



Guidance for Flood Risk Analysis and Mapping

Base Map and Flood Insurance Rate Map Panel Layout

November 2023



FEMA

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Requirements for the FEMA Risk Mapping, Assessment, and Planning (Risk MAP) Program are specified separately by statute, regulation, or FEMA policy (primarily the Standards for Flood Risk Analysis and Mapping). This document provides guidance to support the requirements and recommends approaches for effective and efficient implementation. Alternate approaches that comply with all requirements are acceptable.

For more information, please visit the FEMA Guidelines and Standards for Flood Risk Analysis and Mapping webpage (<https://www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping>). Copies of the Standards for Flood Risk Analysis and Mapping policy, related guidance, technical references, and other information about the guidelines and standards development process are all available here. You can also search directly by document title at <https://www.fema.gov/resource-document-library>.

Table of Revisions

The following summary of changes details revisions to this document subsequent to its most recent version in November 2019.

Affected Section or Subsection	Date	Description
1	Nov. 2023	Added narrative to summarize AMP-specific considerations.
2 & 4	Nov. 2023	Removed states from list of jurisdictional boundaries since not labeled by AMP.
5	Nov. 2023	Clarified that S_Base_Index and orthoimagery are not required for the base map submittal since already sourced from USGS The National Map by AMP by default.
6.8.1	Nov. 2023	Updated Figure 12 to improve illustration of how to select the correct suffix for first-time countywide issuance.
6.8.2	Nov. 2023	Added clarification that submitted base map features should be countywide and not clipped to the PMR limits, as required by AMP for transportation, water and jurisdiction features to produce the FIRM index.
10	Nov. 2023	Added item to ensure proper capitalization based on feature type per FIRM Panel Technical Reference specifications since labels are derived directly from the database when using AMP.
All	Nov. 2023	Various minor style updates or phrasing adjustments for improved clarity.

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1. Introduction

This guidance supports the standards associated with the collection, development and quality control for base map data used, and the development of the Flood Insurance Rate Map (FIRM) panel layout for Flood Risk Projects.

To support greater automation within the Risk MAP Program, FEMA has developed a tool within the Mapping Information Platform (MIP) called Automated Map Production (AMP). AMP automates FIRM panel creation, replacing previous practices of manual cartography. The goal of AMP is to eliminate the need for manual edits or adjustments to labels on the FIRM panels and FIRM index.

Specific AMP-related considerations are noted in this document, as summarized below:

- All vector base map layers are still required. Orthoimagery is not required.
- Submitted FIRM panel layout should be countywide and not clipped to the PMR limits.
- Submitted base map features should be countywide and not clipped to the PMR limits.
- Proper capitalization should be used in accordance with the [FIRM Panel Technical Reference](#) since labels are derived directly from the database.

2. Definition

As it applies to Flood Risk Projects, a base map is defined as the planimetric, or horizontal representation, of map features that show geo-referenced locations, and contain attribute information (i.e., names) for the items. A base map does not include topographic or elevation data.

For a Flood Risk Project, the base map should include:

- Transportation features (road, railroad, etc.), including the feature names
- Hydrographic features (streams, lakes, etc.), including the feature names
- Hydraulic structures (levees, dams, floodwalls, etc.)
- Structures identified as levees
 - Those that do not meet the certification requirements in Section 65.10 of the National Flood Insurance Program Regulations should also be captured but accompanied on the FIRM with a note about not providing protection from the 1-percent-annual-chance flood. Please refer to the [FIRM Panel Technical Reference](#) for more information about FIRM panel notes.
- Jurisdictional boundaries (county and community), including the feature names

- Tribal boundaries, including the feature names
- Park, forest or federal area boundaries, including feature names, if requested for the base map
- Public Land Survey System (PLSS) boundaries, also known as range, township and section lines, including applicable numbers, if located in a state with PLSS boundaries (Figure 1).
 - Certain states only have portions covered by PLSS. Hawaii, which is not shown on the map, is not included in the PLSS. (U.S. Department of the Interior, 2006)



Figure 1: States included in the Public Land Survey System

If attribute information (i.e., feature names) is not contained within the base map, sources such as the U.S. Geological Survey (USGS) Geographic Names Information System, U.S. Census Bureau Topologically Integrated Geographic Encoding and Referencing (TIGER) files, current FIRM panels, and/or other data sources should be utilized to obtain the missing information. Locally developed base map data (i.e., information created or obtained by local municipalities and jurisdictions) are generally more accurate than state or national level data sets. If local data can be obtained, it is recommended for use before state or national data.

Listed below are some additional base map data that can be collected if available. Some data sets may have already been collected in previous phases, such as Discovery. These data sets can be used with other aspects of Flood Risk Projects. These data can be less accurate than the data that serve as the starting point for the base map.

- Bridges
- Unimproved roads or trails (i.e., those travel ways not intended for motorized vehicles or not usually used by motorized vehicles due to width or seasonal conditions)
- Building footprints
- Parcel outlines or parcel centroids
- Address points

3. Characteristics

Most Flood Risk Projects require a base map to help users understand the location of flood hazard and other risks in relation to geographic features encountered in their communities.

The characteristics of base map data can vary among projects as long as the data fulfill the minimum role of a base map. At a minimum, the base map data should:

- Show sufficient ground features (e.g., roads, railroads and hydrographic features), to enable a clear interpretation of the data displayed on the FIRM or other Flood Risk Products. Data created, updated, or checked within the last 7 years is preferred. A base map older than 7 years can be used if the area has not changed substantially since it was created and if the map provides reasonable reference information and does not confuse map users.
- Have a horizontal radial accuracy (accuracy) better than or equal to 38 feet (11.58 meters) as measured using the National Standard for Spatial Data Accuracy (Federal Geographic Data Committee [FGDC], 1998a). Under the old National Map Accuracy Standard, this measure equates to maps of scales larger than or equal to 1:12,000.
- Have a horizontal datum of North American Datum of 1983 (NAD 83).
- Be provided with permission from the source to allow FEMA to freely distribute the data and associated flood hazard information in hardcopy and digital formats with no restrictions. Distribution methods include, but are not limited to, incorporating an image of base map data on printed flood maps, distributing digital base map data on media, distributing digital base map data online, and displaying digital base map data on the Web. FEMA also participates in interagency exchanges of base map data.
- Cover the entire project area and provide seamless coverage for all jurisdictions shown on the FIRM or other Flood Risk Products. The data should not have disconnects or missing features at boundary locations. For some projects conducted at the watershed level, it can be acceptable to develop tiled data coverage if the specific study areas are non-congruent. Cases such as this should be coordinated with the FEMA Project Officer before proceeding.
- Be provided with FGDC-compliant metadata.

When working with communities or state agencies to obtain base map data, encourage them to provide all information within 30 days of FEMA's request. If the request cannot be met within the time frame, alternative data sources should be evaluated.

Once a base map has been accepted, the locations of features in the data should be used "as is." Base map features from one source may be clipped where they meet those from another source. Graphical mismatches between communities, where roads or other features cross community boundaries, should be resolved.

4. Vector and Raster Options

Two of the most important features in the base map are the transportation and hydrographic features. These guide users to known locations and are often the most referenced features when it comes to discussing hazard locations. Two types of geospatial data can be utilized to represent these features: vector data or raster data.

