

Pedestrian and Bicycle Facilities Study Milton, KY



December 2012



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Milton Pedestrian and Bicycle Facilities Study

The Milton Pedestrian and Bicycle Facilities Study was a mitigation commitment in the 2010 Environmental Assessment/Finding of No Significant Impact documents developed during the preliminary engineering and environmental phase of the US 421 Milton-Madison bridge replacement project. The existing US 421 bridge does not provide accommodations for pedestrians and bicycles. The proposed new bridge between Milton, Kentucky, and Madison, Indiana, will provide accommodations for pedestrians and bicycles, but there are currently limited or non-existent pedestrian and bicycle facilities on the Milton, Kentucky side of the river that could offer connection to the new US421 structure. This report will evaluate the existing conditions and develop a master plan for improving the pedestrian/bicycle connectivity between the new rehabilitated US 421 Milton-Madison Bridge, the Lower Milton Commercial District, KY 36 and the Milton City Park. This will allow the City of Milton to apply for future federal and state funding for completion of any or all of the identified bicycle and pedestrian improvements herein.

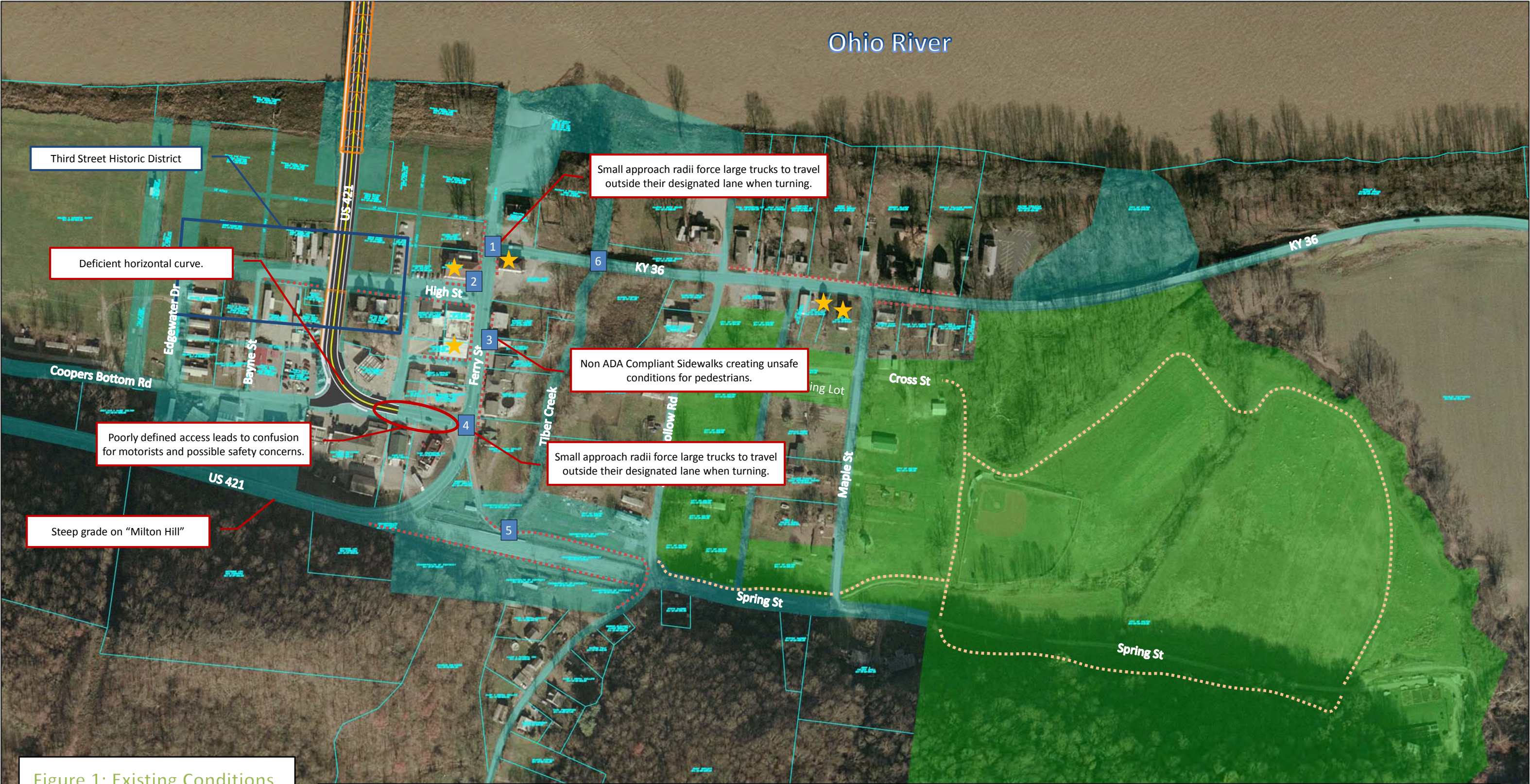
1. Existing Conditions

The existing pedestrian and bicycle infrastructure in the Lower Milton Commercial District is limited in connectivity and has considerable physical degradation. **Figure 1** shows the existing conditions of the study area. The new US 421 Bridge will have two eight foot shoulders that will be able to accommodate bicycles and a five-foot wide sidewalk for pedestrians that will be cantilevered on the downstream side of the truss. Other planned pedestrian and bicycle facilities projects in Milton include a three-phase bicycle trail circling the city that begins and ends in the Milton City Park. Phase 1 has been constructed, which incorporates a paved trail through the Milton City Park.

