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5 COMPARISON OF ALTERNATIVES

This chapter compares alternatives’ performance on core goals, cost and key environmental impacts. The analysis shows which alternative best balances addressing the needs in the Study Area with the impacts of Build Alternatives. It also considers whether the No-Build Alternative is the appropriate selection.

The Mid-States project is being evaluated as a Tiered EIS. The purpose of this Tier 1 document is to determine if a Build Alternative is warranted, and if so, what is the appropriate corridor and associated design elements to carry forward into full project development in Tier 2. The environmental impacts identified within this document are appropriate to make this determination at a Tier 1 level of analysis. Tier 2 studies will further define the project design, the environmental resources within the corridor, specific impacts of Tier 2 alternatives and identify appropriate efforts to avoid and minimize impacts.

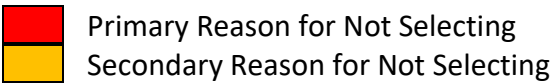
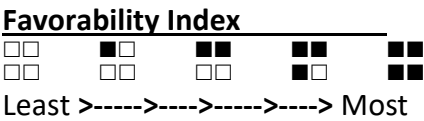
5.1 Summary of Alternatives

Table 5-1 summarizes key project benefits, design elements and environmental impacts of each of the five Build Alternatives carried forward for detailed study. Where applicable, the table highlights primary and secondary reasons for not selecting an alternative. It includes a “favorability index” associated with the key metrics used to rank the alternatives. These qualitative indices provide a quick visual comparison of the comparative performance of alternatives on each metric. The index offers five ranking options. Where results are similar or identical, more than one alternative may share the same rank.

Table 5-2 provides a secondary index of the core goals as a measurement of adequacy. As identified in **Chapter 1 – Purpose and Need**, the core goals are required to provide adequate performance in addressing primary goals to meet the purpose and need. Adequacy for this study is defined as providing at least half the benefit of the best-performing alternative across all goals. Because each core goal measures different types of variables (minutes, hours, and number of people), their values were converted to ratios relative to each goal. This normalizes the variables and establishes a method to average across all goals. The performance index determined Alternatives B and C did not meet the adequacy test; however, Table 5-1 highlights the worst performing measures that most strongly influenced the indices.

The No-Build Alternative is not summarized in the table because it does not have any benefits, impacts or costs. This alternative has been carried forward for the baseline comparison and remains under consideration throughout the Tier 1 Study. This section evaluates each alternative, including the No-Build Alternative, and identifies the Preferred Alternative.