Vector data use lines to depict geographic features. To use vector base map data for a Flood Risk Project, it should depict transportation features (roads, railroads, major airports, etc.), hydrographic features (streams, rivers, lakes, etc.), and boundaries (county limits, corporate limits, military lands, tribal lands, etc.). If the location of the Flood Risk Project is in a state (Figure 1) that uses PLSS, those features should also be depicted as part of the base map.

For vector base maps, the Master Address File (MAF) / TIGER street centerline data should be the default source. These data should be used as-is in regards to any stacked lines, used in cases where there are multiple names for a single feature. At the discretion of the FEMA Project Officer, data provided by the community may be substituted for MAF/TIGER data.

Raster data use a picture to depict geographic features. The typical raster base map is a digital orthoimage. Orthoimages depict the location of features using aerial photographs, which are orthorectified so that positions on the image are accurately georeferenced to true ground locations, taking into consideration the terrain. To use a raster base map for a Flood Risk Project, the orthoimagery must be georeferenced and orthorectified.

A raster base map can be used to display the location of transportation and hydrographic features; however, jurisdictional boundaries and other non-natural features may not be visible. If raster data are selected as the base map, additional vector data should also be gathered to display reference information on the FIRM panels or products. Examples of additional vector data include political and PLSS boundaries.

Vector base map data do not need to be collected for locations determined to be areas not included (ANI). For a raster base map, the raster orthoimagery can be included for ANI areas.

Either a vector or raster base map can be selected for a Flood Risk Project. To determine which, the preference of the community, the accuracy and availability of the data, and the degree of difficulty in using the proposed base map data should be taken into account. These criteria should be documented and supplied as part of the project correspondence. For additional guidance on base map submittal requirements, please refer to the base map section of the [Data Capture Technical Reference](#).

5. Orthoimagery

AMP Studies: For projects that will use AMP to product the FIRM panels:

- Imagery in AMP is sourced from USGS The National Map by default. S_Base_Index and orthoimagery are not required for the base map submittal. The National Map imagery meets the minimum requirements below.

Non-AMP Studies: For projects that will not use AMP to produce the FIRM panels:

If raster is selected as the base map choice, certain criteria should be met. Whenever possible, orthoimagery should be used as it is received, with little or no modification to the actual image. At a minimum, the raster base map should:

- Have a minimum resolution of 1-meter ground sample distance.
- Provide a clear view of features on the ground near areas of significant flood hazards. Leaf-off, cloud-free imagery is preferred, although the canopy of deciduous vegetation and a small amount of cloud cover is tolerated if features near significant flood hazards are not obscured. Different spectral bands (such as near infrared) can be used if the resulting image provides a clear view of ground features.

At the request of state or local officials, portions of raster base maps can be blurred to restrict the visibility of sensitive areas or sites that are potential security concerns. These requests should be documented in the project correspondence and coordinated with the FEMA Project Officer. The blurred area should be limited as close as possible to the sensitive location to minimize the impacts to other parts of the FIRM panel.

Color orthoimagery is widely available and should be considered the first option if it meets the above criteria and provides the clearest option. If color imagery is not available, it is acceptable to use gray-scale imagery. If selected, it is recommended that orthoimagery have a minimum image radiometry of 256 gray levels.

Variations in tones between orthoimages are acceptable. If more than one image is included on a FIRM panel, lightening or darkening of individual images to balance tones is not required. However, adjustments that improve readability are acceptable provided they do not require significant effort.

Raster base maps may be updated to show new roads or other features that have changed since the data were produced by placing vector data on top of the orthoimages. Additionally, vector data that depict flooding sources may be shown on top of the orthoimagery to help clarify the hazard origins, provided they do not conflict with profile baseline requirements in the [FIRM Panel Technical Reference](#).

If the raster option is selected, these data can be contained in a single file or in tiled files. Tiling is not suggested for vector data because file sizes are small enough to be manageable.

Local communities often obtain orthoimagery specifically for their jurisdiction. These data can serve as the raster base map as long as the orthoimagery meets FEMA standards and is freely available. If suitable base maps are not available from local communities, 1-meter National Agricultural Imagery Program (NAIP) orthoimages or 1-meter-resolution Digital Orthophoto Quarter Quadrangles (DOQQs) from the USGS can be used. These orthoimages generally meet the minimum criteria for a base map. For additional guidance on obtaining raster base map data, please refer to the [National and State Data Coordination Procedures](#) available on FEMA's Mapping Information Platform. This lists sources of national data suitable for Flood Risk Projects. FEMA also maintains [State Geospatial Data Coordination Procedures](#) that list best practices for obtaining and using state and community data.

6. FIRM Panel Layout

FIRM panel layout (S_FIRM_Pan), including frame sizes and the location of map elements, is defined in the [FIRM Panel Technical Reference](#). When the FIRM panel dimensions specified in the [FIRM Panel Technical Reference](#) cannot be matched because the map image sizes are larger due to far southern latitudes, or a different system of measurement has been used, or for other reasons that would make the use of Architectural (ARCH) D – sized paper not feasible, a different map size may be used at the discretion of the FEMA Project Officer. Examples include Puerto Rico (metric) and may include Hawaii and American Samoa or other territories. If an alternative size is selected, all other map content not related to map format in the [FIRM Panel Technical Reference](#) must be adhered to.

The development of a FIRM panel layer often occurs as part of the base map preparation. The National Flood Hazard Layer (NFHL) should first be checked to determine if a FIRM panel layout already exists. If one does not exist, or if the existing layout requires modification, the following guidance should be used.

6.1. Map Scale Selection

The scale to be used for the development of the FIRM should be determined before or during Flood Risk Project Discovery. Existing FIRM scales should be reviewed. Where appropriate, either the same map scales or a compatible map scale should be used for the new FIRM. Existing small-scale FIRM panels should be remapped at larger scales where necessary to accommodate detailed floodplain mapping of narrow floodplains and/or floodways.

Map scales should be selected based on the density of information, width of floodplains, type of study (i.e., detailed or approximate), and scale of the previously prepared FIRM(s). The goal is for the flood hazard information depicted on the FIRM panel to be legible and clear at the chosen scale. If the flooding or the 1-percent-annual-chance water surface elevations shown on the cross sections or Base Flood Elevation lines cannot be clearly read, then enlargement of the map to a different scale should be considered. However, it is not mandatory to show all areas of detailed flooding at 1"=500' if the data are usable at 1"=1,000'. If there are FEMA regional preferences in map scale determination, these should also be taken into account.

In general, the map scale should not be smaller than that of the previously published FIRM. This means that if the map scale of the FIRM was previously 1"=1,000' it may be changed to 1"=500' to show the flood hazard information more clearly, but it should not be changed to 1"=2,000'.

6.2. Paneling / Tiling Scheme

The FIRM paneling scheme shall follow that used by the USGS for the 7.5-minute-series quadrangle, or subdivisions thereof, depending on the scale of the FIRM. Map panels shown at 1"=2,000' are to be tiled using the same neatlines as the corresponding USGS 7.5-minute-series quadrangles. Map panels shown at 1"=1,000' are to be tiled using neatlines that correspond to USGS DOQs or 3.75-minute quarter-quadrangles. Map panels shown at 1"=500' are to be tiled using neatlines that correspond to USGS 1.875-minute quarter-quarter-quadrangles.

Due to shapefile (SHP) limitations, there should be no non-contiguous areas of a single panel. It may be necessary to adjust the paneling scheme to avoid this situation. Figure 2 below shows an example of non-contiguous areas of a 1"=2,000' panel (panel 0050) that should be broken out and renumbered as shown in Figure 3.

