Middle Creek Early Warning System Activation Plan

February
2023

OVERVIEW

The Middle Creek Dam is located South of the Gallatin Valley in the Hyalite Canyon holding the 12,790 acre-foot Hyalite Reservoir. The Dam is 1900 feet long and 125 feet high feeding Hyalite Creek, which is a tributary of the Gallatin River. In the event of a catastrophic failure of the Dam in a Probable Maximum Flood scenario (full pool, maximum inflow and catastrophic failure), a considerable amount of residences, businesses and road infrastructure would be affected along Hyalite Creek and then the Gallatin River. The most recent modeling also indicates significant water flow along the Jackrabbit Road corridor and the City of Belgrade.

CONCEPT OF OPERATION

Middle Creek Dam is located within a high recreation area, however there is very limited communication out of the Hyalite Canyon to facilitate rapid notification of developing issues. Due to the nature of water in large quantities and the confined geographic terrain of Hyalite Canyon, a high velocity and high water level will exit the Canyon mouth with little opportunity for advance warning. To address this, Gallatin County maintain and operates the Middle Creek Early Warning System. This document outlines the system and initial response procedures in the event of an indicated dam failure.

PLANNING ASSUMPTIONS

- Notification of a catastrophic dam failure is most likely to be received from the Middle Creek Early Warning System which has up to an approximately 5 minute notification time from activation.
- It is unlikely that any first hand information about an incident at the dam will be received for some time due to lack of communications. Information would have to be received by a government employee with radio communication who happened to be in the area, or an individual with a satellite communications device.
- Reconnaissance by local officials will likely have to occur from the air due to the risk of sending people up the canyon on the ground due to being caught in flood waters or damaged transportation infrastructure.

- The greatest need for immediate action is for the residential areas at the mouth of Hyalite Canyon (~67 minute travel time). The farther away from the canyon mouth, the greater the travel time becomes and immediate action becomes less critical.

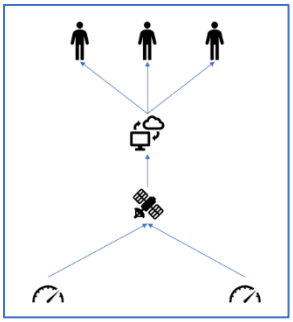
Location	Arrival Time	Peak Time	Max Depth
Langhor Campground	27 Minutes (.45 hr)	57 Minutes (.95 hr)	43.7’
S. 19th @ Middle Creek	77 Minutes (1.28 hr)	92 Minutes (1.53 hr)	17.6’
Blackwood Rd @ Middle Creek	107 Minutes (1.78 hr)	112 Minutes (1.86 hr)	4.3’
Huffine & Cottonwood Roads	132 Minutes (2.2 hr)	147 Minutes (2.45 hr)	3.4’
Jackrabbit & Huffine	117 Minutes (1.95 hr)	132 Minutes (2.2 hr)	2.6’
Jackrabbit & Valley Center	142 Minutes (2.36 hr)	162 Minutes (2.7 hr)	5.77’
Jackrabbit @ I-90	182 Minutes (3.03 hr)	202 Minutes (3.36 hr)	2’
I-90 @ Middle Creek	172 Minutes (2.86 hr)	242 Minutes (4.03 hr)	2.56’
I-90 @ West Gallatin	292 Minutes (4.86 hr)	397 Minutes (6.61 hr)	7.6’
Dry Creek Rd & East Gallatin	297 Minutes (4.95 hr)	372 Minutes (6.2 hr)	6.4’
Nixon Bridge on Gallatin River	382 Minutes (6.36 hr)	442 Minutes (7.36 hr)	11.2’
Railroad Bridge on Gallatin River @ Logan	457 Minutes (7.61 hr)	617 Minutes (10.28 hr)	16.6’
Trident Bridge on Gallatin River	547 Minutes (9.11 hr)	927 Minutes (15.45 hr)	25.8’

**Area 1 automatic evacuations and Area 2 delineated by red line.*

- There are numerous recreation sites in Hyalite Canyon below the Dam, but almost no reaction time or efficient mechanisms for notification of these locations.
- As the water works North across the Gallatin Valley, reaction time is more viable and allows for decisions to be made and implemented based on observed conditions.
- The alerting areas encompass the areas that potentially could have water present. The inundation model is very “braided” and the presence and height of water varies greatly within the inundation area. Just being inside the inundation area does not mean that everyplace will have water, or water at a significant level.

MIDDLE CREEK EARLY WARNING SYSTEM

The Middle Creek Early Warning System was implemented and is hosted by Ott Hydro. The system consists of two monitoring stations below the dam that indicate presence of water within the inundation area, but well above high water mark. When two or more sensors at a single monitoring station show the presence of water, the monitoring station transmits the data by satellite to Ott Hydro's hosted HyrdometCloud System. The HyrdometCloud System then transmits notifications to Gallatin County Emergency Management Duty Officers.



EARLY WARNING SYSTEM ACTIVATION PROCEDURE

EARLY WARNING SYSTEM

1. Activated gauge station transmits alert via satellite.
2. Ott Hydromet Cloud transmits notification to GCEM Duty Officers stating: "Activation of the upper gauge on Middle Creek Early Warning System" or "Activation of the lower gauge on Middle Creek Early Warning System." This is sent by SMS, Active 911, Email and Voice Call.
    a. In a catastrophic dam failure, you should see the Upper Station alert followed shortly by the Lower Station. A single station alerting should be taken at face value, but be suspect why both stations didn't alert.

GCEM DUTY OFFICER

1. Initiate a message to evacuate in the Community Notification System for Alerting Area 1 (Canyon Mouth to Four Corners).
    a. Automatic evacuation of this area is authorized by the Sheriff due to the limited evacuation reaction time.
    b. Stock message: *"This is a message from the Gallatin County Sheriff. People in the Middle Creek Dam Inundation Area between Hyalite Canyon and Four Corners are to evacuate immediately due to a dam failure. Immediately move to the East or West away from the inundation area. More information will follow. Please take action now."*
    c. Wireless Emergency Alert (WEA) messages can not be pre-loaded and must be created at that time, therefore will take longer to disseminate to the community.
2. Notify Gallatin County 911 of the Middle Creek Early Warning System activation.
3. Initiate a notification message in the Community Notification System for Alerting Area 2 (North of Huffine).
    a. Stock Message: "This is a message from the Gallatin County Sheriff. A failure of Middle Creek Dam in Hyalite Canyon has occurred. A Warning has been issued for the inundation areas North of Huffine. Please limit travel in the inundation area and await

further instructions from officials. Time for the initial water to reach Four Corners from dam failure is estimated at around 2 hours as the water moves North. Please limit travel, prepare yourself, and wait for additional directions."

4. Initiate coordination call with:
    a. Gallatin County Sheriff's Office Command Staff
    b. Belgrade Police Command Staff
    c. Hyalite, Gallatin Gateway and Central Valley Fire Districts
    d. Gallatin County Communications Coordinator
5. Initiate sheltering operations.

GALLATIN COUNTY 911

1. Initiate a "Dam Emergency" incident for Hyalite Dam.

LAW ENFORCEMENT

1. Establish Unified Command with fire agencies.
2. Establish a single lead Public Information Officer for all agencies and begin pushing information to community.
    a. Create and disseminate messaging with instructions for both Area 1 and Area 2.
3. Work with transportation agencies on road closures.

