

# I-90 Exit 63 Interchange Alternatives Evaluation

Has the fewest impacts to property

Best accommodates current Long-Range planning efforts

Alternatives at Westgate are most compatible with EAFB and Box Elder Land Planning

Best utilizes existing infrastructure

EXIST 63 INTERCHANGE RECONSTRUCTION ALTERNATIVES	ADDRESS THE NEED FOR THE PROJECT	APZ CONFLICTS	ENVIRONMENTAL IMPACTS	PRIVATE PROPERTY AND ROW	FACILITATES MOVEMENTS TO AND FROM EAFB	ACCOMODATES TRANSPORTATION APPROVED PLANS	CONSTRUCT-ABILITY	CONSTRUCTION COSTS	COMPATIBILITY WITH JULUS	CONNECTIVITY WITH EXISTING ROAD NETWORK	SIMPLICITY OF INTERCHANGE CONFIGURATION	DESIGN CRITERIA	CONTROL OF ACCESS	Carry Forward?
	1	2	3	4	5	6	7	8	9	10	11	12	13	
The No Action Alternative	↓	↑	↑	↑	↑	↓	↑	↑	↑	↘	→	↘	↑	●
Alternative 1 - Interchange at Westgate	↑	↑	→	↘	↘	→	↘	↘	↑	↘	↑	→	→	●
Alternative 2 - Interchange at Westgate with Direct Access to EB 1416	↑	↑	→	→	↘	→	↘	↘	↑	↘	↘	→	→	●
Alternative 3 - Interchange at Westgate Rd. with Existing West Ramps and New East Ramps	↑	↑	→	→	↑	↑	↘	↘	↑	↑	→	↘	↘	●
Alternative 4 - Interchange at Highway 1416	↑	↑	↘	↑	→	↘	→	↘	↑	↘	↑	↑	↑	●
Alternative 5 - Interchange at Radar Hill Road	↑	↑	↓	↓	↘	→	→	↘	↘	→	↑	↑	↘	●
Alternative 6 - Interchange at Radar Hill Rd. with Braided Ramps to Commercial Dr.	↑	↑	↓	↓	↑	→	↘	↓	↘	→	↘	↑	↓	●
Alternative 7 - Split Interchange with Radar Hill Rd. and Commercial Dr.	↑	→	↓	↘	↑	→	↘	↓	→	↘	↘	↓	↘	●
Alternative 8 - Split Diamond with Radar Hill Rd. and Commercial Dr. with Exclusive EAFB Ramps	↑	→	↓	↓	↑	→	↘	↓	→	↘	→	→	→	●
Alternative 9 - Interchange at Bennett Road	↑	↑	↘	↘	↓	↓	↘	→	↑	↘	↑	↑	↑	●
Alternative 10 - Split Diamond Interchange at Commercial Dr	↑	→	↘	↘	↘	→	↘	↘	→	→	↘	→	↓	●
Alternative 11 - Remove Exit 63 Interchange	→	↑	↑	↑	↓	↓	↑	↑	↑	↓	→	↑	↑	●

Alternatives have most impacts on low income and minority populations

Alternatives at Radar Hill Road have highest construction costs

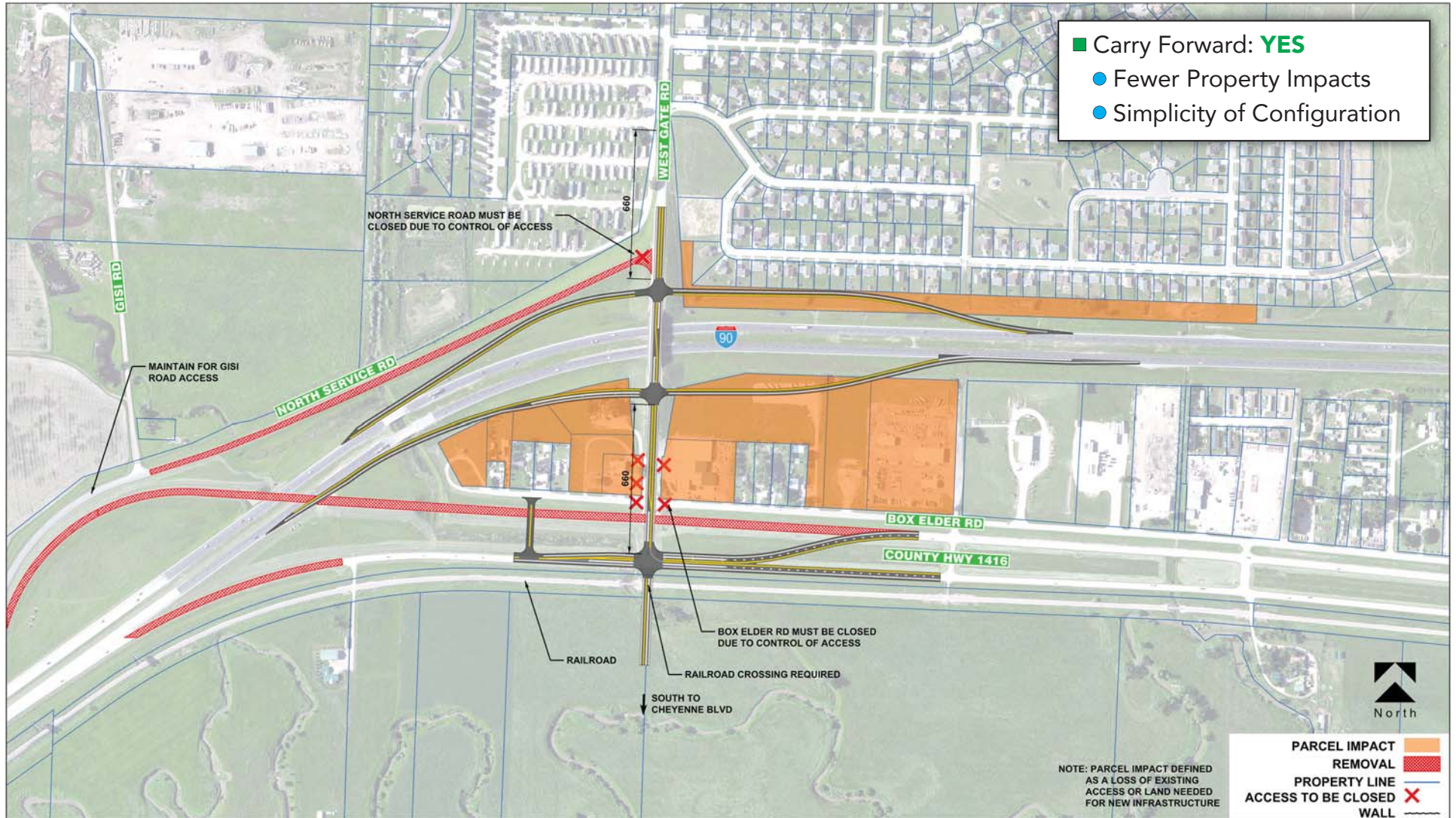
**LEGEND**

- ↓ Point Value = 0 *Least meets criterion*
- ↘ Point Value = 1
- Point Value = 2
- ↗ Point Value = 3
- ↑ Point Value = 4 *Best meets criterion*

