



Neighborhood
Congestion
Reduction

156th Avenue SE Intersections Study



KPG

July 2019

156th Avenue SE Intersections Study

Prepared for:

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June 2019

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Introduction

In November 2016, voters passed the Neighborhood Safety, Connectivity and Congestion Levy, which helps the city address a backlog of important projects. The levy provides approximately \$2 million per year for the Neighborhood Congestion Reduction program that focuses on reducing motor vehicle congestion. Levy funding pays for the planning, public outreach, design and construction of projects that rate the highest for reducing congestion.

This study recommends improvements for three intersections on 156th Avenue SE at Lake Hills Boulevard, SE 16th Street and SE 24th Street-SE 22nd Place. After this study is completed, the City will compare the benefits and costs of these three individual intersection projects with other Neighborhood Congestion Reduction projects throughout the city to determine which projects will move forward to design and construction.

Background

156th Avenue SE travels north-south through the eastern portion of the Lake Hills neighborhood, connecting to State Route 520 and the Microsoft Campus to the north, and Interstate 90 and the Eastgate area to the south. The study evaluates the 156th Avenue SE intersections at: Lake Hills Boulevard, near the Lake Hills Library and Shopping Center; SE 16th Street, near the Lake Hills Greenbelt produce stand and Tillicum Middle School; and the five-legged intersection at SE 24th Street and SE 22nd Place. **Figure 1** shows the study intersections.

During the morning and afternoon commutes, the three all-way stop-controlled intersections experience vehicle congestion and queuing. Other community concerns include cut-through traffic, vehicle speeds, difficulty accessing side streets and driveways, and missing sidewalks and crosswalks. The Lake Hills Boulevard intersection has the highest traffic volumes and longest vehicle delays of the three intersections. The SE 16th Street intersection has limited pedestrian facilities, and citizens have expressed concerns about vehicles approaching the intersection at high speeds. The SE 24th Street-SE 22nd Place intersection has limited pedestrian facilities and the all-way stop with five-legs is inefficient for traffic operations.

Purpose

The focus of this study is to identify intersection improvements that address existing traffic congestion and accommodate future 2035 volumes. Recommendations address safety, non-motorized mobility, and aesthetics as well as upgrading facilities to current design standards and accommodating the planned bicycle lanes on 156th Avenue SE. Outreach with the community was essential to understand transportation issues and concerns experienced by residents and stakeholders, and to receive feedback on improvement alternatives. For each intersection, an alternatives analysis evaluated the benefits and costs, including property and environmental impacts caused by widening for improvements.

An important product of the study is the development of preliminary (10 percent) engineering designs and cost estimates for the recommended improvements. This information will define the three intersection projects for the Neighborhood Congestion Reduction ranking process and enables the projects to pursue funding from grants and other City funding sources.



Figure 1. Vicinity Map and Study Intersections

Summary of Transportation Analysis

KPG completed the following tasks to analyze transportation conditions and select recommended alternatives for the study intersections.

- Analyzed existing transportation conditions, including collecting new traffic counts and creating Synchro/SimTraffic traffic operations models for the AM and PM peak hours.
- Analyzed five years of collision data.
- Developed 2035 AM and PM peak hour traffic volumes using future land use projections and the City of Bellevue's travel demand model.
- Analyzed 2035 AM and PM traffic operations for baseline conditions (without improvements) and for improvement alternatives, including enhanced all-way stop, signals, roundabouts, and other intersection treatments.
- Received input regarding community's transportation issues and concerns at a public open house on January 29, 2019.
- Identified preliminary recommended alternatives for the study intersections based on the transportation analysis and community input.
- Received community input on the preliminary recommended alternatives at a second open house on April 3, 2019.
- Finalized the recommended improvements for the three intersections.
- Developed conceptual (10 percent) engineering designs and cost estimates for the recommended improvements.
- Gathered community feedback on the recommended alternatives via an online questionnaire.

Recommendations

The recommended improvements are based on the findings of the transportation analysis and comments received from the community. Comments showed that the community is divided on whether or not vehicle capacity improvements are appropriate at the three intersections. A similar number of comments supported new signals or roundabouts to reduce congestion as there were comments expressing concern that congestion improvements will increase traffic volumes. The recommended improvements provide a balanced solution to 156th Avenue SE by adding a signal at the most congested intersection (Lake Hills Boulevard) and maintaining all-way stop control at the other two intersections to discourage cut-through traffic. The recommendations for the three intersections include the following.

Lake Hills Boulevard: Install a traffic signal and maintain the same number of lanes on each approach. Construct pedestrian improvements including relocating the marked crosswalks on the north and west legs by removing the southbound right-turn island.

SE 16th Street: Maintain the all-way stop and construct pedestrian and lighting improvements. Construct the missing segment of sidewalk along the south side of SE 16th Street, west of 156th Avenue SE, and add stamped pavement in advance of the crosswalks to enhance visibility.

SE 24th Street-SE 22nd Place: Maintain all-way stop, enhance lighting, and add or upgrade sidewalks at all intersection corners and construct a marked crosswalk with a pedestrian beacon (rectangular rapid flashing beacon) just north of the intersection on 156th Avenue SE.

Existing Conditions

This section describes the existing non-motorized facilities, transit service, roadway facilities, vehicle volumes, intersection operations and collision data.

Non-Motorized Facilities

As part of a 2019 repaving project, the City plans to add on-street bike lanes along both sides of 156th Avenue SE between Lake Hills Boulevard SE and SE 24th Street. **Figure 2** shows existing and planned bicycle lanes and multi-use paths adjacent to the study intersections.

The Lake Hills Boulevard intersection has sidewalks on both sides of all streets approaching this intersection, and marked crosswalks across all four legs. West of 156th Avenue SE, Lake Hills Boulevard has bike lanes on both sides of the street.

At the SE 16th Street intersection, there is a north-south multi-use path along the east side of 156th Avenue SE, and an east-west path that connects the Lake Hills Greenbelt to the Lake to Lake Trail that loops around Phantom Lake. The north and east crosswalks at the intersection provide marked crossings for the two trails. West of 156th Avenue SE, SE 16th Street has a sidewalk along the north side of the street. The southwest corner of the intersection does not have sidewalks or curb ramps.

At the SE 24th Street-SE 22nd Place intersection, there are sidewalks on the east side of 156th Avenue SE, on the north side of SE 22nd Place, and on both sides of SE 24th Street to the east of the intersection. The north leg of the intersection does not have a marked crosswalk.

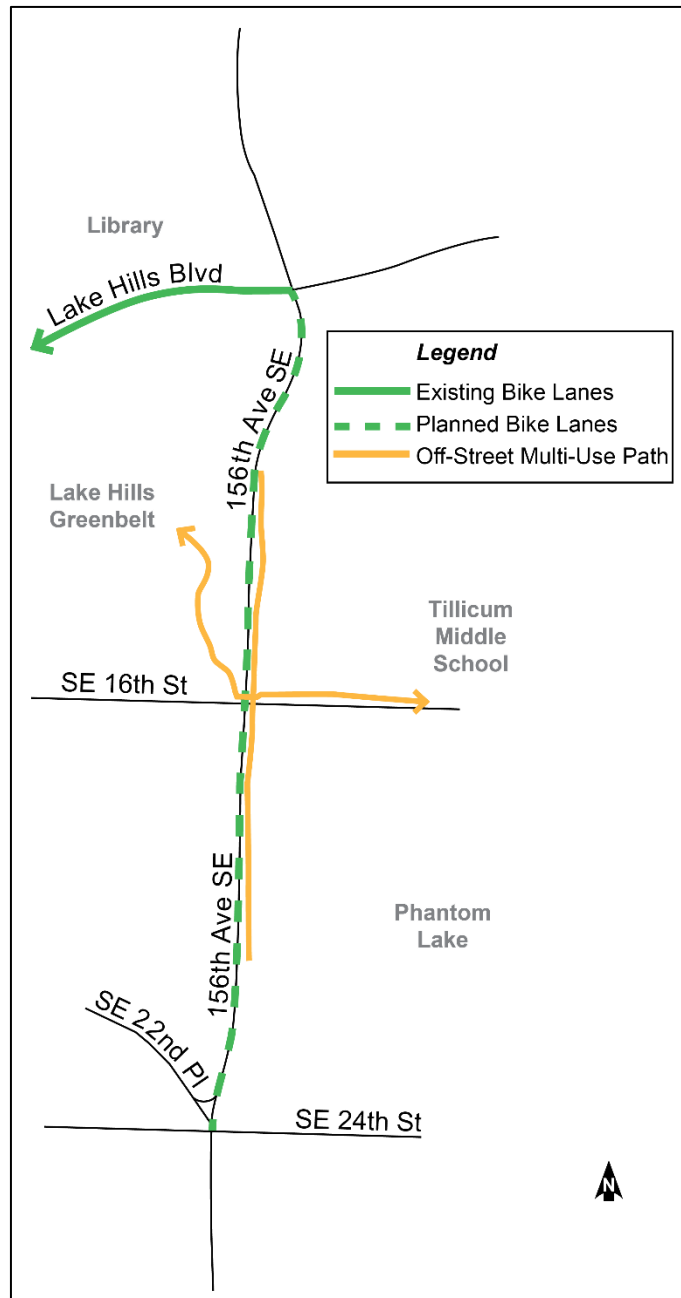


Figure 2. Bicycle Facilities

Transit Service

King County Metro Route 226 travels through the Lake Hills Boulevard intersection, using the north and west legs of the intersection as part of its service between the Bellevue Transit Center and the Eastgate Park and Ride. King County Metro Route 221 travels through the SE 24th Street-SE 22nd Place intersection, using the northwest and east legs of the intersection as part of its service between the Redmond Transit Center and the Eastgate Park and Ride. Both routes operate at 30 minute headways.

Roadway Facilities

The City classifies 156th Avenue NE, Lake Hills Boulevard, SE 16th Street, SE 22nd Place, and the east leg of SE 24th Street as collector arterials. The west leg of SE 24th Street is a neighborhood street.

156th Avenue SE is a two-lane roadway with a 25 mile per hour (mph) speed limit through the Lake Hills Boulevard intersection, a 30 mph speed limit through the SE 16th Street intersection, and a 30 mph speed limit north of SE 24th Street and a 25 mph speed limit south of SE 24th Street.

The traffic control at all three intersections is all-way stop. **Figure 3** shows the lane channelization at the study intersections.

The Lake Hills Boulevard intersection has single lane approaches at the west, south and east legs, and the north leg has a channelized right-turn lane that is controlled by a stop sign. The speed limit on Lake Hill Boulevard is 30 mph west of 156th Avenue SE and 25 mph east of 156th Avenue SE.

The SE 16th Street intersection has single lane approaches and SE 16th Street has a 25 mph speed limit.

The SE 24th Street-SE 22nd Place intersection has five legs with single-lane approaches, and channelized right-turn lane for southbound traffic turning from 156th Avenue SE onto SE 22nd Place. SE 22nd Place and SE 24th Street have 25 mph speed limits.

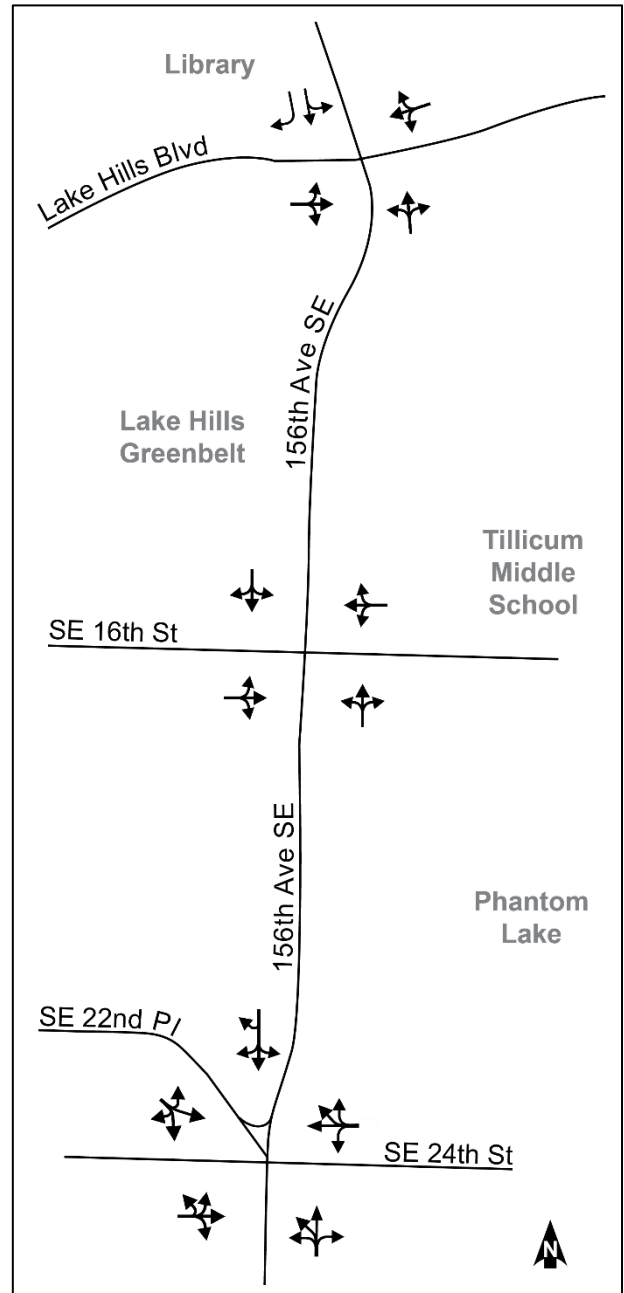


Figure 3. Intersection Channelization

Vehicle Volumes

Vehicle counts were done in November 2018 at the three intersections. The average weekday vehicle volumes on the segment of 156th Avenue SE between Lake Hill Boulevard and SE 24th Street range between 8,700 and 9,500 vehicles. On 156th Avenue SE, northbound is the peak travel direction in the morning, and southbound is the peak travel direction in the afternoon. **Figure 4** shows northbound and southbound vehicle volumes over the course of a 24-hour period on 156th Avenue SE at SE 16th Street. The highest weekday traffic volumes typically occur around 5:00 PM. The vehicle, pedestrian and bicycle counts are included in Appendix A.

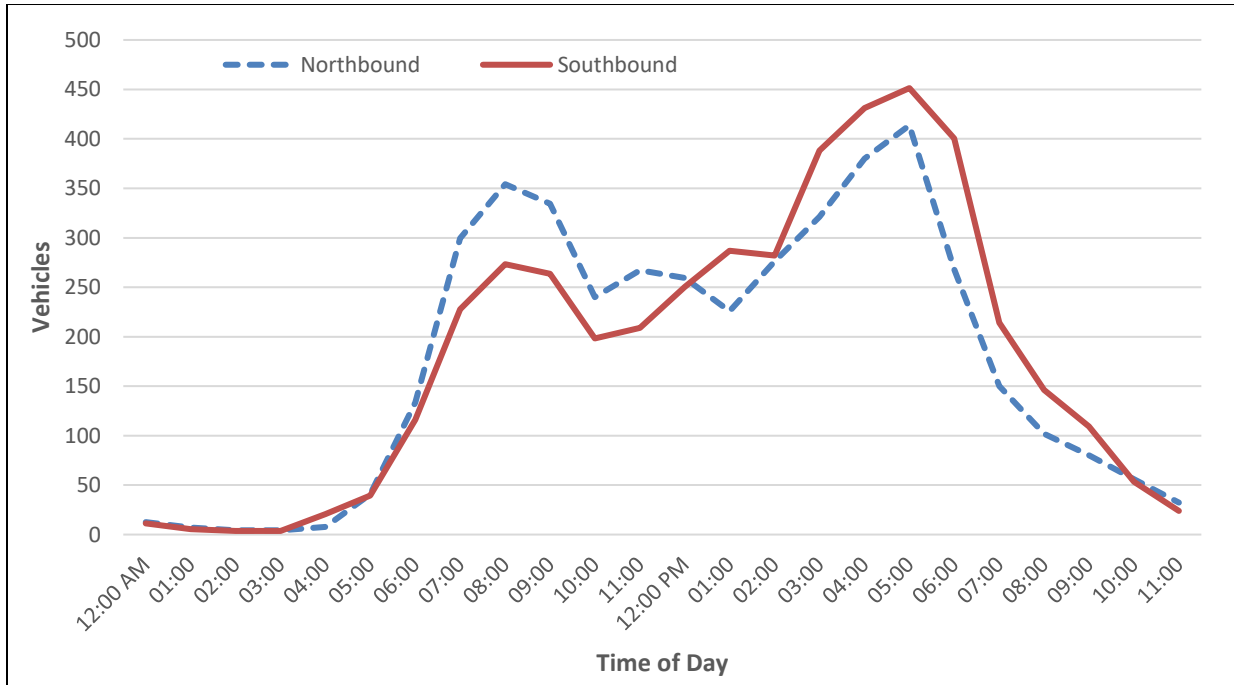


Figure 4. 2018 Existing Weekday Vehicle Volumes on 156th Avenue SE at SE 16th Street
Source: Counts from November 2018.

In addition to the weekday traffic counts, AM and PM peak hour turning movement counts were collected at the three intersections. The primary traffic movements at the study intersections are the northbound and southbound through movements on 156th Avenue SE. The highest turning volume at the study intersections is the southbound right turn at Lake Hills Boulevard, which is 299 vehicles during the PM peak hour.

Figure 5 shows the existing 2018 AM and PM peak hour traffic movements at the three study intersections.

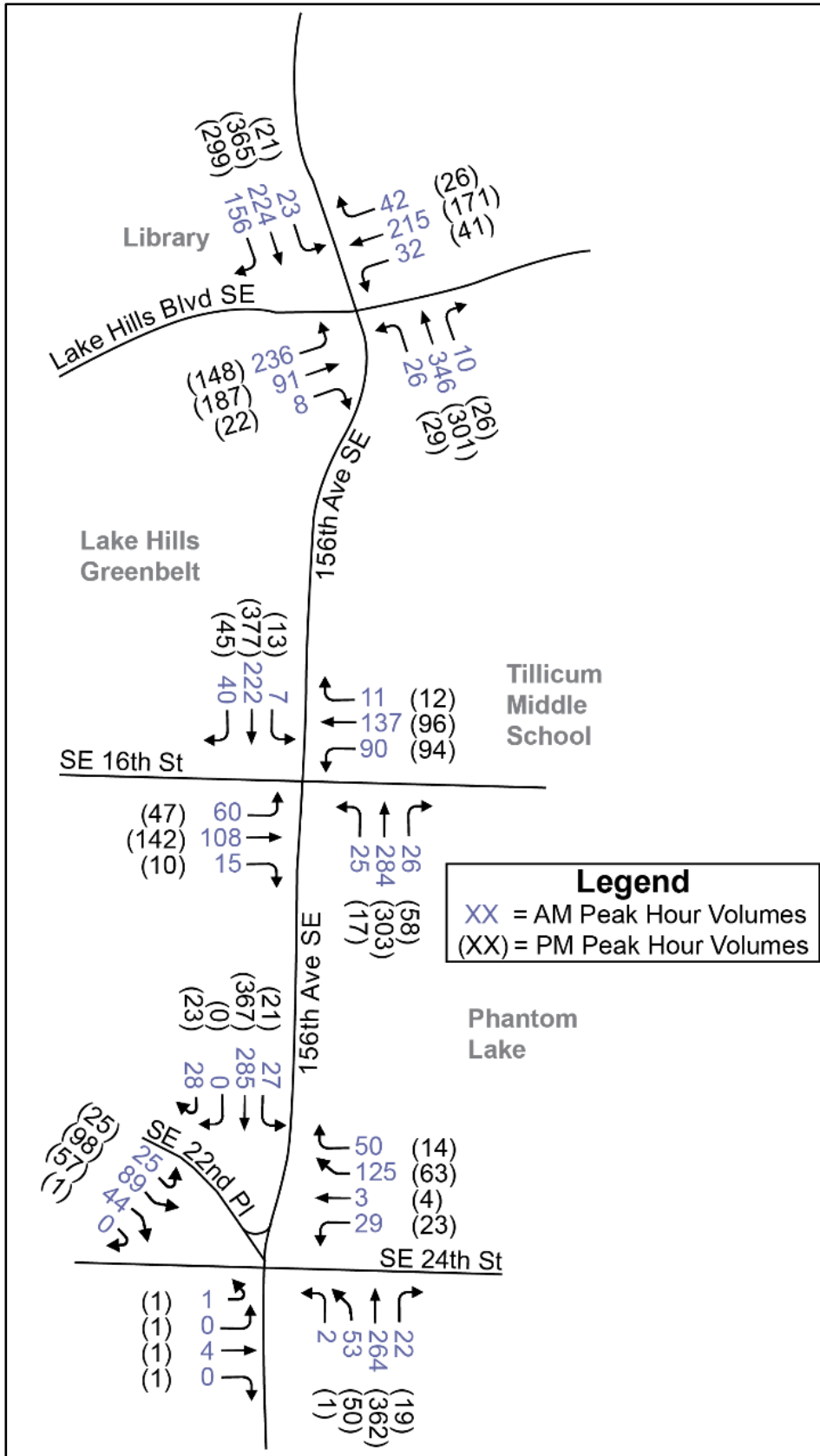


Figure 5. Existing AM and PM Peak Hour Intersection Vehicle Volumes

Intersection Operations

Intersection level of service (LOS) is a measurement of the traffic flow or traffic congestion at an intersection. Intersection LOS is defined by the average seconds of delay experienced by vehicles traveling through the intersection. The intersection LOS ranges from A to F, with LOS A assigned when minimal delays are present and LOS F when lengthy delays occur. **Table 1** shows the LOS criteria for unsignalized and signalized intersections.

Table 1. LOS Criteria for Unsignalized and Signalized Intersections

Level of Service	Unsignalized Average Delay per Vehicle (seconds)	Signalized Average Delay per Vehicle (seconds)
A	0 to 10	0 to 10
B	10 to 15	10 to 20
C	15 to 25	20 to 35
D	25 to 35	35 to 55
E	35 to 50	55 to 80
F	> 50	> 80

Source: 2010 Highway Capacity Manual.

KPG used Synchro 10 traffic modeling software to calculate intersection LOS and delay. **Table 2** shows the 2018 existing AM and PM peak hour intersection LOS and delay at the study intersections. The PM peak hour typically carries the highest traffic volumes and experiences the longest delays. During the PM peak hour, the two intersections at Lake Hills Boulevard/156th Avenue SE and SE 24th Street-SE 22nd Place/156th Avenue operate at LOS E. During the AM peak hour, the study intersections operate at LOS D or better. The calculations for the traffic operations analysis are included in Appendix B.

Table 2. Existing AM and PM Peak Hour Intersection LOS and Delay (seconds)

Intersection	Traffic Control	AM Peak Hour	PM Peak Hour
Lake Hills Blvd / 156th Ave SE ¹	All-Way Stop	D (33)	E (42)
SE 16th St / 156th Ave SE ¹	All-Way Stop	C (18)	D (27)
SE 24th St-SE 22nd Pl / 156th Ave SE ²	All-Way Stop	D (31)	E (38)

¹ LOS calculated using Highway Capacity Manual (HCM) 6th Edition methodology.

² HCM 6th Edition methodology cannot calculate operations for 5-leg intersections. Delay calculated using SimTraffic simulation.

Collision Analysis

WSDOT provided collision data for a five-year period from 7/1/2013 to 6/30/2018 for the three study intersections. During this time, there were a total of 33 reported collisions at the study intersections. No serious injuries or fatalities were reported.

Table 3 lists the number and type of intersection collisions, and the intersection collision rate, which calculates the number of collisions per million vehicles entering the intersection. Typical collision rates at unsignalized intersections are approximately 0.5 collisions per million entering vehicles.



View looking north on 156th Avenue SE toward Lake Hills Boulevard SE intersection.

The Lake Hills Boulevard intersection experienced the highest collision rate with 0.52 and most collisions with 18. The majority of these collisions (14) were angle collisions, mostly resulting from one vehicle failing to stop or yield the right of way at the stop sign and colliding with another vehicle. Twelve of these 14 angle collisions involved a vehicle traveling northbound and colliding with a vehicle traveling either eastbound or westbound through the intersection.

The SE 16th Street intersection experienced nine reported collisions; five rear-end collisions and four angle collisions. All four of the angle collisions involved a vehicle traveling northbound.

The SE 24th Street-SE 22nd Place intersection experienced six collisions; two rear-end collisions and four angle collisions.

Table 3. Five Year Intersection Collision Data

Intersections	Rear-End	Side-swipe	Angle	Ped/Bike	5 Year Total	Average Weekday Traffic	Intersection Collision Rate*
Lake Hills Blvd / 156th Ave SE	3	0	14	1	18	19,000	0.52
SE 16th St / 156th Ave SE	5	0	4	0	9	13,600	0.36
SE 24th St-SE 22nd Pl / 156th Ave SE	2	0	4	0	6	13,900	0.24
Totals	10	0	22	1	33		

Source: WSDOT data from 7/1/2013 to 6/30/2018.

*Intersection Collision Rate = number of collisions per million vehicles entering the intersection.

Traffic Signal Warrants Analysis

Traffic signal warrants use standard minimum thresholds for volumes, operations and safety to determine if a traffic signal could be an appropriate treatment at an intersection. A signal is not required to be installed if one or more signal warrants are met. A transportation engineering study is used to determine if a traffic signal will improve the overall safety and operation of the intersection.

Chapter 4C of the *Manual on Uniform Traffic Control Devices, 2009 Edition* (MUTCD) provides nine warrants to determine the need for a traffic signal at an intersection. The analysis found that all three study intersections meet three or more MUTCD warrants under existing transportation conditions. **Table 4** summarizes the results of the warrants analysis, which showed that all three study intersections meet the 4-hour and 8-hour signal warrants. The intersections with Lake Hills Boulevard and SE 16th Street also meet the peak hour warrant. All three intersections meet the Roadway Network warrant based on existing and forecasted traffic volumes, and the designation of 156th Avenue SE, Lake Hills Boulevard, SE 16th Street, and SE 24th Street-SE 22nd Place as collector arterials. The detailed MUTCD traffic signal warrant analyses are found in Appendix C.

Table 4. Signal Warrants Analysis Results for the Study Intersections

Warrant	Lake Hills Blvd	SE 16th St	SE 24th St-SE 22nd Pl
1. Eight-Hour Vehicular Volume	Met	Met	Met
2. Four-Hour Vehicular Volume	Met	Met	Met
3. Peak Hour	Met	Met	Not Met
4. Pedestrian Volume	Not Met	Not Met	Not Met
5. School Crossing	Not Applicable	Not Applicable	Not Applicable
6. Coordinated Signal System	Not Applicable	Not Applicable	Not Applicable
7. Crash Experience	Not Met	Not Met	Not Met
8. Roadway Network	Met	Met	Met
9. Intersection Near Grade Crossing	Not Applicable	Not Applicable	Not Applicable

Source: MUTCD Chapter 4C, Traffic Control Signal Needs Studies and vehicle and pedestrian counts from November 2018.

2035 Traffic Analysis and Modeling Methodology

This section describes the 2035 vehicle volumes and the traffic operations analysis for 2035 baseline conditions. Baseline conditions represents 2035 traffic volumes without vehicle improvements. Baseline conditions includes the 156th Avenue SE Bike Lanes Project.

2035 Vehicle Volumes

The City of Bellevue developed 2035 vehicle volumes using the City’s travel demand model that forecasts future volumes and travel patterns based on adopted land use projections. The future 2035 volumes are used to analyze baseline conditions and the improvement alternatives.

Table 5 shows the total vehicle volumes entering the study intersections during the AM and PM peak hours for 2018 existing and 2035. From 2018 to 2035, vehicle volume are forecast to increase between 6 percent and 17 percent. **Figure 6** shows the 2035 AM and PM peak hour vehicle volumes at the study intersections.

Table 5. 2018 Existing and 2035 Total Vehicle Volumes Entering the Study Intersections

Intersection	AM Peak Hour Volumes			PM Peak Hour Volumes		
	Existing	2035	Growth	Existing	2035	Growth
Lake Hills Blvd / 156th Ave SE	1,409	1,650	241 (17%)	1,636	1,860	224 (14%)
SE 16th St / 156th Ave SE	1,025	1,160	135 (13%)	1,214	1,290	76 (6%)
SE 24th St–SE 22nd Pl / 156th Ave SE	1,051	1,230	179 (17%)	1,132	1,230	98 (9%)

Source: Existing 2018 traffic counts and 2035 forecasts developed by City of Bellevue.

2035 Traffic Operations

Synchro / SimTraffic version 10 software was used to analyze and simulate traffic operations at the study intersections. The analysis used the Highway Capacity Manual (HCM) 6th Edition methodology to calculate intersection LOS and delay. HCM methodology cannot calculate operations at the SE 24th Street-SE 22nd Place intersection because it has 5-legs, and the LOS and delay were calculated used SimTraffic Simulation. By 2035, the Lake Hills Boulevard intersection and the SE 24th Street-SE 22nd Place intersection are forecast to operate at LOS F during the AM and PM Peak hours. **Table 6** shows 2035 AM and PM peak hour intersection LOS and seconds of delay for baseline conditions.

Table 6. 2035 Baseline AM and PM Peak Hour Intersection LOS and Delay (seconds)

Intersection	Traffic Control	AM Peak Hour	PM Peak Hour
Lake Hills Blvd / 156th Ave SE ¹	All-Way Stop	F (96)	F (70)
SE 16th St / 156th Ave SE ¹	All-Way Stop	E (39)	E (42)
SE 24th St–SE 22nd Pl / 156th Ave SE ²	All-Way Stop	F (68)	F (63)

¹ LOS calculated using HCM 6th Edition methodology.

² HCM 6th Edition methodology cannot calculate operations for 5-leg intersections. Delay calculated using SimTraffic simulation.

