Boulder County

Community Planning & Permitting

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BOULDER COUNTY BOARD OF COUNTY COMMISSIONERS

Thursday, May 11, 2023, at 12:30 p.m.

All Commissioners' public hearings and meetings will be offered in a hybrid format where attendees can join **through Zoom** or **in-person** at the Boulder County Courthouse, 3rd Floor, 1325 Pearl Street, Boulder.

PUBLIC HEARING with PUBLIC TESTIMONY

STAFF: Kelly Watson, Principal Floodplain Planner, CFM

Docket DC-22-0004: Floodplain Land Use Code Change
Text Amendments to the Land Use Code related to floodplain regulations in Article 4-400 and 4-802.

Action Requested by Board of County Commissioners: Approval

PACKET CONTENTS

SUMMARY

Boulder County has participated in the National Flood Insurance Program (NFIP) since 1979. The NFIP provides a means for county residents to purchase flood insurance and receive federal assistance for flood recovery. In exchange, the county must adopt and enforce floodplain regulations that meet or exceed Federal Emergency Management Agency (FEMA) and Colorado Water Conservation Board (CWCB) minimum standards for development in the regulatory floodplain. In Boulder County, the regulatory

floodplain is known as the Floodplain Overlay (FO) District, a zoning district defined by the modeled extent of the predicted 1% annual-chance (100-year) floodplain. County floodplain regulations, set forth in Boulder County Land Use Code (Code) Article 4-400, define allowable and prohibited land uses, establish the basis for floodplain development permitting, and require flood protection measures for development in the FO District. No changes to the map of the FO District are proposed at this time.

PROJECT GOALS

The last substantial text amendments to Article 4-400 were approved in 2016 (Resolution 2016-111, Docket DC-15-0004) and 2017 (Resolution 2017-68, Docket DC-17-0001). In 2020, FEMA published new direction on flood protection requirements for agricultural structures under the NFIP (FEMA Policy #104-008-03, attached as Exhibit E). Article 4-400 must be revised to incorporate these changes to ensure the county remains compliant with FEMA standards and county residents have continued access to flood insurance and federal flood recovery assistance. The county anticipates a review under the NFIP Community Rating System in June 2023 and intends to have the Code changes completed prior to that evaluation.

Also in 2020, the Mile High Flood District (MHFD) approved an amendment to its floodplain regulations prohibiting all tents and makeshift structures used for human habitation in the regulatory floodplain (Resolution 57). The MHFD Position Paper attached in Exhibit F explains the reasons for the revised regulation. Since a portion of Boulder County lies within the MHFD, the county's floodplain regulations should be updated to align with MHFD standards.

Staff also recommends additional revisions and clarifications based on six years of experience with the last revisions to Article 4-400. These clarifications include simplifying flood protection requirements for Manufactured Homes, clarifying the types of buildings that require Elevation Certificates, and other minor clarifications that reflect the current implementation of the Code.

Finally, staff recommends updates to Article 4-800, which was revised in 2019 to provide an option to exempt or waive Site Plan Review (SPR) when a project requires an individual Floodplain Development Permit, so long as the Community Planning & Permitting Director finds that the project does not conflict with the SPR review standards. Since 2019, the Director has typically only required full SPR when other SPR triggers (besides an individual Floodplain Development Permit) are present. Therefore, staff proposes updating the Site Plan Review regulations to narrow the scope of when Site Plan Review would be required when the Floodplain Development Permit is the only trigger.

DISCUSSION

The proposed Code amendments modify many sections of Articles 4-400 and 4-802. Each proposed amendment is discussed below, beginning with the changes that are needed to comply with FEMA and MHFD policies, followed by the other proposed clarifications.

FEMA Policy – Administrative Variances for At-grade Agricultural Structures

In February 2020, FEMA released an NFIP policy document (Exhibit E, "the policy") to clarify flood protection requirements for accessory and agricultural structures. While Article 4-400

conforms to the policy's flood protection requirements for accessory structures, it does not conform to the policy's requirements for agricultural structures.

Currently, Article 4-405.C.3.c allows new and substantially improved agricultural structures to be built at grade if they are "wet floodproofed." Wet-floodproofing involves using flood-resistant materials below the Flood Protection Elevation and installing flood vents that allow flood waters to enter and exit the structure, reducing pressure on walls that could lead to building collapse during a flood event. However, FEMA's policy states that all new and substantially improved agricultural structures must be elevated to the base flood elevation or designed to be watertight ("dry floodproofed") unless 1) the community (Boulder County) grants a "variance" based on defined criteria, or 2) FEMA grants the community a "community-wide exception" to the policy.

Requiring elevation or dry-floodproofing of agricultural structures is overly burdensome for the agricultural community due to high construction and engineering costs, and conflicts with the county's commitment to promoting and assisting in the preservation of agricultural lands and land uses. Therefore, county staff investigated both a community-wide exception and a variance process. While a community-wide exception would make permitting easier for applicants, FEMA's requirements for granting a community-wide exception are stringent. FEMA has only ever granted one community-wide exception to NFIP requirements, for basements in the entire Mid-West of the country. While agricultural structures in the Boulder County floodplain tend to be small, low-value structures that support small farming operations and could have been covered under a community-wide exception, the county did not have the data required by FEMA to justify such an exception. Instead, staff proposes revising the Land Use Code to create an administrative variance process for agricultural structures that meet FEMA criteria.

Under the proposed administrative variance process, applicants wishing to build new or Substantially Improved agricultural structures at grade will submit a variance request with their Floodplain Development Permit application, on a form to be posted on the county's website. To minimize review time, these variance requests will be reviewed and approved by a staff committee consisting of floodplain program staff, the County Engineer, and the Chief Building Official. Unlike other variances granted to floodplain regulations, these administrative variances will not require a hearing before the Board of Adjustment.

The proposed administrative variance process will allow agricultural structures to be built at grade (or otherwise with their floors below the Flood Protection Elevation) if the proposed structure has low damage potential with respect to its value, contents, and location within the floodplain. In other words, variances can be granted if the anticipated 100-year flooding depths and velocities at the structure are relatively low and the cost of recovery with respect to the structure's construction, contents, and purpose are also low. The structure must also comply with all other general requirements for new floodplain construction.

Staff expects administrative variances to be granted for a small number of structures each year. Since 2015, a maximum of 3 Floodplain Development Permits were issued per year for agricultural structures in the Floodplain Overlay District.

Article 4-405.C.3.c. Agricultural Buildings and Structures

Staff recommend revising the first paragraph of Article 4-405.C.3.c to include FEMA's definition of Agricultural Structure, which is limited to structures used exclusively for agricultural purposes. Multi-purpose structures or places for human habitation, employment, or entertainment are excluded and would need to meet flood protection requirements for residential, commercial, or accessory structures.

A new section (v) states that structures that do not meet FEMA's definition of an "insurable structure" (permanent structures with two rigid walls and a roof) may be constructed at grade using flood-resistant materials by permit, i.e., without an administrative variance.

New sections (vi) and (vii) require structures meeting FEMA's definition of "agricultural structure" and "insurable structure" to either be elevated or dry-floodproofed, or to obtain an administrative variance. The administrative variance requires that the building meet all other flood protection requirements for new floodplain construction, be "wet-floodproofed" with an appropriate number of flood vents, have low damage potential, and not increase risks to public safety. The applicant must demonstrate that the administrative variance provides the minimum relief necessary to avoid exceptional hardship.

Finally, section (viii) requires that property owners execute and record Non-Conversion Agreements for new and substantially improved agricultural structures to prevent future conversion to Habitable Space.

MHFD Policy – Occupancy in Floodplains

The Mile High Flood District (MHFD), formerly Urban Drainage and Flood Control District, is a Denver Metro regional district that conducts flood studies and stream restorations, maintains urban drainageways, regulates floodplains, and much more. The southeast portion of Boulder County is within the District (Figure 1). The county often partners with the MHFD on floodplain mapping studies and relies on the District to maintain certain urban stormwater drainageways.

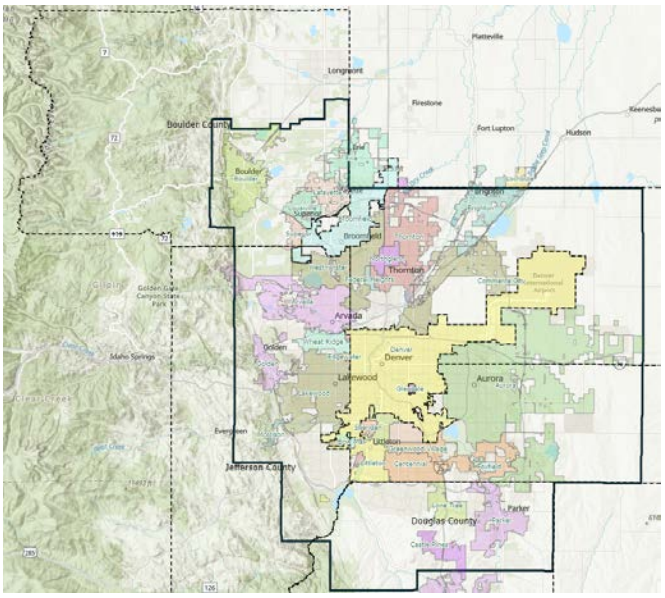


Figure 1. Mile High Flood District (black outline) and Boulder County boundaries.

In 2020, following a fatality, MHFD revised their floodplain regulations to prohibit camping and makeshift structures in the regulatory floodplain. The new District regulation states that "Tents and makeshift structures, enclosures, or other shelters used for human habitation, shall not be permitted in the Floodplain, except in locations expressly permitted by the local government… and having adequate sanitation facilities and flood evacuation plans."

Currently, the county's Land Use Code already prohibits camping in floodways, which is a zone within the 100-year floodplain that must be reserved for conveyance of the 1%-annual-chance (100-year) flood. The proposed text amendment expands the prohibition of camping to parts of the 100-year floodplain outside the floodway (also called the flood fringe). See the discussion of Article 4-404.B for further explanation of floodways and flood fringe.

Sixty percent of the county's floodplain is preserved as open space, where camping is already prohibited. Therefore, the proposed regulation change applies only to flood fringe areas not on open space and not already covered by the MHFD regulation.

The county and MHFD both recognize that urban camping is a complex topic. By incorporating this text amendment into the Land Use Code, the county intends to comply with existing MHFD regulations and create space to educate residents and the public about the dangers of camping in floodplains. Any enforcement of camping regulations would be educational and non-punitive.

Article 4-404.B.6 Dispersed Camping
Article 4-404.B is a list of uses prohibited in Floodways. The list already prohibits "dispersed camping." Staff recommends revising this section to use MHFD's recommended language prohibiting "dispersed camping, including the use of tents, makeshift structures, enclosures, and other temporary shelters used for habitation, except in locations approved through the issuance of a Group Gathering / Special Event Permit as defined in this Code that have adequate sanitation facilities and a flood evacuation plan."

Article 4-404.D.5 Dispersed Camping
Article 4-404.D applies to the flood fringe. Staff recommends adding a new item to this section to comply with 2020 revisions to Mile High Flood District floodplain regulations.

Other Clarifications

Article 4-404.A. Minimum Federal and State Standards
Staff recommends revising this section to remove the implication that development in the Floodway may not increase the regulatory 100-year flood elevation more than 0.00 feet and development in the Flood Fringe may not increase such elevations more than 0.50 feet. Under National Flood Insurance Program (NFIP) and Colorado floodplain management rules, such increases are allowed if they do not impact insurable structures and the proponent obtains a Conditional Letter of Map Revision (CLOMR) from FEMA prior to permitting. County regulations pertaining to development-caused rises in the Floodplain Overlay District and modeling standards for demonstrating those rises are described in detail in Articles 4-404.C.2 and 4-404.2.E.4 of the Code, which also refer to NFIP and State minimum standards. This section (4-404.A) should be revised to be consistent with other sections of the Code.

Article 4-404.B. Uses Prohibited in Floodway (Floodway definition)
"Floodway" is defined in two places in the Land Use Code: Article 4-404.B "Uses Prohibited in the Floodway" and Article 4-414 "Definitions." Article 4-404.B currently defines the Floodway as "the portion of the floodplain where flood depths and velocities are greatest, risk to health and safety is highest, and damages resulting from flooding are the most catastrophic." While Floodways often coincide with areas of high flood depths and velocities, Floodways are and have always been mapped according to "encroachment" studies, which simulate the "filling in" of the floodplain from the edges. This fill increases the modeled water surface elevations (also called Base Flood Elevations, see Figure 2). At the point where the fill causes the water surface elevation to increase a certain height (a maximum of 0.5 feet, per Colorado law), the encroachment is stopped and the edge of the Floodway is defined (Figure 3). In this way, the Floodway is also a model of the maximum portion of the 100-year floodplain that could be developed without increasing flood depths by unreasonable amounts. Article 4-414 currently includes both the "high depth and velocity" explanation of Floodways as well as the encroachment definition.

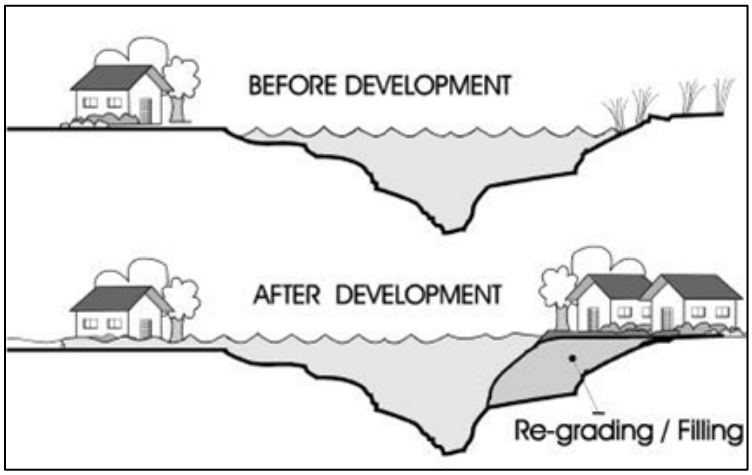


Figure 2. Schematic of the effect of encroachment on Base Flood Elevations.

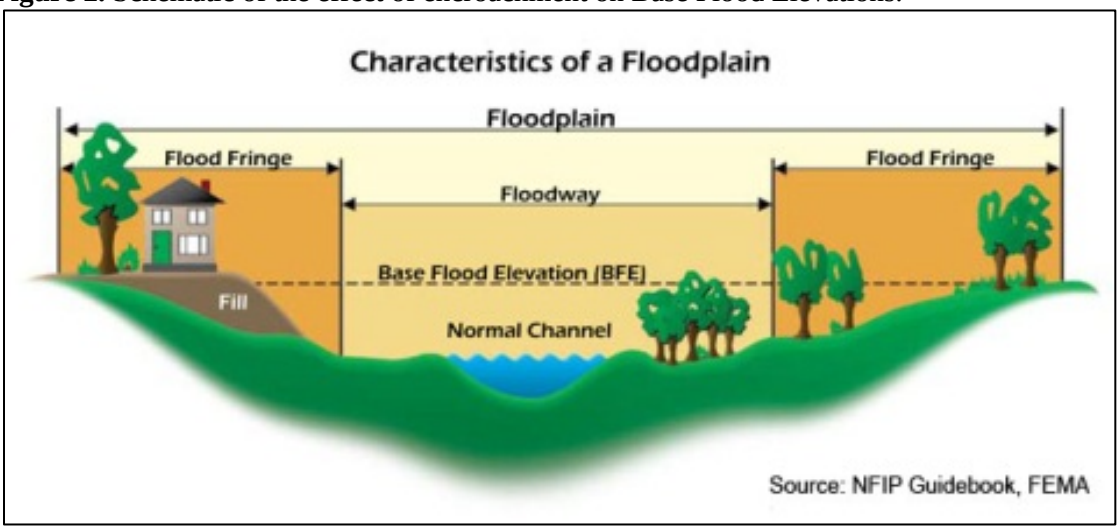


Figure 3. Components of a Regulatory Floodplain including Floodway.

Staff recommends revising the definitions in Articles 4-404.B and 4-414 to clarify that Floodways are mapped and defined by encroachment studies, not significant depths and velocities. The proposed changes more closely align the Land Use Code definitions with the NFIP definition, which defines the Floodway as "the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height." The only proposed difference between the FEMA and county definitions is that staff recommends defining the "base" flood, a term that is not widely used or understood, as the "1% annual-chance (100-year)."

The "designated height" is described in section 4-404.2.E.3. No changes are proposed to this section, which states that in the plains areas below 6,000 feet in elevation, the "designated height" matches the Colorado standard of 0.50 feet. In canyon areas above 6,000 feet in elevation, the "designated height" is 0.00 feet. In other words, the floodway boundaries shall match the 100-year floodplain boundaries in canyon areas above 6,000 feet in elevation. This is to ensure that areas subject to the steep channel slopes, high flow velocities, and erosive forces found in canyons are kept free of development.

Staff originally proposed a different amendment to the Floodway definition in Article 4-414. The original amendment was meant to clarify that Floodways are primarily defined as in the NFIP but may also coincide with areas of significant deaths and velocities. Based on the recommendation from the Planning Commission (see page 11), the proposed text amendment was changed to better align with the NFIP definition and eliminate the mention of significant depths and velocities.

For additional context, staff assembled historical Floodway definitions from the Land Use Code in Exhibit G.

Article 4-404.C.1. Uses Allowed in the Floodway under Certain Conditions (Transportation Infrastructure)
The county first adopted floodplain regulations in 1969. Since that time, "road and highway structures" have been explicitly allowed in Floodways. During the major update to floodplain regulations in 2016, "road and highway structures" were removed from the list of allowed uses in the Floodway. However, the staff recommendation at the time stated that "staff [proposed] to generally maintain the existing floodway and flood fringe restricted activities and uses…". Therefore, staff believes that the Code was never intended to disallow roads in Floodways.

Staff recommends adding a section to the allowed uses list in Article 4-404.C.1 clarifying that roads and other linear transportation infrastructure (e.g., trails and railways) are allowed uses in the Floodway.

Article 4-404.E. Emergency Work
The Code does not specifically state that emergency work is allowed in the Floodplain. Staff recommends adding a new section E to Article 4-404 to allow for emergency work in life-threatening situations while also clarifying that proper permitting is required within a reasonable time frame. Property owners will be required to contact the County Engineer within 7 days of the

initiation of emergency work and must apply for all appropriate Floodplain Development Permits within 30 days.

Article 4-404.1. General Floodplain Development Permits
Staff recommends revising Article 4-404.1, Sections D through I, to reflect the county's 2020 reorganization, clarify language/terminology, and clarify the process by which the County Engineer issues, amends, or rescinds a General Floodplain Development Permit (General FDP). The primary objective is to resolve confusion over the difference between advanced "notice" to the County Engineer of proposed development listed in the General FDP, and "public notice" (now called a 14-day review and comment period) of a proposed new, amended, or rescinded General FDP.

Article 4-404.2.A. Floodplain Pre-Application Conference
The experience of the Floodplain Management Program has been that pre-application conferences are not always necessary for individual Floodplain Development Permit applications. Therefore, staff recommends revising this section to no longer require Floodplain Pre-Apps while reserving the authority to require them if necessary. Program staff will continue to make themselves available for any applicant who requests a pre-application conference.

Article 4-405.C.1.e. General Requirements for New Floodplain Construction (building orientation)
Staff finds the current language around building orientation relative to flood flows could provide more clarity. Staff proposes clarifying the language while maintaining the original intent.

Article 4-405.C.2.a. Residential Buildings
Basements are currently prohibited for all New Floodplain Construction (Article 4-405.C.1.c). Staff recommends removing the reference to Basements in this section to clarify that Basements are not allowed.

Article 4-405.C.3.d. Crawlspaces
Currently, the flood protection requirements for Crawlspaces are listed under the section titled "Non-Residential Construction." Staff proposes moving Crawlspace information to 4-405.C.1, "New Floodplain Construction/General Requirements" to clarify that Crawlspace requirements apply to all New Floodplain Construction (both Residential and Non-Residential).

Article 4-405.E. Manufactured Homes
Staff recommends revising this section to remove any intent to require entire parks to be retrofitted/elevated. Rather, the intent is to require flood protection on a home-by-home basis. Additionally, staff recommends requiring elevation of mechanical equipment and outdoor appliances and allowing multiple anchoring configurations that meet minimum NFIP requirements.

Article 4-405.G.4. Repair/Replacement OWTS
Staff recommends clarifying that individual components of an Onsite Wastewater Treatment System (OWTS) in the Floodplain Overlay District may be repaired or replaced without replacing the entire system.

Article 4-405.J. Elevation Certificate Requirements

NFIP regulations require that the county obtain certified as-built Lowest Floor elevations for all new and Substantially Improved structures. Often, but not always, such elevations must be submitted in the form of a FEMA Elevation Certificate. For example, accessory buildings that are wet-floodproofed and constructed at grade do not require FEMA Elevation Certificates. Staff recommends clarifying when the full Elevation Certificate is required and when a certified letter from a surveyor is sufficient. Not requiring a full Elevation Certificate means less expense for permittees and less time reviewing unnecessary closeout materials for staff.

Article 4-409.D.2.b. Variances, Limitation on Board's Authority

Staff recommends clarifying that the county is required to notify property owners of flood insurance impacts of building below the Flood Protection Elevation only when variances are issued exempting the applicant from the requirements to elevate a building's Lowest Floor to or above the Flood Protection Elevation. This section does not necessarily apply to all variances.

Article 4-414. Definitions

The NFIP defines a basement as "any area or the building having its floor subgrade (below ground level) on all sides." According to the NFIP definition, a basement may have a finished or an unfinished floor. Staff recommends revising the county's definition of Basement to include areas with finished or unfinished floors.

Staff recommends revising the county's definition of Floodway to clarify that the Floodway is primarily defined as in the NFIP. (Also see discussion of Article 4-414.B, above.)

Staff recommends removing the definitions of Maintenance and In-Kind Replacement because they are not referenced anywhere in this Code. These two terms are better defined separately in the General FDP, which specifically addresses activities that are covered under the General FDP as Maintenance and In-Kind Replacement.

Other Minor Fixes in Article 4-400

Staff recommends replacing "Boulder County website" with "the County's website"; "Land Use Code" with "this Code"; and "a FDP" with "an FDP" to be consistent with the rest of the Code. Other minor punctuation issues should also be fixed.

Article 4-802. Applicability and Scope of the Site Plan Review Process for Development

Currently, Article 4-802 requires all projects requiring an individual FDP to go through Site Plan Review (SPR) unless the individual FDP is the only trigger for SPR, in which case the Director may waive or exempt SPR if there are no conflicts with the SPR review criteria. Staff recommends clarifying which types of projects require SPR if an individual FDP is the only SPR trigger. Staff propose requiring SPR for development involving new structures, elevation of existing structures (e.g. due to a Substantial Improvement), or additions to existing buildings that expand the footprint.

TEXT AMENDMENT CRITERIA ANALYSIS

Article 16-100.B contains criteria for amending the text of the Code. Staff finds that these criteria are met in the context of this Docket, as follows:

The existing text is in need of amendment: In order to comply with FEMA and MHFD policy changes, the Code requires amendment.

The amendment is not contrary to the intent and purpose of this Code: The Boulder County Land Use Code is enacted to protect and promote the health, safety, and general welfare of present and future inhabitants of Boulder County. In conformance with the Code, the proposed text amendments seek to support reasonable development and uses in flood hazard areas while complying with local, state, and federal floodplain regulations and creating streamlined processes for agricultural users. Additionally, the proposed clarifications do not deviate significantly from the existing text.

The amendment is in accordance with the Boulder County Comprehensive Plan: As proposed, the text amendment does not make changes to the Code that would alter the current Code's consistency with the goals and policies of the Comprehensive Plan. The proposed modifications support the following specific elements of the Comprehensive Plan while remaining in accordance with the broader policies related to avoiding the placement of people and structures in natural hazard areas and mitigating existing areas at risk:

- **NH 1.03** *Land Use Activities.* The county should ensure to the extent possible that land use activities do not aggravate, accelerate, or increase the level of risk from natural hazards.
- **NH 4.01** *Limits to Development in Floodplains*. The county should strongly discourage and strictly control land use development from locating in designated floodplains, as identified in the Boulder County Zoning Maps.

PUBLIC ENGAGEMENT

The agency referral and public comment period was open from January 27, 2023, to February 28, 2023. The draft text amendment was posted on the Community Planning & Permitting Department's website and sent out to the Land Use Code update listserv on January 27. Additionally, postcards were sent to all property owners in unincorporated Boulder County whose property intersects the Floodplain Overlay District. A virtual (Zoom) community meeting was held on February 9, 2023, where staff presented the proposed amendments and answered questions. Approximately 64 people attended the community meeting.

Agency referral responses are attached as Exhibit C. Responses were received from the Boulder County Development Review Team - Access & Engineering, Boulder County Parks & Open Space Conservation Easement Program, Boulder County Chief Building Official, City of Boulder Open Space & Mountain Parks, City of Longmont Planning & Development Services Department, Larimer County Planning Department, Adams County, and the Mile High Flood District. All agencies that responded had no conflict or no comment. After the Planning Commission hearing, Jefferson County also responded with no comment.

Four written public comments were received and are attached as Exhibit D.

One public comment concerned the proposed changes to the flood protection measures for manufactured homes. The commenter supported the proposed changes and suggested two additional changes. One change—clarifying that the Code applies to "newly" placed or substantially improved manufactured homes—was incorporated into the proposed text amendments. The commenter's other suggestion is better addressed outside the context of the Land Use Code. In summary, the commenter suggested an alternate method for determining the value of manufactured homes for the purpose of making Substantial Improvement calculations. Staff is aware of the issues involved in valuing and improving manufactured homes and will continue to work with homeowners to improve Substantial Improvement determinations for manufactured homes.

The three remaining comments concerned the revised Floodway definition. The three comments also voiced concerns with floodplain mapping, which is not the subject of this docket.

PLANNING COMMISSION SUMMARY

Planning Commission considered the proposed text amendment on March 15, 2023. Staff presented the proposal and responded to clarifying questions from the commissioners. Four members of the public spoke during the public testimony. The public comments were primarily concerned with the Floodway definition and mapping, similar to the written comments in Exhibit D. One commenter provided a document to the Planning Commission regarding floodplain mapping (National Institute of Building Sciences Panel Decision and Report), which has been added to Exhibit D. Planning Commission followed with a discussion of the text amendments. A recording of the hearing is available online.

Planning Commissioners recommended three changes to the proposed text amendments:

1. Revisit and potentially revise the description and contents of the Floodway definition in two sections of the Code changes;
2. Include a more precise definition of "low damage potential" in the agricultural structures section; and
3. Lengthen the emergency work notification from 3 days to 7 days.

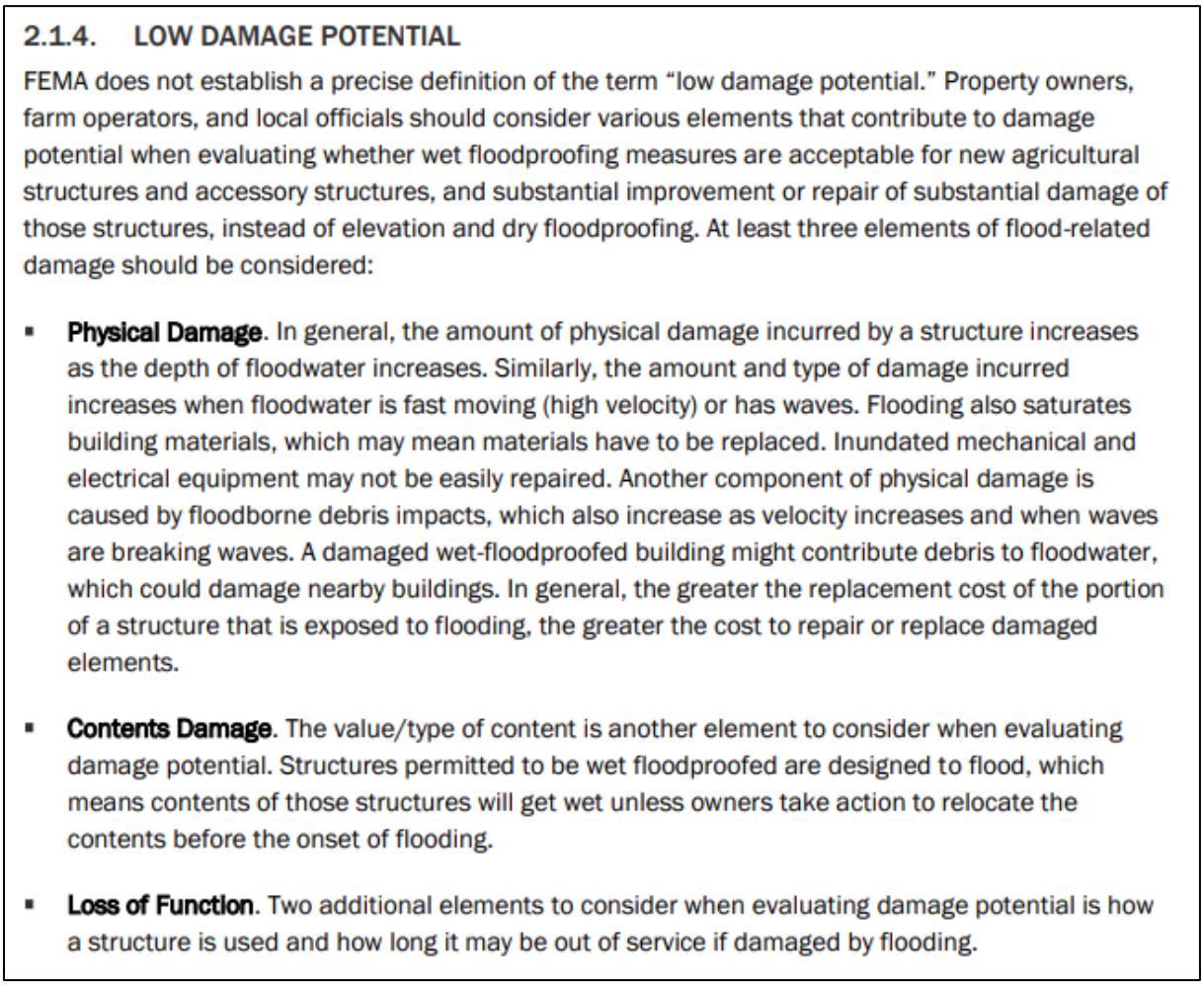
Commissioner Libby moved to approve and recommend approval of the docket with the three recommendations above. The motion was seconded by Commissioner Goldfarb and unanimously approved.