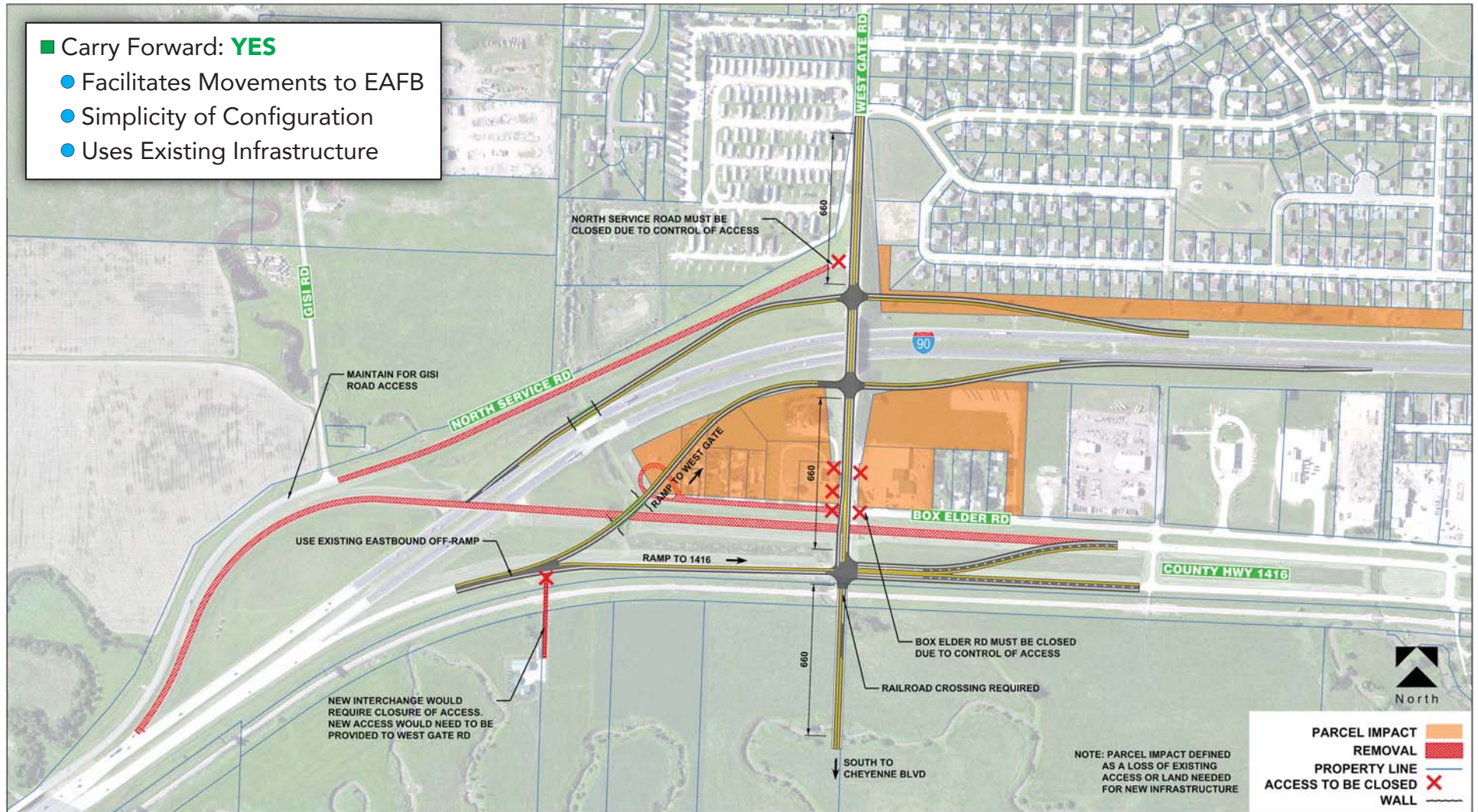
## EXIT 63 INTERCHANGE EVALUATION CRITERIA AND ASSESSMENT OF ALTERNATIVES

SCREENING CRITERIA	ADDRESSES THE P&N OF THE PROJECT	APZ CONFLICTS	ENVIRONMENTAL IMPACTS	PRIVATE PROPERTY AND ROW	FACILITATES MOVEMENT TO AND FROM EAFB	ACCOMMODATES APPROVED PLANS	CONSTRUCTABILITY	CONSTRUCTION COSTS	COMPATIBILITY WITH JURIS	CONNECTIVITY WITH EXISTING ROAD NETWORK	DRIVER EXPECTANCY	DESIGN CRITERIA	CONTROL OF ACCESS
<b>DESCRIPTION</b>	Does the alternative provide full movement access to I-90 and provide another interchange between Exit 61 and Exit 67?	What is the proximity of the alternative to the EAFB accident protection zone?	What are the impacts to known environmental receptors including floodplain, noise and impacts to minority and low income populations. The higher the score the less impact but alternatives impacting minority and low income populations scored lower overall.	What is the impact to private property both to buildings and access to adjacent roadways. The higher the score, the less impact.	Does the alternative facilitate the movement of EAFB personnel to and from Commercial Gate Road. Alternatives with the fewest number of turns received higher scores but increases in the number of inbound turns scored lower.	Including approved plans such as the Box Elder Transportation Plan and the planned and funded improvements at the Highway 1416 / Radar Hill Road intersection.	Including criteria such as complexity of construction, construction impacts to roadways and access and, construction phasing.	Includes material only costs. It does not include ROW, property or design costs. The lower the construction cost the higher the score for each alternative.	Does the alternative abide with EAFB's Air Installation Compatible Use Overlay Zones (AICUZ)?	Does the alternative use the existing road network and improve connectivity? Alternatives that need to be into an additional or new roadway connection will be scored lower.	Is the interchange configuration meet the expectation and experience of drivers? For example, simple diamond interchanges will score highest	How well does the alternative meet 600 foot spacing between ramp terminals, have a grade of no more than 6% on the cross street and meets roadway geometric criteria. Alternatives that did not meet ramp spacing or grade criteria were scored lower.	Number of accesses and roads closed due to control of access requirement
<b>Do Nothing Alternative</b>	It does not	Not near	No impacts	No impacts	0 inbound turns 0 outbound turns	Partially, yes because current plans show a full interchange for Exit 63	No issues as alternatives involves no new construction	No Cost	Yes.	No changes	Missing ramps to and from the east	Existing westbound on-ramp does not meet geometric criteria	0 Roads 0 Accesses
<b>Alternative 1</b>	Yes	No conflicts with apz	Floodplain, Noise	6 Parcels	2 inbound turns 2 outbound turns	Planning efforts envisioned a full movement interchange but does not accommodate plans for N. Service Road	no major issues. Most of the interchange could be built off-line	COST-LOW - low cost as alternative uses existing Westgate road structure	Yes	Connects to Westgate and 1416	Standard Diamond configuration	400 foot spacing	2 Roads 3 Accesses
<b>Alternative 2</b>	Yes	No conflicts with apz	Floodplain, Noise	10 Parcels	0 inbound turns 2 outbound turns	Planning efforts envisioned a full movement interchange but does not accommodate plans for N. Service Road	no major issues. Most of the interchange could be built off-line	COST-LOW - low cost as alternative uses existing Westgate road structure	yes	Connects to Westgate and 1416, and uses existing eb off-ramp	Diamond configuration but eastbound off-ramp splits in two directions	350 foot spacing	3 Roads 3 Accesses
<b>Alternative 3</b>	Yes	No conflicts with apz	Floodplain, Noise	10 Parcels	0 inbound turns 0 outbound turns	Planning efforts envisioned a full movement interchange and accommodates plans for N. Service Road	no major issues. Most of the interchange could be built off-line	COST-LOW - low cost as alternative uses existing Westgate road structure	Yes	Connects to Westgate, 1416, N. Service Road and uses existing exit 63 ramps.	Loop ramp and westbound ramps on different sides of the interchange. N. Service Rd. aligns with WB off-ramp	Existing westbound on-ramp does not meet geometric criteria	0 Roads 3 Accesses
<b>Alternative 4</b>	Yes	No conflicts with apz	Floodplain	1 Parcels	1 inbound turns 1 outbound turns	Planning efforts envisioned a full movement interchange and accommodates plans for N. Service Road	Interchange construction must be built in phases in order to maintain exit 63 access during construction	COST MEDIUM- HIGH - requires new bridge, walls and new road alignments	Yes	Connects 1416 and to N. Service Road but needs connection to Bennet.	Standard Diamond configuration	Meets Criteria	0 Roads 0 Accesses
<b>Alternative 5</b>	Yes	No conflicts with apz	Noise, EJ	42 Parcels	2 inbound turns 2 outbound turns	Fits within Box Elder Plan but not compatible with funded 1416 improvements at RHR	Need to close RHR for construction and difference in grade between north and south adds complexity. Could be built off-line	COST MEDIUM - HIGH - new bridge at RHR and walls, CD roads along RHR	Yes, but could spur undesirable land uses to the north	connects to RHR only	Standard Diamond configuration	Meets Criteria	7 Roads 7 Accesses
<b>Alternative 6</b>	Yes	No conflicts with apz	Noise, EJ	43 Parcels	0 inbound turns 0 outbound turns	Fits within Box Elder Plan but not compatible with funded 1416 improvements at RHR	Need to close RHR for construction and difference in grade between north and south adds complexity. Could be built off-line	COST HIGH - new bridge at RHR and walls, CD roads	Yes, but could spur undesirable land uses to the north	connects to RHR only	Diamond configuration with braided-ramps	Meets Criteria	7 Roads 11 Accesses
<b>Alternative 7</b>	Yes	east ramps are in the apz	Noise, EJ	34 Parcels	0 inbound turns 0 outbound turns	Fits within Box Elder Plan but not compatible with funded 1416 improvements at RHR	Need to close RHR for construction and difference in grade between north and south adds complexity. Could be built off-line	COST HIGH - new bridge at RHR and walls, CD roads and additional structures for braided ramps	Yes, but could spur undesirable land uses to the north. CD roads provide more opportunity for development	connects to RHR and commercial gate road	Split diamond interchange	270 foot spacing	6 Roads 11 Accesses
<b>Alternative 8</b>	Yes	east ramps are in the apz	Noise, EJ	46 Parcels	0 inbound turns 0 outbound turns	Fits within Box Elder Plan but not compatible with funded 1416 improvements at RHR	Need to close RHR for construction and difference in grade between north and south adds complexity. Could be built off-line	COST HIGH - new bridge at RHR and walls, CD roads	Yes, but could spur undesirable land uses to the north. CD roads provide more opportunity for development	connects to RHR and commercial gate road	Split diamond with exclusive EAFB ramps	9% grade	4 Roads 6 Accesses
<b>Alternative 9</b>	Yes	No conflicts with apz	Floodplain	4 parcels, but most land in acres	No access to Commercial Gate Road available with this alternative.	No	No phasing required but challenges with providing sufficient clearance over RR for ramps	COST MEDIUM - new bridge and realignment of frontage roads	Yes	connectivity to the north but no connectivity to the south	Standard Diamond configuration	Meets Criteria	0 Roads 0 Accesses
<b>Alternative 10</b>	Yes	east ramps are in the apz	Noise, EJ	34 Parcels	2 inbound turns 2 outbound turns	No planning effort considers an interchange at Commercial Gate	Need to close RHR for construction and difference in grade between north and south adds complexity. Could be built off-line	COST MEDIUM - CD Roads	Yes, but could spur undesirable land uses to the north. CD roads provide more opportunity for development	connects to commercial gate road, limited access to RHR	Split diamond but limited access to RHR	270 foot spacing	8 Roads 12 Accesses
<b>Alternative 11</b>	Partially. Eliminate the partial interchange but not in a way as envisioned by SAT	No conflicts with apz	No impacts	No impacts	No access to Commercial Gate Road available with this alternative.	No. planning efforts have envisioned a full movement interchange between Exit 61 and 67	No issues as alternatives involves no new construction	COST: LOW - some removals	Yes	Reduces connectivity. Connections such as Cheyenne, and Mall Drive extension would be needed to provide connectivity.	Lack of interchange for 6 miles may not meet driver's expectations	Meets Criteria	0 Roads 0 Accesses

