Macro Analysis Memo

U.S. 51 Environmental Impact Statement

Christian, Shelby, Fayette, Marion, Clinton, Washington, and Jefferson Counties

April 2010

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US 51 Partners, A Joint Venture

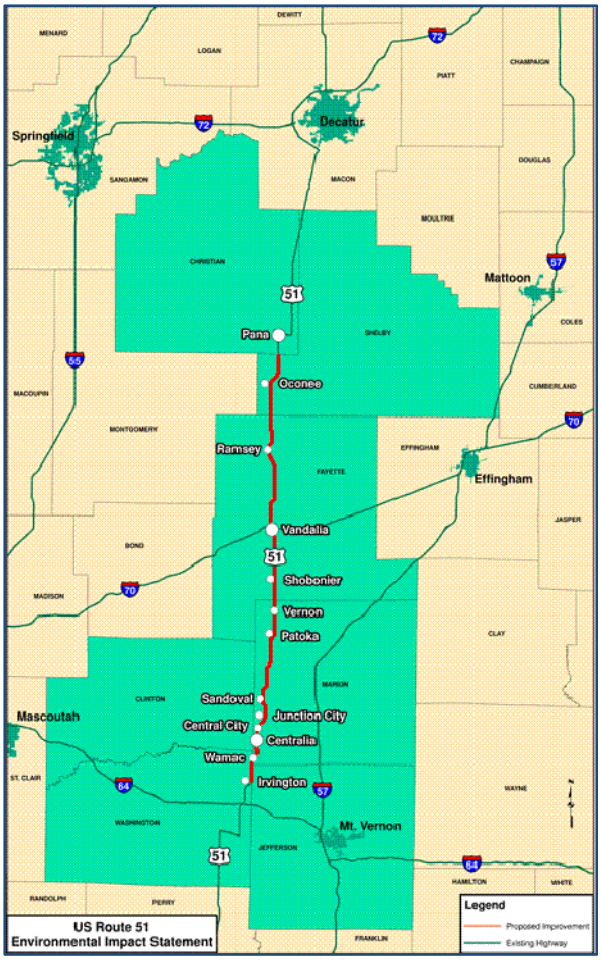
Memo

To:	Robin Helmerichs (FHWA) Matt Fuller (FHWA),		
From:	Project Team: Clark Dietz, HDR, Huff & Huff	Project:	US 51 Environmental Impact Statement
CC:	Project File, Matt Hirtzel (IDOT), Sherry Phillips (IDOT), Barbara Stevens (BDE)		
Date:	April 5, 2010	Job No:	

RE: Macro Analysis Memo

I. INTRODUCTION

US Route 51 (US 51) is part of a transportation corridor that extends the length of Illinois from Rockford to Cairo. In south central Illinois, US 51 is the only two-lane highway link in the four-lane north-south network (I-39, US 51, I-64, & I-57). The purpose of the US 51 project is to improve the connectivity within the south central Illinois region and to enhance the highway system continuity. Improvements to the two-lane portion of US 51 are the subject of the US 51 EIS.



Specific limits of study identified in the location map extend from the Christian/Shelby County line at the north end to Irvington, where US 51 is a four-lane facility north of I-64. The project length is approximately 65 miles.

The US 51 EIS Study commenced in May of 2007. It follows the NEPA/404/CSS/SAFETEA-LU 6002 process. To date, 70 stakeholder meetings have been conducted with City/Village councils, general public, Community Advisory Groups, the Regional Advisory Groups, service organizations and the Project Study Group. Representatives from each community have been involved in identifying community context, developing Purpose & Need, and brainstorming corridor alternatives.

The project has been presented at four NEPA/404 Merger meetings:

- February 2008 – Initial project presentation
- September 2008 – Project update
- February 2009 – Concurrence on Purpose & Need
- June 2009 – Project update

The purpose of this memorandum is to document the Macro Analysis of impacts to known resources in the communities of Wamac, Centralia, Central City, Junction City, Sandoval, Vernon, Patoka, Vandalia, and Ramsey. These communities are either adjacent to or bisected by the

existing US Route 51 alignment. Due to their geographic proximity, several communities with bypass alternatives have been grouped for simplicity of discussion and reference. The Centralia-Sandoval geographic range includes Wamac, Centralia, Central City, Junction City, and Sandoval. Another grouping is the Vernon-Patoka geographic range. Vandalia and Ramsey are referenced unto themselves.

The Macro Analysis is the third step in the process to develop alternative alignments (Development of Alternative Alignments) as highlighted in Figure 1 below, and screens and eliminates corridors with the greatest environmental impacts. Corridors remaining after the Macro Analysis will move on to the fourth step of the alternative development process.

The first step in the process to develop alternative alignments (Develop Preliminary Corridors) involved the brainstorming of corridors in the various communities impacted by US 51. Through the Context Sensitive Solutions (CSS) process, numerous preliminary corridors were created with input from the Community Advisory Groups (CAG), the Regional Advisory Group (RAG), and the Project Study Group (PSG).

The second step in the process to develop alternative corridors (Conduct Screening to Consolidate or Eliminate Corridors) involved two methods of reducing the number of preliminary corridors. The first method was to consolidate corridors if they met the same intent as a similar corridor (or corridors), had the same termini, or were located in the same general area. The second method for narrowing corridors involved testing them against the Purpose & Need statement. For this reason, all corridors included in the Macro Analysis meet the project's Purpose & Need. The screening and consolidation process was documented in a May 1, 2009 memorandum to the FHWA. Documentation of the Purpose & Need screening is available under separate cover

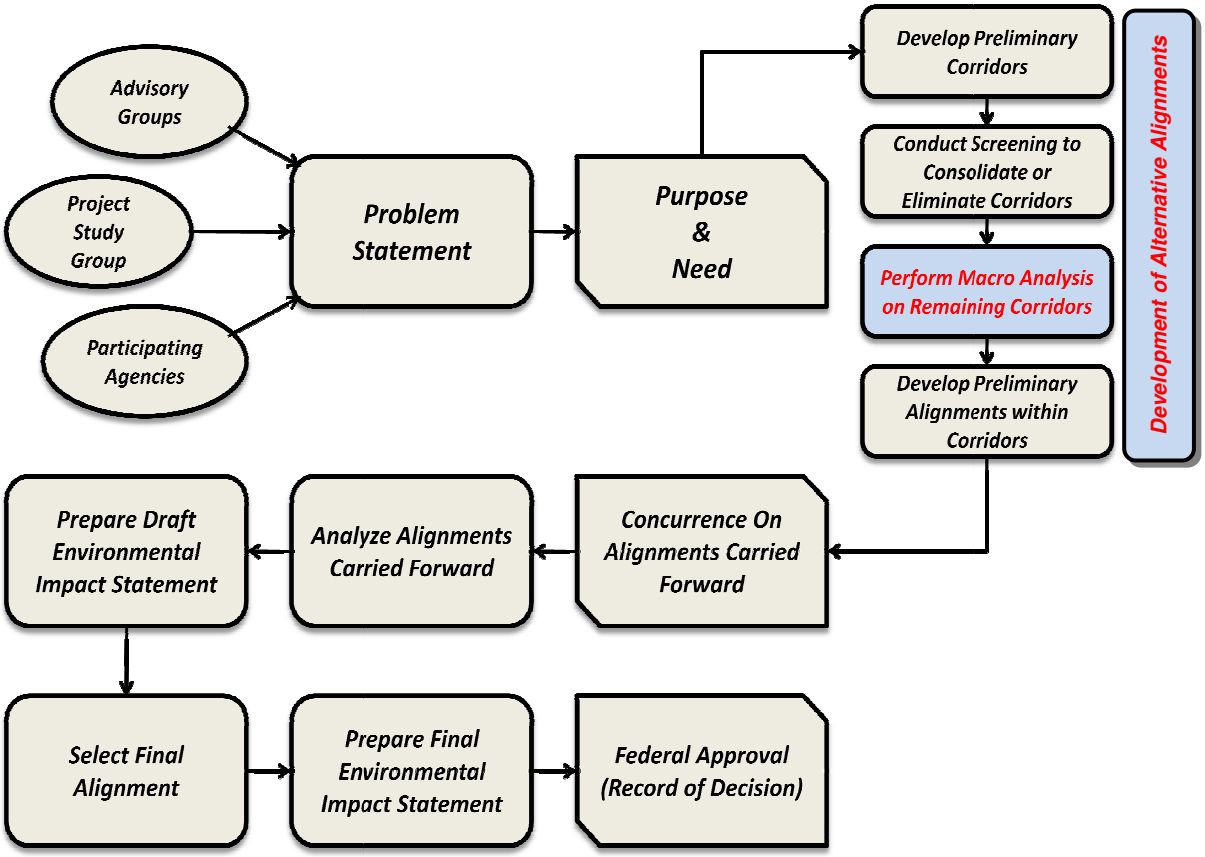


Figure 1 – Study Process Flow Chart

Included in this Macro Analysis memo are the following:

- A description of the environmental resources used for analysis, the evaluation methodology, and individual summaries for each community
- Attachment A – Macro Analysis Alternatives Exhibits depicting the alternatives for evaluation and known environmental resources.
- Attachment B – Community Corridor Summary Tables (details environmental impacts to resources)

The corridors graphically depicted on **Macro Analysis Alternatives, Sheet 1** through **4**, in **Attachment A** represent the full range of alternatives developed in the first step of the process. All meet the project's Purpose & Need. The No-Build alternative does not meet the Purpose & Need and is not included in the Macro Analysis.

The corridors were compared in the Macro Analysis by estimating the resources impacted in each corridor, approximately 500 feet in width, and extending from a common starting point to a common ending point around each of the six communities. Corridors were eliminated by minimizing the resource impacts for each community. The corridors between communities were not evaluated in this step of analysis as the corridors between communities are coincident with the existing US 51 roadway.

The corridors remaining from the Macro Analysis will be carried forward to the fourth step of the alternative development process (Develop Preliminary Alignment within Corridors). Alternative roadway alignments for these coincident areas will be developed in concurrence with preliminary alignment development.

II. ENVIRONMENTAL RESOURCES EVALUATED

Table 1 identifies the five categories and 31 criteria used to evaluate environmental resources and potential impacts attributed to the various corridors being screened. Each resource is briefly described with assumptions, methodology, and sources of information in Appendix A, and shown in **Macro Analysis Alternatives, Sheet 1** through **4**, in **Attachment A**.

Table 1: Environmental Resources Evaluated

Criterion		Unit of Measure
Environmental		
	Water Quality/Water Resources	Floodplain (acres affected)
		Floodways (acres affected)
		Biologically Significant Streams (number of crossings)
		Class I Streams (number of crossings)
		Streams (number of crossings)
		Drinking Water Supplies - Surface Water (number affected)
	Wetlands	Wetland areas (acres affected)
		Wetland areas (number affected)
		High Quality Wetland areas (acres affected)
		High Quality Wetland areas (number affected)
	Special Waste	CERCLIS sites (number affected)
	INAI Sites	INAI sites (acres affected)
	High Quality Woodlands	High Quality Woodland sites (acres affected)
	T&E Species	Threatened and Endangered Species (number affected)
	Important Habitat Areas	Important Habitat Areas (number affected)
Community		
	Residences	Homes (number displaced)
	Business	Commercial buildings (number displaced)
	Public Facilities	Public facilities (number displaced)
	Land Use	Compatibility with adopted Land Use Plan (Y/N)
	Section 4(f) & 6(F) Impacts	Parklands (number affected)
		Parklands (acres affected)
	Utilities	Utilities [Including tank farms] (number of conflicts)
	Community	Divides or isolates a community (Y/N)
Agricultural		
	Prime and Important Farmland	Prime and Important Farmland (acres affected)
	Farmsteads	Farm Out Buildings (number affected)
	Severances	Parcels (number affected)
	Centennial/ Sesquicentennial Farms	Farms (number affected)
Cultural		
	Cultural	Historic Sites (number affected)
		Cemeteries (number affected)
Operations		
	Distance	Distance of travel (miles)
	Time	Travel time (minutes:seconds)

III. CORRIDOR EVALUATION METHODOLOGY

The corridors evaluated are comprised of multiple segments through and around each community. As many as 13 segments were combined to form one complete corridor alternative in each community. In many cases, individual segments were used in more than one corridor alternative. This approach provided a comprehensive assessment of a reasonable range of corridor alternatives for each community.

