UPDATED TRANSPORTATION TECHNICAL REPORT

for

Fircrest School Master Development Plan
15230–15th Avenue NE, Shoreline, WA

APPLICANT:

Washington State Department of Social & Health Services

PREPARED BY:

heffron transportation inc
6544 NE 61st Street, Seattle, WA 98115
ph: (206) 523-3939 ◆ www.hefftrans.com

November 15, 2023

TABLE OF CONTENTS

FIGURES

TABLES

1. INTRODUCTION

This report presents the transportation impact analyses for Washington State Department of Social and Health Services' (DSHS) proposed Fircrest School Master Development Plan (MDP) project, which will replace some of the existing buildings on campus and entitle an undeveloped south portion of the site for future development. This report documents the existing conditions in the site vicinity, presents estimates of project-related traffic, and evaluates the anticipated impacts to the surrounding transportation system including transit, parking, safety, and pedestrian facilities. The overall scope of this analysis was developed to provide details required by the City of Shoreline for a *Traffic Impact Statement* as outlined in the City of Shoreline's *Traffic Study Guidelines*[1] and organized according to the City's *Transportation Impact Analysis Report Guidelines*.[2] The approach, scope, and study area for the analysis were coordinated with City of Shoreline traffic review staff.[3] This updated version of the report reflects additional information and revisions requested by the City of Shoreline in a comment memorandum[4] and clarified in a follow-on meeting[5] and subsequent email communications.[6]

At the time of this analysis, the COVID-19 pandemic and the changes it had on commuter behavior continued to affect traffic volumes and travel patterns throughout the region. Therefore, these analyses were prepared using a combination of baseline traffic data collected in 2018 prior to the pandemic and new data collected in January 2022. The data were adjusted to reflect normalized non-COVID conditions using standards and practices recommended by the Institute of Transportation Engineers (ITE),[7] and other industry professionals.[8]

1.1. Project Description

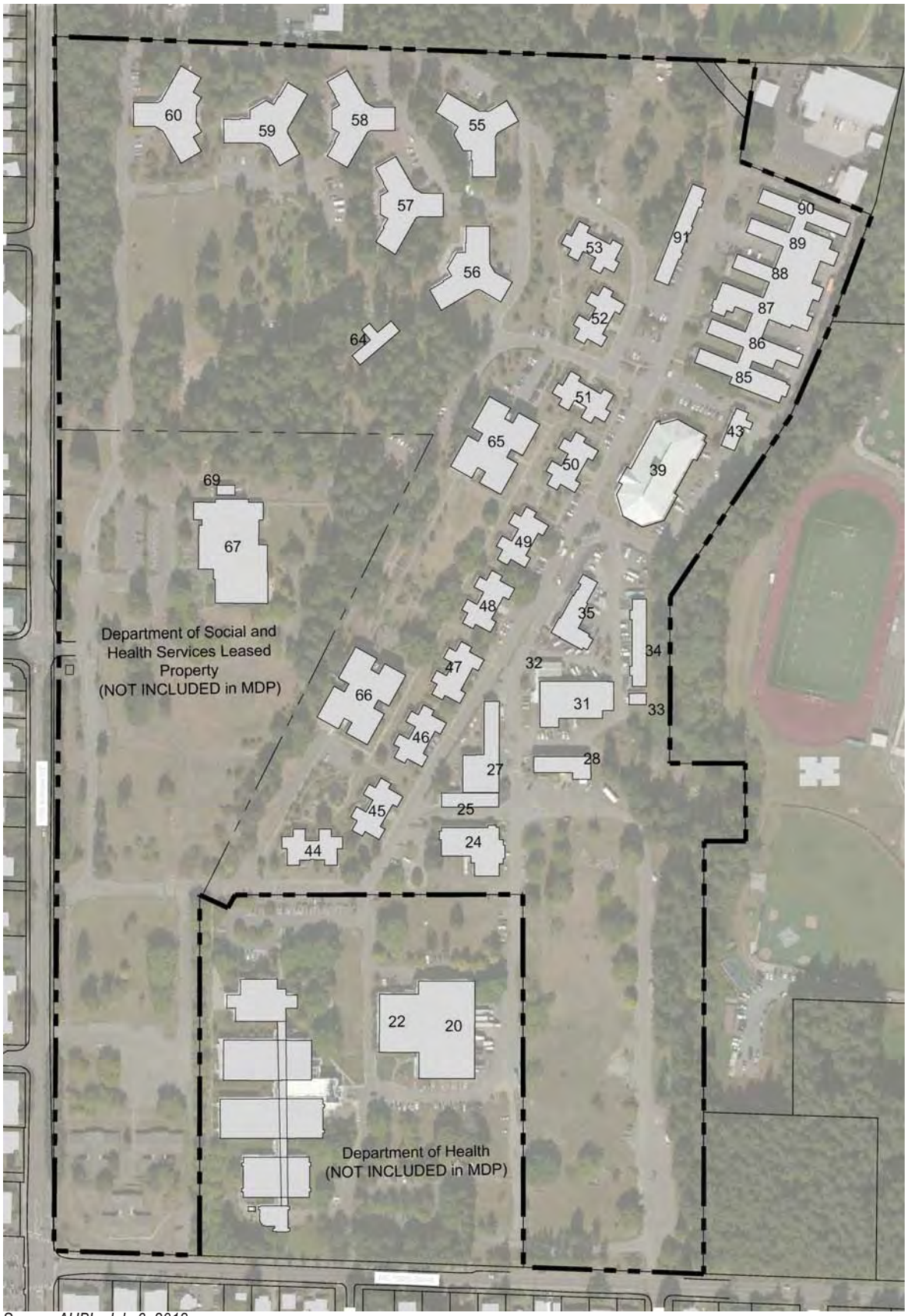
1.1.1. Existing Campus

The Fircrest School site is located at 15230–15th Avenue NE in the City of Shoreline. The overall site is bounded on the west by 15th Avenue NE, on the north and northeast by Hamlin Park, on the east and southeast by Shorecrest High School and South Woods Park, and on the south by NE 150th Street. It is designated as an Institution/Campus in the City's Comprehensive Plan on land zoned C (Campus).[9] A rectangular area in the southeast portion of the site is noted as a Shoreline Park (the Eastside Off-Leash Area). The MDP does not propose changes to land use zoning or comprehensive designations; however, it would establish all of the permitted uses for the campus zoning based on the uses proposed in the MDP. About 12.5 acres located in the middle of the southern portion of the campus contain the Washington State Department of Health public health laboratory, which is not part of this MDP effort. Figure 1 shows the MDP area, which includes northern and eastern parts of campus; it does not consider the southwest corner of the DSHS property.

The Fircrest School MDP area currently has a total of 40 buildings (with about 429,000 square feet (sf)) on about 64.5 acres. The facility, which provides support to about 200 people with intellectual and developmental disabilities, was established in 1959 within a former Naval Hospital that later became a Tuberculosis Sanitarium.[10]

---

1 City of Shoreline, August 2018.
2 City of Shoreline, Appendix E of the 2022 Engineering Development Manual, Effective March 1, 2022.
3 Email communications, K. Dedinsky – City of Shoreline Traffic Engineer, March 2022.
4 PLN22-0190 – MDP Review 15230 15th Ave NE – Fircrest School Master Development, Cory Johnson, April 12, 2023.
5 MS Teams meeting, June 26, 2023.
6 Email communications, A. Bumgarner – City of Shoreline Traffic Engineer, June 2023.
7 ITE, *What a Transportation Professional Needs to Know About Counts and Studies during a Pandemic*, July 2020.
8 Kittelson & Associates, *Estimating Traffic Volumes Under COVID-19 Pandemic Conditions*, April 2, 2020.
9 City of Shoreline, Zoning 2021 Land Use Zoning Map, July 2, 2021.
10 DSHS website (https://www.dshs.wa.gov/dda/consumers-and-families/fircrest-residential-habilitation-center), accessed April 2022.



Source: AHBL, July 6, 2018

Fircrest School Master Plan
Traffic Impact Statement

Figure 1

Existing Fircrest School Campus

heffron transportation inc

The overall site program has three main components of care for persons with unique needs—1) Program Area Team skilled nursing facility (also known as PAT N); 2) the Adult Training Program (ATP), and 3) the residential element or Intermediate Care Facility for Individuals with Intellectual Disabilities (ICF/ID), also known as PAT A.

The PAT N facility is housed in six separate buildings, referred to as the 'Y' buildings located at the northwest portion of the site. It provides individualized health care and activities to persons with unique medical needs and has 120 skilled nursing beds. The ATP is housed in six interconnected buildings located at the northeast portion of the site. It provides individualized habilitative services to support and enhance individual skills and strengths. The PAT A residential portion of the campus consists of 10 buildings. The buildings, referred to as 'the cottages,' are located in the central/eastern portion of the site and have 24-hour supervision with medical/nursing services. The ten PAT A cottages each have 16 beds; however, they currently house 133 patients with intellectual disabilities, which is considered full capacity.

In addition to the three main program elements, the site has support buildings that consist of a commissary, steam plant, kitchen, chapel, administrative / medical offices, office, activities building, maintenance, storage, warehouse, workshop, and gatehouse buildings. An on-site laundry building was destroyed by fire in July 2017 and has not yet been replaced. Traffic and parking generation at the campus is a function of the three primary program elements and the support buildings do not independently add traffic or parking needs. Table 1 lists the existing campus buildings, functions, and total sizes. The core trip-generating components are highlighted with one vacancy noted; the separate off-leash dog area is also noted as an existing trip-generating element.

Table 1. Fircrest School – Existing Building / Use Summary

Type of Building / Function	Building #	Area (sf)
120-bed Nursing Facility ("Y" Buildings)	55, 56, 57, 58, 59, 60	65,628 sf
16-bed ICF/ID Cottage (capacity of 133 patient / residents)	44, 45, 46, 47, 48, 49, 50, 51, 52, 53	65,790 sf
Administration/Medical Offices	65	48,912 sf
Building 66 (Vacant)	66	41,046 sf
Adult Training Program	85 86, 87, 88, 89, 90	47,021 sf
Kitchen	39	21,950 sf
Commissary	24	8,000 sf
Steam Plant	28	8,256 sf
Laundry	31, 32, 33	13,354 sf
Chapel	64	3,518 sf
Activities Building	67	35,341 sf
Maintenance and Storage Buildings	25, 27, 34, 35, 43, 91	34,794 sf
Warehouse/Sheltered Workshop	20, 22	35,200 sf
Gatehouse Building	68	174 sf
Off-leash dog area		1.4 acre
Total Building Area		428,984 sf

Source: AHBL, November 2023
Current trip-generating site elements; *Vacant trip-generating site element*;

Primary vehicular access to the campus is provided from 15th Avenue NE at its signalized intersection with NE 155th Street. The site can also be accessed from two driveways on NE 150th Street—the eastern driveway opposite 20th Avenue NE provides access to the undeveloped off-leash dog park and connects to the support-function buildings at the Fircrest School campus, and the western driveway is located

opposite 17th Avenue NE and provides access to the Department of Health parcel. The western driveway from NE 150th Street also connects internally to the Fircrest School campus near the southernmost PAT A residential cottage building. Automobile parking is provided near or adjacent to most buildings throughout the campus.

1.1.2. Master Development Plan Changes

The Fircrest School MDP is being prepared by DSHS to allow for the continued maintenance and redevelopment projects on the campus. The MDP envisions a range of permitted uses including:

State-owned/operated office or laboratory;
Medical-related office or clinic;
Nursing facility;
Church, synagogue, temple;
Housing for disabled persons;
Child and adult care services;
Library;
Personal services;
Social services provider;
Recreational facility;
Research development & testing;
Light industrial;
Food storage, warehousing and distribution;
Professional office;
Parks and trails;
General retail trade, services;
School district support facility (excluding vehicle maintenance and storage);
Veterinary clinic & hospital;
Fire Station; and
Post Office.

For the purposes of this transportation impact analysis, the following elements have been assumed for the DSHS uses.

- Demolish the six existing "Y" buildings and construct a new 120-bed skilled nursing facility.
- Site and construct a new 48-bed (47,310 sf) behavioral health hospital facility.
- Demolish four of ten existing ICF/ID buildings and construct 14 new 4 bed ICF/ID cottages to provide for a total of 152 ICF/ID beds (96 existing and 56 new). Although full capacity will be maintained at 133 residents/patients, the traffic analysis evaluates conditions with 152 beds.
- Demolish the existing six ATP buildings and relocate the ATP into other existing buildings.
- Construct a new laundry building.
- Construct a new maintenance building.
- Construct a new commissary building
- Complete new internal circulation roadways.
- Expand surface parking within the site.
- Construct an addition (7,355 sf) to the existing activities building.

For the southeastern portion of the site a future commercial development is envisioned to be made-up of compatible uses and be developed by others. For this transportation analysis, it is assumed to consist of the following uses to reflect the highest (worst-case) level of trip generation.

- Medical/dental office building (85,000 sf) and a smaller general office building (28,320 sf) with a 5,000-sf daycare facility.
- The existing off-leash dog area would be removed, but publicly accessible open space is assumed within the southeast corner of the campus.

If any of the other envisioned uses are developed in the southern portion of the site instead, it is anticipated they would generate lower levels of traffic than evaluated herein. Table 2 lists the campus

buildings, functions, and total sizes considered for the proposed MDP with the core trip-generating components highlighted. The existing buildings and functions are listed for comparison. The changes are expected to be completed in phases as funding is available, but may occur over 20 years. Figure 2 shows the proposed developments site plan.

As noted in Table 1 and Table 2, Building 66 is currently vacant. This is reflected in existing traffic counts that were performed at the site driveways. Standard practice for performing SEPA analyses is to assume that this building could be re-occupied in the future without the proposed project since no building permits would be required for such re-occupancy. The additional trips associated with re-use of Building 66 are included in both the 2042-without- and with-project traffic volumes.

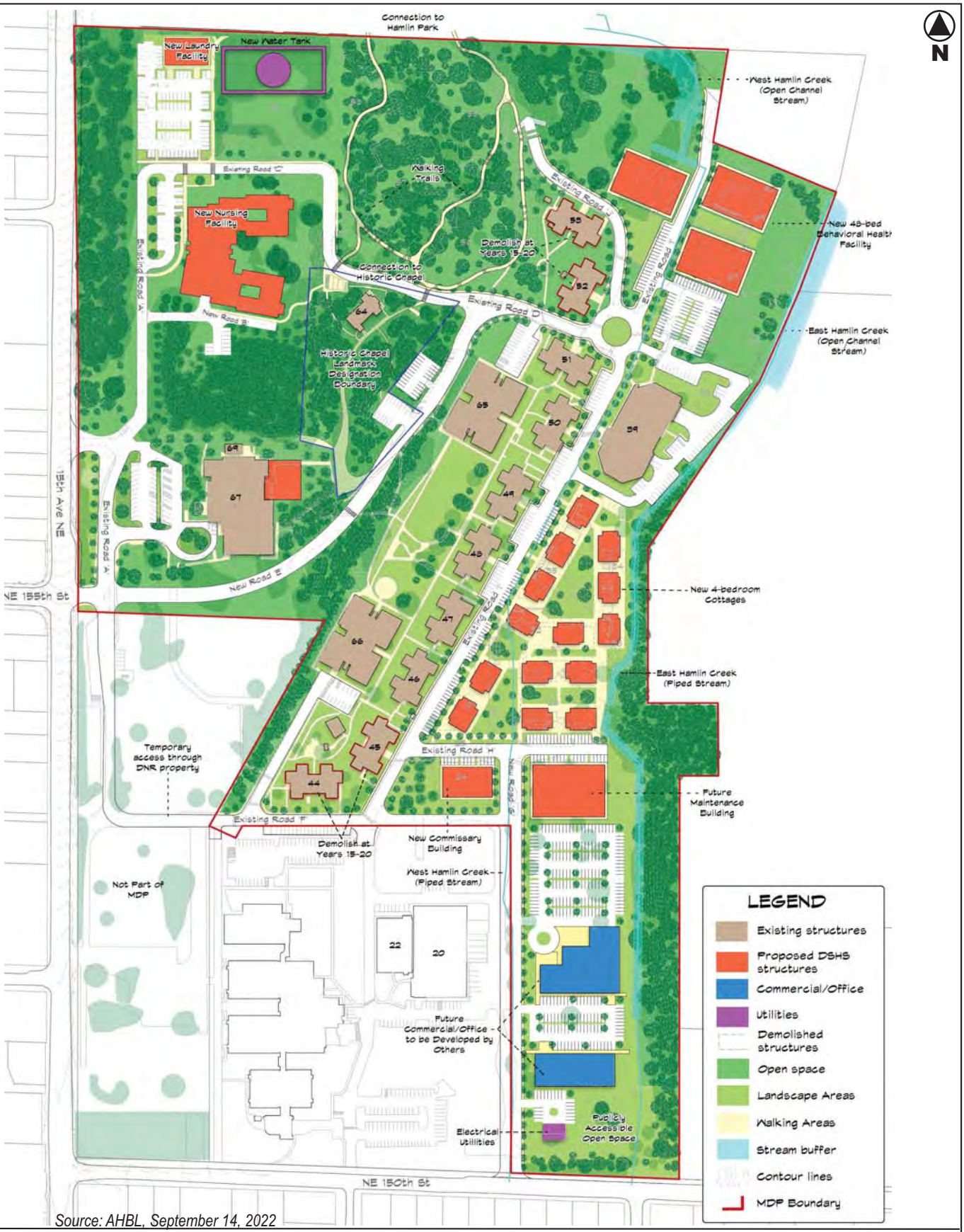
Table 2. Fircrest School MDP – Building / Function Summary

Existing Fircrest School Campus			Proposed Fircrest School MDP		
Building / Function	Building #	Area (sf)	Building / Function	Building #	Area (sf)
120-bed Nursing Facility	55, 56, 57, 58, 59, 60	65,628 sf	120-bed Nursing Facility	New	115,851 sf
16-bed ICF/ID Cottages	44, 45, 46, 47, 48, 49, 50, 51, 52, 53	65,790 sf	16-bed ICF/ID Cottages	46, 47, 48, 49, 50, 51	39,474 sf
Administration / Medical Offices	65	48,912 sf	48-bed Behavioral Health Facility	New	52,000 sf
Building 66 (Vacant)	66	41,046 sf	4-Bedroom ICF/ID Cottages – 14 buildings	New	49,000 sf
Adult Training Program	85 86, 87, 88, 89, 90	47,021 sf	Administration / Medical Offices	65	48,912 sf
Kitchen	39	21,950 sf	Administration Office [1]	66	41,046 sf
Commissary	24	8,000 sf	Kitchen	39	21,950 sf
Steam Plant	28	8,256 sf	Commissary	New	8,075 sf
Laundry	31, 32, 33	13,354 sf	Chapel	64	3,518 sf
Chapel	64	3,518 sf	Activities Building	67	35,341 sf
Activities Building	67	35,341 sf	Activities Building Addition	New	7,353 sf
Maintenance and Storage Buildings	25, 27, 34, 35, 43, 91	34,794 sf	Warehouse / Sheltered Workshop	20, 22	35,200 sf
Warehouse / Sheltered Workshop	20, 22	35,200 sf	Gatehouse Building	68	174 sf
Gatehouse Building	68	174 sf	Laundry Facility	New	15,000 sf
Off-leash dog area		1.4 acre	Maintenance Facility	New	42,794 sf
			North Building – Professional Office	New	85,000 sf
			South Building – Professional Office [2]	New	28,320 sf
Total Building Area		428,984 sf			625,933 sf

Source: AHBL, November 2023

Current trip-generating site elements; *Vacant trip-generating site element*

1. *Although DSHS does not currently have plans to re-use this building, this analysis assumes it could be re-occupied as office space.*
2. *Analysis assumes 5,000-sf daycare facility would be located in this building.*



Source: AHBL, September 14, 2022

Fircrest School Master Plan
Traffic Impact Statement

Figure 2

Proposed Site Plan

heffron transportation inc

1.2. Project Location and Study Area

As stated previously, the site is located at 15230–15th Avenue NE in the City of Shoreline. Vehicular access to the site would occur from two locations—the primary main campus access would remain from the existing signalized access driveway on 15th Avenue NE opposite NE 155th Street. The new development at the southeast corner would be accessed from a new driveway on NE 150th Street located about 290 feet west of 20th Avenue NE. The eastern most driveway on NE 150th Street would be removed; the western access located opposite 17th Avenue NE and providing access to the Department of Health parcel would remain but would no longer connect internally to the Fircrest Campus. An existing gated access on 15th Avenue NE about 350 feet north of NE 155th Street is planned to be retained, but remain gated with access limited to emergency and/or maintenance vehicles.

The City of Shoreline's *Traffic Study Guidelines* indicate that a development of the size and scale proposed (estimated to generate between 100 and 500 peak hour trips), is required to evaluate site access points and nearby intersections. Based on scope coordination with the City of Shoreline Traffic Engineer,[11] the following off-site study-area intersections were selected for review in addition to site access. Figure 3 shows the project site location and vicinity street system.

Signalized Intersection

1. NE 155th Street / 5th Avenue NE
2. NE 155th Street / 15th Avenue NE
3. NE 150th Street / 15th Avenue NE

Unsignalized Intersections

4. NE 150th Street / 25th Avenue NE
5. NE 150th St / Fircrest School Access / 20th Ave NE

[11] Email communication, K. Dedinsky, March 23, 2022.

Fircrest School Master Plan
Traffic Impact Statement

Figure 3

Site Location and Vicinity

heffron transportation inc

1.3. Summary of Findings

The following summarizes the findings of the transportation analysis:

- The changes in program envisioned by MDP are estimated to generate net increases of up to 3,710 daily trips; 383 AM peak hour trips, and 498 PM peak hour trips.

- New traffic generated by MDP development would add delay to study-area intersections during the AM and PM peak hours. All of the signalized study-area intersections are projected to operate at LOS E or better with the proposed project. However, the all-way-stop-controlled NE 150th Street / 25th Avenue NE intersection is forecast to degrade to LOS F by 2042 without the project, and would be exacerbated by additional project traffic if no changes to traffic control are made.

- The site access driveway on NE 150th Street is forecast to operate at LOS A overall with all movements operating at LOS C or better.

- The MDP proposes 812 parking spaces allocated throughout the campus (an increase of 271 spaces compared to existing conditions). The planned supply is expected to exceed the estimated parking demand for the campus which is estimated at 746 vehicles. Parking supply for the individual masterplan elements would be determined at the time of permit application, and the number of spaces needed will depend on the intended building program.

1.4. Summary of Recommended Mitigation

The following measures have been incorporated into the project proposal and/or are recommended to minimize the traffic and parking impacts associated with the Fircrest School MDP.

A. **Construction Transportation Management Plan (CTMP)** – DSHS should require the selected contractor to develop a CTMP. The elements of the CTMP are described in detail in Section 4.

B. **Travel Demand Management Plan (TDMP)** – A TDMP is a standard requirement for MDPs in the City of Shoreline. The TDMP for the Fircrest Campus would evolve as the individual elements are implemented and as owner/operators are identified.

C. **Contribute to cost of improvements (e.g., signalization or conversion to roundabout) at NE 150th Street / 25th Avenue NE** – It would also be appropriate for the project to contribute a proportionate share (estimated at between 2.7% and 3.4%) toward the costs of operational improvements (such as signalization or conversion to roundabout) to mitigate its impacts, if the improvement is not incorporated into the City's Transportation Impact Fee system.

