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Alex Road Traffic Study

City of West Carrollton, OH

April 23, 2024



Agenda – Alex Road Traffic Study

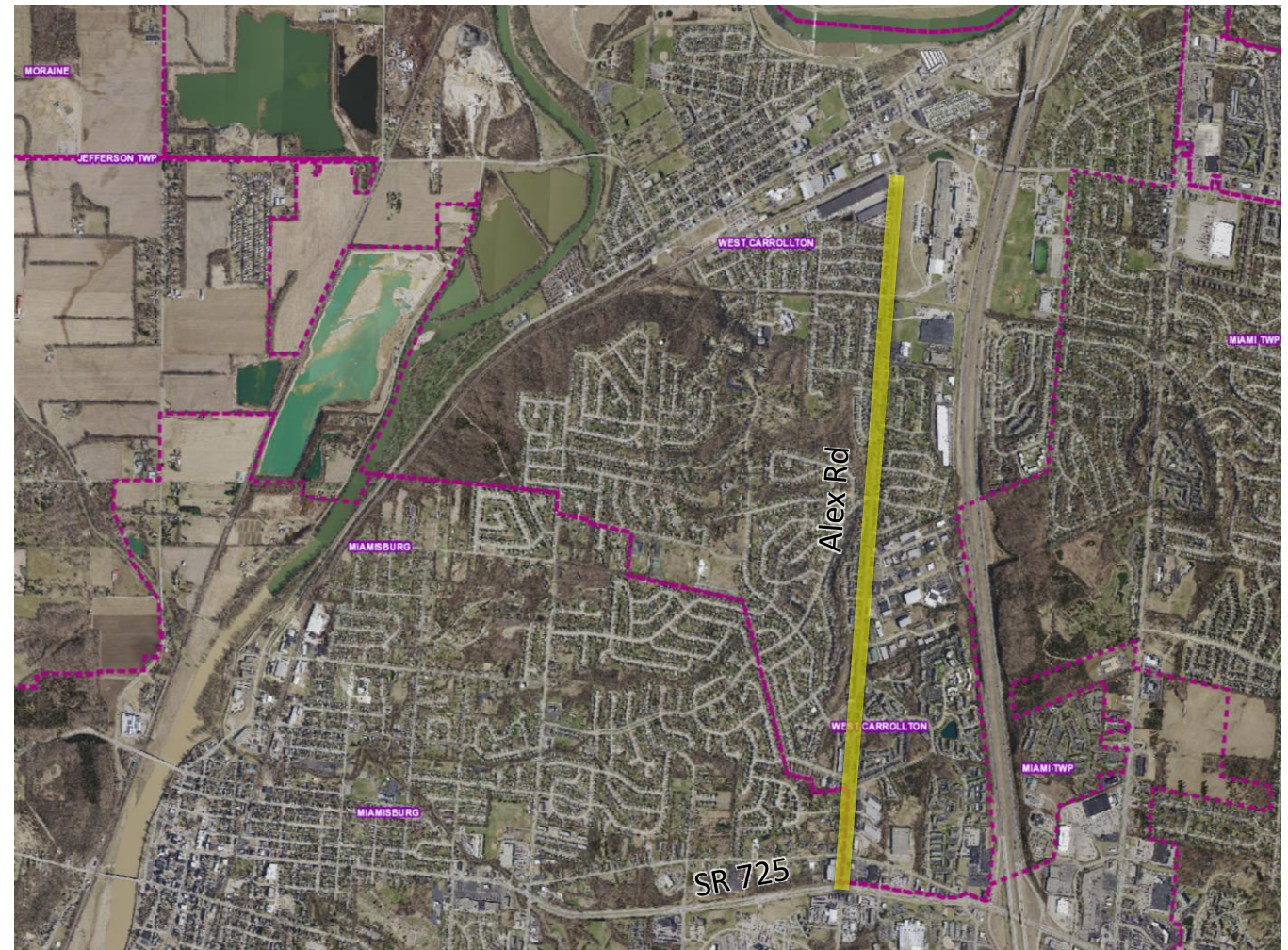
- Study Location and Objectives
- Purpose and Need
- Crash Analysis
- Traffic Analysis
- Alternatives
- Summary



Source: Google Maps Streetview

Study Location and Objectives

- Alex Rd from Kimberly Ln to Watertower Ln
 - Does not include SR 725
- Analyze safety and capacity
- Evaluate alternatives (5-lane and 3-lane)
- Develop opinions of probable construction cost
- Prepare report and identify next steps



Study limits are along Alex Rd between Kimberly Ln and SR 725

Source: Montgomery County Auditor GIS

Purpose and Need

- Improve pavement condition and implement countermeasures to reduce the potential for crashes



Alex Rd ADT = 17,500 (2009)

Source: Google Earth



Alex Rd ADT = 12,500 (2022)

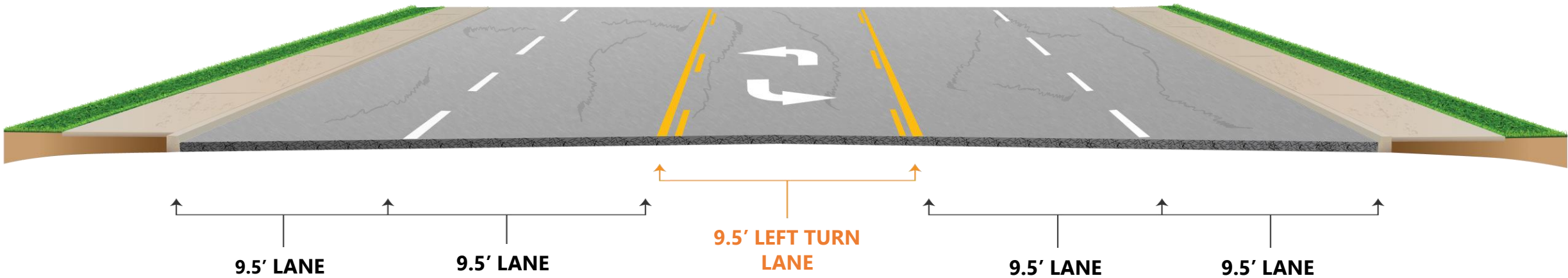
Source: Google Earth

Purpose and Need

- Correct substandard lane width
 - Existing pavement width = 48 ft
 - Minimum standard pavement width = 57 ft

