LETTER OF MAP REVISION (LOMR)

I-70G Edwards Interchange Upgrade Phase 2

Prepared for:

CDOT Region 3
222 South Sixth St., Room 100
Grand Junction, CO 81501

Prepared by:

Felsburg Holt & Ullevig
6400 S Fiddlers Green Circle, Suite 1500
Greenwood Village, CO 80111
303.721.1440

FHU Reference No. 112475-01

October 2020

TABLE OF CONTENTS

Appendices

List of Tables

1. PURPOSE

This request for a Letter of Map Revision (LOMR), on behalf of CDOT Region 3, includes the recently constructed conditions of the drainage improvements to the Eagle River that are part of the I-70G Edwards Interchange Upgrade Phase 2, CDOT Project Number NHPP 0702-344, Project Code: 19944. This project installed a new intersection configuration and access control along the corridor between I-70 and US 6 and replaced the existing bridge over the Eagle River. The constructed bridge configuration is a single-span bridge, 151-feet long and 60-feet wide. A new pedestrian bridge was also installed east of the Edwards Spur Road Bridge. This pedestrian bridge is also single-span, 137-feet long and 12-feet wide. Both the roadway bridge and the pedestrian bridge abutments were constructed outside the Eagle River floodplain limits.

2. BACKGROUND

A Letter of Map Revision (LOMR) (Case No. 13-08-0339P) was issued and made effective on October 18, 2013, Map Numbers 08037C0439D and 08037C0443D. The revised reaches of the LOMR are McCoy Creek from approximately 60 feet downstream to 2,880 feet downstream of Terrell and Ford Ditch. The revised area limits are upstream of the Eagle River and will not be impacted by this LOMR.

A Conditional Letter of Map Revision (CLOMR) (Case No. 19-08-0487R) for the Edwards Road over Eagle River, I-70G Edwards Interchange Upgrade Phase 2, was completed and approved by FEMA on July 31, 2019, Map Numbers 08037C0438D and 08037C0439D. Felsburg Holt & Ullevig (FHU) completed the CLOMR to analyze the proposed conditions for this project.

3. STUDY LIMITS

The I-70G Edwards Interchange Upgrade Phase 2 is in Section 5 of Township 5 South, Range 82 West of the 6th P.M., Eagle County, Colorado.

This section of the Eagle River is shown on Flood Insurance Rate Maps (FIRMs) 08037C0438D and 08037C0439D (effective December 4, 2007) as having Zone "AE" floodplains and floodways and Zone "X" floodplains delineated. The map shows base flood elevations (BFEs), cross section lines, and the regulatory floodplain.

4. MAPPING

The floodplain model follows approximately 1,600 linear feet (LF) of the Eagle River centered on the Edwards Bridge. The initial topographic survey of the Edwards Access Road included 1-foot contour intervals and was conducted by 105 West, Inc. The design survey extended along the Eagle River approximately 300 LF upstream and 230 LF downstream of the Edwards Bridge.

105 West, Inc also obtained as-built data of the recently constructed bridges and channel geometry approximately 100 LF upstream and downstream of the new bridge structure. This post-construction as-built survey was used to update the as-built conditions model. **Appendix G** provides photos of the as-built conditions.

Notably, the original project design survey did not obtain actual thalweg elevations or data of the Eagle River; however, the as-built survey for this LOMR includes the thalweg elevation data; thus, sections 293

through 294.2 are different from the CLOMR proposed model compared to this LOMR As-Built Conditions Model (ACM). **Appendix A** provides detailed mapping of the as-built survey for this LOMR.

All as-built data and elevations for this LOMR are based on the North American Vertical Datum 1988. Bearings used in the calculation of coordinates are based on a grid bearing of N52°57'30" E from CM 307 (MP 0.07) to CM 305 (MP 0.35). Both monuments are CDOT Type II, marked appropriately for the milepost location and control position. The survey data was obtained from a Global Positioning System survey based on the Continuously Operating Reference Stations. Project coordinates are modified Colorado State Plane Central Zone NAD '83 coordinates. The combined elevation/scale factor used to modify the coordinates from state plane to project coordinates is 1.0003626365. The resulting project coordinates are truncated by 1,600,000 in the northing and 2,600,000 in the easting after converting from state plane coordinates to project coordinates.

PROJECT COORDINATES NORTHING = State Plane Coordinate Northing – 1,600,000 * 1.0003626365

PROJECT COORDINATES EASTING = State Plane Coordinate Easting – 2,600,000 * 1.0003626365

Project coordinates and elevations are published in US Survey Feet units.

5. HYDROLOGY

The project area is within the Eagle River major basin. Basins contributing to the Eagle River consist of mostly undeveloped land. This project did not modify the watershed or hydrology contributing to the proposed Edwards Bridge over the Eagle River; the CLOMR and this LOMR flowrates are the same as presented in **Table 1**. The Eagle River Peak Flows at the Edwards Bridge were established by using the Flood Insurance Study Number 08037CV000A effective December 4, 2007. No other hydrology is known to exist for the Eagle River.

Table 1. Eagle River Peak Flows at the Edwards Bridge

Drainageway	Reference	10-Year	50-Year	100-Year	500-Year
Eagle River	FIS #08037CV000A	3,980 cfs	5,010 cfs	5,430 cfs	6,210 cfs

6. HYDRAULICS

The effective floodplain for the Eagle River in the project area is designated as Zone AE. A detailed study with defined BFEs and a defined floodway has been conducted. The CLOMR included modifying the existing effective HEC-RAS model to create the updated Corrected Effective Model (CEM) conditions. The CEM model was obtained from the approved CLOMR. As a basis of comparison, FHU used the post-project model from the approved CLOMR and modified the post-project conditions HEC-RAS model to create an ACM to represent the recently constructed bridge and channel improvements.

6.1 Corrected Effective – Existing Conditions Model

The topographic design survey described in the mapping section was used as the basis for the CEM HEC-RAS model, with sections 293, 293.2, and 294 being updated with the design topography. The Manning's N Values in the Effective model were deemed to be acceptable and were kept in the CEM. The CEM represents the pre-project or existing conditions. See **Appendix C** for more information.

6.2 As-Built Conditions Model

The ACM was run in HEC-RAS 5.0.3 and consists of the updated as-built survey of the Edwards Bridge and channel geometry. As previously stated, the original project design survey did not obtain the channel thalweg, but the as-built survey did. These changes have implications on the as-built hydraulic model, but since the channel flowline was obtained, the water surface elevations have largely decreased from the CEM.

Manning's N values were kept the same as in the CEM. The as-built bridge and channel geometry shows an overall decrease of the 1 percent flood water surface elevations (WSEs) across the project site with the exception of a 0.18' rise at section 294; however, this section has an overall decrease in comparison with effective BFEs. **Appendix E** contains the comparison table highlighting the change in WSE from the CEM to the ACM.

Water velocities in the ACM do not differ significantly from water velocities in the CEM; therefore, sediment transport is assumed to be unchanged from existing to as-built conditions.

Appendix C contains the floodplain work maps describing pre-project and post-project HEC-RAS model centerlines, cross sections, and floodplain limits. **Appendix B** presents the results of the hydraulic analysis in a comparison table for the various models.

7. NATIONAL FLOOD INSURANCE PROGRAM REGULATION REQUIREMENTS

The project is in an area designated as Zone "AE" with defined BFEs and floodways. The hydraulic analysis indicates that WSEs were lowered from the CEM to the ACM. The width of the ACM Special Flood Hazard Area (SFHA) tie-in is within 5 percent of the effective FIRM's scale. This project did not place any fill within the SFHA. This LOMR shows the as-built surveyed conditions including the elevation and width of the effective Zone "AE" floodplain limits on the annotated FIRM and Flood Insurance Study profile for the Eagle River.

8. REFERENCES

Federal Emergency Management Agency Letter of Map Revision, Case Number 13-08-0339P, Effective Date: October 18, 2013.

Federal Emergency Management Agency Flood Insurance Study, Number 08037CV000A, Effective December 4, 2007.

Federal Emergency Management Agency Flood Insurance Rate Map, Community Panel No. 08037C0438D, Effective Date December 4, 2007.

Federal Emergency Management Agency Flood Insurance Rate Map, Community Panel No. 08037C0439D, Effective Date December 4, 2007.

Felsburg Holt & Ullevig, Phase III Drainage Report for the I-70G Edwards Spur Interchange Upgrade Project, Eagle County, Colorado, Submitted May 25, 2018.

Felsburg Holt & Ullevig, Conditional Letter of Map Revision (CLOMR), I-70 Edwards Interchange Upgrade Phase 2, May 9, 2019.

APPENDIX A. AS-BUILT SURVEY

105WEST INCORPORATED

4201 E. Yale Ave., STE 230
Denver, CO 80222
Phone 303-859-4491

October 1, 2020

Mr. Jeremy Colip
Process/Production Manager
HDR
1670 Broadway, Suite 3500
Denver, CO 80202

SUBJECT: Edwards Spur Road over Eagle River LOMR Topographic Survey – Eagle County, Colorado

Dear Mr. Colip:

I, Richard D. Muntean, a duly licensed land surveyor in the State of Colorado, do hereby state that the survey work for the Edwards Spur Road over Eagle River LOMR Topographic Survey was performed under my direct supervision. The purpose of this letter is to provide certification of the data collected during the month of August 2020 and submitted to HDR on August 26, 2020. All survey information was collected using project survey control with final data provided in the form of a MicroStation Digital Terrain Model, CAD file, and text file of the as-measured field points. The data represents a survey of post-construction conditions of the Edwards Spur Road over Eagle River project in Eagle County, Colorado.

Should you have any questions regarding this information, please contact me via phone at 303-918-2496, or if you prefer, via email at rmuntean@105westinc.com.

Sincerely,

105 West, Incorporated

Richard D. Muntean, PLS
Survey Manager

APPENDIX B. FEDERAL EMERGENCY MANAGEMENT AGENCY MT-2 FORMS

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless it displays a valid OMB control number. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a (NFIP) Flood Insurance Rate Maps (FIRM).

A. REQUESTED RESPONSE FROM DHS-FEMA

This request is for a (check one):

☐ CLOMR: A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☒ LOMR: A letter from DHS-FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See 44 CFR Ch. 1, Parts 60, 65 & 72)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Example: 480301 480287	City of Katy Harris County	TX TX	48473C 48201C	0005D 0220G	02/08/83 09/28/90
08037C	EAGLE COUNTY	CO	080051	0438D	12/04/07
08037C	EAGLE COUNTY	CO	080051	0439D	12/04/07

2. a. Flooding Source: EAGLE RIVER

   b. Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)
   ☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

3. Project Name/Identifier: I-70 Edwards Interchange Upgrade Phase 2

4. FEMA zone designations affected: AE (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

   a. The basis for this revision request is (check all that apply)

   ☒ Physical Change ☐ Improved Methodology/Data ☒ Regulatory Floodway Revision ☐ Base Map Changes
   ☐ Coastal Analysis ☒ Hydraulic Analysis ☐ Hydrologic Analysis ☐ Corrections
   ☐ Weir-Dam Changes ☐ Levee Certification ☐ Alluvial Fan Analysis ☐ Natural Changes
   ☒ New Topographic Data ☐ Other (Attach Description)

   Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following structures (check all that apply)

Structures: ☐ Channelization ☐ Levee/Floodwall ☒ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other (Attach Description)

6. ☐ Documentation of ESA compliance is submitted (required to initiate CLOMR review). Please refer to the instructions for more information.

