MORRISON HERSHFIELD

DRAFT REPORT

Algonquin College

ARC Building

1385 Woodroffe Avenue

Traffic Impact Assessment

Ottawa, ON

Presented to:

Richard Smith
Associate

HOK
205 Catherine Street, Suite 101
Ottawa, ON
K2P 1C3

Report No. 1900001 July 2019

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		July 25, 2019
Prepared By: Alex Buck, C.E.T.	Reviewed By: Bassam Hamwi, M.Eng., P.Eng.	Date:

1. SCREENING FORM

The initial screening form for this TIA has been completed and is included in **Appendix A**. A summary table indicating the outcome of the screening process is provided below in **Table 1**.

Table 1: Screening Form Summary

Trigger	Satisfied?
Trip Generation	No
Location	No
Safety	Yes

2. EXISTING AND PLANNED CONDITIONS

2.1 Proposed Development

The following **Table 2** provides a summary of the site conditions for the proposed development.

Table 2: Proposed Development Conditions

Existing / Permitted Land Uses	The City's Zoning By-law identifies the parcel of land within Zone I2 (Major Institutional Zone). A 'recreational and athletic facility' is listed as a permitted land use.
Proposed Land Use / Regulation	Algonquin College is submitting a Site Plan Application for the ARC Building which is proposed to have a 'recreational and athletic facility' land use.
Development Size (m^2)	11,626 m^2
Estimated Date of Occupancy	2021
Planned Phasing of Development	Single Phase
Number of Parking Spaces	Due to the proposed development's location within Area 'Z' of the Zoning Bylaw, no off-street vehicle parking is required to be provided under Section 101 – Minimum Parking Space Rates of the City's Zoning Bylaw.
Access Points	No new vehicular access points. Use of existing accesses only.

The proposed Site Plan is shown below in **Figure 1**.

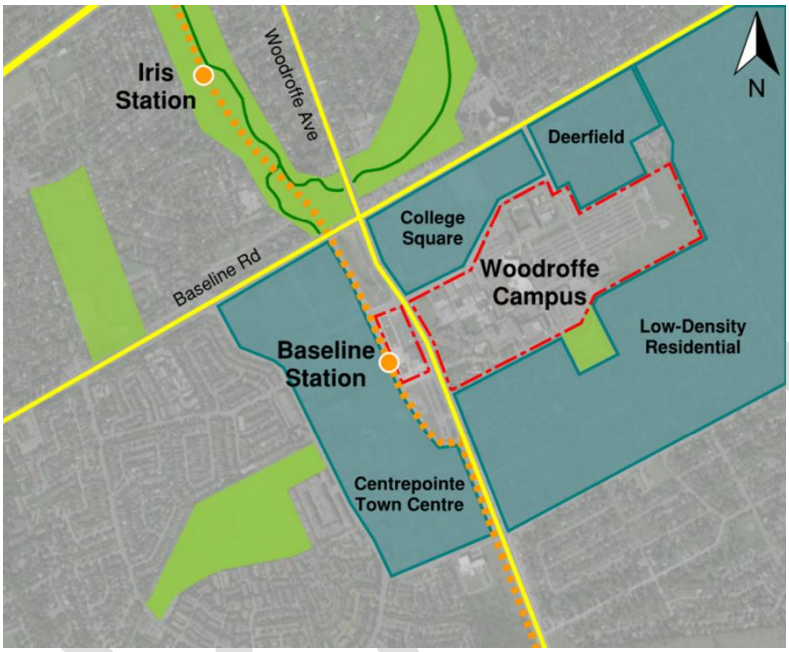
Figure 1: Proposed Site Plan

Placeholder for Site Plan PDF.

2.2 Existing Conditions

The proposed development is located within Algonquin College property, south of Navaho Drive and east of Woodroffe Avenue. **Figure 2** depicts the College property and the surrounding context.

Figure 2: Study Area Context



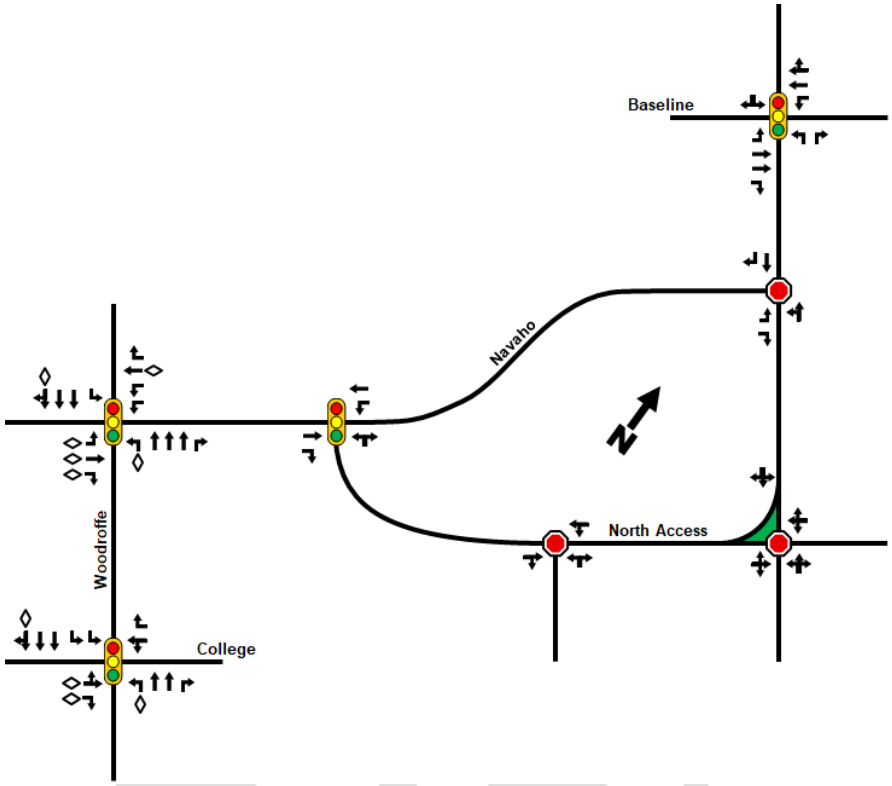
The boundary roadway adjacent to the subject development is a private roadway located on Algonquin College property and is referred to as North Access Road for the purposes of this TIA. The nearest connecting City-owned roadway is Navaho Drive and serves as a collector roadway and connects with the arterial network at Baseline Road and Woodroffe Avenue. The study area roadways included as part of this TIA are described below in **Table 3**.

Table 3: Existing Study Area Roadways

Name	Jurisdiction	Classification	Number of Lanes (Two-Way)	Posted Speed Limit (km/h)
Navaho Drive	City of Ottawa	Collector	2	50 (unposted)
North Access Road	Algonquin College	Local (assumed)	2	25

Along North Access Road, two All-Way Stop (AWS) controlled intersections control access to/from the main parking lot serving the College. In addition to the site accesses provided along North Access Road, an additional access is provided at the south end of the property along College Avenue, connecting directly with Woodroffe Avenue. The study area intersections are illustrated below in **Figure 3** including current intersection controls and lane configurations.

Figure 3: Existing Study Area Intersections – Control / Lane Configurations



Within 200 m of the proposed site driveway (i.e. the AWS intersection at the eastern limit of North Access Road, south of Navaho Drive), an existing site driveway located north of the subject intersection provides access to Parking Lot 11, serving residence, as well as a service road. This parking lot is also served by the subject AWS intersection. Note that the site driveway located west of this intersection (serving Parking Lots 8, 9 and 12) is proposed to be closed upon the buildout of the ARC Building.

2.2.1 Existing Pedestrian and Cycling Facilities

Existing pedestrian facilities on the external road network connecting to the campus include sidewalks on both sides of Baseline Road, Woodroffe Drive and Navaho Drive. **Figure 4** illustrates the pedestrian and recreational facilities in the vicinity of the College as designated in the 2013 Pedestrian Plan.

Existing cycling facilities connecting to campus include exclusive bicycle lanes on both sides of Woodroffe Avenue between Navaho Drive and College Avenue as well as an exclusive bicycle lane on the south side of Baseline Road from Woodroffe Avenue to Navaho Drive. **Figure 5** illustrates the cycling facilities in the vicinity of the College as designated in the 2013 Cycling Plan.

There are also four multi-use pathways located within the campus vicinity, including pathways on the east and south sides of campus which connect to the adjacent residential communities, a pathway west of Woodroffe Avenue, and a pathway north of Baseline Road.

Figure 4: Existing and Future Pedestrian Network

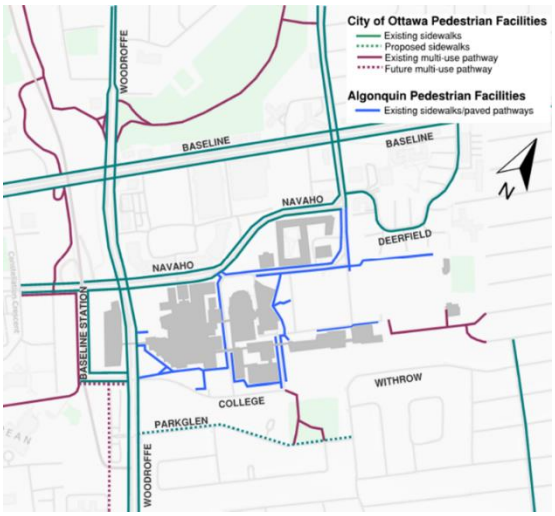
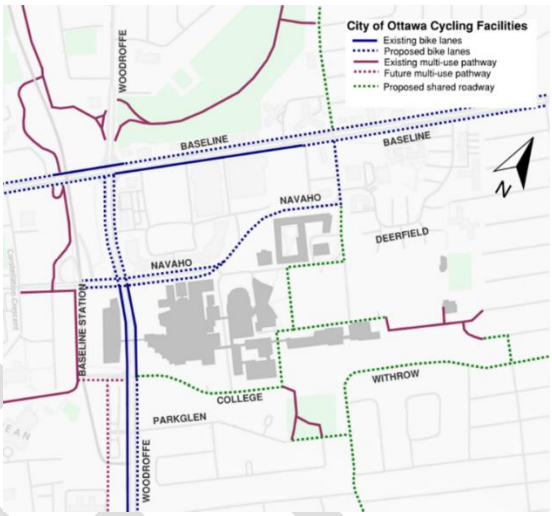


Figure 5: Existing and Future Cycling Network



2.2.2 Existing Transit

Algonquin College is currently well-served by transit as it is located adjacent to Baseline Station which is served by primary transit routes travelling on the West and Southwest Transitway, as well as local, cross-city and express transit routes. In addition to the routes serving the Transitway station, Route 88 serves Algonquin College directly with stops located along North Access Road and the Service Road. Route 88 is a major cross-city route that operates in an east-west direction along Baseline Road within the vicinity of the college and extends to Hurdman Station in the east and Kanata in the west, providing service throughout the day.

The following **Figures 6 and 7** illustrate the transit routes and transit stops operating within the vicinity of Algonquin College.

Figure 6: Existing Transit Routes

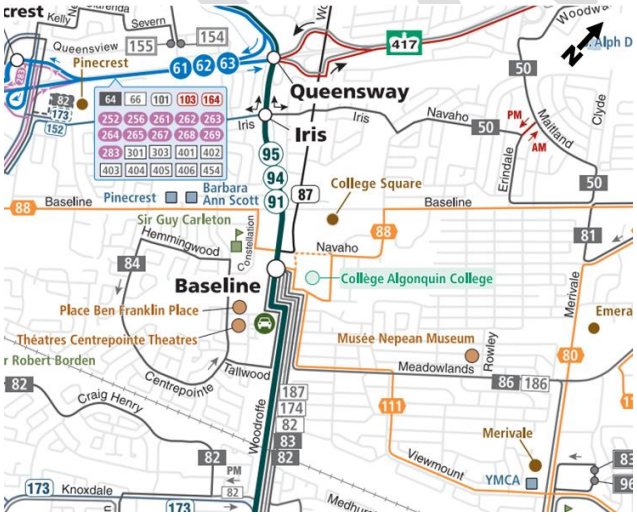


Figure 7: Algonquin College Transit Stops

2.2.3 Existing Area Traffic Management

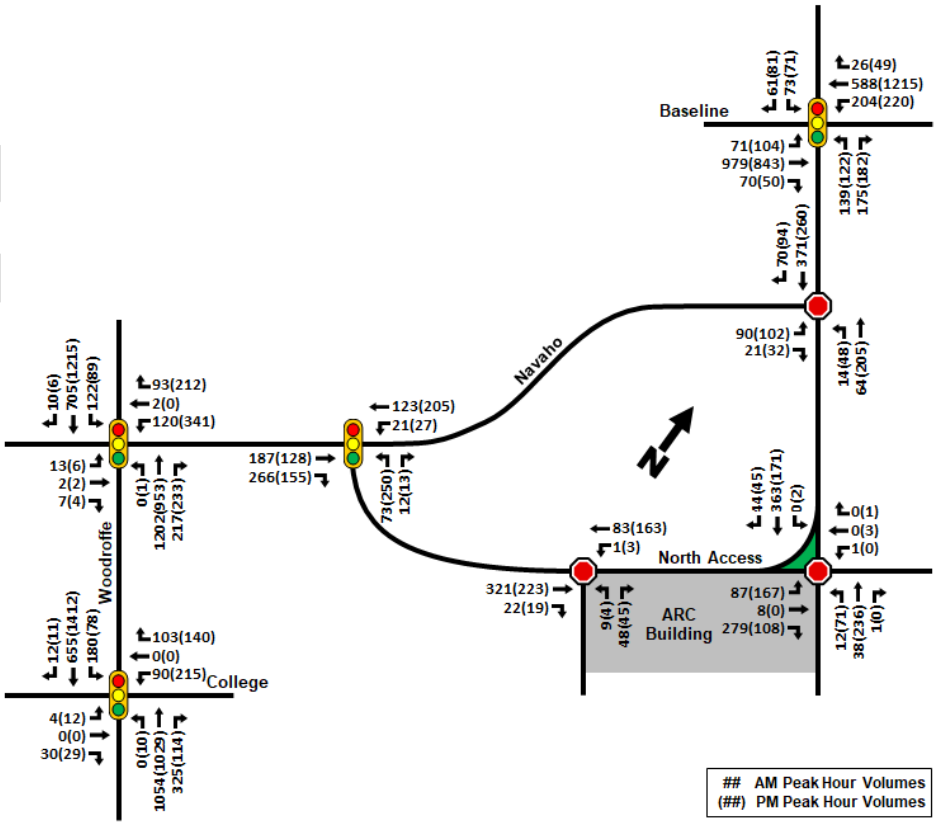
The boundary roadway (North Access Road) includes several methods to manage the travel behaviour and speeds of vehicles entering and exiting the College property. The types of traffic management currently applied along North Access Road include:

- Posted Speed Limit Signs (25 km/h);
- Speed Humps;
- Painted Pedestrian Crosswalks; and
- Pedestrian Crossing Signs.

