

DESIGN EXECUTIVE SUMMARY

County:	Warren	Item #:	3-8852.00	
Route Number(s):	KY 884	State Program #:	8963101D	
BMP/EMP:	5.516/7.438	Federal Project #:	N/A	
Type of Work:	Widening			

Highway Plan Project Description: 3-8852.00, Reconstruct KY 884 from Long Road to the Natcher Parkway (MP 5.516 to MP 7.438) (Bridge over Natcher Pkwy under 3-8818.00)

EXISTING CONDITIONS

ADT (current):	6,500 (2015)	Truck Class:	A	Trucks: 8%
Existing Functional Classification:	<input checked="" type="checkbox"/> Urban <input type="checkbox"/> Rural Collector	Terrain:	Level	Route is on (check all that apply): <input type="checkbox"/> NHS <input type="checkbox"/> NN <input type="checkbox"/> Ext Wt <input checked="" type="checkbox"/> None
Posted Speed Limit:	45 mph	or Statutory Speed Limit:	<input type="checkbox"/> 35 mph (urban) <input type="checkbox"/> 55 mph (rural)	
Existing Bike Accommodations:	Shared Lane	Ped:	<input type="checkbox"/> Sidewalk <input type="checkbox"/> Other: _____	

PROPOSED CONDITIONS

Design Functional Classification:	<input checked="" type="checkbox"/> Urban <input type="checkbox"/> Rural Collector	Design ADT (year): 14,000 (2039) DHV: 5%	Access Control: Min. Spacing: _____ By Permit
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CONTROLLING CRITERIA:	EXISTING	AASHTO Guidance (for design speed)	Recommendation	Design Exception (Check if exception is needed)
Design Speed	45 MPH	Minimum: 30 MPH Selected: 45 MPH	45 MPH	<input type="checkbox"/>
Lane Width, No. of Lanes	10', 2	10'-12', 2 Min.	11' with 12' TWLT, 3	<input type="checkbox"/>
Shoulder Width (minimum usable)	0'-2'	Curb & Gutter	Curb & Gutter	<input type="checkbox"/>
Bridge Width (clear roadway)	N/A	26' Min.	N/A	<input type="checkbox"/>
Max. Grade	3.00%	8.00%	3.31%	<input type="checkbox"/>
Horiz. Radius (minimum)	1136.3'	711'	1150'	<input type="checkbox"/>
Stopping Sight Distance (minimum)	360'	360'	402'	<input type="checkbox"/>
Normal Cross Slope	2.00%	2.00%	2.00%	<input type="checkbox"/>
Max. Superelev. Rate (emax=4%)	8%	4%-6% Max.	3.60%	<input type="checkbox"/>
Vert. Clearance	15'	16.5' Desirable	17.5'	<input type="checkbox"/>

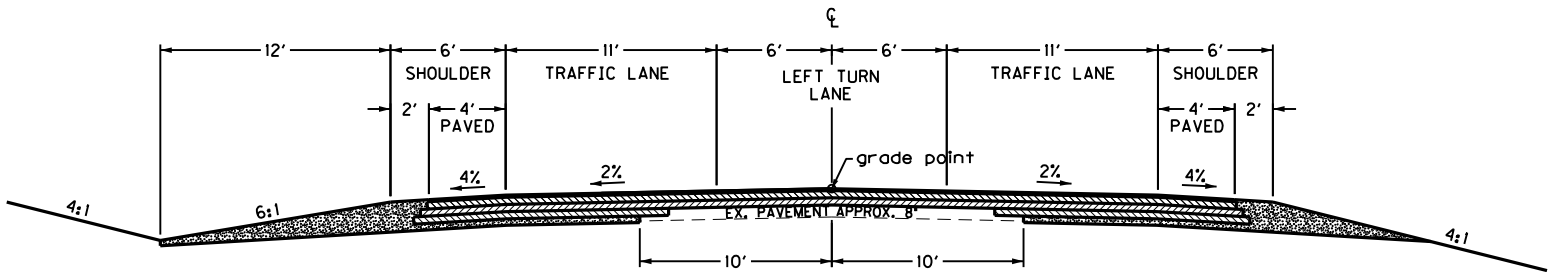
OTHER CRITERIA:

