

# Data Capture Standards Technical Reference

DRAFT

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## Data Capture Standards Technical Reference

### 1. Introduction

The purpose of the Data Capture Standards (DCS) Technical Reference is to provide a consistent framework for submittal, storage, and retrieval of the technical and administrative data needed for a Flood Risk Project. In addition, this document provides data submittal standards for supporting data that are used in performing risk assessment analyses and the creation of flood risk products. This framework is intended to improve the quality of flood risk project documentation; facilitate effective project handoff between organizations; provide easier retrieval of flood risk project data; and preserve the investment made in the data.

The following major production data capture points in the Mapping Information Platform (MIP) workflow are included in this technical reference: discovery, base map, terrain, survey, hydrologic analysis, hydraulic analysis, alluvial fan analysis, coastal analysis, floodplain mapping for redelineation and digital conversion, draft mapping data, preliminary mapping data, post-preliminary data, final mapping data, and risk assessment for studies.

This document is intended to be used in conjunction with the *FIRM Database Technical Reference* document, which details the GIS file formats and content of the FIRM Database files. Most of the FIRM Database files are initially developed during the data development stages outlined in the MIP workflow and will be submitted incrementally as the Flood Risk Project progresses through that workflow. The standards outlined in the *FIRM Database Technical Reference* must be applied to the DCS data submittals.

This document should also be used in conjunction with the *Flood Risk Database Technical Reference* which details the GIS file formats and content of the non-regulatory flood risk data contained in the Flood Risk Database (FRD) and used to prepare the Flood Risk Report (FRR) and Flood Risk Map (FRM). The standards outlined in the *Flood Risk Database Technical Reference* must be applied to the non-regulatory product submittals.

This document outlines some additional data standards for Discovery, Terrain, and Survey data. It also provides the required submittal directory structure and file format requirements for each MIP workflow step.

## 2. Discovery Data Submittal Standards

Discovery deliverables include all the data collected during Discovery (including data collected after the Discovery meeting) and the draft and final Discovery Map. Any data collected during Discovery that are required by the Coordinated Needs Management Strategy (CNMS) must use the data model provided in the *CNMS Technical Reference* to enter the data and update CNMS. Any Discovery deliverables that are not captured by the CNMS are listed in the following sections and must be submitted as specified in this section. If additional data are collected during Discovery that are not specifically mentioned in this section, those data must also be submitted in the format collected as part of Discovery deliverables as supplementary data. Data submitted to the MIP as part of this section must be consistent with data listed in the Discovery Report.

### Table: DCS\_L\_Mtg\_POC

This table is required for all Discovery projects. This non-spatial table includes contact information for the county and every incorporated community in the flood risk project that has the following positions/roles occupied: Chief Executive Officer (CEO), such as Mayor, City Manager, County Judge, or other; State National Flood Insurance Program (NFIP) Coordinator; local Floodplain Administrator (if community participates in the NFIP); State Hazard Mitigation Officer (SHMO); and data/Geographic Information System (GIS) contact (person to contact to obtain local data for use in the flood risk project).

**Table 1: DCS\_L\_Mtg\_POC**

Field	Type	Length	R/A	Description
POC_ID	Text	25	R	Primary key for this table. Assigned by table creator.
POC_NAME	Text	50	R	Point of Contact Full Name.
FIRST_NAME	Text	25	R	Point of Contact First Name.
LAST_NAME	Text	25	R	Point of Contact Last Name.
CNT_TITLE	Text	50	A	Contact Position or Title.
AGENCY	Text	50	R	Contact Agency Name.
AGY_ROLE	Text	50	A	Role of Contact Agency.
CEO	Text	1	R	Community CEO for NFIP purposes. Acceptable values for this field can be found in the D_TrueFalse domain table
FPA	Text	1	R	Community Floodplain Administrator for NFIP Purposes. Acceptable values for this field can be found in the D_TrueFalse domain table
SHMO	Text	1	R	State Hazard Mitigation Officer. Acceptable values for this field can be found in the D_TrueFalse domain table
GIS	Text	1	R	GIS Point of Contact for Community/Agency. Acceptable values for this field can be found in the D_TrueFalse domain table
ADDRESS	Text	75	A	Contact Address.
ADDRESS_2	Text	75	A	Contact Address 2.
CITY	Text	25	A	Contact City.
STATE	Text	24	A	Contact State. Acceptable values for this field are listed in the D_State_Name domain table.

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Field	Type	Length	R/A	Description
ZIP	Text	10	A	Contact Zip Code.
PHONE	Text	10	A	Contact Primary Phone Number. Only numbers ( i.e. 3035551212).
PHONE_EXT	Text	6	A	Contact Primary Phone Number Extension. For example, x2345.
EMAIL	Text	50	A	Contact E-mail Address.
COMMENTS	Text	254	A	User provided comments.

### Table: DCS\_L\_Source\_Cit

This table is required for all Discovery projects. This non-spatial table includes information about the sources of the spatial data that are submitted.

**Table 2: DCS\_L\_Source\_Cit**

Field	Type	Length	R/A	Description
SOURCE_CIT	Text	11	R	Source Citation identifier used in the FIRM Database and in the metadata files. Default source abbreviations are listed in Table 4 of the FIRM Database Technical Reference. Source citations start with the type of source, followed by sequential numbers, for example "BASE1," "BASE2," etc.
CITATION	Text	25	A	Citation A short and unique citation name (Author and Year) used within the FIS report to reference this publication, such as "US Census 2010."
PUBLISHER	Text	254	R	Publisher Name This is the name of the publishing entity.
TITLE	Text	254	R	Title of referenced publication or data Should include a volume number if applicable.
AUTHOR	Text	254	A	Author/Editor Used in FIS Report Bibliography and References Table.. This is the author or editor of the reference. Multiple authors may be listed in this field.
PUB_PLACE	Text	100	A	Publication Place This is the place of publication (i.e. "Washington DC").
PUB_DATE	Text	30	R	Publication Date This the date of publication or date of issuance.
WEBLINK	Text	128	A	Reference Web Address This is the web address for the reference, if applicable.
SRC_SCALE	Text	12	A	Scale of the source data, if applicable. For example 1:24000.
MEDIA	Text	50	R	Media on which the source data were received.
SRC_DATE	Date	Default	A	Calendar date of the source data. Required for spatial sources. Used in metadata.
DATE_REF	Text	254	A	Date currentness reference. What the source date represents (e.g., ground condition, effective date, publication date, model date, MIP submission date, etc.). Required for spatial sources. Used in metadata.

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Field	Type	Length	R/A	Description
CONTRIB	Text	254	A	Source contribution. Information contributed by the source to the data set. Required for spatial sources. Used in metadata.
NOTES	Text	254	A	User Defined Notes.

### Table: DCS\_S\_Pol\_Ar

This table is required for all Discovery projects. This spatial file contains the political boundaries that cover the geographic extent of the flood risk project/mapping project. The spatial entity for this layer is a polygon.

**Table 3: DCS\_S\_Pol\_Ar**

Field	Type	Length	R/A	Description
POL_AR_ID	Text	25	R	Primary key for table lookup. Assigned by table creator.
POL_NAME1	Text	50	R	Political Area Name 1. This is the primary name of the area shown, the area with floodplain management jurisdiction. For areas that have more than one name, this would be the primary name, with additional names shown in the field below. This would correspond to the official name of this jurisdiction used by the Federal Emergency Management Agency (FEMA) within the NFIP. For unincorporated areas of a county, this must be the county name (e.g., Montgomery County).
POL_NAME2	Text	50	A	Political Area Name 2. This is the secondary name of the area shown. Populated if there is a common name for an area other than the official jurisdiction name.
POL_NAME3`	Text	50	A	Political Area Name 3. This is the tertiary name of the area shown. Populated if there is a situation where islands, National Parks, National Forests, military bases, or other area boundaries and labels need to be shown on the FIRM underneath the POL_NAME1 and POL_NAME2 labels.
CO_FIPS	Text	3	R	County FIPS Code. This is the three-digit county Federal Information Processing Standard (FIPS) code. This is a standard numbering system that is used by the Federal government. Defined in FIPS Pub 6-4.
ST_FIPS	Text	2	R	State FIPS. This is the two-digit code that corresponds to the State FIPS code. This is a standard numbering system that is used by the Federal government. Defined in FIPS Pub 6-4. These two numbers correspond to the first two digits of the panel number. Acceptable values for this field are listed in the D_State_FIPS domain table.
COMM_NO	Text	4	R	Community Number. This is the four-digit number

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Field	Type	Length	R/A	Description
				assigned by FEMA to each community for tracking purposes under the NFIP. On newer FIRMs the State FIPS and the community number appear below the community name.
CID	Text	6	R	Community Identification Number. This is the six-digit community identification number assigned by FEMA. It is created by combining the State FIPS code with the COMM_NO. If the jurisdiction does not have a community number assigned by FEMA, the CID is created by combining the State FIPS code with the abbreviation contained in the COMM_NO field (FED, ST, or OTHR).
ANI_TF	Text	1	R	Area Not Included. Acceptable values for this field are listed in the D_TrueFalse domain table.
ANI_FIRM	Text	6	A	Used for Area Not Included polygons where ANI_TF equals "T" and where the data is included in another FIRM Database, usually because it is a multicounty community. Enter the DFIRM_ID of the FIRM Database that contains the SFHA data of the ANI community. For a single-jurisdiction flood risk project, the value is composed of the 2-digit state FIPS code and the 4-digit FEMA CID code (e.g., 480001). For a countywide flood risk project, the value is composed of the 2-digit state FIPS code, the 3-digit county FIPS code, and the letter "C" (e.g., 48107C). Populate with "NP" if the area has never been converted to a FIRM Database from paper FIRM format.
SOURCE_CIT	Text	11	R	Source Citation. Abbreviation used in the metadata file when describing the source information for the feature. The abbreviation must match a value in the DCS_L_Source_Cit table.

### Table: DCS\_S\_Trnsport\_Ln

This table is required for all Discovery projects. This spatial file provides transportation features that cover the geographic extent of the flood risk project/mapping project. The spatial entity for this layer is a line.

**Table 4: DCS\_S\_Trnsport\_Ln**

Fields	Type	Length	R/A	Description
TRANS_ID	Text	25	R	Primary key for table lookup. Assigned by table creator.
MTFCC	Text	70	R	MAF/TIGER feature class code. Defines the primary feature for the edge. Acceptable values for this field are listed in the D_MTFCC domain table.

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Fields	Type	Length	R/A	Description
FULLNAME	Text	100	R	Full name of feature. Concatenation of expanded text for prefix, qualifier, prefix direction, prefix type, basemap name, suffix type, suffix direction, and suffix qualifier (as available) with a space between each expanded text field. This is the primary name of the feature. For areas that have more than one name, this would be the primary name with subsequent names shown in fields below. Route numbers and "Intercoastal Waterway" would also be included in this item.
ALTNAME1	Text	100	A	First alternative name of feature. This is the secondary name of the feature.
ALTNAME2	Text	100	A	Second alternative name of feature. This is the tertiary name of the feature.
SOURCE_CIT	Text	11	R	Source Citation. Abbreviation used in the metadata file when describing the source information for the feature. The abbreviation must match a value in the DCS_L_Source_Cit table.