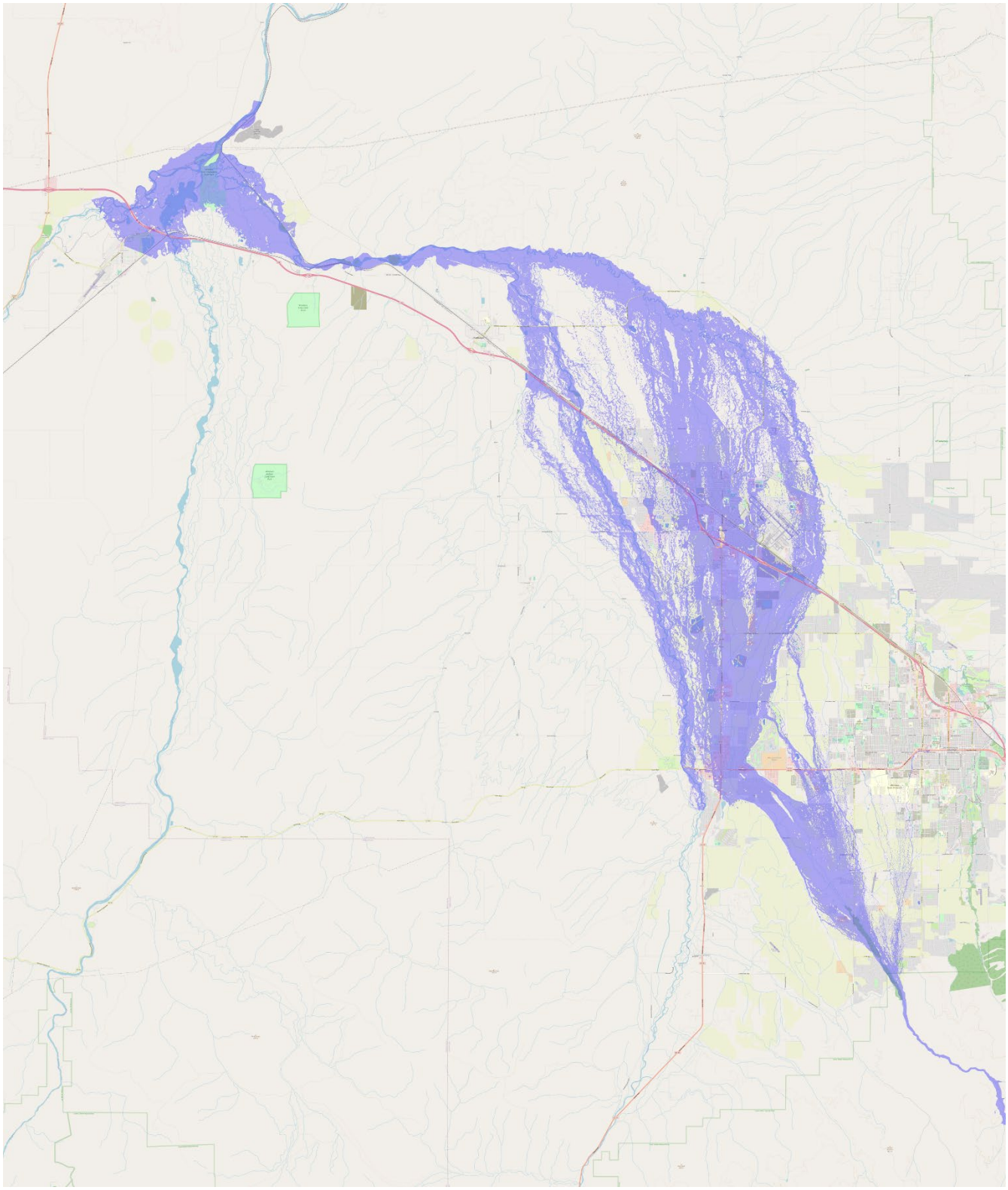
FIRE AGENCIES

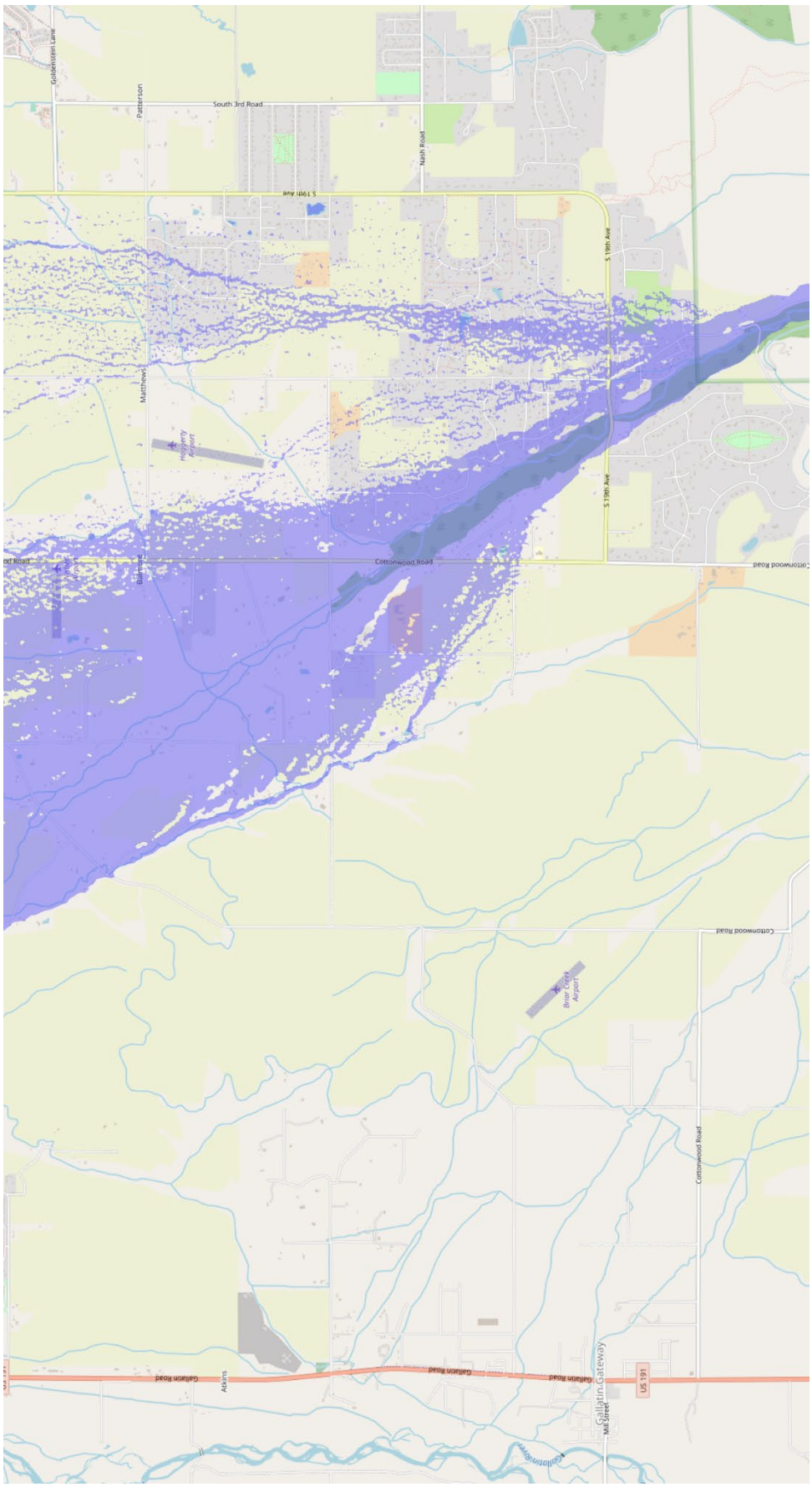
1. Establish Unified Command with law enforcement.

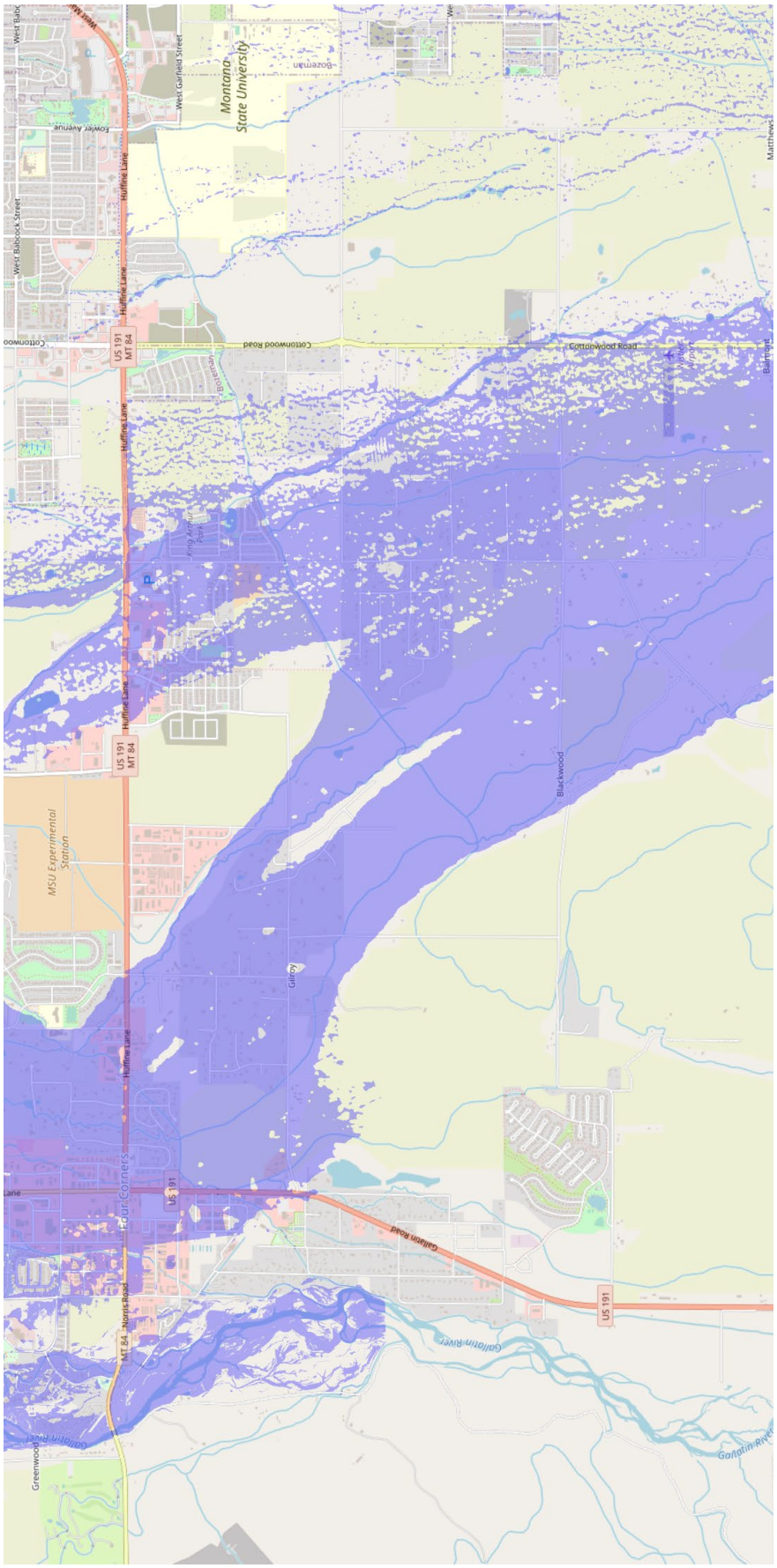
TRANSPORTATION AGENCIES

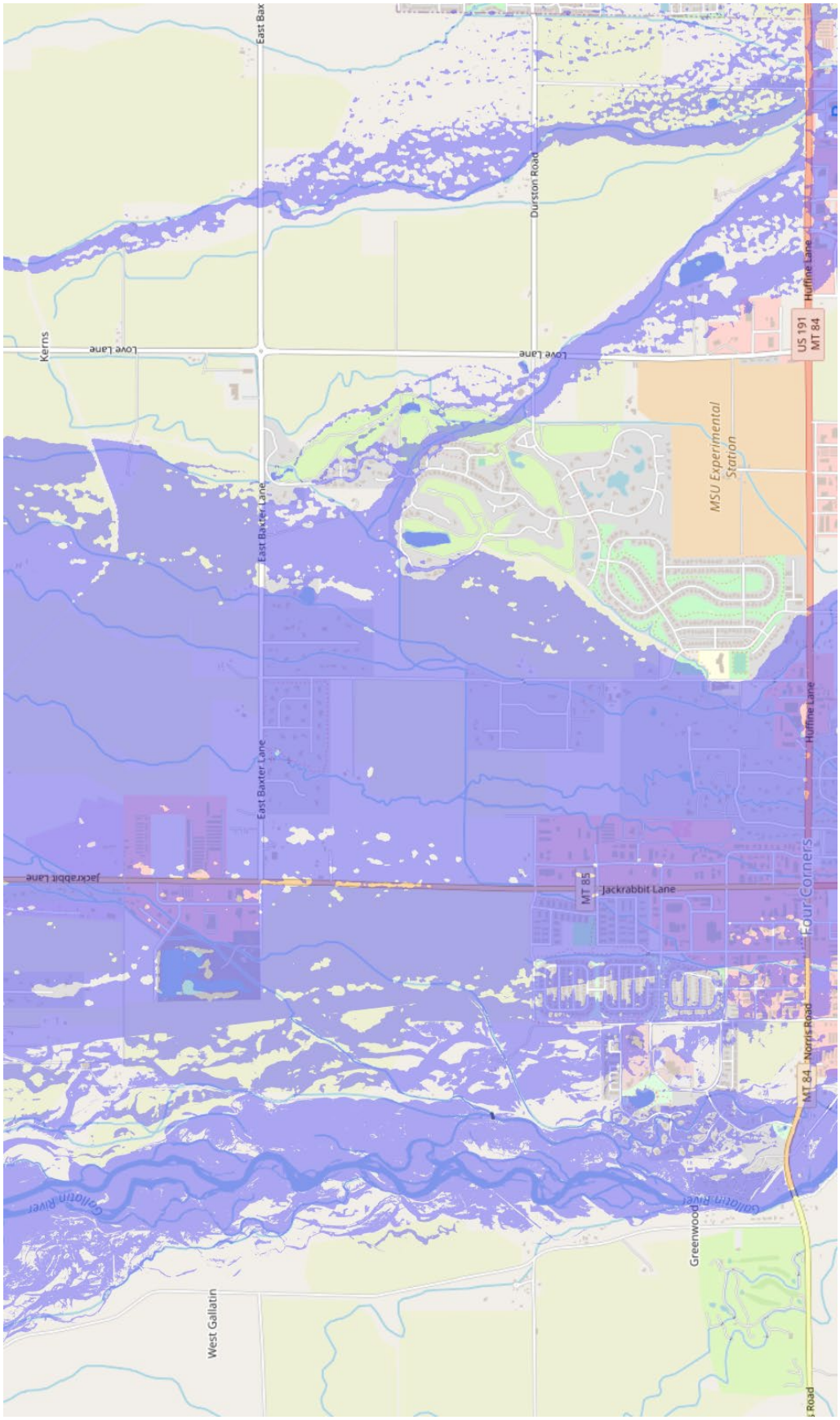
1. Coordinate with Unified Command on emergency road closures.
2. Plan for future road closures such as Huffine, Jackrabbit and I-90.

