pike Avenue, P.O. Box 1330 Columbus, MT 59019 Office: 1-406-322-8700	Dispatch
6	Knight Plésold Ltd. 1650 Main St. West P1B 8G5 North Bay, Ontario Office: 1-705-476-2165	Craig Hall Deputy Engineer of Record (EOR)

The periodic test will consist of a meeting and a tabletop exercise to review the EPP. Attendance shall include the appropriate Sibanye Stillwater representatives, local Disaster and Emergency Services representatives and others with key responsibilities listed in the EPP. At the discretion of Sibanye Stillwater, other organizations that may be involved with a Potential Emergency event at either TSF will be encouraged to participate. Prior to the tabletop exercise, meeting participants will visit both TSFs as part the periodic test to familiarize themselves with the facilities.

The tabletop exercise will begin with the facilitator presenting a scenario of a Potential Emergency event at the TSF. The scenario will be developed prior to the exercise. Once the scenario has been presented, the participants will discuss the responses and actions that they would take to address and resolve the scenario. The facilitator will control the discussion, ensuring realistic responses and developing the scenario throughout the exercise. An event log should be completed as it would during an actual event.

The tabletop exercise will then consider a Potential Emergency event developing into an Emergency Event. The participants will discuss the responses and actions that they would take to address and resolve the scenario. The facilitator will control the discussion, ensuring realistic responses and developing the scenario throughout the exercise. An event log should be completed as it would during an actual event.

## 1.5 TSF LOCATION AND DESCRIPTION

The East Boulder Mine is located in Section 11, Township 4 South, Range 13 E in Sweet Grass County, approximately 9.4 miles southeast of McLeod, Montana (Latitude N43°34'30" Longitude W110°8'46"). The mine site is situated in the East Boulder River watershed at the termination of County Road SG 31 and Forest Service Road 205 (FDR-205). The East Boulder River sub-watershed forms the Big Timber–Swamp Creek Watershed. The watershed flows into the Yellowstone River. The mine location is shown on Figure 1.1 and the general arrangement figure is provided in Appendix A.

The main components of the East Boulder Mine TSF includes the tailings embankments, embankment underdrain, tailings basin which includes a geosynthetics lining system and basin underdrain, tailings delivery system and water reclaim system. The TSF embankments are constructed from locally excavated glacial till and waste rock from the underground mine operations. The TSF is designed to provide temporary storage and management of the Inflow Design Flood. There is no Emergency Spillway. The TSF location and storage parameters are summarized on Table 1.2.

## 1.6 BASIS FOR EPP

### 1.6.1 FAILURE MODES AND EFFECTS ANALYSIS

The objective of a Failure Modes and Effects Analysis (FMEA) is to facilitate a highly qualified, independent review of the design and engineering of the TSF prior to construction. The purpose of the FMEA review is to identify credible potential failure modes, risk rank those identified, and, based on risk ranking, make improvements to the design to lower and mitigate the risk of failure.

The most concerning potential failure modes for the EBM TSF that have been identified are related to a breach in the integrity of the facility that would lead to a loss of water and tailings solids. These failure modes are related to potential structural and foundation failures or erosional failures.

Therefore, this EPP has been developed for the scenario of a potential failure of either the EBM TSF that would result in a flash flood downstream of the facilities due to a release of water and tailings solids. A breach analysis was completed for the TSF to estimate the downstream flood inundation zone. In turn, this identified the residences and roads that are at risk downstream of the TSF. An updated dam breach assessment (DBA) was completed for the Stage 6 TSF (KP, 2022). The updated DBA includes flood inundation maps along the East Boulder River and Boulder River from the EBM site to the confluence of the Boulder River and Yellowstone River. The updated inundation maps are used for emergency preparedness planning and are provided in Appendix B.

The EPP and TOMS Manual have been developed to be compliant with MCA 82-4-379 (MT, 2019). Future updates to the EPP and TOMS Manual will also be compliant with the Global Industry Standard on Tailings Management (GISTM).

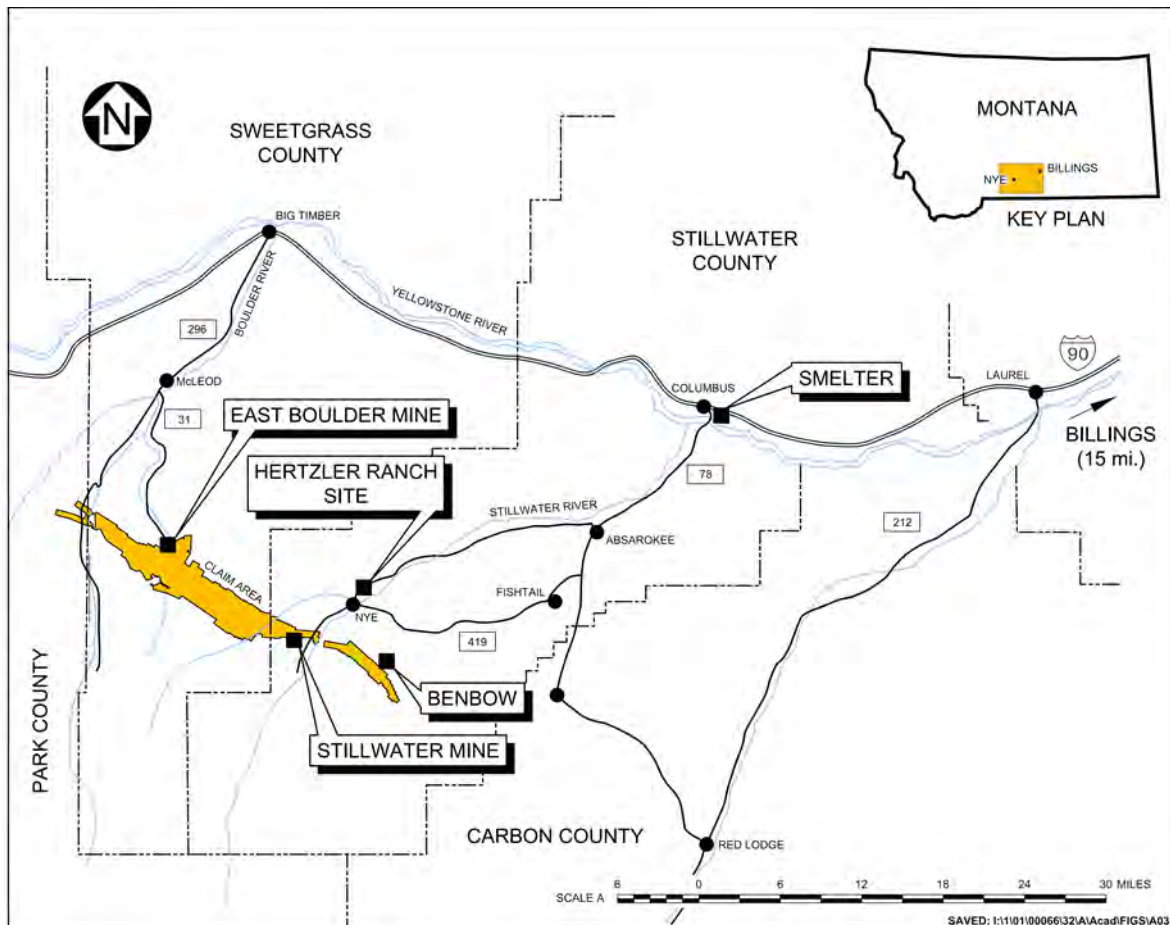


Figure 1.1 Mine Location

Table 1.2 TSF Location and Storage Parameters

Parameter	Value
Impoundment Name	East Boulder Mine Tailings Storage Facility
Impoundment Operator	Sibanye Stillwater
Impoundment Type	Side hill/perimeter embankment lined with HDPE geomembrane
Location	State: Montana County: Sweet Grass Latitude: N43°30'17" Longitude: W110°5'0"
Nearest Town	McLeod, MT: (9.4 miles)
Adjacent Stream	East Boulder River
Year Constructed	Current Embankment: 1998 to 2020 Final Embankment: 2025
Embankment Crest Elevation	Current Embankment: El. 6,321 ft. Final Embankment: El. 6,344 ft.
Embankment Length	5,345 ft.
Embankment Crest Width	30 ft.
Embankment Slopes	Downstream: Interim 1.6H:1V; Finale 1.7 to 2.0H:1V Upstream: 2.0H:1V, 2.5H:1V
Surface Area	124 acres
Operating Pond Volume	Minimum 6.7 M cu. ft. Maximum: 20.1 M cu. ft.
Spillway	During Operations: None Closure: Outlets to Channel
Hypothetical Breach Scenario	Embankment Slump and release of tailings solids (minimal pond volume after capping)
Regulatory Agencies	Montana Department of Environmental Quality (MDEQ), United States Department Agriculture and Forest Service(USFS)

### 1.6.2 POTENTIALLY IMPACTED AREAS

The potentially impacted areas are located adjacent to the East Boulder River and Boulder downstream of the TSF. Potentially-impacted structures include bridges, roads, and residences. The evacuation area is defined by the estimated flooded area or inundation zone. The inundation zone estimates for a EBM TSF breach is illustrated on the figures provided in Appendix B. Residences, building and bridges located along the East Boulder Road (FDR 205) and Highway 298 would be affected by a breach.

The estimated time for the flood wave to impact the closest locations downstream of the TSF could be less than 20 minutes. The estimated time for the flood wave to migrate downstream to Big Timber is approximately 3 hours following the development of a breach.

## 2.0 EMERGENCY LEVEL DEFINITIONS AND INITIAL ACTIONS

Two levels of emergency conditions provide warning signs that can be identified by site operations. These include, in progressing order of urgency, Potential Emergency (Level 1), and Emergency Condition (Level 2). Typical situations that would be classified under the two levels of emergency conditions and the actions to be taken are outlined on Table 2.1. The emergency levels are described further below.

### 2.1 LEVEL 1 - POTENTIAL EMERGENCY CONDITION

Conditions that represent a Potential Emergency Condition are those that if sustained or allowed to progress may result in an emergency, but no emergency situation is imminent. Refer to Table 2.1 for examples of potential emergency conditions and subsequent response actions.

The initial action in the event of a Level 1 Potential Emergency Condition is to discuss and define an action plan, at the site, under the direction of the Tailings Emergency Response Team (TERT) (Environmental Compliance Supervisor, Concentrator Manager, Vice President (VP) of EBM Operations, and the EOR). After such a plan is prepared, it must be presented to the VP of EBM Operations for approval. Construction equipment should be made available, if required, at short notice.

### 2.2 LEVEL 2 - EMERGENCY EVENT

An Emergency Event is defined by either failure of a significant component of the TSF and/or associated facility, or a significant failure of the performance of a component of the TSF. Such failure may have already occurred, or be imminent. Refer to Table 2.1 for examples of emergency conditions and subsequent response actions.

The Sheriff's office dispatch must be contacted immediately so emergency services can begin evacuations of all at risk people and close roads as needed. This is an extremely urgent situation when an TSF failure is occurring or is about to occur and cannot be prevented. There is potential for flash flooding downstream of the TSF due to the release of water and tailings solids. This could result in the flooding of private residences and roads. During a TSF breach, the closest downstream residence could be affected in less than 20 minutes.



Table 2.1 Emergency Warning Levels and Initial Actions

Warning Level	Example Conditions	Example Initial Actions
LEVEL 1 (POTENTIAL EMERGENCY CONDITION)	Major erosion of the downstream slope or crest	<ul style="list-style-type: none"> <li>• Contact the EOR</li> <li>• Prepare to carry out corrective repairs</li> </ul>
	Soft toe condition or significant turbid seepage at the downstream slope or toe	<ul style="list-style-type: none"> <li>• Determine if water source is natural or from the tailings basin</li> <li>• Contact the EOR</li> </ul>
		<ul style="list-style-type: none"> <li>• Commission a field investigation program</li> <li>• Prepare to carry out corrective repairs</li> </ul>
	Moderate cracks with notable displacement developing at the embankment crest or slope	<ul style="list-style-type: none"> <li>• Conduct embankment walkovers daily until the problem is understood and addressed</li> <li>• Contact the EOR</li> </ul>
		<ul style="list-style-type: none"> <li>• Monitor crack development (e.g. crack size, extent, etc.).</li> </ul>
		<ul style="list-style-type: none"> <li>• Prepare to carry out corrective repairs</li> </ul>
	Tailings Delivery Pipeline rupture and significant embankment erosion	<ul style="list-style-type: none"> <li>• Stop tailings discharge</li> </ul>
		<ul style="list-style-type: none"> <li>• Determine the cause or reason for rupture and inspect for damages or leaks. If required, flush pipeline with water to clear obstruction. Complete pipeline repair at rupture point.</li> </ul>
		<ul style="list-style-type: none"> <li>• Prepare to complete corrective repairs for embankment erosion</li> <li>• Contact the EOR</li> </ul>
	Water Levels in the TSF 1 ft. or more above maximum operating level (El. 6,315 ft.) and rising	<ul style="list-style-type: none"> <li>• Stop tailings discharge to the TSF</li> <li>• Initiate reduction efforts such as transferring water to the Percolation Pond</li> <li>• Conduct a detailed inspection of the TSF after levels have decreased</li> </ul>
	Water vortex within the pond	<ul style="list-style-type: none"> <li>• Initiate Level 1 procedures</li> <li>• Check downstream of the dam area for increased and/or turbid seepage discharge</li> <li>• Place granular filter materials as directed by the EOR</li> </ul>
	Any other situations which may lead to a potential emergency	<ul style="list-style-type: none"> <li>• Discuss with the Environmental Supervisor</li> <li>• Seek advice from the EOR</li> </ul>

Warning Level	Example Conditions	Example Initial Actions
LEVEL 2 (EMERGENCY EVENT)	Failure or suspected imminent failure of an embankment (any reason)	<ul style="list-style-type: none"> <li>Initiate Level 2 procedures and ensure safety of people</li> <li>Stop tailings discharge into the TSF</li> <li>Monitor water levels every 3 hours if safe to do so</li> <li>Lower pond by transferring water to Percolation Pond</li> <li>Contact the EOR</li> <li>Construct confinement berms downstream of the embankment where feasible</li> </ul>
	Water Levels in the TSF close to overtopping embankment and rising	<ul style="list-style-type: none"> <li>Initiate Level 2 procedures and ensure safety of people</li> <li>Stop tailings discharge to the TSF</li> <li>Transfer water to the Percolation Pond</li> <li>Monitor water levels in embankment and allow water flow through an emergency spillway if present</li> <li>Conduct a detailed inspection of the TSF after levels have decreased</li> </ul>
	Significant slumping, sliding, or bulging of an embankment slope or adjacent ground	<ul style="list-style-type: none"> <li>Initiate Level 2 procedures</li> <li>Contact the EOR</li> <li>Consider construction of a stabilizing berm and verify with the EOR</li> </ul>
	Significant turbid seepage resulting in erosion of embankment fill or foundations	<ul style="list-style-type: none"> <li>Initiate Level 2 procedures</li> <li>Consider placement of a granular graded filters over seepage location and verify with the EOR</li> </ul>
	Large earthquake resulting in significant embankment slumping and potential loss of freeboard	<ul style="list-style-type: none"> <li>Initiate Level 2 procedures</li> <li>Carry out detailed post-earthquake inspection of the dam with the assistance of the EOR</li> <li>Restore dam as directed by the EOR</li> </ul>

## 3.0 LEVEL 1 POTENTIAL EMERGENCY RESPONSE PLAN

### 3.1 LEVEL 1 REQUIRED ACTIONS AND COMMUNICATIONS

Level 1 emergencies include conditions that represent a potential emergency if the conditions are sustained or allowed to progress, but no emergency situation is imminent.

The Environmental Compliance Supervisor, Concentrator Manager, and/or VP of EBM Operations shall be immediately notified and verify that the Potential Emergency Response Plan should be initiated.

Once confirmed, the Emergency Response and Notification Flowchart (Figure 3.1) shall be followed.

The Environmental Compliance Supervisor, Concentrator Manager or designated representative shall implement the Level 1 Response Plan for a potential TSF emergency situation, which includes:

1. Contact the EOR and determine the course of action, inform him/her of the potential emergency event and that the EPP has been activated.
2. The TSF shall be inspected, in a safe manner. If the condition/occurrence is progressing and/or escalating to an imminent failure condition initiate Level 2 procedures.
3. The TERT will review the condition of the TSF and develop an appropriate remediation and action plan.
4. Following review of the severity of the condition by the TERT. The TERT will utilize SWM dispatch to contact the Sheriff's office (dispatch) if a pre-evacuation notice is required. The TERT will notify the Executive VP of US Operations. EBM dispatch will remain in communication with the Sheriff's office dispatch as required by the response plan.
5. The Level 1 Potential Emergency Condition Event Log (Table 3.1) shall be completed to document the event. Information that should be recorded includes:
  - Record all contacts that were made
  - Record all information, observations, and actions taken
  - Note the time of changing conditions
  - Document the situation with photographs and video, if possible
6. The Environmental Compliance Supervisor shall notify the regulatory Agencies.
7. The approved remediation plan shall be implemented. Construction equipment should be made available, if required, at short notice.
8. Following confirmation with the EOR and Agencies that the emergency situation has ended, an Emergency Situation Termination Report shall be completed by the Environmental Compliance Supervisor and/or Concentrator Manager.

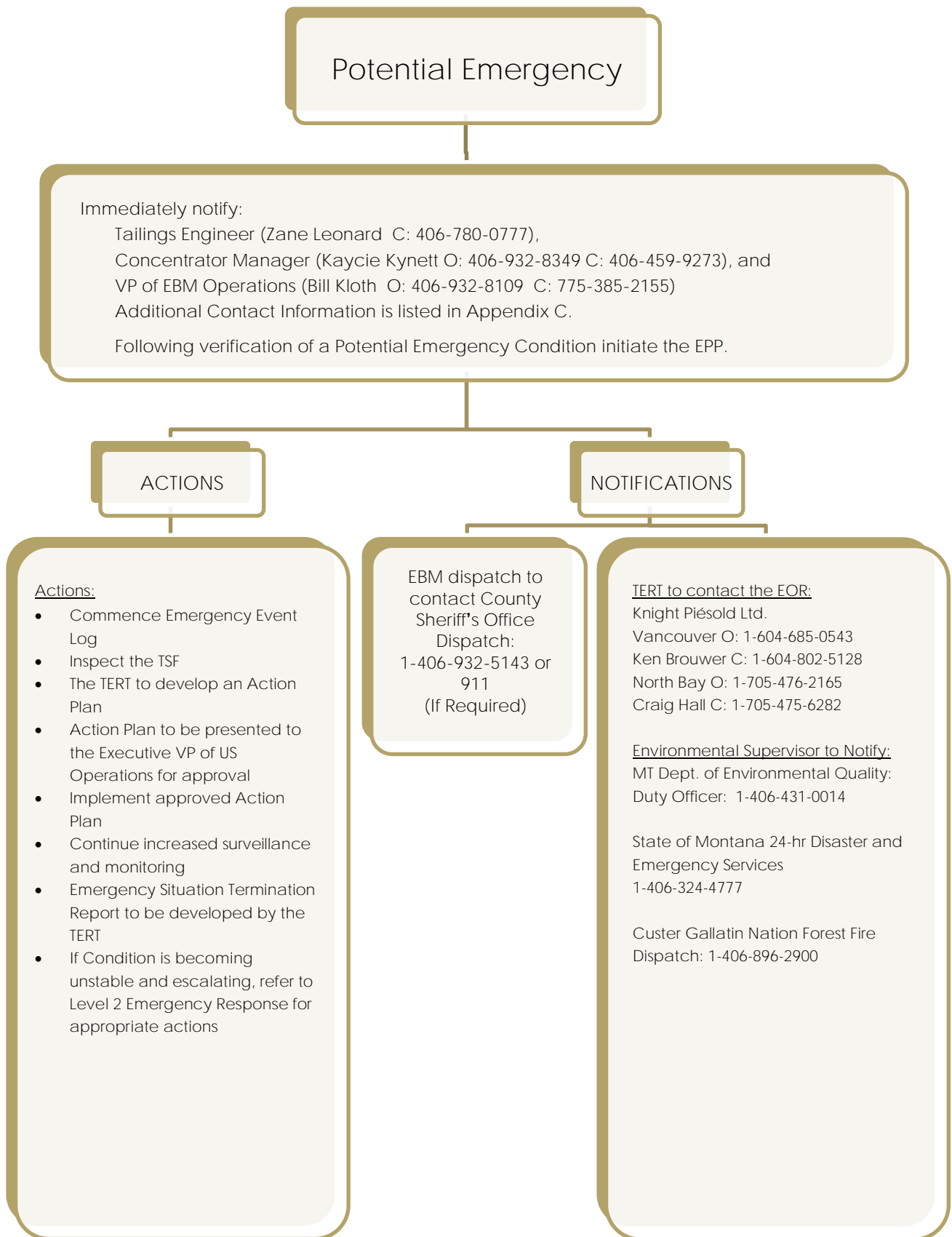


Figure 3.1 Level 1 - Potential Emergency Condition Response and Notification Flowchart



Table 3.1      Level 1 - Potential Emergency Event Log  
(Page 2 of 3)

Date	Time	Action/Event Progression	Action Taken By

Report Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_

Table 3.1      Level 1 - Potential Emergency Event Log  
(Page 3 of 3)

Area(s) of TSF Affected:

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Extent of TSF Damage:

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Possible Cause(s):

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Effect on TSF's Operation:

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Initial Tailings/Water Elevation:

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Time:

---

Maximum Tailings/Water Elevation:

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Time:

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Final Tailings/Water Elevation:

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Time:

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Description of Resulting Damage:

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Other Data and Comments:

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Observer's Name:

---

Telephone Number:

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Report Prepared by:

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## 4.0 LEVEL 2 EMERGENCY EVENT RESPONSE PLAN

### 4.1 LEVEL 2 REQUIRED ACTION AND COMMUNICATIONS

Level 2 emergencies are urgent events that require immediate action due to an imminent failure or failure that is in progress.

The TSF shall be inspected to verify the Emergency Condition.

The TERT and Corporate Environmental Manager shall be immediately notified and the Incident Commander shall immediately notify the Sheriff's Office dispatch / 911. The Sibanye Stillwater Incident Commander is defined in the Stillwater Mine Emergency Response Protocol Guidelines and Duties document. The Incident Commander will take control of the situation.

Refer to Figure 4.1 for the Emergency Response and Notification Flowchart and Figure 4.2 for the Level 2 Prescribed Emergency Communication. Emergency contact numbers are included in Appendix C and available resources are summarized in Appendix D.

The Incident Commander shall setup the Incident Command Center and implement the Level 2 Emergency Response Plan for an imminent failure or a failure that is in progress, which includes:

1. Notify the Sheriff's office dispatch.
2. Contact MSHA, immediately reportable incident.
3. Do whatever is necessary to bring people in immediate danger to safety.
4. A senior representative of Sibanye Stillwater with direct site knowledge will support the Jurisdiction Incident Command (IC) / Unified Command (UC). The Site Incident Commander will keep in frequent contact with the IC/UC as directed.
  - If the event that all means of communication are lost: (1) investigate the basis, (2) seek a successful means of communication, or (3) assign someone to follow through until communications are re-established. If these means fail, manage the situation as well as you can, and periodically try to re-establish contact with the IC/UC. Available communications include:
    - o Dispatch radio
    - o EMS radio (in ambulance)
    - o Telephone
    - o Satellite phone (in Safety Department)
    - o Text 911
5. The Environmental Compliance Supervisor will notify the Agencies, and the National Response Center.
6. The Level 2 Emergency Event Log (Table 4.1) shall be completed to document the event.
  - Record all contacts that were made
  - Record all information, observations, and actions taken on the Level 2 Event Form
  - Note the time of changing conditions
  - Document the situation with photographs and video, if possible



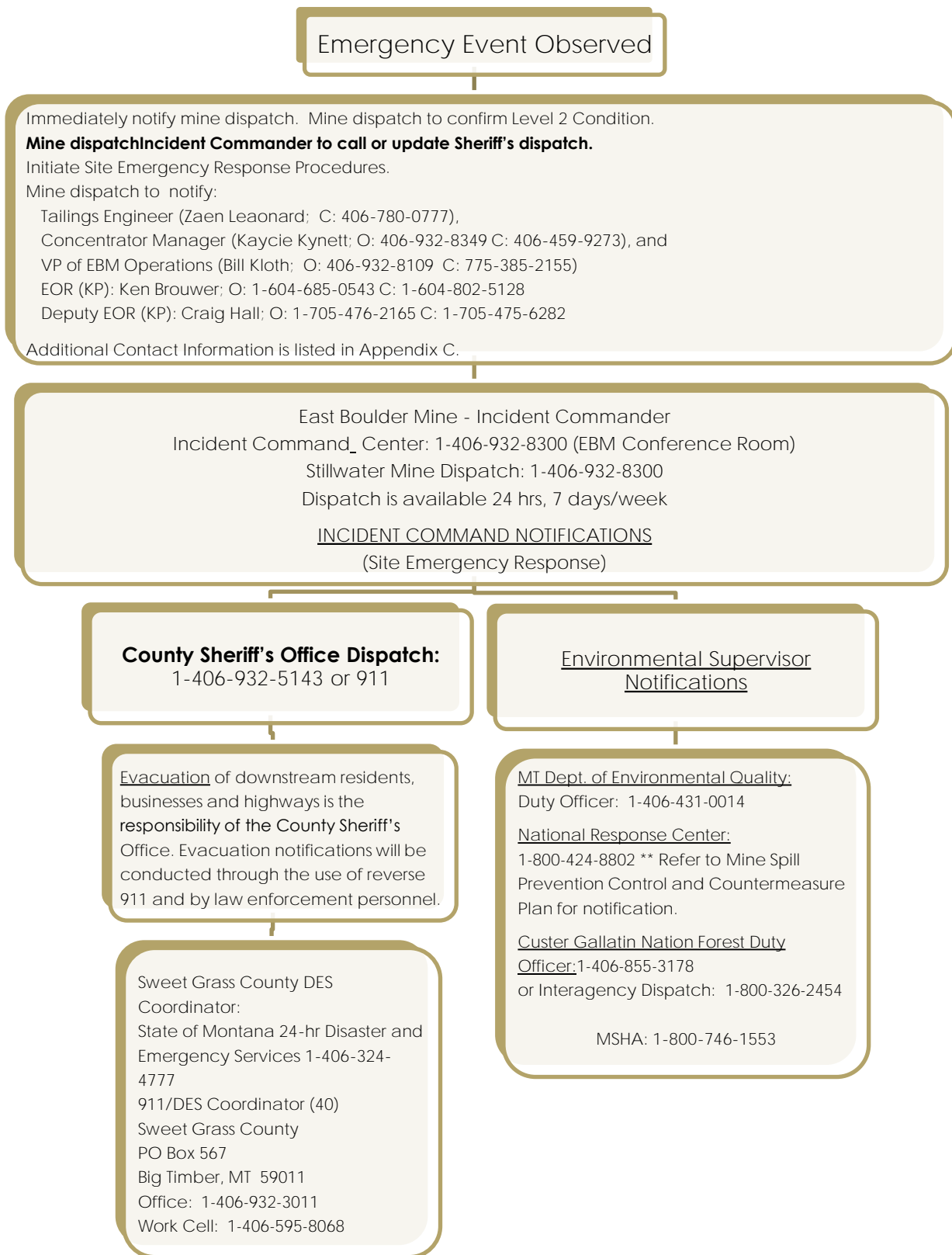


Figure 4.1 Level 2 - Emergency Response and Notification Flowchart

"This is an emergency. This is (Identify yourself; name and position)

The East Boulder Mine TSF, 9.4 miles south of McLeod Montana is failing. The downstream East Boulder River and Boulder River valley area must be evacuated immediately. Repeat, the East Boulder Mine TSF, located 9.4 miles south of McLeod Montana is failing; evacuate the area along low-lying portions of the East Boulder River and Boulder River valleys.