If three-quarters of a smaller scale panel (1"=1000') are broken out into larger scale panels (1"=500'), the fourth quadrant should also be broken out into the larger scale (1"=500'). Figure 4 below shows a 1"=1,000' scale panel (panel 0005) that should be changed to 1"=500' scale (panel 0004) as shown in Figure 5.

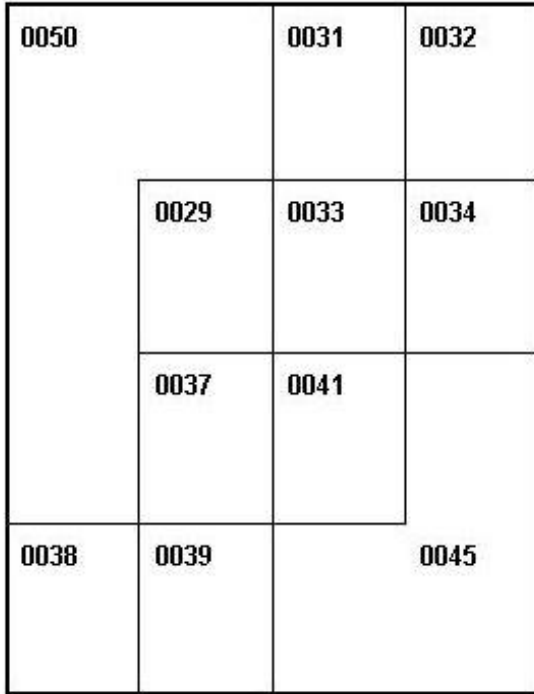


Figure 2: Panel Areas Should Not Be Non-Contiguous

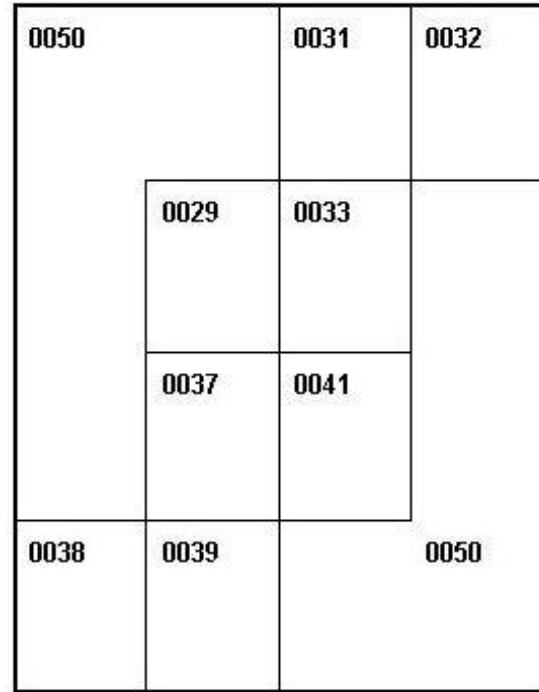


Figure 3: Correctly Broken Out Non-Contiguous Panel Areas

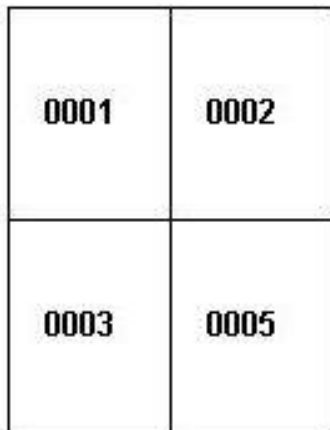


Figure 4: Break Out the Fourth Quadrant

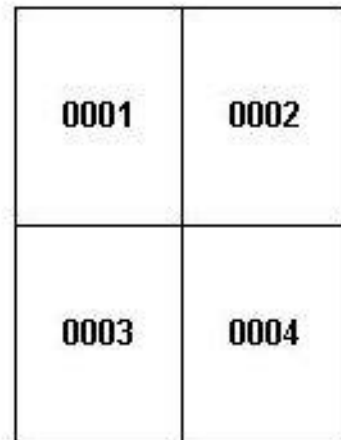


Figure 5: Correctly Broken Out Fourth Quadrant

6.3. North Orientation

All digital FIRMs must be oriented so that grid north points to the top of the map sheet. Older manual FIRMs may have been prepared with a different north orientation. Manual revisions to those panels may retain their existing north orientation.

6.4. Rotation

The FIRM data do not need to be rotated to align exactly to the map border. The slight tilt inherent in the data as the panels move farther away from the central meridian is acceptable.

6.5. Panel Numbering

After the map scale(s) and layout for a jurisdiction have been established, the map panels are numbered. FIRMs use a panel numbering sequence that relates panel number to map scale. Panels shown at 1"=500' use numbers divisible by 1; panels at 1"=1,000' use numbers divisible by 5 (excluding those divisible by 25) and panels at 1"=2,000' use numbers divisible by 25. Table 1 further illustrates the numbering sequence corresponding to the various map scales.

Table 1: Panel Numbering Sequence

Map Scale	Panel Numbers
1" = 500'	1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, etc.
1" = 1,000'	5, 10, 15, 20, 30, 35, 40, 45, 55, 60, 65, 70, etc.
1" = 2,000'	25, 50, 75, 100, 125, 150, 175, 200, 225, 250, etc.

As shown in Figure 6, panel numbering should not be applied to any fully non-printed USGS 7.5-minute quad areas.

