

Appendix A

Compatibility of I-66 Corridor and Bowling Green Outer Beltline

COMPATIBILITY OF *I-66 CORRIDOR & BOWLING GREEN OUTER BELTLINE*



TECHNICAL MEMORANDUM

**Prepared for
Kentucky Transportation Cabinet**

By



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INTRODUCTION

During the initiation of the I-66 Corridor Planning Study in late 2001, the project study area was identified (see Exhibit 1) and an inventory of the “existing plus committed” highway network undertaken. Discussions ensued relating to another future project within the Bowling Green area, the Bowling Green Outer Beltline, and the appropriateness of jointly conducting planning studies for both projects. Through review of the Outer Beltline project, it was determined that the project study area for this project would lie completely within the I-66 Corridor study area and that the potential existed for corridor concepts considered for I-66, in some cases, to be coincident with Outer Beltline corridors, since they would both be studied as freeway-type facilities. For these reasons, the Kentucky Transportation Cabinet (KYTC) and the Federal Highway Administration (FHWA) determined that the studies should be conducted jointly, but that corridor concepts for each project be evaluated independently and separate reports prepared for each.

This technical memorandum is being prepared to document the compatibility of the two projects and the combinations of alternatives for I-66 and the Outer Beltline evaluated.

CORRIDOR COMBINATIONS CONSIDERED

The beginning of both the I-66 Corridor project and the Bowling Green Outer Beltline project is located on the William H. Natcher Parkway, in the vicinity of Hadley. From this point, the corridors traverse east across Warren County. The I-66 Corridors continue easterly toward their ending terminus, which is the Louie B. Nunn (Cumberland) Parkway’s grade-separation of US 68/KY 80 near Glasgow. The Bowling Green Outer Beltline corridors turn in a southerly direction and continue toward their terminus at the end at the William H. Natcher Parkway extension/US 231 (Scottsville Road) intersection south of Bowling Green. The alternative corridors consisted of options that included nearly all new terrain construction, all existing facility utilization, and corridors that included both new terrain construction, as well as utilizing portions of existing facilities. Exhibit 2 shows concepts representing the combinations of the various alternative corridors – i.e. how the Bowling Green Outer Beltline overlaps with the three variations of the I-66 Corridor (along existing routes, north of I-65 and south of I-65).

Because of the number of combinations, the seven (7) final I-66 Corridor concepts (see Exhibit 3) were simply combined with either Corridor A or Corridor B of the Bowling Green Outer Beltline (see Exhibit 4) for the purposes of evaluating the combinations – resulting in seven combinations. Because the Beltline Corridors A and B performed better, had lower costs and had fewer impacts than Corridors C and D, they were utilized as part of the combinations with the final I-66 Corridor concepts. Beltline Corridor D was used in combination with I-66 Corridor 23 however, because Corridors A and B have no sections coincidental with Corridor 23 while Beltline Corridor D does include a coincidental section that could create a combination corridor.

In addition, several cases existed where an I-66 Corridor could be combined with either Corridor A or Corridor B (i.e. Corridor 5-A/5-B). Some of these combinations resulted in two separate roadways being constructed in close proximity to each other (i.e. a combination of I-66 Corridor 2 and Beltline Corridor B), which may or may not be compatible, such that nearly the entire route of both individual corridors would be constructed. In all cases, the combination that required the least amount of new roadway construction was utilized, such that only seven I-66/ Outer Beltline Combinations were analyzed and evaluated. These combinations are shown in Exhibit 5, and include:

- Combination Corridor 2-B
- Combination Corridor 4-B
- Combination Corridor 5-A
- Combination Corridor 10-B
- Combination Corridor 11-A
- Combination Corridor 12-A
- Combination Corridor 23-D

The data for the combinations were then compiled for each individual corridor to its junction with the other and also for the coincident corridor. The data was assimilated into an evaluation table and utilized in the screening of the combinations.

SCREENING OF CORRIDOR COMBINATIONS

During the Level 2 Screening, the combinations of I-66 and Outer Beltline corridors were evaluated based on each corridor's engineering characteristics, its relative impacts on traffic and mobility and natural and man-made environment, and public and review agency input. Further study was conducted through literature searches, GIS, agency coordination, public meetings, and windshield surveys. Corridors were studied using 400-foot study bands to approximate the magnitude of impact of the anticipated right-of-way needed. Some issues required larger study bands. Threatened and endangered species were evaluated within a two-mile band. Archeological and historical resources, and cave entrances were evaluated within a 2,000-foot band. All of the information obtained through this research was documented. Using this documentation, each corridor's strengths and weakness were measured. The corridors that best satisfied traffic and engineering objectives and posed the least impact upon environmental issues were recommended to be carried forward for future engineering and environmental studies within each of the separate studies.

The Level 2 Screening information for the combinations of alternatives is shown in Table 1 at the end of this technical memorandum. The screening involved engineering considerations (project costs, maintenance of traffic during construction, and ease of construction), traffic considerations (that are also used as performance measures for gauging the achievement of project goals), natural and man-made environmental considerations (covering aquatic/terrestrial ecosystems, threatened and endangered

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species, historic/archaeological impacts, socio-economic impacts, geological issues, managed lands, and air and noise quality). Thus, evaluation of the “build” and “no build” corridors included achievement of project goals; engineering, traffic and environmental considerations; and public input. As the Level 1 Screening focused on the achievement of project goals, the Level 2 Screening focused on other considerations and public input. In Table 1, the “build” corridor is highlighted in green if it has the most desirable performance for a particular evaluation criterion or in red if it has the least desirable performance with most desirable for a particular evaluation criterion. The following sections summarize the Level 2 Screening of the combination corridors as displayed in Table 1.

Engineering

The Combination Corridor 2-B, the most northerly I-66 Corridor concept, includes the longest new terrain construction length and also crosses the most difficult terrain of the corridors resulting in the highest total project cost. Even though Combination Corridor 23-D, south of Bowling Green, crosses less difficult terrain, it has relatively high project costs, because of a longer section of the Outer Beltline. Combination Corridor 12-A involves no new terrain construction for I-66, relying completely on widening I-65, but includes a complete Outer Beltline thus no longer resulting in the lowest total project cost. Combination Corridor 12-A also has the greatest concern for maintenance of traffic during construction. Combination Corridor 4-B takes the more northerly route across the north side of Bowling Green crossing more rugged terrain and has a longer section of the Outer Beltline resulting in higher costs. The lowest costs among the Combination Corridors were Corridor 5-A, north of Bowling Green, and Corridor 10-B, north of Bowling Green along with use of I-65, resulting in relatively low project costs.

Geology

Similar to the evaluation of the I-66 Corridor concepts, the northern Combination Corridors, which include Corridors 2-B, 4-B, 5-A, 10-B, and 11-A, have the greatest amount of geological impacts. These corridors cross a significant length of the sinkhole plain along with portions of the Dripping Springs Escarpment and the Mammoth Cave Plateau. There are several karst features within the corridor study bands including cave entrances and sink holes. Combination Corridor 23-D is the southern most alternate, and does not cross a large portion of the sinkhole plain with the I-66 portion of the combination, but does with the Outer Beltline portion. Based on these considerations, all Combination Corridors will have similar impact to the existing geology of the Study Area.

Traffic

In the year 2030, Combination Corridor 5-A has the highest estimated average daily traffic (ADT) volume at 17,150 vehicles per day (vpd). (See Traffic Considerations in Table 1. The narrative below follows through the table.) In addition, the segment of Combination Corridor 5-A between the proposed KY 526 and KY 185 interchanges has the highest estimated segment volume at 23,080 vpd. Combination Corridor 11-A follows with estimated volumes of 16,870 vpd. Combination Corridor 2-B has the least estimated

volume with 9,720 vpd, and it has only 12,400 vpd on the highest volume segment. These numbers show that corridors closer to the north side of Bowling Green and closer to I-65 carry the highest estimated average daily traffic volumes.