We have activated the Emergency Preparedness Plan for this TSF and are currently under Emergency Level 2.

I can be contacted at the following number 406-932-xxxx. If you cannot reach me, please call the following alternative number (Dispatch 406-932-8300)."

Figure 4.2      Level 2 - Prescribed Emergency Communication

Table 4.1      Level 2 - Emergency Event Log  
(Page 1 of 3)

Facility: East Boulder Mine Tailings Storage Facility

County: Sweet Grass County, Montana

Date: \_\_\_\_\_

Time: \_\_\_\_\_

1. When and how was the event detected? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Weather Conditions:

3. General Description of Emergency Event: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Emergency Level Determination: 

2

5. Emergency Level Determination Made by: \_\_\_\_\_

Table 4.1      Level 2 - Emergency Event Log  
(Page 2 of 3)

Date	Time	Action/Event Progression	Action Taken By

Table 4.1      Level 2 - Emergency Event Log  
(Page 3 of 3)

Area(s) of TSF Affected:

---



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Extent of TSF Damage:

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Possible Cause(s):

---



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Effect on TSF's Operation:

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Initial Tailings/Water Elevation:	<hr/>	Time:	<hr/>
Maximum Tailings/Water Elevation:	<hr/>	Time:	<hr/>
Final Tailings/Water Elevation:	<hr/>	Time:	<hr/>

Description of Flooded Downstream/Damages/Injuries/Loss of Life:

---



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Other Data and Comments:

Observer's Name: 

---

 Telephone Number: 

---

Report Prepared by: 

---

## 4.2 LEVEL 2 EMERGENCY EVENT TERMINATION

The Incident Commander is responsible for terminating the Level 2 EPP operations and relaying this decision to the appropriate authorities. It is then the responsibility of each person to notify the same group of contacts that were notified during the original event notification process to inform those people that the event has been terminated.

Prior to termination of an Emergency Event that has not caused actual TSF failure; the TSF will be inspected by the TERT to determine whether any damage has occurred that could potentially result in loss of life, injury, or property damage. If it is determined that conditions do not pose a threat to people or property, Sibanye Stillwater will advise the Incident Commander that it is safe to terminate the EPP operations as described above.

The Sibanye Stillwater Incident Commander and TERT will complete an Emergency Status report to document the Emergency Event and all actions that were taken. This report will be distributed to the appropriate authorities. Subsequent evaluations, investigations and engineering studies will be completed to determine remedial measures required for the TSF and impacted areas.

## 5.0 REFERENCES

- Knight Piésold Ltd. (KP), 2022. *Stage 6 TSF Expansion Dam Breach Assessment*. To be issued. North Bay, Ontario. Ref. No. NB101-45/57-1, Rev 0.
- State of Montana (MT), 2019. *Montana Code Annotated (MCA) 2017*. Title 82. Minerals, Oil, and Gas. Chapter 4. Reclamation. Part 3. Metal Mine Reclamation.

## 6.0 CERTIFICATION

This report was prepared and reviewed by the undersigned.

We hereby certify that the following:

- The Emergency Preparedness Plan describes reasonable measures that can be taken to protect human health and the environment.

Prepared:

---

Zane Leonard, Sibanye Stillwater  
Environmental Compliance Supervisor

Reviewed:

---

Matt Wolfe  
Environmental Sustainability Manager - US Region

Approved:

---

Wayne Robinson, Sibanye Stillwater  
Executive Vice President - US Operations

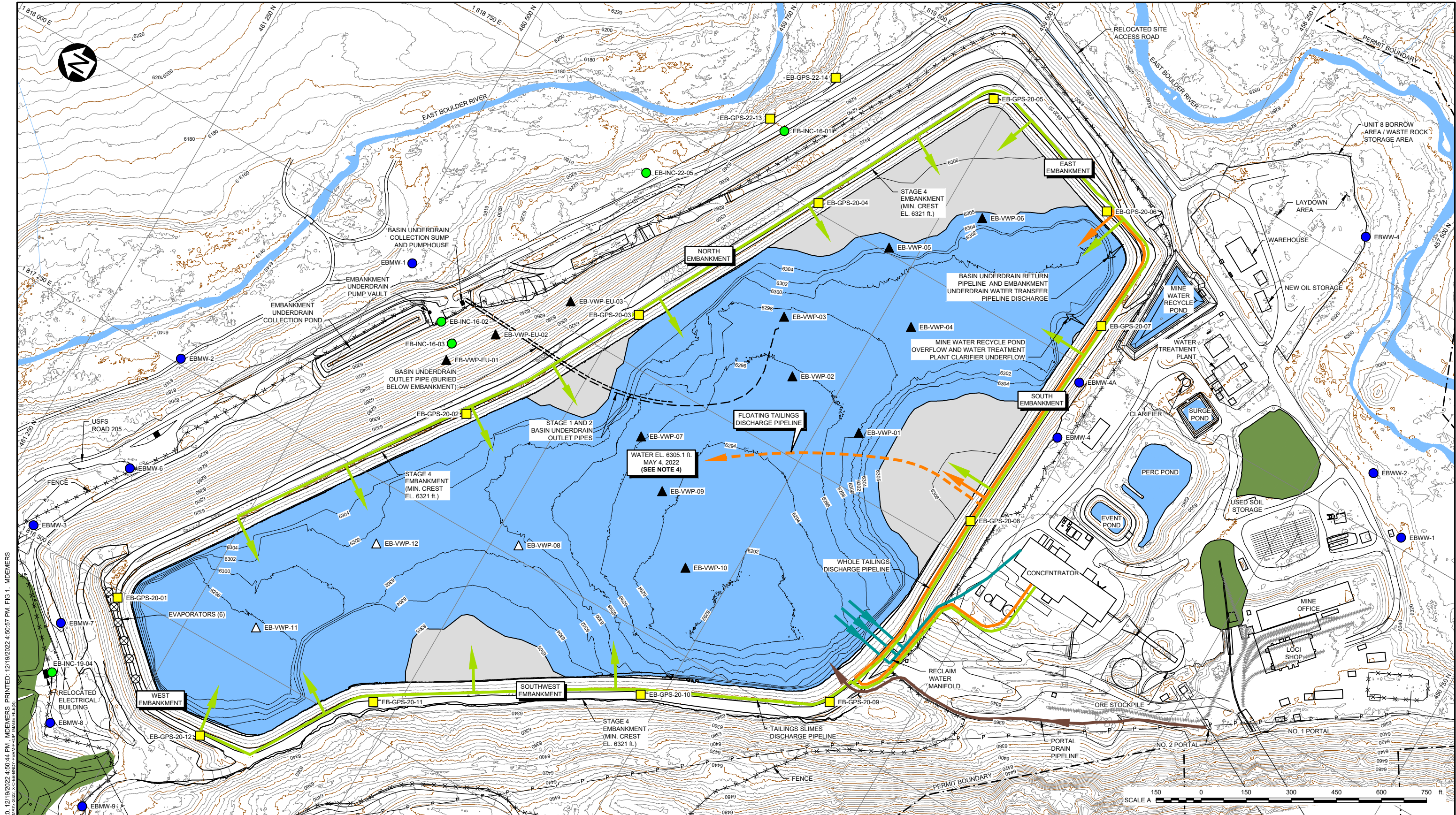


## Appendix A

### Location Figure

(Page A-1)





SAVED: I:\101004559\A\Aad\FIGS\B19.RD, 12/19/2022 4:50:44 PM. MDEWERS PRINTED: 12/19/2022 4:50:57 PM. FIG 1. MDEWERS  
REV: 0 20DEC'22 ISSUED FOR INFORMATION CNH MMD KJB

LEGEND:

- |                        |                                |   |
|------------------------|--------------------------------|---|
| WATER                  | SURVEY MONUMENT                | PORTAL DRAIN PIPELINE                               |
| TAILINGS               | VWP LOCATIONS (OPERATIONAL)    | TAILINGS SLIMES DELIVERY PIPELINE                   |
| SURFACE SOIL STOCKPILE | VWP LOCATIONS (DECOMMISSIONED) | PROPOSED FLOATING TAILINGS SLIMES DELIVERY PIPELINE |
|                        | SLOPE INCLINOMETER LOCATION    | WHOLE TAILINGS DELIVERY PIPELINE                    |
|                        | MONITORING WELL LOCATION       | PROPOSED FLOATING WHOLE TAILINGS DELIVERY PIPELINE  |
|                        | EVAPORATORS                    | RECLAIM WATER PIPELINE                              |
|                        | RECLAIM WATER PUMPS            | ROAD  |
|                        |                                | POWERLINE   |
|                        |                                | PERMIT BOUNDARY (PROPOSED)                          |
|                        |                                | FENCE   |

NOTES:

- TOPOGRAPHY BASED ON LIDAR DATA PROVIDED BY STILLWATER MINING COMPANY JUNE 2018, SURVEY DATA PROVIDED BY WOITH ENGINEERING INC. FEBRUARY 2021, MAY 2021 AND SURVEY DATA PROVIDED BY TURNER MINING JUNE 2022.
- CONTOUR INTERVAL IS 5 FEET.
- HORIZONTAL DATUM IS MONTANA COORDINATE SYSTEM, SINGLE ZONE, NAD83 (1992). UNITS ARE IN INTERNATIONAL FEET. VERTICAL DATUM IS NGVD29.
- TAILINGS SURFACE SHOWN ON THIS FIGURE WAS SURVEYED BETWEEN MAY 4 TO 6, 2022 BY COPPERSTONE TECHNOLOGIES.

SIBANYE STILLWATER

EAST BOULDER MINE

GENERAL ARRANGEMENT



P/A NO. NB101-45/58	REF NO. NB22-01384
------------------------	-----------------------

FIGURE A.1

REV  
0



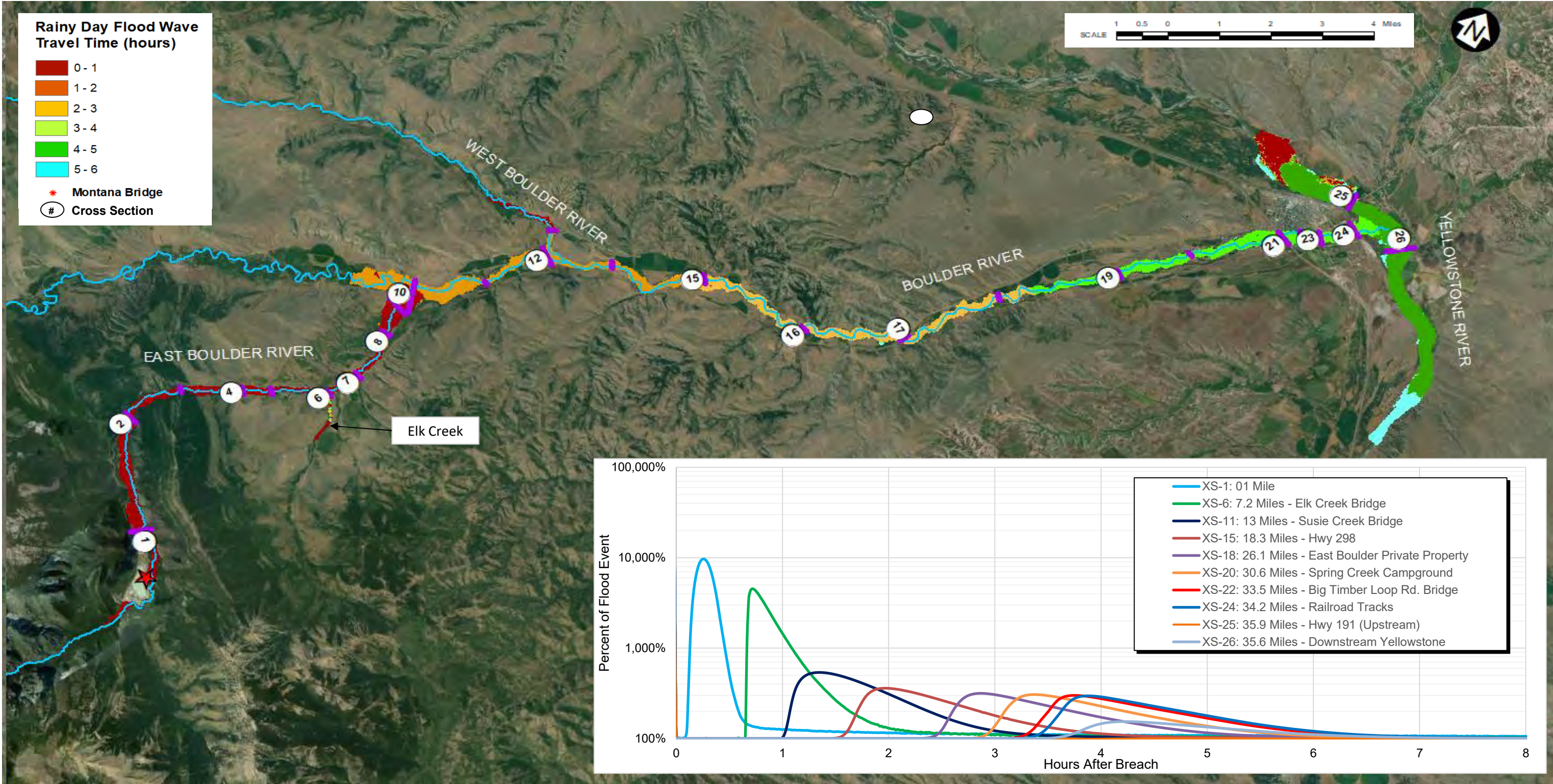
## Appendix B

### Flood Inundation Maps

(Previously Issued with NB101-45/44-9, Rev 0)

(Pages B-1 to B-21)






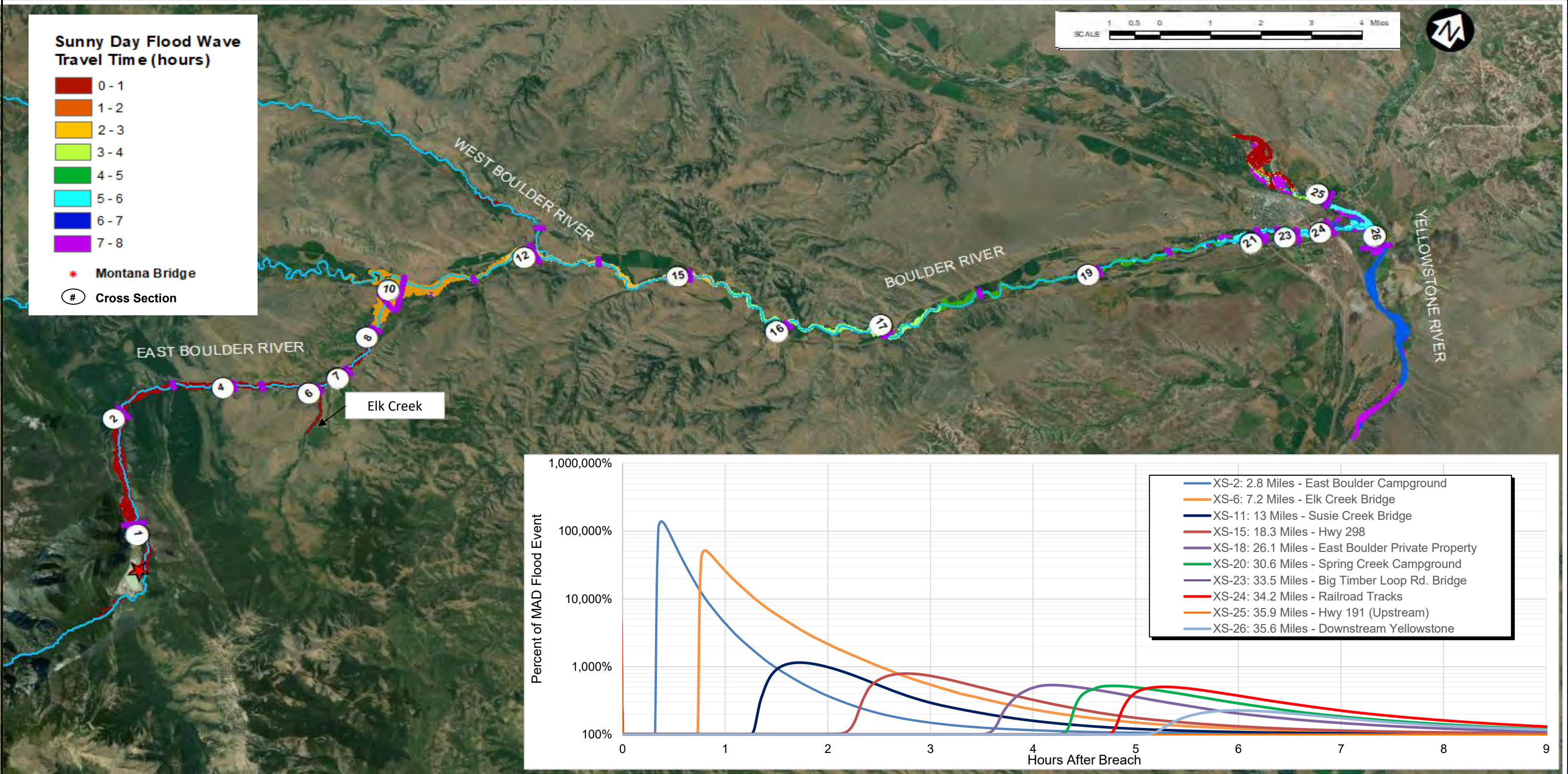
**NOTES:**

1. PERCENT INCREASE IN CHART IS OVER THE 1 IN 1,000 YEAR FLOOD DISCHARGE RATE OF THE EAST BOULDER, AND 1 IN 500 FLOOD FOR THE REMAINDER OF THE RIVERS.

A	19DEC'22	ISSUED WITH TRANSMITTAL	MGP	CNH
REV	DATE	DESCRIPTION	PREP'D	RVW'D

STILLWATER MINING COMPANY		
EAST BOULDER MINE		
RAINY DAY BREACH FLOOD WAVE PROPAGATION		
	P/A NO. NB101-45/57	REF. NO. NB22-01382
	FIGURE C1.5	
		REV A



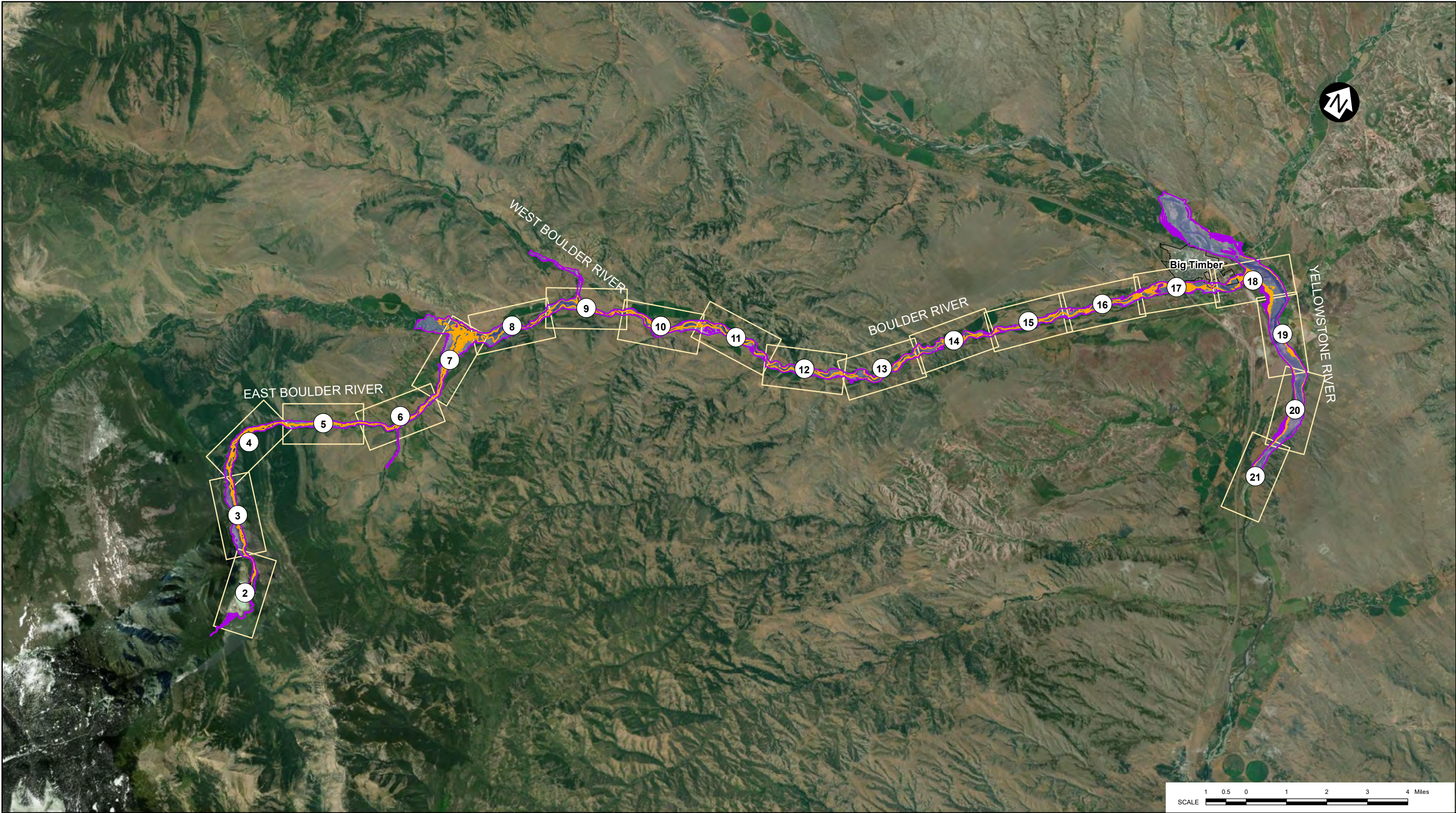


**NOTES:**  
1. PERCENT INCREASE IN CHART IS OVER THE MEAN ANNUAL DISCHARGE OF THE BOULDER RIVER SUB-BASIN.

A	19DEC'22	ISSUED WITH TRANSMITTAL	MGP	CNH
REV	DATE	DESCRIPTION	PREP'D	RVW'D

STILLWATER MINING COMPANY		
EAST BOULDER MINE		
SUNNY DAY BREACH FLOOD WAVE PROPAGATION		
	P/A NO. NB101-45/57	REF. NO. NB22-01382
	FIGURE C1.6	
		REV A





**LEGEND:**

- ★ PROJECT LOCATION
- PAGE EXTENTS
- FLOOD INUNDATION EXTENTS**
- ▭ RAINY DAY BREACH INUNDATION EXTENTS
- ▭ RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

HIGH : 15

LOW : 0

A	19DEC22	ISSUED WITH REPORT	MGP	MGP	CNH
REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED

DRAFT

- NOTES:**
- 1. COORDINATE SYSTEM: NAD 1983 STATEPLANEMONTANA FIPS 2500 FEET INTL.
  - 2. BASE MAP/IMAGERY: © ESRI AND DATA (ONLINE) SERVICE LAYERS (2017). REDLANDS, CA: ENVIRONMENTAL SYSTEM RESEARCH INSTITUTE. ALL RIGHTS RESERVED.
  - 3. BASEMAP DATA SOURCED FROM MONTANA STATE LIBRARY (GEOGRAPHIC INFORMATION SERVICE).

SCALE 1 0.5 0 1 2 3 4 Miles

STILLWATER MINING COMPANY

EAST BOULDER MINE

**RAINY DAY BREACH - FLOOD INUNDATION**

**SHEET 1 OF 21**

PIA NO.  
NB101-45/57

REF NO.  
NB22-01382

**FIGURE C2.1**

REV  
A

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LEGEND:

- ★ BREACH LOCATION
- ⬡ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

FLOOD INUNDATION EXTENTS

RAINY DAY BREACH INUNDATION EXTENTS

RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

MAX WATER DEPTH

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

DRAFT

NOTES:

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STILLWATER MINING COMPANY

EAST BOULDER MINE

RAINY DAY BREACH - FLOOD INUNDATION  
SHEET 2 OF 21



PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C2.2	
REV	A





1

1 MILE

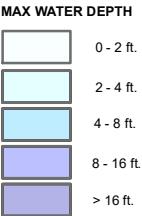
2 MILE

EAST BOULDER RIVER

**Cross Section 1**  
Distance from Breach Confluence 0.9 miles  
Peak Discharge 233,340 cfs  
Max Change in Depth 24.3 feet  
Time to Flood Wave Arrival 0:07 h:m



- LEGEND:**
- ★ BREACH LOCATION
  - ⬢ NOT-ACTIVE USGS GAGING STATION
  - ▲ ACTIVE USGS GAGING STATIONS
  - ✱ MONTANA BRIDGE
  - ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE
  - PAGE EXTENTS
  - LANDPARCEL BOUNDARY
- FLOOD INUNDATION EXTENTS**
- RAINY DAY BREACH INUNDATION EXTENTS
  - RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)



DRAFT

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STILLWATER MINING COMPANY

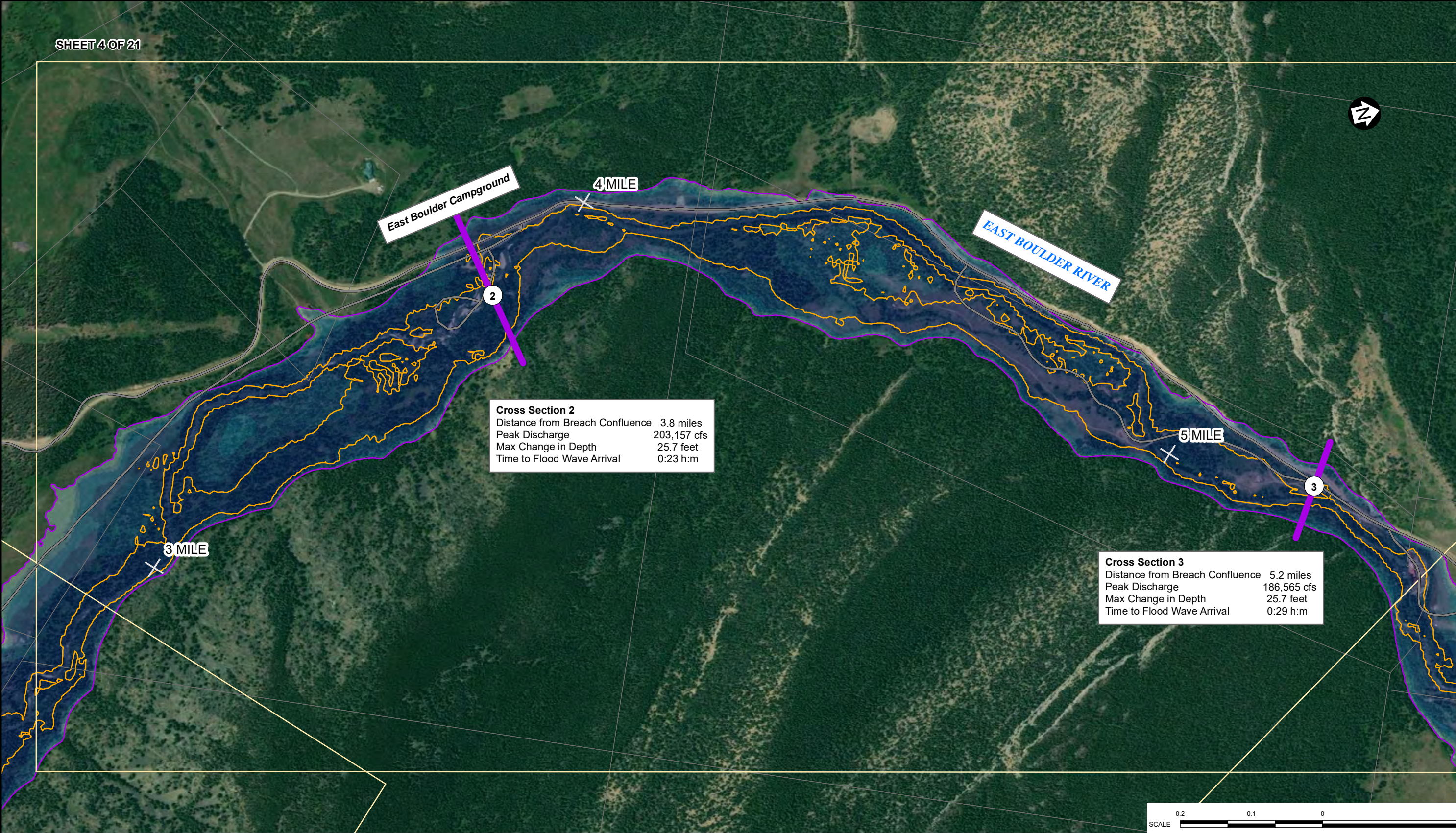
EAST BOULDER MINE

RAINY DAY BREACH - FLOOD INUNDATION  
SHEET 3 OF 21



PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C2.3	REV A





**Cross Section 2**  
Distance from Breach Confluence 3.8 miles  
Peak Discharge 203,157 cfs  
Max Change in Depth 25.7 feet  
Time to Flood Wave Arrival 0:23 h:m