The number of corridor alternatives evaluated for each community varied between 6 and 123, depending upon factors like community size, grouping of geographic range, and topographic features encountered. As all corridors met the Purpose & Need of the project, corridors were evaluated to ensure that those carried forward minimized environmental impacts, were logical from a planning and engineering perspective, and were positively received by the various Community Advisory Groups.

Minimizing impacts was the primary criterion for identifying reasonable corridor alternatives for further refinement. Impacts to the resources listed in Table 1 and shown in Appendix A were calculated corridors with a footprint of 500 feet in width in each community. Not all resources exist in each community, and not all resources that do exist are impacted by the corridors under consideration. The resource criteria that were important in the corridor screening/elimination process varied by community as the resource impacts varied by community, making the process similar but unique for each geographical area. For example, in Vernon-Patoka all corridors are associated with four stream crossings. As the stream crossing impact is the same for all corridors, the number of stream crossings did not affect the elimination of corridors. The acres of high quality wetlands; however, did vary among the corridor alternatives and avoidance/minimization of this resource was one criterion used to eliminate corridors from further consideration.

The resource impact evaluation considered the regulatory mandates and protection of resources. An example of the protection provided for certain resources is the regulatory mandate to avoid and minimize wetland impacts. Defining wetland impacts included consideration of the wetland quality, acres impacted, and number of wetlands impacted. The quality of the wetlands was considered more important than the acreage impacted in assessing corridor impacts. Appendix A describes the Executive Orders and other regulations that protect the environmental resources; the policies and regulations were used to avoid and minimize impacts to other resources, such as floodplains and public lands. Community resource impacts, such as commercial and residential displacements, were also evaluated.

The screening/elimination process considered the range of impacts counted for each resource within the 500-foot width and assigned a threshold value for a resource based upon that range. Corridor impacts above the threshold value were eliminated; typically the threshold value was above the average impact value.

The following steps illustrate the typical process used to screen out corridors with disproportionately high environmental and/or community impacts and eliminate corridors from further analysis. As previously stated, the process and the resources used as elimination criteria varied for each community depending upon the nature of resources that were impacted and their magnitude of impact.

- Review acres of high quality wetlands impacted and eliminate corridors with impacts above threshold value (greatest impacts)
- Review acres of total wetlands (including high quality wetlands) impacted for remaining corridors and eliminate corridors with impacts above threshold value
- Review number of commercial displacements in remaining corridors and eliminate corridors with displacements above threshold value
- Review number of residential displacements in remaining corridors and eliminate corridors with displacements above threshold value

- Review impacts to public facilities, public lands, floodplains, CERCLIS sites, and agricultural areas for remaining corridors and eliminate corridors above threshold values to minimize overall impacts to the resources.
- Use engineering judgment regarding design challenges due to vertical or horizontal topography.

An example of this process is the screening analysis for Vernon-Patoka where the corridor elimination process occurred as follows:

- The acres of high quality wetlands impacted varied from 2.3 to 10.1 acres for all 24 corridors. Using a threshold value of 5 acres for high quality wetland impacts, 11 corridors were eliminated to reduce wetland impacts.
- In reviewing the remaining 13 corridors, the number of commercial displacements varied from 0 to 28. Using a threshold value of 25 displacements, four corridors were eliminated, reducing the remaining number of corridors under consideration to nine.
- In the remaining nine corridors, residential displacements ranged from 19 to 29 homes. A threshold value of 25 was selected as only two corridors had fewer than 25 displacements. The seven corridors with more than 25 residential displacements that were eliminated impacted the eastern side of both Vernon and Patoka.
- The two corridors remaining for Vernon-Patoka represented the lowest level of impacts to resources, were acceptable from an engineering and planning perspective, and were positively received by the public.

A description of the evaluation process for each community and a summary table of the resource impacts used to differentiate and eliminate the corridors with the greatest impacts are included in the following sections. To assist in describing the alignment of the corridor, landmarks are referenced numerically in the written description and reflected on the exhibit. The landmarks were labeled from south to north and west to east. All landmarks are labeled on the exhibit, but depending upon the corridor, only landmarks passed are referenced. **Community Corridor Summary Tables** are provided in **Attachment B**.

IV. CENTRALIA – SANDOVAL ELIMINATION SUMMARY

For the Centralia-Sandoval area, 123 corridor combinations were evaluated for all resource criteria in Table 1. Corridors were evaluated both east, through, and west of Centralia and of Sandoval. Corridors through Centralia-Sandoval impact the communities of Wamac, Centralia, Central City, Junction City, and Sandoval. The following criteria represent the resources with variable impacts that were used to eliminate corridors:

- high quality wetlands,
- total wetland acreage,
- commercial displacements,
- residential displacements,
- CERCLIS impacts, and
- engineering considerations.

Corridors with the greatest resource impacts were eliminated in a stepwise fashion to avoid or minimize the environmental effects of the proposed bypass for Centralia-Sandoval. **Table B1** in **Attachment B** provides a summary of the Centralia-Sandoval environmental impacts of each corridor. At the bottom of the table, the criteria used for elimination are listed along with the corridors subsequently eliminated, as described below.

Resources that exist within the community of Centralia-Sandoval that exhibit similar impacts from all corridors were not considered to be differentiating criteria. These include floodplains, biologically significant streams (Lost Creek), streams, drinking water supplies – surface water, parklands, utilities, prime and important farmland, farmsteads, farm severances, centennial/sesquicentennial farms, historical sites, and cemeteries. Resources that are not known to exist in the Centralia-Sandoval alternative corridors include Class I streams, threatened and endangered species and Illinois Natural Area Inventory (INAI) sites. Two important habitat areas were identified within Centralia-Sandoval. The first was relative to bird species west of the existing alignment of US 51 at the south end of Centralia. The second location was relative to amphibian or reptile species east of the existing alignment of US 51 north of Centralia. The avian and reptile and amphibian important habitat areas are not impacted by the proposed corridors. Floodway within the Centralia-Sandoval corporate limits was not mapped by FEMA; therefore, this information was not available.

Corridors east of Centralia cross Raccoon Lake, a drinking water source for Centralia and adjacent communities, impact high quality wetlands, and displace both homes and businesses. Corridors west of the community are also associated with high quality wetland impacts and displacement of homes and businesses. Similar issues exist with the Sandoval corridors in that both east and west corridors impact high quality wetlands.

High quality wetlands (wetlands with floristic quality indices (FQIs) equal to or greater than 20) are present throughout the entire Centralia-Sandoval area. High quality wetland impacts ranged from 2 to 40 acres. Corridors that impacted 30 acres or more were eliminated from further analysis. As a result, 27 corridors bypassing the far west side of Centralia and crossing back east, north of Centralia, to bypass the east side of Sandoval impacted the greatest number of high quality wetlands and were eliminated. Ninety-six corridors remain under consideration.

Avoidance and minimization of total wetland loss was also an important goal of the corridor evaluation in Centralia-Sandoval. Total wetland impacts varied from 6.5 to 47 acres for the remaining corridors. The acreage includes all wetlands, regardless of FQI. Corridors with 25 or more acres of wetland impacts were eliminated from further analysis. An additional 38 corridors, located primarily on the west side of Centralia and the east side of Sandoval, were eliminated using this criterion. Fifty-eight corridors remain under consideration.

Displacements of commercial buildings varied from 0 buildings to 306 buildings, depending upon the corridor analyzed. Any corridor with 40 or more impacted buildings was eliminated from further consideration as other corridors met the Purpose & Need but yielded fewer displacements. This criterion eliminated 21 corridors associated primarily with routes through either the center of Centralia and/or the center of Sandoval. Thirty-seven corridors remain under consideration.

Residential displacements also showed a wide range of potential impacts (9 to 165) for the remaining corridors. Twenty-four corridors with more than 82 residential displacements were also eliminated. These corridors were associated primarily with routes through the center of Centralia and/or the center of Sandoval. Thirteen corridors remain under consideration.

Any corridor containing segment S37 on the east side of Sandoval traverses through a CERCLIS site. Two remaining corridors, corridor A and S, were eliminated as they contain segment 37. Eleven corridors remain under consideration.

The remaining corridors were reviewed from the perspective of constructability and planning and engineering considerations.

The S39 to T12 segment sequence on the north side of Sandoval presents a curved horizontal alignment that is an undesirable design and does not demonstrate an identifiable advantage over adjacent corridors and maximizes use of the existing US 51 Right-of-Way. Through this review, two corridors were eliminated. Nine corridors remain under consideration.

Engineering judgment was also used to differentiate between similar corridors. Corridor segments S39 and S40 follow a similar horizontal alignment on the east side of Sandoval. S40 is a longer segment and offers no identifiable advantage over segment S39. As such, three corridors containing S40 were eliminated.

With six corridors remaining (D, H, DE, DG, DJ, DL), further evaluation of corridor features was conducted.

Corridors D and H are located on the east side of Centralia. The Centralia Community Advisory Group (CAG) questioned if an east-side corridor is consistent with planned future land use as indicated in the City's Comprehensive Plan, The two remaining corridors on the east side of Centralia were compared to identify which one demonstrates the lowest overall impact to resources. Corridor H impacts 5.0 more acres of high quality wetlands compared to Corridor D. Corridor D traverses the east side of Centralia and Sandoval. Corridor H traverses the east side of Centralia, intersects the existing alignment of US 51, then traverses the west side of Sandoval before traveling back east to meet the existing US 51 alignment. This circuitous route of Corridor H to existing US 51 is not logical from the standpoint of distance traveled and driver expectation. The routing and high quality wetland impacts of Corridor H result in Corridor D being a more favorable alternative for an eastern corridor. Corridor H was eliminated from further consideration.

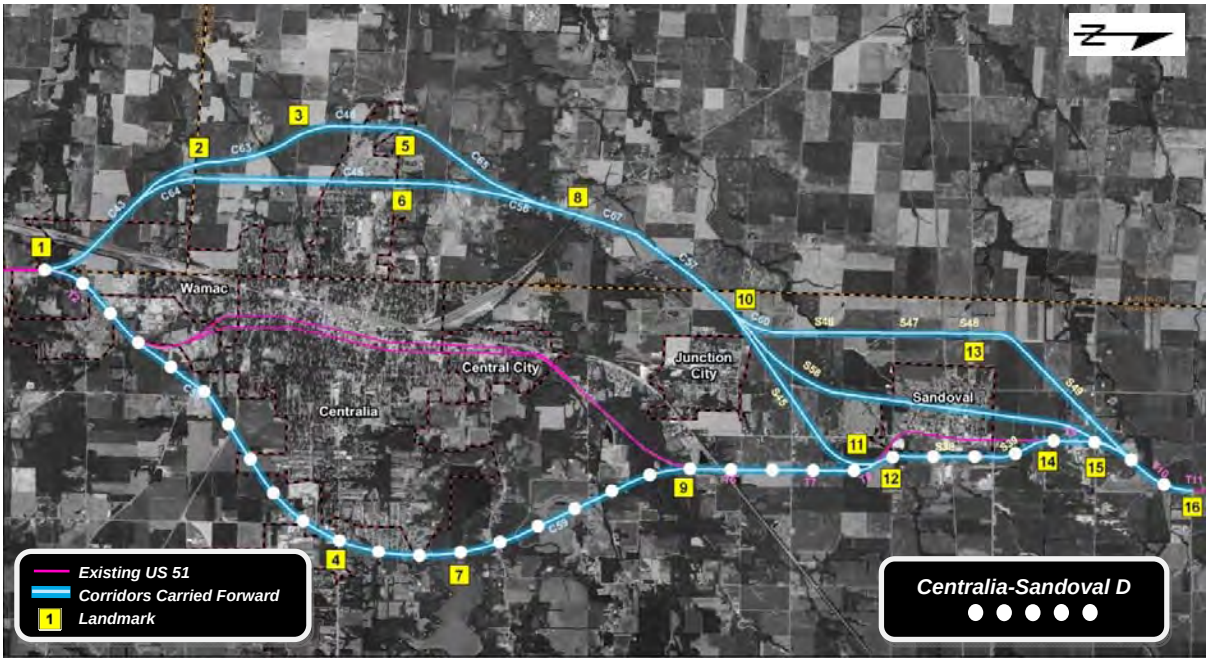
The western corridors, DE, DG, DJ, and DL either pass immediately west of the Murray Center (DJ and DL) or east of the Murray Center (DE and DG) near IL Rte 161. The Murray Center is a state-operated residential center serving people with developmental disabilities, including those with severe medical and/or behavioral needs. Discussions with Murray Center representatives resulted in a conclusion that US 51 routing along the west edge of the site (Corridors DJ and DL) would have the least impact to the Murray Center. Their selection was based upon the location of site access and impacts to residential living quarters on the campus. In addition to this information, Corridors DE and DG would sever an existing neighborhood located southeast of the Murray Center property resulting in approximately 30 homes being isolated. Maintaining the local street access under US 51 would result in further degradation of the neighborhood. The residents of the severed section would have to drive approximately 1.0 mile west to the first available cross street to access IL Rte 161. Base upon the input of the Murray Center and the neighborhood severance, Corridors DE and DG east of Murray Center were eliminated.