In the year 2030, the highest ADT volume along I-65 between the Louie B. Nunn (Cumberland) and William H. Natcher Parkways is on the segment between KY 234 (Cemetery Road) and KY 446. The existing six-lane I-65 may achieve level-of-service (LOS) C at 53,200 vpd, LOS D at 64,500 vpd and LOS E at 86,900 vpd. Thus, the “no build” alternative with existing I-65 at six (6) lanes results in LOS F for this segment.

Referring to Traffic Consideration in Table 1 (third row, last column), Combination Corridor 23-D appears to be the most effective in diverting traffic from existing I-65 between the Louie B. Nunn (Cumberland) and William H. Natcher Parkways. Corridor 23-D leaves an estimated residual volume of 82,080 vpd on I-65, compared to 97,300 vpd for the “no build” alternative, so that a LOS C (equal or less than 95,700 vpd) may be achieved if existing I-65 were widened to eight (8) lanes. Paralleling a significant portion of I-65 from the Louie B. Nunn (Cumberland) Parkway to KY 446, Combination Corridor 5-A is the second most effective in diverting traffic from existing I-65.

Building the Bowling Green Outer Beltline as a part of Combination Corridor 12-A would result in an improvement to the traffic carrying capacity of I-65 over just utilization of I-65 as I-66. Year 2030 traffic assignments to I-66 Corridor 12 resulted in a high of 103,100 vpd on the urban segments between the William H. Natcher Parkway and KY 446 and a high of 85,700 vpd on the rural segments east of KY 446. (Refer to the last table in the I-66 Planning Study report.) When the Outer Beltline is added the highest volume is reduced to 86,170 vpd.

In addition to Combination Corridor 12-A, Combination Corridors 10-B and 11-A would also use a portion of existing I-65 between the Louie B. Nunn (Cumberland) Parkway and their new alignment west of the US 68/KY 80 interchange. The highest estimated volume segment on the common route for I-65 and I-66 is west of the US 68/KY 80 interchange – 84,800 vpd for Corridor 10-B and 84,150 vpd for Corridor 11-A.

Environmental Considerations

Combination Corridor 2-B crosses the sinkhole plain, the escarpment and the Mammoth Cave Plateau. This combination corridor also includes the longest length within the Turnhole Spring groundwater basin, which flows through Mammoth Cave National Park to the Green River. Karst groundwater issues are anticipated for this corridor, which also has the highest number of potential relocations. Combination Corridors 4-B and 5-A include the longest new terrain crossing of the sinkhole plain, creating the greatest potential for water quality concerns and karst impacts. These corridors also have the highest potential farmland, prime farmland and historic impacts.

Combination Corridors 10-B, 11-A and 12-A cross the sinkhole plain primarily along existing I-65; this substantially reduces potential karst impacts and water quality concerns

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as well as reduces potential land requirements and overall impacts. Combination Corridor 12-A relies completely on I-65 with new terrain construction associated with its Outer Beltline portion, thus resulting in lesser potential environmental impacts. Combination Corridors 11-A and 10-B are similar departing I-65 and taking northerly routes around Bowling Green. Of these corridors, Corridor 11-A is closer to Bowling Green and has the least potential environmental impacts of all combination corridors with the exception of historic impacts.

Combination Corridor 23-D is the only corridor south of I-65 with the I-66 portion largely avoiding the sinkhole plain resulting in generally low potential karst impacts and water quality concerns. The corridor also completely avoids the Turnhole Spring groundwater basin. The combination with the longest of the Outer Beltline corridors increases the environmental impacts of this combination corridor.

RECOMMENDATIONS

The corridors that are recommended for further consideration after the Level 2 Screening as a part of each separate project – I-66 Corridor and the Bowling Green Outer Beltline – remain the recommendation when comparing the combinations – Corridors 10-B, 11-A, and 12-A. These combination corridors are shown in Exhibit 6. (The separate recommendations for I-66 and the Beltline appear in Exhibits 7 and 8, respectively.) The “no build” option must also be carried forward for the purposes of fulfilling NEPA requirements. The “build” corridors essentially consist of the following:

- Utilizing I-65 from its interchange with the Louie B. Nunn Parkway to a new interchange on I-65 between the “Corvette Interchange” (KY 446) and the US 68/KY 80 Interchange at Oakland (I-66 Corridors 10, 11 & 12).
- Utilizing either I-66 Corridor 10 or 11, which coincide with Outer Beltline Corridor B or A, respectively, from the new I-65 interchange around the north side of Bowling Green to their respective interchanges along the William H. Natcher Parkway.
- Utilizing the innermost Outer Beltline corridor (A/B) for the southeast leg between the Natcher Extension at its interchange with US 231 and the new I-65 interchange.

These three result in the least amount of new roadway construction, the greatest use of existing freeways and the largest length of coincident segments of I-66 and the Outer Beltline. The following provides the advantages and disadvantages of each of the recommended combinations of alternatives.

Combination Corridor 10-B

Advantages:

- Shortest overall length and makes more use of existing freeway network than other new location corridors
- Highest reduction in congested VHT overall and for trucks within Edmonson County
- Least increase in regional VMT overall

- Low potential for impacts to federal or state listed TES species
- Lowest impact to potentially NRHP eligible historical structures and districts
- Lowest acreage of farmland and percentage of prime farmland impacted
- Lowest acreage of wetlands impacted
- Lowest number of possible relocations
- Political support from City of Bowling Green and Warren County
- Includes longest coincidental segment with Bowling Green Outer Beltline

Disadvantages

- Higher rating for maintenance of traffic during construction
- Least effective in diverting I-65 volumes of new location combinations (88,750 vpd)
- Lowest decrease in congested VHT on I-65 (0.9% over E+C SDC)
- Lowest decrease in VHT for trucks region-wide and for autos or trucks in Warren County
- Highest number of potential archaeological sites
- Minimal public support from 3rd round of public information meetings

Combination Corridor 11-A**Advantages**

- Shortest construction on new location (24.3 miles)
- Shortest overall length and makes more use of existing freeway network than other new location corridors
- 2nd lowest total project cost (\$556.63 million) and lowest estimated construction cost (\$498.16 million)
- Shortest total bridge lengths for crossing the Barren River
- Best rating of constructability (terrain, obstructions, conflicts, etc.)
- 2nd highest average ADT volume (16,870 vpd) for I-66
- Least acreage of open water habitats
- Low acreage of farmland impacted
- Low forest and large block forest potential impacts
- Lowest number of possible relocations
- Low impact to sinkhole plain
- Low impact to mineral resources
- Political support from City of Bowling Green and Warren County
- Includes long coincidental segment with Bowling Green Outer Beltline

Disadvantages

- Least reduction in non-freeway congested VHT and VMT in Edmonson County
- Proximity to 3 federal endangered species
- Large number of historic properties impacted
- Crosses through a potentially NRHP eligible historic district
- Minimal public support from 3rd round of public information meetings

Combination Corridor 12-A**Advantages**

- Shortest construction on new location (24.3 miles)
- Low potential for water quality issues
- Low impact to potentially NRHP eligible historic structures
- Lowest potential impact to farmland including prime farmland
- Low acreage of farmland and lowest percentage of prime farmland impacted
- Low amount of forestland and large forest blocks impacted
- Low potential impact to mineral resources
- Most utilization of the existing parkway system (19.1 miles)

Disadvantages

- Longest total length (66.0 miles) and length of I-65 widening (22.6 miles)
- Highest pre-construction cost (\$66.84 million) – additional I-65 right-of-way
- Longest total bridge lengths for crossing the Barren River
- Worst rating for maintenance of traffic during construction
- Least reduction in non-freeway congested VHT and VMT in Edmonson County
- Proximity to 3 federal endangered species & highest number of state-listed species
- Large number of historic properties impacted
- Highest number of potential archaeological sites
- High number of residential relocations and highest number of business relocations
- 1 RCRA Site
- Minimal public support from 3rd round of public information meetings

The combination corridors that were not recommended due to environmental, engineering, or traffic reasons were Corridors 2-A, 4-B, 5-A, and 23-D. All of these corridors consisted of entirely new terrain routes and most were more costly to build. Because these corridors were entirely made up of new terrain, they were associated with potentially high environmental impacts. The following provides the advantages and disadvantages of these combinations of alternatives.