After meeting with community leaders the project team determined the primary goal of this study should be to link three points of interest within Lower Milton; Milton City Park, Lower Milton Commercial District and the Milton Madison Bridge with safe bicycle and pedestrian facilities. This will provide an important connection between the economic and recreational centers in lower Milton and Madison, IN.

Linking the Milton City Park, Lower Milton Commercial District, and the Milton Madison Bridge will require users to cross two major obstacles; Tiber Creek and US 421/Ferry Street, which are highlighted in **Figure 2**. Crossing existing Ferry Street and US 421 can be hazardous for pedestrians and bicycles because there are bad sightlines, uncontrolled intersections, and a significant amount of vehicle traffic. Tiber Creek has only one existing pedestrian and bicycle friendly crossing which is north of the US 421 truck runaway ramp. KY 36 is a two lane road with one to two foot shoulders and no accommodations for pedestrians and bicycles between Ferry Street and Milton City Park.

Ohio River



Third Street Historic District

Deficient horizontal curve.

Small approach radii force large trucks to travel outside their designated lane when turning.

Non ADA Compliant Sidewalks creating unsafe conditions for pedestrians.

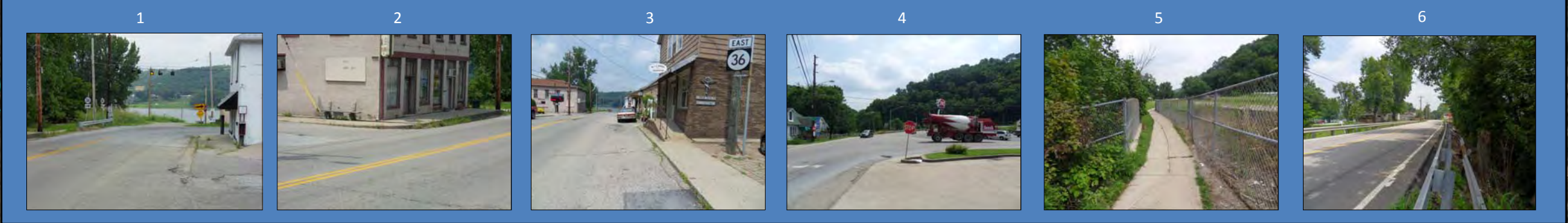
Poorly defined access leads to confusion for motorists and possible safety concerns.

Small approach radii force large trucks to travel outside their designated lane when turning.

Steep grade on "Milton Hill"

Figure 1: Existing Conditions

- Private Property
- City or State Owned Property
- Milton Park
- Existing Shared Use Path
- Existing Sidewalks
- Listed Historic Property



Ohio River

Ferry Street NB traffic does not stop creating an unsafe crossing condition for pedestrians and bicycles.

KY 36 is 25 ft wide when it crosses Tiber Creek. It crosses Tiber Creek over a box culvert. In order to get pedestrians and bicyclists over Tiber Creek at this location, KY 36 will need to be widened, realigned or a new shared use path bridge will have to be constructed.