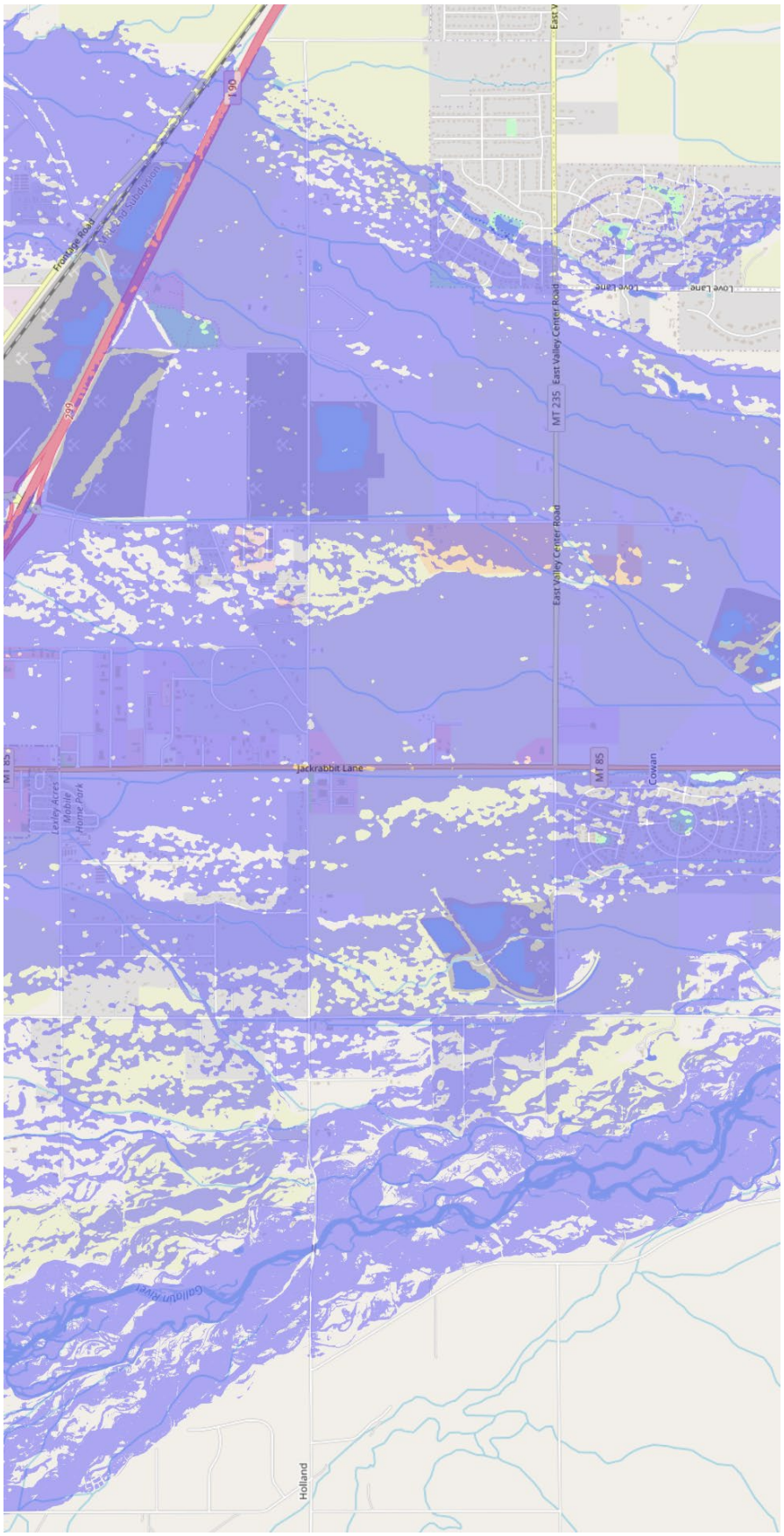
INUNDATION AREA MAP

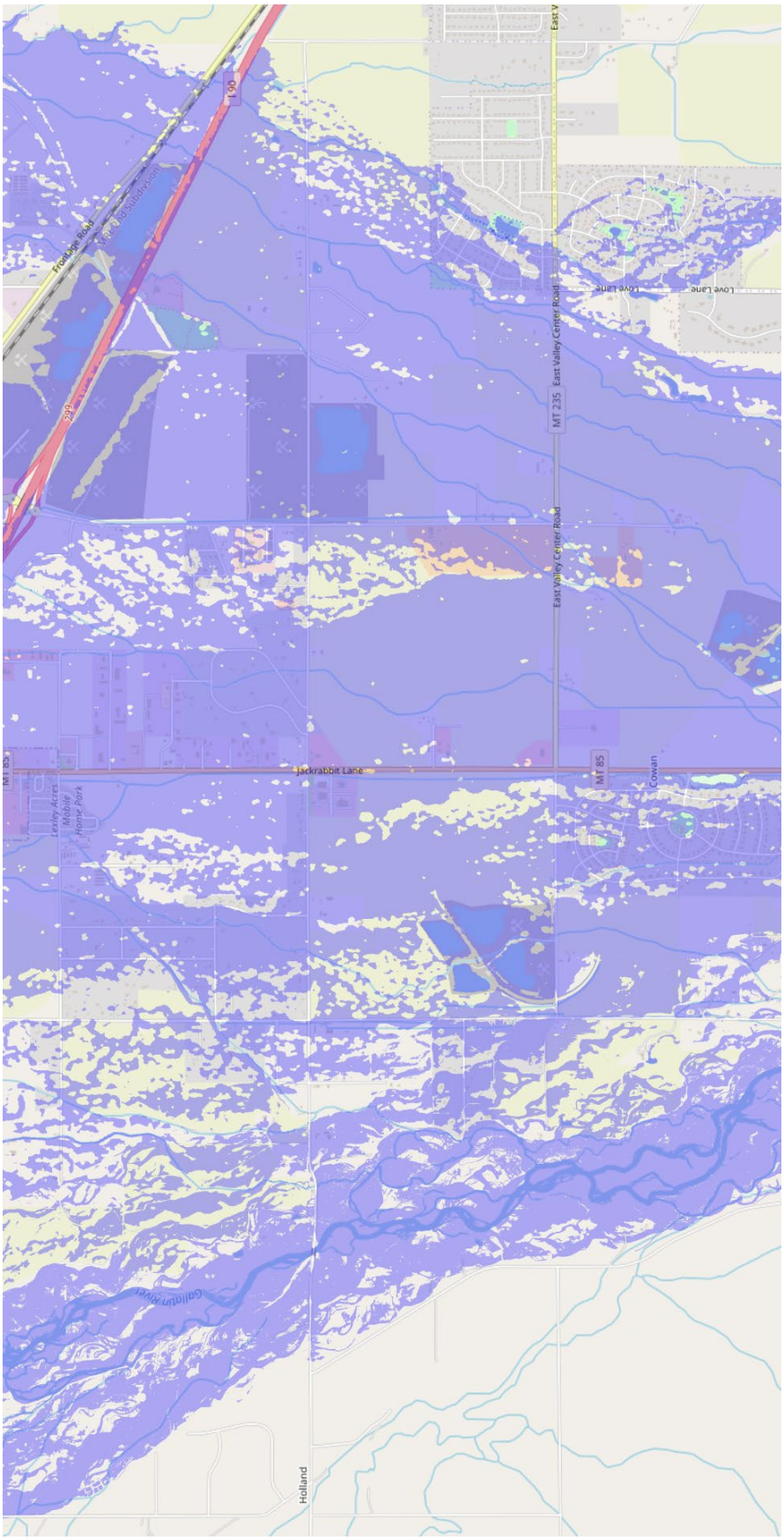



Goldenstein Lane
Patterson
South 3rd Road
Nash Road
S 19th Ave
Matthews
Hegberg Airport
Cottonwood Road
Burrows
Brier Creek Airport
Gallatin Road
Atkins
US 191
Gallatin Gateway
Mill Street


Montana State University
Bozeman
West Garfield Street
Huffine Lane
West Babcock Street
Cottonwood Road
US 191
MT 84
Bridger View Drive
Blackwood
MSU Experimental Station
Gurley
Four Corners
Gallatin River
Greenwood


East Baxter Lane
Durston Road
Kerns
Love Lane
Love Lane
Huffine Lane
US 191
MT 84
MSU Experimental Station
East Baxter Lane
Huffine Lane
Jackrabbit Lane
MT 85
Jackrabbit Lane
Four Corners
Norris Road
MT 84
Gallatin River
Gallatin River
Greenwood
West Gallatin


