

# Chapter 5

## Floodplain Management

### Contents

<b>1.0</b>	<b>Introduction .....</b>	<b>1</b>
<b>2.0</b>	<b>Floodplain Management and Regulation .....</b>	<b>1</b>
2.1	City Code.....	1
2.2	Floodplain Management .....	1
2.3	Level of Flood Protection .....	2
2.3.1	Standard Level of Protection .....	2
2.3.2	Higher Level of Protection .....	2
2.4	National Flood Insurance Program.....	2
2.5	Colorado Water Conservation Board.....	3
2.6	Floodplain Development Regulations .....	3
2.7	Unstudied or Unmapped Floodplains .....	3
<b>3.0</b>	<b>Sources of and Use of Existing Floodplain Information .....</b>	<b>4</b>
3.1	FEMA Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) .....	4
3.2	Major Drainageways with FEMA Mapping in Woodland Park .....	5
3.3	Woodland Park Drainage Master Plan and Stormwater Management Plan.....	6
3.4	Other Floodplain Information.....	6
3.5	Confirmation of Floodplain Data.....	6
<b>4.0</b>	<b>Construction in or Development Adjacent to Floodplains.....</b>	<b>6</b>
4.1	Floodway .....	6
4.2	Floodplain Fringe and Encroachments .....	7
4.3	Subdivision Platting and Floodplains .....	7
4.4	Freeboard Requirements .....	8
<b>5.0</b>	<b>FEMA Map Revisions and Amendments .....</b>	<b>8</b>
5.1	General .....	8
5.2	Conditional Letter of Map Revision (CLOMR) .....	9
5.3	Conditional Letter of Map Revision Based on Fill (CLOMR-F).....	9
5.4	Letter of Map Revision (LOMR).....	9
5.5	Letter of Map Revision Based on Fill (LOMR-F) .....	9
5.6	Conditional Letter of Map Amendment (CLOMA).....	9
5.7	Letter of Map Amendment (LOMA) .....	9
5.8	Physical Map Revision .....	9
<b>6.0</b>	<b>Floodplain Study Guidelines.....</b>	<b>10</b>
6.1	Requirement .....	10
6.2	Incorporation into Other Submittals .....	10
6.3	Floodplain Study Outline.....	10
6.4	Agency Review Requirements .....	11
6.5	Conceptual Review.....	11
<b>7.0</b>	<b>Floodproofing.....</b>	<b>11</b>

## Figures

Figure 5.1. Trout Creek Floodplain Near Northern City Limits .....	12
Figure 5.2. Trout Creek Floodplain Including Confluence with Loy Gulch.....	13
Figure 5.3. Loy Gulch Floodplain and Upper Trout Creek.....	14
Figure 5.4. Loy Gulch, Paint Pony Creek and Lovell Gulch Floodplains .....	15
Figure 5.5. Upper Trout Creek, Including Detailed (Zone AE) Mapping .....	16
Figure 5.6. Upper Trout Creek Approximate (Zone A) Floodplain Mapping .....	17
Figure 5.7. Upper Fountain Creek Floodplain Mapping .....	18
Figure 5.8. Upper Fountain Creek Floodplain Mapping (Continued) .....	19

## 1.0 Introduction

Nature has claimed a prescriptive easement for floods, via its floodplains, that cannot be denied without public and private cost (White 1945). Flooding can result in loss of life, increased threats to public health and safety, damage to public and private property, damage to public infrastructure and utilities, and economic impacts to residents. In contrast, natural floodplains provide many benefits, including natural attenuation of flood peaks, water quality enhancement, groundwater recharge, wildlife habitat and movement corridors, and opportunities for recreation.

Floodplains have been created and recreated over millennia and are the result of a complex interaction between hydrologic forces, vegetation, wildlife activity and geologic features. Changes to any of the factors that contribute to their natural function and dynamic adjustment to natural phenomenon may have far-reaching consequences and must be thoroughly evaluated.

As a matter of public health and safety, it is desirable to minimize risks associated with potential flooding. The most effective means of minimizing these risks is to preserve flood-prone areas and to avoid alterations to flood flows and floodplains.

This chapter describes policies, practices, and procedures for floodplain management. The requirements presented in this chapter apply to development within and adjacent to floodplains.

## 2.0 Floodplain Management and Regulation

### 2.1 City Code

Title 20 of the Woodland Park Code of Ordinances (City Code) addresses Flood Damage Prevention Regulations, including the statutory authority and the basis for the regulations, administrative procedures for Flood Hazard Development Permits, variance procedures and procedures/requirements for flood hazard reduction. The City Code provides the basis for floodplain and floodway regulation in Woodland Park, and this chapter provides information that can be used to develop plans that will be compliant with the City Code. To the extent that there are differences between the recommendations in this chapter and the requirements of Title 20, Title 20 requirements shall prevail.

### 2.2 Floodplain Management

Floodplain management is generally defined as a comprehensive program of preventative and corrective measures to reduce losses associated with flooding. Floodplain management measures may include, but are not limited to, land use regulations (including new development and construction policy), construction of flood control projects, floodproofing, floodplain preservation, acquisition of flood-prone properties, education, and implementation of early warning systems. These measures must be implemented in a consistent manner to be of value. Some of the objectives of floodplain management are to:

- Adopt effective floodplain regulations,
- Improve local land use practices, programs and regulations in flood-prone areas,
- Provide a balanced program of measures to reduce losses from flooding including floodplain and land use regulation, capital improvements, floodplain preservation, public education, flood insurance and others,

- Reduce reliance on local, state and federal disaster relief programs,
- Minimize water quality impacts, and
- Foster the creation or preservation of greenbelts, with associated wildlife and other ecological benefits.

## **2.3 Level of Flood Protection**

### **2.3.1 Standard Level of Protection**

The standard of practice, as defined by FEMA, requires implementation of floodplain management criteria within the “regulatory” 100-year (Base Flood) floodplain. The regulatory 100-year floodplain is the land area that will be inundated or flooded based on the stormwater runoff produced by the 100-year storm event as delineated on adopted FIRMs. The 100-year storm event is defined as the rainfall event that has a 1% probability of being equaled or exceeded in any given year. The flood flows used to determine floodplains shall be estimated using the methods defined in the Hydrology Chapter of this Manual, accepted published documents, and sources and methods otherwise approved by FEMA. Discharge flow rates in excess of the 100-year estimate can and will occur, but with lower probability. In those instances, the depth of flow and floodplain width will typically be greater than indicated on the floodplain maps.

It is important to note that flooding occurs outside of the regulatory floodplains both beyond their width and upstream where mapping has not been provided. These areas must also be managed to preserve adequate space for flooding and to protect property and public safety.

