



FEMA

MISSOURI STATE EMERGENCY MANAGEMENT AGENCY COOPERATING TECHNICAL PARTNERS MAPPING ACTIVITY STATEMENT

Mapping Activity Statement No. 16 – Digital Flood Insurance Rate Map Production and Development of Updated Flood Data

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated June 17, 1999 between Missouri State Emergency Management Agency and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. 16 is as follows:

SECTION 1—OBJECTIVE AND SCOPE

The objective of the Flood Map Project documented in this MAS is to develop a Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for the counties in Table 1.1. The DFIRM and FIS report will be produced in the FEMA County-wide format. In addition, the Mapping Partners involved in this project will develop new and/or updated flood hazard data, for the flooding sources summarized in Table 1.1.

Table 1.1 - Flooding Source(s) to be Studied

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Clay County						
Brushy Creek	1.6 miles upstream from county boundary	1.6	X	X	N/A	N/A
Brushy Creek Trib 1	1.5 miles upstream from confluence with Brushy Creek	1.5	X	X	N/A	N/A
Brushy Creek Trib 2	0.8 miles upstream from confluence with Brushy Creek	0.8	X	X	N/A	N/A
Cates Branch	3.0 miles upstream from confluence with Town Branch	3.0	X	X	N/A	N/A
Clear Creek	10.9 miles upstream from confluence with Fishing River	10.9	X	X	N/A	N/A
Clear Creek trib 15	0.7 miles upstream from confluence with Clear Creek	0.7	X	X	N/A	N/A
Clear Creek trib 15.1	1.2 miles upstream from confluence with Clear Creek Tributary 15	1.2	X	X	N/A	N/A
Crockett Creek	2.8 miles upstream from confluence with Holmes Creek	2.8	X	X	N/A	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Crockett Creek Trib 3	0.5 miles upstream from confluence with Crockett Creek	0.5	X	X	N/A	N/A
Crockett Creek Trib 4	0.7 miles upstream from confluence with Crockett Creek	0.7	X	X	N/A	N/A
Dry Creek	1.3 miles upstream from confluence with Missouri River	1.3	X	X	N/A	N/A
Dry Creek Trib 3	0.1 miles upstream from confluence with Dry Creek	0.1	X	X	N/A	N/A
Dry Fork Fishing River	3.0 miles upstream from confluence with East Fork Fishing River	3.0	X	X	N/A	N/A
East Creek	0.6 miles upstream from county boundary	0.6	X	X	N/A	N/A
East Fork Fishing River	8.3 miles upstream from confluence with Fishing River	8.3	X	X	N/A	N/A
East Fork Fishing River Trib 2	0.8 miles upstream from confluence with East Fork Fishing River	0.8	X	X	N/A	N/A
First Creek	2.7 miles upstream from county boundary	2.7	X	X	N/A	N/A
Fishing River	22.8 miles upstream from county boundary	22.8	X	X	N/A	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Holmes Creek	6.4 miles upstream from confluence Fishing River	6.4	X	X	N/A	N/A
Little Platte River	4.3 miles upstream from county boundary	4.3	X	X	N/A	N/A
Little Shoal Creek	5.4 miles upstream from confluence with Shoal Creek	5.4	X	X	N/A	N/A
Little Shoal Creek Trib 2	2.5 miles upstream from confluence with Little Shoal Creek	2.5	X	X	N/A	N/A
Little Shoal Creek Trib 3	1.4 miles upstream from confluence with Little Shoal Creek	1.4	X	X	N/A	N/A
Little Shoal Creek Trib 4	1.8 miles upstream from confluence with Little Shoal Creek	1.8	X	X	N/A	N/A
Mill Creek	4.0 miles upstream from confluence with Shoal Creek	4.0	X	X	N/A	N/A
Missouri River Provided by WSC	County Boundary to County Boundary	14.6	X	X	N/A	N/A
Missouri River trib 4	0.4 to 0.8 miles upstream from confluence with Missouri River	0.4	X	X	N/A	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Missouri River trib 4.1	0.6 miles upstream from confluence with Missouri River Trib 4	0.6	X	X	N/A	N/A
Muddy Fork	10.0 miles upstream from confluence with Clear Creek	10.0	X	X	N/A	N/A
Owens Branch	3.0 miles upstream from confluence with Little Platte River	3.0	X	X	N/A	N/A
Owens Branch Tributary 11	0.9 miles upstream from confluence with Owens Branch	0.9	X	X	N/A	N/A
Polecat Creek	0.3 miles upstream from confluence with Wilkerson Creek	0.3	X	X	N/A	N/A
Rock Creek	1.0 mile upstream from confluence with Fishing River	2.9	X	X	N/A	N/A
	1.1 mile to 1.4 miles upstream from confluence with Mill Creek					
	1.6 miles upstream from confluence with Missouri River					

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Rock Creek Tributary	2.6 miles upstream from confluence with Rock Creek	2.6	X	X	N/A	N/A
Rock Creek trib 11	0.1 miles upstream from confluence with Dry Creek	0.1	X	X	N/A	N/A
Rocky Branch	2.0 miles upstream from confluence with Wilkerson Creek	2.0	X	X	N/A	N/A
Rush Creek	3.5 miles upstream from confluence with Missouri River 8.5 to 9.6 miles upstream from confluence with Missouri River	5.2	X	X	N/A	N/A
Second Creek	2.1 miles upstream from confluence with Little Platte River	2.1	X	X	N/A	N/A
Shoal Creek	7.9 miles upstream from confluence with Missouri River 8.3 miles to 12.0 miles upstream from confluence with Missouri River	12.6	X	X	N/A	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Shoal Creek	15.7 miles to 16.5 miles upstream from confluence with Missouri River					
Shoal Creek trib 20	1.2 miles upstream from confluence with Shoal Creek	1.2	X	X	N/A	N/A
Shoal Creek trib 20.1	0.5 miles upstream from confluence with Shoal Creek Trib 20	0.5	X	X	N/A	N/A
Town Branch	2.3 miles upstream from confluence with Shoal Creek	2.3	X	X	N/A	N/A
Wilkerson Creek	7.7 miles upstream from confluence with Little Platte River	7.7	X	X	N/A	N/A
Wilkerson Creek Trib 20	1.6 miles upstream from confluence with Wilkerson Creek	1.6	X	X	N/A	N/A
Wilkerson Creek Trib 3	0.3 miles upstream from confluence with Wilkerson Creek	0.3	X	X	N/A	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Williams Creek	9.1 miles upstream from confluence with Fishing River	9.1	X	X	N/A	N/A
Williams Creek Trib 15	0.6 miles upstream from confluence with Williams Creek	0.6	X	X	N/A	N/A
Crawford County						
Meramec River	19.5 to 20.2 miles upstream from county boundary	0.7	N/A	N/A	X	N/A
Whittenburg Creek	2.3 to 2.9 miles upstream from Meramec River	0.6	N/A	N/A	X	N/A
Yadkin Creek	2.3 miles upstream from Whittenburg Creek	2.3	N/A	N/A	X	N/A
Henry County						
Coal Creek	2.6 to 5.1 miles upstream from confluence with South Grand River	2.5	N/A	N/A	X	N/A
Deer Creek	1.8 to 4.3 miles upstream from confluence with Coal Creek	2.5	N/A	N/A	X	N/A
South Grand River Trib 24	1.5 miles upstream of confluence	1.52	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Town Creek	2.9 to 6.7 miles upstream from confluence with South Grand River	3.8	N/A	N/A	X	N/A
Town Creek Trib 5	0.62 miles upstream of confluence	0.62	N/A	N/A	X	N/A
Howell County						
Burton Branch	1.7 miles upstream from confluence with South Fork Howell Creek	1.7	N/A	N/A	X	N/A
Drainage Ditch Number 2	0.2 miles upstream from confluence with Eleven Point River	0.2	N/A	N/A	X	N/A
Drainage Ditch Number 2	0.06 miles upstream of Drainage Ditch Number 1	0.1	X	X	N/A	N/A
Drainage Ditch Number 3	1.0 miles upstream from confluence with Eleven Point River	1.0	N/A	N/A	X	N/A
Eleven Point River	30.8 to 33.0 miles upstream from county boundary	2.2	N/A	N/A	X	N/A
Eleven Point River	North of Willow springs downstream 4.6	4.6	X	X	N/A	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Eleven Point River trib 2	0.3 miles upstream from confluence with Eleven Point River	0.3	N/A	N/A	X	N/A
Howell Creek	13.5 to 14.5 miles upstream from county boundary	1.0	N/A	N/A	X	N/A
Jam Up Creek	1.0 to 3.5 miles upstream from county boundary	2.5	N/A	N/A	X	N/A
Mustion Creek	6.3 to 6.8 miles upstream from confluence with Howell Creek	0.5	N/A	N/A	X	N/A
North Fork Howell Creek	2.5 miles upstream from confluence with Howell Creek	2.5	N/A	N/A	X	N/A
Drainage Ditch No. 1	1.33 miles upstream of confluence	1.33	N/A	N/A	X	N/A
Drainage Ditch No. 1	0.33 miles	0.33	X	X	N/A	N/A
Drainage Ditch No. 4	3.4 miles upstream of confluence	3.4	N/A	N/A	X	N/A
Drainage Ditch No. 4	0.9 from Eleven Point River	0.9	X	X	N/A	N/A
South Fork Howell Creek	3.4 miles upstream from confluence with Howell Creek	3.4	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Johnson County						
Bear Creek Trib	0.9 miles to 2 miles upstream from confluence with Bear Creek	1.1	N/A	N/A	X	N/A
Small Creek Trib	0.3 miles upstream from confluence with Bear Creek Tributary	0.3	N/A	N/A	X	N/A
Laclede County						
Atchley Branch	1.5 miles upstream from confluence with Goodwin Hollow	1.5	N/A	N/A	X	N/A
Beacon Branch	1.0 miles upstream from confluence with Highland Park Branch	1	N/A	N/A	X	N/A
Bear Creek	15.6 to 18.3 miles upstream from confluence with Gasconade River	2.7	N/A	N/A	X	N/A
Dry Auglaize Creek	18.9 to 23.4 miles upstream from county boundary	4.5	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Goodwin Hollow	12.6 to 19.0 miles upstream from confluence with Dry Auglaize Creek	6.4	N/A	N/A	X	N/A
Goodwin Hollow Creek Trib 15	0.4 miles upstream from confluence with Goodwin Hollow	0.4	N/A	N/A	X	N/A
Highlan Park Branch	0.8 miles upstream from confluence with North Cobb Creek	0.8	N/A	N/A	X	N/A
Holman Branch	0.3 miles upstream from confluence with Dry Auglaize Creek	0.3	N/A	N/A	X	N/A
Liberty Branch	3.3 miles upstream from confluence with Goodwin Hollow	3.3	N/A	N/A	X	N/A
Liberty Branch Trib 1	0.1 miles upstream from confluence with Liberty Branch	0.1	N/A	N/A	X	N/A
North Cobb Creek	11.5 to 13.3	1.8	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
	miles upstream from confluence with Osage Fork Gasconade River					
North Cobb Creek Trib 7	2.4 miles upstream from confluence with North Cobb Creek	2.4	N/A	N/A	X	N/A
Radio Tower Branch	4.0 miles upstream from Goodwin Hollow	4	N/A	N/A	X	N/A
Radio Tower Branch Trib 1	0.4 miles upstream from Radio Tower Branch	0.4	N/A	N/A	X	N/A
Lafayette County						
Fire Prairie Creek	0.8 miles upstream from confluence with Missouri River	0.8	N/A	N/A	X	N/A
Little Sni.A.Bar Creek	1.2 miles upstream from confluence with Missouri River	1.2	N/A	N/A	X	N/A
Missouri River Provided by WSC	County boundary to County boundary	44.8	X	X	N/A	N/A
Missouri River Trib 4	2.4 miles upstream from confluence with Missouri River	2.4	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Missouri River Trib 12	1.7 miles upstream from confluence with Missouri River	1.7	N/A	N/A	X	N/A
Sni.A.Bar Creek	0.6 miles upstream from confluence with Missouri River	0.6	N/A	N/A	X	N/A
Sni.A.Bar Creek Tib 26	3.7 miles upstream from confluence with Sni.A.Bar Creek	3.7	N/A	N/A	X	N/A
Lawrence County						
Chat Creek	0.8 miles to 2.8 miles upstream from confluence with Douger Branch	2.0	N/A	N/A	X	N/A
Clear Creek	3.9 miles to 5.2 miles upstream from county boundary	1.3	N/A	N/A	X	N/A
Larkins Branch	0.6 miles upstream from confluence with Clear Creek	0.6	N/A	N/A	X	N/A
Unnamed Tributary	2.2 miles to 3.2 miles upstream from confluence with Williams Creek	1.0	N/A	N/A	X	N/A
Unnamed Tributary	0.4 miles to 2.3 miles upstream	1.9	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Number 1	from confluence with Chat Creek					
Williams Creek	4.8 miles to 6.2 miles upstream from confluence with Spring River	1.4	N/A	N/A	X	N/A
Newton County						
Buffalo Creek	8.9 miles to 13.1 miles upstream from county boundary	4.2	N/A	N/A	X	N/A
Culpepper Creek	4.4 miles upstream from confluence with Shoal Creek	4.4	N/A	N/A	X	N/A
Grandby Creek	2.3 miles to 4 miles upstream from confluence with Culpepper Creek	1.7	N/A	N/A	X	N/A
Hatchery Branch	1.8 miles upstream from confluence with Hickory Creek	1.8	N/A	N/A	X	N/A
Hickory Creek	4.1 miles upstream from confluence with Shoal Creek	4.1	N/A	N/A	X	N/A
High School Branch	2 miles upstream from confluence with Hickory Creek	2.0	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Little Lost Creek	2.8 miles upstream from confluence with Lost Creek	2.8	N/A	N/A	X	N/A
Lost Creek	2.2 miles upstream from county boundary	2.2	N/A	N/A	X	N/A
MacDougal Branch	0.5 miles upstream from confluence with Little Lost Creek	0.5	N/A	N/A	X	N/A
Shoal Creek	10.9 miles upstream from county boundary	17.9	N/A	N/A	X	N/A
	23.8 miles to 26.8 miles upstream from county boundary					
	33.2 miles to 34.9 miles upstream from county boundary					
	40.7 miles to 43.1 miles upstream from county boundary					
South Creek	2.6 miles upstream from confluence with Thurman Creek	2.6	N/A	N/A	X	N/A
South Indian Creek	3.3 miles to 5.4 miles upstream	2.1	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
	from confluence with Indian Creek					
Tin Cup Creek	1.6 miles upstream from confluence with Shoal Creek	1.6	N/A	N/A	X	N/A
Thurman Creek	5.7 miles upstream from confluence with Shoal Creek	5.7	N/A	N/A	X	N/A
West High School Branch	0.8 miles upstream from confluence with High School Branch	0.8	N/A	N/A	X	N/A
Wolf Creek	0.9 miles upstream from confluence with Culpepper Creek	0.9	N/A	N/A	X	N/A
Platte County						
Bear Creek	5 miles upstream from confluence with Missouri River	5.0	X	X	N/A	N/A
Bee Creek	21.8 miles to 23 miles upstream from confluence with Missouri River	1.2	X	X	N/A	N/A
Benner Branch	0.8 miles upstream from confluence with	0.8	X	X	N/A	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
	Brills Creek					
Brills Creek	1.5 miles upstream from confluence with Bear Creek	1.5	X	X	N/A	N/A
Brush Creek	6 miles to 6.7 miles upstream from confluence with Missouri River	0.7	X	X	N/A	N/A
Burlington Creek	1.7 miles upstream from confluence with Missouri River	1.7	X	X	N/A	N/A
Burlington Creek Trib 1	0.3 miles upstream from confluence with Burlington Creek	0.3	X	X	N/A	N/A
East Creek	0.7 miles upstream from confluence with Line Creek	0.7	X	X	N/A	N/A
East Creek Trib 1	0.1 miles upstream from confluence with East Creek	0.1	X	X	N/A	N/A
Gibson Branch	0.7 miles upstream from confluence with Platte River	0.7	X	X	N/A	N/A
Grove Creek	2.2 miles to 3.6	1.4	X	X	N/A	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
	miles upstream from confluence with Platte River					
Jumping Branch	1.3 miles upstream from confluence with Line Creek	1.3	X	X	N/A	N/A
Line Creek	2.9 miles upstream from confluence with Missouri River	2.9	X	X	N/A	N/A
Line Creek Trib 1.1	0.6 miles upstream from confluence with Line Creek Trib 1	0.6	X	X	N/A	N/A
Missouri River Provided by WSC	County boundary to County boundary	49.1	X	X	N/A	N/A
Platte River	13.2 miles upstream from confluence with Missouri River	13.2	X	X	N/A	N/A
Rush Creek	4.1 miles upstream from confluence with Missouri River	4.1	X	X	N/A	N/A
Walnut Creek	2.6 miles upstream from confluence with Rush Creek	2.6	X	X	N/A	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Wells Branch	1.2 miles upstream from confluence with Bear Creek	1.2	X	X	N/A	N/A
Wildcat Branch	0.4 miles upstream from Farrelview City boundary	0.4	X	X	N/A	N/A
Pulaski County						
Big Piney River	1.2 miles to 6.7 miles upstream from confluence with Gasconade River	5.5	N/A	N/A	X	N/A
Dry Creek	3.1 miles upstream from confluence with Big Piney River	3.1	N/A	N/A	X	N/A
Mitchell Creek	3.3 miles upstream from confluence with Roubidoux Creek	3.3	N/A	N/A	N/A	X
Pearson Creek	1.2 miles upstream from confluence with Mitchell Creek	1.2	N/A	N/A	N/A	X
Roubidoux Creek	1.2 miles to 6 miles upstream from confluence	4.8	N/A	N/A	N/A	X

