

3.10 Floodplains

Floodplains are flat areas along streams and water bodies that hold excess water after a storm. Executive Order 11988 says that impacts to floodplains should be avoided when possible.

What is a floodplain?

Floodplains are low lying areas that often flood after large storms. The Federal Emergency Management Agency (FEMA), in cooperation with local and state jurisdictions, map regulatory floodplain areas. Regulatory (100-year) floodplains are regulated by Executive Order 11988. Although areas located outside of the regulatory floodplain may flood, this study includes only the regulatory floodplains mapped by FEMA.

Floodplains may consist of the floodway and/or the flood fringe. The floodway is the channel of a river, stream, or water body that transports water. The portion of the floodplain outside of the channel is the flood fringe.

Floodplain

Low-lying areas that often flood after storm events. The regulatory (100-year) floodplain is the portion of subject to floodplain laws, regulations, and ordinances. The regulatory floodplain is evaluated in this section.

Natural and Beneficial Floodplain Values

Flood reduction, water quality maintenance, groundwater recharge, fish and wildlife habitat, and agricultural production.



Water stored in the Bear Creek floodplain along Thrill Hill Road in Vandalia after a storm in April, 2011

Where are the floodplains in the project study area?

There are 26 floodplains adjacent to streams and lakes within the project area. Ten of the floodplains are avoided by the alternatives. The floodplains are identified in Table 3.10-1 and displayed in Figure 3.10-1.

Table 3.10-1: Regulatory Floodplains in Project Study Area

Water Resource Associated with Floodplain	County	Impacted by A Build Alternative?	Cover Type
Webster Creek	Washington/Marion	Yes	Forested
Fulton Branch	Washington	Yes	Forested and Agricultural
Sewer Creek	Clinton	Yes	Forested and Agricultural
Unnamed tributary to Crooked Creek 1	Clinton	Yes	Agricultural
Unnamed tributary to Crooked Creek 2	Clinton	Yes	Forested and Agricultural
Crooked Creek	Clinton/Marion	Yes	Forested
Crileys Branch	Clinton	No	Forested and Agricultural
Raccoon Creek	Marion	No	Forested and Agricultural
Turkey Creek	Marion	No	Forested
Prairie Creek	Clinton/Marion	Yes	Forested and Agricultural
Lost Creek	Clinton	No	Forested
Davidson Creek	Marion	No	Forested
East Fork of the Kaskaskia River	Marion	Yes	Forested
Louse Run	Marion	No	Forested and Agricultural
North Fork of the Kaskaskia River	Marion	Yes	Forested and Agricultural
Flat Creek	Marion	Yes	Forested
Richland Creek	Fayette	Yes	Forested and Agricultural
Hickory Creek Levee Ditch	Fayette	Yes	Forested and Agricultural
Vandalia Ditch	Fayette	No	Forested and Agricultural
Kaskaskia River	Fayette	Yes	Forested and Agricultural
Old Hickory Creek	Fayette	No	Forested and Agricultural
Sandy Run Ditch	Fayette	No	Forested and Agricultural
Bear Creek	Fayette	Yes	Forested and Agricultural
Vandalia Lake	Fayette	No	Forested and Residential
Hoffman Creek	Fayette	Yes	Forested and Agricultural
Ramsey Creek	Fayette	Yes	Forested and Agricultural

Figure 3.10-1: Regulatory Floodplains in Project Study Area (Page 1 of 2)