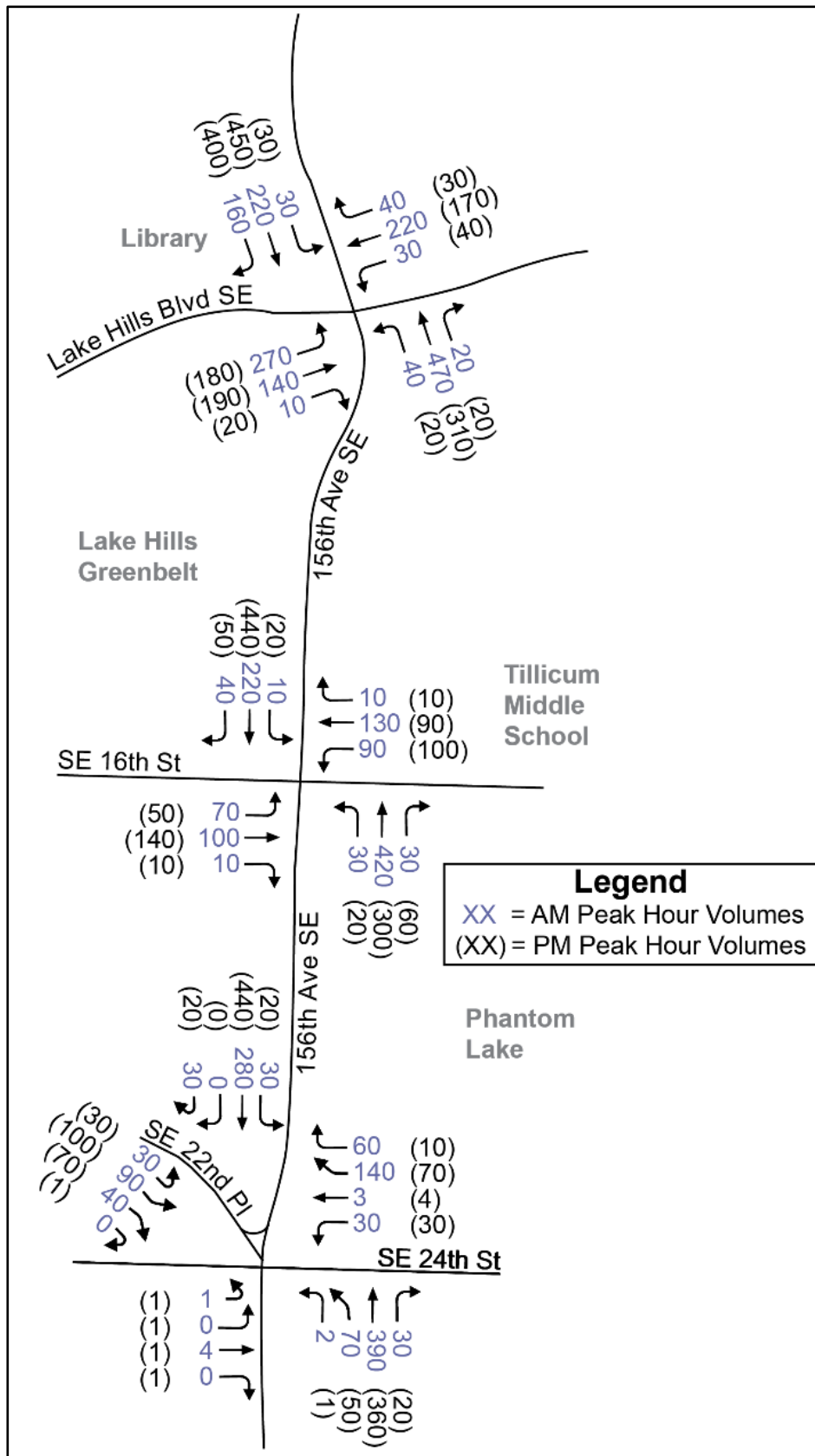


Figure 6. 2035 AM and PM Peak Hour Intersection Volumes

Alternatives Analysis

This section describes the evaluation criteria used for the alternatives analyses, traffic control options evaluated at the study intersections, and the individual alternatives analyses conducted for each of the three study intersections.

Evaluation Criteria

The evaluation criteria used for the alternatives analysis include the following:

- Congestion Reduction – intersection traffic operations, including vehicle delays and queuing.
- Safety – expected type and frequency of collisions, and traffic calming to reduce vehicle speeds.
- Pedestrian and Bicycle Mobility – facilities and crossing treatments.
- Property Impacts – how widening for improvements impacts properties, driveways and buildings.
- Environmental Impacts – how widening for improvements impacts wetlands and trees.
- Cost – related to construction, purchase of right of way, and property and environmental restoration.
- Community Input – comments received via email, phone, online questionnaire, and from the two public open houses.

Intersection Traffic Control Options

For each intersection, the following three traffic control options were evaluated: an enhanced all-way stop, a compact single-lane roundabout, and a traffic signal. While the specific design treatments of the three traffic control options will vary at each intersection; each option includes improvements to pedestrian and bicycle facilities, lighting, landscaping and aesthetics, and upgrading facilities to current design standards.

Table 7 compares the three intersection traffic control options using the evaluation criteria. The findings from the community outreach are covered in the next section.

Table 7. Comparison of Intersection Traffic Control Options

Criteria	Enhanced All-Way Stop	Compact Single-Lane Roundabout	Traffic Signal
Traffic Operations (Congestion Reduction)	A lower capacity option; all vehicles must stop before entering the intersection.	A higher capacity option; drivers entering the roundabout only need to yield to vehicles from one direction.	A higher capacity option; assigns the right of way for individual intersection movements.
Traffic Calming (Safety)	Traffic calming benefit as vehicles must stop.	Traffic calming benefit as vehicles must reduce speeds to navigate the roundabout. Improved operations may increase vehicle volumes.	Minimal traffic calming benefit. Improved operations may increase traffic volumes.
Collisions (Safety)	Collisions typically occur at lower speeds. Typically higher occurrence of angle collisions.	Design reduces the number of injury collisions such as angle and head-on crashes.	Collisions may occur at higher speeds. Typically higher occurrence of rear-end collisions.
Pedestrian and Bike Crossings	All vehicles stop at intersection crosswalks.	Single lane crossings with center refuge island.	Provides a dedicated walk phase with the corresponding through traffic movement.
Property and Environmental Impacts	Smaller property and environmental impacts.	Largest footprint has greatest property and environmental impacts.	Smaller property and environmental impacts.
Cost	Lowest cost.	Highest construction cost due to largest impact to right of way and need to restore properties.	Cost related to the installation of signal equipment.

Community Outreach

Public outreach included two community open houses, an online questionnaire, and a project page on the City's website. Residents and stakeholders along 156th Avenue SE were notified of the two community open houses via an invitation sent by mail and a meeting notice on the City's website. Completed comment cards received at the two open houses are included in Appendix D.

First Community Open House

The City of Bellevue and KPG held an open house at the Lake Hills Library on the evening of January 29, 2019 to listen to community issues, concerns and ideas for the three intersections. Information was presented using poster boards and aerial photos with staff available to receive questions from attendees. Boards included planning process and schedule, map of study intersections, traffic volumes and operations, characteristics of each intersection, an overview of potential improvements, and a list of next steps for the study.



January 29, 2019 Community Open House

An estimated 60 people attended the open house and 40 written comments were collected, in addition to six emails and calls received by City staff. The comments showed general support for pedestrian improvements at all three intersections. The community was divided on whether or not vehicle capacity improvements are appropriate at the three intersections. A similar number of comments supported new signals or roundabouts to reduce congestion as there were comments expressing concern that congestion improvements will increase traffic volumes. At the SE 24th Street-SE 22nd Place five-legged intersection, neighbors requested improvements to make the intersection less confusing.

Second Community Open House

The City of Bellevue and KPG held a second open house at the Lake Hills Boys and Girls Club on Wednesday, April 3, 2019 from 6:00 to 8:00 PM. Residents and stakeholders along the 156th Avenue SE corridor were notified of the event via an invitation sent by mail and a meeting notice on the City's website.

The purpose of the open house was to present the preliminary recommended alternatives for the three intersections and to receive community feedback on the proposed improvements. A series of project information boards summarized the first open house, comments received from the first open house, and conceptual designs for the preliminary recommended alternatives. The open house consisted of one hour for the public to review the boards, a 20-minute presentation, and a 40-minute question and answer session. Approximately 30 people attended and ten written comments were received. The majority of the verbal and written comments supported the preliminary recommended alternatives. Completed comment cards and a summary of the verbal comments are included in Appendix D.



April 3, 2019 Community Open House

Lake Hills Boulevard Intersection Alternatives Analysis

This section includes a description of the alternatives, multimodal LOS analysis, and screening analysis to select the recommended alternative for the Lake Hills Boulevard intersection.

Description of Alternatives

Many improvement options were evaluated for the Lake Hills Boulevard intersection, and the following three alternatives were selected for more detailed analysis:

Enhanced All-Way Stop: Maintain the same lane configuration with single-lane approaches, except the southbound approach includes a dedicated right-turn lane. Upgrade pedestrian facilities and realign crosswalks to directly connect between the corners of the intersection.

Roundabout: Single-lane approaches on all legs; new pedestrian crossings with center refuge islands.

Traffic Signal: Maintain the same lane configuration with single-lane approaches, except the southbound approach includes a dedicated right-turn lane. Upgrade pedestrian facilities and realign crosswalks to directly connect between the corners of the intersection.

Alternatives considered but not selected for further evaluation:

- Widen to add eastbound left-turn lane.
- Widen to add northbound left-turn lane and add protected left-turn signal phase.
- Remove southbound right-turn lane.
- Construct roundabout with southbound right-turn slip lane.

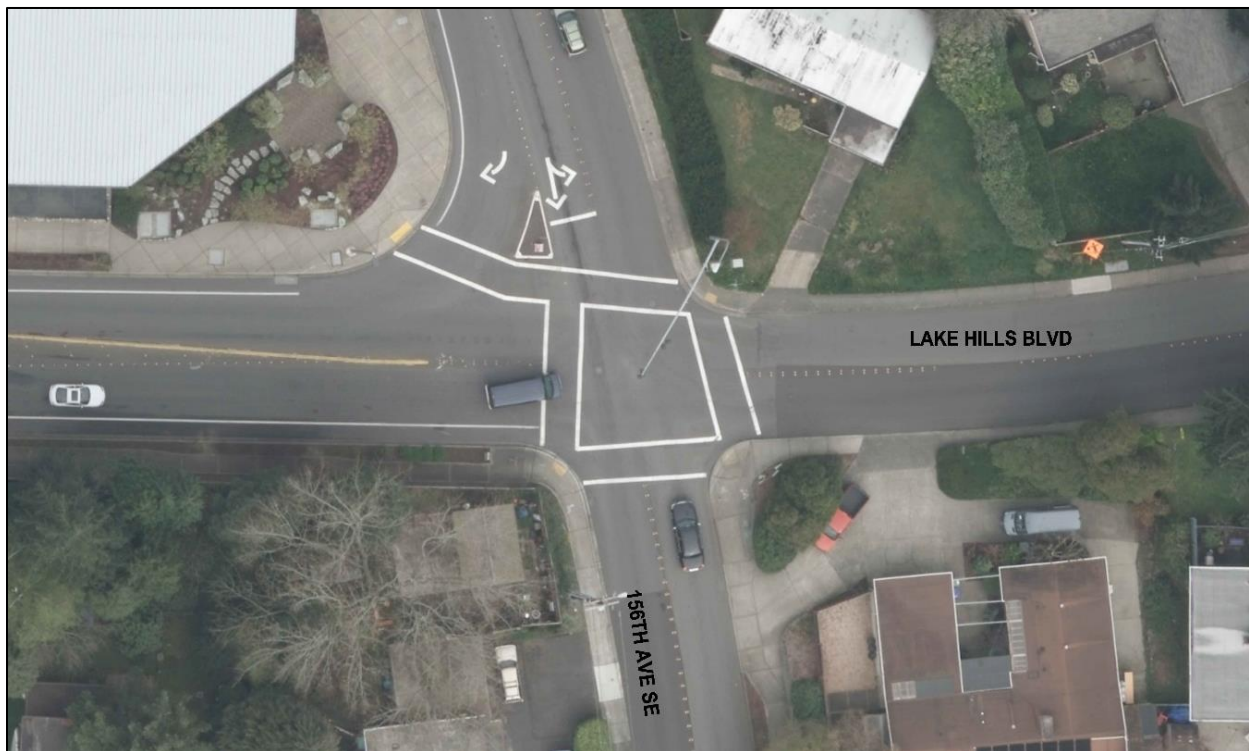


Figure 7. Existing Conditions at Lake Hills Boulevard Intersection

Multimodal LOS Analysis

Multimodal Level of Service (LOS) describes the operations of the transportation system by evaluating each of the travel modes. Pedestrian, bicycle and transit LOS are related to comfort, access, and safety while vehicle LOS is related to intersection capacity and efficiency of traffic flow. For this analysis, how each of the improvement alternatives impacts the different modes traveling through the intersection is compared to baseline conditions. Baseline conditions represent the existing transportation network with the addition of the 156th Avenue SE Bike Lanes Project and 2035 forecasted vehicle volumes. **Table 8** compares the alternatives to baseline conditions, providing a relative assessment of “Improves”, “No change”, or “Worsens” for each mode.

Table 8. Lake Hills Blvd Intersection Multimodal LOS – Alternatives Compared to Baseline

Mode	Enhanced All-Way Stop ¹	Roundabout ²	Signal ¹
Vehicle LOS			
LOS with 2035 Volumes	No change. AM peak hour: F (96 sec.) PM peak hour: F (70 sec.)	Improves. AM peak hour: A (6 sec.) PM peak hour: B (11 sec.)	Improves. AM peak hour: C (26 sec.) PM peak hour: B (19 sec.)
Pedestrian LOS			
Comfort, Access and Safety	Improves. Upgrades sidewalks and curb ramps to ADA standards.	Improves. Upgrades sidewalks and curb ramps to ADA standards. Crosswalks include center refuge islands.	Improves. Upgrades sidewalks and curb ramps. Realigns crosswalks to directly connect the corners of the intersection.
Bicycle LOS			
Level of Traffic Stress	Improves. Removes southbound island, reducing the potential for vehicle-bicycle conflicts.	Improves. Reduces vehicle speeds and the number of conflict points.	Improves. Adds two-stage turn queue box provided for northbound left turn to connect bike lanes.
Transit LOS			
Passenger Comfort, Access and Safety Traveling To Bus Stops	Improves. Upgrades sidewalks and curb ramps.	Improves. Upgrades sidewalks and curb ramps. Crosswalks include center refuge islands.	Improves. Upgrades sidewalks and curb ramps. Realigns crosswalks to directly connect the corners of the intersection.
Transit Travel Speed	No change. Traffic operations will be the same.	Improves. Better intersection LOS improves bus travel speed.	Improves. Better intersection LOS improves bus travel speed.

¹ Vehicle LOS and delay calculated using HCM 6th Edition methodology.

² Vehicle LOS and delay for roundabout calculated using SIDRA 8.

Alternatives Screening Analysis

The Lake Hills Boulevard intersection experiences the longest delays and queuing of the three intersections. Under baseline conditions, the intersection is forecast to operate at LOS F during the 2035 AM and PM peak hours.

The recommended alternative is a traffic signal because it improves traffic congestion with minimal impacts to adjacent properties. A traffic signal will improve operations from LOS F under 2035 baseline conditions to LOS B during the AM peak hour and LOS C during the PM peak hour. Of the three intersections, the Lake Hills Boulevard intersection received the most support for a traffic signal at the two community open houses.

A roundabout was not selected due to its large footprint that would have the greatest impact to adjacent properties. Driveways in the northeast, southeast and southwest corners of the intersection would need to be closed or relocated. This alternative would have the highest cost due to right of way acquisition and property restoration. **Figure 8** shows the conceptual design for a roundabout.

An all-way stop was not selected because the traffic operations worsen to LOS F during the 2035 AM and PM peak hours.

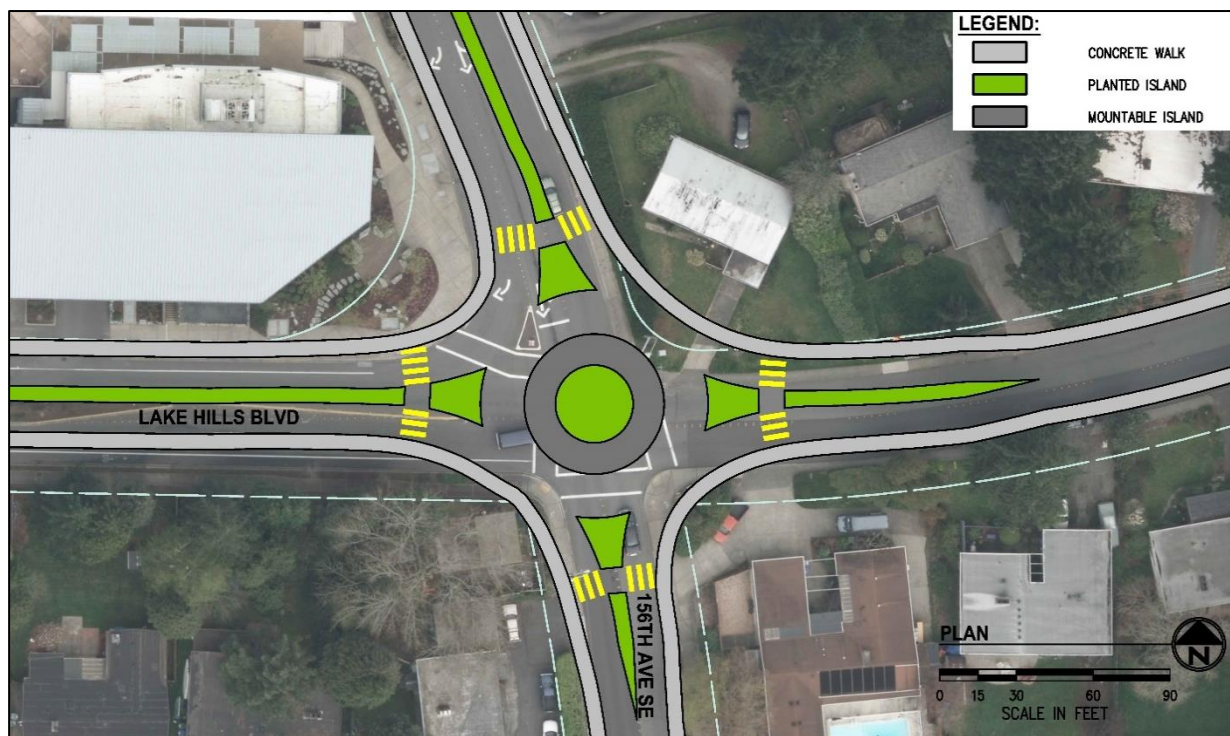


Figure 8. Roundabout Impacts to Adjacent Properties at Lake Hills Boulevard Intersection

Recommended Alternative

The recommended alternative is a traffic signal with the existing lane configuration; it has single lane approaches, except the southbound approach includes a right-turn lane to accommodate

this high-volume movement. Pedestrian improvements include removing the southbound right-turn island and directly connecting marked crosswalks to the intersection corners.

Intersection signal phasing will have the northbound and southbound traffic movements occurring at the same time with permissive left turns. The northbound and southbound left turn volumes are 40 vehicles or less during the 2035 AM and PM peak hours. Eastbound and westbound traffic have split phasing (not occurring at the same time). This will accommodate the high eastbound left turn movement, and separate the eastbound left turn from the north leg pedestrian crossing phase. The north leg crosswalk has the highest number of pedestrians at the intersection. To enhance pedestrian safety, the southbound right-turn movement will be restricted during the pedestrian crossing phases for the north leg and west leg crosswalks. A two-stage left turn queue box is provided to connect the northbound bike lane on 156th Avenue SE with the existing westbound bike lane on Lake Hills Boulevard. **Figure 9** shows the conceptual design of the traffic signal and a full-sized design is included in Appendix E.

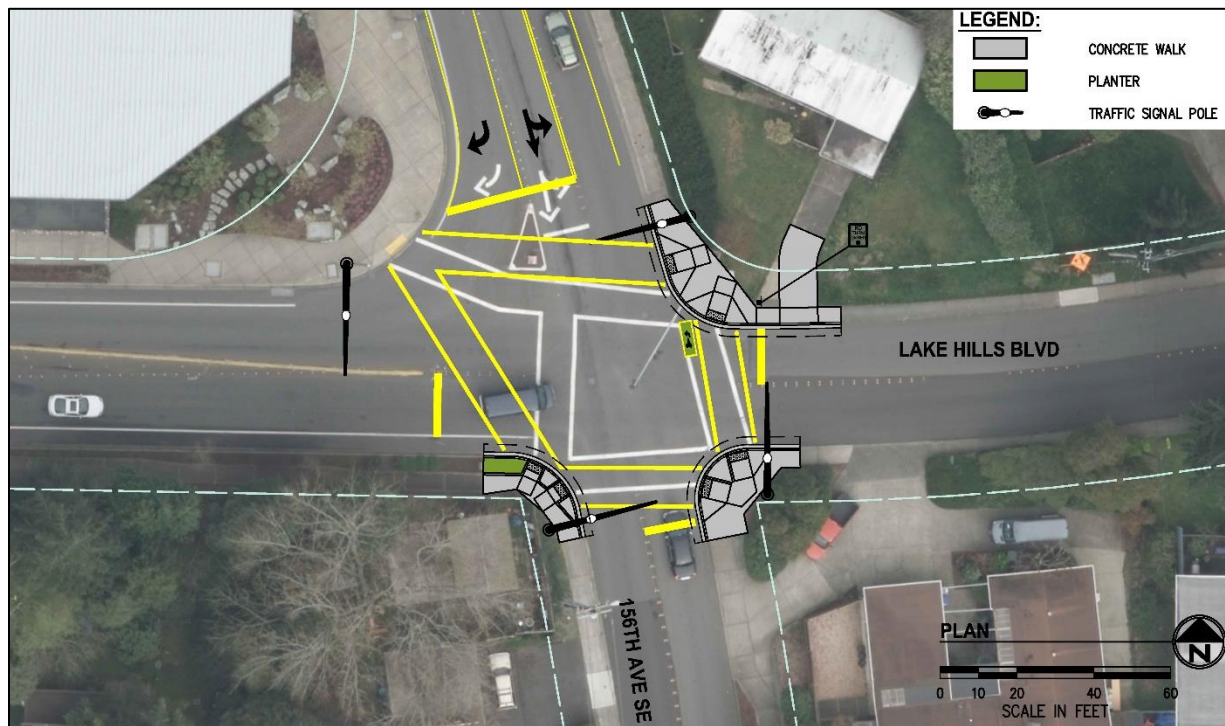


Figure 9. Conceptual Design of a Traffic Signal at the Lake Hills Boulevard Intersection

Cost Estimate

The cost estimate for the recommended alternative is \$1,481,500. The detailed cost estimate is included in Appendix F. For comparison, higher level cost estimates were performed for the other two intersection control alternatives. The cost estimate for the roundabout alternative is \$5,156,000 and cost estimate for the enhanced all-way stop alternative is \$365,100.

Risk Factors

Higher than expected traffic growth could require additional turn lanes and intersection widening. The project may require existing utilities and driveways to be relocated.

SE 16th Street Intersection Alternatives Analysis

This section describes the alternatives analysis and recommended alternative for the intersection of SE 16th Street and 156th Avenue SE.

Description of Alternatives

The following three alternatives were selected for more detailed analysis. All three alternatives would construct the missing segment of sidewalk on south side of SE 16th Street between 154th Avenue SE and 156th Avenue SE.

Enhanced All-Way Stop: Maintain single-lane approaches on all legs; add colored, stamped pavement in advance of the crosswalks to enhance visibility; and upgrade sidewalks and lighting.

Roundabout: Single-lane approaches on all legs with new pedestrian crossings, and upgraded sidewalks and lighting.

Traffic Signal: Single-lane approaches with crosswalks on all legs, and upgraded sidewalks and lighting.



Figure 10. Existing Conditions at the SE 16th Street Intersection

Multimodal LOS Analysis

The Multimodal LOS results for the intersection alternatives are compared in **Table 9**. The table compares the alternatives to baseline conditions, providing a relative assessment of “Improves”, “No change”, or “Worsens” for each mode.

Table 9. SE 16th Street Intersection Multimodal LOS – Alternatives Compared to Baseline

Mode	Enhanced All-Way Stop ¹	Roundabout ²	Signal ¹
Vehicle LOS			
LOS with 2035 Volumes	No change. AM peak hour: E (39 sec.) PM peak hour: E (42 sec.)	Improves. AM peak hour: A (4 sec.) PM peak hour: A (7 sec.)	Improves. AM peak hour: A (8 sec.) PM peak hour: A (10 sec.)
Pedestrian LOS			
Comfort, Access and Safety	Improves. Upgrades sidewalks and curb ramps; adds lighting and stamped pavement in advance of the crosswalks to enhance visibility.	Improves. Upgrades sidewalks and curb ramps and adds lighting. Crosswalks include center refuge islands.	Improves. Upgrades sidewalks and curb ramps and adds lighting.
Bicycle LOS			
Level of Traffic Stress	Improves. Adds lighting and stamped pavement in advance of the intersection to enhance visibility.	Improves. Reduces vehicle speeds and the number of conflict points.	Improves. Adds lighting and upgrades multi-use path crossings.
Transit LOS			
Passenger Comfort, Access and Safety Traveling To Bus Stops	Not applicable, no transit routes use intersection.	Not applicable, no transit routes use intersection.	Not applicable, no transit routes use intersection.
Transit Travel Speed	Not applicable, no transit routes use intersection.	Not applicable, no transit routes use intersection.	Not applicable, no transit routes use intersection.

¹ Vehicle LOS and delay calculated using HCM 6th Edition methodology.

² Vehicle LOS and delay for roundabout calculated using SIDRA 8.

Alternatives Screening Analysis

The SE 16th Street intersection experiences the shortest delays and queuing of the three intersections. Under baseline conditions, the intersection is forecast to operate at LOS E during the 2035 AM and PM peak hours. The north and east legs crosswalks have trail crossings with higher levels of pedestrian and bicycle activity.

The recommended alternative is enhanced all-way stop. The all-way stop control provides traffic calming as vehicles must stop, and vehicles speeds will be lower through the intersection, increasing safety for pedestrians and bicyclists. The intersection has a low collision rate. Public input at the two community open houses generally supported maintaining the all-way stop control at the intersection, while improving the intersection for pedestrians and trail users.

A traffic signal was not selected due to minimal community support, concerns that it would increase cut through traffic, and higher construction costs.

A roundabout was not selected because of its large footprint that would have the greatest impacts to the wetlands in the Lake Hills Greenbelt and highest cost due to construction and restoration of wetland areas. **Figure 11** shows the conceptual design for a roundabout.

The Neighborhood Congestion Program focuses on near-term to mid-term solutions and both the signal and roundabout alternatives are valid solutions to consider in the future if congestion becomes a greater concern of the community.

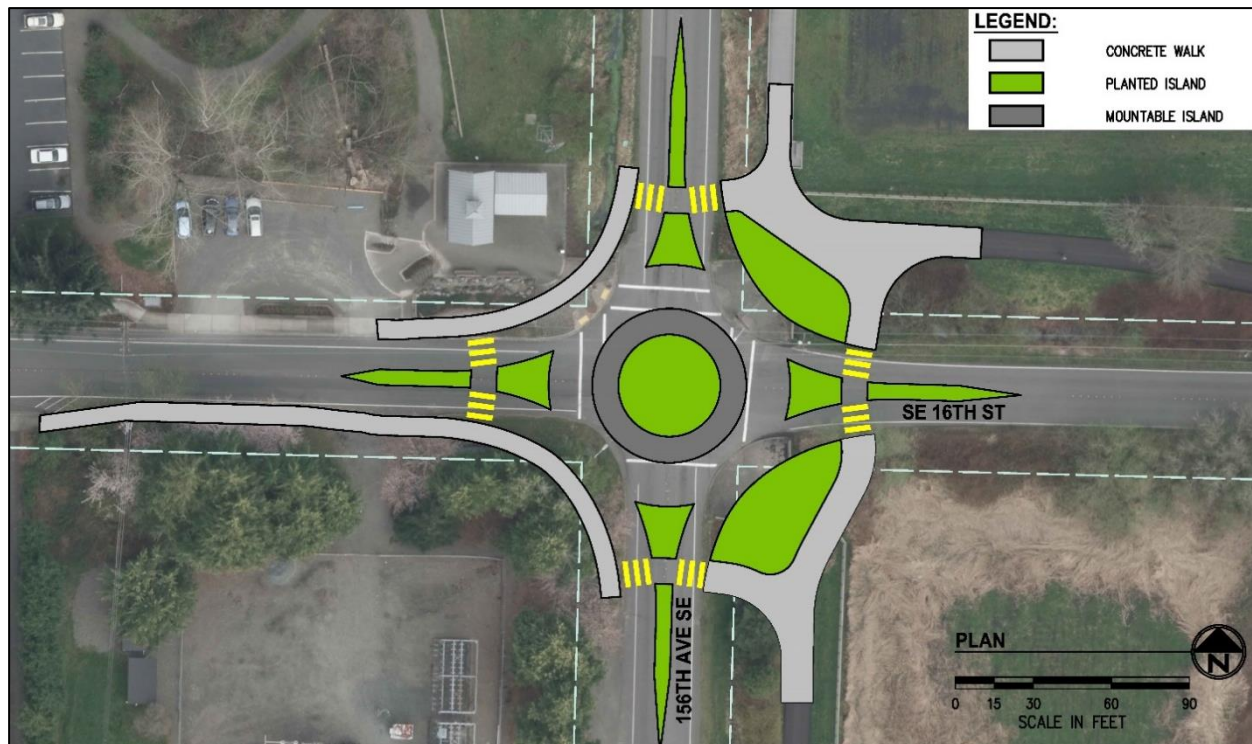


Figure 11. Roundabout Impacts to Adjacent Properties at SE 16th Street Intersection

Recommended Alternative

The recommended alternative is an enhanced all-way stop. The existing single-lane approaches would be maintained and a new sidewalk constructed along south side of SE 16th Street between 154th Avenue SE and 156th Avenue SE. To increase the visibility of the pedestrian crosswalks, the project would improve intersection lighting and add stamped, colored concrete warnings in advance of the crosswalks. **Figure 12** shows the conceptual design of the recommended improvements and a full-sized conceptual design is included in Appendix E.

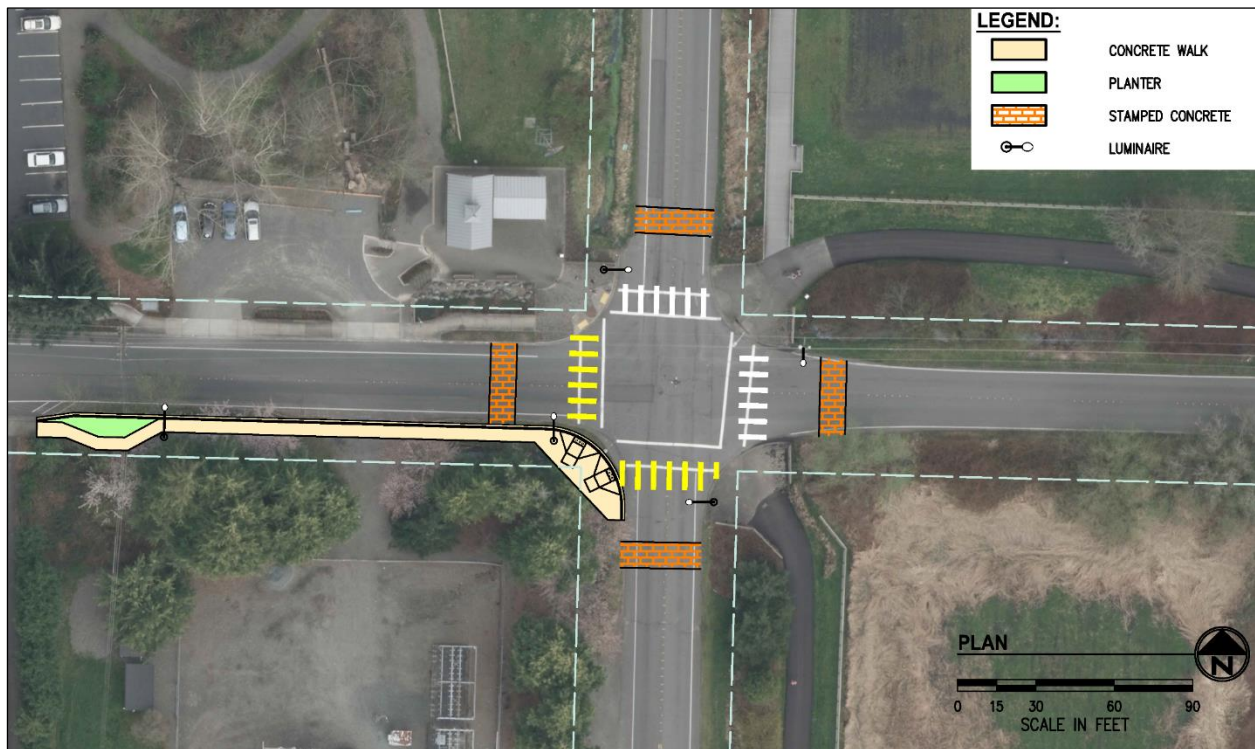


Figure 12. Conceptual Design of SE 16th Street Improvements

Cost Estimate

The cost estimate for the recommended alternative is \$664,300. The detailed cost estimate is included in Appendix F.

