



## TITLE VI ACCOMPLISHMENTS & GOALS REPORT

This outline is for LPA and other governmental entities to report Title VI activities that occurred over the past year and report Title VI goals for the upcoming year. Reports must be returned on or before due date to meet eligibility requirements for federal funding. Send to [TitleVI@WSDOT.wa.gov](mailto:TitleVI@WSDOT.wa.gov)

*DUE DATES:* Refer to Section 28.3 for scheduled reporting period and due date

### Contact Information

Name and title of administrator (signature on Standard Assurances): Barbara Tolbert, City Mayor

Mailing Address: 238 N Olympic Avenue

City: Arlington WA Zip Code: 98223 County: Snohomish

Phone #: 360-403-3442 email address: [btolbert@arlingtonwa.gov](mailto:btolbert@arlingtonwa.gov)

Name and title of head of transportation-related services: Jim Kelly, Public Works Director

Mailing Address: 238 N. Olympic Avenue

City: Arlington WA Zip Code: 98223 County: Snohomish

Phone #: 360-403-3505 email address: [jkelly@arlingtonwa.gov](mailto:jkelly@arlingtonwa.gov)

Name and title of designated Title VI coordinator\*: Kris Wallace, PW Staff Accountant

Mailing Address: 238 N Olympic Avenue

City: Arlington WA Zip Code: 98223 County: Snohomish

Phone #: 360-403-3538 email address: [kwallace@arlingtonwa.gov](mailto:kwallace@arlingtonwa.gov)

\*When the Title VI coordinator changes, notify [TitleVI@WSDOT.wa.gov](mailto:TitleVI@WSDOT.wa.gov) within 30 days.

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To comply with Title VI requirements, each annual report submission must include signed Standard Assurances (USDOT1050.2A).

### Accomplishments

1. **Have there been any changes to the approved Title VI Plan that have not been reported to OEO? If Yes, please submit an update to the Title VI Plan with a new signature.**

There have not been any changes to the Title VI Plan.

2. **Organization, Staffing, Structure – Describe the Title VI Program reporting structure including the Title VI Coordinator, Administrative Head, and transportation-related staff. The list should include name, race, color, and national origin of each individual. Include the same details if your LPA has a volunteer or appointed board related to transportation decision making.**

Title VI Coordinator – Public Works Accountant – Kris Wallace, Caucasian  
No Changes were made to the 2021 Organizational Chart, see Exhibit A

3. Community Demographics – Using a map of the LPA’s boundaries, describe the demographics of the LPA’s service area (e.g., race, color, national origin, low-income). List, by individual languages, the percent of the population(s) that is limited English proficient.

**Race**

<https://statisticalatlas.com/place/Washington/Arlington/Race-and-Ethnicity>

- White - 84.3% 15.8K
- Hispanic – 7.7% 1,448
- Black – 1.1% 201
- Asian – 2.4% 443
- Mixed – 2.9% 541
- Other - 1.7% 318

**Language**

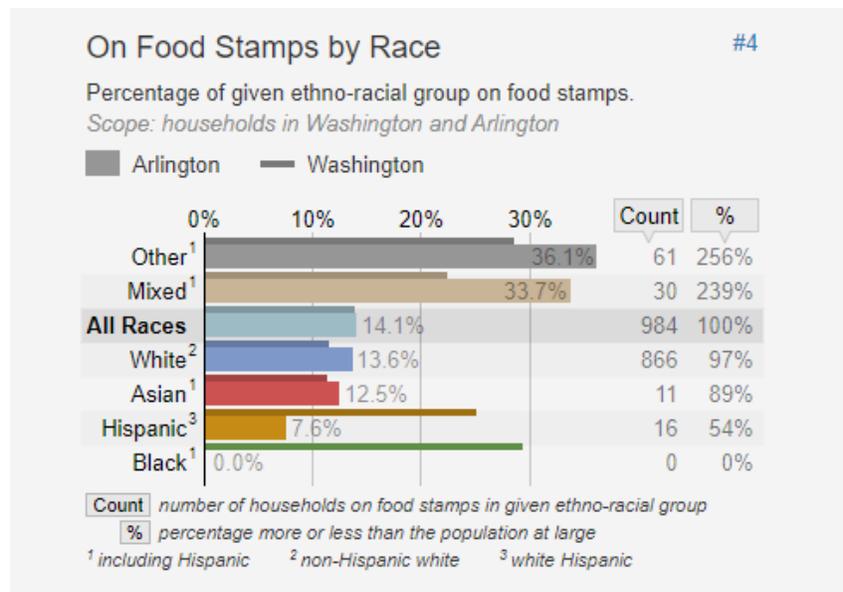
<https://data.census.gov/cedsci/profile?g=1600000US5302585>