2.2.4 Existing Peak Hour Traffic Volumes

The most recent intersection movement counts have been received by the City of Ottawa for the signalized study area intersections. Historical traffic count data has been used at the AWS controlled intersections serving the internal road network. A significant change in volume, with respect to college-related traffic, is not anticipated at these locations. An illustration of morning and afternoon peak hour turning movement volumes at study area intersections is shown below in **Figure 8**.

Figure 8: Existing Study Area Traffic Volumes – AM (PM) Peak Hours



2.2.5 Collision History

A five-year collision history (2014 to 2018, inclusive) was provided by the City. A summary of intersection and mid-block collisions is provided below in **Table 4**.

Table 4: Collision History (2014 – 2018)

Location	Angle	Rear End	Sideswipe	Turning Movement	SMV / Other	Total	5 Year Average
Intersections							
Baseline / Navaho	1	28	10	3	6	**48**	**9.6**
Navaho / 265 E of Woodroffe	0	0	0	1	0	**1**	**0.2**
Navaho / Deerfield	0	0	0	1	0	**1**	**0.2**
Navaho / Woodroffe	1	24	5	30	8	**68**	**13.6**
Woodroffe / College	0	9	1	2	1	**13**	**2.6**
Mid-Block							
Navaho (Baseline – Woodroffe)	8	1	1	5	4	**19**	**3.8**

2.3 Planned Conditions

2.3.1 Planned Roadway Modifications

The Ottawa Transportation Master Plan (TMP) includes a number of transit-related improvements planned within the vicinity of Algonquin College. The following **Table 5** provides a summary of these projects.

Table 5: Ottawa TMP Projects

Project	Description	TMP Horizon
Stage 2 LRT Confederation Line West Extension	Conversion of the West Transitway to LRT between Tunney's Pasture Station and Baseline Station	2023
Baseline / Heron / Walkley / St. Laurent BRT	**Affordable:** At-grade BRT connecting Baseline Station to Heron Station **Concept:** At-grade BRT connecting Bayshore Station to St. Laurent Station	Within 2031 Horizon Beyond 2031 Horizon
Southwest Transitway Extension	Fully exclusive BRT between Baseline Station and Hunt Club Road	Beyond 2031 Horizon
Baseline Road	Transit signal priority and queue jump lanes between Baseline Station and Richmond Road	Within 2031 Horizon

2.3.2 Planned Developments

A number of development applications are currently placed with the City for the construction of residential units near Algonquin College. **Figure 9** illustrates the locations of the planned developments and **Table 6** provides a summary of the development applications.

Figure 9: Current Development Application Locations

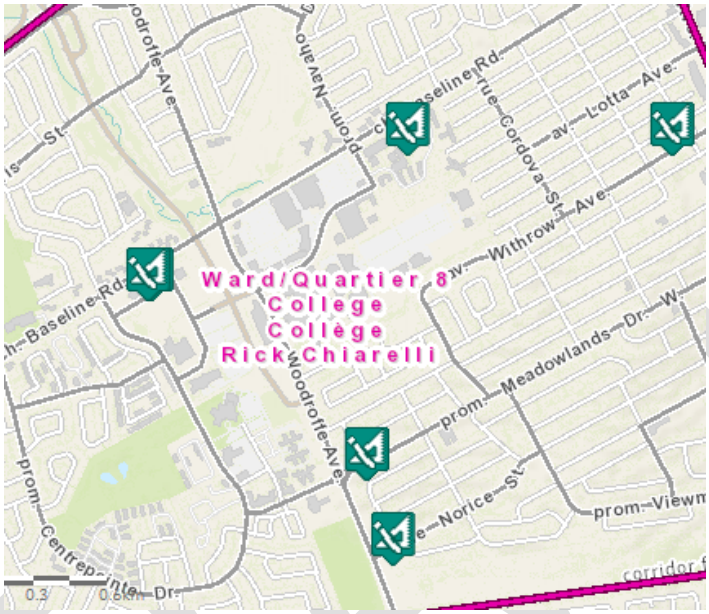


Table 6: Current Development Applications

Address	Application Type	Description
2140 Baseline Road	Site Plan Control	Residential Building (144 units)
1800 Baseline Road	Site Plan Control	Residential Townhouses (36 units)
21 Withrow Avenue	Zoning By-law Amendment	Residential Subdivision (10 lots)
155 Meadowlands Drive	Site Plan Control	Retirement Home (165 units)
193 Norice Street	Site Plan Control	Apartment Building (22 units)

3. STUDY AREA AND TIME PERIODS

The study area for the Design Review includes the development property as well as the boundary roads. The time periods to be considered include the weekday morning and afternoon peak hours as these time periods reflect the highest combination of adjacent street traffic and student-generated traffic. The development is planned to be built in 2021 and, as a result, the proposed horizon years for analysis include 2021 and 2026 (five years beyond build-out). **Table 7** summarizes the study area, time periods and horizon years for this TIA.

Table 7: Study Area, Time Periods and Horizon Years

Element	Description
Study Area	North Access Road
Time Periods	Weekday Morning and Afternoon Peak Hours
Horizon Years	2021 (build-out) and 2026

4. EXEMPTIONS REVIEW

Discussion with the City has indicated that the Network Impact Component (i.e. Modules 4.5 to 4.9) is not required for this TIA and only the components related to Design Review (i.e. Modules 4.1 to 4.4) should be reviewed. In addition to this, further exemptions have been identified for this TIA and are shown below in **Table 8**.

Table 8: Proposed Exemptions

Module	Element	Consideration	Exempt?
4.1 Development Design	4.1.3 New Street Networks	Only required for plans of subdivision	Yes
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	No
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Yes

Module 4.2 requires the review of parking supply and spillover to mitigate any parking demand issues that may arise from a proposed development. However, due to the proposed development's location within Area 'Z' of the Zoning Bylaw #2008-250, no off-street vehicle parking is required to be provided under Section 101 – Minimum Parking Space Rates of the City's Zoning Bylaw. Additionally, Algonquin College has undertaken a separate design assignment which offsets the number of parking spaces absorbed by the construction of the ARC Building. As a result, 'Element 4.2.2 Parking Spillover' has been exempted from this TIA.

City staff has also advised that Modules '3.1 Development-generated Travel Demand' and '3.3 Demand Rationalization' within Step 3 (Forecasting) are not required for this TIA given the low number of trips generated by the proposed site and, as a result, these modules have also been exempted.

5. FORECASTING

As previously mentioned, Modules 3.1 and 3.3 have been exempted from this step of the TIA process. This section will include Module 3.2 Background Network Travel Demands in order to determine the extent of background traffic growth within the study area and includes a review of historical traffic data, transportation plans and other planned developments within the study area.

5.1 Background Network Travel Demands

5.1.1 Transportation Network Plans

Section 2.3.1 of this report identifies major projects planned within the vicinity of Algonquin College. Additional transportation network modifications have not been identified.

5.1.2 Background Growth

A review of historical traffic count data was completed and a summary of calculated growth rates at study area intersections is provided in **Table 9**. Detailed summaries of the historical data are provided in **Appendix B**. The historical data available ranges between 2006 and 2019 and includes traffic counts collected during school months as well as summer months when full-time classes are not in session. Additionally, broader roadway network improvements / modifications have been made over the years, which have an impact on capacity, route choice and mode choice. Given these factors, a significant amount of uncertainty exists within the available data.

Table 9: Study Area Intersection Growth Rate Summary

Intersection	AADT			AM Peak Hour		
	Average	Projected Regression		Average	Projected Regression	
		Linear	Exponential		Linear	Exponential
Baseline / Navaho	1.3%	1.3%	1.2%	-1.0%	-1.1%	-1.1%
Navaho / East of Woodroffe	12.9%	3.7%	3.3%	9.6%	2.8%	2.6%
Woodroffe / College	0.4%	4.1%	3.6%	-1.6%	-0.3%	-0.3%
Navaho / Woodroffe	-8.7%	-9.5%	-25.8%	-1.4%	0.0%	0.0%

In addition to the above, a review of EMME travel demand plots generally indicates negative growth or no growth along the study area arterial network. It is expected that the future conversion of BRT to LRT at Baseline Station in addition to any improvements to pedestrian and cycling facilities will have an effect on mode choice. As a conservative estimate for background growth, an annual growth rate of 1% will be applied to the study area road network. Projected study area turning movement volumes for the 2021 and 2026 horizon years are illustrated below in **Figures 10 and 11**.

Figure 10: Projected Study Area Intersection Peak Hour Volumes – 2021

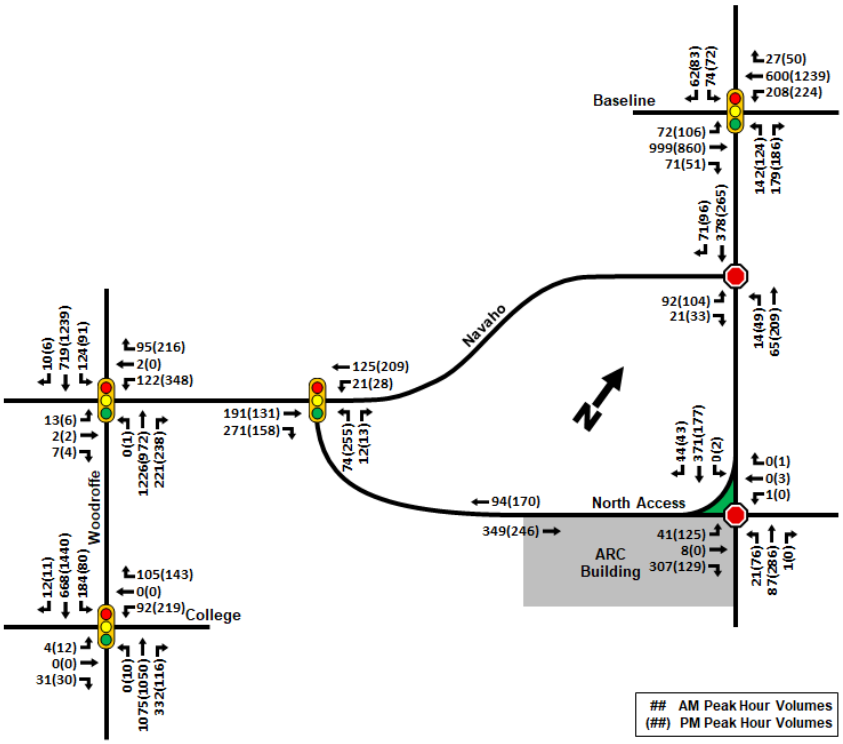
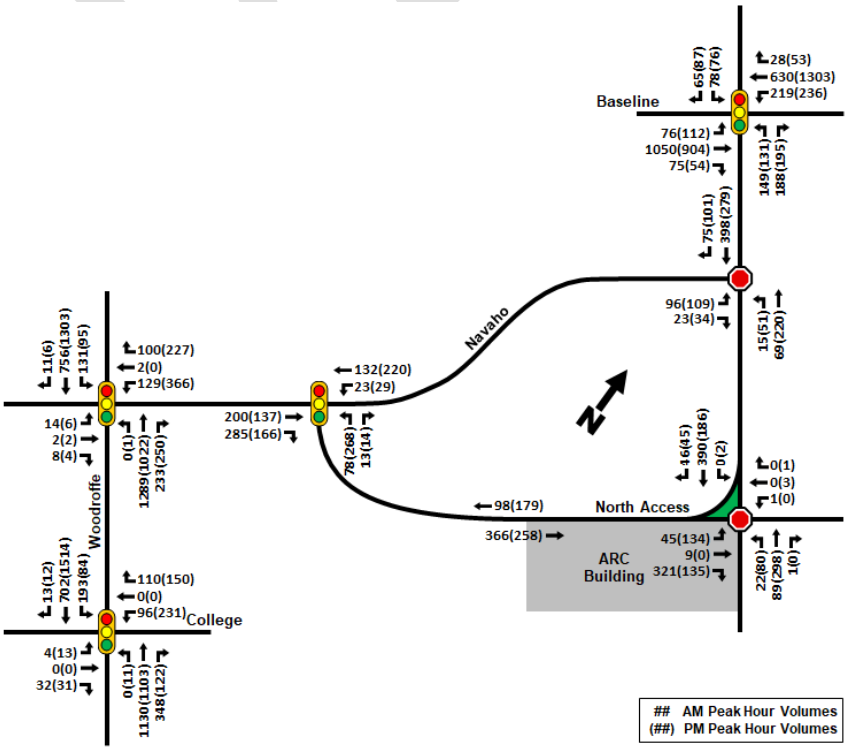


Figure 11: Projected Study Area Intersection Peak Hour Volumes – 2026



5.1.3 Other Developments

Section 2.3.2 of this report identifies development applications that are currently placed with the City for the construction of residential units near Algonquin College. Additional transportation network modifications have not been identified.