D. **Signal optimization for NE 155th Street / 15th Avenue NE intersection** – It may be desirable to implement operational changes at this intersection. If requested by the City, the project could contribute a proportionate share (estimated at up to 11%) toward the costs of the signal optimization and channelization re-striping improvements, if these improvements are not incorporated into the City's Transportation Impact Fee system.

E. **Parking analysis at time of development permitting** – Parking supply for each individual MDP element would be determined at the time of permit application, and the number of spaces needed will depend on the intended building program. It is expected that sufficient supply would be provided to meet project parking demand. If future demand is estimated to exceed the supply, then the proponent should be required to perform further studies to determine if parking mitigation (e.g., share parking or trip reduction strategies) would be needed.

In addition to the recommended measures above, the City of Shoreline collects Transportation Impact Fees (TIFs) from applicants seeking building permits for either new developments or changes of use. Based on the above, the potential TIF for all contemplated MDP uses could range from about $3,342,000 ($490,600 for DSHS Program elements and $2,851,400 for other commercial elements) to $4,144,500 ($857,200 for DSHS Program elements and $3,287,300 for other commercial elements). It is noted that TIFs are collected at the time of building permit issuance and at the rates in place at that time.

2. BACKGROUND CONDITIONS

This section of the report presents the existing and future conditions without the proposed Fircrest School MDP. The impacts of the proposed project were evaluated against these base conditions. DSHS expects that the MDP project elements may be completed over the next 20 years; therefore, year 2042 was selected as the future horizon year for this analysis. The following sections describe the existing roadway network, traffic volumes, traffic operations (in terms of levels of service), traffic safety, transit facilities, and pedestrian/bicycle (non-motorized) facilities.

2.1. Roadway Network

The project site is located on the east side of 15th Avenue NE between about NE 160th and NE 150th Streets. The primary roadways that serve the site and its vicinity are 15th Avenue NE, NE 155th Street, and NE 150th Street. The following provides a description of the study area roadways[12].

15th Avenue NE is a north-south Principal Arterial connecting the south City limit at NE 145th Street to the north City limit at NE 205th Street. Within the study area, the roadway has two travel lanes (one in each direction) plus a center, two-way, left-turn lane and bicycle lanes on both sides. It has curbs on both sides and sidewalk along the west side. The posted speed limit is 35 miles per hour (mph). Its intersections at NE 150th, NE 155th, NE 160th, and NE 165th Street are signalized.

NE 150th Street is an east-west roadway designated as a Collector Arterial near the site (from 15th to 25th Avenue NE). East of 25th Avenue NE, it is a Local Secondary Street terminating at 28th Avenue NE. Adjacent to the site, it has one lane in each direction with curb and walkway (concrete and asphalt) on the north side and bicycle lanes on both sides. The posted speed limit is 30 mph. Its intersection with 15th Avenue NE is signalized; its intersection with 25th Avenue NE is all-way-stop controlled.

NE 155th Street is an east-west roadway designated as a Minor Arterial and connecting Aurora Avenue N on the west and 15th Avenue NE on the east. Near the site, the roadway has two travel lanes (one in each direction) plus a center, two-way, left-turn lane and bicycle lanes on both sides. It has curbs and sidewalks on both sides. East of 15th Avenue NE, the street becomes the main internal access road for the Fircrest School site. The posted speed limit is 30 mph. Its intersection with 15th Avenue NE and the Fircrest School access is signalized.

NE 165th Street is an east-west Collector Arterial between 5th and 15th Avenues NE. It has one travel lane in each direction, with curb and sidewalk on the north side. The posted speed limit is 25 mph. On-street parallel parking occurs along some segments on both sides. Its intersection with 15th Avenue NE is signalized. East of 15th Avenue NE, it is a dead-end local street.

25th Avenue NE is a north-south Collector Arterial that extends north from the south City limit to NE 168th Street and then continues in segments to NE 178th Street. In the site vicinity, it has one travel lane in each direction, parking east side of the street, with curb and sidewalk on both sides. The posted speed limit is 30 mph; however, there are 20 mph school zones in several locations (near Shoreline Christian School, Shorecrest High School, and Kellogg Middle School). Its intersection with NE 150th Street is all-way-stop controlled.

At the time of this report, the City of Shoreline was actively engaged in a multi-year process to update its Transportation Master Plan (TMP). The City of Shoreline's most recent available TMP, *2011 Transportation Master Plan (TMP),* was reviewed. Several planned improvements would provide designated bicycle lanes on 15th Avenue NE, NE 155th Street, and extensions of existing bicycle lanes on 15th Avenue NE. The plan also calls for the designation of a signed bicycle route along NE 160th Street

[12] City of Shoreline, Street Classification, October 2019.

north of the project site. Finally, the plan identifies the segments of NE 150th Street and 15th Avenue NE adjacent to the project site as part of the proposed pedestrian system with sidewalk improvements identified to fill in missing segments or gaps.

The City of Shoreline's *2024 to 2029 Transportation Improvement Program (TIP)*,[13] its *2023-2024 Capital Improvement Plan (CIP)* [14]and its *2023 Capital Improvement Project Map*[15] were also reviewed to determine if there are funded transportation improvements scheduled in the study area. The *TIP* and *2023 CIP Map* identify sidewalk improvements along 15th Avenue NE adjacent to the project site.

Based on review of the CIP, TIP, and other planning documents, no other specific changes are expected to affect the operational capacity of the study area roadways and intersections for the forecast year 2042 analysis conditions. Therefore, the existing roadway channelization and traffic control were assumed for all future conditions analyses.

2.2. Traffic Volumes

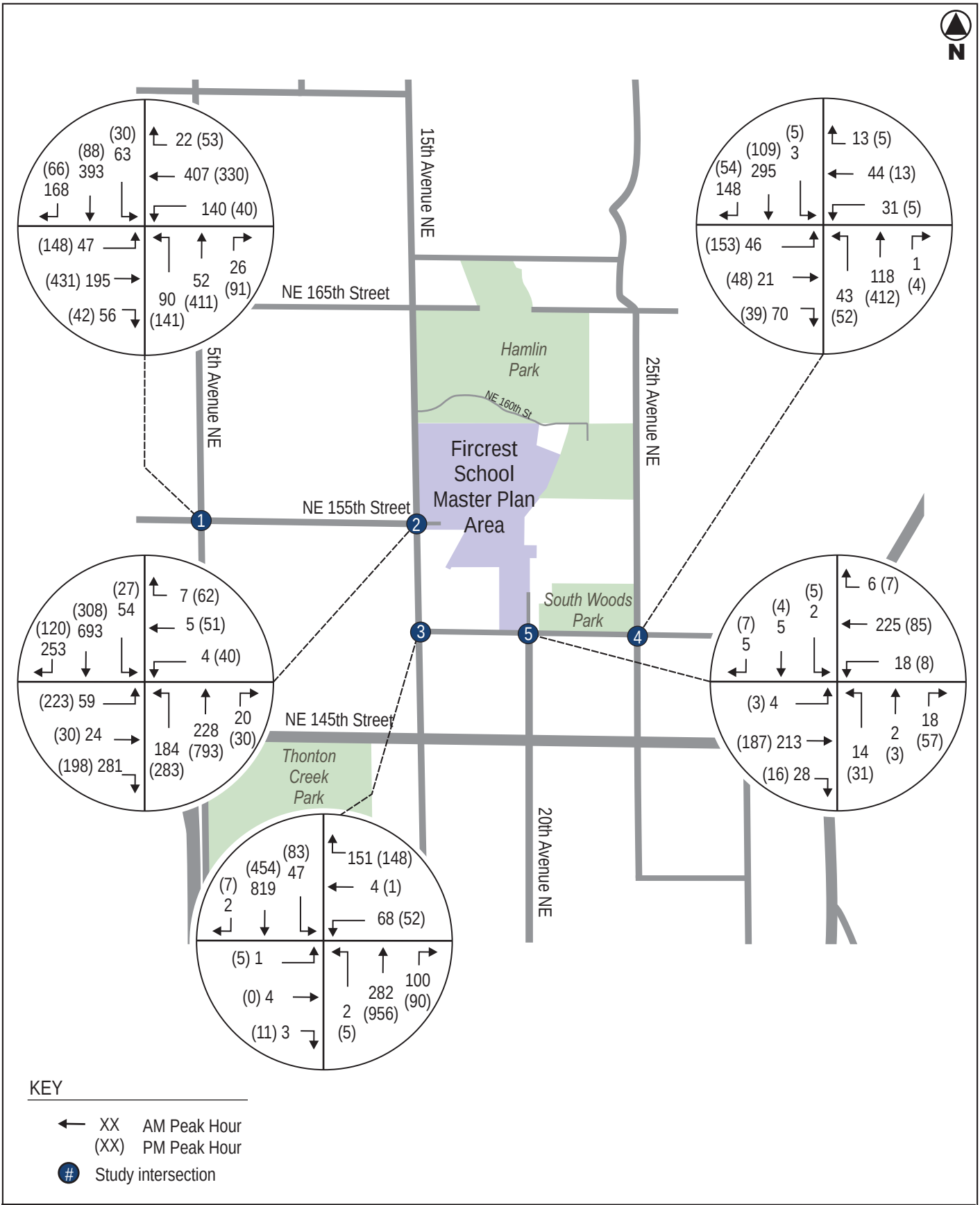
New AM and PM peak period video turning movement counts were conducted by Idax Data Solutions at all study-area intersections on January 11, 2022. In addition, the counts performed previously at four study intersections for this project on September 27, 2018 and at the two remaining study intersections for another project on May 31, 2018 (all by Idax) were compiled for review.

Based on comparisons of data from 2018 and 2022, current traffic volumes at most locations have not rebounded from the declines caused by the COVID-19 pandemic. At comparable locations, total entering PM peak hour volumes in 2022 ranged from about 47% to about 79% of the 2018 volumes; total entering AM peak hour volumes in 2022 ranged from 56% to 91% of the 2018 levels. These levels are consistent with count data throughout the region and account for the large number of employees that continue to work from home. An exception was the volumes along NE 150th Street between 15th and 25th Avenues NE where AM peak hour volumes in 2022 were higher than in 2018. The increase is likely due to the fact that the State Health Lab increased staff to perform COVID testing. Based on the above data review and with guidance from City of Shoreline Traffic Engineering staff, normalized 2022 non-COVID peak hour volumes were derived using the higher of 2018 and 2022 movement volumes at each study intersection. Figure 4 shows the estimated existing (2022) normalized peak hour traffic volumes at the study area intersections for the AM and PM peak hours, respectively.

The Fircrest School MDP elements may be completed over 20 years; therefore, the analysis was performed for year 2042 conditions. Consistent with other analyses prepared for projects in the City of Shoreline, compound annual growth rates for the arterials in the study area were derived from growth projections in the City's *2011 Transportation Master Plan*. The growth projections reflect potential increases in PM peak hour traffic between the base model year (2008) and 2030. A comparison of the growth projections indicate study-area intersections could experience compound annual increases ranging up to 3.1% with most locations expected to grow by 0.3% to 2% annually. The derived growth rates were applied to the existing traffic volumes to estimate 2042 volumes without the project. Pipeline development traffic from one project—*AAA 149th Apartments*—was provided by the City[16] and added to the forecasts. Finally, traffic that could be generated by the Fircrest School site, if existing vacant buildings were re-occupied (described later in Section 3.2), was also added to background traffic conditions. Figure 5 shows the forecast 2042-without-project traffic volumes for the AM and PM peak hours, respectively.

---

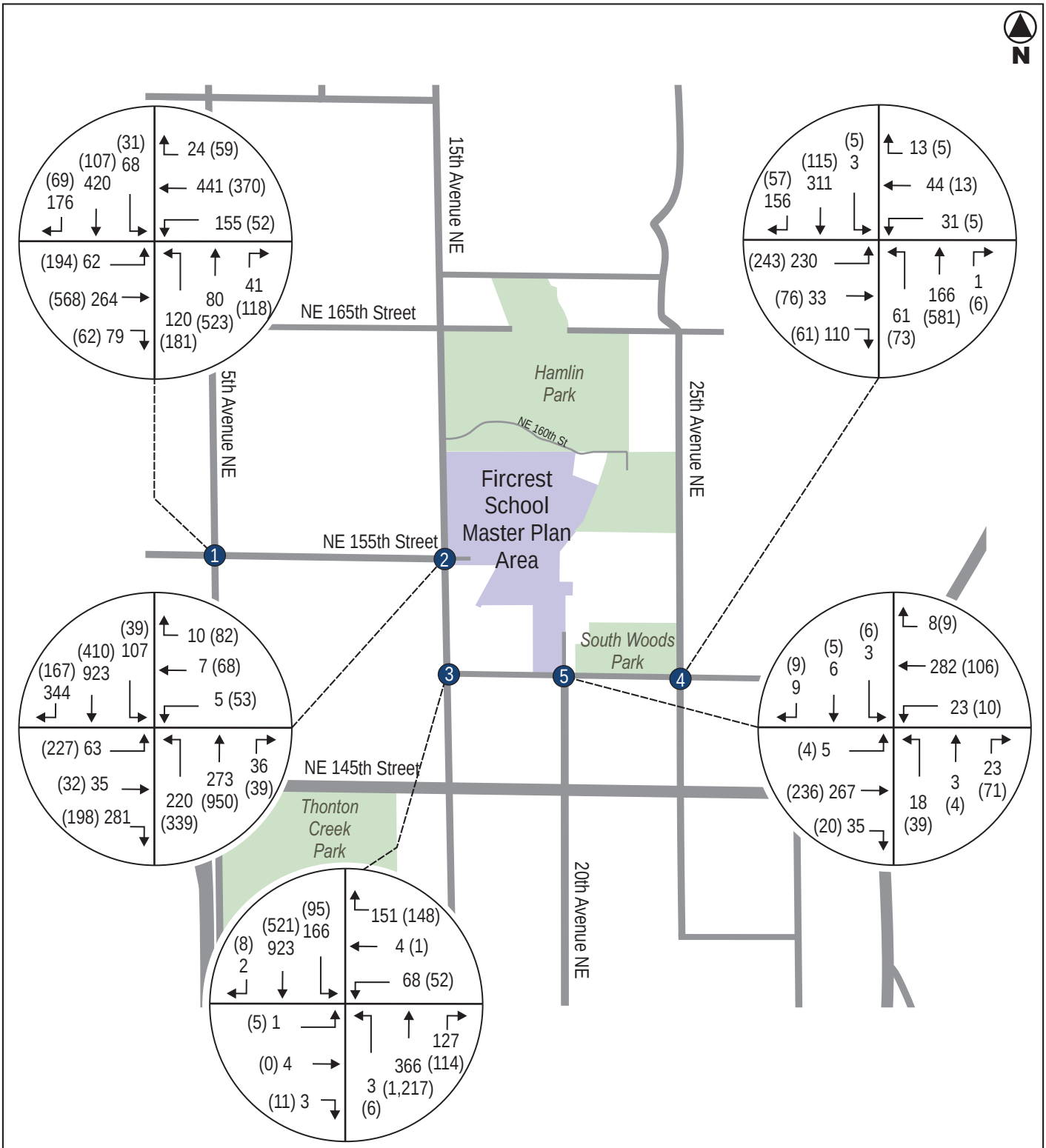
13 City of Shoreline, Adopted May 16, 2023.
14 City of Shoreline, 2023
15 City of Shoreline website, https://www.shorelinewa.gov/government/projects-initiatives/capital-improvement-project-map, accessed November 2023.
16 Email communication, K. Dedinsky, March 23, 2022.



Fircrest School Master Plan
Traffic Impact Statement

Figure 4
Existing (2022) Normalized Traffic Volumes
AM and PM Peak Hours

heffron transportation inc



Fircrest School Master Plan
Traffic Impact Statement

Figure 5
Forecast (2042) Without-Project Traffic Volumes
AM and PM Peak Hours

heffron transportation inc

2.3. Traffic Operations

Traffic operations analysis was performed for the study area intersections described previously. Traffic operations are evaluated using level of service (LOS) with six letter designations, "A" through "F." LOS A is the best and represents good traffic operations with little or no delay to motorists. LOS F is the worst and indicates poor traffic operations with long delays.

The City of Shoreline has adopted LOS D as its standard for signalized intersections on arterials and unsignalized intersecting arterials for review of traffic impacts of developments.[17] In addition, a supplemental LOS standard "*for Principal Arterials and Minor Arterials limits the volume to capacity (v/c) ratio to 0.90 or lower, provided the v/c ratio on any leg of a Principal or Minor Arterial intersection may be greater than 0.90 if the intersection operates at LOS D or better.*" These LOS standards apply throughout the city except where an alternate standard has been adopted for Principal or Minor Arterial segments where "*widening the roadway cross-section is not feasible, due to significant topographic constraints; or rechannelization and safety improvements result in acceptable levels of increased congestion in light of the improved operational safety of the roadway.*" One of the arterial segments meeting at least one of these criteria is 15th Avenue NE from N 150th Street to N 175th Street where the v/c may not exceed 1.10.

It is noted that the City of Shoreline is currently in the process of preparing a Transportation Master Plan Update to the current 2011 version. The City is in Outreach Series 3 and is soliciting community feedback on draft plans for various travel modes (auto, transit, pedestrian, and bicycle). The draft plan suggests a possible small increase in travel delay policy for automobiles along 15th Avenue NE from NE 155th to the south City limits. As a result, LOS standards may be revised prior to development of the MDP elements. The level of service definitions and thresholds are in the Appendix A.

Levels of service for the study area intersections were determined using procedures in the *Highway Capacity Manual 6th Edition*.[18] All level of service calculations were performed using the *Synchro 10.1* traffic operations analysis software, using the Synchro reporting module for the signalized intersection and the *HCM 6* reporting module for unsignalized intersections. The PM peak hour analyses reflect existing signal timings provided by the City of Shoreline; the AM peak hour analyses reflect modified signal phase splits to account for morning volume patterns. Table 3 summarizes existing and 2042-without-project levels of service. The LOS calculation sheets are provided in Appendix B.

As shown, the three signalized intersections currently operate at LOS D or better overall during AM and PM peak hours. The all-way-stop-controlled NE 150th Street / 25th Avenue NE intersection operates at LOS E in the morning and LOS C in the afternoon. The NE 150th Street / 20th Avenue NE intersection operates at LOS A overall with all movements at LOS C or better during both peak hours.

The assumed growth in background traffic is expected to add delay and cause some degradation to operations at the three signalized intersections, but all three are forecast to remain operating at LOS D or better. The growth assumed for the all-way-stop-controlled NE 150th Street / 25th Avenue NE intersection is forecast to degrade operations to LOS F during both AM and PM peak hours by 2042. Based on these levels of delay, a change to traffic control (signalization or conversion to a roundabout) may be required and could improve operations to LOS C or better. The forecast volumes and levels of delay would meet the peak hour warrant (Warrant 3) for signalization outlined in the *Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways*.[19] However, City review and monitoring would be needed to determine the intersection meets warrants for signalization or alternative traffic control measures, such as conversion to roundabout.

---

17 City of Shoreline, *Comprehensive Plan*, Adopted December 10, 2012.
18 HCM 6th Edition, Transportation Research Board, 2016.
19 US Department of Transportation, Federal Highway Administration, 2009.

Table 3. Intersection Level of Service Summary – Existing and Forecast 2042 Background

Intersection Type / Location	AM Peak Hour						PM Peak Hour					
	Existing			Without Project			Existing			Without Project		
Signalized Intersections	LOS [1]	Delay [2]	v/c [3]	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c
1. NE 155th St / 5th Ave NE	B	18.4	0.81	C	22.1	0.85	B	18.3	0.77	C	33.2	0.99
2. NE 155th St / 15th Ave NE	B	16.2	0.75	C	32.9	1.00	C	23.8	0.89	D	36.9	1.01
3. NE 150th St / 15th Ave NE	B	16.9	0.77	B	17.2	0.78	B	16.4	0.70	B	18.9	0.70
All-Way-Stop Intersection	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c
4. NE 150th St / 25th Ave NE	E	47.5		F	126.5		C	17.7		F	83.2	
Northbound Movements	C	17.7	0.52	E	39.8	0.92	B	13.1	0.76	F	137.7	1.22
Eastbound Left Turns	D	25.6	0.73	F	143.9	1.32	A	9.9	0.41	C	24.7	0.75
Westbound Left Turns	B	14.6	0.31	C	19.5	0.42	C	23.0	0.06	B	11.8	0.07
Southbound Movements	F	80.8	1.05	F	182.8	1.41	B	11.1	0.34	B	14.3	0.44
Stop Controlled Intersection	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c
5. NE 150th St / 20th Ave NE	A	2.0		A	2.6		A	3.8		A	4.3	
Northbound Movements	B	14.7	0.14	C	19.0	0.23	B	12.0	0.22	B	14.1	0.31
Eastbound Left Turns	A	7.9	0.01	A	8.1	0.01	A	7.5	0.00	A	7.6	0.00
Westbound Left Turns	A	8.2	0.02	A	8.4	0.03	A	7.8	0.01	A	8.0	0.01
Southbound Movements	C	16.7	0.09	C	22.0	0.15	B	11.5	0.06	B	12.8	0.09

Source: Heffron Transportation, Inc., April 2022.

1. *LOS = Level of service. LOS E shaded LOS F shaded;*
2. *Delay = Average delay per vehicle in seconds.*
3. *Maximum reported v/c = Volume-to-capacity ratio for lane group.*

2.4. Traffic Safety

Collision data for the study-area intersections and roadway segments adjacent to the site were obtained from the Washington State Department of Transportation (WSDOT). These data, reflecting the period between January 1, 2018 and the most recent available, December 20, 2021 (about four years), were examined to determine if there are any unusual traffic safety conditions that could impact or be impacted by the proposed project. The collision data are summarized in Table 4. As shown, all of the study-area intersections averaged fewer than three collisions per year.

The City of Shoreline's *Annual Traffic Report, 2020* was also reviewed for this analysis. The report summarizes High Collision Locations (HCLs) based on various criteria. The 2020 report made special note in its executive summary that total crashes nationwide decreased during the COVID-19 pandemic, the rate of fatal crashes increased. The report identifies nine intersections and three roadway segments city-wide that had the highest number of collisions experienced during the three-year period between 2018 and 2020. Locations with three or more pedestrian collisions or two or more bicycle collisions over a five-year period between 2016 and 2020 are also listed in the report. None of the study-area intersections were listed in the City's *Annual Traffic Report* as HCLs; a portion of the segment along 15th Avenue NE (from NE 150th Street to NE 155th Street) was identified in the report as a corridor location to continue to monitor.

Table 4. Historical Collision Summary – January 1, 2018 - December 20, 2021 (4 years)

Intersections	Number of Collisions by Type						Total (4 Yrs)	Avg / Year
	Rear-End	Side Swipe	Left Turn	Right Angle	Ped / Cycle	Other [a]		
Signalized								
NE 150th St / 15th Ave NE	3	0	1	3	1	0	8	2.0
NE 155th St / 15th Ave NE	3	0	3	2	0	0	8	2.0
NE 155th St / 5th Ave NE	0	0	2	3	0	1	6	1.5
All-Way Stop-Controlled								
NE 150th St / 25th Ave NE	1	0	0	3	0	1	5	1.3
Two-Way Stop-Controlled								
NE 150th St / 20th Ave NE / Fircrest School Access	0	0	0	0	0	0	0	0.0.
Roadway Segments	**Rear-End**	**Side Swipe**	**Left Turn**	**Right Angle**	**Ped / Cycle**	**Other [a]**	**Total (4 Yrs)**	**Avg/ Year**
NE 150th St, between 15th Ave NE and 25th Ave NE	0	0	0	1	0	1	2	0.5
15th Ave NE, between NE 158th St and NE 150th St	4	1	0	1	0	4	10	2.5

Source: WSDOT, January 2022. Reflect collision data for the 4.0-year time period between January 1, 2018 and approximately December 20, 2021. Collisions that occurred recently during the study period (within the past 30 days) may not have been entered into the WSDOT database.

a. "Other" collisions were two vehicles struck fixed objects in the roadway, two vehicles struck fixed objects off the roadway, one vehicle struck a fixed object, and one vehicle struck a parked vehicle.