### Table: DCS\_S\_HUC

This table is required for all Discovery projects. This spatial file contains the Hydrologic Unit Codes (HUCs) for the flood risk project flood risk project area. This will enable the capture of appropriate drainage basins, including those outside the community boundary. The spatial entity for this layer is a polygon.

**Table 5: DCS\_S\_HUC**

Field	Type	Length	R/A	Description
HUC_ID	Text	25	R	Primary key for table lookup. Assigned by table creator.
HUC_CODE	Text	14	R	Unique hydrologic unit based on USGS levels of classification in the hydrologic unit system
HUC_NAME	Text	80	R	The primary name of the hydrologic unit
DIGITS	Short Integer	14	R	Number of digits in HUC-Code (8, 10, 12, or 14)
SOURCE_CIT	Text	11	R	Source Citation. Abbreviation used in the metadata file when describing the source information for the feature. The abbreviation must match a value in the DCS_L_Source_Cit table.

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### Table\_DCS\_S\_Discovery\_Map

This table is required for all Discovery projects. This spatial file contains each stream segment and/or coastline contained within the FIRM database, National Hydrography Dataset (NHD) 100k coverage, or best available streamline data for flood sources included in the scope of work for the flood map project update. This file should provide an inventory of stream mileage for the project area by effective and proposed zone and flood risk project type. This will be shown on the final discovery map. The spatial entity for this layer is a line.

**Table 6: DCS\_S\_Discovery\_Map**

Field	Type	Length	R/A	Description
DISCMAP_ID	Text	25	R	Primary key for table lookup. Assigned by table creator.
COUNTY	Text	100	R	County Name
COMMUNITY	Text	100	R	Community Name
STATE	Text	24	R	State Name. Acceptable values for this field are listed in the D_State_Name domain table.
CID	Text	6	R	Community Identification Number. This is the six-digit community identification number assigned by FEMA. It is created by combining the State FIPS code with the COMM_NO. If the jurisdiction does not have a community number assigned by FEMA, the CID is created by combining the State FIPS code with the abbreviation contained in the COMM_NO field (FED, ST, or OTHR).
ST_FIPS	Text	2	R	State FIPS. This is the two-digit code that corresponds to the State FIPS code. This is a standard numbering system that is used by the Federal government. Defined in FIPS Pub 6-4, these two numbers correspond to the first two digits of the panel number. Acceptable values for this field are listed in the D_State_FIPS domain table.
EZONE_TYP	Text	17	R	From effective flood risk project. Acceptable values for this field are listed in the D_Zone domain table.
EST_TYP	Text	28	R	Effective Study Type. Acceptable values for this field are listed in the D_Study_Typ domain table.
FLOOD_TYP	Text	10	R	Flooding type. Acceptable values for this field are listed in the D_Flood_Typ domain table.

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Field	Type	Length	R/A	Description
WTR_NM	Text	100	R	Surface Water Feature Name. This is the name of the stream or water body, including lakes and shorelines.
STREAM_LEN	Double	Default	R	Length of stream associated with a flood risk project in feet
FBS_TF	Text	1	R	Are stream segments anticipated to meet Floodplain Boundary Standard (FBS)? Acceptable values for this field are listed in the D_TrueFalse domain table.
RANKING	Text	6	A	Ranking based on local/regional input. Values to be used for this field are High, Medium or Low.
FST_TYP	Text	28	R	Final Study Type. Acceptable values for this field are listed in the D_Study_Typ domain table.
SOURCE_CIT	Text	11	R	Source Citation. Abbreviation used in the metadata file when describing the source information for the feature. The abbreviation must match a value in the DCS_L_Source_Cit table.

### Table\_DCS\_S\_Prj\_FirmPan

This table is required for Discovery projects if a flood risk project will result from Discovery. This spatial file contains the proposed panel scheme for the flood risk project area and the panels to be updated as a result of the Discovery meeting. The spatial entity for this layer is a polygon.

**Table 7: DCS\_S\_Prj\_FirmPan**

Field	Type	Length	R/A	Description
FIRM_ID	Text	25	R	Primary key for table lookup. Assigned by table creator.
ST_FIPS	Text	2	R	State FIPS. Acceptable values for this field are listed in the D_State_FIPS domain table.
PCOMM	Text	4	R	Community or County Identification Number. This is the 3rd through the 6th digits of the panel number. For community based maps this corresponds to the FEMA Community Identification number. For countywide maps, this is the county (or county equivalent) FIPS code with a "C".

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Field	Type	Length	R/A	Description
PANEL	Text	4	R	Panel Number. This is the 7th through the 10th digits in the complete panel number. This is assigned by the scale of the map and the position within the community or county. The panel number scheme is described in detail in the <i>FIRM Panel Technical Reference</i> .
SUFFIX	Text	1	R	Map Suffix. This is the final digit in the complete panel number. This is a letter suffix at the end of the panel number.  The map suffix is incremented one letter every time the panel gets republished.
FIRM_PAN	Text	11	R	FIRM Panel Number. This is the complete FIRM panel number, which is made up of ST_FIPS, PCOMM, PANEL, and SUFFIX. This is the 11-digit FIRM panel number that is shown in the title block of the map.
PANEL_TYP	Text	30	R	Panel Type. The type of FIRM panel that identifies whether the panel is printed or not printed and whether it is community based or countywide mapping. Acceptable values for this field are listed in the D_Panel_Typ domain table.
SCALE	Text	5	R	Map Scale. This is the denominator of the FIRM scale as a ratio. For example, 24000 is the denominator for a 1" = 2000' map. Acceptable values for this field are listed in the D_Scale domain table.
BASE_TYP	Text	10	R	Base map type. The type of base map used for the FIRM panel shall be recorded in this field. Acceptable values for this field are listed in the D_Basemap_Typ domain table.
UPDATED_TF	Text	1	R	Will this panel be updated as a result of Discovery meeting? Acceptable values for this field are listed in the D_TrueFalse domain table.
SOURCE_CIT	Text	11	R	Source Citation. Abbreviation used in the metadata file when describing the source information for the feature. The abbreviation must match a value in the DCS_L_Source_Cit table.

## 3. Topographic Breakline Topology Requirements

Topographic breaklines are optional and may be needed depending upon the planned procedures used to perform hydrologic and hydraulic modeling. When optional breaklines are produced, the following breakline topology rules must be followed for the applicable feature classes.

**Table 8: Topographic Breakline Topology Rules**

<b>Topology Filename (*_TOPOLOGY)</b>	<b>Spatial Layer</b>	<b>Topology Rule</b>	<b>Parameter</b>	<b>Minimum Cluster Tolerance (ft)</b>
HydraulicStruct	HydraulicStructure	Must Not Intersect		0.003
HydraulicStruct	HydraulicStructure	Must Not Self Intersect		0.003
HydrographicStruct	HydrographicFeature	Must Not Intersect		0.003
HydrographicStruct	HydrographicFeature	Must Not Self Intersect		0.003
HydrographicStruct	HydrographicFeature	Must not Overlap		0.003
Coastal	CoastalShoreline	Must Not Intersect	CoastalShoreline	0.003
Coastal	CoastalShoreline	Must Not Self Intersect		0.003
PondsLakes	Ponds_and_Lakes	Must Not Intersect		0.003
PondsLakes	Ponds_and_Lakes	Must Not Self Intersect		0.003
Island	Island	Must Not Intersect		0.003
Island	Island	Must Not Self Intersect		0.003

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## 4. Field Survey Submittal Standards

Table 9 lists the recommended survey codes and descriptions that should be used for new survey data submissions. However, alternative survey code definitions are acceptable if complete documentation is provided for the survey codes used during field data collection. Figures 1 through 7 show specific examples for some of the field survey point locations and the corresponding survey codes. Annotation of photographs, All annotated photographs provided in this sub-section are for informational purposes only and show the locations of data points with corresponding survey codes for reference.

**Table 9: Survey Codes**

Code	Description	Field Survey Location
ABT	Abutment	face/foot of abutment of bridge
BOCEDS	Back Of Curb Edge Down Stream	where slope meets top of culvert or top of headwall above culvert centerline on downstream end for determining outlet projection
BOCEUS	Back Of Curb Edge Up Stream	where slope meets top of culvert or top of headwall above culvert centerline on upstream end for determining inlet projection
BRCL	Bridge Centerline	centerline of bridge in overtopping section
CH	Channel	stream bottom between TOS shots
CHCL	Channel Centerline	center of the main flow area of the stream
CUL	Culvert Shape	multiple CUL codes can be used to define shapes for culverts, especially irregular shapes
CULCL	Culvert Centerline	centerline of culvert in overtopping section
CULDSCR	Culvert Down Stream Crown	the highest point of the downstream end of a culvert
CULDSINV	Culvert Down Stream Invert	the lowest point of the downstream end of a culvert
CULUSCR	Culvert Up Stream Crown	the highest point of the upstream end of a culvert
CULUSINV	Culvert Up Stream Invert	the lowest point of the upstream end of a culvert
DAMCL	Dam Centerline	the high point of a dam
DH	Dune Heel	landward toe of primary frontal dune
DP	Dune Peak	peak or rear shoulder of primary frontal dune
DT	Dune Toe	seaward toe of primary frontal dune
EOB	End Of Bridge	end of the bridge deck at the road/rail elevation
ERM	Elevation Reference Mark	Permanent elevation monument. An ERM must be set at every structure and at cross sections if they are more than half a mile to the nearest structure.
FBCL	Foot Bridge Centerline	centerline of non-vehicular bridges in overtopping section
GDR	Guardrail	top of guardrail at ends to define limit and height
GDRBOT	Guardrail at Bottom	base of guardrail at ends to define and height
GR	Ground	on ground to show elevation changes, used outside TOB shots, between TOB and TOS, and to indicate islands or bars within the channel. When used in channel cross-section surveys, a GR point must be placed at least 15 feet past the top of bank or until there is no overhead obstruction from foliage. If overhead foliage is too thick for the entire overbank area, full valley cross sections should be a consideration for modeling.