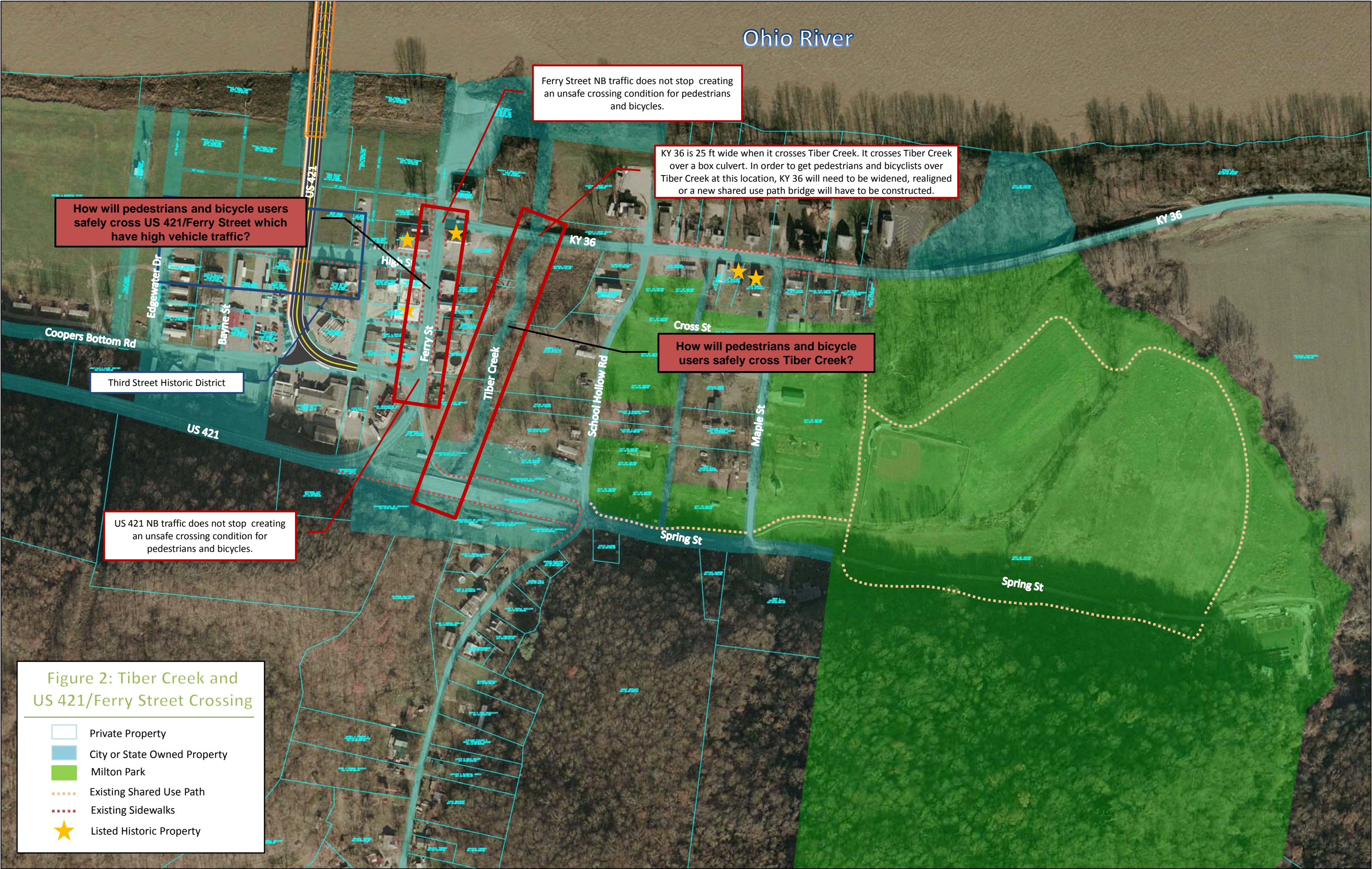
How will pedestrians and bicycle users safely cross US 421/Ferry Street which have high vehicle traffic?

How will pedestrians and bicycle users safely cross Tiber Creek?

US 421 NB traffic does not stop creating an unsafe crossing condition for pedestrians and bicycles.

Figure 2: Tiber Creek and US 421/Ferry Street Crossing

- Private Property
- City or State Owned Property
- Milton Park
- Existing Shared Use Path
- Existing Sidewalks
- Listed Historic Property



2. Alternative Development

The primary goal of this study is to link the Milton City Park, Lower Milton Commercial District, KY 36 and the new Milton Madison Bridge with safe bicycle and pedestrian facilities. This will provide an important connection between the economic and recreational centers in lower Milton and Madison, IN. Initial information was gathered from field visits, right-of-way maps, previous Milton Madison Bridge Reports, Local Government Officials, Kentucky Bicycle and Bikeway Commission, KYTC Pedestrian & Bicycle Travel Policy, U.S. Department of Transportation Manual on Uniform Traffic Control Devices, AASHTO Guide for Development of Bike Facilities, AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, and the Americans with Disabilities Act Accessible Guidelines. As a result, seven potential alternatives (including the Do Nothing alternative) were identified and analyzed during the initial screening process. The proposed routes take advantage of existing city or state owned property where ever possible.

Figure 3 show the six routes outside the Do Nothing Alternative identified during the alternative development process.

3. Screening of Route Alternatives

The six potential bicycle and pedestrian routes shown in **Figure 3** as well as the Do Nothing alternative went through a screening process to determine which routes most effectively meet the goals of the project. The purpose of this project is to provide a safe bicycle and pedestrian connection between the new US 421 Bridge, Lower Milton Commercial District, KY 36 and Milton City Park while maintaining vehicle safety and minimizing construction cost to the City of Milton. The results of the screening process are shown in **Table 1**.

3.1 Do Nothing Alternative

The existing pedestrian and bicycle infrastructure in the lower Milton commercial district is limited in connectivity and has considerable physical degradation. As a result the Do Nothing alternative does not meet the primary purpose of providing a safe bicycle and pedestrian connection between the new US 421 Bridge, Lower Milton Commercial District, and Milton City Park.

3.2 Routes Crossing Intersection at US 421 and Ferry Street

The existing three leg intersection at US 421/Ferry Street has a yield sign for southbound US 421 traffic and a stop sign for southbound Ferry Street traffic. Vehicles traveling northbound on US 421, coming down Milton hill have a free movement with no stop sign. This is a busy intersection with poorly defined access and limited sight distance. Based on the *Milton Madison Bridge Needs and Deficiencies Report from March 2009* this intersection is listed as a high crash spot. In order to provide a safe bicycle and pedestrian crossing at this intersection a stop sign would need to be added for northbound and southbound US 421 traffic (Routes 3 through 6). Based on the traffic analysis discussed below, the new stop sign would cause northbound traffic on US 421 to queue and block the runaway truck ramp. This creates a safety concern for cars and trucks coming down the steep grade at Milton hill at an already high crash spot.