### **2.3.2 Higher Level of Protection**

In some cases, a higher level of protection should be provided for flooding events in excess of the 100-year event. A higher level of protection should be considered for facilities and access routes that are critical for the protection of public health, safety, and welfare, or where flooding in excess of the 100-year storm event flooding is likely to result in loss of life, significant damage to utilities and infrastructure, or result in hazardous materials being transported in flood waters. The event for which protection should be provided should be determined on a case-by-case basis and be appropriate to the consequences of incurring the potential hazards. The Colorado Water Conservation Board (CWCB) has suggested that the 500-year flood event could be appropriate for evaluating risk to “critical facilities.” Critical facilities are structures or related infrastructure 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 and after a flood.

## **2.4 National Flood Insurance Program**

The National Flood Insurance Program (NFIP) is a federal program enabling property owners to purchase insurance protection against losses from flooding. Participation in the NFIP is based on an agreement between local communities and the federal government, which states that if a community will implement and enforce measures to reduce future flood risks to new construction in Special Flood Hazard Areas (SFHAs) or “designated floodplains,” the federal government will make flood insurance available within the community. In the past, the national response to flooding disasters was generally limited to constructing flood control projects and providing disaster relief to flood victims after a flood occurred. This did not reduce losses or discourage unwise development in flood-prone areas. Additionally, the

public could not buy flood coverage from private insurance companies. Faced with mounting flood losses and escalating costs to the general taxpayers, Congress created the NFIP. The City of Woodland Park and Teller County participate in the NFIP and have agreed to adopt and enforce floodplain development regulations that meet or exceed the minimum outlined in 44 Code of Federal Regulations, Part 60. If the communities do not enforce the regulations that have been adopted, the community can be put on probation or suspended from the program. If suspended, the communities become “non-participating” and flood insurance policies cannot be written or renewed.

## **2.5 Colorado Water Conservation Board**

The CWCB is the State Coordinating Agency of the NFIP. The Flood Protection Program of the CWCB assists in the prevention of and recovery from flood disasters. The CWCB is responsible for technical review and approval of all reports and maps that are normally used by local governments for regulatory, floodplain administration, and insurance purposes. The CWCB review and approval process is officially known as floodplain designation. Designation and approval of the existing floodplain mapping enhance a community’s ability to regulate 100-year floodplains more effectively. State enabling law for local zoning and subdivision regulation requires that technical information used for regulation of flood-prone areas be designated and approved by the CWCB.

## **2.6 Floodplain Development Regulations**

The governing regulation for floodplains within the City of Woodland Park is contained within Title 20 of the City of Woodland Park Municipal Code (City Code). The relationship between floodplains and development activity is also discussed in several other articles of Title 17 of the City Code, which addresses subdivision of land including preliminary and final plat requirements, and Title 18, which addresses zoning. The detailed requirements defined in the applicable codes are not reproduced in this chapter. For modifications to the SFHA and other floodplains regulated by the City, a Flood Hazard Development Permit is required.

## **2.7 Unstudied or Unmapped Floodplains**

There are a number of small channels and streams within the City that do not have FEMA-designated SFHAs. Some of these are headwaters reaches where FEMA mapping has not been extended all the way upstream. Typically FEMA maps floodplains for drainageways around urbanized areas that have a tributary drainage area of one square mile or greater. The potential for loss of life and/or property along these streams exists, just as it does along those channels or streams where floodplain limits or SFHAs have been identified. In general, these unstudied or “non-regulatory” floodplains will be managed in a similar manner as floodplains within the SFHAs. Management of these floodplains includes the preservation of right-of-way and natural features, and the mitigation of safety hazards. However, the FEMA process for mapping and map revision procedures is not required.

A significant number of flood insurance claims result from areas outside of regulatory floodplains. By definition, flooding occurs whenever rainfall causes water to inundate the surface of the ground. While this occurs frequently without consequence, a failure to adequately accommodate these conditions can result in significant flood losses.

Floodplain limits and water surface elevations must be determined for these unstudied drainageways when development, including but not limited to, home construction, channel modification, grading and earthmoving, other construction activities, or storage is proposed. In general, where floodplain

information is unavailable, the applicant will be responsible for delineating the floodplain, based on fully-developed conditions in the watershed, consistent with the requirements outlined in this Manual.

### 3.0 Sources of and Use of Existing Floodplain Information

#### 3.1 FEMA Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS)

The purpose of FIRMs is to identify flood-prone areas, by approximate or more detailed methods, and to establish flood risk zones for insurance rate purposes within those flood-prone areas. FIRMs are generally based on watershed conditions at the time the engineering analyses and accompanying survey were completed. In addition, detailed contour mapping may not have been available or used in the preparation of the original FIRMs. It is notable that there are differences between FIRMs and observed flood paths and some drainageway alignments in Woodland Park, and FIRM maps may not accurately reflect actual floodplains. In some cases modifications to drainageways have occurred that are not yet reflected on FIRMs.

The information provided on the FIRMs and in the FIS is not based on consideration of changes that may have occurred since the study was completed or may occur due to future development in the watershed. Therefore, this information should not be solely relied upon as the actual limits of the 100-year floodplain or to identify areas prone to flooding. Further investigation of the assumptions, methodologies, and mapping that was used to produce the flood information on the FIRMs should be performed by a Professional Engineer registered in the State of Colorado. In some cases, the FIRMs are the only source of information available and can be used as an aid, but additional investigation and analyses may be required to define the actual floodplain limits on a particular parcel of land, especially when FIRMs are believed to be out-of-date and/or inaccurate.

FIRMs, however, are the official regulatory maps published by FEMA for flood insurance purposes and, therefore, must be used when determining limits of the SFHA, and for complying with the floodplain regulations, as discussed previously. Important characteristics of FIRMs include:

1. Detailed Studies. FIRMs contain SFHA designations that were developed through a detailed study or by approximate methods. For drainageways that have a detailed study, Base Flood Elevations (BFEs, corresponding to 100-year water surface elevations) are provided on the maps and information is available in the FIS regarding floodplain and floodway widths, drainage areas, and peak discharges at select locations. In most cases, the BFEs can be used in conjunction with detailed topographic information to produce a reasonable estimate of the floodplain limits on a particular parcel of land, as long as it can be verified that the topographic information and the BFEs are referenced to the same vertical datum.
2. Approximate Zones. SFHA designations that were developed by approximate methods (Zone A) are generally less accurate and BFEs are not provided. Typically, there is no published information regarding peak flow rates used to calculate the approximate limits. As a result, making floodplain determinations and correctly delineating the floodplain on a specific property is more difficult. When a project is adjacent to a Zone A floodplain, floodplain limits must be developed using topographic mapping and an acceptable level of hydrologic and hydraulic analysis or a registered Professional Engineer must certify that flooding is unlikely. Procedures for making floodplain estimations in Zone A areas are outlined in the FEMA publication *Managing Floodplain Development in Approximate Zone A Areas*; however, the applicant's engineer should consult with the governing jurisdiction prior to selection of methodology or level

of detail to confirm that they are reasonable and appropriate.