LEGEND



Legend for Table 5-1: Comparison of Alternatives



	Metrics/Units	Alternative B	Alternative C	Alternative M	Alternative O	Alternative P
BENEFITS	Sum of time saved from all locations to key destinations/ Minutes (<i>Core Goal 1</i>)	8-10 ■ ■	16-17 ■ ■	30-35 ■ ■	19-23 ■ ■	25-43 ■ ■
	Time saved from Jasper	4-5	3-3	5-7	3-3	6-13
	Time saved from Crane	4-5	7-7	12-14	9-9	12-21
	Time saved from Bedford	0-0	3-4	9-10	1-3	4-5
	Time saved from French Lick	0-0	3-3	4-4	6-8	3-4
	Increase in Labor Force Access to all destinations/ # Persons (<i>Core Goal 1</i>)	15,300-17,600 ■ ■	4,500-5,000 ■ ■	10,200-11,000 ■ ■	26,300-26,900 ■ ■	10,400-11,200 ■ ■
	Labor Force Access to Jasper	2,100-4,300	1,700-2,200	7,600-7,800	8,400-8,600	8,700-8,900
	Labor Force Access to Crane	200-300	0-0	100-200	0-0	500-900
	Labor Force Access to Washington	12,900-13,000	2,000-2,000	0-200	0-0	400-300
	Labor Force Access to French Lick	0-100	800-800	600-800	17,000-17,200	900-1,000
KEY IMPACTS	Labor Force Access to Bedford	0-0	0-0	1,900-2,000	900-1,100	0-0
	Sum of time saved from Crane & Jasper to major rail & air multi-modal centers/ Minutes (<i>Core Goal 7</i>)	4-8 ■ ■	3-4 ■ ■	17-22 ■ ■	10-13 ■ ■	24-35 ■ ■
	Time saved from Jasper	2-5	1-2	9-14	6-9	14-21
	Time saved from Crane	2-3	2-2	8-8	4-4	10-14
	Annual Truck Hours Saved/ Vehicle Hours Travel (<i>Core Goal 2</i>)	(-11,400)-150 ■ ■	1,800-34,150 ■ ■	7,800-35,900 ■ ■	(-3,000)-18,250 ■ ■	8,400-36,850 ■ ■
COSTS	Total Miles (SR66 / US231 to I69) / Miles	33 ■ ■	41 ■ ■	62 ■ ■	53 ■ ■	54 ■ ■
	Total Construction Cost + Contingency / \$ Millions	449-576 ■ ■	544-759 ■ ■	1,105-1,395 ■ ■	1,074-1,320 ■ ■	735-1,052 ■ ■
	New Right-of-Way / acres	2,220-2,525 ■ ■	1,900-2,403 ■ ■	4,138-4,900 ■ ■	3,162-3,730 ■ ■	2,497-3,226 ■ ■
	Potential Relocations (agricultural, business, institutions or residential) / #	90-96 ■ ■	92-116 ■ ■	187-214 ■ ■	141-189 ■ ■	109-149 ■ ■
	Cultural – Above Ground Historic Sites (NRHP Listed or Potentially Eligible)/ #	0 ■ ■	5 ■ ■	2 ■ ■	15 ■ ■	8 ■ ■
	Cultural – Archaeological Sites (NRHP Listed or Potentially Eligible)/ #	23-27 ■ ■	44-57 ■ ■	48-60 ■ ■	35-45 ■ ■	28-50 ■ ■
	Cultural – Cemeteries / #	5 ■ ■	1 ■ ■	3 ■ ■	6 ■ ■	4 ■ ■
	Agricultural – General / acres	1,517-1,763 ■ ■	1,082-1,408 ■ ■	1,465-1,857 ■ ■	1,091-1,381 ■ ■	1,354-1,832 ■ ■
	Agricultural – Prime Farmland / acres	531-602 ■ ■	234-321 ■ ■	571-724 ■ ■	304-378 ■ ■	520-733 ■ ■
	Protected Species – Potential Presence Within two miles / # of species (Federal)	6 ■ ■	5 ■ ■	9 ■ ■	10 ■ ■	11 ■ ■
	Protected Species – Indiana Bat Forests within <i>maternity</i> area/ acres	206-223 ■ ■	62-86 ■ ■	1,418-1,603 ■ ■	380-431 ■ ■	228-282 ■ ■
	Protected Species – Indiana Bat Forests within <i>hibernacula</i> area/ acres	0 ■ ■	0 ■ ■	0 ■ ■	493-516 ■ ■	0 ■ ■
	Protected Species – Northern Long-Eared Forests within <i>maternity</i> area/ acres	130-135 ■ ■	9-12 ■ ■	841-954 ■ ■	294-327 ■ ■	161-188 ■ ■
	Protected Species – Northern Long-Eared Forests within <i>hibernacula</i> area/ acres	0 ■ ■	0 ■ ■	651-712 ■ ■	1-2 ■ ■	0 ■ ■
	Managed Lands / acres (& miles of trails*)	2 / 0.3 ■ ■	7-12 / 0.5 ■ ■	34-48 / 0.6 ■ ■	7-12 / 0.5 ■ ■	12-18 / 1.3 ■ ■