CHANGES TO THE DRAFT TEXT FOLLOWING PLANNING COMMISSION

Following the Planning Commission hearing, the following changes were made to the proposed text amendments:

- The proposed amendment to Article 4-404.E was revised to require property owners to notify the County Engineer of the initiation of all emergency work within 7 days (instead of 3 days).
- In response to one Planning Commissioner comment, the proposed amendment to Article 4-404.2.A was revised to clarify that Floodplain Pre-Application Conferences may be requested by the applicant, as well as the County Engineer.

- One Planning Commissioner was concerned with the proposed amendment to Article 4-405.C.2.a, which implied that decks and porches would have to be elevated on fill or elevated foundation walls. Deck and porches are more commonly elevated on piers or posts. “Foundation walls” was therefore replaced by “foundation elements” to clarify that multiple methods of elevating structures are allowed.
- The proposed amendment to Article 4-405.C.3.c.vii.B was revised to add additional building characteristics that will be considered when evaluating “low damage potential” for agricultural buildings. FEMA does not have a specific definition for “low damage potential,” but does offer guidance (see Figure 4 below). Instead of creating specific criteria for these building characteristics (e.g. by defining low flood depth) “low damage potential” will be evaluated wholistically on a case-by-case basis as variance requests are submitted.



2.1.4. LOW DAMAGE POTENTIAL

FEMA does not establish a precise definition of the term “low damage potential.” Property owners, farm operators, and local officials should consider various elements that contribute to damage potential when evaluating whether wet floodproofing measures are acceptable for new agricultural structures and accessory structures, and substantial improvement or repair of substantial damage of those structures, instead of elevation and dry floodproofing. At least three elements of flood-related damage should be considered:

- **Physical Damage**. In general, the amount of physical damage incurred by a structure increases as the depth of floodwater increases. Similarly, the amount and type of damage incurred increases when floodwater is fast moving (high velocity) or has waves. Flooding also saturates building materials, which may mean materials have to be replaced. Inundated mechanical and electrical equipment may not be easily repaired. Another component of physical damage is caused by floodborne debris impacts, which also increase as velocity increases and when waves are breaking waves. A damaged wet-floodproofed building might contribute debris to floodwater, which could damage nearby buildings. In general, the greater the replacement cost of the portion of a structure that is exposed to flooding, the greater the cost to repair or replace damaged elements.
- **Contents Damage**. The value/type of content is another element to consider when evaluating damage potential. Structures permitted to be wet floodproofed are designed to flood, which means contents of those structures will get wet unless owners take action to relocate the contents before the onset of flooding.
- **Loss of Function**. Two additional elements to consider when evaluating damage potential is how a structure is used and how long it may be out of service if damaged by flooding.

Figure 4. A screenshot from FEMA Bulletin P-2140 “Floodplain Management Requirements for Agricultural Structures and Accessory Structures”

- The proposed Floodway definition in Article 4-414 was revised to substantially match the NFIP definition. Note that the Floodway definition in Article 4-404.B, as presented to the Planning Commission, already matches the NFIP definition and no further changes are proposed.
- Minor punctuation issues were fixed in Articles 4-404.A, 4-405.C.3.d, and 4-405.J.2.

STAFF RECOMMENDATION

STAFF RECOMMENDS THAT THE BOARD OF COUNTY COMMSSIONERS APPROVE DOCKET DC-22-0004, LAND USE CODE TEXT AMENDMENTS RELATED TO FLOODPLAIN REGULATIONS.

DOCKET DC-22-0004: PROPOSED TEXT AMENDMENTS TO ARTICLE 4-400 AND ARTICLE 4-802 - Text amendments to the Boulder County Land Use Code related to floodplain regulations.

4-404.A Minimum Federal and State Standards

A. Minimum Federal and State Standards. Development in the FO District must comply with the NFIP and State of Colorado minimum standards. These standards require applicants to demonstrate that those development projects allowed in the FEMA Floodway, when combined with all other existing and anticipated development, will not cause an increase in the modeled 1%-annual-chance water surface greater than 0.00 feet and, for projects in the Flood Fringe, will not cause an increase greater than 0.50 feet unless the applicant first receives an approved Conditional Letter of Map Revision (CLOMR) from FEMA prior to permitting, in compliance with the provisions of 4-404.2.E.4.

4-404.B. Uses Prohibited in Floodway

B. Uses Prohibited in Floodway. The floodway is the portion of the FO District that must be reserved for passage or conveyance of the 1%-annual-chance (100-year) flood without cumulatively increasing the water surface elevation more than a designated height (described in Section 4-404.2.E.3). ~~depicts the portion of the floodplain where flood depths and velocities are greatest, risk to health and safety is highest, and damages resulting from flooding are the most catastrophic.~~ The following activities and uses are prohibited within all Floodways:

…

6. Dispersed camping, including the use of tents, makeshift structures, enclosures, and other temporary shelters used for habitation, except in locations approved through the issuance of a Group Gathering / Special Event Permit as defined in this Code that have adequate sanitation facilities and a flood evacuation plan; ~~unless the camping is approved through the issuance of a Group Gathering / Special Event Permit as defined in the Land Use Code;~~

4-404.C.1. Uses Allowed in Floodway under Certain Conditions

C. Uses Allowed in Floodway under Certain Conditions.

1. The County Engineer may issue FDPs for the following development types and open uses within the Floodway unless the use (1) is prohibited in the underlying zoning district, (2) adversely affects the efficiency of the Floodway, (3) changes the direction of flow, or (4) poses a significant safety hazard:

…

c. Industrial or commercial uses such as loading areas~~, railroad rights-of-way (but not including freight yards or switching, storage, or industrial sidings)~~, parking areas, and airport landing strips;

…

f. Hydraulic structures such as bridges, culverts, weirs, diversions, drop structures, and fish ladders, for access and flood or stormwater control; ~~and~~

g. Critical Facilities above 6,000 feet in elevation, as described in 4-405~~(~~.D~~)~~; and~~.~~

h. Linear transportation infrastructure, including but not limited to roads, trails, and railroad rights-of-way (but not including freight yards or switching, storage, or industrial sidings).

4-404.D. Uses Allowed in Flood Fringe under Certain Conditions

5. Dispersed Camping, overnight campgrounds, tents, makeshift structures, enclosures, and other temporary shelters used for habitation in the Flood Fringe must be approved through the issuance of a Group Gathering / Special Event Permit as defined in this Code and must have adequate sanitation facilities and a flood evacuation plan.

4-404.E Emergency Work

E. Emergency Work. Emergency work necessary to prevent or mitigate an immediate threat to life or property is allowed. The property owner is responsible for notifying the County Engineer within 7 days of the initiation of all emergency work. A complete application for a Floodplain Development Permit shall be submitted within 30 days of commencement of work. Authorization to perform emergency work does not indicate approval of such work. If necessary, modifications to the work already performed may be required in accordance with this Code.

4-404.1. General Floodplain Development Permits

D. Content of a General FDP. If the County Engineer determines it appropriate to issue a General FDP after consideration of the factors in 4-404.1.B above, the County Engineer ~~he~~ shall include the following information on the face of the permit:~~.~~

1. A list of specific uses and activities deemed within the scope of the General FDP;~~.~~

2. Conditions of approval, if any, for work approved under the General FDP; and

3~~2~~. Whether or not property owners must notify the County Engineer prior to beginning work on an activity included within the General FDP.

a. The County Engineer shall require such notification for development activities for which it is necessary to evaluate individual and cumulative impacts, ensure minimum compliance with federal and state floodplain rules, and confirm that the uses or activities are unlikely to increase BFEs or have an adverse effect on neighboring properties, species, or ecosystems.

b. For projects where the County Engineer will receive ~~notice~~ notification through referral required by a separate Community Planning & Permitting Code review process (such as Site Plan Review or Special Use Review), the County Engineer need not require duplicative notification. For all other projects where the County Engineer decides to require notification, the applicant must submit the following information to the County Engineer a minimum of 21 days prior to commencing work:

(i) Project description, including materials description and a discussion on the expected impact to the channel and floodplain;

(ii) Location description (an accompanying location map is best); and

(iii) Site plan, if necessary to further describe the work.

c. If the work is within the scope of the General FDP, the County Engineer will respond to the owner with approval to proceed. If additional information is necessary or if the work requires issuance of an Individual FDP, the County Engineer will inform the owner within 14 days of notification submission, or through the Community Planning & Permitting Review referral process.

~~**3.** Conditions of approval, if any, for work approved under the General FDP.~~

E. Process for Issuing, Amending, or Rescinding a General FDP.

1. If the County Engineer determines that a new General FDP, amended General FDP, or rescission of a General FDP is appropriate after consideration of the factors in 4-404.1.B above, the County Engineer shall ~~he shall post the proposed General FDP on the Public Works Department website and also in the manner described in Article 3 by which the public is given notice of comprehensive rezonings, so that the public may review and comment. No such new FDP shall become effective until 14 days after the date it is posted.~~ first provide a 14-day public review and comment period by:

a. Posting the new General FDP, amended General FDP, or notice of General FDP recission on the County's website;

b. Providing public notice of the new General FDP, amended General FDP, or notice of General FDP recission in the manner described in Article 3 for comprehensive

rezonings; and

c. Maintaining a record of all property owners who wish to opt in to receiving direct notice of all proposed actions by the Engineer regarding a General FDP. The County Engineer shall send the new General FDP, amended General FDP, or notice of General FDP rescission (via electronic means to the most recent electronic mail address on file) to all such owners, provided, however, that inadvertent failure to notify every such owner shall not affect the validity of any action by the Engineer on a General FDP.

~~**2.** If the County Engineer determines that an amendment to an existing General FDP is appropriate after consideration of the factors in 4-404.1.B above, he shall post the revised General FDP on the Public Works Department website and also in the manner described in Article 3 by which the public is given notice of comprehensive rezonings, so that the public may review and comment. No such revised FDP shall become effective until 14 days after the date the revision is posted.~~

~~**3.** If the County Engineer determines that an existing General FDP should be rescinded in its entirety per section 4-404.1.C above, he shall post a notice to this effect on the Public Works Department website and in the manner described in Article 3 by which the public is given notice of comprehensive rezonings, so that the public may review and comment. The General FDP shall be deemed rescinded 14 days after the date the rescission notice was posted.~~

~~**4.** In addition to the notice required above (per Section 3-205), the County Engineer shall maintain a record of all property owners who wish to opt in to receiving direct notice of all proposed actions by the Engineer regarding a General FDP. The Engineer shall send notice (via electronic means to the most recent electronic mail address on file) to all such owners regardless of whether the proposed action is issuance of a new General FDP, amending an existing General FDP, or rescinding a General FDP; provided, however, that inadvertent failure to notify every such owner shall not affect the validity of any action by the Engineer on a General FDP.~~

~~**5**~~**2.** If the County Engineer receives public comment on a proposed new, amended, or rescinded General FDP during the 14-day ~~notice~~ review and comment period, then prior to the effective date the County Engineer shall consider such comments to determine whether in their ~~his~~ professional judgment as floodplain administrator any changes to the proposed action are merited. If no comments are received, or if no changes to the proposed action are merited, the proposed action shall be deemed effective 14 days after the date it was posted.

~~**6**~~**3.** Subject to the ~~notice~~ 14-day review and comment period requirements described above, the County Engineer may issue, amend, or rescind a General FDP at any time, on their ~~his~~ own initiative, without the need for public hearings before Planning Commission and Board of County Commissioners.

~~**7**~~**4.** The County Engineer's decision to issue, amend, or rescind a General FDP shall be in writing and shall be a final action appealable pursuant to section 4-408.

~~**8**~~**5.** All General FDPs in effect at a given point in time must comply with all applicable provisions of this section 4-404.1.

F. No Permit Fees. If the County Engineer determines a use or activity falls under the approval granted in a General FDP, no permit fee will be charged.

G. Work Not Approved under a General FDP. Any development within the ~~Floodplain~~ FO District that does not meet the criteria of a General FDP requires either approval of an Individual FDP prior to beginning the work or a determination by the County Engineer that no FDP is required at all.

1. ~~1.~~ Should any work commence that is assumed by an applicant to be covered by a General FDP, and the County Engineer determines it is not covered by a General FDP, a Stop Work order will be issued. The unpermitted work will be treated as a zoning violation under Article 17 until an approved Individual FDP is issued or the violation is otherwise resolved.

2. ~~2.~~ Anyone considering a project in the ~~Floodplain~~ FO District that varies from the projects described in an issued General FDP should contact the County Engineer to determine if an Individual FDP application is required. The County Engineer makes the final decision as to the applicability of a General FDP. Any project determined by the County Engineer to create a significant obstruction to flood flows will require an Individual FDP.

H. Other Permits. Eligibility for a General FDP does not eliminate the need for applicants to obtain all other required permits, including building, grading, access, construction, and/or stormwater permits from Boulder County, as well as other state and federal permits.

I. Records of Issued General FDPs. A copy of all issued General FDPs, including previous versions, will be kept on file ~~in the County Engineer's office~~ at the Community Planning & Permitting Department at all times and available for public review.

4-404.2.A. Floodplain Pre-Application Conferences

A. Floodplain Pre-Application Conference. ~~A Floodplain Pre-Application Conference (Floodplain Pre-App) between the applicant and the County Engineer (or his/her designee) is required for all Individual FDPs, unless waived in writing by the County Engineer as unnecessary under the circumstances. The Boulder County Community Planning & Permitting Department may require a Pre-Application Conference as defined in Section 3-201, which may be substituted for the Floodplain Pre-App requirement of this section. The Floodplain Pre-App should include discussion of conforming and nonconforming structures and uses on the subject property.~~ At the discretion of the County Engineer, or by applicant request, a Floodplain Pre-Application Conference (Floodplain Pre-App) may be required prior to submittal of a complete individual FDP application. The Floodplain Pre-App should include a discussion of conforming and nonconforming structures and uses of the subject property.

4-405.C.1.e. General Requirements for New Floodplain Construction

e. New buildings or other structures must minimize obstruction to flood flows. Whenever practicable and to the extent consistent with other provisions of this Code, new buildings and other structures must be placed with their longitudinal axes parallel to the predicted direction of flow of flood waters or with the same orientation as neighboring structures. ~~be placed with their longitudinal axes parallel to the predicted direction of flow of flood waters or be placed so that their longitudinal axes are on lines, parallel to those of adjoining structures, to the extent consistent with other provisions of this code. This is intended to minimize the obstruction to flow caused by a building or structure.~~

4-405.C.2.a. Residential Buildings

a. All new residential buildings constructed in the Flood Fringe or within Zones A, AO, or AH must have their Lowest Floors (including ~~Basements,~~ porches~~,~~ and decks), as well as any and all service equipment (excepting the necessary connections to public utility), elevated to the FPE, either by the placement of fill or by construction on elevated foundation elements.

4-405.C.3.c. Agricultural Buildings and Structures

c. Agricultural Buildings and Structures. ~~New Floodplain Construction of any Permanent agricultural building or structure in the Flood Fringe must be limited in use to agricultural purposes, in which the use is exclusively in connection with the production, harvesting, storage, drying, or raising of agricultural commodities, including the raising of livestock.~~ Agricultural buildings and structures are those used exclusively for agricultural purposes or uses in connection with the production, harvesting, storage, raising, or drying of agricultural commodities and livestock. Buildings and structures used for human habitation and those that are places of employment or entertainment and structures with multiple or mixed purposes do not satisfy the "exclusive use"

requirement and are not agricultural buildings and structures. Types of buildings and structures that qualify under this section include farm storage structures (used exclusively for the storage of farm machinery and equipment), silos, grain elevators, grain bins, corn cribs, and general purpose barns/loafing sheds.

(i) The building or structure must not be designed for or used as Habitable Space.

~~**(ii)** The building or structure must be wet-floodproofed according to 4-405(C)(2)(b).~~

(iii) Service equipment must be elevated to the FPE, unless elevation of such equipment impedes its agricultural use.

(iiiv) Permanent agricultural buildings or structures are prohibited in the Floodway.

(iv) Temporary agricultural buildings or structures are allowed in the ~~f~~Floodway, but are required to be relocated outside of the FO District or deconstructed in the event of a flood warning. If relocation outside of the FO District is not possible, then relocation to the Flood Fringe will be allowed, so long as the temporary structure is properly anchored.

(v) Agricultural buildings or structures that do not have at least two rigid walls and a fully secured roof, including but not limited to pens, pole barns, shade structures, and some livestock shelters may be constructed at grade and must use flood-resistant materials up to the FPE.

(vi) Agricultural buildings or structures with at least two rigid walls and a fully secured roof must conform with 4-405.C.2, or must be designed to be water-tight with walls substantially impermeable to the passage of water below the FPE, unless an administrative variance is granted by the County Engineer to allow the building or structure to be either elevated to the BFE, or wet-floodproofed at-grade in accordance with 4-405.C.2.b.

(vii) Requests for an administrative variance described in (vi) above must be made in writing using an approved form and submitted with a complete Individual Floodplain Development Permit application. An administrative variance allowing an agricultural building or structure to be wet-floodproofed may be granted if the following criteria are met:

- **(A)** The building or structure meets all flood protection requirements of 4-405.B, 4-405.C.1, and 4-405.C.2.b;
- **(B)** The building or structure has low flood damage potential and cost of recovery with respect to construction materials, location within the floodplain, flood depths and velocities, potential for debris, building contents, and function;
- **(C)** The building or structure does not increase risks and pose a danger to public health, safety, and welfare if flooded and contents are released, including but not limited to the effects of flooding on manure storage, livestock confinement operations, liquified natural gas terminals, and production and storage of highly volatile, toxic, or water-reactive materials; and
- **(D)** The variance would provide the minimum relief necessary to avoid exceptional hardship.

(viii) Prior to issuance of Certificate of Occupancy or final inspection, whichever occurs last, the property owner may be required to execute a Non-Conversion Agreement and the County must record the agreement in the real estate records. If required, the agreement will be in the form of a restrictive covenant or other County approved binding instrument, where the benefits of the covenant run in favor of the County. The covenant must be drafted to run with the land and bind successors, in perpetuity. The purpose of the covenant is to document the current owner's understanding of the limitations on construction and use of the building in accordance with the provisions of this section 4-405.C.3.c (Agricultural Buildings and Structures), and to put prospective purchasers on notice of such

restrictions. The covenant will also reference retrofitting criteria necessary to properly convert the building to habitable space, should the owner choose to do so. In addition to any other enforcement mechanisms available, violation of the agreement will be considered a violation of this Article 4-400 and subject to all applicable zoning enforcement procedures.

4-405.C.3.d. Crawlspaces

1. General Requirements

…

i. New Floodplain Construction of any Below-Grade Crawlspace must have:

(i) An interior grade elevation no lower than two feet below the Lowest Adjacent Grade;

(ii) Height, as measured from the interior grade of the Crawlspace to the top of the foundation wall, not to exceed four feet at any point; and

(iii) An adequate drainage system that allows floodwaters to drain from the interior area of the Crawlspace following a flood.

…

3. Non-residential Buildings.

…

~~**d.** Crawlspaces. New Floodplain Construction of any Below-Grade Crawlspace must:~~

~~(i) Have the interior grade elevation, that is below BFE, no lower than two feet below the Lowest Adjacent Grade;~~

~~(ii) Have the height of the Below-Grade Crawlspace measured from the interior grade of the Crawlspace to the top of the foundation wall, not to exceed four feet at any point;~~

~~(iii) Have an adequate drainage system that allows floodwaters to drain from the interior area of the Crawlspace following a flood; and~~

~~(iv) Meet the provisions 4-405(C)(1), General Requirements.~~

4-405.E. Manufactured Homes

E. Manufactured Homes ~~Home Parks~~

1. General Requirements. All manufactured homes must be installed using methods and practices which minimize flood damage. ~~For the purposes of this requirement, manufactured homes must be elevated to the FPE and anchored to resist floatation, collapse, or lateral movement.~~ All requirements below are in addition to applicable state and local requirements, including those to address wind loads.

2. For ~~new parks commenced on or after February 1, 1979; expansions to existing parks; existing parks where the value of the repair, reconstruction, or improvement of the streets, utilities, and pads equals or exceeds 50 percent of the value of the streets, utilities and pads before the repair, reconstruction or improvement has commenced; an existing park on which a manufactured home has incurred Substantial Damage;~~ manufactured homes to be newly placed or substantially improved on sites in a new manufactured home park, an existing park, or outside a manufactured home park ~~existing parks; and for manufactured homes not placed in a park~~:

a. Stands or lots must be elevated on compacted fill or on pilings so that the lowest floor of the manufactured home will be at or above the FPE. For homes placed on pilings:

(i) lots must be large enough to permit steps;

(ii) piling foundations must be placed in a stable soil no more than ten feet apart; and

(iii) reinforcements must be provided for pilings more than six feet above the ground

level.

b. Adequate surface drainage must be provided.

c. ~~New m~~ Manufactured homes and additions to manufactured homes must be anchored to resist flotation, collapse, or lateral movement. The foundation system must be certified by a P.E. registered in the State of Colorado to withstand the anticipated forces of the 1%-annual-chance (100-year) flood or use ~~by providing~~ over-the-top and frame ties to ground anchors ~~as well as the following~~ that meet the following requirements:

(i) over-the-top ties at each of the four corners, with two additional ties per side at intermediate locations, with the exception of manufactured homes less than 50 feet long which require only one additional tie per side;

(ii) frame ties at each corner with five additional ties per side at intermediate points, with the exception of manufactured homes less than 50 feet long which require only four additional ties per side; and

(iii) all components of a manufactured home anchoring system must be capable of carrying a force of 4800 pounds.~~; and~~

~~(iv) Any additions to the manufactured home be similarly anchored.~~

d. All mechanical equipment and outside appliances must be elevated to or above the FPE.

e. Fully enclosed areas below the lowest floor of the manufactured home must comply with 4-405.C.2.b.

4-405.G.4. Repair/Replacement OWTS

4. Repair/Replacement OWTS

a. For any OWTS or OWTS component in the Flood Fringe that requires replacement, the system or component must meet the requirements of 4-405.G.3.

b. In addition to the requirements of 4-405.G.4.a, for any repair or replacement of an existing OWTS or OWTS component in the Floodway the County Engineer must determine that the proposed repair/replacement is consistent with Subsections (i) through (iii), below.

4-405.J. Elevation Certificate Requirements

J. Elevation Certificate Requirements

1. As built Lowest Floor Elevations (referenced to the NAVD88 datum) for all New Floodplain Construction, Substantial Improvements, other improvements involving new floor area, and ~~or for~~ new manufactured home stands~~,~~ must be certified by a Colorado Registered Professional Engineer or Colorado Registered Professional Land Surveyor. For construction of new accessory structures built at grade in accordance with 4-405.C.2.b and lateral additions to buildings that are not Substantial Improvements, as-built Lowest Floor elevations may be submitted in a certified letter and must be submitted prior to the issuance of a Certificate of Occupancy or final inspection. For all other projects, including new and Substantially Improved permanent buildings with elevated Lowest Floors, FEMA Elevation Certificates are required. FEMA Elevation Certificates must be submitted to the Building Division Inspector and County Engineer twice over the duration of the project. Failure to submit an Elevation Certificate will result in a Stop Work Order until proper certification is provided. To ensure compliance with flood protection requirements during and after construction, completed Elevation Certificates must be submitted at the following times:

a. For slab-on-grade foundations, a FEMA Elevation Certificate must be submitted prior to final pour of foundation when foundation forms are completed.

b. For buildings on elevated foundations, such as extended foundation walls, stem walls, or piles, a FEMA Elevation Certificate must be submitted prior to rough framing when the

foundation is completed.

c. ~~For all buildings that have achieved finished construction, a~~A final FEMA Elevation Certificate must be submitted prior to the issuance of Certificate of Occupancy or final inspection.

2. To convert another elevation reference datum to NAVD88, applicants are directed to datum conversion factors within the current effective FEMA FIS report for Boulder County, or to an online datum conversion program. Assumptions used for the datum conversion must be explicitly described to Boulder County on ~~the~~ all required Elevation Certificates and certified elevation letters. For datum requirements for permit submittals, see 4-404.2.~~(~~B~~)~~.

4-409.D.2.b. Variances, Limitation on Board's Authority

b. For variances that allow construction of a building's Lowest Floor below the FPE, the County must notify the applicant in writing ~~Any applicant to whom such a variance is granted must be given written notice that the building will be permitted to be built with a Lowest Floor Elevation below the FPE and~~ that the cost of flood insurance will be commensurate with the increased risk associated with the reduced Lowest Floor Elevation.

4-414 Definitions

Basement. Any area of a building having a ~~finished~~ floor subgrade on all sides, where the ~~finished~~ floor is greater than four feet below the top of the foundation walls or greater than 2 feet below the Lowest Adjacent Grade.

…

Floodway. Those portions of the FO District including the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the 1% annual-chance (100-year) flood without cumulatively increasing the water surface elevation more than a designated height ~~required for the passage or conveyance of the 1% annual-chance (100-year) flood in which waters will flow at significant depths or with significant velocities, including the channel of a river or other watercourse and any adjacent floodplain areas that must be kept free of development and other encroachments in order to protect the health and safety of the residents of and visitors to Boulder County, and to discharge the 100-year flood without cumulatively increasing the water surface elevation more than a designated height~~ (also called 'surcharge' and described in Section 4-404.2.~~(~~E.~~)(~~3~~)~~).

~~**In-Kind Replacement**. For storm drainage systems and system components, replacement of any system or system component with the same system or component. In-kind Replacement does not include projects that will change the size or function of the system or component.~~

…

~~**Maintenance**. Maintenance means any routine or regularly-scheduled activity undertaken to repair or prevent the deterioration, impairment, or failure of any utility, structure, or infrastructure component. Maintenance includes activities to restore or preserve function and/or usability of a storm drainage, water delivery, or ditch system. Such activities may include, without limitation, the removal or movement of sediment, debris, and vegetation, installation of erosion and sediment control devices, stabilization of stream channel and/or water delivery channel (ditch) banks, and the replacement of structural components, so long as the work substantially conforms to the most recent County-approved design, flow condition, and vertical grade, as applicable. Maintenance does not include expansion or enlargement of a building or structure, Substantial Modifications, Substantial Improvements, total replacement of existing facilities, or total reconstruction of a facility.~~

Other Minor Fixes in 4-400

4-403.B.1 (website language)

1. The most current Official Map and supporting data shall be on file in the County Engineer's Office in electronic format, available for public inspection during normal business hours, with electronic and paper copies available upon request. The Official Map must also be available to the public on the ~~Boulder~~ County's website.

4-404.B.2 ("this Code" language)

2. Construction of new temporary buildings (either residential or non-residential), unless the County Engineer reviews and approves a specific location in the Floodway in conjunction with a Special Event as defined in the Multimodal Transportation Standards, a Group Gathering / Special Event as defined in this Code ~~the Land Use Code~~, or another temporary activity permitted by county regulations;

4-404.B.13 and 4-404.B.14 (fix list punctuation)

13. New or expanded Critical Facilities located on land lower than 6,000 feet in elevation; ~~and~~

14. Any encroachment (including filling and grading) that would adversely affect the efficiency of the Floodway or change the direction of flow, unless it conforms with section 4-404(C);~~.~~

4-404.2.B.1.b and 4-404.2.B.1.c (fix list punctuation)

b. A narrative describing the work to be performed; ~~and~~

c. A location map, showing the specific areas and property(ies) where the work will be performed; and~~.~~

4-404.2.B.3.b (add list punctuation)

b. Description and locations of any proposed site, filling, dredging, grading, and/or channel improvements;

4-404.2.B.4.a.vii (add list punctuation)

(i) existing buildings;

4-405.D.3 ("Code" capitalization)

3. Improvements to existing Critical Facilities that are determined to be Substantial Improvements require that the entire facility (including attendant utility and sanitary facilities) be elevated to the Boulder County FPE or, if not prohibited elsewhere in this ~~c~~Code, be retrofitted such that the building is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads, including the effects of buoyancy.