For comparison, higher level cost estimates were performed for the other two intersection control alternatives. The cost estimate for the roundabout alternative is \$5,234,700 and cost estimate for the signal alternative is \$1,672,600.

Risk Factors

Higher than expected traffic growth could require capacity improvements. The project may require existing utilities to be relocated and environmental restoration of wetland areas.

SE 24th Street-SE 22nd Place Intersection Alternatives Analysis

This section describes the alternatives analysis and recommended alternative for the intersection of SE 24th Street-SE 22nd Place and 156th Avenue SE.

Description of Alternatives

Many improvement alternatives were evaluated for the SE 24th Street-SE 22nd Place intersection, and the following three alternatives were selected for more detailed analysis:

Enhanced All-Way Stop: Maintain single-lane approaches on all legs, add or upgrade sidewalks, add a marked crosswalk with pedestrian beacon (RRFB) just north of intersection, and upgrade lighting.

Roundabout: Single-lane approaches on all five legs with southbound right-turn slip lane, new pedestrian crossings with center refuge islands, and upgrade lighting.

Traffic signal: Single-lane approaches on SE 24th Street and SE 22nd Place, and add dedicated left-turn lanes on 156th Avenue SE. Add north leg crossing and upgrade sidewalks and lighting.

Alternatives considered but not selected for further evaluation:

- Maintain all-way stop and close west leg of SE 24th Street.
- Reconstruct into two intersections with all-way stop at SE 24th Street and a flying-T at SE 22nd Place.
- Reconstruct into two intersections with separate all-way stop control at SE 24th Street and at SE 22nd Place.
- Peanut-shaped roundabout.

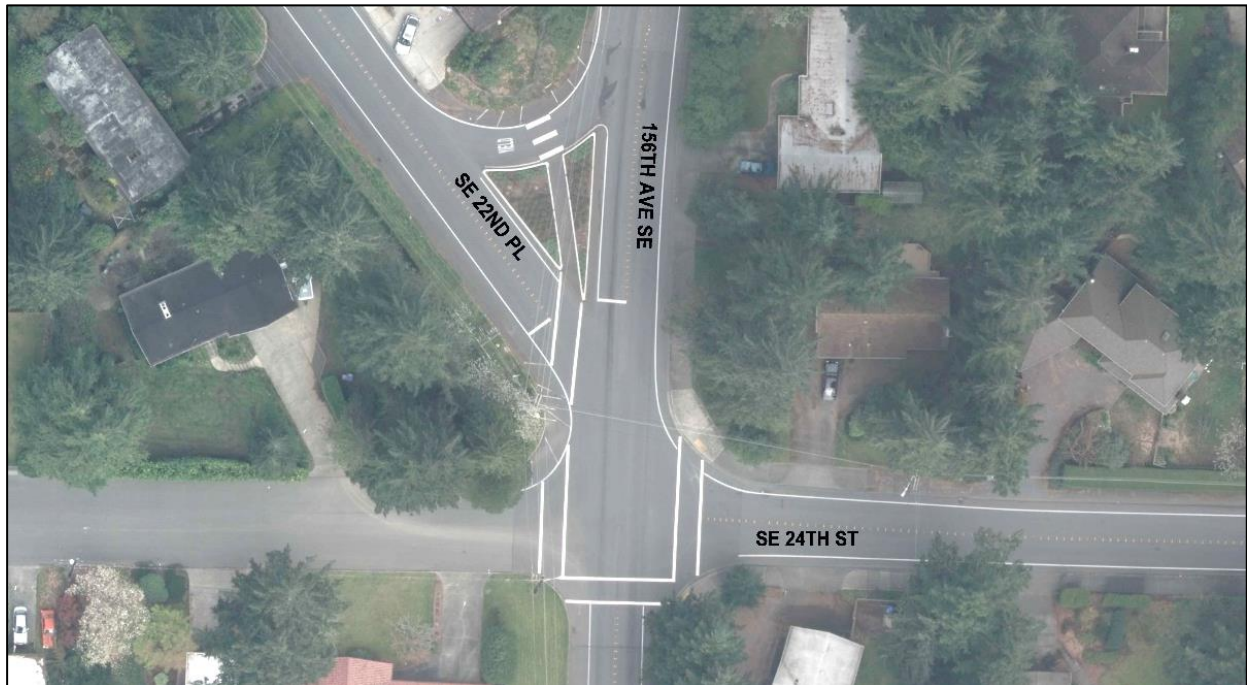


Figure 13. Existing Conditions at the SE 24th Street-SE 22nd Place Intersection

Multimodal LOS Analysis

The Multimodal LOS results for the intersection alternatives are compared in **Table 10**. The table compares the alternatives to baseline conditions, providing a relative assessment of “Improves”, “No change”, or “Worsens” for each mode.

Table 10. SE 24th Street Intersection Multimodal LOS – Alternatives Compared to Baseline

Mode	Enhanced All-Way Stop ¹	Roundabout ²	Signal ¹
Vehicle LOS			
LOS with 2035 Volumes	No change. AM peak hour: F (68 sec.) PM peak hour: F (63 sec.)	Improves. AM peak hour: A (5 sec.) PM peak hour: A (4 sec.)	Improves. AM peak hour: E (68 sec.) PM peak hour: E (60 sec.)
Pedestrian LOS			
Comfort, Access and Safety	Improves. Upgrades/adds pedestrian facilities, adds lighting and a new crosswalk at the north leg with pedestrian beacon (RRFB).	Improves. Upgrades/adds pedestrian facilities and adds lighting. Crosswalks include center refuge islands.	Improves. Upgrades/adds pedestrian facilities and adds lighting.
Bicycle LOS			
Level of Traffic Stress	Improves. Adds lighting and a new crosswalk at the north leg with a pedestrian beacon (RRFB).	Improves. Reduces vehicle speeds and the number of conflict points. Adds lighting.	Improves. Adds lighting and new marked crosswalk at north leg.
Transit LOS			
Passenger Comfort, Access and Safety Traveling To Bus Stops	No change.	Improves. Upgrades/adds pedestrian facilities and adds lighting. Crosswalks include center refuge islands.	Improves. Upgrades/adds pedestrian facilities and adds lighting.
Transit Travel Speed	No change.	Improves. Better intersection LOS improves bus travel speed.	Improves. Better intersection LOS improves bus travel speed.

¹ Vehicle LOS and delay calculated using HCM 6th Edition methodology.

² Vehicle LOS and delay for roundabout calculated using SIDRA 8.

Alternatives Screening Analysis

Under baseline conditions, the SE 24th Street-SE 22nd Place intersection is forecast to operate at LOS F during the 2035 AM and PM peak hours. This intersection has five approaches, uneven entering volumes from the approaches, steep grades, missing sidewalks, and no marked crosswalk across the north leg.

The recommended alternative is enhanced all-way stop. The all-way stop control provides traffic calming as vehicles must stop, and vehicles speeds will be lower through the intersection, increasing safety for pedestrians and bicyclists. The intersection has the lowest collision rate of the three intersections. To address community comments about pedestrian mobility, the alternative will construct enhanced lighting, sidewalks and crosswalks.

A traffic signal was not selected due to minimal community support, concerns that it would increase cut through traffic, and higher construction costs.

A roundabout was not selected due to its large footprint that would have the greatest impact to adjacent properties at all five intersection corners. Several driveways would need to be closed or relocated. This alternative would have the highest cost due to regrading for steep slopes, right of way acquisition, and property restoration. Public input from the two community open houses indicated support for a roundabout. While the roundabout will not move forward as part of the Neighborhood Congestion Relief Project, the City will continue to monitor traffic and safety conditions, and a roundabout could be pursued as a separate future project. **Figure 14** shows a conceptual design for a roundabout.

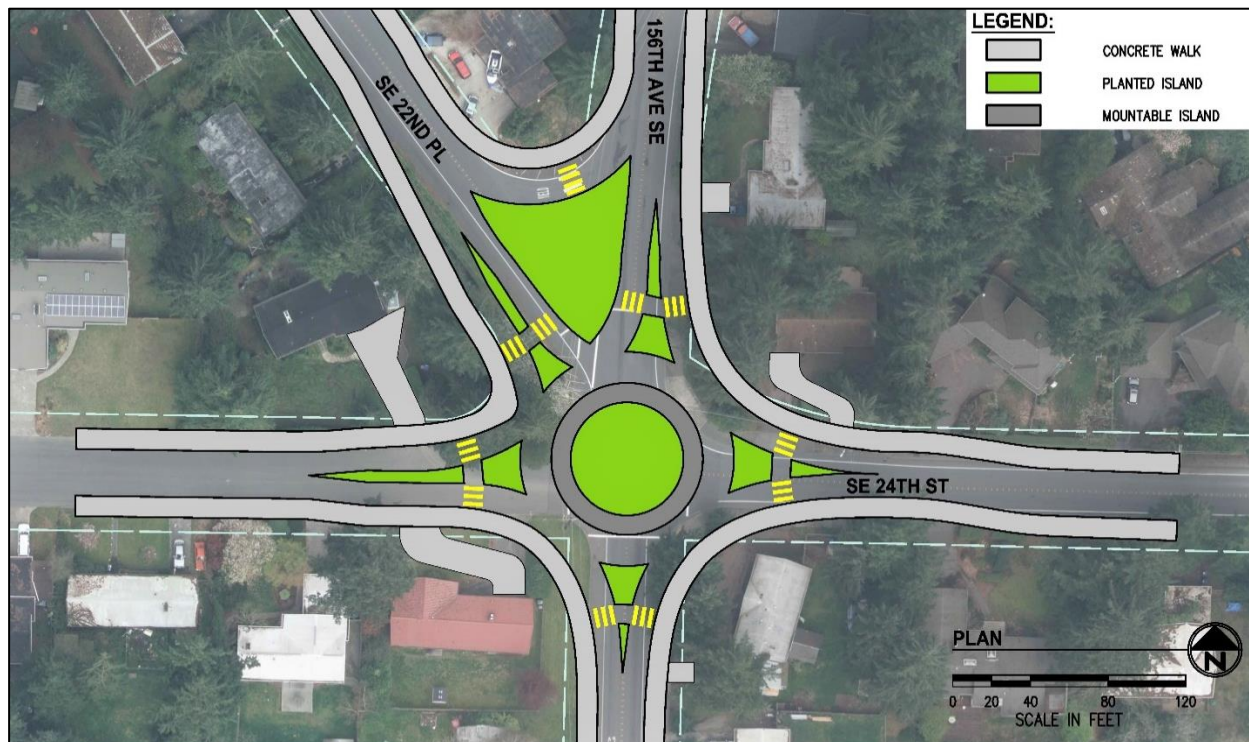


Figure 14. Roundabout Impacts to Adjacent Properties at SE 24th Street-SE 22nd Place

Recommended Alternative

The recommended alternative is an enhanced all-way stop. The existing single-lane approaches would be maintained and a new or upgraded sidewalks will be construction at all five intersection corners. To improve pedestrian mobility a marked crosswalk with a pedestrian beacon (RRFB) will be added just north of the intersection on 156th Avenue SE. **Figure 15** shows the conceptual design of the recommended improvements and a full-sized conceptual design is included in Appendix E.

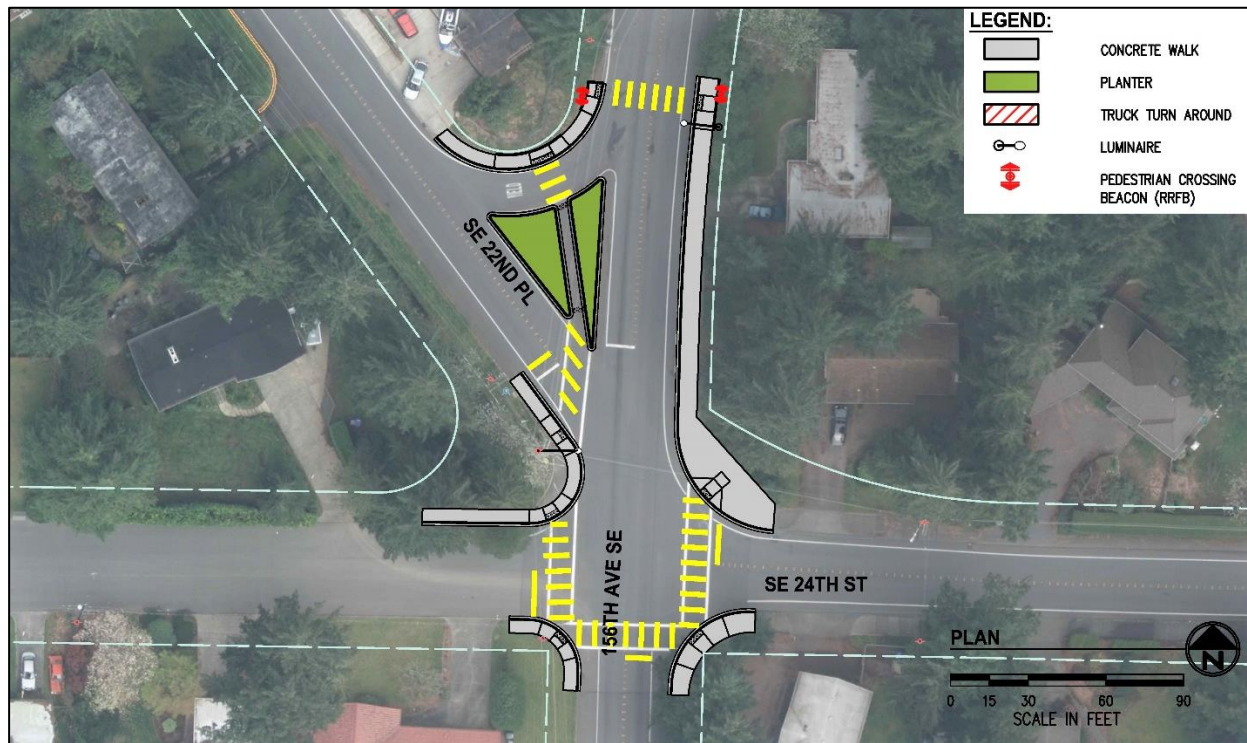


Figure 15. Conceptual Design of SE 24th Street-SE 22nd Place Improvements

Cost Estimate

The cost estimate for the recommended alternative is \$1,174,100. The detailed cost estimate is included in Appendix F.

For comparison, higher level cost estimates were performed for the other two intersection control alternatives. The cost estimate for the roundabout alternative is \$6,161,500 and cost estimate for the signal alternative is \$2,175,700.

Risk Factors

Higher than expected traffic growth could require capacity improvements. The project may require existing utilities to be relocated and restoration of impacted properties.

Appendix A: Vehicle, Pedestrian and Bicycle Counts



Prepared for: **KPG**
Traffic Count Consultants, Inc.

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: 156th Ave SE & Lake Hills Blvd

Date of Count: Wed 11/07/2018

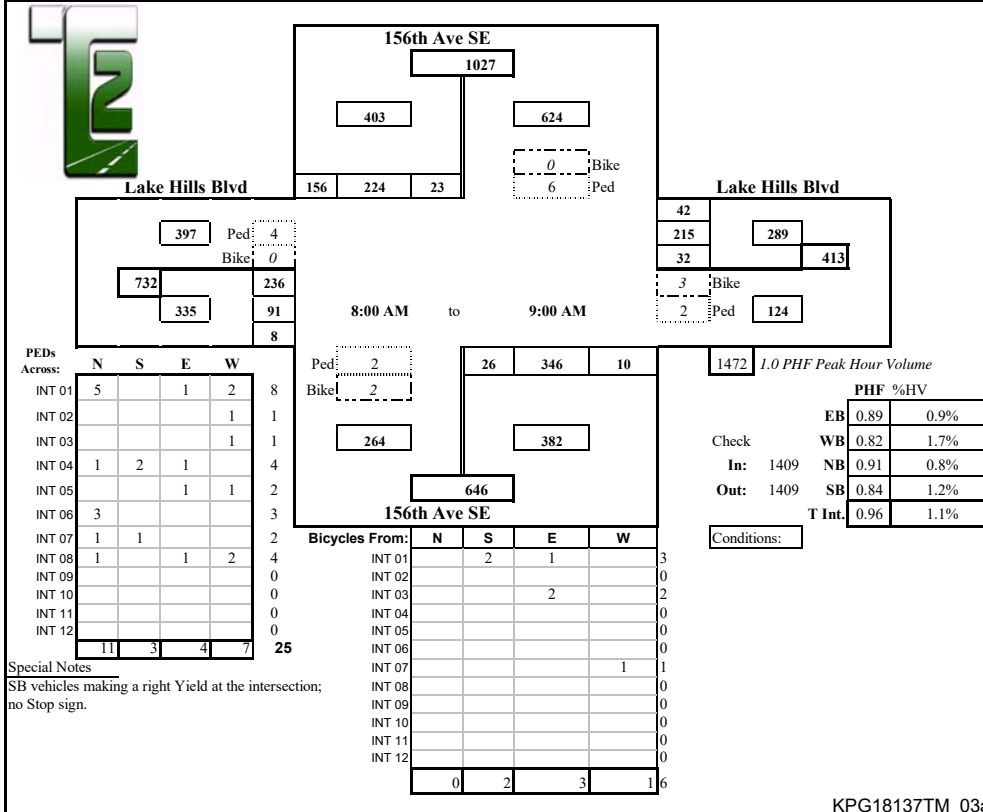
Location: Bellevue, Washington

Checked By: Jess

Time Interval	From North on (SB) 156th Ave SE				From South on (NB) 156th Ave SE				From East on (WB) Lake Hills Blvd				From West on (EB) Lake Hills Blvd				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
8:15 A	1	10	60	50	1	5	83	0	0	9	46	6	1	70	22	2	363
8:30 A	3	5	59	46	1	5	83	4	3	11	66	11	0	55	22	1	368
8:45 A	0	6	52	26	0	6	88	3	0	6	58	14	1	56	22	5	342
9:00 A	1	2	53	34	1	10	92	3	2	6	45	11	1	55	25	0	336
9:15 A	0	4	42	40	1	11	69	4	0	8	39	5	1	67	27	5	321
9:30 A	1	4	51	25	0	3	75	3	0	7	29	1	2	60	34	2	294
9:45 A	2	2	49	37	1	3	84	2	0	5	24	5	2	55	18	5	289
10:00 A	1	1	39	31	2	3	69	3	0	7	25	1	0	42	16	1	238
10:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	9	34	405	289	7	46	643	22	5	59	332	54	8	460	186	21	2551
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Peak Hour: 8:00 AM to 9:00 AM																	
Total	5	23	224	156	3	26	346	10	5	32	215	42	3	236	91	8	1409
Approach	403				382				289				335				1409
%HV	1.2%				0.8%				1.7%				0.9%				1.1%
PHF	0.84				0.91				0.82				0.89				0.96





Prepared for: **KPG**

Traffic Count Consultants, Inc.

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: 156th Ave SE & Lake Hills Blvd

Date of Count: Wed 11/07/2018

Location: Bellevue, Washington

Checked By: Jess

Time Interval Ending at	From North on (SB) 156th Ave SE				From South on (NB) 156th Ave SE				From East on (WB) Lake Hills Blvd				From West on (EB) Lake Hills Blvd				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	1	4	82	42	0	9	62	5	0	3	40	6	1	31	34	7	325
4:30 P	1	3	104	81	0	13	54	7	0	6	35	5	0	39	45	5	397
4:45 P	1	5	94	62	1	9	69	7	0	4	43	7	1	45	42	3	390
5:00 P	2	6	92	81	0	9	78	6	1	17	39	7	0	33	47	7	422
5:15 P	0	6	86	88	0	7	73	4	0	9	46	8	1	36	44	6	413
5:30 P	1	4	93	68	0	4	81	9	0	11	43	4	0	34	54	6	411
5:45 P	2	6	85	59	1	10	69	8	0	8	26	8	1	29	55	3	366
6:00 P	2	10	86	56	0	9	80	8	0	11	31	9	0	25	59	9	393
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	10	44	722	537	2	70	566	54	1	69	303	54	4	272	380	46	3117
Peak Hour: 4:30 PM to 5:30 PM																	
Total	4	21	365	299	1	29	301	26	1	41	171	26	2	148	187	22	1636
Approach	685				356				238				357				1636
%HV	0.6%				0.3%				0.4%				0.6%				0.5%
PHF	0.95				0.95				0.94				0.95				0.97

156th Ave SE
1160

Lake Hills Blvd
685

Lake Hills Blvd
475

Lake Hills Blvd
299, 365, 21

Lake Hills Blvd
26, 171, 41, 238, 472

Lake Hills Blvd
499, 856, 357, 148, 187, 22

Lake Hills Blvd
0, 7, 234

4:30 PM to 5:30 PM

156th Ave SE
428, 356, 784

PHF Peak Hour Volume
1688

Check	PHF %HV	
	EB	%HV
In: 1636	0.94	0.4%
Out: 1636	0.95	0.3%
T Int:	0.97	0.5%

Conditions:

PEDs Across:	N	S	E	W	
INT 01	1		2		3
INT 02	3		1	4	8
INT 03	7		7		14
INT 04	5				5
INT 05	2				2
INT 06	3				3
INT 07	7	2	2	2	13
INT 08	1				1
INT 09					0
INT 10					0
INT 11					0
INT 12					0
Total	29	2	12	6	49

Bicycles From:	N	S	E	W	
INT 01					0
INT 02				3	3
INT 03					0
INT 04					0
INT 05				1	1
INT 06					0
INT 07				1	1
INT 08				3	3
INT 09					0
INT 10					0
INT 11					0
INT 12					0
Total	0	0	0	0	8

Special Notes
SB vehicles making a right Yield at the intersection; no Stop sign.



Prepared for: **KPG**
Traffic Count Consultants, Inc.

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: 156th Ave SE & SE 16th St

Date of Count: Wed 11/07/2018

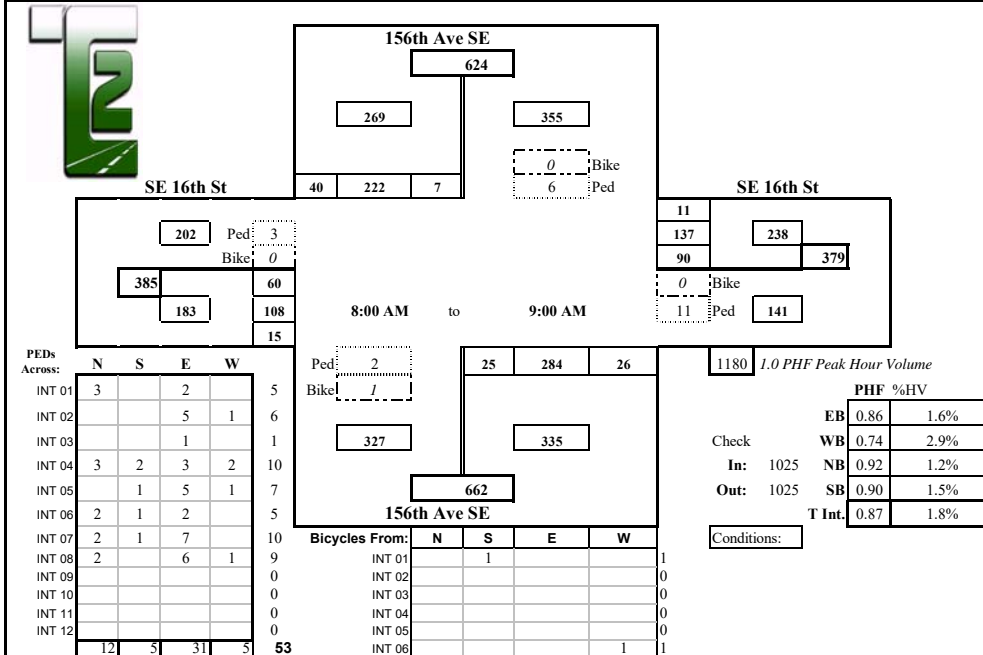
Location: Bellevue, Washington

Checked By: Jess

Time Interval	From North on (SB) 156th Ave SE				From South on (NB) 156th Ave SE				From East on (WB) SE 16th St				From West on (EB) SE 16th St				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
8:15 A	1	3	59	13	1	5	80	6	2	22	35	5	1	12	35	2	277
8:30 A	3	1	58	9	1	8	60	8	0	17	30	2	0	15	28	1	237
8:45 A	0	2	57	14	1	12	71	6	3	32	46	2	2	22	27	4	295
9:00 A	0	1	48	4	1	0	73	6	2	19	26	2	0	11	18	8	216
9:15 A	0	0	54	6	2	2	63	12	5	16	41	1	2	9	10	4	218
9:30 A	0	0	65	6	0	4	69	9	1	19	26	0	1	5	13	7	223
9:45 A	1	2	46	9	0	3	78	3	0	10	11	0	0	6	10	4	182
10:00 A	0	1	51	2	1	5	62	11	1	7	17	4	0	6	12	7	185
10:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	5	10	438	63	7	39	556	61	14	142	232	16	6	86	153	37	1833
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Peak Hour: 8:00 AM to 9:00 AM																	
Total	4	7	222	40	4	25	284	26	7	90	137	11	3	60	108	15	1025
Approach	269				335				238				183				1025
%HV	1.5%				1.2%				2.9%				1.6%				1.8%
PHF	0.90				0.92				0.74				0.86				0.87



Special Notes
 Approximately 8:25AM shoulder work started; did not appear to impede traffic. Workers were not counted crossing any leg of the intersection.



Prepared for: **KPG**

Traffic Count Consultants, Inc.

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: 156th Ave SE & SE 16th St

Date of Count: Wed 11/07/2018

Location: Bellevue, Washington

Checked By: Jess

Time Interval Ending at	From North on (SB) 156th Ave SE				From South on (NB) 156th Ave SE				From East on (WB) SE 16th St				From West on (EB) SE 16th St				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	1	78	7	0	7	68	11	0	19	25	4	0	8	22	5	255
4:30 P	1	4	96	6	0	4	60	14	0	33	23	3	0	7	40	2	292
4:45 P	0	2	82	16	0	3	72	20	1	19	19	2	0	20	42	2	299
5:00 P	1	4	104	11	0	3	92	11	0	23	26	3	0	10	39	2	328
5:15 P	1	3	95	12	0	7	79	13	2	19	28	4	0	10	21	4	295
5:30 P	2	2	92	12	0	8	78	14	0	15	12	2	0	11	18	5	269
5:45 P	0	1	87	9	0	5	67	11	0	17	15	3	0	9	18	2	244
6:00 P	0	2	79	6	0	3	68	12	0	12	11	1	0	12	23	4	233
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	5	19	713	79	0	40	584	106	3	157	159	22	0	87	223	26	2215
Peak Hour: 4:15 PM to 5:15 PM																	
Total	3	13	377	45	0	17	303	58	3	94	96	12	0	47	142	10	1214
Approach	435				378				202				199				1214
%HV	0.7%				n/a				1.5%				n/a				0.5%
PHF	0.91				0.89				0.86				0.78				0.93

156th Ave SE
797

SE 16th St
45, 377, 13

SE 16th St
12, 96, 94, 202, 415

4:15 PM to 5:15 PM

156th Ave SE
481, 378, 859

SE 16th St
158, 357, 199, 47, 142, 10

PHF Peak Hour Volume
1312

Check	PHF %HV	
	EB	n/a
In: 1214	WB	0.86
Out: 1214	NB	0.89
T Int:	SB	0.91
	EB	0.78
	NB	1.5%
	WB	0.86
	SB	0.91
	EB	0.7%
	NB	0.5%

PEDs Across:

	N	S	E	W
INT 01			4	
INT 02	3		4	
INT 03	3		3	
INT 04	2		1	
INT 05	1			
INT 06	2			
INT 07				
INT 08				
INT 09				
INT 10				
INT 11				
INT 12				
Total	11	0	12	0

Bicycles From:

	N	S	E	W
INT 01			1	
INT 02				
INT 03		1		
INT 04		1		
INT 05				
INT 06				
INT 07				
INT 08				
INT 09				
INT 10				
INT 11				
INT 12				
Total	0	2	1	0

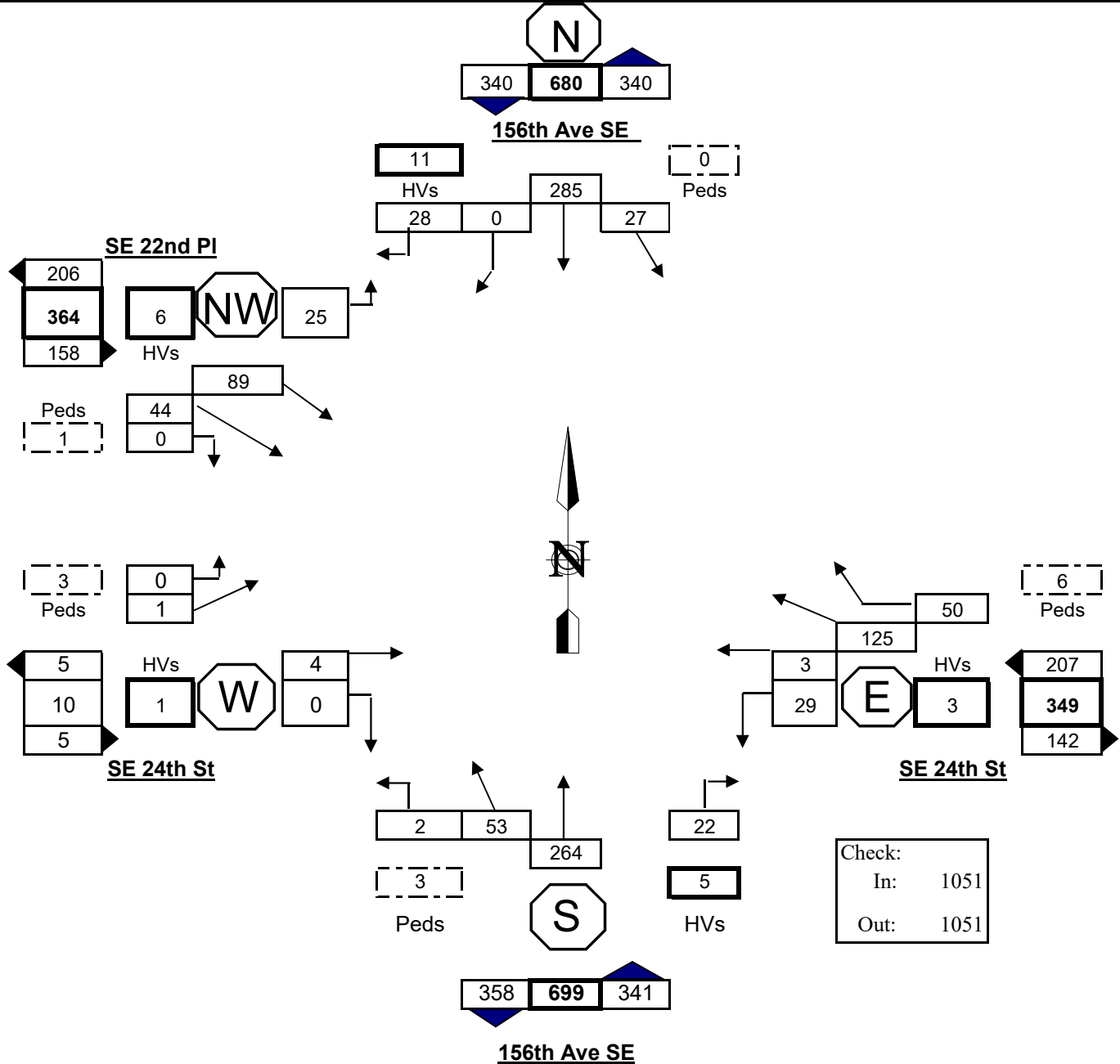
Special Notes



Traffic Count Consultants, Inc.

