Project Name	**Crown Point Avenue**	
Checklist Reference Number	**0000001**	
OPW Number	**52884**	
Project Manager	**Jon Meyer, PE**	
Contact Information	(402) 444-5220	jmeyer@cityofomaha.org

PROJECT SCOPING CHECKLIST				
Existing Conditions				
Current AADT			Year	
Current Truck Volumes			Year	
Current Transit Frequency/Routes		30 min	Peak Frequency	
		#5	Routes	
			None	
Current Pedestrian Counts	**See traffic study**	Year	2018	
Current Bicycle Counts	**See traffic study**	Year	2018	
Are all curb ramps updated to ADA Standards?			None	
Are nodes present at intersections?	No	**Location**		

What are the maximum distances between pedestrian crossings?
From 72nd Street to 78th Street (approximately 2,500 ft) there is no existing provision to cross Crown Point Avenue (currently the parcel on the south side is a vacant field).
Signalized Intersections
72nd Street. 78th Street. Northwest High School Drives (2). Blair High Road. Signals will be evaluated through the traffic study to identify whether they are warranted.

Existing Roadway Cross Section

Street	Range	Street Type	AADT	# of Lanes	Center Turn Lane/ Median	Bikeway	Parking	Sidewalks (configuration, width, setback, etc.)	Posted Speed
1. CPA	72nd - 79th	Urb. Con.	8,400	4	CTL	No	No	Both. Varies.	40
2. CPA	79th - BHR	Urb. Con.	7200-8400	4	none	No	No	Both. 4'. 4' setback.	40
3.									
4.									
5.									

Bicycle/Pedestrian Generators
Omaha Northwest High School. Emmanuel Fellowship Christian Church. Sorenson Park Plaza.

General Description of Corridor Condition
Corridor is in need of pavement reconstruction due to deterrioration of the existing pc pavement.

Project Name	**Crown Point Avenue**	
Checklist Reference Number	**0000001**	
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Contact Information	(402) 444-5220	jmeyer@cityofomaha.org

Traffic Study Results	
Date Traffic Study was Submitted to Public Works	Oct-18
Date Traffic Study Approved by Public Works	Nov-18
Traffic/Corridor Study Results	
Traffic study recommended a three-lane cross section with roundabout traffic control at the main intersections of 78th Street, Northwest High School Drives, and Wenninghoff Road.	
Use the Traffic/Corridor Study Results to inform the through lane and turn-lane decisions in the Roadway Design Parameters Matrix	

Proposed Improved/Future Conditions			
Future AADT	11,000 - 14,800	**Horizon Year**	2040
Functional Classification	**Urban Minor Arterial**		
Proposed Character of Adjacent Development			
No known changes to character of the adjacent development are anticipated to occur from the construction year to the horizon year.			
Proposed Context Zone	Traditional Neighborhood		

Proposed Street Type			
	Functional Classification		
Context Zone	**Arterial**	**Collector**	**Local**
Downtown	Urban Connector	General Urban	General Urban
	General Urban	Main Street	Main Street
	Main Street		
Neighborhood Commercial	Urban Connector	General Urban	Shared Street*
	General Urban	Main Street	General Urban
	Main Street		Shared Street*
Mixed Use & Major Commercial	Urban Connector	General Urban	General Urban
		Main Street	Main Street
	Suburban Connector	Neighborhood Connector	Neighborhood Connector
	General Urban		Shared Street*
Traditional Neighborhoods	Urban Connector	Neighborhood Connector	Neighborhood Residential
			Shared Street*
Suburban Neighborhoods	Suburban Connector	Neighborhood Connector	Neighborhood Residential
			Shared Street*
Parks	Urban Connector	Neighborhood Connector	Neighborhood Residential
	Suburban Connector		
Industrial	Urban Connector	Industrial Street	Industrial Street
	Suburban Connector		
	Industrial Street		
Identified Type(s)	**Urban Connector (arterial)**		

Project Name	**Crown Point Avenue**	
Checklist Reference Number		**0000001**
OPW Number	**52884**	
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PROJECT SCOPING CHECKLIST

Roadway Design Parameters

Street Type	# of Through Lanes[1]	Lane Width[2]	Center Turn Lane / Median[1]	Bikeway Type	On-Street Parking	Posted Speed[1]	Func. Class.
Suburban Connector	4 to 6	Min - 11' Max - 12'	Median	Sidepath	None	45	Arterial
Urban Connector	4 to 6	Min - 11' Max - 12'	Either	Protected or buffered lanes	Limited	35-45	Arterial
General Urban	2 to 4	11'	Optional	Bike lanes	Recommended; delineated	25-40	All
Main Street	2	11'	Optional	Bike lanes	Recommended; delineated	25-35	All
Industrial	2 to 4	12'	CTL	Protected lanes or Sidepath	None	25-45	All
Neighborhood Connector	2	11'	Optional	Bike lanes	None	25	Collector Local
Neighborhood Residential	No centerline	Min - 25' Max - 32'	n/a	None	Non-delineated	25	Local
Shared Street[3]	No centerline[3]	Min - 22' Max - n/a	n/a	n/a	Optional	10	Local
Boulevard	2	Min - 16' Max - 20'	Optional	Optional	Optional	25	Collector Local
Parkway	No centerline[3]	Min - 25' Max - 32'	n/a	?	None	25	Collector Local
Historic Boulevards	See Historic Boulevard Master Plan for corridor specific guidance						Varies

[1] The number of through traffic lanes, turn lane/median configuration and posted speed are determined through a traffic study and review of functional classification.

[2] For designated Truck Routes, minimum lane width defaults to 12'. Lane width is defined from front of curb to centerline stripe.

[3] Shared Streets are only are to be used for private streets.

[4] Where no centerline exists, min. and max. lane width refer to the width of the roadway (back of curb to back of curb).

Selected Roadway Design Parameters

Range	Street Type	# of Through Lanes	Lane Width	Center Turn Lane / Median	Bikeway Type	On-Street Parking	Posted Speed
BHR to 74th Ct	Urban Connector	2	12	CTL (12)	Sidepath	No	35
74th Ct to 72nd	Urban Connector	4	12	Median	No	No	35

Project Name	**Crown Point Avenue**	
Checklist Reference Number		**0000001**
OPW Number	**52884**	
Project Manager	**Jon Meyer, PE**	
Contact Information	(402) 444-5220	jmeyer@cityofomaha.org

Project Scoping Checklist						
Proposed Pedestrian Zone Parameters						
Street Type	**Greenscape/ Furnishing Zone**		**Pedestrian Through Zone**		**Frontage Zone**	
	Recommended	Minimum[1]	Recommended	Minimum	Recommended	Minimum
Suburban Connector	8'	6.5'	Sidepath	5'	n/a	n/a
Urban Connector	8'	6.5'	7'	5'	8'	0'
General Urban	10'	6.5'	10'	5'	8'	0'
Main Street	10'	6.5'	10'	5'	8'	0'
Industrial	8'	6.5'	5'	5'	4'	0'
Neighborhood Connector	8'	6.5'	7'	5'	8'	0'
Neighborhood Residential	8'	0'	5'	5'	n/a	n/a
Shared Street	n/a	n/a	n/a	n/a	n/a	n/a
Historic Boulevards	40'	8'	Sidepath	5'	n/a	n/a
Boulevard/ Parkway	18.5'	0'	6'	6'	13'	13'
ACI Streets	Varies - See ACI Code					
Selected Pedestrian Zone Parameters	6.5'		North side - 10' Sidepath; South side - 5' sidewalk		1'	

[1] Desired minimum greenscape is 6.5' to sustain street trees. Clear zone requirements must be met. Greenscape zone can be reduced to 5' of landscape or 2' of impressed concrete if existing physical preclude the recommended zone with as approved by staff during trade-off discussion.

The minimum total pedestrian zone width for any street with transit service is 8 feet (preferably 10 feet) to provide space for a minimum 5-foot wide by 8-foot deep landing zone.

Project Name	**Crown Point Avenue**	
Checklist Reference Number		**0000001**
OPW Number	**52884**	
Project Manager	**Jon Meyer, PE**	
Contact Information	(402) 444-5220	jmeyer@cityofomaha.org

Identified Preliminary Cross Section Factors	
Functional Class.	Urban Minor Arterial
Context Zone	Traditional Neighborhood
Street Type	Urban Connector
Design Vehicle	S-Bus40
Pedestrian Zone	10' Sidepath; 5' Sidewalk
Overlay District	ACI-3 (at 72nd Street Intersection - Area not Impacted)

Public Engagement Activities

Identified stakeholders will participate in sessions to identify challenges and desires adjacent to the corridor. Stakeholder enhagement will occurr prior to but in concert with public engagement.Two public meetings will be held, the first public meeting to introduce the project and identify alternatives (10% design). The second public meeting will occur after 30 percent design to inform the public as to the preferred alternative. See Public Involvement Plan for more details.

Public Engagement Results

Stakeholder and public engagement identified speeding and safety as critical factors for future design. Stakeholders and the public preferred a three-lane typical to a two-lane alternative. Desires to keep the existing signals were heard. The existing signals do not meet warrants. To conform to the desires to calm traffic and increase safety, roundabouts were selected for intersection control instead of stop signs.

Description of Preliminary Cross Section(s)

Three-lane typical with CTL. 10' sidepath on the north, 5' side walk on the south. 6.5' greenscape/funrishing zone.

Description of Known Constraints/Challenges

ROW widths vary throughout the corridor. Slopes may be a challenge for geometric layout. Mt. Sinai Cemetery is located SE Corner of 78th Street.

Exceptions/Tradeoffs to the Design Parameters Made to Date

None.

Project Timeline (If known)

NTP - 2/2018. 30% Design - 12/2018. 60% Design - 2/2019. 90% Design - 4/2019. Construction - April 2020.

Project Name	Crown Point Avenue	
Checklist Reference Number		0000001
OPW Number	52884	
Project Manager	Jon Meyer	
Contact Informatio	(402) 444-5220	jmeyer@cityofomaha.org

Decision Making Process

A full alternatives analysis will be conducted to determine the preferred cross section. Decisions will be vetted through the complete streets process and documented accordingly. Public input will be considered during the initial phases of design.

Draft Purpose and Need Statement

Not applicable - Local funding only.

Nick B. Weander, PTP
Preparer Signature
Date 2/12/2019

Name
PW Designated Signer
Date

Name
Planning Designated Signer
Date

Complete Streets
Design Checklist - 30 Percent/PIH

Project Name	**Crown Point Avenue**	
Checklist Reference Number		**0000001**
OPW Number	**52884**	
Project Manager	**Jon Meyer, PE**	
Contact Information	(402) 444-5220	jon.meter@cityofomaha.org

Preliminary Roadway Cross Section

Street	Range	Street Type	AADT	# of Lanes	Center Turn Lane/ Median	Bikeway	Parking	Sidewalks (configuration, width, setback, etc.)	Posted Speed
1. CPA	72nd - 74th	Urb. Con.	14,800	4	CTL	no	no	Existing to remain.	40
2. CPA	74th - BHR	Urb. Con.	11,000	2	CTL	Yes (North)	No	10' Sidepath (north), 5' Sidewalk (south)	35

Preliminary Pedestrian Zone Configuration

Street	Range	Greenscape/Furnishing Zone	Pedestrian Zone	Frontage Zone
1. CPA	72nd - 74th	4'	4'	Varies
2. CPA	74th - BHR	6.5'	10' (north), 5' (south)	1'

Constraints and Limitations

Street	From	To	Identified Conflicts with Preliminary Configuration
1. CPA	72nd	74th	No conflicts. Note that this section of the project area remains in its existing configuration.
2. CPA	74th	78th	Creek channel slope requirements on north side of corridor do not allow for retaining a 6.5' Greenscape/Furnishing Zone. Retaining the preliminary configuration would result in need for retaining walls or slope modification outside of project budget.

Design Tradeoff Coordination Meeting Date(s)	3-Dec-18

Design Tradeoff Coordination Meeting Summary

Due to constraints on North Side of Crown Point Ave (creek channel slope), the Greenscape/Furnishing Zone width was reduced. From 74th Ct to 78th Street. This allowed the retaining the width of the 10' sidepath. Alternatives considered included building retaining walls, reducing the width of the sidepath and reducing the width of the Greenscape/Furnishing Zone.