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $8000

☐ No, Attach Explanation

Please see the DHS-FEMA Web site at http://www.fema.gov/plan/prevent/fhm/frm_fees.shtm **for Fee Amounts and Exemptions.**

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Stacey Thomas	Company: Felsburg Holt & Ullevig	
Mailing Address: 6400 South Fiddler's Green Cir, Ste 1500 Greenwood Village, Colorado 80111	Daytime Telephone No.: 303-721-1440	Fax No.:
	E-Mail Address: stacey.thomas@fhueng.com	
Signature of Requester (required):	Date: 9/24/2020	

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirements for when fill is placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. For Conditional LOMR requests, the applicant has documented Endangered Species Act (ESA) compliance to FEMA prior to FEMA's review of the Conditional LOMR application. For LOMR requests, I acknowledge that compliance with Sections 9 and 10 of the ESA has been achieved independently of FEMA's process. For actions authorized, funded, or being carried out by Federal or State agencies, documentation from the agency showing its compliance with Section 7(a)(2) of the ESA will be submitted. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Ms. Nicole Mosby	Community Name: Eagle County	
Mailing Address: PO Box 850 Eagle, CO 81631	Daytime Telephone No.: 970-328-3564	Fax No.:
	E-Mail Address: Nicole.Mosby@eaglecouty.us	
Community Official's Signature (required):	Date:	

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.2(b) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Stacey Thomas	License No.: 53489	Expiration Date: 10/31/2021	
Company Name: Felsburg Holt & Ullevig	Telephone No.: 303-721-1440	Fax No.:	
Signature: Stacey Thomas	Date: 9/24/2020	E-Mail Address: stacey.thomas@fhueng.com	

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if …
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (Optional)

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 3.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington VA 20958-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program (NFIP); Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Eagle River

Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☒ Not revised (skip to section B) ☐ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	Effective/FIS (cfs)	Revised (cfs)

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☐ Precipitation/Runoff Model → Specify Model: _____
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters), and documentation to support the new analysis.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Is the hydrology for the revised flooding source(s) affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation..

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit*	Approx. 40' North of Edwards Bridge	292	7168.28	7168.28
Upstream Limit*	Approx. 32' South of Edwards Bridge	295	7198.40	7198.40

*Proposed/Revised elevations must tie-into the Effective elevations within 0.5 foot at the downstream and upstream limits of revision.

2. Hydraulic Method/Model Used: HEC-RAS 5.0.3

3. Pre-Submittal Review of Hydraulic Models*

DHS-FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS.

4.

Models Submitted	Natural Run		Floodway Run		Datum
	File Name:	Plan Name:	File Name:	Plan Name:	
Duplicate Effective Model*					
Corrected Effective Model*	File Name: EagleRiverFloodplain	Plan Name: Eagle_River	File Name:	Plan Name:	
Existing or Pre-Project Conditions Model	File Name: EagleRiverFloodplain	Plan Name: Existing Conditions	File Name:	Plan Name:	
Revised or Post-Project Conditions Model	File Name: EagleRiverFloodplain	Plan Name: As-built Conditions	File Name: EagleRiverFloodplain	Plan Name: As-built_Floodway	NAVD 1988
Other - (attach description)	File Name:	Plan Name:	File Name:	Plan Name:	

* For details, refer to the corresponding section of the instructions.

☒ Digital Models Submitted? (Required)

C. MAPPING REQUIREMENTS

A **certified topographic work map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

☒ Digital Mapping (GIS/CADD) Data Submitted (preferred)

Topographic Information: Colorado State Plane Central Zone 83, NAVD 1988

Source: Eagle County Date: 10/01/2020

Accuracy: 1-ft Contour Interval

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM**, at the same scale as the original, annotated to show the boundaries of the revised 1%-and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%-and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area on revision.

☒ Annotated FIRM and/or FBFM (Required)

D. COMMON REGULATORY REQUIREMENTS*

1. For LOMR/CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☒ No

   a. For CLOMR requests, if either of the following is true, please submit **evidence of compliance with Section 65.12 of the NFIP regulations**:

   - The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot compared to pre-project conditions.
   - The proposed project encroaches upon a SFHA with or without BFEs established and would result in increases above 1.00 foot compared to pre-project conditions.

   b. Does this LOMR request cause increase in the BFE and/or SFHA compared with the effective BFEs and/or SFHA? ☐ Yes ☒ No

   If Yes, please attach **proof of property owner notification and acceptance (if available)**. Elements of and examples of property owner notifications can be found in the MT-2 Form 2 Instructions.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

   If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(A)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☒ Yes ☐ No

   If Yes, attach **evidence of regulatory floodway revision notification**. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being established. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For CLOMR requests, please submit documentation to FEMA and the community to show that you have complied with Sections 9 and 10 of the Endangered Species Act (ESA).

For actions authorized, funded, or being carried out by Federal or State agencies, please submit documentation from the agency showing its compliance with Section 7(a)(2) of the ESA. Please see the MT-2 instructions for more detail.

* Not inclusive of all applicable regulatory requirements. For details, see 44 CFR parts 60 and 65.

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. NO. 1660-0016
Expires February 28, 2014

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0016). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

PRIVACY ACT STATEMENT

AUTHORITY: The National Flood Insurance Act of 1968, Public Law 90-448, as amended by the Flood Disaster Protection Act of 1973, Public Law 93-234.

PRINCIPAL PURPOSE(S): This information is being collected for the purpose of determining an applicant's eligibility to request changes to National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM).

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by the routine uses published in DHS/FEMA/NFIP/LOMA-1 National Flood Insurance Program; Letter of Map Amendment (LOMA) February 15, 2006, 71 FR 7990.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent FEMA from processing a determination regarding a requested change to a NFIP Flood Insurance Rate Maps (FIRM).

Flooding Source: Eagle River

Note**:** Fill out one form for each flooding source studied.

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization.....complete Section B
Bridge/Culvert.....complete Section C
Dam.....complete Section D
Levee/Floodwall.....complete Section E
Sediment Transport.....complete Section F (if required)

Description Of Modeled Structure

1. Name of Structure: Edwards Bridge

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: Eagle River at the Edwards Access Road

   Downstream Limit/Cross Section: 293.2

   Upstream Limit/Cross Section: 294

2. Name of Structure: _____

   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: ____

   Downstream Limit/Cross Section: _____

   Upstream Limit/Cross Section: _____

3. Name of Structure: _____

   Type (check one) ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: _____

   Downstream Limit/Cross Section: _____

   Upstream Limit/Cross Section: _____

NOTE: FOR MORE STRUCTURES, ATTACH ADDITIONAL PAGES AS NEEDED.

B. CHANNELIZATION

Flooding Source: _____

Name of Structure: _____

1. Hydraulic Considerations

The channel was designed to carry _____ (cfs) and/or the _____-year flood.

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions

☐ Other locations (specify): _____

2. Channel Design Plans

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Accessory Structures

The channelization includes (check one):

☐ Levees [Attach Section E (Levee/Floodwall)] ☐ Drop structures ☐ Superelevated sections

☐ Transitions in cross sectional geometry ☐ Debris basin/detention basin [Attach Section D (Dam/Basin)] ☐ Energy dissipator

☐ Weir ☐ Other (Describe):

4. Sediment Transport Considerations

Are the hydraulics of the channel affected by sediment transport? ☐ Yes ☐ No

If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: Eagle River

Name of Structure: Edwards Bridge

1. This revision reflects (check one):

☐ Bridge/culvert not modeled in the FIS

☒ Modified bridge/culvert previously modeled in the FIS

☐ Revised analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-RAS 5.0.3
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

☒ Dimensions (height, width, span, radius, length)
☐ Shape (culverts only)
☒ Material
☒ Beveling or Rounding
☒ Wing Wall Angle
☒ Skew Angle
☐ Distances Between Cross Sections
☒ Erosion Protection
☒ Low Chord Elevations – Upstream and Downstream
☒ Top of Road Elevations – Upstream and Downstream
☒ Structure Invert Elevations – Upstream and Downstream
☒ Stream Invert Elevations – Upstream and Downstream
☒ Cross-Section Locations

4. Sediment Transport Considerations

Are the hydraulics of the structure affected by sediment transport? ☐ Yes ☒ No

If Yes, then fill out Section F (Sediment Transport) of Form 3. If no, then attach an explanation.

D. DAM/BASIN

Flooding Source: _____
Name of Structure: _____

1. This request is for (check one): ☐ Existing dam/basin ☐ New dam/basin ☐ Modification of existing dam/basin

2. The dam/basin was designed by (check one): ☐ Federal agency ☐ State agency ☐ Private organization ☐ Local government agency

   Name of the agency or organization: _____

3. The Dam was permitted as (check one): ☐ Federal Dam ☐ State Dam

   Provide the permit or identification number (ID) for the dam and the appropriate permitting agency or organization

   Permit or ID number _____ Permitting Agency or Organization _____

   a. ☐ Local Government Dam ☐ Private Dam

      Provided related drawings, specification and supporting design information.

4. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

   Was the dam/basin designed using critical duration storm? (must account for the maximum volume of runoff)

   ☐ Yes, provide supporting documentation with your completed Form 2.

   ☐ No, provide a written explanation and justification for not using the critical duration storm.

5. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why debris/sediment analysis was not considered?

6. Does the Base Flood Elevation behind the dam/basin or downstream of the dam/basin change? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

FREQUENCY (% annual chance)	Stillwater Elevation Behind the Dam/Basin FIS	REVISED
10-year (10%)	_____	_____
50-year (2%)	_____	_____
100-year (1%)	_____	_____
500-year (0.2%)	_____	_____
Normal Pool Elevation	_____	_____

7. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one): ☐ upgrading of an existing levee/floodwall system ☐ a newly constructed levee/floodwall system ☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc. Station _____ to _____
☐ structural floodwall Station _____ to _____
☐ Other (describe): Station _____ to _____

c. Structural Type (check one): ☐ monolithic cast-in place reinforced concrete ☐ reinforced concrete masonry block ☐ sheet piling ☐ Other (describe): _____

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency? _____

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers: _____
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers: _____
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers: _____
4. A layout detail for the embankment protection measures. Sheet Numbers: _____
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, Floodwall structure, closure structures, and pump stations. Sheet Numbers: _____

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope land side is: _____

b. The maximum levee slope flood side is: _____

c. The range of velocities along the levee during the base flood is: _____ (min.) to _____ (max.)

d. Embankment material is protected by (describe what kind): _____

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach	Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
					D_{100}	D_{50}	Thickness	
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								
Sta to								

(Extend table on an added sheet as needed and reference each entry)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:
_____

☐ Overall height: Sta.: _____, height _____ ft.

☐ Limiting foundation soil strength:

Strength ϕ = _____ degrees, c = _____ psf

Slope: SS = _____ (h) to _____ (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):
_____

c. Summary of stability analysis results:

E. LEVEE/FLOODWALL (CONTINUED)

5. Embankment And Foundation Stability (continued)

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is _____ hours.

Attach engineering analysis to support construction plans.

6. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one): ☐ UBC (1988) ☐ Other (specify): _____

b. Stability analysis submitted provides for: ☐ Overturning ☐ Sliding If not, explain: _____

c. Loading included in the analyses were: ☐ Lateral earth @ P_A = _____ psf; P_p = _____ psf

☐ Surcharge-Slope @ _____, ☐ surface _____ psf

☐ Wind @ P_w = _____ psf

☐ Seepage (Uplift); _____ ☐ Earthquake @ P_{eq} = _____ %g

☐ 1%-annual-chance significant wave height: _____ ft.