6. ANALYSIS

The following includes an overview of the Design Review components for the proposed development and provides an assessment of the study area road network impacts associated with the proposed Site Plan. This section discusses Site Plan design elements, parking and impacts to boundary streets and access intersections.

6.1 Development Design

6.1.1 Design for Sustainable Modes

Vehicle and Bicycle Parking Areas

Given the site's location with 'Area Z' of Schedule 1A of the Zoning Bylaw, no minimum number of vehicle parking spaces are required. Parking lots 8, 9 & 12 at Algonquin College currently provide approximately 2,140 parking spaces. Approximately 340 parking spaces will be lost as a result of the development of the ARC Building, reducing the total parking supply in these lots to approximately 1,800 parking spaces. During and following the buildout of the ARC Building, Algonquin College intends to offset this reduction by rearranging the layout of existing parking lots and constructing temporary gravel lots across the campus, introducing approximately 470 parking spaces (a net increase of 130 spaces). Access to vehicle parking will be provided along the south side of the proposed facility with connection to North Access Road along the east side.

The quantity of bicycle parking spaces is not identified on the Site Plan, however the location for bicycle parking is shown along the southwest side of the building near a main entrance. The minimum bicycle parking supply for the proposed site plan is 8 spaces according to Section 111 – Bicycle Parking Space Rates and Provisions of the Zoning Bylaw. A maximum of 50% of the required bicycle parking spaces or 15 spaces, whichever is greater, may be located in a landscaped area (By-law 2011-124).

Pedestrian Routes and Facilities

The proposed site includes sidewalk bordering all sides of the building, a barrier-free ramp and a future pedestrian link. These facilities connect the proposed ARC Building with the Student Commons Building. The Site Plan also indicates the location of existing pedestrian crossings to accommodate students travelling across North Access Road to/from Residence. An additional pedestrian crossing has been provided along the south side of North Access Road crossing the loading dock.

Transit Design and Location

Transit stops are located along both sides of North Access Road within walking distance of the proposed ARC Building. All exterior access doors of the subject development are within 400 metres of both transit stops. The existing stops currently provide shelters and permit transit connections with Route 88 travelling in the eastbound and westbound directions. Additional existing transit-related information is provided in Section 2.2.2.

6.1.2 Circulation and Access

The proposed Site Plan will utilize the existing AWS intersection at the eastern leg of North Access Road. This existing access accommodates OC Transpo transit vehicles along Route 88. An assessment of the loading dock design to accommodate a Heavy Single-Unit (HSU) truck has been completed using AutoTURN and the results of the swept-path analysis are provided in **Appendix C**. Based on the AutoTURN analysis, HSU trucks may enter / exit the loading dock in the following manner:

- **Entering:** HSU trucks must approach from the east, travelling in the westbound lane along North Access Road, in order to complete a reverse entry into the loading dock
- **Exiting:** HSU trucks must depart the loading dock by making a left-turn and head westbound along North Access Road to connect with Navaho Drive

6.2 Parking

6.2.1 Parking Supply

As previously mentioned, the proposed development is located within Area 'Z' of the Zoning Bylaw #2008-250 and as a result, no off-street vehicle parking is required to be provided under Section 101 – Minimum Parking Space Rates of the City's Zoning Bylaw.

The minimum bicycle parking supply for the proposed site plan is 8 spaces according to Section 111 – Bicycle Parking Space Rates and Provisions of the Zoning Bylaw. A maximum of 50% of the required bicycle parking spaces or 15 spaces, whichever is greater, may be located in a landscaped area (By-law 2011-124).

6.3 Boundary Street Design

6.3.1 Mobility

An assessment of the boundary street (North Access Road) was completed to determine the Segment Multi-Modal Level Of Service (MMLOS). This assessment considers the suitability of the pedestrian, cyclist, transit and truck facilities provided and evaluates the respective comfort

level for these types of road users. A summary of this evaluation is provided below in **Table 10** and a detailed analysis is provided in **Appendix D**.

Table 10: North Access Road – Segment MMLOS

Mode	Overall Segment LOS	Target LOS
Pedestrian (PLOS)	A	A
Cyclist (BLOS)	B	B
Transit (TLOS)	D	D

Based on the results of the Segment MMLOS analysis, North Access Road meets or exceeds the target LOS desired for each mode. The existing network is considered to provide adequate facilities for these modes with opportunities to connect users between mode choices. The proposed ARC Building adds to the existing sidewalk provided for pedestrians along the south side of North Access Road including a painted pedestrian crosswalk across the loading dock area. As a result of the Segment MMLOS provided above, the proposed facilities shown on the Site Plan for the ARC Building are considered acceptable and meet the City's MMLOS objectives.

6.3.2 Road Safety

A review of a five-year collision history (2014 to 2018, inclusive) has been provided in Section 2.2.5 and provides a summary of collisions by impact type. Collision data is not available along North Access Road, however the intersection of Navaho / East of Woodroffe (at North Access Road) indicated that one (1) collision has occurred at this location within the past five years. In order to reduce the potential for safety issues, North Access Road currently includes a low posted speed limit (25 km/h), speed humps and AWS controlled intersections along its corridor.

6.3.3 Neighbourhood Traffic Management

As previously mentioned in Section 2.2.3, North Access Road includes several methods to manage travel behaviour for college-related traffic. These measures include:

- Posted Speed Limit Signs (25 km/h);
- Speed Humps;
- Painted Pedestrian Crosswalks; and
- Pedestrian Crossing Signs.

Given that the boundary street currently provides measures to manage vehicle speeds and behaviour, the proposed site is not expected to exacerbate any existing operational concerns.

6.4 Access Intersections Design

6.4.1 Location and Design of Access

The development of the ARC Building does not include the provision of a new site access and will use existing access driveways and intersections to provide network connections. As previously mentioned, the main intersection access is the AWS controlled intersection at the eastern limit of North Access Road (i.e. North Access / Parking Lot intersection). A driveway access to Parking Lot 11 is located approximately 75 m north of this intersection and the signalized Navaho / North Access intersection is located approximately 360 m west of this location. The ARC Building will increase the clear throat length along the west side of the south leg of the subject intersection to approximately 70 m (currently roughly 25 m).

6.4.2 Intersection Control

The Navaho / North Access intersection is currently signalized while the North Access / Parking Lot intersection is STOP controlled on all approaches. Signal warrant analysis (included in **Appendix E**) was completed for the 2021 and 2026 horizon year traffic volumes at the North Access / Parking Lot intersection using Justification 7 from Book 12 of the Ontario Traffic Manual. This analysis indicated that signals are not warranted at this intersection for either horizon year.

The City of Ottawa has developed a Roundabout Implementation Policy that considers the feasibility of roundabouts as a form of traffic control alongside other appropriate controls or road modifications. This policy includes a screening tool to determine if the City should proceed with an Intersection Control Study. Given that the proposed development does not include the introduction of a new City intersection, warrant traffic signals or generate capacity / safety issues, screening for the possibility of a roundabout is not required.

As mentioned previously, OC Transpo Route 88 travels through Algonquin College campus and uses North Access Road. A channelized southbound right-turn movement is provided at the North Access / Parking Lot intersection allowing buses to bypass the STOP condition at this location. Signalized intersections are not provided / required on campus and as a result, the addition of isolated transit priority measures along internal campus roadways is not desirable.

6.4.3 Intersection Design

Intersection MMLOS analysis has been completed for the existing, 2021 and 2026 horizon years at the Navaho / North Access intersection and a summary is provided below in **Table 11**. Given that the existing intersection geometry at this location is planned to be maintained, the following LOS results summarize existing and projected conditions. Detailed MMLOS analysis is provided in **Appendix D**.

Table 11: Navaho Drive / North Access Road – Intersection MMLOS

Mode	Overall Intersection LOS	Target LOS
Pedestrian (PLOS)	F	A
Cyclist (BLOS)	D	B
Transit (TLOS)	B	A

In addition, vehicle LOS at study area intersections has been completed using Synchro 10 for the existing and projected conditions and a summary of the performance evaluation is provided below in **Table 12**. Detailed Synchro reports are included in **Appendix F**.

Table 12: Study Area Intersection Performance – AM (PM) Peak Hours

Intersections	Movements	Delay (s)	v/c Ratio	LOS	95th Queue (m)
Existing Conditions					
Navaho / North Access	NBLR	24 (26)	0.33 (0.63)	A (B)	18 (41)
	Overall	**5 (13)**	**0.29 (0.45)**	**A (A)**	**-**
North Access / Parking Lot	EBLTR	15 (13)	0.57 (0.46)	B (B)	-
	WBLTR	10 (9)	0.00 (0.01)	A (A)	-
	NBLTR	10 (14)	0.09 (0.49)	A (B)	-
	SBLTR	17 (12)	0.64 (0.35)	C (B)	-
	Overall	**15 (12)**	**-**	**C (B)**	**-**
Projected 2021					
Navaho / North Access	NBLR	26 (30)	0.35 (0.67)	A (B)	17 (40)
	Overall	**6 (14)**	**0.28 (0.47)**	**A (A)**	**-**
North Access / Parking Lot	EBLTR	13 (12)	0.47 (0.37)	B (B)	-
	WBLTR	10 (9)	0.00 (0.01)	A (A)	-
	NBLTR	10 (13)	0.17 (0.50)	A (B)	-
	SBLTR	15 (11)	0.58 (0.31)	B (B)	-
	Overall	**13 (12)**	**-**	**B (B)**	**-**
Projected 2026					
Navaho / North Access	NBLR	26 (30)	0.36 (0.68)	A (B)	18 (42)
	Overall	**6 (14)**	**0.29 (0.48)**	**A (A)**	**-**
North Access / Parking Lot	EBLTR	13 (12)	0.51 (0.40)	B (B)	-
	WBLTR	10 (9)	0.00 (0.01)	A (A)	-
	NBLTR	10 (14)	0.17 (0.53)	A (B)	-
	SBLTR	16 (11)	0.61 (0.33)	C (B)	-
	Overall	**14 (12)**	**-**	**B (B)**	**-**

The above analysis demonstrates that the Navaho / North Access and North Access / Parking Lot intersections operate acceptably from a vehicle LOS perspective within the existing, projected 2021 and projected 2026 conditions. However, LOS for pedestrian, cyclist and transit modes do not meet the minimum desirable target LOS for the Policy Area (i.e. within 600 m of a rapid transit station). Given that these results are generated by the existing condition and are

not diminished by the development of the ARC Building, mitigation is not required by the developer.

APPENDIX A

SCREENING FORM

MEMORANDUM

MORRISON HERSHFIELD

TO:	Lucas Smith, P.Eng.	**FROM:**	Anthony Kwok, P.Eng., Bassam Hamwi, P.Eng.
		PROJECT No.:	1900001.00
RE:	Algonquin College – ARC Building Transportation Impact Assessment – Screening Form	**DATE:**	6/21/2019

P:\2019\190000100-ALGONQUIN COLLEGE DC SOA SERVICES\08. WORKING\06. TRAFFIC\6-DOCUMENTATION\2-SCOPING REPORT\APPENDIX A - SCREENING FORM\ALGONQUIN COLLEGE - ARC BUILDING TIA SCREENING.DOCX

1. Description of Proposed Development

Municipal Address	ARC Building Algonquin College 1385 Woodroffe Avenue K2G 3G7, Ottawa ON
Description of Location	The limits of the proposed ARC Building are to be built in the northwest quadrant of Parking Lot 8 & 9 at Algonquin College. The north side of the site is bounded by North Access Road (a secondary roadway off of Navaho Drive).
Land Use Classification	Health/ Fitness Club (ITE Land Use #492) Athletic Club (ITE Land Use #493)
Development Size (units)	1
Development Size (m^2)	125,138 ft^2 (11,626 m^2)
Number of Accesses and Locations	0 (The site does not contain any new main vehicular access.)
Phases of Development	1
Buildout Year	2021

The proposed ARC Building development is expected to replace the existing recreational and athletic facilities on campus with larger multi-use facility. Currently, the athletics/ recreational facilities are situated in a shared building comprising of a multitude of uses, including academics. The additional capacity afforded with the new development will allow the College to expand and provide more inclusive physical and social activity programs for their students.

The total gross floor area of the existing athletics/ recreational facilities on the Algonquin College campus is approximately 47,840 ft^2 (4,445 m^2). The proposed ARC Building development is slated to grow the footprint to 125,138 ft^2 (11,625 m^2), or by approximately 262%. The substantial growth in the footprint of the proposed ARC Building can be attributed to an increase in the areas available for athletics (additional courts), fitness (discovery track, studios, weight rooms, etc.), and recreational (bowling alley, billiards, rock climbing wall, etc.), including lounges/ concessions. **Table 1** provides a breakdown of the existing and proposed athletics/ recreational facilities.

TABLE 1: GROSS FLOOR AREA OF EXISTING AND PROPOSED ATHLETICS/ RECREATIONAL FACILITY

	Athletics (ft^2)	Health/ Fitness (ft^2)	Total (ft^2)
Existing Athletics/ Recreational Facility	18,180	29,660	47,840
ARC Building	41,544	83,594	125,138

Based on the background information provided above, the following memo will address the Transportation Impact Assessment (TIA) screening trigger checks for trip generation, location, and safety.

2. Trip Generation Trigger

	Yes	No
Does the proposed development generate more than 60 person-trips or more during weekday peak hours?		✓

The land use classification for the ARC Building is noted in Section 1 as a Health/ Fitness Club and an Athletic Club. The Health/ Fitness Club land use classification describes a facility where the focus is on individual fitness or training while the Athletic Club focuses primarily on offering a comprehensive offering of athletic facilities for team sports and social gatherings. Although neither land use can accurately describe the form and function of the ARC Building, a combination of the two land uses was determined to provide a better representation of the expected trips.