There was one recorded pedestrian collision at the NE 150th Street / 15th Avenue NE intersection. The collision occurred on Wednesday, December 15, 2021 and the contributing cause was cited as the driver's failure 'to yield right-of-way to pedestrian. There was one collision involving two vehicles that resulted in a fatality (on May 31, 2020) at the NE 155th Street / 5th Avenue NE. A contributing factor listed was "disregard for traffic signs and signals."

2.5. Transit

The site is served by King County Metro Transit Routes 330 and 348. Route 348 operates along 15th Avenue NE adjacent to the site; Route 330 operates along NE 150th Street, 25th Avenue NE, and NE 155th Street. Route 330 provides weekday peak period directional service between Lake City and Shoreline Community College. Route 348 operates full-day service, 7 days per week, to and from Richmond Beach, Shoreline, Northgate, North City, Shoreline, Ballinger, and Mountlake Terrace. The headways (time between consecutive buses) range between 10 and 60 minutes. The closest stops are located adjacent to the site on 15th Avenue NE at its intersection with NE 155th Street.

Less than a mile to the west of the Fircrest School site, Sound Transit is constructing the 148th Street Transit Station as part of the Lynnwood Link Light Rail Extension project. Located just northeast of I-5 at the NE 145th Street exit, the elevated Shoreline Station will be served by Link light rail beginning in 2024 with frequent service between south Snohomish County and the University of Washington, downtown Seattle, the Eastside, Sea-Tac Airport, and beyond. It will also provide a connection to the new the Sound Transit SR 522/NE 145th Bus Rapid Transit service, which is also scheduled to begin service in 2024.

2.6. Non-Motorized Transportation Facilities

As described in *Roadway Network* section (*2.1*), there are intermittent pedestrian and bicycle facilities within the study area. Near the project site, there is sidewalk along the west side of 15th Avenue NE and bicycle lanes on both sides. However, there are only intermittent segments of sidewalk along the east side of 15th Avenue NE, but there is a narrow, foot-worn path in the grass behind a vertical curb. There is curb and sidewalk along the north side of NE 150th Street near the site and bicycle lanes on both sides. There are curbs, sidewalks, and bicycle lanes on both sides of NE 155th Street.

Crosswalks and pedestrian crossing signals are provided on all legs of the signalized study intersections; there are marked crosswalks on all legs of the unsignalized NE 150th Street / 25th Avenue NE intersections

As described previously, the City of Shoreline plans to construct sidewalk along the east side of 15th Avenue NE north of NE 150th Street.

3. TRAFFIC IMPACTS

This section of the report describes the conditions that could exist with the proposed Fircrest School MDP elements complete and occupied. The following sections describe the methodology used to determine the proposed project's impacts and the results of the analysis. As described previously, year 2042 was selected as the future horizon year for this analysis to represent conditions when all elements of the MDP could be complete and occupied.

3.1. Roadway Network

With the changes contemplated by the MDP, vehicular access to the site would occur from two locations—the primary Fircrest School campus access would remain from the existing signalized access driveway on 15th Avenue NE opposite NE 155th Street. An existing gated access on 15th Avenue NE about 350 feet north of NE 155th Street is planned to be retained, but remain gated with access limited to emergency and/or maintenance vehicles. The new development at the southeast corner would be accessed from a new driveway on NE 150th Street located about 290 feet west of 20th Avenue NE. The eastern most driveway on NE 150th Street would be removed. Frontage improvements would be constructed along the portions of campus included in the MDP and are proposed to be completed in phases with triggers based on campus improvements. No other changes to the existing off-site roadway network are proposed.

3.2. Traffic Volumes

The City requires that trip generation estimates be developed using rates and equations published by the Institute of Transportation Engineers (ITE) in its most current edition of the *Trip Generation Manual.*[20] Trip estimates for each site component were prepared based on their current and/or expected function and the best-fit uses included in the ITE manual. Trip generation models for the overall site were prepared for existing and future conditions and then compared to estimate the net change in traffic generation that could occur with the MDP.

3.2.1. Selected Trip Generation Rates and Equations

Based on the existing and proposed facilities and functions that make up the Fircrest School Campus, the ITE land use categories that were selected to estimate trip generation are described for each component.

> **ICF/ID Cottages:** Assisted Living (Land Use 254) – This land use is a "*residential setting that provides either routine general protective oversight or assistance with activities necessary for independent living to persons with mental or physical limitations. The typical resident has difficulty managing in an independent living arrangement but does not require nursing home care. Its centralized services typically include dining, housekeeping, social and physical activities, medication administration, and communal transportation. The complex commonly provides separate living quarters for each resident.*" This best matches the existing and planned future ICF/ID cottages within the campus.
>
> **PAT N Nursing Facility:** Nursing Home (Land Use 620) – This land use is described as "…*a facility whose primary function is to provide care for persons who are unable to care for themselves. Examples include rest homes, chronic care, and convalescent homes. Skilled nurses and nursing aides are present 24 hours a day at these sites. Residents often require treatment from a registered healthcare professional for ongoing medical issues. A nursing home resident is not capable of operating a vehicle. Traffic is*

[20] ITE, 11th Edition, September 2021.

entirely generated by employees, visitors, and deliveries." This best matches the existing and future PAT N nursing facility component.

Administration Offices: Single-Tenant Office Building (Land Use 715) – This land use is described as a building that "*…generally contains offices, meeting rooms, and space for file storage and data processing of a single business or company and possibly other service functions including a restaurant or cafeteria.*" This category is best for application to the existing and future Fircrest School administration office buildings within the campus.

Behavior Health Hospital: Hospital (Land Use 610) – There is no ITE category that exactly reflects the planned behavioral health hospital. The facility proposed as part of the MDP would have 48 beds with up to 400 employees. The facility would be staffed seven days per week with three shifts operating 24-hours per day. There would be limited turn-over of patients and the facility would not be open to the public with ingress and egress mainly by staff and physicians. ITE's *Hospital* land use is the most similar to the proposed facility. After review of the three possible independent variables that could be applied, guidance published by ITE in its *Trip Generation Manual* on selecting independent variables, and expected staffing and shift information provided by the applicant, peak hour rates based on gross floor area were selected. These rates are based on the largest number of studies and have a data point near the size of the proposed project. The resulting peak hour trip estimates are consistent with traffic patterns that would be expected based on the staffing, shift details, and operational expectations provided by the applicant. In contrast, the published rates based on number of beds were derived from only seven studies, with none near the proposed number for this site. Trip estimates based on number of employees were also reviewed and determined to be unreasonable; the peak hour rates based on employees resulted in trips that appeared to be too high given the same staffing and operational parameters. This traffic analysis approach has been applied and accepted recently for a behavioral health hospital project in Lacey, Washington.[21]

North Professional Office Building: Medical-Dental Office Building (LU 720) – The anticipated worst-case use, in terms of trip generation, for the larger of the two new professional office buildings (planned to be developed by others) at the southeast part of the site would be as a medical/dental office building.

South Professional Office Building: General Office Building (LU 710) and Daycare Center (Land Use 565) – The smaller of the two new professional office buildings planned (to be developed by others) at the southeast part of the site was assumed to be a general office building that also contains at 5,000-sf daycare center. The daycare center is expected to give priority to employees who work in the building, the adjacent north office building, and/or the larger Fircrest School site, similar to daycare facilities that the state built near the Capitol Campus in Olympia. Therefore, 50% of its trips were assumed to be the same as those generated by other uses on site—employees coming to the site who also bring their children to the daycare center. A 50% rate of external daycare use is likely conservative, since nearly all of the children enrolled in the planned facility would arrive in the same vehicles as the employees on the site. Even with the 50% adjustment, the number of new trips generated by this MDP element are likely overstated.

Off-Leash Dog Area: There are no published ITE rates to estimate trip generation by off-leash dog areas. Therefore, trip estimates for this existing use were derived using a rate derived by Heffron Transportation, and presented in the *Transportation Impact Analysis for Off-Leash Dog Area(s) at the Chambers Creek Properties*.[22] The weekday PM peak hour rate was developed from counts and

[21] Heffron Transportation, Inc., Olympia Behavioral Health Hospital, Universal Health Services, Inc., 2020.
[22] Heffron Transportation, Inc., November 14, 2006.

observations at three off-leash areas (Grandview, Marymoor, and Magnuson). The daily and AM peak hour rates were estimated based on these results.

The baseline rates and equations applied for each land use type are summarized in Table 5. This analysis and report were prepared to support a 20-year master planning process and the specific types and sizes of land uses could evolve in the future as the campus is re-developed, Table 5 is useful to provide context for how the MDP trip estimates were derived and to help future reviewers and the general public understand how future permit submittals might compare to the land uses and trip rates assumed herein.

As described in ITE's *Trip Generation Handbook*,[23] "*Trip Generation Manual contains no data on mode shares for baseline site trip generation. For this Handbook, a limited amount of weekday peak period (7:00-9:00 a.m., 4:00-6:00 p.m.) site trip generation mode share data were collected for baseline sites to provide a general starting point for baseline mode shares for the most common land use types. Baseline [mode share] data were collected at apartments, motels, offices, shopping centers, restaurants, a bank, and a bowling alley. The land use types were selected so the data would be transferrable to similar land uses (for example, residential apartment mode shares should be applicable to all suburban baseline apartment classifications). Tables B.1 and B.2 show the available weekday AM and PM peak period average mode shares and ranges for the baseline sites at which data were collected. There are not enough samples to derive precise percentages by mode for the land use codes for which data were collected…. Nearly half of the land use category averages in the tables are 100 percent motor vehicle.*"

Tables B.1 and B.2 in the *Trip Generation Handbook* only provides baseline mode-of-travel information for one of land uses being considered and evaluated in the MDP—General Office—and lists it with 1% transit for AM peak and 0% for PM peak. No baseline transit or non-auto data are provided for any of the other land uses. Therefore, as noted above the baseline trip generation rates and equations applied for the various site uses assumed that 99% to 100% of the trips would be by vehicular modes.

In the long-term, more of the site's employees are expected to use transit and non-automobile modes compared to the baseline suburban trip generation rates and equations. As noted previously, Sound Transit is constructing the Lynnwood Link Light Rail Extension with a new transit station located between NE 145th and NE 148th Streets, about a mile west of the Fircrest School Campus. Mode-of-travel estimates for the site's future employees were estimated based on a combination of sources. The *2021 five-year American Community Survey (ACS)* data for workers (16 years and older) in Census tract #211 (which includes the site) indicated about 10.4% commuted by transit and 2.3% walked or biked. These survey data do not account for enhancements in transit that will occur once Sound Transit's 145th Street Station is complete. In addition, the estimates considered, the City of Shoreline's *145th Street Station Subarea Plan*, which was prepared for the surrounding area north of NE 145th Street and extended to 15th Avenue NE at the southwest corner of the Fircrest Campus. The City's plan anticipates 10% of external trips to and from the subarea would be by transit and 12% would be walking and biking (Table 7-2). Unfortunately, no information was provided in the City's plan related to the methodology used to derive those factors. However, based on these expectations, the proximity of the light rail station (about one mile away), transit operating adjacent to the site, the ACS survey results, and existing or anticipated future vicinity non-motorized facilities, it is reasonable to assume some non-auto employee trips for the Fircrest Campus by 2042. The analysis assumed a 6% non-auto (transit, walk and bike) adjustment (or 45 out of 752 unadjusted PM peak trips) from the baseline suburban ITE trip generation results—which is less than 30% of the level assumed in the City's *145th Street Station Subarea Plan*. Table 6 presents trip generation estimates for the existing Fircrest Campus (No Action) and year 2042 with the MDP; the estimated net change due to the MDP is also shown. The detailed trip generation calculations and adjustments are provided in Appendix C.

[23] ITE, 3rd Edition, Sept. 2017.

Table 5. Trip Generation Rates & Equations

Land Use	ITE LU Code	Equations [a] / Rates (in / out %s)		
		Daily	AM Peak Hour	PM Peak Hour
Assisted Living	254	2.60 trips / bed *50% / 50%*	0.18 trips / bed *60% / 40%*	0.24 trips / bed *39% / 61%*
Nursing Home	620	3.06 trips / bed *50% / 50%*	0.14 trips / bed *72% / 28%*	0.14 trips / bed *33% / 67%*
Single-Tenant Office	715	13.07 trips / 1,000 sfgfa *50% / 50%*	T = 1.89(X) – 7.67 *89% / 11%*	T = 1.72(X) + 7.89 *15% / 85%*
Daycare Center	565	47.62 trips / 1,000 sfgfa *50% / 50%*	11.00 trips / 1,000 sf *53% / 47%*	11.12 trips / 1,000 sf *47% / 53%*
Hospital	610	10.77 / 1,000 sfgfa *50% / 50%*	Ln(T) = 0.60 Ln(X) + 2.52 *67% / 33%*	Ln(T) = 0.64 Ln(X) + 2.27 *35% / 65%*
General Office	710	Ln(T) = 0.87Ln(X) + 3.05 *50% / 50%*	Ln(T) = 0.86 Ln(X) + 1.16 *88% / 12%*	Ln(T) = 0.83 Ln(X) + 1.29 *17% / 83%*
Medical/ Dental Office	720	*36.00 trips / 1,000 sfgfa* *50% / 50%*	*Ln(T) = 0.90Ln(X) + 1.34* *79% / 21%*	*T = 4.07(X) - 3.17* *30% / 70%*
Off-Leash Dog Area [b]	N/A	*27.59 trips / acre* *50% / 50%*	*2.76 trips / acre* *50% / 50%*	*2.76 trips / acre* *50% / 50%*

Source: Institute of Transportation Engineers (ITE) Trip Generation, 11th Edition, September 2021 (unless otherwise noted).

a. T = number of trips, X = square feet gross floor area (sfgfa).

b. PM Peak hour rate from Transportation Impact Analysis for Off-Leash Dog Area(s) at the Chambers Creek Properties, Heffron Transportation, Inc., Nov. 2006. Daily rate estimated as ten times the PM peak rate; AM rate estimated to be the same as PM rate.

Table 6. Trip Generation Summary – Fircrest Campus: No Action and With Master Plan

Lane Uses / Sizes (assumes full occupancy)	ITE LU Code	Daily Trips	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
DSHS Fircrest School: No Action								
Nursing Home – 120 beds	620	350	12	4	16	6	10	16
Assisted Living – 160 Beds	254	390	16	11	27	14	22	36
Single-Tenant Office – 89,958 sfgfa	715	1,110	135	17	152	23	130	153
Off-Leash Dog Area – 1.4 acres	N/A	40	2	2	4	2	2	4
Total for Fully Occupied Existing Uses		1,890	165	34	199	45	164	209
DSHS Fircrest School: Proposed Master Development Plan								
Nursing Home – 120 beds	620	350	12	4	16	5	11	16
Single-Tenant Office – 89,958 sfgfa	715	1,110	135	17	152	23	130	153
Behavioral Health Hospital – 52,000 sfgfa (48 beds)	610	530	84	41	125	40	74	114
Assisted Living – 152 beds	254	370	16	10	26	13	21	34
General Office – 23,320 sfgfa	710	310	40	5	45	8	39	47
Day Care Center – 5,000 sfgfa	565	110	14	12	26	12	14	26
Medical/Dental Office – 85,000 sfgfa	720	2,880	155	41	196	97	225	322
Total for Retained and Proposed New Uses		5,660	456	130	586	198	514	712
Net Change With Master Development Plan		3,770	291	96	387	153	350	503

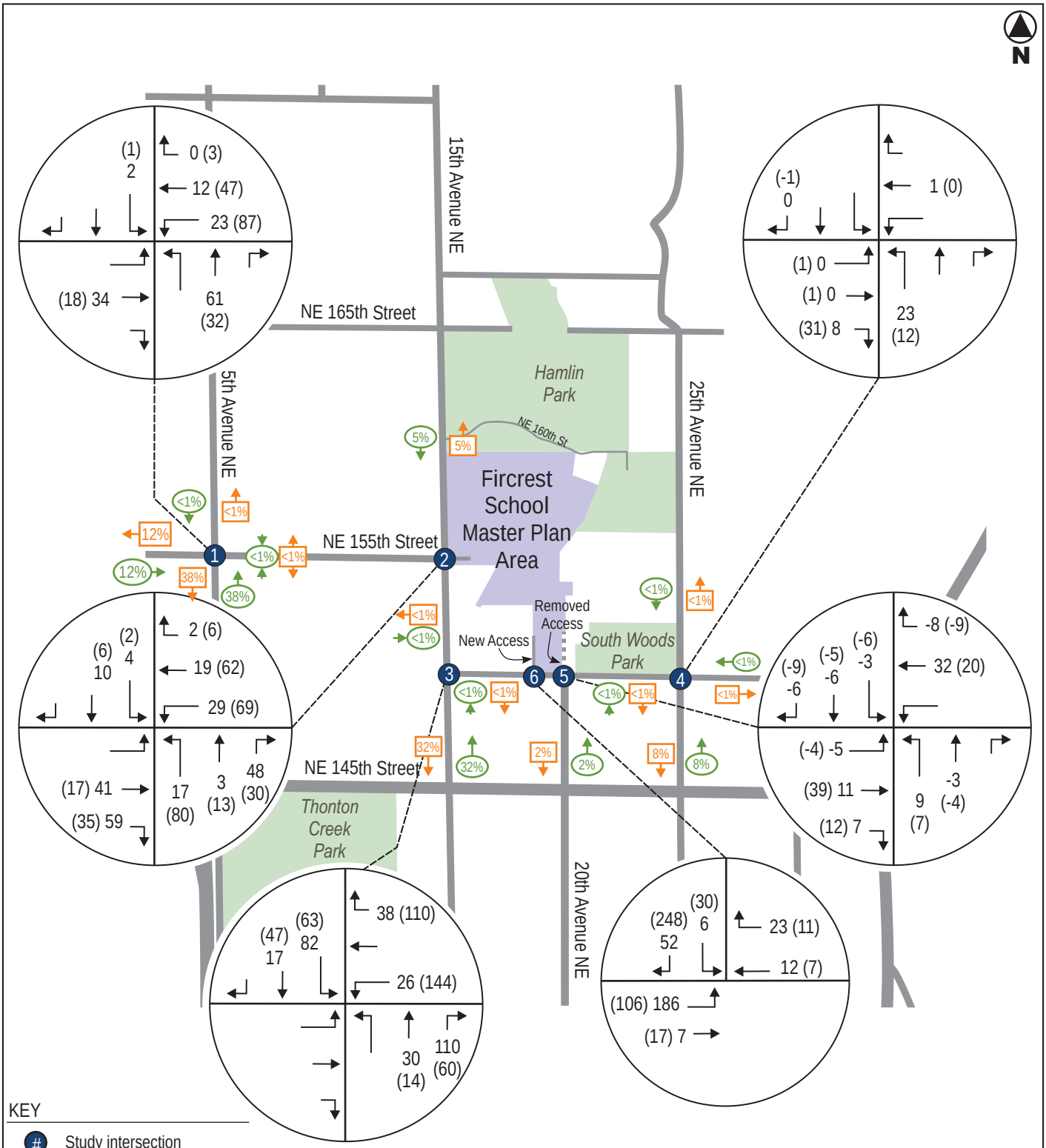
Source: Heffron Transportation, Inc. using ITE's Trip Generation Manual (11th Ed, Sept. 2021) with 6% non-auto trip reduction, Nov. 2023.

3.2.2. Trip Distribution and Assignment

Trip distribution patterns were developed based on a combination of resources including: 1) home-to-work (and vice versa) trip data from *OnTheMap*[24] for employees working in the site's Census tract; 2) *Google Maps* predictive travel-route and travel-time results; 3) traffic patterns at study-area intersections, and 4) the project's planned site access locations. The traffic estimates presented in Table 6 were assigned to the local roadway network. As noted in Section 3.1, "*The new development at the southeast corner would be accessed from a new driveway on NE 150th Street located about 290 feet west of 20th Avenue NE. The eastern most driveway on NE 150th Street would be removed."* All vehicular access to the proposed new southeastern commercial development would be only from NE 150th Street—the existing access connection through the campus to NE 155th Street would be eliminated. As a result, the project-related increase in trips on NE 150th Street is a result of both the concentration of new development that would all use that new driveway (over 113,000 sf of new professional office space, including the daycare center) and to a lesser extent the closure of the existing driveway to the east. Figure 6 shows the trip distribution patterns and net new trip assignments for AM and PM peak hours.

The AM and PM peak hour project trips were added to the forecast 2042 without-project traffic volumes for each period to represent future conditions with the Fircrest School MDP. Figure 7 shows the forecast 2042 with-project AM and PM peak hour traffic volumes.

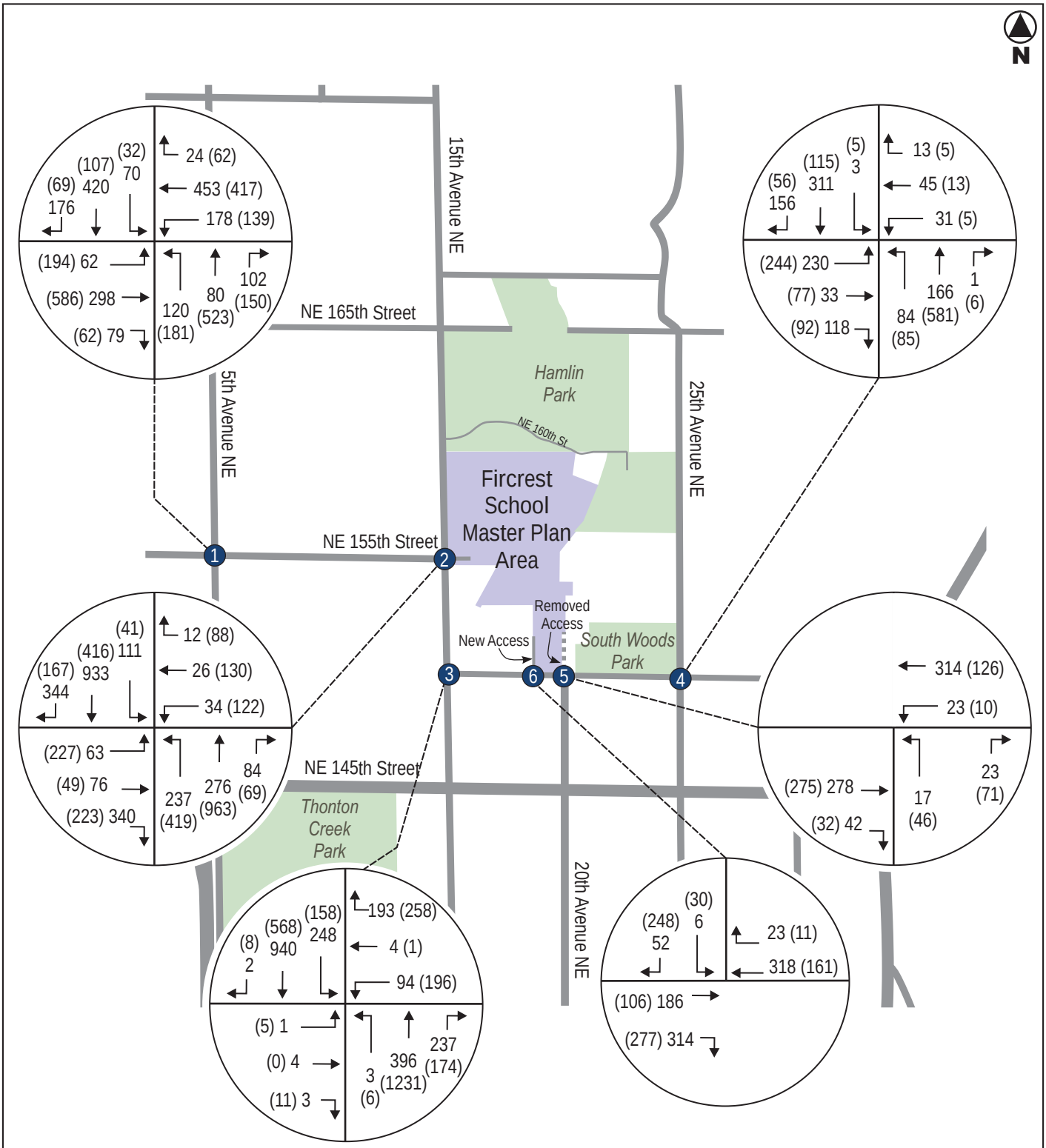
[24] Version 6, United States Census Bureau, web-based mapping and reporting application, https://onthemap.ces.census.gov/, accessed April 2022.