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
	with Gasconade River					
Ray County						
Cockerel Creek	1.3 miles upstream from confluence with Crooked River	1.3	N/A	N/A	X	N/A
Crooked River	50.3 miles upstream from confluence with Missouri River	50.3	N/A	N/A	X	N/A
Davis Branch	1.4 miles upstream from confluence with Crooked River	1.4	N/A	N/A	X	N/A
East Fork Crooked River	24.4 miles upstream from confluence with Crooked River	24.4	N/A	N/A	X	N/A
East Fork Fishing River	1.7 miles upstream from county boundary	1.7	N/A	N/A	X	N/A
Fire Branch Crooked River	6.2 miles upstream from confluence with Crooked River	6.2	N/A	N/A	X	N/A
Fishing River	11.9 miles upstream from confluence with Missouri River	11.9	N/A	N/A	X	N/A
Keeney Creek	4.9 miles upstream from confluence with Fishing River	4.9	N/A	N/A	X	N/A
Keeney Creek Trib 1	0.5 miles upstream from confluence with Keeney Creek	0.5	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Rocky Fork Crooked River	1.6 miles upstream from confluence with Crooked River	1.6	N/A	N/A	X	N/A
Tributary A - East Fork Crooked River	4.2 miles upstream from confluence with East Fork Crooked River	4.2	N/A	N/A	X	N/A
Tributary B - East Fork Crooked River	5.8 miles upstream from confluence with East Fork Crooked River	5.8	N/A	N/A	X	N/A
West Fork Crooked River	15.5 miles upstream from confluence with Crooked River	15.5	N/A	N/A	X	N/A
West Fork Crooked River Trib 1	1.6 miles upstream from confluence with West Fork Crooked River	1.6	N/A	N/A	X	N/A
Scott County						
Commerce Creek	0.8 miles upstream from confluence with Mississippi River	0.8	N/A	N/A	X	N/A
Illmo Branch	2.2 miles upstream from confluence with Ramsey Creek	2.2	N/A	N/A	X	N/A
Illmo Tributary	1.1 miles upstream from	1.1	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
	confluence with Illmo Branch					
Mississippi River Provided by WSC	County boundary to County boundary	22.9	X	X	N/A	N/A
Ramsey Creek	1.4 miles upstream from Sals Creek Diversion Channel	1.4	N/A	N/A	X	N/A
Ramsey Creek Diversion Channel	1.6 miles upstream from Sals Creek Diversion Channel	1.6	N/A	N/A	X	N/A
St. Francois County						
Flatt River	375ft ds of Walker Branch for 1.3 miles	1.3	X	X	N/A	N/A
Flatt River	1,750 ft ds of Elvins Blvd to Highway 32	2.0	X	X	N/A	N/A
Walker Branch Creek	Flatt River confluence for 1.7 miles	1.7	X	X	N/A	N/A
Koen Creek	Flatt River confluence upstream 4.4 miles	4.4	X	X	N/A	N/A
Koen Creek Trib	Koen Creek confluence upstream 1.2 miles	1.2	X	X	N/A	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
Shaw Creek	Flatt River confluence upstream 1.1 miles	1.1	X	X	N/A	N/A
St. Francis River	Upstream of US 67 for 2.8 miles	2.3	X	X	N/A	N/A
Trib St. Francis	St. Francis confluence upstream 2.8 miles	2.8	X	X	N/A	N/A
Kennedy Branch	2.3 miles upstream of Wolf Creek confluence	2.3	X	X	N/A	N/A
Flat River	1.2 miles to 6.5 miles upstream from confluence with Big River	5.3	N/A	N/A	X	N/A
Mississippi River	County boundary to County boundary		X	X	N/A	N/A
Kennedy Branch	0.1 miles to 2.6 miles upstream from confluence with Wolf Creek	2.5	N/A	N/A	X	N/A
St. Francis River Tib	2.7 miles upstream from confluence with St. Francis River	2.7	N/A	N/A	X	N/A
Stone County						
Crane Creek	14.5 miles to 16 miles upstream from confluence with James River	1.5	N/A	N/A	X	N/A
Dodge Hollow	0.4 miles upstream from confluence with	0.4	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
	Crane Creek					
St. Louis City						
Maline Creek	0.8 miles upstream from confluence with Mississippi Riv.	0.8	N/A	N/A	X	N/A
Maline Creek Trib 1	0.03 miles upstream from confluence with Maline Creek	0.03	N/A	N/A	X	N/A
Mississippi River	County boundary to County boundary	19.7	X	X	N/A	N/A
Mississippi River Tib 2	0.6 miles upstream from confluence with Mississippi River	0.6	N/A	N/A	X	N/A
Mississippi River Tib 3	0.3 miles upstream from confluence with Mississippi River	0.3	N/A	N/A	X	N/A
Mississippi River Tib 4	0.2 miles upstream from confluence with Mississippi River	0.2	N/A	N/A	X	N/A
River Des Peres Drainage Chan	9.6 miles upstream from confluence with Mississippi River	9.6	N/A	N/A	X	N/A
River Des Pres Trib 3	1.1 miles upstream from confluence with River Des Peres	1.1	N/A	N/A	X	N/A

Flooding Source	Reach Limits	Reach Length	Detailed Riverine		Redelineation of SFHAs Using Effective Profiles and New Topography	Digital Conversion
			Hydrology	Hydraulics		
	Drainage Channel					
River Des Pres Trib 9	0.2 miles upstream from confluence with River Des Peres Drainage Channel	0.2	N/A	N/A	X	N/A
Rock Creek	0.5 miles upstream from confluence with River Des Peres Drainage Channel	0.5	N/A	N/A	X	N/A

This Flood Map Project will be completed by the following Mapping Partner(s):

- **Missouri State Emergency Management Agency;**
- **AMEC Earth and Environmental as contractor to SEMA; and**
- **National Service Provider,**

The Mapping Partner shall notify FEMA and/or its contractor by e-mail of all meetings with community officials at least two weeks prior to the meeting (with as much notice as possible). FEMA and/or its contractor may or may not attend the community meetings.

The activities for this Flood Map Project, including any required Quality Assurance (QA) reviews, and the Mapping Partners that will complete them are summarized in Table 1.2, Flood Mapping Project Activities. The sections of this MAS that follow the table below describe the specific mapping activities, responsible Mapping Partner(s), FEMA standards that must be met, and resultant map components.

Table 1.2 Flood Mapping Project Activities

State	County	Partner Name	Partner Type	Task Assignments																				
				Scoping	Perform Field Survey	Validate & Store Content	Develop Topographic Data	Validate & Store Content	Perform Independent QA/QC of Topographic Data	Acquire Base Map	Validate & Store Content	Perform Hydrologic Analyses	Validate & Store Content	Perform Independent QA/QC of Hydrologic Analyses	Perform Hydraulic Analyses	Validate & Store Content	Perform Independent QA/QC of Hydraulic Analyses	Perform Floodplain Mapping	Validate & Store Content	Perform Independent QA/QC of Floodplain Mapping	Develop DFIRM Database	Validate & Store Content	Perform Independent QA/QC of Preliminary Map Product	Distribute Preliminary Map Products
MO	Christian	SEMA	SEMA						X								X			X			X	X
MO	Christian	NSP	NSP							X								X	X		X	X		
MO	Clay	SEMA	SEMA		X		X		X		X			X			X			X			X	X
MO	Clay	NSP	NSP					X		X		X	X		X	X		X	X		X	X		
MO	Crawford	SEMA	SEMA						X								X			X			X	X
MO	Crawford	NSP	NSP							X								X	X		X	X		
MO	Henry	SEMA	SEMA						X								X			X			X	X
MO	Henry	NSP	NSP							X								X	X		X	X		
MO	Howell	SEMA	SEMA				X	X	X		X			X			X			X			X	X
MO	Howell	NSP	NSP							X		X			X			X	X		X	X		
MO	Johnson	SEMA	SEMA						X								X			X			X	X
MO	Johnson	NSP	NSP							X								X	X		X	X		
MO	Laclede	SEMA	SEMA						X								X			X			X	X
MO	Laclede	NSP	NSP							X		X			X			X	X		X	X		