Design Variance

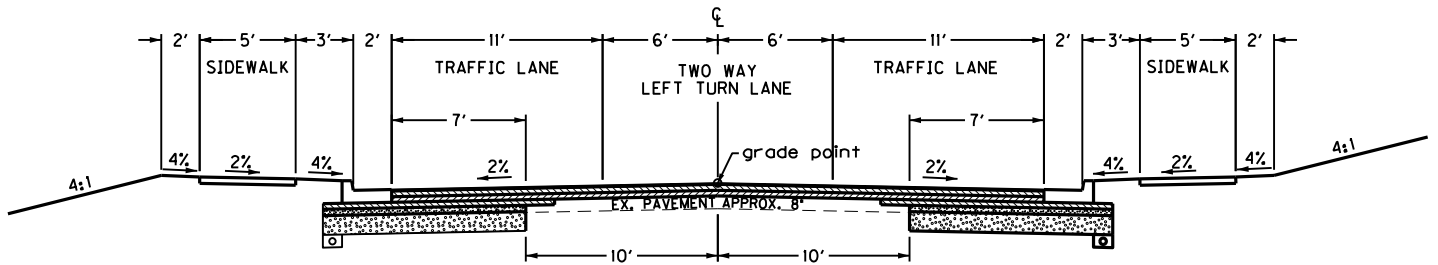
Border Area (urban)	N/A	8'	10'	<input type="checkbox"/>
Sidewalk Width, slope	None	4'-8', 2%	5', 2% (both sides)	<input type="checkbox"/>
Bike Lane Width, slope	None	None	None	<input type="checkbox"/>
Shared Use Path Width	None	None	None	<input type="checkbox"/>
Other:				<input type="checkbox"/>

DESIGN EXECUTIVE SUMMARY	
Design Criteria Notes:	
Environmental Action: <input type="text" value="Overview"/>	Completion Date: <input checked="" type="checkbox"/> scheduled <input type="checkbox"/> actual 06/30/16
Existing Pavement Depths: Five cores were taken to measure existing pavement depth. These thicknesses ranged from 7 3/4" to 11 1/2" with an average depth of 8".	
Include: <ol style="list-style-type: none"> 1. Typical sections, including bridges 2. Map showing project location 3. Project overview and existing conditions 4. Purpose and Need statement 5. Discussion of alternatives (including preferred and no build) with respective traffic control schemes, and environmental, utility and right-of-way impacts. 6. Discussion of Design Exceptions /Variances and mitigation strategies 7. Cost comparison table of alternatives vs. Highway Plan 8. Discussion if preferred alternate cost is >115% than highway plan 9. Discussion of clearzone 10. Consideration for bicycle and pedestrian facilities (see HDM 1502) 11. Water-related impacts summary 	
Submitted by Project Engineer: <i>[Signature]</i>	<input checked="" type="checkbox"/> KYTC <input type="checkbox"/> Consultant Date: 5-5-16
Recommended by Project Manager: <i>[Signature]</i>	Date: 5-5-16
Tier Level Approval <input type="checkbox"/> Tier 1 <input type="checkbox"/> Tier 2 <input checked="" type="checkbox"/> Tier 3	
Location Engineer: <i>Wendy Southwood</i>	Date: 5/9/2016
Roadway Design Branch Manager: <i>Brad Eldridge</i>	Date: 5/13/16
Geometric Approval	<input checked="" type="checkbox"/>
Granted by: <i>William Fisher</i>	Director, Div. of Hwy. Design <input type="text"/> Date: 5/17/2016