☐ 1%-annual-chance significant wave period: _____ sec.

d. Summary of Stability Analysis Results: Factors of Safety.
Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
Dead & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)
Note: (Extend table on an added sheet as needed and reference)

E. LEVEE/FLOODWALL (CONTINUED)

6. Floodwall And Foundation Stability (continued)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is _____ ft. to _____ ft.

c. Settlement of the levee crest is determined to be primarily from : ☐ Foundation consolidation ☐ Embankment compression ☐ Other (Describe): _____

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: _____ acres
Draining to ponding area: _____ acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: _____ cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

e. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is _____ cfs

h. The length of levee system used to drive this seepage rate in item g: _____ ft.

E. LEVEE/FLOODWALL (CONTINUED)

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants: _____ For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all interior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem

Hydrocompaction ☐ is ☐ is not a problem

Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No Attach supporting documentation

d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No

If Yes, then fill out Section F (Sediment Transport). If No, then attach your explanation for why sediment transport was not considered.

10. Operational Plan And Criteria

a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
☐ Yes ☐ No

c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
☐ Yes ☐ No If the answer is No to any of the above, please attach supporting documentation.

E. LEVEE/FLOODWALL (CONTINUED)

11. Maintenance Plan

Please attach a copy of the fomal maintenance plan for the levee/floodwall

12. Operations and Maintenance Plan

Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

CERTIFICATION OF THE LEVEE DOCUMENTION

This certification is to be signed and sealed by a licensed registered professional engineer authorized by law to certify elevation information data, hydrologic and hydraulic analysis, and any other supporting information as per NFIP regulations paragraph 65.10(e) and as described in the MT-2 Forms Instructions. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: _____ License No.: _____ Expiration Date: _____

Company Name: _____ Telephone No.: _____ Fax No.: _____

Signature: _____ Date: _____ E-Mail Address: _____

F. SEDIMENT TRANSPORT

Flooding Source: _____

Name of Structure: _____

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume _____ acre-feet

Debris load associated with the base flood discharge: Volume _____ acre-feet

Sediment transport rate _____ (percent concentration by volume)

Method used to estimate sediment transport: _____

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition: _____

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport: _____

Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

APPENDIX C. FLOODPLAIN WORKMAP

BASIS OF BEARINGS: BEARINGS USED IN THE CALCULATIONS OF COORDINATES ARE BASED ON A GRID BEARING OF N52°57'30"E FROM CM 307 (MP 0.07) TO CM 305 (MP 0.35). BOTH MONUMENTS ARE CDOT TYPE II, MARKED APPROPRIATELY FOR THEIR MILEPOST LOCATION AND CONTROL POSITION. THE SURVEY DATA WAS OBTAINED FROM A GLOBAL POSITIONING SYSTEM(GPS) SURVEY BASED ON THE CONTINUOUSLY OPERATING REFERENCE STATIONS (CORS).

BASIS OF ELEVATIONS: "BASIS OF ELEVATION = 7,205.78 ON USGS BM Y-29 (NAVD88) + 0.31' TO MATCH LOCAL CDOT ELEVATIONS PROVIDED". THIS STATEMENT PROVIDED BY THE COLORADO DEPARTMENT OF TRANSPORTATION AS SHOWN ON CDOT RIGHT-OF-WAY PLANS, PROJECT IM 0702-265. 105 WEST, INC. COMPLETED A CLOSED DIFFERENTIAL LEVEL LOOP THROUGH ALL PROJECT CONTROL BASED ON THE CDOT PUBLISHED ELEVATION ON CM 303, ELEVATION = 7,222.83' (NAVD88), AS SHOWN ON SAID PLAN SET.

COORDINATE DATUM: PROJECT COORDINATES ARE MODIFIED COLORADO STATE PLANE CENTRAL ZONE NAD '83 COORDINATES. THE COMBINED ELEVATION/SCALE FACTOR USED TO MODIFY THE COORDINATES FROM STATE PLANE TO PROJECT COORDINATES IS 1.0003626365. THE RESULTING PROJECT COORDINATES ARE TRUNCATED BY 1,600,000 IN THE NORTHING AND 2,600,000 IN THE EASTING AFTER CONVERTING FROM STATE PLANE COORDINATES TO PROJECT COORDINATES. THE CORS IS BASED ON THE NAD '83 DATUM.

PROJECT COORDINATES NORTHING US SURVEY FEET -
(STATE PLANE COORDINATE NORTHING - 1,600,000 * 1.0003626365).
PROJECT COORDINATES EASTING US SURVEY FEET =
STATE PLANE COORDINATE EASTING - 2,600,000 * 1.0003626365).

105 WEST, INC. UTILIZED THE PROJECT CONTROL DIAGRAM FOR PROJECT IM 0702-265, PROJECT CODE 15851, PROVIDED BY THE COLORADO DEPARTMENT OF TRANSPORTATION. ALL DATA SHOWN HEREIN WAS PERPETUATED FROM SAID PROJECT CONTROL DIAGRAM.

LEGEND

- AS-BUILT CONDITIONS 100 - YEAR FLOODPLAIN
- EFFECTIVE/EXISTING CONDITIONS 100 - YEAR FLOODPLAIN
- AS-BUILT CONDITIONS 500 - YEAR FLOODPLAIN
- EFFECTIVE/EXISTING CONDITIONS 500 - YEAR FLOODPLAIN
- AS-BUILT FLOODWAY
- EFFECTIVE/EXISTING CONDITIONS FLOODWAY
- EFFECTIVE HYDRAULIC CROSS SECTIONS
- PROPERTY BOUNDARIES
- CROSS-SECTION I.D. XXX.XX
- AS-BUILT 100-YEAR FLOOD ELEVATION XXX.XX

COLORADO LICENSED
STACEY R. THOMAS
53489
09/30/2020
PROFESSIONAL ENGINEER

0' 150' 300' 600'

Print Date:	9/30/2020		
File Name:	112475-FloodplainWorkmap.dgn		
Horiz. Scale:	1:300		

FELSBURG HOLT & ULLEVIG
6300 South Syracuse Way, Suite 600
Centennial, CO 80111
Phone: 303.721.1440
www.FHUENG.com

R-X

Sheet Revisions		
Date:	Comments	Init.

Colorado Department of Transportation
Region 3
P.O. BOX 298
714 Grand Avenue
Eagle, CO 81631
Phone: 970-328-9934
Fax: 970-328-2368
KMB

EAGLE COUNTY Engineering

As Constructed
No Revisions:
Revised:
Void:

I-70G EDWARDS INTERCHANGE
UPGRADE PHASE 2
FLOODPLAIN WORKMAP

Designer: SJT
Detailer: SV
Sheet Subset:
Structure Numbers
Subset Sheets: of

Project No./Code
NHPP 0702-344
19944
Sheet Number

Stacey.Thomas 3:04:33 PM I:\112475-01 - I70 G US6 Edwards\19944\Hydraulics\Reports\LOMR\Appendix F_Hydraulic Computations\MS Files\112475-FloodplainWorkmap.dgn

APPENDIX D. ANNOTATED FEMA INFORMATION

NOTES TO USERS

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

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

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

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

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

The **projection** used in the preparation of this map is Universal Tranverse Mercator (UTM) zone 13. The **horizontal datum** is NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

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

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3242

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

Base map information shown on this FIRM was provided in digital format by Eagle County Geographic Information Systems.

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

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

An accompanying Flood Insurance Study report, Letters of Map Revision or Letters of Map Amendment revising portions of this panel, and digital versions of this PANEL may be available. Contact the **FEMA Map Service Center** at the following phone numbers and Internet address for infomation on **all** related products available from FEMA:

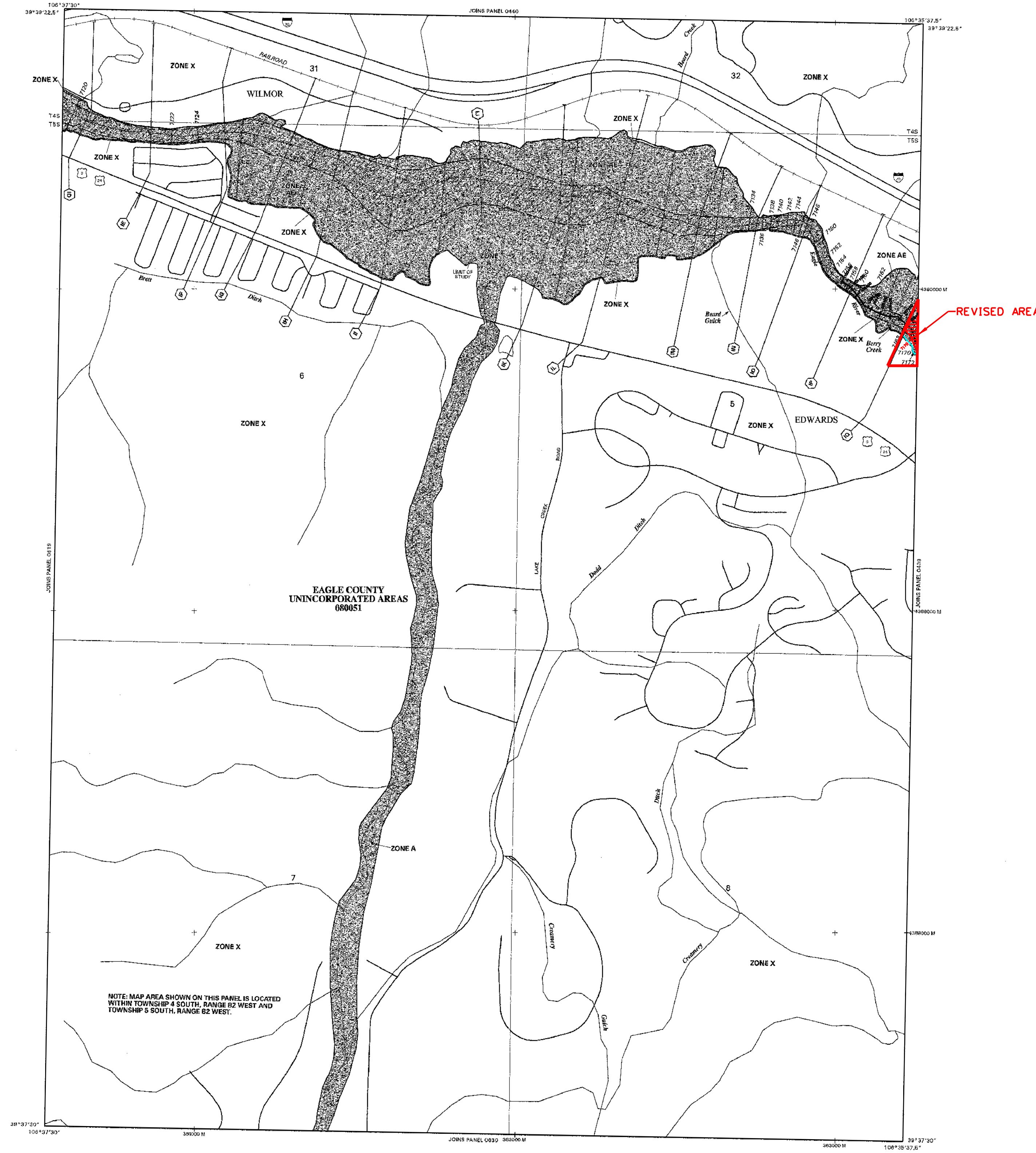
Phone: 800-358-9616
FAX: 800-358-9620
www.fema.gov/msc.