The remaining three corridors, D, DJ, and DL will be carried forward to Alignment Analysis. Refer to the following pages for a detailed description of the remaining corridors. The resource impacts for these corridor alternatives are summarized below:

Resource	Corridor		
	D	DJ	DL
Floodplain, acres	85	60	58
Biologically Significant Streams, crossing	1	1	1
All Other Streams, crossing	5	8	8
Drinking Water Supplies – surface water, crossing	1	None	None
Wetlands, acres/number	12.5 / 15	13.6 / 12	9.6 / 11
High Quality Wetlands, acres/number	8.0 / 2	7.0 / 2	2.0 / 1
CERCLIS	None	None	None
Residential Displacements	61	80	81
Commercial Displacements	19	1	None
Public Facility Displacements	2	1	1
Parklands, acres/number	2.6/1	None	None
Prime/Important Farmland, acres	668	756	758
Farmland Parcel Severances, parcels	4	13	14

Centralia-Sandoval D (T2-C59-T6-T7-T8-S38-S39-T9-T10-T11)

This corridor is an eastern bypass of the City of Centralia combined with an eastern bypass of the Village of Sandoval. The southern limit is located at Greenview Church Road south of the City of Wamac **(1)**. The corridor bypasses the City of Wamac and the City of Centralia by traveling northeasterly until the Centralia Municipal Airport **(4)** near the intersection of Country Club Road and Illinois Route 161. At this point, the corridor is approximately 2.6 miles east of US 51 within the City of Centralia. The corridor continues north-northwest over Raccoon Lake **(7)**, Centralia's source of drinking water, and ties back into US 51 in the vicinity of Community Beach Road **(9)**. Following north along US 51 until Cemetery Road **(12)**, the corridor diverges from existing alignment and continues north of Sandoval. The corridor again joins the US 51 alignment approximately 0.25 miles north of its intersection with the east leg of US 50 **(14)** and ends near Boone Street Road **(16)**. The length of roadway on new alignment is approximately 8.6 miles on a total alignment of 13.0 miles.

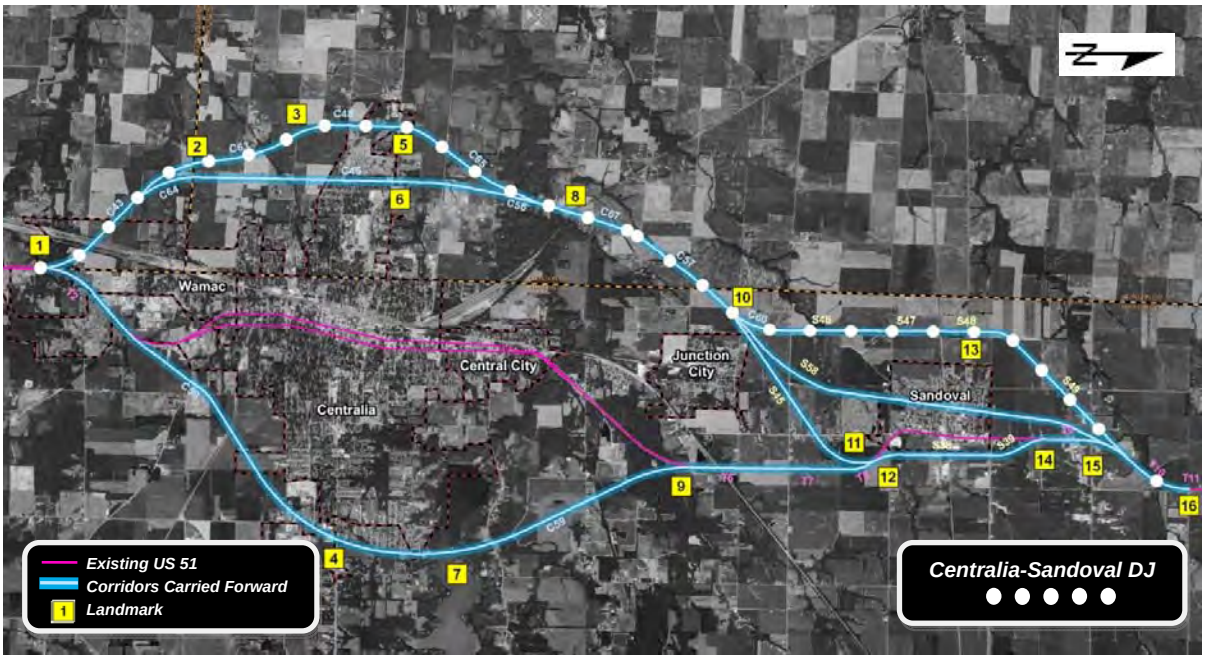


The following are a summary of the impacts for the criteria evaluated:

- Floodplain: 85 acres
- Biologically Sig. Streams: 1 crossing
- Streams: 5 crossings
- Drinking Water Supplies: 1 crossing
- Wetlands: 12.5 acres / 15 sites
- High Quality Wetlands: 8.0 acres / 2 sites
- CERCLIS Sites: None
- Residential Displacement: 61 residences
- Commercial Displacement: 19 buildings
- Public Facility Displacement: 2 facilities
- Parkland: 2.6 acres/1 site
- Prime/Important Farmland: 668 acres
- Farmland Parcel Severances: 4 parcels

Centralia-Sandoval DJ (C43-C63-C48-C65-C67-C57-C60-S46-S47-S48-S49-T10-T11)

This corridor is a western bypass of the City of Centralia combined with a western bypass of the Village of Sandoval. The southern limit is located at Greenview Church Road south of the City of Wamac **(1)**. The corridor bypasses the City of Wamac and City of Centralia by traveling northwest towards Wilkin Road just west of Neff Road **(2)**. The corridor continues by traveling northwest towards the intersection of Sewer Road and 10th Street **(3)**. At this point, the corridor traverses north past Illinois 161 just west of the Murray Center **(5)** and is approximately 2.3 miles west of existing US 51 through the City of Centralia. Turning northeast, the corridor passes the Burlington Northern Railroad east of Jolliff Bridge Road **(8)** and continues northeasterly past Junction Road west of Junction City **(10)** where the corridor then travels directly north and passes Sandoval High School **(13)**. The corridor then turns northeast where joins with US 51 just north of CR 1100N **(15)** and ends near Boone Street Road **(16)**. The length of roadway on new alignment is approximately 10.7 miles on a total alignment of 13.1 miles.

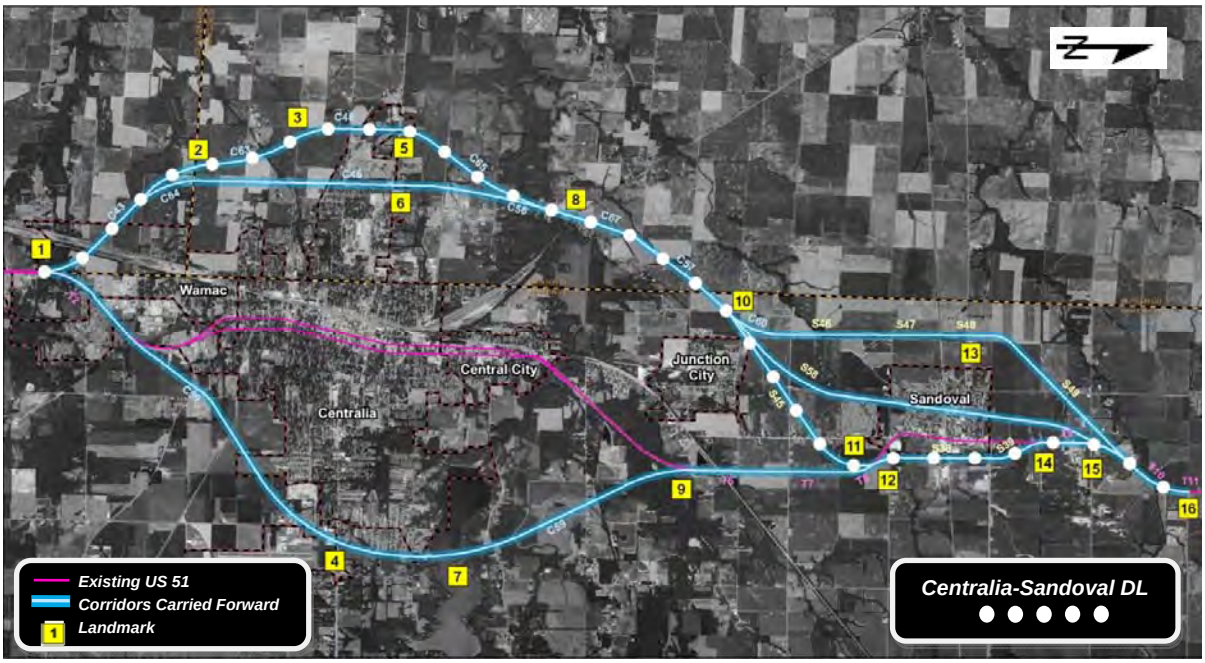


The following are a summary of the impacts for the criteria evaluated:

- Floodplain: 60 acres
- Biologically Sig. Streams: 1 crossing
- Streams: 8 crossings
- Drinking Water Supplies: None
- Wetlands: 13.6 acres / 12 sites
- High Quality Wetlands: 7.0 acres / 2 sites
- CERCLIS Sites: None
- Residential Displacement: 80 residences
- Commercial Displacement: 1 building
- Public Facility Displacement: 1 facility
- Parklands: None
- Prime/Important Farmland: 756 acres
- Farmland Parcel Severances: 13 parcels

Centralia-Sandoval DL (C43-C63-C48-C65-C67-C57-S45-S38-S39-T9-T10-T11)

This corridor is a western bypass of the City of Centralia combined with an eastern bypass of the Village of Sandoval. The southern limit is located at Greenview Church Road south of the City of Wamac **(1)**. The corridor bypasses the City of Wamac and City of Centralia by traveling northwest towards Wilkin Road just west of Neff Road **(2)**. The corridor continues by traveling northwest towards the intersection of Sewer Road and 10th Street **(3)**. At this point, the corridor traverses north past Illinois 161 just west of the Murray Center **(5)** and is approximately 2.3 miles west of existing US 51 through the City of Centralia. Turning northeast, the corridor passes the Burlington Northern Railroad east of Jolliff Bridge Road **(8)**, continues northeasterly past Junction Road west of Junction City **(10)**, and continues to a point east of the Colonial Golf Course **(11)**. Traveling north and approximately 1,000 feet east of existing US 51, the corridor continues along the east side of Sandoval until it joins the US 51 alignment approximately 0.25 miles north of its intersection with the east leg of US 50 **(14)** and ends near Boone Street Road **(16)**. The length of roadway on new alignment is approximately 11.8 miles on a total alignment of 13.4 miles.