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Metrics/Units	Alternative B	Alternative C	Alternative M	Alternative O	Alternative P
Special Lands – Section 4(f) & 6(f) / #	0 / 0 ■ ■	0 / 0 ■ ■	2 / 0 □ □ □ □	0 / 0 ■ ■	1 / 1 □ □ □ □
Forests – Total / acres	312-347 ■ ■	424-556 ■ ■ □ □	1,994-2,311 □ □ □ □	1,588-1,756 ■ ■ □ □	629-923 ■ ■ □ □
Forests – Core Blocks / #	2 ■ ■	7 ■ ■ □ □	18 □ □ □ □	16 ■ ■ □ □	7-10 ■ ■ □ □
Potential Karst Features (caves, springs and sinkholes) / #	0** ■ ■	0 ■ ■ ■ ■	87 □ □ □ □	58 □ □ □ □	0 ■ ■ ■ ■
Streams & Rivers (intermittent and perennial only) / miles	7-8 ■ ■ □ □	6-7 ■ ■ ■ ■	12-14 □ □ □ □	11-13 ■ ■ □ □	8-11 ■ ■ □ □
Floodplains / acres	394-441 ■ ■ ■ ■	380-470 ■ ■ □ □	957-1,092 □ □ □ □	389-452 ■ ■ ■ ■	419-607 ■ ■ □ □
Potential Wetlands / acres	76-84 ■ ■ □ □	46-56 ■ ■ □ □	98-111 □ □ □ □	46-55 ■ ■ ■ ■	39-56 ■ ■ ■ ■
Potential Noise Impacts / # Receptors	58-60 ■ ■ ■ ■	51-54 ■ ■ ■ ■	72-74 ■ ■ □ □	80-82 □ □ □ □	69-77 ■ ■ □ □

*Includes planned trails

**Alternative B has one known sinkhole present along the corridor, but this sinkhole is not associated with Karst topography

Table 5-1: Comparison of Alternatives

Goal	Performance Measure	Alternative B (Range)	Alternative C (Range)	Alternative M (Range)	Alternative O (Range)	Alternative P (Range)
1	Business Center Access	0.31 - 0.26	0.46 - 0.38	1.00 - 0.79	0.58 - 0.49	0.85 - 1.00
1	Labor Force Access	0.58 - 0.65	0.17 - 0.19	0.39 - 0.41	1.00 - 1.00	0.40 - 0.42
2	Annual Truck Hours	(1.32) - 0.00	0.21 - 0.93	0.93 - 0.97	(0.36) - 0.50	1.00 - 1.00
7	Intermodal Center Access	0.17 - 0.23	0.13 - 0.11	0.71 - 0.63	0.42 - 0.37	1.00 - 1.00
Average - Range		(0.07) - 0.29	0.24 - 0.40	0.76 - 0.70	0.41 - 0.59	0.81 - 0.86
Average		0.11	0.32	0.73	0.50	0.83

Table 5-2: Core Goal Performance Index

5.1.1 Alternative B

Alternative B has the westernmost route, branching to the west of Jasper and connecting to I-69 near Washington. It is associated with six local improvement sections. This alternative had unfavorable ratings¹ on three of the four core goal performance measures. While it generally had favorable environmental impacts, it had the second most unfavorable wetland impacts.

Key Favorable Measures

- It has the most favorable ratings for project cost and length being approximately half the cost of the most expensive alternative and shortest route at roughly 33 miles of new alignment.
- It has the second-most favorable rating for new right-of-way with an approximate range between 2,200-2,500 acres. Only Alternative C has less right-of-way required.

¹ "Ratings" in this discussion refers to the favorability ratings provided in Table 5-1.



- It has the most favorable rating in several impact categories. These include impacts to relocations (90-96), cultural resources (no aboveground NHRP sites and only 23-27 NHRP archaeological sites), bat hibernacula (none), managed lands (two acres), forests (312-347 acres and only two core forest blocks) and floodplains (394-441 acres).