4-406.D ("an FDP" correction)

D. Any determination by the County Engineer to approve, conditionally approve, or deny an FDP must be in writing and mailed or otherwise provided to the applicant.

4-407.A (website language)

A. In the event that the County Engineer determines that an Individual FDP application for any development in the Floodway meets the applicable standards for approval, within five business days of permit issuance the County Engineer must publish a notice of the proposed use and the permit issuance on the ~~Boulder~~ County's website and transmit a copy of the notice to property owners adjacent to the subject property as well as a description of the process for appealing

the decision to the Board of Adjustment.

4-410 (remove gender-specific language)
All approved Individual FDPs are subject to final inspection by the County Engineer or ~~his~~ designee to verify that all conditions of approval have been satisfied.

4-413.C.2.a (erroneous parentheses)

(i) ~~(~~Relocation is subject to other provisions of this Code, including without limitation setback and zoning requirements.

(ii) ~~(~~Relocation to less hazardous locations is strongly encouraged, but not required.

4-415 ("this Code" language)

Certain terms used in this Article 4-400 are derived from FEMA and/or CWCB regulations. The federal and state definitions of these terms may not correspond precisely to county definitions of the same or similar terms as used elsewhere in this Code ~~the Land Use Code~~ and related local regulations such as the Building Code. …

4-802. Applicability and Scope of the Site Plan Review Process for Development

A. Site Plan Review shall be required for (unless not required or waived pursuant to sections B and C below):

…

8. Any development in the Floodplain Overlay District involving new structures, elevation of an existing building, or additions to existing buildings that expand the footprint of the structure. ~~development or earthwork requiring an Individual Floodplain Development Permit.~~

…

B. Site Plan Review shall not be required for:

…

6. Any development or earthwork eligible for a General Floodplain Development Permit.

7. Any development or earthwork requiring an Individual Floodplain Development Permit, so long as the Community Planning & Permitting Director finds no conflicts with the standards listed in Article 4-806 of this Code.

…

C. Site Plan Review may be waived for the following circumstances if the Community Planning & Permitting Director determines that there is no potential for any significant conflict with the criteria listed in Article 4-806 of this Code:

…

~~**9.** Any development or earthwork requiring an Individual Floodplain Development Permit for which the Director does not exempt Site Plan Review per 4-802.B.7. above.~~

Boulder County

Community Planning & Permitting

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BOARD OF COUNTY COMMISSIONERS
BUSINESS MEETING

November 15, 2022 – 10:30 AM
Third Floor Hearing Room
County Court House
1325 Pearl Street, Boulder

Authorization under Article 16-100.A of the Boulder County Land Use Code for Text Amendments to the Land Use Code related to floodplain regulations

Staff: Kelly Watson, Floodplain Program Planner, Community Planning & Permitting Department

Public testimony will not be taken – action requested

SUMMARY

Staff requests Board authorization to pursue text amendments in Articles 4-400 and 4-802 of the Land Use Code related to floodplain development regulations. The purpose of this amendment is to:

- Comply with the Federal Emergency Management Agency's (FEMA) recent clarifications to National Flood Insurance Program (NFIP) policy regarding agricultural structures;
- Conform to updated Mile High Flood District (MHFD) regulations regarding tents and makeshift structures in the regulatory floodplain;
- Remove the automatic requirement that Site Plan Review (SPR) be required for all projects requiring an individual Floodplain Development Permit;
- Simplify flood protection requirements for manufactured homes;
- Revise the conditions under which an Elevation Certificate is required;
- Streamline existing processes, requirements, and definitions; and
- Make clarifications that reflect the current implementation of the code.

BACKGROUND

Boulder County has participated in the NFIP since 1979. The NFIP provides a means for county residents to purchase flood insurance and receive federal assistance for flood recovery. In exchange, the county must adopt and enforce floodplain regulations that meet or exceed FEMA and Colorado Water Conservation Board (CWCB) minimum standards for development in the regulatory floodplain. In Boulder County, the regulatory floodplain is known as the Floodplain Overlay District, a zoning district defined by the modeled extent of the predicted 1% annual-chance (100-year) floodplain. County floodplain regulations, set forth in Land Use Code Article 4-400, define allowable and prohibited land uses, establish the basis for floodplain development permitting, and require flood protection measures for development in the Floodplain Overlay District. No changes to the map of the Floodplain Overlay District are proposed at this time.

The last substantial text amendments to Article 4-400 were approved in 2016 (Resolution 2016-111). In 2020, FEMA published new direction on flood protection requirements for agricultural structures under the NFIP (FEMA Policy #104-008-03), and the Mile High Flood District approved an

amendment to their floodplain regulations prohibiting all tents and makeshift structures used for human habitation in the regulatory floodplain (Resolution 57). Land Use Code Article 4-400 must be revised to incorporate these changes to ensure the county remains compliant with FEMA and MHFD standards and county residents have continued access to flood insurance and federal flood recovery assistance. The county anticipates a review under the NFIP Community Rating System in 2023 and intends to have the code changes completed prior to that evaluation.

Staff also recommends additional revisions and clarifications based on six years of experience with the last revisions to Article 4-400. These revisions include simplifying flood protection requirements for Manufactured Homes, clarifying the types of buildings that require Elevation Certificates, and other minor clarifications the reflect the current implementation of the code.

Article 4-800 was revised in 2019 to provide an option to exempt or waive SPR when a project requires an individual Floodplain Development Permit, so long as the Community Planning & Permitting Director finds that the project does not conflict the the SPR review standards. Since 2019, the Director has typically only required full SPR when other SPR triggers (besides an individual Floodplain Development Permit) are present. Therefore, staff would like to investigate whether there is a better way to tailor the level of Land Use review to the types of projects that require an individual Floodplain Development Permit.

Staff plans to conduct a public meeting to educate property owners and the agricultural community on the proposed revisions. Staff will then bring the revisions to the Planning Commission and Board of County Commissioners, likely in February and March 2023.

ACTION REQUESTED

Staff requests that the Board of County Commissioners authorize staff to pursue text amendments to Articles 4-400 and 4-802 of the Boulder County Land Use Code as described above.

Boulder County

Community Planning & Permitting

Courthouse Annex • 2045 13th Street • Boulder, Colorado 80302
Mailing Address: P.O. Box 471 • Boulder, Colorado 80306
303-441-3930 • www.BoulderCounty.gov

Docket DC-22-0004: Land Use Code text amendments related to Floodplain Regulations

Request: Review and Comment on the Proposed Boulder County Land Use Code Amendments to Articles 4-400 and 4-802

Date: January 27, 2023

Dear Stakeholder / Interested Party,

On November 15, 2022, the Board of County Commissioners authorized the Community Planning & Permitting Department to pursue text amendments to Article 4 of the Boulder County Land Use Code, which regulates the Floodplain Overlay (FO) District.

Summary of Proposed Changes:

- Comply with the Federal Emergency Management Agency's (FEMA) recent clarifications to National Flood Insurance Program (NFIP) policy regarding agricultural structures;
- Conform to updated Mile High Flood District (MHFD) regulations regarding occupancy in floodplains;
- Clarify when Site Plan Review (SPR) is required for projects needing an individual Floodplain Development Permit;
- Simplify flood protection requirements for manufactured homes;
- Streamline existing processes, requirements, and definitions; and
- Make clarifications that reflect the current implementation of the code.

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__X__ We have reviewed the proposal and have no conflicts.
_____ Letter is enclosed.

Signed __Anita Riley_____PRINTED Name _Anita Riley, Principal Planner_____

Agency or Address __Community Planning & Permitting, Development Review Team - Access & Eng.

Boulder County

Community Planning & Permitting

Courthouse Annex • 2045 13th Street • Boulder, Colorado 80302
Mailing Address: P.O. Box 471 • Boulder, Colorado 80306
303-441-3930 • www.BoulderCounty.gov

Docket DC-22-0004: Land Use Code text amendments related to Floodplain Regulations

Request: Review and Comment on the Proposed Boulder County Land Use Code Amendments to Articles 4-400 and 4-802

Date: January 27, 2023

Dear Stakeholder / Interested Party,

On November 15, 2022, the Board of County Commissioners authorized the Community Planning & Permitting Department to pursue text amendments to Article 4 of the Boulder County Land Use Code, which regulates the Floodplain Overlay (FO) District.

Summary of Proposed Changes:

- Comply with the Federal Emergency Management Agency's (FEMA) recent clarifications to National Flood Insurance Program (NFIP) policy regarding agricultural structures;
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_____ Letter is enclosed.

Signed Liz Northrup PRINTED Name Liz Northrup

Agency or Address Conservation Easement Program at Boulder County Parks & Open Space

Boulder County

Community Planning & Permitting

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Signed _____Ron Flax_____PRINTED Name _____Ron Flax, CBO_____

Agency or Address

_____

Boulder County

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_____ Letter is enclosed.

Signed Jacob Cassidy PRINTED Name Jacob Cassidy

Agency or Address City of Boulder Open Space and Mountain Parks

Boulder County

Community Planning & Permitting

Courthouse Annex • 2045 13th Street • Boulder, Colorado 80302
Mailing Address: P.O. Box 471 • Boulder, Colorado 80306
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_____ Letter is enclosed.

Signed _____PRINTED Name _____Ayanna Reed_____

Agency or Address _____City of Longmont_____

From: Planner On Call
To: Floodplain Admin
Subject: [EXTERNAL] Docket DC-22-0004
Date: Tuesday, January 31, 2023 2:04:39 PM

Hello,

Larimer County Planning has no comments on the Land Use Code text amendments related to Floodplain Regulations.

Thank you,

Laura Culleton

Planner on Call
Larimer County Planning Department
(970)-498-7679
200 W. Oak Street, Suite 3100
PO Box 1190
Fort Collins, CO 80522-1190

Community Planning & Permitting

Courthouse Annex • 2045 13th Street • Boulder, Colorado 80302
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____ Letter is enclosed.

Signed Theron G Labrie PRINTED Name Theron G. Labrie

Agency or Address Adams County

Boulder County

Community Planning & Permitting

Courthouse Annex • 2045 13th Street • Boulder, Colorado 80302
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Signed Stacey Thompson PRINTED Name Stacey Thompson

Agency or Address Mile High Flood District

From: Heather Gutherless
To: Floodplain Admin
Subject: [EXTERNAL] DC-22-0004 - Floodplain Land Use Code Change
Date: Monday, April 10, 2023 4:44:28 PM
Attachments: image001.png

Hi – Jefferson county has no comments on the proposed changes to Boulder County's Floodplain regulations.

Thanks,

Heather Gutherless, AICP
Planning Supervisor, Long Range Planning
Planning and Zoning Division
Jefferson County
o 303-271-8716
hgutherl@jeffco.us | Find us on the web: planning.jeffco.us

Planning and Zoning is open to the public and we are offering both virtual and in-person appointments. For the convenience and safety of the public and our staff, virtual appointments are encouraged. Many staff are still working remotely to provide online and virtual services Monday through Thursday. County offices are closed on Fridays. Please schedule appointments and submit applications online. Go to planning.jeffco.us for more information.

JeffersonCounty_Final_Primary

Proposed Additional Changes to Boulder County's Floodplain Code

February 8, 2023

To: Kelly Watson, CFM | Principal Floodplain Planner
Boulder County Community Planning & Permitting
2045 13th Street, Boulder, CO 80302

Re: the January 27, 2023, Docket DC-22-0004: Land Use Code text amendments related to Floodplain Regulations

Dear Kelly,

Thank you very much for alerting me to the County's draft changes to its floodplain code, and especially for sending the text of the draft changes that will impact manufactured homes situated in the 100-year flood area.

The draft changes look very good to me, promoting helpful flood mitigation while tailoring the requirements so that homes are required to withstand predicted flow rates in their location during a 100-year flood, and so, not requiring them to withstand flow rates well in excess of these predicted rates (as is required in the current code).

I would like to propose two further changes: One small addition, for clarity, is to insert "newly" before "placed or substantially improved" in 4-405E.2 (header paragraph), to make it clear that subsection 2 applies to newly placed homes in the flood zone, not homes currently situated there.

The other addition is more significant, and quite crucial to preventing the kinds of no-win situation that the current code engenders for owners of older manufactured homes. In short, the proposal is to define "substantial improvement" using a baseline of the in-place resale value of the manufactured home instead of its chattel resale value, which is my understanding of how "substantial improvement" is currently calculated for manufactured homes. In sum, my two proposed additions to 4-405E.2 are in redline, as follows:

> For ~~new parks commenced on or after February 1, 1979; expansions to existing parks; existing parks where the value of the repair, reconstruction, or improvement of the streets, utilities, and pads equals or exceeds 50 percent of the value of the streets, utilities and pads before the repair, reconstruction or improvement has commenced; an existing park on which a manufactured home has incurred Substantial Damage;~~ manufactured homes to be newly placed or substantially improved on sites in a new manufactured home park, an existing park, or outside a manufactured home park existing parks; and for manufactured homes not placed in a park; where a substantial improvement of a manufactured home is defined as any improvement of that manufactured home which increases its value more than 50% of its in-place resale value:

To explain the rationale for the proposed definition of "substantial improvement" of manufactured homes, it helps to look at the Boulder County Assessor Office's records of the assessed values of older homes in the County, which is based on their chattel value rather than their in-place sale value. Many, if not most, older homes have been assessed in the $10-15,000 range. Accordingly, improvements that are within affordable reach of low income homeowners (such as replacing a failing roof on an otherwise healthy, but older home) have become forbidden unless the homeowner goes to the additional lengths of fulfilling the elevation and anchoring requirements of Boulder County's flood zone code. For example, from recent cost experience, and a consulting engineer's estimates, that means an affordable improvement costing over $5000 can quickly turn into a $17-$25,000 project.

The former repair was affordable, while the latter will not be affordable for most owners of older manufactured homes. Moreover, it requires such homeowners to bear costs that dwarf the cost of their otherwise affordable beneficial repairs, as well is being in excess of the chattel value on which substantial improvements are calculated. Because this scenario exemplifies what older home owners face in doing any significant repairs, the effect is that the County's code significantly discourages any such homeowners from doing the repairs needed to make their older homes sound, locking their homes into a spiral of deterioration because they can't afford to do the repairs that keep their homes sound. Since a major goal of the code is to prevent serious loss due to a 100-year level flood, the code is effectively regressive. It guarantees the loss of a home (from deterioration), or exceptionally high costs of repairs for low-income homeowners. Consequently, rather than averting the 1% likelihood of a significant loss from a 100-year flood, the homeowner is now *guaranteed* a rival level of loss or level of repair costs. That comes across as backwards.

Because the problem seems obviously due to the way "substantial improvement" is defined, and the fact that the costs are imposed on homes at the low end of the home value spectrum, it seems the best remedy is to revise the definition of substantial value, as proposed above. The result from the proposed change will be that the costs of satisfying elevation and anchoring requirements do not dwarf the cost of the improvements. The proposed definition has the further virtue of aligning the calculation of substantial improvements for owners of manufactured homes with the analogous calculation of substantial improvements for real property homes, making them more equitable, namely by basing both on their in-place sale values.

Please consider making the proposed definitional change.

Thanks, again, for your work on these sensitive issues.

Sincerely,

Michael Peirce, Ph.D.
303-99-8826

Project Manager, Colorado Coalition of Manufactured Homeowners
Board Member, National Manufactured Home Owners Association
President, Sans Souci Cooperative

From:	Michael Janeczko
To:	Watson, Kelly; Boulder County Board of Commissioners; Flax, Ron; Case, Dale; !floodplainmapscomment; Floodplain Admin
Cc:	vic hart; Kristy Anderson; monte deault; Curt Parker; suzanne pope
Subject:	[EXTERNAL] Floodway mapping
Date:	Sunday, February 26, 2023 2:16:55 PM

Thanks for your response to my e-mail and the Memorandum dated January 10th 2023.
To answer your first question in your e-mail of January 23rd. Yes, of course Curt is forwarding all of your relevant e-mails to all of us. To answer your second question, this is my only e-mail address.
What I was referring to in my memo was the total lack of response from any of the dozen or so County officials to whom I sent the memo. I am particularly curious as to why we have received no response from the County Engineer, Mr. Thomas. I would think that he would have been intimately involved in this process from the beginning. If not he certainly should have been involved. Did he review these maps prior to their adoption by the county? And if so, how could he have approved them when we are now aware of just how erroneous they are as pointed out by Mr. Parker and a nationally recognized independent Scientific Review Panel of seven experts? I guess they all rely solely on you to communicate with us. I guess that is their idea of responsiveness and transparency.
Here are my main concerns with your e-mail:
My foremost concern is that you keep repeating that the County is waiting on FEMA to tell you what to do. You (the County) are solely responsible for prematurely adopting the preliminary maps that were presented to you by your consultants which we now know beyond a shadow of a doubt are woefully inaccurate. The County adopted them, not FEMA. It is the County's sole responsibility to rescind them until such a time as they can be accurately replaced as they certainly do NOT reflect "the best available data" that is required by the County's own regulations. It is our steadfast request that these preliminary maps be replaced with the already recognized reasonably predictive FIRMs which more accurately reflect what actually happened during the 2013 flood. Which by the way are still the official FEMA maps. These maps which the County replaced in 2018 indicate that we are at worst on the outermost fringe of the floodplain or out of the floodplain entirely. This is indeed the "best available data". Waiting on FEMA for further study which you say "likely will take many years" is absolutely not an acceptable option for us.
Again, Here is our personal reality for which you seem to be completely oblivious, since you continually refuse to acknowledge and simply ignore it. We are in our seventies and have a substantial portion of our personal

wealth tied up in our property. Personally, I have a heart condition for which I have already endured a triple heart bypass operation a few years ago. If I keel over in the near future my heirs will no doubt have to put my property up for sale. In its current floodway map position the County has rendered it essentially unsaleable. In short, we do not have "MANY YEARS" (as you stated in your e-mail) to rectify this travesty that has been foisted upon us. Over a year ago, the sale of one of the neighbor's homes has already fallen through because of this mapping causing her considerable economic harm. I certainly do not wish my family to endure a repeat performance of this scenario at any time in the future.

Yes, we all have agreed from the outset that we MAY be in the flood PLAIN. You are entirely correct in stating that the new mapping that you have adopted does not accurately reflect existing hazards. We heartily do not agree that the new maps should have replaced the old ones. Why? Because the new maps artificially CREATED a floodway encompassing our homes that simply does not exist. As I have repeatedly stated in my previous memos, I was NOT in the floodway during the catastrophic 2013 "flood of the century". How can I possibly be in it now?

Your excuse "that the county must ensure that inappropriate development is not allowed "SIMPLY BECAUSE OF THE SRP RULING" is beyond comprehension. I don't believe there is any higher level of appeal than a decision made by an independent expert seven member review panel conducted by the National Institute of Building Sciences in Washington D.C. to be made at this point. Pretending that the county cannot make any recommendations or decisions on this mapping until you hear from FEMA is absolutely untrue. Again, you adopted these maps which we are now saddled with and you certainly have the authority to suspend their adoption.

You stated that I am supposed to "be assured that we are all working toward more accurate maps". Based on what you have told us in your e-mail the County is not working on this at all, only waiting on FEMA. In addition, how can the outcome of any new study be "less favorable" to us homeowners when we are already saddled with the worst nightmare imaginable of being stuck in a phantom floodway which essentially destroys the value of our property.

Your meeting on February 6th to "Pursue Land Use Code text amendments ...etc.." without addressing the most important issue at hand, the floodway and floodplain mapping, appears to me to be nothing more than rearranging the deck chairs on the promenade deck of the Titanic without paying any attention to the enormous iceberg that is sinking our ship.

With regard to the request for comments on the proposed text amendments (Docket DC-22-0004) rather than having me repeat all of these remarks again, please accept this e-mail as my formal comment.

I also request that the deadline to submit further comments be lengthened past the end of February. This short time frame to review the proposed changes to the regulations is simply not sufficient to enable me and counsel to adequately review how the changes will affect the status of my property in the future. It seems entirely unfair that the county may take "many years" to review the mapping but only will allow us to review the regulation changes in a few scant days before they are adopted by the Commission in less than a month. A couple of items of particular concern are:

1) The paragraph in the existing code stating that the Board of County Commissioners MAY … adopt a "Boulder County Floodplain" using the "best data available" when the County is now apparently already using data that has been determined to be erroneous for its "official" map. That situation needs to be corrected and resolved prior to considering adoption of regulations that further restrict what a property owner can or can't do on his own property.

2) In section 4-414 on page 11 of the proposed amendments under the topic Floodway, I object strenuously to changing the word WILL to the word MAY. This change opens the definition of floodway that is specifically defined by accepted engineering and mapping to whatever area someone (Who?) decides the floodwaters MAY flow. This slight little one word change pretty much destroys the whole process of floodway definition by science and opens it up to whoever arbitrarily decides the floodwaters MAY flow.

From: KMD
To: Floodplain Admin
Subject: [EXTERNAL] DC-22-0004: Land Use Code text amendments related to Floodplain Regulations
Date: Tuesday, February 28, 2023 11:01:50 PM

TO: FloodplainAdmin@BoulderCounty.org

RE: DC-22-0004: Land Use Code text amendments related to Floodplain Regulations

The following comments are written under the objection of duress and insufficient time and opportunity to fully consider the comprehensive meaning and impact of the above referenced “update” text amendments to Floodplain Regulations. However, given the February 28 comment deadline, I am submitting the following initial observations and objections. As I write this, I do not intend to present the following to my neighbors for their approval, although I doubt that there would be any substantive disagreement. I will send them a copy at the time of submittal. But my personal feelings are my own, and I reserve the right to add to, remove, or otherwise alter any statement herein, because of the lack of sufficient time and opportunity for sufficient consideration under a lack of pressure and within these complex circumstances.

These long, tangled, and on a comprehensive basis, substantially undecipherable Boulder County text amendment updates, prepared by the County with all of the resources in the world, and added to a Land Use Code which is already of that same nature, are more than difficult to sort out, especially for ordinary citizens.

Ms Watson, with regard to your email of last week, following the February 9th public meeting concerning these proposed amendments- I'm sure that anyone who had been present at, or now listens to, that meeting realizes that no one from our small group of what I will call our Left Hand Creek Senior Citizen Property Owners, wanted our participation to be cut off therein. Nor to the best of my knowledge, did any of us desire currently a separate meeting with yourself and the Land Use Department, as you wrote . That proposed side meeting appeared to be solely your sudden and unilateral decision, which obviously and intentionally put an immediate and unexpected end to all public questions and comments for better comprehension from our group. Nevertheless, our floodway situation is still inextricably bound to the currently proposed “Land Use Code Update regarding Flood Regulations”.

Please note that we DO NOT want the erroneous floodway situation which has been imposed by Boulder County upon us, to be a separate discussion from the new

Boulder County Floodplain Regulatory Update Proposal. We DO NOT want our specific situation to be relegated as a side issue to be addressed at another time, when it is in fact, part and parcel of this floodplain regulations update.

Previous side consultations with Boulder County flood personnel and the Land Use Dept. have taught us what to expect therefrom anyway. From the beginning, the Land-Use (and Transportation) Department has never lifted a finger, except the middle one, to meaningfully assist us with our immediate removal of a County-imposed, knowingly injurious imposition of a demonstrably erroneous regulatory floodway. And this is a floodway concept which these floodplain amendment updates seemingly now seek to potentially expand by definition.

The long, willful, malicious and wrongful regulatory floodway torment on the part of Boulder County towards us and our homes has literally made us sick – physically, mentally, emotionally, financially. There is no doubt in my mind that each one of us could publicly present a letter from our physicians to that effect, especially given that most or all of us are in our 70's to the best of my understanding.

We would likely welcome a side Boulder County meeting- but it should take place in the presence of fully informed decision making parties- most likely at least Planning Commission members and ultimately County Commissioners who have been "brought up to speed" in this matter, and unfiltered through the Land Use Department- given the unfortunate crafting, complexity and egregiously wrong regulatory FLOODWAY which has been inflicted upon our homes and lives as ordinary, and especially as older, citizens.

This now proposed Boulder County regulatory "update" follows immediately upon the heels of the recent NATIONAL, PUBLIC, AND HIGHEST FEMA-RECOMMENDED AND ENDORSED appeal level decision- that of the SCIENTIFIC RESOLUTION PANEL (SRP).

We are GRATEFUL to national level FEMA for providing us with the SRP. This SRP decision was decidedly in our favor vis a vis Boulder County with regard to the regulatory floodway status wrongfully applied to us. This SRP decision also was, and is, a national public rebuke to Boulder County, and to supportive individuals in other entities, and was conducted by the National Institute of Building Sciences with a panel of nationally recognized, independently chosen, flooding and hydrology experts.

The content in this SRP result, the reaction of Boulder County to the SRP decision, our overall experience with the County, coupled with the issues in these proposed amendments, make it impossible to view this situation against us in any light other

than one of bad faith.

From the final decision and report of the SRP, involving our group as the true appellants, and received by us on November 28, 2022, the report begins with a page ONE, ONE page, ONE sentence Summary of the 28 page final decision from the SRP team of national flood engineering experts. It should be specifically noted that the term “FEMA’s data” is in effect FEMA’s regional office acceptance of erroneous data and conclusions used by Boulder County in the imposition of premature and clearly erroneous floodways forced upon our homes and lives:

“Based on the submitted scientific and technical information, and within the limitations of the Scientific Resolution Panel (SRP), the Panel has determined that FEMA’s data does not satisfy NFIP mapping standards defined in FEMA’s Guidelines and Standards for Flood Risk Analysis and Mapping and must be revisited”. (Scientific Resolution Panel Decision and Report, page 1)

As further cited, claimed on appeal, and undisputed in the SRP report:

“The preliminary floodways shown on the proposed floodplain mapping do not appear to be based on, the result of the hydraulic modeling, do not appear to be consistent with the accepted and current FEMA definition of a floodway and appear to be placed in such a fashion as to place as many existing residential structures as possible in a regulatory floodway”. (page 6, Scientific Resolution Panel Decision and Report).

The foregoing statement is then followed by this statement by the national Panel:

“The proposed floodways do not appear to be based on any currently accepted encroachment methodology. It is not at all clear, how the adoption of the Floodways as proposed would be in the best interest and provide for the health, safety and welfare of the citizens of Boulder County. ” (page 6, Scientific Resolution Panel Decision and Report).

Further, combined with this now curiously-timed Floodplain Regulations “update”, it becomes at first blush increasingly more apparent that, once one is placed in a regulatory floodplain and/or floodway, trying to lead a normal existence in Boulder County- on lands which, with ordinary life risks, and for the vast majority of Boulder County’s populated history, were allowed to be normally used and built upon by the residents of Boulder County- has become an increasingly unbearable ordeal. That is clearly intentional. The official expansion of the concept of public health, safety and welfare in this community, if it has not lost its ordinary and reasonable definition altogether, ever more frequently means virtually anything just shy of regulatory “protection” from a meteor strike.

What is now being proposed as a regulatory Land Use Code “update” appears to be an often undecipherable morass upon an existing often undecipherable morass, increasingly unworkable, incompatible with the practical realities of ordinary rural life and agricultural practices, and with a disheartening degree of express, implied and unfettered discretion on the part of County officials. The result of course, with regard to most normal citizen life and property use and improvement undertakings, is that we face draconian requirements and processes which are so prohibitively time-consuming, intimidating, energy draining and expensive, that ordinary and reasonable people so affected will simply give up trying to do much, if anything, with their properties. And of course that is the end game.

The County apparently now seeks to further expand its discretion in the proposed amendment “updates” to the detriment of floodplain/floodway residents and in an apparent attempt to blunt the above referenced SRP decision.

Certainly, there are numerous things in the proposed Code “updates” which appear problematic. For instance, the proposed ban on camping on private property in the 100 year floodplain. Apparently, grandchildren will no longer be able to pitch a tent in the front yard, at least without a permit, because there might be a flood in the next 100 years. In the meantime, we can take them up to the main road at the end of the driveway in a little canvas bicycle cart with a bouncy flag and tow them 3 feet from a fast moving cement truck without any apparent regulatory safety concerns at all. Of course, all activities cannot be made equally safe, but when the disparity of acceptable concerns and practices, or the regulation simply on its face, becomes so laughable, official creative “public health and safety” regulations manufactured without common sense, reasonableness, or good faith, become ludicrous.

However, the primary concern with this now proposed floodplain regulatory update- in addition to the foregoing, and in connection with the SRP decision- is the apparent alteration and official expansive discretion with regard to the definition and application of a regulatory FLOODWAY. This alteration appears to be buried within the proposed text amendments.

The following is subject to professional consultation and approval of my understanding:

Section 4-414 proposed amendment to the Land Use Code definitions purports to “Revise Definitions To More Closely Align With NFIP Definitions”. NFIP means FEMA. Several matters fall under this heading. But when it comes to the definition of “Floodway”, the proposed Code amendment wording appears to attempt to craft something other than the represented “close alignment” intent. This is entirely misleading.

In the proposed amendment, Boulder County cites the following:

“The NFIP defines a regulatory floodway as ‘the channel of a river or other watercourse and the adjacent land areas that MUST BE RESERVED in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height’ “.

This NFIP/FEMA definition wording appears to be correct.

“MUST BE RESERVED” means “MUST BE RESERVED”. Presumably, that means that in the event of a threshold flood, the water WILL be there sufficiently in a floodway sufficient to bear and discharge it.