Combination Corridor 2-B**Advantages**

- Better proximity for Edmonson County
- No widening of I-65
- Better rating for maintenance of traffic during construction
- Lowest impact on historic properties and potential archaeological sites
- Lowest percentage of prime farmland, but high acreage of farmland
- No CERCLA, RCRA, or TRI Sites within corridor
- Large public support from 3rd round of public information meetings
- Political support from local legislators

Disadvantages

- Consists of an entirely new terrain route of the greatest length (48.3 miles)
- Highest construction cost (\$672.73 million) and total project cost (\$725.18 million)
- Worst rating of constructability (terrain, obstructions, conflicts, etc.)
- Least average daily traffic (ADT) volume (9,720 vpd) and least ADT volume on highest volume segment (12,400 vpd)
- Largest growth in overall regional congested VHT and VMT
- High potential impacts upon the Green River groundwater basin
- Highest number of stream crossings
- Highest potential impacts upon forestland including large forest blocks
- High number of relocations
- Highest potential impact upon mineral resources (32 oil and gas wells, 1 quarry)
- 1 abandoned UST site
- Short coincidental segment of I-66 and Bowling Green Outer Beltline

Combination Corridor 4-B**Advantages**

- Short overall project length (46.0 miles)
- Better rating for maintenance of traffic during construction
- Large reduction in congested VHT and VMT for Edmonson County non-freeway roadways
- Low number of potential relocations
- Largest public support of “build” corridors from 3rd round of public information meetings

Disadvantages

- Creates close parallel freeway to I-65, but doesn’t remove sufficient traffic from I-65 to avoid future widening
- Highest potential for water quality issues
- Largest acreage of impacts to open water habitats
- Traverses a potentially NHRP eligible historic district
- High potential for impacts on farmland including prime farmland
- High potential impacts upon forestland including large forest blocks
- Has the largest acreage of sinkholes impacted (519 ac.)
- 2nd highest in mineral resource impacts (21 oil and gas wells, 1 quarry)

Combination Corridor 5-A**Advantages**

- Short overall project length (46.1 miles)
- Lowest pre-construction cost (\$39.39 million), construction cost (\$505.08 million) and lower total project cost (\$544.47 million)
- Better rating for maintenance of traffic during construction
- Better rating of constructability (terrain, obstructions, conflicts, etc.)

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- Highest ADT volume (17,150 vpd) and highest ADT volume on highest volume segment (23,080 vpd)
- Low ADT volume on I-65 (85,430 vpd)
- Largest reduction in congested VHT for Warren County in all categories
- Largest reduction in VMT for Warren County non-freeway roadways
- Lowest potential impacts on stream crossings
- Lowest potential impacts on floodplains
- Low potential impact on wetlands
- Lowest impact on potential archaeological sites
- Low potential impacts upon large forest blocks
- Low potential for relocations
- No hazardous waste sites
- Low potential impacts to mineral resources
- Large public support from 3rd round of public information meetings

Disadvantages

- Creates close parallel freeway to I-65, but doesn't remove sufficient traffic from I-65 to avoid future widening
- High increase in congested VMT for entire regional network
- Highest potential for water quality issues
- Proximity to TES species (state and federal)
- Highest number of potentially NRHP eligible historic sites
- Crosses through both potentially NRHP eligible historic districts
- High potential impact to farmland including highest percentage of prime farmland
- High potential for impacts to sinkhole plain

Combination Corridor 23-D

Advantages

- Best rating for maintenance of traffic during construction
- Best rating of constructability (terrain, obstructions, conflicts, etc.)
- Greatest effect on reducing I-65 traffic – lowest ADT volume on I-65 (82,080 vpd) and greatest decrease in I-65 VHT
- Greatest decrease in region-wide congested VHT for autos and trucks
- Least increase in VMT in Warren County overall
- Low impacts to large forest blocks
- No hazardous waste sites

Disadvantages

- 2nd longest overall length (61.2) and total length of new location corridors (46.2 miles)
- 2nd highest construction cost (\$610.09 million) and total project cost (\$656.41 million)
- Doesn't remove sufficient traffic from I-65 to avoid future widening
- Proximity to TES species (state and federal)
- High potential impacts upon historic and archaeological resources
- Highest potential impacts to farmland

- Highest number of potential relocations
- Highest number of cave entrances
- High potential for impacts to sinkhole plain
- Least public support from 3rd round of public information meetings, plus a petition in opposition to this corridor
- Short coincidental segment of I-66 and Bowling Green Outer Beltline

For these reasons, it is recommended that Combination Corridors 2-A, 4-B, 5-A and 23-D not be carried forward for further consideration.

In addition to the “no build” option, the Combination Corridors recommended for further consideration are 10-B, 11-A and 12-A, as shown in Exhibit 6. (The separate recommendations for I-66 and the Beltline appear in Exhibits 7 and 8, respectively.)