State	County	Partner Name	Partner Type	Task Assignments																					
				Scoping	Perform Field Survey	Validate & Store Content	Develop Topographic Data	Validate & Store Content	Perform Independent QA/QC of Topographic Data	Acquire Base Map	Validate & Store Content	Perform Hydrologic Analyses	Validate & Store Content	Perform Independent QA/QC of Hydrologic Analyses	Perform Hydraulic Analyses	Validate & Store Content	Perform Independent QA/QC of Hydraulic Analyses	Perform Floodplain Mapping	Validate & Store Content	Perform Independent QA/QC of Floodplain Mapping	Develop DFIRM Database	Validate & Store Content	Perform Independent QA/QC of Preliminary Map Product	Distribute Preliminary Map Products	Post Preliminary Processing
MO	Lafayette	SEMA	SEMA							X								X			X			X	X
MO	Lafayette	NSP	NSP								X								X	X		X	X		
MO	Lawrence	SEMA	SEMA							X								X			X			X	X
MO	Lawrence	NSP	NSP								X								X	X		X	X		
MO	Newton	SEMA	SEMA							X								X			X			X	X
MO	Newton	NSP	NSP								X								X	X		X	X		
MO	Platte	SEMA	SEMA		X		X			X		X			X			X			X			X	X
MO	Platte	NSP	NSP					X			X		X	X		X	X		X	X		X	X		
MO	Pulaski	SEMA	SEMA							X								X			X			X	X
MO	Pulaski	NSP	NSP								X								X	X		X	X		
MO	Ray	SEMA	SEMA							X								X			X			X	X
MO	Ray	NSP	NSP								X								X	X		X	X		
MO	Scott	SEMA	SEMA				X			X								X			X			X	X
MO	Scott	NSP	NSP					X			X								X	X		X	X		
MO	St Francois	SEMA	SEMA				X	X		X		X		X				X			X			X	X
MO	St Francois	NSP	NSP								X		X		X				X	X		X	X		

State	County	Partner Name	Partner Type	Task Assignments																					
				Scoping	Perform Field Survey	Validate & Store Content	Develop Topographic Data	Validate & Store Content	Perform Independent QA/QC of Topographic Data	Acquire Base Map	Validate & Store Content	Perform Hydrologic Analyses	Validate & Store Content	Perform Independent QA/QC of Hydrologic Analyses	Perform Hydraulic Analyses	Validate & Store Content	Perform Independent QA/QC of Hydraulic Analyses	Perform Floodplain Mapping	Validate & Store Content	Perform Independent QA/QC of Floodplain Mapping	Develop DFIRM Database	Validate & Store Content	Perform Independent QA/QC of Preliminary Map Product	Distribute Preliminary Map Products	Post Preliminary Processing
MO	Stone	SEMA	SEMA							X								X			X			X	X
MO	Stone	NSP	NSP								X							X	X		X	X			
MO	St. Louis City	SEMA	SEMA							X								X			X			X	X
MO	St. Louis City	NSP	NSP								X								X	X		X	X		

The Missouri State Emergency Management Agency is assigned the Floodplain Mapping Activity and will incorporate the Approximate studies completed by Missouri State Emergency Management Agency for the counties identified in Table 1.1.

Those counties that include the Missouri and/or Mississippi Rivers will use the flood profiles developed by the USACE for the Upper Mississippi River System Flow Frequency Study (UMRFFS).

Missouri State Emergency Management Agency is responsible for the implementation of a Quality Assurance/Quality Control plan for all assigned activities. The Missouri State Emergency Management Agency will submit a Summary Report that describes and provides the results of all automated or manual QA/QC review steps. The report should include the process for all assigned activities.

The Regional Office has reviewed the counties for accredited levees on the Flood Insurance Rate Map. In coordination with the USACE, the Region has determined the PAL classification for each levee accredited on the FIRM. The classification is summarized in Table 1.3. The Missouri State Emergency Management Agency assigned the floodplain mapping task will include the appropriate note for the associated PM 43 classification.

In those cases where the effective map does not include a shaded Zone X area on the landward side of the levee, the Missouri State Emergency Management Agency will delineate the shaded Zone X area based on the elevation of the 1% of annual occurrence flood and existing topographic data.

If the PAL Classification for a levee changes during the course of the project FEMA will contact the Missouri State Emergency Management Agency to discuss the need to revise the statement of work.

Table 1.3 – Levee PAL Classification

County	Levee Name	Provisionally Accredited Levee Classification	Additional Mapping Required
Clay	Birmingham Unit	B	Yes – Shaded Zone X
Clay	North Kansas City Airport Unit	B	Yes – Shaded Zone X
Clay	North Kansas City Lower Unit	B	Yes – Shaded Zone X
Platte	IATAN	A	Yes – Shaded Zone X
Platte	MRLS 385-L	B	Yes – Shaded Zone X
Platte	MRLS 400-L	B	Yes – Shaded Zone X
Platte	MRLS 408-L	B	Yes – Shaded Zone X
St. Louis City	St. Louis Project	B	Yes – Shaded Zone X
Scott	Commerce to Birds Point Levee 4/9+44 to 17/49+00	B	Yes – Shaded Zone X
Scott	Little River Headwater Diversion Levee 0/2+00 to 19/	B	Yes – Shaded Zone X

FEMA has developed tools to assist in the development of the flood hazard data studies and DFIRMs for the CTP to use. Use of the tools is optional. Training and access to the tools should be arranged through the Regional Management Center. The tools available at this time include WISE software and the DFIRM production tools, both available through the Mapping Information Platform (MIP).

QC review activities may be performed by the CTPs or FEMA's contractor at the discretion of FEMA. If the CTP will be utilizing its partners to do the QC review, this should be identified during scoping. The CTP will need to submit its QC plan with checklist to the Regional Project Officer for approval. Please note FEMA will also be performing periodic audits and overall study/project management to ensure study quality.

FEMA will provide download/upload capability for intermediate data submittals through the MIP. A metadata file complying with the FEMA NFIP Metadata Profile Specifications must accompany the uploaded digital data in order to facilitate proper cataloging of the data for search and retrieve capabilities within the MIP. The metadata profile should be obtained from FEMA or its contractor to assure compliance. FEMA has provided the Metadata Manager (MetaMan) Tool in the Citrix environment to convert the .txt metadata files to .xml format. In addition, MetaMan will check the metadata file according to the correct schema for the task for compliance with the FEMA NFIP Metadata Profile.

Metadata files are to be included with each of the following four activities that must satisfy Data Capture Standards (DCS): Perform Field Survey, Develop Topographic Data, Develop Hydrologic Data, and Develop Hydraulic Data. In addition, a DCS QA report is required for all DCS tasks. FEMA has provided the DCS Validator Tool in WISE in the Citrix environment to generate the QA report, and must be used whether or not WISE was used to create the DCS data. The DCS QA report can be either passing or failing, but a failing report must be validated by the RMC for allowable errors. The task will advance in the MIP studies workflow as long as the report has been uploaded and named correctly.

Metadata files are also to be included with each of the following non-DCS activities: Acquire Base Map Data, Perform Floodplain Mapping, Develop DFIRM Database, Produce Preliminary Map Products, and Produce Map Products. The metadata profiles are available from FEMA. The FEMA NFIP Metadata Profiles follow the Federal Geographic Data Committee Content Standard for Digital Geospatial Metadata, but define some specific domains and business rules to make the metadata more useful to FEMA and its mapping partners. The metadata profile should be obtained from FEMA or its contractor to assure compliance.

DFIRM-related tasks require a passing notification from Harvard Design and Mapping (HDM). The HDM notification is not a file that the Missouri State Emergency Management Agency creates or uploads. Data and metadata are sent to HDM for QC via the MIP for the draft, preliminary, and final deliverable submissions (Develop DFIRM Database task, Produce Preliminary Map Products Task, and Produce Map Products task). Submission method is either via the Database Exporter function in the DFIRM Tools or through the Load Data Artifacts portlet within the DFIRM-related MIP studies workflow task. The pass/fail HDM notification and a web link to the detailed QC report are automatically submitted back to the MIP by HDM.

As each activity is completed, the data must be submitted to the MIP. There are four ways to submit data to the MIP:

- Copy data from the Production drive (J:) within the MIP Workflow screen for the associated task

- Upload data via the Load Data Artifacts Portlet in the Studies workflow task,
- Mail to the FEMA Data Depot using the following method:
 - Zip multiple files and subfolders in correct folder structure together.
 - Send CDs, DVDs, Hard Drives, or Flash Drives; there is no file size restriction.
 - Include readme.txt file indicating Region, State, County, Community, FEMA Case Number, workflow task(s), destination folder for zip file, and contact information.
 - Inform MIP Help (miphelp@mapmodteam.com) that the submission has been mailed with necessary documentation to instruct MIPHelp on the upload of the submitted.
 - Workflow will not advance until the data submission has been received and uploaded.
- Exporting data from DFIRM Tools (limited to DFIRM-related data submissions).

The Missouri State Emergency Management Agency assigned the activity will respond to any comments generated as a result of the mandatory quality control checks by the National Service Provider (NSP). The NSP QC process is nationally funded and required on each flood insurance study. The NSP QC process includes the following activities:

- **Validate Content Submission.** Validation of submitted data for Perform Field Survey, Develop Topographic Data, Develop Hydrologic Data, Develop Hydraulic Data, Acquire Base Map Data, Perform Floodplain Mapping, Develop DFIRM Database, and Produce Preliminary Map Products tasks (including verifying presence of all required deliverables per MAS/SOW, running MetaMan to verify NFIP Profile-compliant metadata, and reviewing DCS QA Report for DCS tasks).
- **Store Content.** Storing content of above tasks on the MIP.
- **NSP QC Check of Draft DFIRM database.** Performed during the Develop DFIRM Database task.
- **NSP QC Check of Preliminary DFIRM and Flood Insurance Study Report (FIS).** Performed during the Produce Preliminary Map Products task.
- **NSP QC Check of BFE notices.** Performed during Post Preliminary Processing.
- **NSP QC Check of Final DFIRM.** Performed during Post Preliminary Processing.
- **NSP QC Check of LFD letters.** Performed during Post Preliminary Processing.
- **NSP QC Check of MSC Package.** Performed during Post Preliminary Processing.
- **MSC QC Check of MSC Package.** Performed during Post Preliminary Processing.

In cooperation with the FEMA Project Officer, a Project Management Team (PMT) will be established by the Missouri State Emergency Management Agency consisting of representatives from AMEC Earth and Environmental as SEMA's contractor, FEMA's regional engineer, the Regional Management Center, and other appropriate parties. The PMT will be responsible for coordinating the activities identified in this MAS. The FEMA Region will be provided with documentation identifying the established PMT.

Work completed as part of this MAS will be in accordance with the April 2003 *Guidelines and Specifications for Flood Hazard Mapping Partners (G&S)*. The G&S may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm. Occasionally, the G&S are modified and revised by Procedure Memorandums. Procedure Memorandums 1 - 30, 32 - 38, 41, 43 and 44 are incorporated into this MAS. When new Procedure Memorandums are released, the Mapping Partner will coordinate with the Regional Project Officer to determine impacts on work and schedule.

OUTREACH

(NOTE: The performance of outreach takes place throughout the life of the flood study project. Therefore, we recommend tracking the outreach budget, in the MIP Workflow, equally between Produce Preliminary Map Products and Post Preliminary Processing. An alternate tracking method is acceptable with approval from the project management team.)

The outreach activities for a Flood Map Project can best be understood as a process that begins during the Project Scoping phase and continues through the map production and post-preliminary phases. A regulatory overview of required activities is followed by a description of tools that can be used in working with stakeholders to keep them informed and to solicit their input.

The overarching goal for conducting outreach is to create a climate of understanding and ownership of the mapping process at the State and local levels. Well-planned outreach activities can reduce political stress, confrontation in the media, and public controversy, which can arise from lack of information, misunderstanding, or misinformation. These outreach activities also can assist FEMA and other members of the Project Management Team in responding to congressional inquiries.

The Missouri State Emergency Management Agency will work with the Regional Project Officer during the initiation of this activity to determine an Outreach Plan for implementation throughout the mapping project. The Regional Project Officer will have access to many outreach tools and materials developed for this process that can be utilized or customized. Volume 1 of the *Guidelines and Specifications for Flood Hazard Mapping Partners* provides specific outreach goals that may be considered.

The Missouri State Emergency Management Agency shall attend a final meeting in each county following the issuance of the Preliminary FIRM and FIS.

Prior to the initiation of the project, the Missouri State Emergency Management Agency will notify the CEO of all incorporated communities and the county of the project scope and schedule. The notification letter shall also include the appointment of the Consultation Coordination Officer (CCO). The FEMA Project Officer will provide the name of the CCO. A hardcopy of the community notification shall be provided to the FEMA Project Officer for inclusion in the Docket File.

All communication with local governments will be done in accordance with 44 CFR Part 66.

Deliverables: Upon determination of an Outreach and Coordination Approach, the Missouri State Emergency Management Agency shall deliver the following to the FEMA Regional Project Officer:

- A report detailing outreach and coordination activities.

Perform Field Survey

Responsible Mapping Partner: Missouri State Emergency Management Agency

Scope: To supplement any field reconnaissance conducted during the Project Scoping phase of this project, Missouri State Emergency Management Agency shall conduct a detailed field reconnaissance of the specific study area to determine conditions along the floodplain(s), types and numbers of hydraulic and/or flood-control structures, apparent maintenance or lack thereof of existing hydraulic structures, locations of cross sections to be surveyed, and other parameters needed for the hydrologic and hydraulic analyses.

