SR 37 Mobility Study (Study)
126th Street to SR 32 / SR 38 and along 146th Street from Allisonville Road to Cumberland Road

Project Description

I. GENERAL

The Indiana Department of Transportation, the Indianapolis Metropolitan Planning Organization, Hamilton County, Town of Fishers, and City of Noblesville have identified the need to significantly improve the SR 37 corridor from 126th Street to SR 32 / SR 38. The Study area also extends along 146th Street from Allisonville Road to Cumberland Road. The Study was funded 80% by the Federal Highway Administration through the MPO with the remainder provided by Hamilton County.

II. PURPOSE

The purpose of the Study was to evaluate whether grade separation of the existing intersections would improve the traffic capacity, efficiency, and safety for the Study corridors without the need for additional travel lanes along this segment of the SR 37 corridor. This includes the basic concept of reconstructing each of the existing and anticipated signalized intersections through this segment of SR 37 to interchanges; thus eliminating the need for added travel lanes along the corridor. If this was shown to be an improvement, then the Study was to further identify a preferred design solution for future improvements along the SR 37 corridor and to identify potential environmental concerns that may be present, and to establish a reliable budget to construct these improvements.

The preferred design solution was defined to a level which will allow officials with the INDOT, MPO, Hamilton County, Town of Fishers, and the City of Noblesville to begin making necessary amendments to their requisite Planning Documents.

III. EXISTING FACILITY

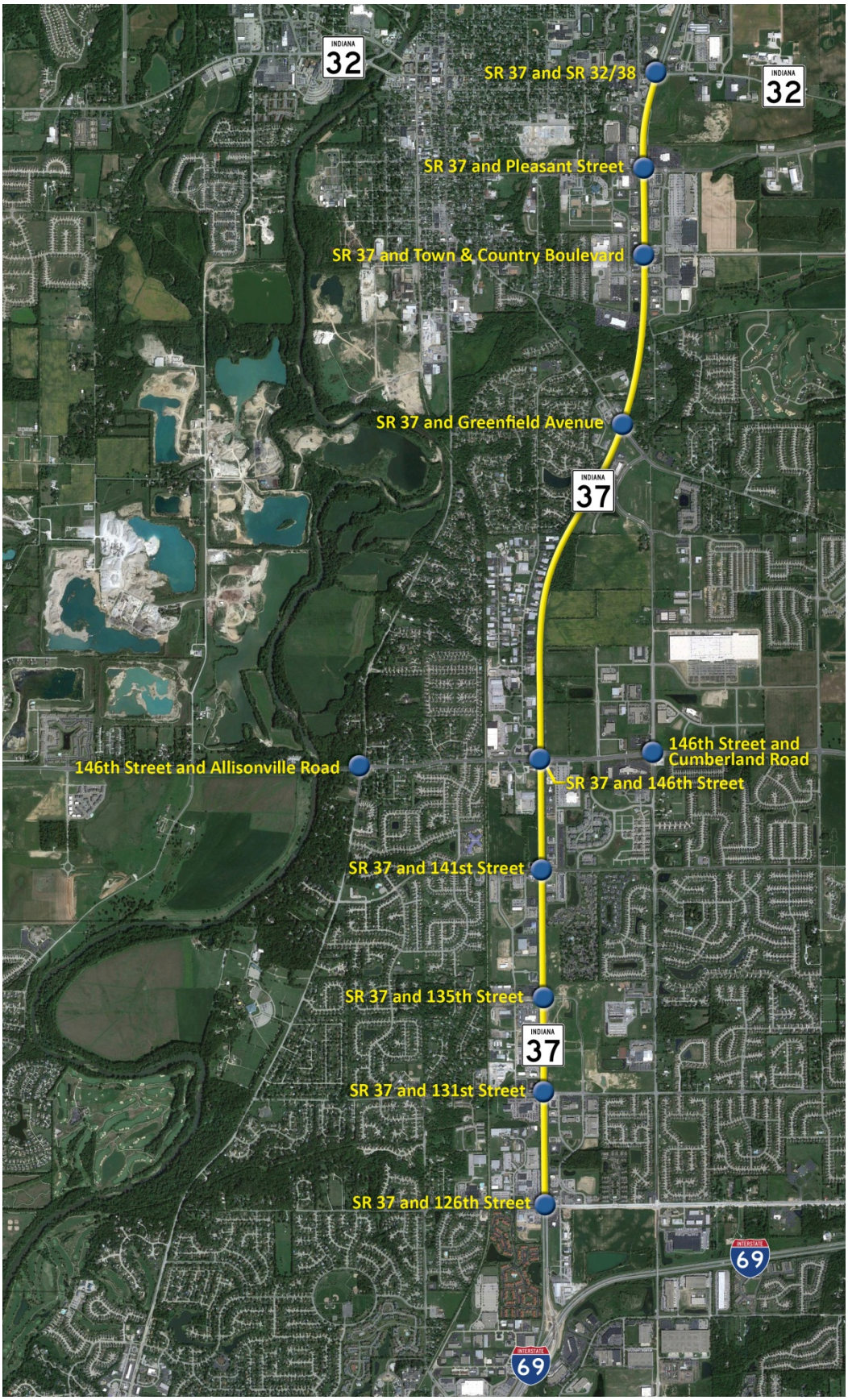
The subject corridors are located in south central Hamilton County in Delaware and Noblesville Townships, and in the Town of Fishers and the City of Noblesville. SR 37 runs south to north through Hamilton County; including the Study area. Additionally, SR 37 is intersected by I-69 immediately south of the Study area. SR 37 is designated as a state highway in central Indiana. Near the Study area, SR 37 begins at I-69 and proceeds in a northerly direction before terminating in the City of Marion, Grant County.