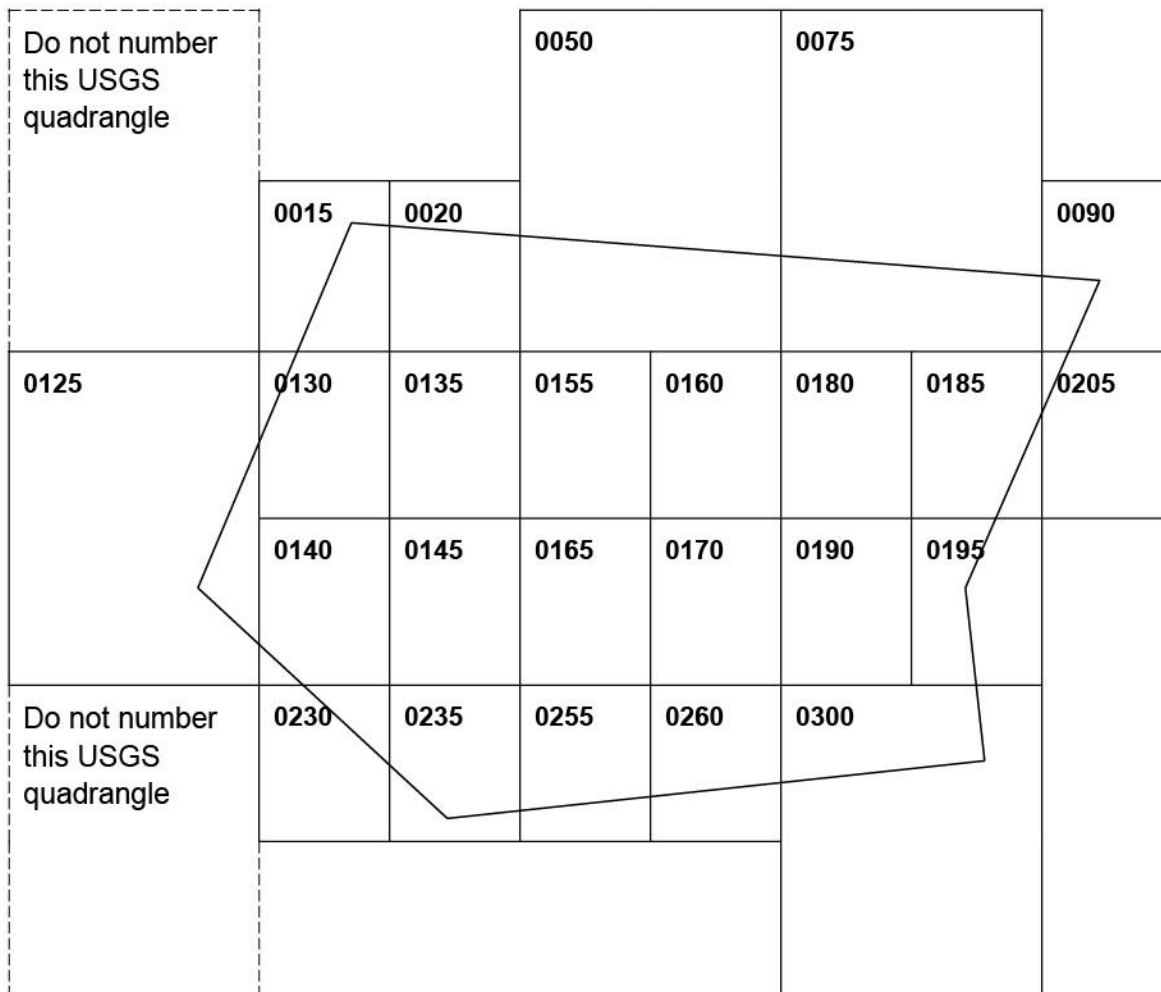


Figure 6: Do Not Number Non-Printed USGS Quads

6.5.1. MULTIPLE-SCALE FLOOD INSURANCE RATE MAPS

The preferred method for numbering is that of multiple-scale FIRMs, which are numbered based on a logical breakdown of USGS 7.5-minute series quadrangle sheets. To accomplish this, the assigned Mapping Partner may envision a USGS quadrangle as having 16 possible subdivisions, with the smallest block being a 1" = 500' scale segment and the largest block being the entire quadrangle at a scale of 1" = 2,000'.

Beginning with the first small-scale map panel, the four large-scale map panels that lie within the grid layout of the larger "parent" panel are to be numbered sequentially from left to right and top to bottom. The associated small-scale map panel is to be numbered sequentially after the four large-scale panels for the area it duplicates (i.e., Panel 0025 covers the same geographical area as Panels 0005, 0010, 0015, and 0020 combined). This numbering system is to be continued in a similar manner to the numbering system for single-scale maps; that is, the next number series would be 0030, 0035, 0040, and 0045 for the larger-scale panels, followed by 0050 for the smaller-scale panel. Figure 7 illustrates this system. Figure 8 contains an example of a FIRM with panels shown at different scales.

0001	0002	0006	0007	0026	0027	0031	0032
0005		0010		0030		0035	
0003	0004	0008	0009	0028	0029	0033	0034
0025		0050					
0011	0012	0016	0017	0036	0037	0041	0042
0015		0020		0040		0045	
0013	0014	0018	0019	0038	0039	0043	0044
0051	0052	0056	0057	0076	0077	0081	0082
0055		0060		0080		0085	
0053	0054	0058	0059	0078	0079	0083	0084
0075		0100					
0061	0062	0066	0067	0086	0087	0091	0092
0065		0070		0090		0095	
0063	0064	0068	0069	0088	0089	0093	0094

Figure 7: Multiple-Scale Panel Numbering Scheme

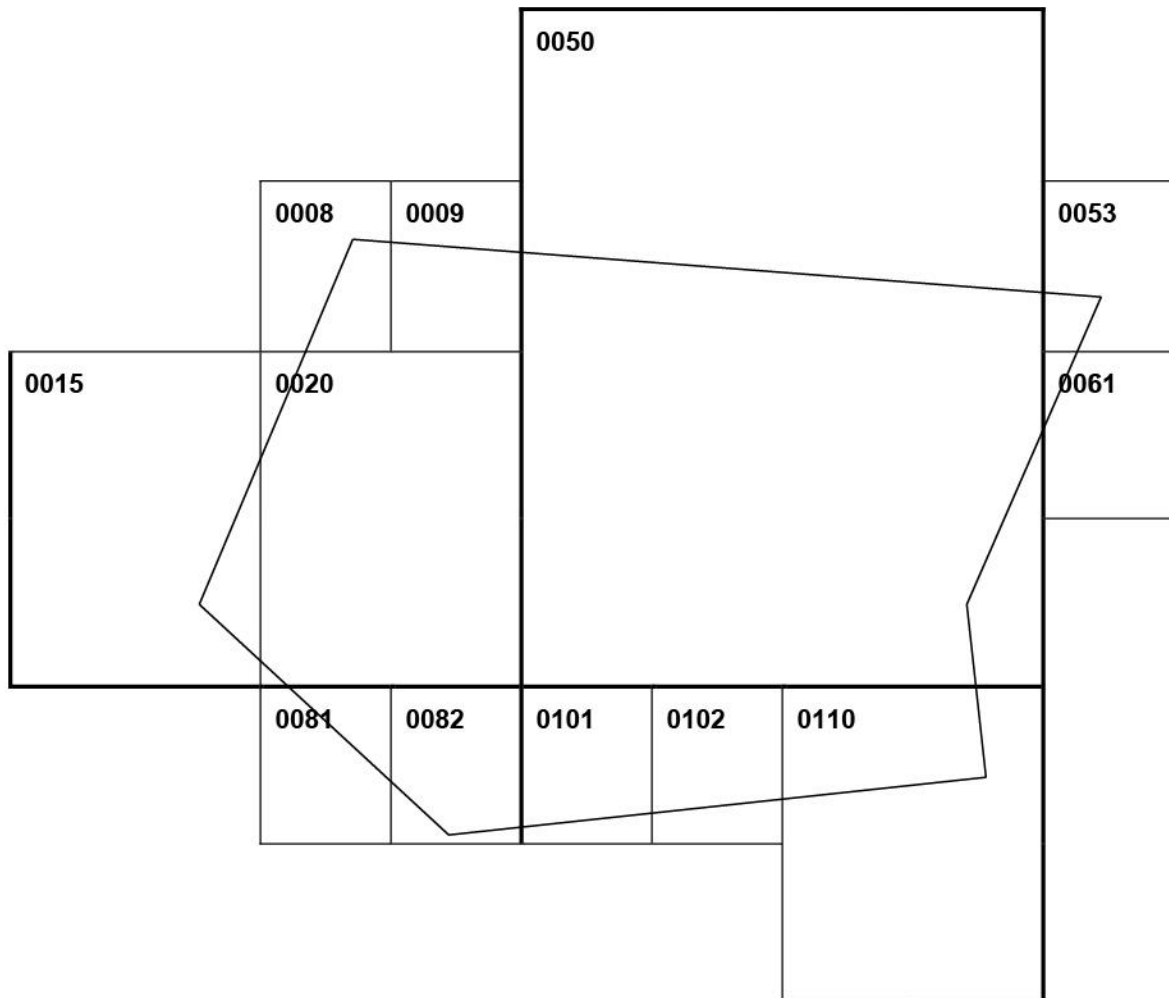


Figure 8: FIRM with Panels Shown at Different Scales

6.5.2. SINGLE-SCALE FLOOD INSURANCE RATE MAPS

Single-scale FIRMs are those in which all panels within the community or county are printed at the same scale. The panel numbering follows sequentially from left to right and from top to bottom according to the scale. Figure 9 contains an example of a FIRM with all panels shown at a scale of 1" = 500'.

