


MEMORANDUM

CITY/BOROUGH OF JUNEAU
155 South Seward Street, Juneau, Alaska 99801

DATE: May 18, 2011

TO: Planning Commission

FROM: Eric Feldt, Planner, CFM 
Community Development Department

FILE NO.: AME2010-0007

PROPOSAL: A map change of the Borough-wide flood maps and study.

ATTACHMENTS

Attachment	A	Adopted FIRM Panel
Attachment	B	Draft FIRM Panel
Attachment	C	Digital Draft FIRM

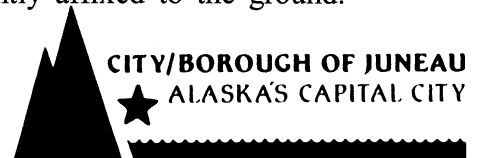
The purpose of this memorandum is to discuss updating the existing 1981 & 1990 Flood Insurance Rate Maps, 1990 Flood Insurance Study, and 1977 Flood Hazard Boundary & Floodway Maps, and to collect comments for further review.

The City and Borough of Juneau (CBJ) Code states in CBJ §49.10.170(d) that the Commission shall make recommendations to the Assembly on all proposed amendments to this title (Title 49), zonings and re-zonings, indicating compliance with the provisions of this title and the Comprehensive Plan.

BACKGROUND

In the early 1980's, the CBJ adopted a Flood Insurance Study (FIS), Flood Insurance Rate Maps, and specific flood regulations to be eligible to join the Nation Flood Insurance Program (NFIP) that has since allowed residents to receive federally-backed flood insurance. This specific type of insurance is not normally covered under home owners/ renters insurance.

As managed by the Federal Emergency Management Agency (FEMA), the NFIP provides flood insurance only to communities that adopt and maintain specific floodplain management procedures and regulations, and flood maps and studies. Flood insurance is provided to any property owner or renter, and only covers buildings that have at least two rigid walls and a roof, are above ground, and are permanently affixed to the ground.



Manufactured (mobile) homes qualify. Insurance premiums vary greatly depending on the flood zone, the elevation of the lowest floor of the building, and other elements. The flood management section ensures the adoption and maintenance of specific flood regulations, flood maps and flood studies such as the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS). These are both discussed below. With these maps and regulations in place, residents of Juneau have been able to receive flood insurance and are required to build in safe locations and use proper construction methods.

Flood Insurance Study & Flood Insurance Rate Map

The Flood Insurance Study (FIS) provides hydraulic and hydrologic flood data from significant coastal and riverine areas throughout the borough and establishes 100- and 500-year flood elevations. Using these elevations, flood hazard areas are then indicated on flood maps, called Flood Insurance Rate Maps (FIRMs). The FIRMs are magnified sections of the Borough called flood panels that show significant flooding sources. These are CBJ's official flood maps for flood determinations. An example of a FIRM is provided as attachment 'A'. Financial and insurance companies also use FIRMs for flood insurance ratings. Engineers, surveyors, and architects use FIRMs for construction purposes.

The first borough-wide FIRM map set was adopted in 1981; several individual FIRM panels were later updated in 1990 with an update to the FIS. These 1990 FIRM panels and the remaining 1981 FIRM panels are CBJ's most current flood maps. After +30 years, these maps have become outdated with newer weather and storm data, new streets, and land rebound from glacier and ice field melt.

Flood Regulations

As stated earlier, the CBJ adopted specific flood regulations to be eligible to participate in the NFIP to receive flood insurance. These regulations are associated with the FIRMs, as it relates to the mapped flood zones and flood elevations. These flood regulations establish a review process for flood determinations and development review, create a connection to the flood maps, and help ensure safe development. These regulations are adopted in Title 49: Article IV *Flood Hazard Areas*, and reflect NFIP-minimum flood protection standards. Predominately, flood regulations require buildings and appurtenant utilities to be elevated to or above the 100-year base flood level, and prudent siting of new subdivisions and buildings away from severe flooding areas. Though flood insurance can be provided to any property owner or renter in Juneau, it is required for those living in a mapped 100-year flood zone (as delineated on the FIRMs) and having a federally-backed mortgage. This requirement stems from the Flood Disaster Protection Act of 1973. For those who don't live in this specific flood zone or do not have a federally-backed mortgage, the purchase of flood insurance is not required.