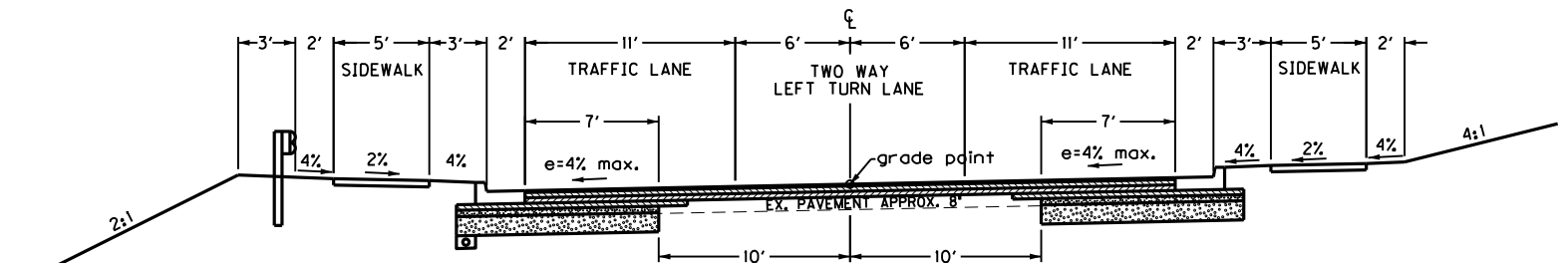
TYPICAL SECTIONS



3 LANE RURAL (NORMAL)
STA. 247 + 48.80 TO STA. 254 + 48.96



3 LANE URBAN (NORMAL)
STA. 255 + 76.34 TO STA. 342 + 50.00

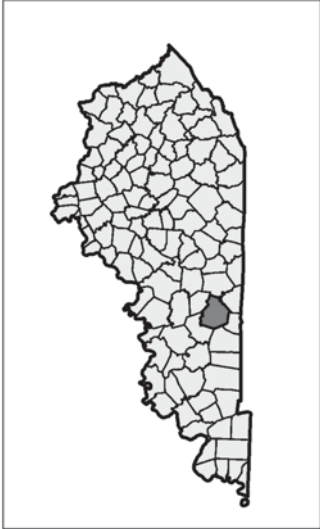
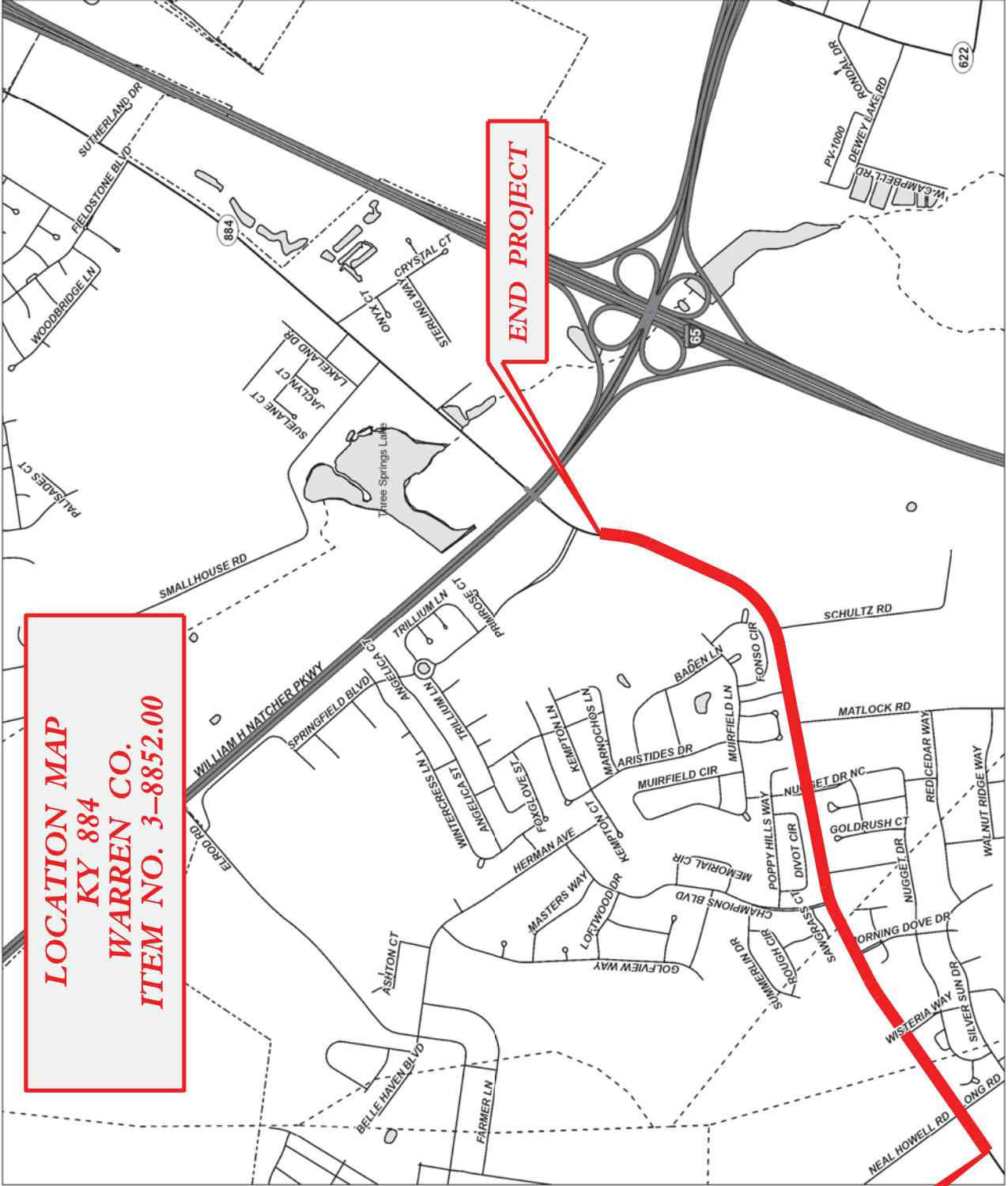