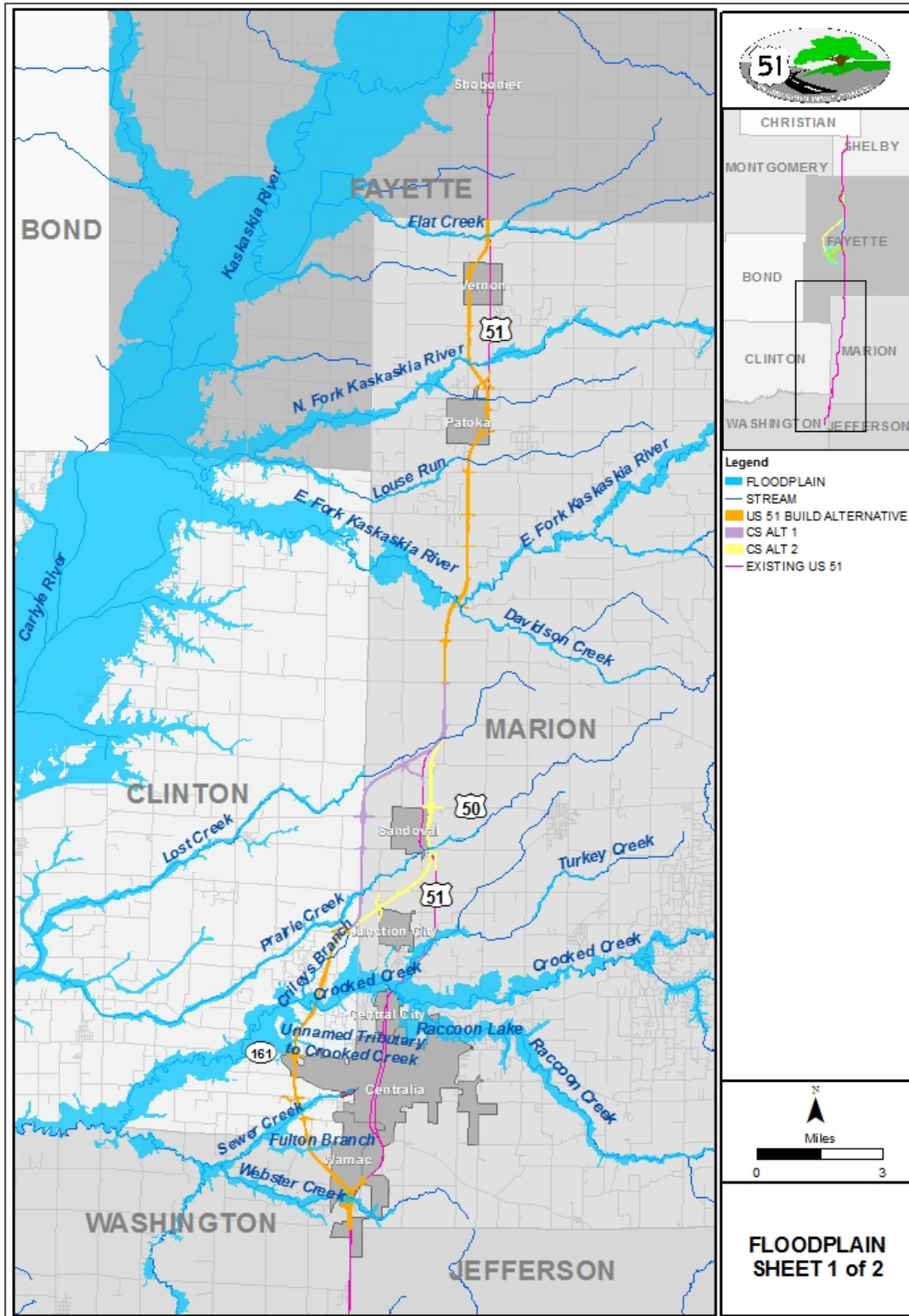
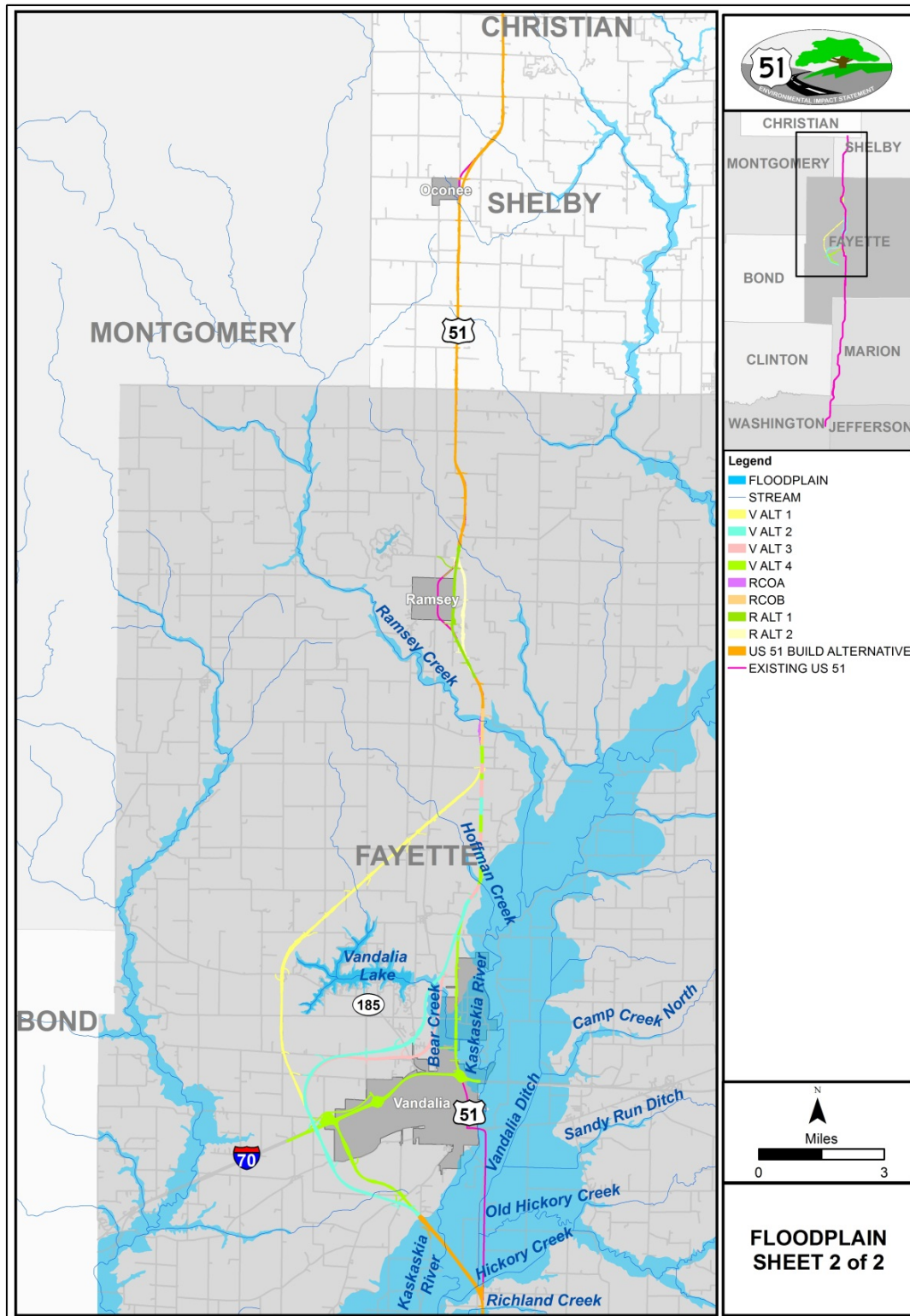


