

APPENDIX H

UTILITY REPORT

**New Corridor Study from I-71 in Gallatin County to AA Highway in Campbell County
Utility Impacts to Level Two Screening of Alternatives - Cost Estimate**

Prepared For:

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Intended User

The intended user of this cost estimate is Richard Sutherland, P.E., Senior Principal, Stantec and the Kentucky Transportation Cabinet (KYTC). No other parties are authorized to rely on this report or any part thereof for any purpose.

Intended Use

The intended use of this report is to provide cost estimates of utility impacts to Level Two screening of the four selected alternatives.

Scope of Work

Identify all major utility conflicts within the corridor boundaries of four Level Two alternatives, identified as Alternates A, B1, D1, and D2.

- Utilize mapping and alignments provided by others to depict major utility crossings and potential impacts for both alternatives
- Develop estimates of cost to relocate utilities within the four corridors
- Estimate costs of non-major distribution lines, but not identified on the mapping
- Develop non-major distribution line cost estimates based on professional experience on a 'per mile' basis
- Determine major utility impact costs based on varying sources per specific utility
- Prepare final report of utility costs to include a narrative discussion of major utility impacts that would require extraordinary coordination or would present a serious obstacle to construction.

Utility Impact Cost Estimate Methodology

For non-major utility distribution lines or collector systems which may be impacted along the proposed alignments, an estimated unit cost has been utilized to determine the general impact of these systems on the project. For utility transmission mains or those with potentially major impacts, the individual system and company has been identified and to the extent possible, unit cost for relocations have been utilized based on information provided by the utility company. Most utility companies were not able to provide unit costs for relocation, so other sources such as KYTC, US DOT, and research studies on utility main costs have been utilized.

Impact of Utility Relocations on Alternative Alignments

The rationale for determining the impact of utility relocations for each alternative on the project is provided below.

Alternate A

This alternative includes 25.0 miles in Kentucky. For non-major utility distribution lines an estimated unit cost of \$600,000 per mile has been utilized to account for the general impact of these utilities on the project. Thirteen (13) major utility impacts were identified. The major

utility impacts included: Electric, Natural Gas, Telecommunications – Fiber, and Water Mains. A brief summary of each major utility impact for this alternative is as follows.

Electric

Companies

The major overhead electric lines range in voltage from 69 kV to 345 kV. Some of the overhead lines have wooden pole and some have metal frame towers. A list of companies that have major electric facilities in the area of the project is as follows:

- East Kentucky Power Co-op
- Ohio Valley Electric Corp.
- Union Light, Heat and Power Co.

Assumptions

The cost estimates are based on unit prices which include the cost of relocating poles/towers as necessary. For estimating purposes, it was assumed that the complete overhead section of electric line within the project area must be relocated. The quantity estimates are based on footages to the nearest tower/pole supports that are located outside of the construction limits.

Cost estimates for the relocation of overhead electric lines are based on unit costs provided by Stantec and confirmed with local high voltage electrical contractors.

Natural Gas

Companies

The major natural gas systems as provided by the gas company were classified as follows: transmission, high pressure, and feeder mains. The only company that had major natural gas facilities in area of the project is as follows:

- Duke Energy

Assumptions

The cost estimates are based on unit prices which include the cost of relocating the complete gas main and all appurtenances within the project area. The quantity estimates are based on footages within the construction limits plus 500 LF on each side.

Cost estimates for the relocation of natural gas mains are based on unit costs from IHS Economics Report.

Telecommunication – Fiber

Companies

The only telecommunication system which was identified by the telecommunication company as a potential major impact were the fiber optic systems. All other telecommunications systems such as cable television were considered as distribution systems and included in the distribution system unit cost. The only companies that had major telecommunications - fiber facilities in area of the project are as follows:

AT&T
Sprint

Assumptions

The cost estimates are based on unit prices which include the cost of relocating the complete fiber system and all appurtenances within the project area. The quantity estimates are based on footages within the construction limits plus 1,000 LF on each side.

Cost estimates for the relocation of fiber telecommunications mains are based on unit costs from the US Department of Transportation – Office Research & Technology.