Project Name	**Really Great Project Number 1**	
Checklist Reference Number		**54321a**
OPW Number	**12345**	
Project Manager	**Suzy Q. Public-Servant**	
Contact Information	(402) 444-5226	SQP@CityofOmaha.org

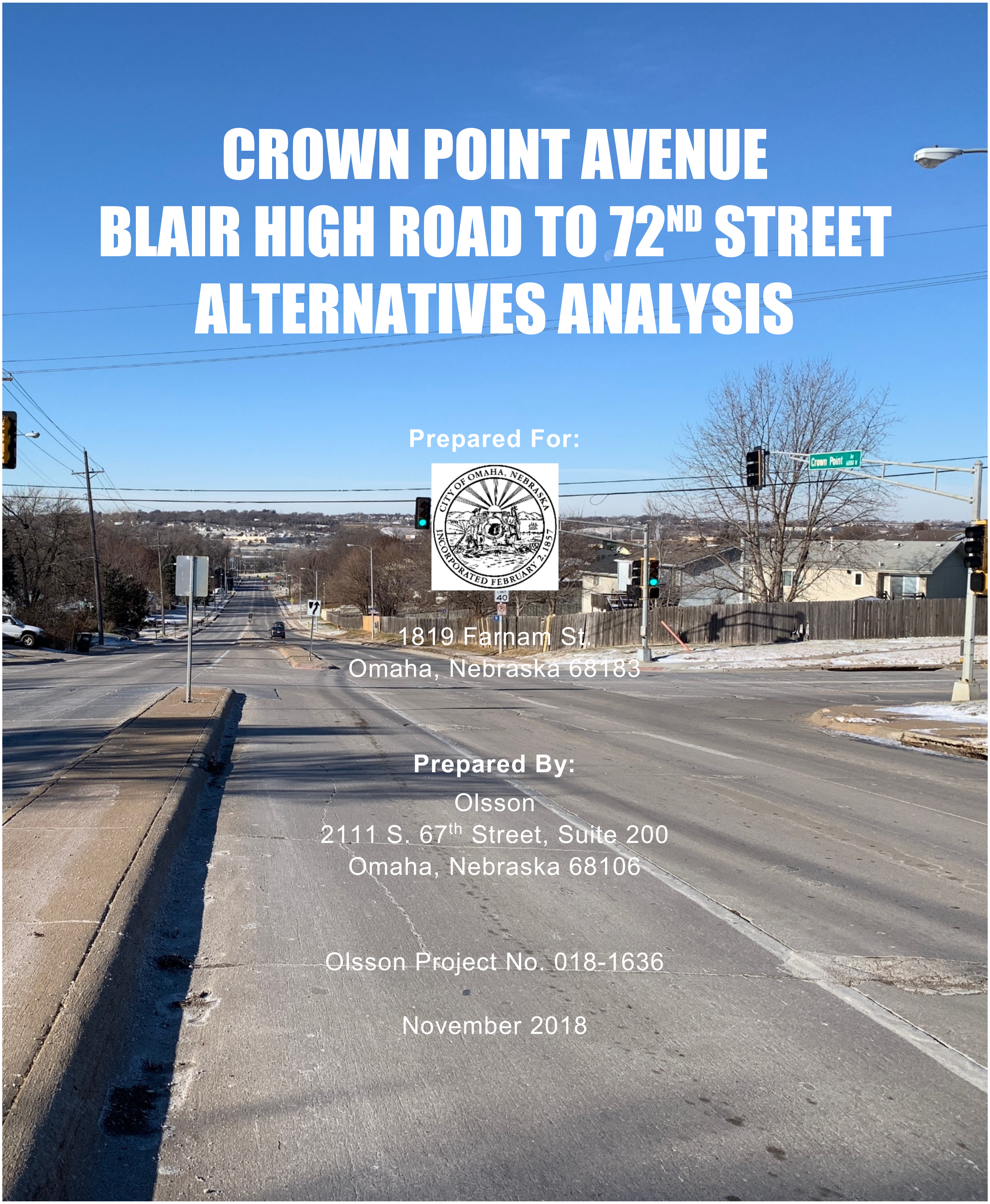
Design Tradeoff Coordination Results			
Street	From	To	Proposed Solution(s) | Exception(s)
1. CPA	74th	78th	Reduce width of Greenscape/Furnishing Zone to match existing slope while allowing 10' sidepath to continue.
2.			
3.			
4.			
5.			

Roadway Cross Section as Designed Following Tradeoff Decisions									
Street	Range	Street Type	AADT	# of Lanes	Center Turn Lane/ Median	Bikeway	Parking	Sidewalks (configuration, width, setback, etc.)	Posted Speed
1. CPA	72^{nd} - 74^{th}	Urb. Con.	14,800	4	CTL	no	no	Existing to remain.	40
2. CPA	74^{th} - BHR	Urb. Con.	11,000	2	CTL	Yes (North)	No	10' Sidepath (north), 5' Sidewalk (south)	35

Pedestrian Zone Configuration as Designed Following Tradeoff Decisions				
Street	Range	Greenscape/ Furnishing Zone	Pedestrian Zone	Frontage Zone
1. CPA	72^{nd} - 74^{th}	Varies - Existing	4'	4'
2. CPA	74^{th} - 78^{th}	2' - North. 6.5' - South.	10' North. 5' South.	1'
3. CPA	78^{th} - BHR	6.5'	10' North. 5' South.	1'
4.				
5.				

Is an Exception Memo Needed to Document Design Tradeoffs?	**No**

Nick B. Weander, PTP	Name	Name
Preparer Signature	**PW Designated Signer**	**Planning Designated Signer**
Date 2/12/2019	Date	Date



CROWN POINT AVENUE
BLAIR HIGH ROAD TO 72ND STREET
ALTERNATIVES ANALYSIS

Prepared For:

1819 Farnam St.
Omaha, Nebraska 68183

Prepared By:

Olsson
2111 S. 67th Street, Suite 200
Omaha, Nebraska 68106

Olsson Project No. 018-1636

November 2018

olsson

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EXECUTIVE SUMMARY

The Crown Point Avenue corridor is an approximately 1.25-mile-long section of roadway in Northwest Omaha. The project is bounded by Blair High Road on the west and 72nd Street on the east. Crown Point Avenue serves as an east-west commuter route for the surrounding residential use, as well as some industrial uses on the west end of the project. Crown Point Avenue also provides direct access to Northwest High School at two locations. Pavement along Crown Point Avenue has deteriorated to the point that reconstruction of the roadway is required. As part of that process, the City of Omaha is taking the opportunity to analyze the traffic conditions along Crown Point Avenue to identify opportunities to improve the operation and character of the corridor.

The purpose of this study is to analyze existing and future traffic conditions under potential roadway cross-sections to establish a preferred typical roadway cross-section along Crown Point Avenue. Intersection traffic control was also evaluated to determine the most appropriate and best fit intersection control for the area (retaining signals, stop control, roundabouts, etc.).

Two scenarios have been analyzed as part of this study: Existing (Year 2018) and 2040 Conditions. The year 2040 represents the long-term horizon year corresponding to the current Metropolitan Area Planning Agency (MAPA) Long-Range Transportation Plan (LRTP). Three roadway cross-section alternatives were identified in the conceptual and preliminary design phase of the project.

In accordance with the Omaha Signal System Master Plan, signal warrant evaluations were performed at the intersections of 78th Street, NW High East Drive, NW High West Drive, and Wenninghoff Road. Year 2040 projected traffic volumes were used. Based on the results of the signal warrant evaluations, none of these intersections satisfied traffic signal warrants for 2040 traffic conditions. With signals removed as an option, both stop-controlled intersections and roundabouts were analyzed in future year (2040) capacity analysis.

Traffic signals at Blair High Road and 72nd Street satisfy signal warrants are to remain in place. The results of the capacity analysis indicated most movements at these signalized intersections are expected to operate at acceptable levels of service. However, the 95th percentile queue length for the eastbound left-turn movement at Crown Point Avenue & Blair High Road is expected to extend past the existing storage length in both AM and PM peak hours. Extending this turn lane to hold the expected queue would result in shortening an existing westbound left-turn lane at Blair High Road & Military Road to the west.

As a two-way stop-controlled intersection, northbound and southbound movements at 78th Street are anticipated to experience unacceptable delay and queue lengths. As a roundabout corridor, 78th Street, NW High East Drive, NW High West Drive, and Wenninghoff Road are anticipated to operate at acceptable levels of service with reduced delay for most movements compared to stop-controlled intersections.

An alternatives analysis was conducted for five different cross-sections and two intersection control options. Using qualitative and quantitative data, including public and stakeholder involvement, results indicate a 2-lane cross-section with a multi-use trail would provide the most benefit to overall safety, capacity, and traffic calming while keeping construction costs low (Alternative 1). Roundabouts as intersection control provide increased capacity and traffic calming benefits to the corridor as compared to two-way stop-controlled (TWSC) intersections; however, they have a greater impact on ROW and are not as familiar to drivers in this region.

A public meeting was held on August 30, 2018 at Northwest High School. Input was gathered from attendees and from online forms. The results of the input indicate a preference for a 3-lane cross-section and a strong preference for a multi-use trail. It was found that the public preferred TWSC intersections but were not opposed to roundabouts as a mode of intersection control.

Based on the capacity analysis, alternatives screenings, and public input, the preferred alternative is a 3-lane cross-section with multi-use trail on the north side of Crown Point Avenue. Roundabouts were selected as the preferred intersection control for the intersections at 78th Street, NW High East Drive, NW High West Drive, and Wenninghoff Road.

1.0 INTRODUCTION AND PURPOSE

This report documents the alternatives analyses conducted for Crown Point Avenue between Blair High Road to 72nd Street in Omaha, Nebraska. The study was performed as part of a roadway improvement project along the corridor. A map showing the general location of the study area is illustrated in **Figure 1**.

The purpose of the analysis was to establish a preferred typical roadway cross-section and determine geometric and traffic control needs along Crown Point Avenue that will provide adequate capacity and safety for existing and future traffic conditions.

Two traffic volume scenarios were analyzed as part of this study: Existing (2018) Conditions and 2040 Conditions. 2040 represents the long-term horizon year corresponding with the current Metropolitan Area Planning Agency (MAPA) Long-Range Transportation Plan (LRTP). Year 2040 Build Conditions evaluates five roadway configuration alternatives identified in the concept development phase of this project. Transit, bicycle, and pedestrian accommodations were analyzed and are discussed in each alternative.

Specific recommendations are included at the end of this report to select a preferred alternative and to comply with the Omaha Transportation Master Plan (TMP) and Complete Streets Policy.

FIGURE 1

Project Area

LEGEND

Study Intersection

Project Corridor

N
NTS

2.0 DATA COLLECTION

Data provided by City of Omaha Public Works Department included peak hour turning movement counts and crash data from 2013 to 2017. A review of the existing roadway network including street type, geometrics, and traffic control device locations was completed as part of this effort. The City of Omaha provided eight-hour turning movement counts at the intersections listed in **Table 1** below.

Table 1. Existing Traffic Count Information.

Intersection	Date Counted	Weather	Temperature (High / Low)
Crown Point Avenue & Blair High Road	3-31-2018	Cloudy	39° / 28°
Crown Point Avenue & Wenninghoff Road	4-09-2018	Cloudy	39° / 36°
Crown Point Avenue & Northwest High School West Drive	4-18-2018	Mostly Cloudy	41° / 32°
Crown Point Avenue & Northwest High School East Drive	4-17-2018	Mostly Sunny	59° / 32°
Crown Point Avenue & 78th Street	3-28-2018	Sunny	57° / 32°
Crown Point Avenue & 72nd Street	4-17-2018	Mostly Sunny	59° / 32°

Counts were conducted while school was in session. Each count was taken at 15-minute intervals from 7:00am – 11:00am, and 2:00pm – 6:00pm and included intersection pedestrian volumes. In addition, bike and truck counts were taken at Crown Point Avenue & Blair High Road, Crown Point Avenue & 72nd Street, and Crown Point Avenue & 78th Street.

Existing peak hour traffic volumes can be seen in **Figure 2**. Count data can be seen in **Appendix A**.