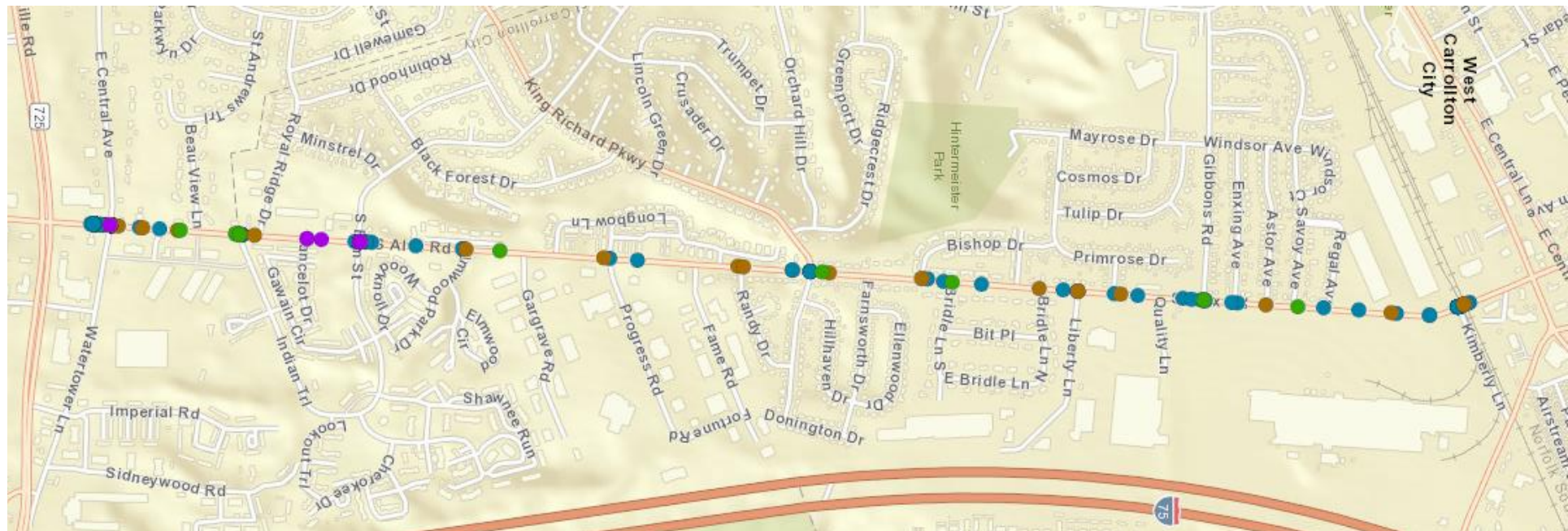
URBAN ROADWAY CRITERIA LANE & SHOULDER WIDTHS ^(A)	301-4
	REFERENCE SECTIONS 301.1.2, 301.2.2, 301.2.3. & 304.2.2

Functional Classification	Locale	Minimum Lane Width (ft.)	Minimum Curbed Shoulder Width (ft.) (F)	
			w/o Parking	w/ Parking (E)
Interstate, Other Freeways, and Expressways (J)	All	12	10 Rt. Paved (H) 4 Med. Paved (D)	
Arterial	50 mph or more	12	8 Each Side Paved (G)	
	Less than 50 mph	11 (B)(K)	1-2 Paved	7-10 Paved
Collector Streets (I)	Commercial/Industrial (L)	11 (K)(M)	1-2 Paved	8-11 Paved
	Residential	10	1-2 Paved	7-8 Paved
Local Streets (I)	Commercial/Industrial (L)	11 (K)(M)	1-2 Paved	8 Paved
	Residential	10 (C)	1-2 Paved	7 Paved