The following are a summary of the impacts for the criteria evaluated:

- Floodplain: 58 acres
- Biologically Sig. Streams: 1 crossing
- Streams: 8 crossings
- Drinking Water Supplies: None
- Wetlands: 9.6 acres / 11 sites
- High Quality Wetlands: 2.0 acres / 1 site
- CERCLIS Sites: None
- Residential Displacement: 81 residences
- Commercial Displacement: None
- Public Facility Displacement: 1 facility
- Parklands: None
- Prime/Important Farmland: 758 acres
- Farmland Parcel Severances: 14 parcels

V. VERNON – PATOKA ELIMINATION SUMMARY

For the Vernon-Patoka area, 24 corridor combinations were evaluated for all resource criteria in Table 1. Corridors were evaluated both east and west of Patoka and east, west and through Vernon. The following criteria represent the resources with variable impacts that were used to eliminate corridors:

- high quality wetlands,
- commercial displacements, and
- residential displacements.

Corridors with the greatest resource impacts were eliminated in a stepwise fashion to avoid or minimize the environmental effects of the proposed bypass for Vernon-Patoka. **Table B2** in **Attachment B** provides a summary of the Vernon-Patoka community impacts. At the bottom of the table, the criteria used for elimination are listed along with the corridors subsequently eliminated, as described below.

Resources that exist within the community of Vernon-Patoka that exhibit similar impacts from all corridors were not considered to be differentiating criteria. These include floodplains, streams, prime and important farmland, farmsteads, farm severances and centennial/sesquicentennial farms. Resources that are not known to exist in the Vernon-Patoka alternative corridors include biologically significant streams, Class I streams, drinking water supplies – surface water, CERCLIS sites, INAI sites, threatened and endangered species, important habitat areas, public facilities, parkland, historic sites, and cemeteries. In addition, one rare plant species, twinleaf (*Jeffersonia diphylla*), was found in north Sandoval. Twinleaf, although rare to the study area, is not listed as a threatened or endangered species. This area is avoided. Floodway within the Vernon-Patoka corporate limits was not mapped by FEMA; therefore, this information was not available.

High quality wetlands are located along the existing US 51 corridor between communities and are impacted by corridors that reuse existing alignment or by those corridors traversing from one-side of a community to the opposite side of the other community. Additionally, high quality wetlands are located at the south end east of US 51 which would be impacted by corridors that bypass Patoka to the east, and at the north end west of US 51 which would be impacted by corridors that bypass Vernon to the west. Corridors through the community of Vernon impact residential and commercial properties, as these corridors traverse the denser area of the community.

Avoidance and minimization of wetland impacts, especially high quality wetlands, was considered as rationale for eliminating corridors. Corridors demonstrating impacts greater than 5 acres to high quality wetlands were eliminated. As a result, 11 corridors were eliminated that were aligned primarily along the east side of Patoka and the west side of Vernon.

Of the remaining 13 corridors, displacement of commercial buildings varied from zero to 28. Any corridor with 25 or more impacted buildings was eliminated from further consideration. This criterion eliminated four of the remaining corridors, all of which were located along the east side of Patoka and through the center of Vernon.

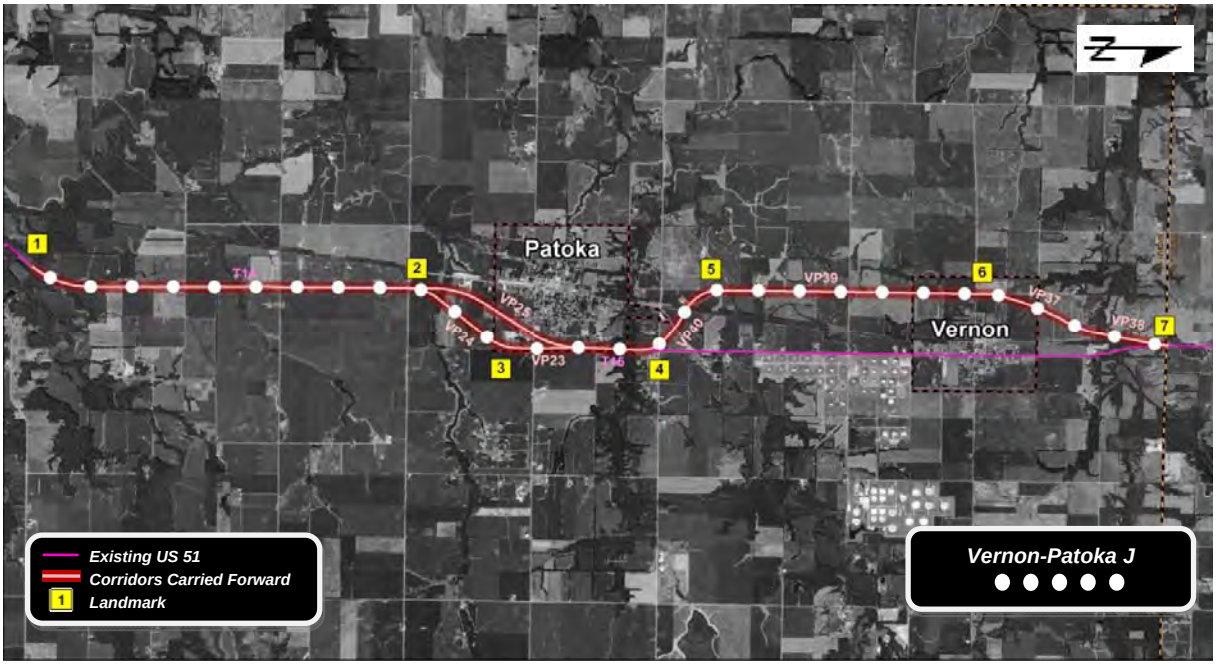
Residential displacements ranged from 19 to 29. Corridors with more than 25 displacements were eliminated from further analysis. This criterion eliminated seven corridors that were primarily eastern bypasses of Patoka and Vernon.

The remaining two corridors (J and Q) will be carried forward to Alignment Analysis. Refer to the following pages for a detailed description of the remaining corridors. The resource impacts for these corridor alternatives are summarized below:

Resource	Corridor	
	J	Q
Floodplain, acres	12	12
Total Wetlands, acres/number	4.4 / 10	4.4 / 10
High Quality Wetlands, acres/number	3.0 / 4	3.0 / 4
Residential Displacements	19	20
Commercial Displacements	1	None
Utility Conflicts	19	19
Prime/Important Farmland, acres	520	518
Farmland Parcel Severances, parcels	5	4

Vernon-Patoka J (T14-VP24-VP23-T15-VP40-VP39-VP37-VP38)

This corridor is a bypass east of the Village of Patoka and west of the Village of Vernon. The southern limit is located in the proximity of the US 51 and CR 1475N intersection **(1)**. The corridor follows US 51 north for approximately 3 miles. Just south of Britt Road **(2)**, the corridor diverges northeast away from US 51 and travels northeasterly towards Berry Road **(3)**. At Berry Road, the corridor falls back on US 51 traveling north to Boat Dock Road **(4)**. Here, the corridor traverses northwest to a point on Railroad Street between Boat Dock Road and Dickey Pond Road **(5)**. At this point, the corridor is approximately 1/2 mile west of US 51. Continuing north, Railroad Street becomes Willett Road and the corridor bypasses the western limit of the Village of Vernon. At Lake Street **(6)**, the corridor turns northeast to join with US 51 at the Marion/Fayette County line **(7)**. The length of roadway on new alignment is approximately 3.7 miles on a total alignment of 9.5 miles.

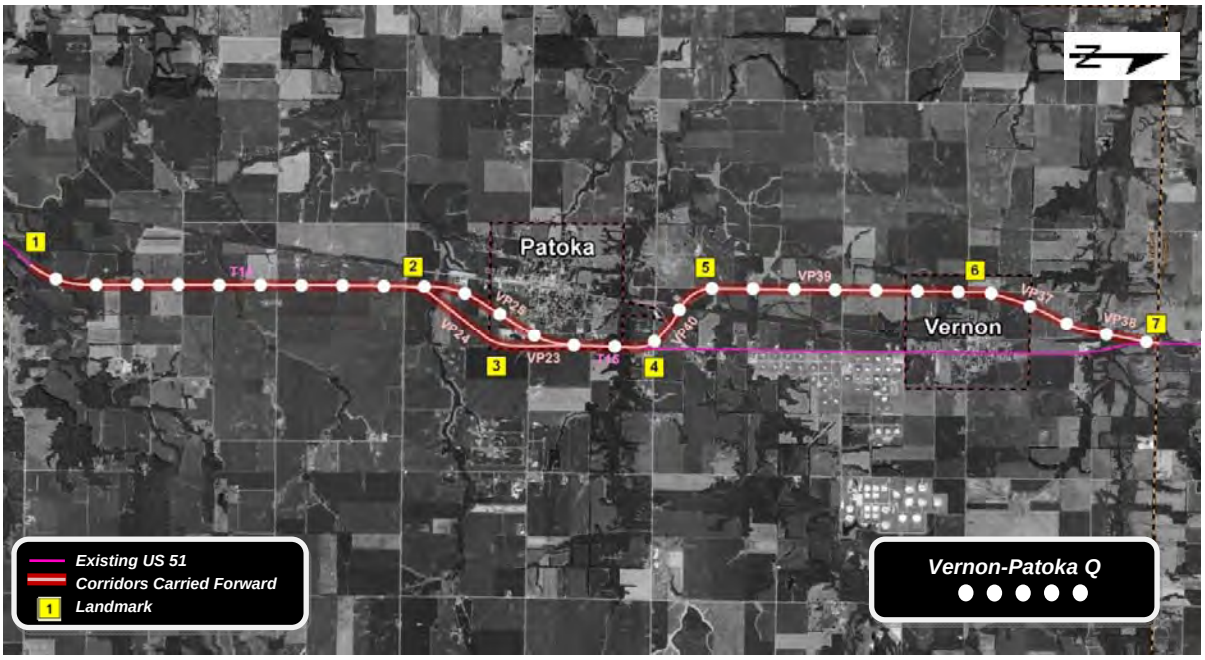


The following is a summary of the impacts for the criteria evaluated:

- Floodplain: 12 acres
- Wetlands: 4.4 acres / 10 sites
- High Quality Wetlands: 3.0 acres / 4 sites
- Residential Displacements: 19 residences
- Commercial Displacements: 1 building
- Utility Conflicts: 19 conflicts
- Prime/Important Farmland: 520 acres
- Farmland Parcel Severances: 5 parcels

Vernon-Patoka Q (T14-VP25-T15-VP40-VP39-VP37-VP38)

This corridor is a bypass located east of the Village of Patoka and west of the Village of Vernon. The southern limit is located in the proximity of the US 51 and CR 1475N intersection **(1)**. The corridor follows US 51 until Boat Dock Road **(4)**. Here, the corridor traverses northwest to a point on Railroad Street between Boat Dock Road and Dickey Pond Road **(5)**. At this point, the corridor is approximately 1/2 mile west of US 51. Continuing north, Railroad Street becomes Willett Road and the corridor bypasses the western limit of the Village of Vernon. At Lake Street **(6)**, the corridor turns northeast to join with US 51 at the Marion/Fayette County line **(7)**. The length of roadway on new alignment is approximately 2.2 miles on a total alignment of 9.4 miles.



The following is a summary of the impacts for the criteria evaluated:

- Floodplain: 12 acres
- Wetlands: 4.4 acres / 10 sites
- High Quality Wetlands: 3.0 acres / 4 sites
- Residential Displacements: 20 residences
- Commercial Displacements: None
- Utility Conflicts: 19 conflicts
- Prime/Important Farmland: 518 acres
- Farmland Parcel Severances: 4 parcels

VI. VANDALIA ELIMINATION SUMMARY

For the Vandalia area, 21 corridor combinations were evaluated for all resource criteria listed in Table 1. These corridors included alternatives both east and west of Vandalia. The following criteria represent the resources with variable impacts that were used to eliminate corridors:

- high quality wetlands,
- floodplain,
- commercial displacements, and
- high quality woodlands.