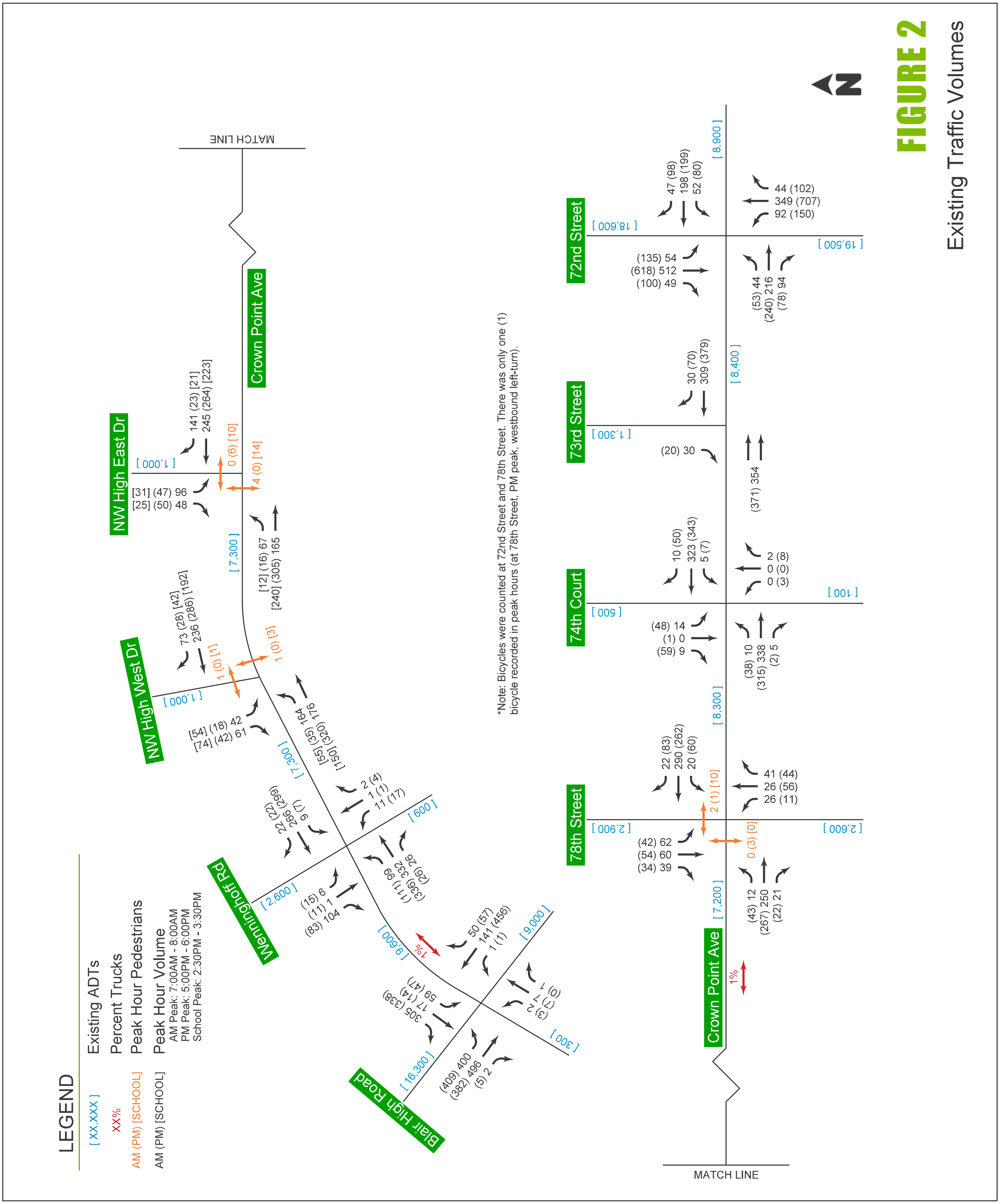


FIGURE 2
Existing Traffic Volumes
LEGEND
[XX,XXX] Existing ADTs
XX% Percent Trucks
AM (PM) [SCHOOL] Peak Hour Pedestrians
AM (PM) [SCHOOL] Peak Hour Volume
AM Peak: 7:00AM - 8:00AM
PM Peak: 5:00PM - 6:00PM
School Peak: 2:30PM - 3:30PM
*Note: Bicycles were counted at 72nd Street and 78th Street. There was only one (1) bicycle recorded in peak hours (at 78th Street, PM peak, westbound left-turn).
MATCH LINE
NW High East Dr
Crown Point Ave
NW High West Dr
Wenninghoff Rd
Blair High Road
72nd Street
73rd Street
74th Court
78th Street
Crown Point Ave
MATCH LINE
[1,000]
141 (23) [21]
245 (264) [223]
[31] (47) 96
[25] (50) 48
0 (6) [10]
4 (0) [14]
[7,300]
[12] (16) 67
[240] (305) 165
73 (28) [42]
236 (286) [192]
1 (0) [1]
1 (0) [3]
[1,000]
[54] (18) 42
[74] (42) 61
[55] (35) 164
[150] (320) 176
[7,300]
22 (22)
266 (299)
9 (7)
2 (4)
1 (1)
11 (17)
[600]
[2,600]
(15) 6
(11) 1
(83) 104
99 (11)
332 (369)
26 (29)
[9,600]
1%
50 (57)
141 (456)
1 (1)
[9,000]
59 (47)
17 (14)
305 (338)
1 (0)
2 (7)
2 (3)
[300]
[16,300]
(409) 400
(382) 496
(5) 2
[18,600]
47 (98)
198 (199)
52 (80)
[8,900]
44 (102)
349 (707)
92 (150)
(135) 54
(618) 512
(100) 49
[19,500]
(53) 44
(240) 216
(78) 94
[1,300]
30 (70)
309 (379)
[8,400]
(20) 30
(371) 354
[500]
10 (50)
323 (343)
5 (7)
2 (8)
0 (0)
0 (3)
[100]
(48) 14
(1) 0
(59) 9
(38) 10
(315) 338
(2) 5
[8,300]
[2,900]
22 (83)
290 (262)
20 (60)
2 (1) [10]
41 (44)
26 (56)
26 (11)
[2,600]
(42) 62
(54) 60
(34) 39
0 (3) [0]
(43) 12
(267) 250
(22) 21
[7,200]
1%

3.0 EXISTING CONDITIONS

Existing traffic conditions were evaluated to identify deficiencies and to provide a baseline for comparison purposes.

3.1 Network Characteristics

Nine major roadways are located within the study area:

- Crown Point Avenue
- Blair High Road
- Wenninghoff Road
- Northwest High School West Drive (NW High West Dr)
- Northwest High School East Drive (NW High East Dr)
- 78th Street
- 74th Court
- 73rd Plaza
- 72nd Street

Current roadway characteristics are summarized in **Table 2** below. Data for each roadway was acquired from aerial photography and the MAPA Federal Functional Classification Map.

Table 2. Existing Roadway Characteristics.

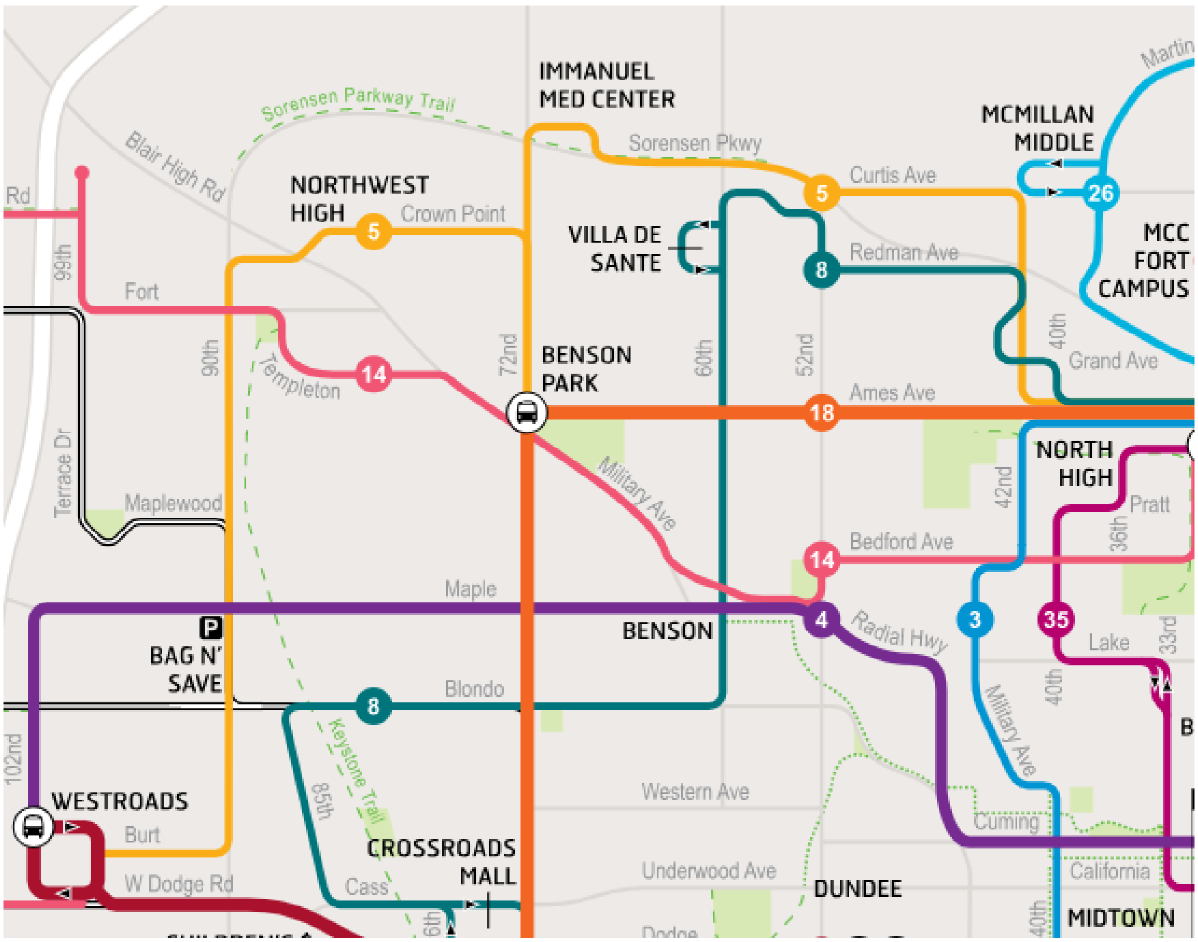
Roadway	Section	Median Type	Posted Speed	Functional Classification
Crown Point Avenue	4-Lane	Undivided[1]	40 mph	Minor Arterial
Blair High Road	4-Lane	Divided	45 mph	Other Principal Arterial
Wenninghoff Road	2-Lane	Undivided	40 mph	Major Collector
NW High West Dr	2-Lane	Undivided	25 mph	Local
NW High East Dr	2-Lane	Undivided	25 mph	Local
78th Street	2-Lane	Undivided	35 mph	Major Collector
74th Court	3-Lane	TWLTL[2]	25 mph	Local
73rd Plaza	3-Lane	TWLTL[2]	25 mph	Local
72nd Street	4-Lane	Divided	40 mph	Other Principal Arterial

[1]Note: East of 74th Court to 72nd Street, Crown Point Avenue widens to a 4-lane divided section with a center median.

[2]TWLTL – Two-Way Left-Turn Lane

Five signalized intersections exist along Crown Point Avenue: Blair High Road, NW High West Drive, NW High East Drive, 78th Street and 72nd Street. All other intersections are stop-controlled, full-movement intersections with the exception of 73rd Plaza which is restricted to right-in, right-out (RIRO). Designated left-turn lanes are located at: 78th Street, 74th Court, and 72nd Street.

Omaha Metro Transit Route 5 runs along Crown Point Avenue and includes nine stops (four eastbound, five westbound) within the study area. This includes two stops in front of Northwest High School. The Route 5 map is shown below.



http://www.ometro.com/index.php/bus-system/system-map/

Sidewalks are present on both the north and south sides of Crown Point Avenue. Pedestrian crosswalks are located at both high school drives. In addition, most pedestrian crossings along the corridor are not ADA (Americans with Disabilities Act) compliant. Bike infrastructure is also lacking through the corridor.

Existing lane configurations and traffic control are illustrated in **Figure 3**.

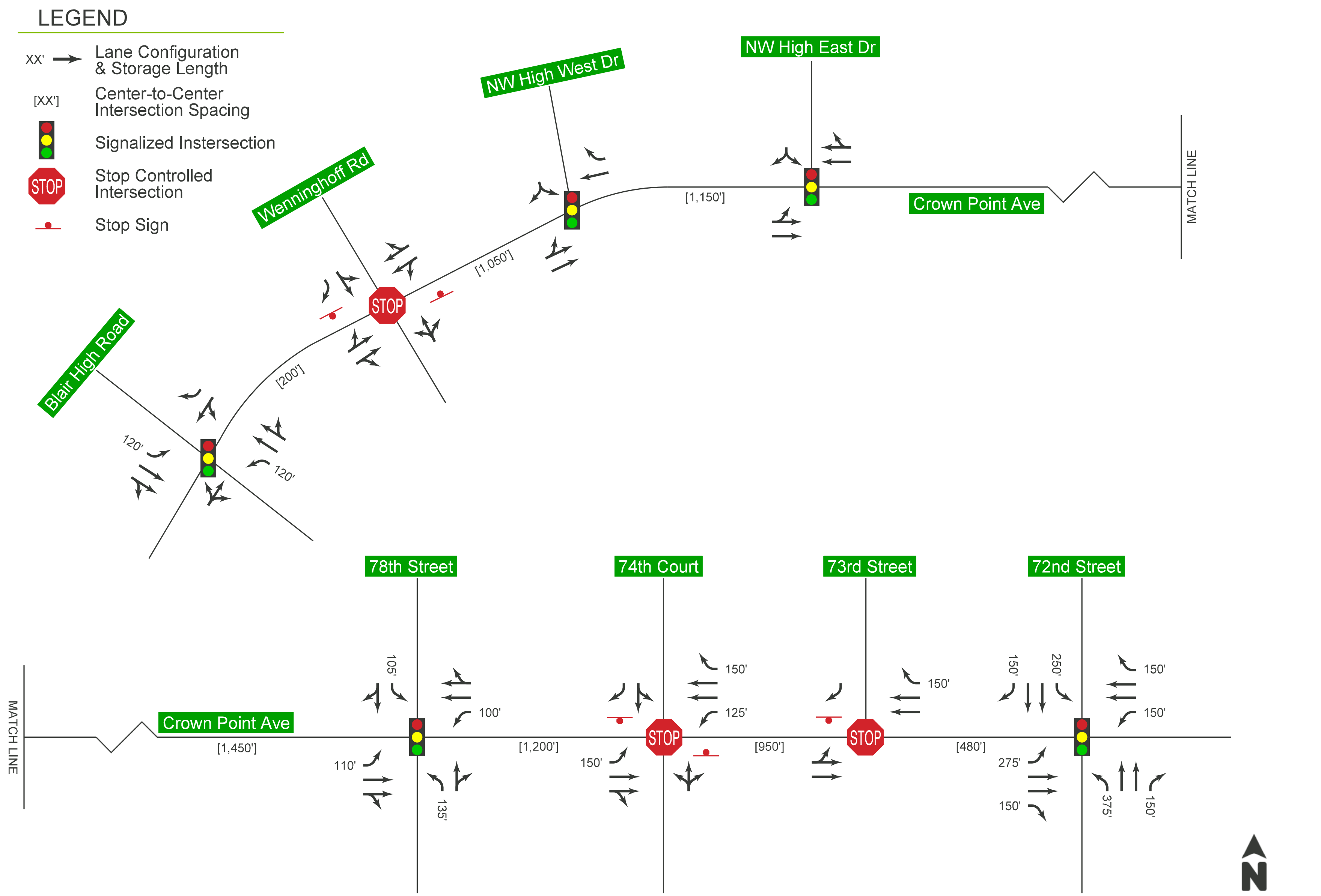


FIGURE 3

Existing Lane Configurations and Traffic Control

3.2 Existing Conditions Capacity Analysis Summary

Capacity analyses were performed for the existing study intersections using the existing lane configurations and traffic control. Analyses were conducted using Synchro, Version 10.0 which is based on the Highway Capacity Manual, 6th Edition methodologies. For simplicity, the amount of control delay is equated to a grade or Level of Service (LOS) based on thresholds of driver acceptance. The amount of delay is assigned a letter grade A through F, LOS A representing little or no delay and LOS F representing very high delay. **Table 3** shows the delays associated with each LOS grade for signalized and unsignalized intersections, respectively.

Table 3. Intersection LOS Criteria.

Level-of-Service	Average Control Delay (seconds)	
	Signalized	Unsignalized
A	< 10	< 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50
Highway Capacity Manual (HCM 6th Ed.)		

The City of Omaha provided existing signal timings at all signalized intersections within the study corridor for use in the capacity analysis. Results of the analysis indicate that signalized intersections operate at LOS B or better in both peak hours. All movements at signalized intersections operate at LOS D or better in both peak hours. The 95th percentile queue length for the southbound right-turn movement at Crown Point Avenue & Blair High Road is approximately 160 feet in the PM peak hour, which will spill back into the adjacent intersection of Crown Point Avenue & Wenninghoff Road. Wenninghoff Road is located approximately 150 feet north of Blair High Road. All other queue lengths are contained within existing available storage lengths.

At unsignalized intersections, all movements operate at LOS C or better in both peak hours. Queue lengths typically do not exceed one vehicle in both peak hours.

The Existing Conditions Capacity Analysis Summary is illustrated in **Figure 4**. Detailed results may be found in **Appendix B**.