# I-90 Exit 63 Alternative 1 - Interchange at West Gate

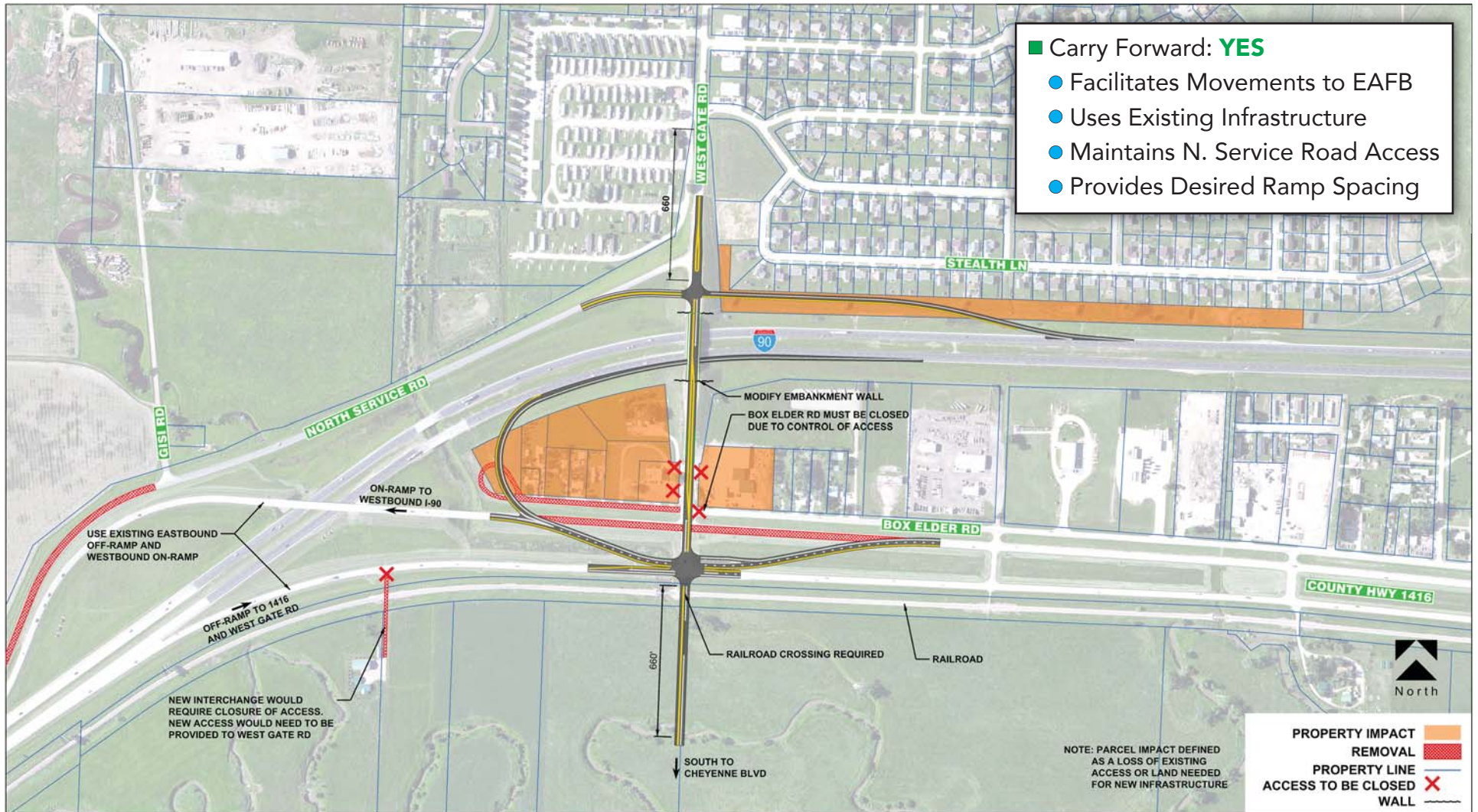


# I-90 Exit 63 Alternative 2 - Interchange at West Gate Rd. with Direct Access to Eastbound 1416

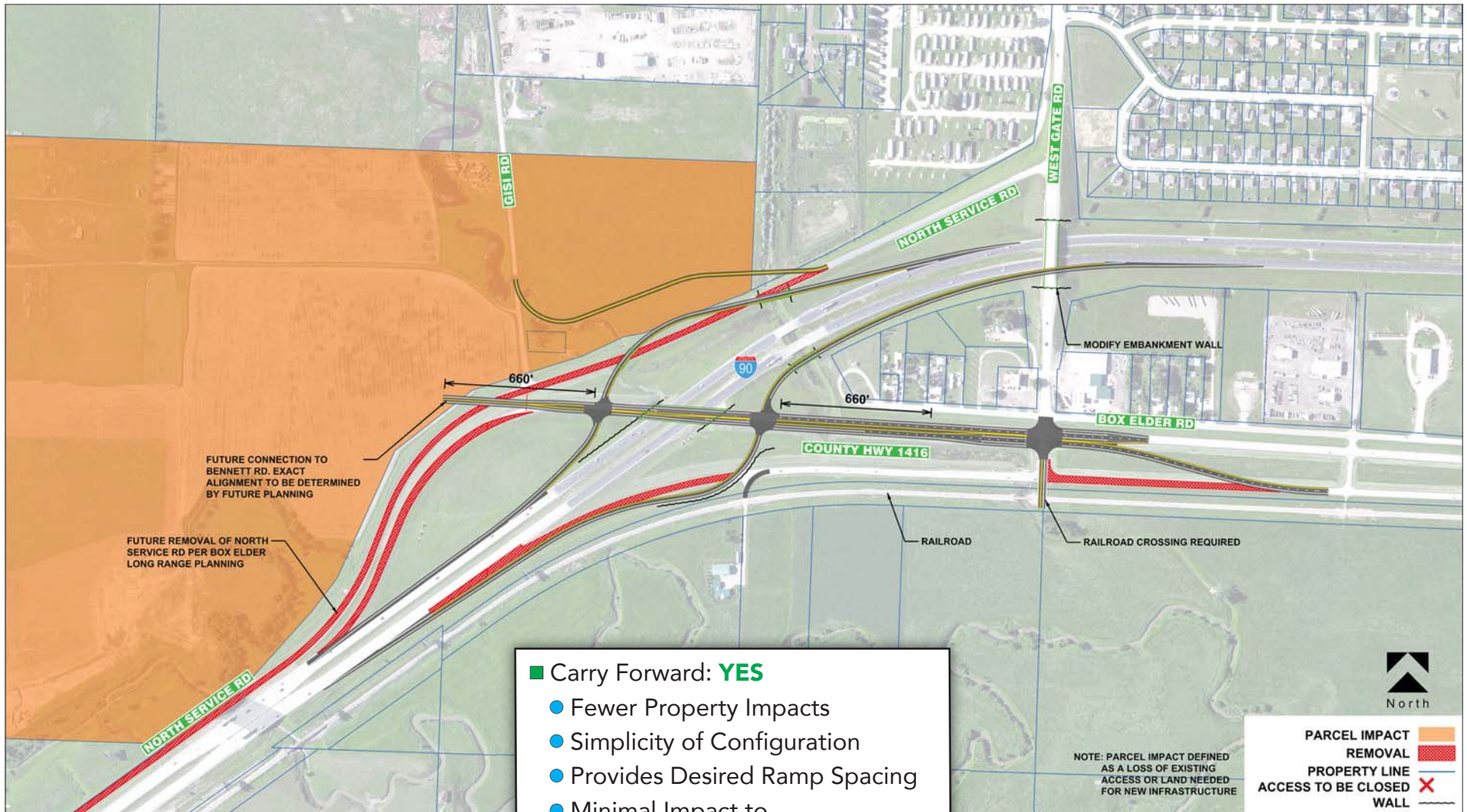


# I-90 Exit 63

## Alternative 3 - Interchange at West Gate Rd. with Existing West Ramps and New East Ramps

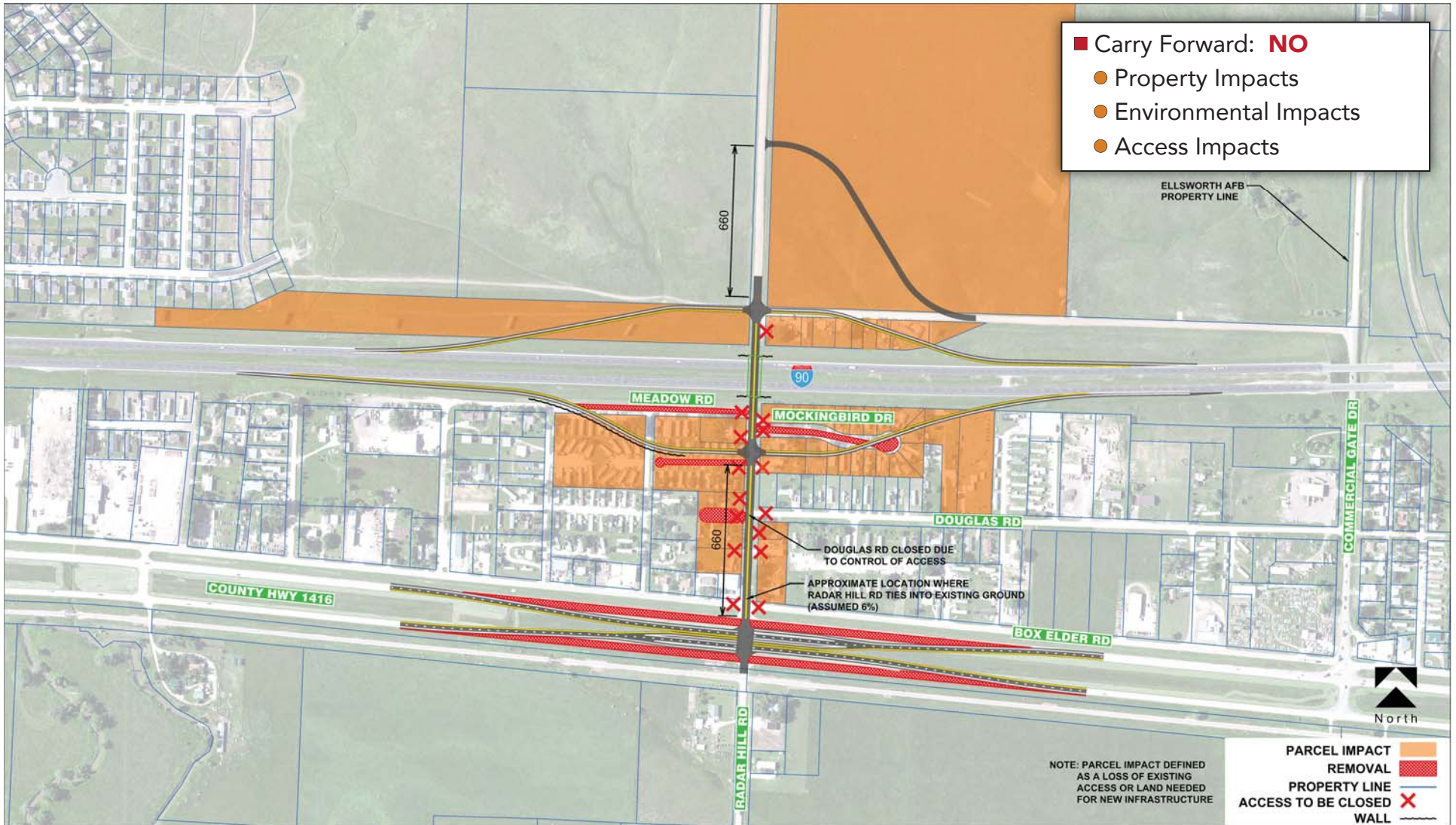