1980's - 2010

Since the early 1980's, there have not been any recent borough-wide studies. Several geographic-specific studies have been completed, such as the Gastineau Channel in the vicinity of South Franklin Street, and Duck and Jordan Creeks in the Mendenhall Valley. In 1990, only Montana Creek and Mendenhall River systems were restudied, and resulted

in a new FIS dated 1990. This FIS, however, only addressed new flood data for these two riverine systems, and did not incorporate new data in other flood sources. Further, only the FIRM panels covering the Mendenhall Valley were updated. Therefore, little new data was provided in the 1990 FIS. This explains why the CBJ must use the 1981 & 1990 FIRM panels for flood determinations.

From 1980 to the present there have been minor flooding events in riverine areas such as Jordan Creek, Montana Creek, and Duck Creek that have affected buildings. These creeks annually swell during the spring months due to snow melt and rain. Unthawed ground during this season may often lead to flooding occurrences as well. During the fall months, when it rains the heaviest and most frequently, riverine water levels will rise the greatest.

Flooding in coastal areas exists during high wind events that create wave run-up matched with high tides. This is usually during the fall months. High tides often carry large, floating debris that can impact and damage structures that may be located high along the shoreline. The most recent documented 100-year storm event occurred on Thanksgiving Day in 1984 and resulted in considerable damage to downtown docks and structures.

Draft Flood Insurance Study

Staff received a new draft Flood Insurance Study (DFIS) in September of 2010. This document was prepared by the Northwest Hydraulic Consultants Inc. (NHC), as contracted through FEMA. Data from the DFIS was collected using past sources such as previous CBJ FIS reports, US Geological Survey (USGS) data, US Army Corps of Engineers (COE) data, CBJ Light Detection and Ranging (LiDAR) data, National Weather Service data, and other sources.

A more recent Coastal Flood Hazard Evaluation System was also used called the Pacific Coast Guidelines. This pilot study was created by NHC, who gathered data in local coastal areas in the CBJ. The Pacific Coast Guidelines is first of its kind for the Inside Passage. This study provides complex hydraulic and hydrologic data and statistics. In general, this study recommended methods for analyzing 100-year storm conditions along coastal areas, and mapping through simulating storm conditions for series of historical weather events. These events were then used for modeling 10-20 large water levels and wind events each year over 30 years. This is similar to the duration between the date of the 1980 FIS/ FIRM and today. Each of the 30 year's high hazard conditions were inserted into a value distribution using maximum likelihood moments (frequencies). The 100-year storm values were calculated from this distribution and were used to indicate flood levels in the DFIS.

FEMA later reviewed the Pacific Coast Guidelines for consistency with their review process and accepted it as reliable data for the DFIS.

Draft Flood Insurance Rate Map

Like the existing FIS, data from the DFIS was used to establish and map the 100-year flood levels on the Draft FIRM (DFIRM). A DFIRM panel is attached to this

memorandum (Attachment B). The full set of the DFIRM can be seen in the CBJ Community Development Department website, at the following link: <http://www.juneau.org/cddftp/FloodMaps.php> Subtle differences in the street layout and illustration exist between the DFRIM and adopted FIRM. Since the DFIRM panels are in a digital format, staff was able to overlay the DFIRM flood lines as a Geographic Information System (GIS) layer onto a 2006 aerial photograph to provide additional clarity for flood determinations. An example of this map is also attached to this memorandum (Attachment C).

Neighborhood Meeting

In December, 2010 staff held a neighborhood meeting at the Thunder Mountain High School to discuss the new DFIS and DFIRM. Representatives from FEMA and NHC Inc. attended to discuss complex elements of the DFIS, regulations, and impact to property owners' flood insurance. This was the first opportunity the public saw and commented on the DFIS and DFIRM.

Prior to final adoption of a new flood map, FEMA has provided the CBJ with a commenting period to appeal elevation data in the DFIS or DFIRM.

Appeal Period

A 90-day appeal period to contest elevation data started March 27th, 2011 and ends June 25th, 2011. Staff is currently accepting public comments. Anyone may submit comments during this period. Once this period closes, FEMA will consider changes and issue a Letter of Final Determination (LFD) indicating the final flood elevations. Staff expects to receive the LFD sometime in November 2011. These changes become the final document. The CBJ has up to six months after receiving the LFD to adopt the FIRM, FIS, and any associated regulations to keep in good standing with the National Flood Insurance Program.