Key Unfavorable Measures

- It has the least favorable rating on the core goal performance measures of annual truck hours saved. It has the potential to add 11,400 hours rather than save time. For improved access to key destinations it shows only 8-10 minutes of time saved.
- It has the second-worst favorability rating on the core goal performance measure of intermodal access with 4-8 minutes saved. Only Alternative C performed worse at 3-4 minutes.
- It has the second-worst favorability rating for wetland impacts with a range of 76-84 acres potentially impacted. Only Alternative M impacted more wetlands.

Based primarily on its low ratings on three of the four core goal performance measures, Alternative B was eliminated from consideration. Its low rating on wetland impacts also was a factor in this determination.

5.1.2 Alternative C

Alternative C has an eastern route around Jasper then breaks west towards Washington north of the East Fork White River. It is associated with four local improvement sections. The alternative's ratings are similar to those for Alternative B. While it has high favorability on cost and most environmental impacts, it has unfavorable ratings on core goal performance measures.

Key Favorable Measures

- It has the most favorable rating for new acres of right-of-way with a range of 1,900-2,403 acres estimated.
- It has the second-most favorable rating for cost with a range between \$544-759 million. Only Alternative B was less expensive.
- It has the highest favorability for a number of impacts. These include impacts to prime farmland (243-321 acres), protected species (five potential species within two miles of the corridor), bat maternity areas (62-86 acres for Indiana bat and 9-12 acres for northern long-eared bat) and hibernacula (0), karst features (0), streams (6-7 miles of streams) and noise receptors (51-54 receptors).

Key Unfavorable Measures

- It has the least favorable rating on two core goal performance measures, labor force access and intermodal center access (increase of 4,500-5,000 persons and 3-4 minutes saved, respectively).
- It has the second-worst favorability rating on the core goal performance measure of improved access to key destinations with 16-17 minutes saved. Only Alternative B performed worse.

Based upon its unfavorable ratings on three of the four core goal performance measures, Alternative C was eliminated from consideration.



5.1.3 Alternative M

Alternative M has an eastern route around Jasper then breaks east near Loogootee to connect to SR 37 at Bedford. It is associated with nine local improvement sections. This is one the higher-performing alternatives, although it does not have the most favorable rating in any performance measure category. It has the least favorable rating in many environmental impact categories and is also the highest cost alternative.

Key Favorable Measures

- It has the second-most favorable rating for three core goal performance measures. These include travel time savings to key destinations (30-35 minutes), travel time savings to intermodal centers (17-22 minutes) and annual truck hours saved (7,800-35,900 hours).

Key Unfavorable Measures

- It has the least favorable rating on cost (~\$1.1-1.4 billion), acres of new right-of-way (4,138-4,900 acres) and length (62 miles).
- It has the least favorable rating in most environmental impact categories. Key unfavorable rating categories include relocations (187-214), agricultural land (1,465-1,857 acres), bat maternity colonies and hibernacula (1,418-1,603 acres of Indiana bat, respectively), forests (1,994-2,311 acres and 18 blocks of core forest), floodplains (957-1,092 acres), karst (87 features) and wetlands (98-111 acres).

Alternative M's high cost and high impacts to many resources resulted in its being removed from further consideration. Several resource agencies expressed their opposition to Alternatives M and O because of their overall high impacts. The U.S. Army Corps of Engineers stated in its April 15, 2020 comment letter on the Screening of Alternatives package that it did not believe either Alternative M or O could satisfy the requirements to select the Least Environmentally Damaging Practicable Alternative (LEDPA), as required under the Section 404(b)(1) guidelines. This letter cited these alternatives' impacts to forest, floodplains and karst in addition to their impacts to streams and wetlands.