The first question is WHY Boulder County’s floodway definition is NOT in “close alignment” with FEMA’s floodway definition to begin with? My understanding is that originally, the FEMA floodway definition WAS the County floodway definition. My further understanding is that there has been a great deal of prior manipulation of the Boulder County floodway definition in recent years. WHY is that? The proposed amendment update now apparently seeks to accomplish the opposite of “closer alignment” with the FEMA definition which the County represents. And there would be a reason for that.

Some projected water flow in a particular area, even if subjectively or arbitrarily deemed. “significant” or not, simply does not rise to the threshold requiring any floodway which “MUST BE RESERVED” under the NFIP definition and in which the prohibition of manmade use or activity protection Is not a FEMA defined necessity. It would seem that the quandary for Boulder County is how to capture those lands as floodways anyway.

As per the proposed amendment to floodway definition in 4-414 (Definitions) and in disregard of the represented purpose of “closer alignment with NFIP definitions” in this proposed Code “update”, the County effectively creates “DIS-ALIGNMENT” with FEMA in the proposed redefinition of the County “Floodway”. It does so by changing ONE crucial word in the existing County floodway definition: the word “WILL” is changed to “MAY”:

Proposed new 4-414: “Floodway. Those portions of the FO District required for the passage or conveyance of the 1% annual-chance (100-year) flood in which waters ‘MAY’ (substituted for the word ‘WILL’) flow at significant depths or with significant velocities, including the channel of a river or other watercourse and any adjacent floodplain areas that must be kept free of development and other encroachments in order to protect the health and safety of the residents of and

visitors to Boulder County, and to discharge the 100 year flood without cumulatively increasing the water surface elevation more than a designated height…"

This of course leaves wide open the apparent possibility that waters which MAY NOT flow with the certainty of "WILL" as currently outlined in the Land Use Code, could yet STILL create a regulatory floodway area, within speculatively defined "significant" water flow, which also may or may not actually exist either under reasonable interpretation.

Apparently, a virtual trickle "may" be deemed significant flow and trigger floodway status, or the possibility of a Biblical flood for whatever proffered reason "may" create a floodway. All of this is seemingly open to be modeled to a desired County floodway result and shoehorned under the guise of "public health and safety", when that result may be far from the genuine FEMA floodway definition purpose. Speculative, incorrect or even abuse of modeling is a problem, especially when enforcement based on the model is strict. And all of this, of course, sounds strikingly familiar to us given our regulatory floodway experience at the hands of Boulder County, and as then correctly evaluated by the SRP.

Someone has worked long and hard at very precisely word-smithing the language and the concepts in this entire Code update. The Boulder County floodway redefinition appears to do the opposite of what is represented under the guise of carrying out the stated intent. Further, our group has personally witnessed faulty engineering modeled to match Boulder County floodway desires, and these proposed floodway amendments, not only do not prevent a barrier to such actions, they appear to effectively enable the ability of the County to embrace more of the same while attempting to blunt the SRP national decision.

The obvious question is WHY Boulder County, if it truly desires "close alignment" with FEMA, does not simply limit its floodway definition to that of FEMA's? The answer seems to be just as obvious- and it is certainly doesn't appear to have anything to do with genuine or reasonable concerns about public health, safety or welfare. As with the quoted conclusion cited above in the SRP decision.

Let's face it: everyone knows what is going on here. For the vast majority of floodplain impacted properties in Boulder County, there are no genuine dangers beyond the ordinary risks of life as a reasonable person would determine them to be, and which should not warrant overbearing, overreaching regulation. This proposed floodway amendment "update" appears to be simply a license to take, an attempted "get out of jail free card" for the seeming benefit of the County and its Land Use Department with regard to floodways, and evidently an attempted end run

with regard to the national SRP decision favoring us. This proposed floodway "redefinition" appears to be a direct calculation with regard to the SRP decision rebuking Boulder County, which decision has yet to become publicly well known. The County can not help but see this situation very well.

Ultimately, to the best of my determination, this entire floodway scenario thus leads to potentially more speculative floodway models, with increasingly less in the way of hard edges- but with much easier confiscation of property rights through regulatory floodway designation under potentially highly questionable pretenses of accuracy.

Ultimately, Boulder County should insure, make and/or keep any limits on the Land Use Department's ability to grab homes and private property through regulatory floodway ruses and abuses, so that ordinary citizens may be released from the regulatory hell which has been unleashed upon us without compassion, and so that future parties will not be subjected to the same.

Ultimately, this proposed regulatory update appears to be simply further evidence of Boulder County's on-its-face continuing pattern of bad faith in its quest to, at least in our case, rip off the homes, properties, lives and retirements of a small bunch of senior citizens.

The CRUX of this entire floodway matter flows from this CENTRAL POINT, and it is hardly one which is a novel claim, nor one made only by ourselves: Boulder County attempts through creativity and regulatory abuse to use floodways and other "standards" to achieve ends ulterior from any genuine public health, safety and welfare concerns. This assertion is also supported in the decision of the SRP as cited above.

Further, in this entire matter, the bad faith of Boulder County also rests in the totality of the circumstances.

1. The response, or lack thereof, to the significant decision of the SRP on the part of Boulder County is its own commentary on good and bad faith. Certainly, there has been completely absent any "Oh no, what have we done to these people?" response on the part of Boulder County. Incredibly, as a result of the national SRP decision, there has been by Boulder County no apology to us, especially as senior citizens, for abusive and erroneously imposed floodways, no end to long and endless torment regarding our homes and lives, no signs of repentance, nor other contrition, nor clamor for or discernible actions to immediately remove the offending floodway status and regulation.

We have instead witnessed apparent obfuscation if not doubling down, and veiled

threats to us that any restudy may leave us in a worse position, expressed official desire for a new “strategy”(!), and an expressed oddly urgent haste on the part of Boulder County in imploring FEMA to approve all remaining proposed flood maps in Boulder County. What would an ordinary and reasonable person think about such an urgent County request? If the County were truly interested in the public good, in light of the SRP decision, wouldn’t it want to insure that all other maps were accurate for the protection of its citizens?

Nevertheless, our understanding is that FEMA HEADQUARTERS, as the result of the SRP in our case, has now put immediate brakes on such approval of all other maps in all of Boulder County, and perhaps beyond, to enable reexamination thereof.

Further as a result of this recent national and public SRP decision, the national exposure and personal and professional questions for, and embarrassment to, the officials and engineers at the various entities, most especially at Boulder County, would seem to be an obvious problem. While that is not something we have sought or desired, this certainly is not our fault. Accordingly, our great concern now is that because of the broad implications of this SRP decision, and given our awful treatment by the County throughout this matter, efforts may be subsequently generated in order to attempt negation of the findings of this SRP, and somehow arrive at the same erroneous result. This is why suspicions are high within this Floodway Regulations update.

2. Boulder County repeatedly proclaims its dependence upon FEMA decisions. The county prematurely approved the flood maps with erroneous floodways PRIOR to FEMA's approval of the same. In light of the SRP decision, there appears to be nothing which indicates that the County cannot “un-adopt” these erroneous flood maps, again without waiting on FEMA approval as before, and thereby remove the injurious floodway cloud from our homes and our lives.

3. If our subject technically erroneous and scientifically unfounded floodways were obvious to Mr. Curt Parker, our engineer and former Boulder County Floodplain Administrator, and these same errors were obvious to a national panel of flooding and hydrology experts at FEMA's highest SRP appeal level, then it is inconceivable that these erroneous regulatory flood maps regarding our properties and floodway status were not ALSO knowingly obvious to the engineers, bureaucrats and entities at, and closely consulting with Boulder County.

If it had not been for the personal courage and character of our engineer and former Boulder County Floodplain Administrator, Curt Parker, this floodway stunt would have flown perfectly under radar, as we would have never been able to decipher what was going on by ourselves, beyond the fact that we knew from practical

experience and observation in 2013 that this floodway status appeared to be wrong.

4. The application of the requirements of the Mile High Flood Protection District to ALL of Boulder County, when in fact it does NOT itself geographically or otherwise cover a substantial portion of Boulder County, including our properties, is intentional, unnecessary, and willfully oppressive regulatory overreach.

5. The Left Hand Creek repair and restoration project which was supposedly for our benefit and protection, and was overseen by Boulder County using millions in FEMA funds, was to the best of our knowledge, not constructed for any such benefit to us.

5. The County Engineer, who is cited throughout the Land Use Code with regard to flood matters, and should have been a great resource for us, has been totally absent throughout our regulatory floodway dispute with the County. This is more than a little odd. Similarly, to this day we have yet to be told exactly who and where the Floodplain Administrator is- even though virtually all significant questions, correspondence and appeals must go through whoever that individual is. This is even more bizarre and has left us intentionally without a route for more directly solving flood problems.

WE WANT THE FOLLOWING:

1. The immediate removal of our homes and properties from the erroneous floodway.

2. A guarantee that Boulder County will not attempt a floodway imposition against us and our homes and properties ever again, and that further the County will within reason LEAVE. US. ALONE. Just as any ordinary and reasonable citizen would expect.

3. A Land Use Code which is understandable, affordable, which overwhelmingly errs on the side of targeted residents, and most importantly, is genuinely bearable. No more attaching endless, oppressive and micromanaged requirements and prohibitions, along with every fiction in the world under the guise of “public health, safety and welfare”. Further, it is not up to us to be a cash cow for a bureaucracy which has become an industry unto itself with six figure salaries and benefits ordinary people can only dream of, and whose primary “product” is the virtual extraction of property rights and normal lives from ordinary citizens.

Again, this latest round is another link in a highly complicated situation with which we have been given insufficient time and opportunity for evaluation. If there is anything in the foregoing which needs to be corrected, I intend to do so. But I don't

think so. I may be an old man, and I am exhausted in every way, but hopefully I have not lost all of my marbles yet.

Finally, the officials at Boulder County, and supportive individuals at other entities, have sat and watched as we have been tormented and had our lives, homes, retirements, families, health and overall well-being ripped off, without mercy. With Boulder County, even the awareness that the stress of this situation has likely at least contributed to the demise of one of us, and the devastation of his widow, and that another of us is living through this with Stage 4 cancer, has fallen upon deaf ears. Imagine having some of your last thoughts on earth be of what has become of the value and enjoyment of your home which represents your life, it's work and security, and thus, what has also become of your primary provision for your surviving spouse and family. Whether legally enforceable or not, this is been a case of multiple violations, including genuine elder abuse in a community which claims to "care about people so much", and where I have lived most all of my life. This needs to be a public story. We have reached the end of our administrative appeals. Left without other options, if Boulder County, and supporting others, are not going to do the right thing, especially in the presence of a national SRP decision, and also with regard to these proposed Code updates, I can see no other path than to, within the bounds of the law, begin enlisting not only legal counsel, but also the public assistance of local, state and national media, senior citizen organizations, and civil rights consultants.

If Boulder County is going to rip off the homes, lives, families, retirements, health and the well-being of a small bunch of old people, then, within the bounds of the law, you need to do so in front of everyone.

With about an hour left to review, edit and submit this, as stated above: Get the floodways off from us now. Commit to not imposing them again. Give us a reasonable, bearable and merciful land use code. And leave us alone in our remaining years. And our families as well.

Kenneth M Deault

8027 N 41st St
Longmont, CO 80503

staysteadyseven@earthlink.net

From: suzanne pope
To: Floodplain Admin
Subject: [EXTERNAL] Land Use Code Amendment Article 4-400
Date: Tuesday, February 28, 2023 3:13:34 PM

I am alarmed that BOCO flood administrative staff thinks that redefining floodway (from the water "will" to the water "may") is their first public action after receiving the results of a scientific panel (11/2022) appointed by federal FEMA that concluded "the (proposed BOCO) maps must be revisited due to the fact that the current maps have been found to NOT satisfy the (FEMA) federal mapping standards for flood risk analysis (Official Panel Decision and Report, SRP COBC73021, Nov.18, 2022). Is this the best that Boulder can offer us after a long and expensive process of fly overs, mapping and hydraulic modeling?

It would seem that if "public health and safety" is indeed the top priority for the BOCO flood plain staff, Boulder County manager (Jana Peterson) and the County Commissioners, then the FEMA approved, most scientifically accurate flood mapping available would be top priority for the Boulder County Floodplain Staff and the County Commissioners. This FEMA approved mapping in place (FIRMS).

Please use accurate maps that the public trusts for regulation and safety. Spending your valuable time and our hard earned tax dollars on expanding your over-reach by making a change in the floodway definition is questionable. If this broader definition of floodway is allowed, ALL BOCO homeowners should be concerned about approving a change in floodway definition from what flood waters WILL do, based on accurate scientific hydraulic mapping and modeling, to what Boulder County staff thinks flood waters MIGHT do.

National Institute of BUILDING SCIENCES™

Panel Decision and Report

SRP COBC073021

Boulder County, CO

November 18, 2022

Innovative Solutions for the Built Environment

Table of Contents

Summary

Based on the submitted scientific and technical information, and within the limitations of the Scientific Resolution Panel (SRP), the Panel has determined that FEMA's data does not satisfy NFIP mapping standards defined in FEMA's Guidelines and Standards for Flood Risk Analysis and Mapping and must be revisited.

1.0 Introduction

This report serves as the recommendation to the Federal Emergency Management Agency (FEMA) Administrator from the National Institute of Building Sciences (NIBS) Boulder County, CO Scientific Resolution Panel (SRP). SRPs are independent panels of experts organized, administered, and managed by NIBS for the purpose of reviewing and resolving conflicting scientific and technical data submitted by a community challenging FEMA's proposed flood elevation. SRPs are charged with helping to efficiently resolve appeal and protest issues between FEMA and communities by acting as an independent third party in an effort to obtain the best data possible for the community's Flood Insurance Rate Maps (FIRMs).

2.0 Panel

Panel ID: COBC073021

Panel Name: Boulder County, CO

FEMA Region: VIII

Panel Members:

- **Avalisha Fisher, P.E., CFM, Principal and Project Manager with Driven Engineering, Inc., in the Mobile, Alabama area.** Mrs. Fisher has over 30 years of experience as a civil engineer with specialized expertise in hydraulics and hydrology with most of her career including numerous projects involving remapping of floodplains and floodways. Mrs. Fisher began her career performing flood studies using HEC-2 and progressed to using other programs like HEC-RAS, and is very familiar with FEMA map revisions requirements. She founded Driven Engineering in 2006 and provides technical advice and training to their team of engineers as well as serving as the floodplain manager for the University of South Alabama and has been assisting the City of Semmes with joining the NFIP and obtaining their community rating.

- **Todd Cochran, PE, CFM – Senior Vice President with House Moran Consulting, Inc. Atlanta, GA area.** Mr. Cochran has 25 years of experience as a civil/water resources engineer and manager. His expertise includes advanced hydrologic and hydraulic modeling and design, including complex hydrologic studies, 1-dimensional (steady and unsteady), and 2-dimensional hydraulic modeling. Mr. Cochran's project experience includes FEMA Flood Insurance Studies, FEMA CLOMR/LOMR, stormwater master plans, stream stabilization design, stormwater BMP design, and hydrologic\hydraulic design of bridges and culverts.

- **Siavash Hoomehr, PhD, P.E., CFM, Area market Sector Lead with HDR, in NYC, NY metropolitan Area.** Dr. Hoomehr has over 17 years of combined experience in project management and water resources engineering analysis and design. He is responsible for the entire life cycle of projects including client relationship, proposal development and review, project management of multi-disciplinary teams, project controls, and technical delivery. He has managed various projects for clients ranging from federal, state, and local government to individual property owners, including USACE, FEMA, and NJDEP. He also has extensive experience in watershed assessment, development of flood protection alternatives, design and modeling of flood control projects; stormwater management and drainage design, advanced hydrologic and hydraulic modeling in support of USACE flood control projects and FEMA flood studies; dam break analysis, inundation mapping and Emergency Action Plan (EAP); levee superiority and interior drainage analyses; bridge scour analysis; and sediment transport modeling.

- **Scott Lyle, PE, CFM - Senior Engineer with the City of Carlsbad, CA.** Mr. Lyle has over 38 years of experience in the management and design of a wide variety of multi-objective water resources type projects including flood control channels, watershed analyses, detention basins, drainage master plans, and storm drain design. Specific technical skills include performing detailed hydrologic and hydraulic analysis (HEC-HMS, HEC-RAS, FLO-2D), sediment transport analyses, field surveys, floodplain mapping, flood control channel design and storm water quality design and management services. Mr. Lyle managed over $20 million of flood insurance study work as a FEMA study contractor during his tenure at Nolte Associates.

- **Ismail Haltas, PhD, PE, M. ASCE - King's College, Wilkes-Barre, PA**. Dr. Haltas has 20 years of experience in hydraulic and water resources engineering. His expertise covers watershed hydrology, open channel hydraulics, 1D and 2D flood routing, and flood hazard mapping in GIS. He has extensive experience in flood risk modeling and mapping that adhere to FEMA's Flood Risk Mapping program and standards. In addition, he has expertise in statistical analysis of hydrological data, Geographic Information Systems. Dr. Haltas is fluent in hydrologic, hydraulic, and statistical modeling and GIS software such as HEC-RAS, HEC-HMS, FLO-2D, R, MATLAB, AnyLogic, ArcGIS, and QGIS. Dr. Haltas also has experience in laboratory experimentation and physical modeling and familiar with field measurements. He authored a book chapter, dozens of journal papers, and conference proceedings on theoretical and engineering hydrology and flood modeling. He teaches undergraduate and graduate-level courses in Fluid Mechanics, Hydraulics and Hydrology, Water Resources Engineering, Environmental Engineering, Computer Applications for Civil Engineers (Excel, AutoCAD, GIS), and Engineering Statistics.

3.0 Basis for Appeal

By letters and/or email dated 6/22/2020 and 5/23/2021, on behalf of a group of Boulder County land owners, Coffey Engineering and Surveying submitted appeals to the Preliminary Flood Insurance Rate Maps (FIRM) for the Colorado Hazard Mapping Program (CHAMP).

The data used in the Boulder County Physical Map Revision (PMR) was initially funded by the Colorado Water Conservation Board (CWCB) in response to the floods in 2013. That data was used as leverage for the Boulder County PMR. AECOM was the FEMA study contractor who performed the initial data development and prepared the preliminary mapping. Compass took over the project at the appeal resolution. Two full 90-day appeal periods were run. The second appeal was due to COVID and the impacts COVID had on local governments.

General Summary of Study Timeline/Milestones:

- Fact Sheet / Study Memo – Outlines Proposed Scope of Study, Source of Hydrology and Topo data for whole study, including Lefthand Creek, concurrence signed by Boulder County on 11/20/2015
- Survey TSDN Dated 11/10/2017
- Flood Risk Review Meetings 2/1/2018
- Hydraulics TSDN Submitted 6/7/2018
- Base Map TSDN Submitted 6/7/2018
- Floodplain Mapping TSDN Submitted 9/30/2018
- Preliminary 9/30/2019
- Resilience Meeting 10/29/2019
- CCO Meeting 10/29/2019
- 1st Appeal Period 3/25/2020 to 6/23/2020, received 11 submittals.
- 6/22/2020 Lefthand Creek Appeal (8027 N. 41st Street) Submittal
- 10/1/2020 Initial Resolution Letter for Lefthand Creek
- 2nd Appeal Period 2/3/2021 to 5/4/2021, received 8 submittals (duplicates of original submittals)
- 5/3/2021 Lefthand Creek (8027 N. 41st Street) Submittal
- 5/6/2021 Acknowledgement letter
- 7/1/2021 2nd Appeal period resolution letter for Lefthand Creek

The appeals were supported by technical reports and supporting data. The appeals specifically address a portion of the Lower Lefthand Creek Floodplain located in unincorporated rural Boulder County, in Sections 19 and 20, Township 2 North, Range 70 West of the 6th P.M. The area of concern is generally west of North 41st Street, north of Nimbus Road, east of North 35th Street, and south of Ogallala Road. Completed Boulder

County Comment Appeal Forms for each of the landowners were signed and accompanied the appeal requests.

The first appeal contended that:

- **FEMA's topographic data does not reflect more recent floodplain and channel conditions**. It further contends that new, and more accurate, topography reflects extensive post-flood debris removal and channel improvements, both hydraulic and habitat, that were funded based on federal flood recovery grants, and as intended, should have been incorporated into the new flood modeling for Lefthand Creek.

- **Technically incorrect BFEs, Special Flood Hazard Area zone designations and regulatory floodways are currently shown on proposed FIRM panels.** The appellant contended that their review of the preliminary hydraulic HEC-RAS modeling and the proposed SFHA zone boundaries revealed discrepancies between the results of the hydraulic HEC-RAS modeling and the mapping of the floodplain zone boundaries as shown on the preliminary FIRM panels.

- **The preliminary floodways shown on the proposed floodplain mapping does not appear to be based on the result of the hydraulic modeling, do not appear to be consistent with the accepted and current FEMA definition of a floodway, and appear to be placed in such as fashion as to place as many existing residential structures as possible in a regulatory floodway.** The proposed floodways do not appear to be based on any currently accepted encroachment methodology. It is not at all clear, how the adoption of the Floodways as proposed would be in the best interest and provide for the health, safety and welfare of the citizens of Boulder County.

The second appeal contended that:

- **The FEMA hydraulic HEC-RAS model utilizes an incorrect methodology.** The FEMA hydraulic HEC-RAS model does not accurately estimate flow distribution between the main channel and the left and right overbanks, and thus does not generate correct BFEs (in either the main channel or overbank areas). Estimated flood flows and BFEs in the channel and both overbank floodplains are based on the total flow at each section distributed across the cross-section so that any low-lying areas (below the estimated BFE) are shown as conveying flood flows. This causes flows being conveyed by the main channel and overbank areas to vary widely from cross-section to cross-section. As an example, 100-year flows in the main channel at Station 64290 is 5,608 cfs but falls to 3,371 cfs at the next downstream cross-section at Station 64021 without any modeling of how the 2,237 cfs leaves (overtops) the main channel. The FEMA HEC-RAS model is essentially determining channel and overbank flows at each cross-section, even though there is no hydraulic connection between the main channel and the overbank flows, and there is no consistency from cross-section to cross-section in flow distribution. Proper modeling procedure would have been to initially

determine the 100-year flood elevations and profile for the main channel, then determine overflow locations and conditions (i.e., is it a stream junction or inline side-channel weir). They contended that when current channel and overbank conditions, including increased channel capacity and overflow spillway are considered as addressed above, estimated channel flows and overbank conditions will be substantially different from those currently modeled and shown on the proposed FIRM.

- **The FEMA data does not appear to include the topography related to extensive channel improvements in the area of concern.** Extensive improvements have been made to the Lefthand Creek main channel and overbanks, including removal of debris, channel widening, restoration of thalweg profile, restoration of overbank profiles, construction of an overflow spillway and channel on the right overbank, along with various scour and head-cutting countermeasures. All improvements were permitted by Boulder County in 2017 and 2018, with construction in 2018. Improvements were constructed based on plans developed Enginuity Engineering Solutions for the Lefthand Watershed Oversight Group and are titled Lefthand Creek Plains Reach Flood Recovery Projects, dated 12/8/16. A copy of the Enginuity plan set (stamped "Reviewed May 3, 2017 by Boulder County Building Safety") was included with the first appeal application report. Assumptions made in order to develop the HEC-RAS model do not reflect these improvements. The constructed channel improvements extend over most of the reach of the subject area of study and occurred from FEMA HEC-RAS River Station 60662 (just upstream of North 41st Street) to Station 64290 (just downstream from the Lefthand Water District diversion structure). Of special note would be the reinforced overflow spillway on the right over bank at approximately Station 64021, designed to spill channel overflows into an overflow channel in the right (south) overbank extending from Station 64021 to 63185. See figures below.

Figure 3-1 – HEC-RAS Cross-Section 62978 showing Preliminary Mapped Boundaries. Note that the mapping shows a single 1% floodplain, while the HEC-RAS output would map 3 or 4 separated floodplains.

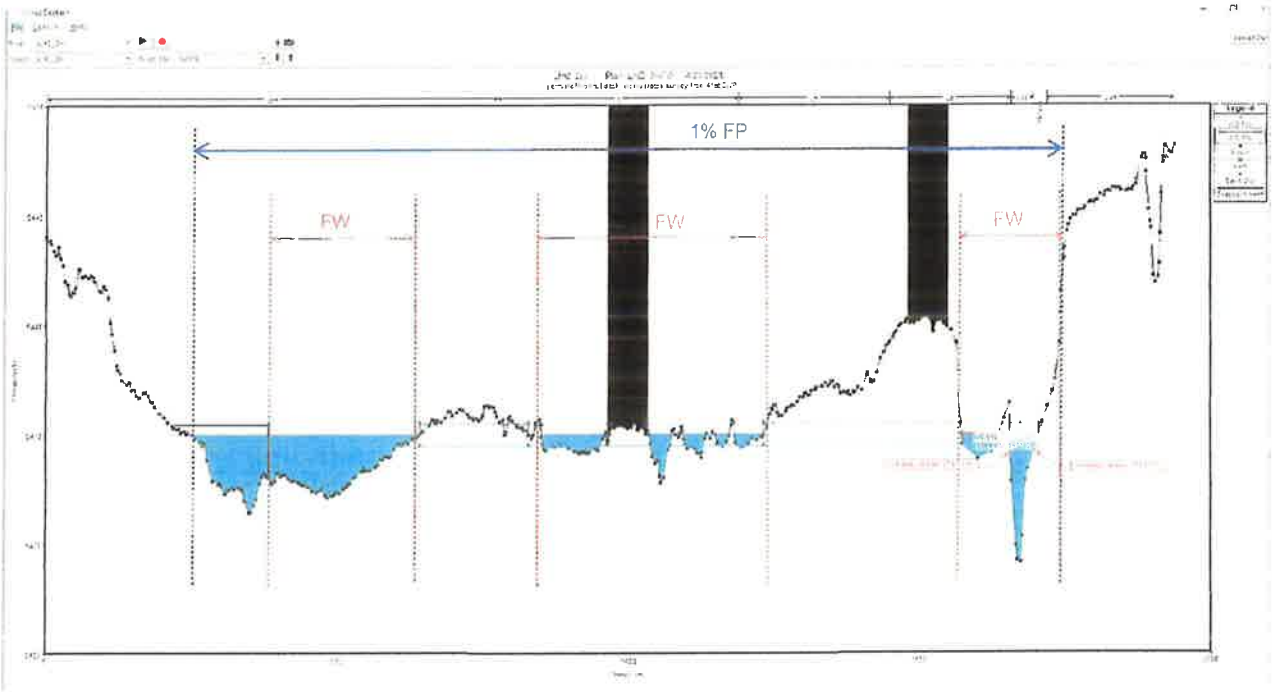
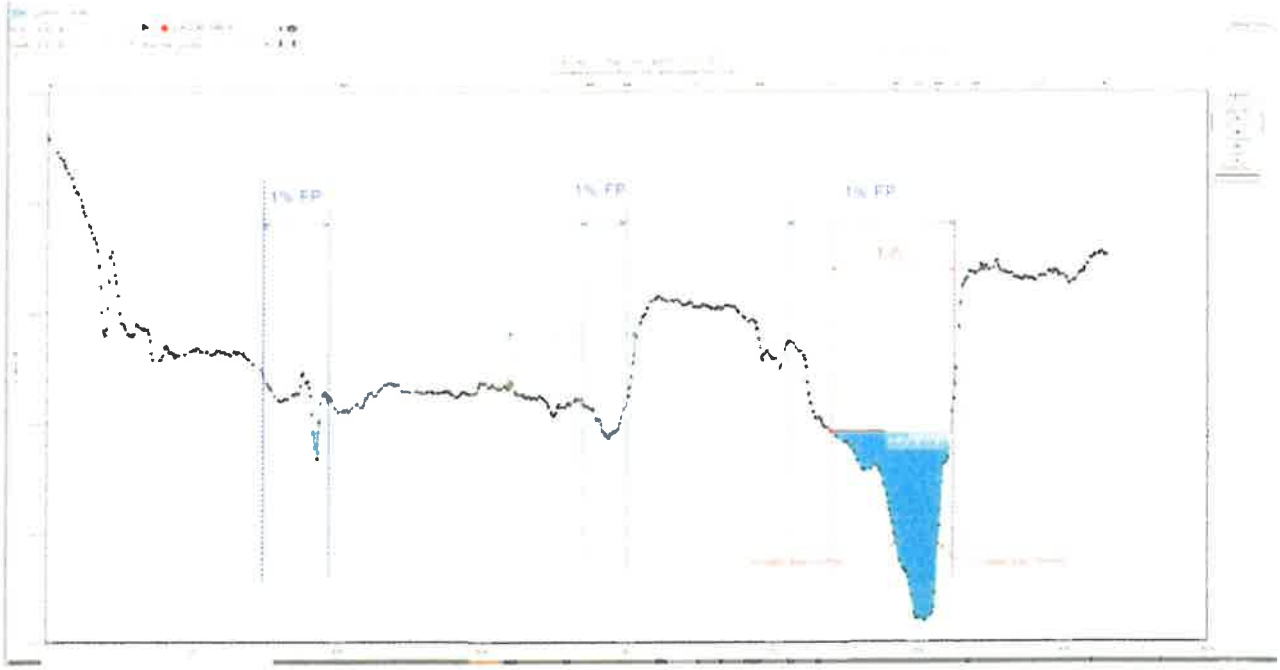
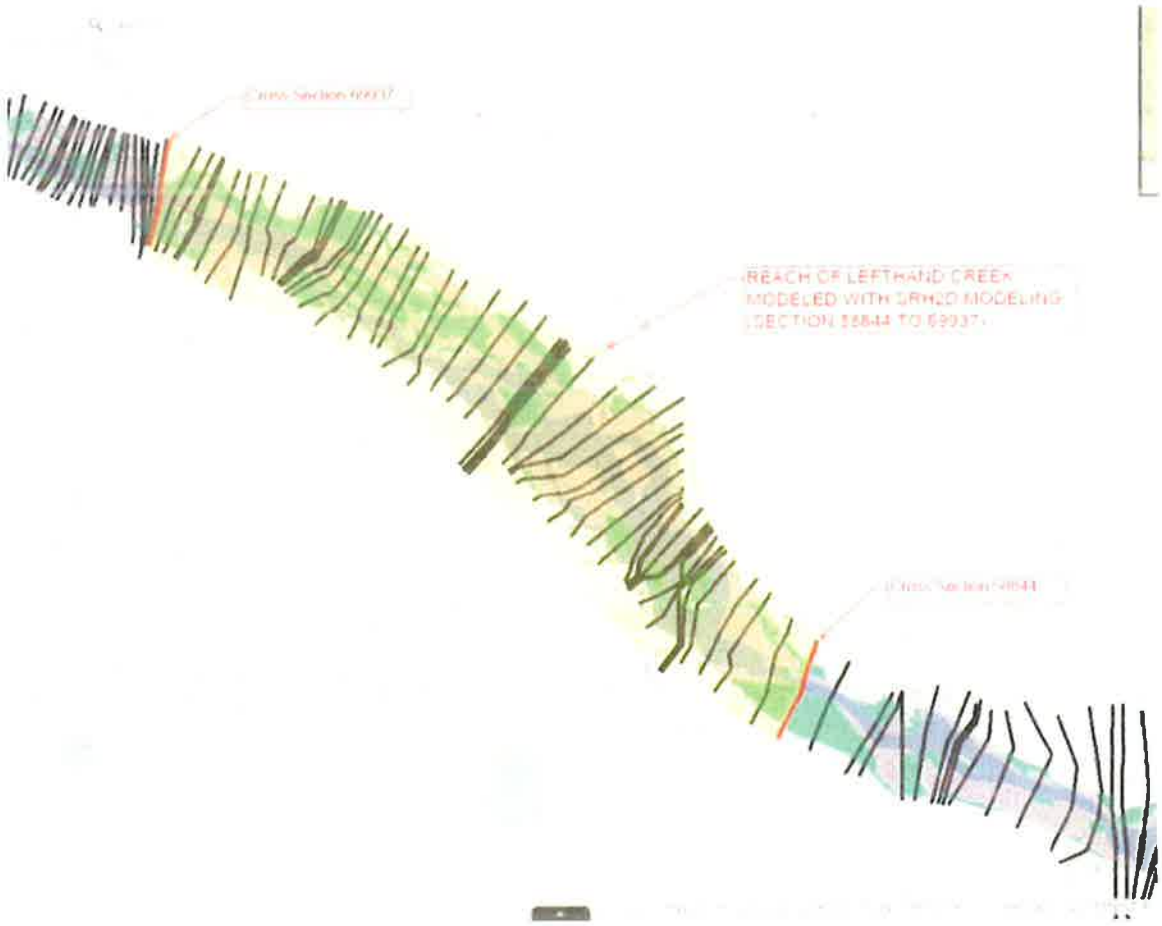


Figure 3-2- HEC-RAS Cross-Section 65356 showing Preliminary Mapped Boundaries. Note areas of split flows mapped do not match projected flow areas.