Figure 3: Pedestrian & Bicycle Routes for Initial Screening

- Private Property
- City or State Owned Property
- Milton Park
- Existing Shared Use Path
- Proposed Pedestrian and Bicycle Routes using KY 36 crossing
- Proposed Pedestrian and Bicycle Routes using existing Tiber Creek pedestrian bridge

A traffic analysis was conducted at the US 421/Ferry Street intersection based on the 2012 Design Hour Volumes shown in the *2010 Milton Madison Bridge Design-Build Plans* and the turning percentages from the *Milton Madison Bridge Needs and Deficiencies Report from March 2009*. The results of this analysis are shown in **Table 2** for all the alternatives. The Ferry Street and southbound US 421 approach has a Level of Service F for the Do Nothing Alternative. If the intersection were converted to a three way stop (Routes 3 through 6) both US 421 approaches would have a Level of Service D and Ferry Street would have a Level of Service F. Based on this analysis the existing intersection has more demand than capacity. This will only get worse as traffic volumes grow from 10,700 vehicles crossing the bridge daily in 2008¹ to a projected 12,900 vehicles per day in 2030¹.

The combination of safety and capacity issues at the existing US 421/Ferry Street intersection indicate a need for roadway improvements. The steep grade of Milton Hill, the deficient curve coming off the Milton Madison Bridge, and the current access to the US 421 bridge being in the flood plain will likely require some realignment of Ferry Street (KY 36) and the US 421 bridge approach. Since it is unknown at this time what the roadway reconfiguration would look like, any improvements made at this intersection to accommodate pedestrians and bicycles could be replaced as part of the roadway reconfiguration/reconstruction.

3.3 Routes Crossing Intersection at Ferry Street and KY 36

The existing three leg intersection at Ferry Street/KY 36 has a stop sign for westbound KY 36 traffic and a stop sign for traffic leaving the Milton Boat Ramp. Vehicles traveling eastbound on Ferry Street have a free movement with no stop sign (note: this is the normal traffic operation prior to the 2012 bridge construction detour). This is a busy intersection with small approach radii and limited sight distance for vehicles traveling eastbound on Ferry Street. In order to provide a safe bicycle and pedestrian crossing at this intersection a stop sign would need to be added for eastbound Ferry Street traffic (Routes 1 through 3). A traffic analysis was conducted at this intersection based on the 2012 Design Hour Volumes shown in the *2010 Milton Madison Bridge Design-Build Plans* and the turning percents from the *Milton Madison Bridge Needs and Deficiencies Report from March 2009*. The results of this analysis are shown in **Table 2** for all the alternatives. Based on the analysis the intersection functions adequately under all alternatives. Although the intersection functions adequately from a traffic engineering standpoint, the small approach radii force large trucks to travel outside their designated lane when turning. As a result the intersection will likely need to be expanded to address the deficient turning radii for trucks.

3.4 Initial Screening Summary

As shown in **Table 1**, Route 1 and Route 2 meet the primary purpose and need of the project. Route 2 requires an additional bicycle crossing at the Ferry Street/High Street intersection. The high traffic volume does have the potential to reduce bicycle safety at this crossing but there are adequate sight lines so it would not necessarily have to be converted to a three way stop. Route 1 takes an alternative route along the riverfront which removes the Ferry Street/High Street crossing. The riverfront view could attract users.

Routes 3, 4, 5, and 6 use the US 421/Ferry Street intersection and as a result of the analysis discussed in **Section 3.2** they do not meet the project's primary purpose to provide a safe bicycle and pedestrian connection between the new US 421 Bridge, Lower Milton Commercial District, and Milton City Park while maintaining vehicle safety.

Table 1: Screening of Route Alternatives against Purpose and Need

PEDESTRIAN & BICYCLE IMPROVEMENT ROUTE	Do Nothing	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6
Does the route link the new US 421 Bridge, Lower Milton Commercial District, and Milton City Park?	No	Yes	Yes	Yes	Yes	Yes	Yes
Will the route attract pedestrian and bicycle users to Milton as well as provide better access to jobs, health services, and retail stores?	No	Yes	Yes	Yes	Yes	Yes	Yes
Does the route provide a connection to the proposed three-phase bicycle trail circling the city that begins and ends in the Milton City Park?	No	Yes	Yes	Yes	Yes	Yes	Yes
Does the route provide safe pedestrian and bicycle crossings along US 421 and Ferry Street?	No	Yes	Yes	No	No	No	No
Does the route maintain motorized vehicle safety?	Yes	Yes	Yes	No	No	No	No
Does the route have an acceptable Level of Service for motorized vehicles?	No	Yes	Yes	No	No	No	No
Can the route be constructed in useful phases as funding and private property are allocated or made available?	N/A	Yes	Yes	Yes	Yes	Yes	Yes
Is a majority of the construction cost eligible for State and Federal grants and/or funding?	N/A	Yes	Yes	Yes	Yes	Yes	Yes
Does this route meet the Purpose and Need of the project?	No	Yes	Yes	No	No	No	No