146th Street runs west to east through Hamilton County. 146th Street is classified as a Primary Arterial in the 2007 Hamilton County Thoroughfare Plan. A Primary Arterial is defined in the 2007 Thoroughfare Plan as a roadway that serves large traffic volumes, generally longer distances, and cross county connections. A Primary Arterial carries the majority of the commuter traffic into and out of the county and the adjacent land uses are usually quite dense. Mobility of through traffic, rather than access to adjoining land uses, is the main focus of the roadway. Table 1 shows the existing roadway system within the Study area:

Table 1 – Existing Roadway System

Facility	Traffic Control	Travel Lanes	Functional Classification	Speed Limit (MPH)
SR 37	-	4	Expressway	55
126th Street	Signal	2	Secondary Arterial	35
131st Street	Signal	2	Collector	35
135th Street (Under Construction)	Signal	2	-	-
141st Street	Signal	2	Secondary Arterial	35
146th Street	Signal	4	Primary Arterial	45
Greenfield Avenue	Signal	2	Primary Arterial	35 (West of SR 37) 40 (East of SR 37)
Town and Country Boulevard	Signal	2	Collector	35
Pleasant Street	Signal	2 (West of SR 37) 4 (East of SR 37)	Collector	35
Cherry Street	One-Way Stop	1	Collector	N/A
SR 32 / SR 38	Signal	4	Primary Arterial	35 (West of SR 37) 45 (East of SR 37)
Allisonville Road	Signal	4	Primary Arterial	35
Cumberland Road	Signal	4	Secondary Arterial	40

The following map shows the project area along the SR 37 and 146th Street corridors:


INDIANA 32
SR 37 and SR 32/38
INDIANA 32
SR 37 and Pleasant Street
SR 37 and Town & Country Boulevard
SR 37 and Greenfield Avenue
INDIANA 37
146th Street and Cumberland Road
146th Street and Allisonville Road
SR 37 and 146th Street
SR 37 and 141st Street
SR 37 and 135th Street
INDIANA 37
SR 37 and 131st Street
SR 37 and 126th Street
INTERSTATE 69
INTERSTATE 69

IV. EVALUATED BUILD ALTERNATIVES

The Study evaluated two primary build alternatives: upgrading the existing SR 37 corridor with either teardrop roundabout interchanges (Alternative 1) or tight diamond interchanges (Alternative 2). Both alternatives will significantly improve traffic operations at the Study intersections.

V. TRAFFIC OPERATION ANALYSIS

A Traffic Operation Analysis was conducted for the Study area. The purpose of the Traffic Operation Analysis (TOA) was to evaluate traffic operations at the Study intersections along the SR 37 and 146th Street corridors. The TOA focused on performing capacity analysis and providing recommendations for the proposed intersection lane configurations. Table 2 shows a summary of existing (2010) capacity analysis for the intersections within the Study area:

Table 2 – Existing (2010) Capacity Analysis

Intersection	Traffic Control	Peak	West Leg		East Leg		South Leg		North Leg		Overall	
			LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
SR 37 and 126th Street	Signal	AM	D	50.6	E	55.4	C	34.7	C	23.2	D	35.5
		PM	F	114.1	F	112.4	E	60.6	C	21.5	E	62.5
SR 37 and 131st Street	Signal	AM	D	44.1	D	54.4	B	12.5	B	16.4	C	22.9
		PM	E	70.2	D	36.5	E	55.7	C	24.0	D	44.9
SR 37 and 135th Street	--	AM	--	--	--	--	--	--	--	--	--	--
		PM	--	--	--	--	--	--	--	--	--	--
SR 37 and 141st Street	Signal	AM	D	48.1	D	44.0	A	5.4	A	8.5	B	15.5
		PM	F	138.7	F	115.5	D	49.2	D	50.1	E	65.3
SR 37 and 146th Street	Signal	AM	D	37.4	E	59.2	D	37.4	D	37.7	D	42.3
		PM	D	37.1	D	41.1	B	11.1	B	14.2	C	24.3
SR 37 and Greenfield Avenue	Signal	AM	D	43.3	D	35.1	C	29.5	B	15.6	C	26.0
		PM	F	85.0	E	57.9	D	44.5	C	28.8	D	47.3
SR 37 and Town & Country Blvd	Signal	AM	C	26.6	D	49.4	B	14.5	A	5.9	B	11.0
		PM	D	37.7	E	64.5	B	15.4	B	16.3	C	24.0
SR 37 and Pleasant Street	Signal	AM	C	31.6	C	26.6	A	7.2	B	10.1	B	11.1
		PM	F	160.4	F	92.1	D	52.5	D	43.4	E	69.2
SR 37 and Cherry Street	One-Way Stop	AM	C	19.1	--	--	--	--	--	--	--	--
		PM	C	19.2	--	--	--	--	--	--	--	--
SR 37 and SR 32 / SR 38	Signal	AM	D	39.1	D	39.9	D	43.7	D	39.5	D	40.5
		PM	D	43.1	D	42.0	C	22.6	D	43.7	C	33.5
146th Street and Allisonville Road	Signal	AM	C	26.7	B	18.4	D	47.1	D	48.6	C	29.7
		PM	C	28.8	C	23.4	D	38.7	D	44.1	C	31.1
146th Street and Cumberland Road	Signal	AM	B	19.4	C	21.3	C	35.3	D	39.2	C	24.4
		PM	B	16.0	C	26.6	D	39.0	D	40.3	C	24.6

Based on the analysis performed in the TOA, it was demonstrated that some Study intersections are currently operating at an unacceptable LOS, and if no improvements are made, all of the Study intersections along SR 37 will be operating at an unacceptable LOS in the year 2036. The SR 37 Mobility Study has proposed a plan to upgrade the existing SR 37 corridor with either teardrop roundabout interchanges (Alternative 1) or tight diamond interchanges (Alternative 2).

Summary of Findings and Recommendations

1. For Alternative 1, based on the RODEL analysis, all Study intersections will be operating at an acceptable LOS in year 2036 with the proposed intersection lane configurations.
   a. There are a total of five triple-lane approaches at four proposed roundabouts based on the year 2036 traffic volumes. During the design stage of this project, it is recommended to further evaluate the possibility of operating these roundabouts with less travel lanes in the opening year with future expandability to maximize the roundabouts' safety benefits.

2. For Alternative 2, all Study intersections will be operating at an acceptable LOS in year 2036 with the proposed intersection lane configurations.
   a. Due to the scope of the Study, only the tight-diamond interchange configuration was analyzed for Alternative 2. Previous research has indicated that the single-point urban interchange (SPUI) can provide comparable traffic operations with the same traffic volumes. One unique benefit of the SPUI is that there is only one signalized intersection at the interchange, which makes it easier to coordinate with adjacent signalized intersections along the cross street.
   b. Although no formal signal warrant analysis has been performed, most of the proposed ramp intersections are expected to be signalized. During the design stage of this project, it is recommended to evaluate the need for traffic signals at the ramp intersections based on requirements documented in the Indiana MUTCD.

3. The abbreviated weaving analysis indicates that at five locations along SR 37, collector-distributor lanes will be required to interconnect adjacent interchanges, thus eliminating any weaving operations that are expected to fail in year 2036.

4. The construction of the new intersection at SR 37 and 135th Street will likely be driven by the development/redevelopment east and west of SR 37. Due to the nature of the development plans, the traffic impact study reports reviewed in this Study may have become outdated. It is recommended to continue to coordinate with the developers for the latest site plans to assure no significant changes have occurred that would affect the design of this interchange.