DBE/WBE

Phone: (253) 770-1407 E-Mail: Team@TC2inc.com



Intersection: 156th Ave SE & SE 24th St & SE 22nd Pl

Location: Bellevue, Washington

Date of Count: Wed 11/07/2018

Peak Period: 8:00 A - 9:00 A

Checked By: Jess

Prepared For: KPG

	%HV	PHF
SB	3.2%	0.90
	n/a	n/a
WB	1.4%	0.86
NB	1.5%	0.95
EB	20.0%	0.42
SEB	3.8%	0.73
Intersection	2.5%	0.93



Traffic Count Consultants, Inc.

DBE/WBE

Vehicle Volume Summary

Phone: (253) 770-1407 E-Mail: Team@TC2inc.com

Date of Count: Wed 11/07/2018
Checked By: Jess

Intersection: 156th Ave SE & SE 24th St & SE 22nd Pl
Location: Bellevue, Washington

Time Interval	From North (SB) 156th Ave SE						0						From E (WB) SE 24th St						From South (NB) 156th Ave SE						From W (EB) SE 24th St						From NW (SEB) SE 22nd Pl						Interval Total
	T	HR	SR	Thru	L	0	0	0	0	0	0	0	T	R	SR	Thru	L	T	R	0	Thru	SL	HL	T	R	Thru	0	SL	HL	T	HR	SR	0	SL	HL		
8:15 A	3	8	0	72	5	0	0	0	0	0	0	0	0	18	35	2	5	1	4	0	66	15	0	0	0	0	0	0	1	0	7	0	11	4	252		
8:30 A	3	7	0	73	4	0	0	0	0	0	0	0	0	8	38	0	3	1	4	0	68	18	0	0	0	0	0	2	0	12	0	16	2	253			
8:45 A	1	6	0	61	10	0	0	0	0	0	0	0	0	9	23	1	13	1	7	0	61	13	2	0	0	2	0	0	14	0	29	11	262				
9:00 A	4	7	0	79	8	0	0	0	0	0	0	0	1	15	29	0	8	2	7	0	69	7	0	1	0	2	0	1	0	2	0	33	8	284			
9:15 A	0	3	0	71	2	0	0	0	0	0	0	0	1	10	28	1	15	1	6	0	54	6	0	0	1	0	0	1	0	15	0	9	12	234			
9:30 A	0	2	0	80	6	0	0	0	0	0	0	0	1	8	17	0	10	0	2	0	64	8	0	0	0	1	0	1	0	0	8	4	221				
9:45 A	0	5	0	54	2	0	0	0	0	0	0	0	1	6	15	0	5	0	5	0	79	13	0	0	1	0	0	1	0	8	0	9	1	204			
10:00 A	0	1	0	61	4	0	0	0	0	0	0	0	2	6	13	0	5	1	4	0	51	9	0	0	0	0	0	0	0	6	0	8	7	175			
10:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
11:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			

Total Survey	11	39	0	551	41	0	0	0	0	0	0	0	8	0	80	198	4	64	7	39	0	512	89	2	1	2	5	0	4	0	10	0	83	0	123	49	1885
--------------	----	----	---	-----	----	---	---	---	---	---	---	---	---	---	----	-----	---	----	---	----	---	-----	----	---	---	---	---	---	---	---	----	---	----	---	-----	----	------

		8:00 A						to						9:00 A						Peak Hour Summary																								
Total	11	28	0	285	27	0	0	0	0	0	0	3	0	50	125	3	29	5	22	0	264	53	2	1	0	4	0	1	0	6	0	44	0	89	25	1051								
Approach	340						0						207						341						5						158						1051							
%HV	3.2%						n/a						1.4%						1.5%						20.0%						3.8%						2.5%							
PHF	0.90						n/a						0.66						0.95						0.42						0.73						0.93							
Peds Total Survey	0						0						10						5						5						1						21							
Prepared For:	KPG																																						KPG18137TM_01a					

Pedestrians

Int'l...	N	S	E	W	NW	Totals
1	0	1	0	1	1	3
2	0	2	3	1	0	6
3	0	0	3	1	0	4
4	0	0	0	0	0	0
5	0	1	1	1	0	3
6	0	0	1	0	0	1
7	0	1	2	1	0	4
8	0	0	0	0	0	0
	0	5	10	5	1	21

Bicycles

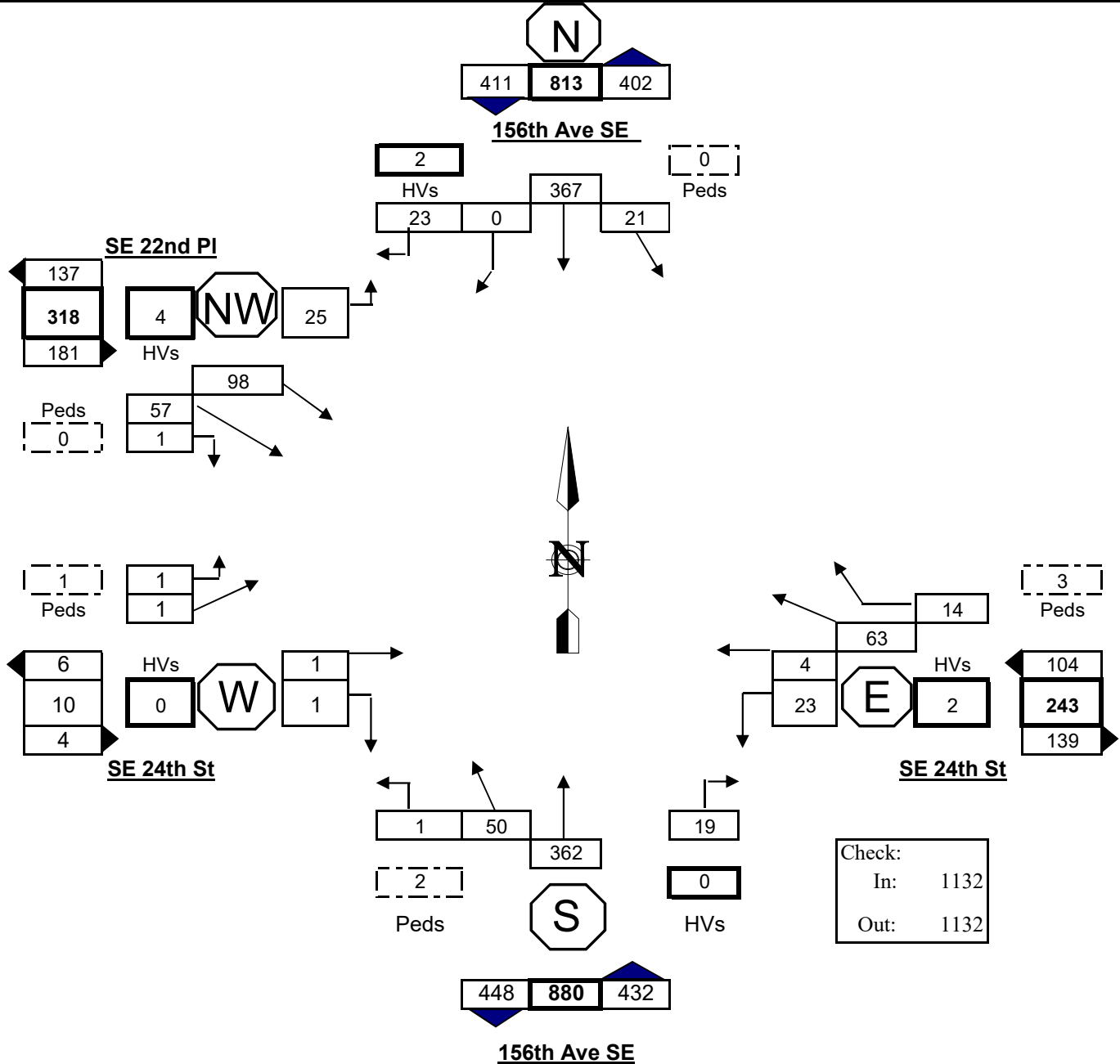
Int'l...	N	S	E	W	NW	Totals
1	0	1	1	0	0	2
2	0	0	1	0	0	1
3	0	0	0	0	0	0
4	0	1	0	0	1	2
5	1	0	0	0	0	1
6	0	0	0	0	0	0
7	1	0	0	0	0	1
8	0	0	0	0	0	0
	2	2	2	0	1	7



Traffic Count Consultants, Inc.

DBE/WBE

Phone: (253) 770-1407 E-Mail: Team@TC2inc.com



Intersection: 156th Ave SE & SE 24th St & SE 22nd Pl

Location: Bellevue, Washington

Date of Count: Wed 11/07/2018

Peak Period: 4:45 P - 5:45 P

Checked By: Jess

Prepared For: KPG

	%HV	PHF
SB	0.5%	0.94
	n/a	n/a
WB	1.9%	0.90
NB	n/a	0.87
EB	n/a	0.50
SEB	2.2%	0.78
Intersection	0.7%	0.96



Traffic Count Consultants, Inc.

DBE/WBE

Vehicle Volume Summary

Phone: (253) 770-1407 E-Mail: Team@TC2inc.com

Date of Count: Wed 11/07/2018
Checked By: Jess

Intersection: 156th Ave SE & SE 24th St & SE 22nd Pl
Location: Bellevue, Washington

Time Interval	From North (SB) 156th Ave SE						0						From E (WB) SE 24th St						From South (NB) 156th Ave SE						From W (EB) SE 24th St						From NW (SEB) SE 22nd Pl						Interval Total
	T	HR	SR	Thru	L	0	0	0	0	0	0	0	T	R	SR	Thru	L	0	T	R	0	Thru	SL	HL	T	R	Thru	0	SL	HL	T	HR	SR	0	SL	HL	
4:15 P	0	0	1	102	7	0	0	0	0	0	0	1	0	7	12	0	7	0	7	0	86	8	0	0	0	0	0	0	1	1	13	0	20	4	275		
4:30 P	1	1	1	83	9	0	0	0	0	0	0	1	0	8	13	0	10	0	8	0	60	16	0	0	0	0	1	0	0	12	0	14	3	239			
4:45 P	1	3	0	109	4	0	0	0	0	0	0	0	0	5	21	1	7	0	6	0	85	13	0	0	0	1	0	0	17	0	13	9	294				
5:00 P	0	4	0	98	7	0	0	0	0	0	0	0	0	6	11	1	11	0	7	0	87	8	0	0	0	1	0	0	0	0	7	0	18	3	269		
5:15 P	2	10	0	94	4	0	0	0	0	0	0	1	0	1	19	1	5	0	5	0	83	14	1	0	0	0	1	1	22	0	28	7	295				
5:30 P	0	5	0	82	6	0	0	0	0	0	0	0	0	5	18	2	4	0	3	0	90	10	0	0	1	0	0	1	0	0	15	0	25	5	272		
5:45 P	0	4	0	93	4	0	0	0	0	0	0	1	0	2	15	0	3	0	4	0	102	18	0	0	0	0	1	3	0	13	0	27	10	296			
6:00 P	1	1	0	96	7	0	0	0	0	0	0	0	0	4	15	0	8	0	5	0	73	7	1	0	0	0	0	1	0	11	0	28	5	261			
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

Total Survey	5	28	2	757	48	0	0	0	0	0	0	4	0	38	124	5	55	0	45	0	666	94	2	0	1	2	0	1	2	7	2	110	0	173	46	2201
--------------	---	----	---	-----	----	---	---	---	---	---	---	---	---	----	-----	---	----	---	----	---	-----	----	---	---	---	---	---	---	---	---	---	-----	---	-----	----	------

		4:45 P						to						5:45 P						Peak Hour Summary																			
Total	2	23	0	367	21	0	0	0	0	0	0	2	0	14	63	4	23	0	19	0	362	50	1	0	1	1	0	1	1	4	1	57	0	98	25	1132			
Approach	411						0						104						432						4						181						1132		
%HV	0.5%						n/a						1.9%						n/a						n/a						2.2%						0.7%		
PHF	0.94						n/a						0.90						0.87						0.50						0.78						0.96		
Peds Total Survey	0						0						10						5						1						0						16		
Prepared For:	KPG																																						KPG18137TM_01p

Pedestrians

Int'l...	N	S	E	W	NW	Totals
1	0	1	2	0	0	3
2	0	2	3	0	0	5
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	3	1	0	4
7	0	2	0	0	0	2
8	0	0	2	0	0	2
	0	5	10	1	0	16

Bicycles

Int'l...	N	S	E	W	NW	Totals
1	1	0	0	0	0	1
2	1	0	0	0	0	1
3	0	0	0	0	0	0
4	0	0	1	0	0	1
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	1	0	1	0	2
8	0	0	0	1	0	1
	2	1	1	2	0	6

		TRAFFIC COUNT CONSULTANTS, INC.								Page 1	
		Team@tc2inc.com									
BELLEVUE, WASHINGTON		(253) 770-									
SE LAKE HILLS BLVD S/O										Site Code: 03S	
156TH AVE SE											
LOC# 03S A KPG18137TM										Date Start: 13-Nov-18	
										Date End: 15-Nov-18	
NORTHBOUND											
	Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week		
	12-Nov-18	13-Nov-18	14-Nov-18	15-Nov-18	16-Nov-18	Day	17-Nov-18	11-Nov-18	Average		
12:00 AM		15	14	15		15			15		
01:00		8	4	9		7			7		
02:00		3	3	4		3			3		
03:00		3	3	7		4			4		
04:00		9	10	14		11			11		
05:00		52	34	38		41			41		
06:00		139	138	128		135			135		
07:00		268	221	208		232			232		
08:00		231	279	269		260			260		
09:00		295	349	319		321			321		
10:00		233	269	276		259			259		
11:00		265	272	273		270			270		
12:00 PM		244	260	276		260			260		
01:00		220	232	210		221			221		
02:00		236	261	218		238			238		
03:00		313	261	252		275			275		
04:00		322	308	265		298			298		
05:00		292	190	236		239			239		
06:00		261	280	240		260			260		
07:00		164	178	159		167			167		
08:00		105	106	112		108			108		
09:00		67	65	73		68			68		
10:00		39	45	58		47			47		
11:00		17	19	16		17			17		
Day Total	0	3801	3801	3675	0	3759	0	0	3759		
% Avg. Wk	0.0%	101.1%	101.1%	97.8%	0.0%						
% Avg. We	0.0%	101.1%	101.1%	97.8%	0.0%	100.0%	0.0%	0.0%			
Grand Total	0	2547	2648	2752	0	2649	0	0	2649		

	A	B	C	D	E	F	H	J	K	M	N	O
1				TRAFFIC COUNT CONSULTANTS, INC.							Page 1	
2				Team@tc2inc.com								
3	BELLEVUE, WASHINGTON			(253) 770-								
4	156TH AVE SE N/O										Site Code: 03N	
5	SE LAKE HILLS BLVD											
6	LOC# 03N A-V KPG18137TM										Date Start: 06-Nov-18	
7											Date End: 08-Nov-18	
8	SOUTHBOUND											
9												
10		Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week		
11		05-Nov	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov-	Day	10-Nov-18	11-Nov-18	Average		
12	12:00 AM		25	18	24		22			22		
13	01:00		12	18	7		12			12		
14	02:00		8	7	11		9			9		
15	03:00		12	7	9		9			9		
16	04:00		17	10	15		14			14		
17	05:00		39	40	43		41			41		
18	06:00		139	129	132		133			133		
19	07:00		296	267	279		281			281		
20	08:00		388	396	371		385			385		
21	09:00		350	331	316		332			332		
22	10:00		254	264	269		262			262		
23	11:00		293	306	291		297			297		
24	12:00 PM		371	377	401		383			383		
25	01:00		415	457	351		408			408		
26	02:00		476	427	476		460			460		
27	03:00		629	617	565		604			604		
28	04:00		523	589	513		542			542		
29	05:00		513	520	602		545			545		
30	06:00		546	529	502		526			526		
31	07:00		350	351	357		353			353		
32	08:00		269	244	260		258			258		
33	09:00		216	177	222		205			205		
34	10:00		78	92	108		93			93		
35	11:00		43	38	48		43			43		
36	Day Total	0	6262	6211	6172	0	6215	0	0	6215		
37	% Avg. Wk	0.0%	100.8%	99.9%	99.3%	0.0%						
38	% Avg. We	0.0%	100.8%	99.9%	99.3%	0.0%	100.0%	0.0%	0.0%			
39												
40												
42	Grand Total	0	6262	6211	6172	0	6215	0	0	6215		

	A	B	C	D	E	F	H	J	K	M	N	O
1				TRAFFIC COUNT CONSULTANTS, INC.							Page 1	
2				Team@tc2inc.com								
3	BELLEVUE, WASHINGTON			(253) 770-								
4	SE LAKE HILLS BLVD W/O										Site Code: 03W	
5	156TH AVE SE											
6	LOC# 03W A-V KPG18137TM										Date Start: 06-Nov-18	
7											Date End: 08-Nov-18	
8	EASTBOUND											
9												
10		Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week		
11		05-Nov-18	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov-18	Day	10-Nov-18	11-Nov-18	Average		
12	12:00 AM		26	27	22		25			25		
13	01:00		15	17	20		17			17		
14	02:00		9	7	11		9			9		
15	03:00		11	6	7		8			8		
16	04:00		17	14	14		15			15		
17	05:00		43	44	42		43			43		
18	06:00		126	115	130		124			124		
19	07:00		263	280	275		273			273		
20	08:00		298	274	303		292			292		
21	09:00		331	308	287		309			309		
22	10:00		233	216	219		223			223		
23	11:00		222	207	220		216			216		
24	12:00 PM		226	260	248		245			245		
25	01:00		209	263	211		228			228		
26	02:00		254	236	238		243			243		
27	03:00		241	274	232		249			249		
28	04:00		223	299	287		270			270		
29	05:00		260	144	184		196			196		
30	06:00		240	229	277		249			249		
31	07:00		239	240	233		237			237		
32	08:00		170	194	159		174			174		
33	09:00		133	140	157		143			143		
34	10:00		88	93	104		95			95		
35	11:00		50	52	76		59			59		
36	Day Total	0	3927	3939	3956	0	3941	0	0	3941		
37	% Avg. Wk	0.0%	99.7%	100.0%	100.4%	0.0%						
38	% Avg. We	0.0%	99.7%	100.0%	100.4%	0.0%	100.0%	0.0%	0.0%			
39												
40												
42	Grand Total	0	3927	3939	3956	0	3941	0	0	3941		

	A	B	C	D	E	F	H	J	K	M	N	O	P
1				TRAFFIC COUNT CONSULTANTS, INC.							Page 1		
2				Team@tc2inc.com									
3	BELLEVUE, WASHINGTON			(253) 770-									
4	SE LAKE HILLS BLVD E/O										Site Code: 03E		
5	156TH AVE SE												
6	LOC# 03E A-V KPG18137TM										Date Start: 06-Nov-18		
7											Date End: 08-Nov-18		
8	WESTBOUND												
9													
10		Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week			
11		05-Nov-	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov-	Day	10-Nov-	11-Nov-	Average			
12	12:00 AM		4	9	4		6			6			
13	01:00		4	5	6		5			5			
14	02:00		2	6	5		4			4			
15	03:00		13	14	9		12			12			
16	04:00		23	26	21		23			23			
17	05:00		62	59	63		61			61			
18	06:00		166	161	138		155			155			
19	07:00		239	279	273		264			264			
20	08:00		275	248	269		264			264			
21	09:00		180	158	180		173			173			
22	10:00		113	112	122		116			116			
23	11:00		105	112	120		112			112			
24	12:00 PM		113	123	137		124			124			
25	01:00		110	163	127		133			133			
26	02:00		148	157	140		148			148			
27	03:00		203	178	204		195			195			
28	04:00		190	211	236		212			212			
29	05:00		200	205	208		204			204			
30	06:00		172	160	212		181			181			
31	07:00		83	99	117		100			100			
32	08:00		80	74	68		74			74			
33	09:00		39	47	46		44			44			
34	10:00		13	22	31		22			22			
35	11:00		10	20	16		15			15			
36	Day Total	0	2547	2648	2752	0	2649	0	0	2649			
37	% Avg. Wk	0.0%	96.1%	100.0%	103.9%	0.0%							
38	% Avg. We	0.0%	96.1%	100.0%	103.9%	0.0%	100.0%	0.0%	0.0%				
39													
40													
42	Grand Total	0	2547	2648	2752	0	2649	0	0	2649			

	A	B	C	D	E	F	H	J	K	M	N	O	P
1				TRAFFIC COUNT CONSULTANTS, INC.							Page 1		
2				Team@tc2inc.com									
3	BELLEVUE, WASHINGTON			(253) 770-									
4	156TH AVE SE S/O										Site Code: 02S		
5	SE 16TH ST												
6	LOC# 02S A-V KPG18137TM										Date Start: 06-Nov-18		
7											Date End: 08-Nov-18		
8	NORTHBOUND												
9													
10		Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week			
11		05-Nov-	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov-	Day	10-Nov-	11-Nov-	Average			
12	12:00 AM		11	17	10		13			13			
13	01:00		4	9	8		7			7			
14	02:00		4	5	4		4			4			
15	03:00		7	5	1		4			4			
16	04:00		9	6	8		8			8			
17	05:00		45	33	41		40			40			
18	06:00		143	136	116		132			132			
19	07:00		301	297	286		295			295			
20	08:00		359	340	339		346			346			
21	09:00		354	310	327		330			330			
22	10:00		231	239	243		238			238			
23	11:00		255	280	253		263			263			
24	12:00 PM		239	278	240		252			252			
25	01:00		216	234	220		223			223			
26	02:00		278	289	248		272			272			
27	03:00		310	321	324		318			318			
28	04:00		367	364	388		373			373			
29	05:00		406	395	410		404			404			
30	06:00		267	269	252		263			263			
31	07:00		157	140	146		148			148			
32	08:00		85	120	94		100			100			
33	09:00		82	89	64		78			78			
34	10:00		52	49	62		54			54			
35	11:00		21	30	41		31			31			
36	Day Total	0	4203	4255	4125	0	4194	0	0	4194			
37	% Avg. Wk	0.0%	100.2%	101.4%	98.3%	0.0%							
38	% Avg. We	0.0%	100.2%	101.4%	98.3%	0.0%	100.0%	0.0%	0.0%				
39													
40													
42	Grand Total	0	4203	4255	4125	0	4194	0	0	4194			

	A	B	C	D	E	F	H	J	K	M	N	O	P
1				TRAFFIC COUNT CONSULTANTS, INC.							Page 1		
2				Team@tc2inc.com									
3	BELLEVUE, WASHINGTON			(253) 770-									
4	156TH AVE SE N/O										Site Code: 02N		
5	SE 16TH ST												
6	LOC# 02N A-V KPG18137TM										Date Start: 06-Nov-18		
7											Date End: 08-Nov-18		
8	SOUTHBOUND												
9													
10		Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week			
11		05-Nov	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov	Day	10-Nov	11-Nov	Average			
12	12:00 AM		13	10	11		11			11			
13	01:00		6	5	5		5			5			
14	02:00		5	3	3		4			4			
15	03:00		5	2	4		4			4			
16	04:00		22	18	21		20			20			
17	05:00		34	40	40		38			38			
18	06:00		124	113	108		115			115			
19	07:00		236	219	217		224			224			
20	08:00		282	274	258		271			271			
21	09:00		288	241	258		262			262			
22	10:00		199	201	193		198			198			
23	11:00		196	227	195		206			206			
24	12:00 PM		250	231	261		247			247			
25	01:00		279	337	233		283			283			
26	02:00		277	275	287		280			280			
27	03:00		381	377	390		383			383			
28	04:00		409	409	417		412			412			
29	05:00		418	411	429		419			419			
30	06:00		401	357	369		376			376			
31	07:00		233	186	212		210			210			
32	08:00		147	156	130		144			144			
33	09:00		105	103	113		107			107			
34	10:00		50	44	64		53			53			
35	11:00		22	18	32		24			24			
36	Day Total	0	4382	4257	4250	0	4296	0	0	4296			
37	% Avg. Wk	0.0%	102.0%	99.1%	98.9%	0.0%							
38	% Avg. We	0.0%	102.0%	99.1%	98.9%	0.0%	100.0%	0.0%	0.0%				
39													
40													
42	Grand Total	0	4382	4257	4250	0	4296	0	0	4296			

	A	B	C	D	E	F	H	J	K	M	N	P
1				TRAFFIC COUNT CONSULTANTS, INC.							Page 1	
2				Team@tc2inc.com								
3	BELLEVUE, WASHINGTON			(253) 770-								
4	SE 16TH ST W/O										Site Code: 02W	
5	156TH AVE SE											
6	LOC# 02W A-V KPG18137TM										Date Start: 06-Nov-18	
7											Date End: 08-Nov-18	
8	EASTBOUND											
9												
10		Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week		
11		05-Nov-	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov-	Day	10-Nov-	11-Nov-	Average		
12	12:00 AM		7	14	9		10			10		
13	01:00		6	2	4		4			4		
14	02:00		5	6	4		5			5		
15	03:00		2	2	4		3			3		
16	04:00		5	5	2		4			4		
17	05:00		14	9	10		11			11		
18	06:00		53	57	59		56			56		
19	07:00		186	194	190		190			190		
20	08:00		186	178	162		175			175		
21	09:00		97	94	101		97			97		
22	10:00		87	89	96		91			91		
23	11:00		102	104	108		105			105		
24	12:00 PM		118	142	127		129			129		
25	01:00		124	177	105		135			135		
26	02:00		178	152	165		165			165		
27	03:00		210	161	207		193			193		
28	04:00		216	196	215		209			209		
29	05:00		225	216	239		227			227		
30	06:00		216	164	199		193			193		
31	07:00		101	97	121		106			106		
32	08:00		68	86	90		81			81		
33	09:00		72	56	61		63			63		
34	10:00		37	31	41		36			36		
35	11:00		13	13	29		18			18		
36	Day Total	0	2328	2245	2348	0	2307	0	0	2307		
37	% Avg. W	0.0%	100.9%	97.3%	101.8%	0.0%						
38	% Avg. W	0.0%	100.9%	97.3%	101.8%	0.0%	100.0%	0.0%	0.0%			
39												
40												
42	Grand Tot	0	2328	2245	2348	0	2307	0	0	2307		

	A	B	C	D	E	F	H	J	K	M	N	O	P
1				TRAFFIC COUNT CONSULTANTS, INC.							Page 1		
2				Team@tc2inc.com									
3	BELLEVUE, WASHINGTON			(253) 770-									
4	SE 16TH ST E/O										Site Code: 02E		
5	156TH AVE SE												
6	LOC# 02E A-V KPG18137TM										Date Start: 06-Nov-18		
7											Date End: 08-Nov-18		
8	WESTBOUND												
9													
10		Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week			
11		05-Nov	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov	Day	10-Nov	11-Nov	Average			
12	12:00 AM		2	4	3		3			3			
13	01:00		2	0	3		2			2			
14	02:00		2	1	2		2			2			
15	03:00		5	3	1		3			3			
16	04:00		16	13	15		15			15			
17	05:00		46	52	46		48			48			
18	06:00		111	109	115		112			112			
19	07:00		266	246	297		270			270			
20	08:00		252	222	233		236			236			
21	09:00		164	140	152		152			152			
22	10:00		95	95	95		95			95			
23	11:00		118	97	88		101			101			
24	12:00 PM		94	125	96		105			105			
25	01:00		92	180	102		125			125			
26	02:00		124	126	145		132			132			
27	03:00		249	178	280		236			236			
28	04:00		193	190	221		201			201			
29	05:00		146	175	180		167			167			
30	06:00		118	136	135		130			130			
31	07:00		55	59	74		63			63			
32	08:00		55	29	64		49			49			
33	09:00		34	47	34		38			38			
34	10:00		16	23	21		20			20			
35	11:00		12	8	19		13			13			
36	Day Total	0	2267	2258	2421	0	2315	0	0	2315			
37	% Avg. Wk	0.0%	97.9%	97.5%	104.6%	0.0%							
38	% Avg. We	0.0%	97.9%	97.5%	104.6%	0.0%	100.0%	0.0%	0.0%				
39													
40													
42	Grand Total	0	2267	2258	2421	0	2315	0	0	2315			

			TRAFFIC COUNT CONSULTANTS, INC.							Page 1
			Team@tc2inc.com							
BELLEVUE, WASHINGTON			(253) 770-							
156TH AVE SE S/O										Site Code: 01S
SE 24TH ST										
LOC# 01S A-V KPG18137TM										Date Start: 06-Nov-18
										Date End: 08-Nov-18
NORTHBOUND										
	Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week	
	05-Nov-	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov-	Day	10-Nov-	11-Nov-	Average	
12:00 AM		13	21	12		15			15	
01:00		6	9	8		8			8	
02:00		5	7	6		6			6	
03:00		7	6	2		5			5	
04:00		9	8	9		9			9	
05:00		44	30	37		37			37	
06:00		145	137	120		134			134	
07:00		297	296	290		294			294	
08:00		312	346	325		328			328	
09:00		344	296	325		322			322	
10:00		240	255	258		251			251	
11:00		268	300	279		282			282	
12:00 PM		261	300	261		274			274	
01:00		228	271	236		245			245	
02:00		284	299	259		281			281	
03:00		327	321	340		329			329	
04:00		346	381	415		381			381	
05:00		191	281	213		228			228	
06:00		277	301	282		287			287	
07:00		159	154	161		158			158	
08:00		101	138	111		117			117	
09:00		96	97	75		89			89	
10:00		51	56	63		57			57	
11:00		25	29	48		34			34	
Day Total	0	4036	4339	4135	0	4170	0	0	4170	
% Avg. Wk	0.0%	96.8%	104.1%	99.2%	0.0%					
% Avg. We	0.0%	96.8%	104.1%	99.2%	0.0%	100.0%	0.0%	0.0%		
Grand Total	0	4036	4339	4135	0	4170	0	0	4170	