Water Transmission Mains

Companies

The only water transmission mains which were identified as a potential major impact were the mains that were considered 12-inch or larger. All other water distribution systems were considered as distribution/collector systems and included in the distribution/collector system unit cost. The only company that had major water transmission main systems in area of the project is as follows:

Northern Kentucky Water District

Assumptions

The cost estimates are based on unit prices which include the cost of relocating the complete water transmission mains and appurtenances within the project area. The quantity estimates are based on footages within the construction limits plus 500 LF on each side.

Cost estimates for the relocation of water transmission mains are based on unit costs provided by Clermont County Water Resources and have been escalated for future planning purposes.

Alternate B1

This alternative includes 35.5 miles in Kentucky. Thirteen (13) major utility impacts were identified. The major utility impacts included: Electric, Natural Gas, Water and Telecommunications – Fiber. A summary of each major utility impact for this alternative is as follows.

Electric

Companies

The major overhead electric lines range in voltage from 69 kV to 345 kV. Some of the overhead lines have wooden pile and some have metal frame towers. A list of companies that have major electric facilities in the area of the project is as follows:

East Kentucky Power Co-op
Ohio Valley Electric Corp.
Union Light, Heat and Power Co.
Kentucky Utilities Co.

Assumptions

The cost estimates are based on unit prices which include the cost of relocating poles/towers as necessary. For estimating purposes, it was assumed that the complete overhead section of electric line within the project area must be relocated. The quantity estimates are based on footages to the nearest tower/pole supports that are located outside of the construction limits.

Cost estimates for the relocation of overhead electric lines are based on unit costs provided by Stantec and confirmed with local high voltage electrical contractors.

Natural Gas

Companies

The major natural gas systems as provided by the gas company were classified as follows: transmission, high pressure and feeder mains. The only company that had major natural gas facilities in area of the project is as follows:

Duke Energy

Assumptions

The cost estimates are based on unit prices which include the cost of relocating the complete gas main and all appurtenances within the project area. The quantity estimates are based on footages within the construction limits plus 500 LF on each side.

Cost estimates for the relocation of natural gas mains are based on unit costs from IHS Economics Report.

Water Transmission Mains

Companies

The only water transmission mains which were identified as a potential major impact were the mains that were considered 12-inch or larger. All other water distribution systems were considered as distribution/collector systems and included in the distribution/collector system unit

cost. The only company that had major water transmission main systems in area of the project is as follows:

Northern Kentucky Water District

Assumptions

The cost estimates are based on unit prices which include the cost of relocating the complete water transmission mains and appurtenances within the project area. The quantity estimates are based on footages within the construction limits plus 500 LF on each side.

Cost estimates for the relocation of water transmission mains are based on unit costs provided by Clermont County Water Resources and have been escalated for future planning purposes.

Telecommunication – Fiber

Companies

The only telecommunication system which was identified by the telecommunication company as a potential major impact were the fiber optic systems. All other telecommunications systems such as cable television were considered as distribution systems and included in the distribution system unit cost. The only company that had major telecommunications-fiber facilities in area of the project are as follows:

Sprint

Assumptions

The cost estimates are based on unit prices which include the cost of relocating the complete fiber system and all appurtenances within the project area. The quantity estimates are based on footages within the construction limits plus 1,000 LF on each side.

Cost estimates for the relocation of fiber telecommunications mains are based on unit costs from the US Department of Transportation – Office Research & Technology.

Alternate D1

This alternative includes 48.5 miles in Kentucky. Nine (9) major utility impacts were identified. The major utility impacts included: Electric and Telecommunications – Fiber. A summary of each major utility impact for this alternative is as follows.

Electric

Companies

The major overhead electric lines range in voltage from 69 kV to 138 kV. Some of the overhead lines have wooden pile and some have metal frame towers. A list of companies that have major electric facilities in the area of the project is as follows:

East Kentucky Power Co-op
Kentucky Utilities Co.

Assumptions

The cost estimates are based on unit prices which include the cost of relocating poles/towers as necessary. For estimating purposes, it was assumed that the complete overhead section of electric line within the project area must be relocated. The quantity estimates are based on footages to the nearest tower/pole supports that are located outside of the construction limits.