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

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report may reflect stream channel distances that differ from what is shown on this map.

LEGEND

PROPOSED CONDITIONS 100 - YEAR FLOODPLAIN
PROPOSED FLOODWAY



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

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

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

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

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

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

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

*Referenced to the North American Vertical Datum of 1988

(A)—(A) Cross Section Line
(23)- - - -(23) Transect Line
97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4276000M — 1000-meter Universal Transverse Mercator grid values, zone 13
600000 FT — 5000-foot grid ticks
DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel).
• M1.5 — River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
DECEMBER 4, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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

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

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0438D

FIRM
FLOOD INSURANCE RATE MAP
EAGLE COUNTY,
COLORADO
AND INCORPORATED AREAS

PANEL 438 OF 1125

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EAGLE COUNTY, UNINCORPORATED AREAS	080051	0438	D

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

MAP NUMBER
08037C0438D

EFFECTIVE DATE:
DECEMBER 4, 2007

Federal Emergency Management Agency

NOTES TO USERS

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

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

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

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

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

The **projection** used in the preparation of this map is Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** is NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

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

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3242

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

Base map information shown on this FIRM was provided in digital format by Eagle County Geographic Information Systems.

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

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

An accompanying Flood Insurance Study report, Letters of Map Revision or Letters of Map Amendment revising portions of this panel, and digital versions of this PANEL may be available. Contact the **FEMA Map Service Center** at the following phone numbers and Internet address for information on all related products available from FEMA:

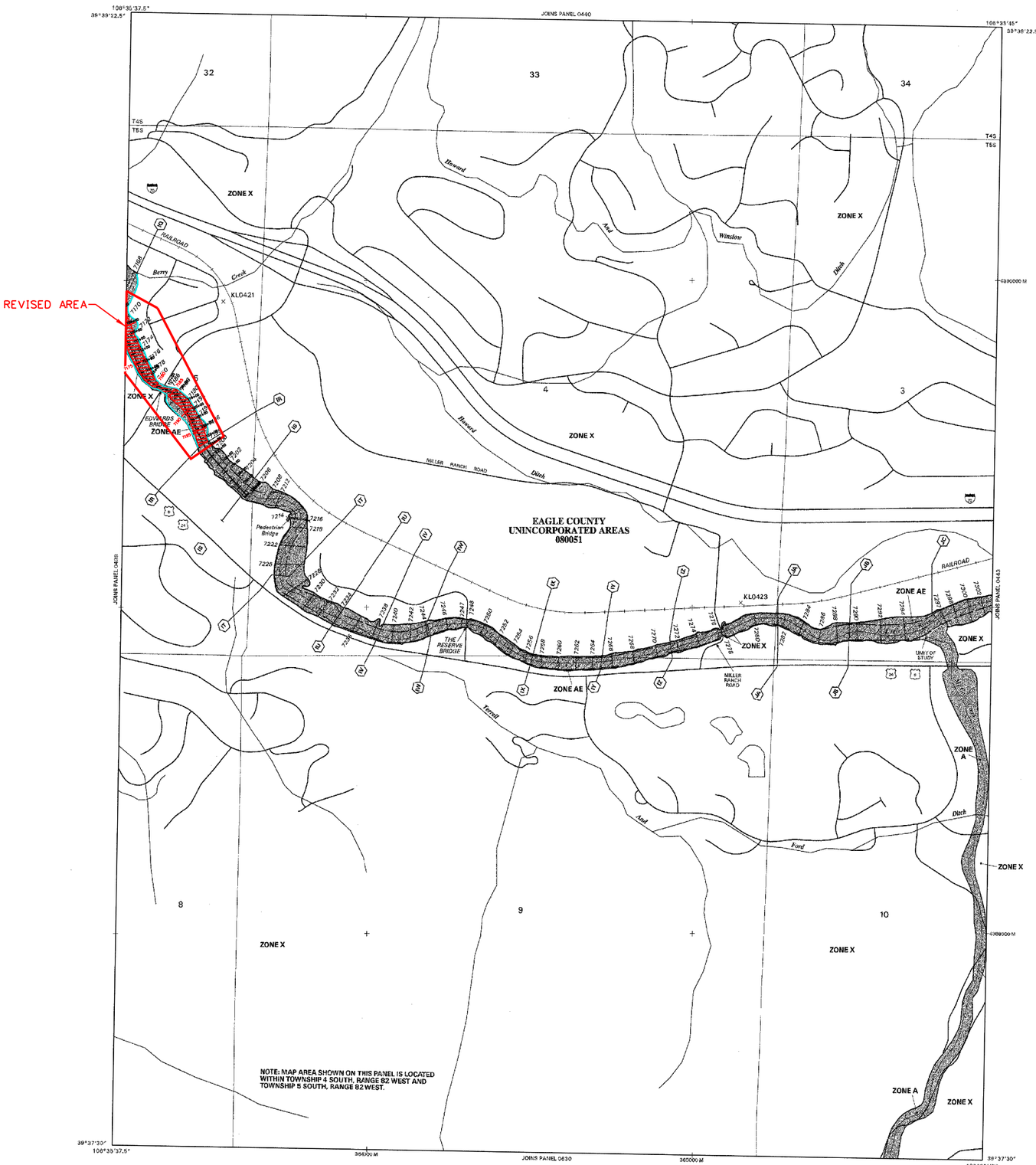
Phone: 800-358-9616
FAX: 800-358-9620
www.fema.gov/msc

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

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report may reflect stream channel distances that differ from what is shown on this map.

LEGEND

PROPOSED CONDITIONS 100 - YEAR FLOODPLAIN
PROPOSED FLOODWAY



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

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

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.

ZONE A99 Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

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

OTHER FLOOD AREAS

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

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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

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

*Referenced to the North American Vertical Datum of 1988

- (A) — (A) Cross Section Line
- (23) — — — (23) Transect Line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276000M — 1000-meter Universal Transverse Mercator grid values, zone 13
- 600000 FT — 5000-foot grid ticks
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel).
- M1.5 — River Mile

MAP REPOSITORY
Refer to Repository Listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
DECEMBER 4, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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