I 90
Frontage Road
MT 2 Alt Subdivision
MT 235
East Valley Center Road
Love Lane
Jackrabbit Lane
MT 85
Cowan
Lexley Acres Mobile Home Park
Gallatin River
Holland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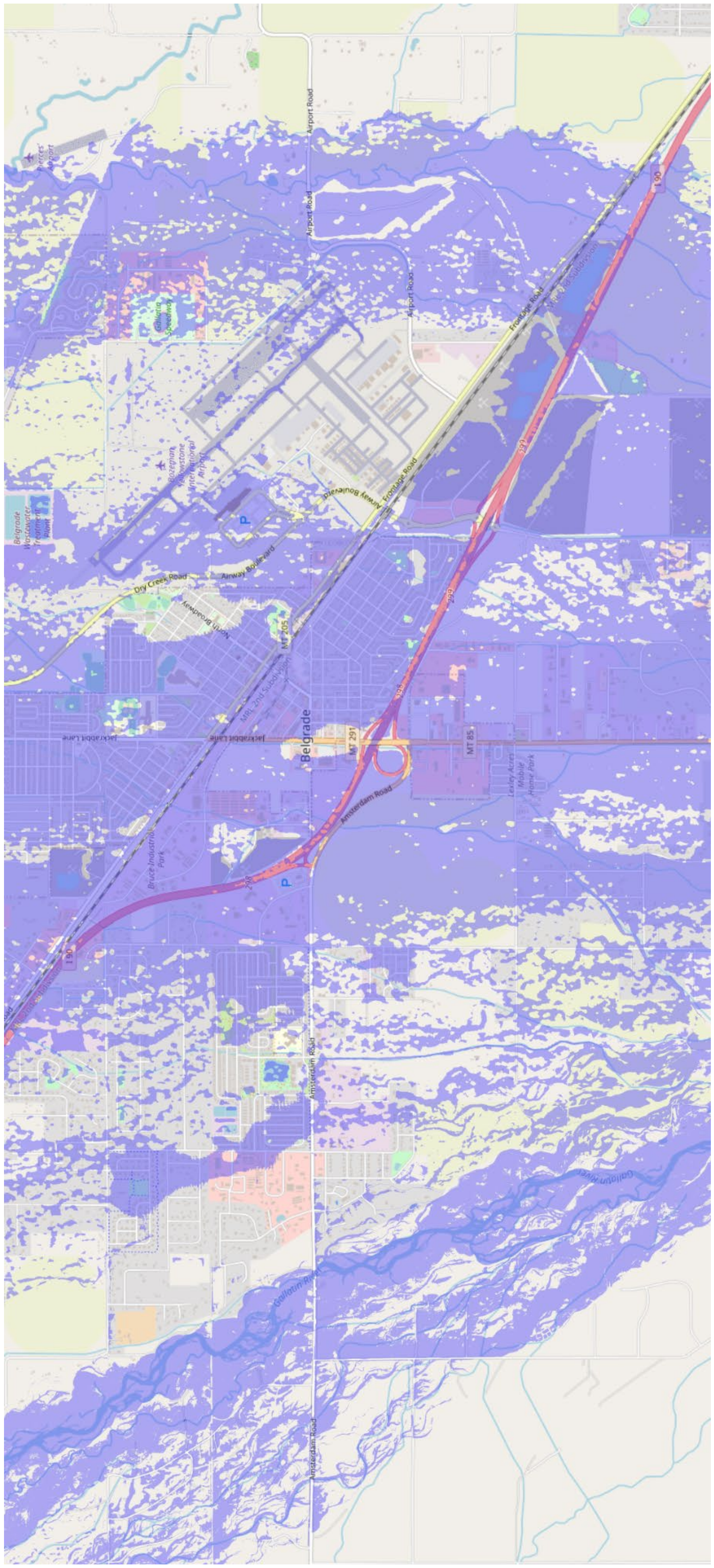
East Valley Center Road
MT 235
East Valley Center Road
Love Lane
Jackrabbit Lane
MT 85
Cowan
Lexley Acres Mobile Home Park
Holland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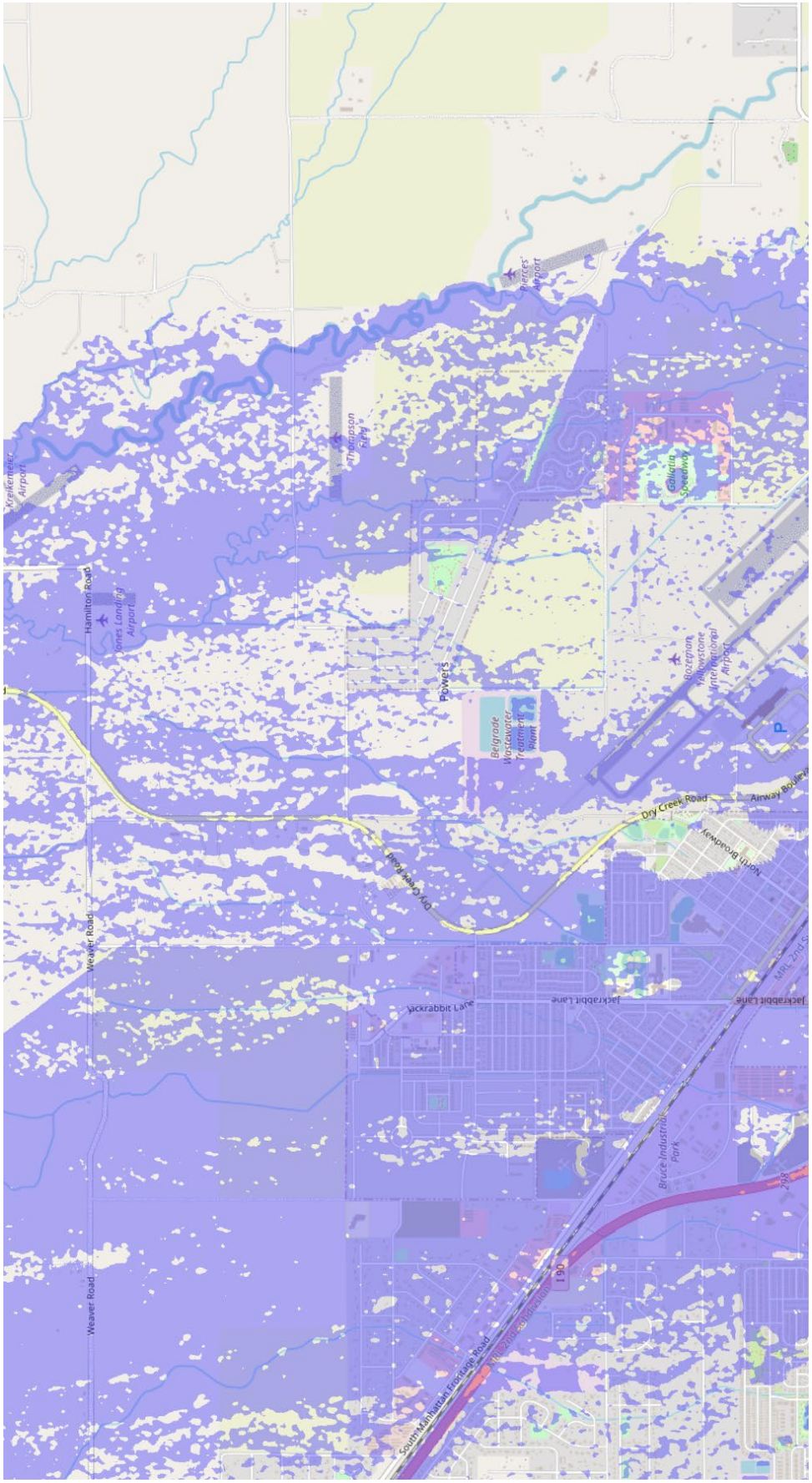
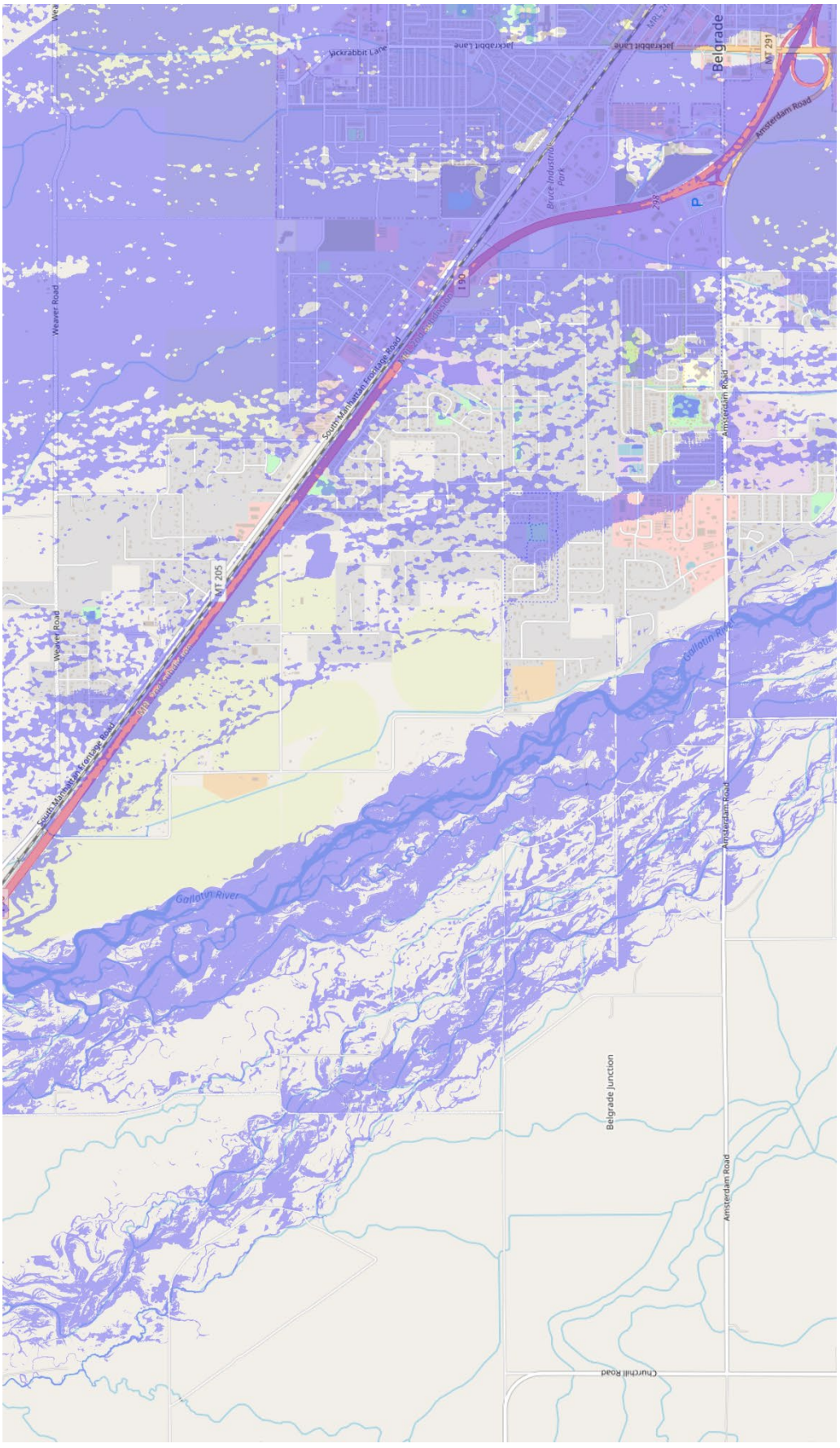
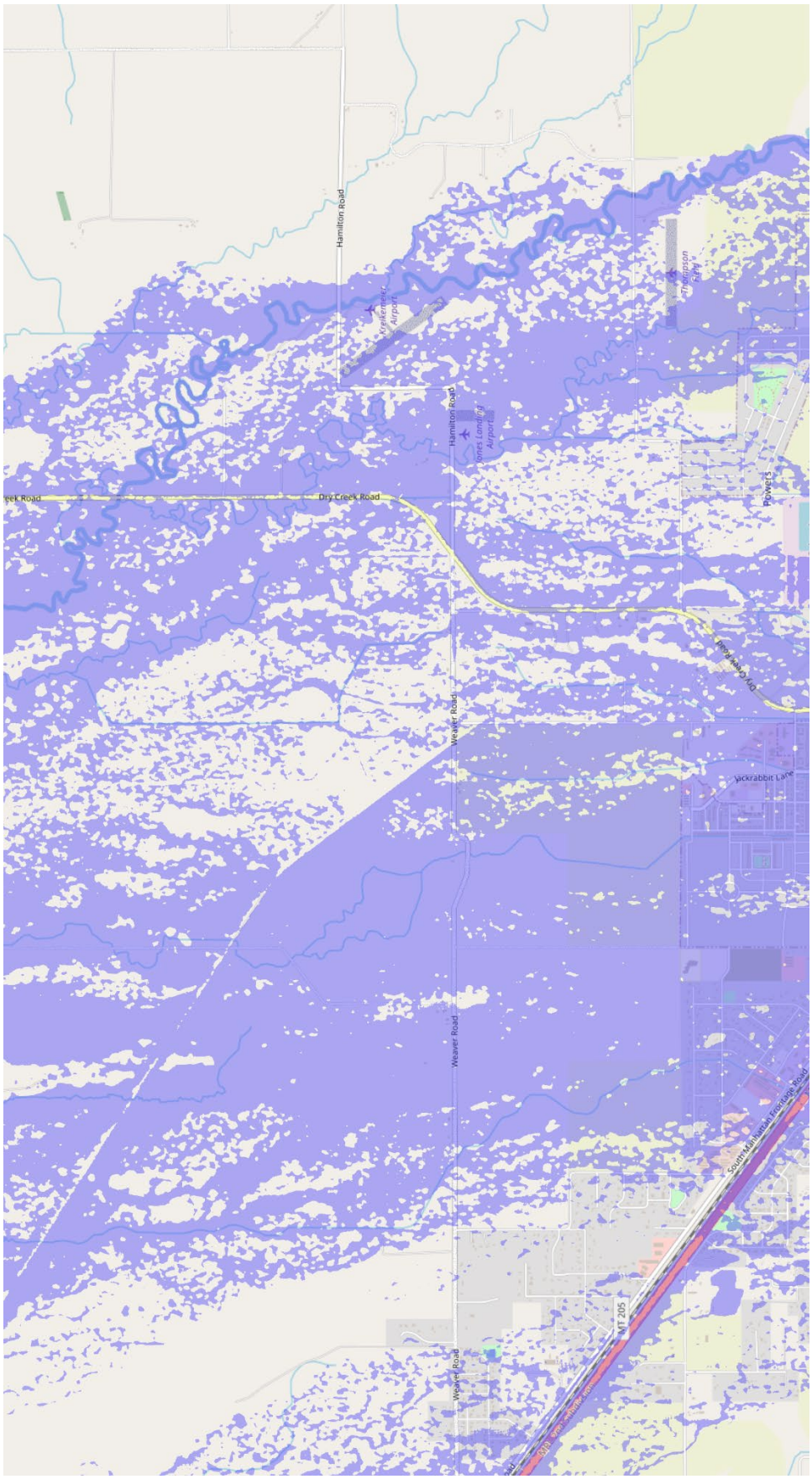
Airport Road
Frontage Road
Dry Creek Road
Airway Boulevard
Jackrabbit Lane
Amsterdam Road
MT 291
MT 85
MT 205
Gallatin River