		TRAFFIC COUNT CONSULTANTS, INC.							Page 1	
		Team@tc2inc.com								
BELLEVUE, WASHINGTON		(253) 770-								
156th AVE SE N/O									Site Code: 01N	
SE 24TH ST										
LOC# 01N A KPG18137TM									Date Start: 13-Nov-18	
									Date End: 15-Nov-18	
SOUTHBOUND										
	Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week	
	12-Nov-18	13-Nov-18	14-Nov-18	15-Nov-18	16-Nov-18	Day	17-Nov-18	18-Nov-18	Average	
12:00 AM		4	11	13		9			9	
01:00		6	4	5		5			5	
02:00		4	6	6		5			5	
03:00		7	6	4		6			6	
04:00		32	25	27		28			28	
05:00		64	72	69		68			68	
06:00		161	153	141		152			152	
07:00		312	280	305		299			299	
08:00		316	334	342		331			331	
09:00		287	320	318		308			308	
10:00		237	220	240		232			232	
11:00		204	238	222		221			221	
12:00 PM		283	298	289		290			290	
01:00		309	288	329		309			309	
02:00		326	329	343		333			333	
03:00		269	383	392		348			348	
04:00		322	334	142		266			266	
05:00		200	221	185		202			202	
06:00		369	349	395		371			371	
07:00		227	239	240		235			235	
08:00		151	184	132		156			156	
09:00		114	146	150		137			137	
10:00		52	58	58		56			56	
11:00		24	22	31		26			26	
Day Total	0	4280	4520	4378	0	4393	0	0	4393	
% Avg. Wk	0.0%	97.4%	102.9%	99.7%	0.0%					
% Avg. We	0.0%	97.4%	102.9%	99.7%	0.0%	100.0%	0.0%	0.0%		
Grand Total	0	1601	1581	1600	0	1594	0	0	1594	

		TRAFFIC COUNT CONSULTANTS, INC.								Page 1	
		Team@tc2inc.com									
BELLEVUE, WASHINGTON		(253) 770-									
SE 24TH ST W/O										Site Code: 01W	
156TH AVE SE											
LOC# 01W V KPG18137TM										Date Start: 06-Nov-18	
										Date End: 08-Nov-18	
EASTBOUND											
	Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week		
	05-Nov-	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov-	Day	10-Nov-	11-Nov-	Average		
12:00 AM		0	0	0		0			0		
01:00		0	1	0		0			0		
02:00		0	0	0		0			0		
03:00		0	0	0		0			0		
04:00		0	0	0		0			0		
05:00		1	1	0		1			1		
06:00		1	1	2		1			1		
07:00		9	8	4		7			7		
08:00		9	7	8		8			8		
09:00		4	6	3		4			4		
10:00		2	3	5		3			3		
11:00		4	3	5		4			4		
12:00 PM		6	7	5		6			6		
01:00		4	11	11		9			9		
02:00		7	11	6		8			8		
03:00		7	4	9		7			7		
04:00		6	7	5		6			6		
05:00		6	6	6		6			6		
06:00		3	4	2		3			3		
07:00		3	0	2		2			2		
08:00		1	3	1		2			2		
09:00		2	3	2		2			2		
10:00		0	1	0		0			0		
11:00		0	0	2		1			1		
Day Total	0	75	87	78	0	80	0	0	80		
% Avg. Wk	0.0%	93.8%	108.8%	97.5%	0.0%						
% Avg. We	0.0%	93.8%	108.8%	97.5%	0.0%	100.0%	0.0%	0.0%			
Grand Total	0	75	87	78	0	80	0	0	80		

	A	B	C	D	E	F	H	J	K	M	N	O
1				TRAFFIC COUNT CONSULTANTS, INC.							Page 1	
2				Team@tc2inc.com								
3	BELLEVUE, WASHINGTON			(253) 770-								
4	SE 24TH ST E/O										Site Code: 01E	
5	156TH AVE SE											
6	LOC# 01E A-V KPG18137TM										Date Start: 06-Nov-18	
7											Date End: 08-Nov-18	
8	WESTBOUND											
9												
10		Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week		
11		05-Nov	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov	Day	10-Nov	11-Nov	Average		
12	12:00 AM		4	4	2		3			3		
13	01:00		0	0	1		0			0		
14	02:00		0	0	0		0			0		
15	03:00		2	1	3		2			2		
16	04:00		6	6	8		7			7		
17	05:00		20	11	24		18			18		
18	06:00		49	49	56		51			51		
19	07:00		188	185	148		174			174		
20	08:00		217	197	199		204			204		
21	09:00		143	135	140		139			139		
22	10:00		79	71	94		81			81		
23	11:00		73	97	89		86			86		
24	12:00 PM		78	81	65		75			75		
25	01:00		65	128	95		96			96		
26	02:00		88	106	90		95			95		
27	03:00		121	111	114		115			115		
28	04:00		117	119	152		129			129		
29	05:00		128	95	127		117			117		
30	06:00		116	73	103		97			97		
31	07:00		49	42	36		42			42		
32	08:00		21	36	28		28			28		
33	09:00		20	15	16		17			17		
34	10:00		12	6	7		8			8		
35	11:00		5	13	3		7			7		
36	Day Total	0	1601	1581	1600	0	1594	0	0	1594		
37	% Avg. Wk	0.0%	100.4%	99.2%	100.4%	0.0%						
38	% Avg. We	0.0%	100.4%	99.2%	100.4%	0.0%	100.0%	0.0%	0.0%			
39												
40												
42	Grand Total	0	1601	1581	1600	0	1594	0	0	1594		

			TRAFFIC COUNT CONSULTANTS, INC.							Page 1
			Team@tc2inc.com							
			(253) 770-							
BELLEVUE, WASHINGTON										Site Code: 01NW
SE 22ND PL NW/O										
156TH AVE SE										Date Start: 06-Nov-18
LOC# 01NW A-V KPG18137TM										Date End: 08-Nov-18
SOUTHEASTBOUND										
	Mon	Tue	Wed	Thu	Fri	Average	Sat	Sun	Week	
	05-Nov-	06-Nov-18	07-Nov-18	08-Nov-18	09-Nov-	Day	10-Nov-	11-Nov-	Average	
12:00 AM		2	2	1		2			2	
01:00		2	5	2		3			3	
02:00		1	2	1		1			1	
03:00		0	1	0		0			0	
04:00		4	5	5		5			5	
05:00		20	16	19		18			18	
06:00		42	32	41		38			38	
07:00		89	116	75		93			93	
08:00		162	159	173		165			165	
09:00		98	95	110		101			101	
10:00		82	77	79		79			79	
11:00		90	81	87		86			86	
12:00 PM		90	111	105		102			102	
01:00		90	138	94		107			107	
02:00		106	130	119		118			118	
03:00		154	129	144		142			142	
04:00		154	133	193		160			160	
05:00		210	191	194		198			198	
06:00		162	114	150		142			142	
07:00		90	87	84		87			87	
08:00		48	63	54		55			55	
09:00		40	44	54		46			46	
10:00		23	24	28		25			25	
11:00		15	11	12		13			13	
Day Total	0	1774	1766	1824	0	1788	0	0	1788	
% Avg. Wk	0.0%	99.2%	98.8%	102.0%	0.0%					
% Avg. We	0.0%	99.2%	98.8%	102.0%	0.0%	100.0%	0.0%	0.0%		
Grand Total	0	1774	1766	1824	0	1788	0	0	1788	

Appendix B: Traffic Operations Reports

Lake Hills Boulevard Intersection

Intersection	
Intersection Delay, s/veh	33.4
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	236	91	8	32	215	42	26	346	10	23	224	156
Future Vol, veh/h	236	91	8	32	215	42	26	346	10	23	224	156
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, %	1	1	1	2	2	2	1	1	1	1	1	1
Mvmt Flow	246	95	8	33	224	44	27	360	10	24	233	163
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	37	28.2	47.9	20.5
HCM LOS	E	D	E	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	7%	70%	11%	9%	0%
Vol Thru, %	91%	27%	74%	91%	0%
Vol Right, %	3%	2%	15%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	382	335	289	247	156
LT Vol	26	236	32	23	0
Through Vol	346	91	215	224	0
RT Vol	10	8	42	0	156
Lane Flow Rate	398	349	301	257	162
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.887	0.799	0.693	0.613	0.352
Departure Headway (Hd)	8.024	8.241	8.288	8.581	7.806
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	450	440	434	419	460
Service Time	6.093	6.312	6.364	6.354	5.579
HCM Lane V/C Ratio	0.884	0.793	0.694	0.613	0.352
HCM Control Delay	47.9	37	28.2	24.1	14.8
HCM Lane LOS	E	E	D	C	B
HCM 95th-tile Q	9.4	7.2	5.2	4	1.6

Intersection	
Intersection Delay, s/veh	41.8
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	148	187	22	41	171	26	29	301	26	21	365	299
Future Vol, veh/h	148	187	22	41	171	26	29	301	26	21	365	299
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	1	1	1	2	2	2	1	1	1	1	1	1
Mvmt Flow	153	193	23	42	176	27	30	310	27	22	376	308
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	45.5	25.2	45.1	43.9
HCM LOS	E	D	E	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	8%	41%	17%	5%	0%
Vol Thru, %	85%	52%	72%	95%	0%
Vol Right, %	7%	6%	11%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	356	357	238	386	299
LT Vol	29	148	41	21	0
Through Vol	301	187	171	365	0
RT Vol	26	22	26	0	299
Lane Flow Rate	367	368	245	398	308
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.858	0.861	0.611	0.938	0.662
Departure Headway (Hd)	8.421	8.426	8.967	8.489	7.735
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	429	431	402	426	465
Service Time	6.477	6.48	7.031	6.247	5.493
HCM Lane V/C Ratio	0.855	0.854	0.609	0.934	0.662
HCM Control Delay	45.1	45.5	25.2	59	24.5
HCM Lane LOS	E	E	D	F	C
HCM 95th-tile Q	8.5	8.6	3.9	10.6	4.7

Intersection	
Intersection Delay, s/veh	96.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	270	140	10	30	220	40	40	470	20	30	220	160
Future Vol, veh/h	270	140	10	30	220	40	40	470	20	30	220	160
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, %	1	1	1	2	2	2	1	1	1	1	1	1
Mvmt Flow	281	146	10	31	229	42	42	490	21	31	229	167
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	91.6	38.6	186.3	25.9
HCM LOS	F	E	F	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	8%	64%	10%	12%	0%
Vol Thru, %	89%	33%	76%	88%	0%
Vol Right, %	4%	2%	14%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	530	420	290	250	160
LT Vol	40	270	30	30	0
Through Vol	470	140	220	220	0
RT Vol	20	10	40	0	160
Lane Flow Rate	552	438	302	260	167
Geometry Grp	5	2	2	7	7
Degree of Util (X)	1.32	1.049	0.754	0.665	0.391
Departure Headway (Hd)	8.923	9.551	10.203	10.216	9.419
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	414	385	356	357	385
Service Time	6.923	7.551	8.203	7.916	7.119
HCM Lane V/C Ratio	1.333	1.138	0.848	0.728	0.434
HCM Control Delay	186.3	91.6	38.6	31	18
HCM Lane LOS	F	F	E	D	C
HCM 95th-tile Q	24.3	13.4	5.9	4.6	1.8

All-Way Stop Control

HCM 6th AWSC
3: 156th Ave SE & Lake Hills Blvd

2035 PM Peak Hour
05/24/2019

Intersection	
Intersection Delay, s/veh	69.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Vol, veh/h	180	190	20	40	170	30	20	310	20	30	450	400
Future Vol, veh/h	180	190	20	40	170	30	20	310	20	30	450	400
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	1	1	1	2	2	2	1	1	1	1	1	1
Mvmt Flow	186	196	21	41	175	31	21	320	21	31	464	412
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	58	26.2	45.3	96
HCM LOS	F	D	E	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	46%	17%	6%	0%
Vol Thru, %	89%	49%	71%	94%	0%
Vol Right, %	6%	5%	12%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	350	390	240	480	400
LT Vol	20	180	40	30	0
Through Vol	310	190	170	450	0
RT Vol	20	20	30	0	400
Lane Flow Rate	361	402	247	495	412
Geometry Grp	5	2	2	7	7
Degree of Util (X)	0.852	0.931	0.618	1.189	0.904
Departure Headway (Hd)	8.761	8.585	9.276	8.647	7.888
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	415	426	391	421	458
Service Time	6.761	6.585	7.276	6.414	5.654
HCM Lane V/C Ratio	0.87	0.944	0.632	1.176	0.9
HCM Control Delay	45.3	58	26.2	134.4	49.9
HCM Lane LOS	E	F	D	F	E
HCM 95th-tile Q	8.3	10.4	4	19.3	10

Signal Control

HCM 6th Signalized Intersection Summary 3: 156th Ave SE & Lake Hills Blvd

2035 AM Peak Hour
05/24/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Volume (veh/h)	270	140	10	35	220	45	40	470	20	30	255	160
Future Volume (veh/h)	270	140	10	35	220	45	40	470	20	30	255	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1961	1961	1961	1945	1945	1945	1961	1961	1961	1885	1885	1885
Adj Flow Rate, veh/h	281	146	10	36	229	47	42	490	21	31	266	0
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
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	506	206	13	153	537	102	138	664	27	144	660	
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.38	0.38	0.38	0.38	0.38	0.00
Sat Flow, veh/h	928	561	35	108	1465	279	76	1746	72	84	1734	1598
Grp Volume(v), veh/h	437	0	0	312	0	0	553	0	0	297	0	0
Grp Sat Flow(s),veh/h/ln	1524	0	0	1853	0	0	1894	0	0	1818	0	1598
Q Serve(g_s), s	3.8	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.3	0.0	0.0	4.5	0.0	0.0	8.9	0.0	0.0	4.1	0.0	0.0
Prop In Lane	0.64		0.02	0.12		0.15	0.08		0.04	0.10		1.00
Lane Grp Cap(c), veh/h	725	0	0	792	0	0	829	0	0	803	0	
V/C Ratio(X)	0.60	0.00	0.00	0.39	0.00	0.00	0.67	0.00	0.00	0.37	0.00	
Avail Cap(c_a), veh/h	1061	0	0	1236	0	0	1119	0	0	1068	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.5	0.0	0.0	8.6	0.0	0.0	9.5	0.0	0.0	8.1	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	0.0	0.3	0.0	0.0	0.9	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	0.0	1.4	0.0	0.0	2.9	0.0	0.0	1.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.3	0.0	0.0	8.9	0.0	0.0	10.5	0.0	0.0	8.4	0.0	0.0
LnGrp LOS	B	A	A	A	A	A	B	A	A	A	A	
Approach Vol, veh/h		437			312			553			297	A
Approach Delay, s/veh		10.3			8.9			10.5			8.4	
Approach LOS		B			A			B			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		18.0		17.5		18.0		17.5				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		19.1		21.9		19.1		21.9				
Max Q Clear Time (g_c+I1), s		10.9		10.3		6.1		6.5				
Green Ext Time (p_c), s		2.4		2.4		1.5		1.7				

Intersection Summary

HCM 6th Ctrl Delay	9.7
HCM 6th LOS	A

Notes

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Signal Control

HCM 6th Signalized Intersection Summary
3: 156th Ave SE & Lake Hills Blvd

2035 PM Peak Hour

05/24/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	↕
Traffic Volume (veh/h)	180	190	25	45	180	30	30	310	30	30	450	400
Future Volume (veh/h)	180	190	25	45	180	30	30	310	30	30	450	400
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.96	1.00		0.97	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1961	1961	1961	1945	1945	1945	1961	1961	1961	1885	1885	1885
Adj Flow Rate, veh/h	188	198	26	47	188	31	31	323	31	31	469	0
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
Percent Heavy Veh, %	1	1	1	2	2	2	1	1	1	1	1	1
Cap, veh/h	225	237	31	62	247	41	90	550	50	82	594	
Arrive On Green	0.26	0.26	0.26	0.19	0.19	0.19	0.33	0.33	0.33	0.33	0.33	0.00
Sat Flow, veh/h	864	910	120	332	1327	219	79	1646	151	59	1780	1598
Grp Volume(v), veh/h	412	0	0	266	0	0	385	0	0	500	0	0
Grp Sat Flow(s),veh/h/ln	1894	0	0	1878	0	0	1877	0	0	1839	0	1598
Q Serve(g_s), s	12.6	0.0	0.0	8.3	0.0	0.0	0.0	0.0	0.0	4.9	0.0	0.0
Cycle Q Clear(g_c), s	12.6	0.0	0.0	8.3	0.0	0.0	10.2	0.0	0.0	15.1	0.0	0.0
Prop In Lane	0.46		0.06	0.18		0.12	0.08		0.08	0.06		1.00
Lane Grp Cap(c), veh/h	493	0	0	350	0	0	690	0	0	676	0	
V/C Ratio(X)	0.84	0.00	0.00	0.76	0.00	0.00	0.56	0.00	0.00	0.74	0.00	
Avail Cap(c_a), veh/h	631	0	0	565	0	0	1181	0	0	1171	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	21.5	0.0	0.0	23.7	0.0	0.0	17.1	0.0	0.0	18.6	0.0	0.0
Incr Delay (d2), s/veh	7.7	0.0	0.0	3.4	0.0	0.0	0.7	0.0	0.0	1.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	0.0	3.8	0.0	0.0	4.3	0.0	0.0	6.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.2	0.0	0.0	27.1	0.0	0.0	17.8	0.0	0.0	20.2	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	A	C	A	
Approach Vol, veh/h		412			266			385			500	A
Approach Delay, s/veh		29.2			27.1			17.8			20.2	
Approach LOS		C			C			B			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		25.0		20.5		25.0		16.0				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		37.5		20.5		37.5		18.5				
Max Q Clear Time (g_c+I1), s		12.2		14.6		17.1		10.3				
Green Ext Time (p_c), s		2.7		1.3		3.4		1.0				

Intersection Summary

HCM 6th Ctrl Delay	23.1
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Roundabout

MOVEMENT SUMMARY

 **Site: 101 [156th Avenue NE / Lake Hills Blvd]**

AM Peak
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 156th Ave NE												
3	L2	42	1.0	0.600	10.2	LOS B	5.5	138.0	0.79	0.83	0.91	24.0
8	T1	490	1.0	0.600	6.2	LOS A	5.5	138.0	0.79	0.83	0.91	23.5
18	R2	21	1.0	0.600	6.6	LOS A	5.5	138.0	0.79	0.83	0.91	23.4
Approach		552	1.0	0.600	6.5	LOS A	5.5	138.0	0.79	0.83	0.91	23.5
East: Lake Hills Blvd												
1	L2	31	2.0	0.455	12.6	LOS B	3.6	90.9	0.89	0.95	0.99	23.3
6	T1	229	2.0	0.455	8.6	LOS A	3.6	90.9	0.89	0.95	0.99	23.2
16	R2	42	2.0	0.455	9.0	LOS A	3.6	90.9	0.89	0.95	0.99	22.1
Approach		302	2.0	0.455	9.1	LOS A	3.6	90.9	0.89	0.95	0.99	23.1
North: 156th Ave NE												
7	L2	31	1.0	0.458	8.0	LOS A	3.4	86.3	0.67	0.62	0.67	24.1
4	T1	229	1.0	0.458	4.0	LOS A	3.4	86.3	0.67	0.62	0.67	23.9
14	R2	167	1.0	0.458	4.4	LOS A	3.4	86.3	0.67	0.62	0.67	23.4
Approach		427	1.0	0.458	4.4	LOS A	3.4	86.3	0.67	0.62	0.67	23.7
West: Lake Hills Blvd												
5	L2	281	0.0	0.408	7.3	LOS A	2.8	70.0	0.58	0.62	0.58	23.7
2	T1	146	0.0	0.408	3.3	LOS A	2.8	70.0	0.58	0.62	0.58	23.8
12	R2	10	0.0	0.408	3.8	LOS A	2.8	70.0	0.58	0.62	0.58	23.4
Approach		438	0.0	0.408	5.9	LOS A	2.8	70.0	0.58	0.62	0.58	23.7
All Vehicles		1719	0.9	0.600	6.3	LOS A	5.5	138.0	0.73	0.75	0.78	23.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KPG | Processed: Monday, March 18, 2019 12:48:31 PM

Project: K:\PROJECTS\BELLEVUE\18096-Transportation On-Call\18096 TO1-156th & Lake Wa Blvd Study\DESIGN\Data & Reports\Traffic\Sidra Lakehills Blvd 156th AM.sip8

Roundabout

MOVEMENT SUMMARY

 **Site: 101 [Lake Hills Blvd / 156th Avenue NE]**

PM Peak
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 156th Ave NE												
3	L2	21	1.0	0.393	8.0	LOS A	2.7	67.2	0.68	0.60	0.68	24.3
8	T1	323	1.0	0.393	4.1	LOS A	2.7	67.2	0.68	0.60	0.68	24.1
18	R2	21	1.0	0.393	4.5	LOS A	2.7	67.2	0.68	0.60	0.68	23.7
Approach		365	1.0	0.393	4.3	LOS A	2.7	67.2	0.68	0.60	0.68	24.1
East: Lake Hills Blvd												
1	L2	42	2.0	0.282	8.6	LOS A	1.7	43.8	0.66	0.67	0.66	24.2
6	T1	177	2.0	0.282	4.6	LOS A	1.7	43.8	0.66	0.67	0.66	24.0
16	R2	31	2.0	0.282	5.0	LOS A	1.7	43.8	0.66	0.67	0.66	23.6
Approach		250	2.0	0.282	5.3	LOS A	1.7	43.8	0.66	0.67	0.66	24.0
North: 156th Ave NE												
7	L2	31	1.0	0.930	21.1	LOS D	25.6	644.5	1.00	1.21	1.56	21.4
4	T1	469	1.0	0.930	17.1	LOS D	25.6	644.5	1.00	1.21	1.56	21.3
14	R2	417	1.0	0.930	17.5	LOS D	25.6	644.5	1.00	1.21	1.56	21.0
Approach		917	1.0	0.930	17.4	LOS B	25.6	644.5	1.00	1.21	1.56	21.2
West: Lake Hills Blvd												
5	L2	188	1.0	0.498	9.7	LOS A	4.1	102.5	0.83	0.86	0.89	23.7
2	T1	198	1.0	0.498	5.7	LOS A	4.1	102.5	0.83	0.86	0.89	23.5
12	R2	21	1.0	0.498	6.1	LOS A	4.1	102.5	0.83	0.86	0.89	23.1
Approach		406	1.0	0.498	7.5	LOS A	4.1	102.5	0.83	0.86	0.89	23.6
All Vehicles		1938	1.1	0.930	11.3	LOS B	25.6	644.5	0.86	0.95	1.14	22.5

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: KPG | Processed: Friday, May 24, 2019 1:44:26 PM

Project: K:\PROJECTS\BELLEVUE\18096-Transportation On-Call\18096 TO1-156th & Lake Wa Blvd Study\DESIGN\Data & Reports\Traffic\Sidra Lakehills Blvd 156th PM.sip8

SE 16th Street Intersection

Intersection	
Intersection Delay, s/veh	17.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	60	108	15	90	137	11	25	284	26	7	222	40
Future Vol, veh/h	60	108	15	90	137	11	25	284	26	7	222	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	3	3	3	1	1	1	2	2	2
Mvmt Flow	69	124	17	103	157	13	29	326	30	8	255	46
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	14.6	16.8	21.1	17
HCM LOS	B	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	33%	38%	3%
Vol Thru, %	85%	59%	58%	83%
Vol Right, %	8%	8%	5%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	335	183	238	269
LT Vol	25	60	90	7
Through Vol	284	108	137	222
RT Vol	26	15	11	40
Lane Flow Rate	385	210	274	309
Geometry Grp	1	1	1	1
Degree of Util (X)	0.668	0.402	0.512	0.548
Departure Headway (Hd)	6.249	6.878	6.744	6.379
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	578	520	531	563
Service Time	4.317	4.96	4.821	4.453
HCM Lane V/C Ratio	0.666	0.404	0.516	0.549
HCM Control Delay	21.1	14.6	16.8	17
HCM Lane LOS	C	B	C	C
HCM 95th-tile Q	5	1.9	2.9	3.3

Intersection	
Intersection Delay, s/veh	26.8
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	47	142	10	94	96	12	17	303	58	13	377	45
Future Vol, veh/h	47	142	10	94	96	12	17	303	58	13	377	45
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	3	3	3	1	1	1	2	2	2
Mvmt Flow	51	153	11	101	103	13	18	326	62	14	405	48
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	16.7	17	26.8	36
HCM LOS	C	C	D	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	24%	47%	3%
Vol Thru, %	80%	71%	48%	87%
Vol Right, %	15%	5%	6%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	378	199	202	435
LT Vol	17	47	94	13
Through Vol	303	142	96	377
RT Vol	58	10	12	45
Lane Flow Rate	406	214	217	468
Geometry Grp	1	1	1	1
Degree of Util (X)	0.747	0.449	0.458	0.848
Departure Headway (Hd)	6.619	7.552	7.592	6.524
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	545	475	474	557
Service Time	4.677	5.62	5.66	4.578
HCM Lane V/C Ratio	0.745	0.451	0.458	0.84
HCM Control Delay	26.8	16.7	17	36
HCM Lane LOS	D	C	C	E
HCM 95th-tile Q	6.4	2.3	2.4	9

All-Way Stop Control

HCM 6th AWSC
5: 156th Ave SE & SE 16th St

2035 AM Peak Hour
05/24/2019

Intersection	
Intersection Delay, s/veh	38.8
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	70	100	10	90	130	10	30	420	30	10	220	40
Future Vol, veh/h	70	100	10	90	130	10	30	420	30	10	220	40
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles, %	2	2	2	3	3	3	1	1	1	2	2	2
Mvmt Flow	80	115	11	103	149	11	34	483	34	11	253	46
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	17.3	20.1	65.8	20.9
HCM LOS	C	C	F	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	39%	39%	4%
Vol Thru, %	88%	56%	57%	81%
Vol Right, %	6%	6%	4%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	480	180	230	270
LT Vol	30	70	90	10
Through Vol	420	100	130	220
RT Vol	30	10	10	40
Lane Flow Rate	552	207	264	310
Geometry Grp	1	1	1	1
Degree of Util (X)	1.006	0.451	0.561	0.613
Departure Headway (Hd)	6.567	7.84	7.637	7.107
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	552	457	471	506
Service Time	4.63	5.923	5.715	5.186
HCM Lane V/C Ratio	1	0.453	0.561	0.613
HCM Control Delay	65.8	17.3	20.1	20.9
HCM Lane LOS	F	C	C	C
HCM 95th-tile Q	14.5	2.3	3.4	4.1

All-Way Stop Control

HCM 6th AWSC
5: 156th Ave SE & SE 16th St

2035 PM Peak Hour
05/24/2019

Intersection	
Intersection Delay, s/veh	42.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	140	10	100	90	10	20	300	60	20	440	50
Future Vol, veh/h	50	140	10	100	90	10	20	300	60	20	440	50
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	2	2	2	3	3	3	1	1	1	2	2	2
Mvmt Flow	54	151	11	108	97	11	22	323	65	22	473	54
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	17.9	18.2	30.1	70.1
HCM LOS	C	C	D	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	25%	50%	4%
Vol Thru, %	79%	70%	45%	86%
Vol Right, %	16%	5%	5%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	380	200	200	510
LT Vol	20	50	100	20
Through Vol	300	140	90	440
RT Vol	60	10	10	50
Lane Flow Rate	409	215	215	548
Geometry Grp	1	1	1	1
Degree of Util (X)	0.775	0.468	0.472	1.021
Departure Headway (Hd)	7.006	8.05	8.11	6.7
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	519	449	447	543
Service Time	5.006	6.05	6.11	4.7
HCM Lane V/C Ratio	0.788	0.479	0.481	1.009
HCM Control Delay	30.1	17.9	18.2	70.1
HCM Lane LOS	D	C	C	F
HCM 95th-tile Q	7	2.4	2.5	15.1

Signal Control

HCM 6th Signalized Intersection Summary
5: 156th Ave SE & SE 16th St

2035 AM Peak Hour
05/24/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	70	125	20	90	155	15	30	420	30	10	251	40
Future Volume (veh/h)	70	125	20	90	155	15	30	420	30	10	251	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	0.99		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1856	1856	1856	1885	1885	1885	1870	1870	1870
Adj Flow Rate, veh/h	80	144	23	103	178	17	34	483	34	11	289	46
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	3	3	3	1	1	1	2	2	2
Cap, veh/h	260	320	44	276	313	26	145	720	49	127	673	104
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.44	0.44	0.44	0.44	0.44	0.44
Sat Flow, veh/h	388	1155	158	436	1130	95	52	1654	112	18	1545	240
Grp Volume(v), veh/h	247	0	0	298	0	0	551	0	0	346	0	0
Grp Sat Flow(s),veh/h/ln	1702	0	0	1661	0	0	1819	0	0	1803	0	0
Q Serve(g_s), s	0.0	0.0	0.0	1.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.5	0.0	0.0	4.6	0.0	0.0	7.5	0.0	0.0	4.1	0.0	0.0
Prop In Lane	0.32		0.09	0.35		0.06	0.06		0.06	0.03		0.13
Lane Grp Cap(c), veh/h	624	0	0	615	0	0	914	0	0	903	0	0
V/C Ratio(X)	0.40	0.00	0.00	0.48	0.00	0.00	0.60	0.00	0.00	0.38	0.00	0.00
Avail Cap(c_a), veh/h	1244	0	0	1234	0	0	1830	0	0	1814	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.4	0.0	0.0	9.8	0.0	0.0	7.1	0.0	0.0	6.2	0.0	0.0
Incr Delay (d2), s/veh	0.4	0.0	0.0	0.6	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	1.4	0.0	0.0	1.7	0.0	0.0	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.9	0.0	0.0	10.4	0.0	0.0	7.7	0.0	0.0	6.4	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		247			298			551				346
Approach Delay, s/veh		9.9			10.4			7.7				6.4
Approach LOS		A			B			A				A
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		18.1		13.2		18.1		13.2				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		29.8		21.2		29.8		21.2				
Max Q Clear Time (g_c+I1), s		9.5		5.5		6.1		6.6				
Green Ext Time (p_c), s		3.7		1.3		2.2		1.6				
Intersection Summary												
HCM 6th Ctrl Delay				8.3								
HCM 6th LOS				A								