Table 2 includes the trip generation equations for the two applicable land use classifications per the ITE Trip Generation Manual (2012), while **Table 3** uses the equations to calculate the expected number of trips. The expected trips generated for the Combined Land Use was determined based on the proportion of the total gross floor area attributed to each classification.

TABLE 2: LAND USE CLASSIFICATIONS

Land Use	# of Studies	2-Way Traffic (Inbound and Outbound)	
		AM Peak Hour	PM Peak Hour
Health/ Fitness Club (492)	6	T = 1.41(x)	Ln(T) = 0.95Ln(x)+1.43
Athletic Club (493)	3 (AM) & 4 (PM)	T = 2.97(x)	T = 6.58(x) - 17.51

Note: 'x' represents each 1000 sq. ft of gross floor area.

TABLE 3: TRIPS GENERATED BASED ON RELEVANT LAND USE CLASSIFICATION

Land Use	% of Land Use	Trips Generated (2-Way Traffic)	
		AM Peak Hour	PM Peak Hour
Existing Facility			
Combined Land Use	$62\%_{Health/Fitness}$ $38\%_{Athletic}$	96 trips	207 trips
Proposed Facility			
Health/ Fitness Club (492)	100%	176 trips (+80 trips)	411 trips (+204 trips)
Athletic Club (493)	100%	372 trips (+276 trips)	806 trips (+599 trips)
Combined Land Use	$67\%_{Health/Fitness}$ $33\%_{Athletic}$	241 trips (+145 trips)	536 trips (+329 trips)

The estimate for trip generation potential per the ITE Trip Generation Manual is not representative of what can be expected by the proposed development for the following reasons:

1. Trip rates in the ITE Trip Generation Manual are based on suburban sites with transit mode share that is at or below 10% of total trips. The ARC Building is within close proximity to the Woodroffe Rapid Transit Station and as a result has achieved a 58% transit mode share.
2. Trip rates in the ITE Trip Generation Manual are based on stand-alone facilities which serve as a "destination" in and of itself. The ARC Building is an integral element of the Algonquin College campus and is intended to serve the College students' exclusively.

In light of the above, the ITE trip generation rates must be adjusted downward to account for the above and ensure that it is representative of what can reasonably be accepted.

To account for the higher transit mode share, ITE trip rates should be reduced by a factor of 53% (1-0.42/ 0.9). As such, the increase in trips can be expected to be 68 vph in the AM peak hour and 155 vph in the PM peak hour.

Notwithstanding the above, there is no expectation of increase in traffic generation due to the increase in facility size. Any increase in traffic generation by the building, if any, would be attributed to increase in student enrolment. Therefore, the Trip Generation trigger is considered not to be satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		✓
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?		✓

The proposed ARC Building will not require a connection to any boundary streets that are designated by the City of Ottawa as transit priority, rapid transit, or spine cycling routes. However, the development is located within the Mixed Use Centre Design Priority Area and Baseline/Woodroffe Transit-Oriented Development zone as defined in Schedule B and Annex 6 of the City of Ottawa's Official plan, respectively, which satisfies the Location Trigger.

However, since the campus is well connected to the pedestrian, cycling and transit networks, it is not viewed as having a significant potential for further improvements that are typically identified from the conduct of a TIA.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		✓
Are there any horizontal/ vertical curvatures on a boundary street limits sight lines at a proposed driveway?		✓
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300m of		✓

intersection in rural conditions, or within 150m of intersection in urban/ suburban conditions)?		
Is the proposed driveway within auxiliary lanes of an intersection?		✓
Does the proposed driveway make use of an existing median break that serves an existing site?		✓
Is there a documented history of traffic operations or safety concerns on the boundary streets within 500m of the development?	✓	
Does the development include a drive-thru facility?		✓

The majority of the questions for the Safety Trigger were answered with 'No', with the exception that there are historical traffic operations and safety concerns for the boundary streets surrounding the proposed development and, as a result, the Safety Trigger is fulfilled.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?		✓
Does the development satisfy the Location Trigger?		✓
Does the development satisfy the Safety Trigger?	✓	

Given that the use of the proposed development will be restricted to Algonquin College students only, and serve the same student population as the current building, it is not expected that the proposed development will have a significant impact on the existing road network and traffic operations to warrant the completion of a full Transportation Impact Assessment. In light of the facts presented herein, as well as our intimate knowledge of the site and the proposed development, we propose that "Step 2 – Scoping" of the TIA reflect the above statement.

APPENDIX B

HISTORICAL GROWTH RATE SUMMARIES

Baseline @ Navaho_AADT

Year	Approach AADT Volume				Total
	Northbound	Southbound	Eastbound	Westbound	
2010	3529	1648	12598	12064	**29839**
2016	3989	1598	12655	14068	**32310**

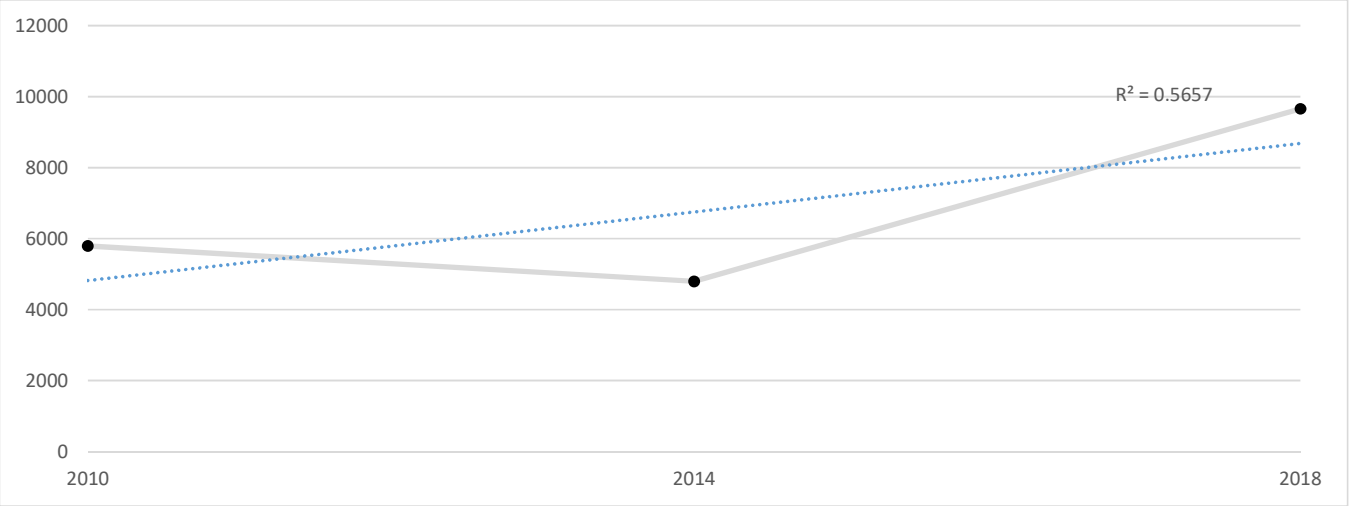
Range	Approach Exponential Growth Rates				Exponential Growth Rates
	Northbound	Southbound	Eastbound	Westbound	
2010 - 2016	2.1%	-0.5%	0.1%	2.6%	**1.3%**
Average	**2.1%**	**-0.5%**	**0.1%**	**2.6%**	**1.3%**
Reliability	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Linear Regression	
Year	2026
Projected Volume	36428
Linear Growth Rate	**1.27%**
Exponential Growth Rate	**1.21%**

Navaho @ E of Woodroffe_AADT

Year	Approach AADT Volume				Total
	Northbound	Southbound	Eastbound	Westbound	
2010	1010	0	2475	2312	**5797**
2014	693	0	2265	1839	**4797**
2018	2123	0	4656	2881	**9660**

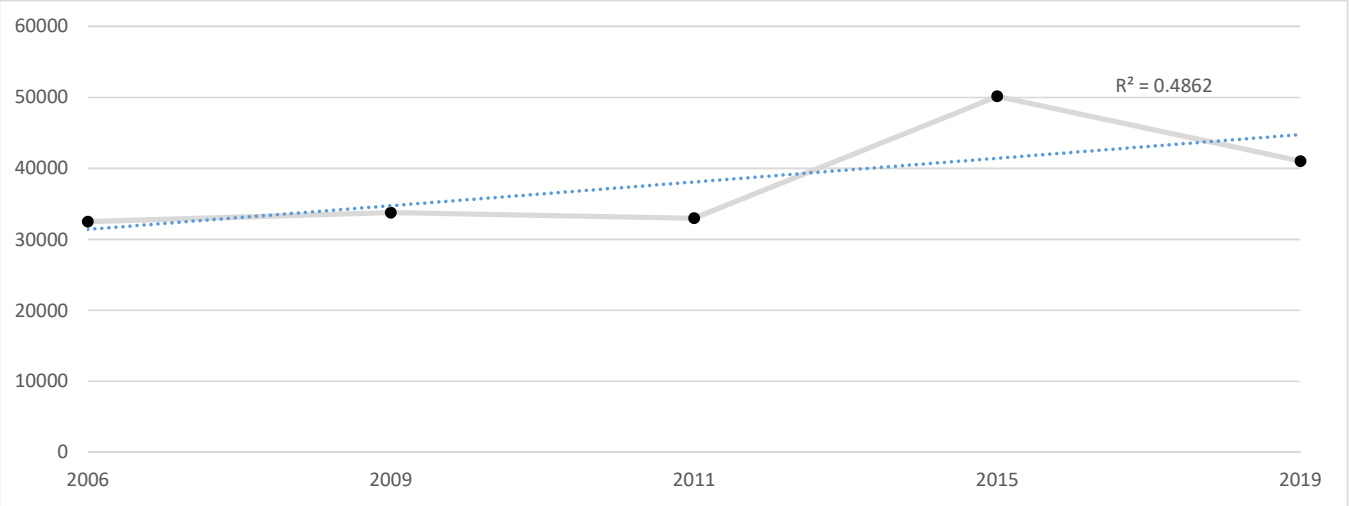
Range	Approach Exponential Growth Rates				Exponential Growth Rates
	Northbound	Southbound	Eastbound	Westbound	
2010 - 2018	9.7%	0.0%	8.2%	2.8%	**6.6%**
2014 - 2018	32.3%	0.0%	19.7%	11.9%	**19.1%**
Average	**21.0%**	**0.0%**	**14.0%**	**7.3%**	**12.9%**
Reliability	**16.0%**	**0.0%**	**8.1%**	**6.4%**	**8.9%**



Linear Regression	
Year	2026
Projected Volume	12546
Linear Growth Rate	**3.73%**
Exponential Growth Rate	**3.32%**

Year	Approach AADT Volume				Total
	Northbound	Southbound	Eastbound	Westbound	
2006	16242	14525	467	1264	**32498**
2009	17221	14515	374	1662	**33772**
2011	18981	12295	376	1327	**32979**
2015	24008	21390	580	4147	**50125**
2019	19157	17734	453	3679	**41023**

Range	Approach Exponential Growth Rates				Exponential Growth Rates
	Northbound	Southbound	Eastbound	Westbound	
2006 - 2019	1.3%	1.5%	-0.2%	8.6%	**1.8%**
2009 - 2019	1.1%	2.0%	1.9%	8.3%	**2.0%**
2011 - 2019	0.1%	4.7%	2.4%	13.6%	**2.8%**
2015 - 2019	-5.5%	-4.6%	-6.0%	-2.9%	**-4.9%**
Average	**-0.8%**	**0.9%**	**-0.5%**	**6.9%**	**0.4%**
Reliability	**3.2%**	**3.9%**	**3.8%**	**7.0%**	**3.6%**

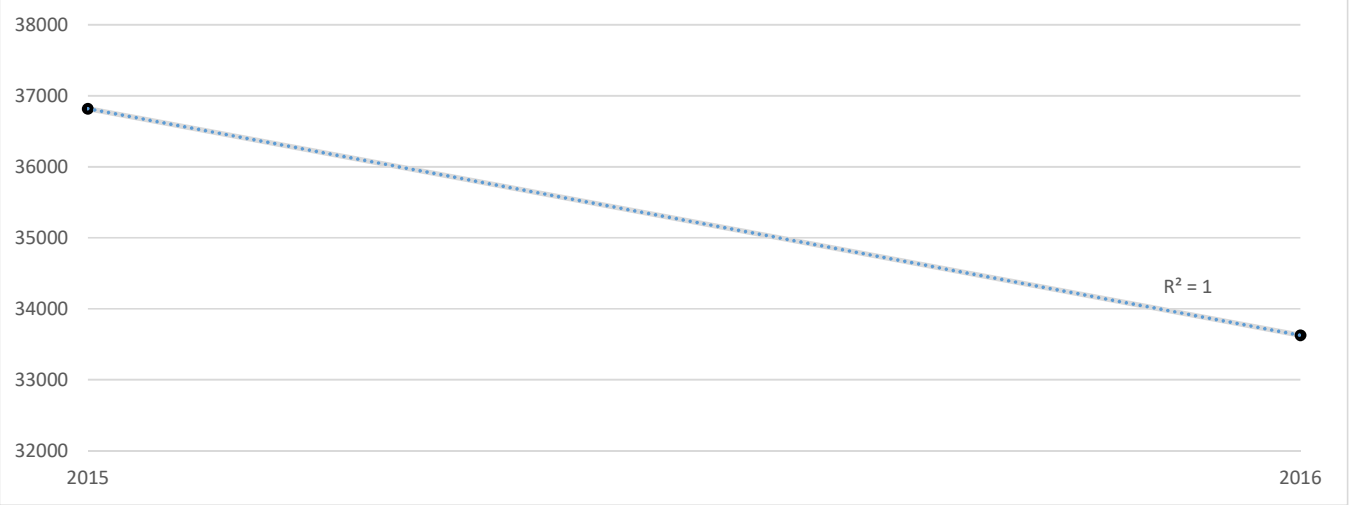


Linear Regression	
Year	2026
Projected Volume	52652
Linear Growth Rate	**4.05%**
Exponential Growth Rate	**3.63%**