Cost estimates for the relocation of overhead electric lines are based on unit costs provided by Stantec and confirmed with local high voltage electrical contractors.

Telecommunication – Fiber

Companies

The only telecommunication system which was identified by the telecommunication company as a potential major impact were the fiber optic systems. All other telecommunications systems such as cable television were considered as distribution systems and included in the distribution system unit cost. The only companies that had major telecommunications - fiber facilities in area of the project are as follows:

AT&T
Sprint

Assumptions

The cost estimates are based on unit prices which include the cost of relocating the complete fiber system and all appurtenances within the project area. The quantity estimates are based on footages within the construction limits plus 1,000 LF on each side.

Cost estimates for the relocation of fiber telecommunications mains are based on unit costs from the US Department of Transportation – Office Research & Technology.

Alternate D2

This alternative includes 44.5 miles in Kentucky. Thirteen (13) major utility impacts were identified. The major utility impacts included: Electric, Natural Gas, and Telecommunications – Fiber. A summary of each major utility impact for this alternative is as follows.

Electric

Companies

The major overhead electric lines range in voltage from 69 kV to 138 kV. Some of the overhead lines have wooden pile and some have metal frame towers. A list of companies that have major electric facilities in the area of the project is as follows:

East Kentucky Power Co-op
Kentucky Utilities Co.
Union Light, Heat, and Power Co.

Assumptions

The cost estimates are based on unit prices which include the cost of relocating poles/towers as necessary. For estimating purposes, it was assumed that the complete overhead section of electric line within the project area must be relocated. The quantity estimates are based on footages to the nearest tower/pole supports that are located outside of the construction limits.

Cost estimates for the relocation of overhead electric lines are based on unit costs provided by Stantec and confirmed with local high voltage electrical contractors.

Natural Gas

Companies

The major natural gas systems as provided by the gas company were classified as follows: transmission, high pressure, and feeder mains. The only company that had major natural gas facilities in area of the project is as follows:

Duke Energy

Assumptions

The cost estimates are based on unit prices which include the cost of relocating the complete gas main and all appurtenances within the project area. The quantity estimates are based on footages within the construction limits plus 500 LF on each side.

Cost estimates for the relocation of natural gas mains are based on unit costs from IHS Economics Report.

Telecommunication – Fiber

Companies

The only telecommunication system which was identified by the telecommunication company as a potential major impact were the fiber optic systems. All other telecommunications systems such as cable television were considered as distribution systems and included in the distribution system unit cost. The only companies that had major telecommunications - fiber facilities in area of the project are as follows:

AT&T
Sprint

Assumptions

The cost estimates are based on unit prices which include the cost of relocating the complete fiber system and all appurtenances within the project area. The quantity estimates are based on footages within the construction limits plus 1,000 LF on each side.

Cost estimates for the relocation of fiber telecommunications mains are based on unit costs from the US Department of Transportation – Office Research & Technology.

SUMMARY OF ESTIMATES			
	NON-MAJOR	MAJOR	TOTAL
ALTERNATE A	\$15,000,000	\$8,138,320	\$23,138,320
ALTERNATE B1	\$21,300,000	\$10,071,778	\$31,371,778
ALTERNATE D1	\$29,100,000	\$4,213,920	\$33,313,920
ALTERNATE D2	\$26,700,000	\$6,528,050	\$33,228,050

References

1. Electric – Stantec, John W. Vaughn Center, Roanoke, VA 24019
2. Natural Gas – IHS Economics, The Economic Benefits of Natural Gas Pipeline Development on the Manufacturing Sector, May 2016
3. Telecommunications – Fiber – US Department of Transportation – Office for the Assistant Secretary for Research & Development, 1200 New Jersey Avenue SE, Washington, DC, 20590
4. Water Transmission Main – Clermont County Water Resources Department, 4400 Haskell Lane, Batavia, OH 45103