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

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0439D

FIRM

FLOOD INSURANCE RATE MAP

EAGLE COUNTY,
COLORADO
AND INCORPORATED AREAS

PANEL 439 OF 1125

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

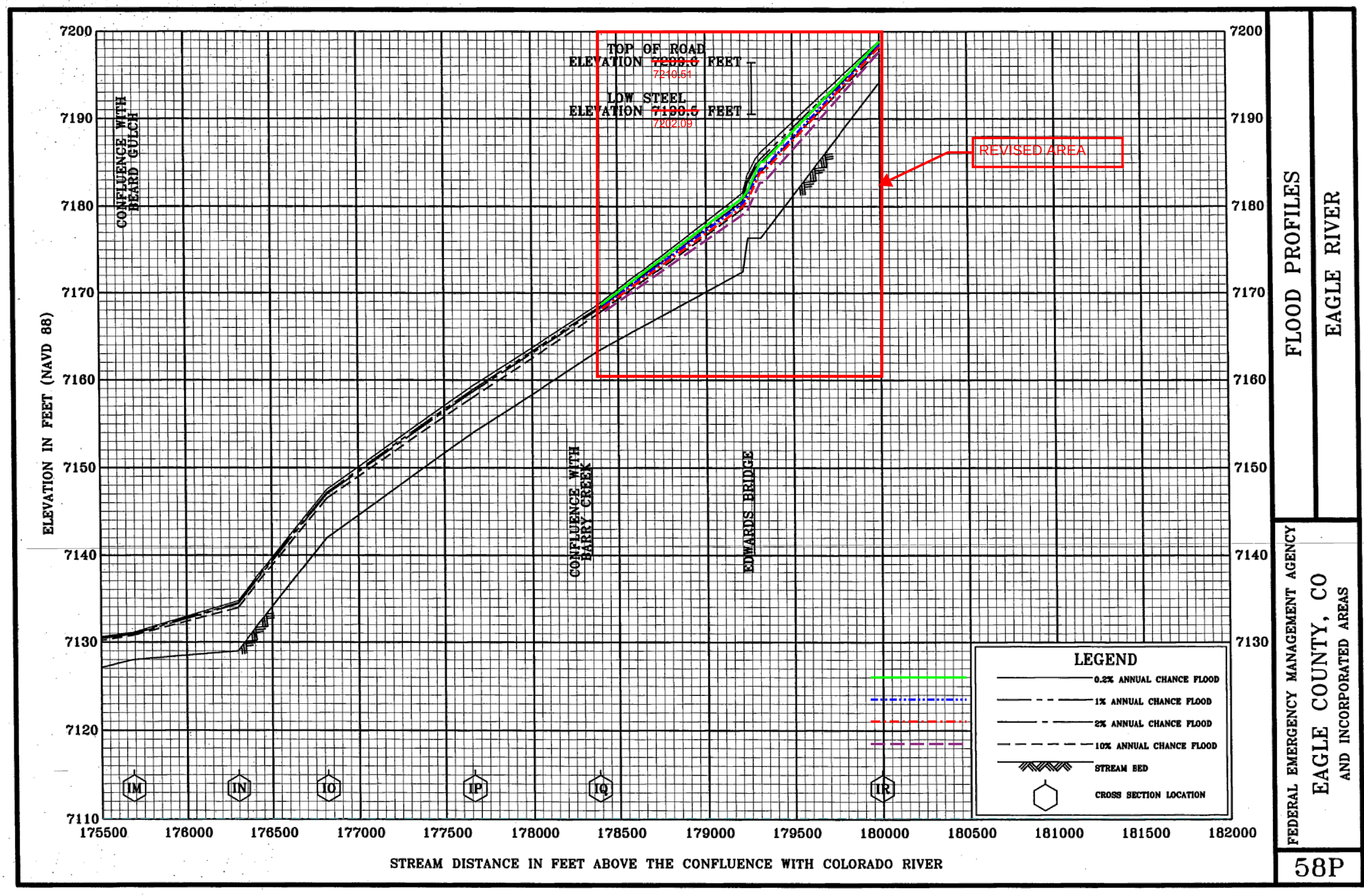
COMMUNITY	NUMBER	PANEL	SUFFIX
EAGLE COUNTY, UNINCORPORATED AREAS	080051	0439	D

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

MAP NUMBER
08037C0439D

EFFECTIVE DATE:
DECEMBER 4, 2007

Federal Emergency Management Agency



FLOOD PROFILES

EAGLE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

EAGLE COUNTY, CO

AND INCORPORATED AREAS

58P

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						FEET (NAVD 88)		
EAGLE RIVER								
IA	166,833	116	773	8.0	7,114.5	7,114.5	7,114.7	0.2
IB	167,224	140	877	7.0	7,116.0	7,116.0	7,116.4	0.4
IC	168,471	249	1,878	3.3	7,119.8	7,119.8	7,119.9	0.1
ID	169,088	192	1,550	4.0	7,120.1	7,120.1	7,120.2	0.1
IE	169,771	116	519	11.9	7,120.4	7,120.4	7,120.5	0.1
IF	170,530	163	814	7.6	7,125.9	7,125.9	7,126.2	0.3
IG	171,210	266	1,969	3.1	7,127.1	7,127.1	7,127.5	0.4
IH	171,728	270	1,297	4.8	7,127.2	7,127.2	7,127.6	0.4
II	172,428	610	2,556	2.4	7,127.4	7,127.4	7,128.3	0.9
IJ	173,366	460	1,701	3.6	7,127.7	7,127.7	7,128.7	1.0
IK	174,196	400	1,714	3.2	7,128.5	7,128.5	7,129.4	0.9
IL	174,840	186	913	6.0	7,128.7	7,128.7	7,129.7	1.0
IM	175,687	186	621	8.7	7,131.0	7,131.0	7,131.9	0.9
IN	176,297	132	702	7.7	7,134.5	7,134.5	7,135.5	1.0
IO	176,817	93	443	12.3	7,147.2	7,147.2	7,147.7	0.5
IP	177,661	92	475	11.4	7,158.9	7,158.9	7,159.3	0.4
IQ	178,384	121	521	10.4	7,168.3	7,168.3	7,168.3	0.0
IR	179,992	100	453	12.0	7,198.4	7,198.4	7,198.5	0.1
IS	180,622	112	618	8.8	7,205.2	7,205.2	7,205.7	0.5
IT	181,940	111	465	11.7	7,226.3	7,226.3	7,226.4	0.1
IU	182,696	121	604	9.0	7,234.0	7,234.0	7,235.0	1.0
IV	183,154	106	503	10.8	7,238.6	7,238.6	7,238.8	0.2
IW	183,685	110	531	10.2	7,244.3	7,244.3	7,244.8	0.5
IX	184,846	93	442	12.3	7,256.8	7,256.8	7,256.9	0.1
IY	185,552	110	584	9.3	7,265.0	7,265.0	7,265.3	0.3
IZ	186,267	78	440	12.3	7,271.2	7,271.2	7,271.6	0.4

REVISED AREA

[1] Stream distance in feet above the confluence with Colorado River

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

EAGLE COUNTY, CO

AND INCORPORATED AREAS

FLOODWAY DATA

EAGLE RIVER

APPENDIX E. COMPARISON TABLES

UDFCD DLOMC Submittal - BFE Comparison Table

Project Name :	**I-70G Edwards Spur Interchange Upgrade Project**
Flooding Source:	**Eagle River**
Company:	**Felsburg Holt and Ullevig**
Completed By:	**Stacey Thomas, PE**

SOURCE DATA											COMPARISONS				
HYDRAULIC CROSS-SECTION INFO.						BASE FLOOD ELEVATIONS (NAVD)									
Effective Cross-Section ID (Letter)	Corrected Effective Cross-Section ID	Corrected Effective Stream Station	Existing Cross-Section ID	As-Built Cross-Section ID	As-Built Stream Station	EFFECTIVE	DUP. EFF.	COR. EFF.	EXISTING	AS-BUILT	DUP. EFF vs. EFF.	COR. EFF. vs. EFF.	EX. vs. COR. EFF.	AS-BUILT vs. COR. EFF.	AS-BUILT vs. EFF.
						BFE	BFE	BFE	BFE	BFE	BFE	BFE	BFE	BFE	BFE
295	295	179993	295	295	179993	7198.40	7198.40	7198.40	7198.40	7198.40	0.00	0.00	0.00	0.00	0.00
294.2	294.2	179355	294.2	294.2	179335	***7185.81***	***7185.81***	7184.99	7184.99	7184.27	0.00	-0.82	0.00	-0.72	-1.54
294	294	179315	294	294	179315	7185.43	7185.43	7184.04	7184.04	7184.22	0.00	-1.39	0.00	0.18	-1.21
293.2	293.2	179240	293.2	293.2	179240	7183.14	7183.14	7181.20	7181.20	7180.91	0.00	-1.94	0.00	-0.29	-2.23
293	293	179209	293	293	179209	7180.95	7180.95	7180.85	7180.85	7180.16	0.00	-0.10	0.00	-0.69	-0.79
292	292	178385	292	292	178385	7168.29	7168.29	7168.28	7168.28	7168.28	0.00	-0.01	0.00	0.00	-0.01

-- = Not applicable or no direct comparison available

5225.98 = Interpolated value or value pulled directly from the effective FIS profile

UDFCD LOMC AGREEMENT TABLE

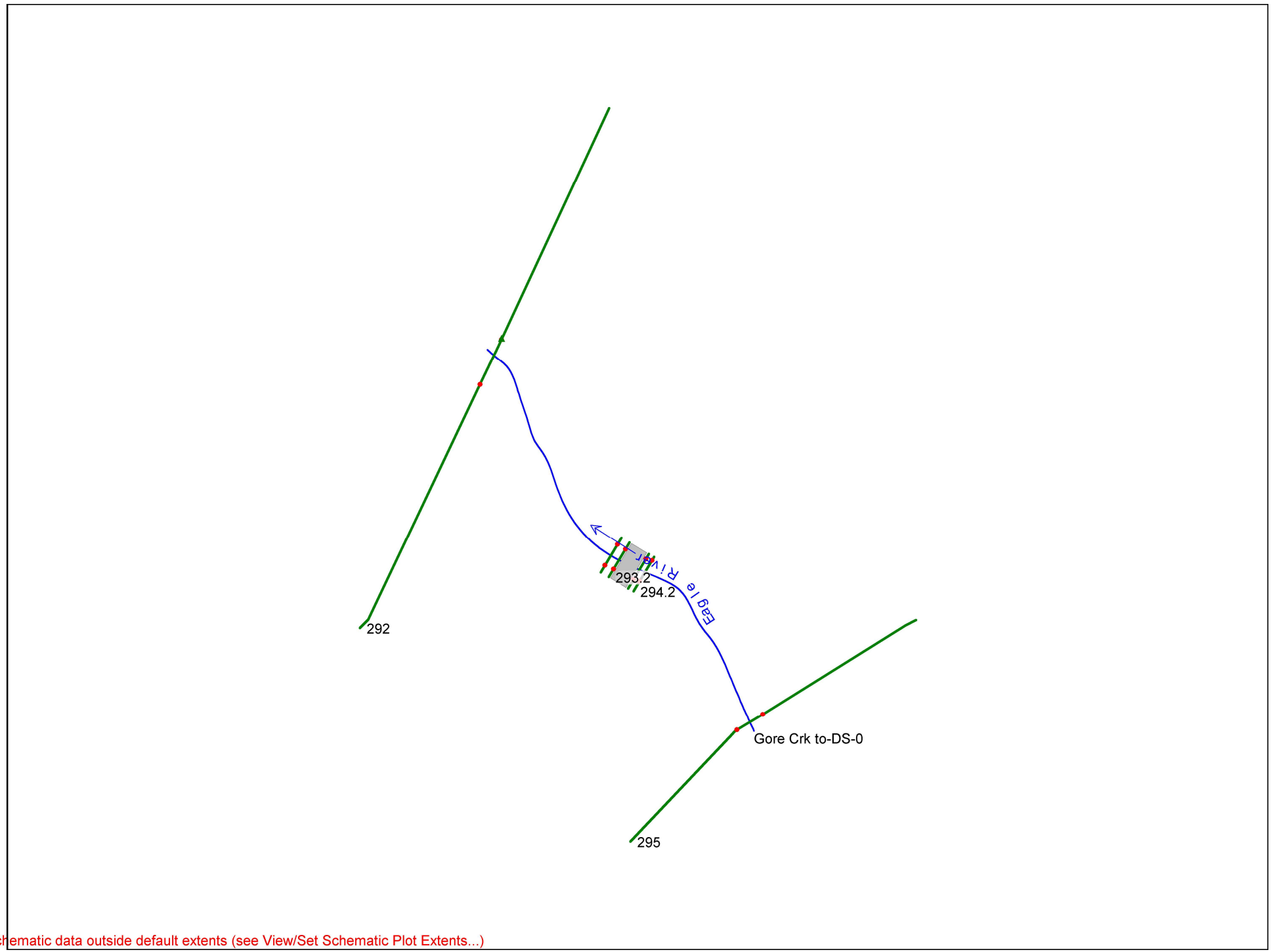
PROJECT NAME:	I-70G Edwards Spur Interchnge Upgrade Project
COMPANY:	Felsburg Holt and Ullevig
COMPLETED BY:	Stacey Thomas, PE

Community(ies): **Eagle County Colorado**
Flooding Source(s): **Eagle River**

Page: **1** **of** **1**
Date: **9/21/2020**

Reference Location	Stream Station	Cross Section #	Channel Distance (ft)			Cumulative Channel Distance (ft)			Base Floodplain Width (ft)			Floodway Width (ft)			Comments
			Model	Map	% Difference	Model	Map	% Difference	Model	Map	Difference (ft)	Model	Map	Difference (ft)	
Upstream Tie-in FEMA section IR	179993	295	658	628	5%	1608	1547	4%	123	128	5	100	97	3	
	179335	294.2	20	20	0%	950	919	3%	68	76	7	82	81	1	
	179315	294	75	76	1%	930	899	3%	66	73	7	79	79	0	
	179240	293.2	31	31	0%	855	823	4%	50	56	6	79	72	7	
	179209	293	824	792	4%	824	792	4%	62	65	4	70	72	2	
Downstream Tie-in FEMA Section IQ	178385	292							541	565	25	121	118	3	
ACCEPTABLE TOLERANCES =			**+/- 5% of Model**			**+/- 5% of Model**			**+/- 25 Feet**						