3. **Map Revisions.** FIRMs are often updated due to development or construction projects, changes in hydrology, the use of better topographic information, or other factors that affect the accuracy of the current SFHA limits. In most cases, the updates occur through a process called a Letter of Map Revision (LOMR). A LOMR provides revised floodplain information for a particular area, which supersedes the previous information and becomes the effective SFHA designation. However, the LOMR is a separate document, and the FIRMs typically are not re-published with the changes resulting from a revision. When reviewing FIRMs, it is important to determine whether any LOMRs have been completed for the area in question since these changes (LOMRs) may not yet be shown on the FIRM.
4. **Map Availability.** Current copies of the FIRMs and LOMR information are available for review in the office of the Floodplain Administrator. Maps can also be acquired through the FEMA Region 8 Office in Denver, or on-line at [www.fema.gov](http://www.fema.gov). Figures for floodplains along major drainageways in Woodland Park are included as Figures 5-1 through 5-8 at the end of this chapter. Users of the Manual *must* check for current FEMA mapping, recent CLOMRs/LOMRs affecting reaches of interest and any updated hydrologic information since the date of the FIS.

### 3.2 Major Drainageways with FEMA Mapping in Woodland Park

The City of Woodland Park has three major drainageways within its City limits. These drainageways include Trout Creek, which flows south to north, Fountain Creek which flows north to south, and Loy Gulch, a tributary of Trout Creek, which flows east to west.

Per the FIS, Trout Creek drains a total area of approximately 24 square miles to the downstream City boundary shown on the FIRM and is a part of the South Platte River Basin. Tributaries of Trout Creek include Lovell and Loy Gulches. The drainage area is comprised of land uses including public, commercial, residential, and forest. According to the FIS, peak flows for the 10-yr, 50-yr, 100-yr, and 500-yr events are approximately 230 cfs, 340 cfs, 380 cfs, and 500 cfs, respectively. Trout Creek has an average gradient of 0.02 ft/ft (2 percent) through the City.

Loy Gulch, a tributary of Trout Creek, drains a total area of approximately 6.6 square miles to the downstream City boundary shown on the FIRM, according to the FIS. The drainage area is comprised of land uses including commercial, residential, and forest. According to the FIS, peak flows for the 10-yr, 50-yr, 100-yr, and 500-yr events are approximately 90 cfs, 140 cfs, 160 cfs, and 200 cfs, respectively. Loy Gulch has an average gradient of 0.03 ft/ft (3 percent) through the City. Figures 5-1 through 5-6 provide effective FEMA floodplain mapping for Trout Creek and Loy Gulch as of the date of this Manual.

Fountain Creek drains a total area of approximately 5.5 square miles to the downstream City boundary shown on the FIRM, according to the FIS. Fountain Creek, located within the Arkansas River Basin, is subject to more intense rainfall than Trout Creek, in the South Platte River Basin. The drainage area is comprised of land uses including agricultural, public, commercial, residential, and forest. According to the FIS, peak flows for the 10-yr, 50-yr, 100-yr, and 500-yr events are approximately 80 cfs, 120 cfs, 130 cfs, and 180 cfs, respectively. Fountain Creek has an average gradient of 0.03 ft/ft (3 percent) through the City. Figures 5-7 and 5-8 provide effective FEMA floodplain mapping for Fountain Creek as of the date of this Manual.

### **3.3 Woodland Park Drainage Master Plan and Stormwater Management Plan**

The City of Woodland Park worked with consultants to create the City of Woodland Park Drainage Master Plan and Stormwater Management Plan in 1996. These plans, which will periodically be updated by the City, define drainage and stormwater management planning for many portions of the City and should be referenced and consulted for proposed construction activities with potential to affect floodplains, drainage and/or stormwater quality management. The City is currently in the process of creating an updated city-wide drainage and stormwater master plan, and Applicants should be sure they are using the most current planning documents.

### **3.4 Other Floodplain Information**

Floodplain data may be obtained from other sources, including the Colorado Water Conservation Board, special districts that have completed floodplain studies and mapping, other local government initiated studies, and studies that have been prepared by private property owners or developers. In some cases, the information may be used as a basis for floodplain delineation for permitting and land development purposes, but the accuracy of all such information must be verified and the use of the information approved by the City.

### **3.5 Confirmation of Floodplain Data**

Prior to using any published floodplain information for design or planning purposes, the source of the data, accuracy, modeling methodology, assumptions, and other considerations must be investigated. Many factors can change floodplain limits; therefore, floodplain data is periodically updated to reflect changes due to floodplain modifications or the use of better technical data. The applicant is solely responsible for acquiring or developing accurate floodplain information for design and planning purposes.

## **4.0 Construction in or Development Adjacent to Floodplains**

The following sections identify the two areas within the SFHA floodplains with BFEs that are defined for regulatory purposes and discuss additional issues related to development adjacent to floodplains.

### **4.1 Floodway**

The floodway is defined as the stream channel and that portion of the floodplain that must be preserved in order to discharge the base flood without cumulatively increasing the water surface more than a designated height. The floodway is based on a maximum increase in the flood elevation of 1.0 foot. The floodway limits are typically generated through hydraulic modeling by assuming an equal loss of conveyance on both sides of the floodplain. The floodway can't be identified by visual inspection on a specific site or stream reach. The floodway is defined for regulatory purposes, and development in or use of the floodway is severely restricted. In most cases, projects that encroach upon the floodway require a "no rise" certification for existing structures, and conveyance improvements are needed to balance fill activities so that no rises in 100-year BFEs adversely affect insurable structures.

It is notable that 1.0-foot rise floodways are being replaced by 0.5-foot-rise floodways as large map revision projects occur (typically Physical Map Revisions [PMRs] and not CLOMRs/LOMRs for specific reaches). Applicants should consult with the City Engineer and CWCB to determine applicable floodway rise criteria.

## 4.2 Floodplain Fringe and Encroachments

The floodplain fringe is the portion of the 100-year floodplain that is not within the floodway. Although development and other forms of encroachment may be considered in the floodplain fringe, developers do not have an inherent right to fill in the floodplain fringe.