EXHIBIT 1
Project Study Area

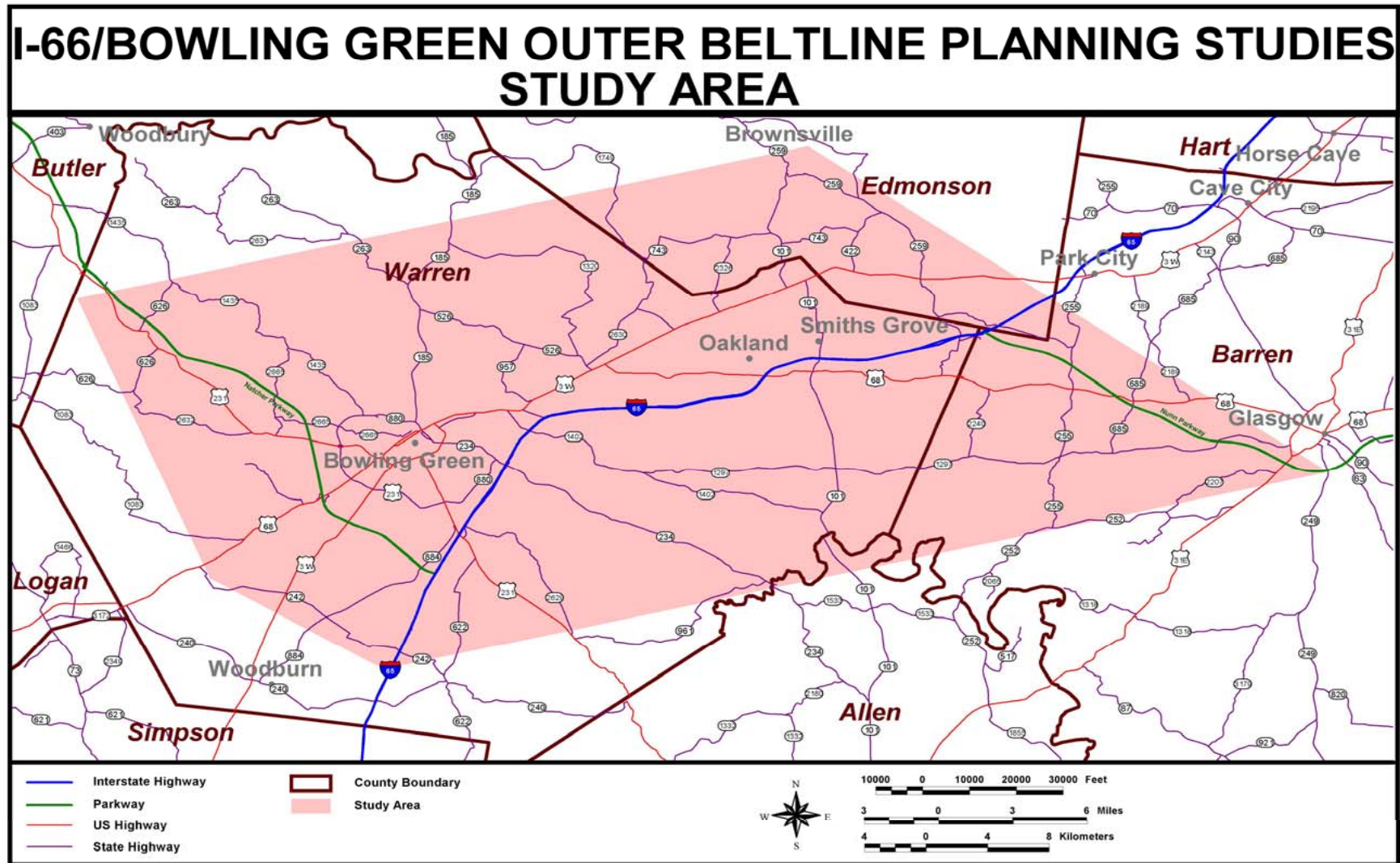
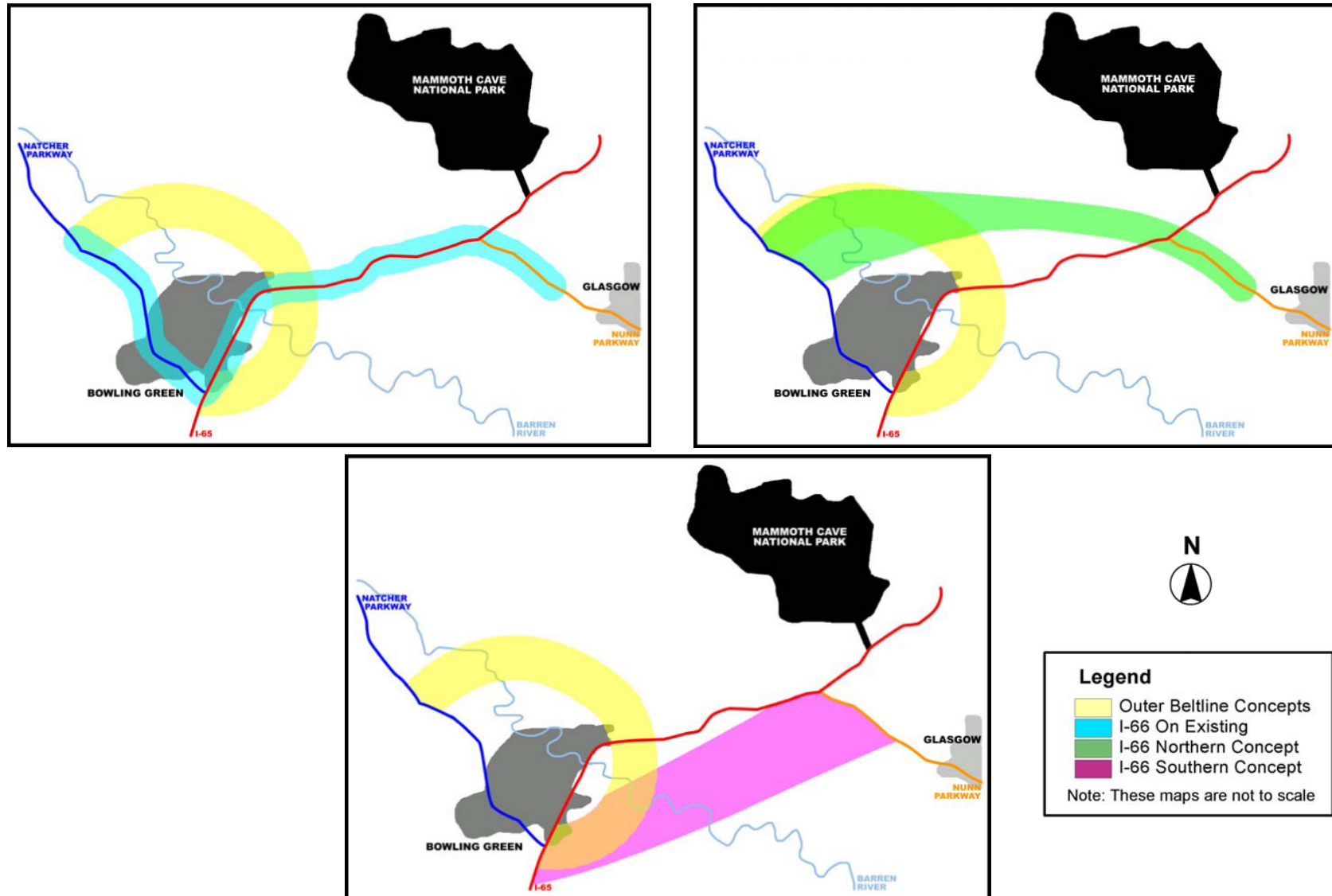