Fircrest School Master Plan
Traffic Impact Statement

Figure 6
Trip Distribution and Net Change in Site Trips
AM and PM Peak Hours

heffron transportation inc



Fircrest School Master Plan
Traffic Impact Statement

Figure 7
Forecast 2042-With-Project Traffic Volumes
AM and PM Peak Hours

heffron transportation inc

3.3. Traffic Operations

Levels of service for the study-area intersections were calculated using the 2042-with-project traffic volumes and the methodology described earlier in this report. Table 7 shows the results of the analysis; levels of service for the 2042-without-project conditions are shown for comparison. The LOS calculation sheets are provided in Appendix B.

Table 7. Level of Service Summary – Forecast-2042-Without- & With-Project Conditions

Intersection Type / Location	AM Peak Hour						PM Peak Hour					
	Without Project			With Project			Without Project			With Project		
Signalized Intersections	LOS [1]	Delay [2]	v/c [3]	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c
1. NE 155th St / 5th Ave NE	C	22.1	0.85	C	22.7	0.85	C	33.2	0.99	D	48.1	1.12
2. NE 155th St / 15th Ave NE	C	32.9	1.00	D	37.7	1.02	D	36.9	1.01	E	63.5	1.19
3. NE 150th St / 15th Ave NE	B	17.2	0.78	C	20.9	0.87	B	18.9	0.70	D	45.3	1.18
All-Way-Stop Intersection	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c			
4. NE 150th St / 25th Ave NE	F	126.5		F	140.1		F	83.2		F	94.5	
Northbound Movements	E	39.8	0.92	F	52.7	1.04	F	137.7	1.22	F	158.2	1.27
Eastbound Left Turns	F	143.9	1.32	F	165.4	1.37	C	24.7	0.75	D	28.7	0.82
Westbound Left Turns	C	19.5	0.42	C	20.6	0.44	B	11.8	0.07	B	12.0	0.07
Southbound Movements	F	182.8	1.41	F	197.1	1.47	B	14.3	0.44	B	14.7	0.45
Stop Controlled Intersection	LOS	Delay	v/c	LOS	Delay	v/c	LOS	Delay	v/c			
5. NE 150th St / 20th Ave NE	A	2.6		A	1.8		A	4.3		A	3.5	
Northbound Movements	C	19.0	0.23	C	18.1	0.24	B	14.1	0.31	B	14.4	0.32
Eastbound Left Turns	A	8.1	0.01		n/a [4]		A	7.6	0.00		n/a [4]	
Westbound Left Turns	A	8.4	0.03	A	8.5	0.03	A	8.0	0.01	A	8.1	0.01
Southbound Movements	C	22.0	0.15		n/a [4]		B	12.8	0.09		n/a [4]	
6. NE 150th St / New Access		n/a [5]		A	3.0			n/a [5]		A	5.4	
Eastbound Left Turns				A	9.5	0.27				A	8.1	0.10
Southbound Movements				C	17.0	0.17				C	15.1	0.46

Source: Heffron Transportation, Inc., May 2022.

1. *LOS = Level of service. LOS E shaded* ▭ *LOS F shaded* ▭;
2. *Delay = Average delay per vehicle in seconds.*
3. *v/c = Volume-to-capacity ratio.*
4. *n/a = not applicable, movement eliminated with removal of north leg of intersection with project.*
5. *n/a = not applicable, driveway would not exist without project.*

As shown, the additional traffic generated by Fircrest School campus with the MDP is forecast to add delay to each of the signalized study-area intersections during both peak periods. Based on the level of delay forecast to be added and the City of Shoreline's currently-adopted LOS standards, it may be desirable to implement operational mitigation measures at the main access intersection on 15th Avenue NE at NE 155th Street. Signal phasing and channelization changes (to provide concurrent protected-permitted left-turn phasing) could reduce delays noticeably (to 48.7 seconds per vehicle). It may be appropriate for the project to contribute a proportionate share toward the costs of signal and channelization improvements to mitigate these impacts. Project traffic is estimated to represent up to 11% of the total entering peak hour volumes and would be a reasonable contribution portion, if these improvements are not incorporated into the City's Transportation Impact Fee system. It is noted that, at

the time of this report, these locations have not been identified as growth projects for inclusion in the City's TIF project list.

The NE 150th Street / 25th Avenue NE intersection, which is an all-way stop, is forecast to operate at LOS F without the project and the relatively small number of added AM and PM peak hour project trips are forecast to cause large increases in delay. As a result, it would also be appropriate for the project to contribute a proportionate share toward the costs of operational improvements (such as signalization or conversion to a roundabout) to mitigate these impacts. Project traffic is estimated to represent between 2.7% and 3.4% of the total entering AM and PM peak hour volumes and would be reasonable contribution portions, if the improvement is not incorporated into the City's Transportation Impact Fee system. The city has identified this location as a growth project, but has not yet updated its TIF projects list.

3.4. Traffic Safety

The new and expanded development contemplated by the MDP could increase traffic at the study-are intersections and statistically, the number of collisions could increase as traffic increases. However, the project does not include any substantial changes to the roadway network that are expected to result in new adverse safety concerns. The collision data provided for the study-area intersections do not indicate any unusual existing safety conditions that would impact or be impacted by the proposed project and the proposed project is not expected to adversely affect the safety in the area.

3.5. Site Access Evaluation

The existing campus has two access points—one main signalized access on 15th Avenue NE opposite NE 155th Street, and one on NE 150th Street opposite 20th Avenue NW. The main campus access would remain from on 15th Avenue NE. The new development at the southeast corner would be accessed from a new driveway on NE 150th Street located about 290 feet west of 20th Avenue NE, while the eastern most driveway on NE 150th Street would be removed. The existing gated access on 15th Avenue NE about 350 feet north of NE 155th Street is planned to be retained, but remain gated with access limited to emergency and/or maintenance vehicles.

The proposed new access on NE 150th Street would meet the minimum clearance from other intersections (greater than 75 feet for access points on a Collector Arterial). It would also meet the minimum spacing for access driveways on the north side of the street; however, because there are driveways serving single-family residential lots on the south side of the street, the access location may require approval for reduced spacing from the City's Engineering Director.

NE 150th Street has crest vertical curves to the west and east of the planned site access locations. Sight distance to and from this access location is clear for more than 500 feet in both directions and would meet the recommended level for a stop-controlled minor approach as outlined in Table 13 of the City's *2023 Engineering Development Manual*[25] (335 feet for an intersection with a major roadway with a posted speed limit of 30 mph). However, there is currently a rockery, vegetation, and trees located behind the sidewalk at the anticipated access locations. At the time of site development, additional review will be required to ensure that the applicable sight distance triangles would be provided.

The operational analyses of the planned new site access location on NE 150th Street was presented previously. It is forecast to operate at LOS A overall with all movements operating at LOS C or better during AM and PM peak hour conditions. The HCM 6 LOS calculation includes estimates of the 95th-percentile queues, which are reported to be about one vehicle for eastbound left-turns into the site during both peak periods. The 95th-percentile queues for vehicles leaving the access driveway onto NE 150th Street are reported to be less than three vehicles during both peak periods.

[25] City of Shoreline, Effective March 1, 2023

3.6. Parking Supply & Demand

Due to the unique nature and variety of uses on the Fircrest School Campus parking demand is largely attributed to the number of full time equivalent (FTE) employees on duty and the number of residents at the campus. The existing campus currently has 541 parking spaces spread throughout the campus with larger clusters of parking near the Activities Building, Kitchen, Administration Building, and the Pat 'N' / 'Y' Buildings. With the proposed MDP, the total number of parking spaces is anticipated to increase to 830 spaces (an increase of 289 spaces compared to existing conditions). This supply is expected to exceed the parking demand for the campus which is estimated to total 751 vehicles.[26] Table 8 shows the parking supply, estimated demand for each building on campus, and the proposed parking supply standards.

Table 8. Fircrest School Campus Proposed Parking Supply and Demand Summary

Building	Parking Supply	Peak Parking Demand	Proposed Parking Spaces Standard
Existing Buildings to Remain			
16-Bed ICF/ID Cottages	40	80	1 per 5 residents, plus 1 per FTE employee on duty
Activities Building	30	8	1 per FTE employee on duty + 3 spaces for deliveries/visitors
Administration Building	24	53	1 per FTE employee on duty + 3 spaces for deliveries/visitors
Kitchen	53	23	1 per FTE employee on duty + 3 spaces for deliveries/visitors
Chapel	46	27	1 per 5 fixed seats + 1 per 50 square feet of gross floor area without fixed seats used for assembly purposes [a]
Existing Parking Spaces Total	193	191	
Near-Term Developments (estimated completion by 2030)			
120-Bed Nursing Facility	130	101	Nursing Facility: 1 per 5 residents, plus 1 per FTE employee on duty Laundry: 1 per FTE employee on duty + 1 loading space
Adult Training Program (Relocation)	14	38	1 per FTE employee on duty + 3 spaces for deliveries/visitors
48-Bed Behavioral Health Facility	89	31	1 per 8 residents, plus 1 per FTE employee on duty
South Building – Professional Office/Daycare	81	51	Professional office uses: 1 per 500 square feet Daycare II: 2 + 1 for each 20 clients [b]
Near-Term Parking Spaces Total	314	221	
Long-Term Developments (estimated completion by 2040)			
Maintenance Facility	20	60	1 per FTE employee on duty + 10 loading space
Commissary Building	15	6	1 per FTE employee on duty + 2 spaces for deliveries/visitors
4-Bedroom ICF/ID Cottages	75	96	1 per 5 residents, plus 1 per FTE employee on duty
North Building – Professional Office	193	170	1 per 500 square feet
Recreation Space	20	7	10 per acre
Long-Term Parking Spaces Total	323	339	
Total Campus (All Development)	830	751	

Source: AHBL, November 2023.

a. Assume 100 seats and 10% of the chapel is without seats

b. Assumes 5,000 sf of Daycare with up to 40 clients

[26] Existing parking supply, proposed supply and estimated demand from AHBL, November 2023.

In total the parking supply on campus in the MDP exceeds the parking demand by approximately 79 spaces. Some of the buildings on campus have fewer parking spaces than the demand stipulated for the proposed use, however other nearby buildings have an excess parking supply. Most buildings on the campus are in close proximity to one another and to multiple parking areas allowing for additional parking spaces to be available when needed. For example, the 16-bed ICF Cottages have a parking demand of 80 spaces and parking supply of 40 spaces, however, the northern ICF Cottages are adjacent to the kitchen and new Behavioral Health Facility which both have an excess parking supply.

It is noted that the total peak parking demand for the cumulative uses reflects a worst-case condition that assumes all of the uses have their peak demand at the same time of day. In reality, peak demand times could occur at different times of day. For example, office uses typically have peak demand times in the mid-morning or mid-afternoon, while the nursing facilities are likely to have their peak demand early in the morning during the shift change. Therefore, peak cumulative demand would likely be less than reported in Table 8.

Parking supply for the individual masterplan elements would be determined at the time of permit application, and the number of spaces needed will depend on the intended building program. It is expected that sufficient supply would be provided to meet project parking demand. If future demand is estimated to exceed the supply, then the proponent should be required to perform further studies to determine if parking mitigation would be needed, which could include sharing parking with other uses on site or in the vicinity, implementing trip and parking demand reduction strategies, or other measures.

3.7. Transit

Some transit trips are expected to be generated by employees working at the site. Based on the trip generation estimates presented previously and the 6% adjustment for non-auto modes of travel, the campus could generate increases of up 360 transit trips per day with about 35 in the AM peak hour and 45 in the PM peak hour. Due to the proximity to local bus stops and access to future light rail (the nearest bus stops are located at the NE 155th Street / 15th Avenue NE intersection), the estimated additional transit trips are not expected to result in adverse impacts to transit facilities or service.

3.8. Non-Motorized Transportation Facilities

Fircrest School campus would continue to generate pedestrian and bicycle trips within the site vicinity. The increase in employment is expected to proportionally increase the number of pedestrian and bicycle trips generated at the site. As noted, frontage improvements (including new sidewalk) would be constructed along the portions of campus included in the MDP in phases with triggers based on campus improvements. These improvements would enhance the non-motorized environment for the site and the project is not expected to adversely affect non-motorized transportation facilities.

The City of Shoreline's *2024 to 2029 TIP and 2023 CIP Map* show that the City intends to repair and replace sidewalks along 15th Avenue NE between NE 155th Street and NE 175th Street, with construction planned in 2023. According to City staff, this planned project is focused primarily on repairing existing sidewalks located on the west side of 15th Avenue NE. There is also a conceptual plan for sidewalk along the east side of 15th Avenue NE identified for potential construction in 2028, but that plan does not address the bike facility along the frontage of the Fircrest campus site.[27] It is noted that the Fircrest School MDP area fronts 15th Avenue NE north of NE 155th Street, but not south of NE 155th Street. Development of the site requiring frontage improvements is likely many years in the future, and may occur after the City's sidewalk project. Remaining frontage improvement needs would be coordinated with the City.

[27] PLN22-0190 – MDP Review 15230 15th Ave NE – Fircrest School Master Development, Cory Johnson, April 12, 2023.

4. RECOMMENDATIONS / CONCLUSIONS

Based on the above findings, the following measures would be incorporated into the project proposal and/or are recommended to minimize the traffic and parking impacts associated with the Fircrest MDP project.

A. **Construction Transportation Management Plan (CTMP)** – DSHS should require the selected contractor to develop a CTMP. The CTMP should address traffic and pedestrian control during each major phase of construction. It should confirm truck routes, lane closures, walkway routes and closures, and parking disruptions, as necessary. The CTMP may also include measures to keep adjacent streets clean on a daily basis at the truck exit points (such as street sweeping or on-site truck wheel cleaning) to reduce tracking dirt off site. The CTMP should identify parking locations for the construction personnel, staff, and fleet vehicles.

B. **Travel Demand Management Plan (TDMP)** – A TDMP is a standard requirement for MDPs in the City of Shoreline. The TDMP for the Fircrest Campus would evolve as the individual elements are implemented and as owner/operators are identified. The TDMP would be based on the current Commute Trip Reduction (CTR) Program that is already in place for the Fircrest campus and includes the following elements:

- Long-term bike storage spaces for employee use throughout the campus;
- Lockers and shower facilities for those who walk or ride to and from the site;
- Transit fare reimbursement (currently $65 per month) for DSHS employees who commute via public transportation;
- Rideshare, carpool, and vanpool ride matching support;
- Guaranteed ride home for employees who carpool, or take transit to work;
- Flexible employee work schedules (e.g., 4-day workweeks, etc.);
- Hybrid and/or telecommuting options for eligible employees; and
- An Employee Transportation Coordinator to assist employees with finding alternatives to driving alone and other information about commute alternatives.

The TDMP would be monitored through the existing annual reporting requirements of the CTR Program, which beginning in 2023, provides performance reports to the City of Shoreline.

C. **Contribute to cost of improvements (e.g., signalization or conversion to roundabout) at NE 150th Street / 25th Avenue NE** – The NE 150th Street / 25th Avenue NE intersection is forecast to operate at LOS F without the project. The added AM and PM peak hour project trips are forecast to cause large increases in delay. As a result, it would also be appropriate for the project to contribute a proportionate share toward the costs of operational improvements (such as signalization or conversion to roundabout) to mitigate these impacts. Project traffic is estimated to represent between 2.7% and 3.4% of the total entering AM and PM peak hour volumes and would be reasonable contribution portions, if the improvement is not incorporated into the City's Transportation Impact Fee system. The city has identified this location as a growth project, but has not yet updated the TIF projects list.

D. **Signal optimization for NE 155th Street / 15th Avenue NE intersection** – Based on the level of delay forecast to be added and the City of Shoreline's currently-adopted LOS standards, it may be desirable to implement operational mitigation measures at the signalized NE 155th Street / 15th Avenue NE intersection. Signal phasing and channelization changes at the NE 155th Street intersection (to provide concurrent protected-permitted left-turn phasing) could reduce delays noticeably. It may be appropriate for the project to contribute a proportionate share toward the costs of signal optimization improvements to mitigate these impacts. Project traffic is estimated to

represent up to 11% of the total entering peak hour traffic at the NE 155th Street intersection, which would be reasonable contribution portion, if these improvements are not incorporated into the City's Transportation Impact Fee system. At the time of this report, this location has not been identified as a growth project for inclusion in the City's TIF project list.

E. **Parking analysis at time of development permitting** – Parking supply for each individual MDP element would be determined at the time of permit application, and the number of spaces needed will depend on the intended building program. It is expected that sufficient supply would be provided to meet project parking demand. If future demand is estimated to exceed the supply, then the proponent should be required to perform further studies to determine if parking mitigation (e.g., share parking or trip reduction strategies) would be needed.

In addition to the recommended measures above, the City of Shoreline collects Transportation Impact Fees (TIFs) from applicants seeking building permits for either new developments or changes of use. The impact fee rate currently in effect (2023) is $9,271.05 per new PM peak hour vehicle trip. The City has also identified fee rates for some select relevant land uses—Assisted living $842.03 / bed; Hospital: $11.05 / sf; Medical offices: $30.17 / sf; General office: $16.60 / sf; and Daycare center: $45.04 / sf.

Based on the estimated change to trip-generating DSHS program elements, only the new Behavioral Health Hospital is expected to increase trips and those would be offset by the reduction in ICF/ID cottage beds (8 fewer assisted-living beds) and the removal of the off-leash dog area. The new commercial development element on the south portion of the campus would be entirely new for the purposes of TIFs.

Based on the above, the potential TIF for all contemplated MDP uses could range from about $3,891,920 ($715,160 for DSHS Program elements and $3,176,760 for other commercial elements) to $4,663,340 ($1,001,275 for DSHS Program elements and $3,662,065 for other commercial elements). These estimates are based on the currently adopted fee rates and depend on whether the per-trip fee rate or rates for specific land uses are applied. It is important to note that impact fees are assessed at the time of building permit issuance and at the rates in place at that time. Increases in the fee rates are calculated annually (by January 1st) and typically based on the Seattle-Tacoma-Bellevue Consumer Price Index for all urban consumers (CPI-U). In addition, the City is currently in the process of updating its TIF calculations and project lists. Fees will be assessed with each permit based on how many trips that portion of the overall MPD project adds and new TIF calculations will be required with each permit application. Individual building permit applications will reference this MDP for any agreed upon reductions.

APPENDIX A
Level of Service Definitions

Levels of service (LOS) are qualitative descriptions of traffic operating conditions. These levels of service are designated with letters ranging from LOS A, which is indicative of good operating conditions with little or no delay, to LOS F, which is indicative of stop-and-go conditions with frequent and lengthy delays. Levels of service for this analysis were developed using procedures presented in the *Highway Capacity Manual, 6th Edition* (Transportation Research Board, 2016).

Level of service for signalized intersections is defined in terms of delay. Delay can be a cause of driver discomfort, frustration, inefficient fuel consumption, and lost travel time. Specifically, level-of-service criteria are stated in terms of the average delay per vehicle in seconds. Delay is a complex measure and is dependent on a number of variables including: the quality of progression, cycle length, green ratio, and a volume-to-capacity ratio for the lane group or approach in question. Table A-1 shows the level of service criteria for signalized intersections from the *Highway Capacity Manual, 6th Edition.*

Table A-1. Level of Service for Signalized Intersections

Level of Service	Average Delay Per Vehicle	General Description
A	Less than 10.0 Seconds	Free flow
B	10.1 to 20.0 seconds	Stable flow (slight delays)
C	20.1 to 35.0 seconds	Stable flow (acceptable delays)
D	35.1 to 55.0 seconds	Approaching unstable flow (tolerable delay—occasionally wait through more than one signal cycle before proceeding.
E	55.1 to 80.0 seconds	Unstable flow (approaching capacity)
F	Greater than 80.0 seconds	Forced flow (jammed)

Source: Transportation Research Board, Highway Capacity Manual, 2016.

For unsignalized intersections, level of service is based on the average delay per vehicle for each turning movement. The level of service for a two-way, stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement. Delay is related to the availability of gaps in the main street's traffic flow, and the ability of a driver to enter or pass through those gaps. Table A-2 shows the level of service criteria for unsignalized intersections from the *Highway Capacity Manual, 6th Edition*.

Table A-2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Delay (seconds per vehicle)
A	Less than 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	Greater than 50.0

Source: Transportation Research Board, Highway Capacity Manual, 2016.