Figure 3.10-1: Regulatory Floodplains in Project Study Area (Page 2 of 2)



How were floodplain impacts evaluated?

The number and length of floodplain crossed by each alternative was calculated by overlaying the alternatives on the floodplain map. New floodplain crossings occur where the floodplain is not currently crossed, and new roads, bridges or culverts are required.

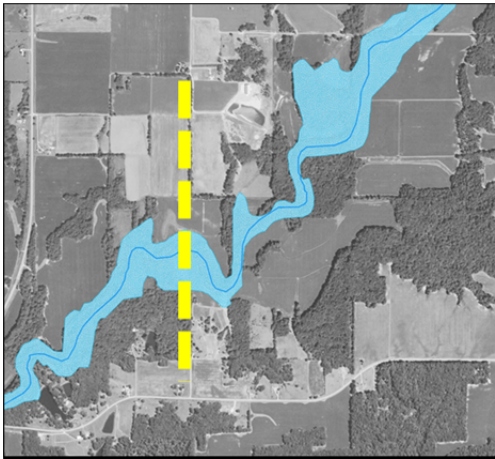
Floodplain impacts are further assessed by the type of encroachment (transverse or longitudinal), floodplain characteristics (floodway or flood fringe), and effects on natural and beneficial floodplain values. Significant encroachments and encroachments that support probable incompatible floodplain development (development that is not consistent with a community’s floodplain plan and indirectly facilitates commercial development or urban growth in the floodplain) were identified.

Encroachment
Any action within the floodplain.

Significant Encroachment
Significant potential for interruption of a road that is needed for emergency vehicle or an evacuation route, poses a significant risk, or a significant adverse impact on natural and beneficial floodplain values.

Floodplain Encroachment Type

Transverse Encroachment



Longitudinal Encroachment



There are two types of floodplain encroachments: transverse and longitudinal.

A transverse encroachment travels across the direction of flow. They are difficult to avoid, and usually result in a lower impact.

A longitudinal encroachment travels along direction of flow. They may result in a greater impact to floodwater transport and storage.

What are the floodplain impacts for the US 51 project?

The floodplain impacts resulting from each alternative are discussed by location below. All impacts occur within the flood fringe portion of the floodplain. No regulatory floodways were impacted by the alternatives. In most of the project area, regulatory floodways were not designated by FEMA.