**Cross Section 3**  
Distance from Breach Confluence 5.2 miles  
Peak Discharge 186,565 cfs  
Max Change in Depth 25.7 feet  
Time to Flood Wave Arrival 0:29 h:m



**LEGEND:**

- BREACH LOCATION
- NOT-ACTIVE USGS GAGING STATION
- ACTIVE USGS GAGING STATIONS
- MONTANA BRIDGE
- ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY
- FLOOD INUNDATION EXTENTS**
- RAINY DAY BREACH INUNDATION EXTENTS
- RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

**DRAFT**

**NOTES:**

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STILLWATER MINING COMPANY

EAST BOULDER MINE

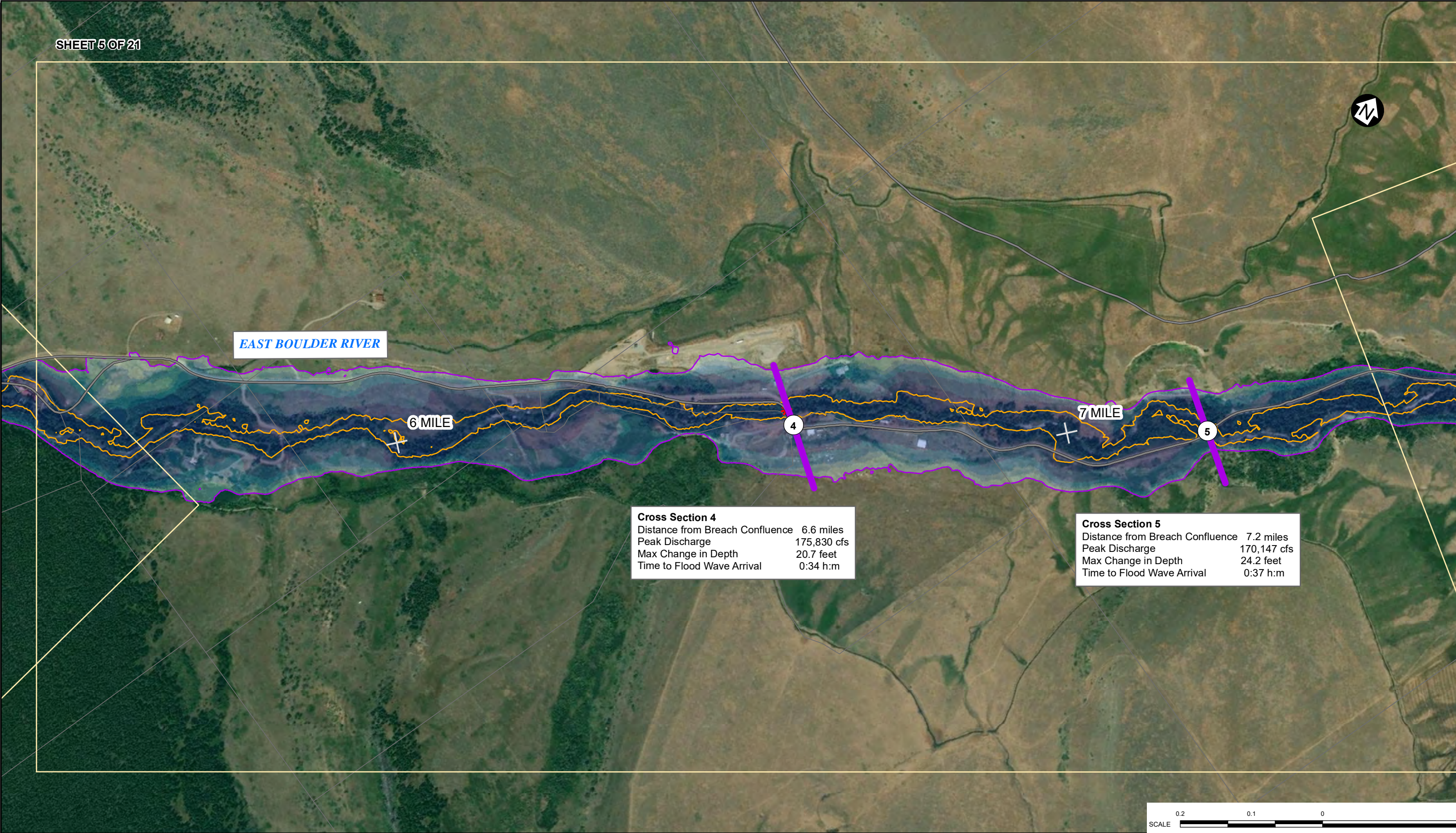
**RAINY DAY BREACH - FLOOD INUNDATION**  
**SHEET 4 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C2.4</b>	
REV	A

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**Cross Section 4**  
Distance from Breach Confluence 6.6 miles  
Peak Discharge 175,830 cfs  
Max Change in Depth 20.7 feet  
Time to Flood Wave Arrival 0:34 h:m

**Cross Section 5**  
Distance from Breach Confluence 7.2 miles  
Peak Discharge 170,147 cfs  
Max Change in Depth 24.2 feet  
Time to Flood Wave Arrival 0:37 h:m



**LEGEND:**

- ★ BREACH LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

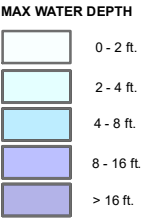
LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- RAINY DAY BREACH INUNDATION EXTENTS
- RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)



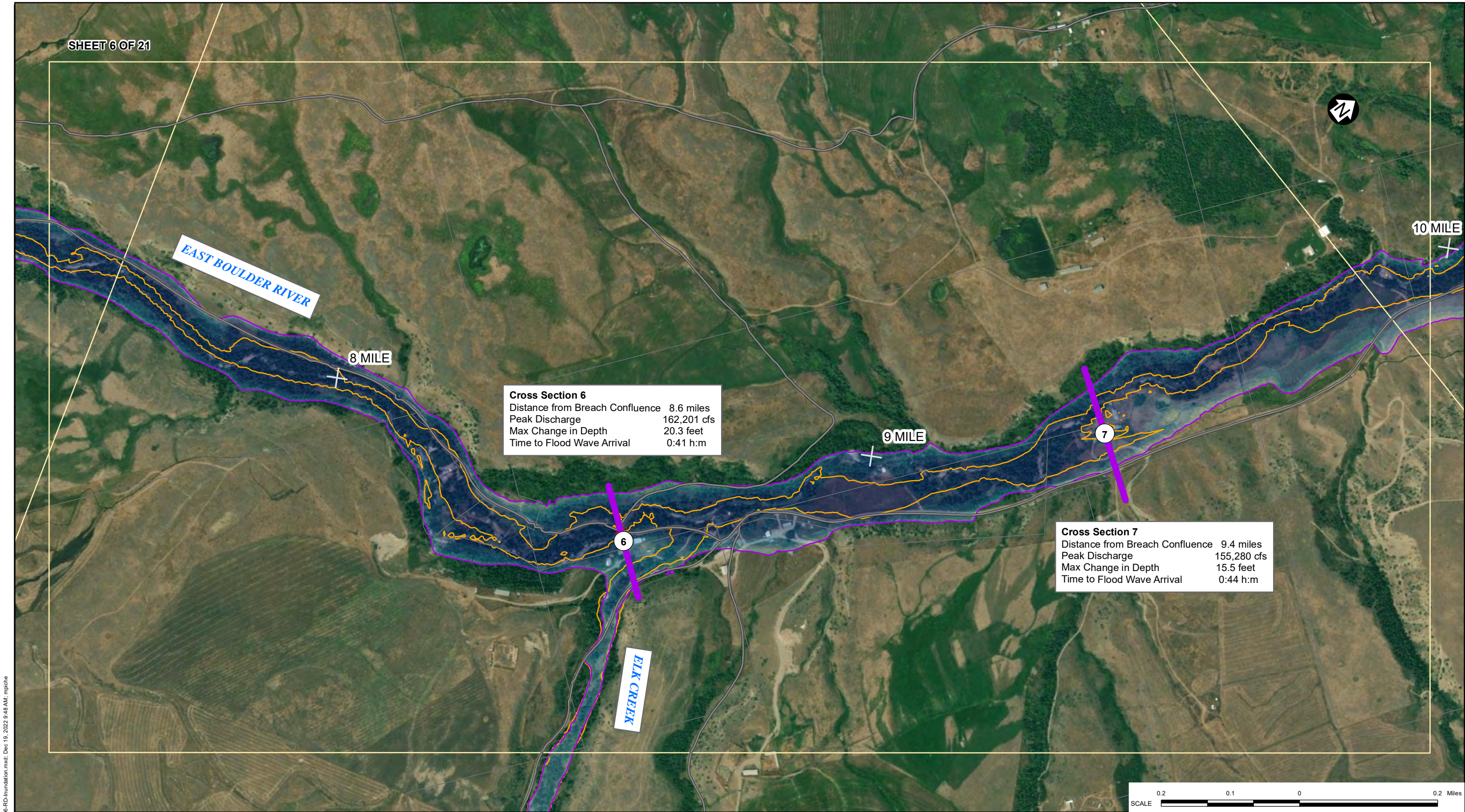
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- NOTES:**
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REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED

STILLWATER MINING COMPANY		
EAST BOULDER MINE		
RAINY DAY BREACH - FLOOD INUNDATION		
SHEET 5 OF 21		
	PIA NO.	REF NO.
	NB101-45/57	NB22-01382
	FIGURE C2.5	REV A





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LEGEND:

- ★ BREACH LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

FLOOD INUNDATION EXTENTS

RAINY DAY BREACH INUNDATION EXTENTS

RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

MAX WATER DEPTH

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

DRAFT

NOTES:

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STILLWATER MINING COMPANY

EAST BOULDER MINE

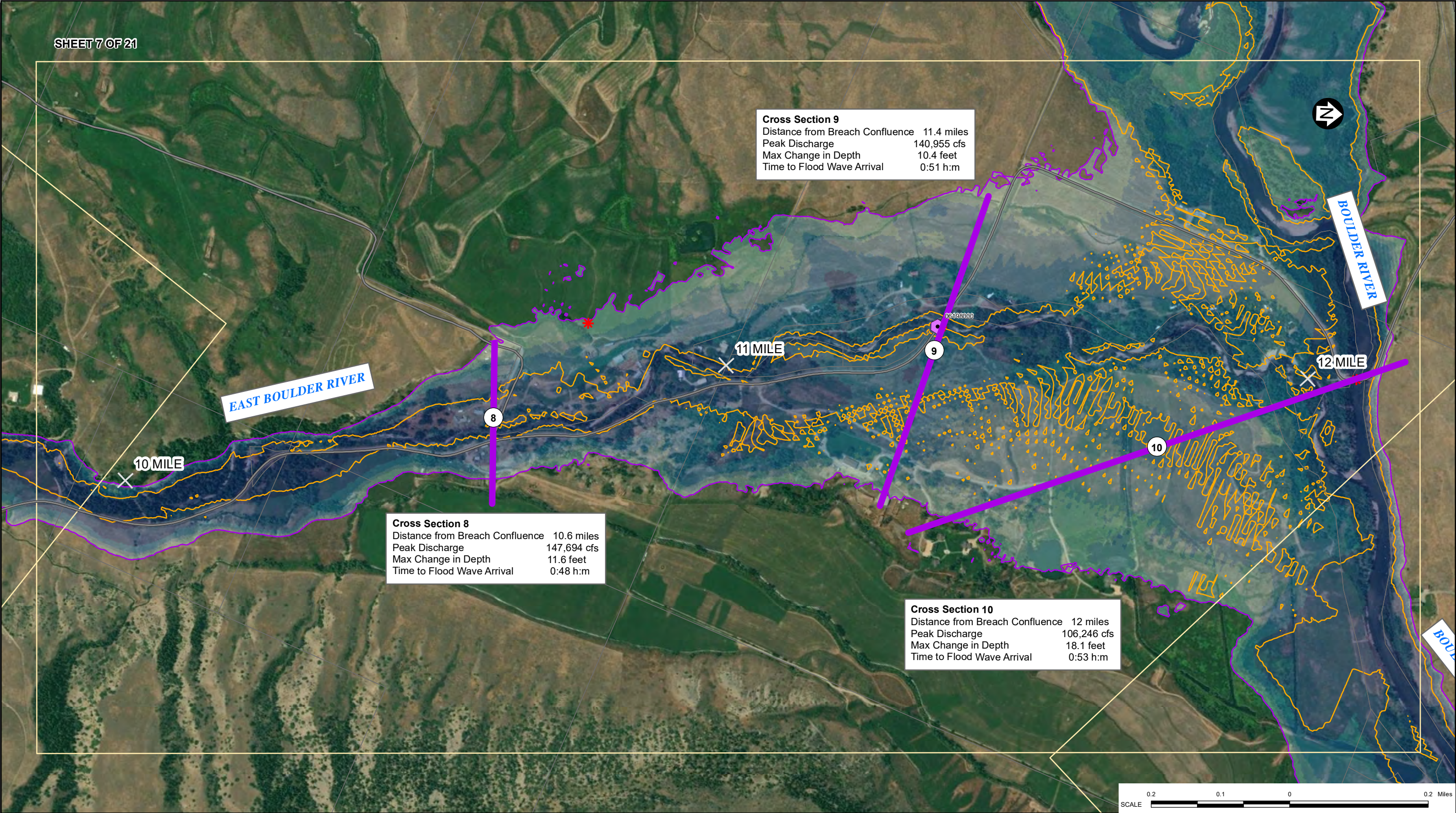
RAINY DAY BREACH - FLOOD INUNDATION  
SHEET 6 OF 21

**Knight Piésold**  
CONSULTING

PIA NO. NB101-45/57	REF NO. NB22-01382
FIGURE C2.6	
REV A	

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REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED





**Cross Section 9**  
Distance from Breach Confluence 11.4 miles  
Peak Discharge 140,955 cfs  
Max Change in Depth 10.4 feet  
Time to Flood Wave Arrival 0:51 h:m

**Cross Section 8**  
Distance from Breach Confluence 10.6 miles  
Peak Discharge 147,694 cfs  
Max Change in Depth 11.6 feet  
Time to Flood Wave Arrival 0:48 h:m

**Cross Section 10**  
Distance from Breach Confluence 12 miles  
Peak Discharge 106,246 cfs  
Max Change in Depth 18.1 feet  
Time to Flood Wave Arrival 0:53 h:m

**LEGEND:**

- ★ BREACH LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✳ MONTANA BRIDGE
- ROADS

LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

RAINY DAY BREACH INUNDATION EXTENTS

RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

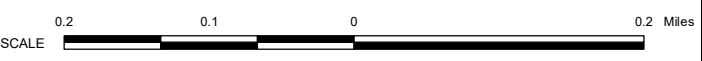
**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

**DRAFT**

**NOTES:**

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STILLWATER MINING COMPANY

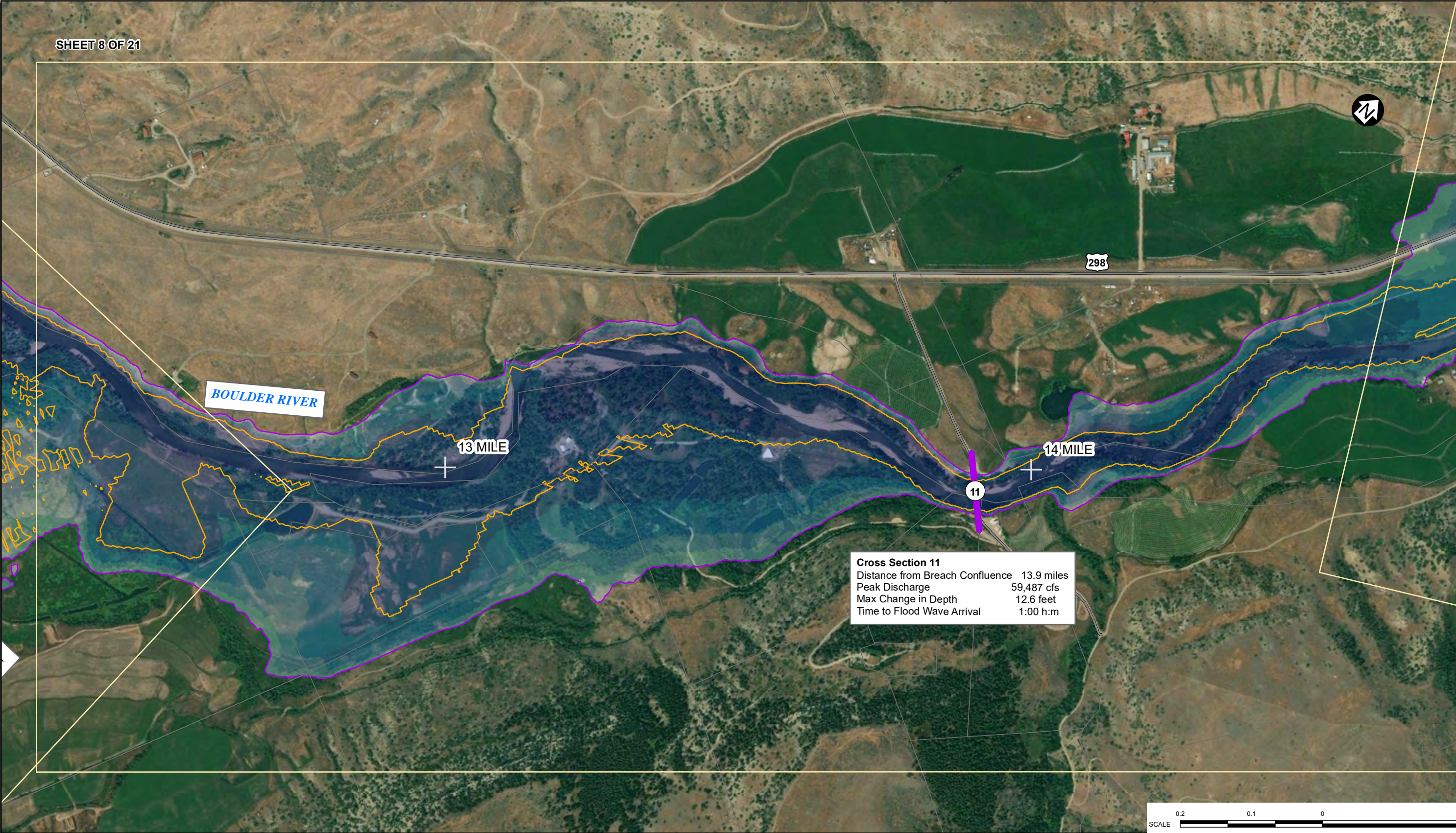
EAST BOULDER MINE

**RAINY DAY BREACH - FLOOD INUNDATION**  
**SHEET 7 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C2.7</b>	
REV	A





**Cross Section 11**  
Distance from Breach Confluence 13.9 miles  
Peak Discharge 59,487 cfs  
Max Change in Depth 12.6 feet  
Time to Flood Wave Arrival 1:00 h:m



**LEGEND:**

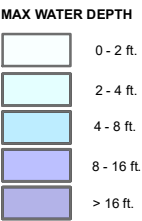
- ★ BREACH LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

LEWIS GULCH IMPOUNDMENT OUTLINE

- PAGE EXTENTS
- LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- RAINY DAY BREACH INUNDATION EXTENTS
- RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)



**DRAFT**

- NOTES:**
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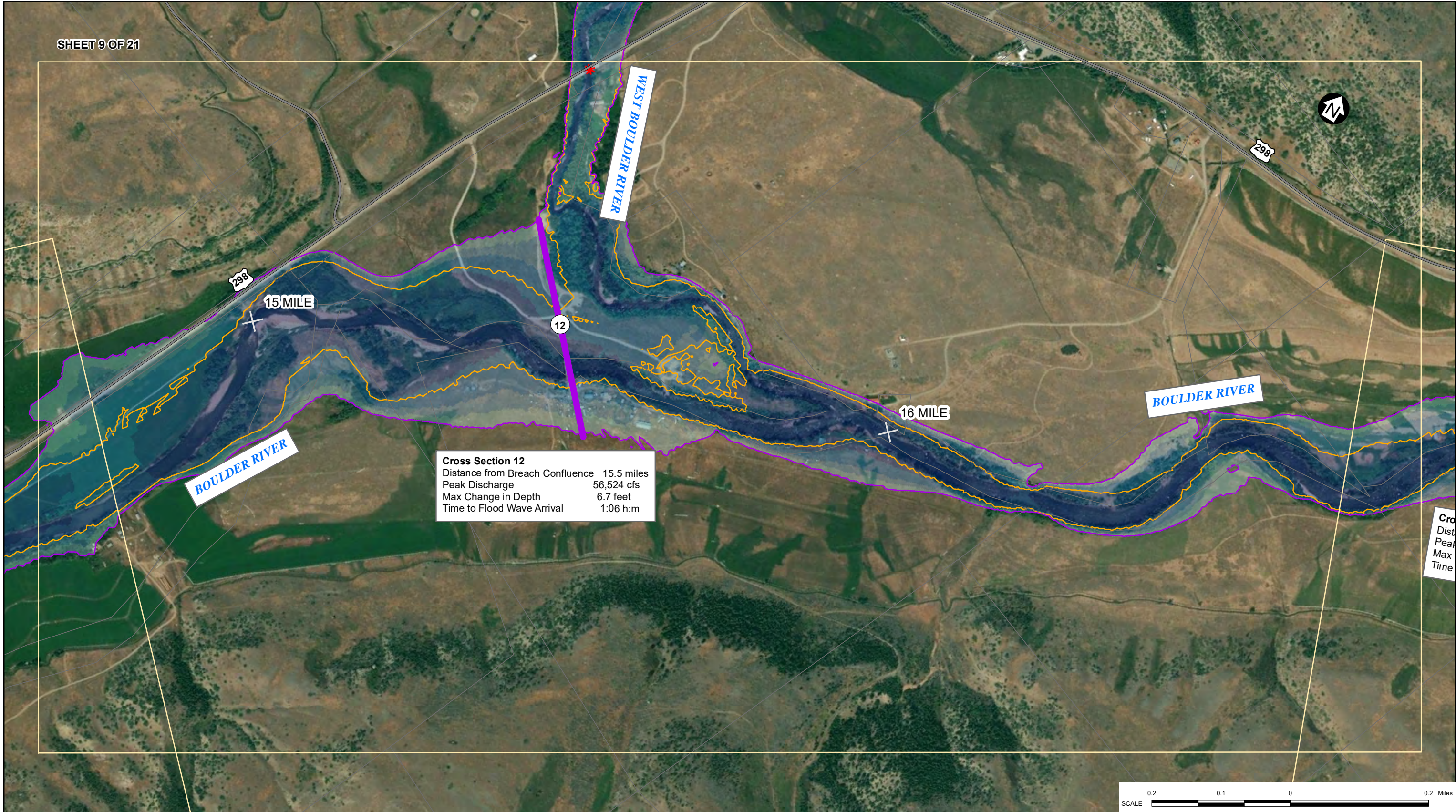
EAST BOULDER MINE

**RAINY DAY BREACH - FLOOD INUNDATION**

**SHEET 8 OF 21**

	PIA NO.	REF NO.
	NB101-45/57	NB22-01382
<b>FIGURE C2.8</b>		REV A





**Cross Section 12**  
Distance from Breach Confluence 15.5 miles  
Peak Discharge 56,524 cfs  
Max Change in Depth 6.7 feet  
Time to Flood Wave Arrival 1:06 h:m

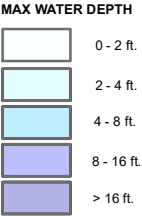
Cross  
Section  
Distance  
Peak  
Max  
Time



**DRAFT**

**LEGEND:**

- BREACH LOCATION
- NOT-ACTIVE USGS GAGING STATION
- ACTIVE USGS GAGING STATIONS
- MONTANA BRIDGE
- ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY
- FLOOD INUNDATION EXTENTS**
- RAINY DAY BREACH INUNDATION EXTENTS
- RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)



- NOTES:**
- COORDINATE SYSTEM: NAD 1983 STATEPLANEMONTANA FIPS 2500 FEET INTL.
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STILLWATER MINING COMPANY

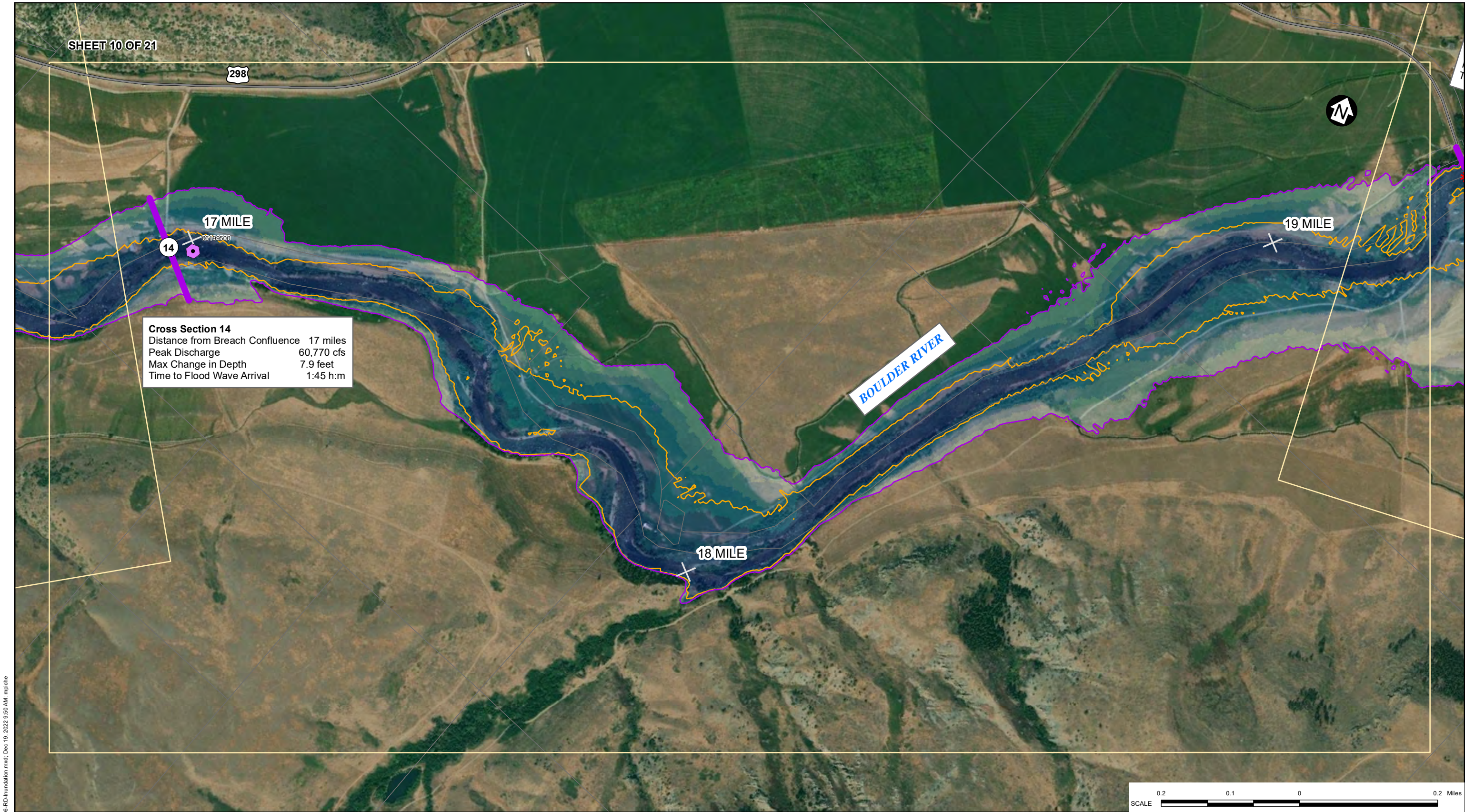
EAST BOULDER MINE

**RAINY DAY BREACH - FLOOD INUNDATION**

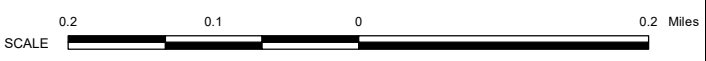
**SHEET 9 OF 21**

	PIA NO.	REF NO.
	NB101-45/57	NB22-01382
<b>FIGURE C2.9</b>		REV A





**Cross Section 14**  
Distance from Breach Confluence 17 miles  
Peak Discharge 60,770 cfs  
Max Change in Depth 7.9 feet  
Time to Flood Wave Arrival 1:45 h:m