EXHIBIT 2
Conceptual Combinations of Alternatives



Warren, Edmonson, and Barren County, Kentucky

EXHIBIT 3

I-66 Corridors Level 2 Screening of Final Corridors

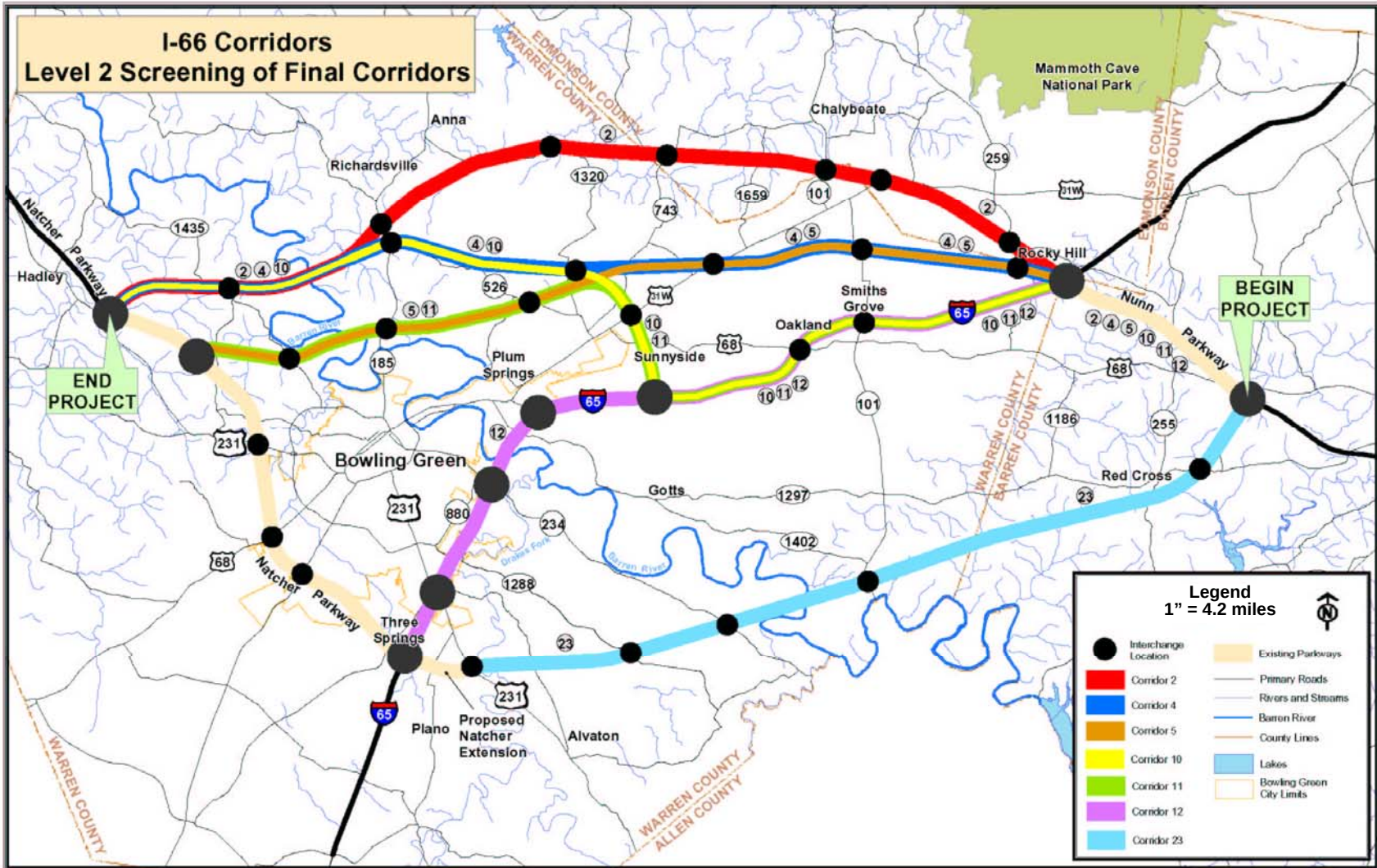
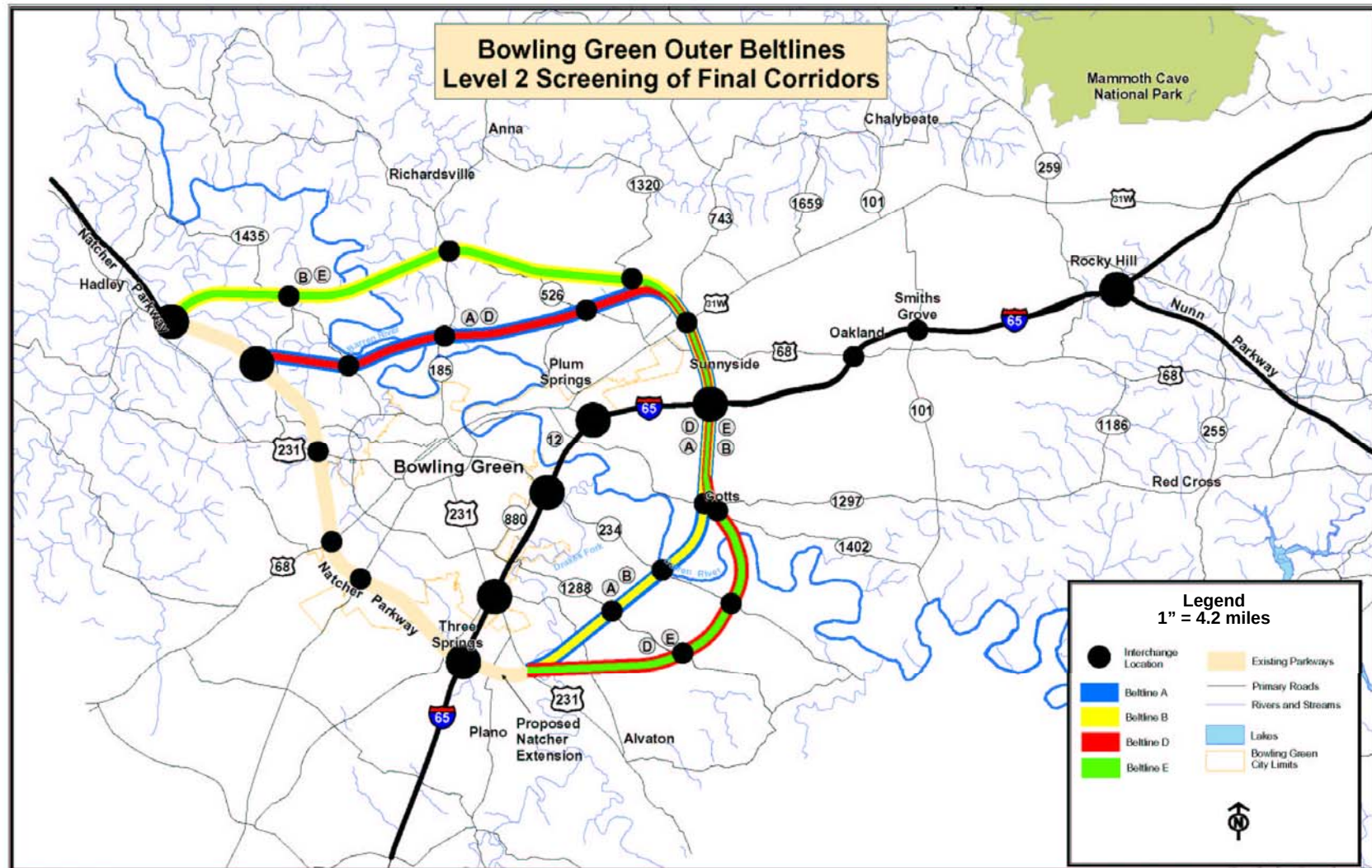
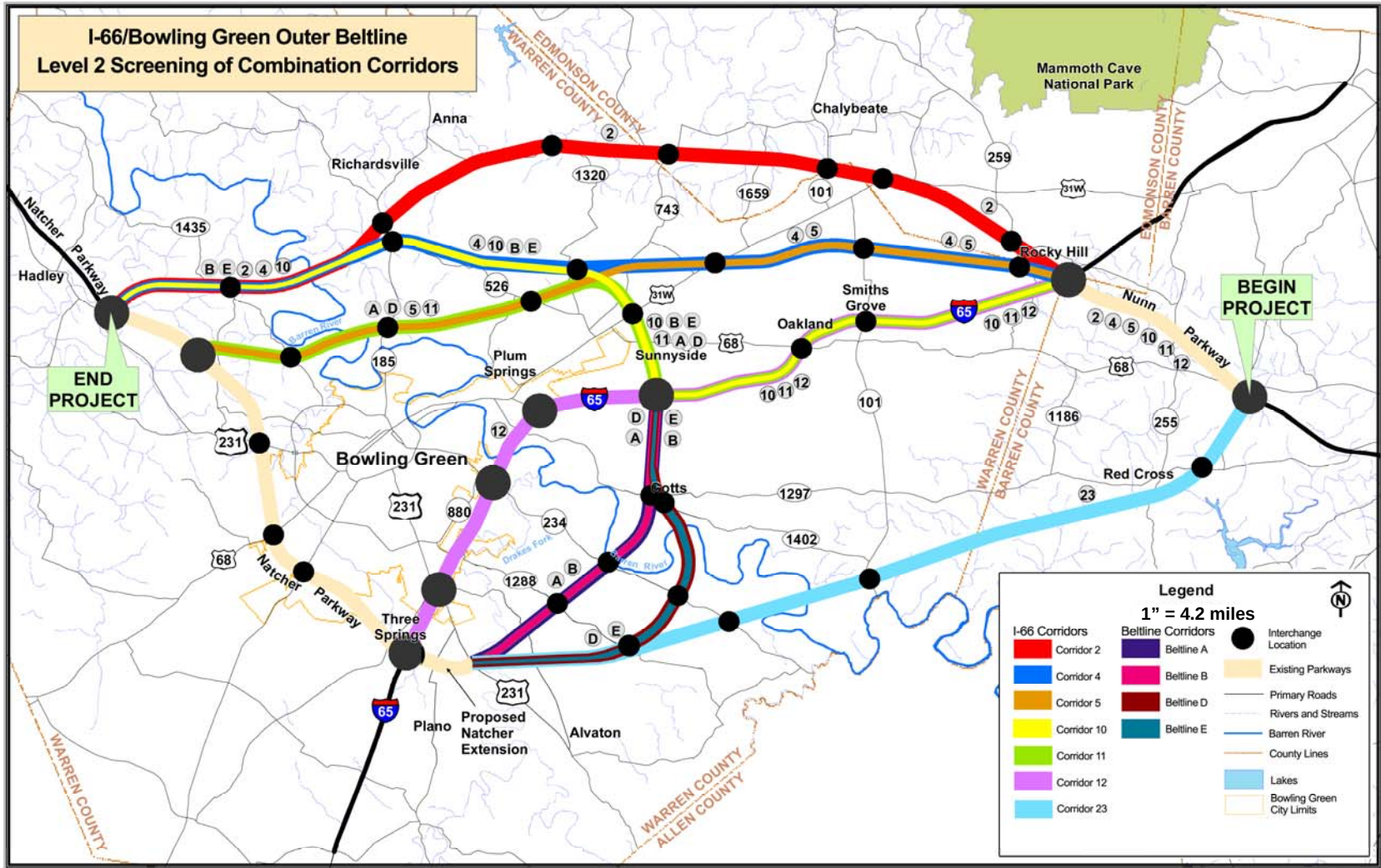