Single-scale numbering is not conducive to future combining of jurisdictions into countywide or state-wide mapping without renumbering all of the panels, so its use should be carefully considered.

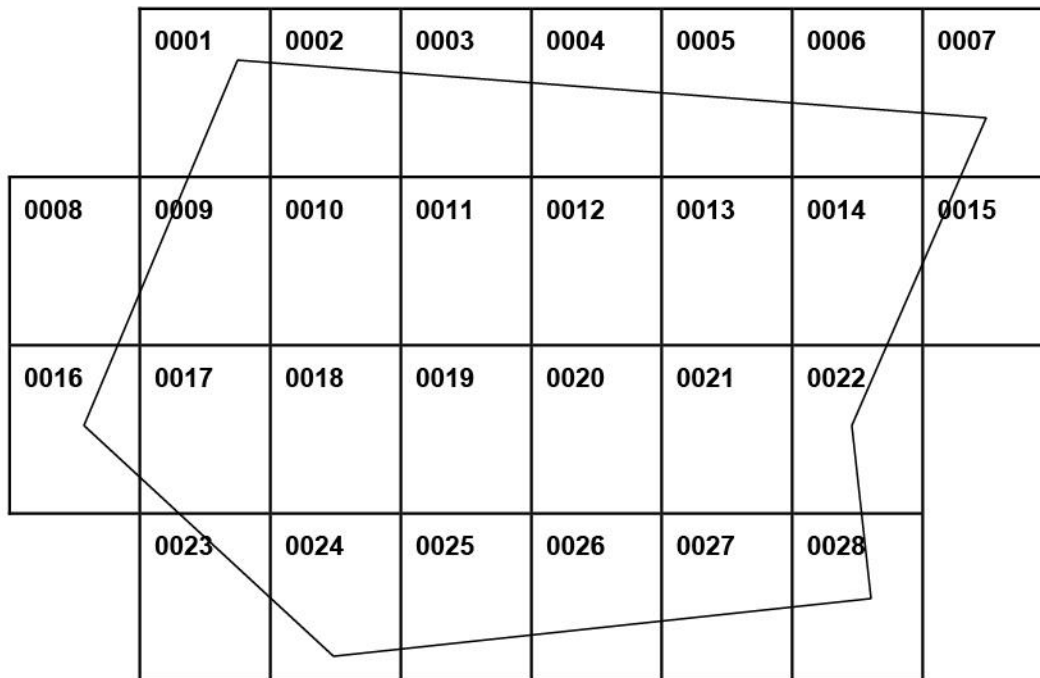


Figure 9: Single-Scale Panel Numbering Scheme (1"=500')

6.6. Map Insets

Map insets shall not be used in preparing FIRMs.

Narrow areas outside of the perimeter of a jurisdiction may be added to existing, adjacent map sheets as over-edge areas, if space permits and with the concurrence of the FEMA Project Officer. This may be done to reduce the panel count of a study or where the USGS quadrangles are not 7.5 minutes (e.g., Hawaii or other islands). Use of over-edge mapping should be carefully considered so as to avoid future re-paneling of the jurisdiction. It may be inadvisable for communities subject to future annexations. If used, the over-edge area can only be added to another panel if it fits within the FIRM border. It cannot be used for interior panels since that would result in a non-standard paneling scheme.

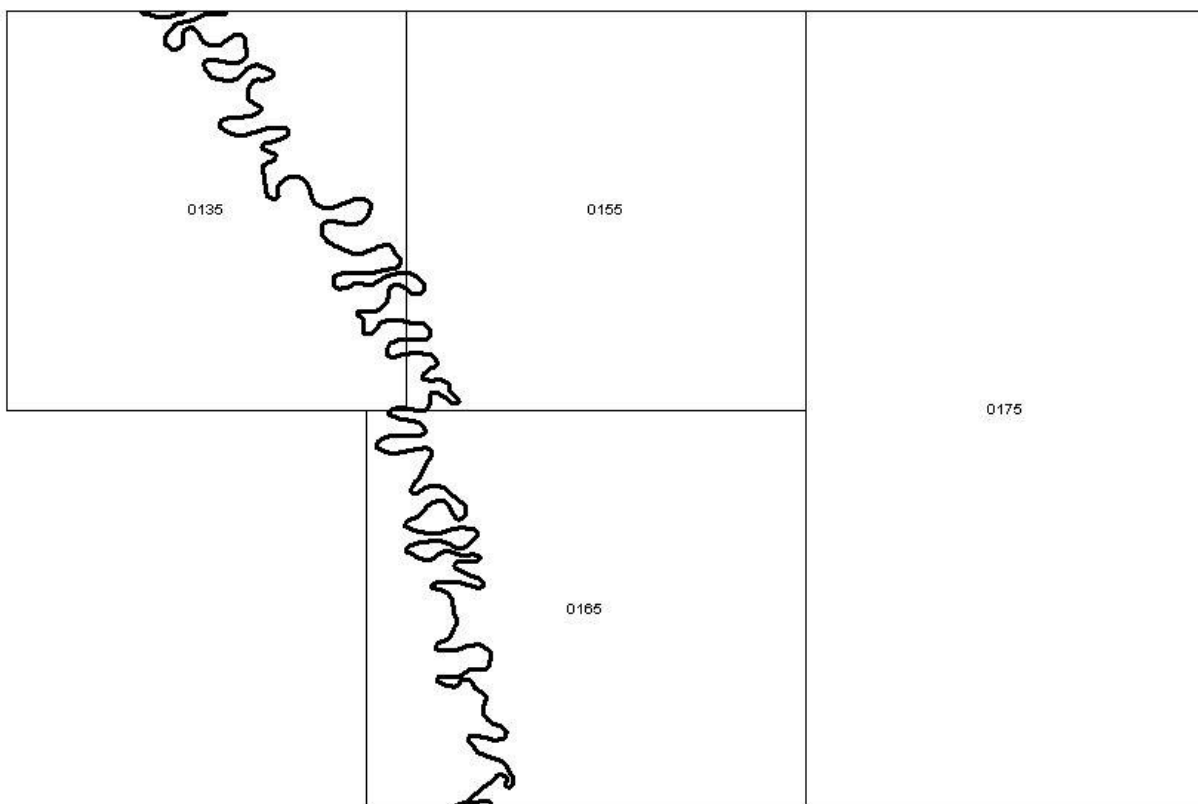


Figure 10: Over-Edge Panel

6.7. Breakout Panels

If a printed panel falls within the area of a smaller-scale panel that is also printed, the smaller-scale panel should show a breakout note in the blank area represented by the larger-scale panel (the breakout panel area). This note is placed in the center of the breakout panel area and specifies the larger-scale panel's map number and scale. The suffixes are not used in breakout panel notes, to avoid unnecessary updates in Physical Map Revisions.