After consultation with the project Stakeholder group, Alternative 1 was selected as the recommended option. Table 3 shows the summary of the capacity analysis for Alternative 1 with identified improvements discussed later:

Table 3 – Alternative 1 (2036) Capacity Analysis												
Intersection	Traffic Control	Peak	West Leg		East Leg		South Leg		North Leg		Overall	
			LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
SR 37 NB Ramps and 126th Street	Roundabout	AM	A	2.4	A	4.2	A	2.4	--	--	A	3.3
		PM	A	3.0	A	3.6	A	3.6	--	--	A	3.3
SR 37 SB Ramps and 126th Street	Roundabout	AM	A	3.0	A	3.0	--	--	A	3.6	A	3.3
		PM	A	3.6	A	3.0	--	--	A	3.0	A	3.2
SR 37 NB Ramps and 131st Street	Roundabout	AM	A	1.8	A	3.0	A	2.4	--	--	A	2.5
		PM	A	2.4	A	3.0	A	3.6	--	--	A	2.8
SR 37 SB Ramps and 131st Street	Roundabout	AM	A	2.4	A	2.4	--	--	A	3.0	A	2.7
		PM	A	3.0	A	1.8	--	--	A	2.4	A	2.6
SR 37 NB Ramps and 135th Street	Roundabout	AM	A	3.6	A	4.8	A	3.6	--	--	A	4.2
		PM	A	5.4	A	4.8	A	5.4	--	--	A	5
SR 37 SB Ramps and 135th Street	Roundabout	AM	A	4.2	A	4.2	--	--	A	4.8	A	4.3
		PM	A	6.6	A	4.2	--	--	A	4.8	A	5.4
SR 37 NB Ramps and 141st Street	Roundabout	AM	A	3.6	A	2.4	A	1.8	--	--	A	2.6
		PM	A	6.6	A	2.4	A	3.0	--	--	A	4.1
SR 37 SB Ramps and 141st Street	Roundabout	AM	A	2.4	A	8.4	--	--	A	2.4	A	5.7
		PM	A	3.0	B	10.2	--	--	A	3.0	A	6.3
SR 37 NB Ramps and 146th Street	Roundabout	AM	A	2.4	D	25.2	A	2.4	--	--	B	12.3
		PM	B	7.8	B	11.4	A	4.2	--	--	A	8.4
SR 37 SB Ramps and 146th Street	Roundabout	AM	A	1.8	C	16.8	--	--	C	21.0	B	13.1
		PM	A	3.6	A	4.2	--	--	A	4.8	A	4.0
SR 37 NB Ramps and Greenfield Avenue	Roundabout	AM	A	2.4	A	3.6	A	2.4	--	--	A	3.0
		PM	A	3.0	A	4.2	A	3.0	--	--	A	3.5
SR 37 SB Ramps and Greenfield Avenue	Roundabout	AM	A	3.0	A	2.4	--	--	A	3.0	A	2.7
		PM	A	3.6	A	1.8	--	--	A	3.0	A	3.0
SR 37 NB Ramps and Town & Country Blvd	Roundabout	AM	A	1.8	A	1.8	A	1.8	--	--	A	1.8
		PM	A	2.4	A	3.0	A	4.2	--	--	A	3.2
SR 37 SB Ramps and Town & Country Blvd	Roundabout	AM	A	1.8	A	1.8	--	--	A	2.4	A	2.0
		PM	A	8.4	A	2.4	--	--	A	6.0	A	5.8
SR 37 NB Ramps and Pleasant Street	Roundabout	AM	A	1.8	A	1.8	A	1.8	--	--	A	1.8
		PM	A	2.4	A	3.6	A	2.4	--	--	A	3.0
SR 37 SB Ramps and Pleasant Street	Roundabout	AM	A	1.8	A	1.8	--	--	A	1.8	A	1.9
		PM	A	3.6	A	2.4	--	--	A	3.0	A	2.9
SR 37 and Cherry Street	One-Way Stop	AM	B	11.2	--	--	--	--	--	--	--	--
		PM	C	17.8	--	--	--	--	--	--	--	--
SR 37 NB Ramps and SR 32	Roundabout	AM	A	1.8	A	2.4	A	1.8	--	--	A	2.1
		PM	A	2.4	A	4.2	A	9.0	--	--	A	6.6
SR 37 SB Ramps and SR 32	Roundabout	AM	A	2.4	A	5.4	--	--	A	8.4	A	5.1
		PM	A	3.0	A	4.2	--	--	A	6.6	A	4.1
146th Street EB Ramps and Allisonville Road	Roundabout	AM	A	3.0	--	--	A	2.4	A	2.4	A	2.7
		PM	A	4.2	--	--	A	9.0	A	2.4	A	5.9
46th Street WB Ramps and Allisonville Road	Roundabout	AM	--	--	A	3.0	A	2.4	A	4.8	A	3.4
		PM	--	--	A	4.2	A	4.2	A	3.0	A	4.0
146th Street and Cumberland Road	Signal	AM	C	32.3	C	32.8	C	33.3	C	28.5	C	32.2
		PM	C	34.5	C	34.4	D	50.5	D	54.8	D	39.1

Please see the complete Traffic Operation Analysis (binder labeled Traffic Operation Analysis) to review the specific results at each intersection.