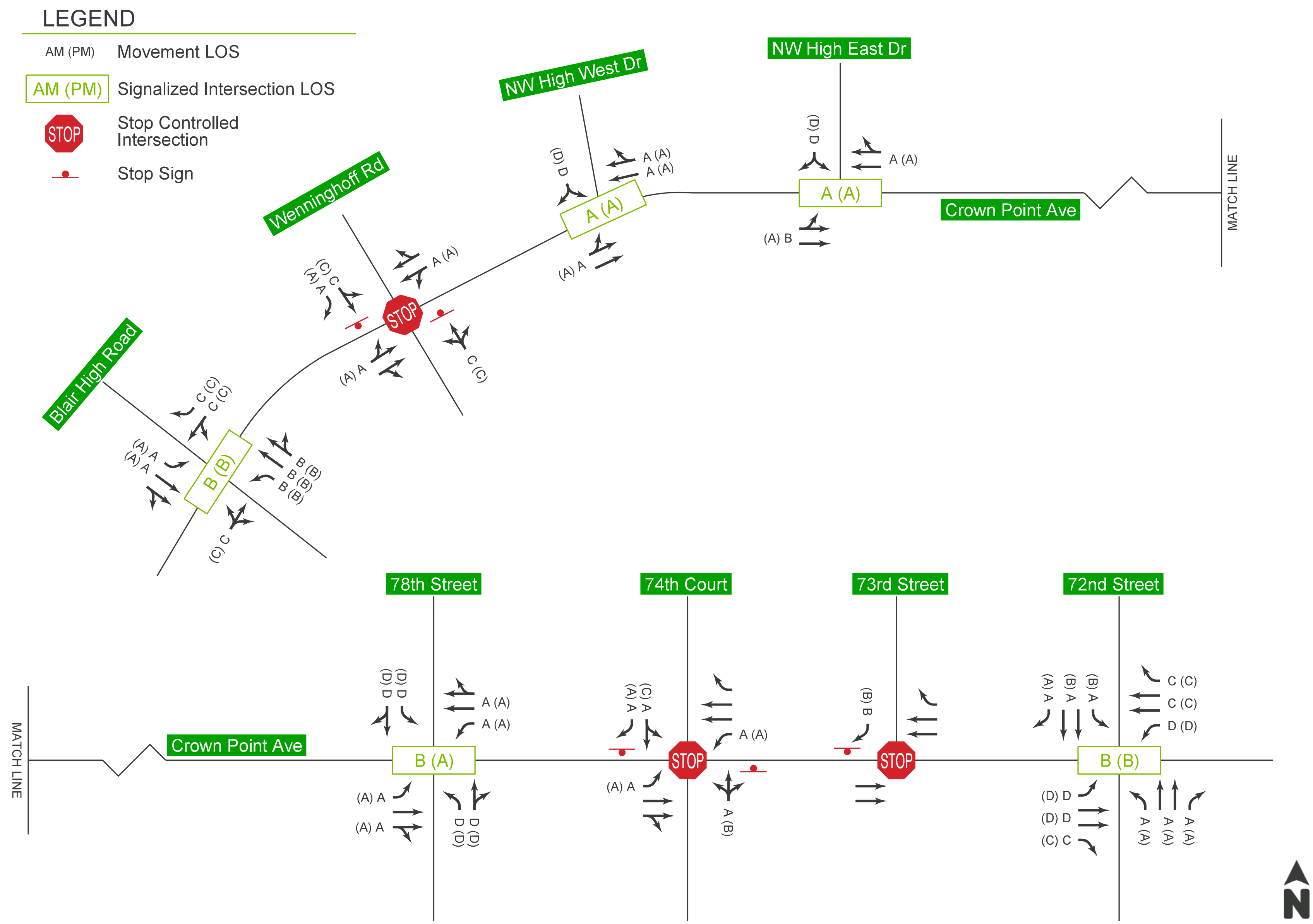


FIGURE 4

Existing Conditions Capacity Analysis Summary

3.3 Existing Crash Data

Crash information was provided by the City of Omaha between January 2013 and December 2017. This data included date, location and severity information, crash type, and direction of crash. A total of 113 crashes were reported in the study area between January 2013 and December 2017. Among all crashes, there were no fatalities (FAT), 38 were injury crashes (INJ), and 75 were property damage only (PDO) crashes. 99 of the 113 crashes occurred at intersections along the corridor.

Crash rates were calculated for each intersection using the following formula:

$$R = \frac{(number\ of\ crashes \times 1{,}000{,}000)}{number\ of\ years \times 365 \times ADT} = \#\ of\ crashes\ per\ million\ entering\ vehicles\ (mev)$$

To provide a baseline for comparison, critical crash rates were calculated for each intersection using the following formula:

$$R_{cr} = R_a + k \times \sqrt{R_a / m} + (0.5 \times m)$$

where:

R_{cr} is the critical crash rate

R_a is the average crash rate for similar intersections

k is a probability factor for a 95% confidence interval (1.642)

m is the exposure

Separate average crash rates, R_a, were calculated for signalized and unsignalized intersection from the crash data provided. Average crash rates for signalized and unsignalized intersections in the study area are 0.72mev and 0.10mev, respectively.

The highest crash rates were found at the intersections of 72nd Street (0.89mev), 78th Street (0.84mev), and Blair High Road (0.75mev). However, the individual intersection crash rates were not greater than the critical crash rates at any of the evaluated intersections. The critical crash rate represents the anticipated number of crashes to occur at a given intersection based on a function of the total traffic at the intersection and the average crash rate for similar intersections. If a calculated crash rate is higher than the critical crash rate, it is flagged for further evaluation to determine what, if any, improvements can be made to mitigate the relatively high frequency of crashes.

The majority of reported crashes occurred at the intersection of 72nd Street & Crown Point Avenue with an identifiable pattern for crashes involving a left-turning vehicle. A total of 21 left-turn crashes, eight of these involving a southbound vehicle, occurred at this intersection.

One pedestrian crash and one bicycle crash were reported. The bicycle crash occurred at 78th Street in the westbound direction: a westbound right-turning vehicle struck a westbound bicycle user. The pedestrian crash occurred at 72nd Street: a southbound vehicle struck an eastbound pedestrian crossing 72nd Street. The pedestrian suffered a disabling injury, or an injury which prevents a person from walking, driving, or normally continuing the activities the person can perform before the injury occurred.

See **Table 4** and **Table 5** for a summary of the crash data provided for the study. All historical crash data obtained can be found in **Appendix C**.

Table 4. Crash Rate Summary – Crown Point Avenue Intersections (2013 – 2017).

	Blair High Road	**Wenninghoff Road**	**82nd Street**	**Northwest High School East Drive**	**80th Street**	**79th Street**	**78th Street**	**74th Street**	**72nd Street**	**Total**
FAT	0	0	0	0	0	0	0	0	0	**0**
INJ	8	0	0	3	0	0	4	0	19	**34**
PDO	16	4	1	3	1	1	12	1	26	**65**
Other	0	0	0	0	0	0	0	0	0	**0**
Total Crashes	**24**	**4**	**1**	**6**	**1**	**1**	**16**	**1**	**45**	**99**
ADT (vpd)	17,632	9,912	8,235	8,212	8,100	8,002	10,482	9,114	27,698	
Crash Rate	0.75	0.22	0.07	0.40	0.07	0.07	0.84	0.06	0.89	
Veh Exposure	32.18	18.09	15.03	14.99	14.78	14.60	19.13	16.63	50.55	
Critical Crash Rate	0.98	0.24	0.26	1.11	0.26	0.26	1.06	0.25	0.93	

Table 5. Crash Summary by Type – Crown Point Avenue Intersections (2013 – 2017).

	Blair High Road	Wenninghoff Road	82nd Street	Northwest High School East Drive	80th Street	79th Street	78th Street	74th Street	72nd Street	Total
Angle	6	2	0	2	0	0	9	0	11	**30**
Backing	0	0	0	0	0	0	1	0	0	**1**
Ran Off Road	4	0	1	0	1	1	1	0	1	**9**
Fixed Object in Road	0	0	0	0	0	0	0	0	0	**0**
Head On	0	0	0	0	0	0	0	0	0	**0**
Left Turn Leaving	6	0	0	2	0	0	1	1	21	**31**
Pedestrian	0	0	0	0	0	0	1	0	1	**2**
Rear End	7	0	0	2	0	0	1	0	9	**19**
Side Swipe	1	2	0	0	0	0	2	0	2	**7**
Total Crashes	**24**	**4**	**1**	**6**	**1**	**1**	**16**	**1**	**45**	**99**

3.4 Existing Signal Warrant Evaluation

The *Manual on Uniform Traffic Control Devices, 2009 Edition* (MUTCD) provides nine signal warrants for evaluation of signalization at intersections. The intersections at Wenninghoff Road, NW High West Drive, NW High East Drive, and 78th Street were directly evaluated for signalization. The following signal warrants are either not applicable for the study intersections, not expected to be satisfied in this study, or could not be performed due to lack of data, and therefore were not evaluated:

- Warrant 6 (Coordinated Signal System)
- Warrant 8 (Roadway Network)
- Warrant 9 (Intersection Near a Grade Crossing)

Each of the nine signal warrants is examined in detail below:

Warrant 1 (Eight-Hour Vehicular Volume)

To evaluate Warrant 1, the MUTCD provides volume thresholds which need to be exceeded during the eight busiest one-hour intervals during the day. There are two Conditions for Warrant 1, Condition A: Minimum Vehicular Volume and Condition B: Interruption of Continuous Traffic. Either of these can be met to satisfy the warrant.

Warrant 2 (Four-Hour Vehicular Volume)

Warrant 2 is satisfied if the four highest volume one-hour periods exceed volume thresholds defined in the MUTCD.

Warrant 3 (Peak-Hour Vehicular Volume)

Warrant 3 is satisfied if the busiest one-hour period exceeds thresholds defined in the MUTCD. The AM and PM peak hours were considered. To account for the reduced impact that a right-turning vehicle has on intersection delay, volume reductions for right turns were also evaluated in both peak hours for Warrant 3. At both high school drives, the school peak period in the afternoon was considered and also evaluated

Warrant 4 (Pedestrian Volume)

Warrant 4 is satisfied if the number of vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street satisfy MUTCD thresholds for any four hours of an average day, *or* MUTCD thresholds for any four consecutive 15-minute period for one hour of an average day at an unsignalized intersection. This criteria does not apply to signalized intersections and was only evaluated at Wenninghoff Road.

Warrant 5 (School Crossing)

Warrant 5 is satisfied if the frequency and adequacy of gaps in the traffic stream is less than the number of minutes in the period where schoolchildren cross at an established [unsignalized] school crossing, *and* there is a minimum of 20 schoolchildren crossing during the highest crossing hour. An adequate gap in the traffic stream is the amount of space and time between vehicles that pedestrians or schoolchildren deem safe enough to cross at an unsignalized crossing. This criteria does not apply to signalized intersections and was only evaluated at Wenninghoff Road.

Warrant 6 (Coordinated Signal System)

Warrant 6 is satisfied if on a two-way street, the adjacent traffic control signals do not provide the necessary degree of platooning of vehicles and an additional signal will collectively provide a progressive operation. The MUTCD states this warrant should not be applied where the spacing of traffic control signals would be less than 1,000 feet. Wenninghoff Road is currently less than 200 feet from Blair High Road and would not meet spacing requirements even with a roadway shift; therefore, this warrant was not evaluated.

Warrant 7 (Crash Experience)

Warrant 7 is satisfied when five or more reported crashes of types susceptible to correction by a traffic control signal have occurred within a 12-month period and volume thresholds are satisfied. The reported crash data available included crashes while 78th Street, NW High East Drive, and NW High West Drive intersections were signalized, therefore this warrant evaluation only applied to Wenninghoff Road.

Warrant 8 (Roadway Network)

Warrant 8 is satisfied when two or more major routes intersect and meet volume thresholds and roadway characteristic criteria (is part of a street that serves as the principal roadway network). NW High West Drive, NW High East Drive, and 78th Street are not considered major routes and therefore Warrant 8 does not apply for further evaluation. The MUTCD defines a major route as: a principal roadway network for through traffic flow; a highway outside, entering, or traversing a city; or the street is identified as a major route on an official plan such as a major street plan.

Warrant 9 (Intersection Near a Grade Crossing)

Warrant 9 is satisfied when a grade crossing for a railroad exists on an approach by a stop or yield sign and the intersection is within 140 feet of the railroad. There are no railroads within the immediate vicinity of the corridor; therefore, Warrant 9 was not evaluated.

Traffic volumes at other intersections along Crown Point Avenue were reviewed but none of these intersections were close to warranting further evaluation. Signal warrant evaluations were performed using existing traffic volumes for Warrant 1, Warrant 2, and Warrant 3. Warrant 4, Warrant 5, and Warrant 7 were evaluated at Wenninghoff Road using the existing pedestrian counts and crash data provided by the city. Results of all signal warrant analyses are summarized in **Table 6** below. Detailed results of the signal warrant evaluation are included in **Appendix D**.

Table 6. Existing Signal Warrant Evaluation Summary.

Intersection	Warrant 1 (Eight-Hour)	Warrant 2 (Four-Hour)	Warrant 3 (Peak Hour)			Warrant 4 (Pedestrian Volume)	Warrant 5 (School Crossing)	Warrant 7 (Crash Experience)
			AM	PM	School			
Crown Point Avenue & Wenninghoff Road	No	No	No	No	No	No	No	No
Crown Point Avenue & NW High West Drive	No	No	No	No	No	N/A	N/A	N/A
Crown Point Avenue & NW High East Drive	No	No	No	No	No	N/A	N/A	N/A
Crown Point Avenue & 78th Street	No	No	No	No	No	N/A	N/A	N/A

3.5 Hydraulics and Hydrology

An existing storm sewer trunk line flows east to west along the north side of Crown Point Avenue. The line begins just west of 74th Court and discharges into a dual concrete box culvert that runs parallel to Blair High Road on the far west end of the corridor. The sewer line has been video recorded west of 78th Street to evaluate its condition. The line has also been modeled in hydraulic software to evaluate its capacity.