Exhibits

Utility Exhibit

Alternate A – Cost Estimate

Alternate A – Cost Estimates by Construction Section

Alternate B1 – Cost Estimate

Alternate B1 – Cost Estimates by Construction Section

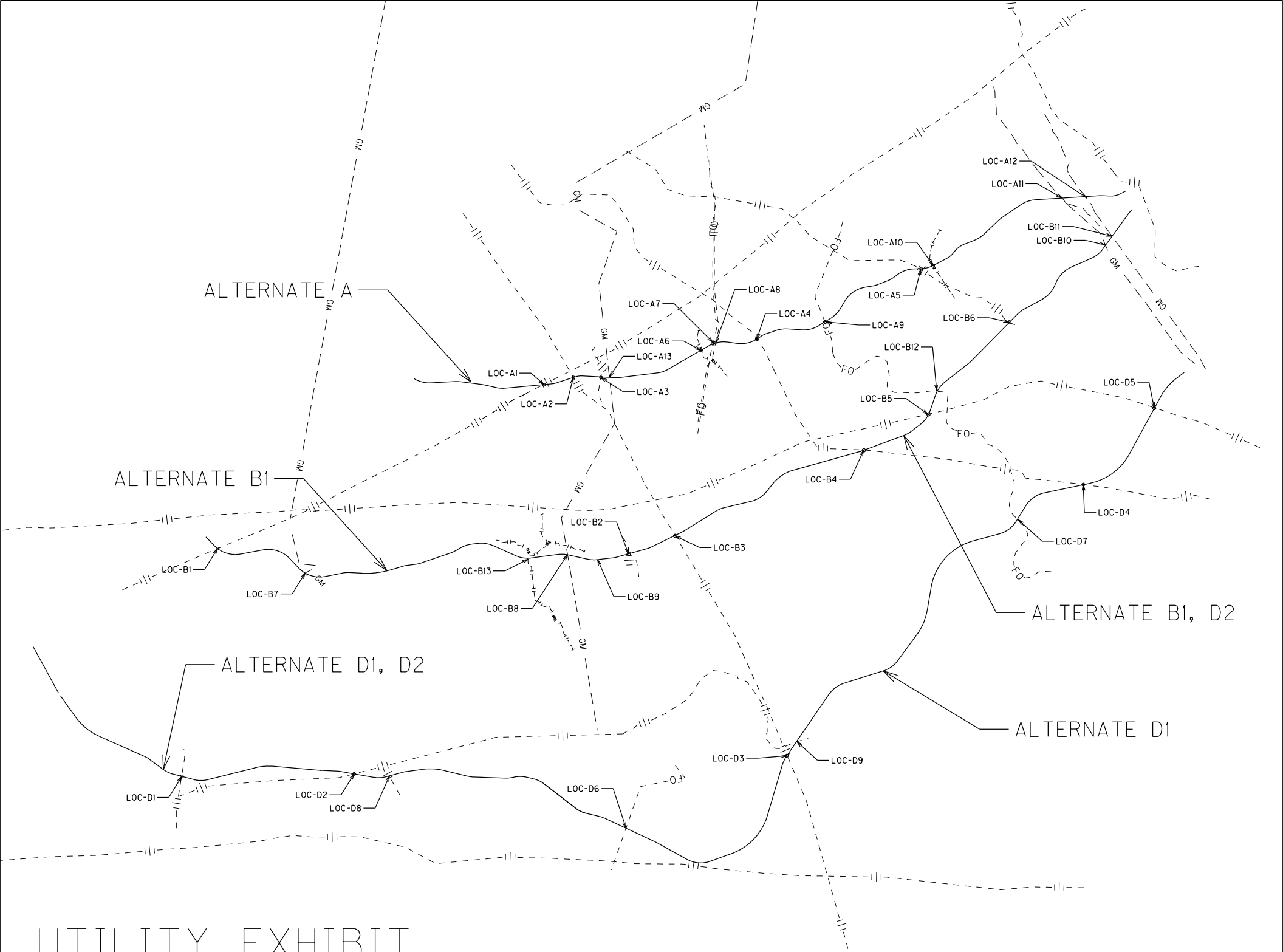
Alternate D1 – Cost Estimate

Alternate D1 – Cost Estimates by Construction Section

Alternate D2 – Cost Estimate

Alternate D2 – Cost Estimates by Construction Section

UTILITY EXHIBIT



Northern Kentucky Outer Loop Study
 Cost Estimate of Utility Impacts to Level Two Screening of Alternatives
 2-Aug-19