Pierces Airport
Thompson Park
Gillette Speedway
Krekeler Airport
Hamilton Road
Jones Landing Airport
Powers
Belgrade Wastewater Treatment Plant
Bozeman Yellowstone International Airport
Dry Creek Road
Airway Boulevard
North Broadway
Dry Creek Road
Weaver Road
Jackrabbit Lane
Jackrabbit Lane
Jackrabbit Lane
MRL 2nd St
Bruce Industrial Park
I 90
208
Weaver Road
South Manhattan Frontage Road
Manhattan Interchange


Belgrade
MT 291
Amsterdam Road
Jackrabbit Lane
Bruce Industrial Park
Weaver Road
South Madison Frontage Road
MT 205
Gallatin River
Belgrade Junction
Churchill Road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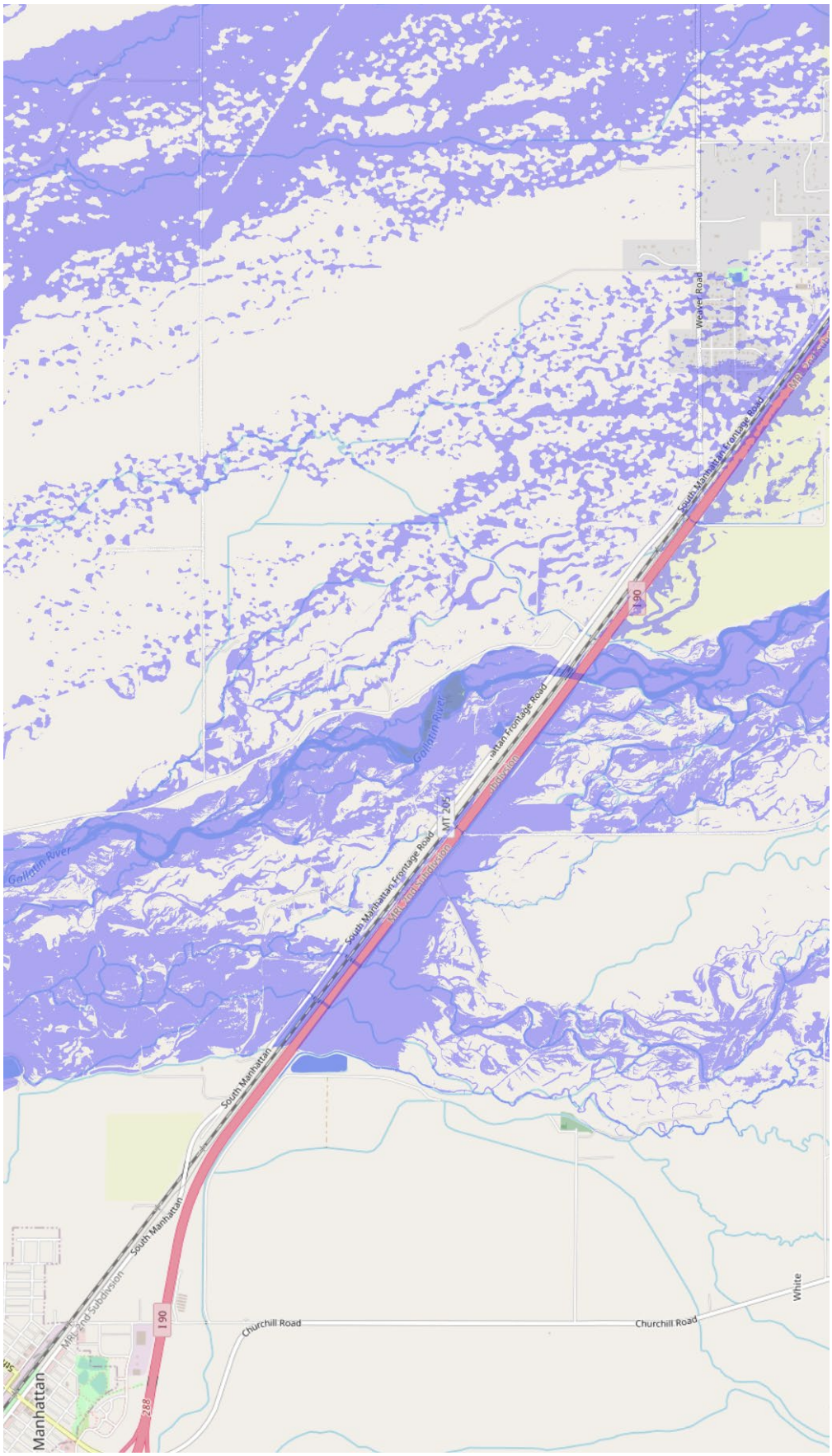
Hamilton Road
Jones Landing Airport
Dry Creek Road
Powers
Weaver Road
Jackrabbit Lane
Weaver Road
MT 205
Weaver Road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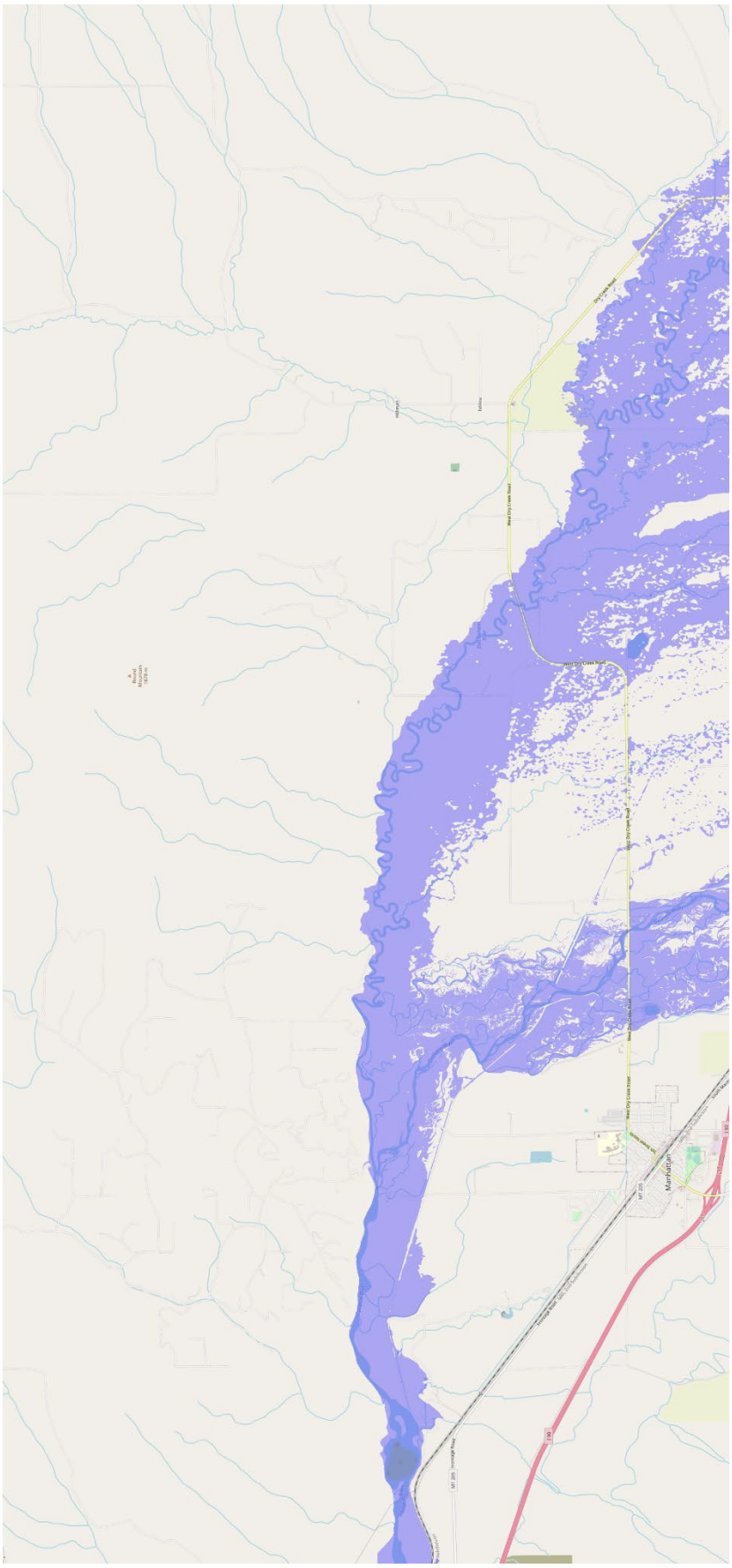
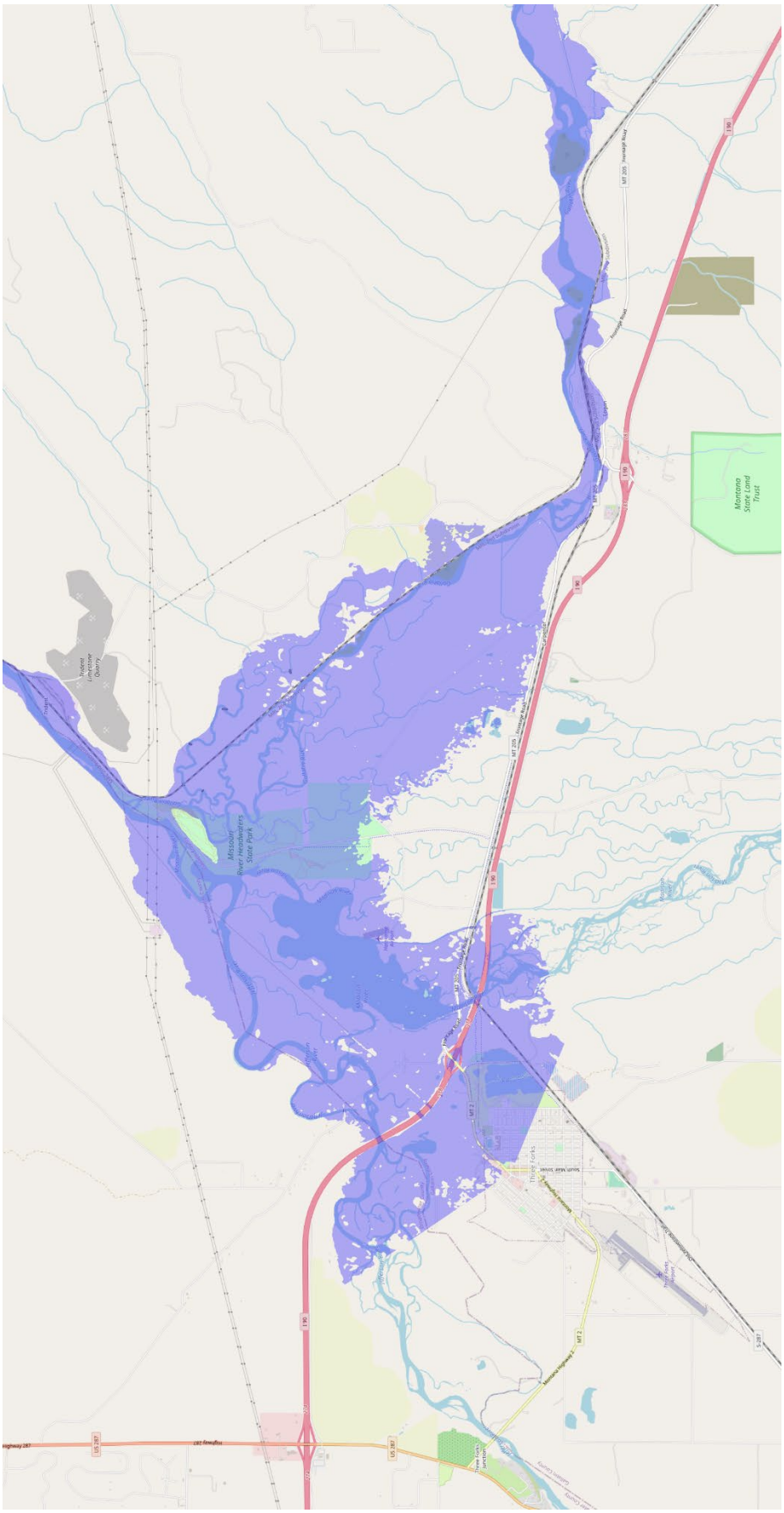
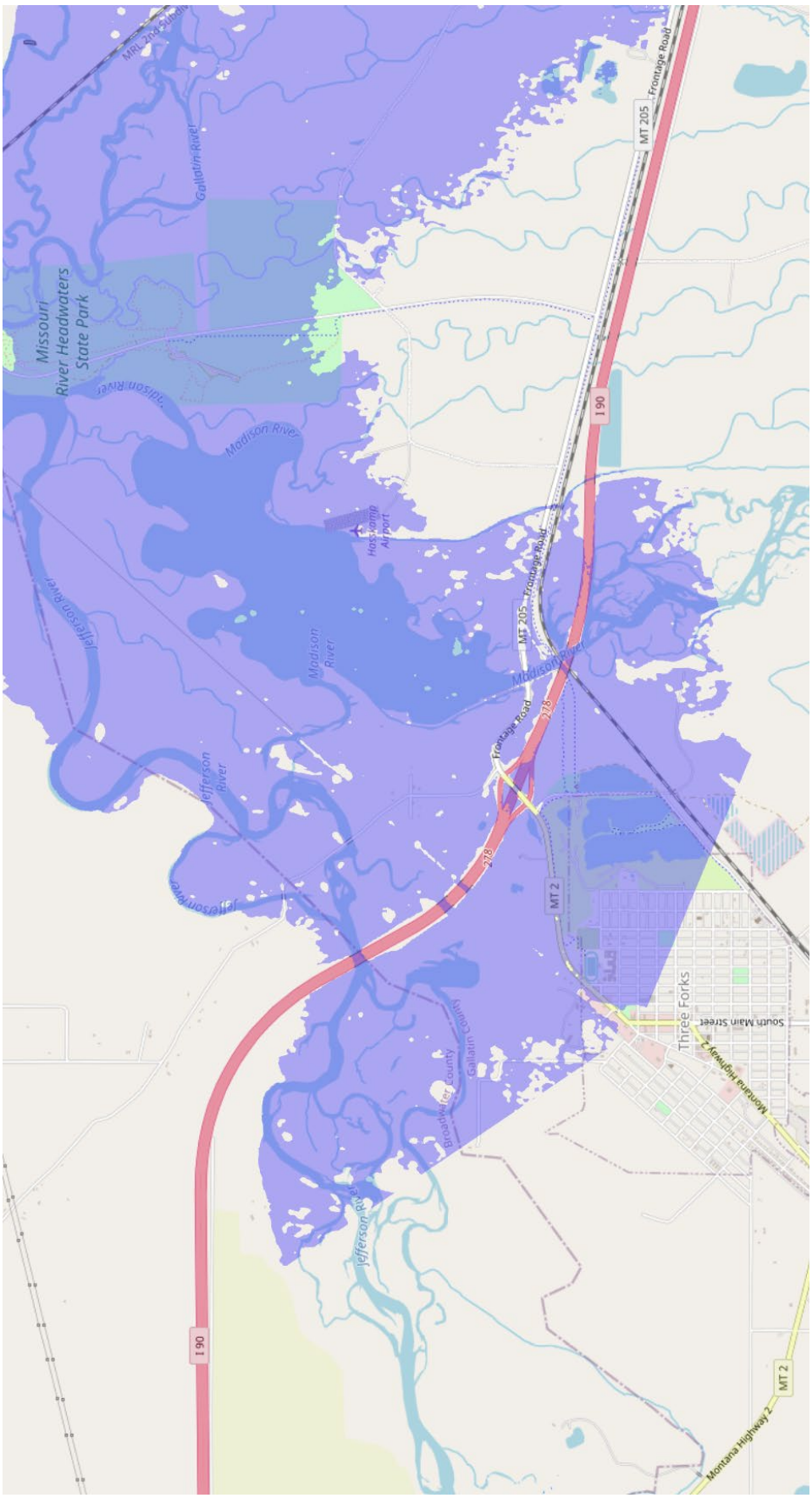
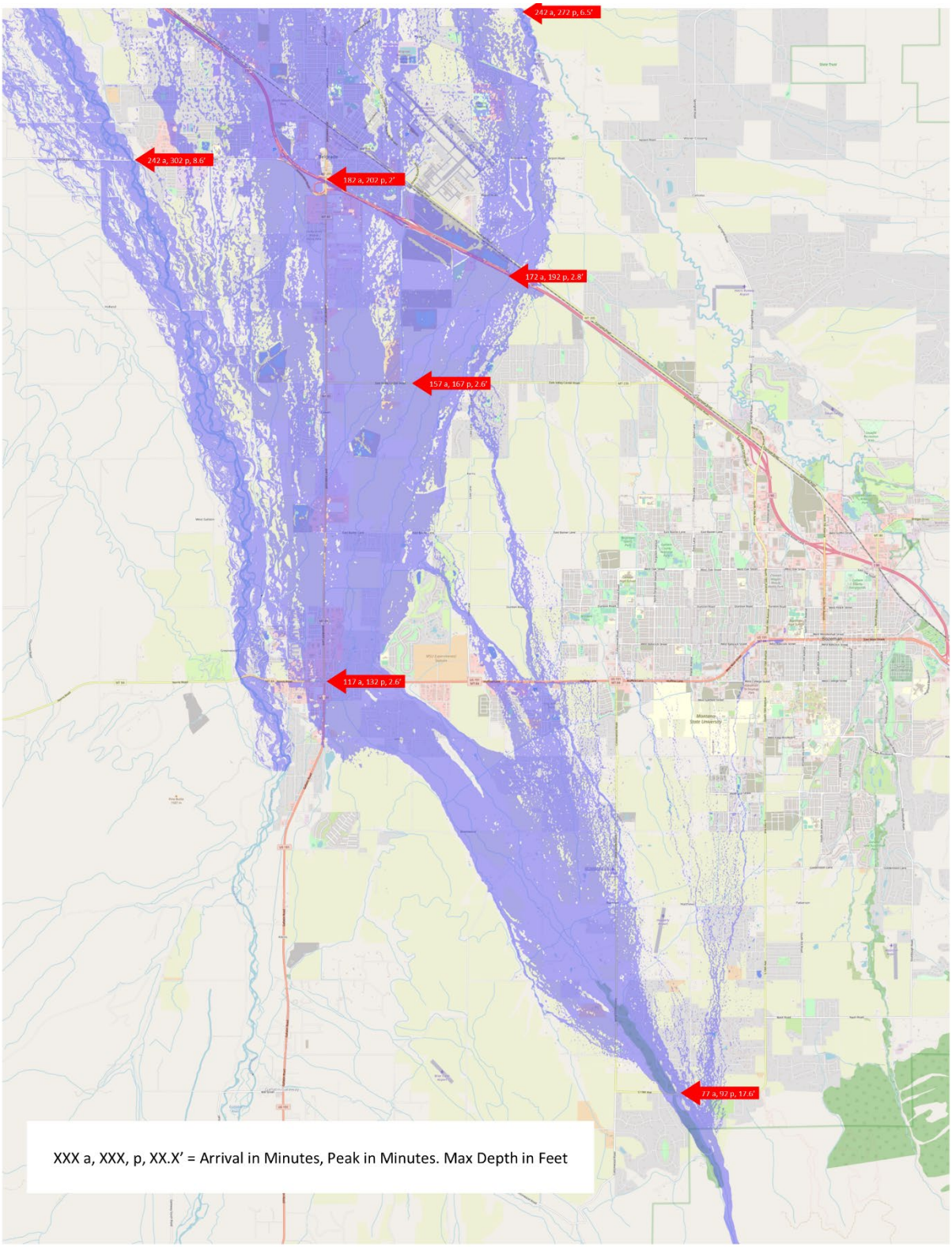
South Manhattan Frontage Road
I 90
Gallatin River
MT 205
Jackrabbit Road
South Manhattan
Churchill Road
Churchill Road
White
Manhattan
288