# I-90 Exit 63 Alternative 4 - Diamond Interchange at Highway 1416



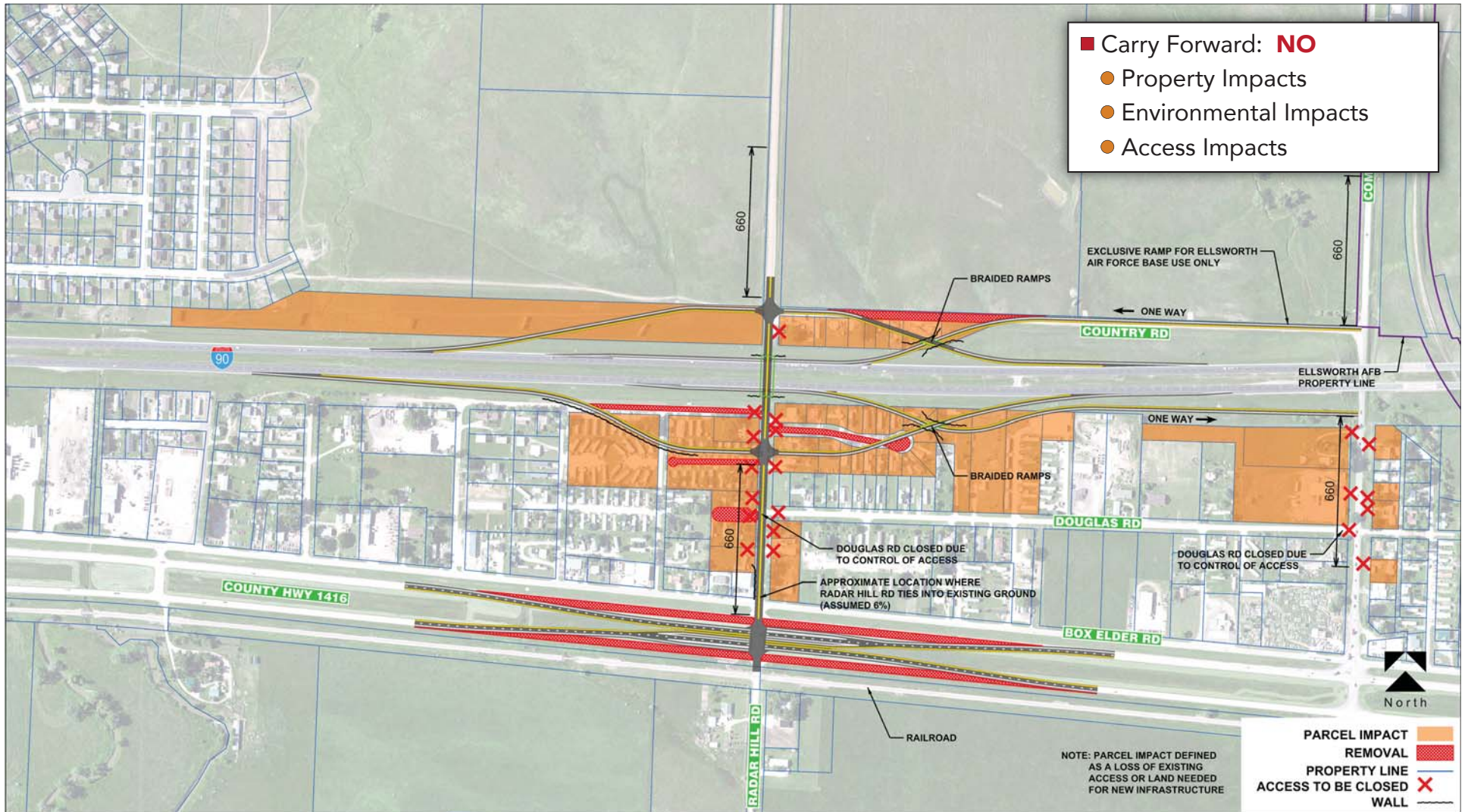
- Carry Forward: **YES**
- Fewer Property Impacts
- Simplicity of Configuration
- Provides Desired Ramp Spacing
- Minimal Impact to Existing Property Access
- Maintains N. Service Road Access