The storm sewer line, which was installed in the 1960s, has sections of pipe that are showing significant damage and degradation. Based on discussions with City of Omaha Public Works staff it was determined that sections of the existing sewer pipe would need to be replaced and given the age of the overall system it was prudent to replace the entire system.

The existing storm sewer line was generally found to be undersized based on current design and modeling standards. However, the overall project, with the reduction in pavement, will reduce and slow the arrival of storm water to the system and subsequent downstream portions of the Papio Creek drainage area. It was determined, in consultation with City of Omaha Public Works staff, the replacement system should be similar in size to the existing system as overall the project will improve the drainage runoff and any expansion of the proposed system would move water down the Papio system which is not sized to handle additional flows.

A map showing drainage capacity pipe condition of the existing storm sewer lines can be found in **Appendix E**.

4.0 FUTURE TRAFFIC VOLUMES AND ANALYSIS

Using current and historic ADT volumes as a baseline, 2040 peak hour volumes were established. The 2040 volumes were then applied to the network to analyze multiple roadway alternatives.

4.1 Future Background Volumes

MAPA provided base year and year 2040 projected ADT volumes at 72nd Street, 78th Street, and Blair High Road along Crown Point Avenue. In addition, a snapshot of 2010 Base and 2040 ADTs in the surrounding area were provided by MAPA to serve as a guide to establish an annual growth rate.

These ADT volumes were used with existing traffic volumes to establish 2040 background peak hour volumes based on techniques described in NCHRP 255, 'HIGHWAY TRAFFIC DATA FOR URBANIZED AREA PROJECT PLANNING AND DESIGN', Chapter 8 along with probable traffic patterns given facility and area characteristics. This process is largely dependent on peak hour ("K") and directional distribution ("d") factors which indicate portion and direction of ADT flow for a given peak hour.

In coordination with MAPA and the City of Omaha, an annual growth rate of one percent was used to project traffic volumes along Crown Point Avenue. The 2040 Background peak hour volumes and ADTs are shown in **Figure 5**.

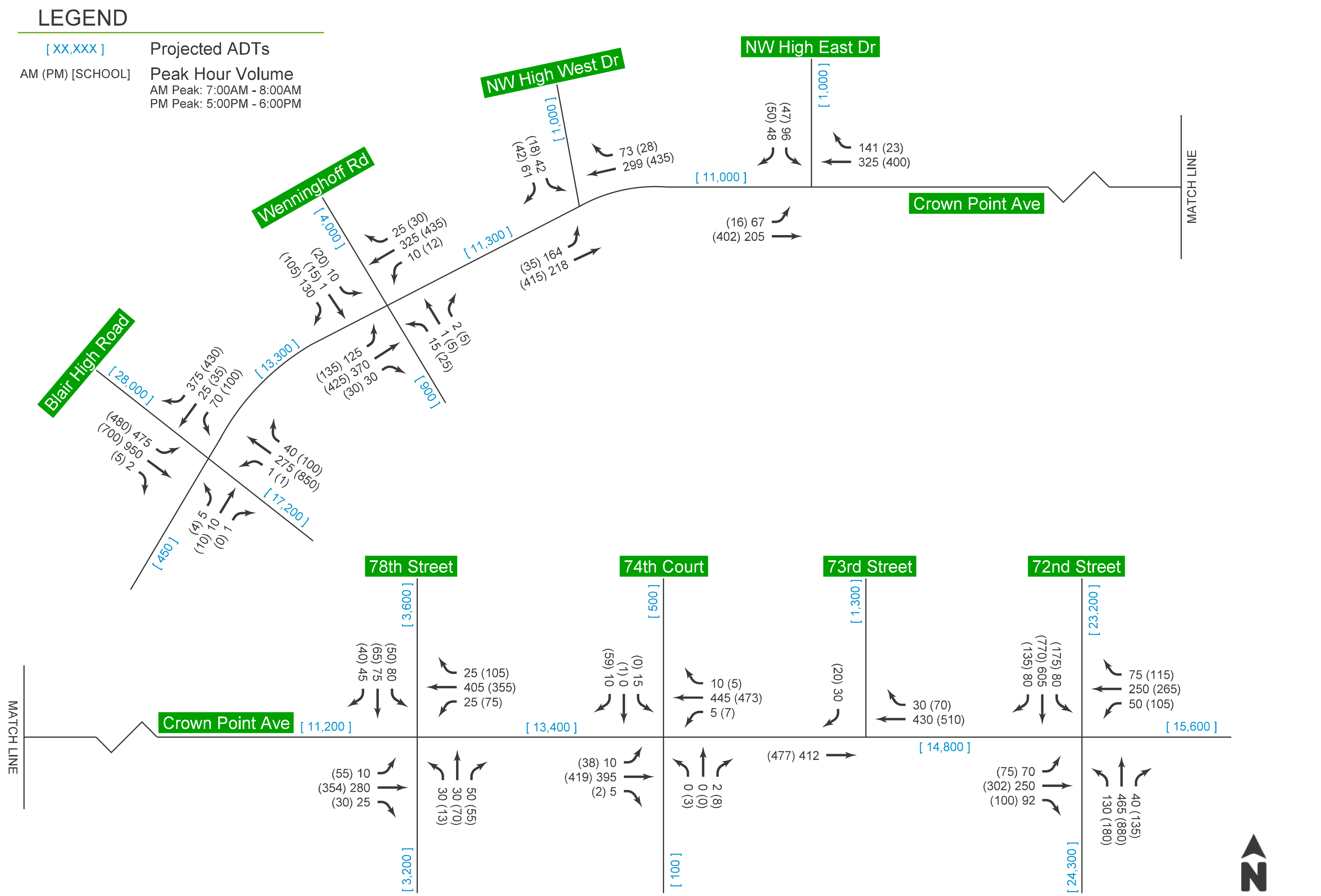


FIGURE 5

2040 Traffic Volumes

4.2 Signal Warrant Evaluation

Traffic signal warrant evaluations were conducted to determine the need for signalization along the corridor using projected 2040 traffic volumes at the following intersections:

- Crown Point Avenue & Wenninghoff Road
- Crown Point Avenue & NW High West Drive
- Crown Point Avenue & NW High East Drive
- Crown Point Avenue & 78th Street

The intersections were evaluated for Eight-Hour Vehicular Volume (Warrant 1) and the Peak Hour Warrant (Warrant 3). In the absence of sufficient data to evaluate Warrant 1, the NDOT planning-level methodology was used. Minor street right-turn volumes were removed from peak hour data, as prescribed by the City of Omaha convention using the National Cooperative Highway Research Program (NCHRP) Report 457 methodology.

Results of the signal warrant evaluations showed that no signal warrants were satisfied at any of the four intersections. Results of all signal warrant analyses are summarized in **Table 7** below. Detailed results of the signal warrant evaluation are included in **Appendix D**.

Table 7. 2040 Signal Warrant Evaluation Summary.

Intersection	Warrant 1 (Eight-Hour)	Warrant 2 (Four-Hour)	Warrant 3 (Peak Hour)		
			AM	PM	School
Crown Point Avenue & Wenninghoff Road	No	No	No	No	No
Crown Point Avenue & NW High West Drive	No	No	No	No	No
Crown Point Avenue & NW High East Drive	No	No	No	No	No
Crown Point Avenue & 78th Street	No	No	No	No	No

5.0 DEVELOPMENT AND SCREENING OF ALTERNATIVES

This section describes the methodology and procedures for formulating alternatives to improve the total transportation system along Crown Point Avenue. Transportation improvement options and screening criteria were developed, and a detailed screening process was used to identify a preferred alternative.

5.1 Description of Alternatives

Five roadway cross-section alternatives were analyzed to determine technical feasibility. Screening involved reviewing the concept alternative for geometric constraints, safety for all traffic modes, traffic calming, construction cost, and public opinion.

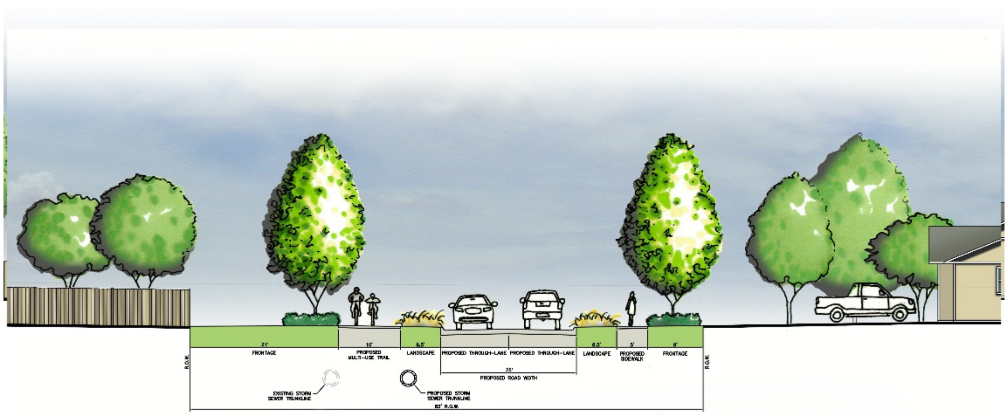
Analysis of the existing and projected traffic volumes identified the need for a 2-lane or 3-lane roadway cross-section; each providing adequate capacity through the horizon year. On the east end of the corridor beginning at 74th Court to 72nd Street the roadway section would remain in its existing state for the benefit of the operations at and near the 72nd Street intersection.

5.1.1 Alternative 0: Future No Build

The Future No Build alternative would be limited to reconstructing the roadway as a four-lane section as it exists today that will maintain the existing operations of the roadway. The Future No Build is used as a comparative basis throughout the alternatives' evaluation process.

5.1.2 Alternative 1: 2-Lane Section with Multi-Use Trail

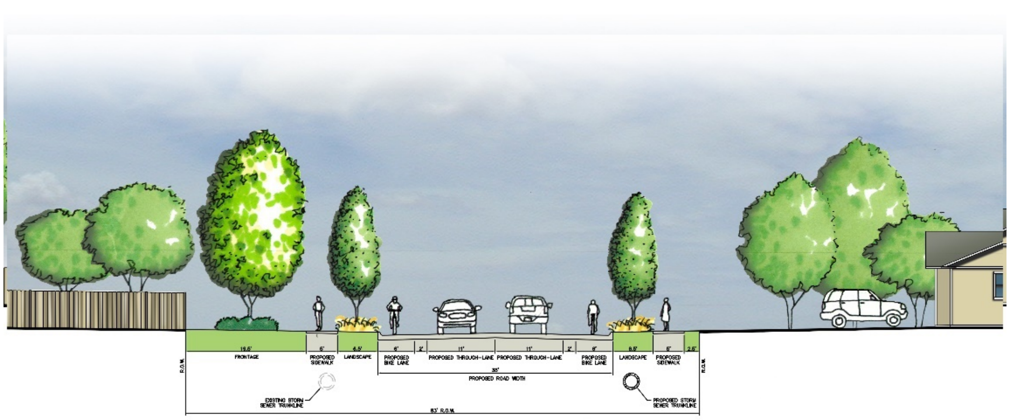
Alternative 1 will consist of narrowing the overall cross-section of the roadway to a 2-lane section, with one eastbound lane and one westbound lane on Crown Point Avenue between Wenninghoff Road and 74th Court. There would be no left-turn lanes along Crown Point Avenue aside from those at the ends of the project at Blair High Road, 74th Court, and 72nd Street. This will allow the freedom to construct the 2-lane section and 10-foot multi-use trail for pedestrians and bicyclists with the least impact on other aspects of the construction process, including construction phasing and impacts to right-of-way.



2-Lane Section with Multi-use Trail

5.1.3 Alternative 2: 2-Lane Section with On-Street Bike Lanes

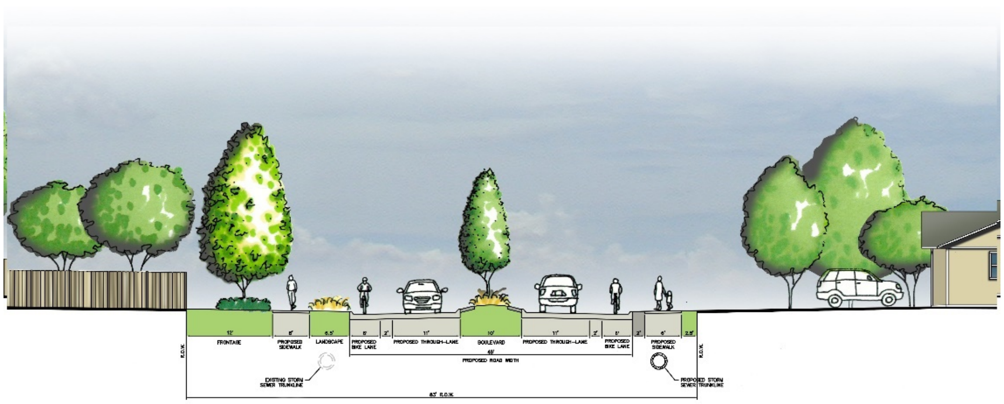
This alternative is a variation of Alternative 1 keeping a 2-lane roadway section; however, 6' bike lanes with 2' buffers would be constructed on the roadway. This would increase the overall roadway section width but still provide freedom through the construction process similar to Alternative 1.



2-Lane Section with On-Street Bike Lanes

5.1.4 Alternative 3: 2-Lane Boulevard Section (Center Median)

The 2-lane boulevard section would include one eastbound and westbound lane along Crown Point Avenue with a center median, between Wenninghoff Road and 74^{th} Court. The median would "break" at major intersections, such as Wenninghoff Road, both high school drives, and 78^{th} Street for vehicular access. This alternative also includes on-street bike lanes as prescribed in Alternative 2.