Centralia-Sandoval Alternatives

CS Alt 1 crosses the Prairie Creek floodplain southwest of Sandoval on new alignment. The encroachment is transverse and is 485 feet in length. The floodplain is forested at this location.

CS Alt 2 crosses the Prairie Creek floodplain east of Sandoval on a new alignment. The encroachment is transverse and is 265 feet in length. The floodplain is forested and contains agricultural land at this location. A forested wetland, Site 303, occurs within the floodplain at this location. Old Cemetery Road crosses the proposed alignment and is longitudinal on the floodplain.

CS Alt 2 will connect with existing US 51 to the west to form an intersection. The intersection is located partially on existing alignment and transversely crosses the floodplain for 250 feet.

The floodplain encroachments resulting from CS Alt 1 and CS Alt 2 will not increase the risk of flood damage or result in flood-related interruption of emergency services or routes, will not result in significant adverse impacts to the natural and beneficial floodplain values, and will not result in incompatible floodplain development. The encroachments for CS Alt 1 and CS Alt 2 were minimized to the extent practicable by utilizing existing encroachments when practicable. Linear feet of encroachments were minimized by crossing at the narrowest point practicable, while considering the avoidance and minimization of other Federally protected resource impacts, such as wetlands.

A summary of floodplain impacts for the Centralia-Sandoval alternatives is in Table 3.10-2.

Table 3.10-2: Centralia-Sandoval Alternative Floodplain Impact Summary

Criteria	CS Alt 1	CS Alt 2
Number of Floodplains Crossed	1	1
Transverse Encroachments		
<i>Along Existing Encroachment (feet)</i>	0	250
<i>Along New Encroachment(feet)</i>	485	265
Total Transverse Encroachment (feet)	485	515
Longitudinal Encroachments		
<i>Along Existing Encroachment (feet)</i>	0	0
<i>Along New Encroachment(feet)</i>	0	0
Total Longitudinal Encroachment (feet)	0	0
Significant Encroachment?	No	No

Vandalia Alternatives

The floodplain south and east of Vandalia is extensive. The floodplain impacts resulting from the Vandalia alternatives are discussed below and summarized in Table 3.10-3. The Kaskaskia River floodplain south of Vandalia is crossed by the US 51 Build Alternative, which is discussed later in this chapter.

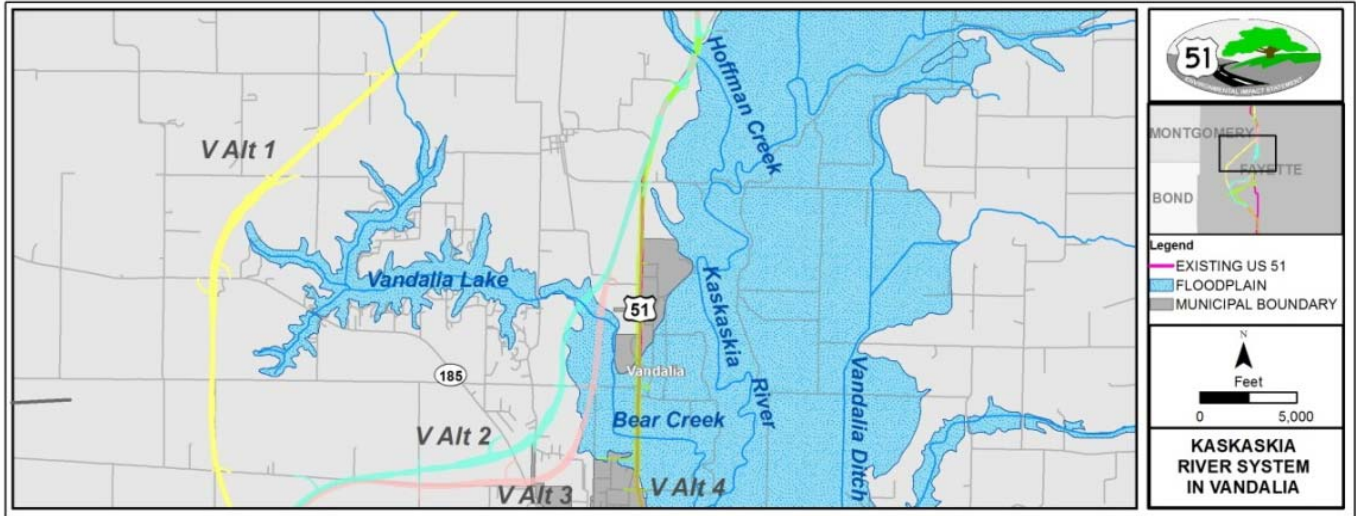
V Alt 1 does not cross a 100-year floodplain.