VI. STAKEHOLDER COMMUNICATION

Throughout the Study process periodic meetings were conducted with a project Stakeholder group. This group was comprised of technical transportation representatives of the MPO, INDOT, Hamilton County, the Town of Fishers, and City of Noblesville. The following paragraphs briefly describe the intent and general results reached at each of the Stakeholder meetings.

A project kick-off stakeholder meeting was conducted on November 23, 2010 at 2:00 p.m. at the offices of the Hamilton County Highway Department. The purpose of the meeting was to initiate the Study.

A second project stakeholder meeting was conducted on June 10, 2011 at 9:30 a.m. at the offices of the Hamilton County Highway Department. The objective of the meeting was to provide an update on the development of the Study and to reach consensus from the Stakeholder group regarding the concept of utilization of collector-distributor (C-D)/Frontage Roads at interchanges. After discussion, the Stakeholder group concurred with the recommendation to analyze the use of C-D/Frontage Roads at the Study intersections/interchanges.

A third project stakeholder meeting was held on Wednesday, December 14, 2011 at 3:00 p.m. at the offices of the Hamilton County Highway Department. The objective of the meeting was to provide an update on the development of the Study and to reach consensus from the group regarding the preferred design solution to carry forward for additional evaluation. A PowerPoint presentation was shown that highlighted results from the draft Traffic Operation Analysis. The primary result from the meeting was the conclusion to continue further investigation of the tear drop build alternative.

A fourth project stakeholder meeting was held on Wednesday, October 10, 2012 at 9:30 a.m. at the offices of the Hamilton County Highway Department. The objective of the meeting was to conclude the stakeholder participation process for the SR 37 Mobility Study. The primary result was a discussion relative to the final design solution. This included an overview of the decisions made relative to over/under SR 37 and intersecting streets and the coordination involved with local Stakeholders.

In addition to the project Stakeholder meetings, numerous meetings were conducted during the Study process with local elected officials from each jurisdiction to keep them abreast of project developments.

VII. GEOTECHNICAL EVALUATION

The Study corridor is located in a glaciated area. With the exception of the area near Stony Creek, the alignment is within a typical Central Indiana profile that consists of softer and moderate-plasticity clays overlying hard and low-plasticity clays, and bedrock is over 100 feet deep. The harder clays are usually within 20 feet of the surface. In addition, frequent seams and layers of granular soils can be encountered. This profile typically includes seasonal perched groundwater conditions within a few feet of the surface. From a design and construction perspective, CBR values are commonly in the range of 3 to 4, and subsurface drainage is typically required for pavement and below-grade structures (e.g., cut walls). Because of the perched groundwater and the clayey soils, improvement of the subgrade for support of pavement and construction activities is usually required, particularly in areas of cut. Support of bridges on driven piling and/or spread foundations is anticipated to be viable. In addition, support of MSE walls in these conditions typically includes preparation of the subgrade for the leveling pad and structure fill.

Cut walls over about 12 feet in height are anticipated to required tie-backs in order to control deflections, and the length of tie-backs is typically in the range of 25 to 50 ft.

A Geotechnical Evaluation will be required to evaluate the subsurface conditions and to provide the necessary information for a pavement design. This will include soil borings and a formal Geotechnical Report with recommendations that will be approved by INDOT.

VIII. ENVIRONMENTAL INVESTIGATION

Construction of the proposed improvements will require the completion of an environmental document to qualify for Federal funding. A Categorical Exclusion as falling within the guidelines of the National List of Categorical Exclusions will be required for this project. The Categorical Exclusion will need to be prepared in a manner consistent with the latest version of the "Indiana Categorical Exclusion Manual". The paragraphs below highlight the key environmental issues associated with the proposed project.

The paragraphs below highlight the key environmental issues associated with the Alternative 1 (teardrop roundabouts) for the Study intersections along SR 37 and 146th Street.

Waters of the U.S. Impacts

The National Wetland Inventory Map identifies a potential forested wetland site adjacent to the project corridor approximately 2,300 feet north of Greenfield Avenue. A "Waters of the U.S." report (wetland determination/delineation) will be required to confirm and identify wetland boundaries throughout the corridor. Wetland impacts greater than 0.10 acre will require compensatory mitigation. Any mitigation efforts should be coordinated with the U.S. Army Corps of Engineers and Indiana Department of Environmental Management.