Corridors were eliminated to reduce impacts to these resource criteria. **Table B3** in **Attachment B** provides a summary of the Vandalia community impacts. At the bottom of the table, the criteria used are listed along with the subsequent corridors eliminated, as described below.

Resources that exist within the community of Vandalia that exhibit similar impacts from all corridors were not considered to be differentiating criteria. These include streams, residential displacements, public facility displacements, parkland, utilities, prime and important farmland, severed farmland, centennial & sesquicentennial farms, historic sites, and cemeteries. Resources that are not known to exist in the Vandalia alternative corridors include biologically significant streams, Class 1 streams, drinking water supplies – surface water, and CERCLIS sites. Floodway within Vandalia corporate limits was not mapped by FEMA; therefore, this information was not available.

In addition to the resources listed above, the state-threatened species heart-leaved plantain was identified by the INHS within the Kaskaskia River bluff south of Vandalia within a high quality wetland. Neither the protected species nor the associated high quality wetlands are impacted by proposed corridors; the corridors were shifted to avoid these resources. There is one INAI site, the Vandalia Geologic Area, located north of Vandalia and west of existing US 51. During coordination with the Illinois Department of Natural Resources (IDNR), IDNR indicated that complete avoidance of this area is not required, if the integrity of the INAI site is maintained. Therefore, corridors that traverse a portion of the Vandalia Geologic Area INAI site were evaluated.

High quality wetland impacts varied from 2.7 to 22.3 acres, Corridors that resulted in more than 20.0 acres of high quality wetlands were eliminated from further analysis. As a result, six corridors (B, C, H, J, R and T) were eliminated. Of note, the existence of high quality wetlands along the entire Kaskaskia River bluffs south of Vandalia precludes development of a western bypass corridor that does not impact high quality wetlands. However, the corridors were shifted to minimize impacts to the greatest extent possible.

On the eastern side of Vandalia, the Kaskaskia River floodplain is extensive. Executive Order 11988 (Protection of Floodplains) requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development when a practical alternative exists. Corridors N and O (using segments V62 and V60 respectively) bypass Vandalia to the east and exhibit floodplain impacts of 319 and 470 acres, respectively. These two corridors (N and O) were eliminated from further consideration due to these longitudinal floodplain impacts. Longitudinal impacts are associated with greater adverse effects to streams and floodplains than transverse impacts. For all remaining corridors, floodplain encroachments are transverse rather than longitudinal.

Commercial displacements varied from 0 to 24 businesses for the corridors under consideration. Corridors that resulted in 10 or more commercial displacements were eliminated from further analysis. As a result, corridor E was eliminated.

High quality woodlands were identified by the INHS near the US 51 and I-70 interchange within the eastern portion of Vandalia and along the Kaskaskia River bluffs south of Vandalia. There are no known regulatory restrictions on high quality woodland areas, however, avoidance was exercised. Corridor segments T25 and V56 impact 2.0 and 6.3 acres of high quality woodland, respectively.

Corridor F contains segment T25 and corridors K, L, M, and P contain segment V56. These five corridors were eliminated from further consideration as other alternatives exist without impacts to this high quality woodland.

In addition to the criteria identified above, compatibility with existing land use plans was also used as differentiating criteria to eliminate corridors. Corridor segment V69 is situated on the west side of the community traversing through an area identified for continued development in Vandalia's adopted land use plan. To maintain a free flow condition on a new facility, signals at intersections leading to commercial development areas would not be permitted. Access control would hamper commercial development in this area. Additionally, to maintain free-flow access along US 51 at this location, the existing diamond interchange would be replaced by a cloverleaf configuration. As was discussed with the Community Advisory Group (CAG), this would severely impact recent commercial development in three of the four quadrants of the interchange. As a result, two corridors (G and I), which contain segment V69, were eliminated from consideration.

Vandalia A, D, Q, S, and U are being carried forward to Alignment Analysis. Refer to the following pages for a detailed description of the remaining corridors. The resource impacts for these corridor alternatives are summarized below:

Resource	Corridor				
	A	D	Q	S	U
Floodplain, acres	156	224	156	224	166
Total Wetlands, acres/number	14.5 / 9	39.4 / 14	15.5 / 12	37.6 / 16	17.1 / 13
High Quality Wetlands, acres/number	11.8 / 3	17.4 / 3	12.2 / 4	17.8 / 4	12.5 / 4
High Quality Woodlands, acres	None	None	None	None	None
INAI Sites, acres	None	None	None	None	10
Residential Displacements	35	25	37	30	21
Commercial Displacements	2	2	2	2	None
Public Facility Displacements	None	None	None	None	None
Prime/Important Farmland, acres	746	784	689	700	681
Farmland Severances, parcels	20	22	18	20	18

Vandalia A (V55-V68-V59-V63-V65-V54-T29)

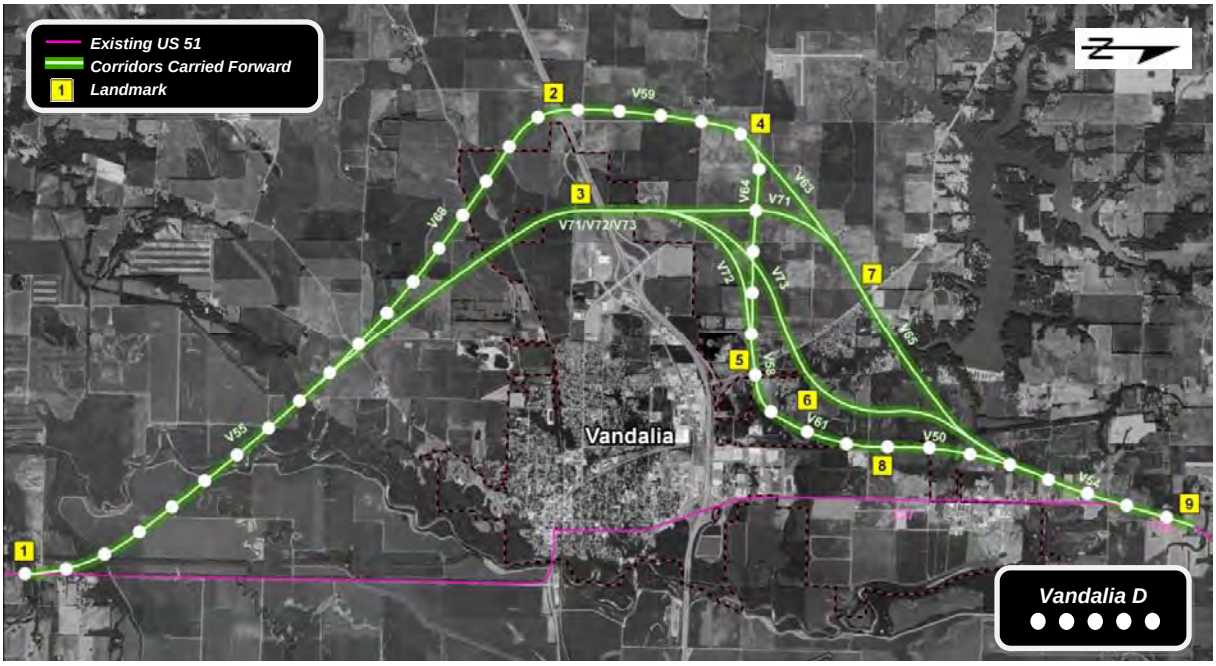
This corridor is a bypass situated to the west of the City of Vandalia. The southern limit is located in the proximity of the intersection of US 51 and CR 1075 **(1)**. The corridor diverges from US 51 to the northwest for approximately six miles until it crosses I-70 **(2)**. At this point, the corridor is approximately 3.6 miles west of and parallel to US 51 through downtown Vandalia. From I-70, the corridor travels north and turns northeast in the vicinity of CR 500 and CR 1700 **(4)**. The corridor then travels northeast and crosses IL 185 south of Vandalia Lake **(7)** and turns north-northeast for approximately two miles to join with US 51. Following US 51 north toward Ramsey the corridor ends approximately 1-1/4 miles north of the Vandalia Correctional Center **(9)**. The length of the roadway on new alignment is approximately 12.2 miles on a total alignment of 12.8 miles.

The following is a summary of the impacts for the criteria evaluated:

- Floodplain: 156 acres
- Wetlands: 14.5 acres / 9 sites
- High Quality Wetlands: 11.8 acres / 3 sites
- High Quality Woodlands: None
- INAI Sites: None
- Residential Displacements: 35 residences
- Commercial Displacements: 2 buildings
- Public Facility Displacements: None
- Prime/Important Farmland: 746 acres
- Farmland Severances: 20 parcels

Vandalia D (V55-V68-V59-V64-V58-V61-V50-V54-T29)

This corridor is a bypass situated west of the City of Vandalia. The southern limit is located in the proximity of the intersection of US 51 and CR 1075 **(1)**. The corridor diverges from US 51 to the northwest for approximately six miles until it crosses I-70 **(2)**. At this point, the corridor is approximately 3.6 miles west of and parallel to US 51 through downtown Vandalia. From I-70, the corridor travels north and turns northeast in the vicinity of CR 500 and CR1700 **(4)**. The corridor then travels east, following CR 1700 until it crosses IL 185 **(5)**. From this point the corridor traverses northeast until it crosses Thrill Hill Road **(8)** and turns north-northeast for approximately two miles to join with US 51. Following US 51 north toward Ramsey the corridor ends approximately 1-1/4 miles north of the Vandalia Correctional Center **(9)**. The length of roadway on new alignment is approximately 13.1 miles on a total alignment of 13.7 miles.

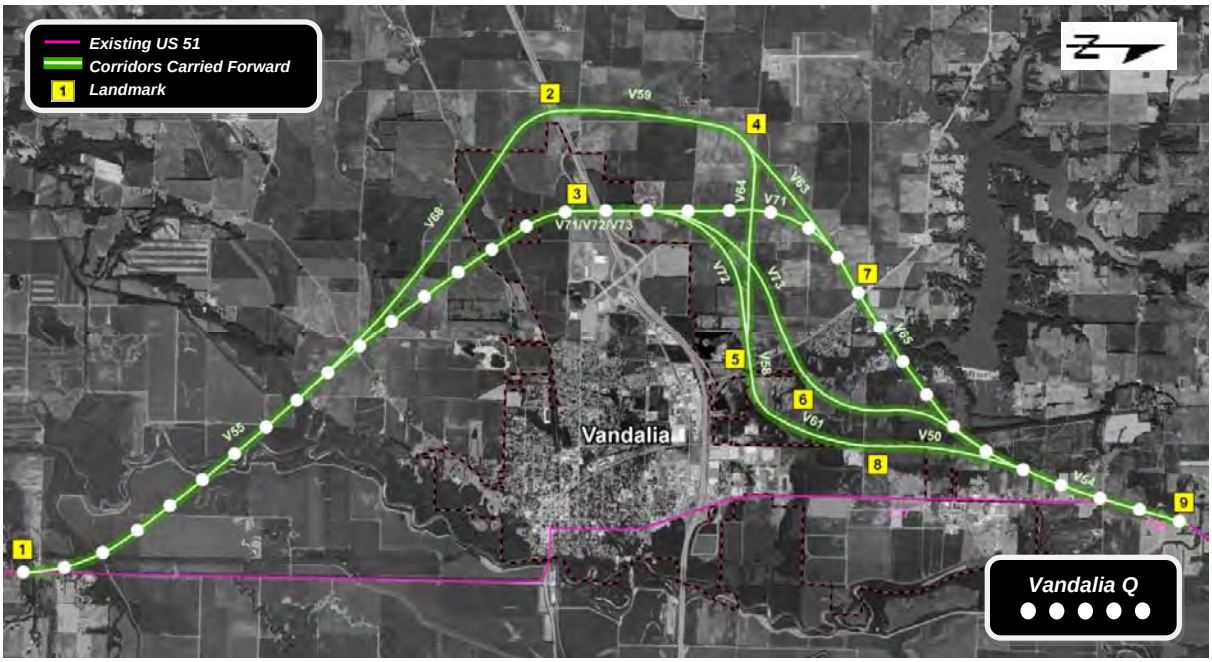


The following is a summary of the impacts for the criteria evaluated:

- Floodplain: 224 acres
- Wetlands: 39.4 acres / 14 sites
- High Quality Wetlands: 17.4 acres / 3 sites
- High Quality Woodlands: None
- INAI sites: None
- Residential Displacements: 25 residences
- Commercial Displacements: 2 buildings
- Public Facility Displacements: None
- Prime/Important Farmland: 784 acres
- Farmland Severances: 22 parcels

Vandalia Q (V55-V71-V65-V54-T29)

This corridor is a bypass situated to the west of the City of Vandalia. The southern limit is located in the proximity of the intersection of US 51 and CR 1075 **(1)**. The corridor diverges from existing US 51 to the northwest for approximately 5-1/4 miles where it begins turning north until crossing I-70 **(3)**. At this point, the corridor is approximately 2.8 miles west of and parallel to existing US 51 through downtown Vandalia. From this point the corridor traverses northeast and crosses IL 185 south of Vandalia Lake **(7)** and turns north-northeast for approximately two miles to join US 51. Following US 51 north toward Ramsey the corridor ends approximately 1-1/4 miles north of the Vandalia Correctional Center **(9).** The length of the roadway on new alignment is approximately 11.2 miles on a total alignment of 11.8 miles.