# I-90 Exit 65 Alternative 5 - Interchange at Radar Hill Rd.



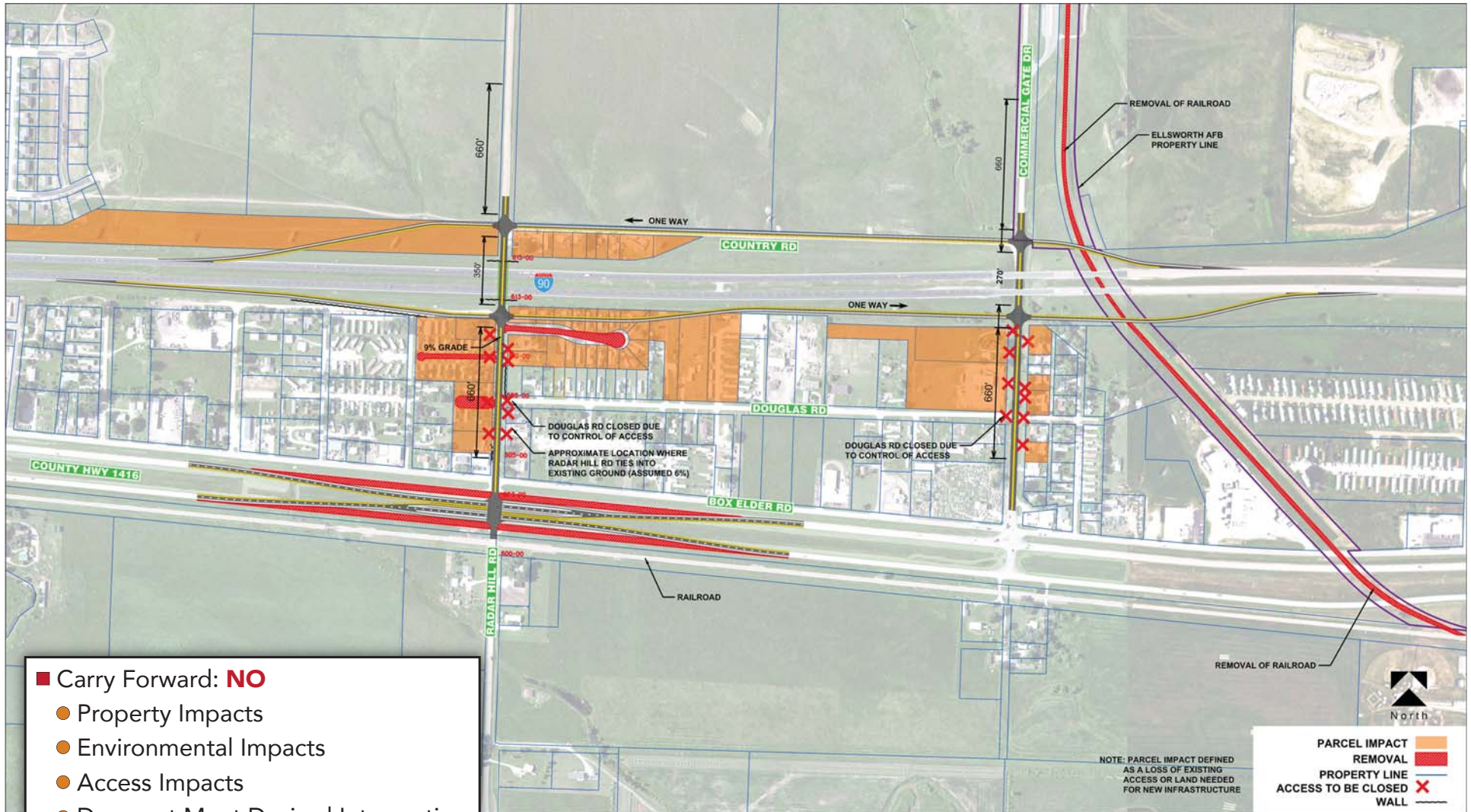
# I-90 Exit 65

## Alternative 6 - Interchange at Radar Hill Rd. with Braided Ramps to Commercial Gate Rd.



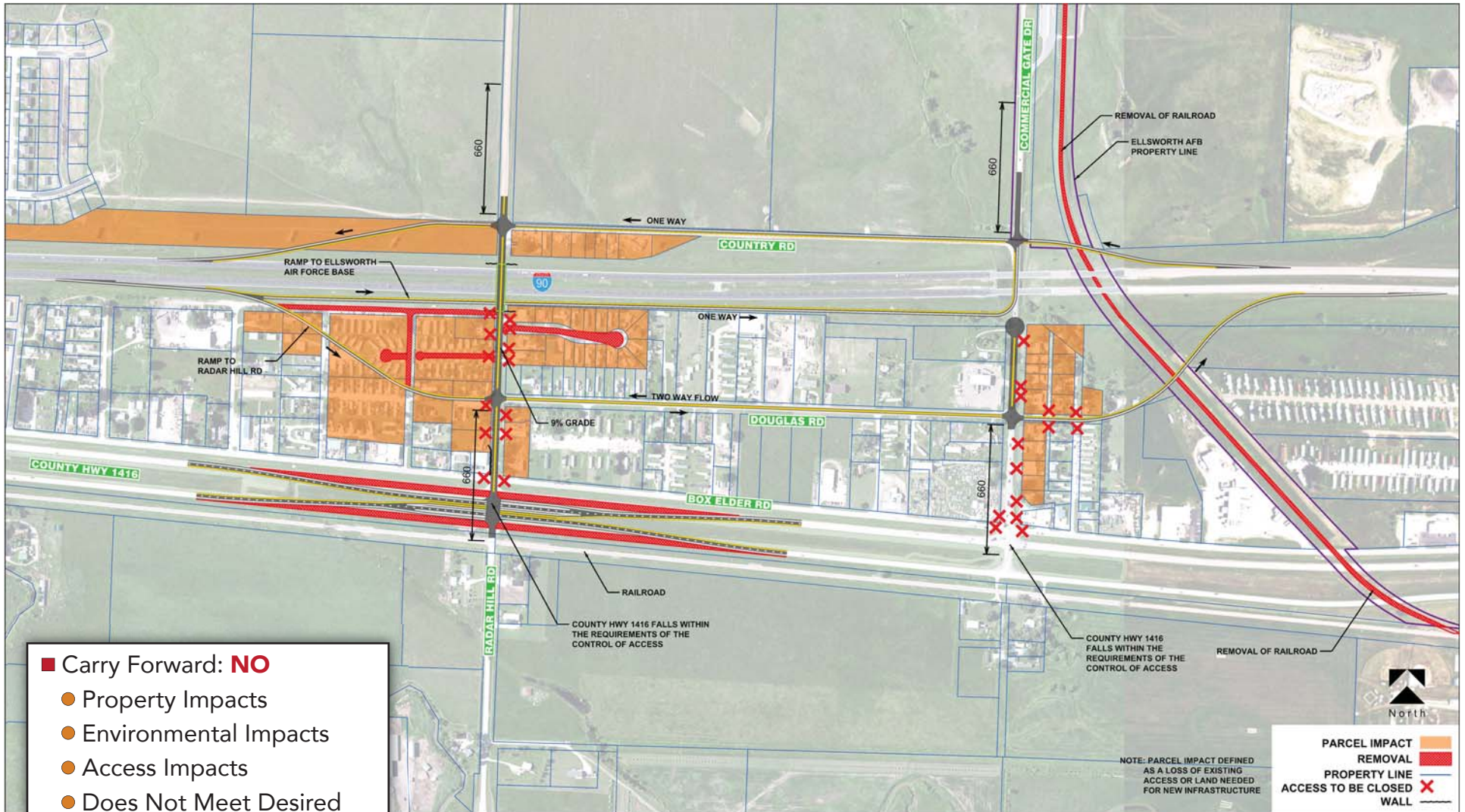


# I-90 Exit 65 Alternative 7 - Split Tight Diamond with Radar Hill Rd. and Commercial Gate Dr.

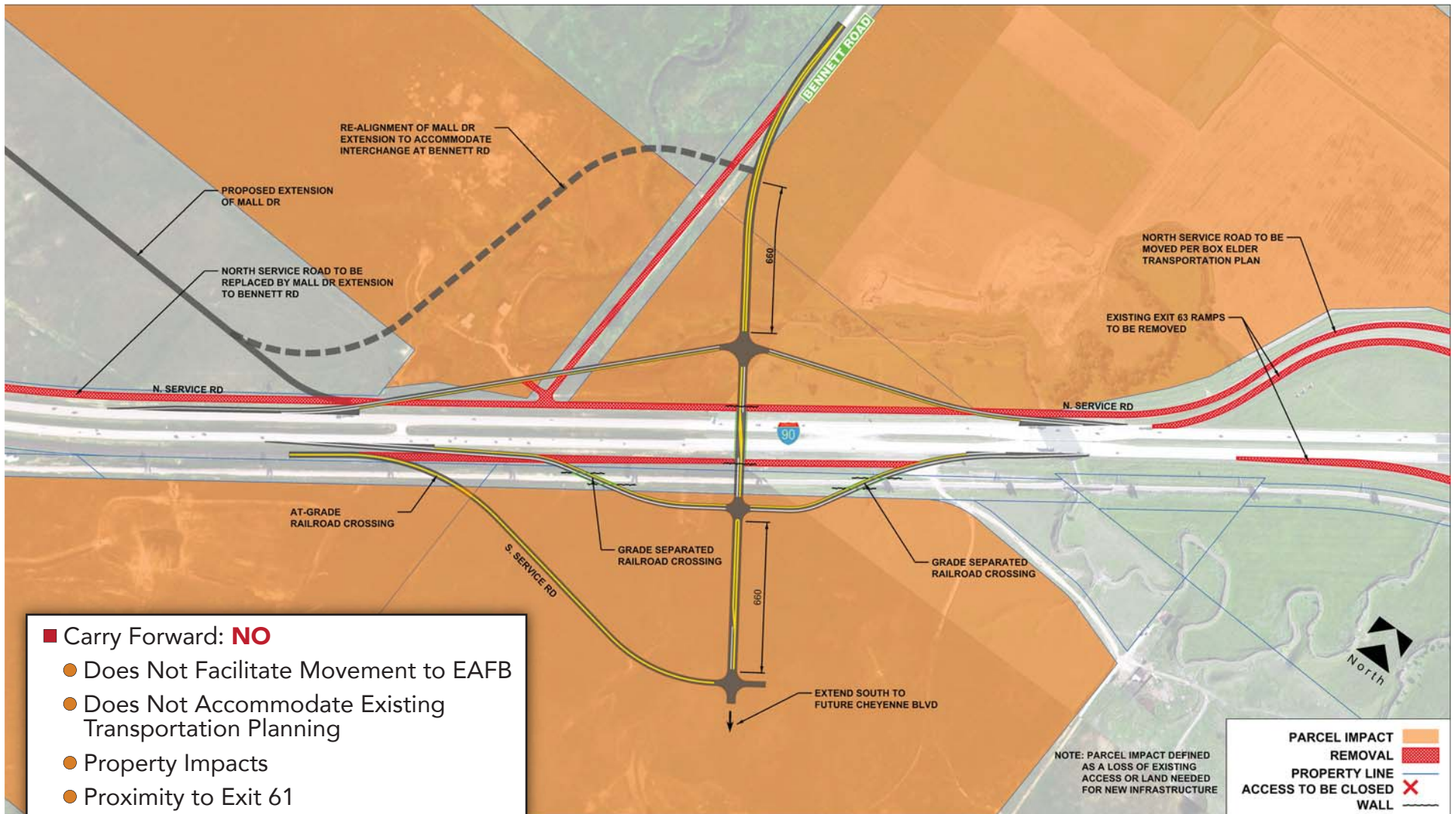


- Carry Forward: **NO**
- Property Impacts
- Environmental Impacts
- Access Impacts
- Does not Meet Desired Intersection for Intersection Ramp Spacing

## Alternative 8 - Split Diamond Interchange with Radar Hill Rd. and Commercial Gate Dr. with Exclusive Ellsworth AFB Ramp