**LEGEND:**

- ★ BREACH LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

RAINY DAY BREACH INUNDATION EXTENTS

RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

**DRAFT**

**NOTES:**

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STILLWATER MINING COMPANY

EAST BOULDER MINE

**RAINY DAY BREACH - FLOOD INUNDATION**  
**SHEET 10 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C2.10</b>	
REV	A

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**Cross Section 15**  
Distance from Breach Confluence 19.4 miles  
Peak Discharge 58,776 cfs  
Max Change in Depth 6.2 feet  
Time to Flood Wave Arrival 1:26 h:m

20 MILE

21 MILE

BOULDER RIVER

15

298



LEGEND:

- ★ BREACH LOCATION

○ NOT-ACTIVE USGS GAGING STATION

▲ ACTIVE USGS GAGING STATIONS

\* MONTANA BRIDGE

— ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

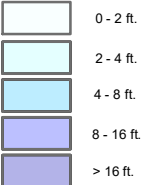
LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

RAINY DAY BREACH INUNDATION EXTENTS

RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

MAX WATER DEPTH



DRAFT

NOTES:

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STILLWATER MINING COMPANY

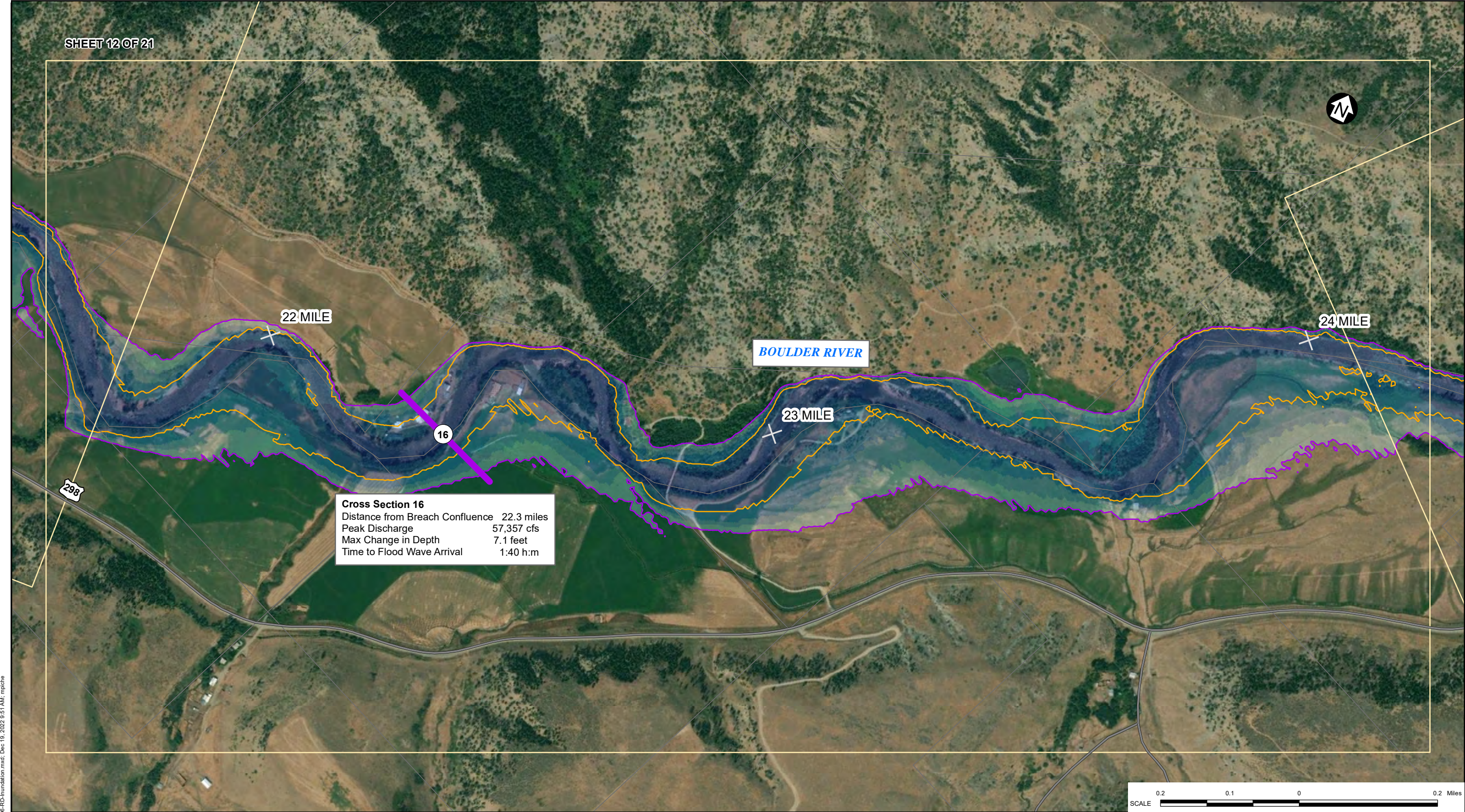
EAST BOULDER MINE

RAINY DAY BREACH - FLOOD INUNDATION  
SHEET 11 OF 21

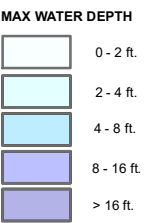


PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C2.11	REV A





- LEGEND:**
- ★ BREACH LOCATION
  - NOT-ACTIVE USGS GAGING STATION
  - ▲ ACTIVE USGS GAGING STATIONS
  - ✱ MONTANA BRIDGE
  - ROADS
  - LEWIS GULCH IMPOUNDMENT OUTLINE
  - PAGE EXTENTS
  - LANDPARCEL BOUNDARY
  - FLOOD INUNDATION EXTENTS**
  - RAINY DAY BREACH INUNDATION EXTENTS
  - RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)



**DRAFT**

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REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED

STILLWATER MINING COMPANY

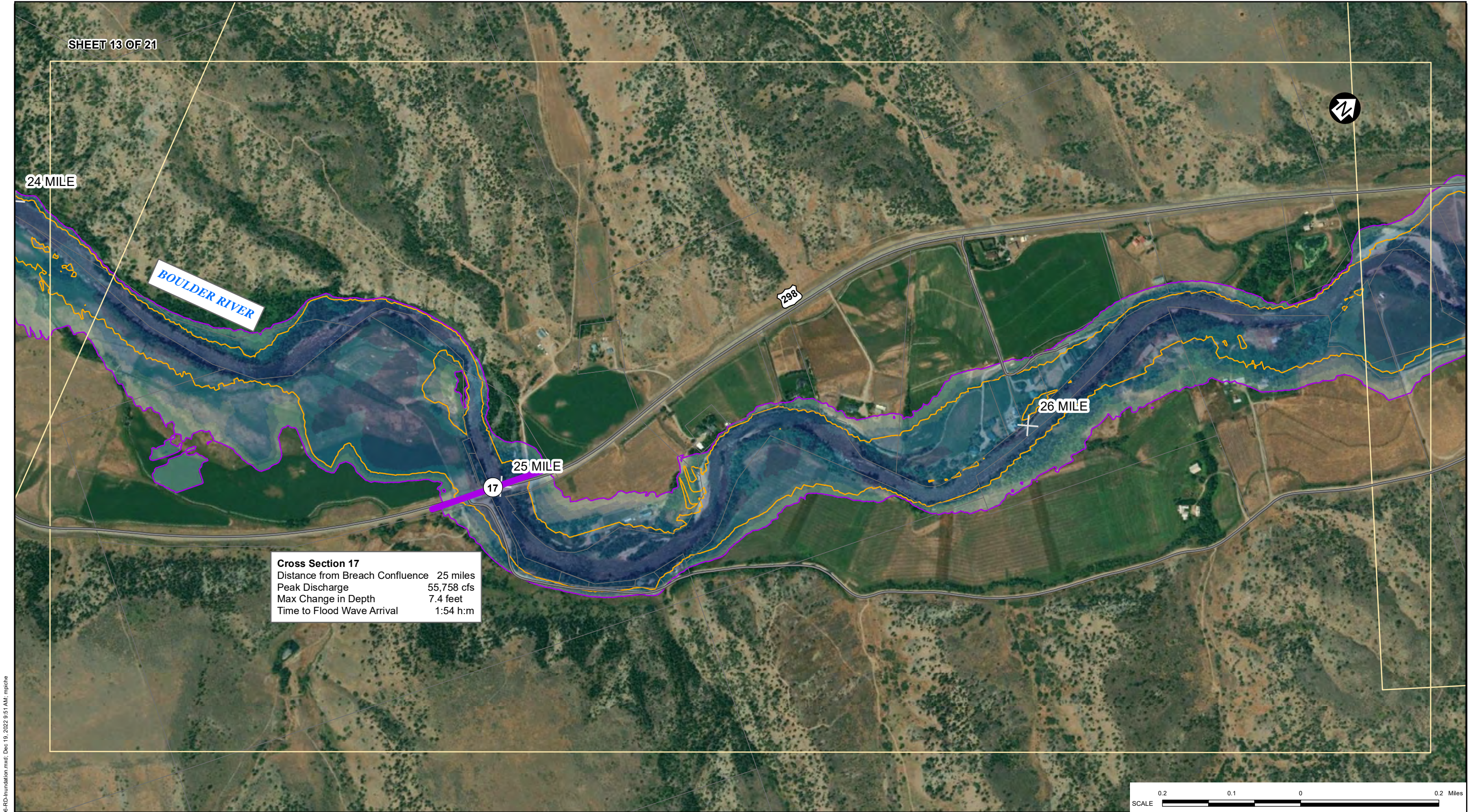
EAST BOULDER MINE

**RAINY DAY BREACH - FLOOD INUNDATION**  
**SHEET 12 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C2.12</b>	REV A





**LEGEND:**

★ BREACH LOCATION

○ NOT-ACTIVE USGS GAGING STATION

▲ ACTIVE USGS GAGING STATIONS

✱ MONTANA BRIDGE

— ROADS

LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

RAINY DAY BREACH INUNDATION EXTENTS

RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

0 - 2 ft.

2 - 4 ft.

4 - 8 ft.

8 - 16 ft.

> 16 ft.

DRAFT

- NOTES:**
1. COORDINATE SYSTEM: NAD 1983 STATEPLANEMONTANA FIPS 2500 FEET INTL.
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STILLWATER MINING COMPANY

EAST BOULDER MINE

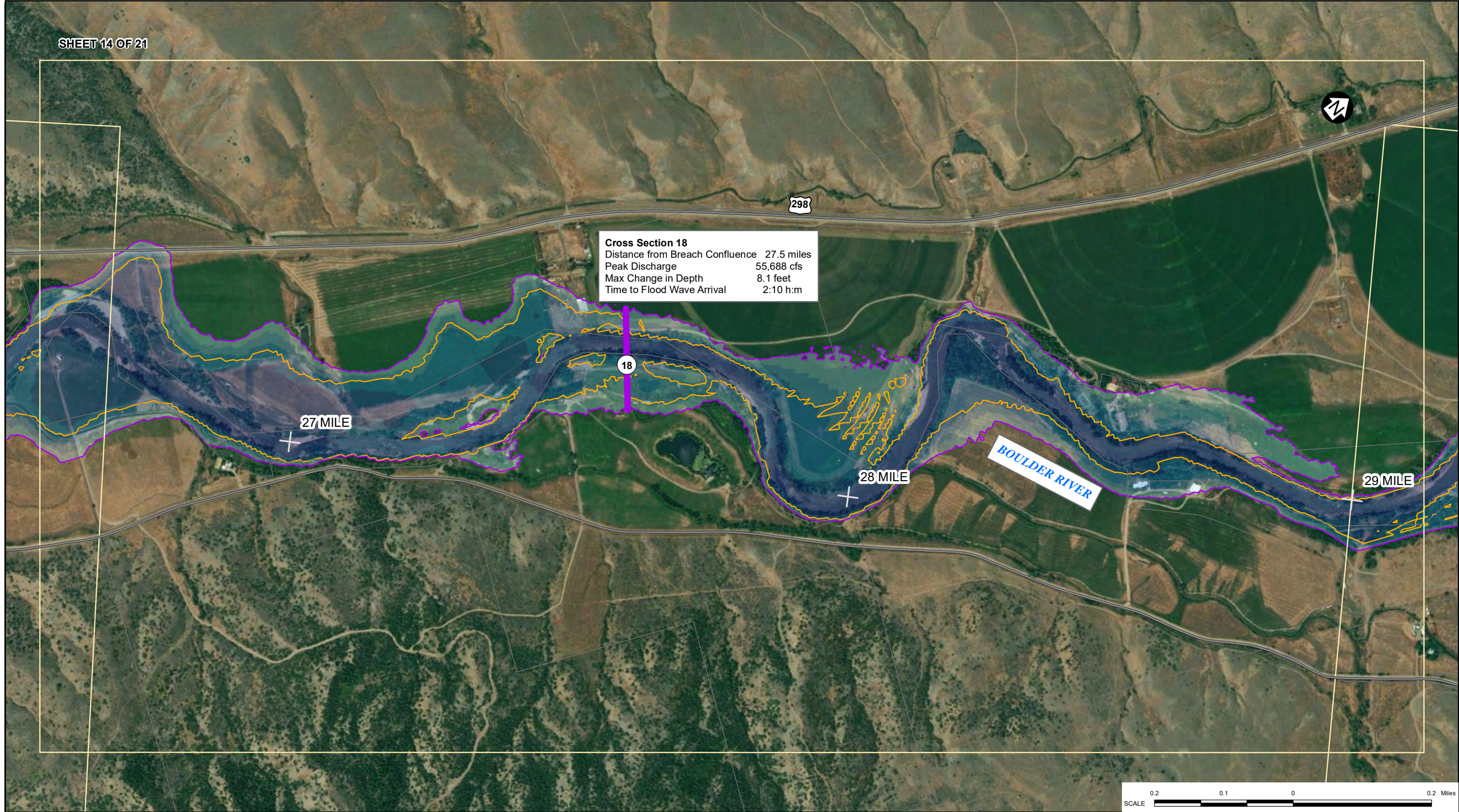
RAINY DAY BREACH - FLOOD INUNDATION

SHEET 13 OF 21

 Knight Piésold  
CONSULTING

PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C2.13	
REV	A





**Cross Section 18**  
Distance from Breach Confluence 27.5 miles  
Peak Discharge 55,688 cfs  
Max Change in Depth 8.1 feet  
Time to Flood Wave Arrival 2:10 h:m

18

27 MILE

28 MILE

BOULDER RIVER

29 MILE



DRAFT

**LEGEND:**

- ★ BREACH LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- RAINY DAY BREACH INUNDATION EXTENTS
- RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

- NOTES:**
- COORDINATE SYSTEM: NAD 1983 STATEPLANEMONTANA FIPS 2500 FEET INTL.
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STILLWATER MINING COMPANY

EAST BOULDER MINE

**RAINY DAY BREACH - FLOOD INUNDATION**

**SHEET 14 OF 21**

PIA NO.  
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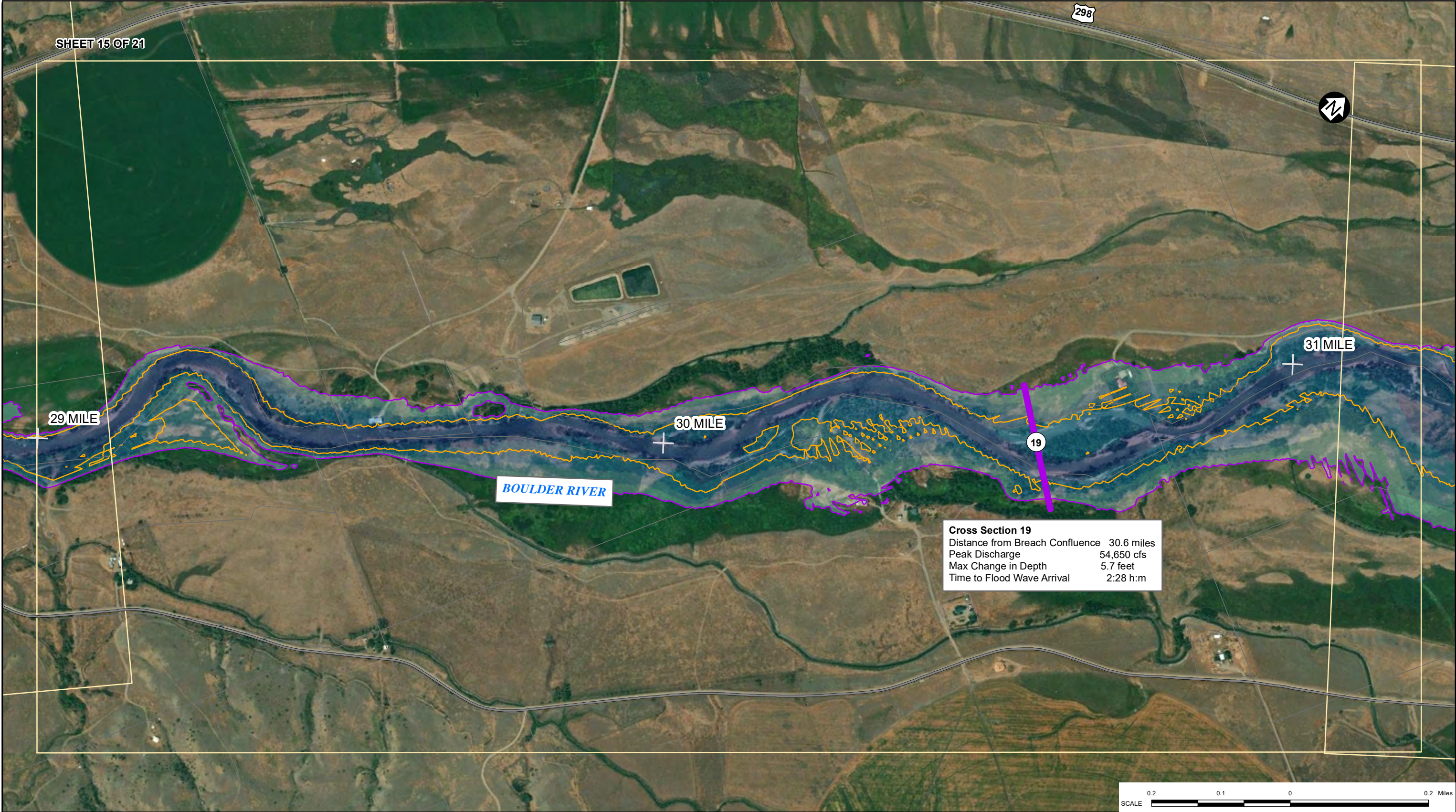
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NB22-01382

**FIGURE C2.14**

REV  
A

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**LEGEND:**

★ BREACH LOCATION

⬢ NOT-ACTIVE USGS GAGING STATION

▲ ACTIVE USGS GAGING STATIONS

✱ MONTANA BRIDGE

— ROADS

□ LEWIS GULCH IMPOUNDMENT OUTLINE

□ PAGE EXTENTS

□ LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

□ RAINY DAY BREACH INUNDATION EXTENTS

□ RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

□	0 - 2 ft.
□	2 - 4 ft.
□	4 - 8 ft.
□	8 - 16 ft.
□	> 16 ft.

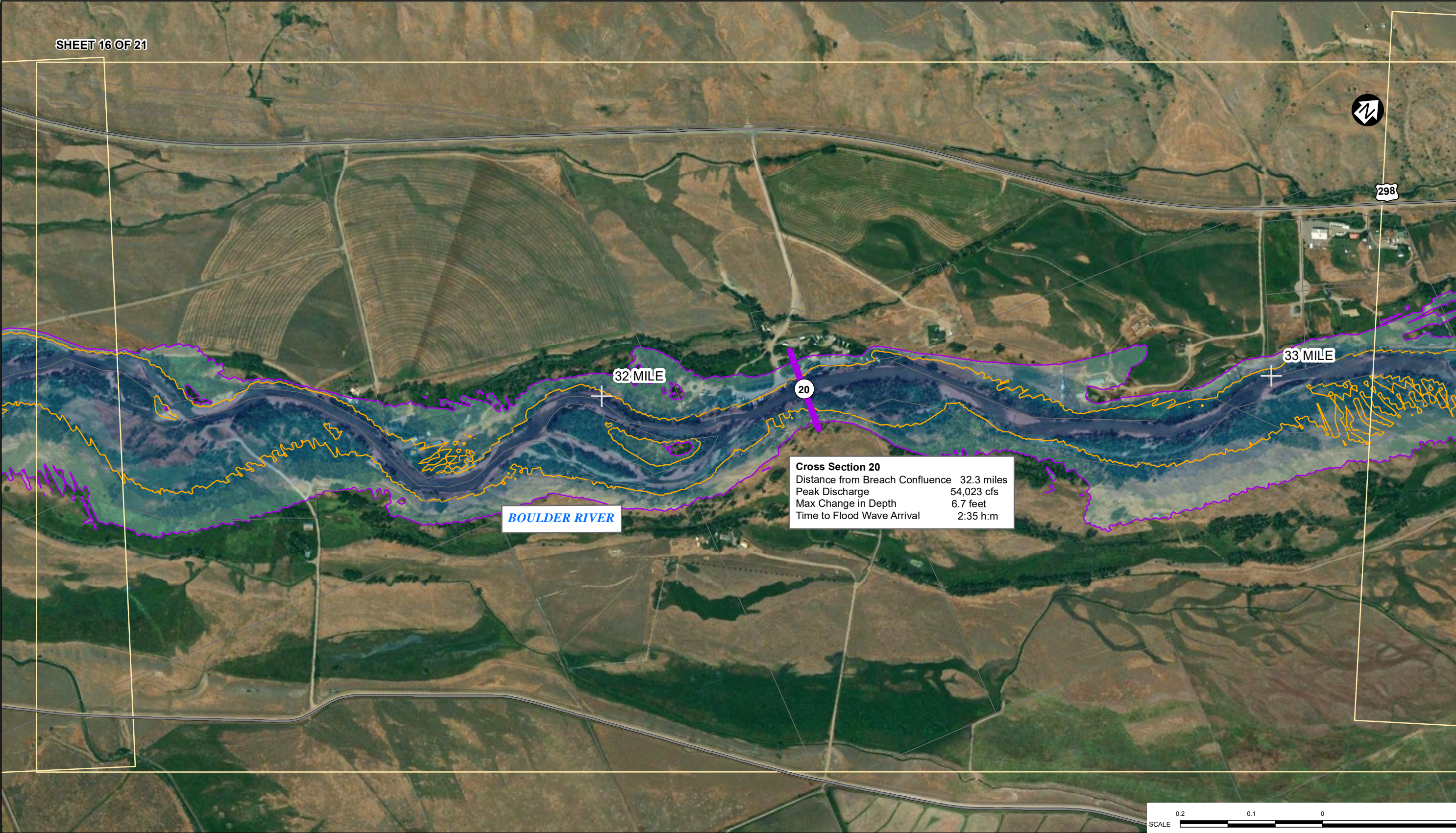
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EAST BOULDER MINE		
RAINY DAY BREACH - FLOOD INUNDATION		
SHEET 15 OF 21		
	PIA NO.	REF NO.
	NB101-45/57	NB22-01382
	FIGURE C2.15	
	REV	A





**Cross Section 20**  
Distance from Breach Confluence 32.3 miles  
Peak Discharge 54,023 cfs  
Max Change in Depth 6.7 feet  
Time to Flood Wave Arrival 2:35 h:m

**BOULDER RIVER**

**LEGEND:**

- ★ BREACH LOCATION

⬢ NOT-ACTIVE USGS GAGING STATION

▲ ACTIVE USGS GAGING STATIONS

✱ MONTANA BRIDGE

— ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

RAINY DAY BREACH INUNDATION EXTENTS

RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)
- MAX WATER DEPTH**

0 - 2 ft.

2 - 4 ft.

4 - 8 ft.

8 - 16 ft.

> 16 ft.