Table 2: Level of Service Analysis for Motorized Vehicles

Routes	US 421 at Ferry Street			Ferry Street at KY 36		
	NB US 421	Ferry Street	SB US 421	Ferry Street	Boat Ramp Entrance	WB KY 36
No Build						
Delay	Free Movement	150.7	Err**	Free Movement	10	17.3
LOS		F	F		A	C
Queue (veh)		23	Err**		0	4
Route 1						
Delay	Free Movement	150.7	Err**	16.5	9.3	11
LOS		F	F	C	A	B
Queue (veh)		23	Err**	5	1	2
Route 2						
Delay	Free Movement	150.7	Err**	16.5	9.3	11
LOS		F	F	C	A	B
Queue (veh)		23	Err**	5	1	2
Route 3						
Delay	34.1	29.7	Err**	16.5	9.3	11
LOS	D	D	F	C	A	B
Queue (veh)	13	12	Err**	5	1	2
Route 4						
Delay	34.1	29.7	Err**	Free Movement	10	17.3
LOS	D	D	F		A	C
Queue (veh)	13	12	Err**		0	4
Route 5						
Delay	34.1	29.7	Err**	Free Movement	10	17.3
LOS	D	D	F		A	C
Queue (veh)	13	12	Err**		0	4
Route 6						
Delay	34.1	29.7	Err**	16.5	9.3	11
LOS	D	D	F	C	A	B
Queue (veh)	13	12	Err**	5	1	2

* Analysis based on HCM 2010 Methodology

Queue Length per Vehicle = 25 feet

** Delay & Queue above acceptable thresholds and cannot be accurately calculated using HCM 2010 Methodology.

4. Recommended Alternative

Based on traffic engineering factors, early input from the local officials and the initial screening process, Route 1 was identified for detailed development as the recommended alternative. This alternative provides the safest and most cost effective bicycle and pedestrian route between the Milton City Park, Lower Milton Commercial District, KY 36, and the new Milton Madison Bridge. During the development process of the recommended alternative right-of-way constraints, design, historic properties, intersection safety, ADA requirements and cost were looked at in more detail.

As shown in **Figure 1**, Route 1 begins at the Milton Madison Bridge and proceeds along US 421 until turning west on Coopers Bottom Road. It then passes through intersections at Bayne Street and Edgewater Drive before turning north towards the Ohio River. It then travels along the riverfront towards KY 36 and the Milton Boat Ramp. It then passes through the intersection at Ferry Street and KY 36 and continues along KY 36 until turning south on School Hollow Road connecting to the existing shared use path and parking lot at the Milton City Park.

Two major obstacles are crossing the intersection at Ferry Street and KY 36 and crossing Tiber Creek. The intersection at Ferry Street and KY 36 will need to be converted to a three way stop in order to provide the bicycle and pedestrian user a safe crossing. KY 36 currently crosses Tiber creek over a concrete culvert. The pavement width on KY 36 is only 25 feet wide at this crossing which is not wide enough to add bike lanes, sidewalks or a shared use path. In order to get pedestrians and bicyclists over Tiber Creek, KY 36 will need to be widened, realigned or a new shared use path bridge will have to be constructed.

The recommended alternative is a network of shared use paths. The proposed shared use path begins at the Milton Madison Bridge and proceeds along US 421 until turning west on Coopers Bottom Road. This specific alignment was chosen for its relatively low volume of traffic on Coopers Bottom Road making roadway crossing safer for bicycle and pedestrian users. To further reinforce the users feeling of separation from vehicular traffic, a five foot minimum buffer zone of shade tree plantings is proposed on Coopers Bottom Road. The shared use path then passes through intersections at Bayne Street and Edgewater Drive before turning north towards the Ohio River. It then travels along the riverfront towards the Milton Boat Ramp and a realigned KY 36. The new alignment of KY 36 provides the bicycle and pedestrian user a safe crossing of this busy intersection. After crossing KY 36, the user then travels parallel to the realigned KY 36 along a shared use path until turning south on School Hollow Road and connecting to the existing shared use path and parking lot at the Milton City Park.

Figure 4 shows the recommended alternative including realigned KY 36 in more detail.

The KY 36 realignment will likely occur when the Tiber Creek culvert under KY 36 needs replacement or when KY 36 is prioritized for roadway widening by the Kentucky Transportation Cabinet. The proposed shared use path and intersection improvements would be constructed in conjunction with this KY 36 project and would not be the responsibility of the City of Milton. Realigning KY 36 to the north, as proposed, will allow the new road to be constructed while maintaining traffic on the existing road. This will prevent large detours as well as provide room for the proposed shared use path without disturbing the historic structure at the corner of Ferry



Ohio River

10 ft Wide Shared Use Path

Third Street Historic District

Convert intersection to a 3-way Stop

Structure Displacement

New Drainage Culvert

KY 36 Realignment

5 ft Wide Sidewalk. Connect to existing KY 36 sidewalk.