2-Lane Boulevard with On-Street Bike Lanes

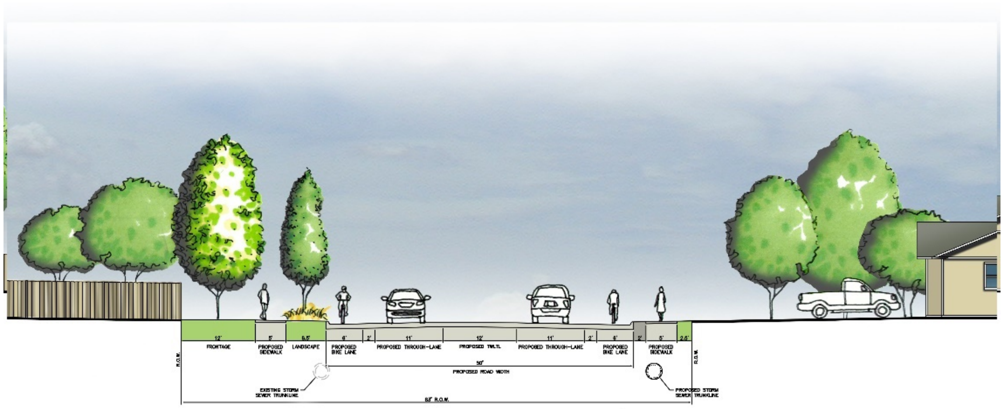
5.1.5 Alternative 4: 3-Lane Section with Multi-Use Trail

This alternative will consist of reconstructing Crown Point Avenue as a 3-lane section with a center two-way left-turn lane (TWLTL) between Blair High Road and 74^{th} Court. A 10-foot multi-use trail would be constructed for pedestrians and bicyclists. Similar to Alternative 1, Alternative 4 will reduce the existing roadway cross-section width but provide refuge for left-turning vehicles at intersections.

3-Lane Section with Multi-use Trail

5.1.6 Alternative 5: 3-Lane Section with On-Street Bike Lanes

This alternative is a variation of Alternative 4 as it keeps the 3-lane roadway section; however, directional 6' bike lanes with 2' buffers constructed on the roadway are proposed. This alternative would have the widest roadway cross-section.



3-Lane Section with On-Street Bike Lanes

5.2 Future Capacity Analysis

Alternative 0 no build was analyzed as a baseline for comparison purposes. No improvements to the roadway were included as part of Alternative 0. The intersections of Wenninghoff Road, both high school drives, and 78th Street were analyzed with two-way stop-control (stop signs on the minor street) and roundabouts. Traffic signals were removed from further analysis because they are not anticipated to satisfy signal warrants in 2040 traffic conditions. Each alternative was analyzed using year 2040 projected volumes.

5.2.1 Alternative 0: 4-Lane Section (No Build)

The capacity analysis indicates signalized intersections at 72nd Street and Blair High Road are anticipated to operate similar to existing conditions. However, the 95th percentile queue lengths are expected to increase. Most queue lengths are expected to be contained within existing and proposed storage bays. The exceptions are at the intersection of Crown Point Avenue & Blair High Road.

The eastbound left-turning movement at Crown Point Avenue & Blair High Road is anticipated to be 145 feet and 330 feet in the AM and PM peak hours, respectively. The existing left-turn storage length is approximately 120 feet. It is anticipated that the eastbound left-turn queue at Crown Point Avenue & Blair High Road would spill back into the adjacent through lane in both peak hours. The eastbound left-turn lane along Blair High Road cannot be extended to store the 95th percentile queue length without affecting the westbound left-turn lane of the adjacent intersection with Military Road.

The southbound right-turn queue at Crown Point Avenue & Blair High Road in the PM peak hour is anticipated to queue through the adjacent intersection of Crown Point Avenue & Wenninghoff Road. The 95th percentile queue length is anticipated to be approximately 210 feet in the PM peak hour. The intersections are spaced approximately 150 feet apart. Based on this spacing, each of the build alternatives show a relocation of the Wenninghoff Road intersection to the east to increase the separation with Blair High Road.

Note that the description of the capacity results for the signalized intersections at Blair High Road and 72nd Street are included in this section because the results of the analyses at these intersections do not change between alternatives.

Movements at unsignalized intersections are anticipated to operate similar to existing conditions with exceptions at the intersection of Crown Point Avenue & Wenninghoff Road. The stop-controlled side street movements at Crown Point Avenue & Wenninghoff Road are expected to operate at LOS E in the PM peak hour with approximately 40 seconds of delay. However, the 95th percentile queue length at this intersection is not anticipated to exceed two vehicles for either minor leg approach.

Detailed results may be found in **Appendix F**.

5.2.2 2-Lane Section

The 2-lane section capacity analysis includes the results of Alternative 1, Alternative 2, and Alternative 3 roadway configurations. The 2-lane cross-section is proposed to extend from Wenninghoff Road on the west to 74th Court on the east. As part of the capacity analysis, the intersections at Wenninghoff Road, NW High West Drive, NW High East Drive, and 78th Street were analyzed as two-way stop-controlled and roundabout controlled intersections.

As two-way stop-controlled intersections, the results of the capacity analysis indicate turning movements at both high school drives are expected to operate at LOS C or better in both peak hours. There are several movements at 78th Street that are expected to operate at unacceptable (LOS E or LOS F) in both peak hours. These movements are detailed in **Table 8** below.

Table 8. 2-Lane Section Stop-Controlled Unacceptable Operations.

Intersection	Movement	LOS AM (PM)	Control Delay, s AM (PM)	Queue Length, veh AM (PM)	V/C Ratio[1] AM (PM)
Wenninghoff Road	NB	D (F)	34.8 (61.6)	0.5 (1.5)	0.14 (0.38)
	SBT/L	D (E)	26.9 (45.9)	0.2 (1.2)	0.07 (0.30)
78th Street	NBL	F (F)	58.3 (53)	1.3 (0.6)	0.33 (0.18)
	NBT/R	D (E)	25 (39.1)	1.4 (3.2)	0.33 (0.58)
	SBL	F (F)	187.4 (112.9)	5.8 (3.1)	1.01 (0.67)
	SBT/R	F (E)	78.4 (35.1)	5.1 (2.5)	0.79 (0.50)

[1]V/C ratio = volume-to-capacity ratio – A V/C greater than 1.0 means the traffic volume demand exceeds the available capacity of the intersection movement. Excessive delays and queues are anticipated.

Roundabout analyses were conducted using Sidra, Version 7.0 which is based on the Highway Capacity Manual 2010 methodologies. Control delay criteria associated with roundabouts is identical to as unsignalized intersections.

As roundabout intersections, the results of the analysis indicate all movements at the intersections of Wenninghoff Road, NW High West Drive, NW High East Drive, and 78th Street are anticipated to operate at LOS B or better in both peak hours. The average delay per vehicle is not anticipated to exceed 15 seconds per vehicle for every turning movement. The 95th percentile queue lengths for all movements are anticipated to be no more than 175 feet (about seven vehicles). At these queue lengths, vehicles will not spill back through adjacent intersections.

Figure 6 and **Figure 7** illustrate the 2-Lane section and roundabouts capacity analysis summaries, respectively. Detailed results may be found in **Appendix F**.

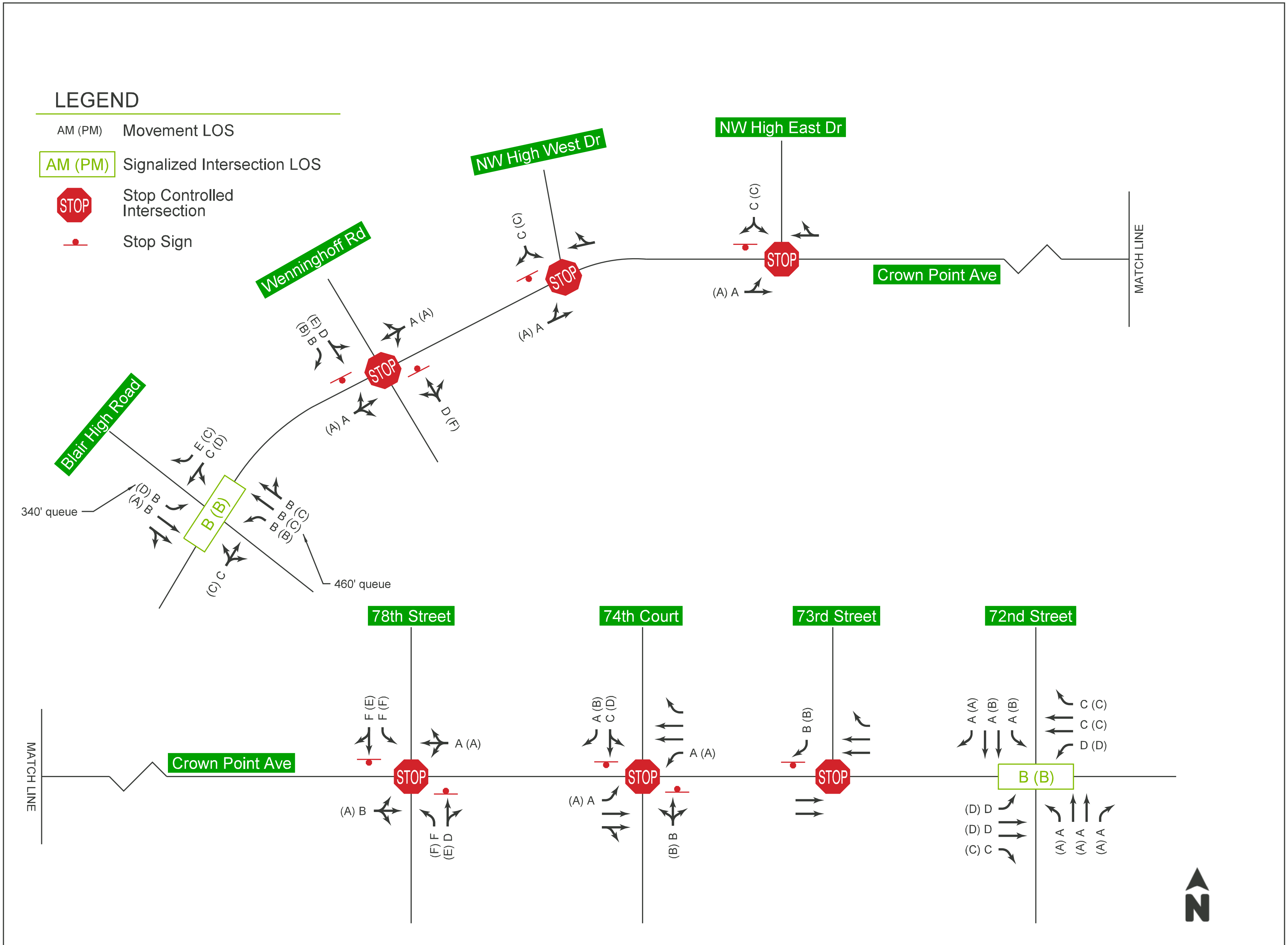


FIGURE 6

2040 Capacity Analysis Summary: 2-Lane Section

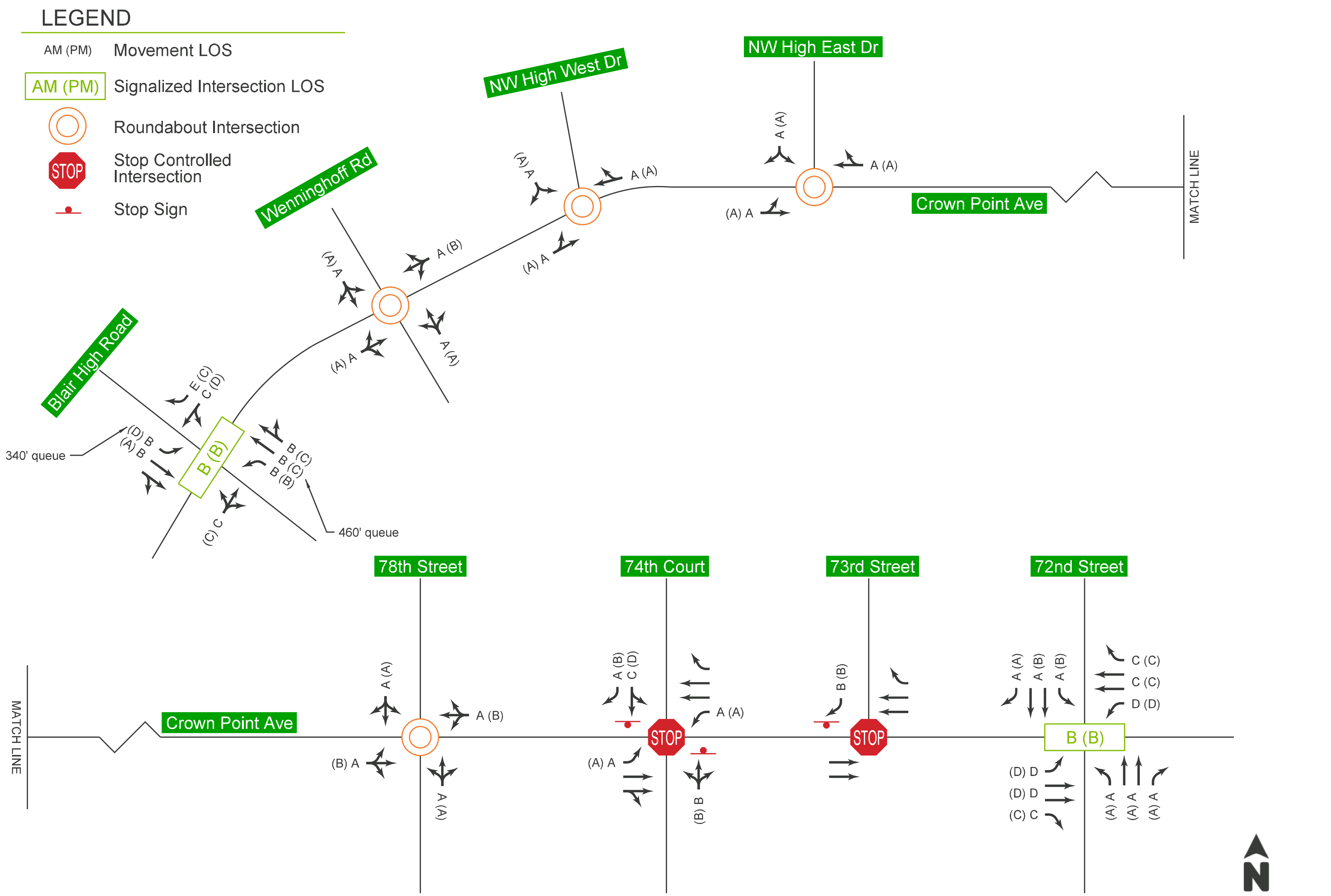


FIGURE 7

2040 Capacity Analysis Summary: Roundabouts

5.2.3 3-Lane Section

The 3-lane section includes the results of Alternative 4 and Alternative 5 roadway configurations. A 3-lane section with a center TWLTL was analyzed from Wenninghoff Road to 74th Court. The intersections of Wenninghoff Road, NW High West Drive, NW High East Drive, and 78th Street were analyzed as both two-way stop-controlled and roundabout intersections.