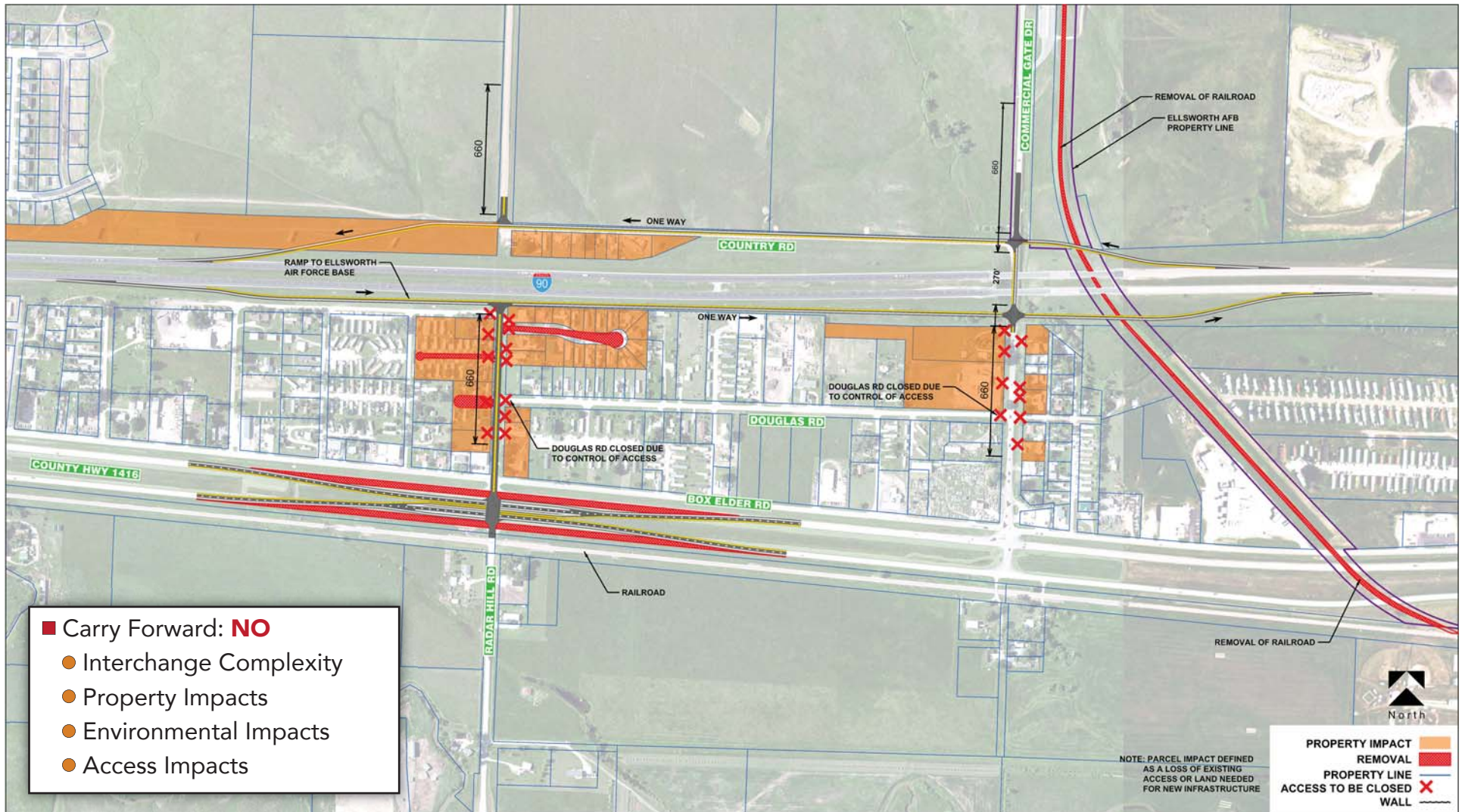


# I-90 Exit 62 Alternative 9 - Interchange at Bennett Rd.

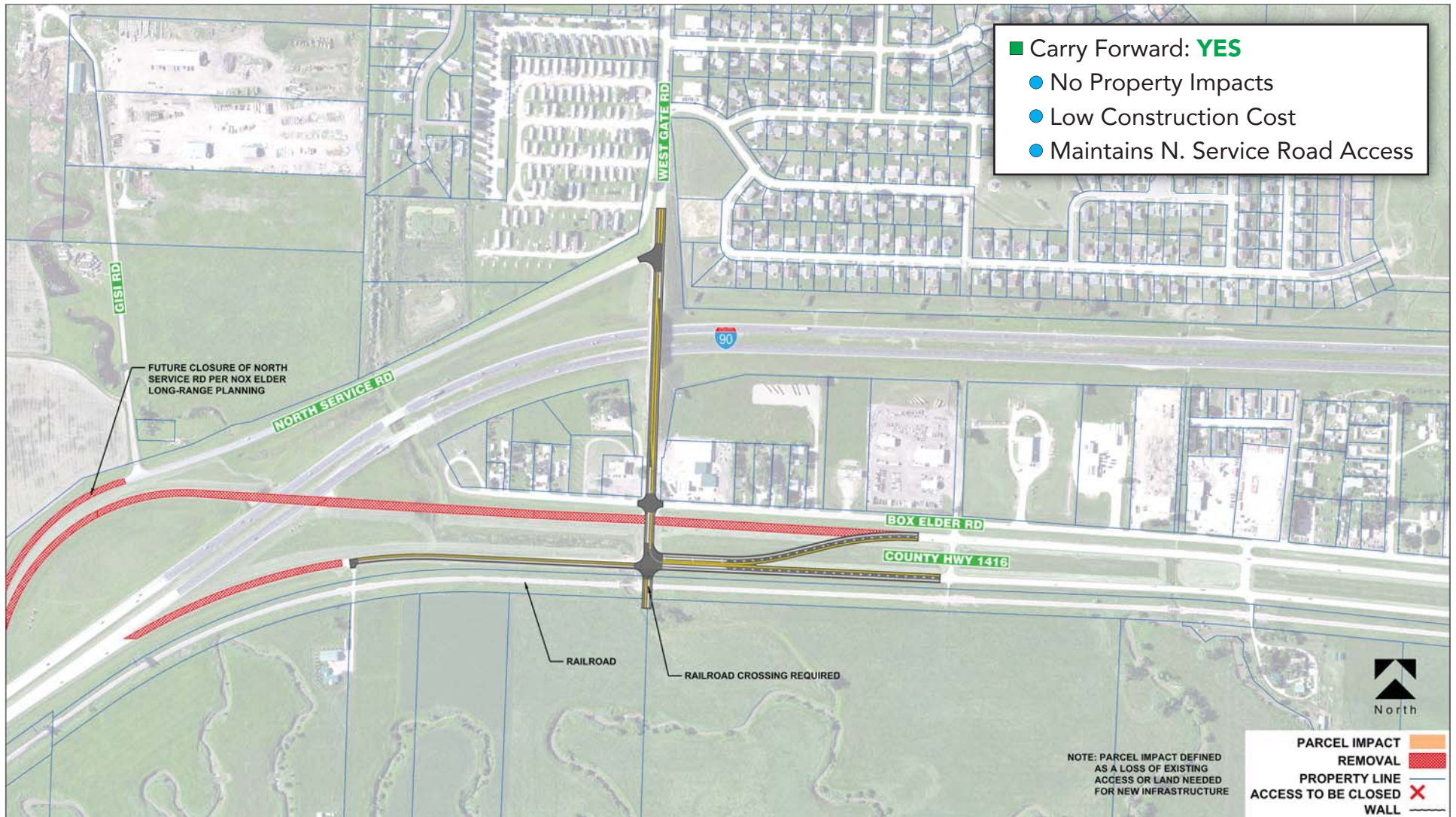


- Carry Forward: **NO**
- Does Not Facilitate Movement to EAFB
- Does Not Accommodate Existing Transportation Planning
- Property Impacts
- Proximity to Exit 61
- Lack of Connectivity to Existing Transportation Network

# I-90 Exit 65 Alternative 10 - Split Diamond Interchange at Radar Hill Rd.



# I-90 Exit 63 Alternative 11 - Exit 63 Removal at County Hwy 1416



# I-90 Exit 63 Evaluation of Options Carried Forward

EXIT 63 INTERCHANGE RECONSTRUCTION ALTERNATIVES		ADDRESS THE NEED FOR THE PROJECT	ENVIRONMENTAL IMPACTS	PRIVATE PROPERTY AND ROW IMPACTS	FACILITATES MOVEMENTS TO AND FROM EAFB	CONSTRUCT-ABILITY	CONSTRUCTION COSTS	CONNECTIVITY WITH EXISTING ROAD NETWORK	DRIVER EXPECTANCY	DESIGN CRITERIA	CONTROL OF ACCESS	PUBLIC COMMENT	CARRY FORWARD?
#	NAME & LOCATION	1	2	3	4	5	6	7	8	9	10	11	
	NO ACTION	↓	NOT SCORED - DOES NOT MEET PURPOSE AND NEED										●
1	WESTGATE DIAMOND	↑	→	→	↘	↑	↘	→	↑	↘	↘	↘	●
2	WESTGATE DIAMOND WITH DIRECT ACCESS TO EAFB	↑	↓	↓	↘	→	↘	→	↘	↘	↓	→	●
3	WESTGATE WITH LOOP RAMP	↑	↓	↘	↑	→	→	↘	↓	→	↘	→	●
4	HIGHWAY 1416 DIAMOND	↑	→	↑	→	↓	↓	↑	↑	↑	↑	↑	●
11	REMOVE EXIT 63	↘	↑	↘	↓	↘	↑	↓	↘	↓	↑	↓	●