The following is a summary of the impacts for the criteria evaluated:

- Floodplain: 156 acres
- Wetlands: 15.5 acres / 12 sites
- High Quality Wetlands: 12.2 acres / 4 sites
- High Quality Woodlands: None
- INAI sites: None
- Residential Displacements: 37 residences
- Commercial Displacements: 2 buildings
- Public Facility Displacements: None
- Prime/Important Farmland: 689 acres
- Farmland Severances: 18 parcels

Vandalia S (V55-V72-V58-V61-V50-V54-T29)

This corridor is a bypass situated west of the City of Vandalia. The southern limit is located in the proximity of the intersection of US 51 and CR 1075 **(1)**. The corridor diverges from existing US 51 to the northwest for approximately 5-1/4 miles where it begins turning north until crossing I-70 **(3)**. At this point, the corridor is approximately 2.8 miles west of and parallel to existing US 51 through downtown Vandalia. After crossing I-70, the corridor curves to the east until crossing IL 185 **(5)**. From this point the corridor traverses northeast until it crosses Thrill Hill Road **(8)** and turns north-northeast for approximately two miles to join with US 51. Following US 51 north toward Ramsey the corridor ends approximately 1-1/4 miles north of the Vandalia Correctional Center **(9)**. The length of roadway on new alignment is approximately 11.5 miles on a total alignment of 12.1 miles.

The following is a summary of the impacts for the criteria evaluated:

- Floodplain: 224 acres
- Wetlands: 37.6 acres / 16 sites
- High Quality Wetlands: 17.8 acres / 4 sites
- High Quality Woodlands: None
- INAI sites: None
- Residential Displacements: 30 residences
- Commercial Displacements: 2 buildings
- Public Facility Displacements: None
- Prime/Important Farmland: 700 acres
- Farmland Parcel Severances: 20 parcels

Vandalia U (V55-V71-V73-V54-T29)

This corridor is a bypass situated west of the City of Vandalia. The southern limit is located in the proximity of the intersection of US 51 and CR 1075 **(1)**. The corridor diverges from existing US 51 to the northwest for approximately 5-1/4 miles where it begins turning north until crossing I-70 **(3)**. At this point, the corridor is approximately 2.8 miles west of and parallel to existing US 51 through downtown Vandalia. After crossing I-70, the corridor curves to the northeast and traverses the southeast portion of the Vandalia Geologic Area INAI site **(6)**. From this point the corridor traverses north-northeast for approximately 2-1/2 miles to join with US 51. Following US 51 north toward Ramsey the corridor ends approximately 1-1/4 miles north of the Vandalia Correctional Center **(9)**. The length of roadway on new alignment is approximately 11.2 miles on a total alignment of 11.8 miles.

The following is a summary of the impacts for the criteria evaluated:

- Floodplain: 166 acres
- Wetlands: 17.1 acres / 13 sites
- High Quality Wetlands: 12.5 acres / 4 sites
- High Quality Woodlands: None
- INAI sites: 10 acres
- Residential Displacements: 21 residences
- Commercial Displacements: None
- Public Facility Displacements: None
- Prime/Important Farmland: 681 acres
- Farmland Parcel Severances: 18 parcels

VII. RAMSEY ELIMINATION SUMMARY

For the Ramsey area, six corridor combinations were evaluated for all resource criteria listed in Table 1. The following criteria represent the resources with variable impacts that were used to eliminate corridors:

- residential displacements,
- commercial displacements,
- public facility displacements,
- parkland (section 4(f)/6(f)), and
- farmland severances.

Corridors were eliminated to reduce impacts to these resource criteria. **Table B4** in **Attachment B** provides a summary of the Ramsey community impacts.

Resources that exist within the community of Ramsey that exhibit similar impacts from all corridors were not considered to be differentiating criteria. These include wetlands, streams, utilities, and prime and important farmland. Resources not known to exist within the Ramsey corridors evaluated include biologically significant streams, Class 1 streams, drinking water supplies – surface water, high quality wetlands, CERCLIS sites, INAI sites, high quality woodlands, threatened and endangered species, important habitat areas, centennial/sesquicentennial farms, historic sites, and cemeteries. Floodplain within the Ramsey corporate limits was not mapped by FEMA; therefore, this information was not available. Ramsey Creek is a biologically significant stream, a Class 1 stream, and an INAI site; however, US 51 crosses Ramsey Creek south of the merger of the bypass alternatives with US 51.

Corridor segment R23 travels through the center of Ramsey, along the existing US 51 alignment. Widening US 51 to a four-lane facility along this segment results in a high number of displacements to homes, businesses, and public facilities. Corridor F, which contains segment R23, results in 125 displacements, four times more than the number of displacements in any of the remaining corridors. Additionally, corridor F impacts 1.9 acres of 4(f) land. For these reasons, corridor F was eliminated.

One differentiator for the remaining corridors is the number of farm severances. Corridor segment R18 severs four farm properties north of Ramsey. Segment R18 is a component of corridors D and E. Of the remaining corridors, corridor A results in 2 severances, and corridors B and C exhibit no severances. For this reason, corridors D and E were eliminated.

Corridors B and C are identical corridors with the exception of a short segment east of Ramsey (R11) where corridor B curves to the east. This corridor segment was developed early in the CAG process with the intention of avoiding what appeared to be several streams. Data collection determined that these streams did not exist. Therefore, corridor B was eliminated from further consideration.

Ramsey A and C are being carried forward to the Alignment Analysis and are discussed in the following sections. Refer to the following pages for a detailed description of the remaining corridors. The resource impacts for these corridor alternatives are summarized below:

Resource	Corridor	
	A	C
Total Wetlands, acres/number	1.6 / 4	1.1 / 8
High Quality Wetlands, acres/number	None	None
Residential Displacements	7	25
Commercial Displacements	None	3
Public Facility Displacements	None	None
Parkland, acres	None	None
Prime/Important Farmland, acres	267	279
Farmland Severances, parcels	2	None

Ramsey A (R19-T36)

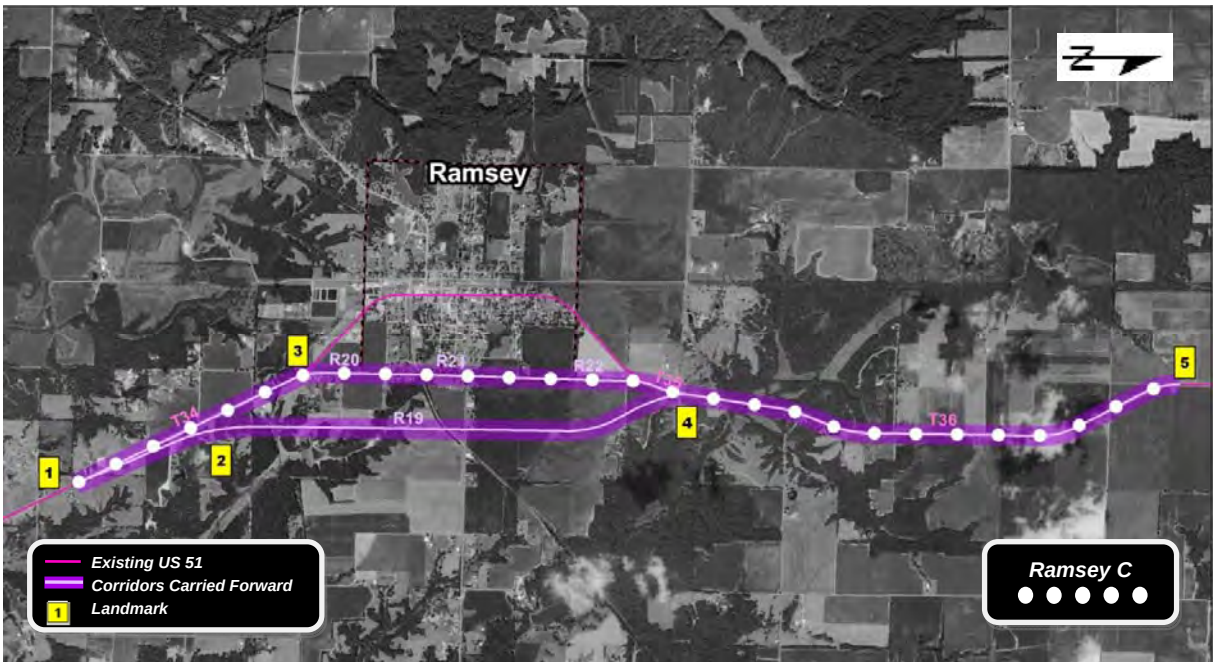
This corridor is a bypass situated east of the Village of Ramsey. The southern limit is located approximately two tenths of a mile north of CR 2600 **(1)**. The corridor bypasses Ramsey by turning to the north **(2)** as US 51 continues northwest toward the town. From this point, the corridor traverses north and is approximately 3,500' east of and parallel to existing US 51 through the Village of Ramsey until joining existing US 51 approximately one quarter mile north of CR 2885 **(4)**. The corridor continues along the existing US 51 roadway and ends less than one half mile north of CR 3100 **(5)**. The length of roadway on new alignment is approximately 3.0 miles on a total alignment of 5.4 miles.

The following is a summary of the impacts for the criteria evaluated:

- Wetlands: 1.6 acres / 4 sites
- High Quality Wetlands: None
- Residential Displacements: 7 residences
- Commercial Displacements: None
- Public Facility Displacements: None
- Parkland: None
- Prime/Important Farmland: 267 acres
- Farmland Severances: 2 parcels

Ramsey C (T34-R20-R21-R22-T35-T36)

This corridor is a bypass situated east of the Village of Ramsey. The southern limit is located approximately two tenths of a mile north of CR 2600 **(1)**. The corridor bypasses Ramsey by turning north **(3)** as US 51 continues northwest towards town. The corridor continues north, approximately 2000' east of and parallel to existing US 51 through the Village of Ramsey, until joining existing US 51 one tenth mile north of CR 2885 **(4)**. The corridor continues along the existing US 51 alignment and ends less than one half mile north of CR 3100 **(5)**. The length of roadway on new alignment is approximately 1.7 miles on a total alignment of 5.5 miles.