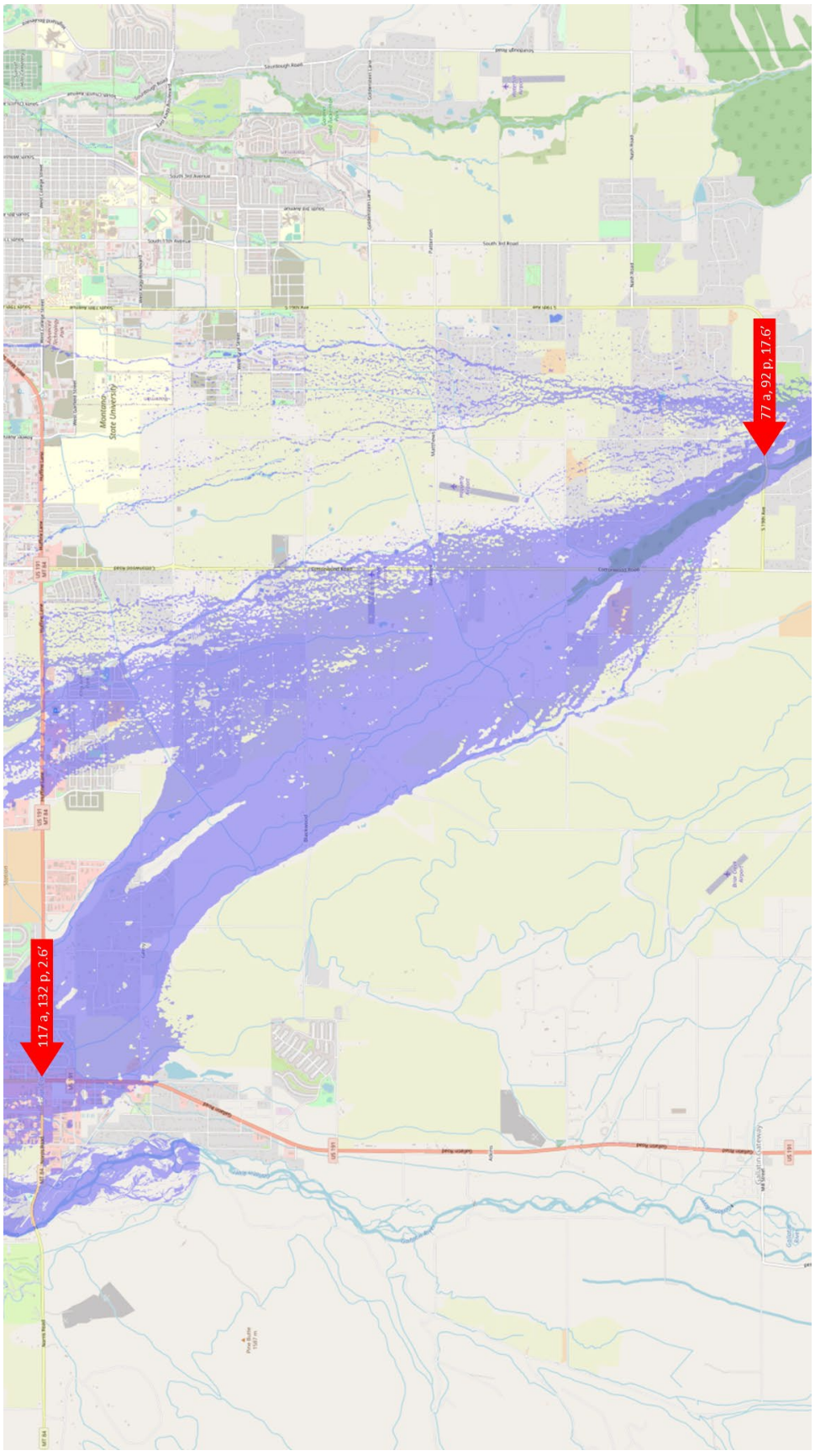

Manhattan

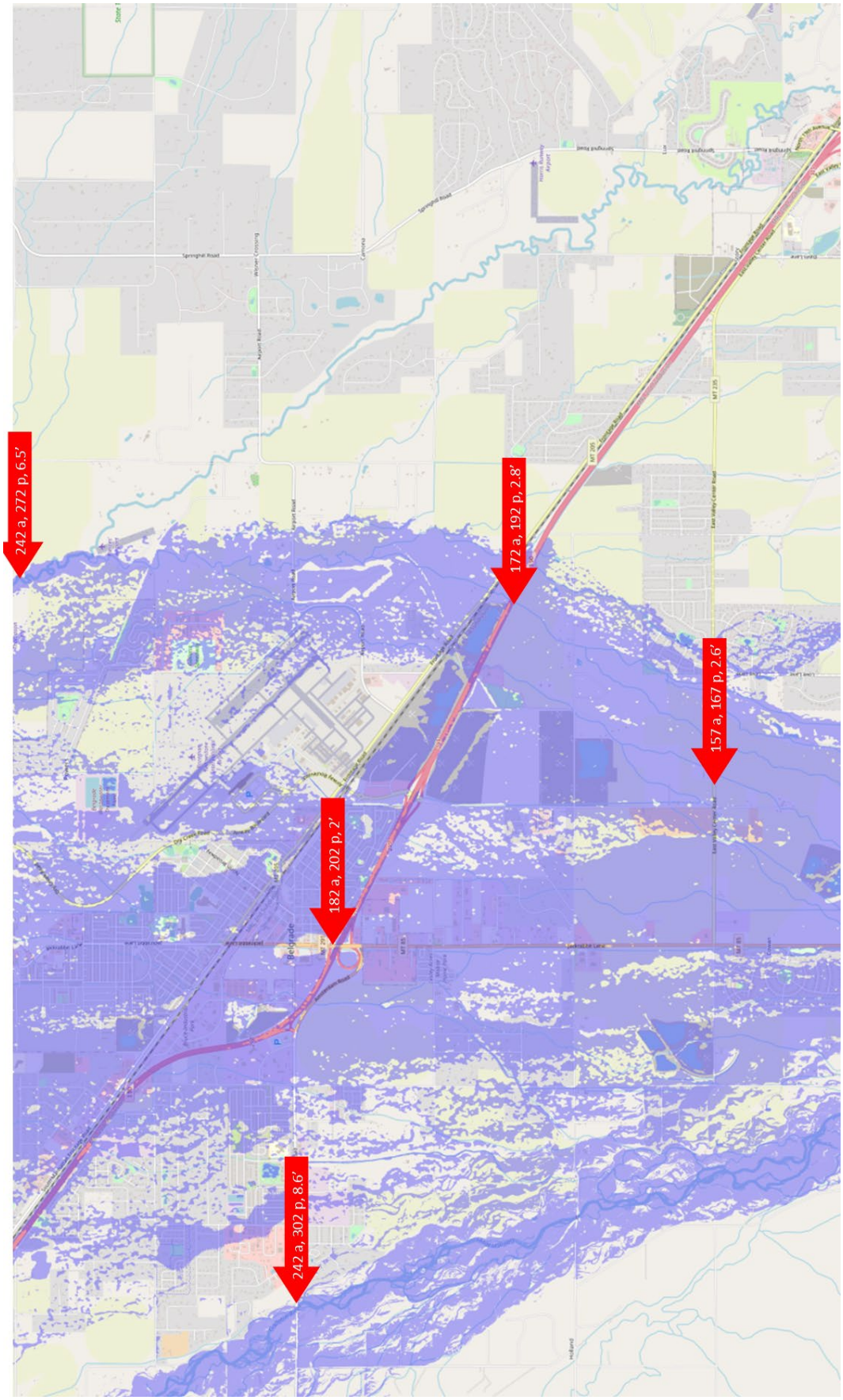

Montana State Land Trust
Missouri River Headwaters State Park
Holter Interpretive Quarry
MT 2
MT 205
I 90
US 287


Missouri River Headwaters State Park
Gallatin River
Madison River
Jefferson River
Three Forks
South Main Street
Montana Highway 2
Frontage Road
MT 205
MT 2
I 90
278
Broadwater County
Gallatin County