Navaho @ Woodroffe_AADT

Year	Approach AADT Volume				Total
	Northbound	Southbound	Eastbound	Westbound	
2015	16437	14622	206	5554	**36819**
2016	15644	13155	198	4630	**33627**

Range	Approach Exponential Growth Rates				Exponential Growth Rates
	Northbound	Southbound	Eastbound	Westbound	
2015 - 2016	-4.8%	-10.0%	-3.9%	-16.6%	**-8.7%**
Average	**-4.8%**	**-10.0%**	**-3.9%**	**-16.6%**	**-8.7%**
Reliability	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

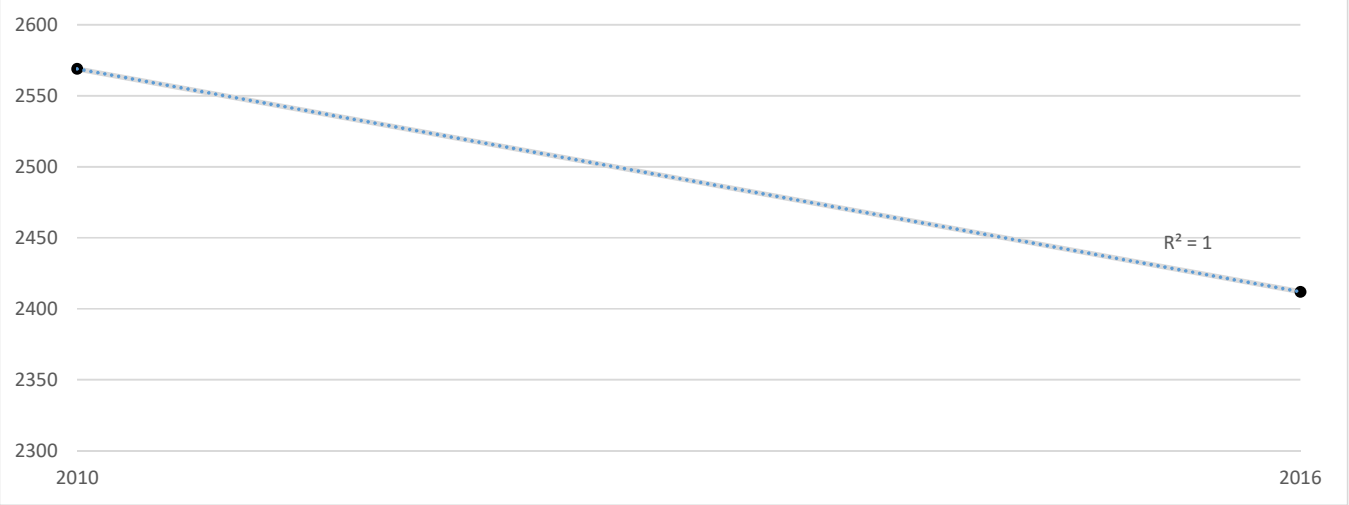


Linear Regression	
Year	2026
Projected Volume	1707
Linear Growth Rate	**-9.49%**
Exponential Growth Rate	**-25.77%**

Baseline @ Navaho_AM Pk

Year	Approach AM Peak Volume				Total
	Northbound	Southbound	Eastbound	Westbound	
2010	292	139	1288	850	**2569**
2016	316	138	1128	830	**2412**

Range	Approach Exponential Growth Rates				Exponential Growth Rates
	Northbound	Southbound	Eastbound	Westbound	
2010 - 2016	1.3%	-0.1%	-2.2%	-0.4%	**-1.0%**
Average	**1.3%**	**-0.1%**	**-2.2%**	**-0.4%**	**-1.0%**
Reliability	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

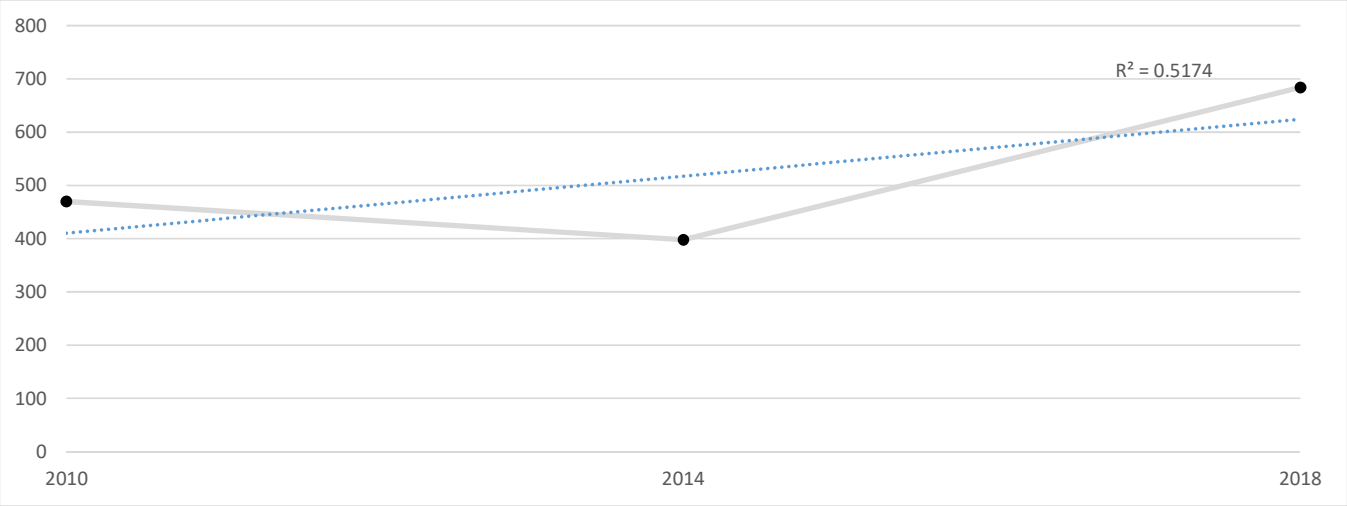


Linear Regression	
Year	2026
Projected Volume	2150
Linear Growth Rate	**-1.09%**
Exponential Growth Rate	**-1.14%**

Navaho @ E of Woodroffe_AM Pk

Year	Approach AM Peak Volume				Total
	Northbound	Southbound	Eastbound	Westbound	
2010	65	0	264	141	**470**
2014	26	0	263	109	**398**
2018	85	0	455	144	**684**

Range	Approach Exponential Growth Rates				Exponential Growth Rates
	Northbound	Southbound	Eastbound	Westbound	
2010 - 2018	3.4%	0.0%	7.0%	0.3%	**4.8%**
2014 - 2018	34.5%	0.0%	14.7%	7.2%	**14.5%**
Average	**18.9%**	**0.0%**	**10.9%**	**3.7%**	**9.6%**
Reliability	**22.0%**	**0.0%**	**5.4%**	**4.9%**	**6.9%**

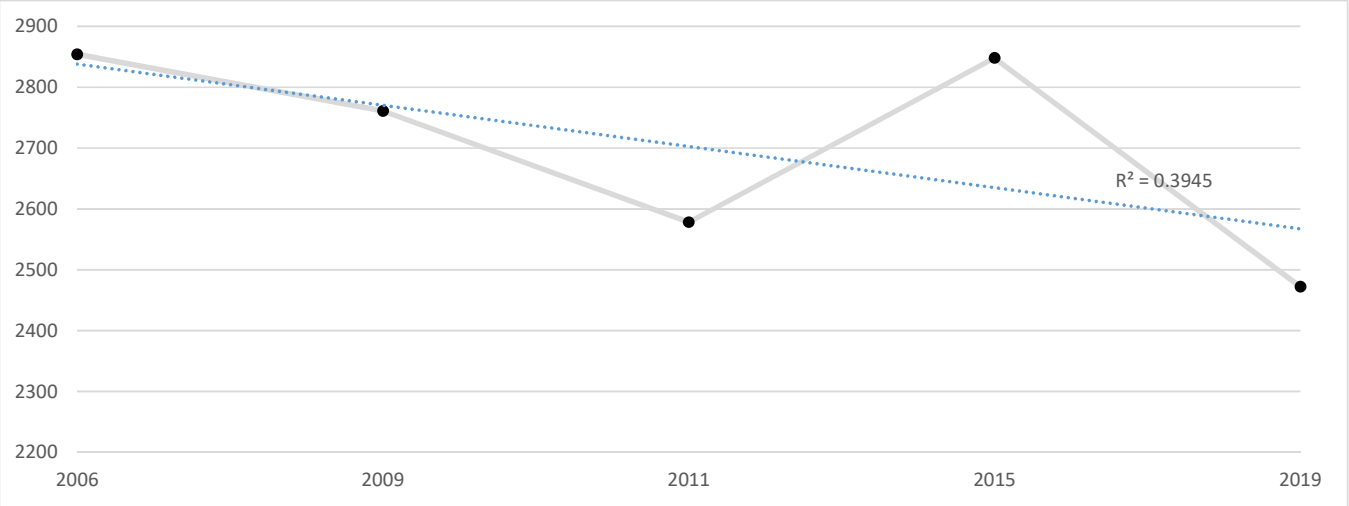


Linear Regression	
Year	2026
Projected Volume	838
Linear Growth Rate	**2.81%**
Exponential Growth Rate	**2.57%**

Woodroffe @ College_AM Pk

Year	Approach AM Peak Volume				Total
	Northbound	Southbound	Eastbound	Westbound	
2006	1871	837	45	101	**2854**
2009	1785	837	45	94	**2761**
2011	1832	633	26	87	**2578**
2015	1607	979	30	232	**2848**
2019	1379	864	34	195	**2472**

Range	Approach Exponential Growth Rates				Exponential Growth Rates
	Northbound	Southbound	Eastbound	Westbound	
2006 - 2019	-2.3%	0.2%	-2.1%	5.2%	**-1.1%**
2009 - 2019	-2.5%	0.3%	-2.8%	7.6%	**-1.1%**
2011 - 2019	-3.5%	4.0%	3.4%	10.6%	**-0.5%**
2015 - 2019	-3.8%	-3.1%	3.2%	-4.3%	**-3.5%**
Average	**-3.0%**	**0.4%**	**0.4%**	**4.8%**	**-1.6%**
Reliability	**0.7%**	**2.9%**	**3.3%**	**6.4%**	**1.3%**

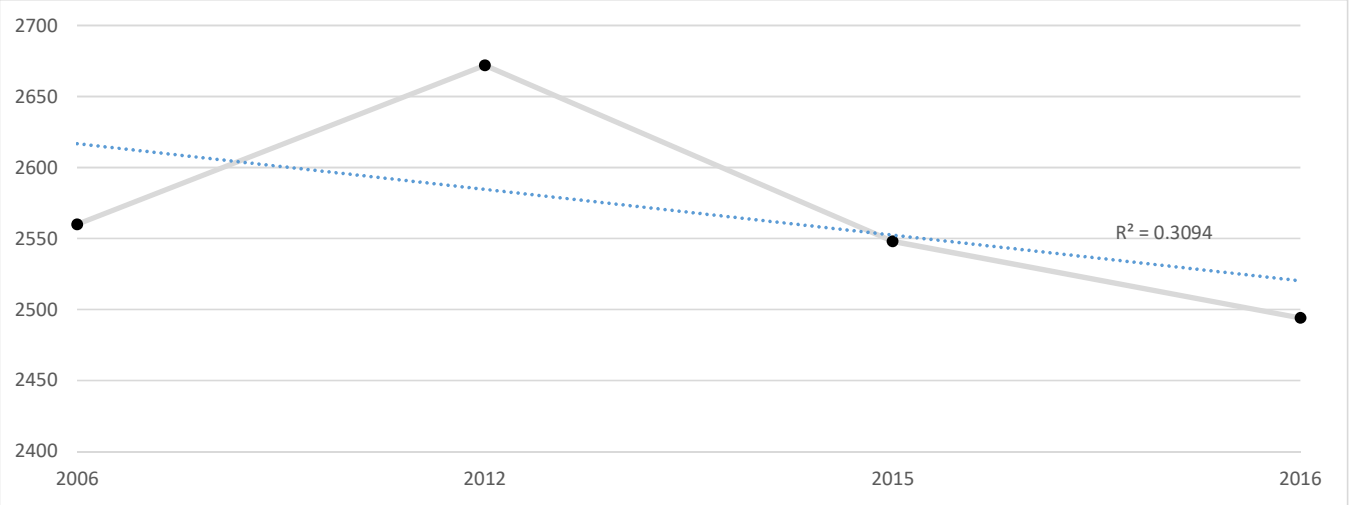


Linear Regression	
Year	2026
Projected Volume	2415
Linear Growth Rate	**-0.33%**
Exponential Growth Rate	**-0.33%**

Navaho @ Woodroffe_AM Pk

Year	Approach AM Peak Volume				Total
	Northbound	Southbound	Eastbound	Westbound	
2006	1354	1009	26	171	**2560**
2012	1587	918	16	151	**2672**
2015	1366	999	20	163	**2548**
2016	1419	838	22	215	**2494**