Crash Analysis

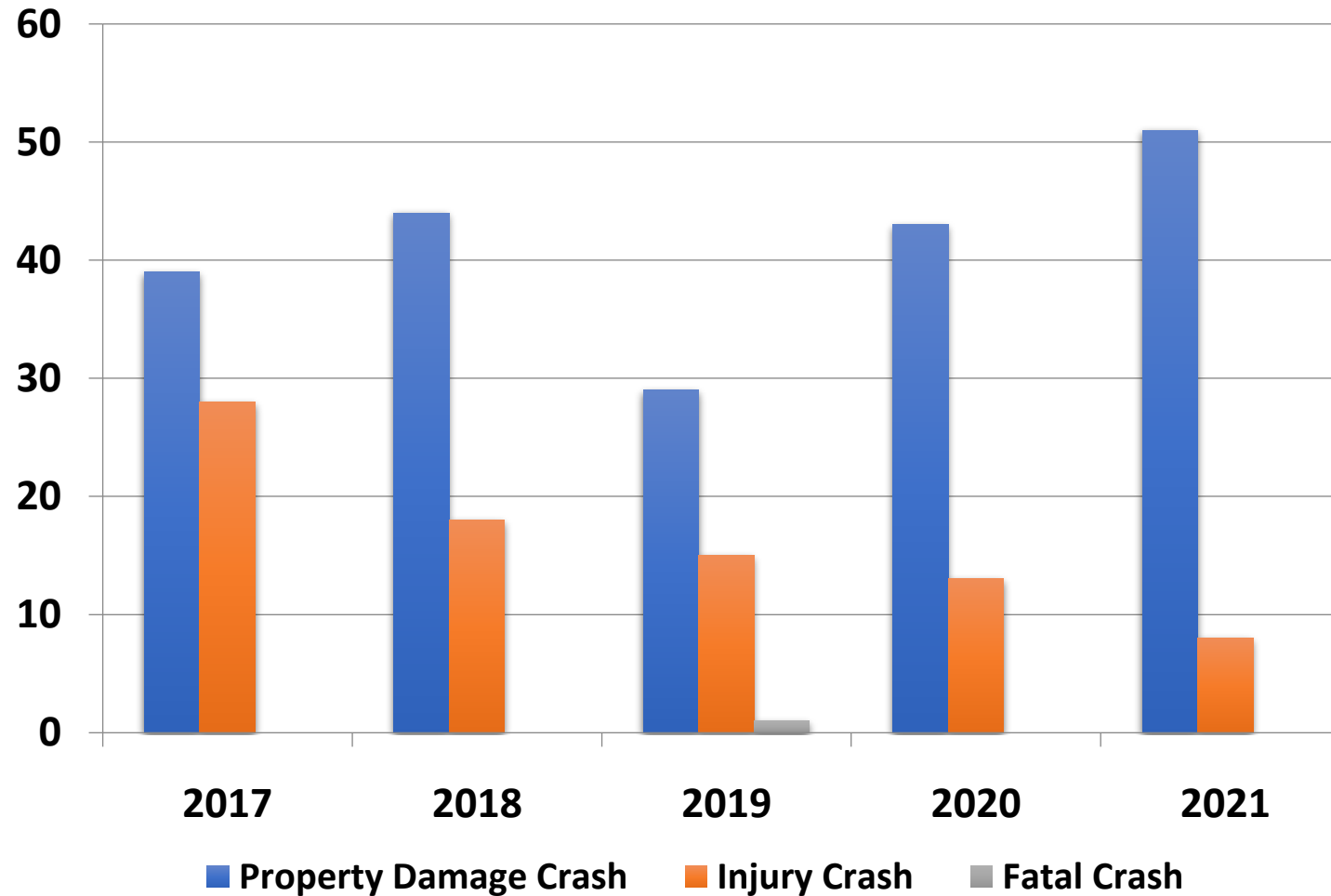
- Total of 289 crashes from 2017 through 2021
 - 29% of crashes resulted in injuries or suspected injuries
 - Angle, Left Turn, and Fixed Object crash types exceed statewide averages