Alternate A

EXHIBIT NUMBER	UTILITY TYPE	SECTION	OWNER/UTILITY COMPANY	SIZE(1)	LENGTH	LENGTH	UNIT	UNIT COST	TOTAL COST	REMARKS	UNIT COST SOURCE
1	Electric	2	Ohio Valley Electric Corp.	2-345 kV	1300	0.25	miles	\$ 4,500,000.00	\$ 1,107,954.55	Metal Towers	Stantec
2	Electric	2	Union Light, Heat and Power Co.	69 kV	2000	0.38	miles	\$ 1,500,000.00	\$ 568,181.82	Wooden Poles	Stantec
3	Electric	3	East Kentucky	138 kV	980	0.19	miles	\$ 1,500,000.00	\$ 278,409.09	Wooden Poles	Stantec
6	Water	3	Northern Kentucky Water District	16"	1850	1850.00	LF	\$ 190.00	\$ 351,500.00		Clermont County Water Resources
13	Gas	3	Duke Energy	transmission	1580	0.30	miles	\$ 1,294,200.00	\$ 1,294,200.00	Assume 12" main	Economics (HIS Report)
4	Electric	4	East Kentucky	138 kV	800	0.15	miles	\$ 1,500,000.00	\$ 227,272.73	Wooden Poles	Stantec
7	Fiber	4			2460	0.47	miles	\$ 530,000.00	\$ 246,931.82		US DOT - Research & Tech
8	Fiber	4			2460	0.47	miles	\$ 530,000.00	\$ 246,931.82		US DOT - Research & Tech
9	Fiber	4	Sprint		4300	0.81	miles	\$ 530,000.00	\$ 431,628.79		US DOT - Research & Tech
5	Electric	5	East Kentucky	69 kV	1200	0.23	miles	\$ 1,500,000.00	\$ 340,909.09	Wooden Poles	Stantec
10	Water	5	Northern Kentucky Water District	12"	2400	2400.00	LF	\$ 190.00	\$ 456,000.00		Clermont County Water Resources
11	Gas	6	Duke Energy	transmission	1380	0.26	miles	\$ 1,294,200.00	\$ 1,294,200.00	Assume 12" main	Economics (HIS Report)
12	Gas	6	Duke Energy	transmission	1380	0.26	miles	\$ 1,294,200.00	\$ 1,294,200.00	Assume 12" main	Economics (HIS Report)

Major Impact Total \$ 8,138,320.00

Non-Major Impacts 25 miles \$600,000.00 \$ 15,000,000.00

Total Impact Cost Estimate \$ 23,138,320.00

Estimate Notes

1. If sizes not available, estimates based on high unit costs

ALTERNATE A

Construction Section	Begin	End	ROW Cost Estimate	Utility Cost Estimate	Construction Cost Estimate
1	I-71	KY 491			
2	KY 491	I-75		\$1,676,136	
3	I-75	KY 17		\$1,924,109	
4	KY 17	KY 177		\$1,152,765	
5	KY 177	US 27		\$796,909	
6	US 27	KY 9 (AA Highway)		\$2,588,400	

Northern Kentucky Outer Loop Study
 Cost Estimate of Utility Impacts to Level Two Screening of Alternatives
 2-Aug-19