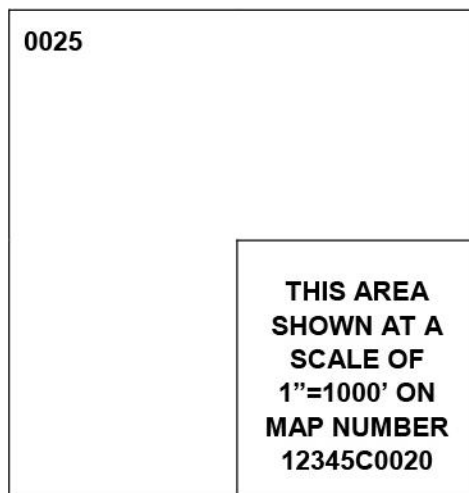


Figure 11: Breakout Panel Note

6.8. Suffix

Standard Identification Number (SID) 287 establishes how suffixes are applied to FIRM panels, according to the type of FIRM panel issuance or revision. SID 287 is supported by specifications and guidance presented in the [FIRM Panel Technical Reference](#), the [Physical Map Revision Guidance](#), and the [Base Map and FIRM Panel Layout Guidance](#).

Always refer to the current language for SID 287, as well as the current information in the [FIRM Panel Technical Reference](#), the [Physical Map Revision Guidance](#), and the [Base Map and FIRM Panel Layout Guidance](#), when determining FIRM panel suffixes for studies.

Per SID 287 and the [FIRM Panel Technical Reference](#), suffixes I and O are not used.

6.8.1. FIRST-TIME COUNTYWIDE ISSUANCE

The suffix for panels in a first-time countywide issuance is determined by examining the suffixes on the county's separate jurisdictions' community-based FIRMs. In the following example, the highest suffix letter used for any of the county's separate jurisdictions' community-based FIRMs is **D** (Figure 12); therefore, per SID 287, the suffix for the first-time countywide panels is advanced to the next highest letter of all jurisdictions, which is **E** (Figure 13).

0151C 07/24/2007	0152C 07/24/2007	0160C 07/24/2007		0180C 07/24/2007		0185B 12/11/2004		
0153C 07/24/2007	0154C 07/24/2007	0158C 07/24/2007	0159C 07/24/2007	0178C 07/24/2007				
0165C 07/24/2007	0162C 07/24/2007	0166C 07/24/2007	0167C 07/24/2007	0186C 07/24/2007	0187C 07/24/2007	0195B 12/11/2004		0215B 12/11/2004
		0168C 07/24/2007	0169C 07/24/2007	0188C 07/24/2007	0189C 07/24/2007			
0280B 12/11/2004		0285C 07/24/2007	0282C 07/24/2007	0301C 07/24/2007	0302C 07/24/2007	0306C 07/24/2007	0307C 07/24/2007	0326C 07/24/2007
				0303C 07/24/2007	0304C 07/24/2007	0308D 09/03/2009	0309D 09/03/2009	0328D 09/03/2009
								0330C 07/24/2007

Figure 12: Separate Jurisdictions' Community-Based FIRMs

0151E 10/16/2012	0152E 10/16/2012	0160E 10/16/2012		0180E 10/16/2012		0185E 10/16/2012		
0153E 10/16/2012	0154E 10/16/2012	0158E 10/16/2012	0159E 10/16/2012	0178E 10/16/2012				
0165E 10/16/2012	0162E 10/16/2012	0166E 10/16/2012	0167E 10/16/2012	0186E 10/16/2012	0187E 10/16/2012	0195E 10/16/2012		0215E 10/16/2012
		0168E 10/16/2012	0169E 10/16/2012	0188E 10/16/2012	0189E 10/16/2012			
0280E 10/16/2012		0285E 10/16/2012	0282E 10/16/2012	0301E 10/16/2012	0302E 10/16/2012	0306E 10/16/2012	0307E 10/16/2012	0326E 10/16/2012
				0303E 10/16/2012	0304E 10/16/2012	0308E 10/16/2012	0309E 10/16/2012	0328E 10/16/2012
								0330E 10/16/2012

Figure 13: First-Time Countywide Edition

6.8.2. PHYSICAL MAP REVISION

The following examples (shown in Figures 14, 15 and 16) present an area of a county that undergoes two Physical Map Revisions (PMRs). In the example, some FIRM panels in the county are not included in either PMR, some FIRM panels are part of either PMR #1 or PMR #2, and some FIRM panels are included in both PMRs. Furthermore, in the example, a full countywide revision follows the second PMR.

AMP Studies: For projects that will use AMP to produce the FIRM panels:

The submitted FIRM panel layout (S_FIRM_Pan) and base map features should be countywide and not clipped to the PMR limits. AMP requires countywide limits of transportation (note: only primary roads such as county roads, highways and interstates are required outside of the PMR limits), water and jurisdiction features to produce the FIRM index.

PMR #1

Recall that Figure 13 shows a countywide layout, with all map panel suffixes established at E. The first PMR is issued for the FIRM panels shown in blue in Figure 14, PMR #1. The panels included in PMR #1 are revised and published as new editions of the effective FIRM panels, so their suffixes are advanced one letter, to F.

0151E 10/16/2012	0152E 10/16/2012	0160E 10/16/2012		0180E 10/16/2012		0185E 10/16/2012			
0153E 10/16/2012	0154F 7/16/2015	0158F 7/16/2015	0159F 7/16/2015	0178E 10/16/2012					
	0162F 7/16/2015	0166F 7/16/2015	0167F 7/16/2015	0186E 10/16/2012	0187E 10/16/2012	0195E 10/16/2012		0215E 10/16/2012	
	0165E 10/16/2012	0168F 7/16/2015	0169F 7/16/2015	0188E 10/16/2012	0189E 10/16/2012				
0280E 10/16/2012			0282E 10/16/2012	0301E 10/16/2012	0302E 10/16/2012	0306E 10/16/2012	0307E 10/16/2012	0326E 10/16/2012	0330E 10/16/2012
			0285E 10/16/2012	0303E 10/16/2012	0304E 10/16/2012	0308E 10/16/2012	0309E 10/16/2012	0328E 10/16/2012	

Figure 14: PMR #1

PMR #2

When PMR #2 is issued, it includes some of the FIRM panels from PMR #1, as well as some that were not part of PMR #1. This is shown in Figure 15, PMR #2.

In Figure 15, the reason for not printing the effective Panel 0185E has changed from “All Zone VE (EL 10)” to “All Zone VE (EL 11).” Because this changes the panel’s flooding status, the suffix is advanced to **F**, even though the panel is still not printed.

Furthermore, two 500-scale breakout panels (0193 and 0194) have been created within the area of 1,000-scale effective panel 0195E. The suffixes for the two printed 500-scale breakout panels and the remaining 1,000-scale panel advance to **F**. The two breakout panels receive the suffix **F** because they were created from areas previously mapped on an E-suffix panel. Panel 0195 receives suffix **F** because its neatlines have now been adjusted (a format change), and because it had been a printed panel but is now not printed. That reflects a change in the panel’s flooding status.

Additionally, one 500-scale breakout panel (0284) has been created within the area of the 1,000-scale effective FIRM Panel 0285E. Both the 500-scale breakout panel (0284) and the remaining 1,000-scale panel (0285) are advanced to suffix **F**.

Finally, effective Panel 0282E was revised as part of PMR #2. It retains its effective panel scale, but its suffix advances to **F**.

Note that the suffix was not advanced for any non-printed panels whose PNP reason, flooding status, or format (neatlines) did not change.