Source: ODOT

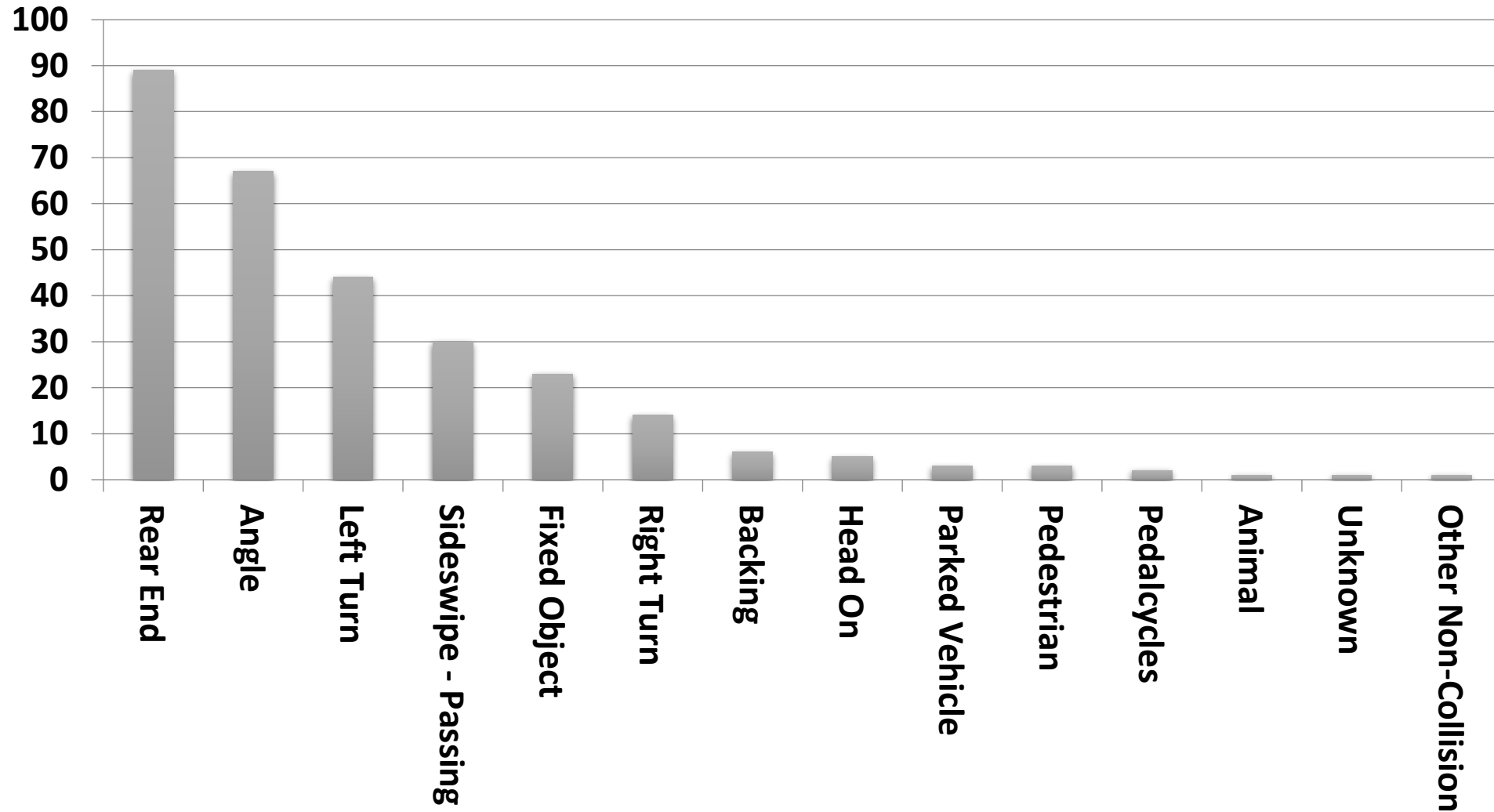
Crash Data

Frequency of Crashes by Year and Severity

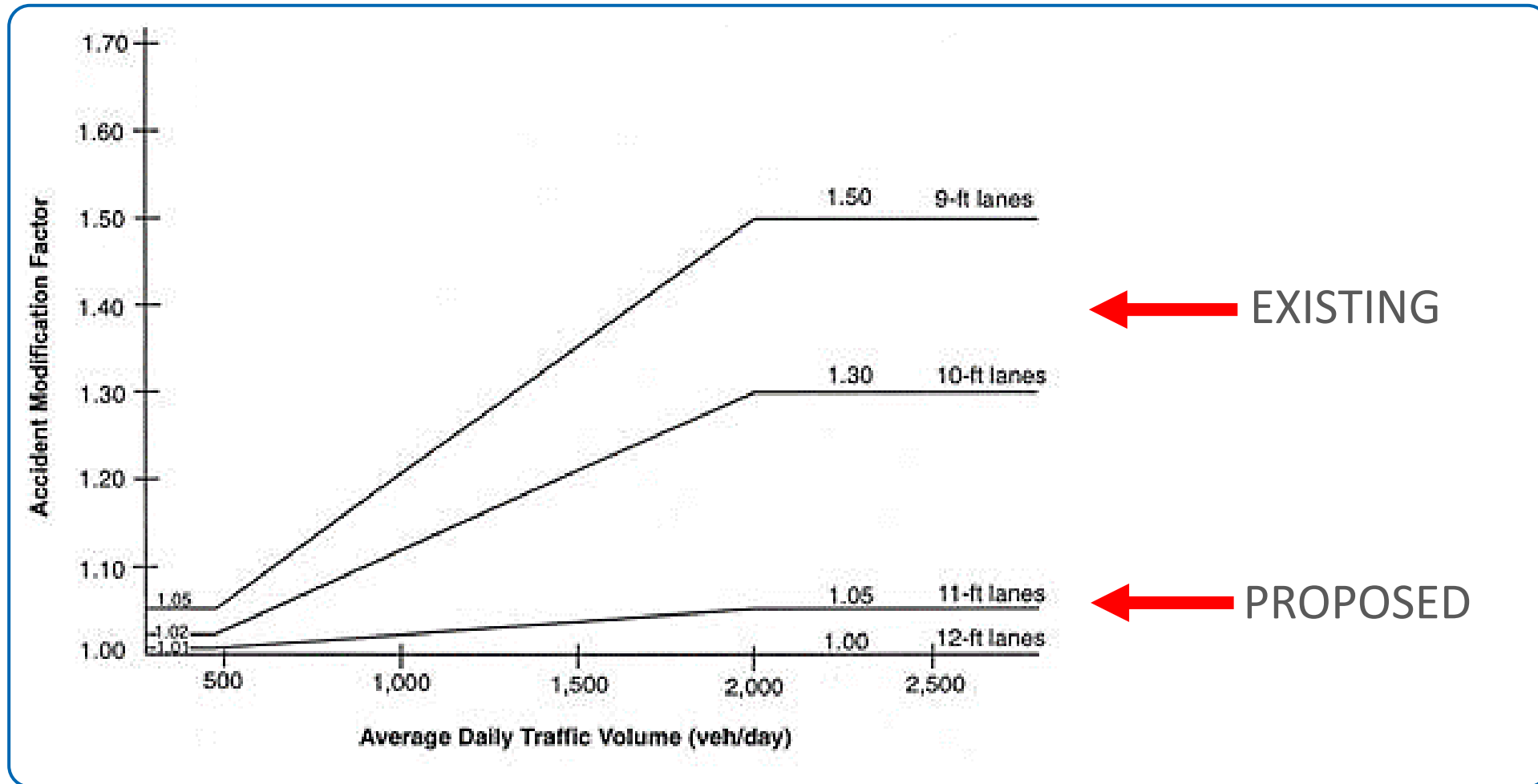


Crash Data

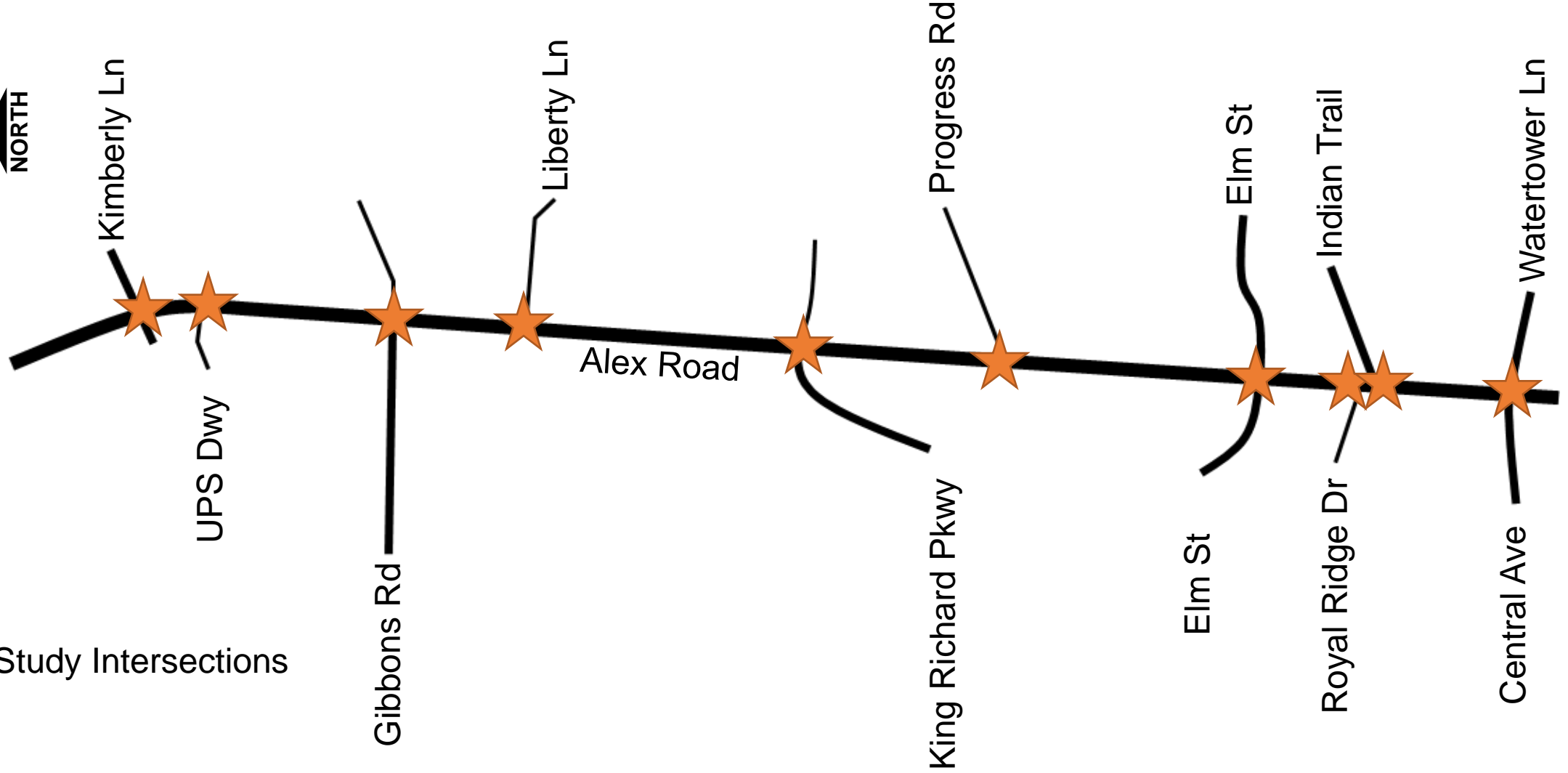
Frequency of Crashes by Type of Crash



Crash Modification Factor

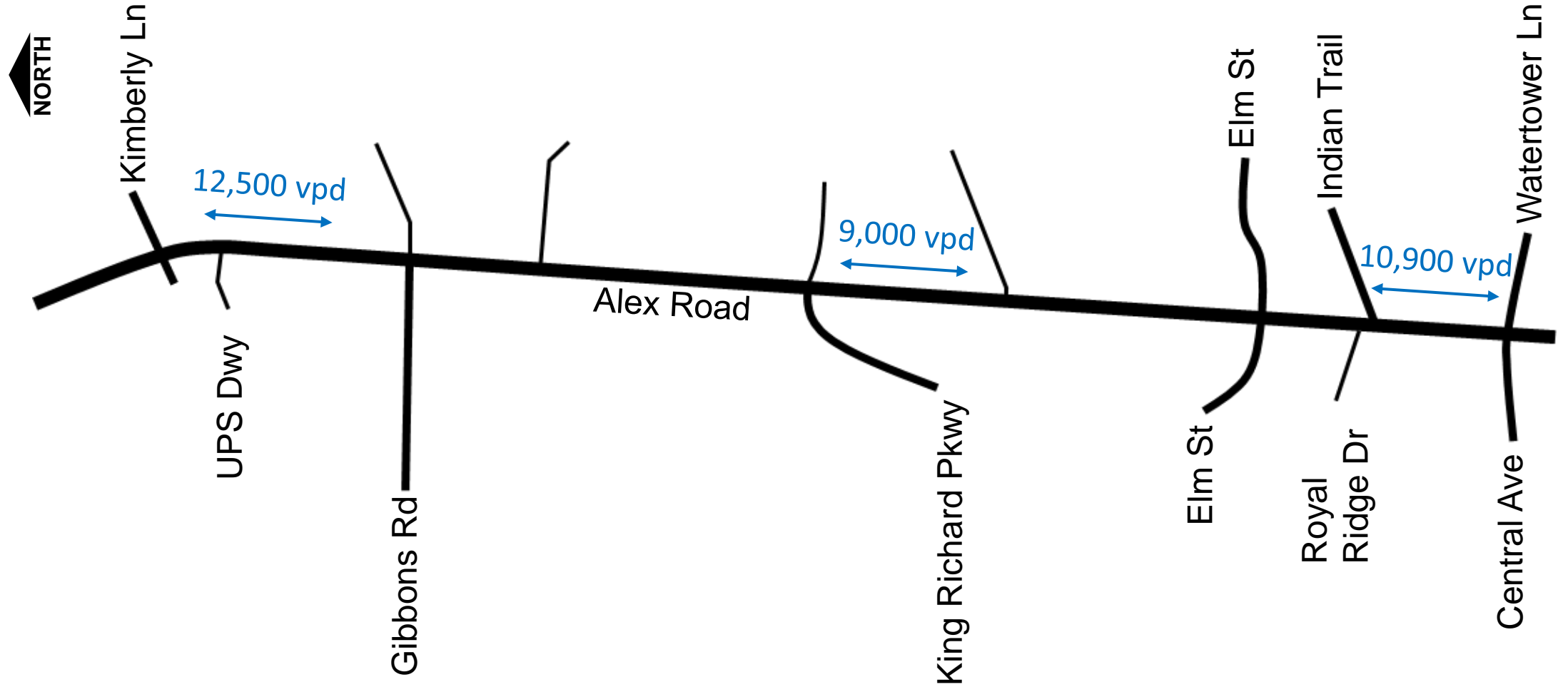


Traffic Analysis



★ Study Intersections

Traffic Volumes



Traffic Signal Warrants

Intersection	Warrant Met?			
	Warrant 1	Warrant 2	Warrant 3	Conclusion
Kimberly Lane	Yes	Yes	Yes	Retain
UPS Driveway	No	No	Yes	Retain
Gibbons Road	No	Yes	Yes	Retain
Liberty Lane	No	Yes	Yes	Retain