As two-way stop-controlled intersections, results of the capacity analysis indicate turning movements at all four intersections are anticipated to operate with acceptable levels of service with a few exceptions at Wenninghoff Road and 78th Street. The unacceptable operations (LOS E or LOS F) are detailed in **Table 9** below.

Table 9. 3-Lane Section Stop-Controlled Unacceptable Operations.

Intersection	Movement	LOS AM (PM)	Delay, s AM (PM)	Queue Length, veh AM (PM)	V/C Ratio AM (PM)
Wenninghoff Road	NB	D (F)	34.8 (61.6)	0.5 (1.5)	0.14 (0.38)
	SBT/L	D (E)	26.9 (45.9)	0.2 (1.2)	0.07 (0.30)
78th Street	NBL	F (F)	56.1 (50)	1.2 (0.6)	0.32 (0.17)
	NBT/R	C (E)	25 (36.1)	1.3 (3)	0.32 (0.55)
	SBL	F (F)	182.7 (98.9)	5.7 (2.9)	1.00 (0.63)
	SBT/R	F (D)	76.2 (32.7)	5 (2.4)	0.78 (0.47)

The operations with 78th Street, NW High East Drive, NW High West Drive, and Wenninghoff Road constructed as roundabouts did not change between a 2-Lane and a 3-Lane cross-section. These results can be found in the previous section. The 3-Lane section capacity analysis summary is illustrated in **Figure 7**. Detailed results may be found in **Appendix F**.

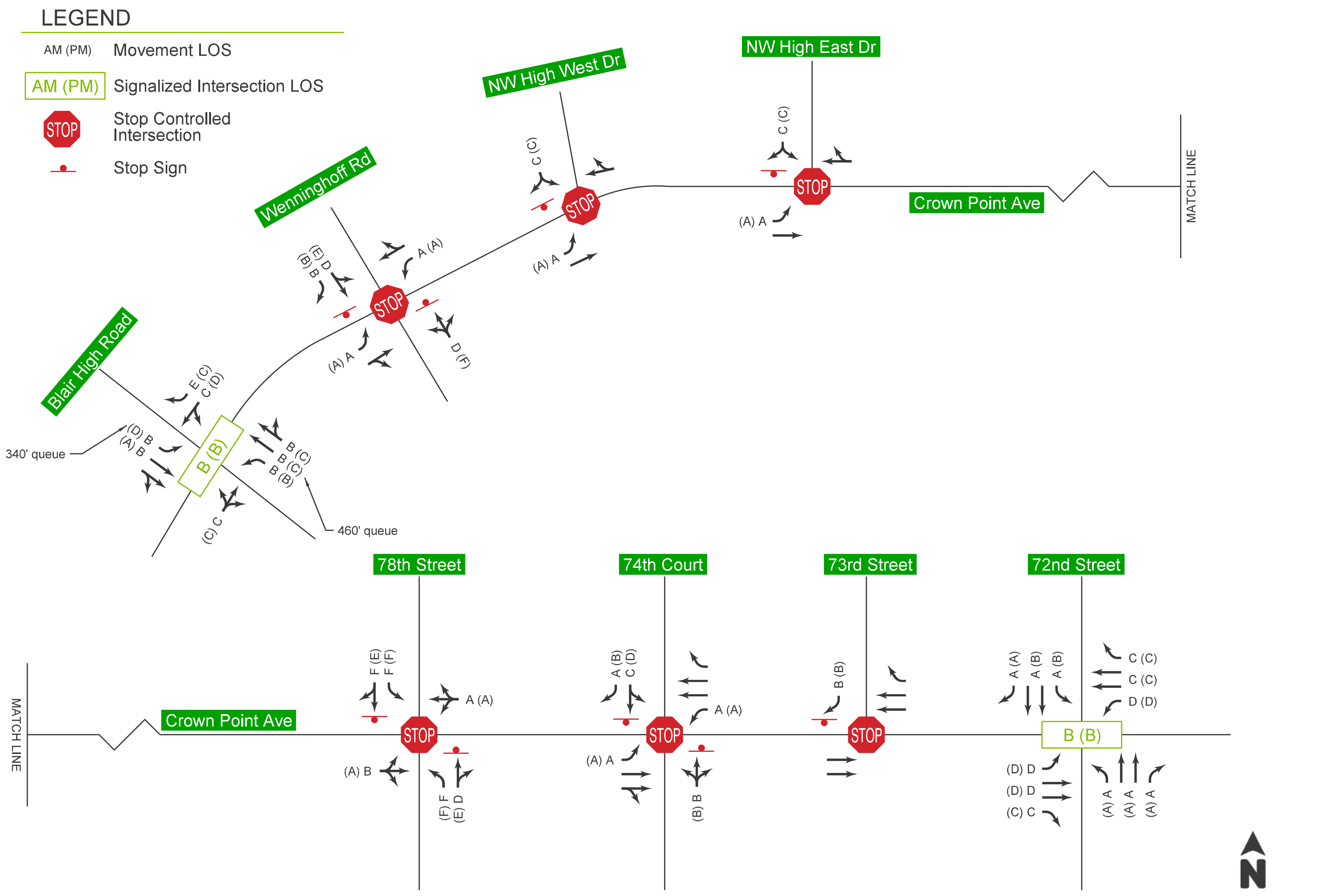


FIGURE 8

2040 Capacity Analysis Summary: 3-Lane Section

5.3 Public Input

This project is somewhat unique in that there are several alternatives that can be implemented somewhat interchangeably. Goals for this project are to inform, engage and work collaboratively with stakeholders and the public to share information and gain feedback on technically feasible alternatives. To accomplish this, targeted mailings were sent, and stakeholder meetings, City Council briefings, and a public meeting were held. Website information and survey results were also used to share information and gather feedback.

5.3.1 Targeted Mailings

A letter was sent May 31, 2018 to 108 adjacent property owners introducing them to the project, project communication tools, and to notify them of field staff in the area gathering initial data. A distribution list and sample letter are included in **Appendix G**.

5.3.2 Stakeholder Meetings

A second letter was sent on August 9, 2018 to 36 adjacent property owners to offer key stakeholders the opportunity for one-on-one meetings with the project team and share details for the public open house that was held on August 30, 2018. The project team hosted five stakeholder meetings. During each meeting, the project team shared the project purpose, bicycle/pedestrian and vehicular transportation alternatives, intersection control alternatives, the project schedule and communication tools, and ended with open discussion.

Each of the stakeholder groups shared their preference for a boulevard/median or 3-lane section, off-street multi-use trail, and roundabouts. A distribution list and sample letter are included in **Appendix G**.

5.3.3 City Council Briefing

Public Works staff met with City Council in August prior to stakeholder and public meetings to brief them on the project prior to the public open house. Meeting materials, project schedule and public involvement activities were shared with council and staff.

5.3.4 Public Open House

A public open house was held on Thursday, August 30th from 5:00-7:00 pm at Northwest High School. (The original start time was scheduled for 5:30, however one of the meeting advertisements listed 5:00 as the start time.) The purpose of this meeting was to inform the public of the project and to gain public preference regarding roadway cross-section, traffic control, and pedestrian/bicycle accommodations.

Postcard invitations, a press release, dynamic message signs on the project corridor, and the website (www.keepomahamoving.org) were used as outreach activities for the public open house. The postcard invitation was also emailed to Emmanuel Fellowship and Northwest High School for distribution to their contacts. These outreach tools are included in **Appendix F**.

Each attendee was asked to sign in (optional) and received a project information sheet and survey. A brief presentation was given by the project team at 5:45 to introduce the project team, explain the project, review the alternatives in detail – including typical cross sections and 3-D renderings of each alternative – project schedule, and opportunities for public involvement.

Prior to and immediately following the presentation, the public was invited to view large format plots of each of the alternatives and ask questions of project staff. Attendees also had the opportunity to complete a survey related to the components of each of the alternatives and submit it on their way out.

Thirty-seven people signed in at the meeting, however, with multiple events happening at the school the same evening, several others took project information and surveys. The distribution list and all meeting materials, including survey responses and comments are available in **Appendix G**.

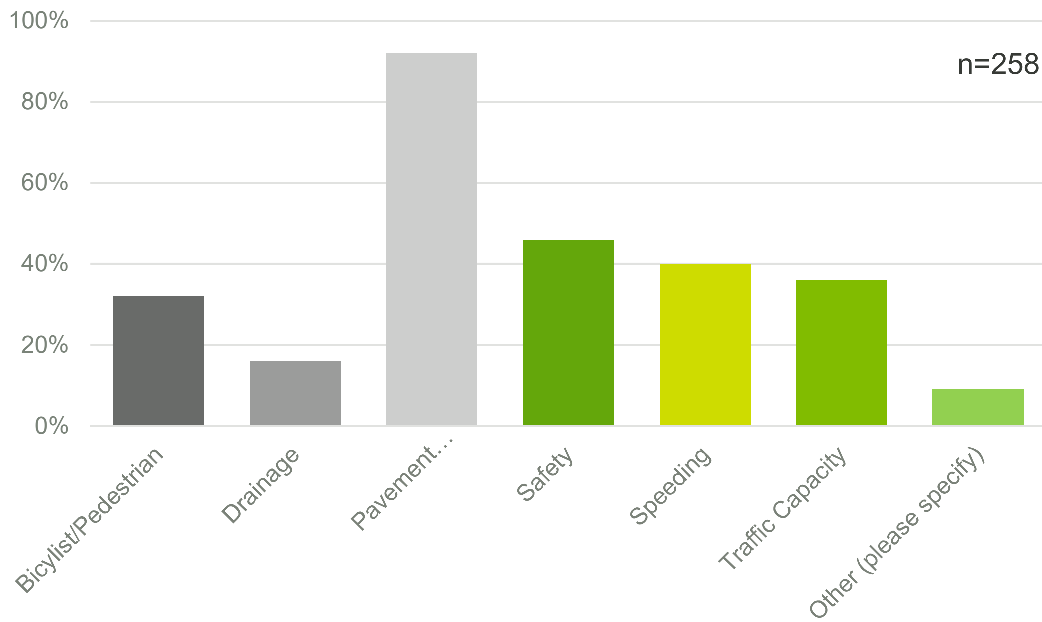
5.3.5 Public Survey

To gather feedback on the components of each alternative, a public survey was administered. The survey was distributed in hard copy form at the public open house. A link to the pdf survey as well as to an electronic version of the survey was posted on the project website. The survey was open from August 30 – September 14, however it was requested by residents to keep the survey open until September 21.

A total of 259 responses to the survey were received – 211 online submissions and 48 hard copy submissions (mailed, emailed or hand delivered to Olsson). Three additional comments were emailed to the project team. All survey responses are included in the results summary in this section and individually in **Appendix G**.

Each of the rating questions asked respondents to rate on a 5-star scale with 1 star meaning not in favor, 3 stars meaning neutral, and 5 stars meaning in favor. The options for roadway cross sections, bicycle/pedestrian facilities, or intersection control are not mutually exclusive. For example, respondents could be in favor of both roundabouts and 2-way stop control. Below is a summary of the responses.

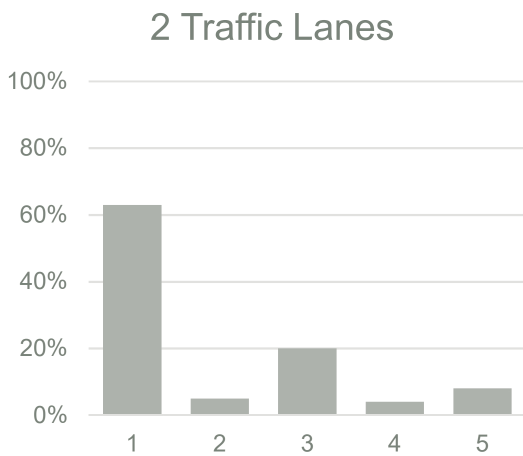
Q1. What issues need to be addressed in the Crown Point Avenue Corridor? Check all that apply.