COMPLIANCE WITH THE COMPREHENSIVE PLAN

The 2008 CBJ Comprehensive Plan contains a chapter on natural hazards and addresses minimizing flood damage to property and protecting the public's health and safety by having appropriate land use designations and development requirements in place. Further, the plan identifies unique flood hazards such as coastal storm surge and wave run-up, as well as snow melt affecting river and creek flood capacities. Floodways are specifically mentioned as unsafe areas for human life as these areas frequently become inundated, and should not be developed. Maintaining flood insurance eligibility under the National Flood Insurance Program through the adoption of flood regulations and maps is also identified in the plan.

The following policies from the Plan are stated below:

POLICY 7.18. IT IS THE POLICY OF THE CBJ TO PROHIBIT RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL DEVELOPMENT IN FLOODWAYS, TO REGULATE DEVELOPMENT IN FLOODPLAINS, AND

TO MAINTAIN A PROGRAM OF EDUCATION, ASSISTANCE, AND INFORMATION IN ORDER TO MAINTAIN ELIGIBILITY FOR THE NATIONAL FLOOD INSURANCE PROGRAM FOR THE BENEFIT OF LOCAL PROPERTY OWNERS AND THE LENDING INDUSTRY.

Standard Operating Procedure

7.18.SOP1 Use the floodway and floodplain boundary lines outlined on maps prepared by FEMA as the basis for defining flood boundaries.

Development Guideline

7.18.DG1 Apply the Flood Hazard Provisions of the Land Use Code to development proposals in the 100-year floodplain that increase flood danger, and prohibit commercial or industrial storage of toxic chemicals or materials in the 100-year floodplain.

Implementing Action

7.18.IA1 Designate, on the CBJ GIS [Geographic Information System] maps and Land Use Code Maps, areas within the 100- year floodplain but outside floodways as public open space/natural areas or stream corridor protection areas if the subject land is in public ownership.

The Plan states that development along stream corridors and lake shorelines can cause increased erosion and run-off, destruction to stream and river banks, and increased sedimentation and pollution. Changes to these critical natural environments can impact habitat and wildlife. Preventative action, such as carefully designed site development that is responsive to the conditions of the site, should be taken to diminish negative impacts to these ecosystems and surrounding land uses.

The following policy advocates protection to riparian habitat and lake shorelines:

POLICY 7.3. IT IS THE POLICY OF THE CBJ TO PROTECT RIPARIAN HABITAT, INCLUDING STREAM CORRIDORS AND LAKE SHORELINES, FROM ADVERSE EFFECTS OF DEVELOPMENT AND TO PROVIDE A HIGHER LEVEL OF PROTECTION FOR NON-URBAN SHORELINES IN PUBLIC OWNERSHIP.

Within the plan are Natural Resources and Hazards subarea maps. Flooding is identified in every map. This shows that significant flooding sources exist throughout the borough.

COMPLIANCE WITH CBJ LAND USE CODE

As stated earlier, the CBJ adopted the minimum FEMA flood regulations to receive federally-backed flood insurance, where it is not normally covered under home/ renters insurance. The Land Use Code, Title 49, contains the flood regulations under sections 49.70.400 Article IV Flood Hazard Areas and 49.70.910(f), (i), & (j). For reviewing purposes, staff recommends the latter two sections be placed under Article IV Flood Hazard Areas. Most of the flood regulations under this article can be found in the 2006 International Building Code (IRC).

Community Rating System

The CBJ may adopt additional NFIP flood protection elements to be awarded lower flood insurance rates community wide, since these additional measures would improve flood protection and minimize flood damages. These elements would be above and beyond the minimum required. Through the Community Rating System (CRS) program communities can gain points toward a rating system by adopting select criteria. This hierarchical rating system offers a specified discount on flood insurance according to the level achieved by amount of criteria accomplished, starting at 10 down to 1. A higher number indicates more expensive flood insurance premiums.

Here are some examples of CRS criteria the CBJ may choose to adopt:

- Requiring and maintaining Elevation Certificates for all new and substantially improved buildings in Special Flood Hazard Areas.
- Initiating public outreach projects
- Require the lowest floor of buildings to be built at +1 feet above the base flood elevation (Free Board)
- Maintain flood protection materials in public libraries
- Preserve open space in floodplains

Communities must have adopted NFIP-minimum flood regulations and flood maps/ insurance study to qualify for admittance in the CRS program. The CBJ currently accomplishes some of the CRS criteria, but is not in full compliance with the NFIP due to insufficient code compliance. This is discussed in the following paragraphs.