**DRAFT**

- NOTES:**
1. COORDINATE SYSTEM: NAD 1983 STATEPLANEMONTANA FIPS 2500 FEET INTL.
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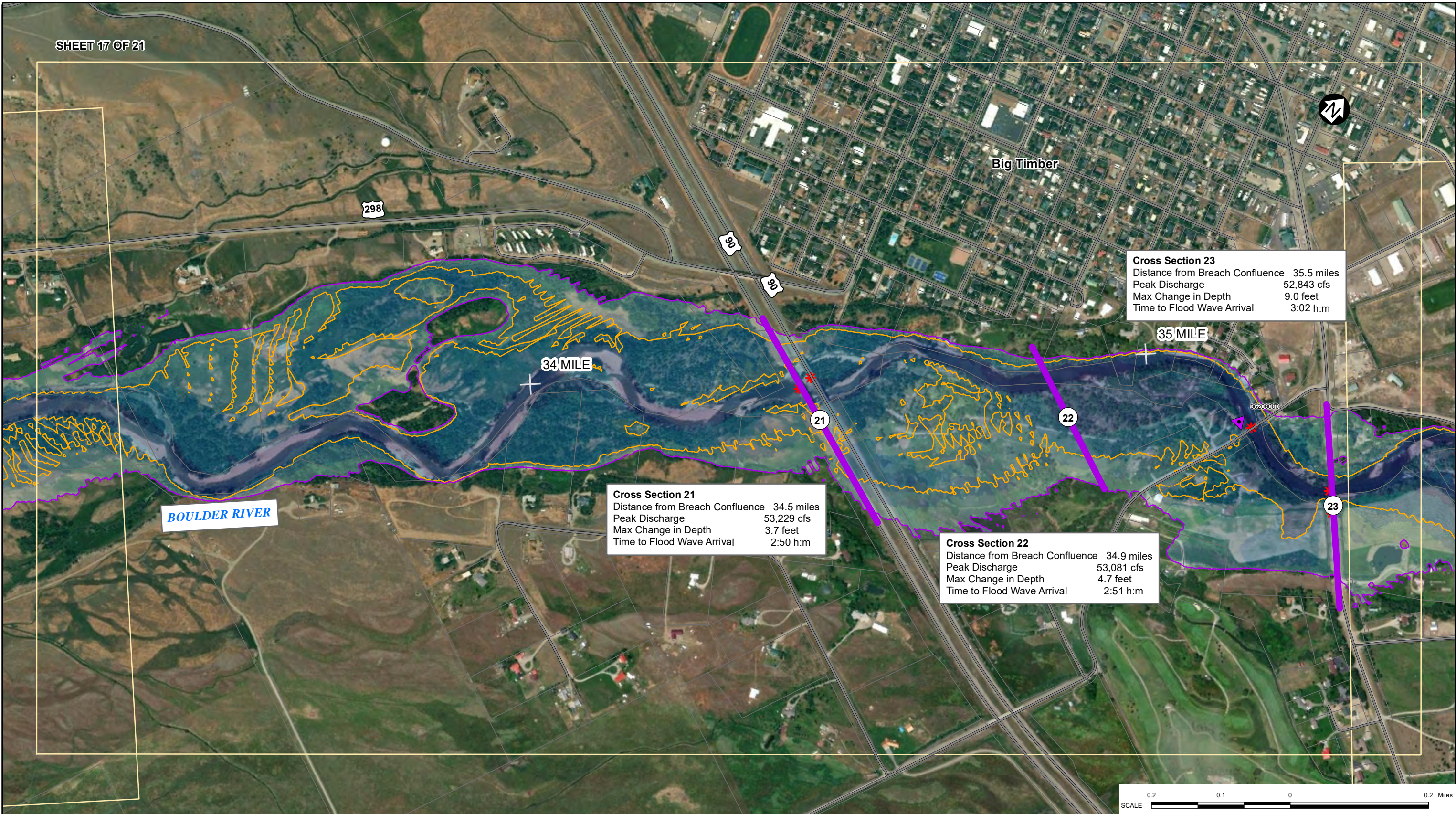
EAST BOULDER MINE

**RAINY DAY BREACH - FLOOD INUNDATION**  
**SHEET 16 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C2.16</b>	REV A





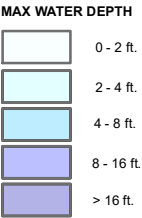
**Cross Section 23**  
Distance from Breach Confluence 35.5 miles  
Peak Discharge 52,843 cfs  
Max Change in Depth 9.0 feet  
Time to Flood Wave Arrival 3:02 h:m

**Cross Section 21**  
Distance from Breach Confluence 34.5 miles  
Peak Discharge 53,229 cfs  
Max Change in Depth 3.7 feet  
Time to Flood Wave Arrival 2:50 h:m

**Cross Section 22**  
Distance from Breach Confluence 34.9 miles  
Peak Discharge 53,081 cfs  
Max Change in Depth 4.7 feet  
Time to Flood Wave Arrival 2:51 h:m



- LEGEND:**
- ★ BREACH LOCATION
  - ⬢ NOT-ACTIVE USGS GAGING STATION
  - ▲ ACTIVE USGS GAGING STATIONS
  - ✱ MONTANA BRIDGE
  - ROADS
  - LEWIS GULCH IMPOUNDMENT OUTLINE
  - PAGE EXTENTS
  - LANDPARCEL BOUNDARY
  - FLOOD INUNDATION EXTENTS**
  - RAINY DAY BREACH INUNDATION EXTENTS
  - RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)



**DRAFT**

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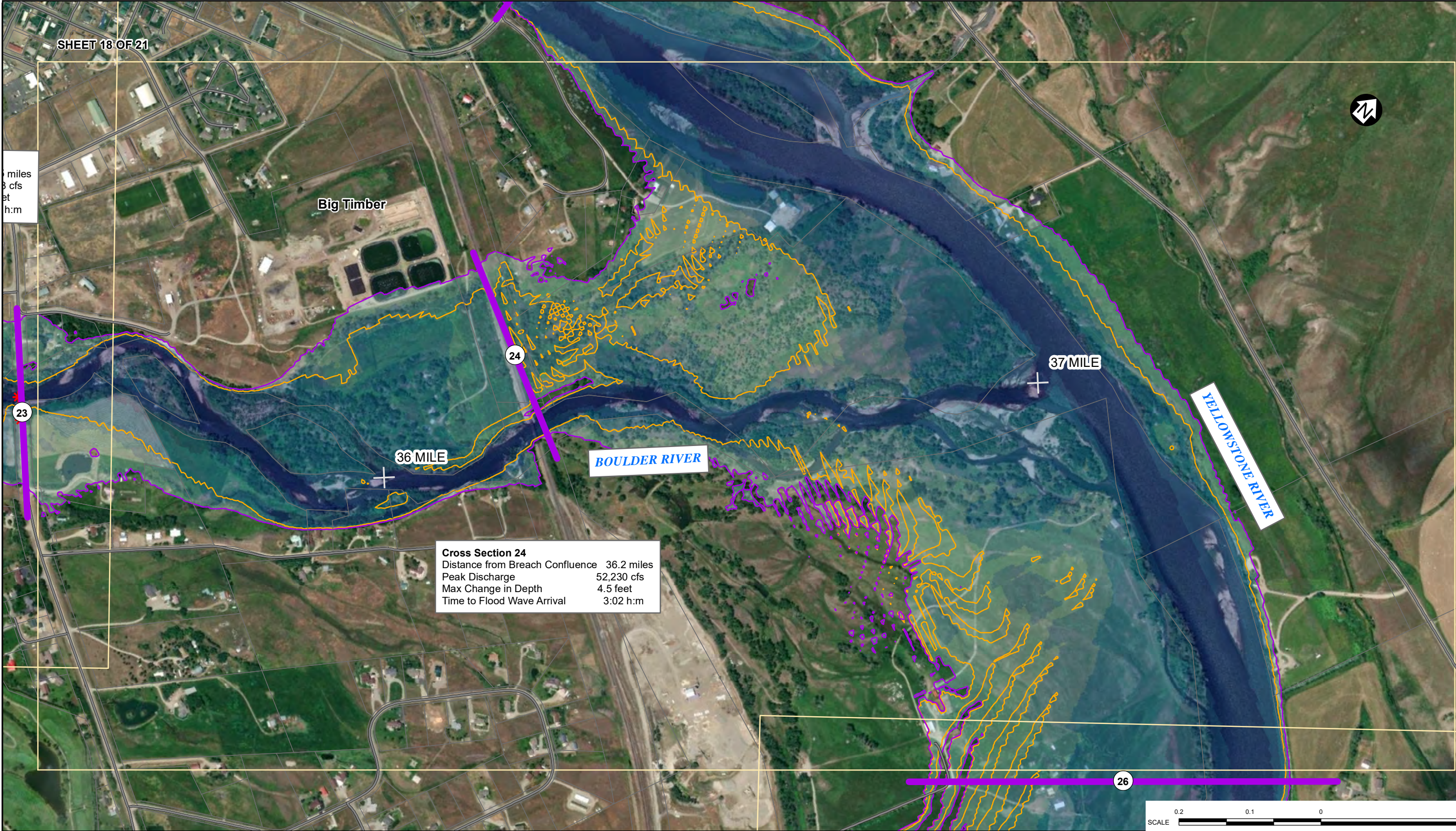
STILLWATER MINING COMPANY  
EAST BOULDER MINE

RAINY DAY BREACH - FLOOD INUNDATION  
SHEET 17 OF 21



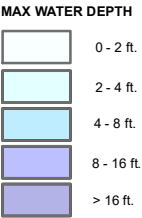
PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C2.17	
REV	A





**Cross Section 24**  
Distance from Breach Confluence 36.2 miles  
Peak Discharge 52,230 cfs  
Max Change in Depth 4.5 feet  
Time to Flood Wave Arrival 3:02 h:m

- LEGEND:**
- ★ BREACH LOCATION
  - ⬢ NOT-ACTIVE USGS GAGING STATION
  - ▲ ACTIVE USGS GAGING STATIONS
  - ✱ MONTANA BRIDGE
  - ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
  - LANDPARCEL BOUNDARY
- FLOOD INUNDATION EXTENTS**
- RAINY DAY BREACH INUNDATION EXTENTS
  - RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)



**DRAFT**

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STILLWATER MINING COMPANY  
EAST BOULDER MINE

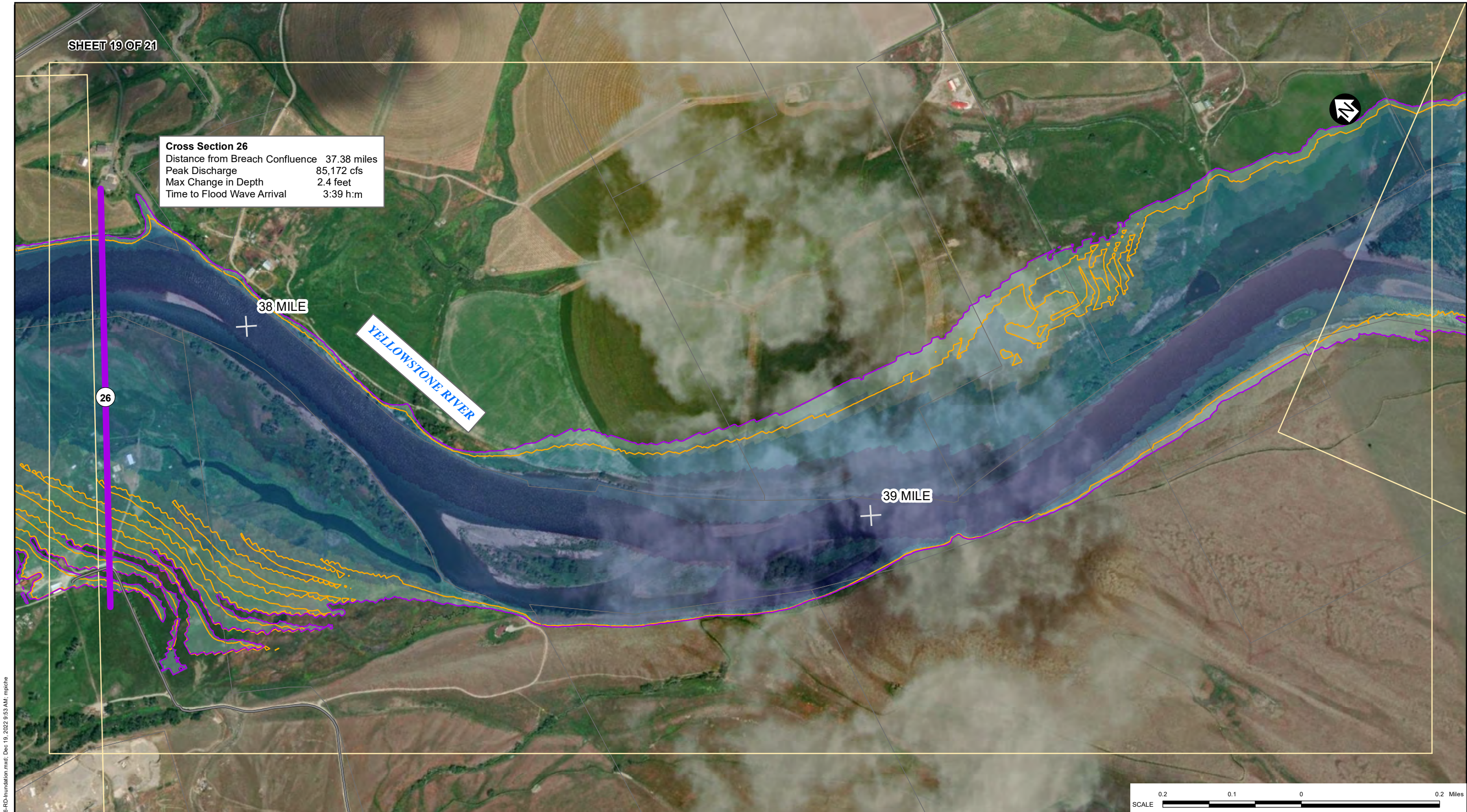
**RAINY DAY BREACH - FLOOD INUNDATION**  
**SHEET 18 OF 21**



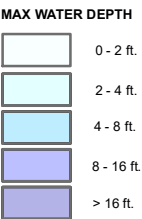
PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C2.18</b>	
REV	A

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- LEGEND:**
- ★ BREACH LOCATION
  - ⬢ NOT-ACTIVE USGS GAGING STATION
  - ▲ ACTIVE USGS GAGING STATIONS
  - ✱ MONTANA BRIDGE
  - ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE
  - PAGE EXTENTS
  - LANDPARCEL BOUNDARY
- FLOOD INUNDATION EXTENTS**
- RAINY DAY BREACH INUNDATION EXTENTS
  - RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)



**DRAFT**

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STILLWATER MINING COMPANY

EAST BOULDER MINE

RAINY DAY BREACH - FLOOD INUNDATION

SHEET 19 OF 21

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NB101-45/57

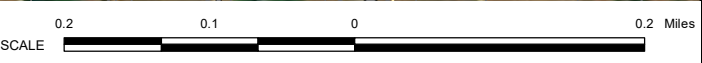
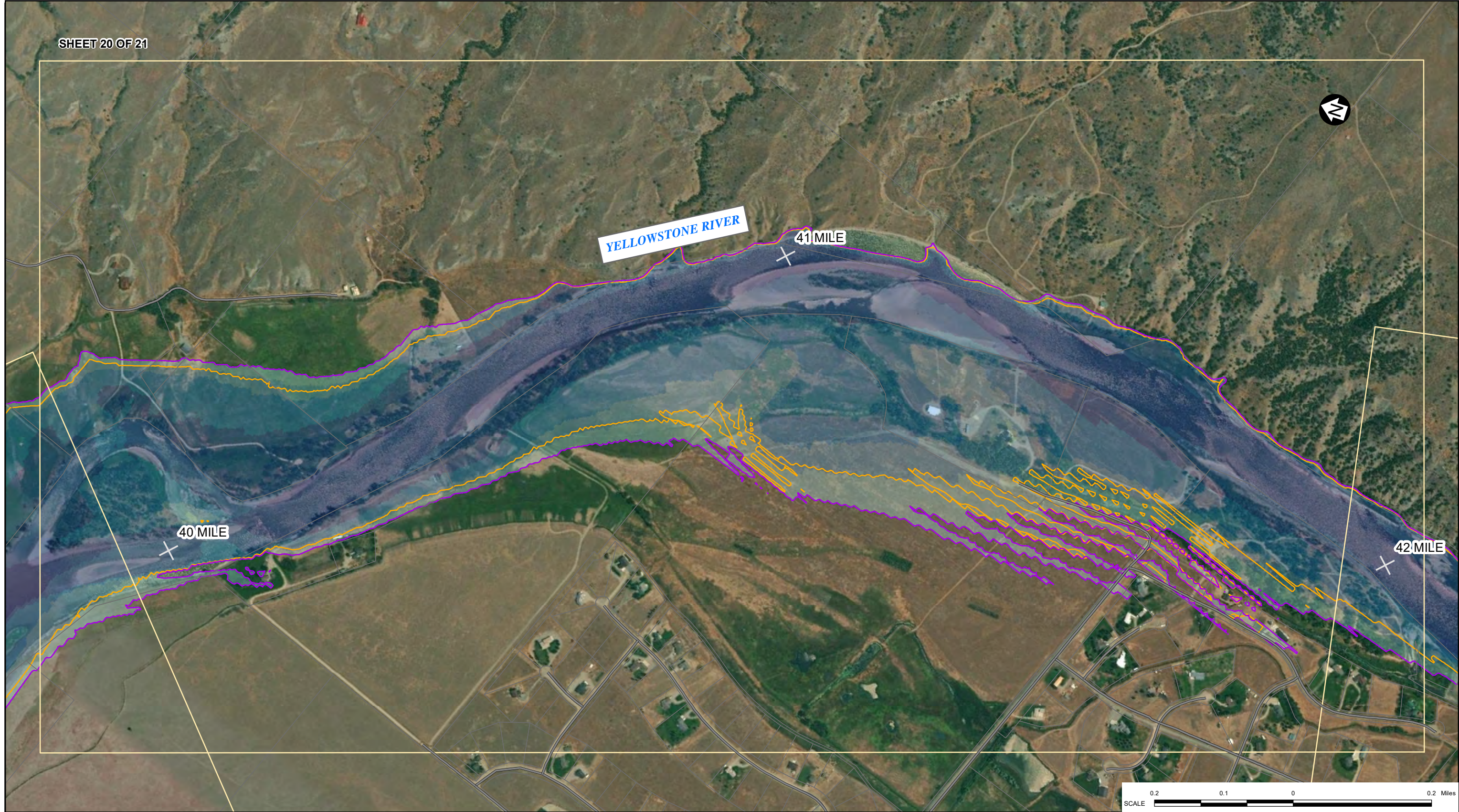
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FIGURE C2.19

REV  
A

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**LEGEND:**

- ★ BREACH LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- RAINY DAY BREACH INUNDATION EXTENTS
- RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

- NOTES:**
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EAST BOULDER MINE

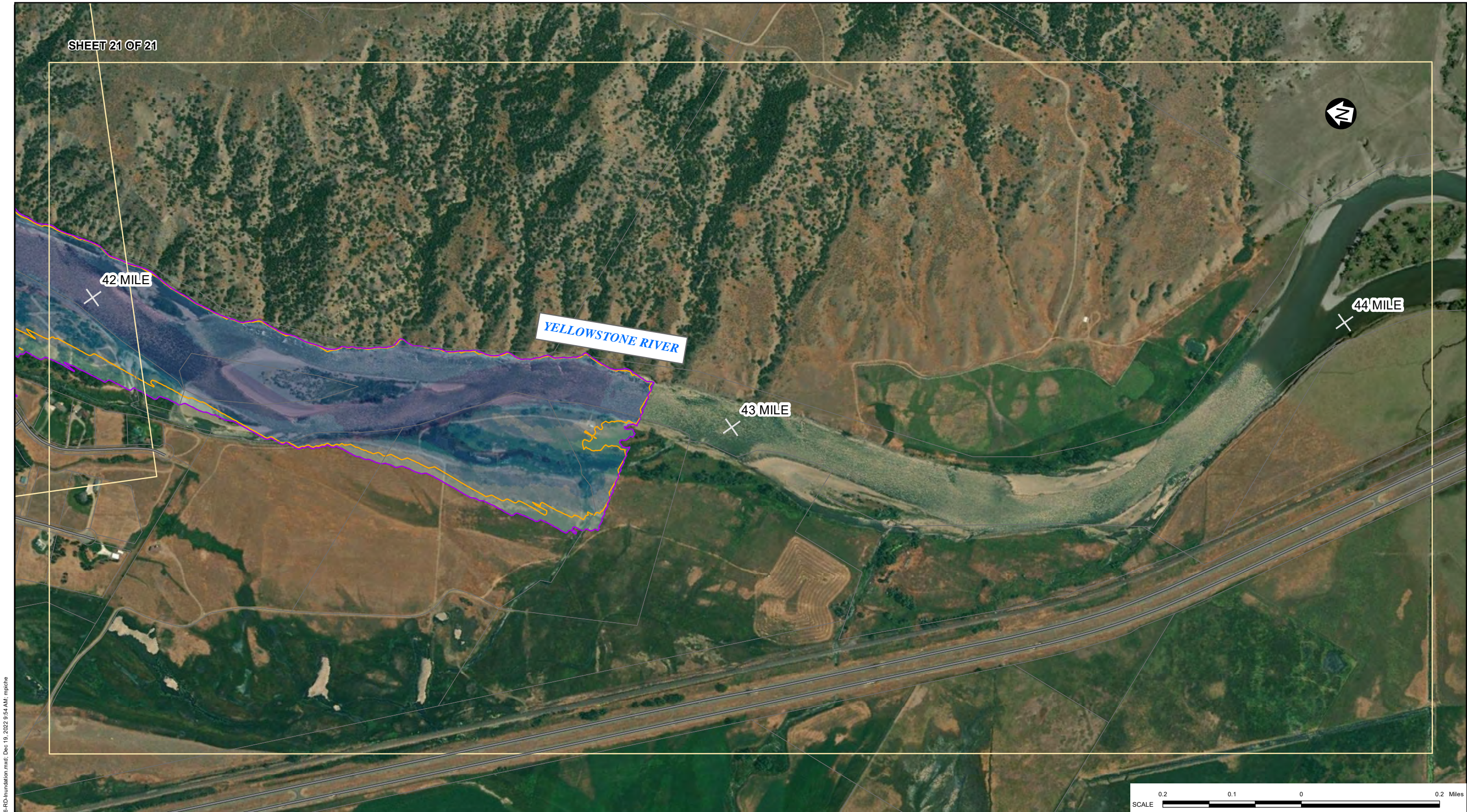
**RAINY DAY BREACH - FLOOD INUNDATION**

**SHEET 20 OF 21**

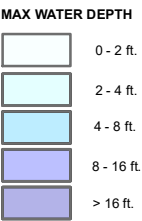
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<b>FIGURE C2.20</b>	
REV	A

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- LEGEND:**
- ★ BREACH LOCATION
  - ⬢ NOT-ACTIVE USGS GAGING STATION
  - ▲ ACTIVE USGS GAGING STATIONS
  - ✱ MONTANA BRIDGE
  - ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE
  - PAGE EXTENTS
  - LANDPARCEL BOUNDARY
- FLOOD INUNDATION EXTENTS**
- RAINY DAY BREACH INUNDATION EXTENTS
  - RAINY DAY INUNDATION EXTENTS (WITHOUT BREACH)



**DRAFT**

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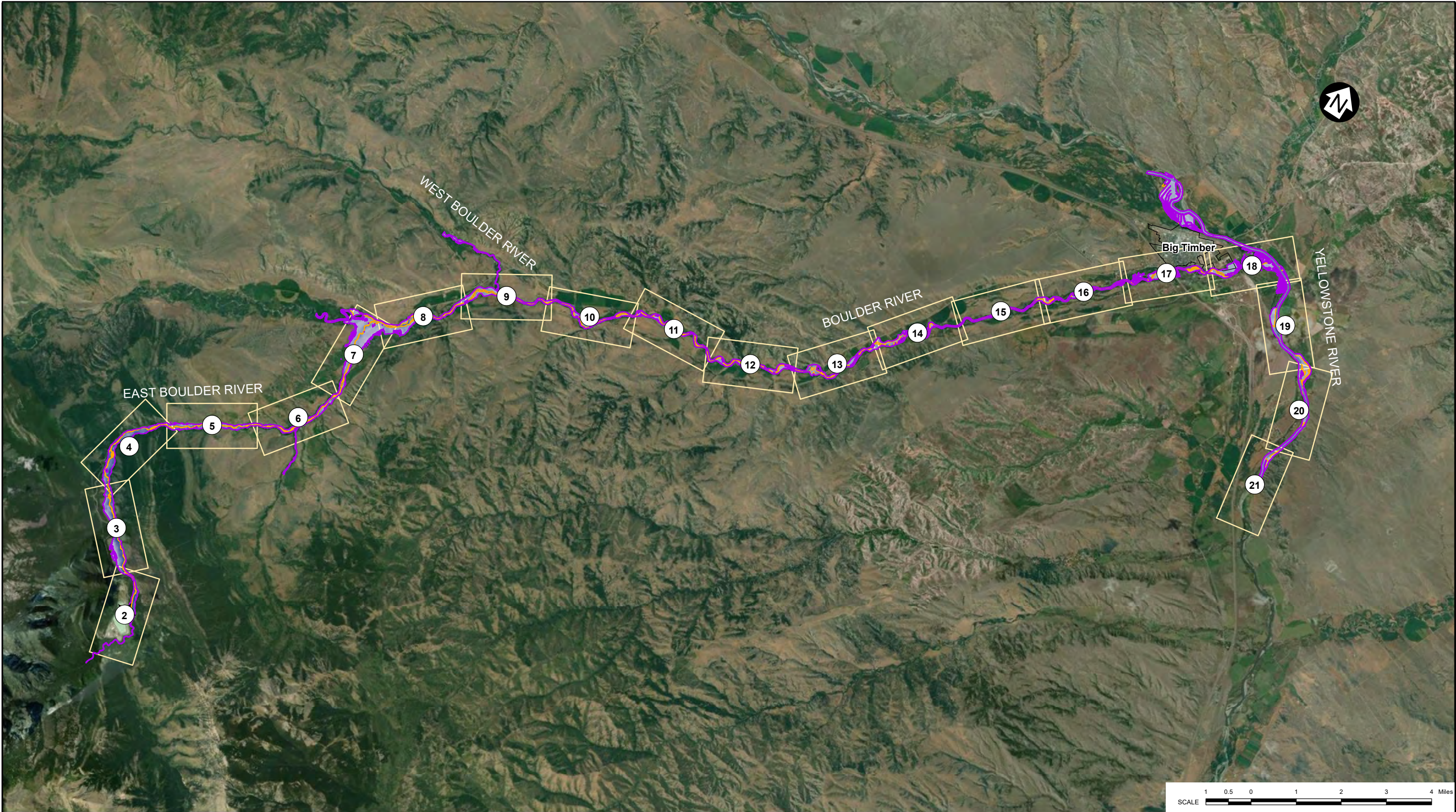
EAST BOULDER MINE

RAINY DAY BREACH - FLOOD INUNDATION  
SHEET 21 OF 21



PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C2.21	REV A





**LEGEND:**

- ★ PROJECT LOCATION
- PAGE EXTENTS
- FLOOD INUNDATION EXTENTS**
- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

HIGH : 15

LOW : 0

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1 0.5 0 1 2 3 4 Miles

SCALE

STILLWATER MINING COMPANY

EAST BOULDER MINE

**SUNNY DAY BREACH - FLOOD INUNDATION**

**SHEET 1 OF 21**

PIA NO.  
NB101-45/57

REF NO.  
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**FIGURE C3.1**

REV  
A





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**LEGEND:**

- ★ PROJECT LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

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STILLWATER MINING COMPANY

EAST BOULDER MINE

SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 2 OF 21

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PIA NO. NB101-45/57	REF NO. NB22-01382
FIGURE C3.2	
REV A	





1

1 MILE

2 MILE

EAST BOULDER RIVER

**Cross Section 1**  
Distance from Breach Confluence 0.9 miles  
Peak Discharge 132,905 cfs  
Max Change in Depth 28.9 feet  
Time to Flood Wave Arrival 0:06 h:m



LEGEND:

- ★ PROJECT LOCATION

○ NOT-ACTIVE USGS GAGING STATION

▲ ACTIVE USGS GAGING STATIONS

\* MONTANA BRIDGE

— ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE

□ PAGE EXTENTS

□ LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

□ SUNNY DAY BREACH INUNDATION EXTENTS

□ SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)
- MAX WATER DEPTH**

□ 0 - 2 ft.

□ 2 - 4 ft.

□ 4 - 8 ft.

□ 8 - 16 ft.

□ > 16 ft.