In addition to the initial field reconnaissance, Missouri State Emergency Management Agency shall conduct field surveys, including obtaining channel and floodplain cross sections, identifying or establishing temporary bench marks, and obtaining the physical dimensions of hydraulic and flood-control structures. Missouri State Emergency Management Agency also shall coordinate with other Mapping Partners that are involved in the Topographic Data Development process.

Missouri State Emergency Management Agency shall address all concerns or questions regarding the field survey that are raised during the NSP's Validate Content Submission Process.

Standards: All Field Survey work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, Missouri State Emergency Management Agency shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- A report summarizing the findings of the field reconnaissance;
- Maps and drawings that provide the detailed survey results;
- Survey notebook containing cross sections and structural data;
- Documentation of the Datum, (Refer to Procedure Memorandum 41);
- Digital version of draft text for inclusion in the FIS report;
- A metadata file complying with the FEMA NFIP Metadata Profile Specifications;
- Survey Database or Data Delivery consistent with the Data Capture Standards–Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- A DCS QA Report, and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.

Former Mapping Activity Task Number Equivalent: Task 3

MIP workflow steps: Perform Field Survey, Rework Data Development Task (if needed as a result of Independent QC).

Corresponding QC steps: Validate Content Submission (NSP core task order), and Store Content (NSP core task order).

Develop Topographic Data

Responsible Mapping Partner: Missouri State Emergency Management Agency

Scope: To supplement the field surveys conducted under this MAS, Missouri State Emergency Management Agency shall obtain additional topographic data of the overbank areas of the flooding sources studied to delineate floodplain boundaries. Missouri State Emergency Management Agency shall gather information on what topographic data is available for the given community and what accuracy and currency it meets. Missouri State Emergency Management Agency shall use topographic data that is better than that of the original study.

Missouri State Emergency Management Agency shall use topographic data for the areas described in the Summary of Topographic Data table. The source of the topographic data should be indicated as well. Missouri State Emergency Management Agency also shall coordinate with other team members conducting field surveys. Contour interval and/or accuracy for the topographic data shall be selected based on the current FEMA requirements as documented in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

For this activity, Missouri State Emergency Management Agency also shall develop topographic maps and/or Digital Elevation Models for the subject flooding sources using the data collected under this Topographic Data Development process and via field surveys. In addition, Missouri State Emergency Management Agency shall address all concerns or questions regarding the topographic data development that are raised by the National Service Provider during the independent QC review, or during the NSP Validation Process.

Summary of Topographic Data

County	Description	Source
Christian	TVC/10 m DEM	USGS
Clay	Lidar – 18.5 cm vertical	Procured as part of MAS
Crawford	TVC/10 m DEM	USGS
Henry	TVC/10 m DEM	USGS
Howell	TVC/10 m DEM	USGS
Johnson	TVC/10 m DEM	USGS
Laclede	TVC/10 m DEM	USGS
Lafayette	Lidar – 18.5 cm vertical	USGS
Lawrence	TVC/10 m DEM	USGS
Newton	TVC/10 m DEM	USGS
Platte	Lidar – 18.5 cm vertical	Procured as part of MAS

Pulaski	TVC/10 m DEM	USGS
Ray	TVC/10 m DEM	USGS
Scott	Lidar – 18.5 cm vertical	Procured as part of MAS
St. Francois	TVC/10 m DEM	USGS
Stone	TVC/10 m DEM	USGS
St. Louis City	Lidar	MSD

Standards: All Topographic Data Development work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, Missouri State Emergency Management Agency shall make the following products available to FEMA by uploading the digital data to the MIP so that The National Service Provider can access it for an Independent QC review. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

For topographic data that is obtained from Public Domain sources, the Missouri State Emergency Management Agency will provide:

- Report summarizing methodology and results;
- Metadata file complying with the FEMA NFIP Metadata Profile Specifications; and
- Terrain Database or Data Delivery consistent with the Data Capture Standards–Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- A DCS QA Report.

For topographic data purchased for this project, or data provide by Community Sources, the Missouri State Emergency Management Agency will provide:

- Accuracy documentation for community provided data, if available;
- Report summarizing methodology and results;
- Digital Elevation Model (DEM) file with breaklines;
- Checkpoint analyses to assess the accuracy of the TIN data, including Root Mean Square Error calculations to support vertical accuracy;
- Identification of remote-sensing data voids and methods used to supplement data voids;
- National Geodetic Survey data sheets for Network Control Points used to control remote-sensing and ground surveys;
- Metadata file complying with the FEMA NFIP Metadata Profile Specifications;
- Documentation of the Datum (Refer to Procedure Memorandum 41);
- Terrain Database or Data Delivery consistent with the Data Capture Standards–Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- A DCS QA Report, and

- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan.

Former Mapping Activity Task Number Equivalent: Task 4

MIP workflow step equivalent: Develop Topographic Data, Rework Data Development Task (if needed as a result of Independent QC).

Concurrent steps: Validate Content Submission (NSP core Task Order), Perform Independent QC for Topographic Data (if funded by Region VII), and Store Content (NSP core Task Order).

Perform Independent QC Review of Topographic Data

Responsible Mapping Partner: Missouri State Emergency Management Agency

Scope: Missouri State Emergency Management Agency shall review the mapping data generated by mapping vendor under Develop Topographic Data to ensure that these data are consistent with FEMA standards and standard engineering practice, and are sufficient to prepare the DFIRM. If the Missouri State Emergency Management Agency utilizes a contractor to perform the QA, the contractor must be a different contractor than who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer.

Standards: All Topographic Data Development work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, Missouri State Emergency Management Agency shall make the following products available to FEMA by uploading the digital data to the MIP, through the Load Studies Data Artifacts portlet under the Data Upload tab under Tools & Links. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- A Summary Report that describes the findings of the Independent QC review; and
- Recommendations to resolve any problems that are identified during the Independent QC review.

Former Mapping Activity Task Number Equivalent: Task 5

MIP workflow step equivalent: Perform Independent QC for Topographic Data.

Concurrent steps: Develop Topographic Data, Validate Content Submission (NSP core Task Order), Rework Data Development Task (if needed as a result of Independent QC), Store Content (NSP core Task Order).

Acquire Base Map

Responsible Mapping Partner: Missouri State Emergency Management Agency

Scope: Base Map Acquisition consists of obtaining the digital base map, orthophotograph, for the project and as necessary, preparing the base map for use. Missouri State Emergency Management Agency shall provide the digital base map. The table below contains a summary of the base map selected for each county. The required activities are as follows:

- Obtain digital files (raster or vector) of the base map. In coordination with the partner who performed scoping, insure that the FEMA Geospatial Data Coordination Policy and Implementation Guide is followed.
- Secure necessary permissions from the map source to allow FEMA’s use and distribution of hardcopy and digital map products using the digital base map, free of charge.
- Certify that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production.

In addition, Missouri State Emergency Management Agency shall address all concerns or questions regarding the base map that are raised during the Independent QC review performed by The National Service Provider, or during the NSP’s Validate Content Submission Process.

Summary of Base Map

County	Description	Source
Christian	Orthophoto	National agricultural insurance program
Clay	Orthophoto	National agricultural insurance program
Crawford	Orthophoto	National agricultural insurance program
Henry	Orthophoto	National agricultural insurance program
Howell	Orthophoto	National agricultural insurance program
Johnson	Orthophoto	National agricultural insurance program
Laclede	Orthophoto	National agricultural insurance program
Lafayette	Orthophoto	National agricultural insurance program
Lawrence	Orthophoto	National agricultural insurance program
Newton	Orthophoto	National agricultural insurance program
Platte	Orthophoto	National agricultural insurance program
Pulaski	Orthophoto	National agricultural insurance program
Ray	Orthophoto	National agricultural insurance program

County	Description	Source
Scott	Orthophoto	National agricultural insurance program
St. Francois	Orthophoto	National agricultural insurance program
Stone	Orthophoto	National agricultural insurance program
St. Louis City	Orthophoto	National agricultural insurance program

Standards: All Base Map Acquisition work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with the *Guidelines and Specifications for Flood Hazard Mapping Partners*, (Volume 1, Appendix K and Appendix L), Missouri State Emergency Management Agency shall make the following products available to FEMA by uploading the digital data to the MIP so that the National Service Provider can access it for an Independent QC. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- Written certification that the digital data meet the minimum standards and specifications;
- Documentation that FEMA can use the digital base map;
- Digital versions of draft text for inclusion in the FIS report;
- A metadata file complying with the FEMA NFIP Metadata Profile Specifications; and
- Documentation of the Datum, if appropriate.

Former Mapping Activity Task Number Equivalent: Task 12

MIP workflow step equivalent: Acquire Base Map.

Concurrent steps: Validate Content Submission (NSP core Task Order), Perform Independent QC for Base Map (if funded by Region VII), Store Content (NSP core Task Order).

Perform Independent QC Review of Base Map

Responsible Mapping Partner: N/A

Perform Hydrologic Analyses

Responsible Mapping Partner: Missouri State Emergency Management Agency

Scope: Missouri State Emergency Management Agency shall perform hydrologic analyses for the flooding source(s) listed in Table 1.1. For streams studied by detailed methods the Missouri State Emergency Management Agency shall calculate peak flood discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events using the method indicated in the table below. These flood discharges will be the basis for subsequent Hydraulic Analyses performed under this MAS. In addition, Missouri State Emergency Management Agency shall address all concerns or questions regarding the hydrologic analyses that are raised during the Independent QC review performed by the National Service Provider, or during the NSP's Validate Content Submission Process.

If GIS-based modeling is used, Missouri State Emergency Management Agency shall document automated data processing and modeling algorithms, and provide the data to FEMA to ensure these are consistent with the standards outlined above. Digital datasets (such as elevation, basin, or land use data) are to be documented and provided to FEMA for approval before performing the hydrologic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analysis, then Missouri State Emergency Management Agency shall provide full user documentation, technical algorithm documentation, and the software to FEMA for review before performing the hydrologic analyses.

The detailed hydrologic analysis will not include the Mississippi or Missouri Rivers. For these streams the discharges developed by the USACE for the UMRFFS will be used by the Missouri State Emergency Management Agency.

Summary of Hydrologic Analysis

County Name	Method	Square Miles of New Detailed Hydrology
Clay	Rainfall/Runoff HMS	411
Howell	Rainfall/Runoff USACE Study	varies
Platte	Rainfall/Runoff HMS	427
St. Francois	Rainfall/Runoff FMSM Mitigation Study	varies

Missouri State Emergency Management Agency will review and adjust study results accordingly in Howell and St.Francois Counties for incorporation of the detailed studies defined in Table 1.1.

The Mapping Partner will compare the calculated, or computed, discharge with discharge determined from reliable gage data, if any. This comparison will only be done at locations where the two discharge

values are considered representative of the same flooding source. Results of this comparison will be used in making a professional judgment for determining the discharge to be used for the hydraulic analysis.

Standards: All Hydrologic Analyses work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, Missouri State Emergency Management Agency shall make the following products available to FEMA by uploading the digital data to the MIP so that the National Service Provider can access it for an Independent QC review. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

For stream studied by detail methods, Missouri State Emergency Management Agency shall provide the following deliverables:

- Digital copies of all hydrologic modeling (input and output) files for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events;
- Digital versions of the Summary of Discharges Table presenting discharge data for the flooding sources for which hydrologic analyses were performed;
- Digital draft text for Hydrologic Analyses Section of the FIS report; and
- Digital versions of all backup data used in the analysis.

For stream studied by approximate methods, Missouri State Emergency Management Agency shall provide the following deliverables:

- Digital copies of all hydrologic modeling (input and output) files for the 1-percent-annual-chance storm event; and
- Digital versions of all backup data used in the analysis.

For all streams, Missouri State Emergency Management Agency shall provide the following deliverables:

- Brief summary report documenting the study area, methodologies, assumptions, and any other pertinent information related to the engineering analysis performed.
- A metadata file complying with the FEMA NFIP Metadata Profile Specifications;
- Hydrology Database or Data Delivery consistent with the Data Capture Standards–Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- A DCS QA Report;
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan; and
- For GIS-based modeling, deliverables shall include all input and output data, intermediate data processing products, and GIS data layers.

Former Mapping Activity Task Number Equivalent: Task 6

MIP workflow step equivalent: Perform Hydrologic Analyses, Rework Data Development Task (if needed as a result of Independent QC).

Concurrent steps: Validate Content Submission (NSP core Task Order), Perform Independent QC for Hydrologic Analyses (if funded by Region VII), Store Content (NSP core Task Order).