On the FIRM (and DFIRM) are areas labeled 'V' for velocity flood zones that indicate wave action of 3 feet or greater during the 100-year storm event. Wave forces during this event can cause severe damage to the shoreline and built environment. To protect and minimize structures built in this flood zone, the NFIP limits the use of columns or pillars as foundation elements that will allow waves to flow beneath the building and continue toward shore unimpeded. The Land Use Code contains this same requirement. Further, the NFIP strictly prohibits the use of fill material as a foundation element in velocity flood zones. This federal code requirement is shown below:

44 Code of Federal Regulations (CFR) Section 60.3 (e)(6):
Prohibit the use of fill for structural support of buildings within Zones V1-30, VE,
and V on the community's FIRM.

The CBJ Land Use Code, however, does not contain this prohibition. CBJ's currently adopted flood maps have areas classified as velocity flood zones that area clearly not at risk of being impacted by waves during a 100-year storm event. Therefore, fill material used as structural support is allowed in a velocity flood zone, if the fill is certified to withstand 100-year storm forces. This Land Use code requirement is stated below.

CBJ § 49.70.400 (f)(6):

The use of fill for structural support of buildings within Zones V1-30 may be allowed only when certified by an engineer or architect that the standards of this chapter are satisfied.

This provision is often utilized by developers where the mapped Velocity Zone may reach inland, far from the coastal shoreline upon level ground. In this situation, using fill material as structural support has been the preferred choice. Areas along the shoreline with steep topography, using a column or pillar type structural support has been used due to the increased cost of creating a level ground with significant amount of fill material.

Removing this regulation probably will cause increase construction costs in mapped velocity flood zones with level topography even though the building may withstand less flood damage. However, the CBJ can apply for the CRS program with the removal of that regulation. If the CBJ participates in the CRS program, flood insurance rates will be reduced for all policy holders in the Borough. When updating a new FIS and FIRM, a community must adopt or maintain NFIP-minimum flood regulations. Thus, CBJ § 49.70.400 (f)(6) will have to be removed with the adoption of the DFIS and DFIRM.

Staff has prepared a brief description of the changes between the existing FIRM panels and the Draft FIRMs panels in specific sub-regions of the Borough:

- **Gastineau Channel Areas:**
 - Downtown Juneau & Douglas: This area continues to be mapped as a velocity zone. A new small AE flood zone is mapped along 1st Street in Douglas. Base flood elevations increases by at least 2 feet in most shorelines from 23 to 25 feet.
 - North Douglas, Salmon Creek, and Lemon Creek: Most areas currently mapped as Velocity zones change to AE zones. Base flood elevations increase by + 1 foot, from 24 to 25 feet.
- **Airport:** Areas around runway continue to be in an AE zone. No change in base flood elevation- still at 23 and 24 feet in areas.
- **Auke Bay:** Entire area changes from an AE zone to a Velocity zone. Base flood elevations increase several feet from 22 to 27 feet.

- **Lena Point:** Flood zones and base flood elevations remain unchanged: Velocity zone with elevations of 25, 27, and 31 feet.
- **Tee Harbor:** Southern and Northern Harbors continue to be in a Velocity zone. Existing map indicates a 25 foot base flood elevation. Draft map does not provide a base flood elevation.
- **Mendenhall River:** This river continues to be mapped as an AE zone with defined floodways. The floodways appear to show little to no change. Base flood elevations change frequently. Comparing both maps, flood elevations slightly increase and decrease throughout the length of the river.
- **Lemon Creek Area:**
 - Lemon Creek: This creek continues to be mapped as an AE zone with defined floodways. Base flood elevations increase by several feet immediately upstream and downstream from Glacier Highway bridge. Further upstream flood elevations between the two maps show no to little change.
 - Switzer Creek: The draft map indicates a larger A zone without flood elevations upstream from Glacier Highway, as compared to the existing flood map. A floodway is not defined in either flood map.
- **Jordan Creek:** This creek continues to be mapped as an AE zone. No significant change to base flood elevations. A mapped floodway continues to be shown on both flood maps and appears to have little to no change.
- **Duck Creek:** This creek continues to be mapped in an AE flood zone. A new floodway is shown on the draft flood map. Base Flood elevations increases by approximately 1-2 feet in certain areas. The Nugget Mall area is shown in a new AE flood zone in the draft map. The area consisting of Aurora Drive, Cascade Street, Sheiye Way, Miner Court, etc. the base flood elevation shown in the draft flood map is several feet higher than the existing flood map.