APPENDIX B
LOS Calculation Sheets

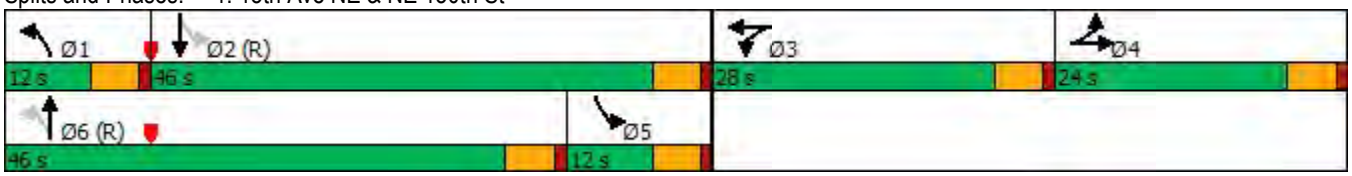
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	4	3	68	4	151	2	282	100	147	819	2
Future Volume (vph)	1	4	3	68	4	151	2	282	100	147	819	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	0		0	0		0	45		0	80		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.98			0.99		0.99	1.00	
Frt		0.949			0.909			0.961				
Flt Protected		0.994			0.985		0.950			0.950		
Satd. Flow (prot)	0	1780	0	0	1528	0	1752	3223	0	1752	3387	0
Flt Permitted		0.994			0.985		0.248			0.517		
Satd. Flow (perm)	0	1778	0	0	1524	0	457	3223	0	943	3387	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			87			52				
Link Speed (mph)		10			30			35			35	
Link Distance (ft)		100			1323			672			440	
Travel Time (s)		6.8			30.1			13.1			8.6	
Confl. Peds. (#/hr)	6		4	4		6	24		7	7		24
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	6%	6%	6%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	1	4	3	71	4	157	2	294	104	153	853	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	232	0	2	398	0	153	855	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases							6			2		
Detector Phase	4	4		3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	24.0	24.0		25.0	25.0		12.0	25.0		12.0	20.0	
Total Split (s)	24.0	24.0		28.0	28.0		12.0	46.0		12.0	46.0	
Total Split (%)	21.8%	21.8%		25.5%	25.5%		10.9%	41.8%		10.9%	41.8%	
Maximum Green (s)	19.0	19.0		23.0	23.0		7.0	41.0		7.0	41.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	12.0	12.0		13.0	13.0			13.0			6.0	
Pedestrian Calls (#/hr)	8	8		4	4			7			14	
Act Effct Green (s)		8.4			16.4		64.6	64.6		74.4	74.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.08			0.15		0.59	0.59		0.68	0.68	
v/c Ratio		0.06			0.77		0.01	0.21		0.22	0.37	
Control Delay		36.2			44.3		17.5	12.2		13.4	12.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		36.2			44.3		17.5	12.2		13.4	12.2	
LOS		D			D		B	B		B	B	
Approach Delay		36.3			44.3			12.2			12.4	
Approach LOS		D			D			B			B	
Queue Length 50th (ft)		3			100		1	45		24	84	
Queue Length 95th (ft)		17			177		6	129		121	328	
Internal Link Dist (ft)		20			1243			592			360	
Turn Bay Length (ft)							45			80		
Base Capacity (vph)		309			388		350	1913		689	2290	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.03			0.60		0.01	0.21		0.22	0.37	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 14 (13%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 16.9 Intersection LOS: B
Intersection Capacity Utilization 59.7% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: 15th Ave NE & NE 150th St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	24	281	4	5	7	184	228	20	54	693	253
Future Volume (vph)	59	24	281	4	5	7	184	228	20	54	693	253
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	10	10	11	11	11	12	10	11	11	12
Storage Length (ft)	0		75	0		0	60		0	90		140
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor		1.00	0.97		1.00	0.97	1.00	1.00		1.00		0.97
Frt			0.850			0.850		0.988				0.850
Flt Protected		0.966			0.978		0.950			0.950		
Satd. Flow (prot)	0	1799	1478	0	1244	994	1662	1784	0	1711	1801	1583
Flt Permitted		0.786			0.908		0.258			0.511		
Satd. Flow (perm)	0	1460	1438	0	1154	968	450	1784	0	919	1801	1530
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			299			145		7				193
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		577			127			874			1332	
Travel Time (s)		13.1			3.5			17.0			25.9	
Confl. Peds. (#/hr)	2		1	1		2	5		1	1		5
Confl. Bikes (#/hr)			3			1			2			2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	100%	0%	57%	5%	5%	5%	2%	2%	2%
Adj. Flow (vph)	63	26	299	4	5	7	196	243	21	57	737	269
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	299	0	9	7	196	264	0	57	737	269
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4		4	2			6		6
Detector Phase	4	4	4	4	4	4	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	12.0	21.0		12.0	23.0	23.0
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	15.0	53.0		12.0	50.0	50.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%	27.8%	16.7%	58.9%		13.3%	55.6%	55.6%
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	48.0		7.0	45.0	45.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0		9.0			11.0	11.0
Pedestrian Calls (#/hr)	2	2	2	2	2	2		0			5	5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		16.0	16.0		16.0	16.0	55.1	55.1		49.0	49.0	49.0
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.61	0.61		0.54	0.54	0.54
v/c Ratio		0.34	0.60		0.04	0.02	0.48	0.24		0.10	0.75	0.29
Control Delay		36.0	9.3		30.1	0.1	20.2	9.5		10.8	22.6	4.5
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		36.0	9.3		30.1	0.1	20.2	9.5		10.8	22.6	4.5
LOS		D	A		C	A	C	A		B	C	A
Approach Delay		15.4			17.0			14.0			17.4	
Approach LOS		B			B			B			B	
Queue Length 50th (ft)		45	0		4	0	46	62		14	295	19
Queue Length 95th (ft)		84	66		17	0	95	122		36	#525	64
Internal Link Dist (ft)		497			47			794			1252	
Turn Bay Length (ft)			75				60			90		140
Base Capacity (vph)		324	552		256	327	410	1094		562	980	920
Starvation Cap Reductn		0	0		0	0	0	0		0	0	0
Spillback Cap Reductn		0	0		0	0	0	0		0	0	0
Storage Cap Reductn		0	0		0	0	0	0		0	0	0
Reduced v/c Ratio		0.27	0.54		0.04	0.02	0.48	0.24		0.10	0.75	0.29

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 16.2 Intersection LOS: B
Intersection Capacity Utilization 79.3% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 15th Ave NE & NE 155th St

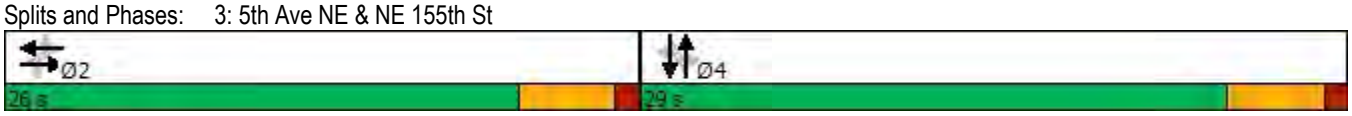
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	195	56	140	407	22	90	52	26	63	393	168
Future Volume (vph)	47	195	56	140	407	22	90	52	26	63	393	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	12	12	12	12	12	12
Storage Length (ft)	110		0	100		0	105		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor	1.00	0.99		1.00	1.00		1.00				0.99	
Frt		0.966			0.992			0.951			0.955	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1664	0	1736	1810	0	1703	1705	0	1687	1684	0
Flt Permitted	0.353			0.596			0.264			0.704		
Satd. Flow (perm)	631	1664	0	1085	1810	0	473	1705	0	1250	1684	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			6			27			50	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		572			796			673			531	
Travel Time (s)		13.0			18.1			15.3			12.1	
Confl. Peds. (#/hr)	5		4	4		5	2					2
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	6%	6%	6%	7%	7%	7%
Adj. Flow (vph)	49	205	59	147	428	23	95	55	27	66	414	177
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	264	0	147	451	0	95	82	0	66	591	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	26.0	26.0		26.0	26.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.3%	47.3%		47.3%	47.3%		52.7%	52.7%		52.7%	52.7%	
Maximum Green (s)	21.0	21.0		21.0	21.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	5	5		5	5		7	7		7	7	
Act Effct Green (s)	15.9	15.9		15.9	15.9		19.1	19.1		19.1	19.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.35	0.35		0.35	0.35		0.42	0.42		0.42	0.42	
v/c Ratio	0.22	0.44		0.39	0.71		0.48	0.11		0.13	0.81	
Control Delay	14.5	13.4		15.7	20.5		20.7	7.1		9.7	22.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.5	13.4		15.7	20.5		20.7	7.1		9.7	22.1	
LOS	B	B		B	C		C	A		A	C	
Approach Delay		13.6			19.3			14.4			20.9	
Approach LOS		B			B			B			C	
Queue Length 50th (ft)	10	51		32	110		19	9		11	127	
Queue Length 95th (ft)	31	104		72	200		62	30		31	#305	
Internal Link Dist (ft)		492			716			593			451	
Turn Bay Length (ft)	110			100			105			160		
Base Capacity (vph)	310	833		533	892		265	969		702	968	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.16	0.32		0.28	0.51		0.36	0.08		0.09	0.61	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 45.7
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 18.4 Intersection LOS: B
Intersection Capacity Utilization 79.6% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 5th Ave NE & NE 155th St



Intersection	
Intersection Delay, s/veh	47.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	146	21	70	31	44	13	43	118	1	3	295	148
Future Vol, veh/h	146	21	70	31	44	13	43	118	1	3	295	148
Peak Hour Factor	0.64	0.64	0.64	0.63	0.63	0.63	0.63	0.63	0.63	0.73	0.73	0.73
Heavy Vehicles, %	1	1	1	5	5	5	0	0	0	1	1	1
Mvmt Flow	228	33	109	49	70	21	68	187	2	4	404	203
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	25.6	14.6	17.7	80.8
HCM LOS	D	B	C	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	27%	62%	35%	1%
Vol Thru, %	73%	9%	50%	66%
Vol Right, %	1%	30%	15%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	162	237	88	446
LT Vol	43	146	31	3
Through Vol	118	21	44	295
RT Vol	1	70	13	148
Lane Flow Rate	257	370	140	611
Geometry Grp	1	1	1	1
Degree of Util (X)	0.509	0.706	0.303	1.065
Departure Headway (Hd)	7.355	7.19	8.119	6.274
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	494	507	446	580
Service Time	5.355	5.19	6.119	4.297
HCM Lane V/C Ratio	0.52	0.73	0.314	1.053
HCM Control Delay	17.7	25.6	14.6	80.8
HCM Lane LOS	C	D	B	F
HCM 95th-tile Q	2.8	5.5	1.3	17.6

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	213	28	18	225	6	14	2	18	2	5	5
Future Vol, veh/h	4	213	28	18	225	6	14	2	18	2	5	5
Conflicting Peds, #/hr	10	0	0	0	0	10	12	0	5	5	0	12
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	78	78	78	57	57	57	42	42	42
Heavy Vehicles, %	1	1	1	5	5	5	7	7	7	100	80	0
Mvmt Flow	6	333	44	23	288	8	25	4	32	5	12	12

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	306	0	0	377	0	0	729	719	360	738	737	314
Stage 1	-	-	-	-	-	-	367	367	-	348	348	-
Stage 2	-	-	-	-	-	-	362	352	-	390	389	-
Critical Hdwy	4.11	-	-	4.15	-	-	7.17	6.57	6.27	8.1	7.3	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.57	-	7.1	6.3	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.57	-	7.1	6.3	-
Follow-up Hdwy	2.209	-	-	2.245	-	-	3.563	4.063	3.363	4.4	4.72	3.3
Pot Cap-1 Maneuver	1260	-	-	1165	-	-	332	348	673	236	267	731
Stage 1	-	-	-	-	-	-	642	613	-	506	517	-
Stage 2	-	-	-	-	-	-	646	623	-	477	493	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1248	-	-	1165	-	-	304	334	670	215	256	716
Mov Cap-2 Maneuver	-	-	-	-	-	-	304	334	-	215	256	-
Stage 1	-	-	-	-	-	-	638	609	-	498	499	-
Stage 2	-	-	-	-	-	-	598	602	-	447	490	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.6	14.7	16.7
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	431	1248	-	-	1165	-	-	335
HCM Lane V/C Ratio	0.138	0.005	-	-	0.02	-	-	0.085
HCM Control Delay (s)	14.7	7.9	0	-	8.2	0	-	16.7
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0.1	-	-	0.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	11	52	1	148	5	956	90	83	454	7
Future Volume (vph)	5	0	11	52	1	148	5	956	90	83	454	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	0		0	0		0	45		0	80		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.98		0.98	1.00		1.00	1.00	
Frt		0.907			0.901			0.987			0.998	
Flt Protected		0.985			0.987		0.950			0.950		
Satd. Flow (prot)	0	1679	0	0	1576	0	1787	3401	0	1770	3411	0
Flt Permitted		0.985			0.987		0.431			0.221		
Satd. Flow (perm)	0	1676	0	0	1575	0	796	3401	0	411	3411	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		169			113			11			2	
Link Speed (mph)		10			30			35			35	
Link Distance (ft)		100			1323			672			440	
Travel Time (s)		6.8			30.1			13.1			8.6	
Confl. Peds. (#/hr)	5		2	2		5	12		4	4		12
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Adj. Flow (vph)	5	0	11	53	1	151	5	976	92	85	463	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	0	0	205	0	5	1068	0	85	470	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases							6			2		
Detector Phase	4	4		3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	24.0	24.0		25.0	25.0		12.0	25.0		12.0	20.0	
Total Split (s)	24.0	24.0		26.0	26.0		12.0	48.0		12.0	48.0	
Total Split (%)	21.8%	21.8%		23.6%	23.6%		10.9%	43.6%		10.9%	43.6%	
Maximum Green (s)	19.0	19.0		21.0	21.0		7.0	43.0		7.0	43.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	12.0	12.0		13.0	13.0			13.0			6.0	
Pedestrian Calls (#/hr)	8	8		4	4			7			14	
Act Effct Green (s)		8.2			13.5		67.9	67.9		75.2	75.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.07			0.12		0.62	0.62		0.68	0.68	
v/c Ratio		0.06			0.70		0.01	0.51		0.23	0.20	
Control Delay		0.4			33.6		15.6	16.2		16.3	9.8	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		0.4			33.6		15.6	16.2		16.3	9.8	
LOS		A			C		B	B		B	A	
Approach Delay		0.4			33.6			16.2			10.8	
Approach LOS		A			C			B			B	
Queue Length 50th (ft)		0			62		1	217		17	53	
Queue Length 95th (ft)		0			134		10	423		70	158	
Internal Link Dist (ft)		20			1243			592			360	
Turn Bay Length (ft)							45			80		
Base Capacity (vph)		429			392		554	2102		367	2333	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.04			0.52		0.01	0.51		0.23	0.20	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 14 (13%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 16.4 Intersection LOS: B
Intersection Capacity Utilization 62.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: 15th Ave NE & NE 150th St

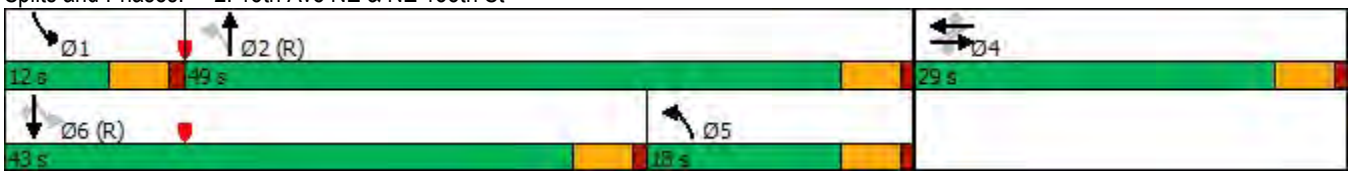
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	30	198	40	51	62	283	793	30	27	308	120
Future Volume (vph)	223	30	198	40	51	62	283	793	30	27	308	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	10	10	11	11	11	12	10	11	11	12
Storage Length (ft)	0		75	0		0	60		0	90		140
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor		0.99	0.97		1.00	0.96	0.99	1.00				0.96
Frt			0.850			0.850		0.995				0.850
Flt Protected		0.958			0.978		0.950			0.950		
Satd. Flow (prot)	0	1785	1478	0	1761	1531	1711	1851	0	1711	1801	1583
Flt Permitted		0.684			0.670		0.562			0.114		
Satd. Flow (perm)	0	1261	1428	0	1203	1476	1002	1851	0	205	1801	1527
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171			145		3				128
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		577			127			874			1332	
Travel Time (s)		13.1			3.5			17.0			25.9	
Confl. Peds. (#/hr)	6		5	5		6	6		4	4		6
Confl. Bikes (#/hr)			2			2			3			1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	237	32	211	43	54	66	301	844	32	29	328	128
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	269	211	0	97	66	301	876	0	29	328	128
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4		4	2			6		6
Detector Phase	4	4	4	4	4	4	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	12.0	21.0		12.0	23.0	23.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0	29.0	18.0	49.0		12.0	43.0	43.0
Total Split (%)	32.2%	32.2%	32.2%	32.2%	32.2%	32.2%	20.0%	54.4%		13.3%	47.8%	47.8%
Maximum Green (s)	24.0	24.0	24.0	24.0	24.0	24.0	13.0	44.0		7.0	38.0	38.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0		9.0			11.0	11.0
Pedestrian Calls (#/hr)	2	2	2	2	2	2		0			5	5
Act Effct Green (s)		21.6	21.6		21.6	21.6	53.8	53.8		40.4	40.4	40.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.24	0.24		0.24	0.24	0.60	0.60		0.45	0.45	0.45
v/c Ratio		0.89	0.45		0.34	0.14	0.43	0.79		0.16	0.41	0.17
Control Delay		63.7	10.3		30.8	0.6	15.6	23.5		17.1	19.4	3.7
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		63.7	10.3		30.8	0.6	15.6	23.5		17.1	19.4	3.7
LOS		E	B		C	A	B	C		B	B	A
Approach Delay		40.2			18.6			21.5			15.1	
Approach LOS		D			B			C			B	
Queue Length 50th (ft)		142	17		44	0	71	323		9	128	0
Queue Length 95th (ft)		#272	75		88	0	161	#733		26	200	32
Internal Link Dist (ft)		497			47			794			1252	
Turn Bay Length (ft)			75				60			90		140
Base Capacity (vph)		336	506		320	499	701	1108		208	808	755
Starvation Cap Reductn		0	0		0	0	0	0		0	0	0
Spillback Cap Reductn		0	0		0	0	0	0		0	0	0
Storage Cap Reductn		0	0		0	0	0	0		0	0	0
Reduced v/c Ratio		0.80	0.42		0.30	0.13	0.43	0.79		0.14	0.41	0.17

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 23.8 Intersection LOS: C
Intersection Capacity Utilization 83.7% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 15th Ave NE & NE 155th St



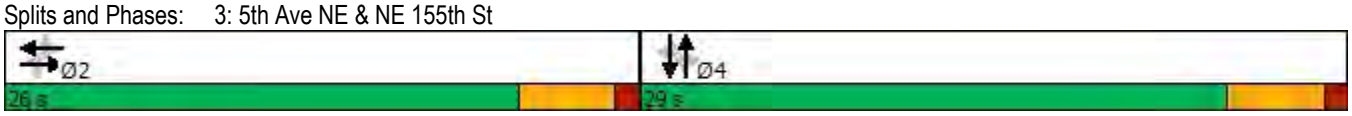
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	431	42	40	330	53	141	411	91	30	88	66
Future Volume (vph)	148	431	42	40	330	53	141	411	91	30	88	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	12	12	12	12	12	12
Storage Length (ft)	110		0	100		0	105		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Frt		0.987			0.979			0.973			0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1773	0	1770	1817	0	1770	1805	0	1687	1646	0
Flt Permitted	0.411			0.299			0.650			0.277		
Satd. Flow (perm)	764	1773	0	556	1817	0	1209	1805	0	491	1646	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			17			26			73	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		572			796			673			531	
Travel Time (s)		13.0			18.1			15.3			12.1	
Confl. Peds. (#/hr)	3		3	3		3	1		2	2		1
Confl. Bikes (#/hr)			2			2						1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	7%	7%	7%
Adj. Flow (vph)	163	474	46	44	363	58	155	452	100	33	97	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	520	0	44	421	0	155	552	0	33	170	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	26.0	26.0		26.0	26.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.3%	47.3%		47.3%	47.3%		52.7%	52.7%		52.7%	52.7%	
Maximum Green (s)	21.0	21.0		21.0	21.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	5	5		5	5		7	7		7	7	
Act Effct Green (s)	17.5	17.5		17.5	17.5		18.1	18.1		18.1	18.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.39	0.39		0.39	0.39	
v/c Ratio	0.57	0.77		0.21	0.60		0.33	0.76		0.17	0.25	
Control Delay	22.1	23.1		14.2	16.3		12.5	19.9		12.2	7.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.1	23.1		14.2	16.3		12.5	19.9		12.2	7.1	
LOS	C	C		B	B		B	B		B	A	
Approach Delay		22.8			16.1			18.3			7.9	
Approach LOS		C			B			B			A	
Queue Length 50th (ft)	35	122		8	89		31	130		6	18	
Queue Length 95th (ft)	#101	#282		30	179		66	228		21	48	
Internal Link Dist (ft)		492			716			593			451	
Turn Bay Length (ft)	110			100			105			160		
Base Capacity (vph)	369	863		269	888		669	1010		271	943	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.44	0.60		0.16	0.47		0.23	0.55		0.12	0.18	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 46.2
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 18.3 Intersection LOS: B
Intersection Capacity Utilization 77.5% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 5th Ave NE & NE 155th St



Intersection	
Intersection Delay, s/veh	17.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	153	48	39	5	13	5	52	412	4	5	109	54
Future Vol, veh/h	153	48	39	5	13	5	52	412	4	5	109	54
Peak Hour Factor	0.97	0.97	0.97	0.75	0.75	0.75	0.87	0.87	0.87	0.75	0.75	0.75
Heavy Vehicles, %	1	1	1	5	5	5	0	0	0	1	1	1
Mvmt Flow	158	49	40	7	17	7	60	474	5	7	145	72
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	13.1	9.9	23	11.1
HCM LOS	B	A	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	64%	22%	3%
Vol Thru, %	88%	20%	57%	65%
Vol Right, %	1%	16%	22%	32%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	468	240	23	168
LT Vol	52	153	5	5
Through Vol	412	48	13	109
RT Vol	4	39	5	54
Lane Flow Rate	538	247	31	224
Geometry Grp	1	1	1	1
Degree of Util (X)	0.766	0.41	0.055	0.335
Departure Headway (Hd)	5.127	5.961	6.44	5.381
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	705	601	553	665
Service Time	3.167	4.015	4.518	3.433
HCM Lane V/C Ratio	0.763	0.411	0.056	0.337
HCM Control Delay	23	13.1	9.9	11.1
HCM Lane LOS	C	B	A	B
HCM 95th-tile Q	7.2	2	0.2	1.5

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	187	16	8	85	7	31	3	57	5	4	7
Future Vol, veh/h	3	187	16	8	85	7	31	3	57	5	4	7
Conflicting Peds, #/hr	6	0	0	0	0	6	2	0	4	4	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	66	66	66	64	64	64	44	44	44
Heavy Vehicles, %	2	2	2	3	3	3	2	2	2	0	0	0
Mvmt Flow	4	240	21	12	129	11	48	5	89	11	9	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	146	0	0	261	0	0	432	429	255	475	434	143
Stage 1	-	-	-	-	-	-	259	259	-	165	165	-
Stage 2	-	-	-	-	-	-	173	170	-	310	269	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1436	-	-	1298	-	-	534	518	784	503	518	910
Stage 1	-	-	-	-	-	-	746	694	-	842	766	-
Stage 2	-	-	-	-	-	-	829	758	-	705	690	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1428	-	-	1298	-	-	512	508	781	434	508	903
Mov Cap-2 Maneuver	-	-	-	-	-	-	512	508	-	434	508	-
Stage 1	-	-	-	-	-	-	744	692	-	834	754	-
Stage 2	-	-	-	-	-	-	795	746	-	616	688	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.6	12	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	653	1428	-	-	1298	-	-	589
HCM Lane V/C Ratio	0.218	0.003	-	-	0.009	-	-	0.062
HCM Control Delay (s)	12	7.5	0	-	7.8	0	-	11.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.8	0	-	-	0	-	-	0.2