Signal Control

HCM 6th Signalized Intersection Summary 5: 156th Ave SE & SE 16th St

2035 PM Peak Hour
05/24/2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	50	150	10	100	100	15	20	345	60	20	440	50
Future Volume (veh/h)	50	150	10	100	100	15	20	345	60	20	440	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1856	1856	1856	1885	1885	1885	1870	1870	1870
Adj Flow Rate, veh/h	57	172	11	115	115	17	23	397	69	23	506	57
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	3	3	3	1	1	1	2	2	2
Cap, veh/h	213	337	19	322	215	27	138	699	117	135	746	82
Arrive On Green	0.24	0.24	0.24	0.24	0.24	0.24	0.46	0.46	0.46	0.46	0.46	0.46
Sat Flow, veh/h	281	1394	80	620	890	112	33	1504	253	28	1603	176
Grp Volume(v), veh/h	240	0	0	247	0	0	489	0	0	586	0	0
Grp Sat Flow(s),veh/h/ln	1755	0	0	1621	0	0	1790	0	0	1807	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.5	0.0	0.0	3.7	0.0	0.0	6.0	0.0	0.0	7.7	0.0	0.0
Prop In Lane	0.24		0.05	0.47		0.07	0.05		0.14	0.04		0.10
Lane Grp Cap(c), veh/h	569	0	0	564	0	0	955	0	0	962	0	0
V/C Ratio(X)	0.42	0.00	0.00	0.44	0.00	0.00	0.51	0.00	0.00	0.61	0.00	0.00
Avail Cap(c_a), veh/h	1169	0	0	1088	0	0	1985	0	0	2012	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.1	0.0	0.0	10.2	0.0	0.0	6.0	0.0	0.0	6.5	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.5	0.0	0.0	0.4	0.0	0.0	0.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.0	1.2	0.0	0.0	1.2	0.0	0.0	1.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.6	0.0	0.0	10.7	0.0	0.0	6.4	0.0	0.0	7.1	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		240			247			489			586	
Approach Delay, s/veh		10.6			10.7			6.4			7.1	
Approach LOS		B			B			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		18.8		11.9		18.8		11.9				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		32.5		18.5		32.5		18.5				
Max Q Clear Time (g_c+I1), s		8.0		5.5		9.7		5.7				
Green Ext Time (p_c), s		3.4		1.1		4.2		1.2				
Intersection Summary												
HCM 6th Ctrl Delay				8.0								
HCM 6th LOS				A								

Roundabout

MOVEMENT SUMMARY

 Site: 101 [SE 16th Street / 156th Avenue NE]

AM Peak
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 156th Ave NE												
3	L2	31	1.0	0.426	6.8	LOS A	3.1	77.4	0.50	0.42	0.50	24.6
8	T1	433	1.0	0.426	2.7	LOS A	3.1	77.4	0.50	0.42	0.50	24.4
18	R2	31	1.0	0.426	3.2	LOS A	3.1	77.4	0.50	0.42	0.50	24.0
Approach		495	1.0	0.426	3.0	LOS A	3.1	77.4	0.50	0.42	0.50	24.4
East: SE 16th Street												
1	L2	93	3.0	0.275	8.8	LOS A	1.7	43.7	0.68	0.70	0.68	24.0
6	T1	134	3.0	0.275	4.6	LOS A	1.7	43.7	0.68	0.70	0.68	23.9
16	R2	10	3.0	0.275	5.1	LOS A	1.7	43.7	0.68	0.70	0.68	23.4
Approach		237	3.0	0.275	6.3	LOS A	1.7	43.7	0.68	0.70	0.68	23.9
North: 156th Ave NE												
7	L2	10	2.0	0.260	7.0	LOS A	1.6	41.1	0.51	0.45	0.51	24.6
4	T1	227	2.0	0.260	2.9	LOS A	1.6	41.1	0.51	0.45	0.51	24.5
14	R2	41	2.0	0.260	3.4	LOS A	1.6	41.1	0.51	0.45	0.51	24.0
Approach		278	2.0	0.260	3.1	LOS A	1.6	41.1	0.51	0.45	0.51	24.4
West: SE 16th Street												
5	L2	72	2.0	0.179	7.2	LOS A	1.0	24.7	0.50	0.55	0.50	24.3
2	T1	103	2.0	0.179	3.1	LOS A	1.0	24.7	0.50	0.55	0.50	24.2
12	R2	10	2.0	0.179	3.5	LOS A	1.0	24.7	0.50	0.55	0.50	23.7
Approach		186	2.0	0.179	4.7	LOS A	1.0	24.7	0.50	0.55	0.50	24.2
All Vehicles		1196	1.8	0.426	3.9	LOS A	3.1	77.4	0.54	0.50	0.54	24.3

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Roundabout

MOVEMENT SUMMARY

 Site: 101 [SE 16th Street / 156th Avenue NE]

PM Peak
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 156th Ave NE												
3	L2	21	1.0	0.386	8.1	LOS A	2.7	68.5	0.69	0.60	0.69	24.3
8	T1	320	1.0	0.386	4.0	LOS A	2.7	68.5	0.69	0.60	0.69	24.2
18	R2	21	1.0	0.386	4.4	LOS A	2.7	68.5	0.69	0.60	0.69	23.7
Approach		361	1.0	0.386	4.3	LOS A	2.7	68.5	0.69	0.60	0.69	24.2
East: SE 16th Street												
1	L2	41	2.0	0.282	8.7	LOS A	1.8	44.6	0.67	0.67	0.67	24.3
6	T1	175	2.0	0.282	4.5	LOS A	1.8	44.6	0.67	0.67	0.67	24.1
16	R2	31	2.0	0.282	5.0	LOS A	1.8	44.6	0.67	0.67	0.67	23.6
Approach		247	2.0	0.282	5.3	LOS A	1.8	44.6	0.67	0.67	0.67	24.1
North: 156th Ave NE												
7	L2	31	1.0	0.826	11.7	LOS B	14.1	354.5	0.95	0.88	1.13	23.7
4	T1	464	1.0	0.826	7.5	LOS A	14.1	354.5	0.95	0.88	1.13	23.5
14	R2	412	1.0	0.826	8.0	LOS A	14.1	354.5	0.95	0.88	1.13	23.1
Approach		907	1.0	0.826	7.9	LOS A	14.1	354.5	0.95	0.88	1.13	23.3
West: SE 16th Street												
5	L2	186	0.0	0.482	9.5	LOS A	3.9	97.2	0.82	0.83	0.87	23.8
2	T1	196	0.0	0.482	5.3	LOS A	3.9	97.2	0.82	0.83	0.87	23.6
12	R2	21	0.0	0.482	5.8	LOS A	3.9	97.2	0.82	0.83	0.87	23.2
Approach		402	0.0	0.482	7.3	LOS A	3.9	97.2	0.82	0.83	0.87	23.7
All Vehicles		1918	0.9	0.826	6.7	LOS A	14.1	354.5	0.84	0.79	0.93	23.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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SE 24th Street-SE 22nd Place Intersection

SE 24th Street-SE 22nd Place and 156th Avenue SE Intersection

HCM 6th Edition methodology cannot calculate operations for 5-legged intersections. Delay was calculated using SimTraffic simulation. Results of the simulation are shown below.

LOS and Delay (seconds) at SE 24th Street-SE 22nd Place and 156th Avenue SE Intersection

Year	AM Peak Hour	PM Peak Hour
Existing All-Way Stop	D (31)	E (38)
2035 All-Way Stop	F (68)	F (63)

Signal Control

Lanes, Volumes, Timings
7: 156th Ave SE & SE 24th St & SE 22nd PI

2035 AM Peak Hour
05/24/2019

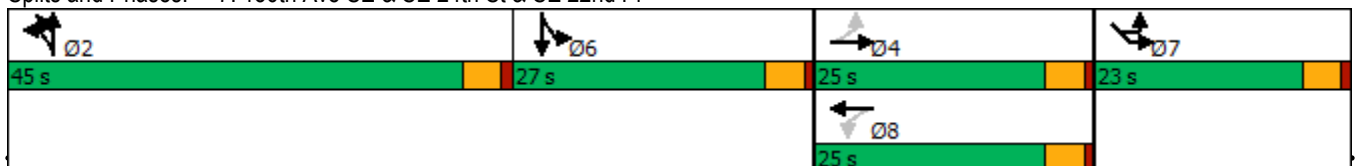


Lane Group	EBL	EBT	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↕		↕					↕			↕
Traffic Volume (vph)	1	4	30	3	140	60	2	70	390	30	30	325
Future Volume (vph)	1	4	30	3	140	60	2	70	390	30	30	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	11	11	11	11	10	10	10	10	14	14
Satd. Flow (prot)	0	1568	0	1554	0	0	0	0	1708	0	0	1937
Flt Permitted		0.970		0.963					0.993			0.996
Satd. Flow (perm)	0	1536	0	1504	0	0	0	0	1706	0	0	1935
Right Turn on Red							Yes			Yes		
Satd. Flow (RTOR)				13					3			95
Link Speed (mph)		25		25					25			30
Link Distance (ft)		684		751					785			2629
Travel Time (s)		18.7		20.5					21.4			59.8
Confl. Peds. (#/hr)			3		1		3	1		6	6	
Confl. Bikes (#/hr)					2	2				2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	20%	20%	1%	1%	1%	1%	2%	2%	2%	2%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	251	0	0	0	0	528	0	0	413
Turn Type	Perm	NA	Perm	NA			Split	Split	NA		Split	NA
Protected Phases		4		8			2	2	2		6	6
Permitted Phases	4		8									
Total Split (s)	25.0	25.0	25.0	25.0			45.0	45.0	45.0		27.0	27.0
Total Lost Time (s)		4.5		4.5					4.5			4.5
Act Effct Green (s)		20.1		20.1					37.9			21.8
Actuated g/C Ratio		0.18		0.18					0.33			0.19
v/c Ratio		0.02		0.92					0.93			0.93
Control Delay		41.8		82.1					61.7			64.4
Queue Delay		0.0		0.0					0.0			0.0
Total Delay		41.8		82.1					61.7			64.4
LOS		D		F					E			E
Approach Delay		41.8		82.1					61.7			64.4
Approach LOS		D		F					E			E

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 114.4
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 67.5 Intersection LOS: E
 Intersection Capacity Utilization 81.3% ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 7: 156th Ave SE & SE 24th St & SE 22nd PI





Lane Group	SBR2	SEL2	SEL	SER
Lane Configurations				
Traffic Volume (vph)	30	30	90	50
Future Volume (vph)	30	30	90	50
Ideal Flow (vphpl)	1900	1900	1900	1900
Lane Width (ft)	14	11	11	11
Satd. Flow (prot)	0	0	1622	0
Flt Permitted			0.966	
Satd. Flow (perm)	0	0	1599	0
Right Turn on Red	Yes			
Satd. Flow (RTOR)				
Link Speed (mph)			25	
Link Distance (ft)			698	
Travel Time (s)			19.0	
Confl. Peds. (#/hr)	1		6	3
Confl. Bikes (#/hr)				1
Peak Hour Factor	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	3%	4%	4%	4%
Shared Lane Traffic (%)				
Lane Group Flow (vph)	0	0	183	0
Turn Type		Prot	Prot	
Protected Phases		7	7	
Permitted Phases				
Total Split (s)		23.0	23.0	
Total Lost Time (s)			4.5	
Act Effct Green (s)			16.5	
Actuated g/C Ratio			0.14	
v/c Ratio			0.79	
Control Delay			71.5	
Queue Delay			0.0	
Total Delay			71.5	
LOS			E	
Approach Delay			71.5	
Approach LOS			E	
Intersection Summary				

Signal Control

Lanes, Volumes, Timings
7: 156th Ave SE & SE 24th St & SE 22nd Pl

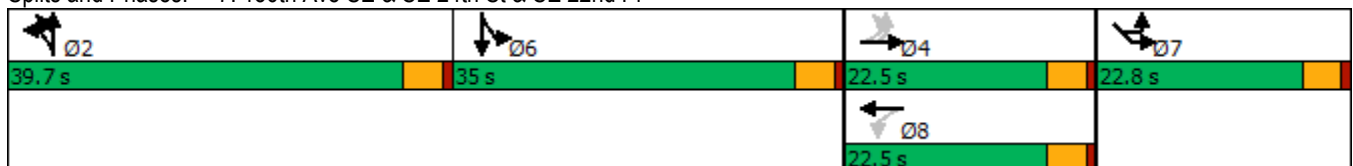
2035 PM Peak Hour
05/24/2019

Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	1	1	1	1	30	0	70	15	1	50	410	20
Future Volume (vph)	1	1	1	1	30	0	70	15	1	50	410	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	11	11	11	11	10	10	10	10
Grade (%)			0%			0%					0%	
Storage Length (ft)		0		0	0		0			0		0
Storage Lanes		0		0	0		0			0		0
Taper Length (ft)		25			25					25		
Satd. Flow (prot)	0	0	1482	0	0	1576	0	0	0	0	1716	0
Flt Permitted			0.777			0.910					0.995	
Satd. Flow (perm)	0	0	1178	0	0	1449	0	0	0	0	1715	0
Right Turn on Red				Yes				Yes				Yes
Satd. Flow (RTOR)			1			95					2	
Link Speed (mph)			25			25					25	
Link Distance (ft)			684			751					785	
Travel Time (s)			18.7			20.5					21.4	
Lane Group Flow (vph)	0	0	4	0	0	123	0	0	0	0	518	0
Turn Type	Perm	Perm	NA		Perm	NA			Split	Split	NA	
Protected Phases			4			8			2	2	2	
Permitted Phases	4	4			8							
Total Split (s)	22.5	22.5	22.5		22.5	22.5			39.7	39.7	39.7	
Total Lost Time (s)			4.5			4.5					4.5	
Act Effct Green (s)			8.5			8.5					35.2	
Actuated g/C Ratio			0.08			0.08					0.32	
v/c Ratio			0.04			0.62					0.94	
Control Delay			42.5			29.1					63.7	
Queue Delay			0.0			0.0					0.0	
Total Delay			42.5			29.1					63.7	
LOS			D			C					E	
Approach Delay			42.5			29.1					63.7	
Approach LOS			D			C					E	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 109.9
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 60.3 Intersection LOS: E
 Intersection Capacity Utilization 84.9% ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 7: 156th Ave SE & SE 24th St & SE 22nd Pl





Lane Group	SBL	SBT	SBR2	SEL2	SEL	SER	SER2
Lane Configurations		↕	↗		↘		
Traffic Volume (vph)	25	440	30	30	100	70	1
Future Volume (vph)	25	440	30	30	100	70	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	11	11	11	11
Grade (%)		0%			0%		
Storage Length (ft)	0				0	0	
Storage Lanes	0				1	0	
Taper Length (ft)	25				25		
Satd. Flow (prot)	0	1962	1672	0	1604	0	0
Flt Permitted		0.997			0.969		
Satd. Flow (perm)	0	1961	1638	0	1583	0	0
Right Turn on Red			Yes				No
Satd. Flow (RTOR)			136				
Link Speed (mph)		30			25		
Link Distance (ft)		2629			698		
Travel Time (s)		59.8			19.0		
Lane Group Flow (vph)	0	500	32	0	216	0	0
Turn Type	Split	NA	Free	Prot	Prot		
Protected Phases	6	6		7	7		
Permitted Phases			Free				
Total Split (s)	35.0	35.0		22.8	22.8		
Total Lost Time (s)		4.5			4.5		
Act Effct Green (s)		30.5	109.9		17.6		
Actuated g/C Ratio		0.28	1.00		0.16		
v/c Ratio		0.92	0.02		0.84		
Control Delay		62.8	0.0		73.3		
Queue Delay		0.0	0.0		0.0		
Total Delay		62.8	0.0		73.3		
LOS		E	A		E		
Approach Delay		59.0			73.3		
Approach LOS		E			E		
Intersection Summary							

Roundabout

MOVEMENT SUMMARY

 Site: 101 [SE 16th Street / 156th Avenue NE]

AM Peak
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 156th Ave NE												
3	L2	31	1.0	0.426	6.8	LOS A	3.1	77.4	0.50	0.42	0.50	24.6
8	T1	433	1.0	0.426	2.7	LOS A	3.1	77.4	0.50	0.42	0.50	24.4
18	R2	31	1.0	0.426	3.2	LOS A	3.1	77.4	0.50	0.42	0.50	24.0
Approach		495	1.0	0.426	3.0	LOS A	3.1	77.4	0.50	0.42	0.50	24.4
East: SE 16th Street												
1	L2	93	3.0	0.275	8.8	LOS A	1.7	43.7	0.68	0.70	0.68	24.0
6	T1	134	3.0	0.275	4.6	LOS A	1.7	43.7	0.68	0.70	0.68	23.9
16	R2	10	3.0	0.275	5.1	LOS A	1.7	43.7	0.68	0.70	0.68	23.4
Approach		237	3.0	0.275	6.3	LOS A	1.7	43.7	0.68	0.70	0.68	23.9
North: 156th Ave NE												
7	L2	10	2.0	0.260	7.0	LOS A	1.6	41.1	0.51	0.45	0.51	24.6
4	T1	227	2.0	0.260	2.9	LOS A	1.6	41.1	0.51	0.45	0.51	24.5
14	R2	41	2.0	0.260	3.4	LOS A	1.6	41.1	0.51	0.45	0.51	24.0
Approach		278	2.0	0.260	3.1	LOS A	1.6	41.1	0.51	0.45	0.51	24.4
West: SE 16th Street												
5	L2	72	2.0	0.179	7.2	LOS A	1.0	24.7	0.50	0.55	0.50	24.3
2	T1	103	2.0	0.179	3.1	LOS A	1.0	24.7	0.50	0.55	0.50	24.2
12	R2	10	2.0	0.179	3.5	LOS A	1.0	24.7	0.50	0.55	0.50	23.7
Approach		186	2.0	0.179	4.7	LOS A	1.0	24.7	0.50	0.55	0.50	24.2
All Vehicles		1196	1.8	0.426	3.9	LOS A	3.1	77.4	0.54	0.50	0.54	24.3

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Roundabout

MOVEMENT SUMMARY

 Site: 101 [SE 16th Street / 156th Avenue NE]

PM Peak
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: 156th Ave NE												
3	L2	21	1.0	0.386	8.1	LOS A	2.7	68.5	0.69	0.60	0.69	24.3
8	T1	320	1.0	0.386	4.0	LOS A	2.7	68.5	0.69	0.60	0.69	24.2
18	R2	21	1.0	0.386	4.4	LOS A	2.7	68.5	0.69	0.60	0.69	23.7
Approach		361	1.0	0.386	4.3	LOS A	2.7	68.5	0.69	0.60	0.69	24.2
East: SE 16th Street												
1	L2	41	2.0	0.282	8.7	LOS A	1.8	44.6	0.67	0.67	0.67	24.3
6	T1	175	2.0	0.282	4.5	LOS A	1.8	44.6	0.67	0.67	0.67	24.1
16	R2	31	2.0	0.282	5.0	LOS A	1.8	44.6	0.67	0.67	0.67	23.6
Approach		247	2.0	0.282	5.3	LOS A	1.8	44.6	0.67	0.67	0.67	24.1
North: 156th Ave NE												
7	L2	31	1.0	0.826	11.7	LOS B	14.1	354.5	0.95	0.88	1.13	23.7
4	T1	464	1.0	0.826	7.5	LOS A	14.1	354.5	0.95	0.88	1.13	23.5
14	R2	412	1.0	0.826	8.0	LOS A	14.1	354.5	0.95	0.88	1.13	23.1
Approach		907	1.0	0.826	7.9	LOS A	14.1	354.5	0.95	0.88	1.13	23.3
West: SE 16th Street												
5	L2	186	0.0	0.482	9.5	LOS A	3.9	97.2	0.82	0.83	0.87	23.8
2	T1	196	0.0	0.482	5.3	LOS A	3.9	97.2	0.82	0.83	0.87	23.6
12	R2	21	0.0	0.482	5.8	LOS A	3.9	97.2	0.82	0.83	0.87	23.2
Approach		402	0.0	0.482	7.3	LOS A	3.9	97.2	0.82	0.83	0.87	23.7
All Vehicles		1918	0.9	0.826	6.7	LOS A	14.1	354.5	0.84	0.79	0.93	23.6

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

Intersection and Approach LOS values are based on average delay for all movements (v/c not used).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix C: MUTCD Signal Warrants Analysis

Warrant 1: Eight-hour Vehicular Volume

3: 156th Ave SE & Lake Hills Blvd

Intersection Information

Major Street Name: 156th Ave SE
 Major Street Direction: NB/SB
 Minor Street Direction: EB/WB

WARRANT 1 MET? **Yes**

Details:

Condition A Met? **Yes** 11 Hours met (8 required)
 Condition B Met? **No** 7 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	100% Standard Met? Cond. A OR Cond. B		80% Standard Met? Cond. A AND Cond. B	
			Condition A 100% Column	Condition B 100% Column	Condition A 80% Column	Condition B 80% Column
07:15 to 08:15	659	359	Yes*	No	Yes	No
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes		
08:15 to 09:15	784	338	Yes*	No	Yes	Yes
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (720)?	Yes	Volume >= 80% column (60)?	Yes		
09:15 to 10:15	663	303	Yes*	No	Yes	No
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes		
11:30 to 12:30	605	230	Yes*	No	Yes	No
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes		
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes		
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes		

Warrant 1: Eight-hour Vehicular Volume

3: 156th Ave SE & Lake Hills Blvd

12:30 to 13:30		680		238		Yes*	No	Yes	No
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes					
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes					
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes					

13:30 to 14:30		641		231		Yes*	No	Yes	No
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes					
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes					
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes					

14:30 to 15:30		871		315		Yes*	No	Yes	Yes
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes					
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes					
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	Yes	Volume >= 80% column (60)?	Yes					

15:30 to 16:30		1,100		448		Yes*	Yes	Yes	Yes
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes					
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes					
Condition B	Volume >= 100% column (900)?	Yes	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	Yes	Volume >= 80% column (60)?	Yes					

17:30 to 18:30		1,103		567		Yes*	Yes	Yes	Yes
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes					
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes					
Condition B	Volume >= 100% column (900)?	Yes	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (720)?	Yes	Volume >= 80% column (60)?	Yes					

Warrant 1: Eight-hour Vehicular Volume

3: 156th Ave SE & Lake Hills Blvd

16:30 to 17:30		1,198	411		Yes*	Yes	Yes	Yes
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes				
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes				
Condition B	Volume >= 100% column (900)?	Yes	Volume >= 100% column (75)?	Yes				
	Volume >= 80% column (720)?	Yes	Volume >= 80% column (60)?	Yes				

18:30 to 19:30		664	301		Yes*	No	Yes	No
Condition A	Volume >= 100% column (600)?	Yes	Volume >= 100% column (900)?	Yes				
	Volume >= 80% column (480)?	Yes	Volume >= 80% column (720)?	Yes				
Condition B	Volume >= 100% column (900)?	No	Volume >= 100% column (75)?	Yes				
	Volume >= 80% column (720)?	No	Volume >= 80% column (60)?	Yes				

Warrant 2: Four-hour Vehicular Volume

3: 156th Ave SE & Lake Hills Blvd

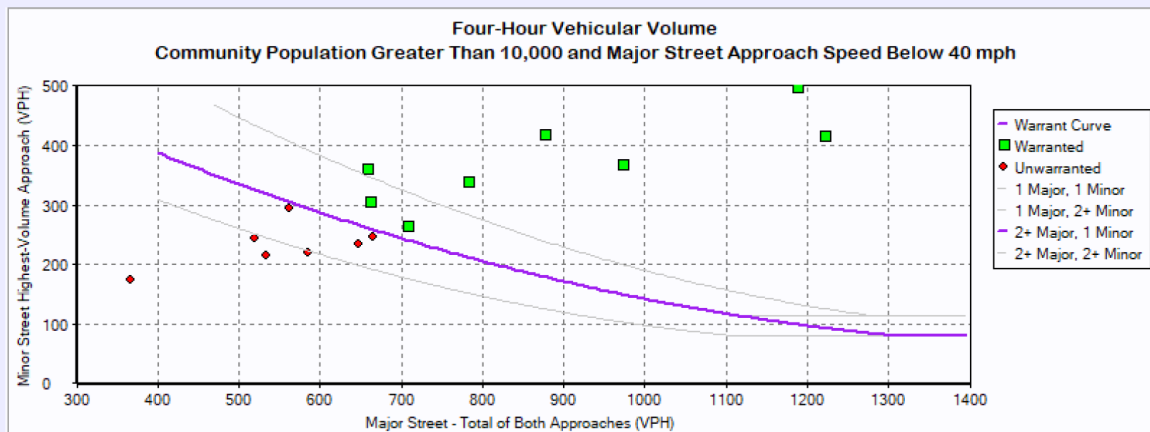
Intersection Information

	Major Street	Minor Street
Street Name	156th Ave SE	Lake Hills Blvd
Direction	NB/SB	EB/WB
Number of Lanes	2	1
Approach Speed	25	30

Warrant 2 Met? **Yes**

Details:

Notes	8 Hours met (4 required)
Low population	No



Warranted Hours

Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
07:15:00 - 08:15:00	659.00	359.00
08:15:00 - 09:15:00	784.00	338.00
09:15:00 - 10:15:00	663.00	303.00
14:00:00 - 15:00:00	710.00	263.00
15:00:00 - 16:00:00	975.00	366.00
16:00:00 - 17:00:00	1,223.00	414.00
17:00:00 - 18:00:00	1,190.00	546.00
18:00:00 - 19:00:00	879.00	417.00

Note: Only data of hours warranted is represented in the above table.

Warrant 3: Peak Hour

3: 156th Ave SE & Lake Hills Blvd

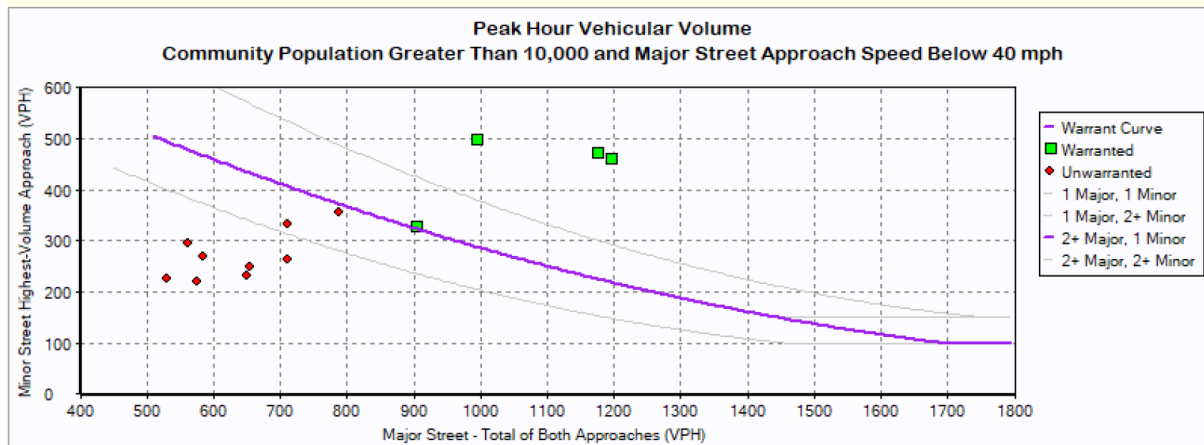
Intersection Information

	Major Street	Minor Street
Street Name	156th Ave SE	Lake Hills Blvd
Direction	NB/SB	EB/WB
Number of Lanes	2	1
Approach Speed	25	30

Warrant 3 Met? Yes

Details

Low Population?	No	Condition B Met?	Yes
Condition A Met?	No	Notes	4 Hours met (1 required)
Notes	0 Hours met (1 required)	Minor Approach Time Delay Condition Met?	Not Met
Minor Approach Time Delay Condition Met?	Not Met	Minor Approach Volume Condition Met?	Met
Minor Approach Volume Condition Met?	Met	Total Entering Intersection Volume Condition Met?	Not Met
Total Entering Intersection Volume Condition Met?	Not Met		



Hour	Major Street Total All Approaches (vph)	Minor Street Highest Volume Approach (vph)
14:45	905	327
15:45	1,197	461
16:45	1,176	472
17:45	995	497

Warrant 8: Roadway Network

3: 156th Ave SE & Lake Hills Blvd

Intersection Information

Major Street Name	156th Ave SE
Major Street Direction	NB/SB
Minor Street Direction	EB/WB

WARRANT 8 MET? (A or B) **Yes**

Condition A, Total Entering Volume		Condition B, Non-normal Business Day		
		Existing		Future
Existing Peak Hour	1,965	Highest Hour	0	0
Years	0.00	Second Highest Hour	0	0
Future Peak Hour	1,965	Third Highest Hour	0	0
Warrant 1 in 5 Years?	Yes	Fourth Highest Hour	0	0
Warrant 2 in 5 Years?	Yes	Fifth Highest Hour	0	0
Warrant 3 in 5 Years?	Yes	Yearly Growth Rate (%)	0.00	
		Years	0.00	

Condition A Met? **Yes**

Condition B Met? **No**

Warrant 1: Eight-hour Vehicular Volume

5: 156th Ave SE & SE 16th St

Intersection Information

Major Street Name: 156th Ave SE
 Major Street Direction: NB/SB
 Minor Street Direction: EB/WB

WARRANT 1 MET? **Yes**

Details:

Condition A Met? **Yes** 9 Hours met (8 required)
 Condition B Met? **No** 5 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	100% Standard Met? Cond. A OR Cond. B		80% Standard Met? Cond. A AND Cond. B	
			Condition A 100% Column	Condition B 100% Column	Condition A 80% Column	Condition B 80% Column
07:00 to 08:00	524	308	Yes*	No	Yes	No
Condition A	Volume >= 100% column (500)?	Yes	Volume >= 100% column (750)?	Yes		
	Volume >= 80% column (400)?	Yes	Volume >= 80% column (600)?	Yes		
Condition B	Volume >= 100% column (750)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (600)?	No	Volume >= 80% column (60)?	Yes		
08:00 to 09:00	625	246	Yes*	No	Yes*	Yes*
Condition A	Volume >= 100% column (500)?	Yes	Volume >= 100% column (750)?	Yes		
	Volume >= 80% column (400)?	Yes	Volume >= 80% column (600)?	Yes		
Condition B	Volume >= 100% column (750)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (600)?	Yes	Volume >= 80% column (60)?	Yes		
09:00 to 10:00	597	161	Yes*	No	Yes	No
Condition A	Volume >= 100% column (500)?	Yes	Volume >= 100% column (750)?	Yes		
	Volume >= 80% column (400)?	Yes	Volume >= 80% column (600)?	Yes		
Condition B	Volume >= 100% column (750)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (600)?	No	Volume >= 80% column (60)?	Yes		
13:00 to 14:00	512	150	Yes*	No	Yes	No
Condition A	Volume >= 100% column (500)?	Yes	Volume >= 100% column (750)?	Yes		
	Volume >= 80% column (400)?	Yes	Volume >= 80% column (600)?	Yes		
Condition B	Volume >= 100% column (750)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (600)?	No	Volume >= 80% column (60)?	Yes		
14:00 to 15:00	559	173	Yes*	No	Yes	No
Condition A	Volume >= 100% column (500)?	Yes	Volume >= 100% column (750)?	Yes		
	Volume >= 80% column (400)?	Yes	Volume >= 80% column (600)?	Yes		
Condition B	Volume >= 100% column (750)?	No	Volume >= 100% column (75)?	Yes		
	Volume >= 80% column (600)?	No	Volume >= 80% column (60)?	Yes		

Warrant 1: Eight-hour Vehicular Volume

5: 156th Ave SE & SE 16th St

15:00 to 16:00		711		240		Yes*	No	Yes	Yes
Condition A	Volume >= 100% column (500)?	Yes	Volume >= 100% column (750)?	Yes					
	Volume >= 80% column (400)?	Yes	Volume >= 80% column (600)?	Yes					
Condition B	Volume >= 100% column (750)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (600)?	Yes	Volume >= 80% column (60)?	Yes					

16:00 to 17:00		804		226		Yes*	Yes	Yes	Yes
Condition A	Volume >= 100% column (500)?	Yes	Volume >= 100% column (750)?	Yes					
	Volume >= 80% column (400)?	Yes	Volume >= 80% column (600)?	Yes					
Condition B	Volume >= 100% column (750)?	Yes	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (600)?	Yes	Volume >= 80% column (60)?	Yes					