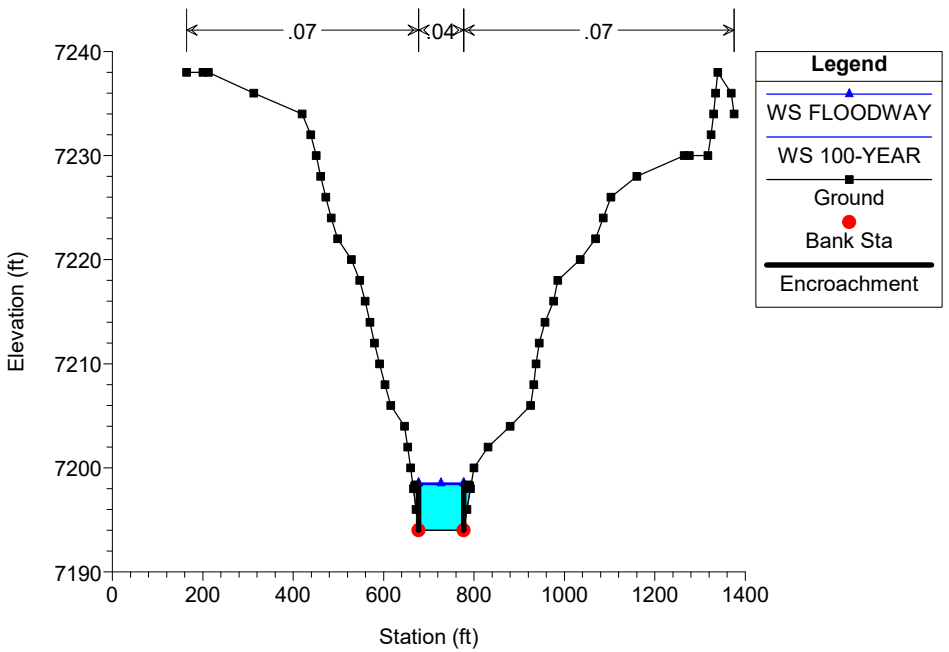
APPENDIX F. HYDRAULICS COMPUTATIONS



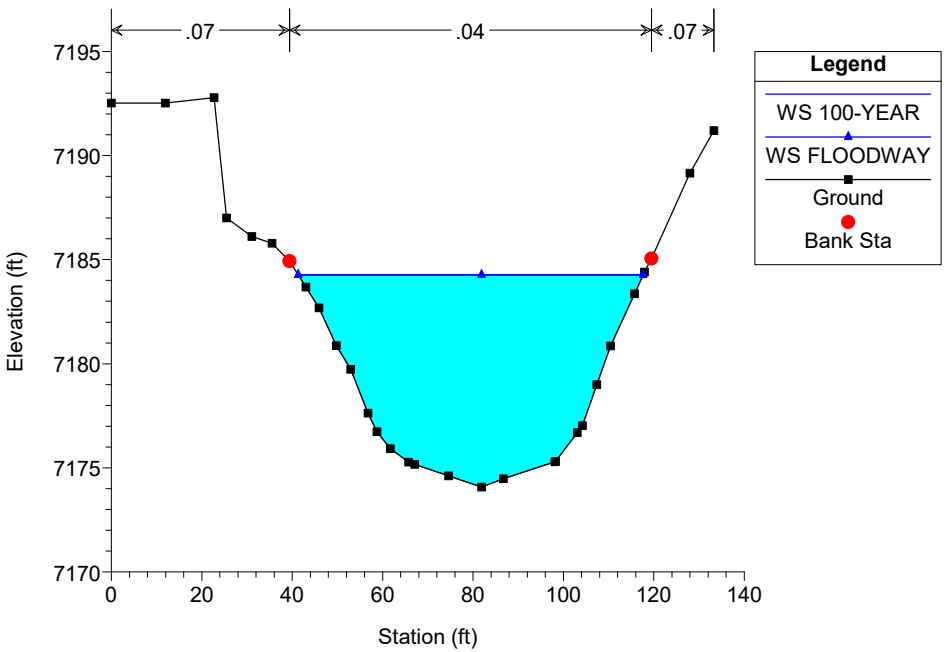
Some schematic data outside default extents (see View/Set Schematic Plot Extents...)

Eagle_River Floodplain Plan: As-built_Floodway 9/30/2020

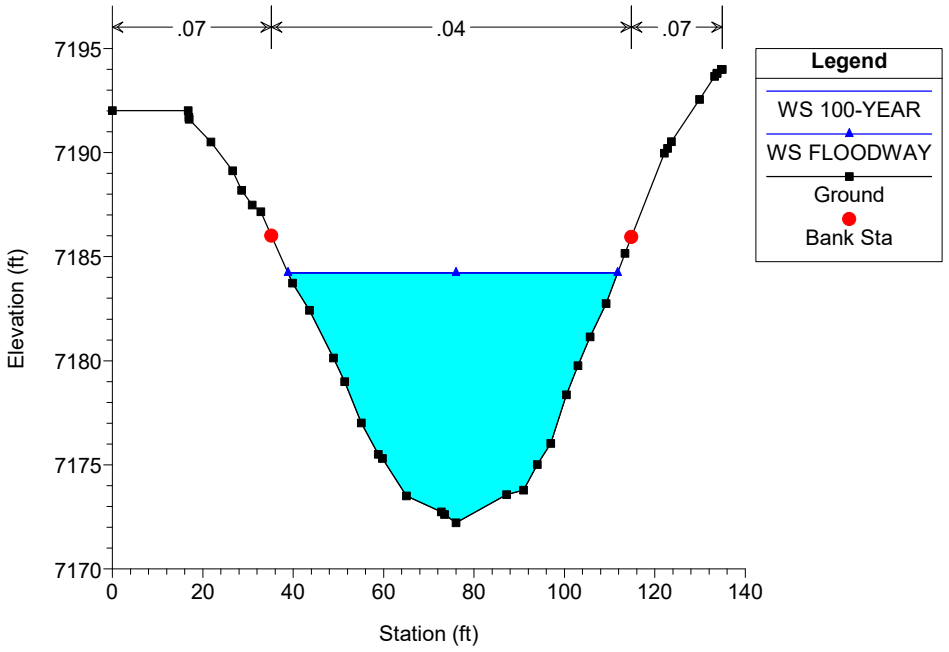
Section IR



Eagle_River Floodplain Plan: As-built_Floodway 9/30/2020

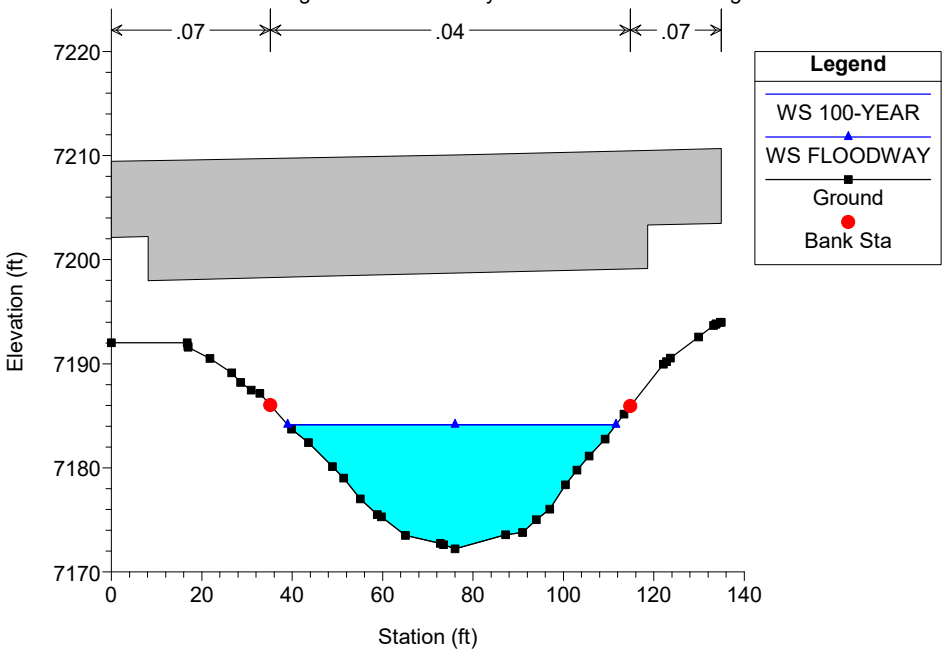


Eagle_River Floodplain Plan: As-built_Floodway 9/30/2020



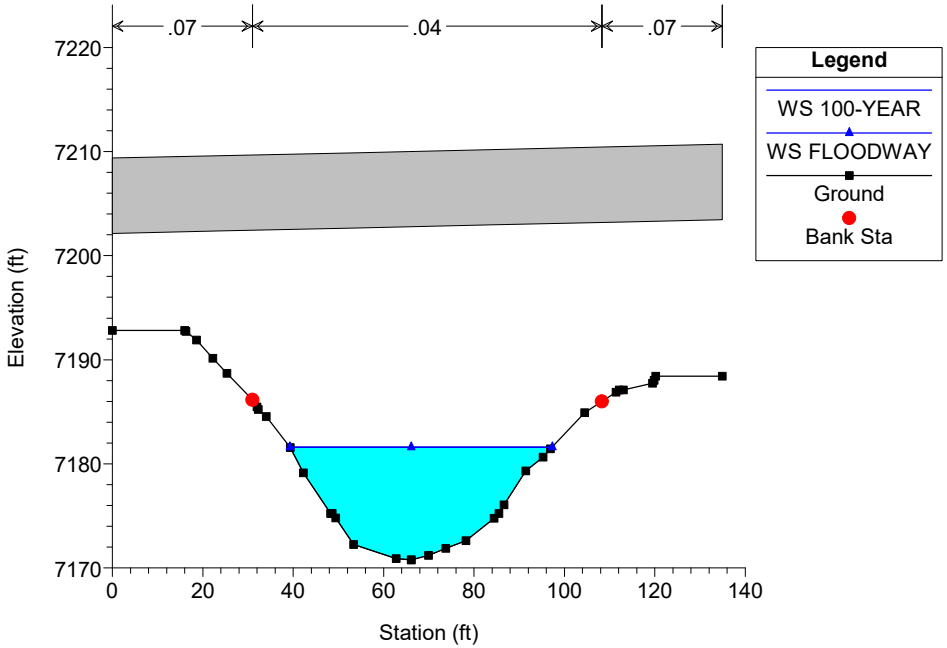
Eagle_River Floodplain Plan: As-built_Floodway 9/30/2020

Edwards Bridge - low chord set by conduit box attached to girder

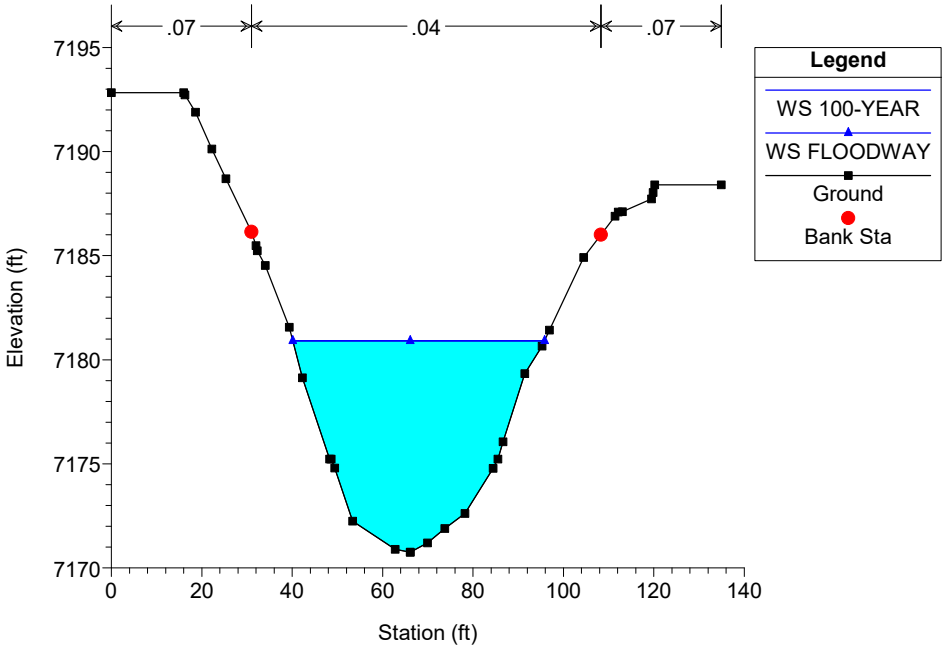


Eagle_River Floodplain Plan: As-built_Floodway 9/30/2020

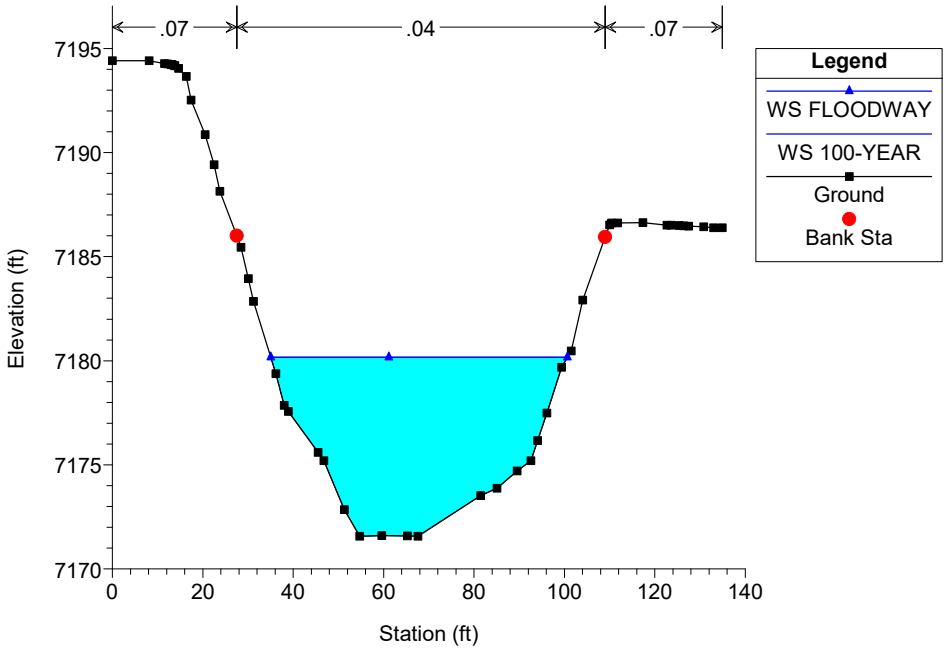
Edwards Bridge - low chord set by conduit box attached to girder