5.1.4 Alternative O

Alternative O has an eastern route around Jasper then breaks east towards French Lick south of the US 231 crossing of the East Fork White River. It is associated with nine local improvement sections. Connection to I-69 is via SR 37 at Mitchell. This alternative has the most favorable rating on one core goal performance measure, labor force access. It also has mid-range favorability on two other core goal performance measures, travel time savings to key destinations and travel time savings to intermodal centers. It has unfavorable ratings on new acres of right-of-way and cost. It has unfavorable ratings for its impacts to a number of key resources.

Key Favorable Measures

- It has the most favorable rating on the core goal performance measure of improved labor force access with an increase range of 26,300-26,900 persons.
- It has the most favorable rating for agricultural land impacts (1,091-1,381 acres).
- It has favorable ratings for floodplain and wetland impacts (389-452 and 46-55 acres, respectively).



Key Unfavorable Measures

- It has the second-worst favorability rating on the core goal performance measure of annual truck hour savings with a potential to add 3,000 or save 18,250 hours of travel depending on the configuration. Only Alternative B performed worse.
- It has the least favorable rating on potential impacts to aboveground cultural resources (15 potential NRHP sites).
- It has the least favorable rating on impacts to Indiana bat hibernacula forested areas (493-516 acres).
- It has the least favorable rating on impacts to karst resources (58 features). Although Alternative M has more total karst features, this alternative crosses through the Lost River basin which has numerous highly sensitive features.
- It has the second worst favorability rating on impacts to forests (1,588-1,756 acres), several protected species categories (contains maternity and hibernacula areas for both the Indiana and northern long-eared bats) and noise receptors (80-82 receptors).

Alternative O's high cost and high impacts to many resources resulted in its being removed from further consideration. Several resource agencies expressed their opposition to Alternatives M and O because of their overall high impacts. The U.S. Army Corps of Engineers stated in its April 15, 2020 comment letter on the Screening of Alternatives package that it did not believe either Alternative M or O could satisfy the requirements to select the LEDPA, as required under the Section 404(b)(1) guidelines. This letter cited these alternatives' impacts to forest, floodplains and karst in addition to their impacts to streams and wetlands.

5.1.5 Alternative P (Preferred Alternative)

Alternative P generally follows the existing US 231 corridor but has an eastern route around Jasper and considered an eastern and western bypass option around Loogootee. This alternative has nine local improvement sections associated. It has the most favorable rating for three of the four core goal performance measures. It generally has moderate levels of impacts, having neither the highest nor lowest effects. An eastern and western bypass option were carried forward to allow greater flexibility during the evaluation process. A 4(f) resource (West Boggs Park) is located on the western side of Loogootee and a higher density of forest and water resources are present on the eastern side. The detailed analysis identified the western bypass option did have a greater potential impact to the human environment with more noise receptors, and farmland while the eastern bypass option would have greater potential impact to natural features including wetlands, streams, floodplain, and forests (**Table 5-3**). Refinements made to the working alignment of the western bypass indicate a Tier 2 project will be able to avoid a 4(f) use or be limited to a de minimis determination, and avoid a 6(f) impact. The western bypass option was selected as the preferred alignment based on the lesser overall impacts, and INDOT is requesting input from the public and resource agencies related to this decision during the comment period of the DEIS.