- **The hydraulic HEC-RAS model results in 1% (100-year) Base Flood boundaries (shapefiles) that do not match those shown on the Preliminary floodplain mapping**. It was the opinion of the appellant that this was because boundaries were determined by 2D mapping. As stated on page 20 of the AECOM Hydraulic Analysis TSDN for St. Vrain HUC-8 Watershed, Colorado, dated June 7, 2018: "An approximate model was created in SRH2D between cross sections 58844 and 69936 to inform the development of the 1D model and mapping of its results, particularly for the 1% and 0.2% profiles. Depth grids for these two profiles are included under Supplemental Data. Zone AOs were mapped based on the 2D modeling between cross sections 67446 to 65356 and 59822 to 59248". The results of the SRH2D modeling are shown on the Colorado Water Conservation Board's Colorado Hazard Mapping and Risk MAP Portal (coloradohazardmapping.com), including data and mapping of Depth Grids, Water Surface Elevation Grids, Velocity Grids, and overall Floodplain Mapping. Review of the CHAMPS maps show that the 100-year and 500-year boundaries (shapefiles) are identical to those shown on the proposed Preliminary floodplain maps, including the Zone AOs mapped between cross sections 67446 to 65356 and 59822 to 59248.

Figure 3-3 – Extent of SRH2D Modeling on Lefthand Creek.



The appellant further contended that the current 1-D HEC-RAS model was developed subsequent to the 2-D mapping in accordance with the procedures outlined in the Technical Memorandum by Rigel Rucker, AECOM Deputy Project Manager titled Calculating 2-Dimensional (2D) Floodways for Use on Regulatory Flood Insurance Rate Maps (FIRMs) and Flood Insurance Studies (FIS), dated January 25, 2017 and Revised May 1, 2017.

- **The appellant suggested that the following options should be considered in order to comply with existing guidance, where appropriate**:

  1. Remove floodways from FIRMs where 2D analyses are conducted. Communities would then be required to manage development by maintaining models or requiring developers to do so and verify that a cumulative surcharge in the floodplain is not resulting from new development.

  2. Develop a procedure to generate floodways in 1D, 1D/2D or 2D unsteady flow models.

  3. Develop and calibrate a steady state 1D model using the results of the 2D model that can then be used to generate a floodway. The 2D model will then become backup information for the regulatory model.

- **The proposed Floodway is not based on encroachment method 4 (equal conveyance reduction) as stated in the Hydraulic TSDN**. On page 14 of the "Colorado Hazard Mapping Program Hydraulic Analysis – Volume 2 Technical Support Data Notebook for the St. Vrain Watershed", it states that for 1-D floodway modeling encroachment analysis were initiated using an automated, equal conveyance reduction method (Method 4) based on a target surcharge of 0.5 foot. Review of the FEMA HEC-RAS Floodway model (Project Plan LHC_3mFW) however shows that only Method 1 (user enters left and right encroachment stations) was utilized. For the study area, it appears that the encroachment stations were chosen based upon the projected floodplain width, with no resulting surcharge. This apparently resulted in the mapping of proposed "split" floodways that are not associated with any existing channel or future conveyance improvements.
- **Floodways are not based on existing channels and encompass several existing residential structures.** Contrary to the statement on page 14 of the Hydraulic TSDN: "Special consideration is also given to areas where development has already occurred. If possible, floodways are moved away from existing buildings", it appears that the opposite has happened over the Coffey study area, with 7 residential houses being newly placed within the proposed floodways. Of particular concern is that by placing the houses in proposed floodways, they will lose the ability to make any site improvements to protect the houses from the relatively shallow (less than 1-foot) flooding that occurred during the 2013 flood events.

4.0 Data Submitted by the Community and FEMA

4.1 Appellant

Appeal One:

The appeal was stated to include:

- Data believed to be better than those used in the original hydrologic analysis

- Documentation of source for data

- Explanation for improvement resulting from the use of new data

- New hydraulic analysis based on the better data and original flood discharge values

- Revised Flood Profiles

- Revised SFHA boundaries and regulatory floodway boundary delineations.

However, the report stated that "Due to the time limitations of the 90-day appeal period, along with schedule, personnel and equipment impacts due to the Covid 19 Pandemic, Coffey was not able to acquire additional survey data (aerial LIDAR) and utilize that information for additional alternative hydraulic modeling upstream and downstream of the initial study area (additional LIDAR survey is currently scheduled for late June)."

The first appeal did not appear to include actual data for evaluation.

Appeal Two:

The second appeal stated "After considerable review of the multiple options and methodologies that would be applicable to the appeal request, it was determined that due to the extent, complexities, and number of properties potentially effected, that a completely new alternative "drop-in ready" model for approximately 2 miles of Lefthand Creek (Foothills Highway to Brubaker-Sorenson Open Space) was in all likelihood beyond the financial capabilities and responsibilities of the 5 property owners participating in this appeal." No new modeling was submitted for review. Instead, the appeal suggested that "because the currently proposed floodplain mapping for this reach of Lefthand Creek is actually based on the CHAMPS 2D hydraulic model, and that model includes the mapping and data required to regulate the floodplain, amend the preliminary FIS data tables and flood profiles, and could be used for future LOMR applications and reviews, it would be appropriate, and in compliance with FEMA regulations and policies to adopt the 2D mapping as the Effective model for this limited reach of Lefthand Creek." The appeal further requested that "We would therefore recommend that the most expeditious means of resolving this matter, and in accordance with accepted

FEMA and CWCB policies and practices, that Boulder County request revisions to the Preliminary Floodplain maps based on the adoption of 2D mapping for the reach of Lefthand Creek between Stations 58844 and 69936. Furthermore, Boulder County would regulate that portion of the Lefthand Floodplain without a mapped 2D floodway in accordance with the guidance document 2D Floodplains and Floodways for Floodplain Managers, dated October 25, 2018 and prepared for FEMA and the CWCB by AECOM." The following exhibits were provided as further details of this suggested solution.

Figure 4-1 – Screen capture of CHAMPS floodplain mapping for Lefthand Creek area of concern.

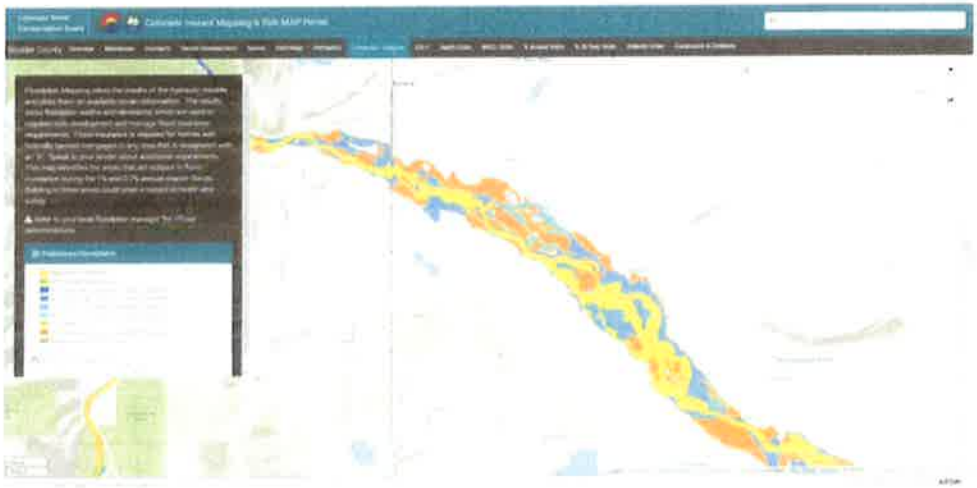


Figure 4-2 – Screen capture of CHAMPS floodplain mapping- Depth Grid of Lefthand Creek area of concern.

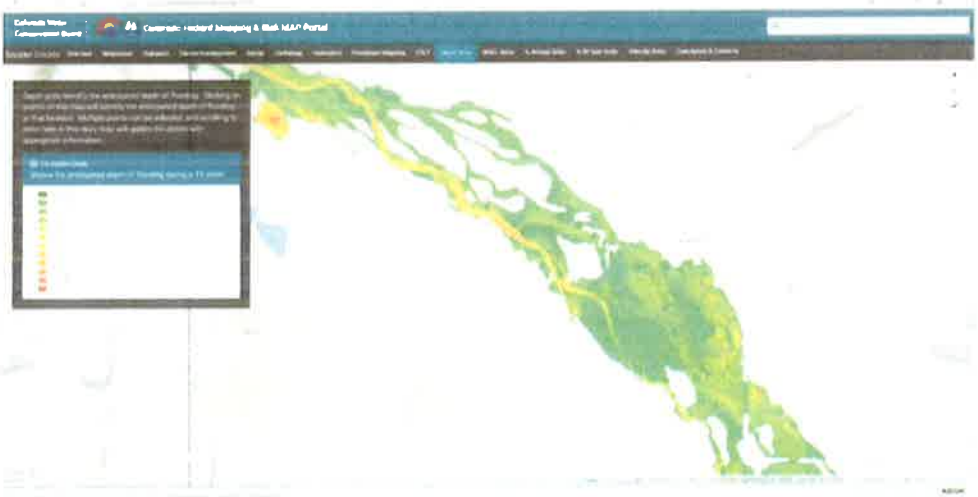
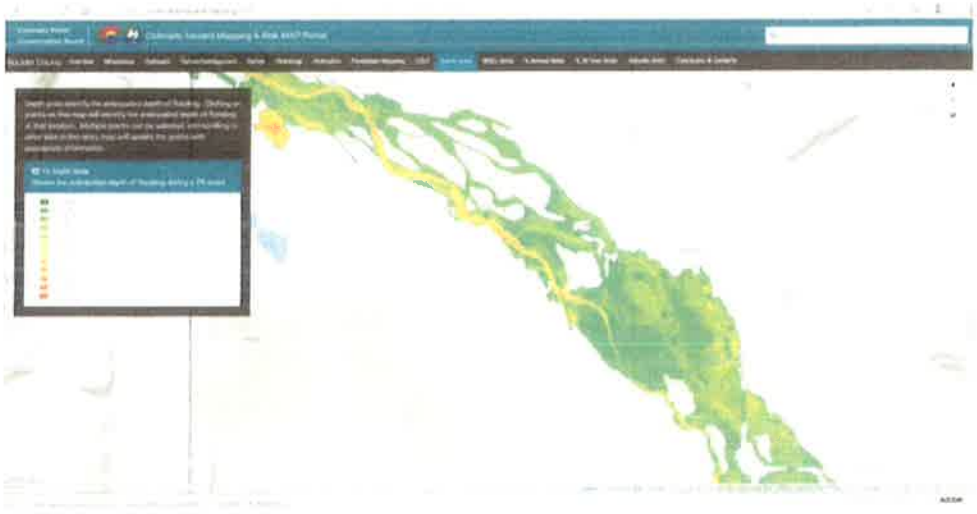


Figure 4-3 – Screen capture of CHAMPS floodplain mapping- WSEL Grid of Lefthand Creek area of concern. Note Base Flood Elevations shown for selected home locations.



The appeal suggested reasons for regulating without a pre-mapped floodway, and stated that "As a Class 5 FEMA Community Rating System (CRS) community, Boulder County should have the staffing and experience required to manage this small reach of Lefthand Creek without a floodway."

4.2 FEMA

Appeal One Response:

FEMA contended that the submission did not meet the requirements of an appeal and that the required FIS documentation was not provided. They indicated that technical comments focused on two key elements as outlined below:

1. Development of more detailed/accurate topographic data

a. Additional, more detailed topographic data would not improve the current submittal when combined with the submitted methodology.

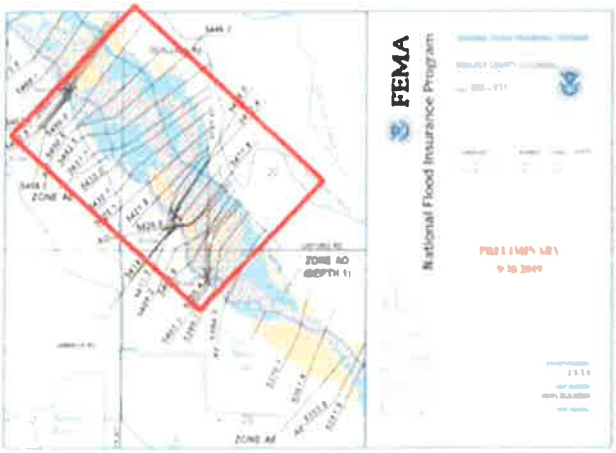
2. Technically incorrect BFEs, Special Flood Hazard Area zone designations and regulatory floodways are currently shown on proposed FIRM panels

a. The FEMA hydraulic HEC-RAS model is not based on current topography and hydraulic capacity of the main channel of Lefthand Creek

i. The methodology submitted does not support any changes to the preliminary products. As shown in Figure 1, because the submitted model's use of ineffective areas, the Base Flood Elevation (BFE) in the channel are being raised. The increase

in the BFEs illustrates the need for the areas of concern to be within the floodway rather than be removed. The preliminary model includes the areas of concern within the floodway.

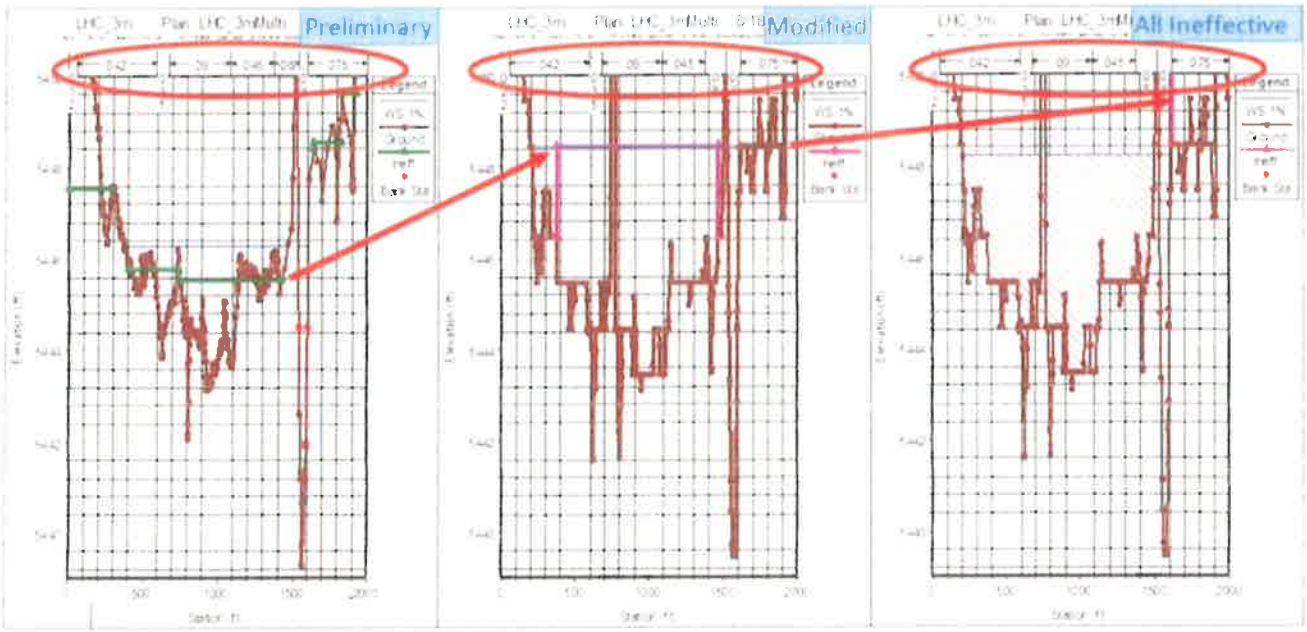
Figure 4-4: Lefthand Creek area of concern and submitted elevation comparison



LHC_8m	Prelim FIS	Appeal (Modified)		Appeal (All Ineffective)	
			Diff (ft)		Diff (ft)
River	W.S. Elev	W.S. Elev	(Mod-Pre)	W.S. Elev	(All Ineff-Pre)
64290	5458.5	5458.45	0.0	5458.45	0.0
64021	5456.0	5455.99	0.0	5455.99	0.0
63776	5450.6	5450.84	+0.2	5451.12	+0.5
63605	5446.3	5448.47	+2.2	5448.24	+1.9
63412	5442.5	5443.8	+1.3	5445.2	+2.7
63185	5437.7	5440.47	+2.8	5441.69	+4.0
62978	5435.0	5435.42	+0.4	5438.7	+3.7
62716	5430.7	5431.47	+0.8	5431.85	+1.2
62382	5425.1	5425.47	+0.4	5427.87	+2.8
62113	5421.8	5421.83	0.0	5421.83	0.0
61892	5420.0	5419.99	0.0	5419.99	0.0
61751	5418.0	5417.95	-0.1	5417.95	-0.1
61741					
61731	5417.4	5417.42	0.0	5417.42	0.0

ii. The BFEs provided by the submitter are higher than the preliminary due to the applied Ineffective Flow Area as compared in Figure 2. Both models support flow in the overbank. It is unclear why additional ineffective flow is being defined when active flow is demonstrated to occur. Since that area is part of the active flow path, adding additional ineffective areas demonstrates why additional encroachments are not warranted in the overbank as they would cause a rise in the water surface elevation above the state's allowed 0.5-foot surcharge. It is recommended to revisit the ineffective flow area stations and elevations designated by submitter to determine if they are reasonable and can be justified.

Figure 4-5: Cross Section comparison



b. The FEMA model does not correctly model what appears to be a split flow floodplain from approximately HEC-RAS cross-section 64290 to downstream cross-section 61751

i. The submitter indicates there is a split flow between river station 64290 and 61751 which was not modeled properly. However, no specific split reach was indicated or recommended in the HEC-RAS model provided by the submitter. Further specific split flow indicated by the submitter needs to be evaluated if it is warranted or adjust braided reach.

c. The proposed Floodway is not based on encroachment method 4 (equal conveyance reduction) as stated in the Hydraulic TSDN

i. The submitter brings out an issue with new floodway encroachment determination and methodology. It should be noted that most of new Map Modernization for a major river tends to include floodway encroachment limits for life and property protection purposes. It is assumed that floodway encroachments were initially determined based on Method 4 and imported to Method 1 in order to keep the encroachment limits fixed. Further floodway encroachment analysis review is recommended if surcharges and floodway widths were optimized. Floodways are not based on existing channels and encompass several existing residential structures.

Appeal Two Response:

The following scientific and/or technical data were submitted in support of this request:

- Cover letter and report regarding a portion of Lower Lefthand Creek near the properties at 7955, 8027, & 8075 N. 41st Street, 4114 Oxford Road, and 3920 Ogallala Road.
- Annotated cross-sections between the proposed Effective HEC-RAS model and the Preliminary map products.
- Recommendations for hydraulic analysis based on alternative data and original flood discharge values.

We received all data necessary to resolve this appeal by May 4, 2021. FEMA has completed their evaluation of the information provided in the submission. It was determined that a change to the model was not warranted for the preliminary study. This submission included a report with recommendations for alternative hydraulic analysis but did not include the following, which are required for valid appeal submittals:

- New hydraulic/floodway analysis, based on the original flood discharge values, in which the original methodology has been applied differently.
- Revised Flood Profiles, FDT, and other FIS Report tables, as applicable.
- Revised SFHA boundary delineations and, if applicable, regulatory floodway boundary delineations.

We have resolved this appeal in accordance with the requirements of 44 CFR Part 67. We have reviewed the submitted data and determined that the proposed regulatory floodway for the Lower Lefthand Creek is correct as shown on the Preliminary FIRM and in the Preliminary FIS report, and that no changes are warranted at this time.

5.0 Summary of Panel Procedures

The Panel was selected on July 29, 2022. At that time, the FEMA and Community data was available for review from NIBS secure file share portal. The Panel officially kicked off and convened on August 25, 2022, to review the purpose and scope of the Panel, and to step through an overview of the data received and the schedule. The following meetings were held for deliberation of each appeal item, review of the data, and development of questions for both FEMA and the appellants:

DATES

The Panel met on September 7, 2022 and September 16, 2022, to review and discuss data provided by FEMA and to prepare for upcoming oral presentations.

The Panel listened to oral presentations from both the FEMA and appellant teams on September 28, 2022.

The Panel then met additionally to further review the provided data, deliberate on each appeal item, and document the decisions.

- September 29, 2022
- October 6, 2022
- October 17, 2022
- October 24, 2022
- November 3, 2022
- November 10, 2022
- November 14, 2022

Report presented to NIBS on November 15, 2022.

6.0 Decision

The Panel recognizes the inherent complexities in the braided channel flow of the Left Hand Creek system and appreciate the effort by FEMA and the FEMA study contractor to create and update the detailed hydrologic and hydraulic models. The Panel reviewed the points made by the appellant as well as FEMA's responses to both appeals that are the subject of this review. Below is a list of the appellant's points made and the panel's response to each point. Based on the Panel's review of the appeals and responses from FEMA, this Panel recommends that FEMA revise the preliminary modeling and mapping based on the below issues:

The first appeal:

1. **Point made: FEMA's topographic data does not reflect more recent floodplain and channel conditions.**

   The appellant and FEMA both agreed that this was a non-issue.

2. **Technically incorrect BFEs, Special Flood Hazard Area zone designations and regulatory floodways are currently shown on proposed FIRM panels.**

   The Panel agrees with the appellant. See section 7 below.

3. **The preliminary floodways shown on the proposed floodplain mapping do not appear to be based on the result of the hydraulic modeling, do not appear to be consistent with the accepted and current FEMA definition of a floodway, and appear to be placed in such as fashion as to place as many existing residential structures as possible in a regulatory floodway.**

   FEMA's study contractor stated that Method 4 was initially used, then left/right encroachments were entered into Method 1. This is consistent with FEMA guidelines. However, the Panel agrees with the appellant that the mapping may not have been completed in accordance with FEMA standards (the expansion and contraction between sections appears random).

The second appeal:

4. **The FEMA hydraulic HEC-RAS model utilizes an incorrect methodology.**

   The Panel agrees with the appellant that the left overbank areas in the reach under appeal may have been more accurately modeled using split-flow analysis.

   Based on the Panel's review of aerial topography and photography and review of the hydraulic models, it does not appear that the left overbank flow is hydraulically connected to main channel flow. The provided HEC-RAS model allows flows to jump back and forth between low-lying areas

and main channel with no signs of hydraulic connectivity. Split-flow analysis appears to be more appropriate. It would define flow in the left overbank and be analyzed as a separate flow pathway (i.e., not hydraulically connected to main channel). Also, it's recommended that a separate 1D model should be developed for the left overbank using the discharges from the split-flow analysis to better capture the floodway for this area.

2D analysis may also be more appropriate as it takes into account the geomorphology of the overbank area and does not force flows into low lying areas across a section while potentially under-calculating flow volume and depth in the main channel. See FEMA Guidance for Flood Risk Analysis and Mapping, Floodway Analysis and Mapping – Guidance Document No. 79, November 2019.

5. **The FEMA data does not appear to include the topography related to extensive channel improvements in the area of concern.**

   The appellant and FEMA both agreed that this was a non-issue. Panel agrees with FEMA response.

6. **The hydraulic HEC-RAS model results in 1% (100-year) Base Flood boundaries (shapefiles) that do not match those shown on the Preliminary floodplain mapping.**

   The Panel agrees with the appellant. See Rationale section 7-C below.

7. **The appellant suggested that the following options should be considered in order to comply with existing guidance, where appropriate (appellant requested removal of floodways from the subject area):**

   The Panel agrees with FEMA. The Community (Boulder County Community) requested floodways for regulatory reasons, so the appeal alone would not be sufficient reason to remove regulatory floodways from the subject area.

8. **The proposed Floodway is not based on encroachment Method 4 (equal conveyance reduction), as stated in the Hydraulic TSDN.**

   FEMA's study contractor stated that Method 4 was initially used, then left/right encroachments were manually entered into Method 1. This is consistent with FEMA guidelines; however, the Panel agrees with the appellant that the mapping may not have been completed in accordance with FEMA standards (the expansion and contraction between sections as well as the apparent discrepancy between flood widths in section versus mapped widths.