0151E 10/16/2012	0152E 10/16/2012	0160E 10/16/2012		0180E 10/16/2012		0185F 9/30/2015			
0153E 10/16/2012	0154F 7/16/2015	0158F 7/16/2015	0159F 7/16/2015	0178E 10/16/2012					
	0162F 7/16/2015	0166F 7/16/2015	0167F 7/16/2015	0186E 10/16/2012	0187E 10/16/2012	0195F 9/30/2015		0215E 10/16/2012	
0165E 10/16/2012		0168G 9/30/2015	0169G 9/30/2015	0188F 9/30/2015	0189F 9/30/2015	0193F 9/30/2015	0194F 9/30/2015		
0280E 10/16/2012		0285F 9/30/2015		0282F 9/30/2015	0301F 9/30/2015	0302F 9/30/2015	0306E 9/30/2015	0307E 10/16/2012	0326E 10/16/2012
				0284F 9/30/2015	0303F 9/30/2015	0304F 9/30/2015	0308F 9/30/2015	0309E 10/16/2012	0328E 10/16/2012
									0330E 10/16/2012

Figure 15: PMR #2

6.9. New FIRM Panel Layout

Any FIRM being revised to reflect a completely new panel layout will have suffixes one letter higher than its highest previously published panel. Splitting existing quad-based FIRM panels does not constitute a new panel layout. A new panel layout consists of either:

1. Updating a legacy community-based “E-size” FIRM paneling scheme to a latitude-longitude “quad-based” FIRM paneling scheme.
2. Adding panels to an existing quad-based FIRM paneling scheme, in a new latitude-longitude quadrant, due to an extended political boundary, or correcting the boundary of a previously extended panel. All of the panels will be renumbered, and the highest panel number will increase.

The following examples (Figures 17, 18 and 19) present a countywide study that adds panels to the existing quad-based FIRM paneling scheme because the political boundary has been increased. Figure 17 shows the existing countywide layout. All suffixes for the county were established at B.

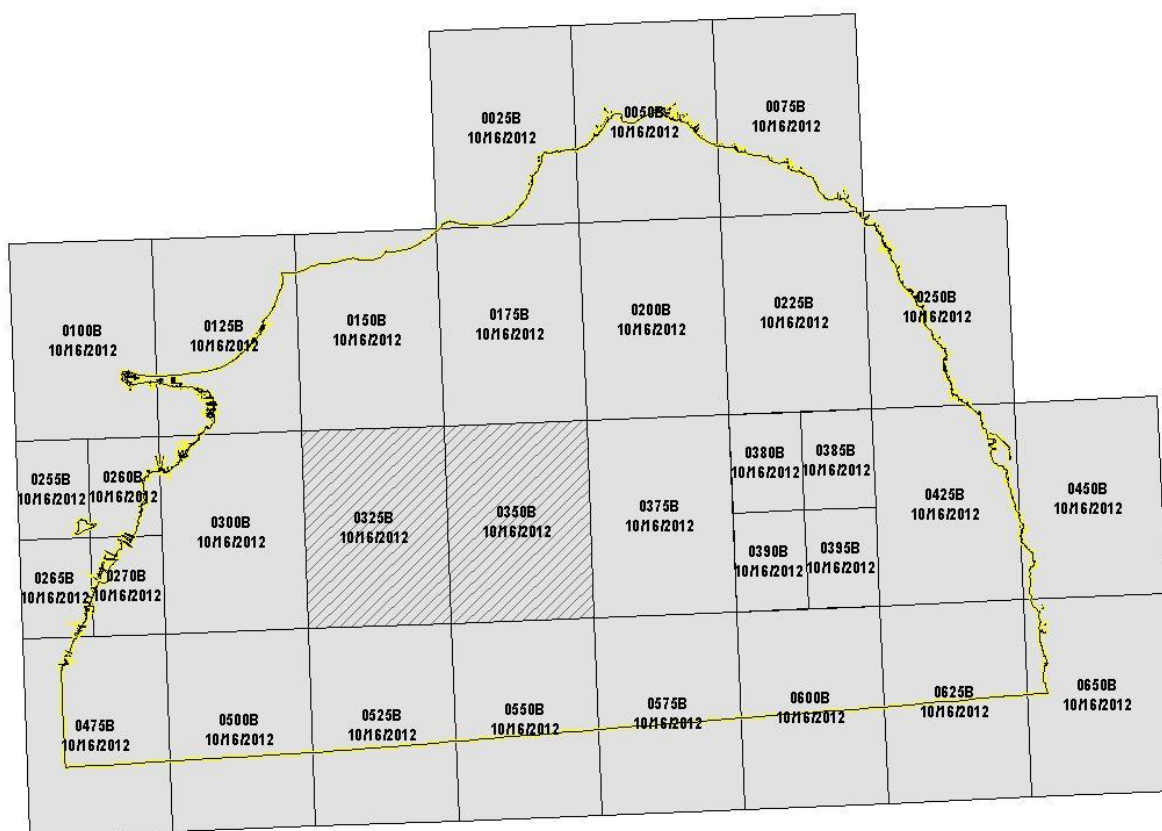


Figure 17: Existing Countywide Panel Layout

PMR #1

PMR #1 is issued for the FIRM panels shown in blue in Figure 18. The panels included in PMR #1 are revised and published as new editions of the effective FIRM panels. Those panels' suffixes are advanced one letter, to C.