Four potential stream crossings have been identified along the SR 37 Study corridor. A "Waters of the U.S." report (wetland determination/delineation) will be required to officially determine the boundaries and locations of all jurisdictional ditches, streams, or other watercourses within the project limits. It is likely that Alternative 1 (teardrop roundabouts) will impact the following five streams:

1. Britton Branch
2. Unnamed Tributary to Britton Branch
3. Stony Creek
4. Unnamed Tributary to Stony Creek

Historic and Cultural Resources

The Hamilton County Interim Report was reviewed for the proposed corridor. The Interim Report shows no historic properties adjacent to the Study limits. However, properties may have become 50 years of age since the publication of the Interim Report.

Alternative 1 (teardrop roundabouts) would result in the acquisition of undisturbed right-of-way. As a result, an Archaeological Records Review and Phase Ia Archaeological Survey will be required to identify potentially significant cultural resources within the proposed project limits.

At a minimum, the preferred alternative will require the completion of the following Section 106 documents: Phase Ia Archaeological Survey, Historic Properties Report and a Section 106 Findings and Determinations (36 CFR 800.11) in order to be eligible for Federal funding.

Hazardous Materials

A search of the red flag indicators revealed several potential hazardous waste sites within ½ mile of the project corridor. A Phase I Initial Site Assessment will be required to fully identify potential hazardous waste sites and to determine if a Phase II Preliminary Site Investigation is required.

Air Quality Analysis

A conformity determination is required prior to approval of any NEPA decision for projects in non-attainment and maintenance areas. Hamilton County is currently considered non-attainment for Ozone (O_3) and PM2.5. For projects in Metropolitan Planning Organization (MPO) areas, including this project, the project's design, concept, and scope will be confirmed that it is accurately reflected in the current Long Range Transportation Plan (TP) and Transportation Improvement Program (TIP) and both have been found to conform to the Indiana State Transportation Implementation Program (INSTIP).

Hot spot analyses are required for projects of air quality concern that are located in carbon monoxide (CO) or particulate matter ($PM_{2.5}$ or PM_{10}) non-attainment or maintenance areas. The proposed project is not located in a carbon monoxide (CO) non-attainment or maintenance area. The proposed project is located in a particulate matter non-attainment area.

Noise Analysis

Because the reconstruction of SR 37 as Alternative 1 (teardrop roundabouts) is an activity which is classified as a Type I project by the FHWA and INDOT, a noise analysis will be required. The noise analysis should be conducted in accordance with INDOT's Traffic Noise Policy effective July 2011. The traffic noise analysis will determine if noise abatement is required for this project.

Regulatory Permits

The proposed improvements, as Alternative 1 (teardrop roundabouts), will require obtaining the following permits from Federal and State regulatory agencies.

IDEM Section 401 Water Quality Certification: The proposed improvements will require Section 401 Water Quality Certification from the Indiana Department of Environmental Management.

US Army Corps of Engineers Section 404 Permit: The proposed improvements will require a Section 404 permit from the Louisville District, U.S Army Corps of Engineers.

IDEM Rule 5 Permit: Since the proposed improvements will disturb greater than one acre, Rule 5 administered through the Indiana Department of Environmental Management will apply to this project. The designer shall coordinate all erosion and sediment control measures with the Hamilton County Soil and Water Conservation District.

IDNR Construction in Floodway Permit: Formal approval from the Indiana Department of Natural Resources (IDNR) - Division of Water for Construction in a Floodway will be required for Alternative 1 (teardrop roundabouts) at the following locations:

a. Britton Branch

c. Stony Creek

d. Unnamed Tributary to Stony Creek

IX. DRAINAGE

Each of the nine SR 37 intersections have similar existing drainage patterns; therefore, the proposed will be handled very similarly. The existing drainage on each cross street is conveyed by sheet draining the pavement to the outside grass utility strip. This sheet flow is drained by small swales into the ditches on SR 37. On mainline SR 37, the existing drainage is conveyed by an open grass median and outside ditches flowing north or south to an existing stream within ¼ mile of the intersection.

The proposed drainage on each cross street will utilize an enclosed storm sewer system consisting of curb and gutter inlets spaced appropriately which will connect to manholes. These manholes will then convey the water to an outside ditch along SR 37 where there is positive drainage from the ditch to the existing outlet stream within ¼ mile of the intersection. The drainage on SR 37 will be handled similarly. Inlets will be spaced along both sides of the median barrier as well as on the outsides against the walls. The inlets that are within the limits of the depressed profile will be conveyed by manholes to a lift station placed at the low point of the profile. This lift station will pump the storm water to a high point of the profile, which is typically within 1,000 feet from the intersection and outlet into the ditch along SR 37 and maintain positive drainage to the existing outlet stream.