DRAFT

- NOTES:**
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STILLWATER MINING COMPANY

EAST BOULDER MINE

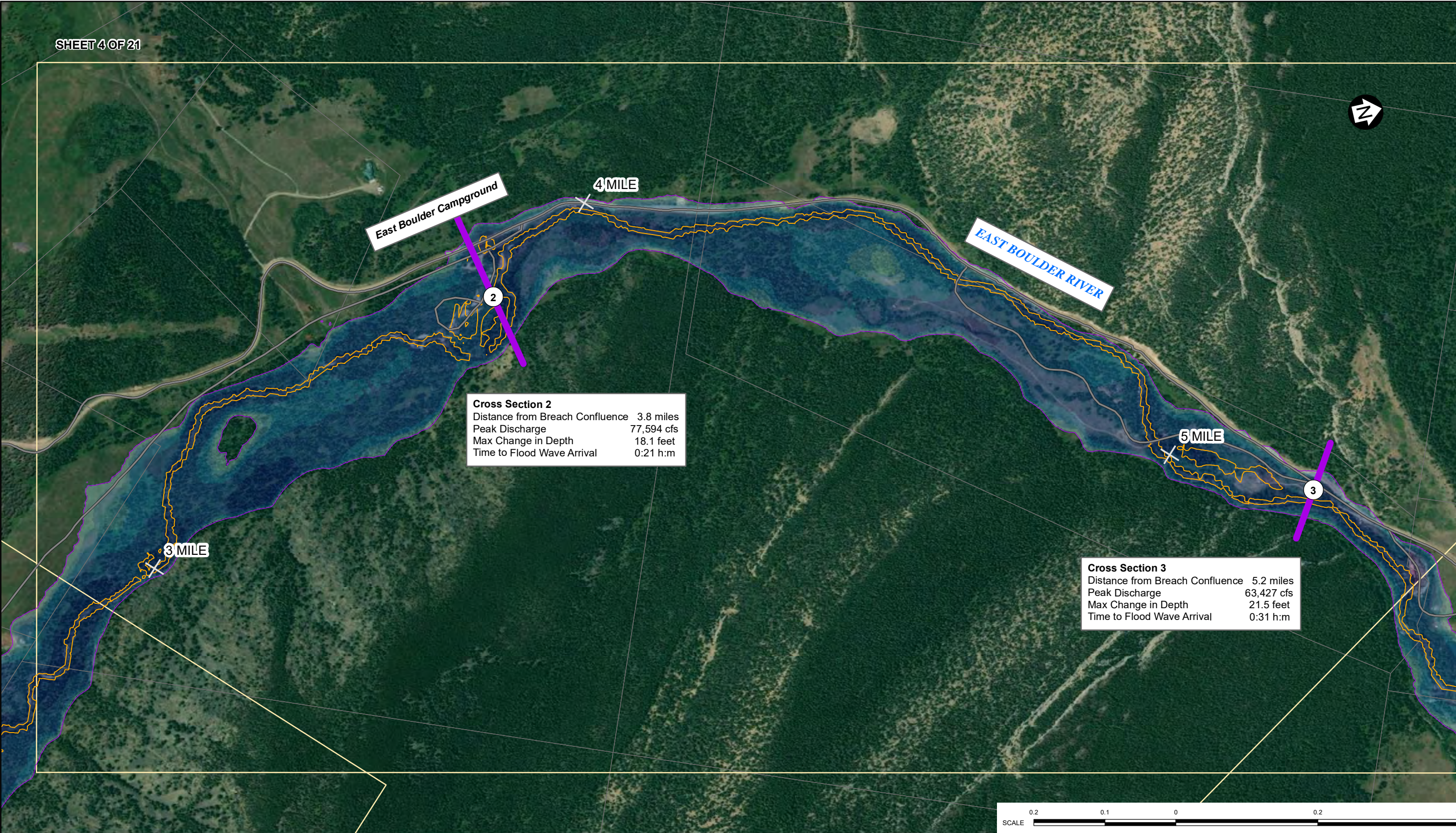
SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 3 OF 21



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NB101-45/57	NB22-01382
FIGURE C3.3	
REV	A

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LEGEND:

- PROJECT LOCATION

NOT-ACTIVE USGS GAGING STATION

ACTIVE USGS GAGING STATIONS

MONTANA BRIDGE

ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

SUNNY DAY BREACH INUNDATION EXTENTS

SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)
- MAX WATER DEPTH**

0 - 2 ft.

2 - 4 ft.

4 - 8 ft.

8 - 16 ft.

> 16 ft.

DRAFT

NOTES:

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STILLWATER MINING COMPANY

EAST BOULDER MINE

SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 4 OF 21

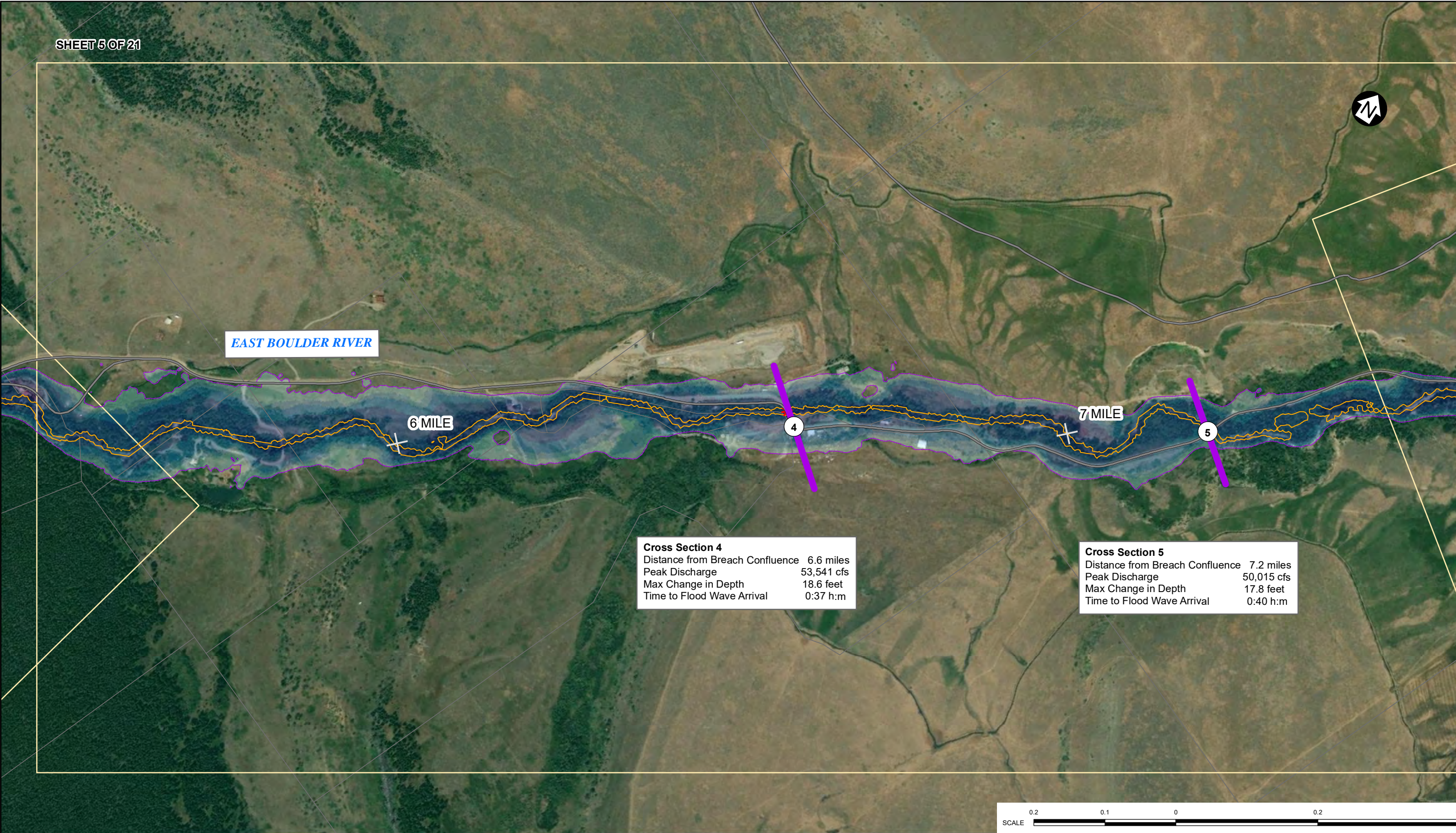


PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C3.4	
REV	A

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EAST BOULDER RIVER

6 MILE

4

7 MILE

5

**Cross Section 4**  
Distance from Breach Confluence 6.6 miles  
Peak Discharge 53,541 cfs  
Max Change in Depth 18.6 feet  
Time to Flood Wave Arrival 0:37 h:m

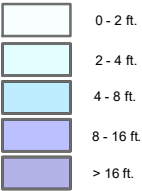
**Cross Section 5**  
Distance from Breach Confluence 7.2 miles  
Peak Discharge 50,015 cfs  
Max Change in Depth 17.8 feet  
Time to Flood Wave Arrival 0:40 h:m



LEGEND:

- ★ PROJECT LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY
- FLOOD INUNDATION EXTENTS**
- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

MAX WATER DEPTH



DRAFT

NOTES:

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EAST BOULDER MINE

SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 5 OF 21

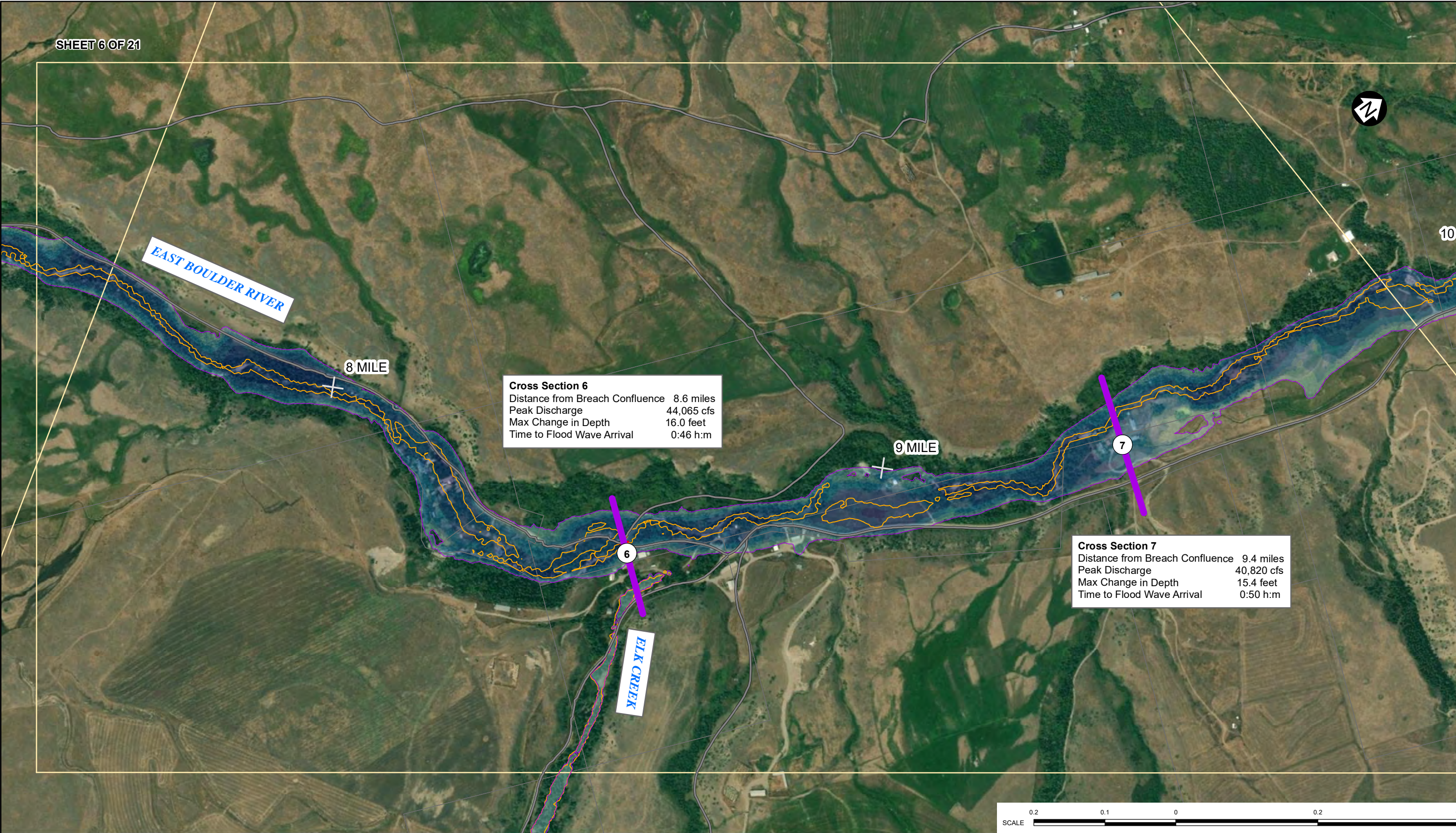


PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C3.5	REV A

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REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED





**Cross Section 6**  
Distance from Breach Confluence 8.6 miles  
Peak Discharge 44,065 cfs  
Max Change in Depth 16.0 feet  
Time to Flood Wave Arrival 0:46 h:m

**Cross Section 7**  
Distance from Breach Confluence 9.4 miles  
Peak Discharge 40,820 cfs  
Max Change in Depth 15.4 feet  
Time to Flood Wave Arrival 0:50 h:m

**LEGEND:**

- ★ PROJECT LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS
- ▭ LEWIS GULCH IMPOUNDMENT OUTLINE
- ▭ PAGE EXTENTS
- ▭ LANDPARCEL BOUNDARY
- FLOOD INUNDATION EXTENTS**
- ▭ SUNNY DAY BREACH INUNDATION EXTENTS
- ▭ SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

**DRAFT**

**NOTES:**

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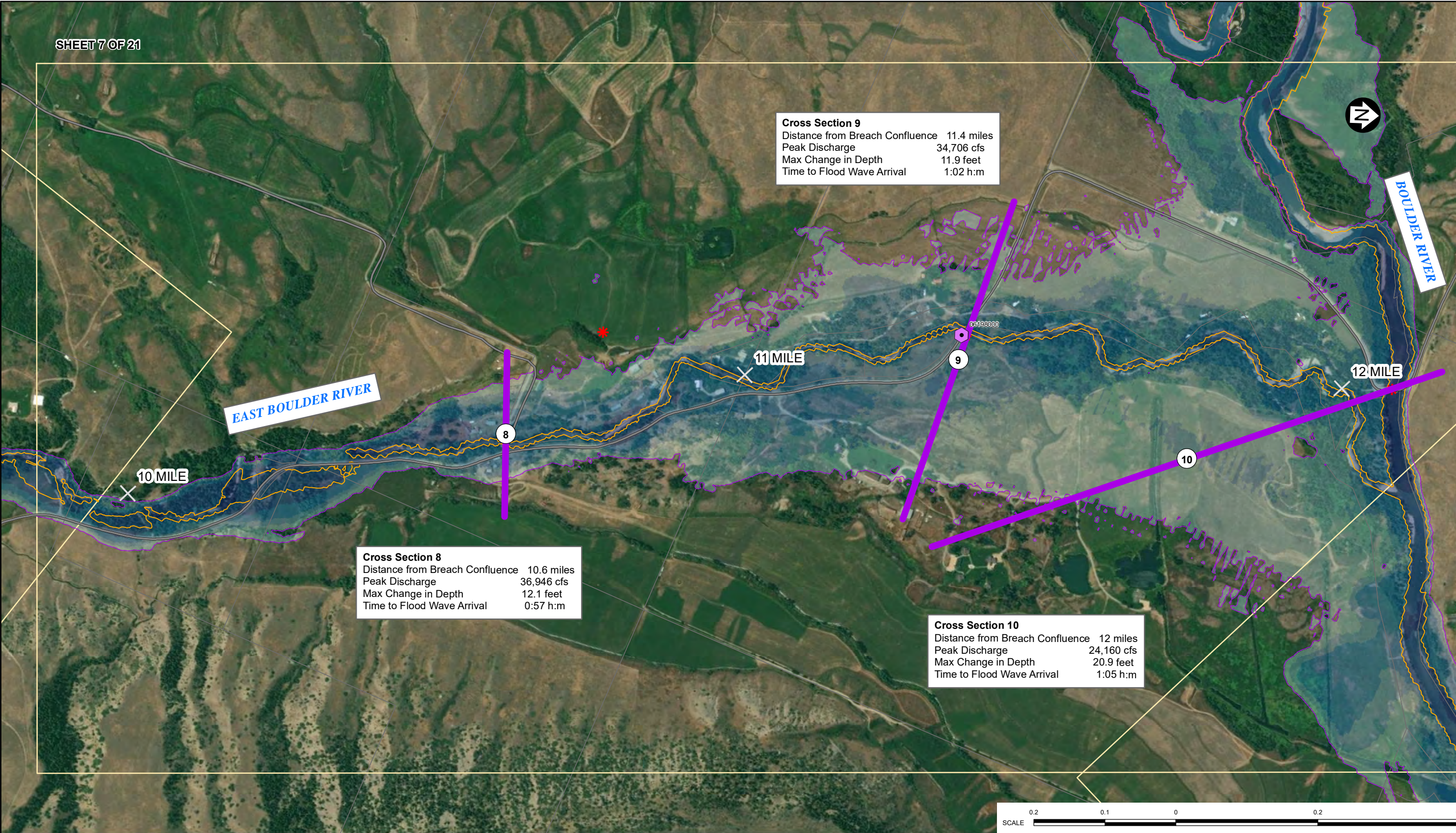
EAST BOULDER MINE

**SUNNY DAY BREACH - FLOOD INUNDATION**  
**SHEET 6 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C3.6</b>	REV A





**Cross Section 9**  
Distance from Breach Confluence 11.4 miles  
Peak Discharge 34,706 cfs  
Max Change in Depth 11.9 feet  
Time to Flood Wave Arrival 1:02 h:m

**Cross Section 8**  
Distance from Breach Confluence 10.6 miles  
Peak Discharge 36,946 cfs  
Max Change in Depth 12.1 feet  
Time to Flood Wave Arrival 0:57 h:m

**Cross Section 10**  
Distance from Breach Confluence 12 miles  
Peak Discharge 24,160 cfs  
Max Change in Depth 20.9 feet  
Time to Flood Wave Arrival 1:05 h:m

**LEGEND:**

- ★ PROJECT LOCATION
- NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY
- FLOOD INUNDATION EXTENTS**
- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

**DRAFT**

**NOTES:**

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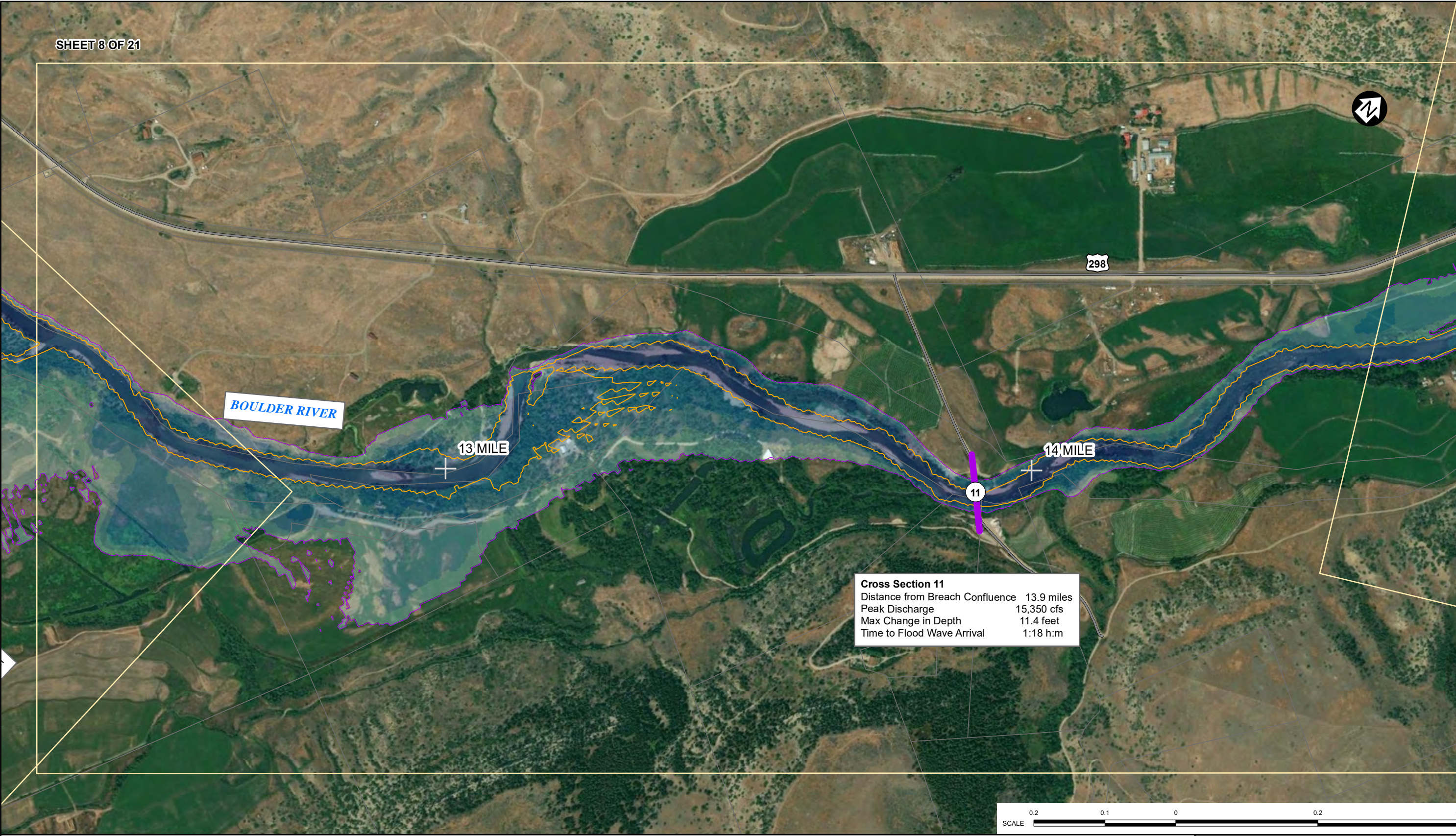
EAST BOULDER MINE

**SUNNY DAY BREACH - FLOOD INUNDATION**  
**SHEET 7 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C3.7</b>	
REV	A





**Cross Section 11**  
Distance from Breach Confluence 13.9 miles  
Peak Discharge 15,350 cfs  
Max Change in Depth 11.4 feet  
Time to Flood Wave Arrival 1:18 h:m



**LEGEND:**

- ★ PROJECT LOCATION

○ NOT-ACTIVE USGS GAGING STATION

▲ ACTIVE USGS GAGING STATIONS

✱ MONTANA BRIDGE

— ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE

□ PAGE EXTENTS

□ LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

□ SUNNY DAY BREACH INUNDATION EXTENTS

□ SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)
- MAX WATER DEPTH**

□ 0 - 2 ft.

□ 2 - 4 ft.

□ 4 - 8 ft.

□ 8 - 16 ft.

□ > 16 ft.

**DRAFT**

- NOTES:**
1. COORDINATE SYSTEM: NAD 1983 STATEPLANEMONTANA FIPS 2500 FEET INTL.
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EAST BOULDER MINE

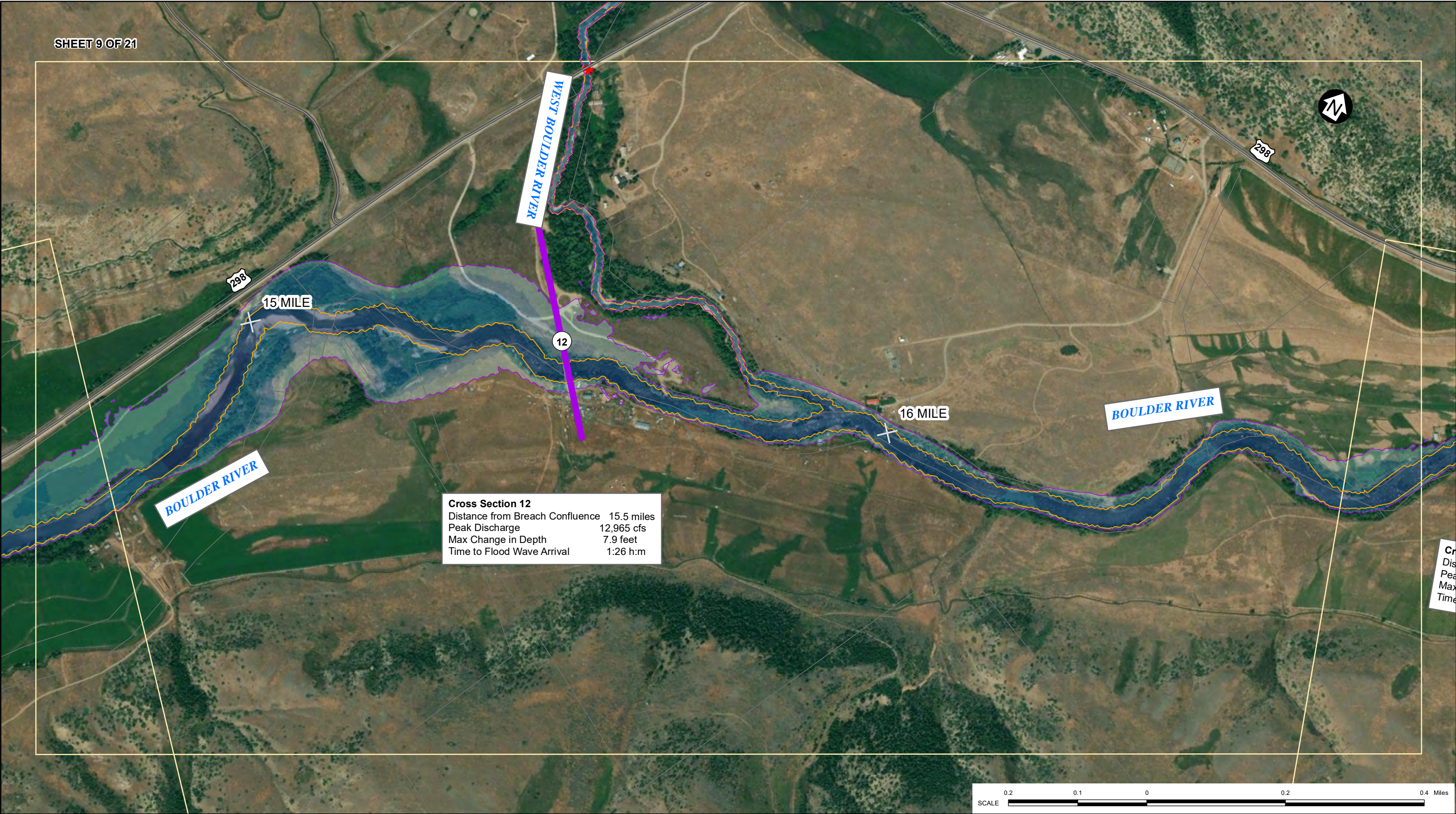
**SUNNY DAY BREACH - FLOOD INUNDATION**  
**SHEET 8 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C3.8</b>	
REV	A

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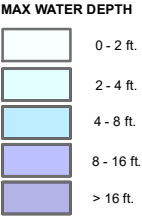


**Cross Section 12**  
Distance from Breach Confluence 15.5 miles  
Peak Discharge 12,965 cfs  
Max Change in Depth 7.9 feet  
Time to Flood Wave Arrival 1:26 h:m

Cross Section 12  
Distance from Breach Confluence  
Peak Discharge  
Max Change in Depth  
Time to Flood Wave Arrival



- LEGEND:**
- ★ PROJECT LOCATION
  - NOT-ACTIVE USGS GAGING STATION
  - ▲ ACTIVE USGS GAGING STATIONS
  - ★ MONTANA BRIDGE
  - ROADS
  - LEWIS GULCH IMPOUNDMENT OUTLINE
  - PAGE EXTENTS
  - LANDPARCEL BOUNDARY
  - FLOOD INUNDATION EXTENTS**
  - SUNNY DAY BREACH INUNDATION EXTENTS
  - SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)



**DRAFT**

- NOTES:**
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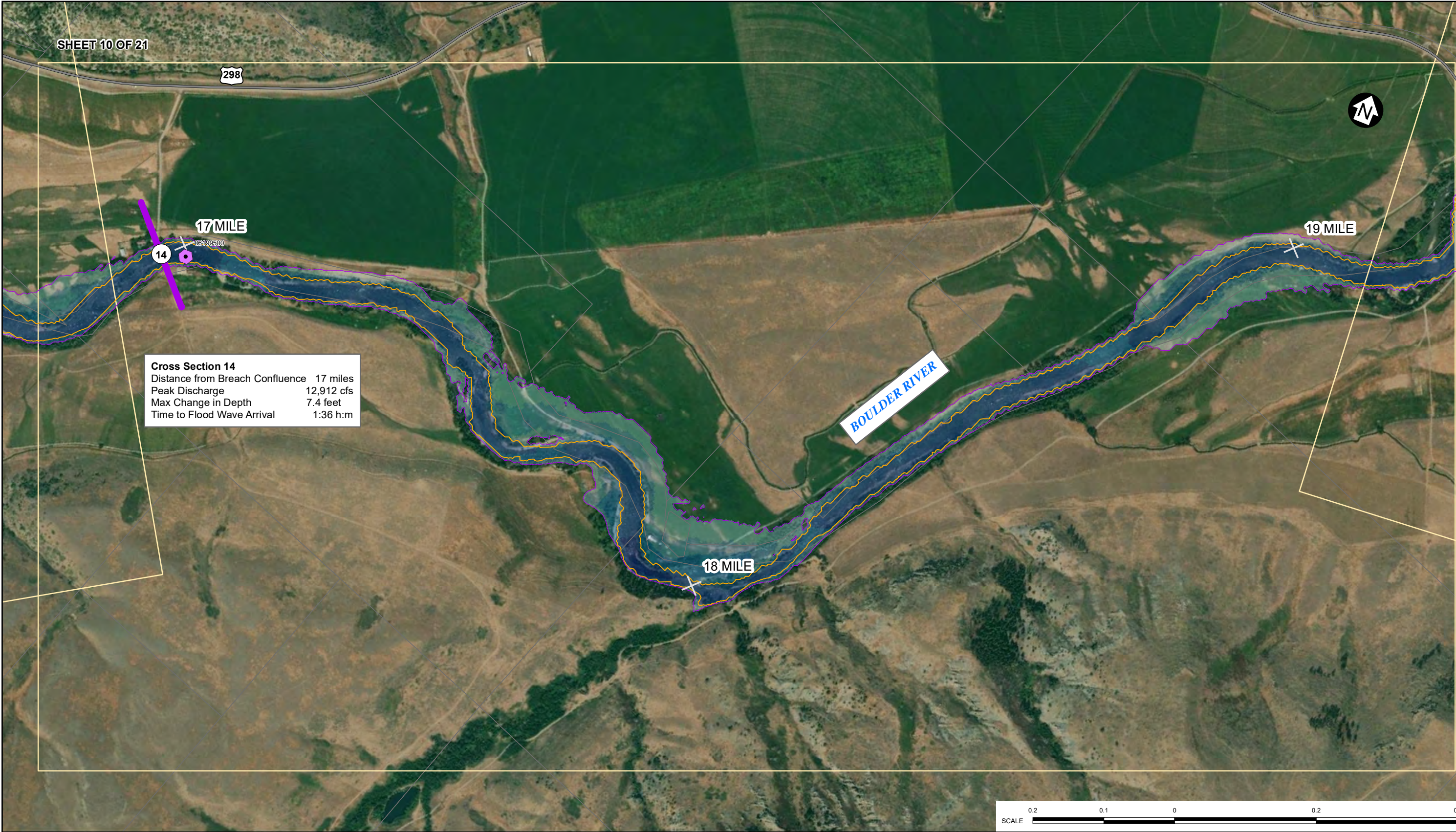
EAST BOULDER MINE

**SUNNY DAY BREACH - FLOOD INUNDATION**  
**SHEET 9 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C3.9</b>	
REV	A





**LEGEND:**

★ PROJECT LOCATION

○ NOT-ACTIVE USGS GAGING STATION

▲ ACTIVE USGS GAGING STATIONS

✱ MONTANA BRIDGE

— ROADS

□ LEWIS GULCH IMPOUNDMENT OUTLINE

□ PAGE EXTENTS

□ LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

□ SUNNY DAY BREACH INUNDATION EXTENTS

□ SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

□ 0 - 2 ft.