17:00 to 18:00		851		238		Yes*	Yes	Yes	Yes
Condition A	Volume >= 100% column (500)?	Yes	Volume >= 100% column (750)?	Yes					
	Volume >= 80% column (400)?	Yes	Volume >= 80% column (600)?	Yes					
Condition B	Volume >= 100% column (750)?	Yes	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (600)?	Yes	Volume >= 80% column (60)?	Yes					

18:00 to 19:00		658		205		Yes*	No	Yes	Yes
Condition A	Volume >= 100% column (500)?	Yes	Volume >= 100% column (750)?	Yes					
	Volume >= 80% column (400)?	Yes	Volume >= 80% column (600)?	Yes					
Condition B	Volume >= 100% column (750)?	No	Volume >= 100% column (75)?	Yes					
	Volume >= 80% column (600)?	Yes	Volume >= 80% column (60)?	Yes					

Warrant 2: Four-hour Vehicular Volume

5: 156th Ave SE & SE 16th St

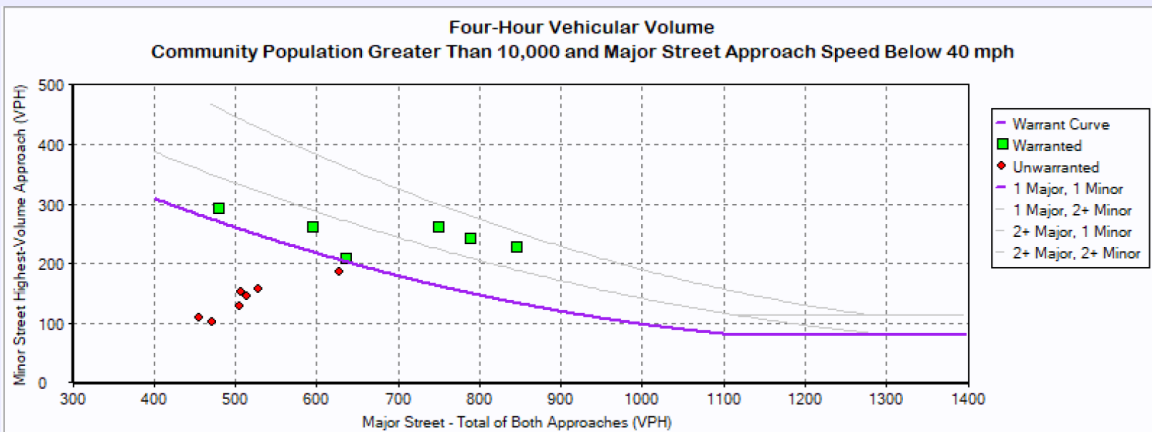
Intersection Information

	Major Street	Minor Street
Street Name	156th Ave SE	SE 16th St
Direction	NB/SB	EB/WB
Number of Lanes	1	1
Approach Speed	30	25

Warrant 2 Met? **Yes**

Details:

Notes	6 Hours met (4 required)
Low population	No



Warrant 8: Roadway Network

5: 156th Ave SE & SE 16th St

Intersection Information

Major Street Name	156th Ave SE
Major Street Direction	NB/SB
Minor Street Direction	EB/WB

WARRANT 8 MET? (A or B) **Yes**

Condition A, Total Entering Volume		Condition B, Non-normal Business Day		
		Existing		Future
Existing Peak Hour	1,271	Highest Hour	0	0
Years	0.00	Second Highest Hour	0	0
Future Peak Hour	1,271	Third Highest Hour	0	0
Warrant 1 in 5 Years?	Yes	Fourth Highest Hour	0	0
Warrant 2 in 5 Years?	Yes	Fifth Highest Hour	0	0
Warrant 3 in 5 Years?	No	Yearly Growth Rate (%)	0.00	
		Years	0.00	

Condition A Met? **Yes**

Condition B Met? **No**

Warrant 1: Eight-hour Vehicular Volume

7: 156th Ave SE & SE 24th St

Intersection Information

Major Street Name: 156th Ave SE
 Major Street Direction: NB/SB
 Minor Street Direction: EB/WB/SEB

WARRANT 1 MET? **Yes**

Details:

Condition A Met? **No** 5 Hours met (8 required)
 Condition B Met? **Yes** 8 Hours met (8 required)

Hour	Major Street Vehicles (Total of Both Approaches)	High Volume Minor Approach Vehicles	100% Standard Met? Cond. A OR Cond. B		80% Standard Met? Cond. A AND Cond. B	
			Condition A 100% Column	Condition B 100% Column	Condition A 80% Column	Condition B 80% Column
07:00 to 08:00	624	178	Yes*	No	Yes*	Yes*
Condition A	Volume >= 100% column (500)? Yes	Volume >= 100% column (750)? Yes				
	Volume >= 80% column (400)? Yes	Volume >= 80% column (600)? Yes				
Condition B	Volume >= 100% column (750)? No	Volume >= 100% column (75)? Yes				
	Volume >= 80% column (600)? Yes	Volume >= 80% column (60)? Yes				
08:00 to 09:00	703	207	Yes*	No	Yes*	Yes*
Condition A	Volume >= 100% column (500)? Yes	Volume >= 100% column (750)? Yes				
	Volume >= 80% column (400)? Yes	Volume >= 80% column (600)? Yes				
Condition B	Volume >= 100% column (750)? No	Volume >= 100% column (75)? Yes				
	Volume >= 80% column (600)? Yes	Volume >= 80% column (60)? Yes				
15:15 to 16:15	797	161	Yes*	Yes	Yes*	Yes*
Condition A	Volume >= 100% column (500)? Yes	Volume >= 100% column (750)? Yes				
	Volume >= 80% column (400)? Yes	Volume >= 80% column (600)? Yes				
Condition B	Volume >= 100% column (750)? Yes	Volume >= 100% column (75)? Yes				
	Volume >= 80% column (600)? Yes	Volume >= 80% column (60)? Yes				
16:15 to 17:15	916	170	Yes*	Yes	Yes*	Yes*
Condition A	Volume >= 100% column (500)? Yes	Volume >= 100% column (750)? Yes				
	Volume >= 80% column (400)? Yes	Volume >= 80% column (600)? Yes				
Condition B	Volume >= 100% column (750)? Yes	Volume >= 100% column (75)? Yes				
	Volume >= 80% column (600)? Yes	Volume >= 80% column (60)? Yes				
17:15 to 18:15	929	189	Yes*	Yes	Yes*	Yes*
Condition A	Volume >= 100% column (500)? Yes	Volume >= 100% column (750)? Yes				
	Volume >= 80% column (400)? Yes	Volume >= 80% column (600)? Yes				
Condition B	Volume >= 100% column (750)? Yes	Volume >= 100% column (75)? Yes				
	Volume >= 80% column (600)? Yes	Volume >= 80% column (60)? Yes				

Warrant 2: Four-hour Vehicular Volume

7: 156th Ave SE & SE 24th St

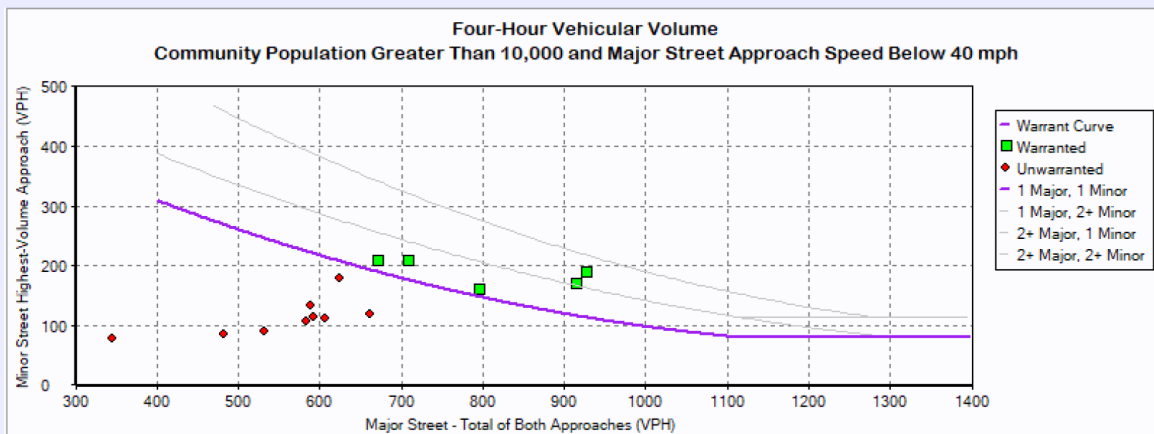
Intersection Information

	Major Street	Minor Street
Street Name	156th Ave SE	SE 22nd Pl
Direction	NB/SB	EB/WB/SEB
Number of Lanes	1	1
Approach Speed	30	25

Warrant 2 Met? **Yes**

Details:

Notes	5 Hours met (4 required)
Low population	No



Warrant 8: Roadway Network

7: 156th Ave SE & SE 24th St

Intersection Information

Major Street Name	156th Ave SE
Major Street Direction	NB/SB
Minor Street Direction	EB/WB/SEB

WARRANT 8 MET? (A or B) **Yes**

Condition A, Total Entering Volume		Condition B, Non-normal Business Day		
		Existing		Future
Existing Peak Hour	1,311	Highest Hour	0	0
Years	0.00	Second Highest Hour	0	0
Future Peak Hour	1,311	Third Highest Hour	0	0
Warrant 1 in 5 Years?	Yes	Fourth Highest Hour	0	0
Warrant 2 in 5 Years?	Yes	Fifth Highest Hour	0	0
Warrant 3 in 5 Years?	No	Yearly Growth Rate (%)	0.00	
		Years	0.00	

Condition A Met? **Yes**

Condition B Met? **No**

**Appendix D: Comment Cards from January 29,
2019 and April 3, 2019 Community Open Houses
and Summary of Verbal Comments from April 3,
2019 Community Open House**

January 29, 2019 Open House – Transcribed Comment Cards Received

Lake Hills Boulevard intersection: <ul style="list-style-type: none">• Leave it alone.
SE 16th Street intersection: <ul style="list-style-type: none">• Do not “fix” what is not broken.
SE 24th Street-SE 22nd Place intersection: <ul style="list-style-type: none">• Leave it alone, quit trying to accommodate cut through traffic from Issaquah to Microsoft.
General Comments: <ul style="list-style-type: none">• According to Bellevue Police 95% of speeders on 156th Ave NE are from Issaquah. Having worked in Issaquah for 11+ years. I would guess these folks are commuting/ cutting thru from Microsoft to I-90. It’d be nice to think Bellevue’s citizens [citizens?] could count for more than Redmond to Issaquah. Please do not accommodate them. Signalizing these intersections- 1 or all- would be a terrible outcome. Bellevue signals are already a cause of traffic frustration. We get 3-5 block long lines of cars in front of our house every weekday. Enough, please! Thanks for listening. Just do nothing.

Lake Hills Boulevard intersection: <ul style="list-style-type: none">• [No comment]
SE 16th Street intersection: <ul style="list-style-type: none">• [No comment]
SE 24th Street-SE 22nd Place intersection: <ul style="list-style-type: none">• [No comment]
General Comments: <ul style="list-style-type: none">• I live right at the intersection with son on the autism spectrum who is scared to cross this intersection because it is too dangerous. During commute hours I cannot open my windows due to the pollution caused by car exhaust! So we need extra safety for pedestrians and eliminate increased pollution due to stopped traffic. Regarding bike lanes: bike lanes need to go along all of 156th and 148th and 164th and 140th avenues from I-90 all the way to 51st St in Redmond/ Microsoft campus so that people feel safe to go to work biking. Bike lanes need to have a raised delineator so cars cannot drive into the bike lanes. Bus: there is not one single bus that goes up/down 156th or 148th Ave along house and biz. I cannot go to work at Microsoft just with one bus. We need traffic improvements to be aligned with public transportation improvements so that people feel that using public transportation is better.

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • Southbound Lane at L.H.Blvd. – get rid of double yellow buttons and L turn arrow at north end of lane. Make turn arrow show straight as well as L at north end of lane, L turn to E bound on LH could be extended a little.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • People just need to pay attention and move promptly with caution.
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • Extend paint north on R turn to SE 22nd so people turning R can get out of the way of people continuing south through the intersection. People still need to pay attention.
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>General Comments:</p> <ul style="list-style-type: none"> • My concern with any of the “fixes” to these intersections is there appears to be an idea to increase traffic flow through the 156th st greenbelt. My concern is 156th St is a sinking road on a peat bog and with increased heavy traffic and vibration, with more pavement layers added as it sinks, the ground water flow toward Larson Lake will be further impeded, resulting in more surface flooding and reversal of groundwater flow. This area is too sensitive for increased traffic. Please get a qualified hydraulic engineer on-board early in this process.

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • No roundabout- unless it does not take property away from the neighbors. Need to also look at crosswalk at 156th and SE 9th to improve safety in this corridor.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • Roundabout.
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • No idea what would be best.
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> [No comment]
SE 16th Street intersection:
<ul style="list-style-type: none"> [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> [No comment]
General Comments:
<ul style="list-style-type: none"> Roundabout! Great examples to decongest neighborhoods in Woodinville, Granite Falls, Sedro Woolley... Their traffic grew in last couple years and recent roundabouts are saviors! It's also much safer for pedestrians. Thank you all for you hard work! 😊

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> [No comment]
SE 16th Street intersection:
<ul style="list-style-type: none"> Curb ramps are great, intersection has good light, need street light on hill of 16th
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> Need crosswalk on North 156th SE, crosswalks are a good visual cue of an intersection, better signage of stop signs, roundabout appears to be best option, less vegetation obstructing views.
General Comments:
<ul style="list-style-type: none"> [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> My main concern is for pedestrians leaving the library, shopping, etc. When cars are southbound on 156th, it is easy to miss seeing walkers enter the crosswalk. Maybe some extra warning could be installed for both pedestrians as well as cars. Thank you.
SE 16th Street intersection:
<ul style="list-style-type: none"> [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> Always interesting! You just have to be a very vigilant driver as you take your turn.
General Comments:
<ul style="list-style-type: none"> [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> [No comment]
SE 16th Street intersection:
<ul style="list-style-type: none"> [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> The stretch between WSP and SE 24th is a speedway! Can speed bumps be installed?
General Comments:
<ul style="list-style-type: none"> [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> I recommend that at the intersection 4 way stop- that a digital sign that would show 1 green arrow and 3 red arrows that would come on and off to bring order to this matter.
SE 16th Street intersection:
<ul style="list-style-type: none"> [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> [No comment]
General Comments:
<ul style="list-style-type: none"> [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> Add lights.
SE 16th Street intersection:
<ul style="list-style-type: none"> Leave it alone.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> Leave it alone.
General Comments:
<ul style="list-style-type: none"> [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> Could use traffic light.
SE 16th Street intersection:
<ul style="list-style-type: none"> No roundabout please- too confusing.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> Well timed traffic light ok.
General Comments:
<ul style="list-style-type: none"> [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> Traffic light-possibly helpful- dangerous for pedestrians- need at least flashing pedestrian crosswalk signal.
SE 16th Street intersection:
<ul style="list-style-type: none"> [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> Might be better served with a traffic light, but definitely needs to be studied first to decide if this will help or make things worse.
General Comments:
<ul style="list-style-type: none"> [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • 1st choice- no change, 2nd choice- roundabout.
SE 16th Street intersection:
<ul style="list-style-type: none"> • 1st choice- no change, 2nd choice- roundabout.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Roundabout.
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • Please consider pedestrian traffic here. There are a lot of middle school students who walk to the library from Tillicum after school. They have a hard time knowing when it is safe to cross at the 4 way stop. A walk signal or other signal would make crossing this intersection easier and safer for students.
SE 16th Street intersection:
<ul style="list-style-type: none"> • [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • [No comment]
General Comments:
<ul style="list-style-type: none"> • 156th and Main- traffic through this corridor has increased dramatically. I frequently need to turn left traveling SB from 156th to Main, but there is no protected turn at this intersection. At high traffic times only 1 car can make it through the light. •

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • No problem for us. Minor delay during rush hour not requiring rebuild.
SE 16th Street intersection:
<ul style="list-style-type: none"> • No problem for us. Minor delay during rush hour not requiring rebuild.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Pass through at least 2x a day. Problem only when individual drivers do not obey traffic rules. Might be worth considering roundabout.
General Comments:
<ul style="list-style-type: none"> • 156th/ 148th Left turn signal timing all near FM, Crossroads.

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • Currently a utility project working through this area (south of intersection). Would be nice if coordinated. If leave as 4 way stop intersection- better signage and lighting may help. Need analysis to consider peds and bike at this intersection.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • I hope your analysis considers the pedestrians that cross for the trail as well as the fruit stand. I did not see anything about pedestrians or bikes. Impact to the wetland needs to be considered as well.
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • It would be nice if additional length would be provided for cars heading south and turning right onto SE 22nd. Intersection needs to be safe for pedestrians who cross to go to park down the hill (heading north) as well as pedestrians crossing in other legs. Need analysis to look at peds and bikes.
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • Suggest traffic light in st for this location with walk lights for pedestrians.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • Best of three locations for roundabout. See roundabout a HUT 2 and Rece Road near Sultan.
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • Suggest rerouting angled street to 48th and dead-ending street at intersection.
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • So for people take turns. Roundabout would help.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • Traffic flashing for pedestrians.
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • Roundabout.
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • Too hard to cross especially at night. It makes it hard to visit my friend and lots of people have to cross it to get their mail. (written by a kid)
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • [No comment]
SE 16th Street intersection:
<ul style="list-style-type: none"> • [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • I would love to have speed bumps along the stretch of road between this intersection and I-90. A flashing crosswalk would be nice also. There are a lot of children in the neighborhood who cross this street going to and from school.
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • Stop light is going to back up anyway. Traffic is a problem in all directions. The island into the library parking lot is a problem and should be redone.
SE 16th Street intersection:
<ul style="list-style-type: none"> • Stoplights will only encourage traffic to flow through the 158th/ 159th pass through and by the school section where there are no sidewalks. Need speed bumps on 158th.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Stop lights will only encourage pass through in the neighborhoods –need speed bumps- like on 161st. People come too fast off the freeway. •
General Comments:
<ul style="list-style-type: none"> • All- flashing crosswalk like by WSP.

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • [No comment]
SE 16th Street intersection:
<ul style="list-style-type: none"> • Put a crosswalk with flashing lights on SE 16th at 154th so Robinswood can access the greenbelt safely. 156th at SE 16th is a drag racing road. Every night people are gunning it. Super dangerous.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Please consider closing access to SE 24th to turn the 5 way into a 4 way. I think it would remove confusion. You could even experiment by just putting jersey barriers.
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • People fail to slow down and don't realize this is still a school zone in am and pm.
SE 16th Street intersection:
<ul style="list-style-type: none"> • I have 3 children who have to cross the street early morning for school bus. I'm afraid cars will run them over.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • [No comment]
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • [No comment]
SE 16th Street intersection:
<ul style="list-style-type: none"> • [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> •
General Comments:
<ul style="list-style-type: none"> • As a member of the community that lives here, I think it is very important to not make 156th Ave SE any more attractive to commuters. The queuing and wait times at the intersections is a deterrent for more use because even though there are less cars than 148th, the actual travel time due to the stop signs, helps even out the choice- 156th or 148th. Maybe even keeps some people on 148th who would rather flow with stoplights than the stop/ start of queing like at stop signs. If the stop signs must go, please consider only the roundabouts, but no stop lights. Thank you!

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • No traffic light- we do NOT want 156th Ave SE to be used as an alternative to 148th (it is obviously, but don't want to encourage more commuter traffic).
SE 16th Street intersection:
<ul style="list-style-type: none"> • The 4 way stop is fine; add a flashing crosswalk light to assist pedestrians. • NO Roundabout because it would make pedestrians crossing, especially from the NW to SE corners, where there are trails, very tricky. I never find the current 4 way stop a problem.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • I have heard that this is a dangerous intersection for pedestrians. A crosswalk, with flashing lights, is needed. Perhaps a roundabout, rather than the 5 way stop would assist traffic flow.
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • Lights- no roundabout
SE 16th Street intersection:
<ul style="list-style-type: none"> • Lights- no roundabout
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Lights- no roundabout
General Comments:
<ul style="list-style-type: none"> • This meeting would have been much more beneficial had we had a presentation on traffic flow and possible remedies. We could also hear our neighbors concerns and share input. This forum too crowded and neighbors could hear no concerns!

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • A light would help flow a ton
SE 16th Street intersection:
<ul style="list-style-type: none"> • [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Needs something, [??]. Stop light, roundabout.. something. So many run the stop signs. Even school busses! If we only do one thing please for this intersection!
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • The south bound 156th lane division causes confusion. The left lane looks like a turn lane but is really the through lane. Please fix the lane alignment.
SE 16th Street intersection:
<ul style="list-style-type: none"> • I'm usually traveling N/S and stop here with no cross traffic. A light or roundabout would help keep things moving.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Can SE 22nd Pl be cut off from the intersection into a cul-de-sac to reduce the confusion of a 5 way intersection?
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • I'm typically interacting with intersection a pedestrian coming from the SE quadrant, heading N and W to the library. It's not an intersection I feel safe in. Commute back up is a minor problem for me.
SE 16th Street intersection:
<ul style="list-style-type: none"> • Please fix the N-S rush hour commute issues here. I'm content with this intersection as a pedestrian.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Same N-S rush hour commute issues. Please fix the pedestrian pathways across here between the east part of SE 24th St (sidewalk on south side of street) and SE 22nd pl (sidewalk on N side of street) There is enough student traffic between neighborhoods, Big Picture school, Robinswood Park, and Spiritridge Elementary that it's a concern.
General Comments:
<ul style="list-style-type: none"> • [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • Roundabout does not solve the issue of crossing the intersection for pedestrians. A light signal with no turn right on red would be better.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • ADP light to the 4 corners to actually see the pedestrians before getting to the corner.
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • Improve visibility SE 24th street can't see the cars coming from SE 22pl and there is no way to see them.
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • We live on 154th and take SE 16th to get to Tillicum. There is no safe way to cross 16th to get to the sidewalk to get to school. There is a rolling hill just before the intersection at 154th and 16th that cars speed over, making crossing the road even more dangerous. I would like to propose a pedestrian crossing with a flashing light to provide a safer crossing for those going to school and trying to access the trails.
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>General Comments:</p> <ul style="list-style-type: none"> • Thank you for the opportunity to share.

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • Pedestrians and bicycles! They should be prioritized over motor vehicles. MV/s can easily stop and start. Don't prioritize 156 N-S over other directions. Keep cycles short (if signals are used). • Better visibility for WB Lake Hills.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • Same as above • E-W traffic is also important.
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • Pedestrian access in every direction! • Same as above. • A traffic circle may be best, if space allows. • Poor visibility from SE 22th to SE 24th. • No crosswalk on angled street! (illustrated)
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> I have seen a child get hit while using this intersection- the yield going from SB 156th to WB Lake Hills is terrible for pedestrian safety. Either a stop light with a cycle for all direction pedestrian crossing, or at least flashing lights, would help improve safety.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> [No comment]
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> The pedestrian connection from WB 24th to SE 22nd (Kids walking to Big Picture School) is very inconvenient and treacherous due to the multi-segment crossing and lack of sidewalks! Need flashing lights for pedestrians.
<p>General Comments:</p> <ul style="list-style-type: none"> SE 10th St and 156th Ave SE- Needs flashing lights at this crosswalk- cars come down hill and around corner far too quickly.

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> Revise accident statistics to separate those involving pedestrians and cars only.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> [No comment]
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> Consider a big roundabout, putting a roundabout for SE 22nd Pl and 156, and closing off SE 22th Pl.
<p>General Comments:</p> <ul style="list-style-type: none"> [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> The right turn only lane from southbound 156th to westbound Lk Hills is problematic because drivers tend to not take their turn as an “all way stop” but rather a yield sign. Dangerous and annoying. I would prefer a light at this intersection. Please, no roundabouts!
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> I go through this intersection frequently and rarely see any issues. If any changes are made, I would prefer a light. Please, no roundabouts!
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> This is a challenging intersection. It backs up southbound 156th in the evenings almost back to Se 16th. I cross on 24th (eastbound) and 22nd frequently, and the 15th traffic tends to not “see” those two streets and don’t properly yield right of way. Not sure what the solution here should be.
<p>General Comments:</p> <ul style="list-style-type: none"> [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • Roundabout!
SE 16th Street intersection:
<ul style="list-style-type: none"> • Roundabout!
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Roundabout!
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • [No comment]
SE 16th Street intersection:
<ul style="list-style-type: none"> • [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • [No comment]
General Comments:
<ul style="list-style-type: none"> • Raised sidewalks and ability for pedestrians to use a flashing yellow light ate fantastic, bike lanes always a plus!

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • Can intersection on 156th be widened and made more obvious for turning?
SE 16th Street intersection:
<ul style="list-style-type: none"> • Roundabout might be possible? Noted new curbs to be removed. The road rests on an old lake bottom and is a peat bog. (has flooded). Maybe stop signs only on 16th. This place is easier as existing compared to other 2 intersections.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Is there room for a roundabout similar to that at W Lake Sammamish near I-90? (probably no room)
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • Maybe convert to a regular stoplight- but at 9:30 pm have it go to 4 way red flash for night (less traffic volume)
SE 16th Street intersection:
<ul style="list-style-type: none"> • Leave as is (4 way stop since 1984)
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Add a ped flashing light to supplement this 5-way intersection.
General Comments:
<ul style="list-style-type: none"> • [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • This area is more residential, please make changes to not add more traffic to there. I personally think a roundabout or full way stop make more sense than traffic lights. But that intersection is very confusing and needs improvements.
<p>General Comments:</p> <ul style="list-style-type: none"> •

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • PLEASE make it pedestrian safe. Lighting! Raised sidewalks? I do not want a stop light.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • LIGHTS (safety lighting). Keep it wild/ natural but make it safe to cross. Sidewalks on all sides. Esp. SE 16th on S side.
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • I don't have great ideas, but I'm comfortable as a driver trying to determine if it is my turn (despite having lived here since I was a baby)
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

April 3, 2019 Open House Transcribed Comment Cards Received

Lake Hills Boulevard intersection: <ul style="list-style-type: none">• [No comment]
SE 16th Street intersection: <ul style="list-style-type: none">• [No comment]
SE 24th Street-SE 22nd Place intersection: <ul style="list-style-type: none">• [No comment]
General Comments: <ul style="list-style-type: none">• I support the pedestrian and bike lane improvements proposed. I oppose any traffic signals other than a four way stop at all three intersections. I live in the area (for 30 years) and I travel the 156th Ave corridor several times per week. There are no traffic/ congestion issues at either of the three intersections at any times besides the morning and evening commute times and only for about one hour in each commute window are these very significant. All of the increased commute traffic congestion is caused by people living outside of the 156th neighborhood in single occupancy vehicles. To enable and facilitate single occupancy vehicle commuting throughout neighborhood is ecologically unsound and a mis-use of our tax dollars. We should restrict vehicle traffic to local residents only and discourage commute through traffic. No traffic signals (red, yellow, green) should be added. Please email to me to confirmation of receipt of my comments.

Lake Hills Boulevard intersection: <ul style="list-style-type: none">• Pedestrian “beg” buttons should trigger instantly, NOT on the “next green”. You did an analysis of traffic delay over the years, you should do something similar for pedestrian. Will a 10-second delay turn into a 60-second delay?
SE 16th Street intersection: <ul style="list-style-type: none">• Looks reasonable, but with Lake Hills and 24th improvements, the congestion may get worse.
SE 24th Street-SE 22nd Place intersection: <ul style="list-style-type: none">• [Diagram provided] As a pedestrian going EW between 22nd and 24th I would cross at either A or B neither location has a crosswalk in this plan. D requires an additional crossing, and E is very far out of the way.• D cars can wait for walking people• 24th curb cuts are only singular. I’ve heard that dual-cuts are safer for wheelchair folks.• Someone mentioned adding carriers to discourage people to cross at A or B. I think that is the wrong attitude. Cars can wait for pedestrians, including children.
General Comments: <ul style="list-style-type: none">• [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • Full stop light on improvements. Lots of juvenial [??] from school and often they [??] paying attention.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • Consideration of wetland vital
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • No roundabout. 156th steep and trying to get up going S. Traction. • Crosswalk downhill NB bling from top of hill. Terrible idea so slick in snow and ice unless you know the hill, bad idea. • Vote, 5 way w/ ped improvement
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • [No comment]
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • Need to know delays on heavily slowed approaching streets on high volume times. Option 1 is not taken into account in possible future roundabout.
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

<p>Lake Hills Boulevard intersection:</p> <ul style="list-style-type: none"> • Concur. The backup with the all-way stops can cause 2-4 block backups on 156th that would be eased with a traffic signal.
<p>SE 16th Street intersection:</p> <ul style="list-style-type: none"> • This is the closest to my home and the one I use the most. It seems like light traffic almost any time of the day. It definitely needs pedestrian improvements for dog walkers and joggers.
<p>SE 24th Street-SE 22nd Place intersection:</p> <ul style="list-style-type: none"> • The 5-way stop is confusing and many people don't know who should go and there are quite a few false starts. I prefer closing 24th street.
<p>General Comments:</p> <ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • [No comment]
SE 16th Street intersection:
<ul style="list-style-type: none"> • [No comment]
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • Option #2 please.
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • Great idea, but it would help to add a 2nd lane on lake hills blvd where it approaches from the west (it used to have 2 lanes but they took one away). Please out in a signal.
SE 16th Street intersection:
<ul style="list-style-type: none"> • Adding the section of sidewalk on the south side of 16th is a great improvement, but I think the stamped, patterned concrete or asphalt strips, even if colored, are pretty unnecessary, and if intended to alert drivers, are too close to stop line.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • I like the 4-way stop idea. My 2nd choice would be roundabout.
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:
<ul style="list-style-type: none"> • I couldn't be happier with the proposal. I hope the funding can be found somewhere to implement it.
SE 16th Street intersection:
<ul style="list-style-type: none"> • I couldn't be happier with this proposal. I hope the funding can be found somewhere to implement it.
SE 24th Street-SE 22nd Place intersection:
<ul style="list-style-type: none"> • I prefer the first alternate (4 way stop) if it can be coordinated with the neighborhood. It will make the intersection much less confusing.
General Comments:
<ul style="list-style-type: none"> • [No comment]

Lake Hills Boulevard intersection:

- As a neighborhood we were told that a traffic light at Lk Hills Blvd would increase use of 156th as an alternative commuter route throughout the day. I realize that traffic has increased, and the safety is important. However, I continue to have concerns about 156th being used for commuting alternatives. My goal is to maintain 156th as a neighborhood road, not an alternative to I-405 or 148th.

SE 16th Street intersection:

- This appears as a very reasonable approach.

SE 24th Street-SE 22nd Place intersection:

- I defer comment to the neighborhood. Closing the west leg of SE 24th wouldn't particularly impact me, it's a neighborhood decision (along with city experts). Any plan should focus on what's best for neighborhoods.

General Comments:

- Thank you all for considering our input, especially in regards to maintaining the neighborhood as a priority.

Lake Hills Boulevard intersection:

- No signal, just pedestrian improvements.

SE 16th Street intersection:

- Leave as is with only pedestrian improvements.