Encroachments into the floodplain fringe reduce beneficial floodplain storage areas, and the cumulative effect of such encroachments can have significant impacts on downstream properties. Encroachment evaluations are only based on flood depth and do not consider impacts to channel stability as a result of increased channel velocity. Reduction of floodplain storage areas can increase peak flow rates and associated BFEs downstream, even though theoretically there may be limited impact at the site where the encroachment occurs. For this reason, encroachment into the floodplain fringe is contrary to the objective of minimizing damage to life and property and to the objective of maintaining floodplains as open space. Therefore, encroachments into the floodplain fringe are discouraged and will be considered on a case-by-case basis. When considering requests involving floodplain fringe encroachment, at a minimum, the following shall be considered:

- Impacts to adjacent properties. If the encroachment creates a rise in the BFE on properties other than that of the applicant, the applicant will be required to obtain floodplain easements for the additional floodplain property. FEMA typically will not allow any encroachment that causes a rise on an existing habitable structure.
- Channel hydraulics and design. If the encroachment creates a significantly narrow channel, with steep side slopes and undesirable velocities, mitigating channel improvements may be required, or the floodplain encroachment may not be supported.
- Channel stability, aesthetics and land use. If the fringe encroachment significantly impacts the functions, stability or aesthetics of the natural drainageway, and the resulting channel improvements create a drainageway that is not deemed compatible with the surrounding land uses, the floodplain fringe encroachment may not be supported.
- Threatened and Endangered Species. FEMA requires that the U.S. Fish and Wildlife Service (USFWS) sign-off for threatened and endangered species for CLOMRs. If there is no effect, the USFWS provides a letter of concurrence of “no taking.” If habitat for threatened and endangered species is affected, a CLOMR review may not begin until a permit is issued by the USFWS, which can delay the CLOMR and project schedule.

## 4.3 Subdivision Platting and Floodplains

Platted lots should be located outside of the 100-year floodplain limits. Subdivision layout should also consider these factors: the size of the tributary watershed and higher degrees of protection where 500-year floodplains have been identified; the stability of the drainageway and anticipated improvements in the floodplain; access and trail requirements adjacent to the floodplain; the proximity of steep or vertical banks relative to the location of lot lines; the potential for the channel to migrate horizontally over time; the topography of the proposed lots; and the differences in elevation between the flooding elevation and potential structure locations. Lot lines should not be placed within or immediately adjacent to the floodplain limits without consideration of these factors.

Additional considerations include:

1. **Actual Floodplain Limits.** The floodplain limits used for subdivision layout must be based on existing or proposed floodplain information that has been verified for accuracy, or floodplain limits must be developed through detailed hydrologic and hydraulic analyses, based on fully-developed conditions in the upstream watershed.
2. **FEMA SFHAs.** In addition to the physical floodplain limits, FEMA-designated SFHA boundaries must be considered in subdivision layout, where applicable. When the SFHA boundary accurately represents the proposed floodplain limits, lots should be platted so that they are outside of the SFHA. There are cases, however, where the SFHA is much wider than the actual or proposed floodplain. This situation frequently arises in locations where the SFHA was delineated using approximate methods or where improvements are proposed to confine the floodplain. In this case, platted lots should be outside of the SFHA and the actual floodplain, whichever is more restrictive. In some cases and only with the approval of the City Engineer, portions of platted lots that will not contain habitable structures (or significant obstructions to flow) may be within the SFHA. This would most typically be the case when detailed analysis shows a narrower floodplain and/or floodway than approximate or older FEMA mapping. Although outside of the actual floodplain, if lots are partially or totally within the SFHA, owners can be burdened with mandatory flood insurance purchase requirements.

#### **4.4 Freeboard Requirements**

A minimum vertical clearance, or freeboard, shall be provided between the 100-year BFE and structures and other applicable facilities which may be impacted by the floodplain. Freeboard is required to allow for uncertainty in the floodplain modeling, changes to the drainageway (i.e., increased invert due to sedimentation or increased vegetation), and to provide an additional factor of safety for structures and facilities which would result in damages or hazards during inundation. A minimum of 1 foot of freeboard shall be provided between the 100-year BFE and the lowest finished floor elevation of all structures (this includes basements). The required freeboard should be contained within the floodplain tract and/or easement. For development/fill in an Approximate Flood Zone (Zone A), a minimum of 1.5 foot of freeboard shall be provided for structures unless detailed analysis is submitted and approved. For Critical Facilities, greater freeboard is recommended and may be required as a part of recent CWCB regulations that will be integrated into the City Code.

### **5.0 FEMA Map Revisions and Amendments**

#### **5.1 General**

FEMA FIRMs are the official regulatory maps that must be used for implementation and enforcement of the floodplain development regulations, which are generally discussed in this chapter. Additionally, the maps show projected flooding elevations, flood velocities, floodway dimensions, and flood risk zones used for insurance purposes. Maps must be updated to correct non-flood-related features, include analyses based on better ground elevation data, reflect changes in ground elevations within the floodplain, provide revised flooding data, and reflect flood control projects or other construction in the floodplain. Detailed information, revision request forms, technical requirements for map revisions or amendments, and construction requirements are included in the NFIP Regulations in 44 Code of Federal Regulations or are available through FEMA. The following sections provide brief descriptions of the various types of map revisions or amendments and how the requirements impact proposed projects.

## **5.2 Conditional Letter of Map Revision (CLOMR)**

A CLOMR is prepared to allow FEMA to comment on a proposed project or the use of better data that would affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, BFEs, or SFHA limits. A CLOMR is required by FEMA, prior to construction, for projects or construction in the floodway that will result in an increase in the BFEs. At the discretion of the Floodplain Administrator, a CLOMR may also be required for other projects when it is important to ensure that the SFHA will be revised based on a proposed project or the use of better data.

## **5.3 Conditional Letter of Map Revision Based on Fill (CLOMR-F)**

A CLOMR-F is prepared to allow FEMA to comment on whether a proposed project involving the placement of fill outside of the regulatory floodway would exclude an area from the SFHA based on elevation. A detailed technical review generally is not required for a CLOMR-F application, as it primarily involves comparison of finished floor and lowest adjacent grades with . A CLOMR-F may also be required for a project when it is important to ensure that the SFHA will be revised based on a proposed project that involves fill in the floodplain fringe.

## **5.4 Letter of Map Revision (LOMR)**

A LOMR is an official revision, by letter, to an effective FIRM. A LOMR may change flood insurance risk zones, floodplain and/or floodway boundary delineations, planimetric features, and/or BFEs. The LOMR may be based on the use of better data or as-built conditions reflecting flood control or other construction projects. The LOMR must be completed and issued in order to revise the effective SFHA.

## **5.5 Letter of Map Revision Based on Fill (LOMR-F)**

A LOMR-F is a document issued by FEMA that officially removes a property and/or structure from the SFHA. A LOMR-F provides FEMA's determination concerning whether a structure or parcel has been elevated on fill above the BFE and excluded from the SFHA.

## **5.6 Conditional Letter of Map Amendment (CLOMA)**

A CLOMA is FEMA's comment on a proposed structure or group of structures that would, upon construction, be located on existing natural ground above the BFE. Generally, a CLOMA involves parcels, portions of parcels, or individual structures that were inadvertently included in the SFHA.