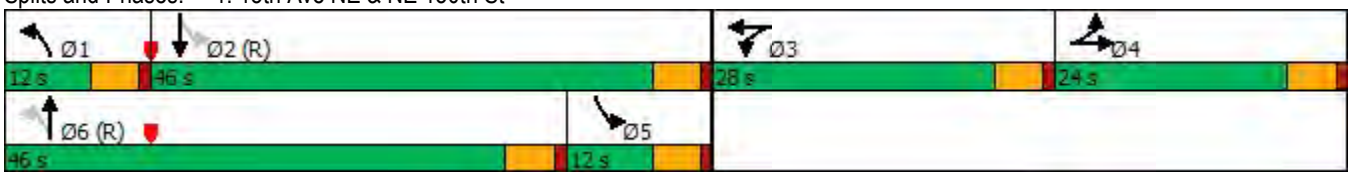
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	4	3	68	4	155	3	366	127	166	923	2
Future Volume (vph)	1	4	3	68	4	155	3	366	127	166	923	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	0		0	0		0	45		0	80		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.98			0.99		0.99	1.00	
Frt		0.949			0.908			0.961				
Flt Protected		0.994			0.985		0.950			0.950		
Satd. Flow (prot)	0	1780	0	0	1526	0	1752	3223	0	1752	3387	0
Flt Permitted		0.994			0.985		0.209			0.463		
Satd. Flow (perm)	0	1778	0	0	1522	0	386	3223	0	846	3387	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			89			50				
Link Speed (mph)		10			30			35			35	
Link Distance (ft)		100			1323			672			440	
Travel Time (s)		6.8			30.1			13.1			8.6	
Confl. Peds. (#/hr)	6		4	4		6	24		7	7		24
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	6%	6%	6%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	1	4	3	71	4	161	3	381	132	173	961	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	236	0	3	513	0	173	963	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases							6			2		
Detector Phase	4	4		3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	24.0	24.0		25.0	25.0		12.0	25.0		12.0	20.0	
Total Split (s)	24.0	24.0		28.0	28.0		12.0	46.0		12.0	46.0	
Total Split (%)	21.8%	21.8%		25.5%	25.5%		10.9%	41.8%		10.9%	41.8%	
Maximum Green (s)	19.0	19.0		23.0	23.0		7.0	41.0		7.0	41.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	12.0	12.0		13.0	13.0			13.0			6.0	
Pedestrian Calls (#/hr)	8	8		4	4			7			14	
Act Effct Green (s)		8.4			16.5		64.5	64.5		74.3	74.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.08			0.15		0.59	0.59		0.68	0.68	
v/c Ratio		0.06			0.78		0.01	0.27		0.28	0.42	
Control Delay		36.2			44.6		17.7	13.1		14.6	12.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		36.2			44.6		17.7	13.1		14.6	12.9	
LOS		D			D		B	B		B	B	
Approach Delay		36.3			44.6			13.2			13.2	
Approach LOS		D			D			B			B	
Queue Length 50th (ft)		3			101		1	64		27	101	
Queue Length 95th (ft)		17			180		8	172		136	384	
Internal Link Dist (ft)		20			1243			592			360	
Turn Bay Length (ft)							45			80		
Base Capacity (vph)		309			389		313	1909		628	2286	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.03			0.61		0.01	0.27		0.28	0.42	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 14 (13%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.78
Intersection Signal Delay: 17.2 Intersection LOS: B
Intersection Capacity Utilization 62.9% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 1: 15th Ave NE & NE 150th St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	35	281	5	7	10	220	273	36	107	923	344
Future Volume (vph)	63	35	281	5	7	10	220	273	36	107	923	344
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	10	10	11	11	11	12	10	11	11	12
Storage Length (ft)	0		75	0		0	60		0	90		140
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor		1.00	0.97		1.00	0.97	1.00	1.00		1.00		0.97
Frt			0.850			0.850		0.983				0.850
Flt Protected		0.969			0.980		0.950			0.950		
Satd. Flow (prot)	0	1805	1478	0	1271	994	1662	1774	0	1711	1801	1583
Flt Permitted		0.798			0.905		0.095			0.453		
Satd. Flow (perm)	0	1482	1438	0	1172	968	166	1774	0	815	1801	1530
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			280			145		11				197
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		577			127			874			1332	
Travel Time (s)		13.1			3.5			17.0			25.9	
Confl. Peds. (#/hr)	2		1	1		2	5		1	1		5
Confl. Bikes (#/hr)			3			1			2			2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	100%	0%	57%	5%	5%	5%	2%	2%	2%
Adj. Flow (vph)	67	37	299	5	7	11	234	290	38	114	982	366
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	104	299	0	12	11	234	328	0	114	982	366
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4		4	2			6		6
Detector Phase	4	4	4	4	4	4	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	12.0	21.0		12.0	23.0	23.0
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	15.0	53.0		12.0	50.0	50.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%	27.8%	16.7%	58.9%		13.3%	55.6%	55.6%
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	48.0		7.0	45.0	45.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0		9.0			11.0	11.0
Pedestrian Calls (#/hr)	2	2	2	2	2	2		0			5	5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		16.0	16.0		16.0	16.0	54.2	54.2		49.0	49.0	49.0
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.60	0.60		0.54	0.54	0.54
v/c Ratio		0.40	0.62		0.06	0.04	0.88	0.31		0.22	1.00	0.40
Control Delay		37.1	11.2		30.4	0.2	63.8	10.4		11.7	51.8	6.8
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		37.1	11.2		30.4	0.2	63.8	10.4		11.7	51.8	6.8
LOS		D	B		C	A	E	B		B	D	A
Approach Delay		17.9			15.9			32.7			37.4	
Approach LOS		B			B			C			D	
Queue Length 50th (ft)		54	9		6	0	83	84		29	510	45
Queue Length 95th (ft)		96	79		20	0	#230	153		62	#869	114
Internal Link Dist (ft)		497			47			794			1252	
Turn Bay Length (ft)			75				60			90		140
Base Capacity (vph)		329	537		260	327	266	1072		516	980	922
Starvation Cap Reductn		0	0		0	0	0	0		0	0	0
Spillback Cap Reductn		0	0		0	0	0	0		0	0	0
Storage Cap Reductn		0	0		0	0	0	0		0	0	0
Reduced v/c Ratio		0.32	0.56		0.05	0.03	0.88	0.31		0.22	1.00	0.40

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 32.9 Intersection LOS: C
Intersection Capacity Utilization 91.4% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 15th Ave NE & NE 155th St

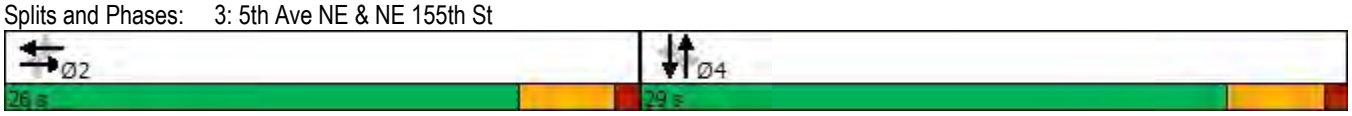
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	264	79	155	441	24	120	80	41	68	420	176
Future Volume (vph)	62	264	79	155	441	24	120	80	41	68	420	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	12	12	12	12	12	12
Storage Length (ft)	110		0	100		0	105		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor	1.00	0.99		1.00	1.00		1.00				0.99	
Frt		0.966			0.992			0.949			0.956	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1664	0	1736	1810	0	1703	1701	0	1687	1686	0
Flt Permitted	0.308			0.464			0.225			0.676		
Satd. Flow (perm)	550	1664	0	845	1810	0	403	1701	0	1200	1686	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			6			43			49	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		572			796			673			531	
Travel Time (s)		13.0			18.1			15.3			12.1	
Confl. Peds. (#/hr)	5		4	4		5	2					2
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	6%	6%	6%	7%	7%	7%
Adj. Flow (vph)	65	278	83	163	464	25	126	84	43	72	442	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	361	0	163	489	0	126	127	0	72	627	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	26.0	26.0		26.0	26.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.3%	47.3%		47.3%	47.3%		52.7%	52.7%		52.7%	52.7%	
Maximum Green (s)	21.0	21.0		21.0	21.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	5	5		5	5		7	7		7	7	
Act Effct Green (s)	17.2	17.2		17.2	17.2		20.2	20.2		20.2	20.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.42	0.42		0.42	0.42	
v/c Ratio	0.33	0.58		0.54	0.75		0.75	0.17		0.14	0.85	
Control Delay	17.5	16.3		20.8	22.4		44.6	7.4		10.2	25.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.5	16.3		20.8	22.4		44.6	7.4		10.2	25.9	
LOS	B	B		C	C		D	A		B	C	
Approach Delay		16.4			22.0			25.9			24.2	
Approach LOS		B			C			C			C	
Queue Length 50th (ft)	14	80		39	129		32	15		13	157	
Queue Length 95th (ft)	42	150		91	#229		#114	41		34	#334	
Internal Link Dist (ft)		492			716			593			451	
Turn Bay Length (ft)	110			100			105			160		
Base Capacity (vph)	254	786		390	839		212	918		633	913	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.26	0.46		0.42	0.58		0.59	0.14		0.11	0.69	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 48
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 22.1 Intersection LOS: C
Intersection Capacity Utilization 85.1% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 5th Ave NE & NE 155th St



Intersection	
Intersection Delay, s/veh	126.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	230	33	110	31	44	13	61	166	1	3	311	156
Future Vol, veh/h	230	33	110	31	44	13	61	166	1	3	311	156
Peak Hour Factor	0.64	0.64	0.64	0.63	0.63	0.63	0.63	0.63	0.63	0.73	0.73	0.73
Heavy Vehicles, %	1	1	1	5	5	5	0	0	0	1	1	1
Mvmt Flow	359	52	172	49	70	21	97	263	2	4	426	214
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	143.9	19.5	39.8	182.8
HCM LOS	F	C	E	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	27%	62%	35%	1%
Vol Thru, %	73%	9%	50%	66%
Vol Right, %	0%	29%	15%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	228	373	88	470
LT Vol	61	230	31	3
Through Vol	166	33	44	311
RT Vol	1	110	13	156
Lane Flow Rate	362	583	140	644
Geometry Grp	1	1	1	1
Degree of Util (X)	0.794	1.219	0.351	1.32
Departure Headway (Hd)	9.28	8.25	10.751	8.025
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	394	443	337	457
Service Time	7.28	6.25	8.751	6.025
HCM Lane V/C Ratio	0.919	1.316	0.415	1.409
HCM Control Delay	39.8	143.9	19.5	182.8
HCM Lane LOS	E	F	C	F
HCM 95th-tile Q	6.9	21.3	1.5	26.4

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	267	35	23	282	8	18	3	23	3	6	6
Future Vol, veh/h	5	267	35	23	282	8	18	3	23	3	6	6
Conflicting Peds, #/hr	10	0	0	0	0	10	12	0	5	5	0	12
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	64	64	64	78	78	78	57	57	57	42	42	42
Heavy Vehicles, %	1	1	1	5	5	5	7	7	7	100	80	0
Mvmt Flow	8	417	55	29	362	10	32	5	40	7	14	14

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	382	0	0	472	0	0	912	901	450	923	923	389
Stage 1	-	-	-	-	-	-	461	461	-	435	435	-
Stage 2	-	-	-	-	-	-	451	440	-	488	488	-
Critical Hdwy	4.11	-	-	4.15	-	-	7.17	6.57	6.27	8.1	7.3	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.17	5.57	-	7.1	6.3	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.17	5.57	-	7.1	6.3	-
Follow-up Hdwy	2.209	-	-	2.245	-	-	3.563	4.063	3.363	4.4	4.72	3.3
Pot Cap-1 Maneuver	1182	-	-	1074	-	-	249	273	599	171	202	664
Stage 1	-	-	-	-	-	-	571	557	-	447	467	-
Stage 2	-	-	-	-	-	-	578	569	-	415	440	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1171	-	-	1074	-	-	220	259	596	150	191	650
Mov Cap-2 Maneuver	-	-	-	-	-	-	220	259	-	150	191	-
Stage 1	-	-	-	-	-	-	566	552	-	439	446	-
Stage 2	-	-	-	-	-	-	523	544	-	378	436	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.6	19	22
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	333	1171	-	-	1074	-	-	247
HCM Lane V/C Ratio	0.232	0.007	-	-	0.027	-	-	0.145
HCM Control Delay (s)	19	8.1	0	-	8.4	0	-	22
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.9	0	-	-	0.1	-	-	0.5

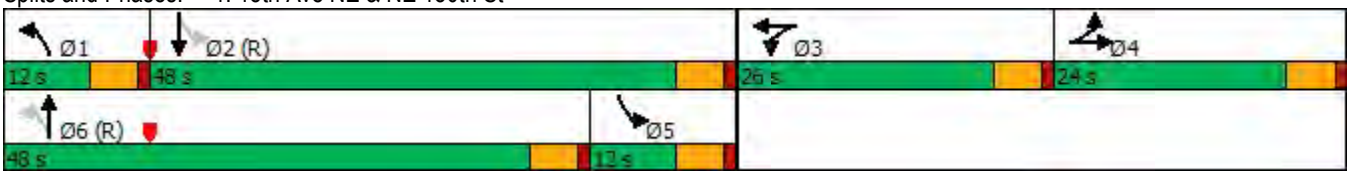
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	11	52	1	148	6	1217	114	95	521	8
Future Volume (vph)	5	0	11	52	1	148	6	1217	114	95	521	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	0		0	0		0	45		0	80		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.98		0.99	1.00			1.00	
Frt		0.907			0.901			0.987			0.998	
Flt Protected		0.985			0.987		0.950			0.950		
Satd. Flow (prot)	0	1679	0	0	1576	0	1787	3401	0	1770	3411	0
Flt Permitted		0.985			0.987		0.391			0.125		
Satd. Flow (perm)	0	1676	0	0	1575	0	727	3401	0	233	3411	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		169			113			10			2	
Link Speed (mph)		10			30			35			35	
Link Distance (ft)		100			1323			672			440	
Travel Time (s)		6.8			30.1			13.1			8.6	
Confl. Peds. (#/hr)	5		2	2		5	12		4	4		12
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Adj. Flow (vph)	5	0	11	53	1	151	6	1242	116	97	532	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	0	0	205	0	6	1358	0	97	540	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases							6			2		
Detector Phase	4	4		3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	24.0	24.0		25.0	25.0		12.0	25.0		12.0	20.0	
Total Split (s)	24.0	24.0		26.0	26.0		12.0	48.0		12.0	48.0	
Total Split (%)	21.8%	21.8%		23.6%	23.6%		10.9%	43.6%		10.9%	43.6%	
Maximum Green (s)	19.0	19.0		21.0	21.0		7.0	43.0		7.0	43.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	12.0	12.0		13.0	13.0			13.0			6.0	
Pedestrian Calls (#/hr)	8	8		4	4			7			14	
Act Effct Green (s)		8.2			13.5		65.5	65.5		75.2	75.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.07			0.12		0.60	0.60		0.68	0.68	
v/c Ratio		0.06			0.70		0.01	0.67		0.38	0.23	
Control Delay		0.4			33.6		15.7	20.0		23.8	10.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		0.4			33.6		15.7	20.0		23.8	10.0	
LOS		A			C		B	C		C	B	
Approach Delay		0.4			33.6			20.0			12.1	
Approach LOS		A			C			B			B	
Queue Length 50th (ft)		0			62		2	317		19	62	
Queue Length 95th (ft)		0			134		11	#660		78	184	
Internal Link Dist (ft)		20			1243			592			360	
Turn Bay Length (ft)							45			80		
Base Capacity (vph)		429			392		500	2028		257	2333	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.04			0.52		0.01	0.67		0.38	0.23	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 14 (13%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 18.9 Intersection LOS: B
Intersection Capacity Utilization 70.6% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: 15th Ave NE & NE 150th St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	32	198	53	68	82	339	950	39	39	410	167
Future Volume (vph)	227	32	198	53	68	82	339	950	39	39	410	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	10	10	11	11	11	12	10	11	11	12
Storage Length (ft)	0		75	0		0	60		0	90		140
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor		0.99	0.97		1.00	0.96	0.99	1.00				0.96
Frt			0.850			0.850		0.994				0.850
Flt Protected		0.958			0.979		0.950			0.950		
Satd. Flow (prot)	0	1785	1478	0	1763	1531	1711	1849	0	1711	1801	1583
Flt Permitted		0.660			0.628		0.463			0.119		
Satd. Flow (perm)	0	1217	1428	0	1128	1476	827	1849	0	214	1801	1527
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			167			145		3				178
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		577			127			874			1332	
Travel Time (s)		13.1			3.5			17.0			25.9	
Confl. Peds. (#/hr)	6		5	5		6	6		4	4		6
Confl. Bikes (#/hr)			2			2			3			1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	241	34	211	56	72	87	361	1011	41	41	436	178
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	275	211	0	128	87	361	1052	0	41	436	178
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4		4	2			6		6
Detector Phase	4	4	4	4	4	4	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	12.0	21.0		12.0	23.0	23.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0	29.0	18.0	49.0		12.0	43.0	43.0
Total Split (%)	32.2%	32.2%	32.2%	32.2%	32.2%	32.2%	20.0%	54.4%		13.3%	47.8%	47.8%
Maximum Green (s)	24.0	24.0	24.0	24.0	24.0	24.0	13.0	44.0		7.0	38.0	38.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0		9.0			11.0	11.0
Pedestrian Calls (#/hr)	2	2	2	2	2	2		0			5	5
Act Effct Green (s)		22.7	22.7		22.7	22.7	50.5	50.5		39.3	39.3	39.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.25	0.25		0.25	0.25	0.56	0.56		0.44	0.44	0.44
v/c Ratio		0.90	0.44		0.45	0.18	0.61	1.01		0.22	0.55	0.23
Control Delay		64.7	10.4		33.6	1.8	23.6	55.1		18.2	22.7	3.5
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		64.7	10.4		33.6	1.8	23.6	55.1		18.2	22.7	3.5
LOS		E	B		C	A	C	E		B	C	A
Approach Delay		41.1			20.8			47.1			17.2	
Approach LOS		D			C			D			B	
Queue Length 50th (ft)		148	19		60	0	123	~703		13	184	0
Queue Length 95th (ft)		#288	77		115	9	198	#961		33	279	37
Internal Link Dist (ft)		497			47			794			1252	
Turn Bay Length (ft)			75				60			90		140
Base Capacity (vph)		324	503		300	499	591	1038		209	786	767
Starvation Cap Reductn		0	0		0	0	0	0		0	0	0
Spillback Cap Reductn		0	0		0	0	0	0		0	0	0
Storage Cap Reductn		0	0		0	0	0	0		0	0	0
Reduced v/c Ratio		0.85	0.42		0.43	0.17	0.61	1.01		0.20	0.55	0.23

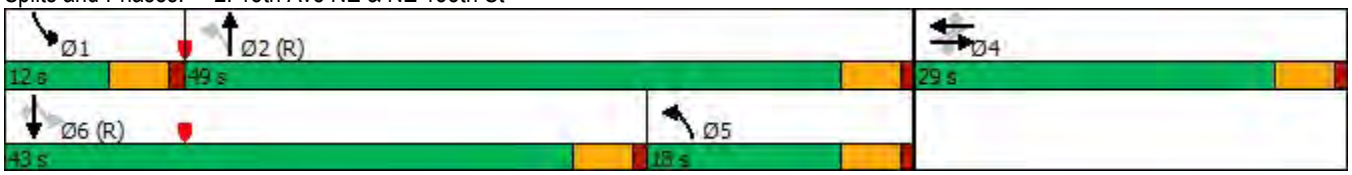
Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 36.9 Intersection LOS: D
Intersection Capacity Utilization 92.8% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 15th Ave NE & NE 155th St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	568	62	52	370	59	181	523	118	31	107	69
Future Volume (vph)	194	568	62	52	370	59	181	523	118	31	107	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	12	12	12	12	12	12
Storage Length (ft)	110		0	100		0	105		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Frt		0.985			0.979			0.972			0.941	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1769	0	1770	1817	0	1770	1803	0	1687	1656	0
Flt Permitted	0.340			0.190			0.636			0.178		
Satd. Flow (perm)	632	1769	0	354	1817	0	1183	1803	0	316	1656	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			17			26			75	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		572			796			673			531	
Travel Time (s)		13.0			18.1			15.3			12.1	
Confl. Peds. (#/hr)	3		3	3		3	1		2	2		1
Confl. Bikes (#/hr)			2			2						1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	7%	7%	7%
Adj. Flow (vph)	213	624	68	57	407	65	199	575	130	34	118	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	213	692	0	57	472	0	199	705	0	34	194	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	26.0	26.0		26.0	26.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.3%	47.3%		47.3%	47.3%		52.7%	52.7%		52.7%	52.7%	
Maximum Green (s)	21.0	21.0		21.0	21.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	5	5		5	5		7	7		7	7	
Act Effct Green (s)	21.1	21.1		21.1	21.1		22.5	22.5		22.5	22.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.42	0.42		0.42	0.42	
v/c Ratio	0.86	0.99		0.41	0.65		0.40	0.91		0.26	0.26	
Control Delay	52.2	51.5		23.5	18.5		13.6	33.6		16.0	7.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	52.2	51.5		23.5	18.5		13.6	33.6		16.0	7.3	
LOS	D	D		C	B		B	C		B	A	
Approach Delay		51.6			19.0			29.2			8.6	
Approach LOS		D			B			C			A	
Queue Length 50th (ft)	63	~222		13	119		42	192		7	22	
Queue Length 95th (ft)	#174	#427		#52	207		86	#389		26	55	
Internal Link Dist (ft)		492			716			593			451	
Turn Bay Length (ft)	110			100			105			160		
Base Capacity (vph)	248	702		139	724		531	824		141	785	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.86	0.99		0.41	0.65		0.37	0.86		0.24	0.25	

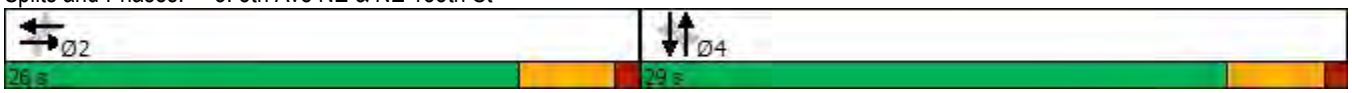
Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 53.6
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 33.2 Intersection LOS: C
Intersection Capacity Utilization 93.4% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 5th Ave NE & NE 155th St



Intersection	
Intersection Delay, s/veh	83.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	243	76	61	5	13	5	73	581	6	5	115	57
Future Vol, veh/h	243	76	61	5	13	5	73	581	6	5	115	57
Peak Hour Factor	0.97	0.97	0.97	0.75	0.75	0.75	0.87	0.87	0.87	0.75	0.75	0.75
Heavy Vehicles, %	1	1	1	5	5	5	0	0	0	1	1	1
Mvmt Flow	251	78	63	7	17	7	84	668	7	7	153	76
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	24.7	11.8	137.7	14.3
HCM LOS	C	B	F	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	64%	22%	3%
Vol Thru, %	88%	20%	57%	65%
Vol Right, %	1%	16%	22%	32%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	660	380	23	177
LT Vol	73	243	5	5
Through Vol	581	76	13	115
RT Vol	6	61	5	57
Lane Flow Rate	759	392	31	236
Geometry Grp	1	1	1	1
Degree of Util (X)	1.23	0.702	0.064	0.411
Departure Headway (Hd)	5.838	6.948	8.192	6.684
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	622	525	440	543
Service Time	3.885	4.948	6.192	4.684
HCM Lane V/C Ratio	1.22	0.747	0.07	0.435
HCM Control Delay	137.7	24.7	11.8	14.3
HCM Lane LOS	F	C	B	B
HCM 95th-tile Q	27.8	5.5	0.2	2