EXHIBIT 4
Bowling Green Outer Beltlines Level 2 Screening of Final Corridors



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EXHIBIT 5
I-66/Bowling Green Outer Beltlines Combination Corridors



I-66/Bowling Green Outer Beltlines Recommended Combination Corridors



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EXHIBIT 7
Bowling Green Outer Beltlines Recommended Corridors

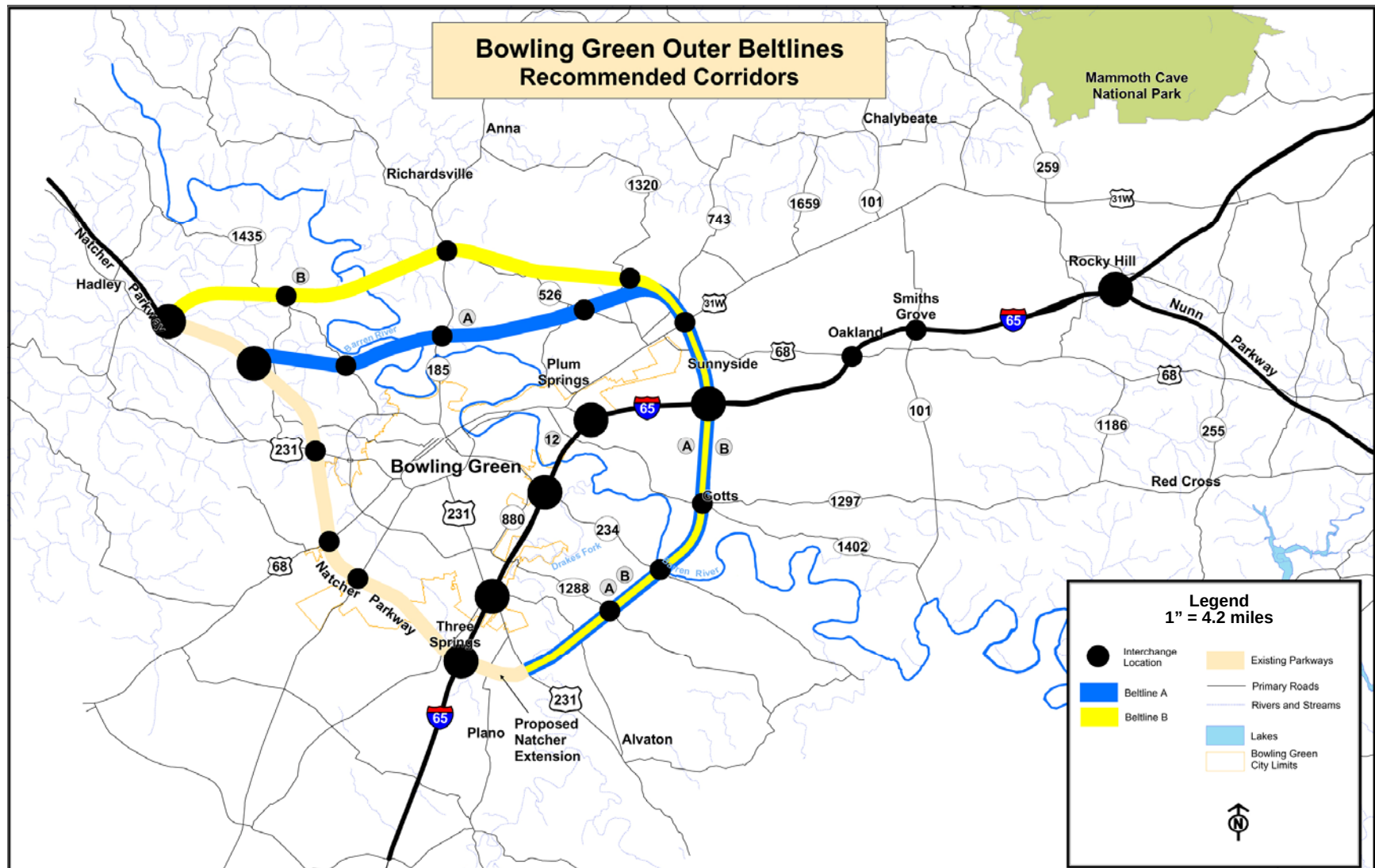


EXHIBIT 8



Compatibility of I-66 and BG Outer Beltline
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TABLE 1
Combination of I-66 Corridor & Bowling Green Outer Beltline
Level 2 Screening Evaluation
Red: least desirable, Green: most desirable

Criteria	Unit	E+C KySTM ^	E+C SDC ^^	Combination I-66/Outer Beltline Corridors						
				2-B	4-B	5-A	10-B	11-A	12-A	23-D
Engineering Considerations										
Length: Total	Miles	n/a	n/a	54.2	46.0	46.1	44.7	44.7	66.0	61.2
New Location	Miles	n/a	n/a	48.3	40.1	37.6	26.9	24.3	24.3	46.2
I-65 Widening	Miles	n/a	n/a	0.0	0.0	0.0	11.9	11.9	22.6	0.0
Utilization of Parkways	Miles	n/a	n/a	5.9	5.9	8.5	5.9	8.5	19.1	15.0
Estimated Pre-Construction Cost (\$) (Design, Right-of-Way & Utilities)	Million \$	n/a	n/a	\$52.45	\$42.56	\$39.39	\$48.95	\$58.37	\$66.84	\$46.32
Estimated Construction Cost (\$) (Roadway, Drainage, Bridge & Mitigation)	Million \$	n/a	n/a	\$672.73	\$567.49	\$505.08	\$543.12	\$498.16	\$546.69	\$610.09
TOTAL PROJECT COST (\$)	Million \$	n/a	n/a	\$725.18	\$610.05	\$544.47	\$592.07	\$556.63	\$613.53	\$656.41
RIVER CROSSINGS										
Bridge Length over the Barren River (ft)	Lin. Ft.	n/a	n/a	3,550	3,550	3,150	3,550	3,150	5,400	4,100
Bridge Length over the Drakes Fork (ft)	Lin. Ft.	n/a	n/a	1,250	1,250	1,250	1,250	1,250	1,250	2,500
Proposed Number of Bridges/Drainage Crossings	Number	n/a	n/a	16	7	5	6/1	3/1	3/2	10
Roads Crossed: Interstates, US & Major State Routes	Number	n/a	n/a	16	14	14	13	13	17	14
Other State Routes & Local Roads	Number	n/a	n/a	27	26	23	23	22	25	33
Proposed Number of Interchanges (Existing/Proposed)	Number	n/a	n/a	1/15	1/13	1/13	3/10	3/10	6/11	0/14
Proposed Number of Overpasses	Number	n/a	n/a	27	26	23	23	22	25	33
Maintenance of Traffic during Construction **	Rating	n/a	n/a	L	L	L	M	M	H	L
Constructability Rating (Terrain, Obstructions, Conflicts, etc.) **	Rating	n/a	n/a	H	M	L	M	L	M	L
Traffic Considerations										
I-66 Average Daily Traffic (ADT) Forecast -- Average	ADT	n/a	n/a	9,720	13,160	17,150	12,430	16,870	n/a	12,260
I-66 ADT Forecast -- Highest Segment	ADT	n/a	n/a	12,400	17,540	23,080	20,710	19,220	n/a	18,200
I-65 (Natcher to Nunn) ADT -- Highest Segment	ADT	84,029	97,309	88,090	88,540	85,430	88,750	86,170	n/a	82,080
% Change from E+C (SDC)	%	---	---	-9.5%	-9.0%	-12.2%	-8.8%	-11.5%	-11.5%	-15.7%
I-65/I-66 Common Section ADT -- Highest Segment	ADT	n/a	n/a	n/a	n/a	n/a	84,800	84,150	84,150	n/a
I-66 (Natcher to Nunn) Congested Speed	mph	61.7	59.6	65.0	65.0	65.0	65.0	65.0	65.0	65.0
% Change from E+C (SDC)	%	---	---	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%
I-65 (Natcher to Nunn) Congested Vehicle Hours of Travel (VHT)	VHT	27,600	32,400	31,050	29,890	28,710	32,120	31,360	31,260	28,600
% Change from E+C (SDC)	%	---	---	-4.2%	-7.7%	-11.4%	-0.9%	-3.2%	-3.2%	-11.7%