10 ft Wide Shared Use Path

High St

10 ft Wide Shared Use Path

KY 36

Edgewater Dr

8 ft Wide Shared Use Path

Ferry St

10 ft Wide Shared Use Path

10 ft Wide Shared Use Path. Connect to existing parking lot at Milton Park.

Cross St

Parking Lot

Cross St

Coopers Bottom Rd

US 421

Tiber Creek

School Hollow Rd

Maple St

8 ft Wide Shared Use Path. Connect to proposed US 421 Bridge sidewalk.

10 ft Wide Shared Use Path. Connect to existing shared use path at Milton Park .

Spring St

US 421

Figure 4: Recommended Alternative

- Private Property
- City or State Owned Property
- Milton Park
- Listed Historic Property



Street and KY 36. As part of this realignment the intersection at KY 36 and Ferry Street would be converted to a three way stop to allow for a safe bicycle and pedestrian crossing.

5. Design Standards

Within this section recommendations are made for the specific characteristics of the proposed shared use path. Existing conditions, comparable trail case studies and best trail practices have been analyzed and applied to this design. All standards and recommendations adhere to the American with Disabilities Act (ADA) design standards.

5.1. Shared Use Path Standards

As most shared use path standards indicated, the ideal width lies between ten and fourteen feet, for a two-way shared use path. The AASHTO Guide for Development of Bike Facilities recommends the minimum width for a two-way shared use path should be no less than ten feet. In addition to the tread width, an additional two to five feet of unpaved shoulder is recommended for paved trail surfaces as to allow for safe passing of users. The ADA accessible longitudinal slope shall not exceed 12.5%, with designed cross slopes no greater than 4%. A vertical clear slope of eight feet is also required by AASHTO standards. In areas of constraint, such as roadway crossing and bridges, it is allowable for a two-way shared use path to narrow to a minimum of eight feet.

5.2. Trail Striping

The shared use path is recommended to be ten feet wide with a yellow dashed center stripe to delineate travel lanes. The one exception is along Copper's Bottom Road where an eight foot wide shared use path is recommended because of right-of-way constraints.

5.3. Trail Surface Materials

While varying users groups may prefer a wide range of material types depending on their level of activity, those with physical impairments require a firm and stable surface. Asphalt and concrete are the most commonly used trail surface materials. Asphalt is recommended for all shared use path sections in this project because of potential flooding, thus potentially decreasing major maintenance or replacement costs of sections of the facility and lower overall initial construction cost.

5.4. Signage and Wayfinding

The trail should include standard signage, markings, and wayfinding as defined in the Federal Highway Administration's Manual on Uniform Traffic Control Devices (MUTCD). In addition to the required safety markings, the shared use path network should provide informational signs. Such informational signage should inform users of points of environmental/historical/cultural interest, destination distances, and upcoming event notifications. Typical signage types include:

- Directional signage
- Interpretive education/historic signage
- General information signage

5.5. At-Grade Street Crossings

The proposed connection of the Milton-Madison Bridge, Lower Milton Commercial District and Milton City Park, incorporates five non-signalized at-grade crossings located at the intersections of Coopers Bottom Road and Bayne Street, Coopers Bottom Road and Edgewater Drive, Ferry Street and KY 36, and KY 36 and School Hollow Road, and School Hollow Road and Cross Street. All at-grade crossings are recommended to have white Continental Pavement Markings, as well as pedestrian crossing warning signs facing on-coming vehicular traffic. Specialty concrete pavers with a high level of color contrast could be used for high priority at-grade crossings where increased user demand and vehicular traffic intersect. This type of paver provides visual separation of vehicular and pedestrian zones that alerts drivers to the trail crossing and provides traffic calming.

6. Construction Phasing

Construction of the proposed shared use path network can be best accomplished in separate phases as funding is allocated and private property is available. **Figure 5** shows one potential construction phasing option.

Phase 1 – Riverfront Trail Connector

Phase 1 will consist of constructing a single ten-foot wide (eight-feet along Cooper’s Bottom Road), shared use path connecting the newly rehabilitated Milton-Madison Bridge and the existing Milton Boat Ramp. The construction of this connector is the most cost effective method for providing bicycle and pedestrian facilities through Lower Milton. It is understood that all intersection improvements and vegetative screening along the connector are recommended to be included in Phase 1 construction. It is anticipated that this segment will provide only a connection from the Milton-Madison Bridge to the Milton Boat Ramp, without the inclusion of additional amenities other than those immediately necessary to the construction of a shared use path. As described in **Table 3**, Phase 1 construction will require full or partial acquisition of nine parcels located along US 421 and Coopers Bottom Road. It is anticipated that no structures will need to be bought or relocated as a result of Phase 1 improvements.