V Alt 2, V Alt 3, and V Alt 4 include a crossing of the Hoffman Creek floodplain on existing alignment north of Vandalia. Existing US 51 crosses Hoffman Creek where it joins the floodplain of the Kaskaskia River. The transverse encroachment on the combined floodplain is 700 feet in length. Agricultural land is the predominant land cover adjacent to the encroachment.

Although V Alt 2, V Alt 3, and V Alt 4 share an identical crossing at Hoffman Creek, they each impact one additional floodplain, Bear Creek, at different magnitudes.

The crossings are illustrated on Figure 3.10-2 and discussed below.

Figure 3.10-2: Kaskaskia River System Floodplain on the North Side of Vandalia



V Alt 2 results in longitudinal and transverse crossing of the Bear Creek floodplain on new alignment. The longitudinal encroachment is approximately 515 feet and includes forested wetland Site 221. The transverse crossing is approximately 1,200 feet and includes scrub-shrub wetland site 375. These crossings involve forested and agricultural lands. Shifting V Alt 2 west to avoid the longitudinal impact would result in additional residential impacts.

V Alt 3 also results in a longitudinal crossing of the Bear Creek floodplain on new alignment. The longitudinal crossing is 6,400 feet in length and involves wetland sites 221 (forested), 222 (wet meadow), 224 (farmed wetland), 225 (wet meadow), 442 (wet meadow), and 443 (wet meadow). An additional 650 feet of longitudinal impact within the floodplain is proposed along an existing cross street. The floodplain is primarily agricultural land with strips of forest along some of the drainage ways. Shifting the roadway alignment east would result in longitudinal impacts to the floodplain, impacts to high quality wetlands located along the west side of existing US 51, and impacts to additional residences along existing US 51.

V Alt 4 results in two crossings of the Kaskaskia River floodplain on existing alignment (along existing I-70). The first encroachment is transverse and occurs at the existing US51/I-70 interchange. The northeast quadrant of the existing interchange lies outside the floodplain. The potential modification of the interchange at this location could involve a 1,160 foot transverse encroachment along I-70.

The second encroachment is longitudinal and is 5,900 feet in length and occurs from just north of Thrill Hill Road on existing alignment (along existing US 51).

An additional 1,650 feet of existing side roads are to be widened within this section. All of these local road encroachments would be considered longitudinal. The encroachments involve primarily agricultural land. Five wetland areas occur adjacent to existing US 51 near this location; site 115 (forested wetland), site 118 (wet meadow), site 119 (forested), and site 120 (wet meadow), and site 444 (wet meadow).

Although V Alt 4 results in the highest impacts to floodplains, the majority of the impacts occur along existing alignment.

V Alt 1 does not cross any floodplain. The floodplain encroachments resulting from V Alt 2, V Alt 3, and V Alt 4 will not increase the risk of flood damage or result in flood-related interruption of emergency services or routes, will not result in significant adverse impacts to the natural and beneficial floodplain values, and will not result in incompatible floodplain development. The encroachments for V Alt 1, V Alt 2, and V Alt 3 were minimized to the extent practicable by utilizing existing encroachments when practicable. Linear feet of encroachments were minimized by crossing at the narrowest point practicable, while considering the avoidance and minimization of other Federally protected resource impacts, such as wetlands.

A summary of floodplain impacts for the Vandalia alternatives is in Table 3.10-3.

Table 3.10-3: Vandalia Alternative Floodplain Impact Summary

Criteria	V Alt 1	V Alt 2	V Alt 3	V Alt 4
Number of Floodplains Crossed	0	2	2	2
Transverse Encroachments				
<i>Along Existing Encroachment (feet)</i>	0	700	700	1,860
<i>Along New Encroachment(feet)</i>	0	1,200	0	0
Total Transverse Encroachment (feet)	0	1,900	700	1,860
Longitudinal Encroachments				
<i>Along Existing Encroachment (feet)</i>	0	0	650	7,550
<i>Along New Encroachment(feet)</i>	0	515	6,400	0
Total Longitudinal Encroachment (feet)	0	515	7,050	7,550
Significant Encroachment?	No	No	No	No

Ramsey Creek Options

The Ramsey Creek options cross the Ramsey Creek floodplain on existing alignment (see Table 3.10-4). RCOA includes a 1,445 foot transverse encroachment and RCOB includes a 1,000 foot transverse encroachment. The encroachments occur within a forested area. The floodplain encroachments resulting from RCOA and RCOB will not increase the risk of flood damage or result in flood-related interruption of emergency services or routes, will result in significant adverse impacts to the natural and beneficial floodplain values, and will not result in incompatible floodplain development. The encroachments for RCOA and RCOB were minimized to the extent practicable by utilizing existing encroachments.