X. UTILITY COORDINATION

A site visit was conducted to identify existing utilities along the Study corridor. Based on observations of above ground facilities (i.e., manholes, valve boxes, pedestals, utility markers), we identified likely underground facilities. If more accurate information is required, “Holey Moley” or the individual utilities can be contacted.

A variety of utilities (electric, gas, water, telecommunications, and sanitary) cross over and under the intersections within the project limits. Most of the impacted utilities are along the east-west county streets, but a few run along SR 37 outside the existing limited access right-of-way.

The proposed plan is to raise the east – west local roads over SR 37, while lowering SR 37. This approach tries to balance the cut and fill required. Underground utilities along these east-west local roads can either relocate lower (under SR 37) or attach their facilities to the bridge. Overhead utilities along these east-west roads can remain if they do not conflict with the bridge, offset their facilities north or south of the bridge, or relocate underground. Service connections will also need to be adjusted.

At the Allisonville Road and 146th Street intersection, the proposed plan is to raise Allisonville Road over 146th Street, while lowering 146th Street. The existing utilities along Allisonville Road will be impacted in the same manner as the east-west local roads along SR 37. The possible relocation for overhead and underground utilities is the same as described above. The lowering of 146th Street will also impact the existing utilities within its right-of-way. Underground utilities along 146th Street can lower their facilities to maintain their cover or offset their facilities outside the construction limits. Overhead facilities along 146th Street can raise their facilities to carry them over Allisonville Road, offset their facilities north or south of the Allisonville Road bridge and maintain their current height, or relocate underground and pass through the embankment. Service connections will also need to be adjusted.

Several sanitary sewers cross under SR 37. Lowering SR 37 will require the sanitary trunk line to be either lowered or offset around the lowered portion. Both options can reduce the amount of fall required in a gravity-based system. If the amount of fall is reduced enough, a lift station will be required.

If utilities in their own easement are required to relocate, relocations expenses are reimbursable. Typically, overhead electrical transmission lines are located in easements due to the additional height of the facility and the complexity of the service. Overhead electrical transmission facilities are located along 126th Street, Greenfield Avenue, and Pleasant Street. It is expected that this facility might be in an easement.

XI. PROPOSED IMPROVEMENTS (Summary)

Alternative 1 identified the following improvements for each of the Study intersections:

1. SR 37 and 126th Street: A teardrop roundabout interchange is proposed, with a four lane bridge crossing SR 37. We have determined that the construction cost for the scope described above will be approximately $ 21,649,596. For specific design details, please refer to Binder 1 (SR 37 and 126th Street).

2. SR 37 and 131st Street: A teardrop roundabout interchange is proposed, with a four lane bridge crossing SR 37. We have determined that the construction cost for the scope described above will be approximately $ 20,580,215. For specific design details, please refer to Binder 2 (SR 37 and 131st Street).

3. SR 37 and 135th Street: A teardrop roundabout interchange is proposed, with a two lane bridge crossing SR 37. We have determined that the construction cost for the scope described above will be approximately $ 21,019,406. For specific design details, please refer to Binder 3 (SR 37 and 135th Street).

4. SR 37 and 141st Street: A teardrop roundabout interchange is proposed, with a two lane bridge crossing SR 37. We have determined that the construction cost for the scope described above will be approximately $ 21,057,025. For specific design details, please refer to Binder 4 (SR 37 and 141st Street).

5. SR 37 and 146th Street: A teardrop roundabout interchange is proposed, with a four lane bridge crossing SR 37. There are two three-lane approaches due to the heavy turning movements. We have determined that the construction cost for the scope described above will be approximately $ 19,275,850. For specific design details, please refer to Binder 5 (SR 37 and 146th Street).

6. SR 37 and Greenfield Avenue: A teardrop roundabout interchange is proposed, with a four lane bridge crossing SR 37. We have determined that the construction cost for the scope described above will be approximately $ 24,886,132. For specific design details, please refer to Binder 6 (SR 37 and Greenfield Avenue).

7. SR 37 and Town and Country Boulevard: A teardrop roundabout interchange is proposed, with a four lane bridge crossing SR 37. We have determined that the construction cost for the scope described above will be approximately $ 25,933,795. For specific design details, please refer to Binder 7 (SR 37 and Town and Country Boulevard).

8. SR 37 and Pleasant Street: A teardrop roundabout interchange is proposed, with a four lane bridge crossing SR 37. We have determined that the construction cost for the scope described above will be approximately $ 25,939,415. For specific design details, please refer to Binder 8 (SR 37 and Pleasant Street).

9. SR 37 and SR 32 / SR 38: A teardrop roundabout interchange is proposed, with a four lane bridge crossing SR 37. There are three triple-lane approaches due to heavy turning movements. We have determined that the construction cost for the scope described above will be approximately $ 27,725,110. For specific design details, please refer to Binder 9 (SR 37 and SR 32 / SR 38).