Alternate B1

EXHIBIT NUMBER	UTILITY TYPE	SECTION	OWNER/UTILITY COMPANY	SIZE(1)	LENGTH	LENGTH	UNIT	UNIT COST	TOTAL COST	REMARKS	UNIT COST SOURCE
1	Electric	1	Ohio Valley Electric Corp.	2-345 kV	2700	0.51	miles	\$ 4,500,000.00	\$ 2,301,136.36	Metal Towers	Stantec
7	Gas	2	Duke Energy	transmission	1680	0.32	miles	\$ 1,294,200.00	\$ 1,294,200.00	Assume 12" main	Economics (HIS Report)
8	Gas	4	Duke Energy	transmission	1840	0.35	miles	\$ 1,294,200.00	\$ 1,294,200.00	Assume 12" main	Economics (HIS Report)
13	Water	4	Northern Kentucky Water District	12"	1760	1760.00	LF	\$ 190.00	\$ 334,400.00		Clermont County Water Resources
2	Electric	5	Union Light, Heat and Power Co	69 kV	1100	0.21	miles	\$ 1,500,000.00	\$ 312,500.00	Wooden Poles	Stantec
3	Electric	5	East Kentucky	138 kV	1050	0.20	miles	\$ 1,500,000.00	\$ 298,295.45	Wooden poles	Stantec
9	Fiber	5			2900	0.55	miles	\$ 530,000.00	\$ 291,098.48		US DOT - Research & Tech
4	Electric	6	East Kentucky	138 kV	2050	0.39	miles	\$ 1,500,000.00	\$ 582,386.36	Wooden Poles	Stantec
5	Electric	7	Kentucky Utilities Co.	138 kV	1200	0.23	miles	\$ 1,500,000.00	\$ 340,909.09	Wooden poles	Stantec
12	Fiber	7	Sprint		2345	0.44	miles	\$ 530,000.00	\$ 235,388.26		US DOT - Research & Tech
6	Electric	8	Kentucky Utilities Co.	69 kV	700	0.13	miles	\$ 1,500,000.00	\$ 198,863.64	Wooden poles	Stantec
10	Gas	8	Duke Energy	transmission	1530	0.29	miles	\$ 1,294,200.00	\$ 1,294,200.00	Assume 12" main	Economics (HIS Report)
11	Gas	8	Duke Energy	transmission	1380	0.26	miles	\$ 1,294,200.00	\$ 1,294,200.00	Assume 12" main	Economics (HIS Report)

Major Impact Total \$ 10,071,778.00

Non-Major Impacts 35.5 miles \$600,000.00 \$ 21,300,000.00

Total Impact Cost Estimate \$ 31,371,778.00

Estimate Notes

1. If sizes not available, estimates based on high unit costs

ALTERNATE B1

Construction Section	Begin	End	ROW Cost Estimate	Utility Cost Estimate	Construction Cost Estimate
1	I-71	KY 16		\$2,301,136	
2	KY 16	KY 1942		\$1,294,200	
3	KY 1942	KY 1942			
4	KY 1942	I-75		\$1,628,600	
5	I-75	KY 3184		\$901,894	
6	KY 3184	KY 17		\$582,386	
7	KY 17	US 27		\$576,297	
8	US 27	KY 9 (AA Highway)		\$2,787,264	

Northern Kentucky Outer Loop Study
 Cost Estimate of Utility Impacts to Level Two Screening of Alternatives
 2-Aug-19

Alternate D1

EXHIBIT NUMBER	UTILITY TYPE	SECTION	OWNER/UTILITY COMPANY	SIZE(1)	LENGTH	LENGTH	UNIT	UNIT COST	TOTAL COST	REMARKS	UNIT COST SOURCE
1	Electric	2	Kentucky Utilities Co.	69 kV	1200	0.23	miles	\$ 1,500,000.00	\$ 340,909.09	Wooden Poles	Stantec
2	Electric	3	East Kentucky	69 kV	1700	0.32	miles	\$ 1,500,000.00	\$ 482,954.55	Wooden Poles	Stantec
8	Electric	3	East Kentucky	69 kV	700	0.13	miles	\$ 1,500,000.00	\$ 198,863.64	Wooden Poles	Stantec
6	Fiber	4	AT&T		6550	1.24	miles	\$ 530,000.00	\$ 657,481.06		US DOT - Research & Tech
3	Electric	5	East Kentucky	138 kV	1700	0.32	miles	\$ 1,500,000.00	\$ 482,954.55	Wooden poles	Stantec
9	Electric	6	East Kentucky	69 kV	1600	0.30	miles	\$ 1,500,000.00	\$ 454,545.45	Wooden poles	Stantec
4	Electric	7	Kentucky Utilities Co.	69 kV	2700	0.51	miles	\$ 1,500,000.00	\$ 767,045.45	Wooden Poles	Stantec
5	Electric	7	Kentucky Utilities Co.	138 kV	2000	0.38	miles	\$ 1,500,000.00	\$ 568,181.82	Wooden poles	Stantec
7	Fiber	7	Sprint		2600	0.49	miles	\$ 530,000.00	\$ 260,984.85		US DOT - Research & Tech