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	236	20	10	106	9	39	4	71	6	5	9
Future Vol, veh/h	4	236	20	10	106	9	39	4	71	6	5	9
Conflicting Peds, #/hr	6	0	0	0	0	6	2	0	4	4	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	78	78	78	66	66	66	64	64	64	44	44	44
Heavy Vehicles, %	2	2	2	3	3	3	2	2	2	0	0	0
Mvmt Flow	5	303	26	15	161	14	61	6	111	14	11	20

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	181	0	0	329	0	0	542	537	320	593	543	176
Stage 1	-	-	-	-	-	-	326	326	-	204	204	-
Stage 2	-	-	-	-	-	-	216	211	-	389	339	-
Critical Hdwy	4.12	-	-	4.13	-	-	7.12	6.52	6.22	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.5	-
Follow-up Hdwy	2.218	-	-	2.227	-	-	3.518	4.018	3.318	3.5	4	3.3
Pot Cap-1 Maneuver	1394	-	-	1225	-	-	451	450	721	420	450	872
Stage 1	-	-	-	-	-	-	687	648	-	803	737	-
Stage 2	-	-	-	-	-	-	786	728	-	639	643	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1386	-	-	1225	-	-	425	439	718	343	439	865
Mov Cap-2 Maneuver	-	-	-	-	-	-	425	439	-	343	439	-
Stage 1	-	-	-	-	-	-	684	645	-	795	722	-
Stage 2	-	-	-	-	-	-	743	713	-	531	640	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.6	14.1	12.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	571	1386	-	-	1225	-	-	509
HCM Lane V/C Ratio	0.312	0.004	-	-	0.012	-	-	0.089
HCM Control Delay (s)	14.1	7.6	0	-	8	0	-	12.8
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1.3	0	-	-	0	-	-	0.3

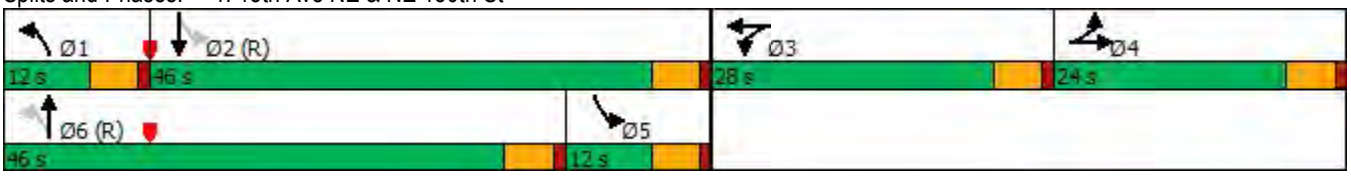
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	4	3	94	4	193	3	396	237	248	940	2
Future Volume (vph)	1	4	3	94	4	193	3	396	237	248	940	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	0		0	0		0	45		0	80		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.98			0.99		0.99	1.00	
Frt		0.949			0.910			0.944				
Flt Protected		0.994			0.984		0.950			0.950		
Satd. Flow (prot)	0	1780	0	0	1528	0	1752	3152	0	1752	3387	0
Flt Permitted		0.994			0.984		0.188			0.384		
Satd. Flow (perm)	0	1778	0	0	1525	0	347	3152	0	703	3387	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			82			129				
Link Speed (mph)		10			30			35			35	
Link Distance (ft)		100			1032			672			440	
Travel Time (s)		6.8			23.5			13.1			8.6	
Confl. Peds. (#/hr)	6		4	4		6	24		7	7		24
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	6%	6%	6%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	1	4	3	98	4	201	3	413	247	258	979	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	303	0	3	660	0	258	981	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases							6			2		
Detector Phase	4	4		3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	24.0	24.0		25.0	25.0		12.0	25.0		12.0	20.0	
Total Split (s)	24.0	24.0		28.0	28.0		12.0	46.0		12.0	46.0	
Total Split (%)	21.8%	21.8%		25.5%	25.5%		10.9%	41.8%		10.9%	41.8%	
Maximum Green (s)	19.0	19.0		23.0	23.0		7.0	41.0		7.0	41.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	12.0	12.0		13.0	13.0			13.0			6.0	
Pedestrian Calls (#/hr)	8	8		4	4			7			14	
Act Effct Green (s)		8.4			20.2		60.8	60.8		70.6	70.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.08			0.18		0.55	0.55		0.64	0.64	
v/c Ratio		0.06			0.87		0.01	0.37		0.50	0.45	
Control Delay		36.2			56.6		18.3	13.7		21.6	14.4	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		36.2			56.6		18.3	13.7		21.6	14.4	
LOS		D			E		B	B		C	B	
Approach Delay		36.3			56.6			13.8			15.9	
Approach LOS		D			E			B			B	
Queue Length 50th (ft)		3			151		1	91		56	134	
Queue Length 95th (ft)		17			#287		8	207		#230	394	
Internal Link Dist (ft)		20			952			592			360	
Turn Bay Length (ft)							45			80		
Base Capacity (vph)		309			384		281	1799		517	2172	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.03			0.79		0.01	0.37		0.50	0.45	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 14 (13%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 20.9 Intersection LOS: C
Intersection Capacity Utilization 69.4% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: 15th Ave NE & NE 150th St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	76	340	34	26	12	237	276	84	111	933	344
Future Volume (vph)	63	76	340	34	26	12	237	276	84	111	933	344
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	10	10	11	11	11	12	10	11	11	12
Storage Length (ft)	0		75	0		0	60		0	90		140
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor		1.00	0.97		1.00	0.97		0.99		1.00		0.97
Frt			0.850			0.850		0.965				0.850
Flt Protected		0.978			0.973		0.950			0.950		
Satd. Flow (prot)	0	1822	1478	0	1144	994	1662	1736	0	1711	1801	1583
Flt Permitted		0.824			0.782		0.096			0.401		
Satd. Flow (perm)	0	1532	1438	0	918	968	168	1736	0	721	1801	1530
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			278			145		26				195
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		577			127			874			1332	
Travel Time (s)		13.1			3.5			17.0			25.9	
Confl. Peds. (#/hr)	2		1	1		2	5		1	1		5
Confl. Bikes (#/hr)			3			1			2			2
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	100%	0%	57%	5%	5%	5%	2%	2%	2%
Adj. Flow (vph)	67	81	362	36	28	13	252	294	89	118	993	366
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	148	362	0	64	13	252	383	0	118	993	366
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4		4	2			6		6
Detector Phase	4	4	4	4	4	4	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	12.0	21.0		12.0	23.0	23.0
Total Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	15.0	53.0		12.0	50.0	50.0
Total Split (%)	27.8%	27.8%	27.8%	27.8%	27.8%	27.8%	16.7%	58.9%		13.3%	55.6%	55.6%
Maximum Green (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	48.0		7.0	45.0	45.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0		9.0			11.0	11.0
Pedestrian Calls (#/hr)	2	2	2	2	2	2		0			5	5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)		16.5	16.5		16.5	16.5	51.6	51.6		48.5	48.5	48.5
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.57	0.57		0.54	0.54	0.54
v/c Ratio		0.53	0.74		0.38	0.04	0.96	0.38		0.25	1.02	0.40
Control Delay		40.2	18.8		38.8	0.2	81.3	11.6		12.3	57.8	7.1
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		40.2	18.8		38.8	0.2	81.3	11.6		12.3	57.8	7.1
LOS		D	B		D	A	F	B		B	E	A
Approach Delay		25.0			32.3			39.3			41.6	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)		79	43		33	0	94	98		30	523	45
Queue Length 95th (ft)		132	137		69	0	#254	179		64	#883	115
Internal Link Dist (ft)		497			47			794			1252	
Turn Bay Length (ft)			75				60			90		140
Base Capacity (vph)		340	535		204	327	262	1006		469	970	914
Starvation Cap Reductn		0	0		0	0	0	0		0	0	0
Spillback Cap Reductn		0	0		0	0	0	0		0	0	0
Storage Cap Reductn		0	0		0	0	0	0		0	0	0
Reduced v/c Ratio		0.44	0.68		0.31	0.04	0.96	0.38		0.25	1.02	0.40

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 37.7 Intersection LOS: D
Intersection Capacity Utilization 95.5% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: 15th Ave NE & NE 155th St

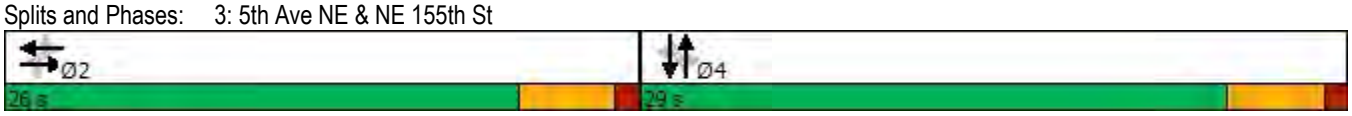
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	298	79	178	453	24	120	80	102	70	420	176
Future Volume (vph)	62	298	79	178	453	24	120	80	102	70	420	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	12	12	12	12	12	12
Storage Length (ft)	110		0	100		0	105		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor	1.00	0.99		1.00	1.00		1.00				0.99	
Frt		0.969			0.993			0.916			0.956	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1703	1670	0	1736	1812	0	1703	1642	0	1687	1686	0
Flt Permitted	0.295			0.420			0.223			0.637		
Satd. Flow (perm)	527	1670	0	765	1812	0	399	1642	0	1131	1686	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			6			107			49	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		572			796			673			531	
Travel Time (s)		13.0			18.1			15.3			12.1	
Confl. Peds. (#/hr)	5		4	4		5	2					2
Confl. Bikes (#/hr)			1			1						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	6%	6%	6%	4%	4%	4%	6%	6%	6%	7%	7%	7%
Adj. Flow (vph)	65	314	83	187	477	25	126	84	107	74	442	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	397	0	187	502	0	126	191	0	74	627	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	26.0	26.0		26.0	26.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.3%	47.3%		47.3%	47.3%		52.7%	52.7%		52.7%	52.7%	
Maximum Green (s)	21.0	21.0		21.0	21.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	5	5		5	5		7	7		7	7	
Act Effct Green (s)	17.4	17.4		17.4	17.4		20.2	20.2		20.2	20.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.42	0.42		0.42	0.42	
v/c Ratio	0.34	0.64		0.68	0.76		0.75	0.25		0.16	0.85	
Control Delay	18.1	17.8		29.2	23.2		45.5	5.8		10.4	26.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.1	17.8		29.2	23.2		45.5	5.8		10.4	26.0	
LOS	B	B		C	C		D	A		B	C	
Approach Delay		17.9			24.8			21.6			24.4	
Approach LOS		B			C			C			C	
Queue Length 50th (ft)	14	93		48	133		32	15		14	157	
Queue Length 95th (ft)	43	170		#132	#246		#114	47		35	#334	
Internal Link Dist (ft)		492			716			593			451	
Turn Bay Length (ft)	110			100			105			160		
Base Capacity (vph)	241	780		351	834		209	911		592	907	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.51		0.53	0.60		0.60	0.21		0.13	0.69	

Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 48.2
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 22.7 Intersection LOS: C
Intersection Capacity Utilization 86.6% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 5th Ave NE & NE 155th St



Intersection	
Intersection Delay, s/veh	140.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	230	33	118	31	45	13	84	166	1	3	311	156
Future Vol, veh/h	230	33	118	31	45	13	84	166	1	3	311	156
Peak Hour Factor	0.64	0.64	0.64	0.63	0.63	0.63	0.63	0.63	0.63	0.73	0.73	0.73
Heavy Vehicles, %	1	1	1	5	5	5	0	0	0	1	1	1
Mvmt Flow	359	52	184	49	71	21	133	263	2	4	426	214
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	165.4	20.6	52.7	197.1
HCM LOS	F	C	F	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	33%	60%	35%	1%
Vol Thru, %	66%	9%	51%	66%
Vol Right, %	0%	31%	15%	33%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	251	381	89	470
LT Vol	84	230	31	3
Through Vol	166	33	45	311
RT Vol	1	118	13	156
Lane Flow Rate	398	595	141	644
Geometry Grp	1	1	1	1
Degree of Util (X)	0.88	1.272	0.364	1.352
Departure Headway (Hd)	9.545	8.475	11.269	8.35
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	382	435	322	438
Service Time	7.545	6.475	9.269	6.35
HCM Lane V/C Ratio	1.042	1.368	0.438	1.47
HCM Control Delay	52.7	165.4	20.6	197.1
HCM Lane LOS	F	F	C	F
HCM 95th-tile Q	8.7	23.2	1.6	27.1

Intersection	
Int Delay, s/veh	1.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	278	42	23	314	27	23
Future Vol, veh/h	278	42	23	314	27	23
Conflicting Peds, #/hr	0	0	0	0	12	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	64	64	78	78	57	57
Heavy Vehicles, %	1	1	5	5	7	7
Mvmt Flow	434	66	29	403	47	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	500	0	940	472
Stage 1	-	-	-	-	467	-
Stage 2	-	-	-	-	473	-
Critical Hdwy	-	-	4.15	-	6.47	6.27
Critical Hdwy Stg 1	-	-	-	-	5.47	-
Critical Hdwy Stg 2	-	-	-	-	5.47	-
Follow-up Hdwy	-	-	2.245	-	3.563	3.363
Pot Cap-1 Maneuver	-	-	1049	-	287	582
Stage 1	-	-	-	-	621	-
Stage 2	-	-	-	-	617	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1049	-	274	579
Mov Cap-2 Maneuver	-	-	-	-	274	-
Stage 1	-	-	-	-	621	-
Stage 2	-	-	-	-	588	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	18.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	362	-	-	1049	-
HCM Lane V/C Ratio	0.242	-	-	0.028	-
HCM Control Delay (s)	18.1	-	-	8.5	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0.1	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	186	314	318	23	6	52
Future Vol, veh/h	186	314	318	23	6	52
Conflicting Peds, #/hr	15	0	0	15	5	5
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	64	64	78	78	92	92
Heavy Vehicles, %	1	1	5	5	2	2
Mvmt Flow	291	491	408	29	7	57

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	452	0	-	0	1516	443
Stage 1	-	-	-	-	438	-
Stage 2	-	-	-	-	1078	-
Critical Hdwy	4.11	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.209	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1114	-	-	-	131	615
Stage 1	-	-	-	-	651	-
Stage 2	-	-	-	-	327	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1098	-	-	-	81	603
Mov Cap-2 Maneuver	-	-	-	-	81	-
Stage 1	-	-	-	-	408	-
Stage 2	-	-	-	-	322	-

Approach	EB	WB	SB
HCM Control Delay, s	3.5	0	17
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1098	-	-	-	362
HCM Lane V/C Ratio	0.265	-	-	-	0.174
HCM Control Delay (s)	9.5	0	-	-	17
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	1.1	-	-	-	0.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	11	196	1	258	6	1231	174	158	568	8
Future Volume (vph)	5	0	11	196	1	258	6	1231	174	158	568	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	0		0	0		0	45		0	80		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.99			1.00			1.00	
Frt		0.907			0.923			0.981			0.998	
Flt Protected		0.985			0.979		0.950			0.950		
Satd. Flow (prot)	0	1679	0	0	1608	0	1787	3377	0	1770	3411	0
Flt Permitted		0.985			0.979		0.334			0.084		
Satd. Flow (perm)	0	1677	0	0	1605	0	628	3377	0	156	3411	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		169			55			16			1	
Link Speed (mph)		10			30			35			35	
Link Distance (ft)		100			1031			672			440	
Travel Time (s)		6.8			23.4			13.1			8.6	
Confl. Peds. (#/hr)	5		2	2		5	12		4	4		12
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Adj. Flow (vph)	5	0	11	200	1	263	6	1256	178	161	580	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	0	0	464	0	6	1434	0	161	588	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases							6			2		
Detector Phase	4	4		3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	24.0	24.0		25.0	25.0		12.0	25.0		12.0	20.0	
Total Split (s)	24.0	24.0		29.0	29.0		12.0	45.0		12.0	45.0	
Total Split (%)	21.8%	21.8%		26.4%	26.4%		10.9%	40.9%		10.9%	40.9%	
Maximum Green (s)	19.0	19.0		24.0	24.0		7.0	40.0		7.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	12.0	12.0		13.0	13.0			13.0			6.0	
Pedestrian Calls (#/hr)	8	8		4	4			7			14	
Act Effct Green (s)		8.2			24.0		55.0	55.0		64.7	64.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.07			0.22		0.50	0.50		0.59	0.59	
v/c Ratio		0.06			1.18		0.02	0.85		0.83	0.29	
Control Delay		0.4			139.1		19.2	31.1		50.7	6.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		0.4			139.1		19.2	31.1		50.7	6.0	
LOS		A			F		B	C		D	A	
Approach Delay		0.4			139.1			31.1			15.6	
Approach LOS		A			F			C			B	
Queue Length 50th (ft)		0			~362		2	454		53	50	
Queue Length 95th (ft)		0			#567		12	#770		m#189	m141	
Internal Link Dist (ft)		20			951			592			360	
Turn Bay Length (ft)							45			80		
Base Capacity (vph)		429			393		388	1696		194	2007	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.04			1.18		0.02	0.85		0.83	0.29	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 14 (13%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.18
Intersection Signal Delay: 45.3 Intersection LOS: D
Intersection Capacity Utilization 94.6% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: 15th Ave NE & NE 150th St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	49	233	122	130	88	419	963	69	41	416	167
Future Volume (vph)	227	49	233	122	130	88	419	963	69	41	416	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	10	10	11	11	11	12	10	11	11	12
Storage Length (ft)	0		75	0		0	60		0	90		140
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor		0.99	0.96		1.00	0.96	0.99	1.00				0.96
Frt			0.850			0.850		0.990				0.850
Flt Protected		0.960			0.976		0.950			0.950		
Satd. Flow (prot)	0	1788	1478	0	1757	1531	1711	1840	0	1711	1801	1583
Flt Permitted		0.444			0.491		0.385			0.118		
Satd. Flow (perm)	0	821	1425	0	881	1471	687	1840	0	212	1801	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158			119		5				136
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		577			127			874			1332	
Travel Time (s)		13.1			3.5			17.0			25.9	
Confl. Peds. (#/hr)	6		5	5		6	6		4	4		6
Confl. Bikes (#/hr)			2			2			3			1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	241	52	248	130	138	94	446	1024	73	44	443	178
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	293	248	0	268	94	446	1097	0	44	443	178
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			4		5	2		1	6	
Permitted Phases	4		4	4		4	2			6		6
Detector Phase	4	4	4	4	4	4	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	15.0	15.0	15.0	5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	25.0	25.0	25.0	25.0	25.0	25.0	12.0	21.0		12.0	23.0	23.0
Total Split (s)	38.0	38.0	38.0	38.0	38.0	38.0	27.0	60.0		12.0	45.0	45.0
Total Split (%)	34.5%	34.5%	34.5%	34.5%	34.5%	34.5%	24.5%	54.5%		10.9%	40.9%	40.9%
Maximum Green (s)	33.0	33.0	33.0	33.0	33.0	33.0	22.0	55.0		7.0	40.0	40.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag							Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)	13.0	13.0	13.0	13.0	13.0	13.0		9.0			11.0	11.0
Pedestrian Calls (#/hr)	2	2	2	2	2	2		0			5	5
Act Effct Green (s)		33.0	33.0		33.0	33.0	57.9	57.9		40.0	40.0	40.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.30	0.30		0.30	0.30	0.53	0.53		0.36	0.36	0.36
v/c Ratio		1.19	0.46		1.02	0.18	0.79	1.13		0.28	0.68	0.28
Control Delay		154.7	14.5		99.0	3.7	22.7	84.8		27.4	35.8	8.3
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		154.7	14.5		99.0	3.7	22.7	84.8		27.4	35.8	8.3
LOS		F	B		F	A	C	F		C	D	A
Approach Delay		90.4			74.3			66.8			27.9	
Approach LOS		F			E			E			C	
Queue Length 50th (ft)		~250	47		~194	0	91	~902		20	261	19
Queue Length 95th (ft)		#421	121		#365	25	m164	m#1070		45	377	68
Internal Link Dist (ft)		497			47			794			1252	
Turn Bay Length (ft)			75				60			90		140
Base Capacity (vph)		246	538		264	524	566	970		172	654	640
Starvation Cap Reductn		0	0		0	0	0	0		0	0	0
Spillback Cap Reductn		0	0		0	0	0	0		0	0	0
Storage Cap Reductn		0	0		0	0	0	0		0	0	0
Reduced v/c Ratio		1.19	0.46		1.02	0.18	0.79	1.13		0.26	0.68	0.28

Intersection Summary

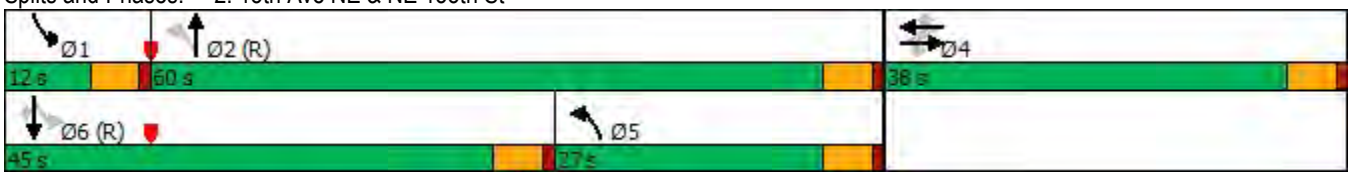
Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.19
Intersection Signal Delay: 63.5 Intersection LOS: E
Intersection Capacity Utilization 105.3% ICU Level of Service G
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 15th Ave NE & NE 155th St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	586	62	139	417	62	181	523	150	32	107	69
Future Volume (vph)	194	586	62	139	417	62	181	523	150	32	107	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	12	12	12	12	12	12
Storage Length (ft)	110		0	100		0	105		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Frt		0.986			0.981			0.967			0.941	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1771	0	1770	1821	0	1770	1792	0	1687	1656	0
Flt Permitted	0.275			0.190			0.636			0.173		
Satd. Flow (perm)	511	1771	0	354	1821	0	1183	1792	0	307	1656	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			16			33			75	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		572			796			673			531	
Travel Time (s)		13.0			18.1			15.3			12.1	
Confl. Peds. (#/hr)	3		3	3		3	1		2	2		1
Confl. Bikes (#/hr)			2			2						1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	7%	7%	7%
Adj. Flow (vph)	213	644	68	153	458	68	199	575	165	35	118	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	213	712	0	153	526	0	199	740	0	35	194	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	26.0	26.0		26.0	26.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.3%	47.3%		47.3%	47.3%		52.7%	52.7%		52.7%	52.7%	
Maximum Green (s)	21.0	21.0		21.0	21.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	5	5		5	5		7	7		7	7	
Act Effct Green (s)	21.0	21.0		21.0	21.0		23.1	23.1		23.1	23.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.43	0.43		0.43	0.43	
v/c Ratio	1.08	1.02		1.12	0.73		0.39	0.95		0.27	0.26	
Control Delay	110.1	61.8		137.8	22.0		13.5	38.6		16.5	7.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	110.1	61.8		137.8	22.0		13.5	38.6		16.5	7.2	
LOS	F	E		F	C		B	D		B	A	
Approach Delay		72.9			48.1			33.2			8.7	
Approach LOS		E			D			C			A	
Queue Length 50th (ft)	~82	~261		~61	139		42	207		7	22	
Queue Length 95th (ft)	#190	#444		#155	#278		86	#418		27	55	
Internal Link Dist (ft)		492			716			593			451	
Turn Bay Length (ft)	110			100			105			160		
Base Capacity (vph)	198	695		137	717		525	813		135	776	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	1.08	1.02		1.12	0.73		0.38	0.91		0.26	0.25	