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TABLE 1
Combination of I-66 Corridor & Bowling Green Outer Beltline

Level 2 Screening Evaluation

Red: least desirable, Green: most desirable

Criteria	Unit	E+C KySTM ^	E+C SDC ^^	Combination I-66/Outer Beltline Corridors						
				2-B	4-B	5-A	10-B	11-A	12-A	23-D
Regional Congested Vehicle Hours of Travel (VHT)	VHT	583,920	667,240	667,410	666,770	665,270	667,250	665,940	665,940	665,080
% Change from E+C (SDC)	%	---	---	0.0%	-0.1%	-0.3%	0.0%	-0.2%	-0.2%	-0.3%
Regional Congested VHT for Trucks	VHT	71,330	77,960	77,770	77,720	77,580	77,850	77,750	77,750	77,520
% Change from E+C (SDC)	%	---	---	-0.2%	-0.3%	-0.5%	-0.1%	-0.3%	-0.3%	-0.6%
Warren County Congested VHT	VHT	172,340	204,050	197,980	198,790	196,720	199,460	197,670	197,670	196,790
% Change from E+C (SDC)	%	---	---	-3.0%	-2.6%	-3.6%	-2.3%	-3.1%	-3.1%	-3.6%
Warren County Non-Freeway Congested VHT	VHT	130,670	155,810	144,570	144,710	142,400	145,560	143,580	143,580	143,940
% Change from E+C (SDC)	%	---	---	-7.2%	-7.1%	-8.6%	-6.6%	-7.9%	-7.9%	-7.6%
Warren County Congested VHT for Trucks	VHT	17,640	19,730	18,880	19,000	18,820	19,140	18,980	18,980	18,840
% Change from E+C (SDC)	%	---	---	-4.3%	-3.7%	-4.6%	-3.0%	-3.8%	-3.8%	-4.5%
Edmonson County Congested VHT	VHT	11,240	15,150	16,640	15,030	15,270	14,750	14,900	14,900	14,850
% Change from E+C (SDC)	%	---	---	9.8%	-0.8%	0.8%	-2.6%	-1.6%	-1.6%	-1.9%
Edmonson County Non-Freeway Congested VHT	VHT	9,090	12,760	12,310	12,210	12,430	12,330	12,490	12,490	12,460
% Change from E+C (SDC)	%	---	---	-3.6%	-4.3%	-2.6%	-3.4%	-2.2%	-2.2%	-2.4%
Edmonson County Congested VHT for Trucks	VHT	1,440	1,580	1,780	1,560	1,570	1,530	1,540	1,540	1,540
% Change from E+C (SDC)	%	---	---	12.8%	-0.8%	-0.3%	-2.9%	-2.5%	-2.5%	-2.5%
Regional Vehicle Miles of Travel (VMT)	VMT	23,075,370	25,823,750	26,463,590	26,436,220	26,456,030	26,363,370	26,374,530	26,374,530	26,380,130
% Change from E+C (SDC)	%	---	---	2.5%	2.4%	2.4%	2.1%	2.1%	2.1%	2.2%
Regional VMT for Trucks	VMT	3,826,380	4,063,940	4,108,990	4,107,720	4,108,070	4,104,630	4,105,200	4,105,200	4,102,660
% Change from E+C (SDC)	%	---	---	1.1%	1.1%	1.1%	1.0%	1.0%	1.0%	1.0%
Warren County VMT	VMT	5,973,780	6,765,850	6,952,480	7,015,530	7,015,720	7,002,360	6,998,280	6,998,280	6,938,180
% Change from E+C (SDC)	%	---	---	2.8%	3.7%	3.7%	3.5%	3.4%	3.4%	2.5%
Warren County Non-Freeway VMT	VMT	3,409,330	3,877,440	3,696,260	3,702,100	3,665,140	3,732,940	3,700,660	3,700,600	3,680,160
% Change from E+C (SDC)	%	---	---	-4.7%	-4.5%	-5.5%	-3.7%	-4.6%	-4.6%	-5.1%
Warren County VMT for Trucks	VMT	870,960	925,890	928,210	938,620	937,560	939,110	937,810	937,810	930,140
% Change from E+C (SDC)	%	---	---	0.2%	1.4%	1.3%	1.4%	1.3%	1.3%	0.5%
Edmonson County VMT	VMT	495,570	648,340	749,250	652,760	659,510	632,670	637,810	637,810	635,150
% Change from E+C (SDC)	%	---	---	15.6%	0.7%	1.7%	-2.4%	-1.6%	-1.6%	-2.0%
Edmonson County Non-Freeway VMT	VMT	357,050	495,640	471,290	472,320	478,100	478,250	483,550	483,550	482,010
% Change from E+C (SDC)	%	---	---	-4.9%	-4.7%	-3.5%	-3.5%	-2.4%	-2.4%	-2.8%
Edmonson County VMT for Trucks	VMT	77,740	82,820	96,150	82,880	83,040	80,850	81,010	81,010	81,010
% Change from E+C (SDC)	%	---	---	16.1%	0.1%	0.3%	-2.4%	-2.2%	-2.2%	-2.2%

Compatibility of I-66 and BG Outer Beltline
Warren, Edmonson, and Barren County, Kentucky

TABLE 1
Combination of I-66 Corridor & Bowling Green Outer Beltline
Level 2 Screening Evaluation