Table 3.10-4: Ramsey Creek Options Floodplain Impact Summary

Criteria	RCOA	RCOB
Number of Floodplains Crossed	1	1
Transverse Encroachments		
<i>Along Existing Encroachment (feet)</i>	1,445	1,000
<i>Along New Encroachment(feet)</i>	0	0
Total Transverse Encroachment (feet)	1,445	1,000
Longitudinal Encroachments		
<i>Along Existing Encroachment (feet)</i>	0	0
<i>Along New Encroachment(feet)</i>	0	0
Total Longitudinal Encroachment (feet)	0	0
Significant Encroachment?	No	No

Ramsey Alternatives

The Ramsey alternatives do not cross floodplain.

US 51 Build Alternative

The US 51 Build Alternative crosses eleven floodplains, as summarized in Table 3.10-5.

Table 3.10-5: US 51 Build Alternative Floodplain Impacts

Floodplain	Crossing	Total Encroachment Length (feet)
Webster Creek	Transverse	3,630
Fulton Branch	Transverse	500
Sewer Creek	Transverse	1,210
Unnamed tributary to Crooked Creek 1	Transverse and Longitudinal	585
Unnamed tributary to Crooked Creek 2	Longitudinal	690
Crooked Creek	Transverse and Longitudinal	1,940
E. Fork Kaskaskia River	Transverse	880
N. Fork Kaskaskia River	Transverse	835
Flat Creek	Transverse	350
Richland Creek	Transverse	1,145
Hickory Creek/Vandalia Ditch/Kaskaskia River	Longitudinal	14,050
Total		25,815

The US 51 Build alternative crosses the Webster Creek floodplain south of Centralia. The encroachment includes three transverse crossings of the floodplain totaling 3,630 feet, based on the construction of an interchange with existing US 51. Of the total 3,630 feet, 2,505 feet is on new alignment and 1,125 feet is on existing alignment and The area is forested and contains wetland sites 208 (forested), 209 (shrub-scrub), and 524 (forested). A power line corridor is cleared through the forested area; the majority of the utility corridor is wetland site 209.

The Fulton Branch floodplain is crossed southwest of Centralia. The transverse encroachment is 500 foot in length on new alignment and the floodplain contains forested area with some agricultural land.

The Sewer Creek floodplain is crossed southwest of Centralia. The transverse encroachment is 1,210 feet in length on new alignment into a wooded floodplain.

The US 51 Build Alternative results in encroachments on two different unnamed tributaries to Crooked Creek. The first is the area between IL 161 and the railroad and involves a total encroachment of 585 feet. Of the total 585 feet, 310 feet is transverse encroachment on new alignment, and 275 is longitudinal encroachment on existing alignment at the proposed intersection with IL 161.