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Metrics/Units*	Western	Eastern	Difference	Greater Impact
Cost (\$millions)	124-166	192-202	36-69	Eastern
Potential Relocations (agricultural, business, institutions, or residential) / #	12-16	18	2-6	Eastern
Cultural – Above Ground Historic Sites (NRHP Listed or Potentially Eligible)/ #	12	14	2	Eastern
Cultural – Archaeological Sites (NRHP Listed or Potentially Eligible)/ #	9	7	2	Western
Cultural – Cemeteries / #	2	4	2	Eastern
Agricultural – General / acres	761-1,004	735-941	26-63	Western
Agricultural – Prime Farmland / acres	334-425	379-478	45-53	Eastern
Protected Species – Potential Presence Within 2 miles / # of species (Federal)	---	---	---	---
Protected Species – Indiana Bat Forests within maternity area/ acres	---	---	---	---
Protected Species – Indiana Bat Forests within hibernacula area/ acres	---	---	---	---
Protected Species – Northern Long-Eared Forests within maternity area/ acres	---	---	---	---
Protected Species – Northern Long-Eared Forests within hibernacula area/ acres	---	---	---	---
Managed Lands / acres/miles of trails**	12-18/1.3	12-18/1.3	<0.5/<0.1	Western
Special Lands – Section 4(f) & 6(f) / #	2	0	2	Western
Forests – Total / acres	348-411	455-542	107-131	Eastern
Forests – Core Blocks / #	1	4	3	Eastern
Potential Karst Features (caves, springs, and sinkholes) / #	---	---	---	---
Streams & Rivers (intermittent and perennial only) / miles	4.4-5.3	5.8-6.4	1.1-1.4	Eastern
Floodplains / acres	134-160	222-261	88-101	Eastern
Potential Wetlands / acres	18-26	26-33	7-8	Eastern
Potential Noise Impacts / # Receptors	74-77	69-71	5-6	Western

*Comparison of metrics are generally confined to Section 3 (north of the White River)

**the less than half acre is associate with West Boggs for managed lands, for trails all but roughly 300 linear feet is associated with LI-8 which is common to both options

“- - -” are present where no difference is present between options

Table 5-3: Potential Impact Differences of Key Resources, Loogootee Bypass Options



Key Favorable Measures

- It has the most favorable rating on three of the four core goal performance measures. These include travel time savings to key destinations (25-43 minutes), travel time savings to intermodal centers (24-35 minutes) and annual truck hours saved (8,400-36,850 hours).
- It has the most favorable rating for impacts to forests within hibernacula areas (0).
- It has the most favorable rating for impacts to karst features (0).
- It impacts fewer wetlands than any other alternative (39-56 acres).

Key Unfavorable Measures

- It has the least favorable rating for protected species within two miles (11 species).

Alternative P overall has a median level of impacts to key natural resources.

5.1.6 No-Build Alternative

The No-Build Alternative would not result in any costs or impacts. The No-Build Alternative also would provide no transportation or economic benefits to the 12-county Study Area. This alternative would not meet the project's Purpose and Need.

5.2 Identification of the Preferred Alternative

After detailed analysis and review of the available alternatives, Alternative P has been identified as the Preferred Alternative for the Mid-States Corridor for the following reasons:

- 1) It produces the best combination of benefits associated with the defined goals for the project.
 - a. Most time saved from all key destinations (Core Goal 1)
 - b. Third best increase in access to labor force (Core Goal 1)
 - c. Most time saved for annual truck hours (Core Goal 2)
 - d. Most time saved from major multi-modal centers in Crane and Jasper (Core Goal 7)
- 2) Although this alternative does not consistently produce the lowest impacts to environmental resources, it does produce the lowest impacts among Alternatives M, O and P. These three alternatives were considered to adequately address the project's Purpose and Need. While Alternatives B and C have lower impacts and costs, they also fail to adequately address the project's Purpose and Need.
- 3) Alternative P has favorable ratings for several key impacts.
 - a. Wetlands – It has the potential to produce the smallest impacts.
 - b. Karst Features – No karst features are present along this corridor.

Figure 5-1 highlights the Preferred Alternative in comparison to the other Build Alternatives within the Study Area. This Tier 1 decision will defer the selection of the facility type to Tier 2 to provide maximum flexibility with future design to balance impacts, costs and benefits. **Chapter 6 – Environmental Commitments** summarizes avoidance, minimization and mitigation efforts carried forward into the Tier 2 studies if the Preferred Alternative is identified as the Selected Alternative in the Final Environmental Impact Statement (FEIS)/Record of Decision (ROD).