The following is a summary of the impacts for the criteria evaluated:

- Wetlands: 1.1 acres / 8 sites
- High Quality Wetlands: None
- Residential Displacements: 25 residences
- Commercial Displacements: 3 buildings
- Public Facility Displacements: None
- Parkland: None
- Prime/Important Farmland: 279 acres
- Farmland Parcel Severances: None

VIII. SUMMARY AND CONCLUSION

The Macro Analysis has identified the following corridors to move forward to the preliminary alignment development step:

Centralia and Sandoval – D, DJ, and DL
Vernon and Patoka –J and Q
Vandalia – A, D, Q, S, and U
Ramsey – A and C

A preliminary alignment alternative will be developed in each of the corridors in addition to the areas along the existing US 51 roadway between the communities. The preliminary alignments will represent a refined footprint of approximately 200 feet compared to the 500 foot corridor width. These alignments will be developed avoiding or minimizing impacts to known resources, and will be used to determine if a reasonable and feasible alignment can be developed with the preferred corridor.

Appendix A

ENVIRONMENTAL RESOURCE DESCRIPTIONS

Following is a discussion of the environmental resource categories considered for corridor evaluation. The Macro Analysis corridor footprint mentioned in the descriptions below is five hundred feet (500') in width.

Environmental

Water Quality/Water Resources

Floodplains

Floodplains within the corridors have been identified by the Federal Emergency Management Agency (FEMA). Flood Insurance Rate Maps (FIRM) from FEMA shows the limits of flooding affecting the individual communities. Flood events which are commonly referred to as the 10, 50, 100, and 500-year floods represent storm events having a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. The 100-year floodplain boundaries are shown on the FIRM as Zones A or AE and correspond to the boundary of the areas of special flood hazards. The 500-year floodplain boundaries are shown on the FIRM as Zones X which corresponds to the boundary of the areas of moderate flood hazards.

FIRM maps were used to measure potential impacts to floodplains. FIRM maps were obtained from FEMA for Washington, Jefferson, Marion, Clinton, Fayette and Shelby Counties. Within those counties, the towns of Ramsey, Vernon, Patoka, and Sandoval are not mapped from the FEMA FIRM and therefore floodplain data are not available within the municipal boundaries.

Executive Order 11988 (Protection of Floodplains) requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development when a practicable alternative exists. In identifying impacts to floodplains at the macro analysis level, any floodplain area within the corridor footprint was measured and described as either transverse or longitudinal. The floodplain impacts were measured and rounded to the whole acre. Avoidance of longitudinal encroachments was evaluated for the proposed stream crossings. Given the general flow direction of streams and the north-south orientation of US 51, only a few longitudinal encroachments were identified. Further refinements in the alignment analysis will consider avoidance of these encroachments.

Floodways

Floodways within the corridors have been identified by FEMA. The floodway is the channel of a stream that must be kept free of encroachment to allow the 100-year flood to be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. More recent FIRM from FEMA shows the limits of floodway within a particular floodplain area.

FIRM maps were obtained from FEMA for Washington, Jefferson, Marion, Clinton, Fayette and Shelby Counties. Within those counties, Centralia is the only community with a mapped floodway.

In characterizing impacts to floodways at the macro analysis level, any floodway area within the corridor footprint was measured. The floodway impacts were measured and rounded to one half acre.

Both transverse and longitudinal encroachments were evaluated for the stream crossings proposed. Given the general flow direction of streams and the north-south orientation of US 51, only a few longitudinal encroachments were identified.

Biologically Significant Streams

Biologically Significant Streams (BSS) have been identified by the Illinois Department of Natural Resources (IDNR) based upon the integrity and diversity of their aquatic communities. The IDNR issued a report in October 2008 "Integrating Multiple Taxa in a Biological Stream Rating System" which classified stream segments in Illinois and identified BSS. Data were not available for all streams so the classification process is incomplete.

For purposes of the macro analysis all biologically significant streams were separately counted to identify high quality areas. Only two streams, Ramsey Creek and Lost Creek, were classified as biologically significant streams. Both are currently crossed by existing US 51.

In characterizing impacts to streams at the macro analysis level, stream crossings provide a measure of impact. If any portion of a biologically significant stream is crossed by a potential corridor, it is counted as one crossing.

Each stream may have more than one crossing by the same corridor. For example, if the stream meanders, there may be multiple crossings of the same stream. Each crossing is counted individually.

Other Streams

Other perennial and intermittent streams in the corridors were identified for purposes of providing a measure of water quality impacts. Each stream may have more than one crossing by the same corridor and each crossing is counted individually.

Class 1 Streams

Class 1 streams are specific waterways identified in an interagency agreement between the Illinois Department of Natural Resources (IDNR) and the Illinois Department of Transportation (IDOT). Such streams require early coordination with IDNR and are listed by county in the IDOT Memorandum "IDNR-DOT Natural Resource Review and Coordination Agreement" dated February 2, 1996.

In characterizing impacts to this resource at the macro analysis level, corridor crossings of a stream provide a measure of the impact. If any portion of a class 1 stream is crossed by a potential corridor, it is counted as one crossing. The same class 1 stream may have more than one crossing by the same corridor. For example, if the stream meanders, there may be multiple crossings of the same stream. Each crossing is counted individually.

The only class 1 stream in the US 51 project corridor is Ramsey Creek, which is also a biologically significant stream. This stream was counted under "biologically significant" stream.

Drinking Water Supplies – Surface Water

Drinking water supplies represent surface waters used as a supply of potable water.

Sources of data used to identify drinking water supplies included Source Water Assessment Summary Fact Sheets from the IEPA website as well as personal contact with community representatives. The information from both sources was compared to an aerial photograph

with GIS shape files of the alternatives to verify the location of crossings of surface water bodies.

In characterizing impacts to drinking water supplies at the macro analysis level, crossings that occur upstream of a drinking water supply are counted individually.

Wetlands

Wetlands

The U.S. Army Corps of Engineers (COE) (Federal Register 1982) and the U.S. Environmental Protection Agency (Federal Register 1980) jointly define wetlands as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions". Wetlands include forested areas, wet meadows, and a variety of habitats exhibiting the hydrology, soils, and vegetation required by the COE.

Wetland information was provided by the Illinois Natural History Survey (INHS). Wetlands along the sections of existing US 51 between communities were surveyed by INHS during the 2008 field season and this information was released in GIS format in May 2009. Wetlands along the bypass areas of each community were surveyed by INHS during the 2009 field season and this information was released in GIS format in December 2010.

Segment V55 in Vandalia was shifted slightly north/east to avoid impacts to a state listed threatened/endangered species identified by INHS during the 2009 field season. The updated location of segment V55 has not been surveyed by INHS to date. Therefore, wetland information based on confirmed field delineations for this segment is not available. However, based upon INHS review of the original V55 location, assumptions were made regarding the potential locations of wetlands. Specifically, INHS identified several linear wetlands, including high quality wetlands, associated with streams and indicated that these areas continue outside the limits of the INHS survey areas. Based upon the INHS information and with the aid of the county soil surveys (presence of hydric soils), assumptions were made as to the potential location of wetlands along the shifted corridor location. These potential wetland areas are included in the wetland impact analysis. All non-delineated areas will be submitted for INHS review during the 2010 field season and impacts will be updated as soon as the delineated wetland information becomes available.

Executive Order 11990 (Protection of Wetlands) requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of wetlands, and avoid direct and indirect impacts whenever there is a practicable alternative. Avoidance of wetlands was of first importance in evaluating corridor alternatives. Minimizing wetland impacts was an important criterion in evaluating corridor alternatives. In characterizing impacts to wetlands at the macro analysis level, any wetland area within the corridor footprint was measured. This wetland assessment included all wetlands identified by INHS. The wetland impacts were measured and rounded to the nearest tenth of an acre. Additionally, the number of wetlands impacted was tallied so that both metrics (areas impacted and number of wetlands impacted) could be assessed.

High Quality Wetlands

The INHS provided information regarding the plant species composition of each wetland using a Floristic Quality Index (FQI). High quality wetlands are associated with an FQI equal to or greater than 20. High quality wetlands were identified for special consideration and avoidance. In identifying impacts to high quality wetlands at the macro analysis level, impacts were measured and rounded to a tenth of an acre. High quality wetland impacts

were also characterized as either a bisecting (or crossing) impact or an edge impact. Avoidance of such impacts was considered, where feasible.

Illinois Natural Area Inventory (INAI) Sites

Illinois Natural Area Inventory (INAI) sites and Illinois Nature Preserves are protected by the State of Illinois and may include threatened and endangered species within their boundaries. State laws have been established to define and protect these areas.

Known INAI sites within the project area include Ramsey Creek and the Vandalia Geologic Area. Existing US 51 already crosses Ramsey Creek south of the convergence point of bypass alternatives. This crossing, therefore, was not considered in the macro analysis.

The Vandalia Geologic Area is located north of the Vandalia corporate limits and south of Thrill Hill Road. The designated INAI area is part of a larger formation that begins near Vera, IL and extends south to Carlisle Lake. A preliminary investigation into the nature of the site is available under separate cover. Based on the investigation and coordination with the IDNR, complete avoidance of this site is not necessary if the integrity of the site can be maintained. Therefore, corridors that traversed the southeast corner of the INAI site were evaluated.

There is one Nature Preserve in the project area, the Ramsey Railroad Prairie located at the north side of Ramsey, which is avoided by all corridors.

High Quality Woodlands

High quality woodlands along the Kaskaskia River bluffs near Vandalia were identified during the INHS 2008 field season. This area was identified as a potential Illinois Natural Areas Inventory (INAI) candidate by INHS, and was considered for avoidance. Several additional high quality woodland areas were identified by INHS in Vandalia near the US 51 and I-70 interchange. These areas were also avoided.

Threatened and Endangered Species

Threatened and endangered species include all types of plants and animals which face possible extinction in the near future if steps aren't taken to protect them. These species are protected by both state and federal laws, such that avoidance of these resources is required to the maximum extent possible.

T&E species were surveyed by INHS during the 2008 and 2009 field seasons. One endangered fish species, the western sand darter (*Etheostoma clarum*), was found in the Kaskaskia River near the project area. Two endangered bird species, the northern harrier (*Circus cyaneus*) and osprey (*Pandion haliaetus*), were also recorded in the project area. The endangered heart-leaved plantain (*Plantago cordata*) was identified within a high quality wetland along the Kaskaskia River bluffs south of Vandalia within the project area. In addition, one rare plant species, twinleaf (*Jeffersonia diphylla*), was found at two locations in the study area. Twinleaf, although rare to the study area, is not listed as a threatened or endangered species. All known T&E species were avoided.

Important Habitat Areas

The INHS identified several important habitat areas within the study area during the 2008 field season. Four important avian census areas were identified within the study area. These areas contain diverse communities of bird species, including Neotropical migrants, and contain a relatively high number of species with special conservation designations. These designations include species on the *American Bird Conservancy* watch-list, *Partners in Flight* species of concern, and the *Comprehensive Illinois Wildlife Action Plan* conservation priority

species. No threatened or endangered bird species were identified in these important habitat areas.

Three reptile and amphibian important habitat areas were identified within the study area. These areas contained five or more reptile and amphibian species. No threatened or endangered amphibian or reptile species were identified in these areas. The avian and reptile and amphibian important habitat areas are not impacted by the proposed bypass corridors.

One ecologically sensitive site, an un-named remnant savanna/open oak woodland, was also identified by INHS during the 2008 field season. This savanna is located along existing US 51 and is not impacted by the project.

Special Waste

CERCLIS Sites

CERLCIS is the abbreviation for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Information System, the United States Environmental Protection Agency's (EPA's) database and management system that inventories sites that reportedly have unlawfully accepted and stored hazardous substances or that have a record of accidental spills or dumping.

The Illinois State Geological Survey (ISGS) is currently surveying special waste sites including CERCLIS sites along the potential corridors and to date this information is not available. For the macro level analysis, the USEPA "Superfund Site Information" online database was searched to locate CERCLIS sites within the vicinity of the project. Any additional CERCLIS sites identified by ISGS will be included during the alignment analysis when the ISGS information becomes available, which is expected in 2010.