## **5.7 Letter of Map Amendment (LOMA)**

A LOMA is a document issued by FEMA that officially removes a property and/or structure from the SFHA. A LOMA establishes a property's or structure's location in relation to the SFHA.

## **5.8 Physical Map Revision (PMR)**

A PMR is an official republication of a map to change flood insurance zones, floodplain delineations, flood elevations, floodways, and planimetric features. A community can submit scientific and technical data to FEMA to support the request for a map revision. The data will be analyzed, and the map will be revised if warranted.

## 6.0 Floodplain Study Guidelines

### 6.1 Requirement

When a project will modify the SFHA or any other floodplain regulated by the City, a Flood Hazard Development Permit is required, which must be supported by a floodplain study. This section presents general guidelines for preparing a floodplain study. Activities or projects that may potentially affect floodplains are not limited to new development. Other activities include, but are not limited to, bridge or culvert construction, utility installation, channel stabilization projects, trail crossing construction, and proposed storage of equipment or materials.

### 6.2 Incorporation into Other Submittals

In some cases, the floodplain study will be an independent document; however, the floodplain study results are often incorporated into drainage reports for development projects or form the basis for CLOMR or LOMR submittals to FEMA.

### 6.3 Floodplain Study Outline

A floodplain study must be certified by a Professional Engineer registered in the State of Colorado. The study must address the following items through detailed analysis or through reference to the current drainage master plan:

1. A description of the site.
2. A description of the major drainage basin.
3. The identification of drainage master plan reports, Flood Hazard Area Delineation (FHAD) studies, or FISs with a discussion of the applicability of published information or data to the proposed activity or modification.
4. Hydrologic analysis, including a narrative on the source of peak flow rates used for design. The flow rates used should be those generated for each storm event included in previous studies under future or revised development conditions for the entire watershed, unless the floodplain modification study is for a CLOMR/LOMR application, in which case, the FIS discharges should be used.
5. Characteristics of the proposed channel including, but not limited to, slope, roughness, depth, velocity, Froude Number, centerline alignment and stationing, and cross-sections. Existing topographic mapping may be utilized if it has been field-verified to determine that it has not changed significantly since mapping. The profile and plan shall be given for existing conditions and for the proposed channel alignment, including the cross-section locations.
6. A description of the method of hydrologic and/or hydraulic analysis (such as HEC-HMS or HEC-RAS) and its application in the study.
7. Identification and discussion of all input parameters and basis for input parameters.
8. Discussion of the results and conclusions of the hydraulic analysis. This shall include a narrative summary of the results, printed comprehensive output file free of modeling errors, and an electronic file of the modeling effort for review.

9. The delineation of the existing and proposed floodplains and water surface profiles for both conditions, including cross-section locations.
10. A description of potential impacts to other properties in the vicinity of the modification or activity and to downstream properties adjacent to the floodplain.
11. A description of measures proposed to mitigate potential impacts.
12. A conceptual design for the channel including bank protection, drop structures, culverts, bridges, and hardened trickle channel or low-flow channel.
13. A channel stability analysis if there is a change to the hydraulic characteristics of the drainageway or the stability of the bed and banks or if there is a change to the soils. This may include an analysis of sediment transport and fluvial morphology.

#### **6.4 Agency Review Requirements**

Requests to modify the floodplain must be reviewed by multiple agencies, depending on the existing mapping of the flood hazard area and the extent of the modifications proposed, but in general conformance with the following:

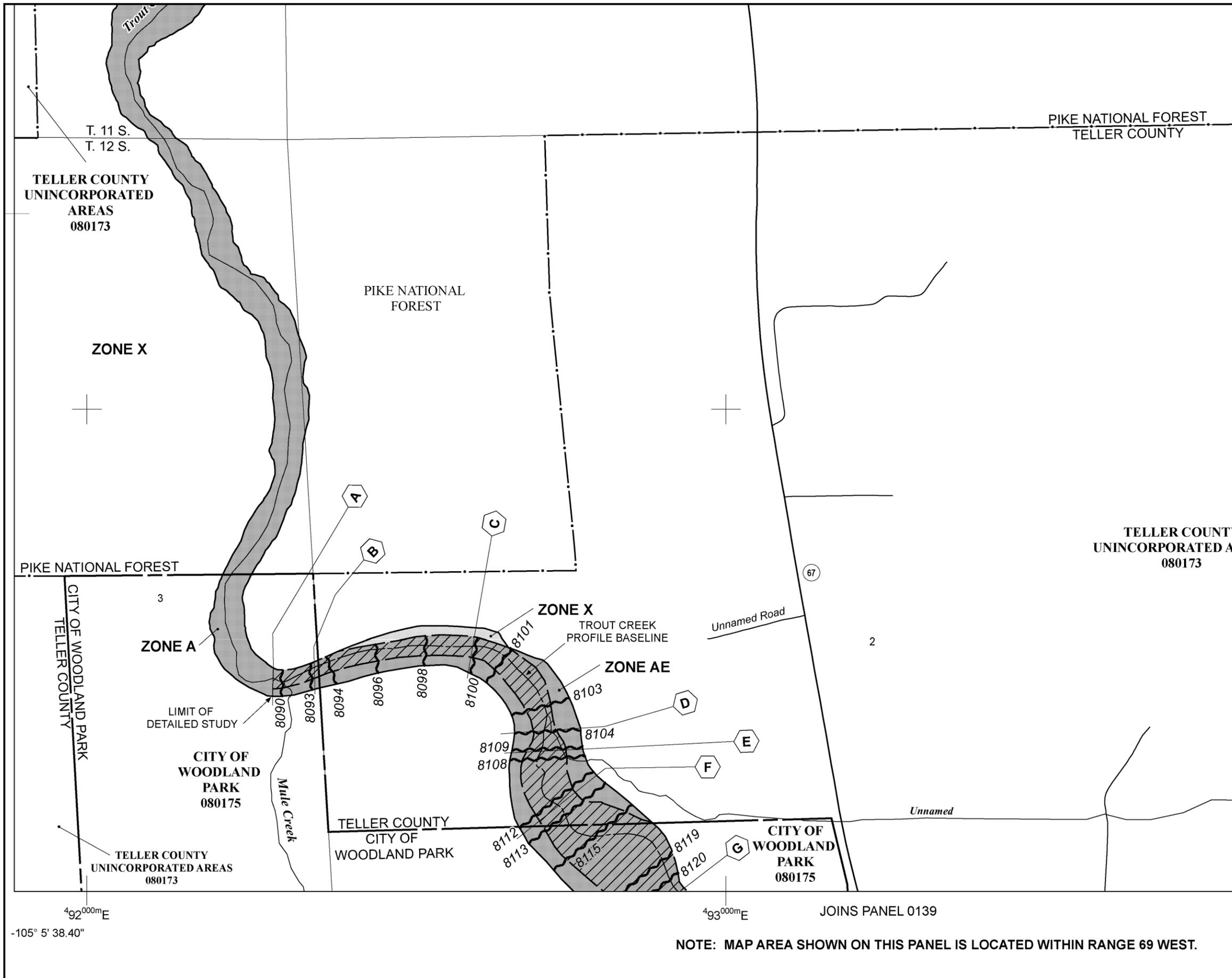
1. City of Woodland Park. Issues related to floodplain management should be coordinated with any land use applications to the Planning Department and the Woodland Park City Engineer.
2. CWCB. The CWCB is the State Coordinating Agency of the NFIP and is responsible for technical review and approval of all reports and maps that are normally used by local governments for regulatory, floodplain administration, and insurance purposes.
3. FEMA. FEMA administers the NFIP. FEMA publishes Flood Hazard Boundary Maps and FIRMs that show floodplain boundaries for major drainageways. FEMA reviews applications to modify these FEMA designated floodplains. Floodplain modifications that impact a FEMA-designated floodplain must be submitted to FEMA for review and approval via a CLOMR/LOMR process.