Red: least desirable, **Green:** most desirable

Criteria	Unit	E+C KySTM ^	E+C SDC ^^	Combination I-66/Outer Beltline Corridors						
				2-B	4-B	5-A	10-B	11-A	12-A	23-D
Environmental Considerations*										
Aquatic/Terrestrial Ecosystems										
Water Quality Issues**	Rating	n/a	n/a	M-H	H	H	M-H	M-H	L-M	M-H
Ground Water Basins: Green River	Length crossed(mi)	n/a	n/a	3.0	1.5	1.5	1.1	1.1	1.1	0
Barren River	Length crossed(mi)	n/a	n/a	19.8	26.6	24.1	25.4	23.5	29.2	18.2
Streams: 1st Order (Intermittent)	Number	n/a	n/a	13	8	5	9	6	7	11
2nd Order (Perennial)	Number	n/a	n/a	7	2	1	2	1	1	1
3rd Order (Perennial)	Number	n/a	n/a	1	1	1	2	2	2	0
4th Order (Perennial)	Number	n/a	n/a	0	0	0	0	0	0	0
5th Order (Perennial)	Number	n/a	n/a	0	0	0	0	0	0	0
6th Order (Perennial)	Number	n/a	n/a	1	1	1	1	1	1	1
7th Order (Perennial)	Number	n/a	n/a	2	2	2	2	2	3	3
Total	Number	n/a	n/a	24	14	10	16	12	14	16
Open Water Habitats (Ponds & Lakes)	Acres	n/a	n/a	15.6	16.1	12.7	10.2	7.9	8.8	14.3
Floodplains	Lin. Ft.	n/a	n/a	13,508	10,542	8,959	12,229	10,737	11,259	10,138
Wetlands: Forested	Acres	n/a	n/a	2.4	0.4	0.0	0.2	0.0	0.0	2.3
Scrub/Shrub	Acres	n/a	n/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Emergent	Acres	n/a	n/a	1.3	1.4	1.3	0.6	0.6	1.5	0.6
Aquatic Bed	Acres	n/a	n/a	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	Acres	n/a	n/a	3.7	1.8	1.3	0.8	0.6	1.5	2.9
Wild and Scenic Rivers***	Yes/No	n/a	n/a	No	No	No	No	No	No	No
Big Trees (e.g., State Champion)	Number	n/a	n/a	0	0	0	0	0	0	0
Federal and State Species****										
Federally Endangered	Number	n/a	n/a	0	0	3	0	3	3	3
Federally Threatened	Number	n/a	n/a	0	0	0	0	0	0	0
State Listed Species*****	Number	n/a	n/a	3	3	7	2	6	10	7
Total	Number	n/a	n/a	3	3	10	2	9	13	10
Historic/Archaeological Impacts*****										
Historic Structures (Listed)	Number	n/a	n/a	1	1	0	1	0	0	0
Historic Structures (Potentially Eligible)	Number	n/a	n/a	2	3	7	2	6	6	5
Historic Districts (Listed)	Number	n/a	n/a	0	0	0	0	0	0	0

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				2-B	4-B	5-A	10-B	11-A	12-A	23-D
Historic Districts (Potentially Eligible)	Number	n/a	n/a	0	1	2	0	1	1	1
Archaeological Resource Potential	Rating	n/a	n/a	H-M	H-M	H-M	H-M	H-M	H-M	H-M
Archaeological Sites: National Register	Number	n/a	n/a	0	0	0	0	0	0	0
Historic	Number	n/a	n/a	3	3	3	3	3	3	3
Prehistoric	Number	n/a	n/a	9	9	9	12	11	12	12
Total	Number	n/a	n/a	12	12	12	15	14	15	15
Historic Cemeteries	Number	n/a	n/a	4	4	4	5	5	5	8
Socioeconomic Impacts										
Land Use: Farmland*****	Acres	n/a	n/a	1,801	1,671	1,614	1,134	1,135	1,232	1,899
Forest	Acres	n/a	n/a	519	336	189	304	175	178	318
Wetland/Water	Acres	n/a	n/a	10	11	12	8	10	11	13
Residential/Business	Acres	n/a	n/a	0	0	0	4	4	33	0
Land Use: % Farmland	%	n/a	n/a	77	83	89	78	86	85	85
% Forest	%	n/a	n/a	22	17	10	21	13	12	14
% Wetland	%	n/a	n/a	<1	<1	<1	<1	<1	<1	<1
% Residential/Business	%	n/a	n/a	0	0	0	<1	<1	2	0
Percent Prime Farmland (Estimate)*****	%	n/a	n/a	28	31	35	12	16	12	25
Large Forest Block (KSNPC)*****	Number	n/a	n/a	37	14	4	16	5	5	6
Large Forest Block (KSNPC)*****	Acres	n/a	n/a	443	193	55	182	10	10	16
Relocations: Homes	Number	n/a	n/a	70	39	41	36	39	78	84
Mobile Homes	Number	n/a	n/a	12	6	5	6	5	5	11
Businesses	Number	n/a	n/a	0	0	0	0	0	6	2
Schools	Number	n/a	n/a	0	0	0	0	0	0	0
Public Facilities	Number	n/a	n/a	2	2	1	2	1	1	0
Cemeteries	Number	n/a	n/a	1	0	0	0	0	0	1
Churches	Number	n/a	n/a	1	1	0	1	0	0	1
# of Railroad Tracks: Active	Number	n/a	n/a	2	2	2	2	2	1	1
Abandoned	Number	n/a	n/a	0	0	0	0	0	0	0
Utilities: Transmission Lines	Number	n/a	n/a	6	6	6	7	7	10	8
Pipelines	Number	n/a	n/a	1	1	4	1	4	1	4
Towers (Radio/Cellular)	Number	n/a	n/a	0	0	0	0	0	0	0
Water Towers	Number	n/a	n/a	0	0	0	0	0	0	0
Substations	Number	n/a	n/a	1	0	0	0	0	0	0
Fiber Optics	Number	n/a	n/a	1	1	1	1	1	1	1

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				2-B	4-B	5-A	10-B	11-A	12-A	23-D
Environmental Justice Issues**	Rating	n/a	n/a	L	L	M	L	L-M	L-M	L-M
UST Facilities: Existing Abandoned	Number	n/a	n/a	0	0	0	0	0	0	0
	Number	n/a	n/a	1	0	0	0	0	0	0
Landfills (Old)	Number	n/a	n/a	0	0	0	0	0	0	0
CERCLA Sites	Number	n/a	n/a	0	0	0	0	0	0	0
RCRA Sites	Number	n/a	n/a	1	1	0	1	0	1	0
TRI Sites	Number	n/a	n/a	0	0	0	0	0	0	0
Geological Issues										
Number of Cave Entrances*****	Number	n/a	n/a	9	9	5	8	4	5	19
Sinkholes	Number	n/a	n/a	194	157	154	221	220	295	187
Sinkholes	Acres	n/a	n/a	287	519	508	243	235	285	294
Oil and Gas Wells	Number	n/a	n/a	32	21	8	19	7	8	17
Dry and Abandoned Wells	Number	n/a	n/a	13	12	8	8	7	7	17
Oil Batteries	Number	n/a	n/a	0	0	0	0	0	0	0
Quarries	Number	n/a	n/a	1	1	1	1	1	1	1
Coal Mines	Number	n/a	n/a	0	0	0	0	0	0	0
Managed Lands										
Federal Lands	Number	n/a	n/a	0	0	0	0	0	0	0
State Lands	Number	n/a	n/a	0	0	0	0	0	0	0
Nature Conservancy Lands	Number	n/a	n/a	0	0	0	0	0	0	0
City Parks	Number	n/a	n/a	0	0	0	0	0	0	0
Air Quality										
Project is in the 6-Year Plan***	Yes/No	n/a	n/a	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Highway Noise										
Potential for Noise Impacts**	Rating	n/a	n/a	L-M	L	M	L	M-H	L-M	L-M

3 Evaluation does not include any modifications to the existing Natcher and Nunn Parkways or the Natcher Extension

** Denotes a probability, i.e., H – High, M – Moderate, L - Low

*** Denotes a Yes or No response

**** Denotes within 1 mile of the centerline

***** Does not include Federally Listed Species

***** Denotes within 1,000 feet of the centerline

***** Land use impacts do not include existing transportation land use of I-65

***** Denotes estimated percent of new terrain construction crossing prime farmland

***** Large Forest Blocks identified by Kentucky State Nature Preserves Commission

^ KySTM -- Forecasts based on similar data to that in the Kentucky Statewide Travel Model

^^ SDC -- Forecasts based on information received from State Data Center in 2002