Eagle_River Floodplain Plan: As-built_Floodway 9/30/2020

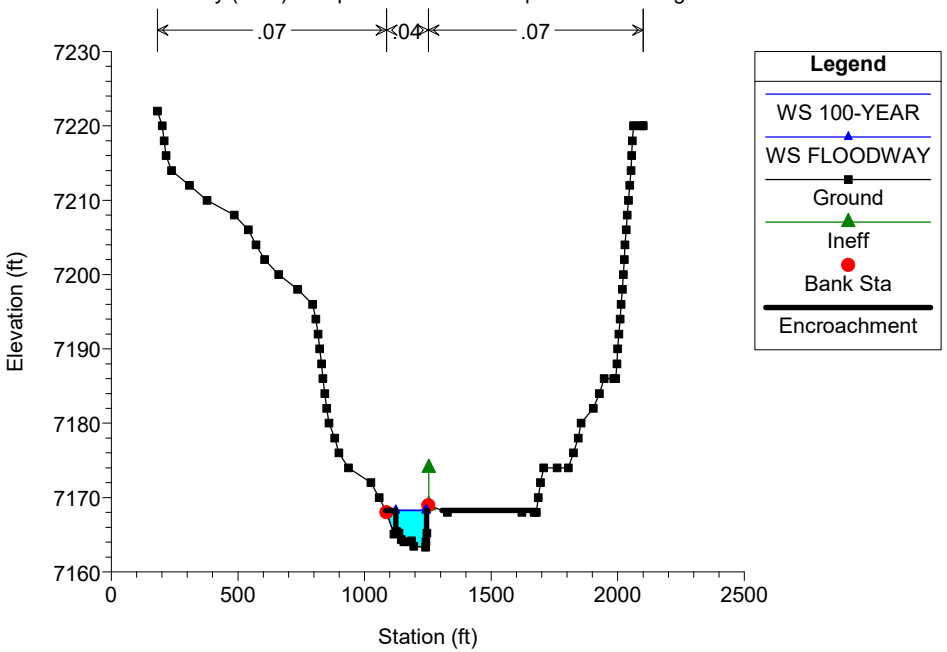


Eagle_River Floodplain Plan: As-built_Floodway 9/30/2020



Eagle_River Floodplain Plan: As-built_Floodway 9/30/2020

Survey (7-02) + Topo. Non FEMA compliant levee in right overbank



Plan: ACM_FWY Eagle River Gore Crk to-DS-0 RS: 293.5 Profile: 100-YEAR

E.G. US. (ft)	7185.75	Element	Inside BR US	Inside BR DS
W.S. US. (ft)	7184.22	E.G. Elev (ft)	7185.70	7184.33
Q Total (cfs)	5430.00	W.S. Elev (ft)	7184.15	7181.61
Q Bridge (cfs)	5430.00	Crit W.S. (ft)	7181.83	7180.96
Q Weir (cfs)		Max Chl Dpth (ft)	11.93	10.85
Weir Sta Lft (ft)		Vel Total (ft/s)	10.00	13.24
Weir Sta Rgt (ft)		Flow Area (sq ft)	542.75	410.09
Weir Submerg		Froude # Chl	0.65	0.88
Weir Max Depth (ft)		Specif Force (cu ft)	4223.22	4013.13
Min El Weir Flow (ft)	7209.45	Hydr Depth (ft)	7.47	7.07
Min El Prs (ft)	7203.49	W.P. Total (ft)	77.49	63.36
Delta EG (ft)	1.50	Conv. Total (cfs)	73806.4	52909.9
Delta WS (ft)	3.31	Top Width (ft)	72.63	58.04
BR Open Area (sq ft)	2237.22	Frctn Loss (ft)		
BR Open Vel (ft/s)	13.24	C & E Loss (ft)		
BR Sluice Coef		Shear Total (lb/sq ft)	2.37	4.26
BR Sel Method	Momentum	Power Total (lb/ft s)	23.68	56.35

HEC-RAS Plan: ACM_FWY River: Eagle River Reach: Gore Crk to-DS-0

Reach	River Sta	Profile	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
Gore Crk to-DS-0	294.2	100-YEAR	7185.93	7184.27		0.12	0.07	76.27		5430.00		10.35
Gore Crk to-DS-0	294.2	FLOODWAY	7185.93	7184.27		0.12	0.07	76.26		5430.00		10.35
Gore Crk to-DS-0	294	100-YEAR	7185.75	7184.22	7181.80			72.91		5430.00		9.91
Gore Crk to-DS-0	294	FLOODWAY	7185.75	7184.22	7181.80			72.91		5430.00		9.91
Gore Crk to-DS-0	293.5 BR U	100-YEAR	7185.70	7184.15	7181.83			72.63		5430.00		10.00
Gore Crk to-DS-0	293.5 BR U	FLOODWAY	7185.70	7184.15	7181.83			72.63		5430.00		10.00
Gore Crk to-DS-0	293.5 BR D	100-YEAR	7184.33	7181.61	7180.96			58.04		5430.00		13.24
Gore Crk to-DS-0	293.5 BR D	FLOODWAY	7184.33	7181.61	7180.96			58.04		5430.00		13.24
Gore Crk to-DS-0	293.2	100-YEAR	7184.25	7180.91	7180.91	0.43	0.17	55.70		5430.00		14.66
Gore Crk to-DS-0	293.2	FLOODWAY	7184.25	7180.91	7180.91	0.43	0.17	55.70		5430.00		14.66
Gore Crk to-DS-0	293	100-YEAR	7183.17	7180.16	7180.16	9.84	0.88	65.58		5430.00		13.92
Gore Crk to-DS-0	293	FLOODWAY	7183.17	7180.16	7180.16	10.69	0.66	65.60		5430.00		13.91

HEC-RAS Plan: ACM_FWY River: Eagle River Reach: Gore Crk to-DS-0

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Gore Crk to-DS-0	295	100-YEAR	5430.00	7194.00	7198.40	7198.40	7200.47	0.013929	11.78	501.32	128.82	0.99
Gore Crk to-DS-0	295	FLOODWAY	5430.00	7194.00	7198.53	7198.53	7200.76	0.015623	11.99	452.73	100.00	0.99
Gore Crk to-DS-0	294.2	100-YEAR	5430.00	7174.08	7184.27		7185.93	0.006346	10.35	524.67	76.27	0.70
Gore Crk to-DS-0	294.2	FLOODWAY	5430.00	7174.08	7184.27		7185.93	0.006348	10.35	524.60	76.26	0.70
Gore Crk to-DS-0	294	100-YEAR	5430.00	7172.22	7184.22	7181.80	7185.75	0.005267	9.91	548.08	72.91	0.64
Gore Crk to-DS-0	294	FLOODWAY	5430.00	7172.22	7184.22	7181.80	7185.75	0.005269	9.91	548.01	72.91	0.64
Gore Crk to-DS-0	293.5		Bridge									
Gore Crk to-DS-0	293.2	100-YEAR	5430.00	7170.76	7180.91	7180.91	7184.25	0.013938	14.66	370.42	55.70	1.00
Gore Crk to-DS-0	293.2	FLOODWAY	5430.00	7170.76	7180.91	7180.91	7184.25	0.013944	14.66	370.37	55.70	1.00
Gore Crk to-DS-0	293	100-YEAR	5430.00	7171.57	7180.16	7180.16	7183.17	0.013998	13.92	390.22	65.58	1.01
Gore Crk to-DS-0	293	FLOODWAY	5430.00	7171.57	7180.16	7180.16	7183.17	0.013975	13.91	390.44	65.60	1.00
Gore Crk to-DS-0	292	100-YEAR	5430.00	7163.31	7168.28	7167.83	7169.54	0.010299	8.99	604.80	541.08	0.82
Gore Crk to-DS-0	292	FLOODWAY	5430.00	7163.31	7168.28	7167.96	7169.97	0.012073	10.42	520.99	121.00	0.89

APPENDIX G. PHOTOS

NATIONAL FLOOD INSURANCE PROGRAM
FEMA PRODUCTION AND TECHNICAL SERVICES CONTRACTOR

January 20, 2021

Ms. Stacey Thomas, P.E.
Water Resources Engineer
Felsburg Holt & Ullevig
6400 South Fiddlers Green Circle, Suite 1500
Greenwood Village, CO 80111

IN REPLY REFER TO:
Case No.: 21-08-0109P
Community: Eagle County, Colorado
Community No.: 080051

316-AD

Dear Ms. Thomas:

This responds to your request dated October 30, 2020, that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a revision to the Flood Insurance Rate Map (FIRM) for Eagle County, Colorado, and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	Edwards Access at Eagle River LOMR
Flooding Source:	Eagle River
FIRM Panel(s) Affected:	08037C0438D, 08037C0439D

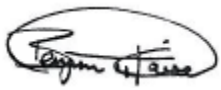
The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the attached summary.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the current fee schedule. A copy of the current fee schedule is available for your information on the FEMA website at https://www.fema.gov/flood-maps/change-your-flood-zone/status/flood-map-related-fees.

FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, we are unable to grant extensions for the submission of required data/fee for revision requests. If a requester is informed by letter that additional data are required to complete our review of a request, the data/fee **must** be submitted within 90 days of the date of the letter. Any fees already paid will be forfeited if the requested data are not received within 90 days.

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program, please contact the FEMA Mapping and Insurance eXchange (FMIX), toll free, at 1-877-FEMA MAP (1-877-336-2627). If you have specific questions concerning your request, please contact your case reviewer, Mr. Jamie Chiu, by e-mail at chiuy@cdmsmith.com or by telephone at (303) 383-2496, or the Revisions Coordinator for your state, Mr. Henry Poburka, CFM, by e-mail at poburkahw@cdmsmith.com or by telephone at (303) 383-2369.

Sincerely,



Benjamin Kaiser, P.E., CFM
Revisions Manager
Compass PTS JV

Attachment:
Summary of Additional Data

cc: Ms. Nicole Mosby
Staff Engineer
Eagle County

Summary of Additional Data Required to Support a
Letter of Map Revision (LOMR)

Case No.: 21-08-0109P

Requester: Ms. Stacey Thomas, P.E.