US 51 Build Alternative

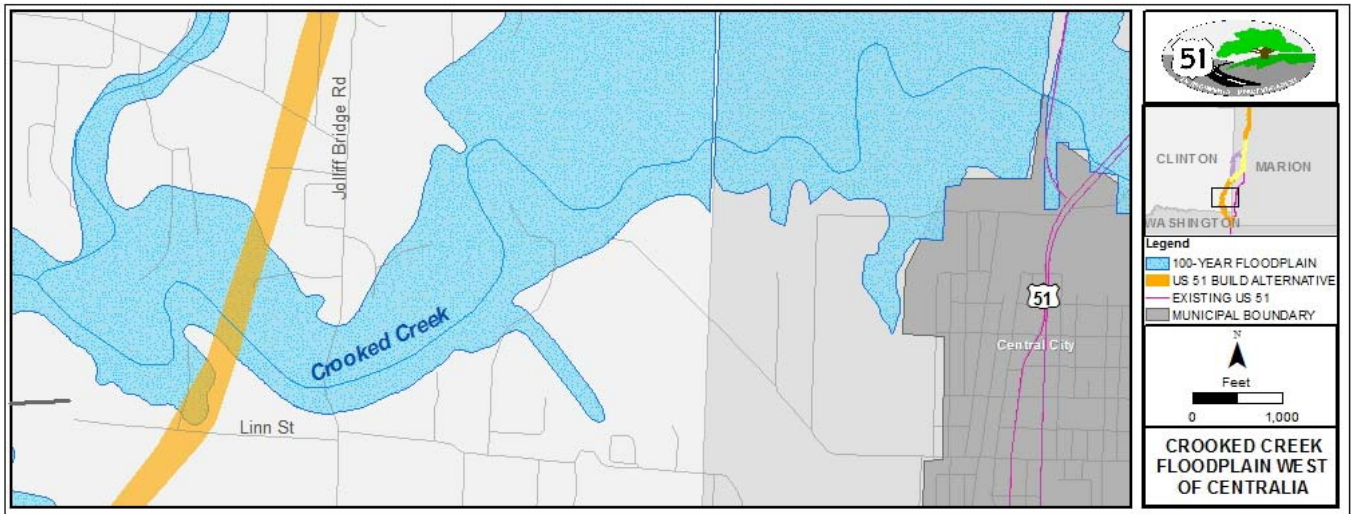
The alternative between the larger towns where there is only one remaining alternative is referred to collectively as the US 51 Build Alternative. The US 51 Build Alternative is shown in orange below. Existing US 51 is shown in pink.

The US 51 Build Alternative is compared against the No Build Alternative. The US 51 Build Alternative and the remaining alternatives near the larger towns are described in Chapter 2.3.

Wetland site 353 (marsh) is adjacent to IL 161 at this location. The second is a longitudinal encroachment area (690 feet in length) between the railroad and Linn Street on new alignment. The site is a combination of farmland and forest and contains forested wetland sites 347 and 348.

The alignment crosses Crooked Creek floodplain (1,300 feet transverse encroachment) and across a lobe of this floodplain (640 feet longitudinal encroachment) on new alignment. Both areas are forested with the first mentioned area also containing forested wetlands site 339 and 342 for most of this crossing. This is considered a significant encroachment as there is a high potential for an adverse impact to the natural and beneficial floodplain values. Figure 3.10-3 shows the location of the Crooked Creek floodplain encroachment west of Centralia.

Figure 3.10-3: Crooked Creek Floodplain West of Centralia



There are two encroachments on the E. Fork of the Kaskaskia River floodplain; the existing encroachment of US 51 and a new encroachment involving the realignment of CR 1500 N. The US 51 encroachment is primarily transverse and 720 feet in length. The floodplain is forested and involves wetland site 177 (forested wetland). CR 1500 N is being realigned over the E. Fork of the Kaskaskia River on a primarily transverse crossing (160 feet in length).

There is a transverse encroachment (835 feet in length) across the N. Fork of the Kaskaskia River on new alignment involving forested and agricultural areas.

The transverse encroachment of Flat Creek is 350 feet in length on a new alignment. The floodplain area is forested.

Approximately 350 feet of existing US 51 cross the Richland Creek floodplain. Existing US 51 and adjacent railroad are on fill and located out of the floodplain.

The expansion of US 51 will increase the encroachment to 1,145 feet. The encroachment is transverse and is primarily agricultural land.

The longitudinal encroachment to the Kaskaskia River floodplain is 11,950 feet in length (see Figure 3.10-4.) on new alignment. It primarily crosses tilled agricultural land and some forested land. The encroachment also crosses the Kaskaskia River at a longitudinal skew. A number of wetland sites occur within the encroachment including forested wetlands sites 135, 141, 259, 384, 388, 389, sedge meadow wetland Site 294, wet meadow site 386, and farmed wetlands sites 250, 392, 487. A realignment of CR 750 E is proposed which results in an additional 2,100 feet of longitudinal impacts to the floodplain, primarily on new encroachment through agricultural land. The crossing of the Kaskaskia River floodplain is considered a significant encroachment as there is a high potential for an adverse impact the natural and beneficial floodplain values. Figure 3.10-4 shows the location of the Kaskaskia River floodplain encroachment south of Vandalia.

Figure 3.10-4: Kaskaskia River System Floodplain South of Vandalia



The floodplain encroachments resulting from the US 51 Build Alternative will not increase the risk of flood damage or result in flood-related interruption of emergency services or routes and will not result in incompatible floodplain development. The US 51 Build Alternative encroachments of the Crooked Creek and Kaskaskia River floodplains are considered significant due to the potential adverse impacts to the natural and beneficial values to the floodplain, specifically flood storage and agricultural production. Linear feet of encroachments were minimized by crossing at the narrowest point practicable, while considering the avoidance and minimization of other Federally protected resource impacts, including wetlands. The impacts resulting from the US 51 Build Alternative are summarized in Table 3.10-6.