9. Floodways are not based on existing channels and encompass several existing residential structures.

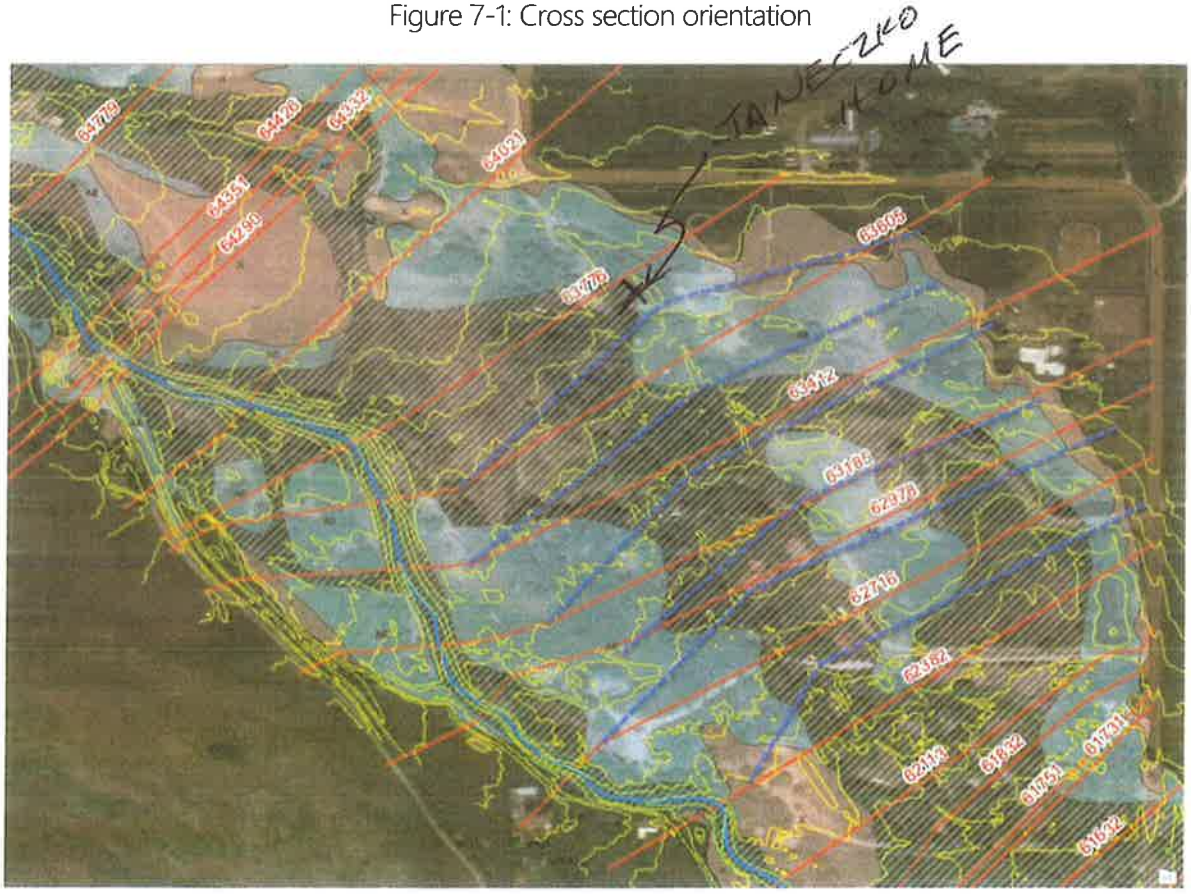
The Panel agrees with the appellant. The Panel is of the opinion that we are tasked with addressing established guidelines for delineating floodway boundaries. The floodway delineation does not match the HEC-RAS model in several locations. The floodway delineation is wider than the modelled floodway width at the upstream and downstream cross sections.

7.0 Rationale for Findings

A) Orientation of cross sections

Per FEMA guidelines (FEMA, 2020) and the current HEC-RAS Hydraulic Reference Manual (HEC, 2022), "the cross sections must traverse the floodplain and be oriented perpendicular to the direction of flow," "every effort should be made to obtain cross sections that accurately represent the stream and floodplain geometry." In the vicinity of the disputed area, several cross sections are not perpendicular to the flow path (not aligned with the contour lines). Multiple breaking points could be used to assure cross sections are properly oriented across the floodplain. A couple of examples are shown (with blue dashed lines) on Figure 7-1. The Panel believes that should the cross sections be oriented more like the guidelines specify and as generally indicated below; the resultant calculated water surface elevations would be very different in the eastern areas of the subject area.

Figure 7-1: Cross section orientation



B) Split flow upstream of properties - why no split-flow analysis?

A split-flow analysis or at a minimum a sensitivity analysis between cross sections XS65077 and XS65356 is important to understand the maximum discharge and flow volume diverted to the left overbank. Also, this area could have been modeled as a separate reach (1D Model) using the flow discharges from the split-flow analysis. This would result in more accurate mapping of the floodplain and better delineation of the floodway.

2D analysis would also be more appropriate as it takes into account the geomorphology of the overbank area and does not force flows into low lying areas across a section while potentially under-calculating flow volume and depth in the main channel.

See FEMA Guidance for Flood Risk Analysis and Mapping, Floodway Analysis and Mapping – Guidance Document No. 79, November 2019, Section 5.2.3. TRIBUTARY, SPLIT AND DIVERTED FLOWS.

C) Applicability of using 2D modeling results within the appeal reach

FEMA's study contractor, AECOM, prepared a 2D model using SRH2D between cross sections 58844 and 69936. AECOM used the 2D modeling results to map Zone AO limits in the left overbank areas between cross sections 67446 to 65356 and 59822 to 59248. However, AECOM used 1D modeling results to map floodway and floodplain limits between cross sections 65356 and 59822, which represents the mapping reach subject to this appeal. AECOM did state that the 2D modeling results were used as a check on the 1D modeling results in this reach.

Based on the panel's review of the provided materials (i.e., aerial photos, photographs, topography, HEC-RAS models), the geomorphology of the left overbank appears very similar within the entire 2D modeling limits. The abrupt change from 2D to 1D modeling and mapping through the appeal reach does not appear to accurately represent the divided flow in the left overbank. It is the Panel's opinion that the 2D modeling results should have also been used in the appeal reach to more accurately model and map shallow flooding areas in the left overbank.

See Federal Emergency Management Agency, Guidance for Flood Risk Analysis and Mapping, Riverine Mapping and Floodplain Boundaries Guidance, December 2020.

C) Floodplain delineation- mismatch between top widths and mapping

Per FEMA guidelines (FEMA, 2020) Section 3.0 Mapping of One-Dimensional Riverine Analyses, "The flood boundaries are delineated by finding the intersection of the ground surface defined by the underlying digital terrain model and the flood surface. Floodplain boundaries are delineated on the best available topographic mapping using the water-surface elevations determined at cross sections." There are discrepancies between the HEC-RAS model and the flood map in top width measurements for 100-yr floodplain extend. For example, at Cross Section 65356 the HEC-RAS model shows a top width of about 8 ft on the most left flow area. Yet, on the map at Cross Section 65356, the mapped left floodplain width measures about 85 ft.

Figure 7-2: Mapped top width for XS 65356

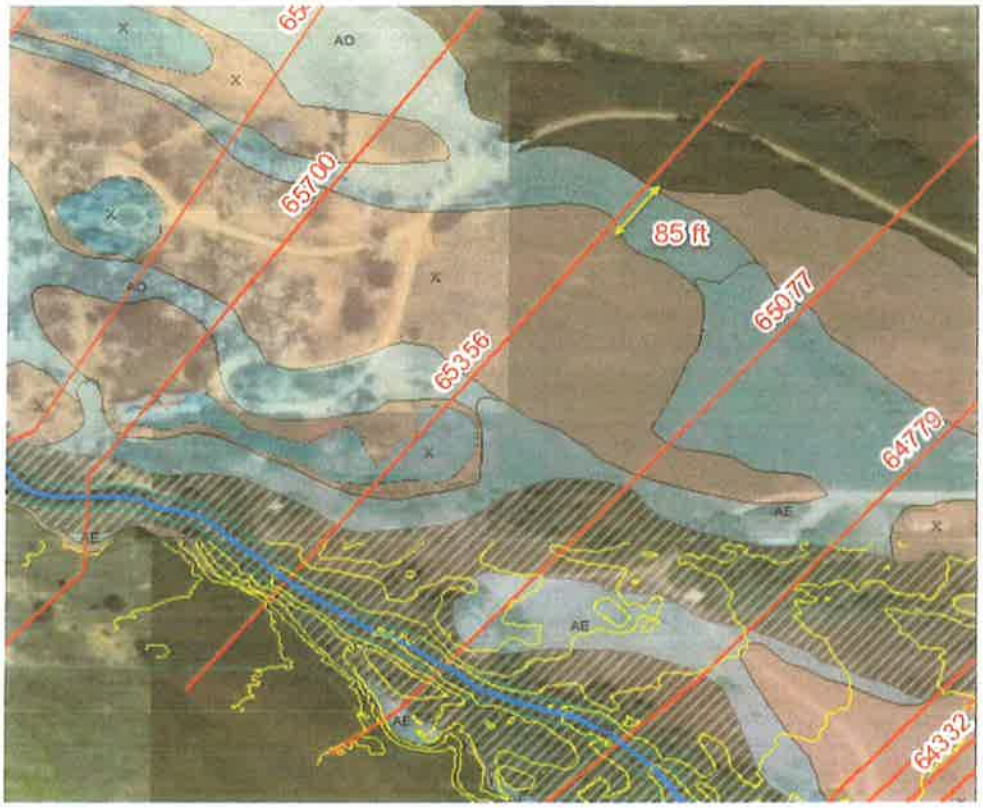
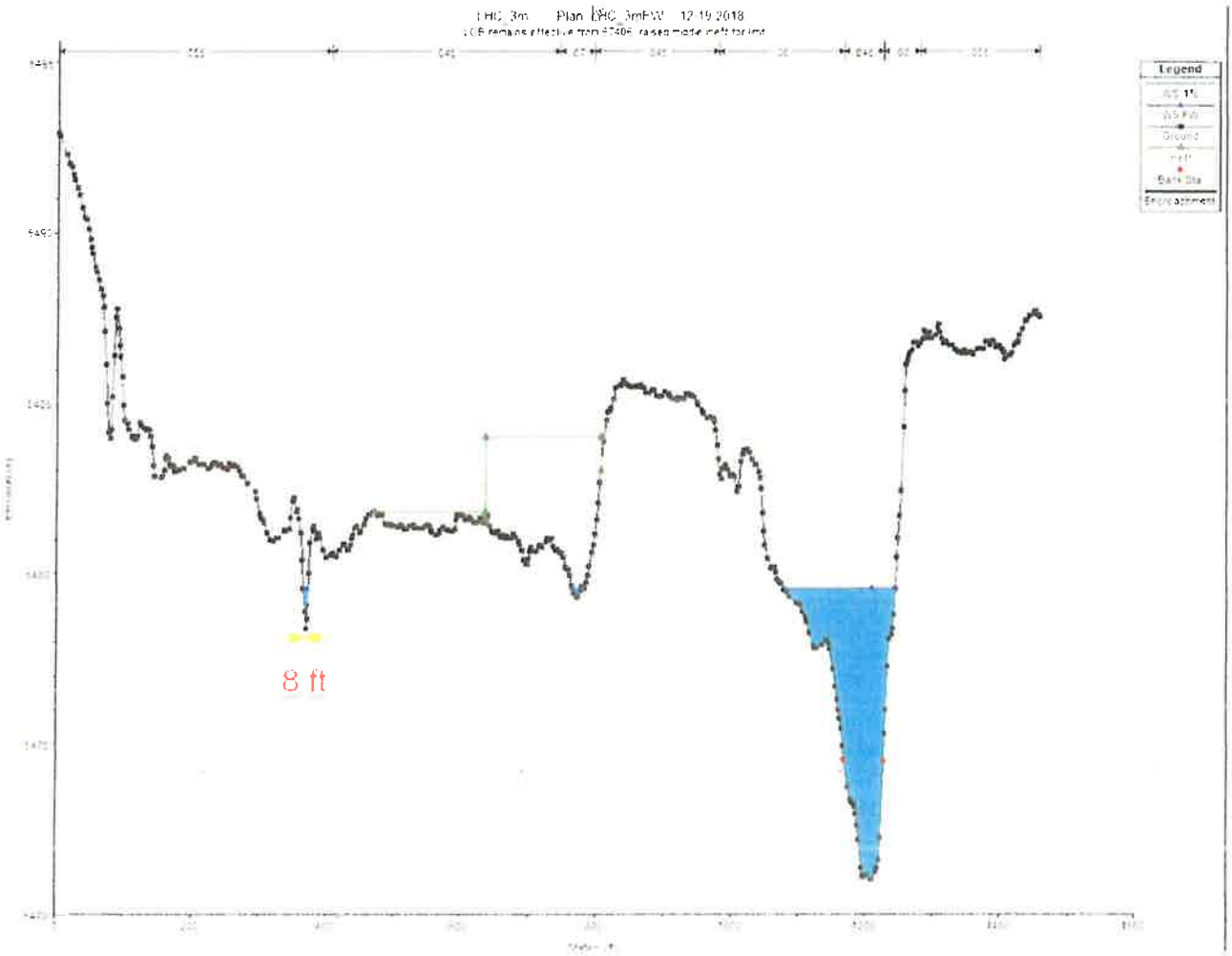
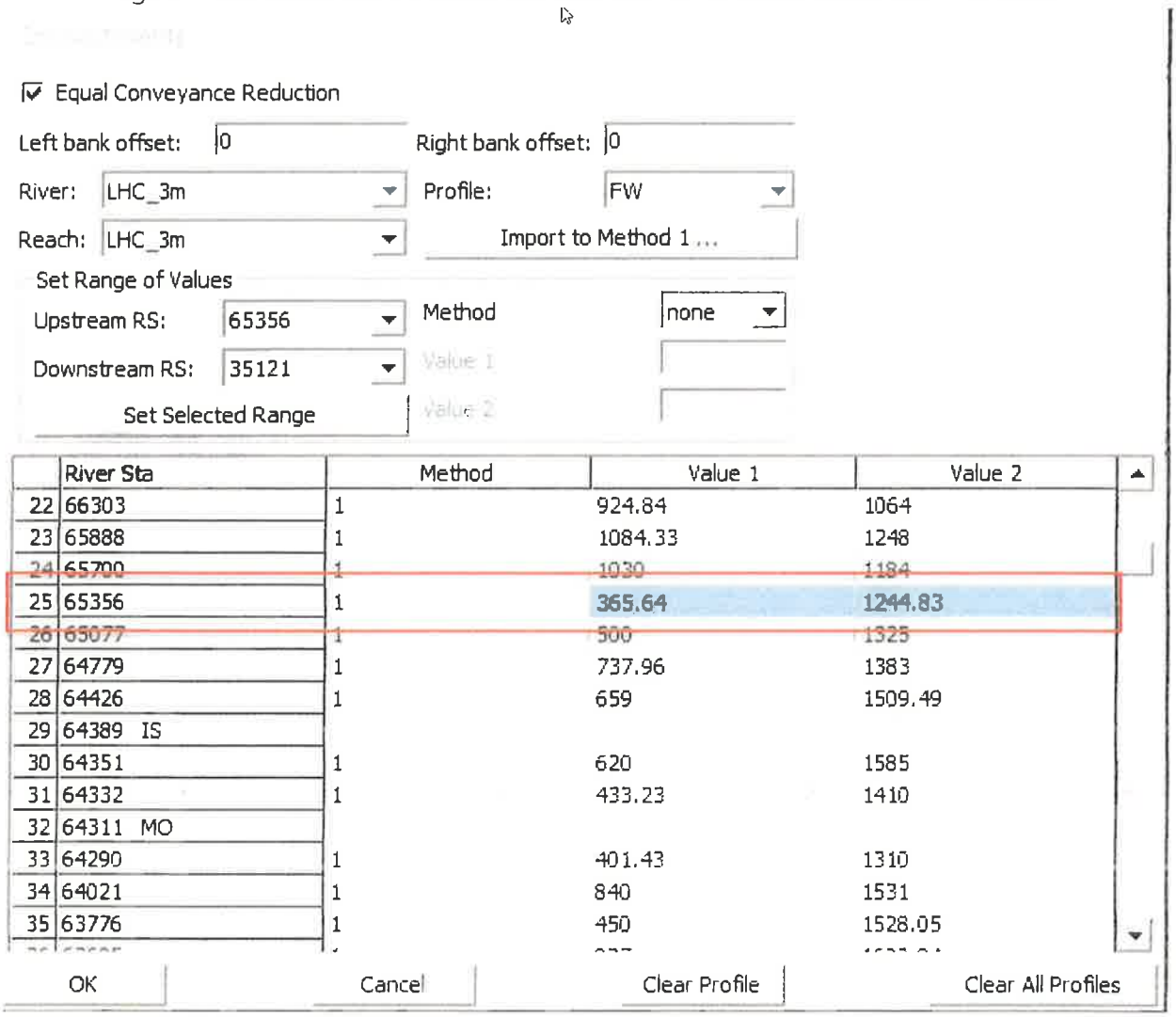


Figure 7-3: Top width for XS 65356 in the HEC-RAS model



Per FEMA guidelines (FEMA, 2019) Section 5.0 Floodway Mapping, "For one-dimensional riverine analyses, floodways are delineated at encroachment stations (limits of conveyance) at cross sections and delineated between cross sections." There are multiple discrepancies between the encroachment stations in the HEC-RAS model and floodway boundary shown on the map. As an example, the left encroachment for XS 65356 is noted as 365.64 (Figure 7-4) while the left boundary of the floodway is about XS station 1080 ft.

Figure 7-4: Encroachment stations with Method 1 for XS 65356 in the HEC-RAS model



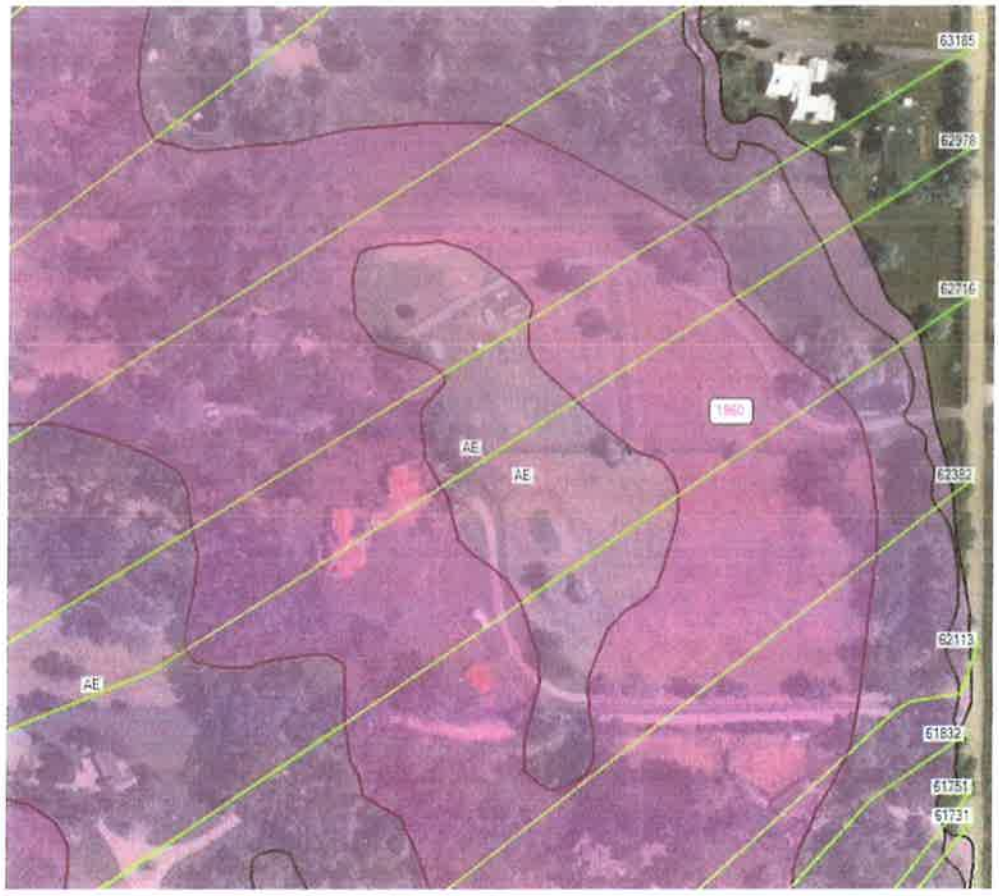
	River Sta	Method	Value 1	Value 2
22	66303	1	924.84	1064
23	65888	1	1084.33	1248
24	65700	1	1030	1184
25	65356	1	365.64	1244.83
26	65077	1	500	1325
27	64779	1	737.96	1383
28	64426	1	659	1509.49
29	64389 IS			
30	64351	1	620	1585
31	64332	1	433.23	1410
32	64311 MO			
33	64290	1	401.43	1310
34	64021	1	840	1531
35	63776	1	450	1528.05

D) Floodway encroachments - should not widen and narrow between cross sections without justification

The floodway delineation process begins with hydraulic analysis by placing encroachments on the left and right overbanks of the 100-yr floodplain and gradually encroaching, following encroachment Method 4 requirements, until reaching the allowable rise in water surface elevation above the BFE (usually 1 ft). This model provides the baseline floodway encroachments, but since a floodway is a regulatory designated area, FEMA can expand it beyond the hydraulically defined boundaries to identify high hazard areas for insurance purposes. After reviewing the preliminary FIRMS, the Panel noted that floodway boundaries on the preliminary FIS maps were expanded between hydraulic cross sections XS63185-XS62716 at a few locations without any obvious underlying topographic features or obstructions. The Panel recommends review of these locations for potential re-delineations of floodway boundaries.

See FEMA Guidance for Flood Risk Analysis and Mapping, Floodway Analysis and Mapping – Guidance Document No. 79, November 2019, Section 5.1.

Figure 7-5: Floodway delineation near the subject properties



E) Inconsistency in including/not including areas in the floodplain

The floodplain mapping for the reach of Left Hand Creek that is the basis of the appeals includes areas where the LiDAR ground data is higher than the calculated 1% annual chance flood elevation or BFE. FEMA Standard #140 in Flood Risk Analysis and Mapping states, "Shallow flooding areas shall not contain non-SFHA islands based on small scale topographic variations." However, Left Hand Creek was mapped as a Zone AE with floodway, not a shallow flooding hazard zone (i.e., Zone AO or AH). It is typical for small "islands" that are created during the automated floodplain mapping process to be filled in for Zone AE floodplain mapping. During the presentation, the FEMA contractor also stated that the areas included in the floodplain and floodway were only slightly higher than the BFE. As shown in Figure 6 (cross section 62978), the "island" created at between stations 1232.6 and 1272.4 is approximately 5 feet higher than the BFE. While the floodway is not mapped in this high area, this high area is included in the 1% annual chance flood zone. In contrast, a similar high area just left of the main channel is not included in the 1% annual chance flood zone or floodway at cross sections 62113 and 62382. The highest ground elevation is approximately 1 foot above the BFE at these cross sections. It seems reasonable that the 1% annual chance flood zone would be revised near cross section 62978 to remove the existing house.

See Federal Emergency Management Agency Policy Standard for Flood Risk Analysis and Mapping Policy, December 2019.

8.0 References

1. Federal Emergency Management Agency, FEMA Policy Standards for Flood Risk Analysis and Mapping – FEMA Policy #204-078-1, December 22, 2020.
2. Federal Emergency Management Agency, Guidance for Flood Risk Analysis and Mapping, General Hydrologic Considerations, February 2019.
3. Federal Emergency Management Agency, Guidance for Flood Risk Analysis and Mapping, Floodway Analysis and Mapping – Guidance Document No. 79, November 2019.
4. Federal Emergency Management Agency, Guidance for Flood Risk Analysis and Mapping, Riverine Mapping and Floodplain Boundaries Guidance, December 2020.
5. Hydrologic Engineering Center, HEC-RAS Hydraulic Reference Manual, November 2022.
6. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-RAS River Analysis System, User's Manual (Version 5.0), February 2016.

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FEMA POLICY: Floodplain Management Requirements for Agricultural Structures and Accessory Structures

FEMA Policy #104-008-03
Date Issued: February 2020

BACKGROUND

This policy is intended to provide clarification and technical assistance to National Flood Insurance Program (NFIP) State/Tribe/Territory Coordinators and local floodplain administrators regarding implementation of the NFIP design and performance standards for agricultural structures and accessory structures. This policy establishes standards for these structures, as defined in this policy, which are located within the Special Flood Hazard Areas (SFHAs) designated in FEMA's Flood Insurance Studies and effective Flood Insurance Rate Maps. This policy clarifies the requirements for granting variances and exceptions to the NFIP design and performance standards for agricultural and accessory structures in accordance with current FEMA regulations.

This policy supersedes portions of existing FEMA guidance related to agricultural structures and accessory structures found in NFIP Technical Bulletin 1 "Openings in Foundation Walls and Walls of Enclosures," NFIP Technical Bulletin 5 "Free-of Obstruction Requirements," and NFIP Technical Bulletin 7 "Wet Floodproofing Requirements." This policy also supersedes all specific communications and guidance on this subject from FEMA Regional Offices. In the event of a conflict between this policy and prior FEMA policies, bulletins, or guidance, this policy shall take precedence.

PURPOSE

The purpose of this policy is to acknowledge the unique characteristics and uses of agricultural structures and accessory structures within the SFHA to ensure sound development and promote public health, safety, and welfare. This policy clarifies the definition of agricultural structures and accessory structures and establishes a clear, consistent process for ensuring compliance with NFIP design and performance standards for those structures located within the SFHA.

Agricultural structures and accessory structures are non-residential structures, and the NFIP requires new construction and substantial improvements of non-residential structures in SFHAs to be elevated or dry floodproofed to or above the Base Flood Elevation (BFE). Dry floodproofing is not permissible in V Zones (V, VE, V1-V-30), which are defined on the effective Flood Insurance Rate Map. However, in accordance with the NFIP design and performance standards for floodplain management, wet floodproofing,

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as applied to buildings constructed at-grade, below the required elevation, or elevated on fill, may be an allowable alternative mitigation technique for certain agricultural structures and accessory structures.

This policy does not provide clarification on eligibility or application of federal flood insurance for agricultural structures or accessory structures. Agricultural and accessory structures are generally eligible for federal flood insurance coverage under the NFIP. See FEMA's Flood Insurance Manual for information on the rules governing NFIP building coverage and/or contents coverage, including agricultural and accessory structures (as amended).

PRINCIPLES

This policy explains the minimum requirements for agricultural structures and accessory structures in general and the criteria for when and how wet floodproofing instead of elevating or dry floodproofing may be used in specific situations in accordance with current FEMA regulation and consistent with the principles outlined below.

A. Promote smart development and mitigation strategies for agricultural and accessory structures.
B. Provide clarity on how to meet the floodplain management and design and performance standards for construction of agricultural and accessory structures, especially in wide and deep floodplains.
C. Reduce the financial burden of meeting design and performance standards for certain low damage potential agricultural and accessory structures.

REQUIREMENTS

This section provides the NFIP floodplain management development requirements and design and performance standards for agricultural structures and accessory structures located within the SFHA and the requirements for granting exceptions to the minimum standards.

A. DEFINITIONS OF AGRICULTURAL STRUCTURE AND ACCESSORY STRUCTURE

Outcome: FEMA provides a clear NFIP definition of agricultural structures and accessory structures for floodplain management purposes, consistent with the National Flood Insurance Act of 1968 (NFIA) and the NFIP regulations.

1. An *agricultural structure* means a structure, as defined in 44 C.F.R. § 59.1, that is used exclusively in connection with the production, harvesting, storage, raising, or drying of agricultural commodities and livestock; an agricultural structure specifically excludes any structure used for human habitation.
    a. Agricultural structures are considered "walled and roofed" when the structure includes at least two outside rigid walls and a fully secured roof.
    b. The NFIP recognizes aquaculture to be farming that is conducted in water. As such, the NFIP considers an aquaculture structure to be included within the

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NFIP definition of agricultural structure for floodplain management purposes, provided that:

i. The aquaculture structure meets the NFIP definition of a structure as defined in 44 C.F.R. § 59.1, for floodplain management purposes (walled and roofed), where walled and roofed shall be interpreted as having at least two outside rigid walls and a fully secured roof; and

ii. The aquaculture structure is used exclusively for the production, harvesting, storage, raising, or drying of aquatic animals or plants.

c. The following may be related to agricultural purposes or uses but are generally not considered to be agricultural structures by the NFIP:

i. Structures that do not meet the exclusive use requirement of the NFIP definition of agricultural structure, such as:

1. Structures used for human habitation, whether as a permanent residence or as temporary or seasonal living quarters;
2. Structures used by the public, such as a place of employment or entertainment; and
3. Structures with multiple, or mixed, uses where one or more use does not meet the definition of agricultural structure.

ii. Development that does not meet the NFIP definition of a structure for floodplain management purposes. Examples include, but are not necessarily limited to, a pole barn (roofed but not walled) or a holding pen or aquaculture tank/pool (walled but not roofed).

2. An *accessory structure* means a structure, as defined in 44 C.F.R. § 59.1, that is on the same parcel of property as a principal structure and the use of which is incidental to the use of the principal structure; an accessory structure specifically excludes structures used for human habitation.

a. Accessory structures are considered walled and roofed where the structure includes at least two outside rigid walls and a fully secured roof.

b. Examples of accessory structures include but are not necessarily limited to two-car detached garages (or smaller), carports, storage and tool sheds, and small boathouses.

c. The following may have uses that are incidental or accessory to the principal structure on a parcel but are generally not considered to be accessory structures by the NFIP:

i. Structures in which any portion is used for human habitation, whether as a permanent residence or as temporary or seasonal living quarters, such as a detached garage or carriage house that includes an apartment or guest quarters, or a detached guest house on the same parcel as a principal residence;

ii. Structures used by the public, such as a place of employment or entertainment; and

iii. Development that does not meet the NFIP definition of a structure for floodplain management purposes. Examples includes, but are not necessarily limited to, a gazebo, pavilion, picnic shelter, or carport that is open on all sides (roofed but not walled).

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B. NFIP MINIMUM FLOODPLAIN MANAGEMENT REQUIREMENTS FOR AGRICULTURAL STRUCTURES AND ACCESSORY STRUCTURES

Outcome: FEMA specifies clear construction requirements for agricultural structures and accessory structures located in the SFHA. Agricultural and accessory structures are not exempt from NFIP floodplain management requirements.