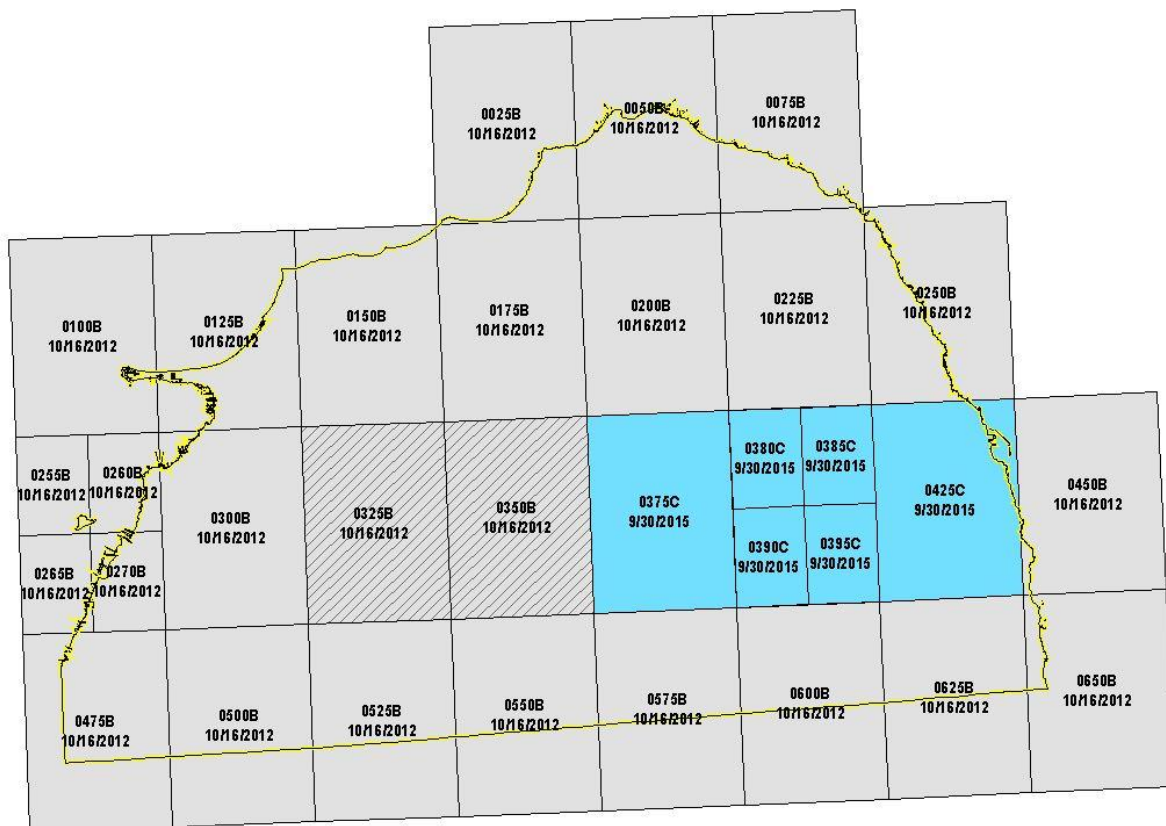


Figure 18: PMR #1

PMR #2

When PMR #2 is issued, the county boundary along the coastline is updated. This adds two additional quads to the FIRM panel layout (shown in green in Figure 19). The suffixes for all panels are advanced to D.

In Figure 19, effective Panels 0375D and 0400D are not printed (PNP). However, the suffix for both panels is advanced to D because they were renumbered.

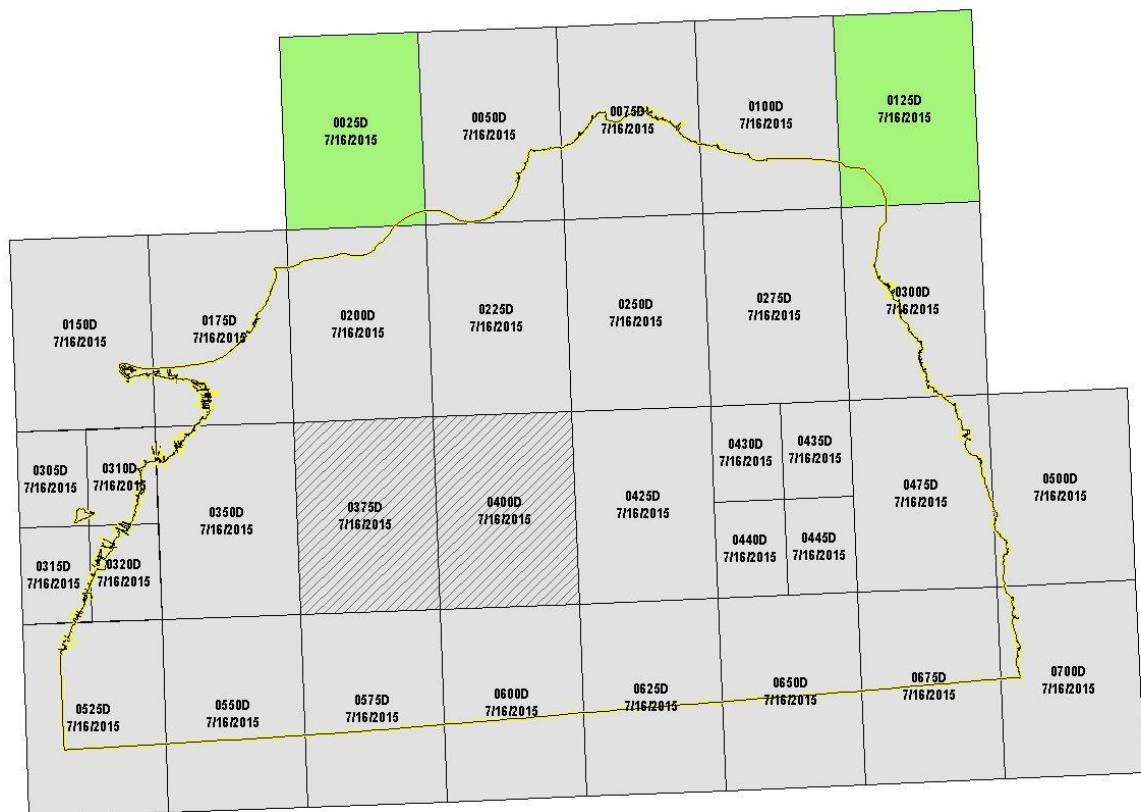


Figure 19: PMR #2

7. Formatting the Base Map

Once collected, the base map data should be formatted and compiled into a countywide FIRM database. For more information about the FIRM database requirements, please refer to the [FIRM Database Technical Reference](#).

8. Metadata

Metadata, or “data about data,” provide information about the content, quality, condition, and other characteristics of data. For Flood Risk Projects, the content of base map metadata should follow the guidance in the [Metadata Profiles Technical Reference](#). A specific base map metadata profile is available. FEMA created the profile based on the Federal Geographic Data Committee’s Content Standard for Digital Geospatial Metadata (1998b and 2006).

The best time to collect metadata is when the data are being developed or obtained. It is recommended that metadata be collected when the base map is supplied for the project. Work directly with the data owner to recover information that may not have been recorded. It also recommended that vendors provide compliant metadata for any newly collected data.

Most Flood Risk Projects include the requirement of a digital base map that meets the standards established in FEMA’s [Policy for Flood Risk Analysis and Mapping](#), and closely follows this guidance document. Any exceptions or variances from those standards or guidance should be documented in the metadata.

There should be no restrictions on FEMA’s use or redistribution of metadata. Distribution methods include, but are not limited to, incorporating metadata in FIRM collar information, annotations on printed flood maps, distributing metadata with digital flood data online, digital media, and providing metadata on the Web. FEMA also participates in interagency exchanges of metadata, and participants can expect the metadata to appear on publicly available data portals. The metadata also may appear in other applications that acquire data from such portals and clearinghouses, even if FEMA does not participate in these other applications directly.

9. Procuring New Data

For Flood Risk Projects, FEMA will not provide funding for new base map data collection. Regarding leverage credits to communities, if adequate base map data exist but a community supplies better data, FEMA will provide leverage credit to the community.

10. Quality Control

Any base map used as part of a Flood Risk Project should be subject to Quality Assurance and Quality Control (QA/QC) to provide reasonable assurance that the data meet the specifications reported and are suitable for the project. QA/QC should be applied before determining if the data can be used. When data are obtained, it is recommended the following QC checks be applied:

- Check if the base map data contain complete attributes, such as full road or stream names.
 - AMP products: Labels are derived directly from the database. Attributes should follow the FIRM Panel Technical Reference.
 - Attribute hydrologic features, structures and political areas capital/lower case (**CLC**)
 - Attribute transportation features in all **CAPS**
- Check if the base map data contain any gaps or disconnection with the project area.
- Check if the base map data reasonably edge match to adjoining jurisdictions.
- Check if the base map data are accompanied by metadata.
- Check if the orthoimagery is clear and not blurred (unless intentionally for security concerns).
- Check if all required features have been collected.
- Check if the data are geo-referenced to a known and documented projection and datum.
- Check if data and metadata redistribution is allowed.

Documentation of any QA/QC should accompany the base map submittal. For additional guidance about quality documentation, please refer to Quality Management for Flood Risk Projects Guidance.