49.70.900-49.70.1097 COASTAL DEVELOPMENT, HABITAT, AND WETLANDS

This section of the Land Use Code identifies specific sensitive environments such as coastal areas, wetlands, and natural hazards, i.e. flooding, avalanches, etc. and how they may impact, or be impacted by, new transportation routes, energy facilities and routes, fish and timber processing, and other developmental industries.

Flood prone areas are typically areas of high sensitive environments and ecosystems. Disturbing these areas can greatly impact flood control, erosion, marine habitat, flora and fauna survival, navigation, and other water features. Development in coastal and riverine areas is not only reviewed for flood compliance, but also compliance with CBJ habitat, wetland, and other sensitive environment regulations.

ALASKA COASTAL MANAGEMENT PROGRAM (ACMP)

The Alaska Coastal Management Program is currently under review and is not effective at this time.

Staff's Findings

The data used to create the draft flood maps and insurance study is more recent and covers a longer time span than the 1990 insurance study. The draft flood maps can be placed into a GIS system and overlaid onto aerial photographs, street grid, etc. This function can improve staff's flood zone determinations.

Staff will address the opportunities the CBJ can take to participate in the Community Rating System program in a future memorandum.

Steps to Final Adoption

As stated earlier, the 90-day appeal period to contest elevation data shown in the draft Flood Insurance Rate Maps and Flood Insurance Study is underway and expires June 25 2011. This memorandum serves to present the draft material for review and commenting. In November, FEMA will send a Letter of Final Determination to the CBJ indicating the final data in the FIRM and FIS. Upon receipt, staff will present the final documents to the Planning Commission for recommendation to the Assembly for adoption.

RECOMMENDATION

This memorandum serves to present the draft flood maps and insurance study to the Commission. Staff is seeking comments from the general public and the Commission on the draft data.

ELEVATION REFERENCE MARKS

Map of Juneau, Alaska, showing elevation reference marks. The table lists the following data:

MARK	ELEVATION
1001	1001
1002	1002
1003	1003
1004	1004
1005	1005
1006	1006
1007	1007
1008	1008
1009	1009
1010	1010
1011	1011
1012	1012
1013	1013
1014	1014
1015	1015
1016	1016
1017	1017
1018	1018
1019	1019
1020	1020
1021	1021
1022	1022
1023	1023
1024	1024
1025	1025
1026	1026
1027	1027



SEE PANEL 0878

KEY TO MAP

100 Year Flood Boundary
 500 Year Flood Boundary
 Zone Properties
 Zone 1
 Zone 2
 Zone 3
 Zone 4
 Zone 5
 Zone 6
 Zone 7
 Zone 8
 Zone 9
 Zone 10
 Zone 11
 Zone 12
 Zone 13
 Zone 14
 Zone 15
 Zone 16
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EXPLANATION OF ZONE DESIGNATIONS

Zone 1: Special Flood Hazard Area (SFHA) - 100 Year Flood Zone
 Zone 2: SFHA - 500 Year Flood Zone
 Zone 3: SFHA - 100 Year Flood Zone
 Zone 4: SFHA - 500 Year Flood Zone
 Zone 5: SFHA - 100 Year Flood Zone
 Zone 6: SFHA - 500 Year Flood Zone
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 Zone 95: SFHA - 100 Year Flood Zone
 Zone 96: SFHA - 500 Year Flood Zone
 Zone 97: SFHA - 100 Year Flood Zone
 Zone 98: SFHA - 500 Year Flood Zone
 Zone 99: SFHA - 100 Year Flood Zone
 Zone 100: SFHA - 500 Year Flood Zone

NOTES TO USER

This map is a representation of the flood insurance rate zones for the City and Borough of Juneau, Alaska. It is based on the best available data and is subject to change without notice. The map is intended for informational purposes only and should not be used as a basis for any legal or financial decision. For more information, please contact the Federal Emergency Management Agency (FEMA) or the National Flood Insurance Program (NFIP).

GENERAL NOTES:

1. This map is a representation of the flood insurance rate zones for the City and Borough of Juneau, Alaska. It is based on the best available data and is subject to change without notice. The map is intended for informational purposes only and should not be used as a basis for any legal or financial decision. For more information, please contact the Federal Emergency Management Agency (FEMA) or the National Flood Insurance Program (NFIP).