3 LANE URBAN (SUPERELEVATED)
STA. 255 + 76.34 TO STA. 342 + 50.00

LOCATION MAP
KY 884
WARREN CO.
ITEM NO. 3-8852.00

END PROJECT

BEGIN PROJECT



Item No. 3-8852.00

Improvements to KY 884: Widen KY 884 from Long Road to Springfield Boulevard Warren County, Kentucky

1. Project Overview and Existing Conditions

Three Springs Road (KY 884) is a narrow two-lane roadway with a 10' driving lanes and a total pavement width of approximately 23' and a variable earth shoulder of 0'-2'. This area of Warren County is the fastest growing residential area in the County, which has resulted in traffic volumes that have exceeded the capacity of the existing roadway. The traffic forecast that was developed for this project shows existing 2015 ADT being 4,800 vpd between Long Road and Matlock Road and 6,500 vpd between Matlock Road and Springfield Boulevard and is expected to increase to 10,000 vpd between Long Road and Matlock Road and 14,000 vpd between Matlock Road and Springfield Boulevard by the year 2039. The accident data for this area shows that there were 39 accidents along this stretch of roadway over the past three years and were categorized as follows: 12 angle, 1 head-on, 6 rear end, 5 sideswipe and 15 single vehicle collisions. The design team has decided that the best approach to resolve this issue is to widen the existing road to a three lane facility provided refuge for left and right turning vehicles which will in turn improve the flow of traffic and safety of Three Springs Road in this area.

2. Purpose and Need

KY 884 (Three Springs Road) is a narrow two-lane roadway which serves as a major urban collector for the expanding residential areas in the Three Springs neighborhood of southern Bowling Green. KY 884 provides the primary connection from those residential developments to the major commercial activity centers along US 231 (Scottsville Road) and to the I-65 interchange with US 231. The section of the corridor from Long Road to the entrance to Flealand also provides direct access to the Griffin Park recreation activities and the Aviation Heritage Park, and indirect access to the Jody Richards Elementary School. With the mix of recreational opportunities in the area and the residential development, there is an interest in expanding the existing mobility opportunities for pedestrians and bicyclists through the project area. The increasing traffic volumes and the geometric and capacity limitations of the existing roadway impede the mobility and safety along the corridor. The purpose of this project is to increase the safety and mobility for motorists, pedestrians, and bicyclists along the KY 884 (Three Springs Road) Corridor from Long Road to the entrance to Flealand.

3. Public Involvement

On October 20, 2015, an open house style public information meeting was held at the Holy Spirit Catholic Church from 4:00pm to 6:00pm, CDT. Large display exhibits of the preferred alignment including typical sections were on display for the 97 meeting attendees (see Exhibit 1). Project handouts were provided as well as survey questionnaires. Upon the expiration of the public comment period on November 3, 2015, there were 49 survey questionnaires received from the public (see Exhibit 2). The following table shows a breakdown of the responses and if they recommended the preferred alternate or the No Build option. Responses were identified as a result of clear sentiment on the part of the respondent.

Response Type	Quantity	People Represented	Preferred Alternate	No Build Alternate
Survey Questionnaire	49	55	43**	6

**11 of these questionnaires selected “Yes” to question No. 4 saying that they agree that the project is needed but did not select “Preferred Alternate” or “No Build” on question No. 6.