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Code	Description	Field Survey Location
HWMARK	High Water Mark	historical high water marks-mud/stain lines, drift lines, parole evidence, etc.
INVDS	Invert Down Stream	channel invert at downstream end of structure, used to define paved aprons
INVUS	Invert Up Stream	channel invert at upstream end of structure, used to define aprons
LC	Low Chord	change in bridge deck thickness, usually at center of a pile row or pier. Multiple low chord codes can be used to define irregular shaped bridges such as arched bridges with the explanation of the multiple LC shots shown in the sketch for the structure.
LCDSL	Low Chord Down Stream Left	bottom of deck and beam at the downstream left corner of bridge <sup>1</sup>
LCDSR	Low Chord Down Stream Right	bottom of deck and beam at the downstream right corner of bridge <sup>1</sup>
LCUSL	Low Chord Up Stream Left	bottom of deck and beam at the upstream left corner of bridge <sup>1</sup>
LCUSR	Low Chord Up Stream Right	bottom of deck and beam at the upstream right corner of bridge <sup>1</sup>
LV	Levee	Centerline of the top of a levee
PIER	Pier	the up and downstream centerline of a pier
PILE	Pile	the up and downstream centerline of a row of piles
RAIL	Rail	top of rail to define limits and height of railing on structures
RAILBOT	Rail Bottom	bottom of rail to define limits and height of railing on structures
RDCL	Road Centerline	the centerline on a crowned road or the high side of a road with super elevation
SFLOOR	Sea Floor	shots either direct or combination of bathymetric and conventional/GPS survey of coastal area which can be collected during structure or transect survey
TEMP	Temporary Control Point	temporary control point used for data collection of cross sections and structures. TEMPs are established when ERMs are not present.
TOB	Top Of Bank	top of bank in a multiple channel scenario
TOBL	Top Of Bank Left	break point from over bank to channel on the left side when looking downstream
TOBR	Top Of Bank Right	break point from over bank to channel on the right side when looking downstream
TOD	Top Of Deck	to show an irregular arch or dip in a bridge deck between the bridge corner shots
TODDSL	Top Of Deck Down Stream Left	downstream left corner of a bridge on the deck directly above the LCDSL shot to measure deck thickness and width <sup>1</sup>
TODDSR	Top Of Deck Down Stream Right	downstream right corner of a bridge on the deck directly above the LCDSR shot to measure deck thickness and width <sup>1</sup>
TODUSL	Top Of Deck Up Stream Left	upstream left corner of a bridge on the deck directly above the LCUSL shot to measure deck thickness and width <sup>1</sup>
TODUSR	Top Of Deck Up Stream Right	upstream right corner of a bridge on the deck directly above the LCUSR shot to measure deck thickness and width <sup>1</sup>
TOS	Toe Of Slope	the toe in a multiple channel scenario
TOSL	Toe Of Slope Left	break point from channel bank to channel bed on the left side when looking downstream
TOSR	Toe Of Slope Right	break point from channel bank to channel bed on the right side when looking downstream

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Code	Description	Field Survey Location
WALL	Wall	top of a retaining wall, also used outside TOBL and TOBR when the stream banks are vertical walls or rock cuts
WALLBOT	Wall Bottom	bottom of a retaining wall, also used outside TOBL and TOBR when the stream banks are vertical walls or rock cuts
WEIR	Weir	top of dam spillways and outlet structures. Multiple weir codes may be used to collect data for gates, flashboards, and other operable structures. The explanation of the multiple shots must be shown in the structure sketch.
WW	Wing Wall	top face of each end of a wing wall or headwall on a structure to define height and length
WWBOT	Wing Wall Bottom	base of each end of a wing wall or head wall on a structure to define height and length

<sup>1</sup> The four bridge corner shots need to be taken outside of any rail to accurately measure hydraulic length.

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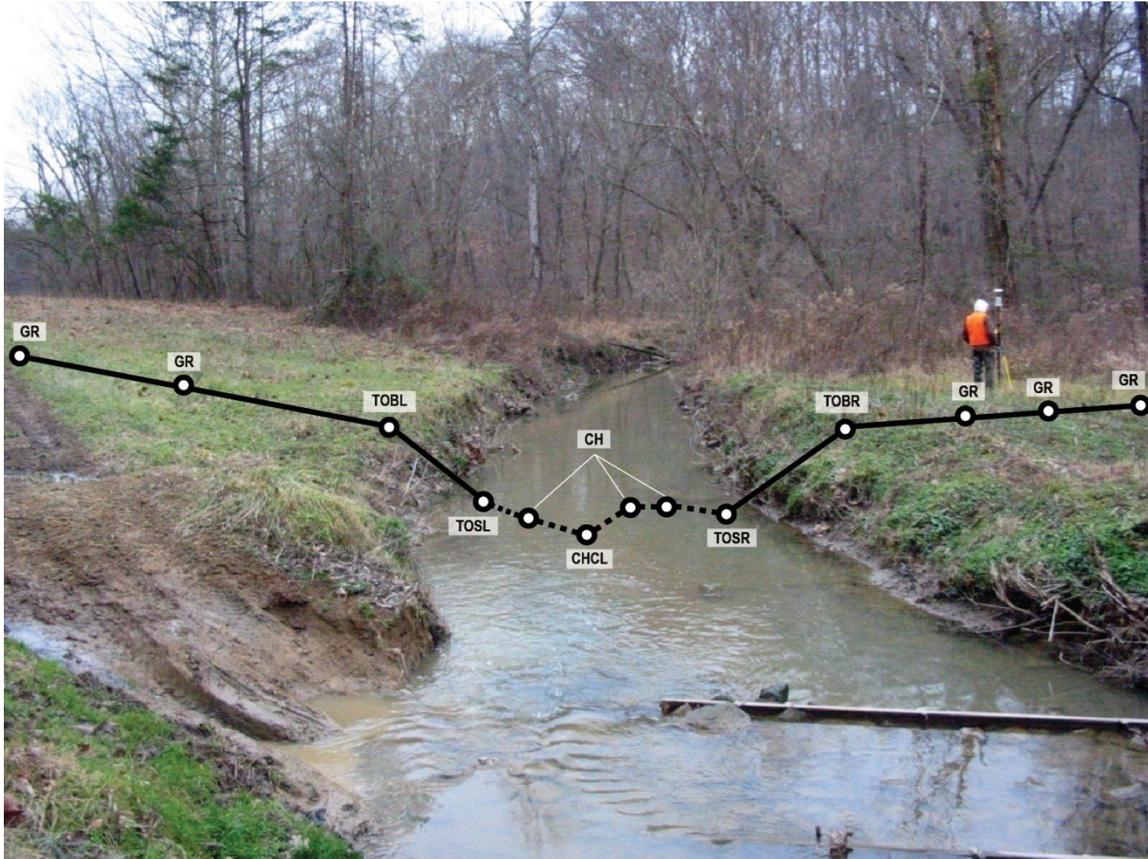


Figure 1. Typical Cross-Section Photograph: Indian Creek IND-6600 (Displays Survey Code Locations)

# Data Capture Standards Technical Reference

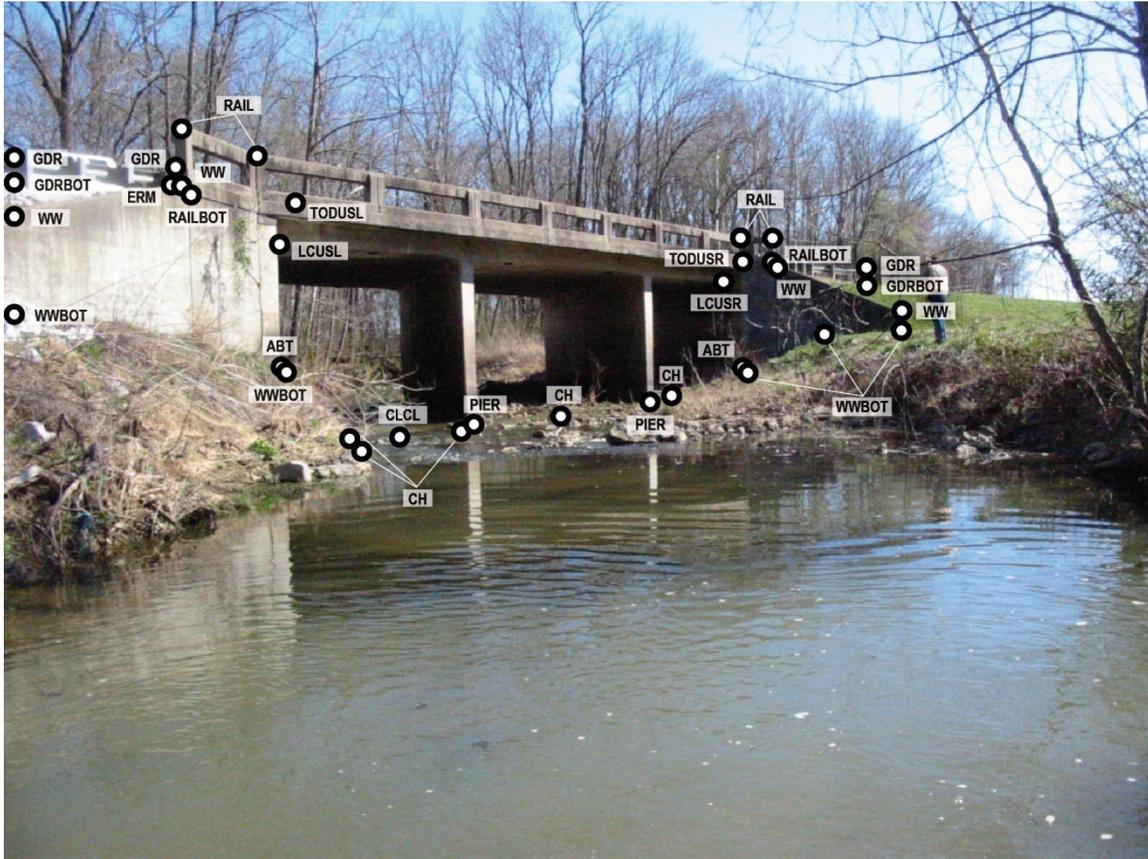


Figure 2. Typical Bridge Photograph: White Creek WHI-1800 (Displays Survey Code Locations)

## Data Capture Standards Technical Reference

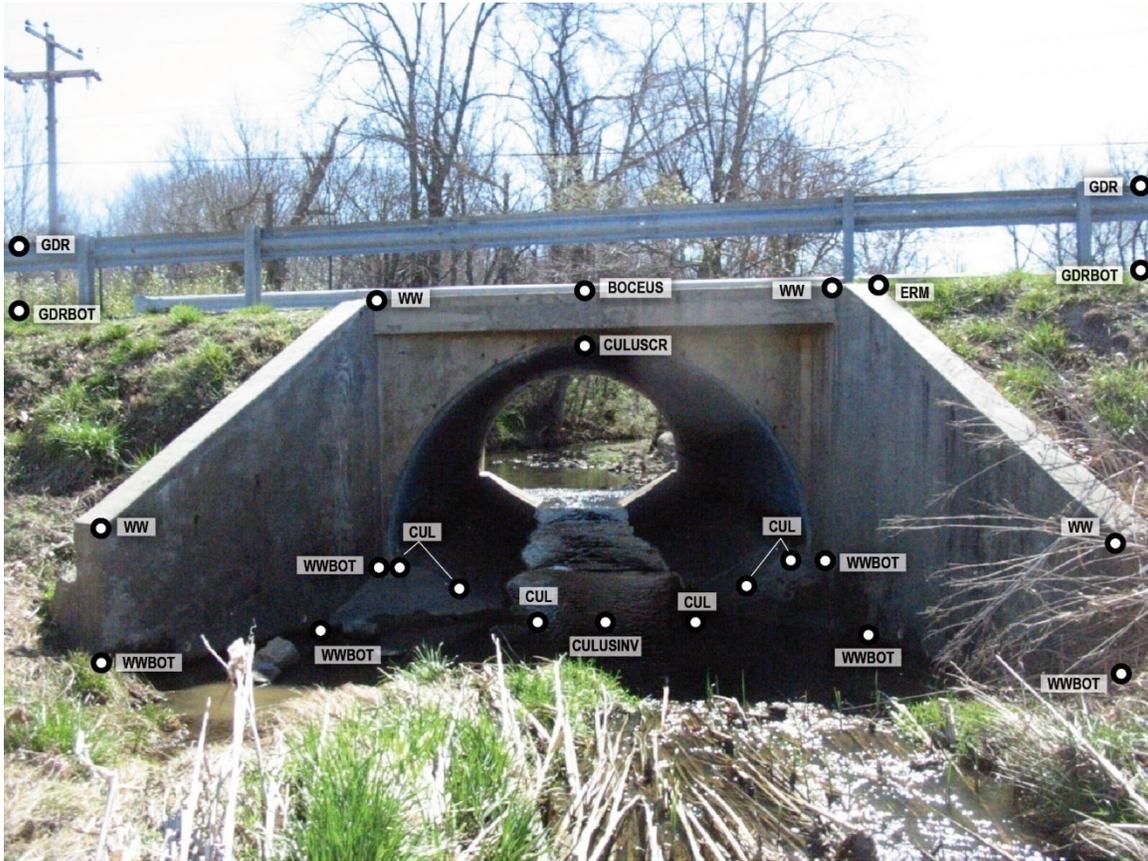


Figure 3. Typical Culvert Photograph: Sanderson Creek SAN-0880 (Displays Survey Code Locations)