Best utilizes existing infrastructure

Easiest to construct

Best meets driver expectancy

Alternatives have most impacts on private property

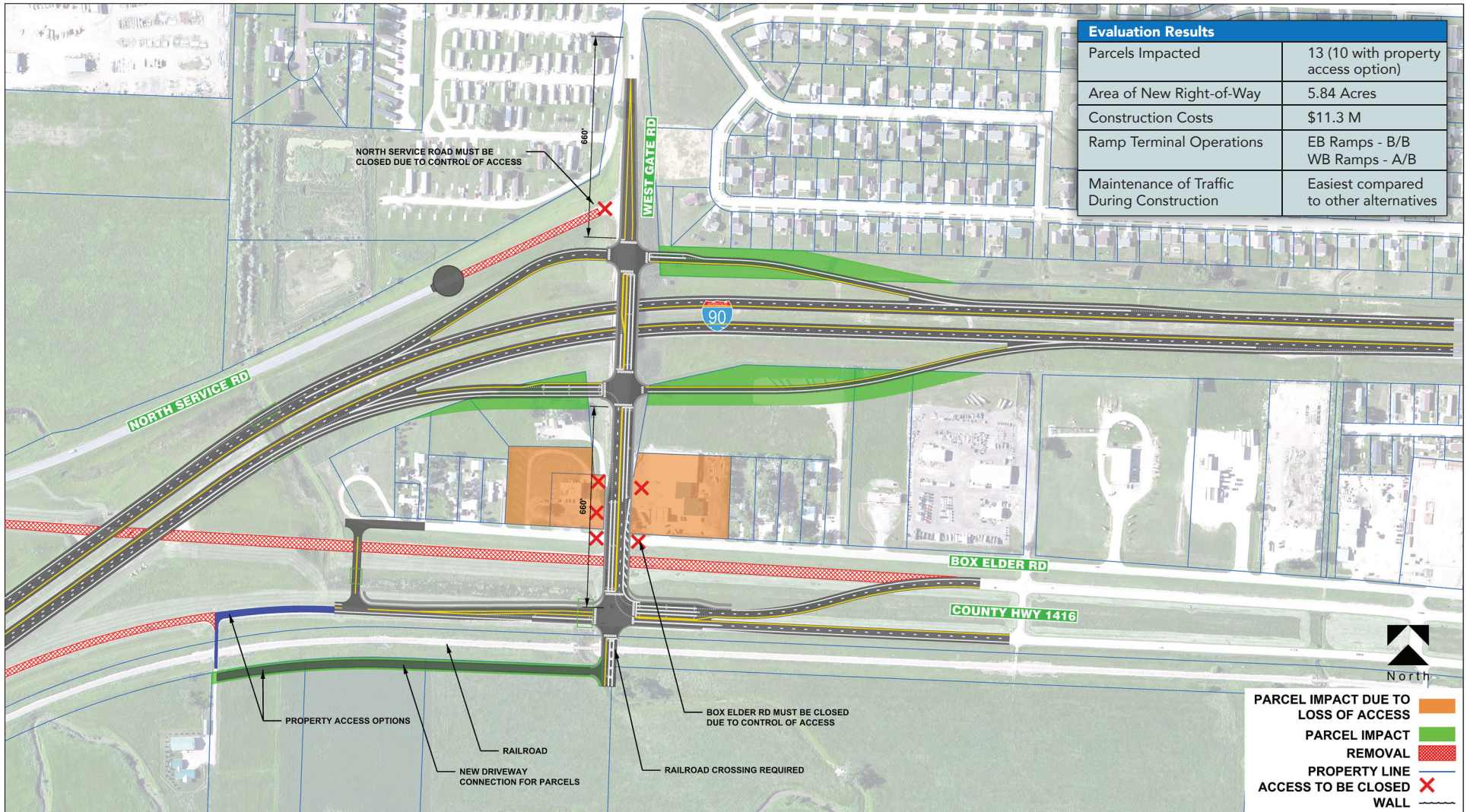
Control of access cannot be achieved

Lowest driver expectancy

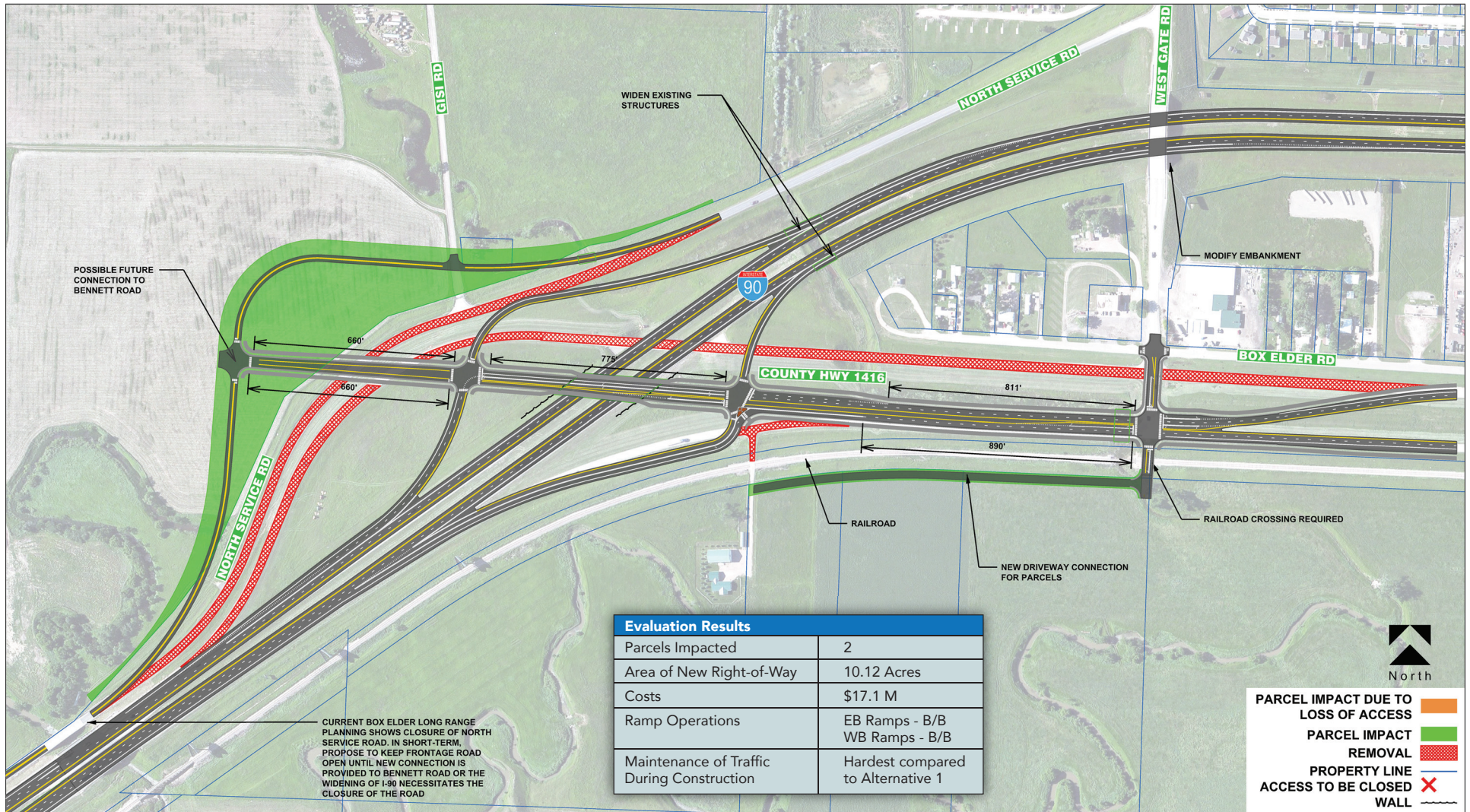
**LEGEND**

↓	Point Value = 0	Least meets criterion
↘	Point Value = 1	
→	Point Value = 2	
↗	Point Value = 3	
↑	Point Value = 4	Best meets criterion