Perform Independent QC Review of Hydrologic Analyses

Responsible Mapping Partner: National Service Provider

Scope: The National Service Provider shall review the technical, scientific, and other information submitted by Missouri State Emergency Management Agency specific to the hydrologic analyses to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice, and are sufficient to prepare the DFIRM. If the Missouri State Emergency Management Agency utilizes a contractor to perform the Independent QC, the contractor must be a different contractor than who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
 - Use of acceptable models;
 - Use of appropriate methodology(ies);
 - Correctly applied methodology(ies)/model(s), including QC of input parameters;
 - Comparison with gage data and/or regression equations, if appropriate; and
 - Comparison with discharges for contiguous reaches or flooding sources.
- Maintain records of all contacts, reviews, recommendations, and actions and make the data readily available to FEMA;
- Maintain an archive of all data submitted for hydrologic modeling review. (All supporting data must be retained for three years from the date a funding recipient submits its final expenditure report to FEMA, and once the study is effective all associated data should be submitted to the FEMA library); and

Standards: All Independent QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: : In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the National Service Provider shall make the following products available to FEMA by uploading the digital data to the MIP, through the Load Studies Data Artifacts portlet under the Data Upload tab under Tools & Links. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- A Summary Report that describes the findings of the Independent QC review and
- Recommendations to resolve any problems that are identified during the Independent QC review.

Former Mapping Activity Task Number Equivalent: Task 7

MIP workflow step equivalent: Perform Independent QC for Hydrologic Analyses.

Concurrent steps: Perform Hydrologic Analyses, Validate Content Submission (NSP core Task Order), Rework Data Development Task (if needed as a result of Independent QC), Store Content (NSP core Task Order).

Perform Hydraulic Analyses

Responsible Mapping Partner: Missouri State Emergency Management Agency

Scope: For the streams identified in Table 1.1 that will be studied by detailed methods, Missouri State Emergency Management Agency will perform hydraulic analyses for approximately 198 miles. The modeling will include the 10%, 2%, 1% and 0.2% annual chance storm events based on peak discharges computed in the Perform Hydrologic Analyses Task. The hydraulic methods used for this analysis will include HEC-RAS computer program. The hydraulic analyses will be used to establish flood elevations and regulatory floodways for the subject flooding sources.

Missouri State Emergency Management Agency shall use the cross-section and field data collected during Perform Field Survey and the topographic data collected during the Develop Topographic Data to perform the hydraulic analyses. The hydraulic analyses will be used to establish flood elevations and regulatory floodways for the subject flooding sources.

Missouri State Emergency Management Agency shall use the FEMA CHECK-2 or CHECK-RAS checking program to verify the reasonableness of the hydraulic analyses. To facilitate the Independent QC review, Missouri State Emergency Management Agency shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, Missouri State Emergency Management Agency shall address all concerns or questions regarding the hydraulic analyses that are raised by the National Service Provider during the Independent QC review, or during the NSP's Validate Content Submission Process.

Missouri State Emergency Management Agency shall document automated data processing and modeling algorithms for GIS-based modeling and provide the data to FEMA for review to ensure these are consistent with the standards outlined above. Digital datasets are to be documented and provided to FEMA for approval before performing the hydraulic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analyses, then Missouri State Emergency Management Agency shall provide full user documentation, technical algorithm documentation, and software to FEMA for review before performing the hydraulic analyses.

The hydraulic analysis will not include the Mississippi or Missouri Rivers. For these streams, the profile and floodway developed by the USACE for the UMRFFS will be used by the Missouri State Emergency Management Agency.

Summary of Hydraulic Analysis

County Name	Method	Total Miles of New Detailed or Approximate Hydraulics
Clay	HEC-RAS	155.4
Howell	HEC-RAS	6.9 Miles per USACE Study
Platte	HEC-RAS	42.6
St. Francois	HEC-RAS	19.5 Miles per FMSM Disaster Recovery Study

Levee(s) that are mapped as providing protection on effective FIRMs and that will not receive a Provisionally Accredited Levee designation and identified in Table 1.3 as requiring hydraulic analysis should be done in accordance with Appendix H of the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All Hydraulic Analyses work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, Missouri State Emergency Management Agency shall make the following products available to FEMA by uploading the digital data to the MIP so that the National Service Provider can access it for an Independent QC review. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

For streams studied by detailed methods, Missouri State Emergency Management Agency shall provide the following deliverables:

- Digital profiles of the 10-, 2-, 1- and 0.2-percent-annual-chance water-surface elevations representing existing conditions using the FEMA RASLOT program or similar software;
- Digital versions of the Floodway Data Table for each flooding source that is compatible with the DFIRM database;
- Digital work map showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, and with base map used from the Acquire Base Map Task
- Explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate; and
- Digital versions of draft text for inclusion in the FIS report.

For stream studied by approximate methods, Missouri State Emergency Management Agency shall provide the following deliverables:

- Digital versions of draft text for inclusion in the FIS report (only for counties that require a FIS report).

For all flood sources Missouri State Emergency Management Agency shall provide the following deliverables:

- Digital versions of all hydraulic modeling (input and output) files;
- Digital versions of a table showing ranges of Manning’s “n” values;
- Digital versions of all backup data used in the analyses;
- A metadata file complying with the FEMA NFIP Metadata Profile Specifications;
- Hydraulic Database or Data Delivery consistent with the Data Capture Standards–Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- A DCS QA Report;
- A Summary Report that describes and provides the results of all automated or manual QA review steps taken during the preparation of the DFIRM as outlined in the approved QA Plan; and
- For GIS-based modeling, deliverables include all input and output data, intermediate data processing products, GIS data layers, and final products in the format of the DFIRM database structure.

Former Mapping Activity Task Number Equivalent: Task 8

MIP workflow step equivalent: Perform Hydraulic Analyses, Rework Data Development Task (if needed as a result of Independent QC).

Concurrent steps: Validate Content Submission (NSP core Task Order), Perform Independent QC for Hydraulic Analyses (if funded by Region VII), Store Content (NSP core Task Order).

Perform Independent QC Review of Hydraulic Analyses

Responsible Mapping Partner: National Service Provider

Scope: National Service Provider shall review the technical, scientific, and other information submitted by Missouri State Emergency Management Agency under Hydraulic Analysis to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice, and are sufficient to revise the FIRM. If the Missouri State Emergency Management Agency utilizes a contractor to perform the QC, the contractor must be a different contractor than who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
 - Use of acceptable model(s);
 - Starting water-surface elevations;
 - Cross-section geometry;
 - Manning's "n" values and expansion/contraction coefficients;
 - Bridge and culvert modeling;
 - Flood discharges;
 - Regulatory floodway computation methods; and
 - Tie-in to upstream and downstream non-revised Flood Profiles.
- Use the CHECK-2 or CHECK-RAS program, as appropriate, to flag potential problems and focus review efforts.
- Maintain records of all contacts, reviews, recommendations, and actions and make the data readily available to FEMA.
- Maintain an archive of all data submitted for hydrologic modeling review. (All supporting data must be retained for three years from the date a funding recipient submits its final expenditure report to FEMA, and once the study is effective all associated data should be submitted to the FEMA library); and
-

Standards: All Independent QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with Appendix N of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, the National Service Provider shall make the following products available to FEMA by uploading the digital data to the MIP, through the Load Studies Data Artifacts portlet under the Data Upload tab under Tools & Links. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- A Summary Report that describes the findings of the Independent QC review;
- Recommendations to resolve any problems that are identified during the Independent QC review;

Former Mapping Activity Task Number Equivalent: Task 9

MIP workflow step equivalent: Perform Independent QC for Hydraulic Analyses.

Concurrent steps: Perform Hydraulic Analyses, Validate Content Submission (NSP core Task Order), Rework Data Development Task (if needed as a result of Independent QC), Store Content (NSP core Task Order).

Perform Floodplain Mapping

Responsible Mapping Partner: Missouri State Emergency Management Agency

Scope for Detailed Riverine: Missouri State Emergency Management Agency shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for the flooding sources for which detailed hydrologic and hydraulic analyses were performed. Missouri State Emergency Management Agency shall incorporate all new or revised hydrologic and hydraulic modeling and shall use the topographic data acquired under Develop Topographic Data to delineate the floodplain and regulatory floodway boundaries on a digital work map.

Scope of Redelineation of Detailed Floodplain Boundaries Using Updated Topographic Data: Missouri State Emergency Management Agency shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries, and regulatory floodway boundaries for the flooding sources listed earlier in Table 1.1. Missouri State Emergency Management Agency shall use the topographic data acquired under Develop Topographic Data to delineate the floodplain and regulatory floodway boundaries, as appropriate, on a digital work map. If the new topographic data do not reflect the same hydraulic characteristics as in the effective study, Missouri State Emergency Management Agency shall evaluate the topographic data to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. If so, Missouri State Emergency Management Agency shall contact the FEMA Regional Project Officer, identified in Section 12 – Points of Contact, with a recommendation.

Scope for Non-revised Areas: For all flooding sources except those segments for which updated flood data will be developed, Missouri State Emergency Management Agency shall convert the information shown on the effective FIRM and FBFM panels for all incorporated and unincorporated areas to digital format in conformance with FEMA DFIRM specifications. Missouri State Emergency Management Agency shall use the acquired base map for the conversion. Missouri State Emergency Management Agency shall not digitize the flood theme for those segments of flooding sources for which updated flood data will be developed.

Scope for Merging Revised and Non-Revised Information: Upon completion of the floodplain mapping activities for the revised and non-revised areas, Missouri State Emergency Management Agency shall merge the digital floodplain data into a single, updated DFIRM. This work is to include tie-in of flood hazard information for areas that were not studied as part of the Flood Map Project documented in this MAS. Missouri State Emergency Management Agency also shall tie in the revised and non-revised Flood Profiles, floodplain boundaries, and regulatory floodway boundaries with contiguous communities

that were not studied as part of the Flood Map Project documented in this MAS. Missouri State Emergency Management Agency shall coordinate with FEMA and any additional Mapping Partners responsible for other components of Perform Floodplain Mapping, as necessary, to resolve any potential tie-in issues.

DFIRM Panel Summary

County Name	Number of DFIRM panels
Christian	24
Clay	97
Crawford	27
Henry	35
Howell	41
Johnson	33
Laclede	40
Lafayette	50
Lawrence	41
Newton	56
Platte	97
Pulaski	36
Ray	50
Scott	71
St. Francois	37
Stone	32
St. Louis City	38

Missouri State Emergency Management Agency shall incorporate the results of all effective Letters of Map Change (LOMCs) within the revised areas as appropriate. Only those LOMCs visible at the published map scale shall be included.

Missouri State Emergency Management Agency shall address all concerns or questions regarding Floodplain Mapping that are raised by the National Service Provider during the Independent QC review, or during the NSP's Validate Content Submission Process.

Standards: All Floodplain Mapping work shall be performed in accordance with the standards specified in Section 5 - Standards. Mapping quality standards must be consistent with Procedure Memorandum No. 38, dated September 2, 2005. MISSOURI STATE EMERGENCY MANAGEMENT AGENCY may expand on the approaches for analyzing Zone A areas outlined in *Guidelines and Specifications for Flood Hazard*

Mapping Partners and in FEMA 265, *Managing Floodplain Development in Approximate Zone A Areas* (April 1995), and/or develop new approaches. Such approaches must be coordinated with and approved by the FEMA Regional Project Officer before analysis and mapping begin.

Deliverables: In accordance with Appendix L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, and upon completion of floodplain mapping for the counties identified in Table 1.1, Missouri State Emergency Management Agency shall make the following products available to FEMA by uploading the digital data to the MIP so that the National Service Provider can access it for the Independent QC review. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal. The mapping for the remaining flooding sources including any non-revised digital panels and all merged revised and non-revised floodplain mapping data is to be submitted for a final QC review at the completion of this activity.

- Digital work map showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone designation labels, and all applicable base map features;
- Floodway Data Table;
- Digital versions of draft text for inclusion in the FIS report;
- DFIRM mapping files prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in the approved QA/QC Plan;
- Any backup or supplemental information including supporting calculations and assumptions used in the mapping required for the Independent QC review of Hydrologic and /or Hydraulic Analyses and Floodplain Mapping;
- An explanation for the use of existing topography for the studied reaches, if appropriate.
- Written summary of the analysis methodologies;
- Digital versions of input and output for any computer programs that were used;
- A metadata file complying with the FEMA NFIP Metadata Profile Specifications; and
- If automated GIS-based models are applied, all input data, output data, intermediate data processing products, and GIS data layers shall be submitted.

Former Mapping Activity Task Number Equivalent: Task 10 (Detailed Riverine), Task 10A (Redelineation), Task 13 (Non-revised Areas), and Task 14 (Merging Revised and Non-Revised).

MIP workflow step equivalent: Perform Floodplain Mapping, Rework Data Development Task (if needed as a result of Independent QC).

Concurrent steps: Validate Content Submission (NSP core Task Order), Perform Independent QC for Floodplain Mapping (if funded by Region VII), Store Content (NSP core Task Order).

Perform Independent QC Review of Floodplain Mapping

Responsible Mapping Partner: National Service Provider

Scope: The National Service Provider shall review the floodplain mapping submitted by Missouri State Emergency Management Agency under Perform Floodplain Mapping to ensure that the results of the analyses performed are accurately represented; the redelineation of existing data on new, updated topography is appropriate; and to ensure that the new DFIRM panels accurately represent the information shown on the effective FIRMs and FBFMs for the unrevised areas that are mapped. If the Missouri State Emergency Management Agency utilizes a contractor to perform the QA, the contractor must be a different contractor than who performed the original floodplain mapping. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall include, at a minimum, the activities listed below.