# Data Capture Standards Technical Reference

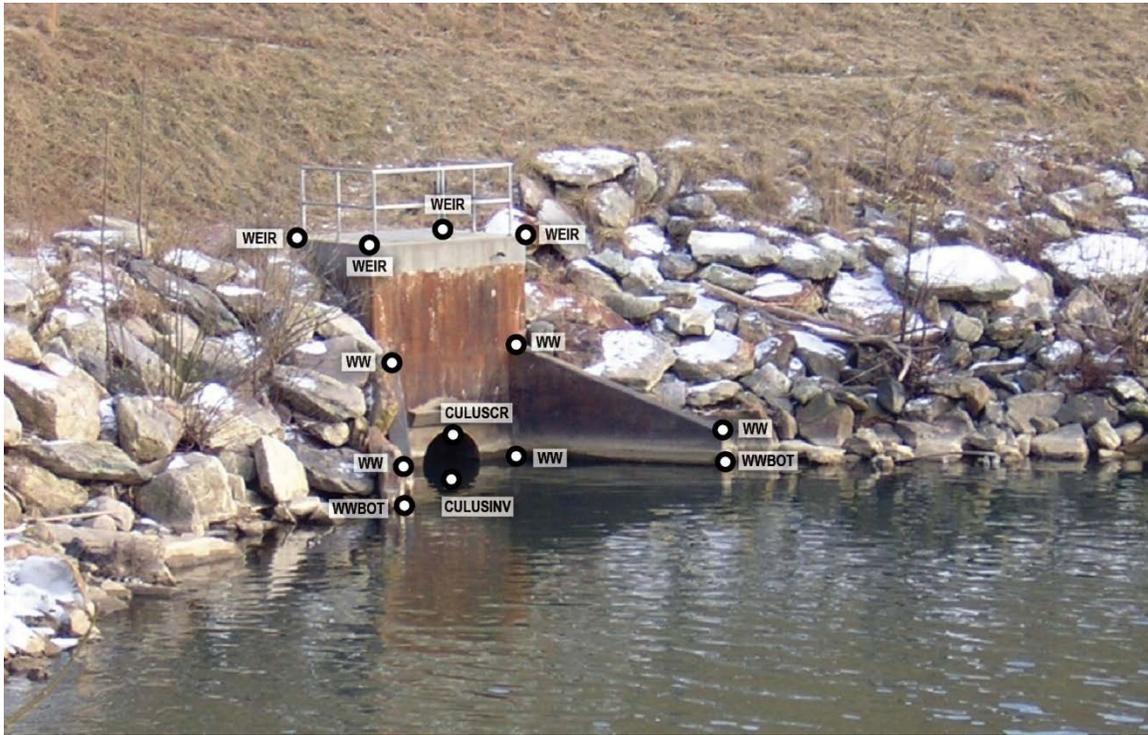


DAM CENTERLINE



SPILLWAY

## Data Capture Standards Technical Reference



OUTLET STRUCTURE

Figure 4. Typical Dam Data (Displays Survey Code Locations)

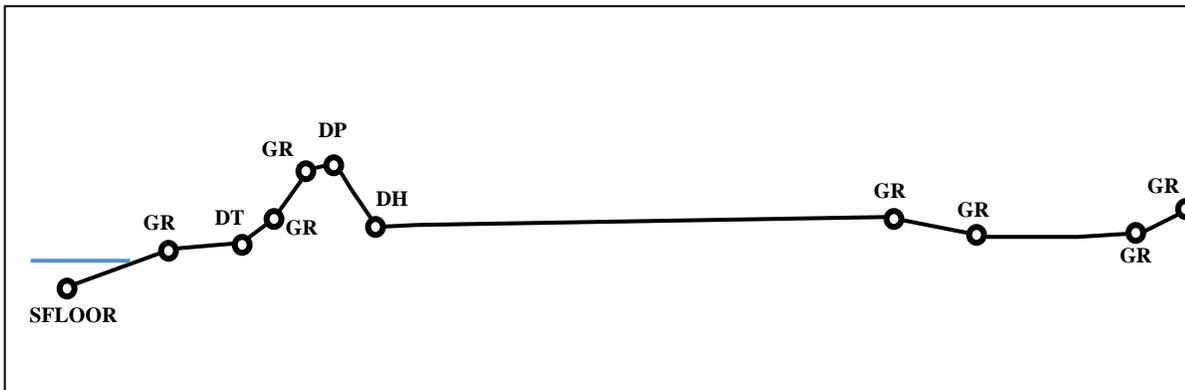


Figure 5. Typical Transect (Displays Survey Code Locations)

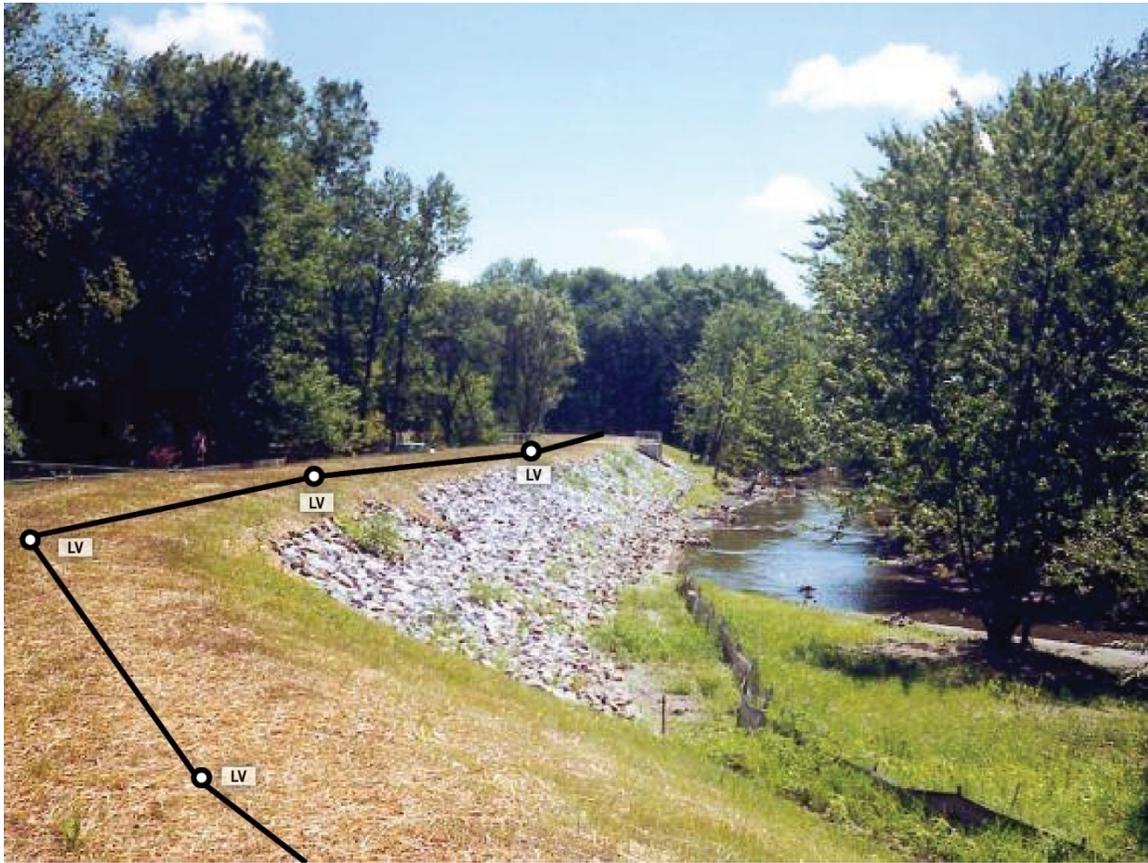


Figure 6. Typical Levee (Displays Survey Code Locations)

## Data Capture Standards Technical Reference

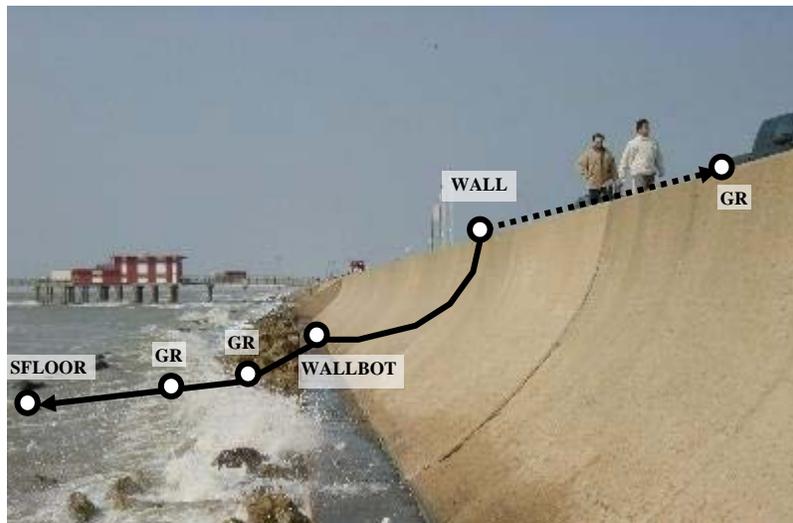


Figure 7. Typical Coastal Structure (Displays Survey Code Locations)

### 5. Deliverables

#### Final Regulatory Products

The required documents that make up the final regulatory products package include the following items. They must be in the digital format and directory structure indicated below and in Section 6. The final paperwork (Transmittal Form, Transmittal Letters, Inventory Worksheets, and CMAL) are currently submitted electronically to the Map Service Center (MSC) via email, FTP, or Sharepoint. The remaining deliverables (FIS Report, FIRM Scans, FIRM Database, Metadata, Orthophotos) are submitted to the MIP and to the MSC on media (i.e., CD/DVD). In the future, all data will be submitted to the MIP only.

#### Transmittal Form

The transmittal form provides a listing of all of the items being submitted to the MSC. It is designed as a checklist to ensure that all contents that constitute the MSC Deliverables Package are included with the submittal to the MSC. The Transmittal Form must be provided in Microsoft Word format. See Appendix B for a sample transmittal form.

#### Transmittal to Community CEO

A transmittal letter to the community CEO (179 Letter) is sent by the MSC to each community, along with the final mapping products distributed by the MSC. Refer to *Appendix A* of the *Document Control Procedures Manual* for the current letter templates.

There must be one letter for each community that appears on a printed map panel of the flood insurance study. For Physical Map Revisions, only communities that lie or appear on a revised printed map panel will receive a letter. The letter must include the current (as of the date the post-preliminary study deliverables are prepared) CEO's name and address, the six-digit community identification number, and the effective date. Each letter must be provided in Microsoft Word format.