TIME TO ARRIVAL MAP




77 a, 92 p, 17.6'
117 a, 132 p, 2.6'
Montana State University


242 a, 272 p, 6.5'
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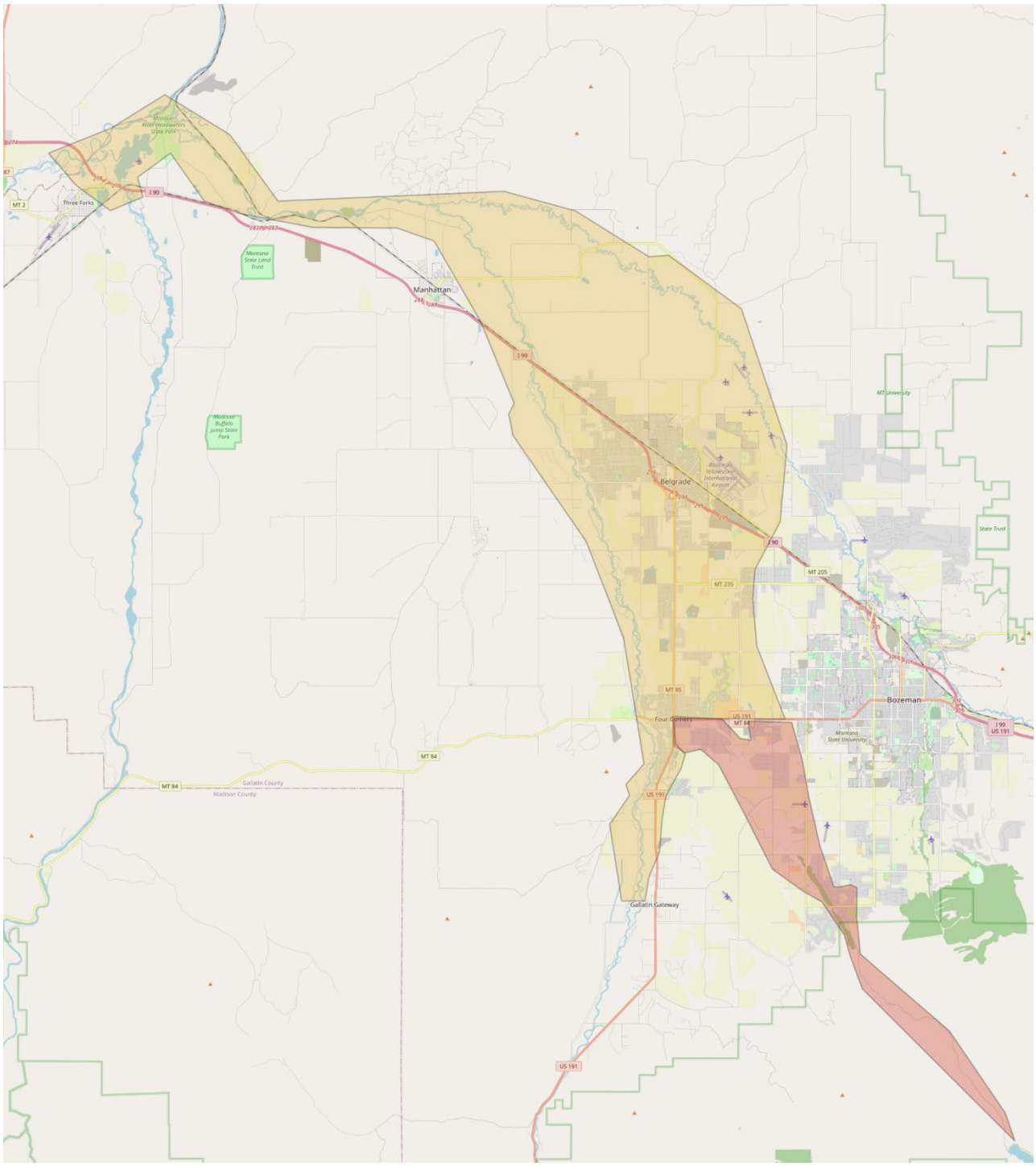
157 a, 167 p, 2.6'
182 a, 202 p, 2'
242 a, 302 p, 8.6'

ALERTING AREAS MAP



Alerting Area 1

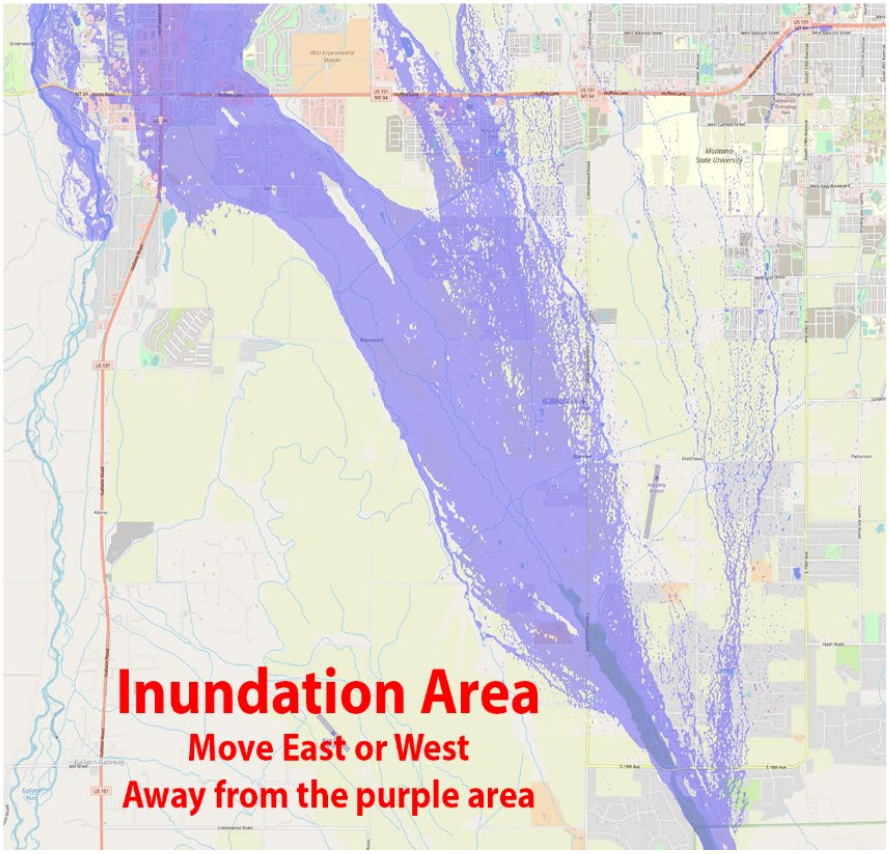
Alerting Area 2

SAMPLE MASS NOTIFICATION MESSAGES

*Web Page Message

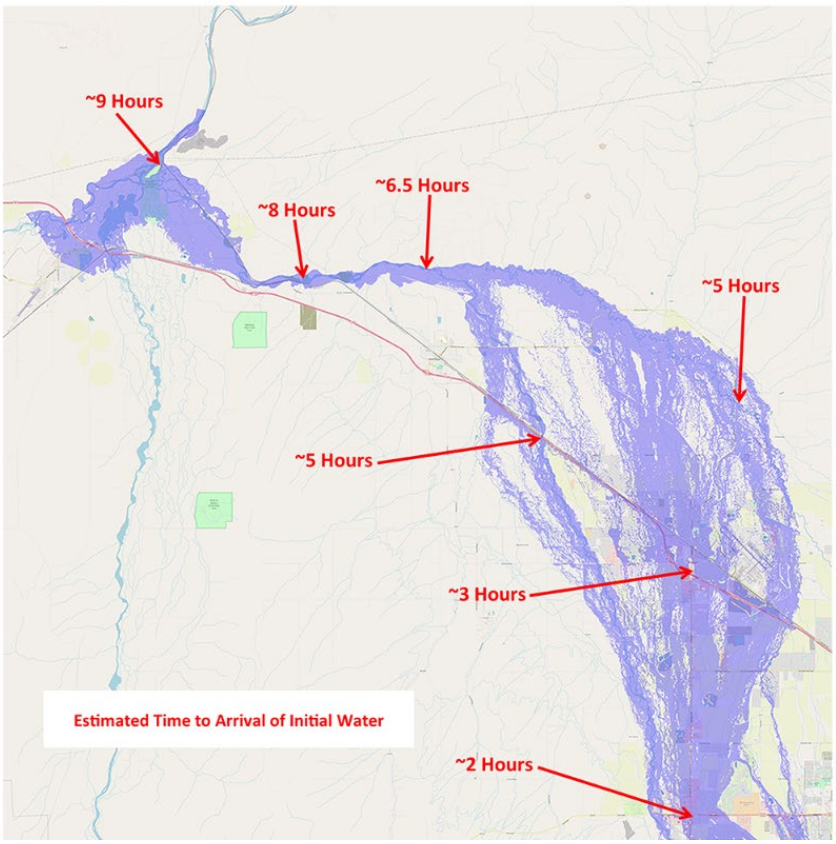
Middle Creek Dam Failure - Evacuation Order

This is a message from the Gallatin County Sheriff. People in the Middle Creek Dam Inundation Area between Hyalite Canyon and Four Corners are to evacuate immediately due to a dam failure. **Immediately move to the East or West** away from the inundation area. More information will follow. Please take action now.



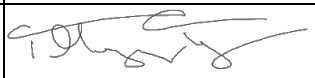
Middle Creek Dam Failure - Warning

This is a message from the Gallatin County Sheriff. A failure of Middle Creek Dam in Hyalite Canyon has occurred. A Warning has been issued for the inundation areas North of Huffine. Please limit travel in the inundation area and await further instructions from officials. Time for the initial water to reach Four Corners from dam failure is estimated at around 2 hours as the water moves North. Please limit travel, prepare yourself, and wait for additional directions.



PLAN CONCURRENCE

The following concur with the February 2023 Middle Creek Early Warning System Plan.

Agency	Name	Signature	Date
Hyalite Fire Department	Brian Nickolay	Brian Nickolay Brian Nickolay (May 23, 2023 11:01 MDT)	May 23, 2023
Gallatin Gateway Fire District	Jeremiah Hillier	Jeremiah R. Hillier Jeremiah R. Hillier (May 18, 2023 14:24 MDT)	May 18, 2023
Central Valley Fire District	Greg Tryon		Jun 1, 2023
Gallatin County Sheriff's Office	Dan Springer	Dan Springer Dan Springer (May 30, 2023 15:39 MDT)	May 30, 2023
Belgrade Police Department	Dustin Lensing	Dustin Lensing Dustin Lensing (May 18, 2023 14:25 MDT)	May 18, 2023
Gallatin County 911	Tim Martindale	Tim Martindale Tim Martindale (May 23, 2023 13:15 MDT)	May 23, 2023
Gallatin County Emergency Management	Patrick Lonergan		May 18, 2023

Activation Plan

Final Audit Report 2023-06-01

Created:	2023-05-18
By:	Patrick Lonergan (patrick.lonergan@gallatin.mt.gov)
Status:	Signed
Transaction ID:	CBJCHBCAABAADEpPbp4nywdAaeNOeJaoqW9MPsRZsjZ6

"Activation Plan" History

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