King Richard Parkway	Yes	Yes	Yes	Retain
Progress Road	No	No	No	Retain to serve Dayton Progress Corporation
Elm Street	Yes	Yes	Yes	Retain
Indian Trail	No	No	No	Retain to serve apartment complex
Watertower Lane	Yes	Yes	Yes	Retain



Alternatives Evaluation

- No Build (5-lane) Alternative
 - Existing lane use and geometry
- Build (3-lane) Alternative

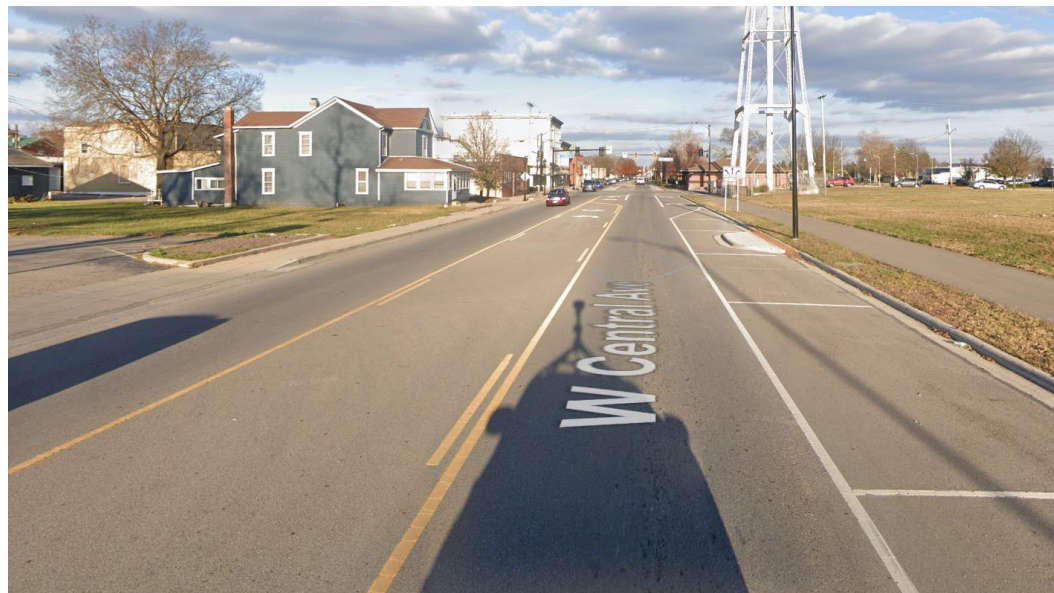
Build (3-lane) Alternative

- Reduce travel lanes from 5 to 3
- Royal Ridge and Indian Trail intersection modifications
- Signal phasing and timing changes
- Add right turn lanes in certain locations



Brown St – 12,700 ADT

Source: Google Maps Streetview



W Central Ave – 14,500 ADT

Source: Google Maps Streetview



E Central Ave (SR 725) – 11,300 ADT

Source: Google Maps Streetview

Build Alternative Option 1 – Three Travel Lanes with Buffered Bike Lanes



Build Alternative Option 2 – Three Travel Lanes with Shoulders



Build Alternative North Transition

- Drop southbound lane at UPS driveway
- Add northbound lane north of UPS driveway



Build Alternative South Transition

- Drop northbound lane at Watertower Lane
- Add southbound lane south of Watertower Lane