In addition to enforcing all other design and performance standards identified in 44 C.F.R. § 60.3 applicable to non-residential structures, communities must:

1. Require that new construction and substantial improvements of non-residential structures in the SFHA be constructed with the lowest floor elevated to or above the BFE or, together with attendant utility and sanitary facilities, be dry floodproofed to or above the BFE.
2. Require that enclosed areas below the lowest floor of non-residential structures used solely for building access, parking, or limited storage must include, at a minimum, adequate flood opening designed to automatically equalize hydrostatic flood forces.
3. Require that areas below the lowest floor within V Zones (V, VE, V1-V-30) be free of obstruction or constructed with non-supporting breakaway walls, open wood lattice work, or insect screening intended to collapse under wind and water loads without causing collapse or structural damage to the elevated portion of the building or foundation system.
4. Obtain and maintain a record of the certified elevation of the lowest floor for all new construction and substantial improvements and, where applicable, the certified elevation to which the structure has been dry floodproofed.

C. EXCEPTIONS TO THE NFIP MINIMUM FLOODPLAIN MANAGEMENT REQUIREMENTS FOR AGRICULTURAL STRUCTURES AND ACCESSORY STRUCTURES

Outcome: FEMA articulates clear requirements for granting exceptions to the NFIP minimum design and performance standards for agricultural structures and accessory structures.

1. **Agricultural Structures Only**. Per Section 1315(a)(2)(A) of the NFIA, agricultural structures located in the SFHA that are designated as repetitive loss, as defined in the NFIA, or substantially damaged by flood may be repaired and restored to pre-damaged conditions under the following criteria:
    a. Damage must be from flooding alone and must meet the community's substantial damage threshold. If damage is caused by other hazards, or a mix of hazards, the agricultural structure must meet elevation or dry floodproofing requirements when repaired or restored or wet floodproofing if it qualifies per this policy.
    b. The language of the local jurisdiction's land use provision must be reviewed and approved by FEMA to confirm consistency with the NFIP design and performance standards, and it must be incorporated into the local floodplain management regulations.

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c. The repair or restoration must be to pre-damaged condition only. Substantial improvements require the agricultural structure to meet elevation or dry floodproofing requirements or wet floodproofing if it qualifies per this policy.
d. Repair and restoration to pre-damaged condition requires issuance of a floodplain development permit for each occurrence.
e. In accordance with Section 1315(a)(2)(C) of the NFIA, disaster assistance under any program administered by the Administrator or any other federal agency is not available for agricultural structures repaired or restored to pre-damaged condition.
f. In accordance with Section 1315(a)(2)(B) of the NFIA, FEMA may deny federal flood insurance coverage unless the agricultural structure is wet floodproofed, consistent with the design and performance standards of 44 C.F.R. § 60.3(c)(5).

2. **Agricultural Structures and Accessory Structures.** The community may allow certain agricultural and/or accessory structures located in the SFHA to be wet floodproofed in lieu of the elevation or dry floodproofing requirement, via variance, under the following conditions:
   a. In accordance with the provisions of 44 C.F.R. § 60.6(a), the owner of an agricultural or accessory structure may request a variance from the appropriate local authority to allow certain agricultural or accessory structures located in the SFHA to be wet floodproofed in lieu of the elevation or dry floodproofing requirement of the NFIP. Communities must have a mechanism to ensure compliance with this policy and should include within their floodplain management regulations the criteria for an agricultural or accessory structure to receive a variance to wet floodproof in lieu of elevation or dry floodproofing.
      i. The variance must be for an individual agricultural or accessory structure as defined in this policy.
      ii. Justification for the variance must be on a case-by-case basis in accordance with the criteria established in 44 C.F.R. § 60.6(a), and the variance application and community documentation must address the following:
         1. The agricultural or accessory structure must meet the definition of *structure, for floodplain management purposes,* provided in 44 C.F.R. § 59.1, where walled and roofed shall be interpreted as having at least two outside rigid walls and a fully secured roof.
         2. An accessory structure is small and represents a minimal investment.
         3. An agricultural structure has a low damage potential and is located in an A Zone (A, AE, A1-A30, AR, A99).
         4. A description of the exceptional hardship that the applicant would incur if a variance were not granted must be included.
         5. The agricultural or accessory structure must meet the definition of agricultural or accessory structure, including the exclusive use requirements provided in this policy.

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6. The agricultural or accessory structure must be anchored to resist flotation, collapse, and lateral movement.
7. The portions of the agricultural or accessory structure located below the BFE must be constructed with flood-resistant materials.
8. Mechanical and utility equipment for the agricultural or accessory structure must be elevated or dry floodproofed to or above the BFE.
9. The agricultural or accessory structure must comply with the floodway encroachment provisions of the NFIP.
10. The agricultural or accessory structure must be wet floodproofed to protect the structure from hydrostatic pressure. The design must meet the NFIP design and performance standards for openings per 44 C.F.R. § 60.3(c)(5) and must allow for the automatic entry and exit of floodwaters without manual operation or the presence of a person (or persons).

iii. The variance must provide the minimum relief necessary.

iv. The variance must restrict use of the agricultural or accessory structure in accordance with the exclusive use requirement of the NFIP definition provided in this policy.

v. In accordance with FEMA regulation and guidance, owing to the increased risk to public safety, a variance for wet floodproofing in lieu of elevation or dry floodproofing is not recommended for:
   1. An agricultural structure located in a V Zone (V, VE, V1-V-30). Wet floodproofing and breakaway walls below a compliant elevated structure is permissible without a variance.
   2. An agricultural or accessory structure which, if flooded, would create a threat to public safety, health, and welfare. Such structures include but may not be limited to confinement operations; structures with liquefied natural gas terminals; and facilities producing and storing highly volatile, toxic, or water-reactive materials. Ideally, these structures should be located outside of the SFHA; however, when located within the SFHA, these structures must be elevated or dry floodproofed in accordance with NFIP design and performance standards.

b. In accordance with the provisions of 44 C.F.R. § 60.6(b), a community may request a community-wide exception from FEMA to allow certain agricultural or accessory structures located in the SFHA to be wet floodproofed in lieu of the elevation or dry floodproofing requirement of the NFIP.

   i. The community must submit a request, in writing, to its respective FEMA Regional Office, including:
      1. The nature, extent of, and reasons for the exception
      2. A description of the extraordinary circumstances and local conditions that cause a hardship or inequity for elevating or dry floodproofing agricultural or accessory structures

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3. Sufficient supporting justification, which may include community-wide economic impacts; environmental, topographic, hydrologic, and hydraulic conditions and data; other scientific and technical data; and data demonstrating the impact on public safety and welfare and the environment
4. Sufficient supporting information regarding other planning considerations and factors that justify wet floodproofing as an appropriate alternative mitigation design, which may include flooding characteristics (frequency, duration, depth); flood warning time; safety and access; emergency operations plans; protection of contents and equipment; and any other conditions, requirements, or restrictions the community proposes to enforce for an agricultural and/or accessory structure to be eligible for the exception to wet floodproof
5. The proposed regulations language for allowing certain agricultural or accessory structures to be wet floodproofed, consistent with the minimum criteria outlined in Section C, Part 2(a) of this policy

ii. The FEMA Regional Office will complete an initial review and evaluation of the request and work with the community to ensure sufficient documentation and justification for the request has been received prior to submitting the request to FEMA Headquarters for final review and approval.

iii. FEMA will prepare a Special Environmental Clearance to determine whether the proposed community-wide exception will have a significant impact on the human environment. The decision to prepare an Environmental Impact Statement, or other environmental documentation, will be made in accordance with FEMA Directive 108-1 and FEMA Instruction 108-1-1. This will be part of FEMA's assessment of how applicable environmental and historic preservation laws, regulations, Executive Orders, and agency policy apply to proposed federal actions.

iv. After review and evaluation of the request, the FEMA Regional Office will notify the community whether the requested community-wide exception is approved.
    1. If the request is denied, the FEMA Regional Office will provide an explanation for the denial.
    2. If the request is approved, the FEMA Regional Office will provide technical assistance, as necessary, to ensure the regulations language is sufficient and consistent with the requirements of the approved community-wide exception.

3. **Accessory Structures Only.** The community may allow certain accessory structures located in the SFHA to be wet floodproofed in lieu of the elevation or dry floodproofing requirement, without a variance, under the following conditions:

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a. Communities must have a mechanism to ensure compliance with this policy and should include within their FEMA-approved floodplain management regulations the criteria for an accessory structure to be wet floodproofed in lieu of elevation or dry floodproofing without a variance.
    i. The accessory structure must meet the definition of structure, for floodplain management purposes, provided in 44 C.F.R. § 59.1, where walled and roofed shall be interpreted as having two outside rigid walls and a fully secured roof.
    ii. The accessory structure should be small, as defined by the community and approved by FEMA, and represent a minimal investment. Accessory structures of any size may be considered for a variance; however, FEMA considers accessory structures that meet the following criteria to be small and therefore not necessarily in need of a variance, if the community chooses to allow it:
        1. Located in an A Zone (A, AE, A1-A30, AR, A99) and less than or equal to the size of a one-story, two-car garage.
        2. Located in a V Zone (V, VE, V1-V-30) and less than or equal to 100 square feet.
    iii. The accessory structure must be anchored to resist flotation, collapse, and lateral movement.
    iv. The portions of the accessory structure located below the BFE must be constructed with flood-resistant materials.
    v. Mechanical and utility equipment for the accessory structure must be elevated or dry floodproofed to or above the BFE.
    vi. The accessory structure must comply with the floodway encroachment provisions of the NFIP.
    vii. The accessory structure must be wet floodproofed to protect the structure from hydrostatic pressure. The design must meet the NFIP design and performance standards for openings per 44 C.F.R. § 60.3(c)(5) and must allow for the automatic entry and exit of floodwaters without manual operation or the presence of a person (or persons).

David Maurstad
FEMA Deputy Associate Administrator for the Federal Insurance and Mitigation Administration (FIMA)

02/12/20

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ADDITIONAL INFORMATION

REVIEW CYCLE

FEMA Policy #104-008-03: Floodplain Management Requirements for Agricultural Structures and Accessory Structures will be reviewed, reissued, revised, or rescinded within 4 years of the issue date.

AUTHORITIES

A. Homeland Security Act of 2002, Pub. L. No. 107-296
B. Executive Order 11988: Floodplain Management, 42 FR 26951, May 24, 1977
C. National Flood Insurance Act of 1968, as amended, 42 U.S.C. § 4001 *et seq*.

REFERENCES

A. 42 U.S.C. § 4022 and § 4102 State and Local Land Use Controls; Criteria for Land Management Use
B. 44 C.F.R. § 59.1 National Flood Insurance Program Regulations
C. 44 C.F.R. § 60.1 Purpose of Subpart A – Requirements for Flood Plain Management Regulations
D. 44 C.F.R. § 60.3 Flood Plain Management Criteria for Flood-Prone Areas
E. 44 C.F.R. § 60.6 Variances and Exceptions
F. American Society of Civil Engineers (ASCE) 24-14, Flood Resistant Design and Construction, January 2014
G. International Code Council, International Building Code, August 2017
H. FEMA 480, National Flood Insurance Program Floodplain Management Requirements, February 2005
I. FEMA Flood Insurance Manual, National Flood Insurance Program, Effective April 2019
J. FEMA P-936, Floodproofing Non-Residential Buildings, July 2013
K. [1]NFIP Technical Bulletin 1, Openings in Foundation Walls and Walls of Enclosures, August 2008
L. [1]NFIP Technical Bulletin 2, Flood Damage-Resistant Materials Requirements, August 2008
M. [1]NFIP Technical Bulletin 3, Non-Residential Floodproofing – Requirements and Certification, April 1993
N. [1]NFIP Technical Bulletin 5, Free-of-Obstruction Requirements, August 2008
O. [1]NFIP Technical Bulletin 7, Wet Floodproofing Requirements, December 1993
P. FEMA P-993, Floodplain Management Bulletin – Variances and the National Flood Insurance Program, July 2014
Q. FEMA Directive 108-1, Environmental Planning and Historic Preservation Responsibilities and Program Requirements, August 2016
R. FEMA Instruction 108-1-1, Instruction on Implementation of the Environmental Planning and Historic Preservation Responsibilities and Program Requirements, August 2016

[1] Reference items K - O are available at https://www.fema.gov/media-library/resources-documents/collections/4

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DEFINITIONS

A Zone – designated in FEMA's Flood Insurance Studies and Flood Insurance Rate Maps as zones labeled A, AE, A1-30, AH, AO, and AR/A99

Accessory Structure – a structure, as defined in 44 C.F.R. § 59.1, which is on the same parcel of property as a principal structure and the use of which is incidental to the use of the principal structure; specifically excludes structures used for human habitation

Agricultural Structure – a structure, as defined in 44 C.F.R. § 59.1, which is used exclusively in connection with the production, harvesting, storage, raising, or drying of agricultural commodities and livestock; specifically excludes any structures used for human habitation

Base Flood Elevation (BFE) – the height of the flood having a 1 percent chance of being equaled or exceeded in any given year

Community – any State or area or political subdivision thereof (such as county, city, township, village), or any Indian tribe or authorized tribal organization, or Alaska Native village or authorized native organization, which has authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction

Development – any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials

Dry Floodproofing – a combination of measures that results in a structure, including the attendant utilities and equipment, being watertight with all elements substantially impermeable to the entrance of floodwater and with structural components having the capacity to resist flood loads

Exception – a waiver from the NFIP regulations for floodplain management requirements found in 44 C.F.R. § 60, granted by FEMA and directed to a community, which relieves the community from the requirements, regulation, order, or other determination made or issued pursuant to the NFIA, as amended

Floodplain/Floodprone Area – any land area susceptible to being inundated by water from any source

Floodplain Management – the operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans; flood control works; and such State, Tribal, territorial, or local regulations, ordinances, and building codes that provide standards for the purpose of flood damage prevention and reduction

Hardship – the inability to comply with an NFIP floodplain management regulation and make reasonable use of a property because of unusual physical and topographical conditions that are unique to the property, are not caused by the applicant, and pertain to the land and not any structures, its inhabitants, or the personal circumstances of the property owner

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Local Floodplain Administrator – the local official or other person designated by a community as responsible for administering NFIP floodplain management regulations

Lowest Floor – the lowest floor of the lowest enclosed area of a structure, including a basement. Any NFIP-compliant unfinished or flood-resistant enclosure used solely for parking of vehicles, building access, or storage (in an area other than a basement) is not considered a structure's lowest floor.

National Flood Insurance Act of 1968 (NFIA) – created the Federal Insurance Administration and made federal flood insurance available for the first time

National Flood Insurance Program (NFIP) – a program enacted by Congress intended to reduce the impact of flooding on private and public structures by making federal flood insurance available within communities that adopt and enforce NFIP floodplain management regulations

New Construction – (for floodplain management purposes) structures for which the start of construction commences on or after the effective date of an NFIP floodplain management regulation adopted by a community and includes all subsequent improvements to the structures

Opening – open area or space within a wall that meets certain performance characteristics related to allowing the automatic entry and exit of floodwaters

Special Flood Hazard Area (SFHA) – the land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year. The SFHA is inclusive of A Zones and V Zones.

State/Tribe/Territory Coordinator – the person, office, or agency of the State government designated by the Governor of the State/**Tribe/territory**, or by State/**Tribe/territory** statute, that assists in the implementation of the NFIP in that State/Tribe/territory

Structure – (for floodplain management purposes) a walled and roofed building, including a gas or liquid storage tank, that is principally above ground, as well as a manufactured home. Walled and roofed shall be interpreted as two outside rigid walls and a fully secured roof

Substantial Damage – damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred

Substantial Improvement – any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure (or a smaller percentage if established by the community) before the start of construction of the improvement

Variance – a grant of relief by a community from the terms of an NFIP requirement for floodplain management regulations

V Zone – area of the SFHA that is inundated by tidal floods (coastal high hazard area) as designated in FEMA's Flood Insurance Studies and Flood Insurance Rate Maps; zones labeled V, VE, V1-30, and VO

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Wet Floodproofing – use of flood damage-resistant materials and construction techniques to minimize flood damage to a structure by intentionally allowing floodwaters to enter and exit automatically (without human intervention)

MONITORING AND EVALUATION

The efficacy of this policy shall be monitored as a joint effort of local floodplain administrators, NFIP State/Tribe/territory Coordinators, and FEMA through data and documentation available from regular inspections of structures, monitoring and recording of building performance, Community Assistance Visits and Contacts conducted by FEMA or State/Tribe/territory NFIP personnel, permit and variance records, federal flood insurance policy data, and the Community Information System (CIS).

FEMA Headquarters will utilize the data and documentation to evaluate of the effectiveness of this policy and inform policy review, reissuance, revision, or rescission.

QUESTIONS

Questions regarding implementation or clarification of this policy should be directed to a community's FEMA Regional Office.

Regional offices seeking guidance, outreach, training, or clarification on this policy may direct questions to the FEMA Floodplain Management Division:
FEMA-Floodplain-Management-Division@fema.dhs.gov.

MHFD
MILE HIGH FLOOD DISTRICT

2480 W. 26th Ave Suite 156-B | Denver, CO 80211
TEL 303 455 6277 | FAX 303 455 7880

www.mhfd.org

Date: February 28, 2020

Subject: Position Paper – Tents and Makeshift Structures in Floodplains

In October 2019, the Mile High Flood District (MHFD) passed a resolution expressly prohibiting tents and makeshift structures from within the floodplains of MHFD. These floodplain regulation changes were made for the sole purpose of public safety. The MHFD's enabling statutes state that "In the event of any conflict between this floodplain regulation and any floodplain regulation adopted by any other public body within MHFD, the more restrictive regulation shall control," making this prohibition the controlling regulation within the Flood District.

The dangers of allowing the proliferation of tents and other makeshift structures for human habitation within your community's floodplains are fourfold:

1. The individuals living in these structures put themselves at grave risk of serious injury and death by drowning during flooding.
2. The frequent swift-water rescue attempts of inhabitants of these makeshift structures during times of flood puts at risk the lives of first responders.
3. The building materials and furnishings of tents and makeshift structures within floodplains add to the debris load of the flood, clogging bridge and culvert openings, exacerbating flooding, and endangering the rest of the community.
4. The byproducts of human inhabitation of these structures (feces and refuse) pollute the floodwaters with fecal bacteria and other hazardous substances, endangering the rest of the community.

MHFD is well aware that urban camping is a complex issue, and that there are many other aspects to the situation than tents and makeshift structures in the floodplain. These other aspects are well beyond the jurisdiction of MHFD; however, we cannot allow the proliferation of unauthorized structures within our floodplains. We have never allowed the building of homes or businesses in the floodplain for safety reasons, and this is an effort to be consistent and protect a vulnerable population. The risk to the inhabitants, the first responders, and the rest of the community is too high. Our mission has always been to put public safety first, and that is the intent of this revised regulation—to do everything possible to prevent drowning deaths from occurring, while also protecting the health, safety, and wellbeing of the entire community.

MHFD has drafted several example model ordinances for the 41 jurisdictions' consideration for adoption and are currently scheduling meetings with the local governments to discuss enforcement issues and solutions.

For a full copy of our revised amendment, please reach contact David Bennetts at dbennetts@MHFD.org

URBAN DRAINAGE AND FLOOD CONTROL DISTRICT
d/b/a

MILE HIGH FLOOD DISTRICT

FLOODPLAIN REGULATION

SECTION 1: PURPOSE

To promote the public health, safety, and general welfare, to minimize flood losses in areas subject to flood hazards, and to promote wise use of the floodplain through the development of sound floodplain management practices that assist the Mile High Flood District (MHFD) and the communities it serves with implementation of the Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP) and the Colorado Water Conservation Board (CWCB) *Rules and Regulations for Regulatory Floodplains in Colorado*; this Floodplain Regulation has been established with the following purposes intended:

1.1 To reduce the hazards of floods to life and property; by:

1.1.1 Prohibiting certain uses which are dangerous to life or property in times of flooding.

1.1.2 Restricting uses which would be hazardous to the public health in times of flooding.

1.1.3 Restricting uses which are particularly susceptible to flood damage, so as to alleviate hardship and eliminate demands for public expenditures for relief and protection.

1.1.4 Requiring permitted floodplain uses, including public facilities which serve such uses, to be protected against floods by providing floodproofing where applicable, and general flood protection at the time of initial construction.

1.2 To alert floodplain occupants or potential occupants of the potential for flood damages which may result from their land uses; (or that of others) by:

1.2.1 Regulating the manner in which structures designed for human occupancy may be constructed so as to prevent danger to human life within such structures.

1.2.2 Regulating the method of construction of water supply, sanitation systems and other utilities, so as to prevent disease, contamination and unsanitary conditions.

1.2.3 Delineating and describing areas that could be inundated by floods so as to protect individuals from purchasing floodplain lands for purposes which are unsuitable for those areas.

1.3 To protect the public from the burden of avoidable financial expenditures for flood control and relief; by:

1.3.1 Regulating all uses within the floodplain so as to produce a method of construction and a pattern of development which will minimize the probability of damage to property and loss of life or injury to the inhabitants of the flood hazard area.

1.4 To protect the flood storage capacity of floodplains and to assure retention of sufficient floodway area to convey flood flows which can reasonably be expected to occur; by:

1.4.1 Regulating the filling, dredging, and alteration of channels by deepening, widening, or relocating.

1.4.2 Prohibiting unnecessary and damage-creating encroachments.

1.4.3 Encouraging floodplain uses such as open space, natural areas, agriculture and recreation.

1.5 To protect the hydraulic characteristics of the small watercourses, including the gulches, sloughs and artificial water channels used for conveying flood waters, which make up a portion of the urban drainage system; by:

1.5.1 Regulating the filling and channelization of watercourses so as to maintain natural storage capacity and slow flow characteristics.

1.5.2 Prohibiting encroachment into the small watercourses to maintain their water carrying capacity.

1.5.3 Encouraging uses such as open space, natural areas, recreation and trails.

SECTION 2: GENERAL PROVISIONS

2.1 Authority: Per 32-11-218(1)(f)(I) C.R.S., MHFD has the power to adopt, amend, repeal, enforce, and otherwise administer this Floodplain Regulation. In the event of any conflict between this floodplain zoning regulation and any floodplain regulation adopted by any other public body within MHFD, the more restrictive regulation shall control. Most local governments within MHFD also have floodplain regulations and processes in place to administer and enforce those regulations. For this reason, the MHFD Floodplain Administrator will generally defer to the floodplain administrators appointed by those local governments for the administration of routine floodplain management activities such as granting grading and floodplain development permits, etc., and will not be involved in these matters unless directed to do so by the MHFD Board of Directors.

2.2 Jurisdiction: The jurisdiction of this section includes all lands adjacent to any watercourse within MHFD that would be inundated by the one-percent annual chance flood for that watercourse (as defined in *Section 10, Definitions*), and areas removed from the Floodplain by the placement of fill.

2.3 Floodplain Components: The Floodplain covers the mapped area corresponding to the one-percent annual chance flood (a.k.a. the 100-year flood). This is the area susceptible to inundation during a flood that has a one percent chance of being equaled or exceeded in any given year. Where deemed to be in the public interest by the MHFD, and to promote wise use of the Floodplain, the Floodplain may be subdivided into the Floodway and the Flood Fringe.

The Floodplain is defined by computing the limits of the one-percent annual chance flood under existing channel and Floodplain conditions, and typically with consideration of future runoff potential from full development of the watershed.

Subdivision of the Floodplain into the Floodway and the Flood Fringe must not cause a one-percent annual chance rise of more than one-half foot in either the flood water surface elevation or corresponding energy grade line (as defined in *Section 10, Definitions*) elevation above that for the Floodplain unless requirements of or comparable to those in 44 CFR. § 65.12 of the NFIP regulations have been met. This ensures that alternative options have been considered and documentation of individual legal notice (as defined in *Section 10, Definitions*) to all impacted property owners has been provided. This also requires certification that no structures will be impacted by the rise in water surface elevation profile.

The subdivision of the Floodplain and accompanying hydraulic studies shall be based upon computational hydraulic analyses which consider a portion (to be determined by the Floodplain Administrator) of the Flood Fringe reach being filled. Determination of the Floodway and Flood Fringe must be made only with the full understanding that such subdivision may tend to increase flood peaks downstream.

2.4 Boundaries: The boundaries of the Floodplain shall be as they appear on the floodplain maps kept on file with the Floodplain Administrator. The boundary lines on the map shall be determined by the use of the scale appearing on the map. Where there is a conflict between the boundary lines illustrated on the map and actual field conditions, the dispute shall be settled according to *Section 7.3, Mapping Disputes*.

2.5 Interpretation: In the Floodplain Administrator's interpretation and application, the provisions of this Regulation shall be held to be minimum requirements and shall be liberally construed in favor of the governing body and shall not be deemed a limitation or repeal of any other powers granted by Colorado Statutes.

2.6 Warning and Disclaimer of Liability: The degree of flood protection intended to be provided by this section is considered reasonable for the regulatory purposes and is based on engineering and scientific methods of study. Larger floods can and will occur on occasions, and the depth of any flood may be increased by man-made or natural causes, such as ice jams and bridge openings restricted by debris. This Regulation does not imply the areas outside Floodplain area boundaries or land uses permitted within such areas will always be free from flooding or flood damage. Nor shall this section create a liability on the part of or a cause of action against MHFD or any officer or employee thereof for any flood damages that may result despite reliance on this Regulation.

2.7 Adoption of Floodplain Maps: The location and boundaries of the Floodplain established by this regulation shall be as they appear on the maps and profiles contained in engineering reports adopted after a public hearing by the MHFD Board of Directors, and any subsequent revisions to these maps and profiles as approved or designated by FEMA or CWCB. The MHFD Board of Directors may designate Floodways and Flood Fringes by adopting floodway tables and corresponding delineations contained in the above mentioned engineering reports, or subsequent map revisions after a public hearing. Each change in the official maps shall be subject to the Amendment procedure as required in *Section 7.3, Mapping Disputes*. The adopted maps and flood profiles shall be on file with the Floodplain Administrator and also with the County Clerk and Recorder of the county in which the Floodplain is located.

SECTION 3: NONCONFORMING USES

3.1 The existing lawful use of a structure or premises which is not in conformity with the provisions of this Regulation may be continued, subject to the following conditions:

3.1.1 No such use shall be expanded or enlarged except in conformity with the provisions of this Regulation.

3.1.2 Substantial improvement (as defined in *Section 10, Definitions*) to any nonconforming structure or use must result in the permanent change of the structure or use to a conforming use.

3.1.3 If such use is discontinued for twelve (12) consecutive months, any future use of the building and premises shall conform to this Regulation.

3.1.4 Uses or adjuncts thereof which are public nuisances shall not be permitted to continue as nonconforming uses. These shall include, but not be limited to, tents and makeshift structures, enclosures, or other shelters used for human habitation; except in locations expressly permitted by the local government (as defined in *Section 10, Definitions*) and having adequate sanitation facilities and flood evacuation plans (also as defined in *Section 10, Definitions*).

3.1.5 Any alteration, addition, or repair to any existing nonconforming structure shall be protected, where applicable, by floodproofing measures pursuant to *Section 7.44(1), Floodproofing*.

SECTION 4: THE FLOODPLAIN

4.1 Application: These provisions shall apply to all Floodplains of watercourses in MHFD, for which one-percent annual chance flood limits have been determined.

4.2 Description: The Floodplain shall include the areas so delineated on the maps and profiles for the one-percent annual chance flood limits along the watercourses adopted by the MHFD Board of Directors in accordance with *Section 2.7, Adoption of Floodplain Maps*, and subsequent map revisions approved and/or designated by FEMA or CWCB.

4.3 Special Provisions: The following regulations shall apply to all uses within the Floodplain, notwithstanding that such uses may be permitted under the terms of this Regulation.

4.3.1 No new construction; substantial improvement; fill, including fill for roads and levees; deposit; obstruction (as herein defined); storage of materials, or other Floodplain uses shall be permitted that decreases the efficiency or the capacity of the Floodway, unless requirements of or comparable to those in 44 CFR. § 65.12 of the NFIP regulations have been met. This ensures that alternative options have been considered, documentation of individual legal notice to all impacted property owners is provided, and requires certification that no structures will be impacted by the rise in the one-percent annual chance water surface elevation profile.

4.3.2 No Floodplain use shall adversely affect the efficiency of or unduly restrict the capacity of the channels or Floodways of any tributaries to the main stream, drainage ditches, or any other drainage facilities or systems, unless requirements of or comparable to those in 44 CFR. § 65.12 of the NFIP regulations have been met. This ensures that alternative options have been considered, documentation of individual legal notice to all impacted property owners is provided, and requires certification that no structures will be impacted by the rise in water surface elevation profile.

4.3.3 All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.

4.3.4 All new construction, substantial improvements, and utility equipment shall be constructed with materials resistant to flood damage. Flood-resistant material is defined in *Section 10, Definitions*.

4.3.5 All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damage.

4.3.6 All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system; and all new and replacement sanitary sewage systems shall be designed to minimize or eliminate both infiltration of flood waters into the system and discharges from the system into flood waters.