Phase 2 – KY 36 Realignment

Phase 2 will consist of constructing a single ten-foot wide, shared use path south of realigned KY 36. A five foot minimum landscaped buffer zone is proposed between the KY 36 and the shared use path. The KY 36 realignment will likely occur when the Tiber Creek culvert under KY 36 needs replacement or the Kentucky Transportation Cabinet prioritizes KY 36 needs roadway widening. The proposed shared use path and intersection improvements would be constructed in conjunction with this project. Realigning KY 36 to the north, as proposed, will allow the new road to be constructed while maintaining traffic on the existing road. This will prevent large detours as well as provide room for the proposed shared use path without disturbing the historic structure at the corner of Ferry Street and KY 36. As part of this realignment the intersection at KY 36 and Ferry Street would be converted to a three way stop to allow for a safe bicycle and pedestrian crossing. As described in **Table 3**, Phase 2 construction will require full or partial



Phase 1: Riverfront Trail Connector

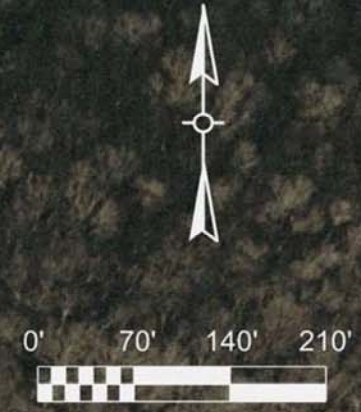
Phase 2: KY 36 Realignment

Phase 3: Milton Park Connector

Third Street Historic District

Figure 5: Construction Phasing

- Private Property
- City or State Owned Property
- Milton Park
- Listed Historic Property



Ohio River

KY 36

High St

Ferry St

Cross St

Cross St

Parking Lot

Maple St

Spring St

US 421

US 421

Tiber Creek

School Hollow Rd

Edgewater Dr

Bayne St

Coopers Bottom Rd

acquisition of five parcels located along KY 36. It is anticipated that one structure, located in Parcel No. 014-10-12-010.00, will need to be bought or relocated as a result of the KY 36 realignment. This structure is abandoned.

Phase 3 – Milton Park Trail Connector

Phase 3 will consist of constructing a single ten-foot wide, shared use path connecting the newly constructed shared use path along KY 36 and the existing shared use path and parking lot at the Milton City Park. The trail will travel along the east side of School Hollow Road and connect to the existing Milton Park trail at the Spring Street and School Hollow Road Intersection. An additional shared use path will also turn off School Hollow Road and travel east on Cross Street connecting the proposed shared use path and the existing Milton Park parking lot. As described in **Table 3**, Phase 2 construction will require partial acquisition of three parcels located along School Hollow Road. It is anticipated that no structures will need to be bought or relocated as a result of Phase 1 improvements.

Table 3: Right-of-Way Acquisition

Phase 1: Riverfront Trail Connector			
Parcel No.	Type	Size (SF)	Approx. Acquisition (SF)
014-10-01-004.00	Private	2,146	Partial (630)
014-10-01-005.00	Private	5,225	Partial (1,095)
014-10-01-003.00	Private	18,347	Partial (570)
014-10-01-001	Private	9,690	Partial (3,111)
014-10-02-001	Private	8,800	Partial (1,600)
014-10-02-001.00	Private	10,755	Partial (1,600)
014-10-02-002.00	Private	14,215	Partial (2,130)
014-10-02-002.00	Private	33,746	Full
Commonwealth of KY	Public	62,232	Full
Phase 2: KY 36 Realignment			
Parcel No.	Type	Size (SF)	Approx. Acquisition (SF)
014-10-12-010.00	Private	11519	Full
014-10-12-012.00	Private	21167	Partial (5,065)
014-10-12-009.00	Private	78051	Partial (23,090)
014-10-07-012.00	Private	9139	Partial (1,745)
014-10-07-011.00	Private	39326	Partial (105)
Phase 3: Milton Park Trail Connector			
Parcel No.	Type	Size (SF)	Approx. Acquisition (SF)
014-10-10-013.00	Private	10216	Partial (1,090)
014-10-10-007.00	Private	12938	Partial (1,200)
014-10-10-006.00	Private	10903	Partial (1,090)

7. Preliminary Opinion of Probable Construction Cost

To assist the local government in applying for funding for the proposed pedestrian/bicycle improvements, budget level cost estimates were completed in 2012 dollars. The preliminary opinion of probable construction cost is based on the proposed planning level alignment and details. The proposed improvements will require private right-of-way acquisition. Private property could be bought or donated from participating owners. Right-of-way acquisition and utility relocation costs are not included in this estimate. The cost estimate has been developed without specific detailed engineering designs and with the limitations of geographical information systems and is therefore subject to reasonable deviations of error. Construction phasing is dependent on the availability of land and public, private, and other funding sources.

Design Engineering costs are not included in the estimate below. Reasonable expectation would be 8% to 15% of the construction cost.

To inflate the below construction costs to future year estimates, it is recommended that an average from the Highway Construction Cost Index maintained by FHWA be used.