In characterizing impacts to CERLCIS sites at the macro analysis level, if any portion of a property identified as a CERLCIS site is crossed by a potential corridor, it is counted as one impact.

Community

Residences and Businesses

Homes and Commercial Buildings

Home and commercial buildings were identified within the corridor limits based on information from ESRI (Environmental System Research Institute, Inc.) data, Google Maps, and public feedback. Buildings were located by the project team using 2007 aerial photography. The buildings identified as residences and businesses were compared to other public facility buildings in order to remove duplicates.

For the purpose of macro analysis, residential and commercial impacts were counted separately. A residential or commercial property was impacted if any part of the building structure is located within the corridor limits.

Only the residential structure was counted as being impacted; freestanding garages or other structures on the respective property were not counted as impacted. Residential buildings under construction were counted. Multi-unit housing, such as apartments, townhomes, or condos, was considered as one residence. Farmsteads were included in the count of residential buildings.

Commercial impacts were computed as each commercial building impacted. Several commercial properties incorporated multiple buildings. Each of the buildings was counted as a separate commercial building. Multi-use buildings with commercial and residence in the same building were counted as both residential and commercial impacts.

Public facilities were not counted as a residential impact; they are identified under separate Environmental Resource descriptions below.

Public Facilities

Public facilities were identified within the corridor limits based on information from ESRI data, Google Maps, municipality maps, and public feedback. Public facilities include schools, libraries, places of worship, post offices, public institutions (hospital, prison, etc.) or municipal buildings. For the macro analysis, public facility impacts were counted for each of the categories above.

Some public facility properties were situated at the edge of the corridor limits with portions of the property being contained within the corridor and portions being outside the corridor. It is only identified as an impact if the building structure is within the corridor limits.

Numerous public facility properties are multi-purpose facilities. As an example, a single building might contain a police station in addition to a fire station. Impacts were calculated separately for each of these categories.

Land Use

Compatibility with Adopted Land Use Plan

The communities of Centralia, Central City and Vandalia and Shelby County have adopted zoning and land use plans within the project study area. The compatibility of a corridor alternative to comply with these plans was a criterion evaluated in the macro analysis. The following plans and zoning maps were used in this analysis:

- Vandalia Comprehensive Plan 2001
- City of Vandalia Zoning District Map 2009
- Centralia Comprehensive Plan 2007
- Centralia Land Use and Zoning Maps 2007
- Central City Comprehensive Plan 2005
- Shelby County Comprehensive Plan 2005
- Shelby County Zoning Maps 2005

The combined corridor alternatives were evaluated and defined as Compatible, Partially Compatible, or Not Compatible.

A corridor alternative is considered “Compatible” if the corridor alternative traverses through areas identified for development or is contiguous with a majority of the community’s planning boundary. Compatible corridors were identified with a “Yes” on the macro analysis summary table.

A corridor alternative is considered “Partially Compatible” if the corridor alternative traverses through a portion of areas identified for development or is contiguous to portions of the community’s planning boundary. Partially compatible corridors were identified with a “Neutral” on the macro analysis summary table.

A corridor alternative is considered "Not Compatible" if the corridor alternative is located outside of the community's planning boundaries or requires land from an area currently identified for development. Non-compatible corridors were identified with a "No" on the macro analysis summary table.

If no comprehensive plan exists for a community, "N/A" was entered in the macro analysis summary table and the alternatives through that community were not evaluated on this criterion.

Section 4(f) and 6(f)

Parklands 4(f), 6(f)

Publicly owned lands within the study area that are managed as parks and recreation areas, wildlife or waterfowl refuges, or historic sites are identified as Section 4(f) properties. Although publicly owned historic sites are Section 4(f) properties, the impacts to historic sites are identified under separate Environmental Resource description below. Section 4(f) properties were identified through a review of USGS topographic maps, ESRI data, and community maps.

Section 6(f) properties are lands that were acquired or developed with funds from the Land and Water Conservation (LAWCON) Fund (16 USC 4601-4) or the Open Space Lands and Acquisition and Development Program (OSLAD). Section 6(f) properties within the study area were identified by the Illinois Department of Natural Resources.

Some Section 4(f) properties are also identified as Section 6(f) properties; the impact assessment, however, was calculated separately for these two property types. Impacts to Section 4(f) and Section 6(f) properties were calculated by measuring the overlap of the corridor with parkland property. For the macro analysis, the number and acreage of Section 4(f) and Section 6(f) properties impacted by the corridors was identified.

Utilities

Utilities evaluated as part of the macro analysis include antenna structures, radio/microwave towers, electrical facilities (substation or similar), utility crossings, and oil tank farms. Utilities were identified from database searches, aerial photography and during field reconnaissance. Antenna structures and radio/microwave tower information were identified from the Federal Communications Commission (FCC) database (http://wireless.fcc.gov/antenna/). The electrical facilities and pipe lines information were obtained from the U.S. Census Bureau. The substation and oil tank farm locations are identified from aerial information.

In identifying impacts to utilities at the macro analysis level, utility crossings provide a measure of the impact. If any portion of a utility crosses through or is located within a potential corridor, it is counted as one impact. The same utility may have more than one crossing by the same corridor. Each crossing is counted individually.

Community

Divides or Isolates a Community

The study area contains numerous communities along the existing US 51 corridor: Ramsey, Vandalia, Vernon, Patoka, Sandoval, Junction City, Central City, and Centralia. The isolation or division of these communities was a criterion evaluated in the macro analysis. This metric relates to the division of a community into two or more sections with one section being isolated from facilities or services such as schools, emergency services or recreation areas in which there was previous access.

The potential to divide or isolate a community for each combined corridor alternative was measured and defined as either "Community Division/Isolation" or "No Community Division/Isolation" Category. The evaluation was based on the relative location of combined corridor alternative to community boundaries and the location of public facilities, schools, and recreational areas. If a combined corridor alternative divided a community or isolated a community from a majority of its school, public facilities, or recreational areas, "YES" was applied to that combined corridor alternative. In all other cases, the combined corridor alternative was given a "NO."

Agricultural

Prime and Important Farmland

The Code of Federal Regulations (CFR) Title 7, Volume 6, Section 657.5(a) defines prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. The CFR states, "Prime Farmland has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crop when treated and managed, including water management, according to acceptable farming methods." To be considered prime farmland, the land does not have to be cleared; however, it cannot be urbanized, paved, or permanently under water. Soils are designated as prime farmland by the county soil scientist, and therefore, may differ between counties.

The digital format Natural Resource Conservation Service (NRCS) soil maps for each county were used to measure potential prime and important farmland impacts. The digital soil maps identify each soil type designated as prime and important farmland.

In characterizing impacts to prime and important farmland at the macro analysis level, any soil type designated as prime and important farmland within the corridor footprint was measured rounded to one acre.

Farmsteads

Farm Residences and Out-Buildings

A farmstead refers to the residence located on a farm and was included in the count of residential buildings; outbuildings refer to structures separated from the farmstead and include barns, stables, sheds, and storehouses. Farmsteads and outbuildings were located by the project team using 2007 aerial photography.

In characterizing impacts to farmsteads and outbuildings at the macro analysis level, if any portion of the corridor crosses a farmstead structure or outbuilding, it is counted as one impact per structure.

Severances

Parcels

Severed farm operations occur when a new roadway divides a farm either laterally or diagonally, and separates one or more parcels from others within a single farm operation. If a corridor takes farm land on the edge or perimeter of a farm tract, this is not a severance. Farm parcels were visually identified using 2007 aerial photography.

In characterizing impacts to farm severances at the macro analysis level, if any portion of the corridor severs the parcel and the severance results in less than 25% of a parcel separated from the remainder of the parcel, it is counted as one impact.

Centennial/Sesquicentennial

Farms

Centennial and Sesquicentennial Farms are those registered in the Illinois Department of Agriculture (IDOA) Centennial Farms Program. To qualify for Centennial Farm status, an agricultural property must have been owned by the same family of lineal (child or grandchild) or collateral (brother, sister, aunt, uncle, niece, nephew, or cousin) descendants for at least 100 years. Centennial Farms may also be registered as Sesquicentennial Farms, those properties that have been owned by the same family of lineal or collateral descendants for at least 150 years.

The Centennial and Sesquicentennial Farms registered in the IDOA program were queried by county on February 3, 2009. The query identifies names of property owners of registered farms and general location of the farm (township, range, and section). The owner names were checked against the most recent available county plat maps by the project team to attempt to locate the farms. A small number (approximately 2%) of registered farms could not be identified due to inadequate address information.

In characterizing impacts to Centennial and Sesquicentennial Farms, if any portion of the farm property is crossed by the project corridor, it is counted as one impact.

Cultural

Cultural

Historic Sites

Historic sites are those listed on the National Register or those eligible for listing on the National Register. The National Register is the official federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture. The National Park Service administers the National Register of Historic Places.

Historic sites were identified using the online Illinois Historic Preservation Agency (IHPA) Historic Architectural and Archaeology Resources Geographic Information System (HAARGIS) database. A survey of potential historic sites within the project corridors will be conducted and submitted to IHPA for a determination as to which sites are potentially eligible for registration. The survey will include structures more than 50 years in age. When available, those sites determined by IHPA to be potentially eligible will be incorporated in the alignment analysis.

In characterizing impacts to historic sites, if any portion of a historic site or structure is crossed by the project corridor, it is counted as one impact.

Cemeteries

A cemetery is any land used for human burial and includes undeveloped areas as well as plotted areas. Cemeteries were identified using topographic maps, aerial photography, plat books, and during field reconnaissance.

In characterizing impacts to cemeteries, if any portion of a cemetery is crossed by the project corridor, it is counted as one impact.

Operations

Distance

Distance of Travel

Distance of travel was measured from south termini to north termini along centerline of the corridor segment. For each corridor combination, the distances of all segments were combined to arrive at a total distance for a corridor alternative. Distance of travel was measured in miles and used in the calculation of travel time.

Time

Travel Time

Travel time was evaluated to determine the time it takes to travel from one end of a corridor to the other. For the macro analysis, the travel time was measured for each corridor segment and then the segment times were summed to produce a time for the combined corridor alternative.

The travel time for the proposed alternatives was calculated by dividing the distance of travel by proposed speed limit. Corridor alternatives traverse both rural and urban conditions and a different speed was considered for each condition. The rural speed limit was set at 65 mph; the urban speed limit was set at 45 mph. Free flow conditions for all of the proposed corridor alternatives were assumed and no delays due to traffic control restraints (all-way stop control or traffic signals) were included in the analysis. For the No Build condition, the current US 51 alignment was evaluated based upon the existing lengths, speed limits, and traffic control conditions. The existing speed ranged from a downtown speed limit of 30 miles per hour (mph) to a rural speed limit of 65 mph. For existing traffic signals along US 51, an additional 35 seconds for delay was added to that segment's travel time. Since northbound and southbound speed limits and traffic control constraints differ at locations, each direction's travel time was calculated and the maximum travel time was entered in the table.

Travel time was recorded in minutes and seconds.

Utilization of Existing Roadway

The utilization of existing roadway within a corridor was evaluated as part of the macro analysis. The existing roadway could not be used as-is, but re-building a potential improvement in the same location as the existing roadway has benefits regarding ROW needs, potential simplification of construction staging, economic benefits to the furnishing of materials during construction, and positive public perception.

Other Considerations

The macro level analysis of alternatives utilizes information available at the GIS level to screen a variety of resources. Two additional environmental factors that will be considered in the refinement of alignments will be subgroup population data and travel dependent businesses. Sensitive population groups, identified by income, national origin, age, or disability can only be characterized by using U.S. Census block data. Impacts to travel dependent businesses are important where bypass alternatives will be evaluated. Travel-dependent businesses are a subset of businesses and can be identified using guidance from the BDE Community Impact Assessment Manual. The level of detail necessary to evaluate impacts for these two environmental factors is not appropriate for or consistent with the macro level analysis of alternatives; such analysis, however, will be included in the future refinement of alignments.