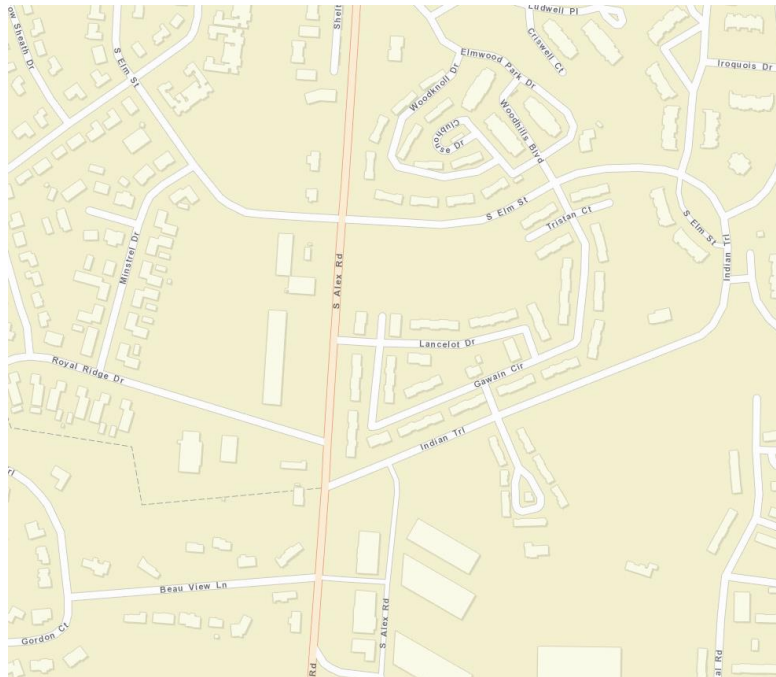


Royal Ridge and Indian Trail Intersections



Royal Ridge and Indian Trail Intersections

- Restrict southbound left turns from Alex Rd to Indian Trail
- Restrict eastbound left turns from Royal Ridge to Alex Rd



Source: Ohio Department of Transportation



Right Turn Lanes

- Criteria include:
 - Maintain existing right turn lanes
 - Add if right turn movement exceeds 50 vehicles in the peak hour
 - Transition from 5-lane to 3-lane section

Location	Criteria Met
Kimberly Ln (northbound)	Existing RTL; exceeds 50 veh in peak hour
UPS Driveway (southbound, no widening)	Transition from 5 lanes to 3 lanes
Gibbons Rd (southbound)	Exceeds 50 veh in peak hour
King Richard Pkwy (southbound)	Exceeds 50 veh in peak hour
Elm St (northbound)	Exceeds 50 veh in peak hour
Watertower Ln (northbound, no widening)	Transition from 5 lanes to 3 lanes

No Build Capacity Analysis

Intersection	Level of Service (average delay, seconds)			
	2024 AM Peak Hour	2024 PM Peak Hour	2044 AM Peak Hour	2044 PM Peak Hour
Kimberly Lane	B (13.3)	C (21.6)	B (13.5)	C (22.5)
UPS Driveway	A (9.5)	A (3.8)	A (9.6)	A (4.0)
Gibbons Road ¹	A (6.8)	A (6.2)	A (7.1)	A (6.3)
Liberty Lane	A (7.1)	A (5.9)	A (7.3)	A (6.0)
King Richard Parkway	A (9.5)	A (4.5)	A (9.5)	A (4.4)
Progress Road	A (1.7)	A (3.7)	A (1.7)	A (3.7)
Elm Street	B (10.9)	B (10.6)	B (10.8)	B (10.8)
Indian Trail	A (1.3)	A (1.3)	A (1.3)	A (1.3)
Watertower Lane ¹	B (11.5)	B (15.7)	B (11.5)	B (15.7)

1. HCM 2000 Results

LOS	Signalized Intersections (average delay, seconds)	Unsignalized Intersections (average delay, seconds)
A	≤10	≤10
B	>10 to 20	>10 to 15
C	>20 to 35	>15 to 25
D	>35 to 55	>25 to 35
E	>55 to 80	>35 to 50
F	>80	>50

Build (3-Lane) Alternative Capacity Analysis

Intersection	Level of Service (average delay, seconds)			
	2024 AM Peak Hour	2024 PM Peak Hour	2044 AM Peak Hour	2044 PM Peak Hour
Kimberly Lane	B (13.1)	C (21.6)	B (13.3)	C (22.5)
UPS Driveway	A (7.7)	A (5.4)	A (7.9)	A (5.8)
Gibbons Road ¹	A (8.4)	A (8.5)	A (8.4)	A (9.1)
Liberty Lane	A (3.8)	A (7.9)	A (3.9)	A (8.2)
King Richard Parkway	A (8.5)	A (4.8)	A (8.5)	A (4.8)
Progress Road	A (2.0)	A (4.0)	A (2.0)	A (4.0)
Elm Street	B (15.9)	B (12.4)	B (16.1)	B (12.9)
Indian Trail	A (1.6)	A (2.0)	A (1.6)	A (2.2)
Watertower Lane ¹	B (11.9)	B (16.7)	B (11.9)	B (17.1)

1. HCM 2000 Results

LOS	Signalized Intersections (average delay, seconds)	Unsignalized Intersections (average delay, seconds)
A	≤10	≤10
B	>10 to 20	>10 to 15
C	>20 to 35	>15 to 25
D	>35 to 55	>25 to 35
E	>55 to 80	>35 to 50
F	>80	>50