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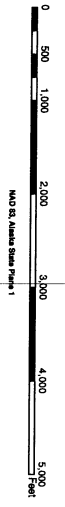
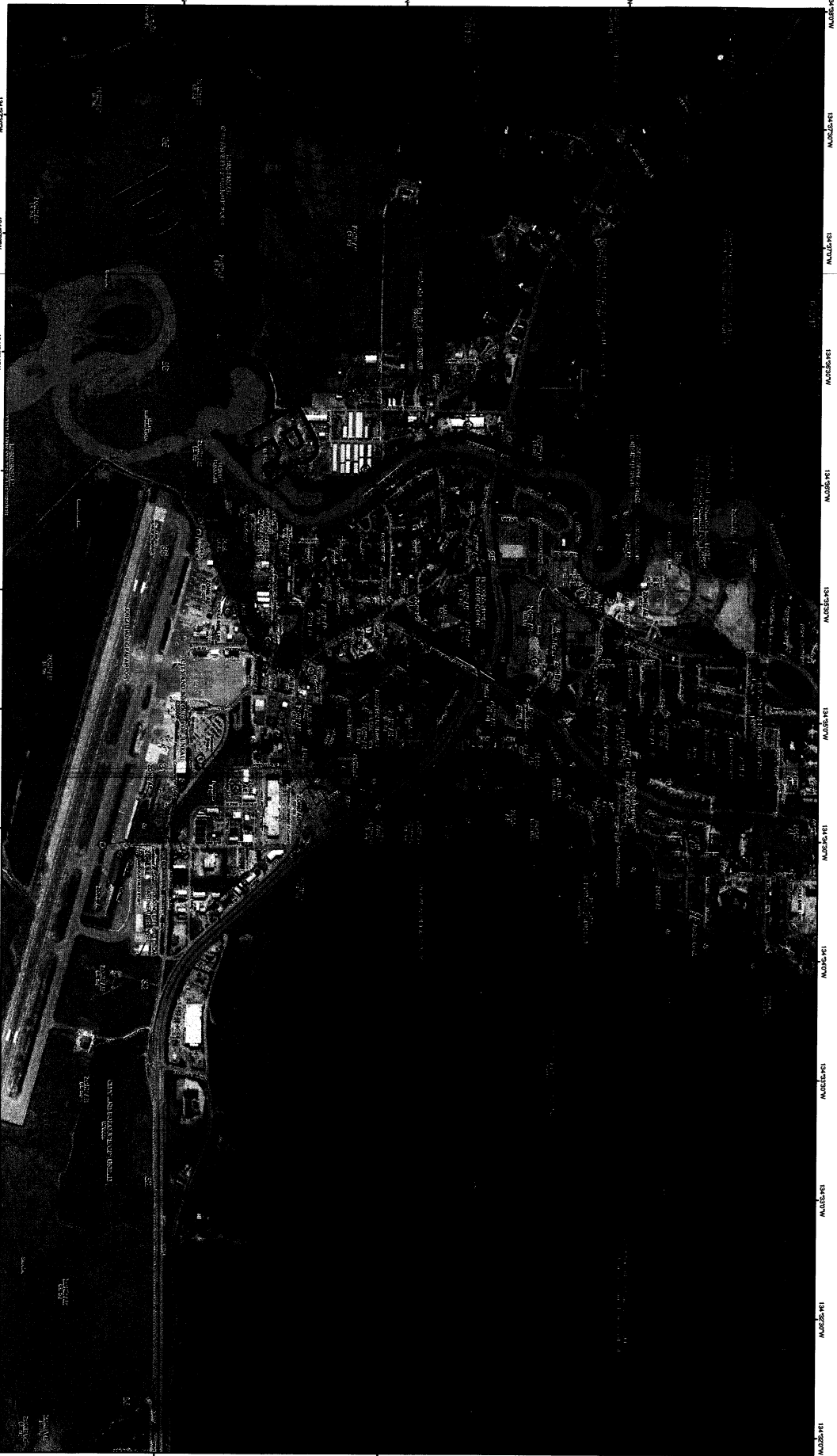
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FIRM
FLOOD INSURANCE RATE MAP
 CITY AND BOROUGH OF
 JUNEAU
 ALASKA

PANEL 0878 OF 1028

COMMUNITY PANEL NUMBERS
 02000 0800 C
 MAP REVISION:
 SEPTEMBER 28, 1990

Federal Emergency Management Agency



2010 FEMA Flood Insurance Rate Map

Map created by CEU using FEMA GIS flood polygon and annotation file
Aerial Photo taken June 2006