Major Impact Total \$ 4,213,920.00

Non-Major Impacts 48.5 miles \$600,000.00 \$ 29,100,000.00

Total Impact Cost Estimate \$ 33,313,920.00

Estimate Notes

1. If sizes not available, estimates based on high unit costs

ALTERNATE D1

Construction Section	Begin	End	ROW Cost Estimate	Utility Cost Estimate	Construction Cost Estimate
1	I-71	US 127			
2	US 127	KY 36		\$340,909	
3	KY 36	KY 22		\$681,818	
4	KY 22	I-75		\$657,481	
5	I-75	KY 22		\$482,955	
6	KY 22	US 27		\$454,545	
7	US 27	KY 9 (AA Highway)		\$1,596,212	

Northern Kentucky Outer Loop Study
 Cost Estimate of Utility Impacts to Level Two Screening of Alternatives
 2-Aug-19

Alternate D2

EXHIBIT NUMBER	UTILITY TYPE	SECTION	OWNER/UTILITY COMPANY	SIZE(1)	LENGTH	LENGTH	UNIT	UNIT COST	TOTAL COST	REMARKS	UNIT COST SOURCE
D1	Electric	2	Kentucky Utilities Co.	69 kV	1200	0.23	miles	\$ 1,500,000.00	\$ 340,909.09	Wooden Poles	Stantec
D2	Electric	3	East Kentucky	69 kV	1700	0.32	miles	\$ 1,500,000.00	\$ 482,954.55	Wooden Poles	Stantec
D8	Electric	3	East Kentucky	69 kV	700	0.13	miles	\$ 1,500,000.00	\$ 198,863.64	Wooden Poles	Stantec
D6	Fiber	4	AT&T		6550	1.24	miles	\$ 530,000.00	\$ 657,481.06		US DOT - Research & Tech
B2	Electric	5	Union Light, Heat and Power Co	69 kV	1100	0.21	miles	\$ 1,500,000.00	\$ 312,500.00	Wooden Poles	Stantec
B3	Electric	5	East Kentucky	138 kV	1050	0.20	miles	\$ 1,500,000.00	\$ 298,295.45	Wooden poles	Stantec
B9	Fiber	5			2900	0.55	miles	\$ 530,000.00	\$ 291,098.48		US DOT - Research & Tech
B4	Electric	6	East Kentucky	138 kV	2050	0.39	miles	\$ 1,500,000.00	\$ 582,386.36	Wooden Poles	Stantec
B5	Electric	7	Kentucky Utilities Co.	138 kV	1200	0.23	miles	\$ 1,500,000.00	\$ 340,909.09	Wooden poles	Stantec
B12	Fiber	7	Sprint		2345	0.44	miles	\$ 530,000.00	\$ 235,388.26		US DOT - Research & Tech
B6	Electric	8	Kentucky Utilities Co.	69 kV	700	0.13	miles	\$ 1,500,000.00	\$ 198,863.64	Wooden poles	Stantec
B10	Gas	8	Duke Energy	transmission	1530	0.29	miles	\$ 1,294,200.00	\$ 1,294,200.00	Assume 12" main	Economics (HIS Report)
B11	Gas	8	Duke Energy	transmission	1380	0.26	miles	\$ 1,294,200.00	\$ 1,294,200.00	Assume 12" main	Economics (HIS Report)

Major Impact Total \$ 6,528,050.00

Non-Major Impacts 44.5 miles \$600,000.00 \$ 26,700,000.00

Total Impact Cost Estimate \$ 33,228,050.00

Estimate Notes

1. If sizes not available, estimates based on high unit costs

ALTERNATE D2

Construction Section	Begin	End	ROW Cost Estimate	Utility Cost Estimate	Construction Cost Estimate
1	I-71	US 127			
2	US 127	KY 36		\$340,909	
3	KY 36	KY 22		\$681,818	
4	KY 22	I-75		\$657,481	
5	I-75	KY 3184		\$901,894	
6	KY 3184	KY 17		\$582,386	
7	KY 17	US 27		\$576,297	
8	US 27	KY 9 (AA Highway)		\$2,787,264	