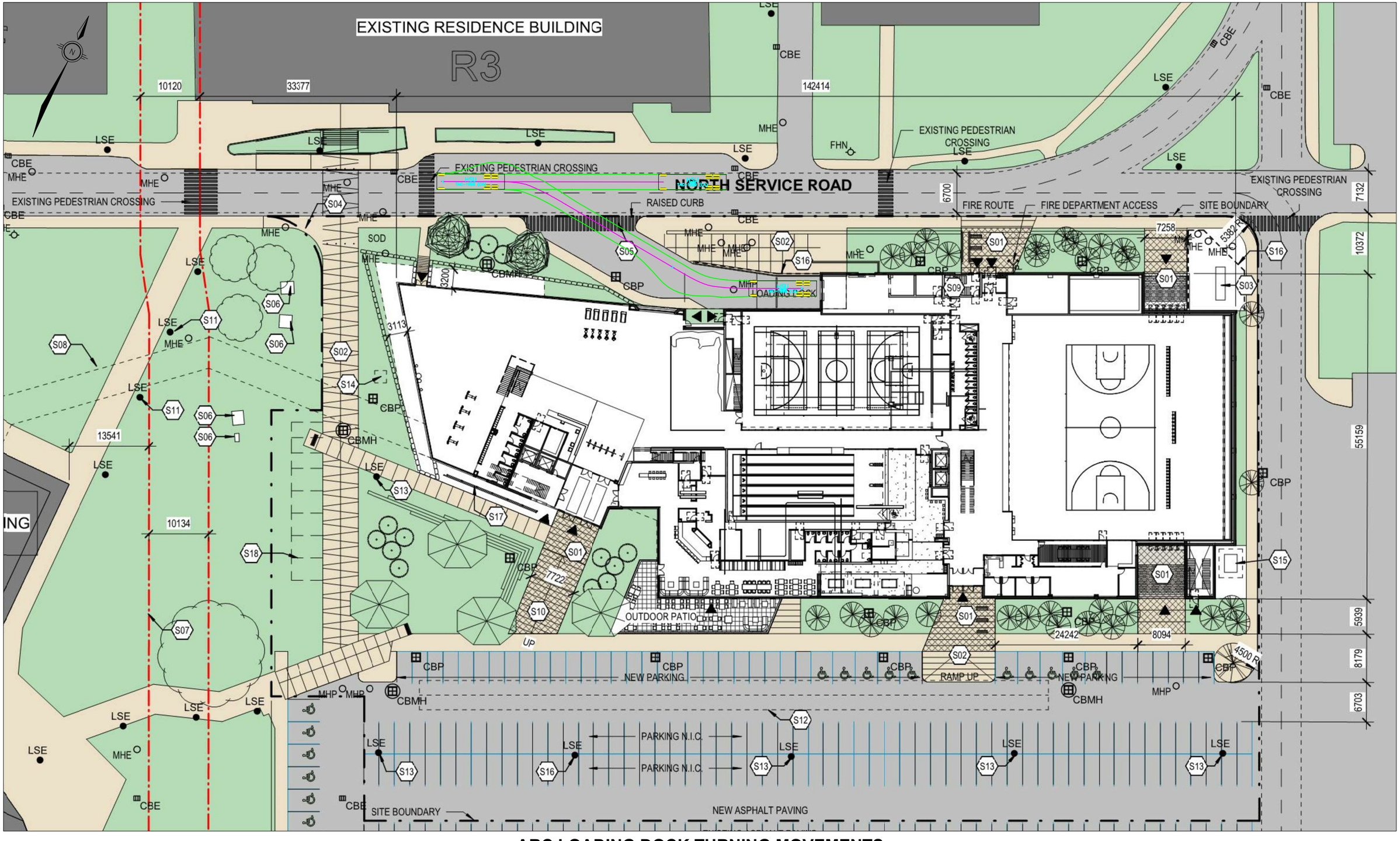
Range	Approach Exponential Growth Rates				Exponential Growth Rates
	Northbound	Southbound	Eastbound	Westbound	
2006 - 2016	0.5%	-1.8%	-1.7%	2.3%	**-0.3%**
2012 - 2016	-2.8%	-2.3%	8.3%	9.2%	**-1.7%**
2015 - 2016	3.9%	-16.1%	10.0%	31.9%	**-2.1%**
Average	**0.5%**	**-6.7%**	**5.5%**	**14.5%**	**-1.4%**
Reliability	**3.3%**	**8.1%**	**6.3%**	**15.5%**	**1.0%**



Linear Regression	
Year	2026
Projected Volume	2499
Linear Growth Rate	**0.02%**
Exponential Growth Rate	**0.02%**

APPENDIX C

VEHICLE TURNING TEMPLATES

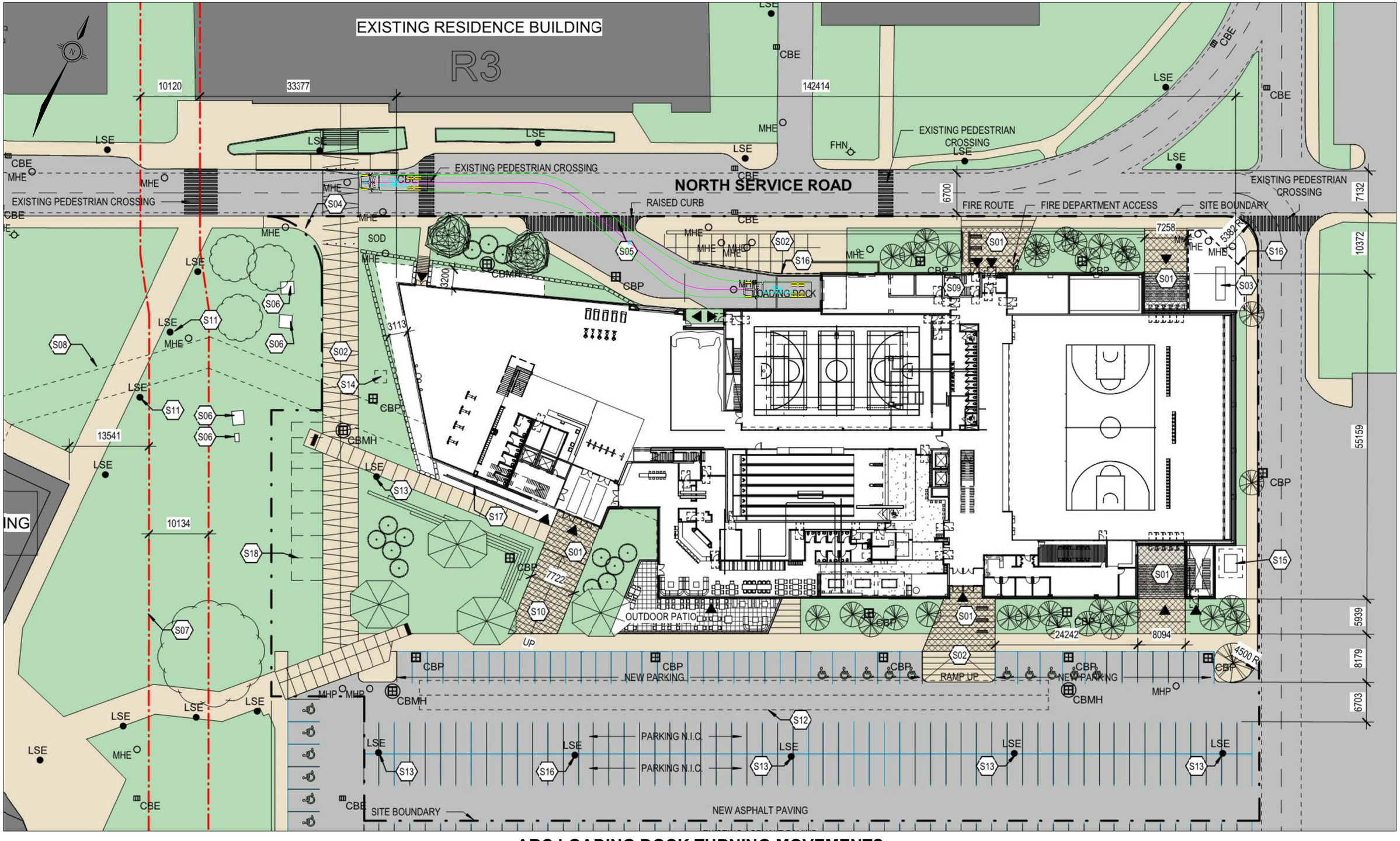


ARC LOADING DOCK TURNING MOVEMENTS

HEAVY SINGLE UNIT TRUCK VEHICLE
(WESTBOUND REVERSE ENTRY)

MORRISON HERSHFIELD

THIS DRAWING IS FOR
DISCUSSION PURPOSES ONLY



ARC LOADING DOCK TURNING MOVEMENTS

HEAVY SINGLE UNIT TRUCK VEHICLE
(WESTBOUND EXIT)

MORRISON HERSHFIELD

THIS DRAWING IS FOR
DISCUSSION PURPOSES ONLY

APPENDIX D

INTERSECTION AND SEGMENT MMLOS

	SEGMENTS	North Access Road	
	Designation/Policy Area	Within 600m of a Rapid Transit Station	
	Roadway Classification	Local	
	Approach	Eastbound	Westbound
Pedestrians	Sidewalk Width (m)	>= 2.0	1.8
	Boulevard Width (m)	0	0
	AADT	<= 3000	<= 3000
	On-Street Parking	N/A	N/A
	Operating Speed (km/h)	<= 30	<= 30
	Resultant LOS	A	A
	Overall Segment	**A**	
	Target LOS	**A**	
Cyclists	**Route Classification**	**Local Route**	
	Type of Bikeway	Mixed Traffic	Mixed Traffic
	# of Travel Lanes (2-way)	2-3	2-3
	Centre Median	-	-
	Bike Lane Width (m)	-	-
	Operating Speed (km/h)	<= 40	<= 40
	Bike Lane Blockage	-	-
	Unsig. Crossing Present?	Yes	Yes
	Median Refuge (> 1.8m)?	No	No
	# of Lanes Crossed	<= 3	<= 3
	Side-Street Op. Speed (km/h)	<= 40	<= 40
	Resultant LOS	B	B
	Overall Segment	**B**	
	Target LOS	**B**	
Transit	**Transit Facility**	**TP - Isolated Measures**	
	Facility	Mixed Traffic	Mixed Traffic
	Exposure to Congestion	Yes	Yes
	Level of Friction	Low	Low
	Incident Potential	Medium	Medium
	Exposure Criteria	Limited Parking/Dvwy Friction	Limited Parking/Dvwy Friction
	Resultant LOS	D	D
	Overall Segment	**D**	
	Target LOS	**D**	
Truck	**Truck Facility**	**Other**	
	Curb Lane Width (m)	<= 3.5	<= 3.5
	Travel Lanes (2-way)	2	2
	Resultant LOS	C	C
	Overall Segment	**C**	
	Target LOS	**No Target**	

	INTERSECTIONS	Navaho Drive / North Access Road			
	Designation/Policy Area	Within 600m of a Rapid Transit Station			
	Roadway Classification	Collector			
	Approach	Northbound	Southbound	Eastbound	Westbound
Pedestrians	Total travel lanes crossed	6	-	6	5
	Centre Median (>2.4m)	No	-	Yes	No
	Left-Turn Conflict	Perm.	-	Perm.	None/Prohibited
	Right-Turn Conflict	Perm./Yield	-	None	Perm./Yield
	RTOR	Perm.	-	Perm.	Prohibited
	Leading Ped Interval	No	-	No	No
	Right-Turn Channel	No Right-Turn Channel	-	No Right-Turn Channel	No Right-Turn
	Right-Turn Corner Radius	> 5m to 10m	-	No Right-Turn	> 5m to 10m
	Crosswalk Treatment	Textured/Coloured Pavement	-	Textured/Coloured Pavement	Textured/Coloured Pavement
	PETSI Score	24	-	39	56
	PETSI LOS	F	-	E	D
	Cycle Length (s)	65			
	Directional Split (s)	38	-	27	27
	FDW + Intergreen	18.8	-	19.5	19.5
	Pedestrian Delay (s)	16	-	25	25
	Delay LOS	B	-	C	C
	Resultant LOS	F	-	E	D
	Overall Intersection	**F**			
	Target LOS	**A**			
Cyclists	**Route Classification**	**Local Route**			
	Facility	Mixed Traffic	-	Mixed Traffic	Mixed Traffic
	Right-Turn Type	Shared Lane	-	Shared Lane	Shared Lane
	Turning Bay Length (m)	<= 50	-	<= 50	<= 50
	Veh. Turning Speed (km/h)	<= 25	-	<= 25	<= 25
	Right-Turn LOS	D	-	D	D
	Left-Turn Type	Single Left	-	Single Left	Single Left
	# of Lanes Crossed	0	-	0	0
	Veh. Approach Speed (km/h)	<= 40	-	<= 40	<= 40
	Left-Turn LOS	B	-	B	B
	Resultant LOS	D	-	D	D
	Overall Intersection	**D**			
	Target LOS	**B**			
Transit	**Transit Facility**	**Rapid Transit Corridor**			
	Transit Delay (s)	-	-	<= 10	<= 10
	Resultant LOS	-	-	B	B
	Overall Intersection	**B**			
	Target LOS	**A**			
Truck	**Truck Facility**	**Other**			
	Effective Corner Radius (m)	< 10	-	< 10	< 10
	# of Receiving Lanes	1	-	1	1
	Resultant LOS	F	-	F	F
	Overall Intersection	**F**			
	Target LOS	**No Target**			

APPENDIX E

SIGNAL WARRANT ANALYSIS

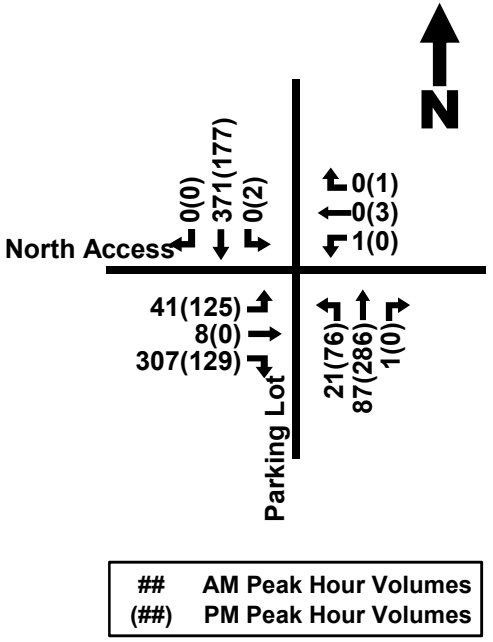
Signal Warrant Analysis (Justification 7) - North Access/Parking Lot