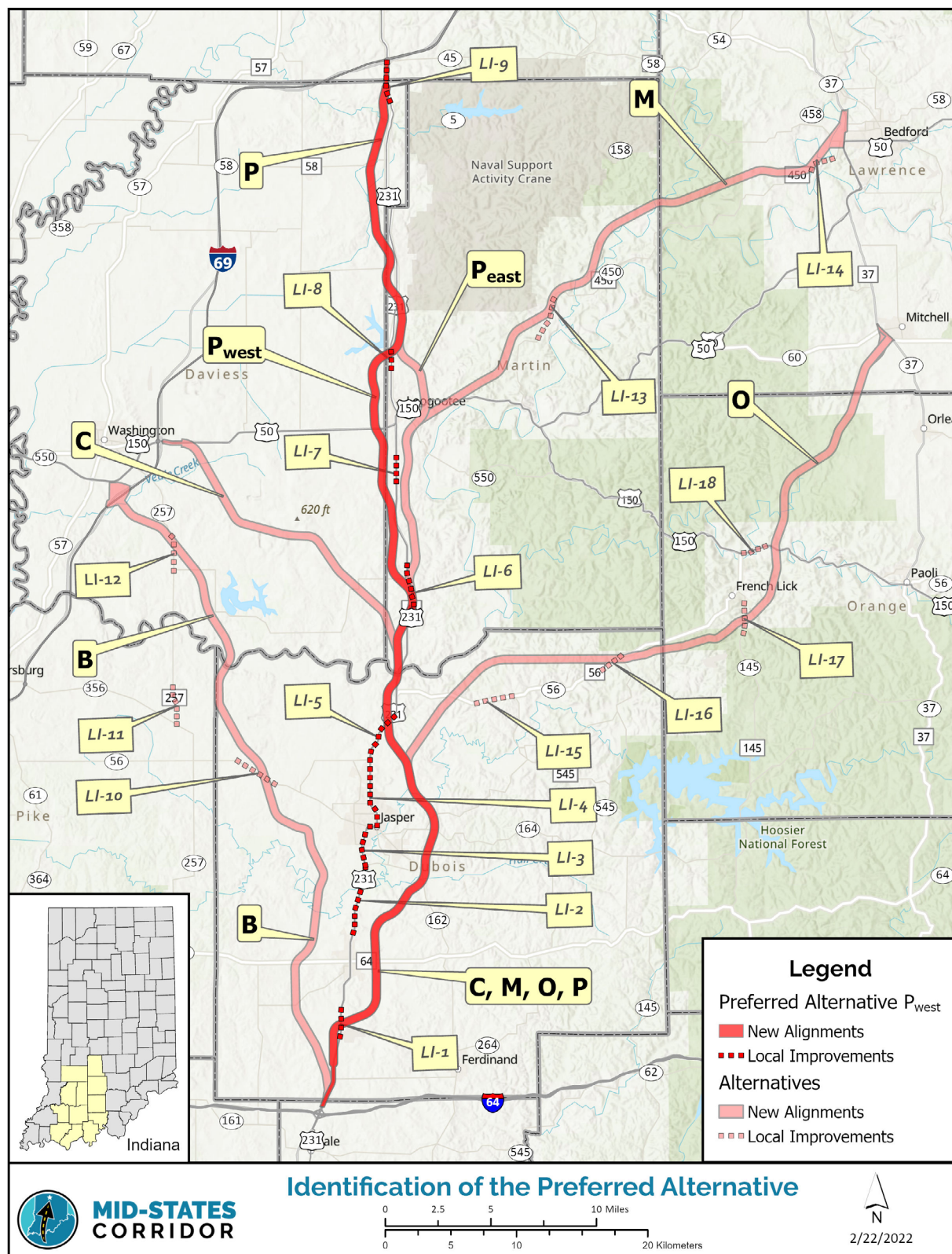


Figure 5-1: Identification of the Preferred Alternative