4.3.7 Onsite waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding.

4.3.8 Except as allowed under *Section 4.5.3*, mobile homes and recreational vehicles should not be placed in the Floodplain. Mobile homes and recreational vehicles already placed within the Floodplain shall be anchored to resist flotation, collapse, or lateral movement by providing over the top and frame ties to ground anchors. Specific requirements shall be that:

(1) Over-the-top ties be provided at each of the four corners of the mobile home, with two additional ties per side at intermediate locations and mobile homes less than fifty feet long requiring one additional tie per side.

(2) Frame ties be provided at each corner of the home with five additional ties per side at intermediate points and mobile homes less than fifty feet long requiring four additional ties per side;

(3) All components of the anchoring system be capable of carrying a force of 4,800 pounds; and

(4) Any additions to the mobile home be similarly anchored.

4.3.9 Tents and makeshift structures, enclosures, or other shelters used for human habitation, shall not be permitted in the Floodplain, except in locations expressly permitted by the local government (as defined in *Section 10, Definitions*) and having adequate sanitation facilities and flood evacuation plans (also as defined in *Section 10, Definitions*).

4.4 Description of Uses

Permitted Uses: The following uses shall be permitted within the Floodplain to the extent that they are not prohibited in a particular area by any underlying county or city zoning ordinance or regulation.

4.4.1 Agricultural uses such as: general farming, livestock grazing, forestry, sod farming, and wild crop harvesting;

4.4.2 Industrial-commercial uses such as: loading areas, parking areas, airport landing strips, and temporary storage of equipment or machinery easily moved or not subject to flood damage;

4.4.3 Public and private recreational uses not requiring "permanent or temporary structures" designed for human habitation such as: parks, swimming areas, golf courses, picnic grounds, wildlife and nature preserves, fish hatcheries, hunting, fishing and hiking areas; and

4.4.4 Utility facilities such as: flowage areas, transmission lines, pipelines, water monitoring devices, roadways, and bridges.

4.5 Special Exceptions: Any use enumerated in *Subsections 4.51 through 4.55* may be permitted only upon the issuance of a special exception letter by the Floodplain Administrator as provided in *Section 7.4, Special Exceptions*.

4.5.1 Residential Construction. New construction or substantial improvement of any residential structure may be permitted only upon a finding by the Floodplain Administrator that the lowest floor, including basement, is to be elevated to or above the flood protection elevation (as defined in *Section 10, Definitions*). As a condition of such finding, such condition shall be certified by a Colorado-licensed professional engineer, architect, or land surveyor to the Floodplain Administrator. This includes structures placed on areas removed from the Floodplain by fill.

4.5.2 Nonresidential Construction. Critical facilities shall be regulated in accordance with *Section 6.3, Special Provisions*. New construction or substantial improvement of any other commercial, industrial or other nonresidential structure may be permitted only upon a finding by the Floodplain Administrator that the lowest floor, including basement, is to be elevated to or above the flood protection elevation or, together with attendant utility and sanitary facilities, is to be floodproofed so that below the flood protection elevation, the structure is water tight and contains adequate structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. This includes structures placed on areas removed from the Floodplain by fill. A Colorado-licensed professional engineer or architect shall certify to the Floodplain Administrator that the standards of this subsection are satisfied.

4.5.3 Mobile Homes. New mobile home parks and mobile home subdivisions, expansions of existing mobile home parks and mobile home subdivisions, and existing mobile home parks and mobile home subdivisions where the repair, reconstruction, or improvement of the street utilities and pads equals or exceeds 50 percent of the value of the streets, utilities and pads before the repair, reconstruction or improvement has commenced and for mobile home subdivision, may be permitted only upon a finding by the Floodplain Administrator that:

a) Stands or lots will be elevated on compacted fill or on pilings so that the lowest floor of the mobile home will be elevated to or above the flood protection elevations; and

b) Adequate surface drainage and access for a hauler will be provided.

This includes mobile home parks placed on areas removed from the Floodplain by fill.

4.5.4 Fills or Deposits of Materials. This may be permitted only upon a finding by the Floodplain Administrator that:

(1) Any fill or deposit of materials will comply with the *Section 4.3, Special Provisions*;

(2) The fill or deposit of materials will have some beneficial purpose and the amount thereof will not be greater than is necessary to achieve that purpose, as demonstrated by a plan submitted by the owner showing the final dimensions of the proposed fill or other material and the use to which the filled land will be put;

(3) The fill or deposit of materials does not imprudently reduce the flood storage capacity of the waterway and the other requirements of this section are met; and the fill or deposit of materials does not encroach on that portion of the Floodplain which would have significant flow during the flood, and which for that reason would

help convey the flood waters. Any filling that reduces the hydraulic capacity requires appropriate hydraulic studies and a review of the impact of such reduction;

(4) The fill or other materials will be protected against erosion in conformance with stabilization best management practices as described in the Urban Storm Drainage Criteria Manual; and

(5) The fill or deposit of materials does not otherwise adversely impact upstream, downstream, and/or adjacent property owners.

4.5.5 Storage or Processing of Hazardous Materials. Materials that are buoyant, flammable, toxic, explosive, or in times of flooding, could be injurious to human, animal, or plant life, shall be at or above the flood protection elevation for the particular area. Solid waste disposal facilities, such as junkyards or areas for the dumping of refuse shall also require a permit from the Floodplain Administrator.

4.5.6 Uses Similar in Nature to Permitted Uses. These may also be allowed provided that they are consistent with the provisions of this Regulation.

SECTION 5: THE FLOODWAY

5.1 Application: *Section 4.1, Application*, *Floodplain*, shall also apply hereto.

5.2 Description: The Floodway shall include the areas so delineated on the maps and profiles for the one-percent annual chance flood limits along the watercourses adopted by the MHFD Board of Directors in accordance with *Section 2.7, Adoption of Floodplain Maps*, and subsequent map revisions approved and/or designated by FEMA or CWCB.

5.3 Special Provisions: The following additional provisions shall apply to all uses within the Floodway.

5.3.1 No encroachments, including fill, new construction, substantial improvements, or other development shall be permitted within the Floodway that would result in any increase in flood levels during the occurrence of the one-percent annual chance flood unless requirements of or comparable to those in 44 CFR. § 65.12 of the NFIP regulations have been met. This ensures that alternative options have been considered, documentation of individual legal notice to all impacted property owners is provided, and requires certification that no structures will be impacted by the rise in water surface elevation profile.

5.3.2 No mobile homes or recreational vehicles shall be placed in the Floodway.

5.3.3 No buildings or structures designed or intended for human occupancy shall be placed in the Floodway.

5.3.4 No floatable or buoyant material, nor any material that could easily become dislodged and move downstream during a flood, shall be stored or placed in the Floodway.

5.3.5 No storage or processing of materials that are flammable, toxic, explosive, or in times of flooding, could be injurious to human, animal, or plant life, shall be stored or placed in the Floodway.

5.3.6 No solid waste disposal facilities, such as junkyards or areas for the dumping of refuse shall be placed in the Floodway.

5.4 Description of Uses: The uses that are permitted in *Section 4.4, Description of Uses, Floodplain,* are permitted, provided that such use does not include any filling or deposit of materials, and the capacity of the Floodway is left unimpaired.

SECTION 6: THE FLOOD FRINGE

6.1 Application: All provisions of *Section 4.1, Application, Floodplain*, shall also apply hereto.

6.2 Description: The Flood Fringe shall include the areas so delineated on the maps and profiles for the one-percent annual chance flood limits along the watercourses adopted by the MHFD Board of Directors in accordance with *Section 2.7, Adoption of Floodplain Maps*, and subsequent map revisions approved and/or designated by FEMA or CWCB.

6.3 Special Provisions:

6.3.1 The provisions of *Sections 4.3 and 4.5* shall apply to all uses in the Flood Fringe.

6.3.2 Within shallow flooding areas, all new construction and substantial improvement of residential structures may be permitted only upon a finding of the Floodplain Administrator that the lowest floor, including basement, will be elevated one foot above the crown of the nearest street or one foot above the flood depth specified on the map, whichever is higher.

6.3.3 Within shallow flooding areas, all new construction and substantial improvement of nonresidential structures may be permitted only upon a finding of the Floodplain Administrator that the lowest floor, including basement, will be elevated one foot above the crown of the nearest street; or the highest adjacent grade of the structure will be one foot above the flood depth specified on the map, whichever is higher; or together with attendant utility and sanitary facilities, will be completely floodproofed to or above that level so that any space below that level is watertight and contains adequate structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

6.3.4 All new critical facilities shall be located outside the Floodplain whenever possible.

6.3.5 All new critical facilities which are unable to be located outside the Floodplain, substantially improved critical facilities, and new additions to existing critical facilities in the Flood Fringe shall be elevated or floodproofed to at least one foot above the flood protection elevation.

6.3.6 New critical facilities shall, when practicable, have continuous non-inundated access (ingress and egress for evacuation and emergency services) during a one-percent annual chance flood event.

SECTION 7: ADMINISTRATION

7.1 Floodplain Administrator: The MHFD Executive Director is the Floodplain Administrator who shall administer the provisions of this Regulation.

7.2 Special Exception Letter: A special exception letter must be obtained from the Floodplain Administrator before any new land use not expressly allowed by this Regulation may be initiated.

7.3 Mapping Disputes: The following procedure shall be used by the Floodplain Administrator in deciding contested cases in which the location of a Floodplain boundary is disputed:

7.3.1 In all cases the person contesting the location of the Floodplain boundary shall be given the opportunity to submit technical evidence certified by a Colorado-licensed professional engineer that demonstrates the Floodplain is scientifically or technically incorrect, or that an

indisputable error has occurred. The Floodplain Administrator shall not allow deviations from the boundary line as mapped unless the evidence clearly and conclusively establishes that the mapped location of the line is incorrect.

7.3.2 The Floodplain Administrator shall render a written opinion within 30 days following receipt of the applicant's technical evidence setting forth the findings of fact and the reasons for the decision.

7.3.3 Contestants shall have the right to appeal such decisions to the MHFD Board of Directors. Such appeal must be made within 30 days.

7.4 Special Exceptions:

7.4.1 Application: Any use listed in this Regulation as requiring a special exception may be allowed only upon the issuance of a special exception letter by the Floodplain Administrator.

7.4.2 Procedure to be followed in Passing on Special Exception Letters: Pursuant to a Special Exception Letter Application the Floodplain Administrator may:

(1) Require the applicant to submit, at the time of application, a geo-referenced topographic work map, certified by a Colorado-licensed engineer competent in open channel hydraulics. This work map shall show vertical datum, horizontal datum, and mapping projection used. This map shall be required to accurately locate the proposed Floodplain and/or Floodway boundaries with respect to the effective Floodplain and/or Floodway limits (as defined in *Section 2.7, Adoption of Floodplain Maps*), the pre-project or existing Floodplain and/or Floodway limits, channel of stream, and existing Floodplain development. This map shall further be required to include, as attachments, all other pertinent information such as the nature of the proposal; legal description of the property; fill limits and elevations; building floor elevations; and floodproofing measures, as applicable.

(2) Require the applicant to furnish the following additional information, as deemed necessary by the Floodplain Administrator for the evaluation of the effects of the proposal under flood flows and Floodplain storage and to render a decision of the proposed Floodplain use:

(a) Cross-sections (as appropriate), showing the channel of the stream, the Floodplain and/or Floodway adjoining each side of channel, cross-sectional area to be occupied by the proposed development, and high water information.

(b) Plan (surface view), a geo-referenced map showing vertical datum, horizontal datum and mapping projection, elevations or contours of the existing and proposed ground; pertinent structure, fill or storage elevations; size, location and spatial arrangement of all proposed and existing structures on the site; location and elevations of streets, water supply, sanitary facilities, and soil types, water surface elevations, and other pertinent information.

(c) Profile (as appropriate), showing the slope of the bottom of the existing and proposed channel or thalweg of the stream and existing and proposed one-percent annual chance water surface profiles.

(d) Specifications for building construction and materials, floodproofing, filling, dredging, grading, channel improvement, storage of materials, water supply, and sanitary facilities.

(e) Hydrologic and Hydraulic Analyses and/or supplemental calculations for all proposed development within the Floodplain.

The Floodplain Administrator shall render, within 30 days of receipt of all necessary application documents and materials, a written decision granting or denying a permit application. If a denial is made, the decision shall set forth the Floodplain Administrator's findings of fact and reasons for the denial. Applicants shall have the right to appeal any adverse findings or decision to the MHFD Board of Directors. Such appeal must be made within 30 days.

7.4.3 Bases for the Floodplain Administrator's Determination: The determination of the Floodplain Administrator on each special exception letter application shall be based on the effects of the proposed land use with respect to the objectives and purposes of this Regulation.

7.4.4 Conditions Attached to Special Exception Letters: Upon consideration of the factors listed above and the purposes of this Regulation, the Floodplain Administrator may attach such conditions as he deems necessary in furthering the purposes of this Regulation. Such conditions may include specifications for, without limitation because of specific enumeration, modification of other waste disposal methods and facilities, landscaping, periods of operation, operational controls, sureties, deed restriction and adequate floodproofing, where applicable.

(1) Floodproofing. Special exceptions requiring floodproofing measures such as the following shall be designed consistent with the flood protection elevation for the particular areas and flood velocities, forces and other factors associated with the flood protection elevation. Methods shall be in conformance with the latest FEMA guidance relative to floodproofing practices.

The Floodplain Administrator shall require that the applicant submit a plan or document certified by a Colorado-licensed professional engineer that the floodproofing measures are consistent with the flood protection elevation for the particular area.

(a) Anchorage to resist flotation and lateral movement.

(b) Installation of watertight doors, bulkheads, and shutters.

(c) Reinforcement of walls to resist water pressures.

(d) Use of paints, membranes, or mortars to reduce seepage of water through walls.

(e) Addition of mass or weight to structures to resist flotation.

(f) Installation of pumps to lower water levels in structures.

(g) Construction of water supply and waste treatment systems to prevent the entrance of flood waters.

(h) Pumping facilities for subsurface drainage systems for buildings to relieve external foundation wall and basement floor pressure.

(i) Construction to resist rupture or collapse, caused by water pressure or floating debris.

(j) Backflow prevention valves on sewer lines, or the elimination of gravity flow basement drains.

SECTION 8: ENFORCEMENT AND PENALTIES

8.1 Any structure, building, fill, or development placed or maintained within any Floodplain in violation of this Regulation is a public nuisance and the creation thereof may be enjoined and maintenance thereof may be abated by action at suit of the City, Town, or County in which it is located or by MHFD, or any citizen thereof. Any person who places or maintains any structure, building, fill, or development within any Floodplain in violation of this Regulation may be fined not more than $500 for each offense. Each day during which such violation exists is a separate offense.

SECTION 9: AMENDMENTS

9.1 The MHFD Board of Directors may from time to time alter, supplement, or change the Floodplain, Floodway, and Flood Fringe boundaries and the provisions contained in this Regulation in the manner provided by law.

9.1.1 Amendments to this Regulation may be made on petition of any interested party in accordance with the provisions of the Colorado Revised Statutes.

9.1.2 The subdivisions of the Floodplain into the Floodway and Flood Fringe will be made only by action of the MHFD Board of Directors.

SECTION 10: DEFINITIONS

Unless specifically defined below, words or phrases used in this Regulation shall be interpreted so as to give them the same meaning as they have at common law and to give this Regulation its most reasonable application.

10.1 Channel: That area of a watercourse where water normally flows and not that area beyond where vegetation exists.

10.2 Critical Facility: A structure or related infrastructure, but not the land on which it is situated, that if flooded may result in significant hazards to public health and safety or interrupt essential services and operations for the community at any time before, during, or after a flood. Typical critical facilities include hospitals, fire stations, police stations, storage of critical records, similar facilities, and all other facilities and uses identified in *Rule 6* of the Colorado Water Conservation Board's *Rules and Regulations for Regulatory Floodplains in Colorado*. These facilities should be given special consideration when formulating regulatory alternatives and floodplain management plans. A critical facility should not be located in a Floodplain if at all possible.

10.3 Energy Grade Line: The line representing the elevation of the potential energy for water flowing in a conduit or channel that is indicative of a change in how fast water is moving under given conditions.

10.4 Flood: A general and temporary condition of partial or complete inundation of normally dry land areas from (a) the overflow of streams, rivers, or other inland water, or (b) the unusual and rapid accumulation or runoff of surface waters from any source.

10.5 Flood Evacuation Plan: A document describing the procedures for evacuating an area inundated by a flood. Such document shall include, at a minimum:

(a) Conditions that will activate the plan;

(b) Chain of command during a flood event;

(c) Emergency functions and who will perform them;

(d) Specific evacuation procedures, including routes and exits; and

(e) Procedures to account for personnel, customers, and visitors.

10.6 Flood Fringe: The Fringe portion of the Floodplain in which flows are characteristically of shallow depths and low velocities.

10.7 Flood Profile: A graph or a longitudinal profile showing the relationship of the water surface elevation of a flood event to the location along a stream or river.

10.8 Flood Protection Elevation: An elevation one foot above the elevation of the one-percent annual chance flood under existing channel and Floodplain conditions. It is one foot above the elevation of the Floodplain, as shown on the floodplain maps in the office of the Floodplain Administrator, and at www.mhfd.org.

10.9 Flood-Resistant Material: Flood-resistant material includes any building product capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage. Prolonged contact means at least 72 hours. Significant damage is any damage requiring more than low-cost cosmetic repair (such as painting).

10.10 Floodplain: An area both including and adjacent to a watercourse, which area is subject to flooding as the result of the occurrence of the one-percent annual chance flood and which area is so adverse to past, current, or foreseeable construction or land use as to constitute a significant hazard to public health and safety or to property. The Floodplain may be further subdivided into the Floodway and the Flood Fringe.

The term includes, but is not limited to:

(a) Mainstream Floodplains;

(b) Debris-fan Floodplains; and

(c) Dry wash channels and dry wash Floodplains.

10.11 Floodplain Administrator: That individual appointed by the MHFD Board of Directors to administer the provisions of these Regulations. MHFD Resolution No. 5, series of 1979, designates the MHFD Executive Director as the Floodplain Administrator.

10.12 Floodplain Maps: Those maps that accurately indicate the boundaries of the Floodplain.

10.13 Floodproofing: A combination of structural provisions, changes, or adjustments to properties and structures subject to flooding primarily for the reduction or elimination of flood damages to properties, water and sanitary facilities, structures, and contents of buildings in a flood hazard area.

10.14 Floodway: That portion of the Floodplain required for the reasonable passage or conveyance of the one-percent annual chance flood which is characterized by hazardous and significant depths and velocities. The Floodway limits are based on the cumulative encroachment into the Floodplain resulting in a maximum water surface increase of one-half foot (unless the requirements of *Section 2.3, Floodplain Components* are met).

10.15 Individual Legal Notice: Public notice distributed by MHFD to all affected property owners by publication in a newspaper of general circulation within the boundaries of MHFD and by mailing an individual notice to each affected property owner.

10.16 Local Government: The town, city, county, or city and county having regulatory police power over the use of property covered by this Regulation.

10.17 Obstruction: Sandbars formed by the natural flow of a watercourse, temporary structures, planks, snags, and debris, in and along an existing channel, which cause a flood hazard.

10.18 Occupancy: The use or possession of a building by humans for purposes including, but not limited to, residential, office, hospital, or commercial.

10.19 One-Percent Annual Chance Flood: Also known as the one-percent annual exceedance probability flood and more colloquially as the 100-year flood, a flooding event of this magnitude has a one-percent chance of occurring in any given year, giving it an average return period (recurrence interval) of one hundred years, as determined from an analysis of floods on a particular watercourse and other watercourses in the same general region.

10.20 Public Nuisance: A public nuisance is defined as an act or omission that has the potential to affect the health, safety, welfare, and/or comfort of the general public.

10.21 Reach: A hydraulic engineering term to describe longitudinal segments of a stream or river.

10.22 Shallow Flooding Area: An area subject to inundation by the one-percent annual chance flood with average depths of less than three feet, and not typically related to the flood profile. These are areas where no clearly defined channel exists, where the path of flooding is indeterminate, but where conveyance may be evident.

10.23 Storage Capacity of a Floodplain: The volume of space above an area of floodplain land that can be occupied by flood water of a given stage at a given time, regardless of whether the water is moving. Storage capacity tends to reduce downstream flood peaks.

10.24 Structure: Anything constructed or erected, the use of which required a more or less permanent location on or in the ground. Includes, but is not limited to, walled and roofed buildings (including gas or liquid storage tanks), that are principally above ground, as well as a manufactured homes. The terms "structure" and "building" are interchangeable for the purposes of this Floodplain Regulation.

10.25 Structure, Permanent: A structure which is built of such materials and in such a way that it would commonly be expected to last and remain useful for a substantial period of time.

10.26 Structure, Temporary: A structure which is built of such materials and in such a way that it would commonly be expected to have a relatively short useful life, or is built for a purpose that would commonly be expected to be relatively short-term.

10.27 Substantial Improvement: Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds fifty (50) percent of the actual cash value of the structure either (a) before the improvement has started, or (b) if the structure has been damaged and is being restored, before the damage occurred. Substantial improvement is started when the first alteration of any structural part of the building commences and is cumulative over a ten (10) year period.

10.28 Watercourse: A channel, natural depression, slough, artificial channel, gulch, arroyo, stream, creek, pond, reservoir, or lake in which storm runoff and flood water flows either regularly or infrequently. This includes major drainageways for carrying urban storm runoff.

Historical Floodway Definitions in the Boulder County Land Use Code

The county's first fully-fledged floodplain regulations appear in 1969. The *Amendment to the Boulder County Zoning Resolution*, approved August 11, 1969, included the following floodway definition:

> 20.37 Floodway - that portion of the regulatory area required for the reasonable passage or conveyance of the 100-year flood. This is the area of significant depths and velocities and due consideration should be given to effects or fill, loss of cross sectional flow area, and resulting increased water surface elevations.

The next oldest edition of the Land Use Code found by staff is from 1996. At this time, the Floodway definition was located in Article 18 with other Land Use Code definitions.

> **18-161 FLOODWAY -**
>
> (A) Those portions of the Floodplain Overlay District required for the passage or conveyance of the base flood in which waters will flow at significant depths or with significant velocities. It includes the channel of a river or creek and any adjacent floodplain areas that must be kept free of development and other encroachments so the base flood can be conveyed without substantial increase in flood height.
>
> (B) Specifically, the floodway is defined according to the following criteria:
>
> (1) Those portions of the Floodplain Overlay District that must be kept free of development and other encroachments so the base flood is conveyed with no more than a one foot increase in the water surface elevations, and which areas have been identified as floodway by the Colorado Water Conservation Board within those reports (including technical addendum thereto) listed in Section 4-402 of this Code;
>
> (2) Where the floodway has not been so identified, it is those portions of the Floodplain Overlay District determined to be in the floodway by a detailed hydraulic analysis approved by the County Engineer as set forth in Paragraph 4-407(B)(7) of this Code;
>
> (3) Where the floodway has not been so identified or determined, it is those portions of the Floodplain Overlay District where floodwater from the base flood is 18 inches or greater in depth.
>
> (C) However, in no instance shall the floodway extend less than 25 feet from the banks of the river or
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> **BOULDER COUNTY LAND USE CODE**
>
> creek, unless such bank consists of an impervious natural rock wall or cliff which is higher than the flood elevation.

The Floodway definition was revised by Docket DC-02-09 (Resolution 2002-147), approved by the Board of County Commissioners on October 29, 2002.

18-161 Floodway

A. Those portions of the Floodplain Overlay District required for the passage or conveyance of the base flood in which waters will flow at significant depths or with significant velocities. It includes the channel of a river or creek and any adjacent floodplain areas that must be kept free of development and other encroachments so the base flood can be conveyed without substantial increase in flood height.

B. Specifically, the floodway is defined according to the following criteria:

1. Those areas defined by the effective Flood Insurance Rate Map with cross-hatching overlay of areas in Zone AE;
2. Those portions of the Floodplain Overlay District that must be kept free of development and other encroachments so the base flood is conveyed with no more than a one foot increase in the water surface elevations, and which areas have been identified as floodway by the Colorado Water Conservation Board within those reports (including technical addendum thereto) listed in Section 4-402 of this Code;
3. Where the floodway has not been so identified, it is those portions of the Floodplain Overlay District determined to be in the floodway by a detailed hydraulic analysis approved by the County Engineer as set forth in Section 4-407(B)(7) of this Code;
4. Where the floodway has not been so identified or determined, it is those portions of the Floodplain Overlay District where floodwater from the base flood is 18 inches or greater in depth.

C. However, in no instance shall the floodway extend less than 25 feet from the banks of the river or creek, unless such bank consists of an impervious natural rock wall or cliff which is higher than the flood elevation.

In 2010, the Colorado Water Conservation Board revised the state's floodplain regulations to require all new floodways to be mapped using a 0.5-foot rise criteria. Previously, the "designated height" was 1 foot. Docket DC-12-0005 (Resolution 2012-123) incorporated the state's new 0.5' rise into the county's regulations, effective November 13, 2012. This docket also identified the floodway as an area of high risk to human safety.

18-161 Floodway

A. Those portions of the Floodplain Overlay District required for the passage or conveyance of the base flood in which waters will flow at significant depths or with significant velocities. It includes the channel of a river or creek and any adjacent floodplain areas that must be kept free of development and other encroachments so the base flood can be conveyed without substantial increase in flood height.

B. The floodway is a high hazard zone within the floodplain where the combination of water depth and water velocity create unacceptably high risks to human safety.

1. The Colorado statewide standard for the designated height to be used for all newly studied reaches, on or after January 14, 2011, shall be one-half foot (six inches).

C. Specifically, the floodway is defined according to the following criteria:

1. Those areas defined by the effective Flood Insurance Rate Map with cross-hatching overlay of areas in Zone AE;
2. Those portions of the Floodplain Overlay District that must be kept free of development and other encroachments so the base flood is conveyed with no more than a one foot increase in the water surface elevations, and which areas have been identified as floodway by the Colorado Water Conservation Board within those reports (including technical addendum thereto) listed in Section 4-402 of this Code;
3. Where the floodway has not been so identified, it is those portions of the Floodplain Overlay District determined to be in the floodway by a detailed hydraulic analysis approved by the County Engineer as set forth in Section 4-407(B)(7) of this Code;
4. Where the floodway has not been so identified or determined, it is those portions of the Floodplain Overlay District where floodwater from the base flood is 18 inches or greater in depth.
5. However, in no instance shall the floodway extend less than 25 feet from the banks of the river or creek, unless such bank consists of an impervious natural rock wall or cliff which is higher than the flood elevation.

The Floodway definition was revised and moved to Article 4-414 vis Docket DC-15-0004 (Resolution 2016-111), effective October 17, 2016.

Floodway. The floodway depicts the most hazardous portion of the floodplain, where flood depths and velocities are greatest and damages resulting from flooding are the most catastrophic. As such, Boulder County's development restrictions in the floodway are stricter than those within the Flood Fringe. In Boulder County, Floodway means:

1. Those portions of the FO District required for the passage or conveyance of the base flood in which waters will flow at significant depths or with significant velocities, including the channel of a river or other watercourse and any adjacent floodplain areas that must be kept free of development and other encroachments to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.
   a. The Colorado statewide standard for the designated height to be used for all newly studied reaches is 0.5 foot.
   b. For existing Floodway delineations in previously studied reaches, the designated height is that in place at the time of the study. This information is on file with the County Engineer and available upon request. Letters of Map Revision to existing Floodway delineations may continue to use the floodway criteria in place at the time of the original delineation.
2. Areas identified as floodway by the Colorado Water Conservation Board or FEMA.
3. In the foothill canyons and in any drainage above 6,000 feet (NAVD88) in elevation, as a result of the expected high flow velocities, with reference to the best terrain data available as of the last FO District update, (a) the entirety of the 1%-annual-chance (100-year) flood hazard area, or (b) as reflected on an engineering study approved by the County Engineer and available upon request.
4. In Zone A or AE areas, where the proposed development does not involve buildings or structures, then in the absence of either a specific floodway designation by FEMA or an engineering study submitted by the applicant and approved in writing by the County Engineer, the Floodway is defined as the channel or flowpath of the river, stream, or other watercourse and areas of the floodplain where the product of flood depth (in feet) multiplied by flood velocity (in feet per second) is greater than four. This formula is derived from the 1987 Colorado State University flume study. Flow depth and velocity can be determined from a number of sources, including without limitation hydraulic modeling, water surface elevation information, terrain data, and flood risk products created specifically to display depth and/or velocity.
5. Where the proposed development involves buildings or structures in the FO District and the floodway has not been previously identified, the Floodway is those portions of the FO District determined to be floodway by an engineering study submitted by an applicant and approved by the County Engineer as further described in Section 4-404(E).

The last revision to the Floodway definition became effective June 1, 2017 (DC-17-0001, Resolution 2017-68). The definition found in Article 4-414 was shortened and certain other pieces of the 2016 definition (e.g. the surcharge criteria for plains vs. foothills areas) were moved to other parts of the code.

Floodway. Those portions of the FO District required for the passage or conveyance of the 1% annual-chance (100-year) flood in which waters will flow at significant depths or with significant velocities, including the channel of a river or other watercourse and any adjacent floodplain areas that must be kept free of development and other encroachments in order to protect the health and safety of the residents of and visitors to Boulder County, and to discharge the 100-year flood without cumulatively increasing the water surface elevation more than a designated height (also called 'surcharge' and described in Section 4-404.2(E)(3)).