#### **6.5 Conceptual Review**

Floodplain modifications must be permitted and approved by the agencies listed previously, depending on the proposed modification and site location. All projects or proposed modifications should be discussed with these agencies, in concept, prior to commencement of efforts required to produce the floodplain study.

### **7.0 Floodproofing**

In areas where structures may be within an existing floodplain or where local flooding may be expected, floodproofing can provide protection against flooding or reduce flood damage. For more information on floodproofing, see the technical bulletins provided by FEMA as part of the NFIP and Volume 2 of the UDFCD Manual.



National Flood Insurance Program at 1-800-638-6620.

  
**MAP SCALE 1" = 500'**  
 0      500      1000  
 FEET

---

**NFIP**      **PANEL 0137D**

---

**NATIONAL FLOOD INSURANCE PROGRAM**

**FIRM**  
**FLOOD INSURANCE RATE MAP**  
**TELLER COUNTY, COLORADO**  
**AND INCORPORATED AREAS**

**PANEL 0137 OF 0415**  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
TELLER COUNTY	080173	0137	D
WOODLAND PARK, CITY OF	080175	0137	D

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

**MAP NUMBER**  
08119C0137D

**MAP REVISED**  
SEPTEMBER 25, 2009

Federal Emergency Management Agency

---

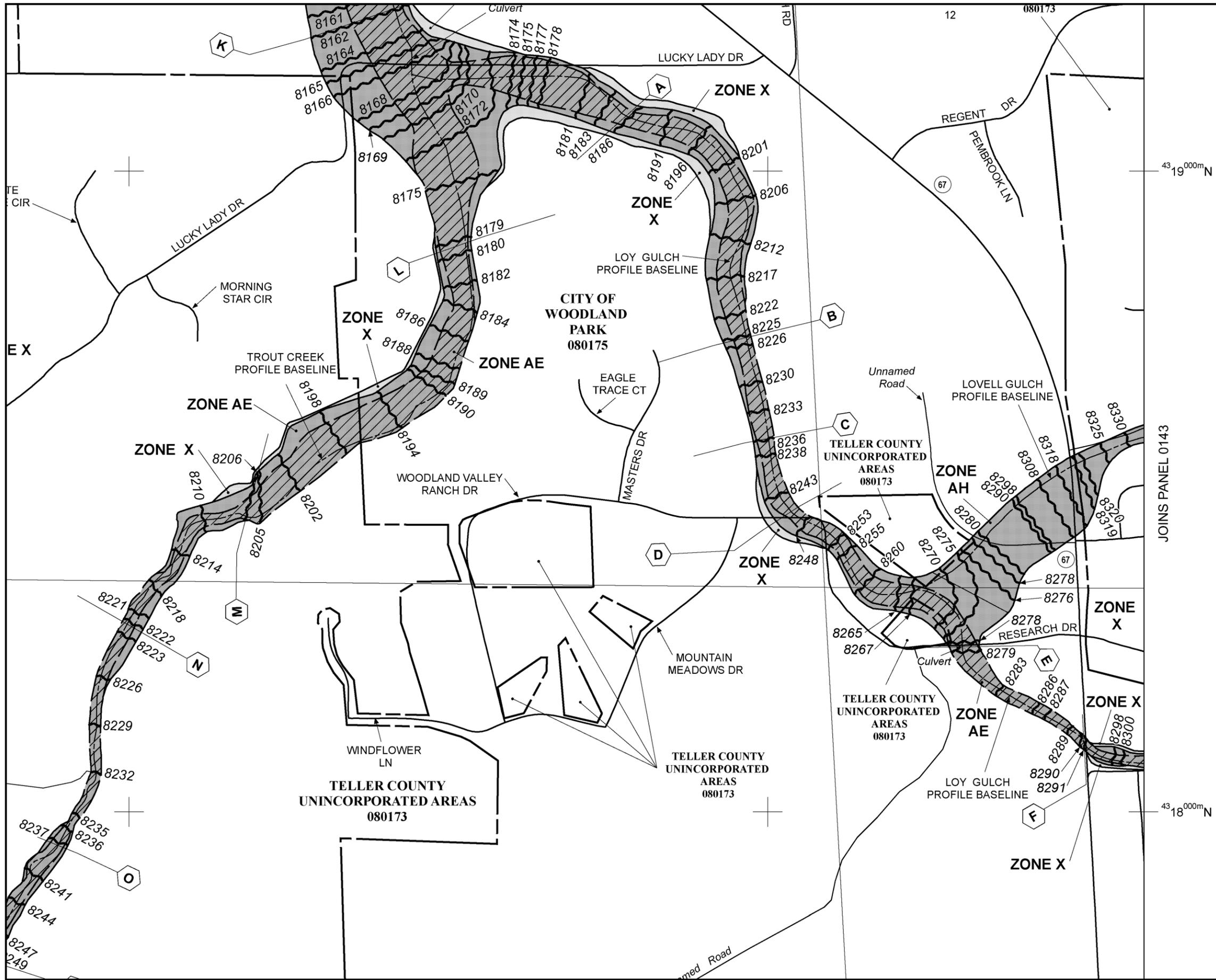


This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

**NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN RANGE 69 WEST.**

Figure 5.1 Trout Creek Floodplain Near Northern City Limits





National Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 500'

0 500 1000 FEET

**NFIP** PANEL 0139D

**FIRM**  
FLOOD INSURANCE RATE MAP  
TELLER COUNTY,  
COLORADO  
AND INCORPORATED AREAS

PANEL 0139 OF 0415  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
TELLER COUNTY	080173	0139	D
WOODLAND PARK, CITY OF	080175	0139	D