#### Inventory Worksheet for Each Community

The Inventory Worksheet is used by the MSC to update the MSC inventory and management information systems. Every community—including the Unincorporated Areas, the countywide or all-jurisdictions mapping number, if applicable, and mapped non-flood-prone and non-participating communities—requires a separate Inventory Worksheet. The Inventory Worksheet must be provided in Microsoft Excel format (XLS/XLSX). The formatting of the standard Inventory Worksheet template must not be modified or otherwise altered. See Appendix C for a sample Inventory Worksheet.

#### Community Map Action List (CMAL)

One copy of the CMAL must accompany each submission to the MSC; however, several communities may be shown on one CMAL, provided that the FIRMs have the same effective date. Each CMAL should list all the communities within the county, including the non-flood-prone communities. Areas Not Included should not be listed. For Physical Map Revisions, only communities that lie or appear on a revised printed map panel should be listed in the CMAL. The CMAL must be provided in Microsoft

## Data Capture Standards Technical Reference

Excel format (XLS/XLSX). See Appendix D for a Community Map Action List and sample. For a more detailed list of the CMAL codes, see Appendix E.

### FIS Report

The FIS report must be submitted in digital format as an unsecure PDF file, with a resolution of 400 dpi. There must be one PDF file per FIS volume that is bookmarked at each of the major headings shown within the table of contents (minimum), and at the start of each flooding source's profile (subject to cost and project-officer approval). The FIS report must also be submitted in Word format and the profiles must be submitted as CADD files (DXF, DWG) or in a RAS-Plot database. The FIS report must conform to the requirements of the *FIS Report Technical Reference*.

The PDF version of the FIS report must be named <ST\_FIPS><PCOMM><VOLUME NUMBER>.pdf. The Word file should conform to the same naming convention.

Examples:

24031CV000B.pdf – Single volume countywide FIS

120234V001A.pdf – Community FIS Volume 1 of 2

120234V002A.pdf – Community FIS Volume 2 of 2

24031CV000B.docx – Single volume countywide FIS

120234V001A.docx – Community FIS Volume 1 of 2

120234V002.docx – Community FIS Volume 2 of 2

### FIRM Scans and World Files

FIRM Scans are the raster images of the FIRM panels and Map Index. The FIRM Scans must be georeferenced. The FIRM Scans of the FIRM panels must conform to the requirements of the *FIRM Panel Technical Reference*. The FIRM Scans of the Map Index must conform to the requirements of the *Flood Insurance Study (FIS) Technical Reference*. The FIRM Scans must be named according to the map number shown on the titleblock of the FIRM panel or Map Index. Color images must be 400 DPI, 24 bit PNG. All images must be accompanied by their world file. The MXD files used to create the FIRM Scans must also be submitted with file names that conform to the same naming convention.

Examples:

#### FIRM Scans

24031C0001A.png – FIRM panel

24031CIND0A.png – Map Index

#### World files for the image files above:

24031C0001A.pgw – FIRM panel

## Data Capture Standards Technical Reference

24031CIND0A.pgw – Map Index

### MXD files

24031C0001A.mxd – FIRM panel

24031CIND0A.mxd – Map Index

### FIRM Database

FIRM Databases must be submitted in Esri Shapefile (SHP) and Esri Personal Geodatabase (PGDB) format. The FIRM Database must conform to the requirements of the *FIRM Database Technical Reference*. When submitted on CD-ROM or DVD-ROM, each FIRM Database must be submitted in a single directory that contains all subordinate subdirectories. The name of this directory is designed to identify the study and whether these data represent an initial FIRM Database or revise an existing FIRM Database. The directory for an initial FIRM Database must be named <CID or County FIPS>\_FIRM, while a submission that replaces a current FIRM Database must be named <CID or County FIPS>\_<Alpha>\_FIRM. Each subsequent revision for which there is a new effective date requires the <Alpha> character to be advanced. To determine the appropriate alpha-character, view the current effective FIRM Database listed under the FIRM Database section of MSC's EDDie. The FIRM Database PGDB files must also conform to the same naming convention. FIRM Database Shapefiles must be named using the table names in the *FIRM Database Technical Reference*.

Examples:

#### Initial FIRM Database Submission Directory

120234\_FIRM – community FIRM Database

12345C\_FIRM – countywide FIRM Database

120234\_A\_FIRM – community FIRM Database that revises a current FIRM Database

12345C\_A\_FIRM – countywide FIRM Database that revises a current FIRM Database

#### FIRM Database

120234\_FIRM.mdb – community FIRM Database

12345C\_FIRM.mdb – countywide FIRM Database

120234\_A\_FIRM.mdb – community FIRM Database that revises a current FIRM Database

12345C\_A\_FIRM.mdb – countywide FIRM Database that revises a current FIRM Database

### Orthophotos

The aerial images and any associated world files that were used to create the FIRM (if applicable) must be submitted. These data should be in the format in which the orthophotos were provided to the FEMA Mapping Partner, unless the appearance of any portion of the orthophotos shown on the FIRM was

## Data Capture Standards Technical Reference

modified by re-projection, re-sampling, etc. In this case, only the modified orthophotos should be submitted.

### Metadata Files

Metadata files should be provided in xml format. The metadata files must conform to the requirements of the *Metadata Profiles Technical Reference*. The metadata files must be named <ST\_FIPS><PCOMM>\_<EFF\_DATE>\_metadata.xml where ST\_FIPS is the two-digit state FIPS code. PCOMM is either the three-digit county FIPS code with a trailing “C” or the four-digit community number. EFF\_DATE is the effective date of the study in YYYYMMDD format. Note that the metadata file name for a revised submission also requires the \_<Alpha> addition to the filename.

Examples:

24031C\_20031217\_metadata.xml – a countywide FIRM Database

241234\_20031217\_metadata.xml – a community FIRM Database

## Final Non-Regulatory Flood Risk Assessment Products

The required documents that make up the final non-regulatory Flood Risk Assessment products package include the following items. They must be in the digital format and directory structure indicated below and in Section 6.

### Flood Risk Products Index

The index provides a listing of the communities covered in the FRD being submitted to the MSC. It is a table designed to ensure that all communities with data in the dataset are accurately represented on the MSC website. See Appendix F for a sample Flood Risk Products Index form. All Regions, states, counties, CIDs, and products associated with the Flood Risk Products submission should be listed.

The Transmittal Form must be provided in Microsoft Excel format. The Index for the Flood Risk Dataset must be named <FRD>\_<MIP Case Number>\_Index.xls

Example:

FRD\_12-04-1234S\_Index.xls

### Flood Risk Database

Flood Risk Databases (FRDs) must be submitted in Esri Shapefile (SHP) and Esri File Geodatabase (fGDB) format. The Flood Depth and Analysis rasters must be submitted in the fGDB and in GeoTIFF format. The FRD must conform to the requirements of the *Flood Risk Database Technical Reference*. Each FRD must be submitted in a single directory that contains all subordinate subdirectories. The FRD must include the final Changes Since Last FIRM (CSLF) and Flood Depth and Analysis Rasters and any available Flood Risk Assessment and/or Areas of Mitigation Interest (AoMIs). The name of this directory is designed to identify the MIP case number for the FRD. The directory for an initial FRD must be named FRD\_<MIP Case Number>. In the event that there will be more than one FRD for one MIP project, a suffix for each county should be used FRD\_<MIP Case Number>\_<FIPS Number>. The FRD fGDB file

## Data Capture Standards Technical Reference

name must be named FRD\_<MIP Case Number>\_<YYYYMMDD> where <YYYYMMDD> is the submittal date of the FRD to FEMA. FRD Shapefiles must be named using the table names in the *Flood Risk Database Technical Reference*. The GeoTIFF versions of the rasters must be named using the file naming convention in the *Flood Risk Database Technical Reference*.

Examples:

Flood Risk Database Submission Directory

FRD\_12-04-1234S – a MIP Project-wide FRD

FRD\_12-04-1234S\_12456C – a county extract of an FRD from a larger MIP Project FRD

Flood Risk Database

FRD\_12-04-1234S\_20130419.gdb

### Metadata Files

Metadata files should be provided in xml format. The metadata files must conform to the *Metadata Profiles Technical Reference*. The metadata files must be named <FEMA Case Number>\_<FRD>\_metadata. The FEMA Case Number is a unique 9-digit number assigned to each flood risk project in yy-rr-rrnnS format. Note that the metadata file name for a county FRD extract also requires the \_<FIPS> addition to the filename.

Examples:

FRD\_12-04-1234S\_metadata.xml – a MIP Project-wide FRD

FRD\_12-04-1234S\_metadata\_12456C.xml – a county extract of an FRD

### Flood Risk Report

The Flood Risk Report (FRR) must be submitted in digital format as an unsecure PDF file, with a resolution of 400 dpi. The FRR must also be submitted in Word format.

The PDF version of the FRR must be named FRR\_<MIP Case Number>\_<YYYYMMDD>.pdf. The <YYYYMMDD> is the submittal date of the FRR to FEMA. The FRR in Word format must also conform to the same naming convention.

Examples:

FRR\_12-04-1234S\_20130419.pdf

FRR\_12-04-1234S\_20130419.docx

### Flood Risk Map

The Flood Risk Map (FRM) must be submitted in digital format as an unsecure PDF file, with a resolution of 400 dpi. The MXD file used to create the FRM must also be submitted.

The PDF version of the FRM must be named FRM\_<MIP Case Number>\_<YYYYMMDD>.pdf. The <YYYYMMDD> is the submittal date of the FRM to FEMA. The FRM in MXD format must also conform to the same naming convention.

## Data Capture Standards Technical Reference

Examples:

FRM\_12-04-1234S\_20130419.pdf

FRM\_12-04-1234S\_20130419.mxd

## 6. MIP Directory Structure and File Formats

Mapping Partners must submit data to the MIP in the file format(s) and in the MIP directory structure shown below for each of their assigned workflow tasks. Where multiple file formats are shown separated by a slash, either is acceptable (e.g., Word/PDF). When multiple file formats are required to be submitted, they are noted as such (e.g., Word and PDF).

The MIP is currently organized with pre-defined directories for each FEMA Region, state, county, community, MIP case number, assigned MIP workflow tasks, and an auto-generated System ID# (Task SYSID), as illustrated below. Note that the directory structure shown in this section represents the structure below the Task SYSIDs that are assigned in the MIP for each workflow task. Directory names are shown in bold for clarification.