- Review the cross sections for proper location and orientation on the work map and agreement with the Floodway Data Table.
- Review the BFEs shown on the work map for proper location and agreement with the results of the hydraulic modeling.
- Review the regulatory floodway widths for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling.
- Review the floodplain boundaries for agreement with the flood elevations shown in the Floodway Data Table, the contour lines, and other topographic information shown on the work maps.
- Review the floodplain widths at cross sections as shown on the work maps to ensure the data matches the Floodway Data Table.
- Review the floodplain boundaries as shown on the work maps to ensure the data matches the Flood Profiles.
- For non-revised floodplain areas, the 1- and 0.2-percent-annual-chance floodplain boundaries agree with the floodplain boundaries shown on the FIRM, the contour lines, other topographic information, and planimetric information shown on the DFIRM base.
- Road and floodplain relationships are maintained for all unrevised areas.
- Review the flood insurance risk zones as shown on the work maps to ensure the data are labeled properly.
- Review the DFIRM mapping files to ensure the data were prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- Review the metadata file to ensure the data includes all required information shown in the FEMA NFIP Metadata Profiles.

Standards: All Independent QC work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with Appendix L of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the National Service Provider shall make the following products available to FEMA by uploading the digital data to MIP, through the Load Studies Data Artifacts portlet under the Data Upload tab under Tools & Links. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- A Summary Report that describes the findings of the QC review, noting any deficiencies in or agreeing with the mapping results;

- Recommendations to resolve any problems that are identified during the Independent QC review; and
- An annotated work map with all questions and/or concerns indicated, if necessary.

Former Mapping Activity Task Number Equivalent: Task 11 (review of revised floodplain mapping) and Task 13A (review of non-revised areas).

MIP workflow step equivalent: Perform Independent QC for Floodplain Mapping.

Concurrent steps: Perform Floodplain Mapping, Validate Content Submission (NSP core Task Order), Rework Data Development Task (if needed as a result of Independent QC), Store Content (NSP core Task Order).

Develop DFIRM Database

Responsible Mapping Partner: Missouri State Emergency Management Agency

Scope: Missouri State Emergency Management Agency shall prepare the database, produced during Perform Floodplain Mapping in accordance with Appendix L of the *Guides and Specifications for Flood Hazard Mapping Partners*, for upload to the MIP. Missouri State Emergency Management Agency shall coordinate with those Mapping Partners responsible for Floodplain Mapping, as necessary, to resolve any problems that are identified during development of the DFIRM Database. The primary purpose of this activity is to ensure that a quality DFIRM database is prepared earlier in the flood study process and well in advance of the Preliminary DFIRM Map Production and Distribution.

Standards: All DFIRM Database work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with Appendix L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, Missouri State Emergency Management Agency shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- DFIRM database files prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners* and in the format(s) required for the NSP's Validate Content Submission Process; and
- A metadata file complying with the FEMA NFIP Metadata Profile Specifications.

Former Mapping Activity Task Number Equivalent: None.

MIP workflow step equivalent: Develop DFIRM Database, Rework Data Development Task (if needed as a result of Independent QC).

Concurrent steps: Perform Independent QC for DFIRM Database (if funded by Region VII), NSP QC Check of Draft DFIRM database (HDM automated), Database, Validate Content Submission (NSP core Task Order), Store Content (NSP core Task Order).

NSP QC Check of Draft DFIRM database. The Missouri State Emergency Management Agency assigned the Develop DFIRM Database task must upload the draft DFIRM database (currently in .e00 format) and draft DFIRM metadata to HDM through the MIP. The submission is automatically sent to HDM for data auto-validation. The detailed logic description for the HDM QC Pro Auto Screen is available from FEMA or its contractor.

Produce Preliminary Map Products

Responsible Mapping Partner: Missouri State Emergency Management Agency

Scope: Missouri State Emergency Management Agency shall apply the final FEMA DFIRM graphic and database specifications to the DFIRM files produced under Floodplain Mapping. This work shall include adding all required annotation, line pattern, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to user). Missouri State Emergency Management Agency will be preparing the database for this project in the Standard format. The database shall be produced in accordance with Appendix L of the *Guides and Specifications for Flood Hazard Mapping Partners*. Missouri State Emergency Management Agency shall coordinate with those Mapping Partners responsible for the Perform Floodplain Mapping and Develop DFIRM Database tasks to resolve any problems that are identified during development of the Preliminary Map Products.

This task includes the creation of the countywide Flood Insurance Study (FIS) report. The FIS report will include the new study data and portions of the existing community based FIS reports as appropriate. The floodway data tables and profile sheets will be combined as needed to create a continuous table and profile for the subject streams. The elevations shown in the FIS shall be referenced to NAVD 1988 vertical datum.

Floodway Data Tables and Profile sheets for the Missouri River are available from the USACE-Kansas City District. The Missouri State Emergency Management Agency shall incorporate this information into the county-wide FIS as appropriate.

The task also includes a draft preliminary Summary of Map Actions (SOMA) prepared in accordance with FEMA requirements, for all affected communities. The SOMA shall list pertinent information regarding LOMCs that will be affected by the issuance of the DFIRM (i.e., superseded, incorporated, revalidated).

Missouri State Emergency Management Agency shall address all concerns or questions regarding the Preliminary Map Products that are raised by the National Service Provider during the Independent QC review, or during the NSP's Validate Content Submission Process.

Standards: All DFIRM Database, DFIRM Map, and FIS Report work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with Appendix K and L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, Missouri State Emergency Management Agency shall make the following products available to FEMA by uploading the digital data to the MIP. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- DFIRM mapping and database files prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners* and in the format(s) required for the NSP QC Process;
- All Digital information used to compile and print panels which can include digital label and annotation files used to create labeling on panels (including all fonts and style files, if applicable) which can comprise cross sections, BFEs, flood insurance zone labels, and all applicable base map features;
- The Flood Insurance Study Report is prepared in the FEMA Countywide Format as documented in Appendix J of *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale;
- Draft Preliminary SOMA;
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM as outlined in approved QA/QC Plan; and
- A metadata file complying with the FEMA NFIP Metadata Profile Specifications.

Former Mapping Activity Task Number Equivalent: Task 14A.

MIP workflow step equivalent: Produce Preliminary Map Products, Rework Data Development Task (if needed as a result of Independent QC).

Concurrent steps: Perform Independent QC for Preliminary Map Products (if funded by Region VII), NSP QC Check of Preliminary DFIRM database (HDM automated) DFIRM and FIS (NSP visual), Validate Content Submission (NSP core Task Order), Store Content (NSP core Task Order).

NSP QC Check of Preliminary DFIRM and Flood Insurance Study Report (FIS): The Missouri State Emergency Management Agency assigned the Produce Preliminary Map Products task must upload the Preliminary DFIRM database (currently in .e00 format) and preliminary DFIRM metadata to HDM through the MIP. The submission is automatically sent to HDM for data auto-validation. The detailed logic description for the HDM QC Pro Auto Screen is available from FEMA or its contractor. In addition, the Missouri State Emergency Management Agency must submit the preliminary DFIRM and FIS report to the Regional Management Center (RMC) prior to distribution. The amount of time necessary to complete the review will vary dependent upon study size. The RMC will review the DFIRM panels and the FIS report, and verify that the DFIRM database has passed the automated database check as indicated by a passing notification from HDM in the MIP. The RMC will review a sample—roughly 10 percent—of DFIRM panels. In this review, the RMC will look for significant errors. The Missouri State Emergency Management Agency is responsible for checking all panels and correcting errors identified by the RMC. Any errors identified during this review must be corrected before the Preliminary DFIRM is distributed.

Independent QC Review of Preliminary Map Products

Responsible Mapping Partner: National Service Provider

Scope: Upon completion of the Produce Preliminary Map Products activity, National Service Provider shall review the DFIRM spatial database to determine if it meets current FEMA database specifications. In addition, National Service Provider shall review the DFIRM panels to ensure they meet current FEMA graphic specifications. National Service Provider shall coordinate with other Mapping Partners, as necessary, to resolve any problems identified during this QC review. In addition, National Service Provider shall perform a review of the FIS report including all data tables, Flood Profiles, and other components of the FIS report. If Missouri State Emergency Management Agency utilizes a contractor to perform the Independent QC, the contractor must be a different contractor than who performed the original analyses. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. This work shall ensure that the requirements below are met.

- All required DFIRM features are accurately and legibly labeled and follow the examples shown in the FEMA DFIRM specifications (App. K). This includes all flood insurance risk zones, BFEs, cross sections, studied streams, mapped political entities, pertinent notes, and all roads within and adjacent to the 1-percent-annual-chance floodplains.
- All DFIRM features are correctly symbolized with the appropriate symbol, line pattern, or area shading and follow the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- All map collar information is complete, correct, and follows the requirements specified in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- DFIRM mapping files are in a GIS file and database format as specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, and conform to those specifications for content and attribution.
- DFIRM database files are in one of the database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, and conform to those specifications for content and attribution.
- The FIS report is prepared in the FEMA Countywide Format as documented in Appendix J of *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- Metadata files describing the DFIRM data include all required information shown in the FEMA NFIP Metadata Profile Specifications.

Standards: All DFIRM Database Development work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: : In accordance with Appendix K and L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, National Service Provider shall make the following products available to FEMA by uploading the digital data to the MIP, through the Load Studies Data Artifacts portlet under the Data Upload tab under Tools & Links. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- A Summary Report that describes the findings of the QA review noting any deficiencies in or agreeing with the mapping results and the results of all automated or manual QA steps taken during the Independent QC review;
- Recommendations to resolve any problems that are identified during the Independent QC review;
- An annotated copy of the DFIRM with all questions and/or concerns indicated, if necessary.

Former Mapping Activity Task Number Equivalent: Task 14B.

MIP workflow step equivalent: Perform Independent QA/QC of Preliminary Map Products.

Concurrent steps: Produce Preliminary Map Products, NSP QC Check of Preliminary DFIRM database (HDM automated) DFIRM and FIS (NSP visual), Validate Content Submission (NSP core Task Order), Rework Data Development Task (if needed as a result of Independent QC), Store Content (NSP core Task Order).

Distribute Preliminary Map Products

Responsible Mapping Partners: Missouri State Emergency Management Agency

Scope: Distribute Preliminary Map Products consists of the printing and distribution of the Preliminary copies of the DFIRM and FIS report for community officials and the general public for review and comment. FEMA may audit or assist in these activities if deemed to be necessary by the Regional Project Officer. The activities to be performed are summarized below.

Preliminary Transmittal Letter Preparation: The Missouri State Emergency Management Agency shall prepare transmittal letters for the Preliminary copies of the DFIRM, FIS report and related enclosures to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA. This letter may be prepared for FEMA only or for signature by FEMA and Missouri State Emergency Management Agency. A template specific to Region VII is available from the Regional Management Center.

Preliminary FIRM and FIS Countywide Brochure: Region VII has developed a brochure that will be provided to each community with the Preliminary Transmittal Letter. The Missouri State Emergency Management Agency shall prepare the brochure for each county. The template is available from the Regional Management Center.

Distribution of Preliminary DFIRM and FIS Report: The Missouri State Emergency Management Agency shall distribute the Preliminary copies of the DFIRM and FIS report to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

News Release Preparation: The Missouri State Emergency Management Agency shall prepare news release notifications of BFE changes for all affected communities, if appropriate, and perform QA/QC reviews of the notices for accuracy and compliance with FEMA format requirements. The Missouri State Emergency Management Agency shall file the notifications for later submittal to FEMA for review.

Preliminary Summary of Map Actions (SOMA) Distribution: The Missouri State Emergency Management Agency shall finalize and distribute Preliminary SOMAs for all affected communities, if appropriate, with the Preliminary DFIRM and FIS Report, Countywide brochure, and transmittal letter.

Standards: All Preliminary Map Products work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with Appendix L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, Missouri State Emergency Management Agency shall make the following products available to FEMA. Additionally, the Technical Support Data Notebook format described in Appendix M

of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

- Preliminary transmittal letters shall be prepared and transmitted. These letters and any additional letters requested by FEMA shall be prepared in accordance with the current version of the FEMA *Document Control Procedures Manual* and in conjunction with Guidance provided by the Region and/or its contractor.
- Preliminary copies of the DFIRM and FIS report, including all updated data tables and Flood Profiles shall be mailed to the Chief Executive Officer (CEO) and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.
- Preliminary SOMAs, prepared in accordance with FEMA requirements, shall be provided as appropriate.
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the final preparation of the preliminary DFIRM shall be provided as outlined in the approved QA/QC Plan.

Former Mapping Activity Task Number Equivalent: Task 15.

MIP workflow step equivalent: Distribute Preliminary Map Products, Verify Outreach Activities.

Concurrent steps: None

Post-Preliminary Processing

Responsible Mapping Partners: Missouri State Emergency Management Agency and FEMA

Scope: This activity consists of finalizing the DFIRM and FIS report after the Preliminary copies of the DFIRM and FIS report have been issued to community officials and the public for review and comment. The activities to be performed are summarized below and are subject to the mandatory quality control checks by the National Service Provider (NSP), also as described below.