Community: Eagle County, Colorado

Community No.: 080051

The issues listed below must be addressed before we can continue the review of your request.

1. Please provide certified (sealed, signed, and dated) as-built plans or survey data for the new pedestrian bridge and revised Edwards Spur Road bridge in the submitted as-built condition hydraulic analysis. The plans should include the dimensions (size and length) of the structures and all elevations necessary for verification of the hydraulic modeling. Also, please ensure that the vertical datum such as the North American Vertical Datum of 1988 (NAVD88) or the National Geodetic Vertical Datum of 1929 (NGVD29), is referenced on each plan.

2. Our review of the submitted HEC-RAS 5.0.3 hydraulic analysis revealed the following issues. Please submit a revised hydraulic analysis that corrects these issues and provide digital copies of the input and output files for this model. Please show the vertical datum, such as NAVD88, in the description box of all the HEC-RAS models.

    a. Our review revealed discrepancies between the natural water-surface elevations (WSELs) of the 1-percent-annual-chance (base) flood calculated in the revised conditions multiple-profile hydraulic model and the natural base flood WSELs calculated in the revised conditions floodway hydraulic model. There appears to be differences in the geometry of the hydraulic structures entered within the model. Please revise the above-referenced hydraulic models to utilize the same geometry so that the natural base flood WSELs match in the multiple-profile and floodway models.
    b. When the submitted hydraulic analyses are revised as a result of the comment above, please ensure that the floodway analysis does not result in surcharges exceeding 1.0 foot or negative surcharges, and that all encroachment stations are placed in the floodway fringe, the area between the limits of the base floodplain and the bank stations.
    c. According to the HEC-RAS Hydraulic Reference Manual, the typical contraction and expansion loss coefficients are equal to 0.3 and 0.5, respectively, at bridges and culverts where there are more abrupt transitions (as are typical at bridge/culvert Sections 2, 3, and 4) and equal to 0.1 and 0.3, respectively, at other cross sections where there are more gradual transitions (including bridge and culvert Sections 1 and 5). Please revise the submitted as-built conditions hydraulic model so that the contraction and expansion loss coefficients are equal to 0.3 and 0.5, respectively, at Cross Section 294.2, or provide an explanation of why the contraction and expansion loss coefficients used in the model were chosen.

3. The submitted topographic work map, entitled "I-70G Edwards Interchange Upgrade Phase 2," prepared by Felsburg Holt & Ullevig, certified May 9, 2019, does not provide essential information required to complete our review of this request. Please submit a revised topographic work map, certified by a registered Professional Engineer, which shows all applicable items listed in Section C of Application/Certification Form 2, entitled "Riverine Hydrology and Hydraulics Form," including the following information. Please ensure that there is consistency between the work map, revised hydraulic model and the annotated Flood Insurance Rate Map (FIRM).

    a. Please remove the existing conditions floodplain delineations from the work map. If desired, a separate work map can be submitted to show existing conditions.
    b. Please ensure sufficient labels are provided on the pre-project topographic data so that the revised floodplain can be verified. Please also show how the revised and existing topography tie-in to each other.
    c. To assist our review and to expedite processing of this request, please provide updated digital Geographic Information System (GIS) or Computer-Aided Design (CAD) data that reflect the revised topographic work map. Please ensure the digital data are spatially referenced and cite what projection (coordinate system, example: Universal Transverse Mercator [UTM]/State Plane) was used, so that the data may be used for accurate mapping. The important data to show on the digital work map are the contour information, the stream centerline, the cross section lines, the road crossings and hydraulic structures, the preliminary and proposed flood hazard delineations and the tie-in locations. Everything should be clearly labeled and all information should be contained within the drawing and not externally referenced.

4. We have received the draft property owner notification that was included in your submission. Once we are confident that there will be no further changes to the modeling and/or mapping, we will provide our comments on the draft so that it can be finalized and distributed.

Please upload the required data using the Online LOMC website at https://hazards.fema.gov/femaportal/onlinelomc/signin.

For identification purposes, please include the case number referenced above on all correspondence.

NATIONAL FLOOD INSURANCE PROGRAM

FEMA PRODUCTION AND TECHNICAL SERVICES CONTRACTOR

April 5, 2021

Ms. Stacey Thomas, P.E.
Water Resources Engineer
Felsburg Holt & Ullevig
6400 South Fiddlers Green Circle, Suite 1500
Greenwood Village, CO 80111

IN REPLY REFER TO:
Case No.: 21-08-0109P
Community: Eagle County, Colorado
Community No.: 080051

316-AD

Dear Ms. Thomas:

This responds to your submittal dated February 11, 2021, regarding an October 30, 2020 request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a revision to the Flood Insurance Rate Map (FIRM) for Eagle County, Colorado, and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	Edwards Access at Eagle River LOMR
Flooding Source:	Eagle River
FIRM Panel(s) Affected:	08037C0438D, 08037C0439D

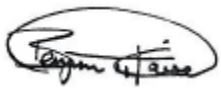
The data required to complete our review, which must be submitted within 90 days of the date of this letter, are listed on the attached summary.

If we do not receive the required data within 90 days, we will suspend our processing of your request. Any data submitted after 90 days will be treated as an original submittal and will be subject to all submittal/payment procedures, including the flat review and processing fee for requests of this type established by the current fee schedule. The fee schedule is available for your information on the FEMA website at https://www.fema.gov/flood-maps/change-your-flood-zone/status/flood-map-related-fees.

FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, we are unable to grant extensions for the submission of required data/fee for revision requests. If a requester is informed by letter that additional data are required to complete our review of a request, the data/fee **must** be submitted within 90 days of the date of the letter. Any fees already paid will be forfeited if the requested data are not received within 90 days.

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program (NFIP), please contact the FEMA Mapping and Insurance eXchange (FMIX), toll free, at 1-877-FEMA MAP (1-877-336-2627). If you have specific questions concerning your request, please contact your case reviewer, Mr. Jamie Chiu, by e-mail at chiuy@cdmsmith.com or by telephone at (303) 383-2496, or the Revisions Coordinator for your state, Mr. Henry Poburka, CFM, by e-mail at poburkahw@cdmsmith.com or by telephone at (303) 383-2369.

Sincerely,



Benjamin Kaiser, P.E., CFM
Revisions Manager
Compass PTS JV

Attachment:
Summary of Additional Data

cc: Ms. Nicole Mosby
Staff Engineer
Eagle County

Summary of Additional Data Required to Support a
Letter of Map Revision (LOMR)

Case No.: 21-08-0109P

Requester: Ms. Stacey Thomas, P.E.

Community: Eagle County, Colorado

Community No.: 080051

The issues listed below must be addressed before we can continue the review of your request.

1. Our review of the submitted post-project conditions HEC-RAS 5.0.3 hydraulic analysis revealed the following issues. Please submit a revised hydraulic analysis that corrects these issues and provide digital copies of the input and output files for the revised model.

    a. Our review revealed significant changes between the revised and effective 1-percent-annual chance (base) flood elevations (BFEs) and floodway elevations outside of the revised reach. Please provide an updated analysis that resolves these discrepancies to ensure the effective data remains unchanged outside of the revised reach. This may require revising the model to run in the same version of the effective analysis. Please also ensure consistency with effective LOMR 12-08-0871P, which revised the effective model for Eagle River.
    b. When the hydraulic analysis is revised to ensure consistency with the effective BFEs and floodway outside of the revised reach, please ensure that the floodway surcharge remains between 0.0 and 1.0 foot.
    c. Our review revealed significant differences in the channel geometry elevations in the approved Conditional Letter of Map Revision (CLOMR) analysis when compared to the as-built conditions. Differences in channel elevations of roughly 3 feet are observed throughout the revised reach. Please provide a detailed explanation of these differences, and ensure that the vertical datum is properly and consistently enforced throughout all aspects of the LOMR request. Please also ensure that the vertical datum is properly listed in the HEC-RAS description box if any changes have occurred.
    d. Our review of the as-built bridge at Cross Section 293.5 revealed that the geometry points are entered such that they result in a floating bridge deck, not connected to ground geometry. Please revise the bridge geometry or channel geometry, as necessary, to ensure the bridge opening is properly depicted in the as-built conditions analysis.
    e. Our review revealed discrepancies between the natural water-surface elevations (WSELs) of the base flood calculated in the revised conditions multiple-profile hydraulic model and the natural base flood WSELs calculated in the revised conditions floodway hydraulic model, beyond the limits of the revised reach. Please revise the hydraulic models to utilize the same geometry so that the natural base flood WSELs match in the multiple-profile and floodway models.

2. Our review of the submitted topographic work map entitled "I-70G Edwards Interchange Upgrade Phase 2 Floodplain Workmap," submitted by your firm and dated February 1, 2021, does not provide essential information required to complete our review of this request. Please submit a revised topographic work map, certified by a registered Professional Engineer, which shows all applicable items listed in Section C of Application/Certification Form 2, entitled "Riverine Hydrology and Hydraulics Form," including the following information. Please ensure that there is consistency between the work map, revised hydraulic model and the annotated Flood Insurance Rate Map (FIRM).

    a. Our review revealed that the basis for the vertical datum on the submitted work map is unclear. The note on the submitted work map indicates a basis of North American Vertical Datum of 1988 (NAVD88) + 0.31feet; however, the elevations reported on the cross sections are consistent with the hydraulic analysis, which references NAVD88. Please clearly label the vertical datum used, and ensure consistency and datum control throughout the submitted LOMR components.
    b. Our review revealed that the approximate floodway topwidth shown on the work map at Cross Sections 292 does not match the post-project conditions hydraulic analysis. Please revise the submitted work map to ensure consistency between the map and model at all locations throughout the revised reach.

3. If the flood hazard delineations are changed as a result of comments above, please submit an updated topographic work map, annotated FIRM, and digital mapping files which are consistent with the changes.

4. Our review of the submitted draft property owner notifications revealed that changes are necessary before they can be sent. Once the hydraulic analysis and work map have been finalized, comments will be provided on the submitted draft notifications so that they may be distributed.

Please upload the required data using the Online LOMC website at https://hazards.fema.gov/femaportal/onlinelomc/signin.

For identification purposes, please include the case number referenced above on all correspondence.

Federal Emergency Management Agency

Washington, D.C. 20472

June 21, 2021

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Jeff Shroll
County Manager, Eagle County
P. O. Box 850
Eagle, CO 81631

IN REPLY REFER TO:
Case No.: 21-08-0109P
Follows Conditional Case No.: 19-08-0487R
Community Name: Eagle County, CO
Community No.: 080051
Effective Date of
This Revision: November 5, 2021

Dear Mr. Shroll:

The Flood Insurance Study (FIS) report and Flood Insurance Rate Map (FIRM) for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed that provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other enclosures specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Denver, Colorado, at (303) 235-4830, or the FEMA Mapping Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Sincerely,

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering and Modeling Division
Federal Insurance and Mitigation Administration

List of Enclosures:

Letter of Map Revision Determination Document
Annotated Flood Insurance Rate Map
Annotated Flood Insurance Study Report

cc: Ms. Nicole Mosby, P.E., CFM
Floodplain Administrator
Eagle County

Ms. Stacey Thomas, P.E.
Water Resources Engineer
Felsburg Holt & Ullevig, Inc.