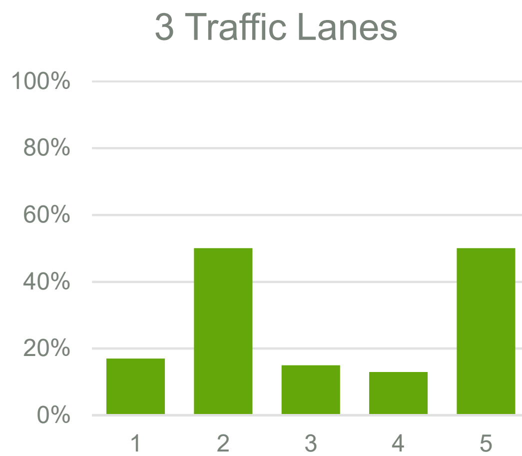
Of the total responses, 92% selected **Pavement Surface** as their primary issue that needs to be addressed. Secondarily, 46% and 40% selected **Safety** and **Speeding**, respectively. Additional issues noted in the open comment field included:

- School start and stop time (2 comments)
- Traffic flow for busses, parents and other traffic at and around Northwest High School
- Traffic diverted through "Wynnewood" around Northwest High School
- Emergency services accommodations
- Pedestrian crossing safety
- Sewer
- Maintain 4 lanes
- Decrease non-local traffic

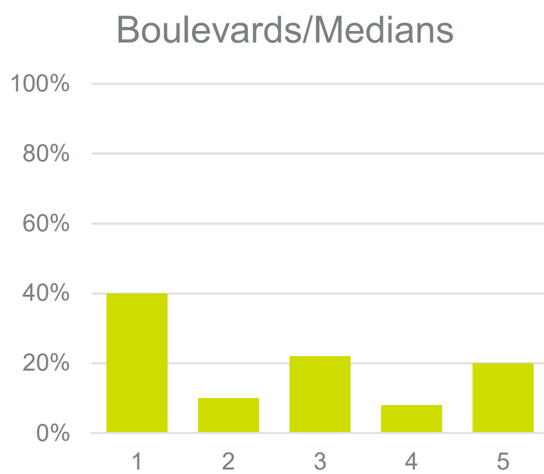
Q2. Please rate the following options for vehicle traffic in this corridor.



Average rating of 1.90

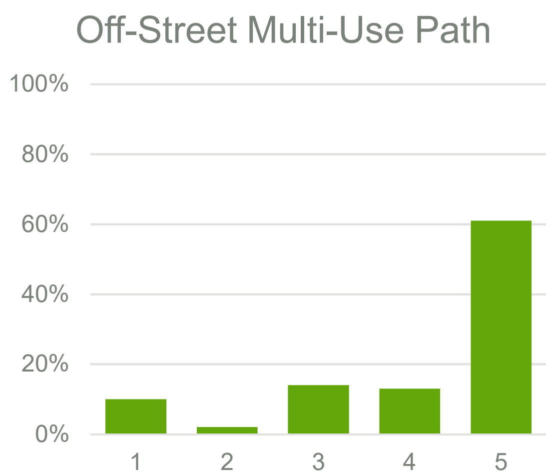


Average rating of 3.73

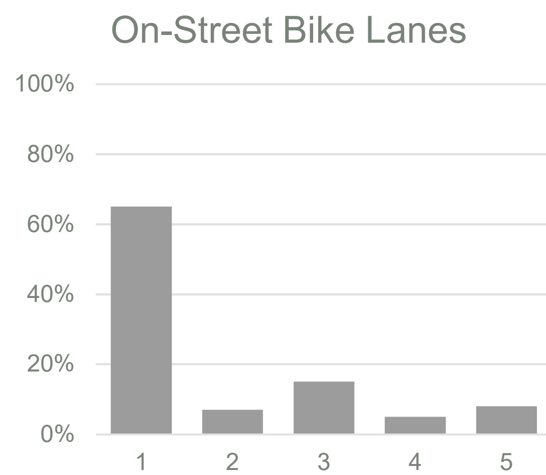


Average rating of 2.57

Q3. Please rate the following options for <u>alternative transportation modes</u> (bicycles & pedestrians) in this corridor.

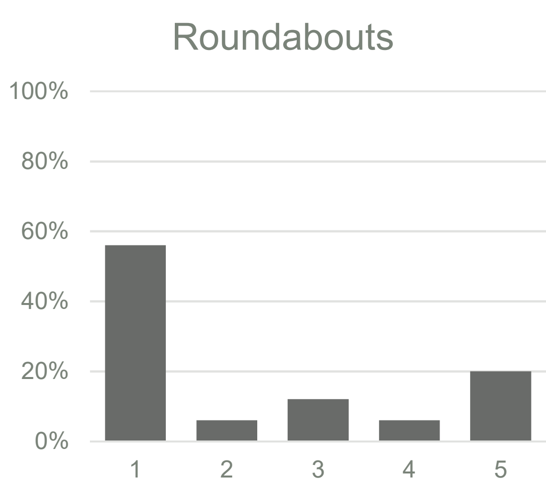


Average rating of 4.12

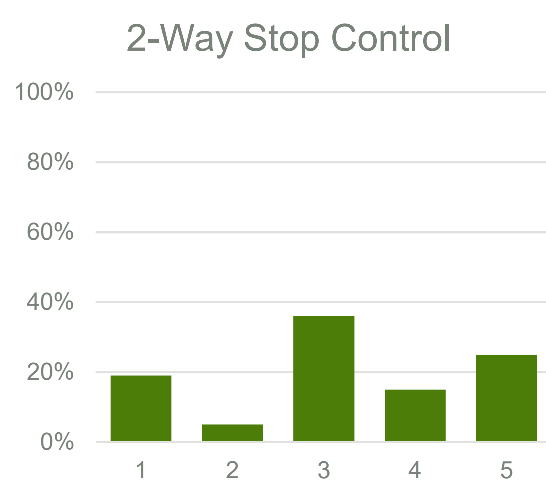


Average rating of 1.83

Q4. Please rate the following options for <u>intersection control</u> in this corridor.



Average rating of 2.26



Average rating of 3.22

Q5. Are there any other items related to this project you would like to make the project team aware of?

There were 156 responses to this open-ended question. The most frequently mentioned items included retaining the current 4-Lane section and only repaving the existing roadway, and roundabouts. A full list of individual responses is in **Appendix G**.

5.4 Alternatives Screening

5.4.1 Cross-Section Screening

Several key criteria were used to screen each alternative to ultimately determine a preferred alternative. These included: vehicle capacity, pavement rehabilitation, minimizing right-of-way impacts, safety, traffic calming, cost, and public opinion. Each alternative was graded based on how well the alternative addressed each criterion. Each criterion is defined below:

- **Vehicle Capacity**: The grade is based on the City of Omaha requirements for all signalized intersections are to operate at LOS C or better and individual movements at LOS D or better in peak hour conditions.

- **Pavement Rehabilitation**: Pavement rehabilitation is a primary goal of the project, and because Crown Point Avenue will be reconstructed as part of this project, all alternatives address this goal.

- **Minimize ROW Impacts**: Each alternative was graded based on its capability to stay within the existing right-of-way.

- **Traffic Calming**: Speeding is a known issue along the corridor, and each cross-section was graded based on the relative benefit to address speeding vehicles.

- **Vehicular Safety**: Each alternative was graded based on how it benefits vehicular safety, including traffic calming and lowering the likelihood of crashes.

- **Pedestrian Safety**: The separation between pedestrians and vehicular traffic, roadway width, and pedestrian refuge at crossings were graded in each alternative.

- **Bicycle Safety**: The presence of dedicated on-street or off-street bicycle facilities were graded for each alternative.

- **Cost**: Construction cost was graded based on the relative difference in cost between each alternative.

- **Public Opinion**: The public opinion grade was based on comments received regarding all alternatives and cross-section options.

A summary of the screening results is shown in **Table 10**.

Table 10. Alternatives Screening Summary – Corridor Cross-Section.

Selection Criteria	Alt 0 4-Lane (Existing)	Alt 1 2-Lane w/ Trail	Alt 2 2-Lane w/ Bike Lanes	Alt 3 2-Lane Boulevard	Alt 4 3-Lane w/ Trail	Alt 5 3-Lane w/ Bike Lanes
Vehicle Capacity	b	b	b	b	b	b
Pavement Rehabilitation	b	b	b	b	b	b
Minimize ROW Impacts	b	b	z	B	z	B
Traffic Calming	B	b	b	b	b	b
Vehicular Safety	B	z	z	b	b	b
Pedestrian Safety	B	b	z	b	z	B
Bicycle Safety	B	b	b	b	b	b
Cost	b	b	z	B	z	B
Public Opinion	N/A	z	B	B	b	B

b Best z Good B Fair

Generally, vehicular capacity, pavement rehabilitation, and safety criteria were all met with each presented alternative. Other primary considerations included right-of-way (ROW) impacts, cost of each alternative, and public input when assessing alternatives.

Alternative 1, proposed as a 2-lane cross-section with no left-turn lanes, has the fewest ROW impacts as it has the narrowest overall cross-section; allowing flexibility in final design. Traffic calming is also improved compared to the existing cross-section due to the narrow road width and increased friction between vehicles. In addition, Alternative 1 includes a multi-use trail for bicycles and pedestrians (north side) that moves bicycles off Crown Point Avenue. Alternative 1 was found to be the most cost-effective solution of the five alternatives.

Alternative 2 is similar to Alternative 1 as it is a 2-lane cross-section with no center left-turn lane. Alternative 2 includes buffered on-street bicycle lanes, increasing the crossing distance for pedestrians at intersections. The overall cross-section is wider than Alternative 1 and will impact existing ROW along the corridor. The increase in roadway cross-section as well as ROW impacts will increase overall costs to construct this alternative.

Alternative 3 is similar to Alternative 2 as it is a 2-lane section with buffered on-street bicycle facilities. Alternative 3 includes a 10-foot boulevard median to separate opposing directions of traffic and to provide traffic calming along the corridor by breaking up pavement width. The 10-foot median provides pedestrians refuge when crossing Crown Point Avenue and splits the crossing into two stages. Because of the total width of the roadway section, Alternative 3 will have a larger impact to existing ROW than Alternative 2. Consequently, Alternative 3 is one of the most expensive options to construct.

Alternative 4 is proposed as a 3-lane section with a center TWLTL with a multi-use trail (north side). A 3-lane section increases the crossing distance for pedestrians compared to a 2-lane section and lacks a refuge. In addition, the wider cross-section will have some ROW impacts along the corridor that will increase the total cost of the project.

Alternative 5 is similar to Alternative 4 except buffered on-street bicycle facilities are proposed. These on-street facilities increase the total roadway width, which increases pedestrian crossing distance at intersections and increases ROW impacts along the corridor. This results in Alternative 5 being one of the more expensive alternatives to construct.

5.4.2 Intersection Control Screening

Several types of intersection control were evaluated at study intersections. These include signalized intersections, two-way stop-controlled (TWSC), multi-way stop-controlled (MWSC), and roundabouts.

A TWSC intersection is an intersection that provides free traffic movements along the major road and stop signs along the minor leg approaches. Generally, stop-controlled intersections also reduce the need for additional ROW.

Roundabouts provide free-flow movements to all legs of an intersection with yield signs. Generally, roundabouts have a larger footprint than standard four-leg intersections and have greater ROW impacts, but also provide safety benefits, including traffic calming and a reduction in vehicular and pedestrian conflict points.

Signal warrant evaluations were performed at Wenninghoff Road, NW High West Drive, NW High East Drive, and 78th Street. Based on the results of the evaluations, all three intersections do not satisfy signal warrants. In addition, MWSC guidance was evaluated at 78th Street. Results of the evaluation indicate MWSC does not meet minimum guidance for installation. Therefore, TWSC and roundabout intersection control were evaluated as part of the intersection control screening.

The criterion used in the screening are defined below:

- **Capacity**: The grade is based on the City of Omaha requirements for all individual turning movements are to operate at LOS D or better in peak hour conditions.
- **Safety**: Each intersection traffic control was graded based on how it benefits vehicular safety, including traffic calming and lowering the likelihood of crashes.
- **Traffic Calming**: Speeding is a known issue along the corridor, and each intersection traffic control was graded based on the relative benefit to address speeding vehicles.
- **Minimize ROW Impacts**: Each traffic control, roundabouts and TWSC, were graded at each intersection based on its capability to stay within the existing right-of-way.
- **Pedestrian Compatibility**: The relative comfort and ease of pedestrians navigating each intersection traffic control was graded.
- **Bicycle Compatibility**: The relative comfort and ease of bicyclists navigating each intersection traffic control was graded.
- **Driver Expectancy**: Each traffic control was graded based on what type of intersection control devices drivers in the region expect at intersections.
- **Public Input**: The public opinion grade was based on comments received regarding all alternatives and intersection control options.

A summary of the screening results is shown in **Table 11**.

Table 11. Alternatives Screening Summary – Intersection Control.

Selection Criteria	Wenninghoff Rd		NW High West Drive		NW High East Drive		78th Street	
	RA	TWSC	RA	TWSC	RA	TWSC	RA	TWSC
Capacity	b	z	b	b	b	b	b	B
Safety	b	z	b	z	b	z	b	z
Traffic Calming	b	B	b	B	b	B	b	B
Minimize ROW Impacts	z	b	z	b	z	b	B	b
Pedestrian Compatibility	z	B	z	B	z	B	z	B
Bicycle Compatibility	z	B	z	B	z	B	z	B
Driver Expectancy	z	b	z	b	z	b	z	b
Public Input	z	z	z	z	z	z	z	z

b Best z Good B Fair

Based on the intersection control screening summary, roundabouts generally outperform TWSC intersection control from a capacity, safety, and traffic calming standpoint. TWSC intersections would have fewer impacts to ROW and are more familiar to drivers in this region. At 78th Street, a roundabout would impact ROW the most, requiring acquisitions on all four corners. Roundabouts were chosen as the preferred intersection control based on the screening results above.

6.0 CONCLUSIONS AND PREFERRED ALTERNATIVE

Due to the safety and speeding concerns in this corridor, the City has elected to go beyond merely a reconstruction of the existing Crown Point Avenue 4-lane roadway and make significant safety improvements to the corridor and the adjacent sidewalks and curb ramps. Redesigning the existing right-of-way width to fewer traffic lanes gives visual cues to drivers to slow down. Changing the intersection control will also reduce the frequency and severity of right-angle crashes, which there is a history in the corridor. Designating a safe space for bicyclists and pedestrians and making connections to the larger trail network encourages multimodal transportation.

Roundabouts were selected as an intersection control option because of their safety benefits – reduction of speed, and frequency and severity of crashes. Roundabouts also allow for continuous flow of traffic, which means less wait time to safely enter or exit the roadway.

Based on the capacity analysis, alternatives screenings, and public input, the preferred alternative is a 3-lane cross-section with multi-use trail on the north side of Crown Point Avenue. Roundabouts were selected as the preferred intersection control for the intersections at 78th Street, NW High East Drive, NW High West Drive, and Wenninghoff Road.