The survey questionnaires from the public meeting show more support for Preferred Alternate than the No Build Alternate. All public responses said there was a dire need for major road improvement in the project area. Five of the six questionnaires that support the No Build option are residents that front Three Springs Road whose front yards will be impacted the most by the road widening.

Existing Road Concerns:

- Safety
- Capacity/Congestion
- Narrow driving lanes
- Shoulder Drop-offs

General Comments from Questionnaires that Favor the Preferred Alternate:

- Fastest growing area in Warren County, increased congestion.
- High traffic volumes, congestion, future growth.
- Project is needed to improve traffic flow. Road use has outgrown original design due to residential development.
- No longer a rural area.
- Difficult to pull out from driveways and approach roads.
- Construct 5 lanes past Natcher Parkway.
- Add traffic signal at Smallhouse Road.
- Significant speeding needs to be addressed in this area.

General Comments from Questionnaires that Agree the Project is Needed but did not select the Preferred Alternate or No Build Alternate:

- If built it should continue to KY 242.
- Widening will put the new road/sidewalks very close to their homes.
- Do not see the need for sidewalks all the way to Long Road. Construct sidewalks only in residential areas.
- Construct 4 lanes past Natcher Parkway for future growth.
- Stop light at Smallhouse Road.
- Noise pollution.
- Excessive Speeding.
- Need ramps from Three Springs Road to Natcher Parkway.

- Safety concerns about widening the road and putting traffic closer to homes.

General Comments from Questionnaires that Favor the No Build Alternate:

- The proposed widening should stop at Flea Land.
- Widening the road closer to homes will deflate property value.
- Traffic flows smoothly except during morning and afternoon peak hours, it is fine the way it is.
- Sidewalks on both sides of roadway excessive.
- A wider road will result in increased speeds.
- KYTC has over estimated traffic. Traffic is not as heavy as the report suggests.
- Nobody currently walks along Three Springs Road so sidewalks are not needed.

4. Alternatives Considered

No Build Alternative

The No Build Alternate would not address the purpose and need and would leave a narrow roadway with a high volume of traffic.

Preferred Alternative (Urban Typical Section)

The preferred construction alternate will be to widen the existing two lane roadway to a 3 lane roadway with curb and gutter and sidewalks. The project will begin approximately 750' west of the Long Road and Three Springs Road intersection at Sta. 247+48.80 with a rural two lane typical section. From this location the proposed route will continue east along the existing centerline with symmetric widening to each side. On the west side of the Long Road intersection left and right turn lanes will be provided for vehicles to turn onto Long Road and Neal Howell Road. As the proposed roadway crosses through the intersection the typical section changes to an urban three lane section. Left and right turn lanes will be provided here as well. The majority of the corridor for this project is made up of dense residential housing on both sides of Three Springs Road. This being the case the proposed centerline very closely follows the existing centerline with symmetric widening on each side of the existing roadway, except for a short section from the Long Road intersection to Sta. 275+00 where the widening is shifted to the north into some vacant farmland. The three lane urban typical section throughout the corridor from the Long Road intersection to where the project ties to the previous section (3-8818.00). Right turn lanes were also provided at subdivision access roads where right turn lanes currently exist, these include Bailey's Farm Drive and McCoy Place Drive. Even though a right turn lane was not warranted at Matlock Road and since the lot in the southwest quadrant of that intersection is vacant the design team recommended that a right turn lane be provided to improve the traffic flow.

Secondary Alternative (Rural Typical Section)

The other alternative that was considered used the same horizontal and vertical alignments with the only difference being a rural typical section with 2' deep ditches instead of the urban typical with curb and gutter and sidewalk.

Traffic Control

The traffic control scheme that would be implemented with both alternatives on this project would be to construct the proposed widening and pave the asphalt base up to the existing roadway elevation and then shift traffic to the newly widened portion. This will allow room to construct the opposite side of the proposed roadway. Once the entire roadway is constructed up to the existing pavement elevation asphalt will be placed in 3"-4" lifts shifting traffic as needed.

Environmental Issues

There were no significant issues recognized on this section being environmentally sensitive.

Right of Way

The Right of Way for this project will typically be 2' behind the sidewalk where the berm breaks over to the fill slope. Locations where there is sufficient room between the existing Right of Way and the proposed sidewalk the construction will be done with a temporary construction easement and the existing Right of Way line will be maintained and no proposed Right of Way will be purchased in these areas.