□ 2 - 4 ft.

□ 4 - 8 ft.

□ 8 - 16 ft.

□ > 16 ft.

DRAFT

- NOTES:**
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EAST BOULDER MINE

SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 10 OF 21



PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C3.10	REV A





**Cross Section 15**  
Distance from Breach Confluence 19.4 miles  
Peak Discharge 12,562 cfs  
Max Change in Depth 5.9 feet  
Time to Flood Wave Arrival 2:02 h:m

20 MILE

21 MILE

BOULDER RIVER

15

298



LEGEND:

- ★ PROJECT LOCATION

○ NOT-ACTIVE USGS GAGING STATION

▲ ACTIVE USGS GAGING STATIONS

\* MONTANA BRIDGE

— ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE

□ PAGE EXTENTS

□ LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

□ SUNNY DAY BREACH INUNDATION EXTENTS

□ SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)
- MAX WATER DEPTH**

□ 0 - 2 ft.

□ 2 - 4 ft.

□ 4 - 8 ft.

□ 8 - 16 ft.

□ > 16 ft.

DRAFT

- NOTES:**
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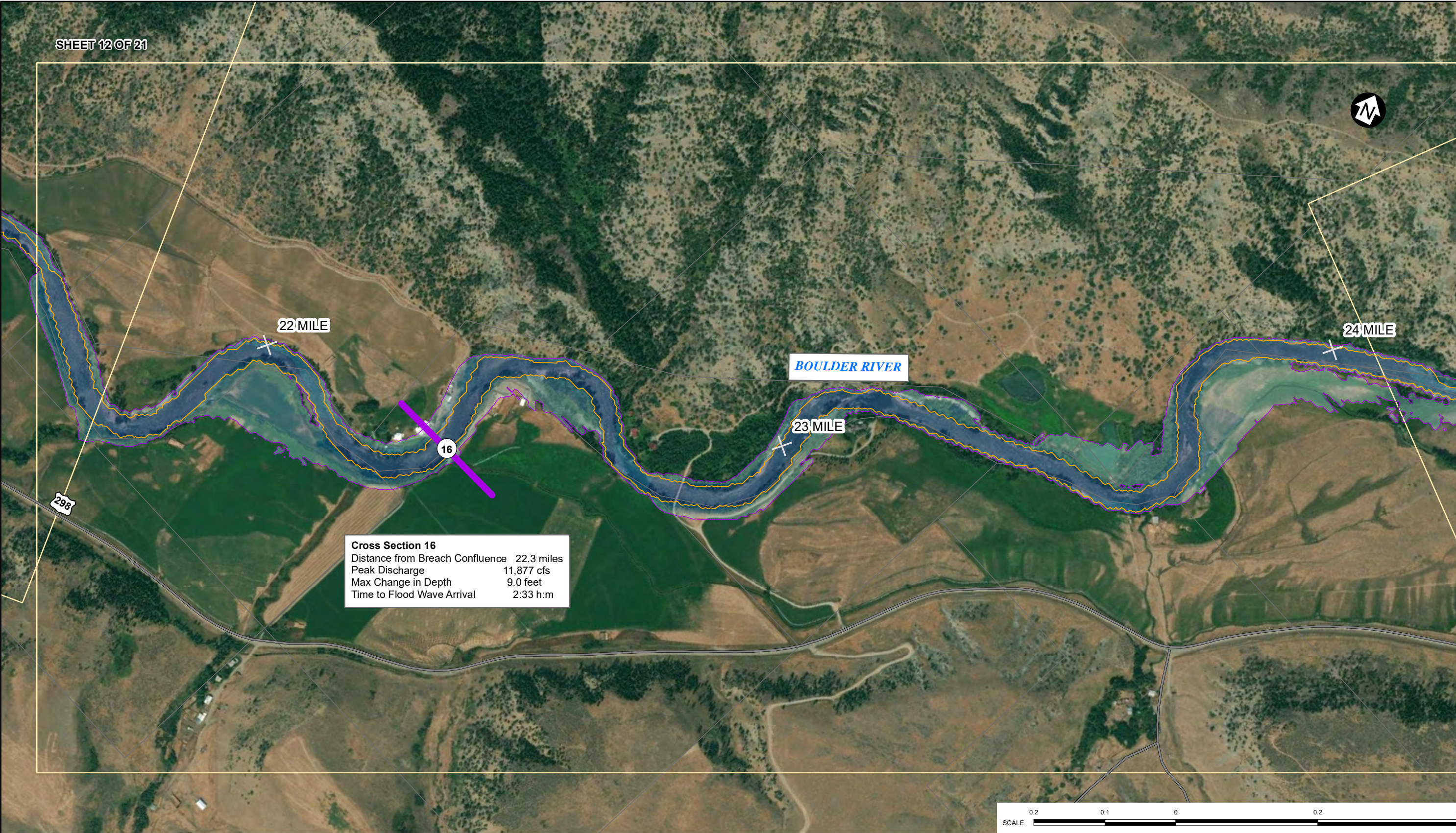
EAST BOULDER MINE

SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 11 OF 21



PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C3.11	
REV	A





**Cross Section 16**  
Distance from Breach Confluence 22.3 miles  
Peak Discharge 11,877 cfs  
Max Change in Depth 9.0 feet  
Time to Flood Wave Arrival 2:33 h:m

BOULDER RIVER

22 MILE

23 MILE

24 MILE

298



**LEGEND:**

- ★ PROJECT LOCATION
- NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

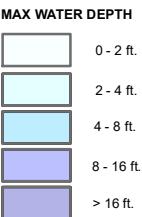
LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)



DRAFT

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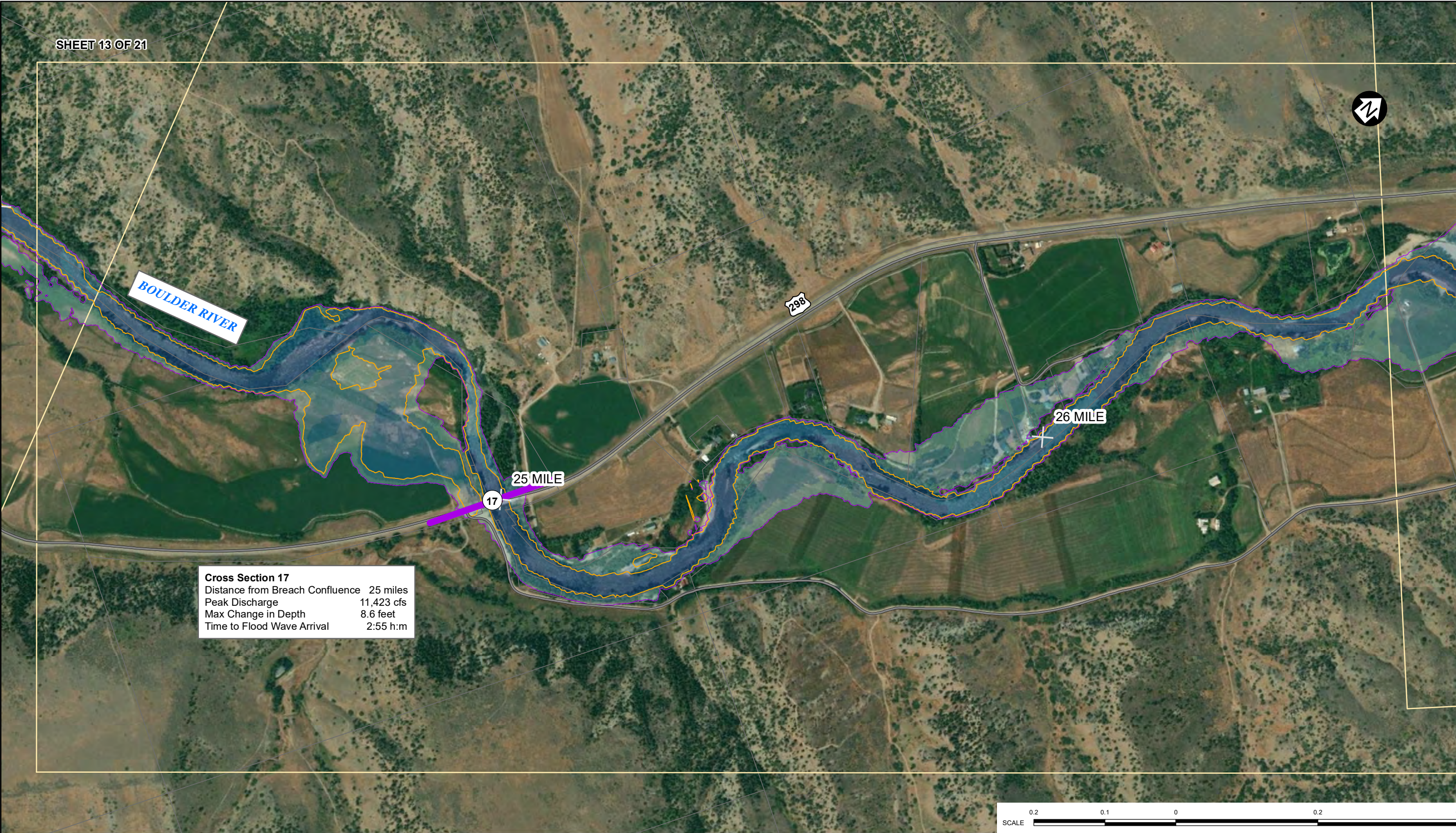
EAST BOULDER MINE

SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 12 OF 21



PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C3.12	
REV	A





**Cross Section 17**  
Distance from Breach Confluence 25 miles  
Peak Discharge 11,423 cfs  
Max Change in Depth 8.6 feet  
Time to Flood Wave Arrival 2:55 h:m

**LEGEND:**

- ★ PROJECT LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

DRAFT

- NOTES:**
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REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED

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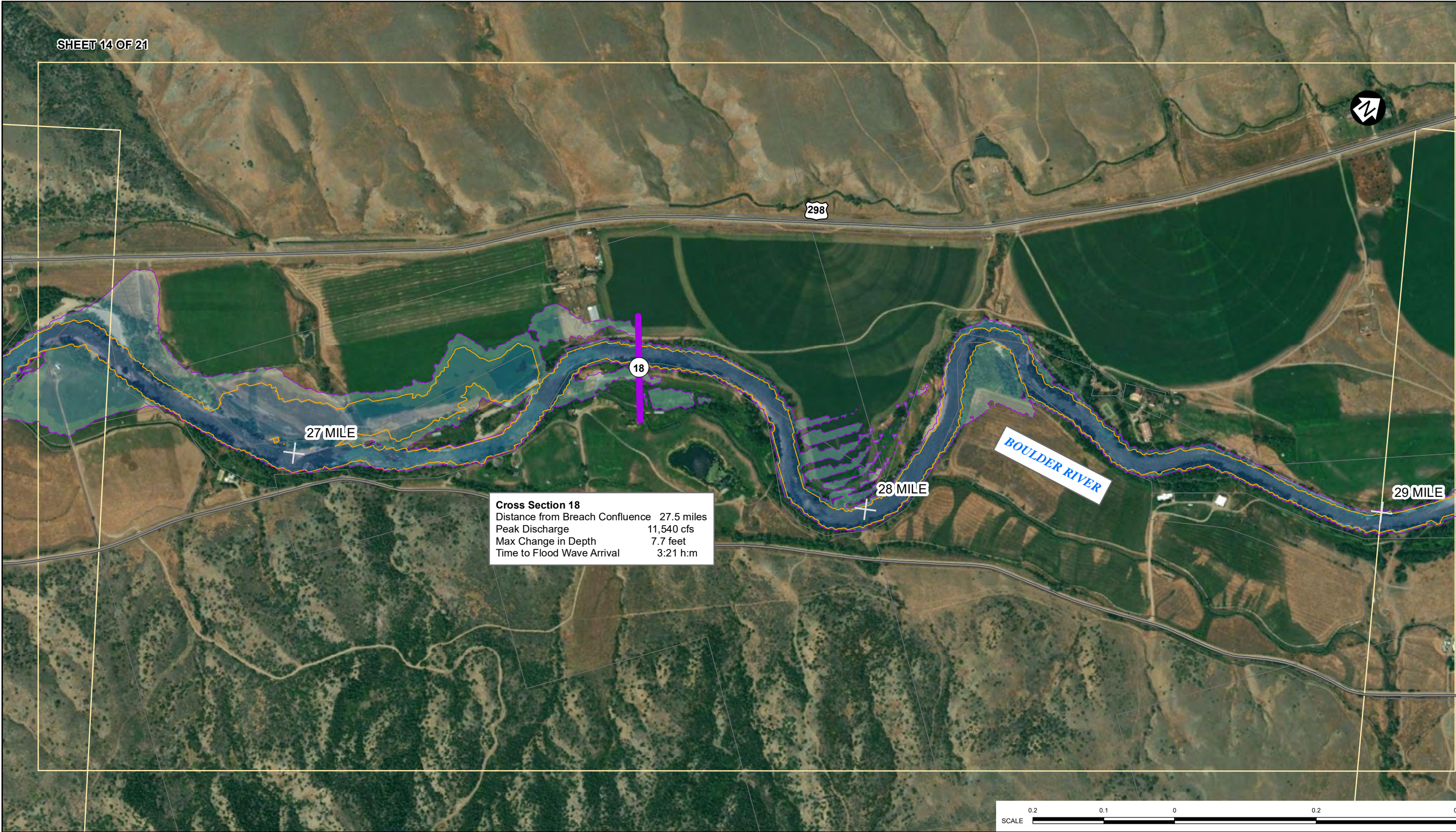
EAST BOULDER MINE

SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 13 OF 21



PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C3.13	REV A



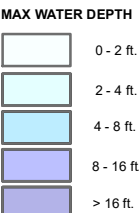


**Cross Section 18**  
Distance from Breach Confluence 27.5 miles  
Peak Discharge 11,540 cfs  
Max Change in Depth 7.7 feet  
Time to Flood Wave Arrival 3:21 h:m



**LEGEND:**

- ★ PROJECT LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY
- FLOOD INUNDATION EXTENTS**
- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)



**DRAFT**

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EAST BOULDER MINE

SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 14 OF 21

PIA NO.  
NB101-45/57

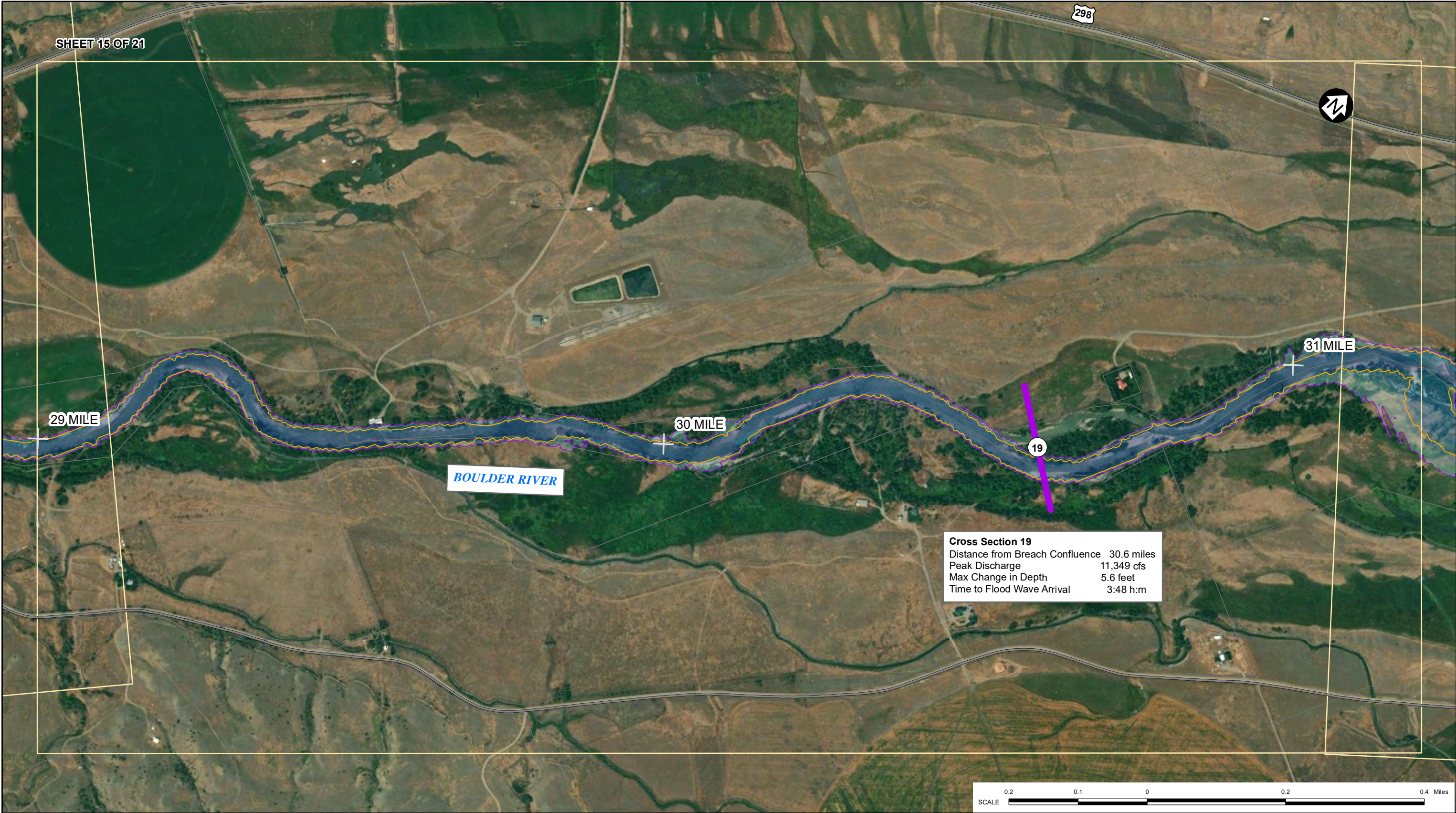
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FIGURE C3.14

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A

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**Cross Section 19**  
Distance from Breach Confluence 30.6 miles  
Peak Discharge 11,349 cfs  
Max Change in Depth 5.6 feet  
Time to Flood Wave Arrival 3:48 h:m



**LEGEND:**

- ★ PROJECT LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

DRAFT

- NOTES:**
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EAST BOULDER MINE

**SUNNY DAY BREACH - FLOOD INUNDATION**

**SHEET 15 OF 21**

PIA NO.  
NB101-45/57

REF NO.  
NB22-01382

**FIGURE C3.15**

REV  
A

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**Cross Section 20**  
Distance from Breach Confluence 32.3 miles  
Peak Discharge 11,249 cfs  
Max Change in Depth 6.8 feet  
Time to Flood Wave Arrival 4:08 h:m



**LEGEND:**

- ★ PROJECT LOCATION

⬢ NOT-ACTIVE USGS GAGING STATION

▲ ACTIVE USGS GAGING STATIONS

✱ MONTANA BRIDGE

— ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

SUNNY DAY BREACH INUNDATION EXTENTS

SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)
- MAX WATER DEPTH**

0 - 2 ft.

2 - 4 ft.

4 - 8 ft.

8 - 16 ft.

> 16 ft.

**DRAFT**

- NOTES:**
1. COORDINATE SYSTEM: NAD 1983 STATEPLANEMONTANA FIPS 2500 FEET INTL.
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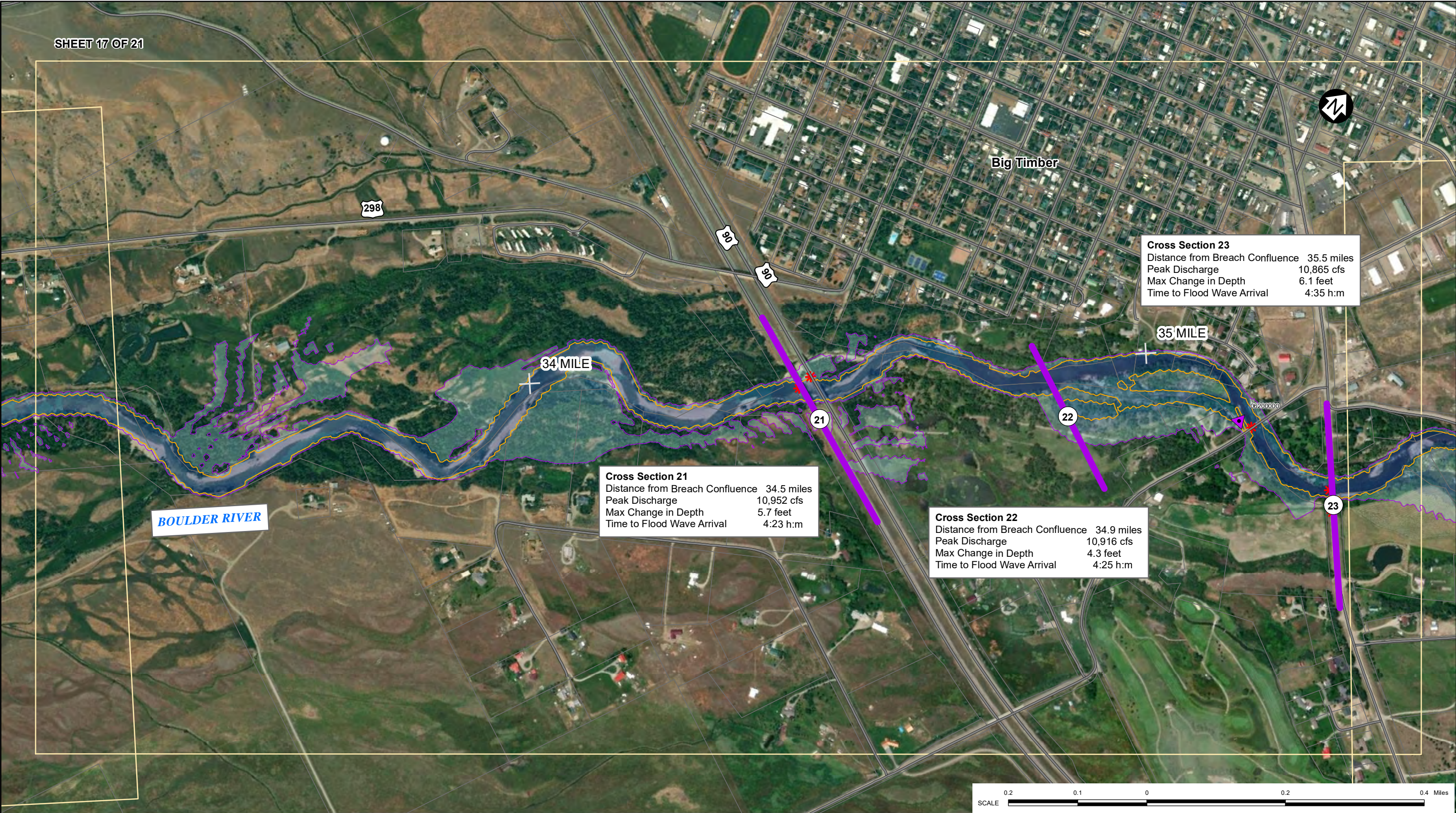
EAST BOULDER MINE

**SUNNY DAY BREACH - FLOOD INUNDATION**  
**SHEET 16 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C3.16</b>	
REV	A





**Cross Section 21**  
Distance from Breach Confluence 34.5 miles  
Peak Discharge 10,952 cfs  
Max Change in Depth 5.7 feet  
Time to Flood Wave Arrival 4:23 h:m

**Cross Section 22**  
Distance from Breach Confluence 34.9 miles  
Peak Discharge 10,916 cfs  
Max Change in Depth 4.3 feet  
Time to Flood Wave Arrival 4:25 h:m

**Cross Section 23**  
Distance from Breach Confluence 35.5 miles  
Peak Discharge 10,865 cfs  
Max Change in Depth 6.1 feet  
Time to Flood Wave Arrival 4:35 h:m