Table 4: Preliminary Opinion of Probable Construction Costs

Phase 1: Riverfront Trail Connector

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
Site Preparation				
Site Clearing	1	LS	\$1,000.00	\$1,000.00
Grading	1	LS	\$3,000.00	\$3,000.00
Seeding & Mulching Areas of Disturbed Land	1	AC	\$1,500.00	\$1,500.00
Silt Fence	1,280	LF	\$4.00	\$5,120.00
Trail, Access & Amenities				
10 ft Class II Asphalt Shared Use Path - 4" Thick	443	TON	\$90.00	\$39,870.00
Crushed Stone Base - 4" Thick	366	TON	\$20.00	\$7,320.00
Pavement Striping (4")	1,892	LF	\$1.50	\$2,838.00
Standard Header Curb	662	LF	\$25.00	\$16,550.00
Sidewalk Ramp	9	EA	\$600.00	\$5,400.00
Trail Marker	2	EA	\$1,100.00	\$2,200.00
Canopy Trees & Vegetative Screening	51	EA	\$300.00	\$15,300.00
<i>Note: All costs in 2012 dollars</i>			Subtotal	\$100,098.00
			15% Contingency	\$15,014.70
			TOTAL	\$120,000.00

Phase 2: KY 36 Realignment

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
Earthwork/Paving/Misc.				
Mobilization	1	LS	\$20,000.00	\$20,000.00
Staking	1	LS	\$20,000.00	\$20,000.00
Erosion Control	1	LS	\$25,000.00	\$25,000.00
Maintain & Control Traffic	1	LS	\$50,000.00	\$50,000.00
Embankment In Place	8,120	CY	\$10.00	\$81,200.00
1.25" Class II Asphalt Surface - Roadway	230	Ton	\$100.00	\$23,000.00
10" Class II Asphalt Base - Roadway	1,880	Ton	\$65.00	\$122,200.00
12" DGA Base - Roadway	2,350	Ton	\$20.00	\$47,000.00
Pavement Striping - Thermo (4") - Roadway	3,350	LF	\$0.50	\$1,675.00
Pavement Marking - Thermo Cross Walk (24")	150		\$7.00	\$1,050.00
Pavement Marking - Thermo Stop Bar (24")	30	LF	\$10.00	\$1,605.00
10 ft Class II Asphalt Shared Use Path - 4" Thick	140	TON	\$90.00	\$12,600.00
Crushed Stone Base Shared Use Path - 4" Thick	150	TON	\$20.00	\$3,000.00
Shared Use Path Pavement Striping (4")	600	LF	\$0.30	\$180.00
Trail Marker	2	EA	\$1,100.00	\$2,200.00
Sidewalk (4")	335	SY	\$45.00	\$15,075.00
Sidewalk Ramp	8	EA	\$2,500.00	\$20,000.00
Curb & Gutter	1,500	LF	\$25.00	\$37,500.00
Street Lights	14	EA	\$6,000.00	\$84,000.00
Drainage Structures				
Concrete Box Culvert (25' x 6')	2,250	SF	\$150.00	\$337,500.00
Storm Sewer Pipe	1,500	LF	\$50.00	\$75,000.00
Curb Box Inlet	21	EA	\$2,500.00	\$52,500.00
<i>Note: All costs in 2012 dollars</i>			Subtotal	\$1,032,285.00
			15% Contingency	\$154,842.75
			TOTAL	\$1,200,000.00

Phase 3: Milton Park Connector

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL COST
Site Preparation				
Site Clearing	1	LS	\$1,000.00	\$1,000.00
Grading	1	LS	\$3,000.00	\$3,000.00
Seeding & Mulching Areas of Disturbed Land	1	AC	\$1,500.00	\$1,500.00
Silt Fence	1,000	LF	\$4.00	\$4,000.00
Trail, Access & Amenities				
10 ft Class II Asphalt Shared Use Path - 4" Thick	230	TON	\$90.00	\$20,700.00
Crushed Stone Base - 4" Thick	240	TON	\$20.00	\$4,800.00
Pavement Striping (4")	1,000	LF	\$1.50	\$1,500.00
Thermo Cross Walk Striping (24")	60	LF	\$10.00	\$600.00
Sidewalk Ramp	5	EA	\$600.00	\$3,000.00
Trail Marker	3	EA	\$1,100.00	\$3,300.00
<i>Note: All costs in 2012 dollars</i>			Subtotal	\$43,400.00
			15% Contingency	\$6,510.00
			TOTAL	\$50,000.00

8. Potential Funding Sources

A variety of funding programs and sources applicable to trail and park construction are available from federal and state agencies. Potential funding sources include:

- Transportation Alternatives Funding from MAP-21
- Surface Transportation Program
- Congestion Mitigation and Air Quality Mitigation Program (if designated a non-attainment area)
- Job Access and Reverse Commute Grants
- FHWA Recreational Trails Program
- Housing and Urban Development Block Grant Funds
- Economic Development Administration
- US Army Corps of Engineers
- US Department of the Interior Land and Water Conservation Fund