Major Street:	North Access
Minor Street:	Parking Lot
Comments:	

Number of Major Road Through Lanes (1-way):	1
Traffic Flow Conditions:	Restricted
Type of Intersection:	4-Leg
Pedestrians Crossing Major Road:	23

Warrant 1 - Minimum Vehicle Volume			
A - All Approaches		**Sectional %**	**Entire %**
Warrant Value:	720	**57%**	**57%**
Actual Approach Volume:	409		
B - Minor Street (Both Approaches)		**Sectional %**	
Warrant Value:	170	**150%**	
Actual Approach Volume:	255		

Warrant 2 - Delay to Cross Traffic			
A - Major Street (Both Approaches)		**Sectional %**	**Entire %**
Warrant Value:	720	**21%**	**21%**
Actual Approach Volume:	154		
B - Traffic Crossing Major Street		**Sectional %**	
Warrant Value:	75	**247%**	
Total Crossing Volume:	185		



Warrant Criteria:	**Single Warrant**	**Are signals warranted?**
Projected peak hour traffic volumes:	120%	**NO**

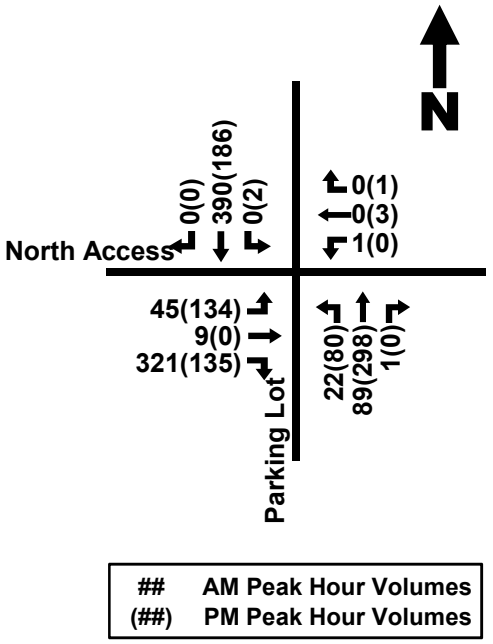
Signal Warrant Analysis (Justification 7) - North Access/Parking Lot

Major Street:	North Access
Minor Street:	Parking Lot
Comments:	

Number of Major Road Through Lanes (1-way):	1
Traffic Flow Conditions:	Restricted
Type of Intersection:	4-Leg
Pedestrians Crossing Major Road:	23

Warrant 1 - Minimum Vehicle Volume			
A - All Approaches		**Sectional %**	**Entire %**
Warrant Value:	720	**60%**	**60%**
Actual Approach Volume:	430		
B - Minor Street (Both Approaches)		**Sectional %**	
Warrant Value:	170	**158%**	
Actual Approach Volume:	268		

Warrant 2 - Delay to Cross Traffic			
A - Major Street (Both Approaches)		**Sectional %**	**Entire %**
Warrant Value:	720	**23%**	**23%**
Actual Approach Volume:	162		
B - Traffic Crossing Major Street		**Sectional %**	
Warrant Value:	75	**259%**	
Total Crossing Volume:	194		



Warrant Criteria:	**Single Warrant**	**Are signals warranted?**
Projected peak hour traffic volumes:	120%	**NO**

APPENDIX F

SYNCHRO REPORTS

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	187	266	21	123	73	12
Future Volume (vph)	187	266	21	123	73	12
Satd. Flow (prot)	1728	1469	1691	1712	1478	0
Flt Permitted			0.628		0.959	
Satd. Flow (perm)	1728	1334	1057	1712	1467	0
Satd. Flow (RTOR)		296			13	
Lane Group Flow (vph)	208	296	23	137	94	0
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases		2	6			
Detector Phase	2	2	6	6	8	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	25.8	25.8	25.8	25.8	26.5	
Total Split (s)	38.0	38.0	38.0	38.0	27.0	
Total Split (%)	58.5%	58.5%	58.5%	58.5%	41.5%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-1.8	-1.8	-1.8	-1.8	-1.5	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	48.7	48.7	48.7	48.7	12.2	
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.19	
v/c Ratio	0.16	0.28	0.03	0.11	0.33	
Control Delay	4.1	1.6	3.7	3.8	23.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.1	1.6	3.7	3.8	23.3	
LOS	A	A	A	A	C	
Approach Delay	2.6			3.8	23.3	
Approach LOS	A			A	C	
Queue Length 50th (m)	11.4	6.2	0.6	3.9	7.9	
Queue Length 95th (m)	14.1	6.6	2.6	9.5	17.6	
Internal Link Dist (m)	241.1			389.6	176.6	
Turn Bay Length (m)		35.0	45.0			
Base Capacity (vph)	1294	1073	791	1282	531	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.16	0.28	0.03	0.11	0.18	

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.33

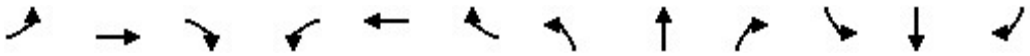
Intersection Signal Delay: 5.4	Intersection LOS: A
Intersection Capacity Utilization 40.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: North Access & Navaho

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	90	21	14	64	371	70
Future Volume (vph)	90	21	14	64	371	70
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	100	23	16	71	412	78

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total (vph)	100	23	87	412	78
Volume Left (vph)	100	0	16	0	0
Volume Right (vph)	0	23	0	0	78
Hadj (s)	0.57	-0.61	0.27	0.09	-0.58
Departure Headway (s)	6.2	5.1	5.0	4.5	3.2
Degree Utilization, x	0.17	0.03	0.12	0.51	0.07
Capacity (veh/h)	538	653	682	782	1121
Control Delay (s)	9.4	7.0	8.7	12.1	6.4
Approach Delay (s)	8.9		8.7	11.2	
Approach LOS	A		A	B	

Intersection Summary			
Delay	10.5		
Level of Service	B		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	87	8	279	1	0	0	12	38	1	0	363	44
Future Volume (vph)	87	8	279	1	0	0	12	38	1	0	363	44
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	97	9	310	1	0	0	13	42	1	0	403	49

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	416	1	56	452
Volume Left (vph)	97	1	13	0
Volume Right (vph)	310	0	1	49
Hadj (s)	-0.35	0.20	0.07	0.01
Departure Headway (s)	4.9	6.2	5.8	5.1
Degree Utilization, x	0.57	0.00	0.09	0.64
Capacity (veh/h)	696	501	551	679
Control Delay (s)	14.2	9.2	9.3	16.7
Approach Delay (s)	14.2	9.2	9.3	16.7
Approach LOS	B	A	A	C

Intersection Summary				
Delay	15.1			
Level of Service	C			
Intersection Capacity Utilization	53.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	321	22	1	83	9	48
Future Volume (vph)	321	22	1	83	9	48
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	357	24	1	92	10	53

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	381	93	63
Volume Left (vph)	0	1	10
Volume Right (vph)	24	0	53
Hadj (s)	-0.02	0.17	-0.41
Departure Headway (s)	4.1	4.6	4.5
Degree Utilization, x	0.44	0.12	0.08
Capacity (veh/h)	856	750	722
Control Delay (s)	10.3	8.2	7.9
Approach Delay (s)	10.3	8.2	7.9
Approach LOS	B	A	A

Intersection Summary			
Delay	9.7		
Level of Service	A		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

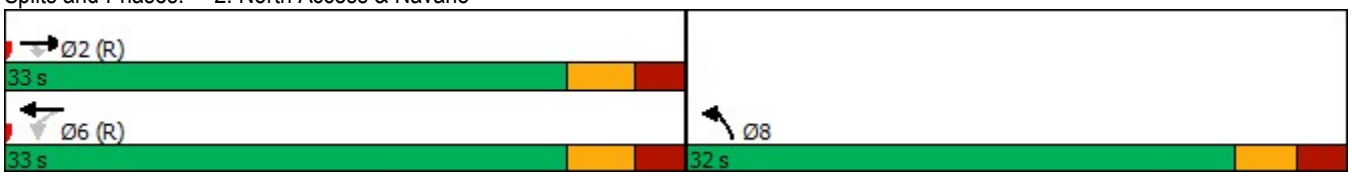
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	128	155	27	205	250	13
Future Volume (vph)	128	155	27	205	250	13
Satd. Flow (prot)	1762	1427	1691	1728	1618	0
Flt Permitted			0.666		0.955	
Satd. Flow (perm)	1762	1289	1110	1728	1561	0
Satd. Flow (RTOR)		172			5	
Lane Group Flow (vph)	142	172	30	228	292	0
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases		2	6			
Detector Phase	2	2	6	6	8	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	25.8	25.8	25.8	25.8	26.5	
Total Split (s)	33.0	33.0	33.0	33.0	32.0	
Total Split (%)	50.8%	50.8%	50.8%	50.8%	49.2%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	-1.8	-1.8	-1.8	-1.8	-1.5	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	38.6	38.6	38.6	38.6	18.4	
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.28	
v/c Ratio	0.14	0.21	0.05	0.22	0.63	
Control Delay	5.8	2.2	7.6	8.1	25.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.8	2.2	7.6	8.1	25.7	
LOS	A	A	A	A	C	
Approach Delay	3.8			8.0	25.7	
Approach LOS	A			A	C	
Queue Length 50th (m)	4.4	0.0	1.2	10.5	27.5	
Queue Length 95th (m)	19.7	14.1	4.9	24.7	41.0	
Internal Link Dist (m)	241.1			389.6	176.6	
Turn Bay Length (m)		35.0	45.0			
Base Capacity (vph)	1047	835	659	1027	699	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.21	0.05	0.22	0.42	

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 1 (2%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 12.5	Intersection LOS: B
Intersection Capacity Utilization 47.8%	ICU Level of Service A
Analysis Period (min) 15	

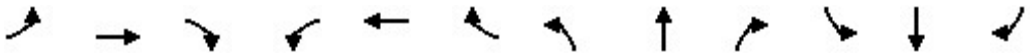
Splits and Phases: 2: North Access & Navaho



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	102	32	48	205	260	94
Future Volume (vph)	102	32	48	205	260	94
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	113	36	53	228	289	104

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total (vph)	113	36	281	289	104
Volume Left (vph)	113	0	53	0	0
Volume Right (vph)	0	36	0	0	104
Hadj (s)	0.50	-0.65	0.09	0.07	-0.60
Departure Headway (s)	6.4	5.2	4.8	4.8	3.2
Degree Utilization, x	0.20	0.05	0.38	0.38	0.09
Capacity (veh/h)	524	632	723	725	1121
Control Delay (s)	9.7	7.3	10.7	10.7	6.5
Approach Delay (s)	9.2		10.7	9.6	
Approach LOS	A		B	A	

Intersection Summary			
Delay	9.9		
Level of Service	A		
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	167	0	108	0	3	1	71	236	0	2	171	45
Future Volume (vph)	167	0	108	0	3	1	71	236	0	2	171	45
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	186	0	120	0	3	1	79	262	0	2	190	50

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	306	4	341	242
Volume Left (vph)	186	0	79	2
Volume Right (vph)	120	1	0	50
Hadj (s)	-0.06	-0.15	0.05	-0.05
Departure Headway (s)	5.4	5.9	5.2	5.3
Degree Utilization, x	0.46	0.01	0.49	0.35
Capacity (veh/h)	628	495	653	643
Control Delay (s)	12.8	8.9	13.1	11.1
Approach Delay (s)	12.8	8.9	13.1	11.1
Approach LOS	B	A	B	B

Intersection Summary				
Delay	12.4			
Level of Service	B			
Intersection Capacity Utilization	64.9%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	223	19	3	163	4	45
Future Volume (vph)	223	19	3	163	4	45
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	248	21	3	181	4	50

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	269	184	54
Volume Left (vph)	0	3	4
Volume Right (vph)	21	0	50
Hadj (s)	-0.05	0.02	-0.51
Departure Headway (s)	4.2	4.3	4.4
Degree Utilization, x	0.31	0.22	0.07
Capacity (veh/h)	846	806	747
Control Delay (s)	9.0	8.5	7.7
Approach Delay (s)	9.0	8.5	7.7
Approach LOS	A	A	A

Intersection Summary			
Delay	8.7		
Level of Service	A		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	191	271	21	125	74	12
Future Volume (vph)	191	271	21	125	74	12
Satd. Flow (prot)	1728	1469	1691	1712	1478	0
Flt Permitted			0.637		0.959	
Satd. Flow (perm)	1728	1334	1070	1712	1467	0
Satd. Flow (RTOR)		271			12	
Lane Group Flow (vph)	191	271	21	125	86	0
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases		2	6			
Detector Phase	2	2	6	6	8	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	25.8	25.8	25.8	25.8	26.5	
Total Split (s)	38.0	38.0	38.0	38.0	27.0	
Total Split (%)	58.5%	58.5%	58.5%	58.5%	41.5%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.5	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	47.5	47.5	47.5	47.5	10.5	
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.16	
v/c Ratio	0.15	0.26	0.03	0.10	0.35	
Control Delay	4.7	1.8	4.2	4.3	25.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.7	1.8	4.2	4.3	25.4	
LOS	A	A	A	A	C	
Approach Delay	3.0			4.3	25.4	
Approach LOS	A			A	C	
Queue Length 50th (m)	12.4	7.3	0.7	4.0	7.4	
Queue Length 95th (m)	14.8	7.7	2.6	9.4	17.2	
Internal Link Dist (m)	241.1			389.6	176.6	
Turn Bay Length (m)		35.0	45.0			
Base Capacity (vph)	1261	1047	781	1249	496	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.15	0.26	0.03	0.10	0.17	

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.35

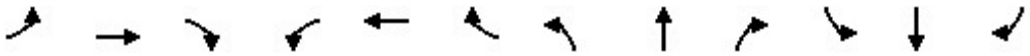
Intersection Signal Delay: 6.0	Intersection LOS: A
Intersection Capacity Utilization 42.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: North Access & Navaho