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



MAP NUMBER  
08119C0139D

MAP REVISED  
SEPTEMBER 25, 2009

Federal Emergency Management Agency

JOINS PANEL 0143

43,19,000m N

43,18,000m N

NATIONAL FLOOD INSURANCE PROGRAM

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

Figure 5.3 Loy Gulch Floodplain and Upper Trout Creek

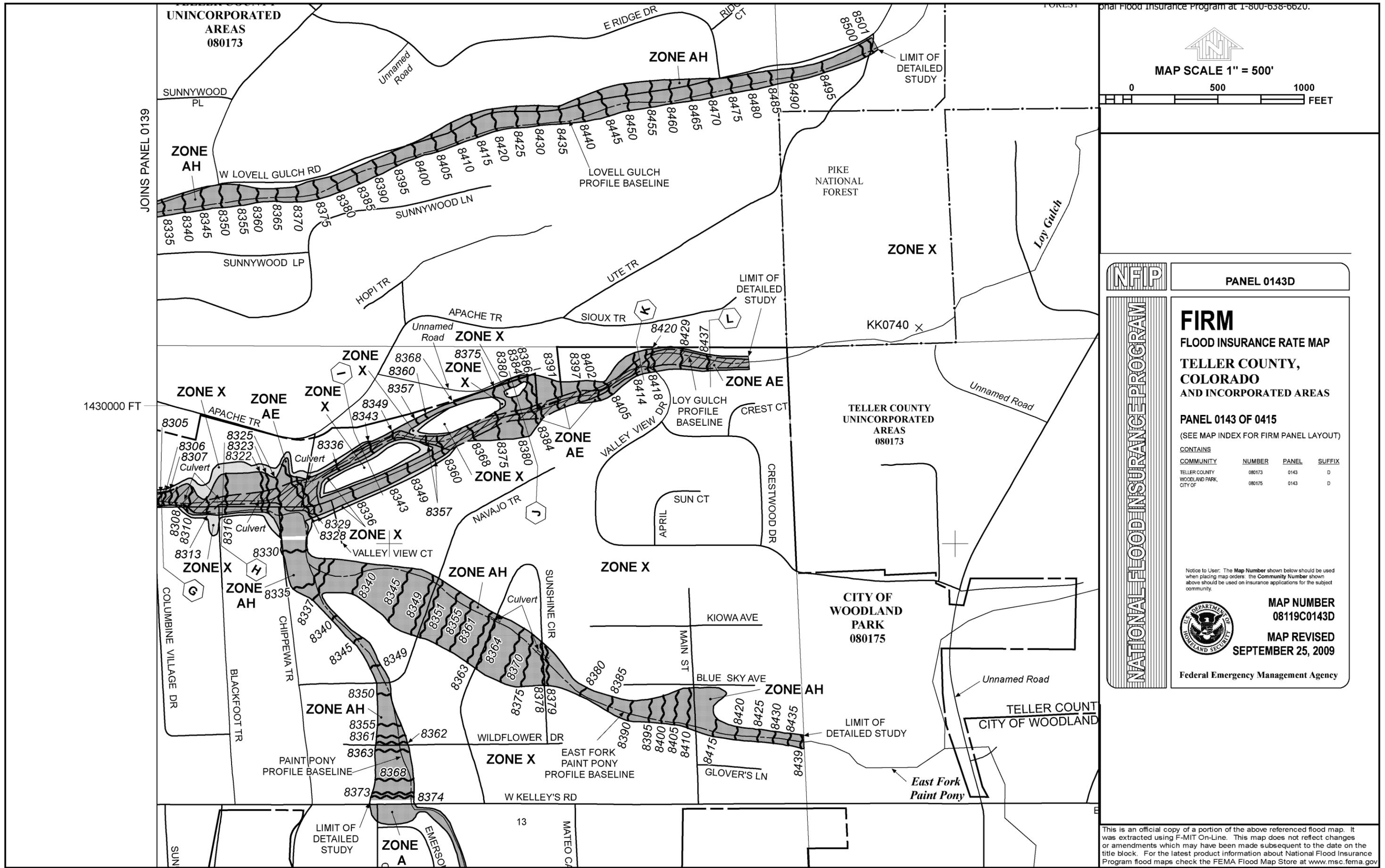
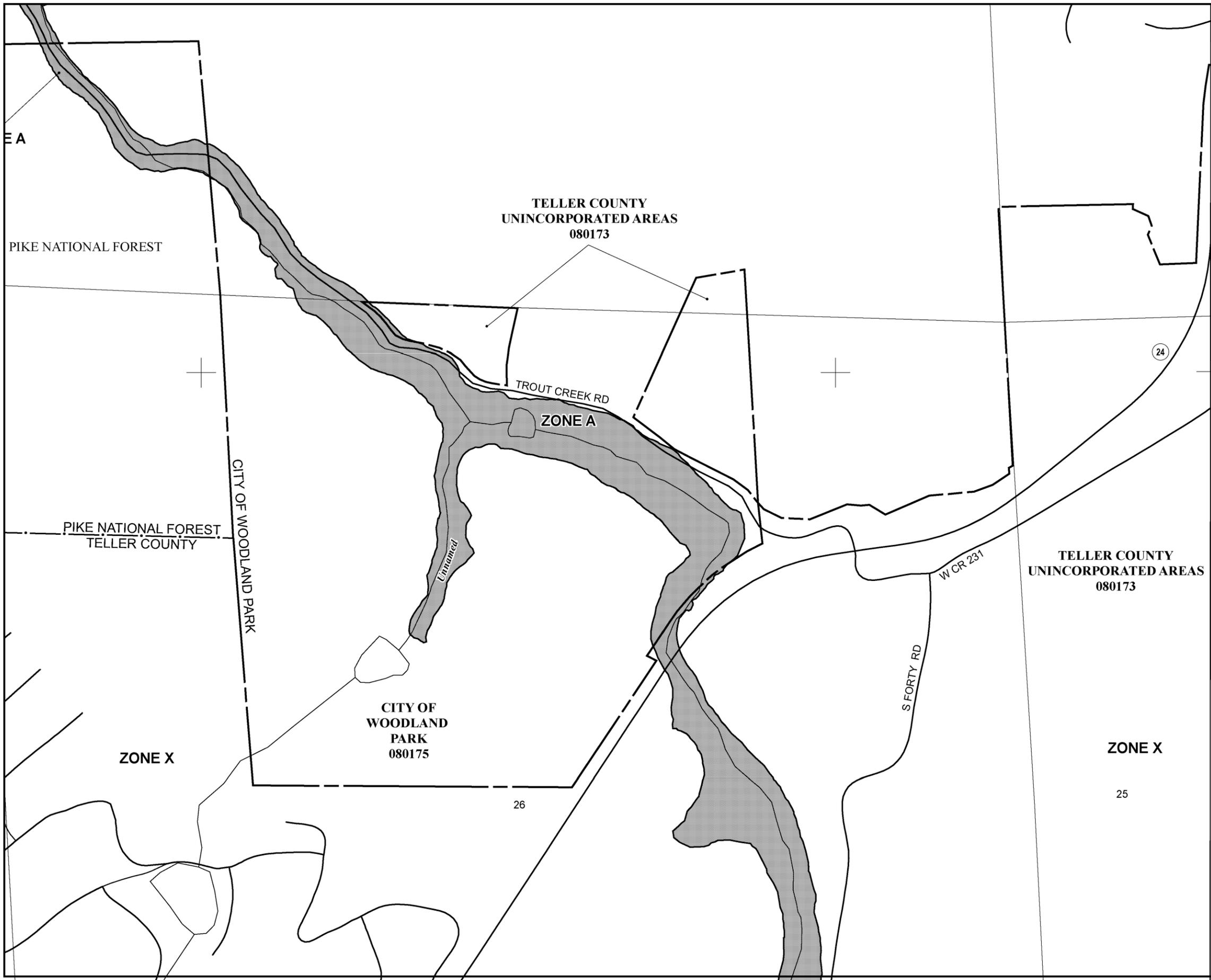