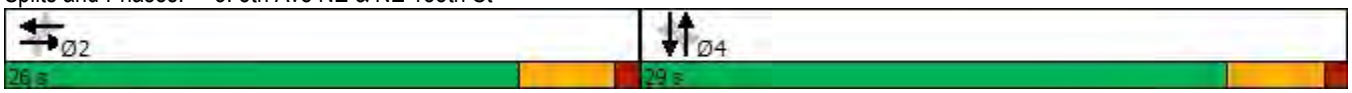
Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 54.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 48.1 Intersection LOS: D
Intersection Capacity Utilization 99.9% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 5th Ave NE & NE 155th St



Intersection	
Intersection Delay, s/veh	94.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	244	77	92	5	13	5	85	581	6	5	115	56
Future Vol, veh/h	244	77	92	5	13	5	85	581	6	5	115	56
Peak Hour Factor	0.97	0.97	0.97	0.75	0.75	0.75	0.87	0.87	0.87	0.75	0.75	0.75
Heavy Vehicles, %	1	1	1	5	5	5	0	0	0	1	1	1
Mvmt Flow	252	79	95	7	17	7	98	668	7	7	153	75
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	28.7	12	158.2	14.7
HCM LOS	D	B	F	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	13%	59%	22%	3%
Vol Thru, %	86%	19%	57%	65%
Vol Right, %	1%	22%	22%	32%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	672	413	23	176
LT Vol	85	244	5	5
Through Vol	581	77	13	115
RT Vol	6	92	5	56
Lane Flow Rate	772	426	31	235
Geometry Grp	1	1	1	1
Degree of Util (X)	1.28	0.758	0.065	0.417
Departure Headway (Hd)	5.964	6.995	8.436	6.892
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	610	519	427	526
Service Time	4.016	4.995	6.436	4.892
HCM Lane V/C Ratio	1.266	0.821	0.073	0.447
HCM Control Delay	158.2	28.7	12	14.7
HCM Lane LOS	F	D	B	B
HCM 95th-tile Q	30.4	6.6	0.2	2

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	275	32	10	126	46	71
Future Vol, veh/h	275	32	10	126	46	71
Conflicting Peds, #/hr	0	0	0	0	2	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	66	66	64	64
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	353	41	15	191	72	111

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	394	0	597	378
Stage 1	-	-	-	-	374	-
Stage 2	-	-	-	-	223	-
Critical Hdwy	-	-	4.13	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.227	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1159	-	466	669
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	814	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1159	-	459	666
Mov Cap-2 Maneuver	-	-	-	-	459	-
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	801	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	566	-	-	1159	-
HCM Lane V/C Ratio	0.323	-	-	0.013	-
HCM Control Delay (s)	14.4	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.4	-	-	0	-

Intersection						
Int Delay, s/veh	5.4					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	106	277	161	11	30	248
Future Vol, veh/h	106	277	161	11	30	248
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	78	66	66	92	92
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	136	355	244	17	33	270

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	261	0	-	0	880	253
Stage 1	-	-	-	-	253	-
Stage 2	-	-	-	-	627	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1303	-	-	-	318	786
Stage 1	-	-	-	-	789	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1303	-	-	-	277	786
Mov Cap-2 Maneuver	-	-	-	-	277	-
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	532	-

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1303	-	-	-	656
HCM Lane V/C Ratio	0.104	-	-	-	0.461
HCM Control Delay (s)	8.1	0	-	-	15.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	2.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	11	196	1	258	6	1231	174	158	568	8
Future Volume (vph)	5	0	11	196	1	258	6	1231	174	158	568	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	11	11	12	11	11
Storage Length (ft)	0		0	0		0	45		0	80		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			0.99			1.00			1.00	
Frt		0.907			0.923			0.981			0.998	
Flt Protected		0.985			0.979		0.950			0.950		
Satd. Flow (prot)	0	1679	0	0	1608	0	1787	3377	0	1770	3411	0
Flt Permitted		0.985			0.979		0.334			0.084		
Satd. Flow (perm)	0	1677	0	0	1605	0	628	3377	0	156	3411	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		169			55			16			1	
Link Speed (mph)		10			30			35			35	
Link Distance (ft)		100			1031			672			440	
Travel Time (s)		6.8			23.4			13.1			8.6	
Confl. Peds. (#/hr)	5		2	2		5	12		4	4		12
Confl. Bikes (#/hr)						1						1
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Adj. Flow (vph)	5	0	11	200	1	263	6	1256	178	161	580	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	0	0	464	0	6	1434	0	161	588	0
Turn Type	Split	NA		Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	4	4		3	3		1	6		5	2	
Permitted Phases							6			2		
Detector Phase	4	4		3	3		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		10.0	10.0		5.0	15.0		5.0	15.0	
Minimum Split (s)	24.0	24.0		25.0	25.0		12.0	25.0		12.0	20.0	
Total Split (s)	24.0	24.0		29.0	29.0		12.0	45.0		12.0	45.0	
Total Split (%)	21.8%	21.8%		26.4%	26.4%		10.9%	40.9%		10.9%	40.9%	
Maximum Green (s)	19.0	19.0		24.0	24.0		7.0	40.0		7.0	40.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lead		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Flash Dont Walk (s)	12.0	12.0		13.0	13.0			13.0			6.0	
Pedestrian Calls (#/hr)	8	8		4	4			7			14	
Act Effct Green (s)		8.2			24.0		55.0	55.0		64.7	64.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio		0.07			0.22		0.50	0.50		0.59	0.59	
v/c Ratio		0.06			1.18		0.02	0.85		0.83	0.29	
Control Delay		0.4			139.1		19.2	31.1		51.9	5.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		0.4			139.1		19.2	31.1		51.9	5.9	
LOS		A			F		B	C		D	A	
Approach Delay		0.4			139.1			31.1			15.8	
Approach LOS		A			F			C			B	
Queue Length 50th (ft)		0			~362		2	454		53	48	
Queue Length 95th (ft)		0			#567		12	#770		m#211	152	
Internal Link Dist (ft)		20			951			592			360	
Turn Bay Length (ft)							45			80		
Base Capacity (vph)		429			393		388	1696		194	2007	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.04			1.18		0.02	0.85		0.83	0.29	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 14 (13%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.18
Intersection Signal Delay: 45.4 Intersection LOS: D
Intersection Capacity Utilization 94.6% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: 15th Ave NE & NE 150th St

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	227	49	233	122	130	88	419	963	69	41	416	167
Future Volume (vph)	227	49	233	122	130	88	419	963	69	41	416	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	12	10	10	11	11	11	12	10	11	11	12
Storage Length (ft)	115		0	40		0	60		0	90		140
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor	0.99	0.97		0.99	0.98		0.99	1.00				0.96
Frt		0.876			0.939			0.990				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1652	1581	0	1652	1663	0	1711	1840	0	1711	1801	1583
Flt Permitted	0.314			0.226			0.418			0.104		
Satd. Flow (perm)	541	1581	0	391	1663	0	746	1840	0	187	1801	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191			27			5				140
Link Speed (mph)		30			25			35			35	
Link Distance (ft)		577			127			874			1332	
Travel Time (s)		13.1			3.5			17.0			25.9	
Confl. Peds. (#/hr)	6		5	5		6	6		4	4		6
Confl. Bikes (#/hr)			2			2			3			1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Adj. Flow (vph)	241	52	248	130	138	94	446	1024	73	44	443	178
Shared Lane Traffic (%)												
Lane Group Flow (vph)	241	300	0	130	232	0	446	1097	0	44	443	178
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	4.0	15.0		4.0	15.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	12.0	25.0		12.0	25.0		12.0	21.0		12.0	23.0	23.0
Total Split (s)	12.0	25.0		12.0	25.0		26.0	61.0		12.0	47.0	47.0
Total Split (%)	10.9%	22.7%		10.9%	22.7%		23.6%	55.5%		10.9%	42.7%	42.7%
Maximum Green (s)	8.0	20.0		8.0	20.0		21.0	56.0		7.0	42.0	42.0
Yellow Time (s)	3.5	4.0		3.5	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	0.5	1.0		0.5	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	5.0		4.0	5.0		5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	2.0		3.0	2.0		2.0	2.0		2.0	2.0	2.0
Recall Mode	None	None		None	None		None	C-Max		None	C-Max	C-Max
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		13.0			13.0			9.0			11.0	11.0
Pedestrian Calls (#/hr)		5			5			5			5	5
Act Effct Green (s)	26.7	17.7		26.7	17.7		61.1	61.1		44.3	44.3	44.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.24	0.16		0.24	0.16		0.56	0.56		0.40	0.40	0.40
v/c Ratio	1.14	0.72		0.70	0.80		0.74	1.07		0.28	0.61	0.26
Control Delay	138.7	26.5		51.9	59.5		18.4	59.3		25.6	31.1	7.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	138.7	26.5		51.9	59.5		18.4	59.3		25.6	31.1	7.3
LOS	F	C		D	E		B	E		C	C	A
Approach Delay		76.5			56.8			47.5			24.3	
Approach LOS		E			E			D			C	
Queue Length 50th (ft)	~163	70		71	140		87	~874		19	247	16
Queue Length 95th (ft)	#269	168		#135	#242		m156	m#1057		43	366	63
Internal Link Dist (ft)		497			47			794			1252	
Turn Bay Length (ft)	115			40			60			90		140
Base Capacity (vph)	212	443		186	324		599	1025		172	724	695
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	1.14	0.68		0.70	0.72		0.74	1.07		0.26	0.61	0.26

Intersection Summary

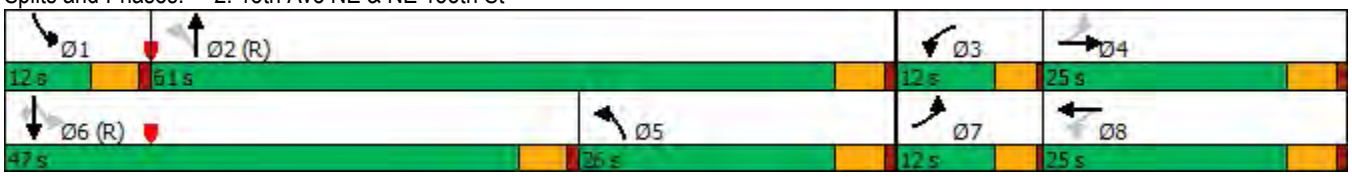
Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 48.7 Intersection LOS: D
Intersection Capacity Utilization 100.7% ICU Level of Service G
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: 15th Ave NE & NE 155th St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	586	62	139	417	62	181	523	150	32	107	69
Future Volume (vph)	194	586	62	139	417	62	181	523	150	32	107	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	11	12	12	12	12	12	12	12	12	12
Storage Length (ft)	110		0	100		0	105		0	160		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. 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
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Frt		0.986			0.981			0.967			0.941	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1771	0	1770	1821	0	1770	1792	0	1687	1656	0
Flt Permitted	0.275			0.190			0.636			0.173		
Satd. Flow (perm)	511	1771	0	354	1821	0	1183	1792	0	307	1656	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			16			33			75	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		572			796			673			531	
Travel Time (s)		13.0			18.1			15.3			12.1	
Confl. Peds. (#/hr)	3		3	3		3	1		2	2		1
Confl. Bikes (#/hr)			2			2						1
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	7%	7%	7%
Adj. Flow (vph)	213	644	68	153	458	68	199	575	165	35	118	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	213	712	0	153	526	0	199	740	0	35	194	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		24.0	24.0		24.0	24.0	
Total Split (s)	26.0	26.0		26.0	26.0		29.0	29.0		29.0	29.0	
Total Split (%)	47.3%	47.3%		47.3%	47.3%		52.7%	52.7%		52.7%	52.7%	
Maximum Green (s)	21.0	21.0		21.0	21.0		24.0	24.0		24.0	24.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Recall Mode	None	None		None	None		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	5	5		5	5		7	7		7	7	
Act Effct Green (s)	21.0	21.0		21.0	21.0		23.1	23.1		23.1	23.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.43	0.43		0.43	0.43	
v/c Ratio	1.08	1.02		1.12	0.73		0.39	0.95		0.27	0.26	
Control Delay	110.1	61.8		137.8	22.0		13.5	38.6		16.5	7.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	110.1	61.8		137.8	22.0		13.5	38.6		16.5	7.2	
LOS	F	E		F	C		B	D		B	A	
Approach Delay		72.9			48.1			33.2			8.7	
Approach LOS		E			D			C			A	
Queue Length 50th (ft)	~82	~261		~61	139		42	207		7	22	
Queue Length 95th (ft)	#190	#444		#155	#278		86	#418		27	55	
Internal Link Dist (ft)		492			716			593			451	
Turn Bay Length (ft)	110			100			105			160		
Base Capacity (vph)	198	695		137	717		525	813		135	776	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	1.08	1.02		1.12	0.73		0.38	0.91		0.26	0.25	

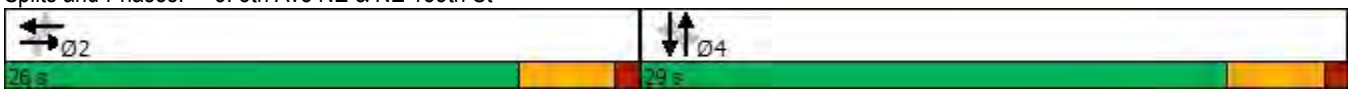
Intersection Summary

Area Type: Other
Cycle Length: 55
Actuated Cycle Length: 54.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 48.1 Intersection LOS: D
Intersection Capacity Utilization 99.9% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: 5th Ave NE & NE 155th St



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	77	92	5	13	5	85	581	6	5	115	56
Future Volume (vph)	244	77	92	5	13	5	85	581	6	5	115	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. 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
Ped Bike Factor		0.99			0.99			1.00			0.99	
Frt		0.970			0.970			0.999			0.957	
Flt Protected		0.971			0.989			0.994			0.999	
Satd. Flow (prot)	0	1763	0	0	1724	0	0	1886	0	0	1772	0
Flt Permitted		0.800			0.904			0.925			0.979	
Satd. Flow (perm)	0	1445	0	0	1575	0	0	1751	0	0	1736	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			7			1			58	
Link Speed (mph)		25			30			30			30	
Link Distance (ft)		1337			645			437			419	
Travel Time (s)		36.5			14.7			9.9			9.5	
Confl. Peds. (#/hr)	6		1	1		6	16		3	3		16
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.97	0.97	0.97	0.75	0.75	0.75	0.87	0.87	0.87	0.75	0.75	0.75
Heavy Vehicles (%)	1%	1%	1%	5%	5%	5%	0%	0%	0%	1%	1%	1%
Adj. Flow (vph)	252	79	95	7	17	7	98	668	7	7	153	75
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	426	0	0	31	0	0	773	0	0	235	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		23.0	23.0		23.0	23.0	
Total Split (s)	24.0	24.0		24.0	24.0		36.0	36.0		36.0	36.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Maximum Green (s)	19.0	19.0		19.0	19.0		31.0	31.0		31.0	31.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	5	5		5	5		5	5		5	5	
Act Effct Green (s)		18.1			18.1			28.1			28.1	
Actuated g/C Ratio		0.32			0.32			0.50			0.50	
v/c Ratio		0.89			0.06			0.88			0.26	
Control Delay		42.3			12.5			27.3			6.9	
Queue Delay		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		42.3			12.5			27.3			6.9	
LOS		D			B			C			A	
Approach Delay		42.3			12.5			27.3			6.9	
Approach LOS		D			B			C			A	
Queue Length 50th (ft)		137			6			221			32	
Queue Length 95th (ft)		#295			18			#412			50	
Internal Link Dist (ft)		1257			565			357			339	
Turn Bay Length (ft)												
Base Capacity (vph)		510			543			977			993	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.84			0.06			0.79			0.24	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 56.4
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 28.1 Intersection LOS: C
Intersection Capacity Utilization 90.2% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: 25th Ave NE & NE 150th St

Intersection	
Int Delay, s/veh	3.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	275	32	10	126	46	71
Future Vol, veh/h	275	32	10	126	46	71
Conflicting Peds, #/hr	0	0	0	0	2	4
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	66	66	64	64
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	353	41	15	191	72	111

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	394	0	597	378
Stage 1	-	-	-	-	374	-
Stage 2	-	-	-	-	223	-
Critical Hdwy	-	-	4.13	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.227	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1159	-	466	669
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	814	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1159	-	459	666
Mov Cap-2 Maneuver	-	-	-	-	459	-
Stage 1	-	-	-	-	696	-
Stage 2	-	-	-	-	801	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	14.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	566	-	-	1159	-
HCM Lane V/C Ratio	0.323	-	-	0.013	-
HCM Control Delay (s)	14.4	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.4	-	-	0	-

Intersection						
Int Delay, s/veh	5.4					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	106	277	161	11	30	248
Future Vol, veh/h	106	277	161	11	30	248
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	78	66	66	92	92
Heavy Vehicles, %	2	2	3	3	2	2
Mvmt Flow	136	355	244	17	33	270

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	261	0	-	0	880	253
Stage 1	-	-	-	-	253	-
Stage 2	-	-	-	-	627	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1303	-	-	-	318	786
Stage 1	-	-	-	-	789	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1303	-	-	-	277	786
Mov Cap-2 Maneuver	-	-	-	-	277	-
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	532	-

Approach	EB	WB	SB
HCM Control Delay, s	2.2	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1303	-	-	-	656
HCM Lane V/C Ratio	0.104	-	-	-	0.461
HCM Control Delay (s)	8.1	0	-	-	15.1
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	2.4

APPENDIX C
Detailed Trip Generation Calculations

DSHS Fircrest School: Existing Site - Trip Generation Estimates

Proposed Uses	ITE LU Code	ITE Equation / Rate	Daily Trips	AM Peak Hour Trips				PM Peak Hour Trips			
				ITE Equation / Rate	In	Out	Total	ITE Equation / Rate	In	Out	Total
Nursing Home	620	*3.06 trips/bed*	370	*0.14 trips/bed*	*72%* 12	*28%* 5	17	*0.14 trips/bed*	*33%* 6	*67%* 11	17
Assisted Living	254	*2.60 trips/bed*	420	*0.18 trips/bed*	*60%* 17	*40%* 12	29	*0.24 trips/bed*	*39%* 15	*61%* 23	38
Single-Tenant Office	715	*13.07 trips/1,000 sf*	640	*T = 1.89(X) - 7.67*	*89%* 76	*11%* 9	85	*T = 1.72(X) + 7.89*	*15%* 14	*85%* 78	92
Off-Leash Dog Area	N/A	*27.59 trips/1,000 sf (assumes 10xPM)*	40	*2.76 trips/1,000 sf (assumes same as PM)*	*56%* 2	*44%* 2	4	*2.76 trips/acre1,000 sf **	*56%* 2	*44%* 2	4
Total for Existing Uses			**1,470**		**107**	**28**	**135**		**37**	**114**	**151**

** Rate from Off-Leash Dog Area(s) at the Chambers Creek Properties, Heffron Transportation, Inc., November 14, 2006, [Weekday PM peak hour counts/observations at 3 OLAs (Grandview, Marymoor, and Magnuson)*

DSHS Fircrest School: No Action - Trip Generation Estimates (TRANSIT ADJUSTED)

Transit 6%

Proposed Uses	ITE LU Code	ITE Equation / Rate	Daily Trips	AM Peak Hour Trips				PM Peak Hour Trips			
				ITE Equation / Rate	In	Out	Total	ITE Equation / Rate	In	Out	Total
Nursing Home	620	*3.06 trips/bed*	350	*0.14 trips/bed*	*72%* 12	*28%* 4	16	*0.14 trips/bed*	*33%* 6	*67%* 10	16
Assisted Living	254	*2.60 trips/bed*	390	*0.18 trips/bed*	*60%* 16	*40%* 11	27	*0.24 trips/bed*	*39%* 14	*61%* 22	36
Single-Tenant Office	715	*13.07 trips/1,000 sf*	1,110	*T = 1.89(X) - 7.67*	*89%* 135	*11%* 17	152	*T = 1.72(X) + 7.89*	*15%* 23	*85%* 130	153
Off-Leash Dog Area	N/A	*27.59 trips/1,000 sf*	40	*2.76 trips/1,000 sf*	*56%* 2	*44%* 2	4	*2.76 trips/acre1,000 sf **	*56%* 2	*44%* 2	4
Total for Fully Occupied Existing Uses			**1,890**		**165**	**34**	**199**		**45**	**164**	**209**

** Rate from Off-Leash Dog Area(s) at the Chambers Creek Properties, Heffron Transportation, Inc., November 14, 2006, [Weekday PM peak hour counts/observations at 3 OLAs (Grandview, Marymoor, and Magnuson)*

DSHS Fircrest School: Proposed Master Plan - Trip Generation Estimates (TRANSIT ADJUSTED)

Transit 6%

Proposed Uses	ITE LU Code	ITE Equation / Rate	Daily Trips	AM Peak Hour Trips				PM Peak Hour Trips			
				ITE Equation / Rate	In	Out	Total	ITE Equation / Rate	In	Out	Total
Nursing Home	620	*3.06 trips/bed*	350	*0.14 trips/bed*	*72%* 12	*28%* 4	16	*0.14 trips/bed*	*33%* 5	*67%* 11	16
Single-Tenant Office	715	*13.07 trips/1,000 sf*	1110	*T = 1.89(X) - 7.67*	*89%* 135	*11%* 17	152	*T = 1.72(X) + 7.89*	*15%* 23	*85%* 130	153
Behavioral Health Hospital	610	*10.77 trips/1,000 sf*	530	Ln(T) = 0.60 Ln(X) + 2.52	*67%* 84	*33%* 41	125	*Ln(T) = 0.64 Ln(X) + 2.27*	*35%* 40	*65%* 74	114
Assisted Living	254	*2.60 trips/bed*	370	*0.18 trips/bed*	*60%* 16	*40%* 10	26	*0.24 trips/bed*	*39%* 13	*61%* 21	34
General Office	710	*Ln(T) = 0.87Ln(X) + 3.05*	310	*Ln(T) = 0.86Ln(X) + 1.16*	*88%* 40	*12%* 5	45	*Ln(T) = 0.83Ln(X) + 1.29*	*17%* 8	*83%* 39	47
Day Care Center	565	*47.62 trips/1,000 sf*	110	*11.00 trips/1,000 sf*	*53%* 14	*47%* 12	26	*11.12 trips/1,000 sf*	*47%* 12	*53%* 14	26
Medical/Dental Office	720	*36.00 trips/1,000 sf*	2,880	*Ln(T) = 0.90Ln(X) + 1.34*	*79%* 155	*21%* 41	196	*T = 4.07(X) - 3.17*	*30%* 97	*70%* 225	322
Clinic	630	*37.60 trips/1,000 sf*	0	*2.75 trips/1,000 sf*	*81%* 0	*19%* 0	0	*3.69 trips/1,000 sf*	*30%* 0	*70%* 0	0
Total for Retained and Proposed New Uses			**5,660**		**456**	**130**	**586**		**198**	**514**	**712**
Transit trip estimates			**361**				**37**				**45**
Net Change for Total Site			**3,770**		**291**	**96**	**387**		**153**	**350**	**503**
Allocation for DSHS Elements			*470*		*82*	*38*	*120*		*36*	*122*	*108*
Allocation for Development by Others			*3,300*		*209*	*58*	*267*		*117*	*278*	*395*