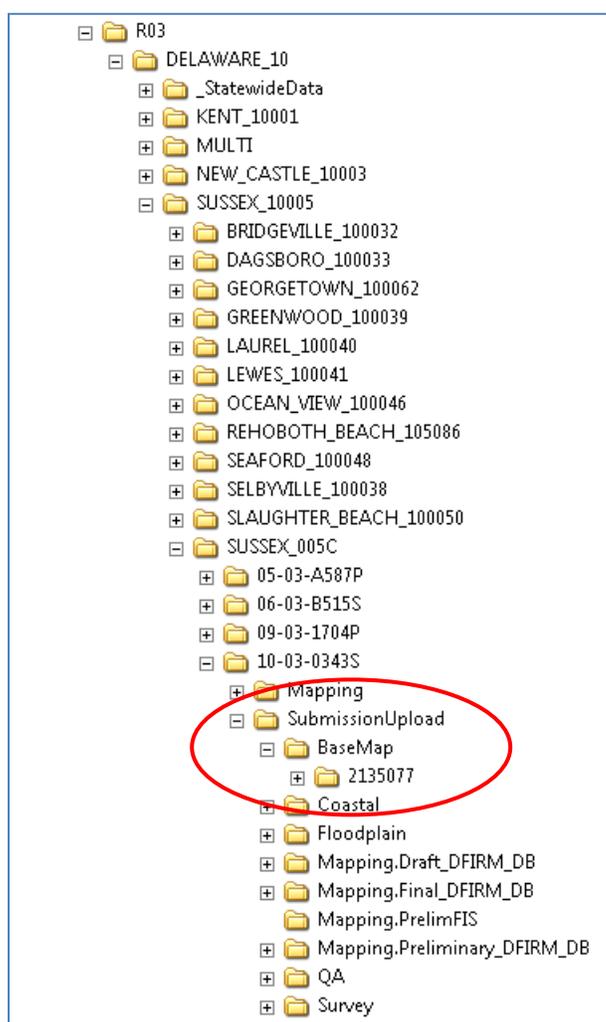


Figure 8 MIP Pre-Defined Directory Structure

## Discovery

### Scoping/Task SYSID

**HUC-8** (use for Riverine data)

#### Discovery

##### General

- Metadata - XML

##### Project\_Discovery\_Initiation

- Project Management Team – Word/PDF
- Discovery Report – Word/PDF

##### Discovery\_Meeting

- Meeting Invitations – Word/PDF
- Meeting Agendas/Meeting Minutes – Word/PDF
- Meeting Attendance Records – Word/PDF
- Meeting Summary – Word/PDF
- Project Charter – Word/PDF

##### Post\_Discovery

- SOW or MAS – Word/PDF
- Geospatial Data Summary – Word/PDF

##### Spatial\_Files

- Community Contact List – (DCS\_L\_Mtg\_POC)  
DBF/PGDB/fGDB/GML
- Source citations (DCS\_L\_Source\_Cit)  
MDB/DBF/PGDB/fGDB/GML
- Political Areas (DCS\_S\_Pol\_Ar) – SHP/PGDB/fGDB/GML
- Transportation (DCS\_S\_Trnsport\_Ln) – SHP/PGDB/fGDB/GML
- Discovery Map (DCS\_S\_Discovery\_Map) –  
SHP/PGDB/fGDB/GML
- Proposed FIRM Panel Index (DCS\_S\_Prp\_FIRMPan) –  
SHP/PGDB/fGDB/GML
- HUC (DCS\_S\_HUC) – SHP/PGDB/fGDB/GML

##### Supplemental\_Data

- All other data collected during Discovery – Format as received

**Water\_Body\_Name** (use for coastal data)

#### Discovery

##### General

- Metadata - XML

##### Project\_Discovery\_Initiation

- Project Management Team – Word/PDF
- Discovery Report – Word/PDF
- Political Areas (DCS\_S\_Pol\_Ar) – SHP/PGDB/fGDB/GML

# Data Capture Standards Technical Reference

- Transportation (DCS\_S\_Trnsport\_Ln) – SHP/PGDB/fGDB/GML
- HUC (DCS\_S\_HUC) – SHP/PGDB/fGDB/GML

## Discovery\_Meeting

- Meeting Invitations – Word/PDF
- Meeting Agendas/Meeting Minutes – Word/PDF
- Meeting Attendance Records – Word/PDF
- Meeting Summary – Word/PDF
- Project Charter – Word/PDF

## Post\_Discovery

- SOW or MAS – Word/PDF
- Geospatial Data Summary – Word/PDF

## Spatial\_Files

- Community Contact List – (DCS\_L\_Mtg\_POC)  
DBF/PGDB/fGDB/GML
- Source citations (DCS\_L\_Source\_Cit)  
MDB/DBF/PGDB/fGDB/GML
- Political Areas (DCS\_S\_Pol\_Ar) – SHP/PGDB/fGDB/GML
- Transportation (DCS\_S\_Trnsport\_Ln) – SHP/PGDB/fGDB/GML
- Discovery Map (DCS\_S\_Discovery\_Map) –  
SHP/PGDB/fGDB/GML
- Proposed FIRM Panel Index (DCS\_S\_Prп\_FIRMPan) –  
SHP/PGDB/fGDB/GML
- HUC (DCS\_S\_HUC) – SHP/PGDB/fGDB/GML

## Supplemental\_Data

- All other data collected during Discovery – Format as received

## Base Map

### BaseMap/Task SYSID

#### HUC-8

##### General

- Project Narrative – Word
- Certification – PDF
- Metadata – XML

##### Correspondence

- Letters; transmittals; memoranda; general status reports and queries; SPRs; technical issues; direction by FEMA; and internal communications, routing slips, and notes – Word/PDF

##### Spatial\_Files

- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP/PGDB/fGDB/GML
- Feature Names– SHP/PGDB/fGDB/GML/text/annotation

# Data Capture Standards Technical Reference

- Orthophotos – BIL/GeoTIFF/IMG/JPEG2000/MrSID/PNG + PGW/georeferenced JPEG/TIF + TFW

## Supplemental\_Data

- Any additional Base Map data collected for use in the preparation of this flood risk project – Format as received

## Terrain

### Terrain/Task SYSID

#### General

- Project Narrative – Word
- Certification – PDF
- Flight plans and logs – Word/PDF
- Mapping Partner and independent QA/QC reports – Word/PDF
- Photogrammetric Reports (if applicable) – Format as received
- Metadata – XML

#### Correspondence

- Letters; transmittals; memoranda; general status reports and queries; SPRs; technical issues; direction by FEMA; and internal communications, routing slips, and notes – Word/PDF

#### Source

##### Raw\_Point\_Cloud\_Data

- LiDAR Data – LAS/ASCII
- LiDAR Tile Index – SHP/PGDB/fGDB

##### Classified\_Point\_Cloud\_Data

- LiDAR Data – LAS/ASCII
- LiDAR Tile Index – SHP/PGDB/fGDB

##### Breaklines

- 3D Breaklines – SHP/PGDB/fGDB/DXF
- 3D Breakline Tile Index – SHP/PGDB/fGDB
- 2D Breaklines – SHP/PGDB/fGDB/DXF
- 2D Breakline Tile Index – SHP/PGDB/fGDB
- Mass Points – SHP/PGDB/fGDB/DXF

##### Bare\_Earth\_DEM

- DEMs – Esri grid/GeoTIFF/ASCII grid
- DEM Tile Index – SHP/PGDB/fGDB

##### Contours

- Contours – SHP/PGDB/fGDB/DXF
- Contour Tile Index – SHP/PGDB/fGDB
- Bathymetric Data – SHP/PGDB/fGDB/DXF
- Bathymetry Tile Index – SHP/PGDB/fGDB

# Data Capture Standards Technical Reference

## TIN

- Uncorrected TIN Files – Esri ArcGIS
- Terrain – Esri ArcGIS
- TIN Tile Index – SHP/PGDB/fGDB

## HDEM

- Hydrologically Corrected DEMs – Esri grid/GeoTIFF/ASCII grid
- Terrain – Esri ArcGIS
- HDEM Tile Index – SHP/PGDB/fGDB

## Final

### Classified\_Point\_Cloud\_Data

- LiDAR Data – LAS/ASCII
- LiDAR Tile Index – SHP/PGDB/fGDB

### Breaklines

- 3D Breaklines – SHP/PGDB/fGDB/DXF
- 3D Breakline Tile Index – SHP/PGDB/fGDB
- 2D Breaklines – SHP/PGDB/fGDB/DXF
- 2D Breakline Tile Index – SHP/PGDB/fGDB
- Mass Points – SHP/PGDB/fGDB/DXF

### Bare\_Earth\_DEM

- DEMs – Esri grid/GeoTIFF/ASCII grid
- DEM Tile Index – SHP/PGDB/fGDB

### Contours

- Contours – SHP/PGDB/fGDB/DXF
- Contour Tile Index – SHP/PGDB/fGDB
- Bathymetric Data – SHP/PGDB/fGDB/DXF
- Bathymetry Tile Index – SHP/PGDB/fGDB

## TIN

- Uncorrected TIN Files – Esri ArcGIS
- Terrain – Esri ArcGIS
- TIN Tile Index – SHP/PGDB/fGDB

## HDEM

- Hydrologically Corrected DEMs – Esri grid/GeoTIFF/ASCII grid
- Terrain – Esri ArcGIS
- HDEM Tile Index – SHP/PGDB/fGDB

## Spatial\_Files

- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP/PGDB/fGDB/GML

## Supplemental\_Data

- As-built drawings – As received
- GIS representations of structures – As received

# Data Capture Standards Technical Reference

- Any additional Terrain data collected for use in the preparation of this flood risk project – Format as received

## Survey

### Survey/Task SYSID

#### HUC-8

##### General

- Project Narrative – Word
- Certification – PDF
- Metadata – XML

##### Correspondence

- Letters; transmittals; memoranda; general status reports and queries; SPRs; technical issues; direction by FEMA; and internal communications, routing slips, and notes – Word/PDF

##### Photos

- Digital Photographs – JPEG/TIFF/BMP

##### Sketches

- Digital Sketches – JPEG/TIFF/BMP/PDF

##### Survey\_Data

- Survey Files – MDB/PGDB/fGDB/XLS/XLSX/DBF/ASCII/CSV

##### Supplemental\_Data

- Any additional Survey data collected for use in the preparation of this flood risk project – Format as received

##### As-Built

- As-Built Data – Format as received

##### Spatial\_Files

- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP/PGDB/fGDB/GML

## Hydrology

### Hydrology/Task SYSID

#### HUC-8

##### General

- Hydrology Report – Word and PDF
- Draft FIS Section 5.1 – Word and PDF
- Project Narrative – Word

# Data Capture Standards Technical Reference

- Certification – PDF
- Metadata – XML

## Correspondence

- Letters; transmittals; memoranda; general status reports and queries; SPRs; technical issues; direction by FEMA; and internal communications, routing slips, and notes – Word/PDF

## Hydrology\_Models

### Watershed\_Name

#### Simulations

- Model input and output files – Native format
- Readme file explaining contents of each named file – TXT

#### Supplemental\_Data

- Database file(s) such as data and analyses for stream and rainfall gages and computations for regional regression equations such as output from USGS PeakFQ, NFF or NSS computer programs – Native format
- Any additional Hydrology data collected for use in the preparation of this flood risk project – Format as received

## Spatial\_Files

- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP/PGDB/fGDB/GML

## Hydraulics

### Hydraulics/Task SYSID

#### HUC-8

##### General

- Hydraulics Report – Word and PDF
- Draft FIS Section 5.2 – Word and PDF
- Project Narrative – Word
- Certification – PDF
- Metadata – XML

##### Correspondence

- Letters; transmittals; memoranda; general status reports and queries; SPRs; technical issues; direction by FEMA; and internal communications, routing slips, and notes – Word/PDF

##### Hydraulic\_Models

###### Stream\_Name (Station)

###### Simulations

- Model input and output files for all flood frequencies required by the task order and floodway analysis – Native format

## Data Capture Standards Technical Reference

- Model input and output files for levee analysis for the 1-percent-annual-chance flood including, if applicable: de-accredited left levee and hold right levee; de-accredited right levee and hold left levee; both levees in place; and both levees de-accredited (for floodway analysis) – Native format
- Model input and output files for levee analyses for all flood frequencies required by the task order [e.g., the 10-, 4-, 2- (normally with levees in place), 1-, 0.2-(normally without levees) percent-annual-chance floods] – Native format