10. 146th Street and Allisonville Road: A teardrop roundabout interchange is proposed, with a four lane bridge crossing 146th Street. We have determined that the construction cost for the scope described above will be approximately $ 21,856,942. For specific design details, please refer to Binder 10 (146th Street and Allisonville Road).

11. 146th Street and Cumberland Road: No improvement is necessary. The existing at-grade signalized intersection will remain unchanged.

XII. MAINTENANCE OF TRAFFIC

There will be subtle differences in the Maintenance of Traffic (MOT) plan for each interchange as the access needs to and from each cross street is different. However, the basic MOT plan will likely be the same for each interchange. The following is a logical basic MOT plan for the construction of any interchange:

Phase 1 – The southbound SR 37 travel lanes will be widened to the inside with temporary widening. Temporary cross-overs will be constructed in the median to the north and south of the interchange.

Phase 2 – All SR 37 traffic will run on the southbound side with two travel lanes in each direction. The southbound travel lanes will be shifted west to run on the existing outside shoulder. The northbound traffic will be switched over to the southbound side to run on the temporary widening constructed in phase 1.

The northbound half of mainline SR 37 will be constructed. A temporary cut wall will be constructed "top down" between the existing southbound lanes and the proposed northbound lanes through the interchange area where SR 37 will be depressed.

The northbound exit and entrance ramps will be constructed up to the proposed roundabout. A temporary connection will be constructed across the proposed roundabout area connecting the top of the northbound exit ramp and the top of the northbound entrance ramp.

The east end bent for the proposed bridge will also be constructed in this phase.

The east segment of the cross-street will be closed, with no access to SR 37. The east segment of cross-street and roundabout approaches will be constructed.

The west segment of the cross-street will maintain access to SR 37. This could be set up as right-in/right-out access to and from the cross-street with SR 37 traffic remaining free-flow through the intersection. Alternatively, a temporary signal could be utilized to allow the west cross-street protected access to and from both directions of SR 37.

Phase 3 – All SR 37 traffic will run on the proposed northbound lanes and shoulders constructed in phase 2, with two lanes in each direction. The southbound lanes will be switched over to the northbound side to run on the proposed northbound lanes constructed in phase 2. The northbound lanes will run up the proposed northbound exit ramp, across the temporary connection, and back down the proposed northbound entrance ramp all constructed in phase 2.

The southbound half of mainline SR 37 will be constructed, as well as the west segment of the cross-street and the west roundabout. Both sides of the cross-street will have no access to or from SR 37 in this phase. However, temporary connections could be constructed on the east side between the portion of the east cross-street segment constructed in phase 2 and the

northbound SR 37 travel lanes. If desired, this could be done to keep access to and from northbound SR 37 and the east side of the cross-street in this phase.

XIII. LAND ACQUISITION

It is anticipated that over 200 parcels would be impacted by the construction of the Alternative 1 (teardrop roundabouts) improvements discussed herein. Total permanent right of way acquisition required for construction of these improvements would be approximately 34 acres.

Because the project would likely utilize Federal Aid, future land acquisition would need to adhere to the *Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs Act*. This process includes title research, right-of-way engineering, appraisal problem analysis (APA), an appraisal, a review appraisal, and negotiations/buying with the property owner.

All existing right-of-way would be verified during the land acquisition process, which may reveal the need for additional parcels. If recorded documents do not exist, it may be necessary to reacquire portions of the apparent existing right-of-way, which could also increase the anticipated number of parcels and costs affiliated with those additional parcels.

XIV. PROJECT PRIORITIES

Table 4 below indicates the priority for construction of the proposed improvements. The ranking as shown generally flows south to north but can be revised without affecting the integrity of constructing methodologies:

Table 4 – Construction Priorities

Priority Rank	Binder Number	Intersection
1.	5	SR 37 at 146th Street
2.	10	146th Street at Allisonville Road
3.	1	SR 37 at 126th Street
4.	2	SR 37 at 131st Street
5.	3	SR 37 at 135th Street
6.	4	SR 37 at 141st Street
7.	6	SR 37 at Greenfield Avenue
8.	7	SR 37 at Town and Country Boulevard
9.	8	SR 37 at Pleasant Street
10.	9	SR 37 at SR 32 / SR 38

XV. PROJECT BUDGET

A detailed Project Development Cost Estimate has been included herein to highlight the breakdown of individual design costs and all construction activities. The construction cost was developed based on current cost information with 10% contingency and inflated for construction in years 2018 thru 2027.