Figure 5.4 Loy Gulch, Paint Pony Creek and Lovell Gulch Floodplains







**MAP SCALE 1" = 500'**

0 500 1000  
FEET

---

NATIONAL FLOOD INSURANCE PROGRAM

**PANEL 0202D**

**FIRM**  
**FLOOD INSURANCE RATE MAP**  
**TELLER COUNTY,**  
**COLORADO**  
**AND INCORPORATED AREAS**

**PANEL 0202 OF 0415**  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
TELLER COUNTY	080173	0202	D
WOODLAND PARK, CITY OF	080175	0202	D

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



**MAP NUMBER**  
08119C0202D

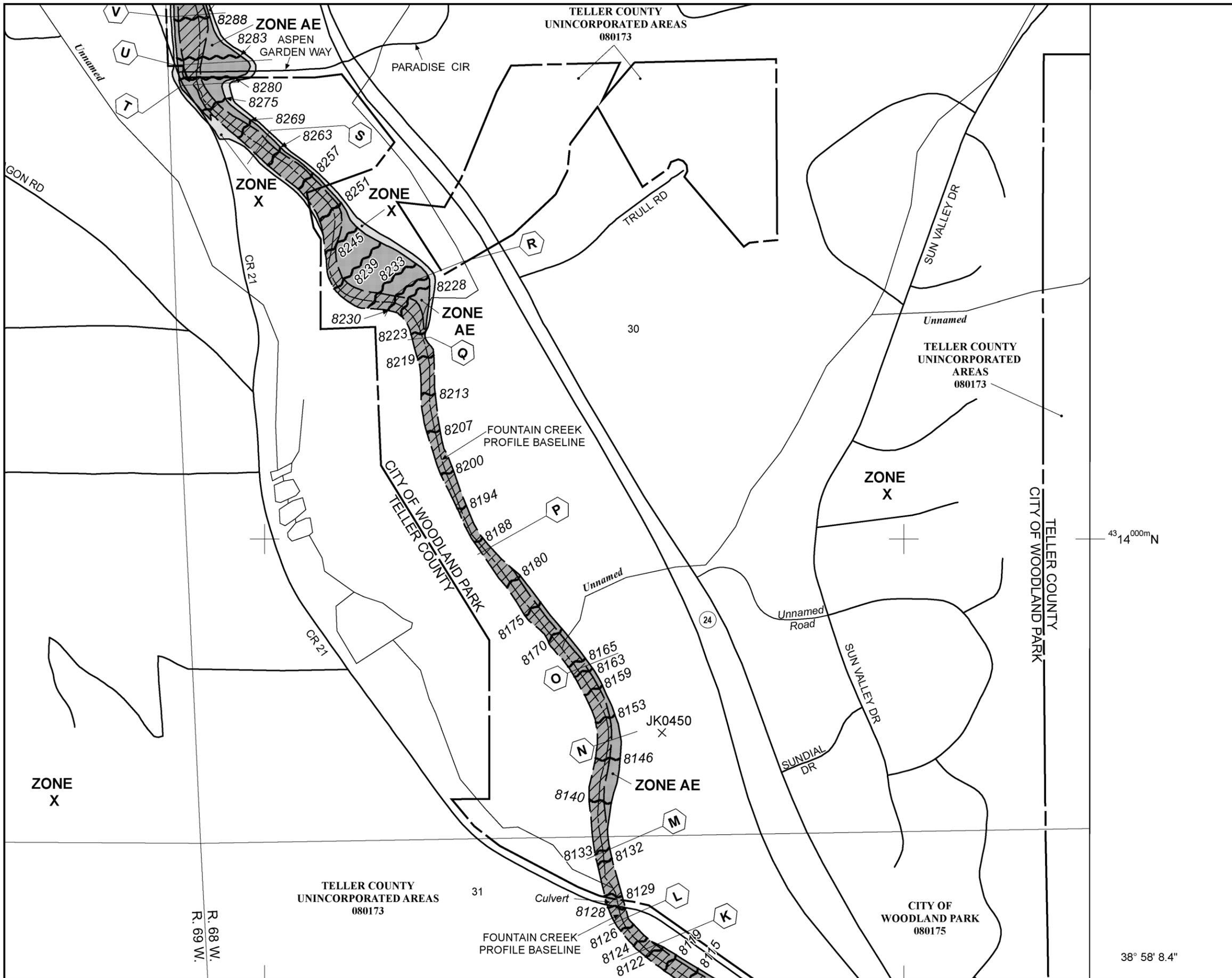
**MAP REVISED**  
SEPTEMBER 25, 2009

**Federal Emergency Management Agency**

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

Figure 5.6 Upper Trout Creek Approximate (Zone A) Floodplain Mapping





National Flood Insurance Program at 1-800-638-6620.

  
**MAP SCALE 1" = 500'**  
 0 500 1000  
 FEET

---

**NFIP** **PANEL 0206D**

**FIRM**  
**FLOOD INSURANCE RATE MAP**  
**TELLER COUNTY, COLORADO**  
**AND INCORPORATED AREAS**

**PANEL 0206 OF 0415**  
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
TELLER COUNTY	080173	0206	D
WOODLAND PARK, CITY OF	080175	0206	D

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

  
**MAP NUMBER**  
**08119C0206D**  
**MAP REVISED**  
**SEPTEMBER 25, 2009**  
 Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

Figure 5.8 Upper Fountain Creek Floodplain Mapping (Continued)