5. Discussion of Design Exceptions/Variations and Mitigation Strategies

There are no design exceptions or variations needed for this project.

6. Cost – As compared to the SYP budgeted amount

			2014 Hwy. <u>Plan Estimate</u>	2016 Recommended <u>Hwy. Plan Estimate</u>	Preferred Alt. <u>Estimate</u>	Secondary Alt. <u>Estimate</u>
SPP	R	2015	\$1,000,000	\$1,000,000	\$ 1,850,000	\$1,850,000
SPP	U	2016	\$2,000,000	\$2,000,000	\$ 4,340,000	\$4,340,000
SPP	C	2017	<u>\$5,300,000</u>	<u>\$9,150,000</u>	<u>\$ 8,130,000</u>	<u>\$5,479,000</u>
Total			\$8,300,000	\$12,150,000	\$14,320,000	\$11,669,000
Percent Above 2014 Hwy. Plan					72.5%	40.6%
Percent Above 2016 Rec. Hwy. Plan					17.9%	N/A

7. Discussion if Preferred Alternate Cost is >115% than Highway Plan

During the writing of this Design Executive Summary the 2016 Recommended Highway Plan was published and the design team felt the new budget should be included in this evaluation even though the 2016 Recommended Highway Plan will not be approved until April 2016 and is subject to change. As can be seen above, this edition of the Highway Plan increases the construction phase of this project from \$5,300,000 to \$9,150,000. This is a significant increase and results in a new project total of \$12,150,000. When compared to the 2016 Recommended Highway Plan Estimate, the Preferred Alternative is 17.9% higher where as with the current 2014 High Way Plan Estimate the Preferred Alternative is 72.5% higher.

As can be seen from the above cost comparison neither total estimate is within the desired 115% of the current 2014 Highway Plan or the 2016 Recommended Highway Plan. However, if you look at these

estimates individually the differences are easily explained. The construction estimate that was completed for the Highway Plan assumed a rural typical section. The Secondary Alternative also used a rural typical section and is within 3.4% of the original 2014 Highway Plan Construction estimate. The Preferred Alternate Construction estimate is 53.4% more than the 2014 Highway Plan estimate due to the urban typical section that was used and the additional cost of curb & gutter, sidewalk and stormsewer facilities. However, the Preferred urban design is below the revised 2016 Recommended Highway Plan estimate.

The current utility estimate is 217% more than the current estimate, however the utility estimate for the SYP Plan estimates was completed in 2007. In 2014 Warren County Water District constructed a new 12" water main along approximately 1.5 miles of the project. Since we do not have an exact location for this line we are assuming that it will be a relocation. Warren County Water District also constructed a new water tower and 20" water main in 2009 and approximately 1200' of the 20" water main could be impacted by this project. This area is one of the fastest growing residential areas in Warren County and utility companies are continuously expanding their facilities to serve this area.

When you compare the Right of Way estimate there is an 85% increase from what was used for the SYP estimates and the current preliminary line and grade estimate. The explanation for this increase is similar to the utility cost increase. This area of Warren County is developing very rapidly and with high demand for property in this area land value has increased significantly. There have also been several new subdivisions created along the project since the SYP estimate was developed which has increased the total number of parcels that will be involved.

Despite the budget overruns for the Preferred Alternative (Urban Typical Section) the design team recommended that the benefits were worth the additional expense. Given the dense residential development and the vicinity to Basil Griffin Park, Aviation Heritage Park and the Christian Academy the added pedestrian connectivity the sidewalks provide will be a great addition to this area of Warren County.

8. Discussion of Clearzone

Design Criteria: 14,000 Future ADT, 45 MPH Design Speed, 4:1 Foreslope

Recommended Clearzone: 24'-28' (2011 Roadside Design Guide, Table 3-1)

Proposed Clearzone: 12'

Since it is typical for the Right of Way line for urban typical sections to be located at the edge of the berm (2' behind the sidewalk), which is only 12' from the driving lane the 24' recommended clearzone cannot be enforced after construction has been completed. Due to the utilization of an urban typical section and the location of the proposed Right of Way line a **12' clearzone** will be used for this project.