**LEGEND:**

- ★ PROJECT LOCATION
- NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

**DRAFT**

- NOTES:**
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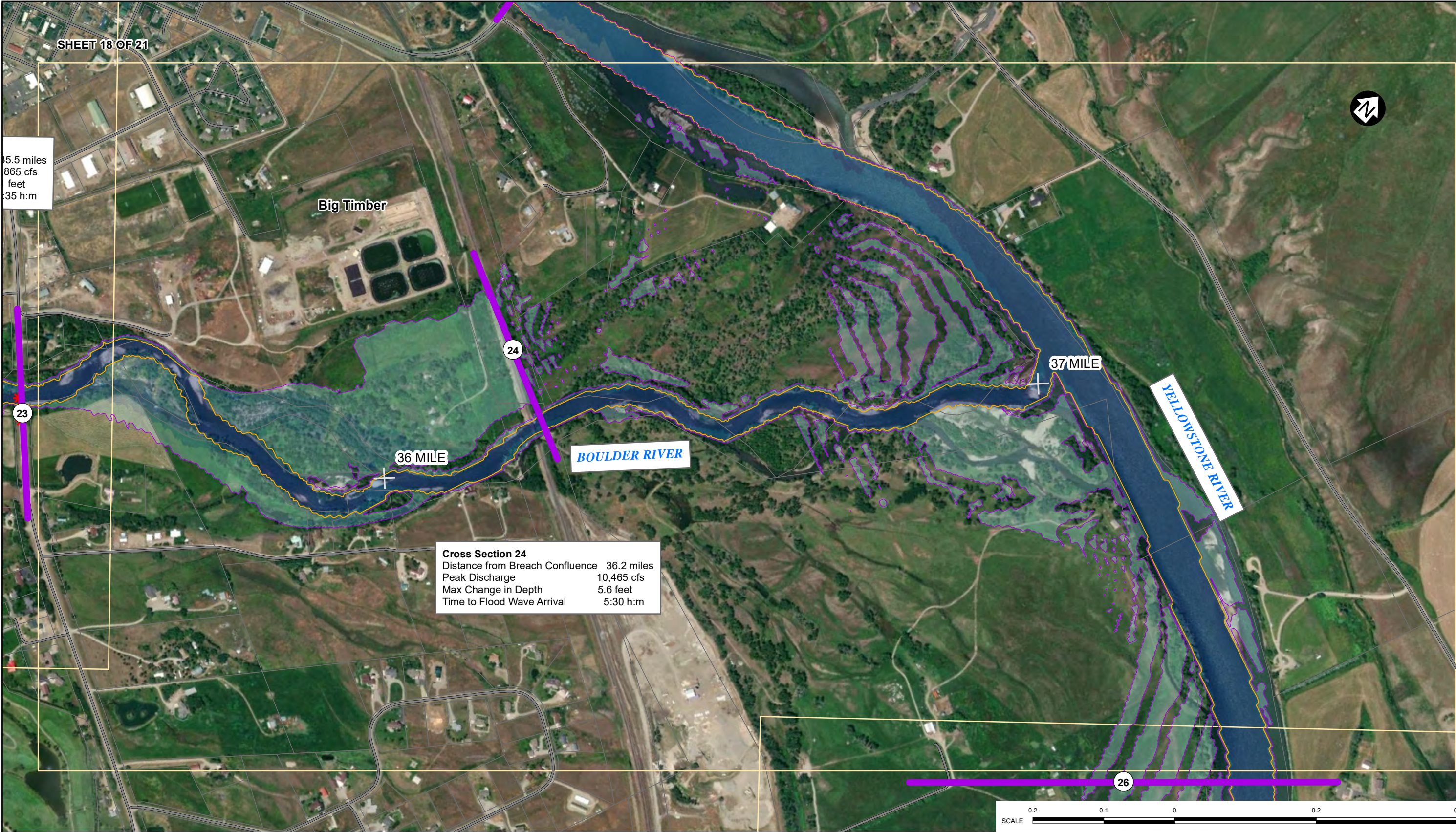
EAST BOULDER MINE

**SUNNY DAY BREACH - FLOOD INUNDATION**  
**SHEET 17 OF 21**



PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C3.17</b>	REV A





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**LEGEND:**

- ★ PROJECT LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

	0 - 2 ft.
	2 - 4 ft.
	4 - 8 ft.
	8 - 16 ft.
	> 16 ft.

DRAFT

- NOTES:**
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EAST BOULDER MINE

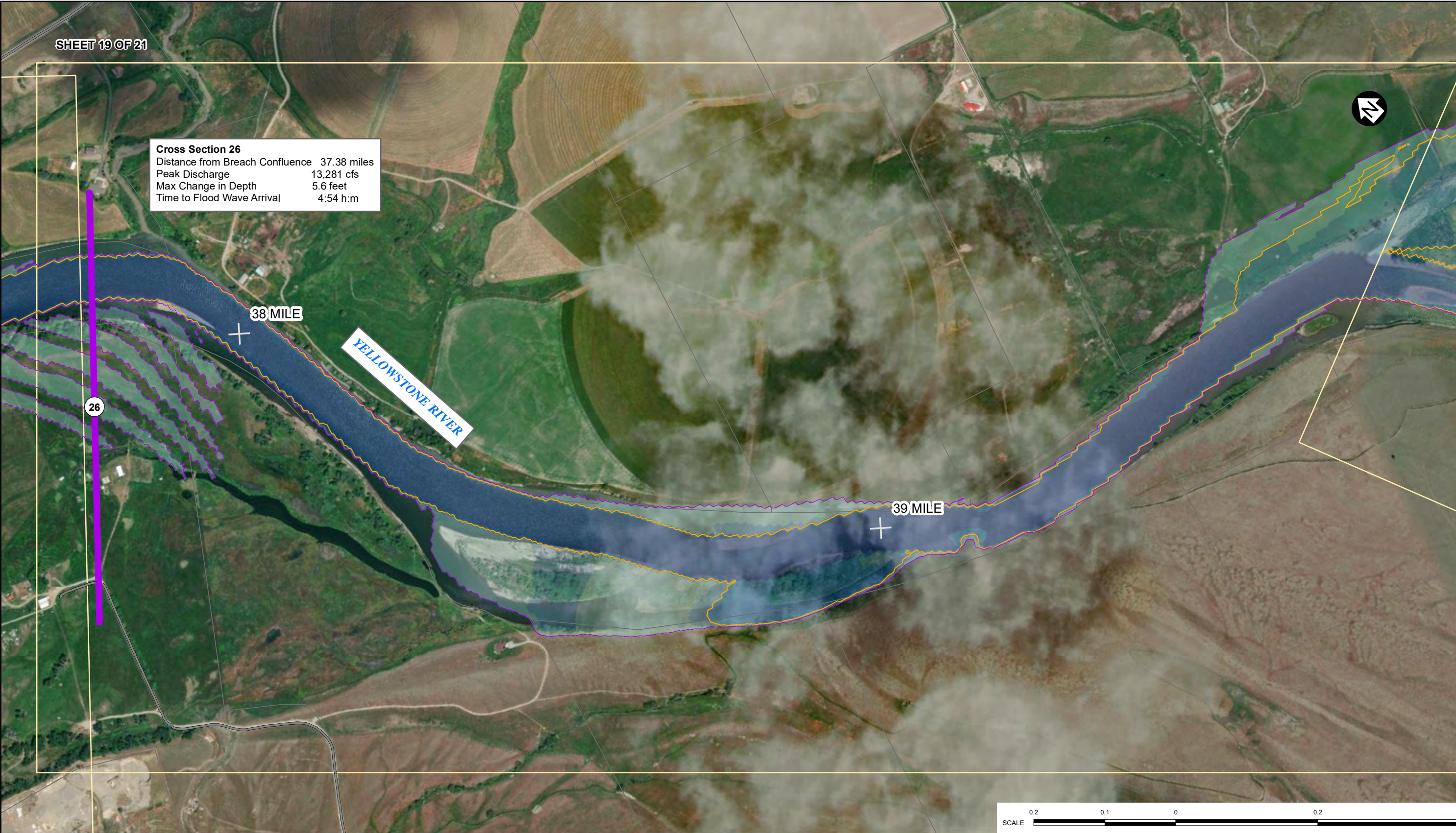
SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 18 OF 21

Knight Piésold  
CONSULTING

PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C3.18	
REV	A



**Cross Section 26**  
Distance from Breach Confluence 37.38 miles  
Peak Discharge 13,281 cfs  
Max Change in Depth 5.6 feet  
Time to Flood Wave Arrival 4:54 h:m



LEGEND:

- ★ PROJECT LOCATION

○ NOT-ACTIVE USGS GAGING STATION

▲ ACTIVE USGS GAGING STATIONS

✱ MONTANA BRIDGE

— ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE

□ PAGE EXTENTS

□ LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

□ SUNNY DAY BREACH INUNDATION EXTENTS

□ SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)
- MAX WATER DEPTH**

□ 0 - 2 ft.

□ 2 - 4 ft.

□ 4 - 8 ft.

□ 8 - 16 ft.

□ > 16 ft.

DRAFT

- NOTES:**
1. COORDINATE SYSTEM: NAD 1983 STATEPLANEMONTANA FIPS 2500 FEET INTL.
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3. BASEMAP DATA SOURCED FROM MONTANA STATE LIBRARY (GEOGRAPHIC INFORMATION SERVICE).

STILLWATER MINING COMPANY

EAST BOULDER MINE

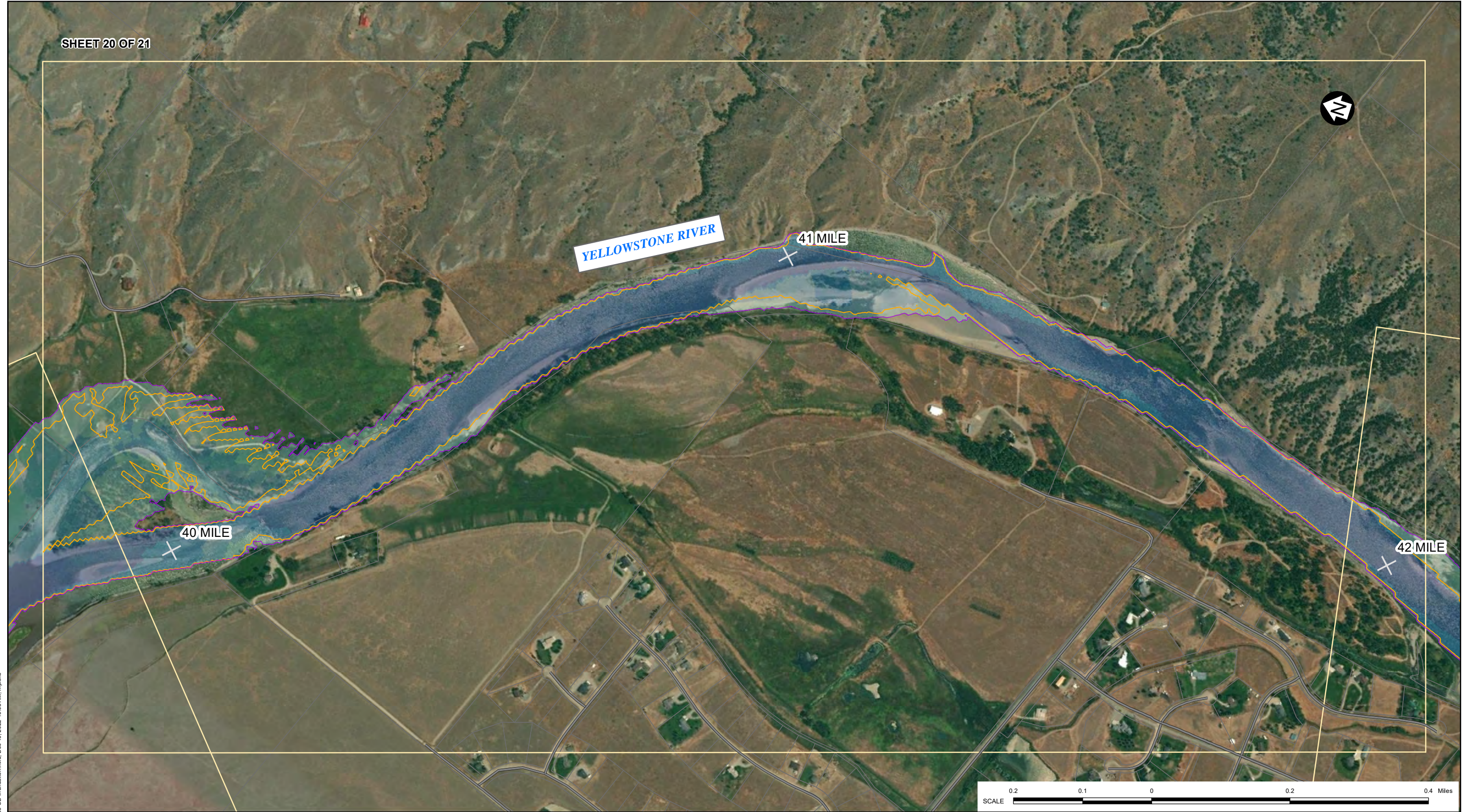
SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 19 OF 21



PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C3.19	
REV	A

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**LEGEND:**

- ★ PROJECT LOCATION
- ⬢ NOT-ACTIVE USGS GAGING STATION
- ▲ ACTIVE USGS GAGING STATIONS
- ✱ MONTANA BRIDGE
- ROADS

- LEWIS GULCH IMPOUNDMENT OUTLINE
- PAGE EXTENTS
- LANDPARCEL BOUNDARY

**FLOOD INUNDATION EXTENTS**

- SUNNY DAY BREACH INUNDATION EXTENTS
- SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)

**MAX WATER DEPTH**

- 0 - 2 ft.
- 2 - 4 ft.
- 4 - 8 ft.
- 8 - 16 ft.
- > 16 ft.

DRAFT


- NOTES:**
- COORDINATE SYSTEM: NAD 1983 STATEPLANEMONTANA FIPS 2500 FEET INTL.
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STILLWATER MINING COMPANY

EAST BOULDER MINE

**SUNNY DAY BREACH - FLOOD INUNDATION**

**SHEET 20 OF 21**



**Knight Piésold**  
CONSULTING

PIA NO.	REF NO.
NB101-45/57	NB22-01382
<b>FIGURE C3.20</b>	
REV	A

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LEGEND:

- PROJECT LOCATION

NOT-ACTIVE USGS GAGING STATION

ACTIVE USGS GAGING STATIONS

MONTANA BRIDGE

ROADS
- LEWIS GULCH IMPOUNDMENT OUTLINE

PAGE EXTENTS

LANDPARCEL BOUNDARY

FLOOD INUNDATION EXTENTS

SUNNY DAY BREACH INUNDATION EXTENTS

SUNNY DAY INUNDATION EXTENTS (WITHOUT BREACH)
- MAX WATER DEPTH

0 - 2 ft.

2 - 4 ft.

4 - 8 ft.

8 - 16 ft.

> 16 ft.

DRAFT

- NOTES:
1. COORDINATE SYSTEM: NAD 1983 STATEPLANEMONTANA FIPS 2500 FEET INTL.
2. BASE MAP/IMAGERY: © ESRI AND DATA (ONLINE) SERVICE LAYERS (2017). REDLANDS, CA: ENVIRONMENTAL SYSTEM RESEARCH INSTITUTE. ALL RIGHTS RESERVED.
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STILLWATER MINING COMPANY

EAST BOULDER MINE

SUNNY DAY BREACH - FLOOD INUNDATION  
SHEET 21 OF 21



PIA NO.	REF NO.
NB101-45/57	NB22-01382
FIGURE C3.21	REV A



## Appendix C

### Emergency Contact Information

(Pages C-1 to C-3)





TABLE C.1  
SIBANYE STILLWATER  
EAST BOULDER MINE  
TAILINGS STORAGE FACILITY - EMERGENCY PREPAREDNESS PLAN  
EMERGENCY CONTACT LIST

Print Dec/23/22 15:36:01

Title	Name	Contact Information			
Stillwater Mining Company (SMC)					
COO of US Region	Corne Strydom	Office:			
		Cellular:	406-780-1760	E-mail:	<a href="mailto:Corne.Strydom@sibanyestillwater.com">Corne.Strydom@sibanyestillwater.com</a>
Vice President Legal, Governmental and Environmental Affairs	Heather McDowell	Office:	406-373-8743		
		Cellular:	406-598-0066	E-mail:	<a href="mailto:Heather.McDowell@sibanyestillwater.com">Heather.McDowell@sibanyestillwater.com</a>
Vice President East Boulder Operations	William (Bill) Kloth	Office:	406-932-8109		
		Cellular:	775-385-2155	E-mail:	<a href="mailto:William.Kloth@sibanyestillwater.com">William.Kloth@sibanyestillwater.com</a>
Environmental Sustainability Manager - US Region	Matt Wolfe	Office:			
		Cellular:	406-321-0313	E-mail:	<a href="mailto:Matt.Wolfe@sibanyestillwater.com">Matt.Wolfe@sibanyestillwater.com</a>
Sr. Tailings Engineer	Zane Leonard	Office:			
		Cellular:	406-780-0777	E-mail:	<a href="mailto:Zane.Leonard@SibanyeStillwater.com">Zane.Leonard@SibanyeStillwater.com</a>
Chief Engineer - Technical Services	Justin Patterson	Office:	406-932-7854		
		Cellular:	406-224-7450	E-mail:	<a href="mailto:Justin.Patterson@sibanyestillwater.com">Justin.Patterson@sibanyestillwater.com</a>
Corporate Environmental Manager	Randy Weimer	Office:	406-328-8627		
		Cellular:	406-321-0015	E-mail:	<a href="mailto:Randy.Weimer@sibanyestillwater.com">Randy.Weimer@sibanyestillwater.com</a>
Safety Manager	Matt McManamen	Office:	406-932-8117		
		Cellular:		E-mail:	<a href="mailto:Matt.McManamen@sibanyestillwater.com">Matt.McManamen@sibanyestillwater.com</a>
Concentrator Manager	Kaycie Kynett	Office:	406-932-8349		
		Cellular:	406-459-9273	E-mail:	<a href="mailto:Kaycie.Kynett@sibanyestillwater.com">Kaycie.Kynett@sibanyestillwater.com</a>
Surface General Foreman	Neil Sholey	Office:	406-932-8256		
		Cellular:	208-512-1557	E-mail:	<a href="mailto:Neil.Sholey@sibanyestillwater.com">Neil.Sholey@sibanyestillwater.com</a>
Concentrator Supervisors	(nights and weekends)	Office:	406-932-8362		
		Cellular:		E-mail:	
Surface Supervisor	Wade LaVoy	Office:	406-932-8255		
		Cellular:		E-mail:	<a href="mailto:Wade.Lavy@sibanyestillwater.com">Wade.Lavy@sibanyestillwater.com</a>
East Boulder Mine Manager	Vince Mendive	Office:	406-932-8227		
		Cellular:	406-321-2413	E-mail:	<a href="mailto:Vince.Mendive@sibanyestillwater.com">Vince.Mendive@sibanyestillwater.com</a>
Environmental Affairs Manager	Ashley Chancellor	Office:			
		Cellular:	406-598-0549	E-mail:	<a href="mailto:ashley.chancellor@sibanyestillwater.com">ashley.chancellor@sibanyestillwater.com</a>
Health and Safety Specialists	John Bellegham	Office:	406-932-8248	E-mail:	<a href="mailto:John.Belleghem@sibanyestillwater.com">John.Belleghem@sibanyestillwater.com</a>
	Jim Goodson	Office:	406-932-8273	E-mail:	<a href="mailto:Jim.Goodson@sibanyestillwater.com">Jim.Goodson@sibanyestillwater.com</a>
Tom Roe & Son Construction Inc.					
Owner	Chip Roe	Office:	406-932-5171		
Knight Piesold Ltd. (KP)					
Engineer of Record	Ken Brouwer	Office:	604-685-0543		
		Cellular:	604-802-5128	E-mail:	<a href="mailto:kbrouwer@knightpiesold.com">kbrouwer@knightpiesold.com</a>
Deputy Engineer of Record	Craig Hall	Office:	705-476-2165		
		Cellular:	705-475-6282	E-mail:	<a href="mailto:chall@knightpiesold.com">chall@knightpiesold.com</a>
Montana Department of Environmental Quality					
Environmental Management Bureau Chief	Dan Walsh	Office:	406-444-6791		
		Cellular:		E-mail:	<a href="mailto:dwalsh@mt.gov">dwalsh@mt.gov</a>
United States Forest Service					
CGNF Mine Coordinator	Robert Grosvenor	Office:	405-848-7375 x28		
		Cellular:	406-223-3450	E-mail:	<a href="mailto:rgrosvenor@fs.fed.us">rgrosvenor@fs.fed.us</a>

[https://sibanyestillwater-my.sharepoint.com/personal/zane\\_leonard\\_sibanyestillwater\\_com/Documents/Desktop/Working Docs/Projects/TOMS, Governance, Training/EPP EBM Files/Table C.1 - Emergency Contact List \(2022 Updates\).xlsx](https://sibanyestillwater-my.sharepoint.com/personal/zane_leonard_sibanyestillwater_com/Documents/Desktop/Working%20Docs/Projects/TOMS,%20Governance,%20Training/EPP%20EBM%20Files/Table%20C.1%20-%20Emergency%20Contact%20List%20(2022%20Updates).xlsx)



TABLE C.2

SIBANYE STILLWATER  
EAST BOULDER MINE

EAST BOULDER MINE - TAILINGS STORAGE FACILITY EMERGENCY PREPAREDNESS PLAN (EPP)  
EMERGENCY SERVICES CONTACT (MAY 2021)

Print Dec/23/22 15:37:18

Agency/Organization	Principal Contact	Address	Office Telephone No.
Ambulance			911
Sweet Grass County Sheriff	Alan Ronneberg sgsheriff@itstriangle.com (term expires 12/31/2022)	PO Box 567 200 West 1st Ave. Big Timber, MT 59011	406-932-5143 or 911
Mine Safety and Health Administration (MSHA) (Helena)	Hotline and Curtis Petty Petty.Curtis@dol.gov	10 West 15 <sup>th</sup> Street Suite 2100 Helena, MT 59626	1-800-746-1553 406-441-1180
Pioneer Medical Clinic (Big Timber)		301 West 7 <sup>th</sup> Ave Big Timber, MT 59011	406-932-4603
HELP Helicopter - Medical		1233 North 30 <sup>th</sup> Street Billings, MT 59101	1-800-538-4357 Heli Pad Coordinates N45° 23' 05' W109°52'21'

[https://sibanyestillwater-my.sharepoint.com/personal/zane\\_leonard\\_sibanyestillwater\\_com/Documents/Desktop/Working Docs/Projects/TOMS, Governance, Training/EPP EBM Files/\[Table C.2 - East Boulk](https://sibanyestillwater-my.sharepoint.com/personal/zane_leonard_sibanyestillwater_com/Documents/Desktop/Working Docs/Projects/TOMS, Governance, Training/EPP EBM Files/[Table C.2 - East Boulk)



TABLE C.3

SIBANYE STILLWATER  
EAST BOULDER MINE

EAST BOULDER MINE - TAILINGS STORAGE FACILITY EMERGENCY PREPAREDNESS PLAN (EPP)  
FEDERAL AND STATE AGENCIES CONTACTS (MAY 2020)

Print Dec/23/22 15:37:21

Agency	Contact	Address	Telephone No.
Natural Response Centre (NRC) Sole Federal Spill Notification			1-800-424-8802
Montana Department of Natural Resources (Billings)			1-406-259-3264
Montana Department of Natural Resources (Head Office - Helena)	Michele Lemieux Impoundment Safety Program miemieux@mt.gov	1424 9th Avenue PO Box 201601 Helena, MT 59620-1601	1-406-444-6613
MDEQ - Water Quality Bureau (Helena Office)	Jon Kenning Water Protection Bureau jkenning@mt.gov	PO Box 200901 1520 E. Sixth Ave Helena, MT 59620-0901	1-406-444-2406
EPA Region 8		1860 Lincoln Street Denver, CO 80295	1-800-227-8917
MDEQ - Water Quality Bureau (Billings)	Dan Freeland dfreeland@mt.gov		1-406-256-7655
MDEQ - Solid & Hazardous Waste (Helena)			1-406-444-1430
Montana Department of Fish, Wildlife & Parks (Billings)			1-406-247-2940
Montana Mine Inspector			1-406-444-6401

[https://sibanyestillwater-my.sharepoint.com/personal/zane\\_leonard\\_sibanyestillwater\\_com/Documents/Desktop/Working Docs/Projects/TOMS, Governance, Training/EPP EBM Files/\[Table C.3 - Federal a](https://sibanyestillwater-my.sharepoint.com/personal/zane_leonard_sibanyestillwater_com/Documents/Desktop/Working Docs/Projects/TOMS, Governance, Training/EPP EBM Files/[Table C.3 - Federal a)



## Appendix D

### Resources Available

(Page D-1 to D-3)



TABLE D.1  
SIBANYE STILLWATER  
EAST BOULDER MINE  
  
EAST BOULDER MINE - TAILINGS STORAGE FACILITY EMERGENCY PREPAREDNESS PLAN (EPP)  
RESOURCES AVAILABLE

Printed: 2022/12/23 15:32:00

Company/Owner	Equipment/Material Type	Contact Info
Helicopter Services		
Billings Flying Service (Helicopters)	Chinook CH47D Bell 212 HP Bell 209 Long Ranger	1-406-252-6937 <a href="http://www.billingsflyingervice.com">www.billingsflyingervice.com</a> contact@flybfs.com
Central Copters Inc. (Belgrade, MT)	Euro Copter AS350B Bell 214B1	1-406-586-9185 <a href="http://www.centralcopters.com">www.centralcopters.com</a> info@centralcopters.com
Rocky Mountain Rotors	Bell 206 BIII Jettranger Bell 505 X Bell 407 GX Bell 429	1-406-579-9312 <a href="http://www.rockymountainrotors.com">www.rockymountainrotors.com</a> mark@rmrheli.com
Earthworks Equipment		
Stillwater Mining Company East Boulder Mine 517 West 1st Street Big Timber MT 59011	(1) 50 Ton Crane (2) 50 Ton Cat Haul Trucks <b>(1) 65' Genie Manlift</b> (1) Portable Light Plant (2) Extendable boom Forklifts (2) 980 H Loaders (1) D8 Dozer (1) Road Grader (1) Cat 769C Water Truck	Dispatch: 1-406-932-8300 Security: 1-406-932-8383



TABLE D.1  
SIBANYE STILLWATER  
EAST BOULDER MINE  
EAST BOULDER MINE - TAILINGS STORAGE FACILITY EMERGENCY PREPAREDNESS PLAN (EPP)  
RESOURCES AVAILABLE

Company/Owner	Equipment/Material Type	Contact Info
Stillwater Mining Company East Boulder Mine 517 West 1st Street Big Timber MT 59011 (continued)	(2) Bobcat Skid Steers (1) Road Grader (1) Cat 769C Water Truck	D Dispatch: 1-406-932-8300 Security: 1-406-932-8383
Roe Construction PO Box 905 11 McLeod Street Big Timber, MT 59011	(1) Excavator - Komatsu PC 210 (1) Excavator - Cat 320 CL (1) Road Grader (1) D-4 Dozer (1) D-6 Dozer (1) 936 Loader (1) 950 Loader (1) 938 Loader (1) Bobcat Skid Steer (3) Dump Trucks (1) Water Truck (1) Snow Plow	Office: 1-406-932-5171 Cell: 1-406-220-7049

I:\1\01\001110\22\A\Report\Report 5 - Stillwater EPP\Rev 4\App D - Resources Available\Appendix D Resources Available SWM-2021-04-22.docx