### Profiles

- Profiles – RAS-Plot (MDB)/DXF/DWG

### FWDT

- Floodway Data Tables – MDB/XLS/XLSX/DBF
- Flood Hazard Data Tables – MDB/XLS/XLSX/DBF

### Supplemental\_Data

- Database file(s) such as high water mark data for model calibration – Native format
- Zone A backup files – Native format
- Any additional Hydraulics data collected for use in the preparation of this flood risk project – Format as received

### Spatial\_Files

- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP/PGDB/fGDB/GML

## Alluvial Fan

### AlluvialFan/Task SYSID

#### HUC-8

#### General

- Alluvial Fan Technical Report – Word and PDF
- Draft FIS Section 5.4 – Word and PDF
- Project Narrative – Word
- Certification – PDF
- Metadata – XML

#### Correspondence

- Letters; transmittals; memoranda; general status reports and queries; SPRs; technical issues; direction by FEMA; and internal communications, routing slips, and notes – Word/PDF

#### Hydraulic\_Data

##### Stream\_Name

##### Simulations

# Data Capture Standards Technical Reference

- Model input and output files – Native format

## Profiles

- Profiles – RAS-Plot (MDB)/DXF/DWG

## Hydraulic\_Databases

- Database File(s) – Native format

## FAN\_Program\_Files

### Simulations

- Model input and output files – Native format

## Supplemental\_Data

- Any additional Alluvial Fan data collected for use in the preparation of this flood risk project – Format as received

## Spatial\_Files

- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP/PGDB/fGDB/GML

## Coastal

### Coastal/Task SYSID

#### Water\_Body\_Name

#### Project\_Name

#### General

- Coastal Analyses and Mapping Reports – Word and PDF
- Draft FIS Coastal Hydrology and Coastal Hydraulic Analysis Sections (typically 5.1 and 5.3) – Word and PDF
- FIS Graphics (e.g., SWEL contour map, transect location map) – PDF/JPEG
- FIS Tables – MDB/XLS/XLSX/DBF
- FIS Coastal Profiles – PDF/JPEG/DXF/DWG
- Project Narrative – Word
- Certification – PDF
- Metadata – XML

#### Correspondence

- Letters; transmittals; memoranda; general status reports and queries; SPRs; technical issues; direction by FEMA; and internal communications, routing slips, and notes – Word/PDF

#### Stillwater\_Models

#### Software\_Name

#### Simulations

#### Calibration

# Data Capture Standards Technical Reference

- Model input and output files for calibration runs
  - Native format

## **Verification**

- Model input and output files for verification runs
  - Native format

## **Production\_Runs**

- Model input and output files for production runs including statistical analysis – Native format

## **Coastal\_Databases**

- Database file(s) such as high water marks for model calibration – Native format

## **Supplemental\_Data**

- Any additional data used in the modeling of this flood risk project – Native format

## **Model\_Name**

### **Spatial\_Files**

- Spatial files by model – SHP/PGDB/fGDB/GML

## **Offshore\_Wave\_Models**

### **Software\_Name**

#### **Simulations**

##### **Calibration**

- Model input and output files for calibration runs
  - Native format

##### **Verification**

- Model input and output files for verification runs
  - Native format

##### **Production\_Runs**

- Model input and output files for production runs including statistical analysis – Native format

#### **Coastal\_Databases**

- Database file(s) such as wave buoy data for model calibration – Native format

#### **Supplemental\_Data**

- Any additional data used in the modeling of this flood risk project – Native format

## **Model\_Name**

### **Spatial\_Files**

## Data Capture Standards Technical Reference

- Spatial files by model – SHP/PGDB/fGDB/GML

### Nearshore\_Wave\_Models

#### Software\_Name

##### Simulations

- Model input and output files for WHAFIS 1D wave calculations, runoff calculations, or other overland wave models – Native format
- Wave Envelope Files – PDF and DXF or spatially compatible file

##### Spatial\_Files

- Spatial files by model including Transect Layout file – SHP/PGDB/fGDB/GML

##### Coastal\_Databases

- Database file(s) such as CHAMP or WISE – Native format

##### Supplemental\_Data

- Any additional data used in the modeling of this flood risk project – Native format

### Transects

- Transects (if one-dimensional model was used) – Native format

### Spatial\_Files

- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP/PGDB/fGDB/GML

## Floodplain Mapping / Redelineation

### Floodplain/Task SYSID

#### HUC-8

##### General

- Draft FIS Report – Word and PDF
- FIS Tables – MDB/XLS/XLSX/DBF
- FIS text overflow for Principal Flood Problems and Special Considerations (if necessary) – TXT
- Project Narrative – Word
- Certification – PDF
- Metadata – XML

##### Correspondence

- Letters; transmittals; memoranda; general status reports and queries; SPRs; technical issues; direction by FEMA; and internal communications, routing slips, and notes – Word/PDF

# Data Capture Standards Technical Reference

## Base\_Map

- Orthophotos (if not submitted under Base Map) – BIL/GeoTIFF/IMG/JPEG2000/MrSID/PNG + PGW/JPEG/TIF + TFW

## Spatial\_Files

- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP/PGDB/fGDB/GML

## Topographic\_Data

- Topographic Data Files (if not submitted under Terrain) – LAS/ASCII/SHP (2D or 3D)/PGDB/fGDB/DXF/Esri Grid/GeoTIFF/ASCII Grid/Esri ArcGIS

## Supplemental\_Data

- Rectified effective maps and any other data that was used to re-create effective profiles and delineations – Native format

## Draft Mapping Data

### Mapping.Draft\_DFIRM\_DB/Task SYSID

#### FIPS

##### General

- Metadata – XML
- FIS text overflow for Principal Flood Problems and Special Considerations (if necessary) – TXT

##### Spatial\_Files

- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP and PGDB

## Preliminary Mapping Data

Note that currently the DFIRM Verification Tool (DVT) requires all data used for verification (i.e., SHP files and metadata) to be in the Task SYSID folder.

### Mapping.Preliminary\_DFIRM\_DB/Task SYSID

- Metadata – XML
- FIS text overflow for Principal Flood Problems and Special Considerations (if necessary) – TXT
- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP
- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – PGDB

#### RFIRM

- Preliminary FIRM Panel and Map Index Images – PDF

#### FIS

- Preliminary FIS Report – PDF

## Final Mapping Data

Note that currently the DVT requires all data used for verification (i.e., SHP files and metadata) to be in the Task SYSID folder.

### Mapping.Final\_DFIRM\_DB/Task SYSID

- Metadata – XML
- FIS text overflow for Principal Flood Problems and Special Considerations (if necessary) – TXT
- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – SHP
- FIRM Database files as described in the *FIRM Database Technical Reference* Table 3 – PGDB

### RFIRM

- Final georeferenced FIRM Panel and Map Index Images – PNG + PGW/TIF + TFW

### Ortho\_photos

- Orthoimagery used as base map for FIRMs – BIL/BIP/GeoTIFF/MrSID/PNG + PGW/JPEG/TIF + TFW/ECW

### FIS

- Final FIS Report – Word and Bookmarked PDF
- Profiles – RAS-Plot (MDB)/DXF/DWG

### MSC\_Paperwork

- Transmittal Form – Word
- Transmittal Letters – Word
- Community Map Action List – XLS/XLSX
- Inventory Worksheets – XLS/XLSX

### MXD

- FIRM Panel and Map Index MXD Files – MXD

### FRD\_<CaseNumber>

#### FRD

##### ArcShape

- FRD as described in the *Flood Risk Database Technical Reference* – SHP

##### fGDB

- FRD as described in the *Flood Risk Database Technical Reference* (note that the depth grids and other rasters are included in the fGDB in addition to being submitted as GeoTIFFs in a separate directory) – fGDB

##### Metadata

- Metadata – XML

#### Rasters

## Data Capture Standards Technical Reference

- Depth grids and other rasters – GeoTIFF

### **FRM**

- Flood Risk Map – PDF and MXD

### **FRR**

- Flood Risk Report – PDF and Word

### **NR\_Index**

- Non-Regulatory Flood Risk Products Index of communities within the dataset – XLS/XLSX

## QA Reports

### **QA/Task SYSID**

#### **FIPS**

#### **MIP\_Reports**

- DVT or other MIP reports, MIPHelp emails, etc. – As received

## Post Preliminary

The Post Preliminary files must be submitted as a .ZIP file for each of the data categories organized in the following directory structure.

### **LFD/Task SYSID**

#### **FIPS**

#### **Post\_Preliminary**

##### **General**

- Final Project Narrative – Word
- Certification – PDF
- Checklists – Word/PDF

##### **Correspondence**

- Letters; transmittals; memoranda; general status reports and queries; SPRs; technical issues; direction by FEMA; and internal communications, routing slips, and notes – Word/PDF

##### **FBS**

- Preliminary Self-Certification – PDF
- Final Self-Certification – PDF

##### **FEDD**

- FEDD files (one file per community) – PDF

## Non-Regulatory Flood Risk Data

There is not yet a pre-defined MIP directory structure for the non-regulatory flood risk data.

# Data Capture Standards Technical Reference

## Flood\_Risk\_Data

### HUC-8

#### General

- Project Narrative – Word
- Certification – PDF
- Metadata – XML

#### Correspondence

- Letters; transmittals; memoranda; general status reports and queries; SPRs; technical issues; direction by FEMA; and internal communications, routing slips, and notes – Word/PDF

## Flood\_Risk\_Source\_Data

### Datasets

#### CSLF

- Input and output data associated with the Changes Since Last FIRM dataset (not the actual CSLF dataset which is submitted with the FRD) – Native format

#### FDAG

- Input and output data associated with the Flood Depth and Associated Grids dataset (not the actual grids which are submitted with the FRD) – Native format

#### FRA

- Input and output data associated with the Flood Risk Assessment dataset, which include Hazus data (not the actual Risk Assessment dataset which is submitted with the FRD) – Native format (.hpr files for Hazus data)

#### AOMI

- Input and output data associated with the Areas of Mitigation Interest dataset (not the actual AOMI dataset which is submitted with the FRD) – Native format

### Products

#### FRD

- Input and output data associated with the Flood Risk Database (not the actual FRD which is submitted with the final mapping data) – Native format

#### FRR

- Input and output data associated with the Flood Risk Report (not the actual FRR which is submitted with the FRD) – Native format

#### FRM

## Data Capture Standards Technical Reference

- Input and output data associated with the Flood Risk Map (not the actual FRM which is submitted with the FRD) – Native format

### **Supplemental\_Data**

- Any additional data used to assist in the preparation of this flood risk project – Native format

## Appendix A. File Format Acronyms List

The following acronyms are used in the list of file format(s) shown in the directory structure.