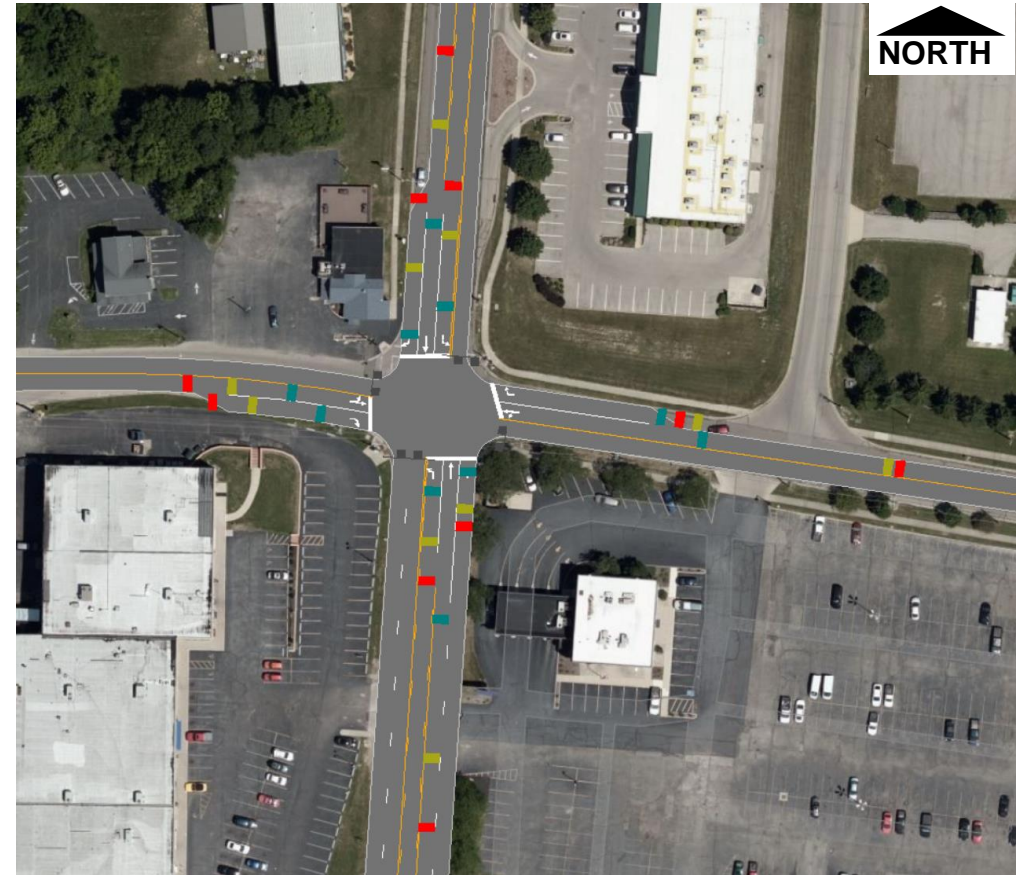
Capacity Analysis Comparison

Intersection	Level of Service (average delay, seconds)			
	2044 No Build AM Peak Hour	2044 Build AM Peak Hour	2044 No Build PM Peak Hour	2044 Build PM Peak Hour
Kimberly Lane	B	B	C	C
UPS Driveway	A	A	A	A
Gibbons Road ¹	A	A	A	A
Liberty Lane	A	A	A	A
King Richard Parkway	A	A	A	A
Progress Road	A	A	A	A
Elm Street	B	B	B	B
Indian Trail	A	A	A	A
Watertower Lane ¹	B	B	B	B

1. HCM 2000 Results

Queue Lengths Comparison

- Gibbons Road
 - Southbound queue increased from 115' to 265' (AM)
 - Northbound queue increased from 175' to 310' (AM)
- Liberty Lane
 - Northbound queue increased from 125' to 350' (PM)
- Watertower Lane
 - Northbound queue increased from 120' to 295' (PM)



Anticipated Construction Cost – No Build (5-lane) Alternative to Meet Current Standards

Work Category	Cost
Roadway	\$3,070,000
Drainage	\$1,140,000
Pavement	\$2,790,000
Traffic Signals and Traffic Control	\$2,100,000
Incidentals	\$830,000
Subtotal	\$9,930,000
Contingency (25%)	\$2,480,000
Inflation (11.4%)	\$1,420,000
Total Construction Cost	\$13,830,000

*Design and R/W costs not included

Anticipated Construction Cost – Build (3-lane) Alternative

Work Category	Cost
Roadway	\$110,000
Drainage	\$190,000
Pavement	\$1,710,000
Traffic Signals and Traffic Control	\$430,000
Incidentals	\$310,000
Subtotal	\$2,750,000
Contingency (25%)	\$690,000
Inflation (11.4%)	\$390,000
Total Construction Cost	\$3,830,000

*Design and R/W costs not included

Summary

- Alex Rd pavement is in poor condition and traffic volumes are declining
- Existing lane widths on Alex Rd are substandard
 - Potential contributing factor to top six crash types
- Alternatives
 - No Build – 5-lane section (match existing)
 - Build – 3-lane section (multiple options for extra pavement)
- Level of Service was maintained with 3-lane section

City Council Comments

- Presented in Council Work Session on April 11, 2023
- Comments included:
 - How much additional growth can be accommodated with the Build (3-lane) section?
 - Results of sensitivity analysis indicate up to 1 percent additional background growth can be accommodated over 20 year horizon.
 - Will school buses affect operations?
 - School buses will require traffic to stop, similar to other 2 and 3-lane roadways. This may increase travel time slightly at specific times of day but should not have a significant impact on operations.
 - Will residents have difficulty exiting driveways?
 - This is not anticipated due to the wider lanes and potential for lower speeds.
 - High speeds are a concern on the current roadway. What improvements can be made to calm traffic?
 - The reduction in thru lanes should result in reduced speeds. Other countermeasures (curb extensions, etc.) could also be considered.