Table 3.10-6: US 51 Build Alternative Floodplain Impact Summary

Criteria	US 51 Build Alternative
Number of Floodplains Crossed	11
Transverse Encroachments	
<i>Along Existing Encroachment (feet)</i>	2,195
<i>Along New Encroachment(feet)</i>	7,965
Total Transverse Encroachment (feet)	10,160
Longitudinal Encroachments	
<i>Along Existing Encroachment (feet)</i>	275
<i>Along New Encroachment(feet)</i>	15,380
Total Longitudinal Encroachment (feet)	15,655
Significant Encroachment?	Yes (2)

How were impacts to floodplains avoided and minimized?

The alternatives were developed to utilize existing pavement (including existing US 51) when possible, thereby limiting the number of new floodplain crossings. Where the alternatives follow existing US 51 alignment, avoidance of floodplain is not possible due to the east-west orientation of many streams in the project study area. Upgrading existing US 51 through towns was considered in order to minimize the number of new floodplain crossings. However, in order to satisfy the Purpose and Need Statement and to minimize other Federal and State protected resources, the proposed alternatives bypass existing US 51 around several communities. In these locations, the alternatives were designed to minimize floodplain impacts. Longitudinal encroachments and significant encroachments were avoided when practicable. However, not all longitudinal and significant encroachments were avoidable. There is no practicable alternative to construction in the floodplain.

Given the general flow of streams and the north-south orientation of existing US 51, only a few longitudinal encroachments were identified, and those were minimized by the alternatives proposed. The impacts to longitudinal crossings were minimized by crossing the floodplain at the most narrow point possible, thereby reducing the linear feet of encroachment. Crossing at the most narrow point was not possible in every circumstance as other Federally protected resources, such as wetlands, were present within several of the floodplains and these areas were also considered for avoidance.

The Crooked Creek and Kaskaskia River floodplain encroachments are considered significant. Due to the east-west orientation of Crooked Creek, it cannot be avoided. The crossing was designed to minimize impacts, including

Compensatory Storage

Compensatory storage is a method of mitigating impacts to the floodplain. When the floodplain is filled by the construction of a road, another area nearby must be excavated in order to offset the loss of flood storage capacity. This excavated volume is the compensatory storage.

impacts to wetlands. The Kaskaskia River system south and west of Vandalia is extensive. Existing US 51 is located within the floodplain south and through Vandalia. The location of the Kaskaskia River floodplain results in all proposed alternatives impacting the floodplain. Alternatives were developed that utilized existing US 51 and bypassed Vandalia to the east. The alternatives were eliminated during the alternative evaluation process due to disproportionately high longitudinal floodplain impacts compared to alternatives that bypassed west of Vandalia. The US 51 Build Alternative was designed to cross the floodplain at one of the narrowest points and also to minimize impacts to wetlands, including high quality wetlands, identified by state scientists along the Kaskaskia River bluffs south of Vandalia.

If an alternative that includes a significant encroachment is selected as a Preferred Alternative, the Final Environmental Impact Statement (FEIS) will include a “only practicable alternative finding,” which explains why the proposed action must be located in the floodplain and why other alternatives considered were not practicable, in accordance with Executive Order 11988 and 23 CFR Part 650, Subpart A.

How are floodplain impacts mitigated?

IDOT policy is to restore and preserve the natural and beneficial floodplain values that are adversely impacted by the construction of roadways. This is accomplished through mitigation. Where fill within floodplains is unavoidable, mitigation such as compensatory storage will be provided to offset the impact to the floodplain. Mitigation for fill in the floodplain will be based upon IL Administrative Code Title 17 Part 3700, 8/20/10.

Compensatory storage will offset the loss of flood storage created by the roadway. Compensatory storage will be provided by excavating an equivalent volume to the amount of floodplain that will be filled as a result of the roadway. The compensatory storage will be provided within the project right-of-way and will be located in or adjacent to low-lying areas near the impacted floodplain when possible. The excavated area will hold water during flood events. The amount and location of compensatory storage will be determined during the final design. To minimize flood easement and flood storage compensation costs, the following will be considered in the final design: purchase of adjoining flood fringe properties to compensate for lost floodway conveyance and storage, or removal of existing floodway encroachments or construction of conveyance/storage areas to compensate for the restrictions created by the project.