ASCII – American Standard for Information Interchange

BIL – Band Interleaved by Line

BIP – Band Interleaved by Pixel

BMP – Bitmap image file

CSV – Comma Separated Values

DBF – dBase DataBase File

DXF – AutoCAD Drawing Interchange Format or Drawing Exchange Format

DWG – AutoCAD DraWinG file

ECW – ERDAS Enhanced Compression Wavelet

Esri grid – Esri raster file format

fGDB – Esri File Geodatabase

GML – Geographic Markup Language

GeoTIFF – Georeferenced TIFF

IMG – Image file

JPEG/JPEG2000 – Joint Photographic Experts Group

LAS – LASer (ASPRS)

MDB – Microsoft Access Database

MrSID – LizardTech Multiresolution Seamless Image Database

MXD – Esri ArcMap document

PDF – Adobe Portable Document Format

PGDB – Esri Personal Geodatabase

PGW – PNG World File

PNG – Portable Network Graphics

SHP – Esri Shapefile

TFW – TIFF World File

TIFF – Tagged Image File Format

## Data Capture Standards Technical Reference

TIN – Triangulated Irregular Network

TXT – Text file

Word – Microsoft Word .doc or .docx file format

XLS/XLSX – Microsoft Excel format

XML – Extensible Markup Language

## Appendix B. Transmittal Form

### TRANSMITTAL FORM

#### 1. Point of Contact:

\_\_\_\_\_  
Name of PTS Contractor

\_\_\_\_\_  
Name/Title

\_\_\_\_\_  
Address

\_\_\_\_\_  
Phone Number

\_\_\_\_\_  
Email

\_\_\_\_\_  
Name of Study / CID

\_\_\_\_\_  
Effective Date

#### 2. MSC Deliverables Package:

Transmittal Letter(s)

LFD Letter

Inventory Worksheet

CMAL

RFIRM (PNG w/PGW)

OrthoImagery (w/world files)

FIS Report (PDF)

Metadata (XML)

Shapefiles (SHP w/PRJ)

Geodatabase (PGDB)

## Data Capture Standards Technical Reference

### Appendix C. Inventory Worksheet

<b>INVENTORY WORKSHEET</b>		
TWO COLOR? YES:    NO: ✓		PTS: STARR
EFFECTIVE DATE: 11/18/2009		PROGRAM STATUS: R
COMMUNITY NUMBER: 470267		MAPPING PARTNER: AMEC
STATE AND COUNTY NUMBER (FIPS): 47145		COUNTY CODE: 145
COMMUNITY NAME: Roane County*		STATE/REGION: TN/04
COUNTY NAME: Roane County		<b>MSC USE ONLY</b> DATE DIGITAL RECEIVED:
PRINT TYPE            NEW:            REV: ✓		

NEW/REVISED FIRMS		STUDY/ FLOODWAYS		OBSOLETE
PANEL & SUFFIX	QTY TO TRANSFER	PANEL & SUFFIX	QTY TO TRANSFER	PANEL & SUFFIX
47145CIND0B		47145CV000B		47145CIND0A
47145C0093G				47145C0093F
47145C0094G				47145C0094F
47145C0113G				47145C0113F
47145C0140G				47145C0140F
47145C0145G				47145C0145F
47145C0160G				47145C0160F
47145C0170G				47145C0170F
47145C0180G				47145C0180F
47145C0185G				47145C0185F
47145C0190G				47145C0190F
47145C0195G				47145C0195F
47145C0205G				47145C0205F
47145C0206G				47145C0206F
47145C0207G				47145C0207F
47145C0210G				47145C0210F
47145C0215G				47145C0215F
47145C0220G				47145C0220F
47145C0226G				47145C0226F



# COMMUNITY MAP ACTION LIST

## REVIEW CONTRACTOR: Michael Baker Corp

Effective Date: January 19, 2006

List Number:

State	FIA Community Number	Community Name (County Name)	Printed Panel(s) & Suffix	Inland/Coastal	Hazard	60.3 Code	Program Status	Map Status		Initial Map Date		Printed Floodway Panels	Location of Map Repository including phone number	Comments
								FHBM	FIRM	FHBM	FIRM			
MO	290813	Linn County (Unincorporated Areas)	INDOA 0025C	I	FL	D	2	1	3		12/15/83		Linn County Courthouse 108 North High Street Linneus, MO 64653 (555) 123-4567	
			0045C, 0050C, 0075C, 0100C, 0125C, 0150C, 0160C, 0170C, 0175C, 0200C, 0225C, 0250C, 0270C, 0275C, 0285C, 0295C, 0300C, 0315C, 0320C, 0325C, 0350C, 0375C, 0400C, 0425C, 0450C, 0455C, 0460C, 0500C											
MO	290214	City of Brookfield (Linn County)	INDOA 0316C 0320C	I	FL	D	2	5	3		02/01/74 07/16/90		City Hall 116 West Brooks Street Brookfield, MO 64628 (555) 123-4568	
MO	290619	City of Browning (Linn County)	INDOA 0045C	I	FL	B	2	5	3		02/21/75 09/18/85		City Hall 313 West Main Street Browning, MO 64630 (555) 123-4569	
MO	290913	City of Bucklin (Linn County)	INDOA 0350C	I	NF	A	2	1	2				City of Bucklin 22 North Livingston Street Bucklin, MO	
MO	290557	City of Laclede (Linn County)	INDOA 0295C	I	FL	B	2	4	2		06/25/76		City Hall 607 Pershing Drive Laclede, MO 64651 (555) 123-4590	
MO	290563	City of Linneus (Linn County)	INDOA 0170C	I	FL	B	2	4	3		07/11/75		City of Linneus 207 North High Street Linneus, MO 64653	
			0175C, 0285C, 0300C											

## Appendix E. Community Map Action List Codes

### Community Map Action List Select Category Codes and their Usage

August 2, 2006

The FEMA Map Service Center (MSC) has created this document with the assistance of FEMA’s Community Assistance Section to help identify the proper usage of select category codes found on the Community Map Action List (CMAL). The intent of this document is to reduce the data entry errors found on CMALs that are submitted to the MSC as part of the MSC Deliverables Package. The tables provided below correspond to select categories of the CMAL. Each table includes the various codes found in that category and a detailed description of each code’s usage.

Column: INLAND/COASTAL – (only one code can be selected for a community):

CMAL Code	Explanation and Usage of Code
I – Inland	Used for inland flooding. Should be used if the 60.3 code shown in the LFD is “b”, “c”, or “d”.
C – Coastal	Used for coastal flooding. Should be used if the 60.3 code shown in the LFD is “e”.
IC – Inland and Coastal	Used if a community is affected by both inland and coastal flooding. Should be used if the 60.3 code shown in the LFD is either “b”, “c”, or “d” and “e”.

Column: HAZARD – (only one code can be selected for a community):

CMAL Code	Explanation and Usage of Code
“FL” – Flood	Used if the community has SFHAs identified. SFHAs consist of Zones AE, AO, AH, AR, A99, A1-A30, VE, VO, and V1-V30 included on FHBM/FIRM). Do not use this code for communities with only Zones A or V; use “MF” for minimally flood-prone instead.
“MS” – Mudslide	Used if the community is subject to mudslides (Zones M, N, and/or P shown on FHBM/FIRM. Maps may be published or non-published).
“ER” – Erosion	Used if the community is subject to erosion hazards (Zone E shown on FHBM/FIRM).
“NF” – Non-floodprone	Used if the community has no SFHAs identified (Only Zones B, C, or X shown on FHBM/FIRM).
“MF” – Minimally floodprone	Used if the community has only unnumbered/unlettered Zones A or V identified.
“DF” – Undetermined but possible flood hazard	Used if the community has undetermined but possible flood hazards (Zone D shown on FHBM/FIRM. Maps may be published or non-published).

Column: PROGRAM STATUS – (only one code can be selected for a community)

CMAL Code	Explanation and Usage of Code
1 – Emergency	Community participates in the Emergency Program.
2 – Regular	Community participates in the Regular Program.
3 – Not participating, no map	Community is non-participating in the NFIP and is not shown on a FHBM/FIRM.
4 – Not participating, with map	Community is non-participating in the NFIP and is shown on a FHBM/FIRM.
5 – Withdrew	Community has withdrawn from the NFIP.
6 – Suspended	Community is currently suspended from the NFIP.
7, 8, and 9	Internal codes. Contact MSC before use.

Column: MAP STATUS (FHBM) – (only one code can be selected for a community)

## Data Capture Standards Technical Reference

CMAL Code	Explanation and Usage of Code
1 – Never mapped	A FHBM was never produced for the community. Leave the date field on the CMAL blank.
2 – Original	The FHBM is the original for the community. The effective date of the map should be recorded on the CMAL.
3 – Revised	The original FHBM was revised by another FHBM. The revision date of the map should be recorded in the notes section of the CMAL.
4 – Rescinded	The FHBM was rescinded. The date of and reason for the rescission should be recorded in the notes section of the CMAL.
5 – Superseded by FIRM	The FHBM was superseded by a FIRM. The effective date of the FIRM represents the date on which the FHBM was superseded.

Column: MAP STATUS (FIRM) – (only one code can be selected for a community):

CMAL Code	Explanation and Usage of Code
1 – Never mapped	A FIRM has never been produced for the community. Leave the date field on the CMAL blank.
2 – Original	The FIRM represents the first FIRM for the community that contains SFHAs with BFEs. For FIRMs produced in the non-countywide format, the date of the FIRM is identified as “Effective Date” on the title block. This FIRM’s effective date would be listed in CIS under the initial FIRM field.
3 – Revised	The current FIRM for the community is being superseded by a new FIRM (the FIRM is being revised). For FIRMs produced in the non-countywide format, the date of the FIRM is identified as “Map Revised” on the title block. The FIRM must contain SFHAs with BFEs.
4 – Rescinded	The FIRM was rescinded. The date of, and reason for, the rescission should be recorded in the notes section of the CMAL.
5 – All Zone C/X – No published FIRM	The community is participating in the Regular Program as non-flood prone with no published FIRM (identified NSHFA community). This code can be used for non-participating communities; however, they will not be sanctioned after one year if they fail to adopt.
6 – All Zones A & C/X – no elevation determined	The community is either non-participating or participating in the Regular Program as minimally flood-prone and the published FIRMs include only Zones A and C/X.
7 – All Zones A & C/X – original FIRM by letter	The community is participating in the Regular Program as minimally floodprone and the FHBM was converted to a FIRM by letter. In the rarest of occasions, this code may apply to non-participating communities.
8 – All Zone D – no published FIRM	The community is all Zone D and there is no published FIRM. This code can apply to non-participating or participating communities.
9 – All Zone D – with published FIRM	The community is all Zone D with a published FIRM. This code can apply to non-participating or participating communities.
10 – All Zone C/X – with published FIRM	The community is all Zone C/X and a FIRM was published. If used for non-participating communities, they will not be sanctioned after one year if they fail to adopt.

## Appendix F. Flood Risk Products Index Form

A sample Flood Risk Products Index form is shown below. All Regions, states, counties, CIDs, and products associated with the Flood Risk Products submission should be listed.

### Flood Risk Products Index Case Number 12-04-1235S

<b>Region</b>	4
<b>State</b>	GA
	AL
<b>FRR</b>	FRR_12-04-1235S_20130606.pdf
<b>FRM</b>	FRM_12-04-1235S_20130606.pdf
<b>FRD</b>	FRD_12-04-1235S_20130606.gdb
<b>GeoTiffs</b>	Depth_01pct.gtiff
	Depth_02pct.gtiff
	Depth_04pct.gtiff
	Depth_10pct.gtiff
	Depth_0_2pct.gtiff
	Depth_01plus.gtiff
	WSE_01pct.gtiff
	WSE_02pct.gtiff
	WSE_04pct.gtiff
	WSE_10pct.gtiff
	WSE_0_2pct.gtiff
<b>County</b>	13456
	12456
<b>CIDs</b>	12345C
	123456
	123455
	123466
	124893
	124897