9. Consideration for Bicycle and Pedestrian Facilities

The design team chose to implement an urban typical section with curb and gutter and sidewalks for this project due to the dense residential development and the vicinity to Basil Griffin Park. Both sidewalks will run the entire length of the project and tie to the proposed sidewalks on the previous section of this project (3-8818.00). This will provide connectivity with the residential areas and Basil Griffin Park. The project team recommended that the new 5’ sidewalks on each side of the new roadway will accommodate the needs of the pedestrian traffic in this area.

After a lengthy discussion during the Alternate Review Meeting it was recommended that the typical section not include dedicated bike lanes. The wider lanes and the additional TWLTL will provide substantial additional space for vehicles and cyclists to share the roadway. It is legal in Bowling Green and Warren County to ride a bicycle on the sidewalk. This will provide additional options for cyclists as well.

10. Avoidance to Water-Related Impacts

WATER RELATED IMPACTS SUMMARY

County	Warren	Route No.	KY 884	Item No.	3-8818.00
Date	1/19/2016	Program #	8962901D		
Federal Project No.					
State Project No.	FD04 114 0884 005-007				
Location Engineer	Wendy Southworth				

Section 1: Impact Checklist

Complete this section for each alternative considered at the conclusion of Phase 1 design. All of the alternatives considered resulted in the same water-related impacts therefore only one checklist is shown.

PREFERRED ALTERNATIVE

FLOODPLAIN IMPACTS		
FEMA Study Type	Yes	Community No.
Detailed FEMA Study with delineated floodway*	X	C0315E
Detailed FEMA Study without delineated floodway*		
Approximate FEMA Study		
No FEMA Study		
* May require initiation of the map revision process if impacts to water surface elevations cannot be avoided. Potential impacts to floodplains and/or floodways shall be assessed early in the project. Refer to Sections DR 203 and DR 204 of the Drainage Manual.		

The project is located on the FEMA Flood Map Panel 21227C0315E and there are no flood areas within the project limits.

SIGNIFICANT RESOURCE IMPACTS				
Are open sinkholes impacted? If so, how many sinkholes are impacted?	Yes	<input type="checkbox"/>	No	X
Are wetlands impacted? If so, how many total acres are estimated? _____ acres	Yes	<input type="checkbox"/>	No	X
Are any of the streams in the project area designated "Special Use Waters" (e.g. Wild Rivers, Exceptional Waters, Outstanding State Resource Water, etc.)?	Yes	<input type="checkbox"/>	No	X
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>Where possible, alignments should be developed that avoid significant resources. When it becomes impossible to avoid a significant resource, the project should be designed to minimize these impacts. Significant resource impacts are discussed in DR 202 of the drainage manual. Wetland impacts and their costs are also discussed in DR 500 of the Drainage Manual.</p> <p>Projects that impact special use waters may require an individual KPDES Erosion Control Permit. Contact the Division of Environment analysis for more information.</p>				

STREAM CHANNEL IMPACTS				
Will stream relocations (channel changes) be needed? If so, how many total linear feet are estimated? _____ LF	Yes	<input type="checkbox"/>	No	X
Will new culverts or culvert extensions be constructed? If so, how many total linear feet are estimated? _____ LF	Yes	<input type="checkbox"/>	No	X
Will temporary stream crossings be needed?	Yes	<input type="checkbox"/>	No	X
Will excess material sites that require permitting be needed?	Yes	<input type="checkbox"/>	No	X
Will bridges be constructed?	Yes	<input type="checkbox"/>	No	X
<p>On highway projects that involve stream crossings such as bridge and culverts, it is often not feasible to totally avoid stream channel impacts. In these cases, design the project to minimize the impacts. Stream relocations should be avoided if possible. If stream relocations are unavoidable design to project to minimize their impacts. Stream channel impacts are discussed in DR 506, 601-3, 608-2, and 802-3 of the drainage manual.</p>				

Section 2 : Impact Discussion

Complete this section for the chosen alternate. Discuss the selected alternate's influence on each of the impacts listed above. Discuss any avoidance, minimization and/or mitigation measures included in the project.

This project does not have any stream crossing through the corridor. The majority of the roadway drainage will be collected into the storm sewer systems and discharged into to existing and proposed drainage basins along the project. Water quality for the project will be maintained with standard erosion control practices and the use of a BMP Plan.