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	92	21	14	65	378	71
Future Volume (vph)	92	21	14	65	378	71
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	92	21	14	65	378	71

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total (vph)	92	21	79	378	71
Volume Left (vph)	92	0	14	0	0
Volume Right (vph)	0	21	0	0	71
Hadj (s)	0.57	-0.61	0.27	0.08	-0.58
Departure Headway (s)	6.1	4.9	4.9	4.4	3.2
Degree Utilization, x	0.16	0.03	0.11	0.46	0.06
Capacity (veh/h)	549	669	695	791	1121
Control Delay (s)	9.1	6.9	8.5	11.2	6.4
Approach Delay (s)	8.7		8.5	10.5	
Approach LOS	A		A	B	

Intersection Summary			
Delay	9.9		
Level of Service	A		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	41	8	307	1	0	0	21	87	1	0	371	44
Future Volume (vph)	41	8	307	1	0	0	21	87	1	0	371	44
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	41	8	307	1	0	0	21	87	1	0	371	44

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	356	1	109	415
Volume Left (vph)	41	1	21	0
Volume Right (vph)	307	0	1	44
Hadj (s)	-0.47	0.20	0.07	0.01
Departure Headway (s)	4.8	6.1	5.5	5.0
Degree Utilization, x	0.47	0.00	0.17	0.58
Capacity (veh/h)	705	504	602	691
Control Delay (s)	12.1	9.1	9.6	14.6
Approach Delay (s)	12.1	9.1	9.6	14.6
Approach LOS	B	A	A	B

Intersection Summary				
Delay	12.9			
Level of Service	B			
Intersection Capacity Utilization	54.5%	ICU Level of Service	A	
Analysis Period (min)	15			

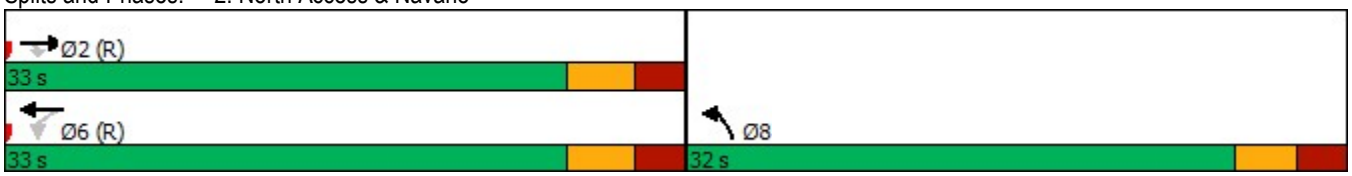
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	131	158	28	209	255	13
Future Volume (vph)	131	158	28	209	255	13
Satd. Flow (prot)	1762	1427	1691	1728	1616	0
Flt Permitted			0.673		0.955	
Satd. Flow (perm)	1762	1289	1120	1728	1559	0
Satd. Flow (RTOR)		158			5	
Lane Group Flow (vph)	131	158	28	209	268	0
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases		2	6			
Detector Phase	2	2	6	6	8	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	25.8	25.8	25.8	25.8	26.5	
Total Split (s)	33.0	33.0	33.0	33.0	32.0	
Total Split (%)	50.8%	50.8%	50.8%	50.8%	49.2%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.5	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	37.7	37.7	37.7	37.7	16.0	
Actuated g/C Ratio	0.58	0.58	0.58	0.58	0.25	
v/c Ratio	0.13	0.19	0.04	0.21	0.67	
Control Delay	6.3	2.5	8.0	8.4	29.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	6.3	2.5	8.0	8.4	29.3	
LOS	A	A	A	A	C	
Approach Delay	4.2			8.4	29.3	
Approach LOS	A			A	C	
Queue Length 50th (m)	4.2	0.0	1.2	9.9	26.3	
Queue Length 95th (m)	19.8	14.8	4.9	23.3	40.2	
Internal Link Dist (m)	241.1			389.6	176.6	
Turn Bay Length (m)		35.0	45.0			
Base Capacity (vph)	1020	813	648	1001	661	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.13	0.19	0.04	0.21	0.41	

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 1 (2%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 13.9	Intersection LOS: B
Intersection Capacity Utilization 51.5%	ICU Level of Service A
Analysis Period (min) 15	

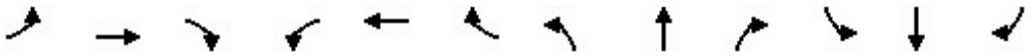
Splits and Phases: 2: North Access & Navaho



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	104	33	49	209	265	96
Future Volume (vph)	104	33	49	209	265	96
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	104	33	49	209	265	96

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total (vph)	104	33	258	265	96
Volume Left (vph)	104	0	49	0	0
Volume Right (vph)	0	33	0	0	96
Hadj (s)	0.50	-0.65	0.09	0.07	-0.60
Departure Headway (s)	6.2	5.1	4.7	4.7	3.2
Degree Utilization, x	0.18	0.05	0.34	0.35	0.09
Capacity (veh/h)	537	649	735	737	1121
Control Delay (s)	9.4	7.1	10.1	10.2	6.5
Approach Delay (s)	8.9		10.1	9.2	
Approach LOS	A		B	A	

Intersection Summary			
Delay	9.4		
Level of Service	A		
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	125	0	129	0	3	1	76	286	0	2	177	43
Future Volume (vph)	125	0	129	0	3	1	76	286	0	2	177	43
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	125	0	129	0	3	1	76	286	0	2	177	43

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	254	4	362	222
Volume Left (vph)	125	0	76	2
Volume Right (vph)	129	1	0	43
Hadj (s)	-0.16	-0.15	0.04	-0.04
Departure Headway (s)	5.2	5.7	5.0	5.1
Degree Utilization, x	0.37	0.01	0.50	0.31
Capacity (veh/h)	639	525	698	667
Control Delay (s)	11.2	8.7	12.8	10.4
Approach Delay (s)	11.2	8.7	12.8	10.4
Approach LOS	B	A	B	B

Intersection Summary				
Delay	11.7			
Level of Service	B			
Intersection Capacity Utilization	67.5%	ICU Level of Service	C	
Analysis Period (min)	15			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	200	285	23	132	78	13
Future Volume (vph)	200	285	23	132	78	13
Satd. Flow (prot)	1728	1469	1691	1712	1478	0
Flt Permitted			0.632		0.959	
Satd. Flow (perm)	1728	1334	1063	1712	1468	0
Satd. Flow (RTOR)		285			13	
Lane Group Flow (vph)	200	285	23	132	91	0
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases		2	6			
Detector Phase	2	2	6	6	8	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	25.8	25.8	25.8	25.8	26.5	
Total Split (s)	38.0	38.0	38.0	38.0	27.0	
Total Split (%)	58.5%	58.5%	58.5%	58.5%	41.5%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.5	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	47.3	47.3	47.3	47.3	10.6	
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.16	
v/c Ratio	0.16	0.27	0.03	0.11	0.36	
Control Delay	4.6	1.7	4.3	4.4	25.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.6	1.7	4.3	4.4	25.5	
LOS	A	A	A	A	C	
Approach Delay	2.9			4.4	25.5	
Approach LOS	A			A	C	
Queue Length 50th (m)	12.6	7.0	0.7	4.2	7.9	
Queue Length 95th (m)	14.8	7.2	2.8	10.1	17.7	
Internal Link Dist (m)	241.1			389.6	176.6	
Turn Bay Length (m)		35.0	45.0			
Base Capacity (vph)	1258	1049	774	1246	497	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.16	0.27	0.03	0.11	0.18	

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.36

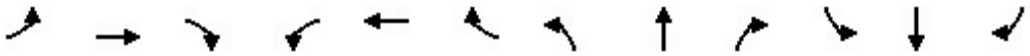
Intersection Signal Delay: 6.0	Intersection LOS: A
Intersection Capacity Utilization 44.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: North Access & Navaho

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	96	23	15	69	398	75
Future Volume (vph)	96	23	15	69	398	75
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	96	23	15	69	398	75

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total (vph)	96	23	84	398	75
Volume Left (vph)	96	0	15	0	0
Volume Right (vph)	0	23	0	0	75
Hadj (s)	0.57	-0.61	0.27	0.08	-0.58
Departure Headway (s)	6.2	5.0	5.0	4.5	3.2
Degree Utilization, x	0.17	0.03	0.12	0.49	0.07
Capacity (veh/h)	542	660	688	785	1121
Control Delay (s)	9.2	7.0	8.6	11.7	6.4
Approach Delay (s)	8.8		8.6	10.9	
Approach LOS	A		A	B	

Intersection Summary			
Delay	10.2		
Level of Service	B		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	45	9	321	1	0	0	22	89	1	0	390	46
Future Volume (vph)	45	9	321	1	0	0	22	89	1	0	390	46
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	45	9	321	1	0	0	22	89	1	0	390	46

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	375	1	112	436
Volume Left (vph)	45	1	22	0
Volume Right (vph)	321	0	1	46
Hadj (s)	-0.46	0.20	0.07	0.01
Departure Headway (s)	4.9	6.2	5.6	5.1
Degree Utilization, x	0.51	0.00	0.17	0.61
Capacity (veh/h)	694	478	588	683
Control Delay (s)	12.8	9.2	9.8	15.8
Approach Delay (s)	12.8	9.2	9.8	15.8
Approach LOS	B	A	A	C

Intersection Summary				
Delay	13.9			
Level of Service	B			
Intersection Capacity Utilization	56.6%	ICU Level of Service	B	
Analysis Period (min)	15			

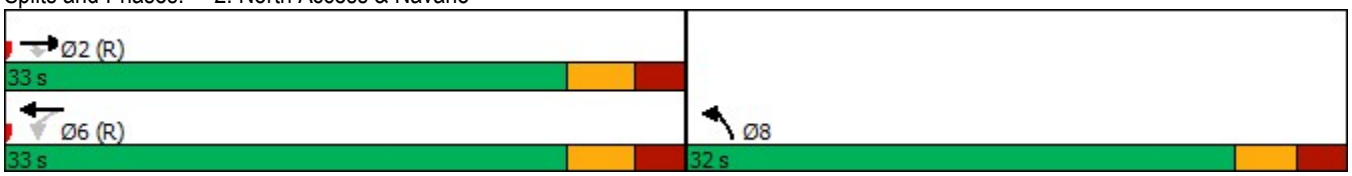
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	137	166	29	220	268	14
Future Volume (vph)	137	166	29	220	268	14
Satd. Flow (prot)	1762	1427	1691	1728	1615	0
Flt Permitted			0.669		0.955	
Satd. Flow (perm)	1762	1289	1114	1728	1558	0
Satd. Flow (RTOR)		166			5	
Lane Group Flow (vph)	137	166	29	220	282	0
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	2			6	8	
Permitted Phases		2	6			
Detector Phase	2	2	6	6	8	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	25.8	25.8	25.8	25.8	26.5	
Total Split (s)	33.0	33.0	33.0	33.0	32.0	
Total Split (%)	50.8%	50.8%	50.8%	50.8%	49.2%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.8	5.8	5.8	5.8	5.5	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	
Act Effct Green (s)	37.2	37.2	37.2	37.2	16.5	
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.25	
v/c Ratio	0.14	0.21	0.05	0.22	0.68	
Control Delay	6.4	2.5	8.3	8.8	29.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	6.4	2.5	8.3	8.8	29.3	
LOS	A	A	A	A	C	
Approach Delay	4.3			8.8	29.3	
Approach LOS	A			A	C	
Queue Length 50th (m)	4.5	0.0	1.3	10.7	27.6	
Queue Length 95th (m)	20.8	15.5	5.1	25.1	41.8	
Internal Link Dist (m)	241.1			389.6	176.6	
Turn Bay Length (m)		35.0	45.0			
Base Capacity (vph)	1007	808	636	987	661	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.21	0.05	0.22	0.43	

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 1 (2%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 52.4%	ICU Level of Service A
Analysis Period (min) 15	

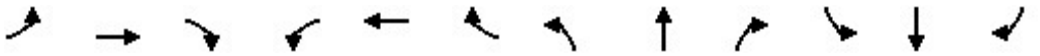
Splits and Phases: 2: North Access & Navaho



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	109	34	51	220	279	101
Future Volume (vph)	109	34	51	220	279	101
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	109	34	51	220	279	101

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total (vph)	109	34	271	279	101
Volume Left (vph)	109	0	51	0	0
Volume Right (vph)	0	34	0	0	101
Hadj (s)	0.50	-0.65	0.09	0.07	-0.60
Departure Headway (s)	6.3	5.2	4.8	4.7	3.2
Degree Utilization, x	0.19	0.05	0.36	0.37	0.09
Capacity (veh/h)	531	639	728	730	1121
Control Delay (s)	9.6	7.2	10.4	10.5	6.5
Approach Delay (s)	9.0		10.4	9.4	
Approach LOS	A		B	A	

Intersection Summary			
Delay	9.7		
Level of Service	A		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	134	0	135	0	3	1	80	298	0	2	186	45
Future Volume (vph)	134	0	135	0	3	1	80	298	0	2	186	45
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	134	0	135	0	3	1	80	298	0	2	186	45

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	269	4	378	233
Volume Left (vph)	134	0	80	2
Volume Right (vph)	135	1	0	45
Hadj (s)	-0.16	-0.15	0.04	-0.04
Departure Headway (s)	5.3	5.8	5.1	5.2
Degree Utilization, x	0.40	0.01	0.53	0.33
Capacity (veh/h)	629	499	678	655
Control Delay (s)	11.7	8.9	13.6	10.7
Approach Delay (s)	11.7	8.9	13.6	10.7
Approach LOS	B	A	B	B

Intersection Summary				
Delay	12.3			
Level of Service	B			
Intersection Capacity Utilization	69.9%	ICU Level of Service	C	
Analysis Period (min)	15			