Initiation of Statutory 90-Day Appeal Period: When required, upon completion of a 30-day community comment period and/or final coordination meeting with the affected communities, Missouri State Emergency Management Agency shall arrange for and verify that the following activities are completed in accordance with the current version of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* and *Document Control Procedures Manual*:

- The Missouri State Emergency Management Agency shall prepare and distribute Proposed BFE determination letters to the CEOs and floodplain administrators of affected communities.
- The Missouri State Emergency Management Agency shall prepare news release notifications of BFE changes and verify the notices are published in newspapers with local circulation in accordance with 44 CFR.
- The Missouri State Emergency Management Agency shall use the BFEs-on-theWeb tool to create BFE notices in accordance with Procedure Memorandum No. 44 – Protocol for Publishing Base Flood Elevation (BFE) Notices on the Web.

NSP QC Check of BFE Notices.

- The NSP shall perform a QC review of the Base Flood Elevation (BFE) determination letters and the BFE web notice.
- The NSP shall publish the BFE notice on the web.
- The NSP shall prepare and submit the proposed rule to FEMA for concurrence and publication in the *Federal Register*.

The Missouri State Emergency Management Agency assigned Post-Preliminary Processing is to submit these documents to the RMC at the ‘Create BFE Notice’ step in the MIP workflow. The documents must be submitted to the RMC at least 2 weeks prior to the first newspaper publication date. Any errors identified must be corrected by the Missouri State Emergency Management Agency prior to publication and distribution. This check, ‘Approve BFE Notice’ in the MIP, will occur shortly after the Community Coordination Officer (CCO) meeting. After FEMA approval, ‘Review BFE Docket’ in the MIP, the Missouri State Emergency Management Agency will be able to advance the remaining steps in the ‘Manage Appeal’ process in the MIP.

Resolution of Protests: Missouri State Emergency Management Agency shall review and resolve protests received during the comment or 90-day appeal periods. The activity will include all protests to correct street, stream and other names, corporate boundaries, and floodplain boundary changes due to topographic data. For each protest, the following activities shall be conducted as appropriate:

- Initial processing and acknowledgment of submittal;
- Technical review of submittal to determine validity of protest;
- Preparation of letter(s) requesting additional supporting data; and
- Preparation of a draft resolution letter for co-signature with FEMA and Missouri State Emergency Management Agency and revised DFIRM and FIS report materials for FEMA review.

Missouri State Emergency Management Agency shall mail all associated correspondence upon authorization by FEMA.

Resolution of Appeals: Missouri State Emergency Management Agency shall review and resolve appeals received during the 90-day appeal period. Appeals that are defined by 67.6(b)(1) or 67.6(b)(3) might be considered a change of scope and should be discussed with the Regional Project Manager before proceeding. For each appeal, the following activities shall be conducted as appropriate:

- Initial processing and acknowledgment of submittal;
- Technical review of submittal to determine validity of appeal;
- Preparation of letter(s) requesting additional supporting data;
- Performance of revised analyses; and
- Preparation of a draft resolution letter for co-signature with FEMA and Missouri State Emergency Management Agency and revised DFIRM and FIS report materials for FEMA review.

Missouri State Emergency Management Agency shall mail all associated correspondence upon authorization by FEMA.

Letters of Map Change: Missouri State Emergency Management Agency shall include all effective LOMCs occurring after the Preliminary Map and up to the time of the Letter of Final Determination, (LFD) for each affected community. Only those LOMCs visible at the published map scale shall be included.

Preparation of Special Correspondence: Missouri State Emergency Management Agency shall support FEMA in responding to comments not received within the 90-day appeal period (referred to as “special correspondence”) including drafting responses for FEMA review when appropriate and finalizing

responses for co-signature. Missouri State Emergency Management Agency also shall mail the final correspondence (and enclosures, if appropriate) and distribute appropriate copies of the correspondence and enclosures upon receipt of authorization from FEMA.

Revision of FIRM and FIS Report: If necessary, Missouri State Emergency Management Agency shall work together with FEMA to revise the DFIRM and FIS report and shall distribute revised Preliminary copies of the DFIRM and FIS report to the CEO and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

Final SOMA Preparation: Missouri State Emergency Management Agency shall prepare Final SOMAs for the affected communities with assistance from FEMA, as appropriate.

Processing of Letter of Final Determination: The Missouri State Emergency Management Agency shall work with FEMA to establish the effective date for the DFIRM and FIS report, and shall prepare Letters of Final Determination (LFDs) for each affected community for FEMA review in coordination with the Region and its contractor, and in accordance with the FEMA *Document Control Procedures Manual*. FEMA or its designated contractor shall mail the final signed LFDs and enclosures and distribute appropriate copies of the signed LFDs.

NSP QC Check of LFD letters. The Missouri State Emergency Management Agency assigned Post-Preliminary Processing is responsible for preparing the LFD and SOMA for affected communities. This is the ‘Prepare LFD Docket’ step in the MIP workflow. The NSP reviews the LFD letters, final Summary of Map Actions (SOMA) and final rule for the federal register. This is the ‘Review LFD Docket’ step in the MIP. The Missouri State Emergency Management Agency producing these documents is to submit them to the RMC. The letters should be submitted to the RMC at least three (3) weeks prior to the date they are to be distributed. Any errors identified must be corrected by the Missouri State Emergency Management Agency prior to publication and distribution. The 6-month compliance period is initiated with the distribution of the LFD and determines the map’s effective date. This is the ‘Distribute LFD Letter’ step in the MIP.

Processing of Final DFIRM and FIS Report for Printing: Missouri State Emergency Management Agency shall prepare final reproduction materials for the DFIRM and FIS report and provide these materials to MSC for printing by the United States Government Printing Office. Missouri State Emergency Management Agency shall also prepare the appropriate paperwork to accompany the DFIRM and FIS report (including Print Processing Worksheet, Printing Requisition Forms, and Community Map Actions Form) and transmittal letters to the community CEOs.

NSP QC Check of Final DFIRM. The Missouri State Emergency Management Agency must submit the final DFIRM and database to the NSP through the MIP at the ‘Produce Map Products’ step. Two checks occur during this review—an automated database check and a visual agreement check. The submission is to include the following:

- For automated checks – E00 and metadata text files
- For visual checks – E00, SHP, MIF files; FEMA NFIP Profile-compliant metadata for the DFIRM; and TIF for vector based maps or PNG for Ortho-based maps with their associated world files

Any errors identified during this review, ‘Perform Map Products QA’ in the MIP, must be corrected by the Missouri State Emergency Management Agency. This step often is iterative and must be

completed before the Letter of Final Determination (LFD) is issued. The period of time that is required to complete the automated and visual agreement check will take no less than 30 days. The method of prioritizing studies is the use of the projected effective date.

This QC step must be completed and the final map products approved before the negatives are produced. It must be remembered that the final DFIRM products including the map negatives and digital data must be delivered to the Map Service Center 4 months prior to the effective date.

NSP QC Check of MSC Package. The Missouri State Emergency Management Agency must prepare the final DFIRM products (Page 1-101 in Volume 1 of the Guidelines and Specifications), both hard copy and digital. This is the 'Submit MSC Deliverable' step in the MIP workflow. The products must be sent to the NSP for quality review one week before the date due to the MSC. This review is the 'Validate MSC Deliverable' step of the MIP. The Missouri State Emergency Management Agency must correct any errors identified as a result of this review. Once the check is complete and no errors are found, the NSP will forward the package to the Map Service Center.

MSC QC Check of MSC Package. Once the final DFIRM products are delivered to the MSC at the 'Submit Products to MSC' step in the MIP workflow, a final check of the digital data and map negatives is completed. If any errors are identified the MSC will contact the Missouri State Emergency Management Agency. The Government Printing Office (GPO) requires a month to print the maps. Once the maps are back from the GPO the MSC then mails the maps and FIS. The digital data is placed on their website.

Proof Copies: The Missouri State Emergency Management Agency will produce and distribute a digital proof copy of the final DFIRM and FIS delivered to the MSC according to the procedures set forth in *Region VII Procedures for Proof Copy Preparation and Distribution* available from the RMC. The proof copy package includes the following:

- CD or DVD containing digital proof copies of the DFIRM panels and FIS report
- Cover letter addressed to the relevant State NFIP Coordinator

Missouri State Emergency Management Agency will prepare and distribute the proof copy package to the State NFIP Coordinator, with copies to FEMA Region VII and the RMC, within one week of submitting the final DFIRM and FIS report to the MSC.

Revalidation Letter Processing: Missouri State Emergency Management Agency shall prepare and distribute letters for FEMA signature to the community CEOs and floodplain administrators to notify the affected communities about LOMCs for which determinations will remain in effect after the DFIRM and FIS report become effective.

Archiving Data: Missouri State Emergency Management Agency shall ensure that technical and administrative support data are packaged in the FEMA required format and stored properly in the library archives until transmitted to the FEMA Engineering Study Data Package Facility. In addition, the Missouri State Emergency Management Agency will maintain copies of all data for a period of no less than three years.

Standards: All Post Preliminary DFIRM work shall be performed in accordance with the standards specified in Section 5 - Standards.

Deliverables: In accordance with Appendix L of the *Guidelines and Specifications for Flood Hazard Mapping Partners*, Missouri State Emergency Management Agency shall make the following products available to FEMA. Additionally, the Technical Support Data Notebook format described in Appendix M of the *Guidelines and Specifications for Flood Hazard Mapping Partners* must be delivered in accordance with Section 2 – Technical and Administrative Support Data Submittal.

Hard copy documents to be supplied through the FEDD file (sent to FEMA library):

- Documentation that the news releases were published in accordance with FEMA requirements;
- Documentation that the appropriate *Federal Register* notices (Proposed and Final Rules) were published in accordance with FEMA requirements;
- Draft and final Special Correspondence (and all associated enclosures, backup data, and other related information) for FEMA review and signature, as appropriate;
- Draft and final Appeal and Protest acknowledgment, additional data, and resolution letters (and all associated enclosures, backup data, and other related information) for FEMA review and signature, as appropriate;
- Draft and final LFDs (and all associated enclosures, backup data, and other related information) for FEMA review and signature;
- DFIRM negatives and final FIS report materials including all updated data tables and Flood Profiles;
- Paperwork for the final DFIRM and FIS report materials;
- Transmittal letters for the printed DFIRM and FIS report;
- Proof Copy Distribution Letter;
- LOMC Revalidation Letters, if appropriate;
- Completed, organized, and archived technical and administrative support data; and
- Completed, organized, and archived case files and flood elevation dockets.

Digital files to be submitted through the MIP;

- Digital copies of the final DFIRM database, DFIRM panels and FIS report; and
- A metadata file complying with the FEMA NFIP Metadata Profiles Specifications.

Former Mapping Activity Task Number Equivalent: Task 16.

MIP workflow step equivalent: All steps within Manage Post Preliminary Processing process train.

Concurrent steps: None.

SECTION 2—TECHNICAL AND ADMINISTRATIVE SUPPORT DATA SUBMITTAL

The Project Team members for this Flood Map Project that have responsibilities for activities included in this MAS shall comply with the data submittal requirements summarized below.

All supporting documentation for the activities in this MAS shall be submitted in the TSDN format in accordance with Appendix M of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners*, dated April 2003. Appendix M may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/pdf/fhm/frm_gsam.pdf. Table 2-1 indicates the sections of the TSDN that apply to each mapping activity.

If any issues arise that could affect the completion of an activity within the proposed scope or budget, the responsible Mapping Partner shall complete a Special Problem Report (SPR) as soon as possible after the

issue is identified and submitted to FEMA. The SPR is to describe the issue and propose possible resolutions. (For additional information on SPRs, refer to Appendix M, Subsection M.2.1.1 of *Guidelines and Specifications for Flood Hazard Mapping Partners*.)

Table 2-1. Mapping Activities and Applicable TSDN Sections

TSDN Section	Mapping Activities													
	Scoping	Perform Field Survey	Topographic Development	QA/QC of Topographic Data	Acquire Base Map	Hydrologic Analyses	QA/QC of Hydrology	Hydraulic Analysis	QA/QC of Hydraulic Analyses	Perform Floodplain Mapping	QA/QC of Floodplain Mapping	Develop DFIRM Database	Distribute Preliminary Map Products	Post-Preliminary Processing
General Documentation														
Special Problem Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Telephone Conversation Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Meeting Minutes/ Reports	X	X	X	X	X	X	X	X	X	X	X	X	X	X
General Correspondence	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Engineering Analyses														
Hydrologic Analyses		X			X	X	X	X	X	X	X			
Hydraulic Analyses		X			X	X	X	X	X	X	X			
Key to Cross-Section Labeling		X			X	X	X	X	X	X	X			

TSDN Section	Mapping Activities													
	Scoping	Perform Field Survey	Topographic Development	QA/QC of Topographic Data	Acquire Base Map	Hydrologic Analyses	QA/QC of Hydrology	Hydraulic Analysis	QA/QC of Hydraulic Analyses	Perform Floodplain Mapping	QA/QC of Floodplain Mapping	Develop DFIRM Database	Distribute Preliminary Map Products	Post-Preliminary Processing
Key to Transect Labeling		X			X	X	X	X	X	X	X			
Draft FIS Report					X	X	X	X	X					
Mapping Information	X		X	X						X	X	X	X	X
Miscellaneous Reference Information	X	X	X	X	X	X	X	X	X	X	X	X	X	X

SECTION 3—PERIOD OF PERFORMANCE

The mapping activities assigned to Missouri State Emergency Management Agency in this MAS will be completed within the period of performance specified in the Agreement Articles of the Cooperative Agreement. The Mapping Activities may be terminated at the option of FEMA or Missouri State Emergency Management Agency in accordance with the provisions of the June 17, 2007 CTP Partnership Agreement. If these mapping activities are terminated, all products produced to date and the remaining funds from uncompleted activities, provided by FEMA for this MAS, will be returned to FEMA.