# Feasible Option 1 - Westgate Diamond

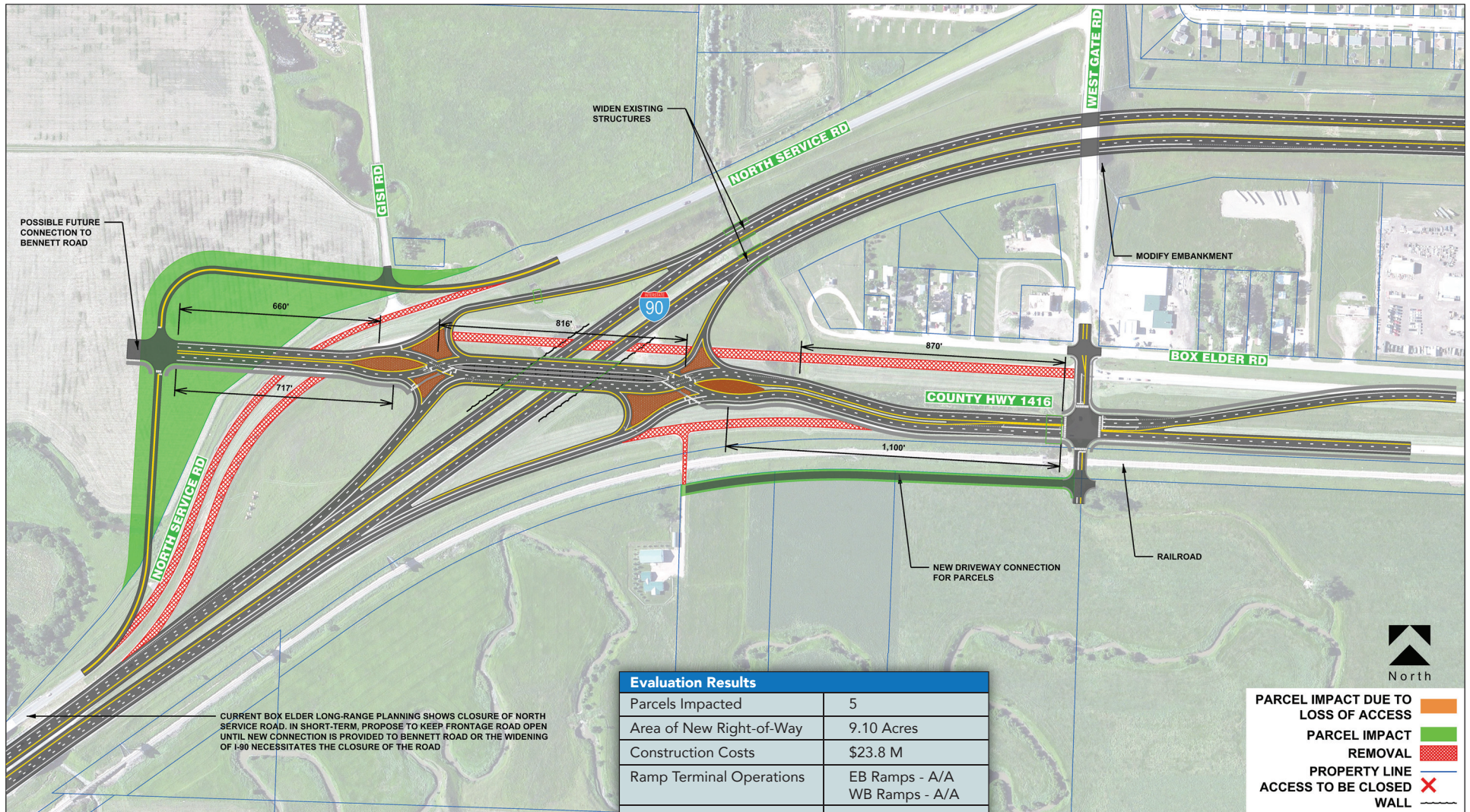


# Feasible Option 4a - Highway 1416 Diamond





# Feasible Option 4b - Highway 1416 Diverging Diamond Interchange (DDI)



Evaluation Results	
Parcels Impacted	5
Area of New Right-of-Way	9.10 Acres
Construction Costs	\$23.8 M
Ramp Terminal Operations	EB Ramps - A/A WB Ramps - A/A
Maintenance of Traffic During Construction	Hardest compared to Alternative 1

CURRENT BOX ELDER LONG-RANGE PLANNING SHOWS CLOSURE OF NORTH SERVICE ROAD. IN SHORT-TERM, PROPOSE TO KEEP FRONTAGE ROAD OPEN UNTIL NEW CONNECTION IS PROVIDED TO BENNETT ROAD OR THE WIDENING OF I-90 NECESSITATES THE CLOSURE OF THE ROAD



**DRAFT**

**I-90 Exit 61**

**Opinion of Probable Cost**



FHU Ref # 116034-01

**Alternative #1**

Date Prepared: August 23, 2017

Prepared By: Ben Harms

Project Construction Items	Unit	Quantity	Unit Cost (\$)	Total Cost	
Clearing	ACRE	9	\$5,000	\$45,000	
Removal of Asphalt Mat	SY	31,000	\$2	\$62,000	
Removal of Bridge	LS	2	\$23,000	\$46,000	
Embankment	CY	400,000	\$5	\$2,000,000	
Hot Mix Asphalt (HMA)	SY	51,000	\$30	\$1,530,000	
Aggregate Base Course (ABC)	CY	8,500	\$50	\$425,000	
Type B Concrete Curb and Gutter	LF	3,200	\$25	\$80,000	
Concrete Sidewalk (6")	SY	2,500	\$10	\$25,000	
Bridge Replacement	SF	11,600	\$200	\$2,320,000	
Traffic Signal	EACH	3	\$200,000	\$600,000	
<b>Total accounted construction items</b>				<b>\$7,133,000</b>	<b>(A)</b>
	<b>% Range</b>		<b>% Used</b>		
Project Construction Bid Items (from above)	Project Dependent			\$7,133,000	(A)
Landscaping	1% of (A)		1.00%	\$71,330	(B)
Additional Removals	0-5% of (A)		2.00%	\$142,660	(C)
Drainage	1-10% of (A)		4.00%	\$285,320	(D)
Erosion Control	2-8% of (A)		2.50%	\$178,325	(E)
Signing & Striping	1-5% of (A)		2.00%	\$142,660	(F)
Lighting	2% of (A)		2.00%	\$142,660	(G)
Utilities	4% of (A)		4.00%	\$285,320	(H)
Construction Traffic Control	5 to 25% of (A)		5.00%	\$356,650	(J)
Construction Survey	1.5% (A)		1.50%	\$106,995	(K)
Mobilization	(4 to 10%) of (A+B+C+D+E+F+G+H+I+J) Default = 6%		7.00%	\$619,144	(L)
Contingencies	(15% - 30%) of (A+B+C+D+E+F+G+H+I+J+K)		20.00%	\$1,892,813	(M)
<b>Total Construction Cost</b>	<b>Sum (A-M)</b>			<b>\$11,356,877</b>	

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**DRAFT**

**I-90 Exit 61**

**Opinion of Probable Cost**



FHU Ref # 116034-01

**Alternative #4A**

Date Prepared: August 23, 2017

Prepared By: Ben Harms

Project Construction Items	Unit	Quantity	Unit Cost (\$)	Total Cost	
Clearing	ACRE	10	\$5,000	\$50,000	
Removal of Asphalt Mat	SY	22,000	\$2	\$44,000	
Removal of Bridge	LS	2	\$23,000	\$46,000	
Embankment	CY	420,000	\$5	\$2,100,000	
Hot Mix Asphalt (HMA)	SY	58,000	\$30	\$1,740,000	
Aggregate Base Course (ABC)	CY	9,700	\$50	\$485,000	
Type B Curb and Gutter	LF	9,000	\$25	\$225,000	
Concrete Sidewalk (6")	SY	9,000	\$10	\$90,000	
Bridge Replacement	SF	30,000	\$200	\$6,000,000	
Retaining Walls	SF	10,000	\$40	\$400,000	
Traffic Signal	EACH	3	\$200,000	\$600,000	
<b>Total accounted construction items</b>				<b>\$11,780,000</b>	<b>(A)</b>
	<b>% Range</b>		<b>% Used</b>		
Project Construction Bid Items (from above)	Project Dependent			\$11,780,000	(A)
Landscaping	1% of (A)		0.50%	\$58,900	(B)
Additional Removals	0-5% of (A)		1.00%	\$117,800	(C)
Drainage	1-10% of (A)		2.00%	\$235,600	(D)
Erosion Control	2-8% of (A)		1.25%	\$147,250	(E)
Signing & Striping	1-5% of (A)		1.25%	\$147,250	(F)
Lighting	2% of (A)		1.00%	\$117,800	(G)
Utilities	4% of (A)		2.00%	\$235,600	(H)
Construction Traffic Control	5 to 25% of (A)		5.00%	\$589,000	(J)
Construction Survey	1.5% (A)		0.75%	\$88,350	(K)
Mobilization	(4 to 10%) of (A+B+C+D+E+F+G+H+I+J) Default = 6%		3.50%	\$473,114	(L)
Contingencies	(15% - 30%) of (A+B+C+D+E+F+G+H+I+J+K)		20.00%	\$2,798,133	(M)
<b>Total Construction Cost</b>	<b>Sum (A-M)</b>			<b>\$16,788,797</b>	

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**DRAFT**

**I-90 Exit 61**

**Opinion of Probable Cost**



FHU Ref # 115324-01

**Alternative #4B**

Date Prepared: August 23, 2017

Prepared By: Ben Harms

Project Construction Items	Unit	Quantity	Unit Cost (\$)	Total Cost	
Clearing	ACRE	10	\$5,000	\$50,000	
Removal of Asphalt Mat	SY	22,000	\$2	\$44,000	
Removal of Bridge	LS	2	\$23,000	\$46,000	
Embankment	CY	400,000	\$5	\$2,000,000	
Hot Mix Asphalt (HMA)	SY	60,000	\$30	\$1,800,000	
Aggregate Base Course (ABC)	CY	8,600	\$50	\$430,000	
Type B Concrete Curb and Gutter	LF	10,500	\$25	\$262,500	
4" Colored & Patterned Median Concrete	SY	5,900	\$110	\$649,000	
Concrete Sidewalk (6")	SY	6,600	\$10	\$66,000	
Bridge Replacement	SF	24,000	\$200	\$4,800,000	
Retaining Walls	SF	13,000	\$40	\$520,000	
Traffic Signal	EACH	3	\$200,000	\$600,000	
<b>Total accounted construction items</b>				<b>\$11,267,500</b>	<b>(A)</b>
	<b>% Range</b>		<b>% Used</b>		
Project Construction Bid Items (from above)	Project Dependent			\$11,267,500	(A)
Landscaping	1% of (A)		0.50%	\$56,338	(B)
Additional Removals	0-5% of (A)		1.00%	\$112,675	(C)
Drainage	1-10% of (A)		2.00%	\$225,350	(D)
Erosion Control	2-8% of (A)		1.25%	\$140,844	(E)
Signing & Striping	1-5% of (A)		1.25%	\$140,844	(F)
Lighting	2% of (A)		1.00%	\$112,675	(G)
Utilities	4% of (A)		2.00%	\$225,350	(H)
Construction Traffic Control	5 to 25% of (A)		5.00%	\$563,375	(J)
Construction Survey	1.5% (A)		0.75%	\$84,506	(K)
Mobilization	(4 to 10%) of (A+B+C+D+E+F+G+H+I+J) Default = 6%		3.50%	\$452,531	(L)
Contingencies	(15% - 30%) of (A+B+C+D+E+F+G+H+I+J+K)		20.00%	\$2,676,397	(M)
<b>Total Construction Cost</b>	<b>Sum (A-M)</b>			<b>\$16,058,385</b>	

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