SE 24th Street-SE 22nd Place intersection:

- No extra pedestrian crossing, not safe

General Comments:

- We need left hand turn lights at Main Street and 156th Ave.

156th Avenue SE Intersection Study

April 3, 2019 – 6:00-8:00 p.m.

Community Open House @ Lake Hills Community Club

The following are comments and questions made by the public during the open question and answer session that followed the project team's presentation

1. How do improvements at SE 16th St and SE 24th St mitigate for traffic volumes given that the preliminary alternatives only envision pedestrian improvements?
2. What are the sources of the projected increases in traffic in 2035?
3. Has there been any consideration in closing of SE 22nd Place to traffic instead of SE 24th St?
4. Would the proposed traffic signal/light be timed or actuated?
5. There is element of community consideration listed in the evaluation criteria. Will community input be factored into the future evaluation for all intersections being studied as part of the Neighborhood Congestion Reduction program?

At this point, questions and comments were solicited by intersection.

156th Ave SE at SE 22nd Pl/SE 24th St

1. Given the space between the northbound 156th Ave SE stop sign and the proposed marked crosswalk to the north, will the northern pedestrian crossing (with rectangular rapid flashing beacon) interfere with northbound traffic operations?
2. What color are the crossing lights at the rectangular rapid flashing beacon?
3. If I'm walking east to west from SE 22nd Place to SE 24th St, I would most likely not use the northern crosswalk and would jaywalk.
4. Have "stop and go" lights (i.e. ramp meters)—like on the freeway—been considered for these intersections?
5. Will there be any improvements to street lighting?
6. As people driving travel northbound on 156th Avenue SE and pick up speed, it is safe to have the crosswalk so far from the intersection?
7. Concerned that intersections aren't balanced with the only capacity improvement happening at the north end of the corridor
8. Human nature dictates that people will cross east to west at SE 22nd Place/SE 24th St. Would suggest actively discouraging crossing here.
9. There is a lot of confusion at this intersection, even when turn signals are on.
10. Is there any consideration to maintain consistent speed limits throughout the corridor? Currently, they fluctuate from 25-30-25 mph.
11. When people walking travel west up the hill on the SE 24th St, they will likely pause at the NE corner, catch their breath, and then continue north to the marked crosswalk to the north.

156th Ave SE at SE 16th St

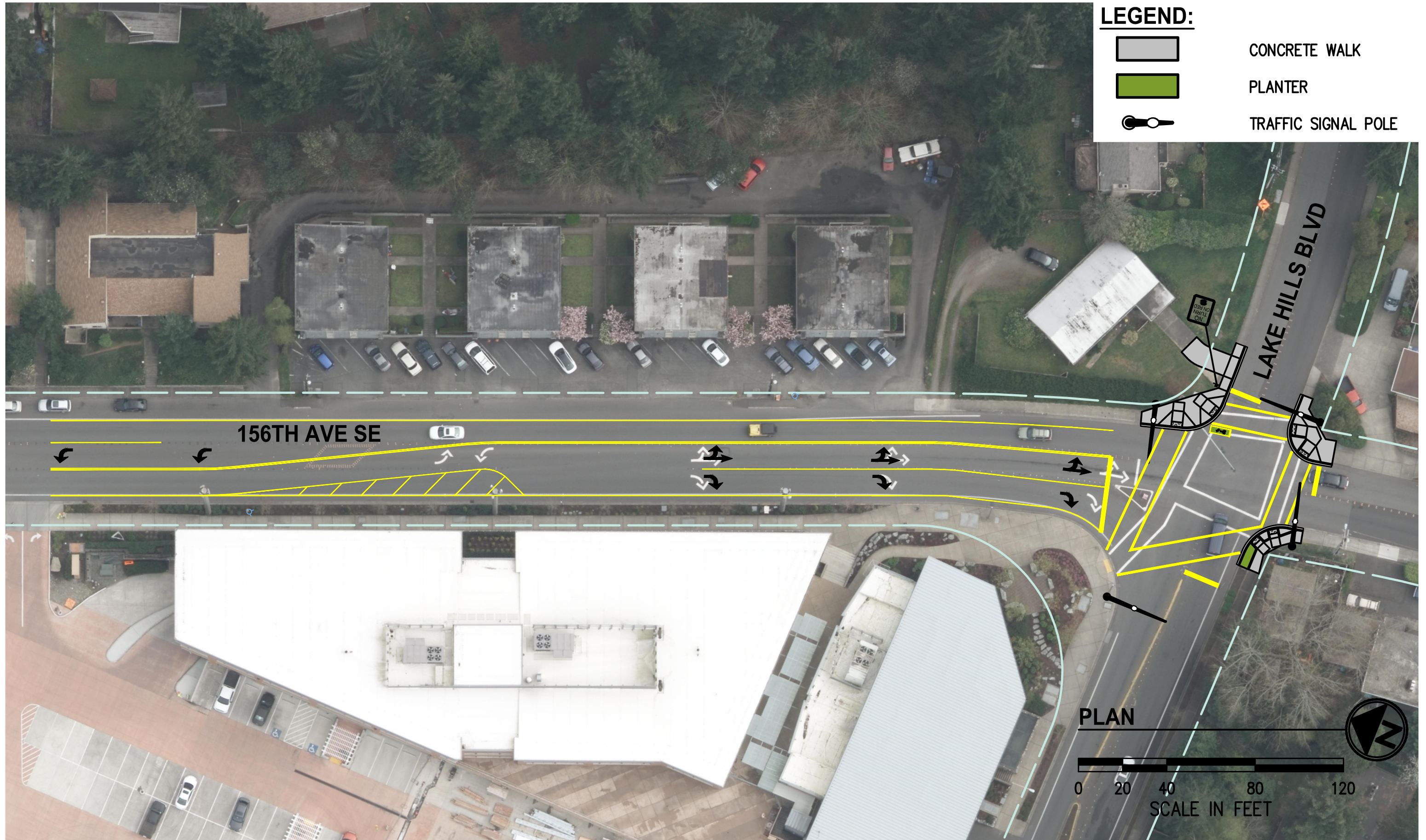
1. Is stamped concrete expensive and difficult to install?
2. How raised is the stamped concrete? Will it impact people on motorcycles or bicycles?
3. It's a waste of money to installed the stamped concrete features?
4. The pedestrian improvements are great.

5. The sidewalk addition is great as it will create a connection to the crosswalk
6. SE 16th is a low point and during heavy rainfall, the road floods. Have you considered a process to fix the flooding and improve water flow?
7. 2/3 of the intersections in the project corridor include potential improvements that don't mitigate traffic congestion. Given this, how well will the 156th/LHB intersection compete among the other NCR intersections slated for further evaluation?
8. Is there funding to fund projects from the 2009 ped/bike plan and PBII?
9. Make sure improvements don't preclude bike facilities.

156th Ave SE at Lake Hills Blvd

1. How will you get the delay down to 19 seconds with the recommended signal?
2. The real problem at this intersection is AM and PM peak, it's not fair to neighborhood residents who use this intersection throughout the day to get stuck at the signal when traffic isn't backed up.
3. Is there any consideration about shifting the SB lane?
4. How will neighborhood that is south and west of the intersection get out to 156th Ave SE and LHB?
5. New signals in the city work well and efficiently
6. How will signal handle left turns (e.g. EB to NB)?
7. Will you have a EB to NB left turn lane?
8. Will sidewalk curb line preclude bike lanes?
9. Will bikes trigger the signal?
10. Is there any broader consideration to limit the amount of traffic that uses the 156th corridor?
11. The projected traffic increase is a result of traffic originating from outside the neighborhood. The city should look to bolster bus services and work with employees on stronger commute trip reduction techniques.

Appendix E: Conceptual Designs

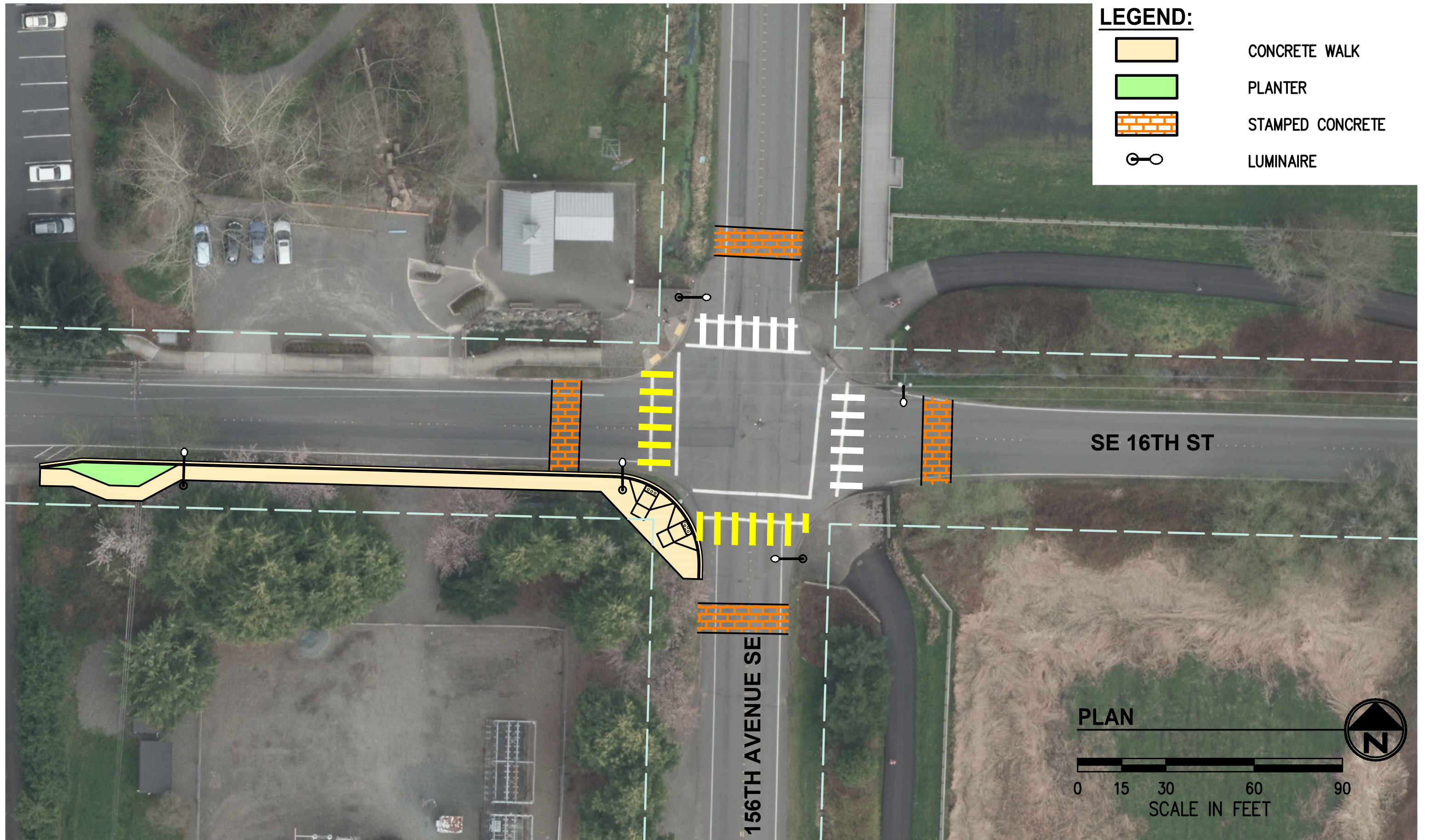


INTERSECTION STUDY ON 156TH AVE SE: LAKE HILLS BLVD



City of Bellevue
Transportation Department



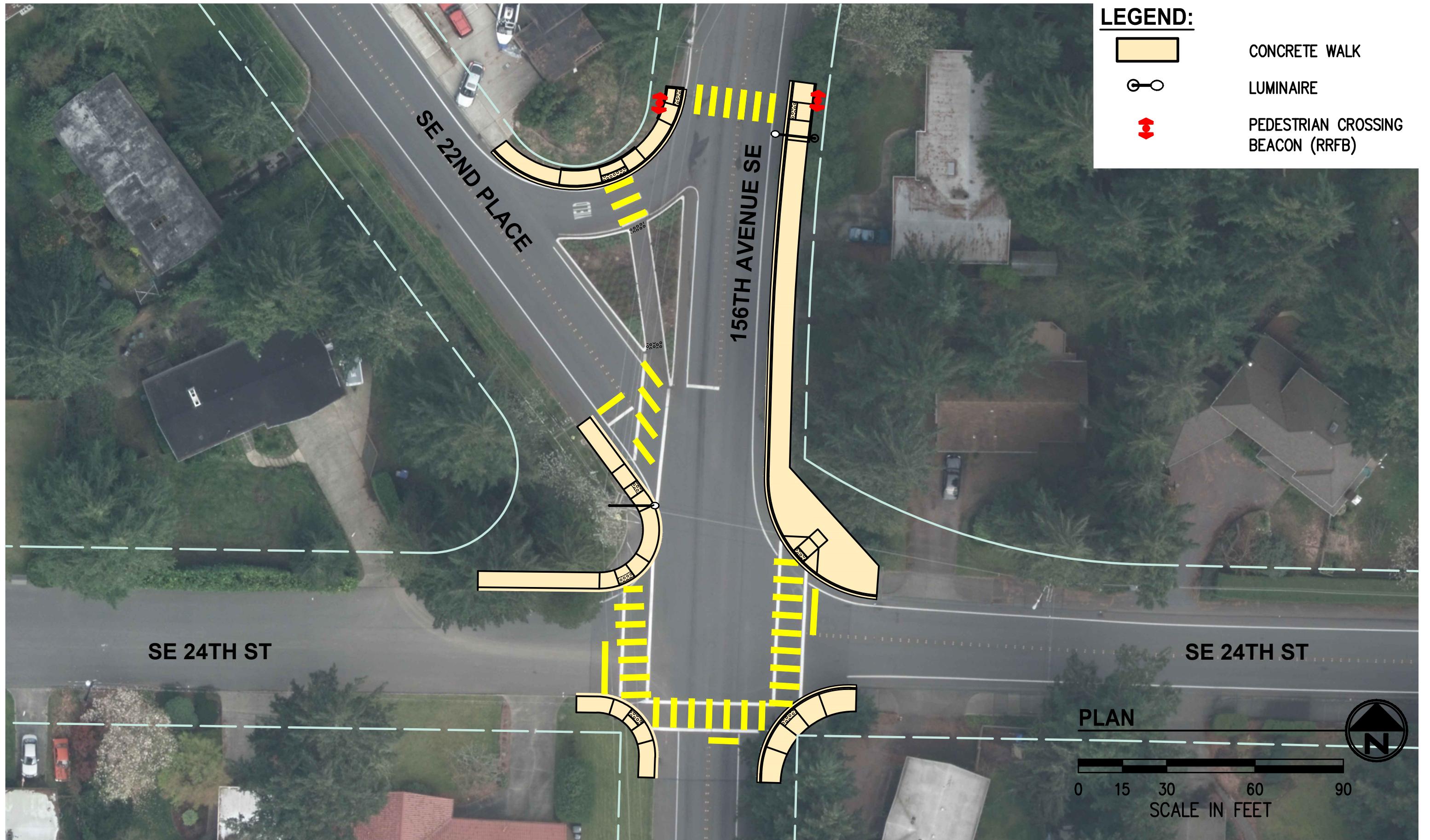


INTERSECTION STUDY ON 156TH AVE SE: SE 16TH ST



City of Bellevue
Transportation Department





INTERSECTION STUDY ON 156TH AVE SE: SE 24TH ST



City of Bellevue
Transportation Department



Appendix F: Cost Estimates



City of Bellevue
Lake Hills Blvd & 156th Ave SE
Traffic Signal Conceptual Cost Estimate

Item No.	Description	Unit	Unit Price	Quantity	Amount
GENERAL					\$ 120,000.00
1	Construction Surveying (2% of Const. Subtotal)	LS	\$ 12,000.00	1	\$ 12,000.00
2	Mobilization (8% of Const. Subtotal)	LS	\$ 48,000.00	1	\$ 48,000.00
3	Project Temporary Vehicle & Pedestrian Traffic Control (10% of Sub.)	LS	\$ 60,000.00	1	\$ 60,000.00
REMOVALS AND EARTHWORK					\$ 38,800.00
4	Earthwork - light (0-2' Grading)	SF	\$ 1.00	4,000	\$ 4,000.00
5	Removals of Structures or Obstructions	LS	\$ 10,000.00	1	\$ 10,000.00
6	Significant Tree Removal	EA	\$ 5,000.00		\$ -
7	Gravel Borrow	TON	\$ 25.00		\$ -
8	Modular Block Walls (up to 4' tall)	SF	\$ 40.00	140	\$ 5,600.00
9	Temporary Erosion Control & Water Pollution Prevention	LS	\$ 5,000.00	1	\$ 5,000.00
10	Remove Concrete Curb & Gutter	LF	\$ 20.00	270	\$ 5,400.00
11	Remove Sidewalk	SY	\$ 30.00	200	\$ 6,000.00
12	Remove HMA	SY	\$ 40.00	70	\$ 2,800.00
13	Remove/Abandon Pipe (Storm, Water)	LF	\$ 5.00		\$ -
14	Remove/Abandon Storm Structure	EA	\$ 500.00		\$ -
ROADWAY					\$ 70,000.00
15	Full Depth HMA Replacement	SY	\$ 80.00	50	\$ 4,000.00
16	HMA Grind and Overlay	SY	\$ 30.00	1,400	\$ 42,000.00
17	Stamped Concrete Crossing Treatment	SF	\$ 22.00	-	\$ -
18	CSBC	TON	\$ 35.00		\$ -
19	Utility Trench Repair	LF	\$ 40.00		\$ -
20	Channelization & Signage	LS	\$ 15,000.00	1	\$ 15,000.00
21	Cement Concrete Curb & Gutter	LF	\$ 45.00	200	\$ 9,000.00
UNDERGROUND UTILITES (Water, Sewer, Gas)					\$ -
22	Water Main Replacement (incl. fittings, trench, bedding, backfill)	LF	\$ 140.00		\$ -
23	Fire Hydrant	EA	\$ 5,000.00		\$ -
24	Relocate/Adjust Water Service	EA	\$ 2,500.00		\$ -
25	PSE Gas Coordination	LS	\$ 5,000.00		\$ -
26	Adjust Utility Structure to Grade	EA	\$ 750.00		\$ -
SIDEWALK ITEMS					\$ 33,800.00
27	Cement Concrete Sidewalk with LID Treatment	SY	\$ 120.00	90	\$ 10,800.00
28	Curb Ramp	EA	\$ 3,500.00	6	\$ 21,000.00
29	Driveway Approaches	EA	\$ 2,000.00	1	\$ 2,000.00
STORMWATER SYSTEM					\$ 3,000.00
30	Storm Drain Pipe	LF	\$ 100.00		\$ -
31	Storm Drain Inlet	EA	\$ 1,500.00		\$ -
32	Storm Drain CB/MH	EA	\$ 3,000.00		\$ -
33	Connection to Existing Structures	EA	\$ 1,000.00		\$ -
34	Adjust Structure to Grade	EA	\$ 750.00	4	\$ 3,000.00
RESTORATION/LANDSCAPING					\$ 1,000.00
35	Landscape Strip	SY	\$ 100.00	10	\$ 1,000.00
36	Driveway Restoration	EA	\$ 1,500.00		\$ -
37	Fencing	LF	\$ 35.00		\$ -
SIGNALIZATION ITEMS, STREET LIGHTING					\$ 450,000.00
38	New Signal System	LS	\$ 450,000.00	1	\$ 450,000.00
Subtotal Estimated Construction Items					\$ 716,600.00
Design/Est Contingency (30% Subtotal)					\$ 215,000.00
Subtotal Est. Construction 2020					\$ 931,600.00
Estimated CM Services (20%)					\$ 186,400.00
Estimated City PM/Administration (3%)					\$ 28,000.00
City Management Reserve (10%)					\$ 93,200.00
Total Est. Construction Phase					\$ 1,239,200.00
Estimated Design--Prepare PS&E (18%)					\$ 167,700.00
Estimated ROW & Permitting Services (5%)					\$ 46,600.00
Subtotal Est. Design & Permitting					\$ 214,300.00
Estimated City PM/Administration (3%)					\$ 6,500.00
City Management Reserve (10%)					\$ 21,500.00
Total Est. Design & Permitting Phase					\$ 242,300.00
Estimated ROW & Easement Costs					\$ -
Subtotal Est. ROW Costs					\$ -
City Management Reserve (10%)					\$ -
Total Est. ROW Acquisition Phase					\$ -
Total Estimated Project Cost					\$ 1,481,500.00



City of Bellevue
SE 16th St & 156th Ave SE
 Enhanced All Way Stop Conceptual Cost Estimate

Item No.	Description	Unit	Unit Price	Quantity	Amount
GENERAL					\$ 55,000.00
1	Construction Surveying (2% of Const. Subtotal)	LS	\$ 6,000.00	1	\$ 6,000.00
2	Mobilization (8% of Const. Subtotal)	LS	\$ 22,000.00	1	\$ 22,000.00
3	Project Temporary Vehicle & Pedestrian Traffic Control (10% of Sub.)	LS	\$ 27,000.00	1	\$ 27,000.00
REMOVALS AND EARTHWORK					\$ 73,800.00
4	Earthwork - light (0-2' Grading)	SF	\$ 1.00	3,000	\$ 3,000.00
5	Removals of Structures or Obstructions	LS	\$ 10,000.00	1	\$ 10,000.00
6	Significant Tree Removal	EA	\$ 5,000.00		\$ -
7	Gravel Borrow	TON	\$ 25.00		\$ -
8	Modular Block Walls (up to 4' tall)	SF	\$ 40.00	1,300	\$ 52,000.00
9	Temporary Erosion Control & Water Pollution Prevention	LS	\$ 10,000.00		\$ -
10	Remove Concrete Curb & Gutter	LF	\$ 20.00	-	\$ -
11	Remove Sidewalk	SY	\$ 30.00	-	\$ -
12	Remove HMA	SY	\$ 40.00	220.00	\$ 8,800.00
13	Remove/Abandon Pipe (Storm, Water)	LF	\$ 5.00		\$ -
14	Remove/Abandon Storm Structure	EA	\$ 500.00		\$ -
ROADWAY					\$ 82,800.00
15	Full Depth HMA Replacement	SY	\$ 80.00	80	\$ 6,400.00
16	HMA Grind and Overlay	SY	\$ 30.00	800	\$ 24,000.00
17	Stamped Concrete Crossing Treatment	SF	\$ 22.00	1,180	\$ 26,000.00
18	CSBC	TON	\$ 35.00	10	\$ 400.00
19	Utility Trench Repair	LF	\$ 40.00	100	\$ 4,000.00
20	Channelization & Signage	LS	\$ 4,000.00	1	\$ 4,000.00
21	Cement Concrete Curb & Gutter	LF	\$ 45.00	400	\$ 18,000.00
UNDERGROUND UTILITIES (Water, Sewer, Gas)					\$ -
22	Water Main Replacement (incl. fittings, trench, bedding, backfill)	LF	\$ 140.00	-	\$ -
23	Fire Hydrant	EA	\$ 5,000.00	-	\$ -
24	Relocate/Adjust Water Service	EA	\$ 2,500.00	-	\$ -
25	PSE Gas Coordination	LS	\$ 5,000.00	-	\$ -
26	Adjust Utility Structure to Grade	EA	\$ 750.00	-	\$ -
SIDEWALK ITEMS					\$ 31,000.00
27	Cement Concrete Sidewalk with LID Treatment	SY	\$ 120.00	200	\$ 24,000.00
28	Curb Ramp	EA	\$ 3,500.00	2	\$ 7,000.00
29	Driveway Approaches	EA	\$ 2,000.00	-	\$ -
STORMWATER SYSTEM					\$ 18,500.00
30	Storm Drain Pipe	LF	\$ 100.00	100	\$ 10,000.00
31	Storm Drain Inlet	EA	\$ 1,500.00		\$ -
32	Storm Drain CB/MH	EA	\$ 3,000.00	2	\$ 6,000.00
33	Connection to Existing Structures	EA	\$ 1,000.00	1	\$ 1,000.00
34	Adjust Structure to Grade	EA	\$ 750.00	2	\$ 1,500.00
RESTORATION/LANDSCAPING					\$ 9,300.00
35	Landscape Strip	SY	\$ 50.00	30	\$ 1,500.00
36	Replace/Relocate Irrigation System at NW Corner	LS	\$ 6,000.00		\$ -
37	Driveway Restoration	EA	\$ 1,500.00	1	\$ 1,500.00
38	Fencing	LF	\$ 35.00	180	\$ 6,300.00
SIGNALIZATION ITEMS, STREET LIGHTING					\$ 50,000.00
39	Street Lighting	LS	\$ 50,000.00	1	\$ 50,000.00
Subtotal Estimated Construction Items					\$ 320,400.00
Design/Est Contingency (30% Subtotal)					\$ 96,200.00
Subtotal Est. Construction 2020					\$ 416,600.00
Estimated CM Services (20%)					\$ 83,400.00
Estimated City PM/Administration (3%)					\$ 12,500.00
City Management Reserve (10%)					\$ 41,700.00
Total Est. Construction Phase					\$ 554,200.00
Estimated Design--Prepare PS&E (18%)					\$ 75,000.00
Estimated ROW & Permitting Services (5%)					\$ 20,900.00
Subtotal Est. Design & Permitting					\$ 95,900.00
Estimated City PM/Administration (3%)					\$ 2,900.00
City Management Reserve (10%)					\$ 9,600.00
Total Est. Design & Permitting Phase					\$ 108,400.00
Estimated ROW & Easement Costs					\$ 1,500.00
Subtotal Est. ROW Costs					\$ 1,500.00
City Management Reserve (10%)					\$ 200.00
Total Est. ROW Acquisition Phase					\$ 1,700.00
Total Estimated Project Cost					\$ 664,300.00

City of Bellevue
SE 24th St & 156th Ave SE
Enhanced All Way Stop Cost Estimate

Item No.	Description	Unit	Unit Price	Quantity	Amount
GENERAL					\$ 96,000.00
1	Construction Surveying (2% of Const. Subtotal)	LS	\$ 10,000.00	1	\$ 10,000.00
2	Mobilization (8% of Const. Subtotal)	LS	\$ 38,000.00	1	\$ 38,000.00
3	Project Temporary Vehicle & Pedestrian Traffic Control (10% of Sub.)	LS	\$ 48,000.00	1	\$ 48,000.00
REMOVALS AND EARTHWORK					\$ 54,300.00
4	Earthwork - light (0-2' Grading)	SF	\$ 1.00	5,400	\$ 5,400.00
5	Removals of Structures or Obstructions	LS	\$ 7,000.00	1	\$ 7,000.00
6	Significant Tree Removal	EA	\$ 5,000.00	-	\$ -
7	Gravel Borrow	TON	\$ 25.00	-	\$ -
8	Modular Block Walls (up to 4' tall)	SF	\$ 40.00	-	\$ -
9	Temporary Erosion Control & Water Pollution Prevention	LS	\$ 10,000.00	1	\$ 10,000.00
10	Remove Concrete Curb & Gutter	LF	\$ 20.00	480	\$ 9,600.00
11	Remove Sidewalk	SY	\$ 30.00	290	\$ 8,700.00
12	Remove HMA	SY	\$ 40.00	340	\$ 13,600.00
13	Remove/Abandon Pipe (Storm, Water)	LF	\$ 5.00	-	\$ -
14	Remove/Abandon Storm Structure	EA	\$ 500.00	-	\$ -
ROADWAY					\$ 153,000.00
15	Full Depth HMA Replacement	SY	\$ 80.00	300	\$ 24,000.00
16	HMA Grind and Overlay	SY	\$ 30.00	2,300	\$ 69,000.00
17	Stamped Concrete Crossing Treatment	SF	\$ 22.00	-	\$ -
18	CSBC	TON	\$ 35.00	-	\$ -
19	Utility Trench Repair	LF	\$ 40.00	-	\$ -
20	Channelization & Signage	LS	\$ 15,000.00	1	\$ 15,000.00
21	Cement Concrete Curb & Gutter	LF	\$ 45.00	1,000	\$ 45,000.00
22	Traffic Islands	EA	\$ 6,000.00	-	\$ -
UNDERGROUND UTILITES (Water, Sewer, Gas)					\$ 3,800.00
23	Water Main Replacement (incl. fittings, trench, bedding, backfill)	LF	\$ 140.00	-	\$ -
24	Fire Hydrant	EA	\$ 5,000.00	-	\$ -
25	Relocate/Adjust Water Service	EA	\$ 2,500.00	-	\$ -
26	PSE Gas Coordination	LS	\$ 5,000.00	-	\$ -
27	Adjust Utility Structure to Grade	EA	\$ 750.00	5	\$ 3,800.00
SIDEWALK ITEMS					\$ 74,800.00
28	Cement Concrete Sidewalk with LID Treatment	SY	\$ 120.00	340	\$ 40,800.00
29	Curb Ramp	EA	\$ 3,500.00	8	\$ 28,000.00
30	Driveway Approaches	EA	\$ 2,000.00	3	\$ 6,000.00
STORMWATER SYSTEM					\$ -
31	Storm Drain Pipe	LF	\$ 100.00	-	\$ -
32	Storm Drain Inlet	EA	\$ 1,500.00	-	\$ -
33	Storm Drain CB/MH	EA	\$ 3,000.00	-	\$ -
34	Connection to Existing Structures	EA	\$ 1,000.00	-	\$ -
35	Adjust Structure to Grade	EA	\$ 750.00	-	\$ -
RESTORATION/LANDSCAPING					\$ 26,000.00
36	Landscape Strip	SY	\$ 100.00	230	\$ 23,000.00
37	Replace/Relocate Irrigation System at NW Corner	LS	\$ 6,000.00	-	\$ -
38	Driveway Restoration	EA	\$ 1,500.00	2	\$ 3,000.00
39	Fencing	LF	\$ 35.00	-	\$ -
SIGNALIZATION ITEMS, STREET LIGHTING					\$ 160,000.00
40	RRFB Pedestrian Crossing System	LS	\$ 60,000.00	1	\$ 60,000.00
41	Street Lighting	LS	\$ 100,000.00	1	\$ 100,000.00
Subtotal Estimated Construction Items					\$ 567,900.00
Design/Est Contingency (30% Subtotal)					\$ 170,400.00
Subtotal Est. Construction 2020					\$ 738,300.00
Estimated CM Services (20%)					\$ 147,700.00
Estimated City PM/Administration (3%)					\$ 22,200.00
City Management Reserve (10%)					\$ 73,900.00
Total Est. Construction Phase					\$ 982,100.00
Estimated Design--Prepare PS&E (18%)					\$ 132,900.00
Estimated ROW & Permitting Services (5%)					\$ 37,000.00
Subtotal Est. Design & Permitting					\$ 169,900.00
Estimated City PM/Administration (3%)					\$ 5,100.00
City Management Reserve (10%)					\$ 17,000.00
Total Est. Design & Permitting Phase					\$ 192,000.00
Estimated ROW & Easement Costs					\$ -
Subtotal Est. ROW Costs					\$ -
City Management Reserve (10%)					\$ -
Total Est. ROW Acquisition Phase					\$ -
Grand Total					\$ 1,174,100.00