SECTION 4—FUNDING/LEVERAGE

Funds will be provided to Missouri State Emergency Management Agency by FEMA through Cooperative Agreement for the completion for this Flood Map Project. The Cooperative Agreement budget identifies the amount to be provided by each party.

Activities associated with any additional needs would be performed based on availability of additional funds. The CTP Leverage listed below includes in-kind services and blue book values for acquired information (i.e. base map data, hydrologic and hydraulic analyses, etc.). The current Blue Book is dated November 2006.

[Redacted Header]				
Christian				
Clay				
Crawford				
Henry				
Howell				
Johnson				
Laclede				
Lafayette				
Lawrence				
Newton				
Platte				

Pulaski				
Ray				
Scott				
St. Francois				
Stone				
St. Louis City				
Totals				

SECTION 5—STANDARDS

The standards relevant to this MAS are provided in Tables 5-1 and 5-2. Information on the correct volume, appendix, section, or subsection of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* to be referenced for each mapping activity are summarized in Table 5-2 for convenience. However, all mapping partners working on a Flood Map Project are responsible for complying with all appropriate requirements in FEMA’s *Guidelines and Specifications for Flood Hazard Mapping Partners* and related Procedure Memoranda published by FEMA as of the date of this agreement.

These guidelines may be downloaded from the FEMA Flood Hazard Mapping website at http://www.fema.gov/plan/prevent/fhm/dl_cgs.shtm. The Geospatial Data Coordination Policy and the Geospatial Data Coordination Implementation Guide are located at <https://hazards.fema.gov> under “Tools & Links.”

Table 5-1. Applicable Standards for Project Activities

Applicable Standards	Activities														
	Scoping	Perform Field Survey	Topographic Development	QA/QC Review of Topo Data	Acquire Base Map	Hydrologic Analysis	QA/QC Review of Hydrologic Analysis	Hydraulic Analysis	QA/QC Review of Hydraulic Analysis	Perform Floodplain Mapping	QA/QC Review of Floodplain Mapping	Develop DFIRM Database	QA/QC Review of Preliminary Map	Distribute Preliminary Map Products	Post-Preliminary Processing
<i>Guidelines and Specifications for Flood Hazard Mapping Partners</i> , April 2003	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
FEMA’s Geospatial Data Coordination Policy	X		X		X										
FEMA’s Geospatial Data Coordination Implementation Guide	X		X		X										
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-510), “Guidelines for Establishing GPS-Derived Ellipsoid Heights,” November 1997	X	X	X	X											
Engineer Manual 1110-2-1003, <i>Hydrographic Surveys</i> (USACE), January 1, 2002	X	X													
“Numerical Models Accepted by FEMA for NFIP Usage,” Updated April 2003	X				X	X	X	X	X						
NFIP Metadata Profile Specifications	X		X	X						X	X	X	X	X	X
<i>Document Control Procedures Manual</i>	X													X	X
<i>44 Code of Federal Regulations Part 66 and 67</i>	X													X	

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications

Activity Description	Applicable Volume, Section/Subsection, and Appendix
Scoping	Volume 1, Section 1.3, Appendix I, Scoping Report document; 44 Code of Federal Regulations Part 66 and 67
Perform Field Survey	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1)
	Appendix A
	Appendix F, Section F.3
	Appendices B, C, M, and N
Topographic Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1)
	Appendix A
	Appendices M and N
Independent QA/QC Review of Topographic Data	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.1)
	Appendix A
	Appendices M and N
Acquire Base Map	Volume 1, Sections 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsections 1.4.3.1 and 1.4.3.2)
	Appendix A, Section A.1 (specifically Subsection A.1.1); Appendices K, L, and M
Perform Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4)
	Appendix A, Section A.4
	Appendix C, Sections C.1 and C.7
	Appendices E, F, G, H, M and N

Activity Description	Applicable Volume, Section/Subsection, and Appendix
Perform Independent QA/QC Review of Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) ----- Appendix A, Section A.4 ----- Appendix C, Section C.2 ----- Appendices E, F, G, H, M and N
Perform Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) ----- Appendix A, Section A.4 (specifically Subsection A.4.7) ----- Appendix C, Sections C.3 and C.7 ----- Appendices B, E, F, G, H, M and N
Perform Independent QA/QC Review of Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) ----- Appendix A, Section A.4 (specifically Subsection A.4.7) ----- Appendix C, Section C.5 ----- Appendices B, E, F, G, H, M and N ----- Appendix C, Section C.5 ----- Appendices B, D, and M ----- Appendix A, Section A.4 ----- Appendices B, D, H and M
Perform Floodplain Mapping	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) ----- Appendix C, Sections C. 4 and C.6 (specifically Subsection C.6.1.3) ----- Appendix D, Sections D.2 (specifically Subsection D.2.7) and D.3 (specifically Subsection D.3.7) ----- Appendices E, F, G, H, K, L, and M
	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2, 1.4.2.3, and 1.4.3.2) ----- Appendix C, Section C.6 (specifically Subsection C.6.1.3) ----- Appendices K, L, and M
	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.3)

Activity Description	Applicable Volume, Section/Subsection, and Appendix
Perform Independent QA/QC Review of Floodplain Mapping	Appendix C, Sections C.4 and C.6 Appendix D, Sections D.2 (specifically Subsection D.2.7) and D.3 (specifically Subsection D.3.7) Appendices E, F, G, H, K, L, and M
Develop DFIRM Database	Volume 1, Section 1.4 Appendices K, L, and M
Perform Independent QA/QC Review of Preliminary Map Product	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3, 1.4.3.3, 1.4.3.9, and 1.4.3.10) Appendices K, L, and M
Distribute Preliminary Map Products	Volume 1, Sections 1.4 (specifically Subsections 1.4.2 and 1.4.3) and 1.5 (specifically Subsection 1.5.1) Appendices J, K, L, and M
Post-Preliminary Processing	Volume 1, Section 1.5 (specifically Subsection 1.5.2) Appendices J, K, L, and M

SECTION 6—SCHEDULE

The tasks documented in this Mapping Activity Statement shall be completed in accordance with the project schedule. The Missouri State Emergency Management Agency will use the MIP to report progress, entering Cost to Date, Percent Complete to Date, and “As of” date in the “Update Information” section of the Task Information screen for each task. Within three weeks of funds award, the Missouri State Emergency Management Agency will provide the RMC with the initial schedule for each county for entry into the MIP. The data reported in the MIP will include estimated and actual completion dates, budget and amount spent, and the percent complete of each task identified in the Mapping Activity Statement. Each county identified in Table 1-1 will have separate schedule established.

The Missouri State Emergency Management Agency will update the MIP at least quarterly, and when a task is completed.

SECTION 7—CERTIFICATIONS

Field Surveys and Topographic Data Development

A Registered Professional Engineer or Licensed Land Surveyor shall provide an accuracy statement for field surveys and/or topographic data used and shall certify these data meet the accuracy statement provided. Data accuracy should be stated used the Federal Geographic Data Committee National Standards for Spatial Data Accuracy, but the American Society for Photogrammetry and Remote Sensing accuracy reporting standards are acceptable.

Base Map Acquisition and Preparation

- A community official or responsible party shall provide written certification that the digital data meet FEMA minimum standards and specifications.
- The responsible Mapping Partner shall provide documentation that the digital base map can be used by FEMA. Please note that uploading base map data to the MIP does not constitute agreement that the digital base map can be used by FEMA. Documentation that the digital base map can be used by FEMA is still being required.
- Certifications must be made at the time the intermediate data is submitted. For example, if hydrologic data is submitted, certification will be required at the time it is submitted.

Hydrologic Analyses, Hydraulic Analyses, and Floodplain Mapping

- A Registered Professional Engineer shall certify hydrologic and hydraulic analyses and data in accordance with 44 CFR 65.6(f).
- Any levee systems to be accredited will be certified in accordance with 44 CFR 65.10.

SECTION 8—TECHNICAL ASSISTANCE AND RESOURCES

Project Team members may obtain copies of FEMA-issued LOMCs, archived engineering backup data, and data collected as part of the Mapping Needs Assessment Process from FEMA and/or your Regional Project Officer.

General technical and programmatic information, such as FEMA 265 and the Quick-2 computer program, can be downloaded from the FEMA website at <http://www.fema.gov/plan/prevent/fhm/index.shtm>. Specific technical and programmatic support may be provided through FEMA and/or its contractor; such assistance should be requested through the FEMA Project Officer specified in Section 12 – Points of Contact.

Project Team members also may consult with the FEMA Regional Project Officer to request support in the areas of selection of data sources, digital data accuracy standards, assessment of vertical data accuracy, data collection methods or subcontractors, and GIS-based engineering and modeling training.

SECTION 9—CONTRACTORS

Missouri State Emergency Management Agency intends to use the services of AMEC Earth and Environmental as a contractor for this Flood Map Project. Missouri State Emergency Management Agency shall ensure that the procurement for all contractors used for this Flood Map Project complies with the requirements of 44 CFR 13.36.

SECTION 10—REPORTING

Missouri State Emergency Management Agency shall provide progress and financial reports to the FEMA Regional Project Officer and Assistance Officer in accordance with Cooperative Agreement Articles V & VI, and 44 CFR 13.40 and 13.41.

EARNED VALUE REPORTING:

The MIP was developed in part to track the Earned Value of mapping projects. This information is automatically calculated by the MIP, using the Actual cost and schedule of work performed, or “actuals” and comparing them to the expected cost and schedule of work performed, or “baseline”.

Once the FEMA Regional office has issued a task order the NSP will complete the “Obligate Project Funds” screen in the MIP. This step establishes the baseline for the project in the MIP, using the cost and schedule information for each activity.

The MIP study workflow allows Missouri State Emergency Management Agency to report on the status of these projects at a task level. The cost and schedule information, updated by the Missouri State Emergency Management Agency for each contracted task, is compared to the baseline established for those tasks. This information is rolled up to a project level and monitored by the FEMA Region to assess progress and Earned Value.

Earned Value reporting involves the reporting of cost, schedule and performance (physical percent complete) in the MIP by the Missouri State Emergency Management Agency.

Once the baseline schedule and cost is established in the MIP, the Missouri State Emergency Management Agency shall input the performance and actual cost to date for each contracted task for each project. This must be completed at least quarterly. When a task is completed, the Missouri State Emergency Management Agency shall enter 100% complete, enter the actual completion cost, and the actual completion date of each task appearing on their workbench.

Progress reporting shall utilize the MIP. Other progress reports are not anticipated. When the Missouri State Emergency Management Agency provides deliverables through the MIP, the Missouri State Emergency Management Agency shall ensure the MIP reflects the status of the related task. The Missouri State Emergency Management Agency will submit two (2) copies of the MIP Flood Engineering Report and other appropriate reports to the FEMA Assistance Officer for quarterly progress reporting.

The Project Officer, as needed, may request additional information on status on an ad hoc basis.

SECTION 11—PROJECT COORDINATION

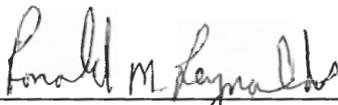
Throughout the project, all members of the Project Team will coordinate, as necessary, to ensure the products meet the technical and format specifications required and contain accurate, up-to-date information. Coordination activities shall include:

- Meetings, teleconferences, and video conferences with FEMA and other Project Team members on an ad hoc basis;
- Telephone conversations with FEMA and other Project Team members on an ad hoc basis;
- Updates to the MIP and other FEMA status information systems in accordance with requirements in Volumes 1 and 3 of *Guidelines and Specifications for Flood Hazard Mapping Partners*; and
- E-mail, facsimile transmissions, and letters, as required.
- Project Team members shall meet with the Regional Management Center and/or FEMA quarterly to review the progress of the project. These meetings will be held via a conference call at a mutually agreeable time to be determined. Typically, the call will occur following the submittal of the quarterly progress report.

SECTION 12—POINTS OF CONTACT

The points of contact for this Flood Map Project are Bob Franke, the FEMA Regional Project Officer; Jason Schneider, the Project Manager for Missouri State Emergency Management Agency; or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. When necessary, any additional FEMA assistance should be requested through the FEMA Regional Project Officer.

Each party has caused this MAS to be executed by its duly authorized representative.



Roynald M Reynolds, Director
Missouri State Emergency Management Agency

4-26-07

Date



Robert G Bissell
Director, Federal Insurance and Mitigation Division
Federal Emergency Management Agency, Region VII

6-12-07

Date