- English only – 87.5%
- Spanish – 6.5%
- Other Indo-European – 1.8%
- Asian % Pacific Island – 3.8%
- Other – 0.4%
- 12.5% speak other than English spoken at home

**Income**

<https://data.census.gov/cedsci/profile?g=1600000US5302585>

The population of Arlington is 19,868, up from 17,923 in 2010. The median household income is \$82,626, with a poverty rate of 5.0%+/- 2.0%. 11.6% of Arlington’s population are veterans. 14.4% of the population in Arlington is considered to have a disability.



<https://statisticalatlas.com/place/Washington/Arlington/Food-Stamps>

4. **Complaints – Provide a copy of the LPA’s Title VI complaint log, including new Title VI complaints received during this reporting period and any still pending. Include the basis of the complaint (race, color, national origin) and describe the disposition (status/outcome).**

No complaints were received. Please see Attachment B for the City of Arlington’s Title VI Complaint log, Attachment C for City of Arlington’s Complaint Form in English and Spanish. The complaint forms are posted on the City’s website.

5. **Planning – Describe the transportation planning activities performed this reporting period. Describe the actions taken to promote Title VI compliance regarding transportation planning, including monitoring and review processes, community involvement, their outcome or status. Include examples of community outreach.**

204<sup>th</sup> / 77<sup>th</sup> Roundabout – Project consisted of the installation of a roundabout, construction of ADA ramps and flashing crosswalks, pavement markings, new asphalt, installation of center median, new sidewalks, and area lighting. Community involvement and outreach included postcards being mailed to affected homes, businesses, and surrounding area, Letters and maps sent to the affected businesses and residents, email updates weekly to area businesses and residents, E-newsletter and website updates to the public. Project was started in 2020, completed in 2021.

2021 Utility Improvement & Pavement Preservation – City of Arlington’s yearly overlay project includes pavement repair and full overlay, planning, construction of ADA Ramps, pavement markings, and water line replacements and utility adjustments. Community involvement included postcards and letters mailed to the affected homes with a location map, timeline, website information and direct contact information. E-newsletter and social media updates on project progress and weekly updates posted on the City website, which uses Google Translate. Project was completed in 2021.

Smokey Point Blvd Pavement Preservation – Project consisted of the installation of a 2-inch pavement overlay along Smokey Point Blvd from south City limits to 174<sup>th</sup> PI NE, and a center median installation north and south of 172<sup>nd</sup> St NE. Community outreach included post cards being mailed to affected residents, businesses and surrounding area, letters and map sent to the affected businesses and residents, weekly email updates to area businesses, E-newsletter and social media updates, and weekly website updates.

173<sup>rd</sup> St Phase 1 – The project started construction in 2021. The project consists of the installation of a new roadway north of 172<sup>nd</sup> St between Smokey Point Blvd and 40<sup>th</sup> Ave with a 12-foot wide multiuse trail. Community involvement included an online open house presentation that was placed on the City’s website in 2020, letters to the neighborhoods and businesses surrounding the project area, weekly email updates to residents and businesses, E-Newsletter and social media updates, and weekly website updates.

204<sup>th</sup>/74<sup>th</sup> Signal – Project was in the design phase in 2021. The project will consist of the installation of a 4-way signal system with intersection improvements at 204<sup>th</sup> St and 74<sup>th</sup> Ave. Community outreach included placing a project page onto the City’s website.

74<sup>th</sup> Ave Trail – Project is in the initial design phase in 2021. Project will include the installation of a 12-foot multi use trail from the current trail end on Arlington Valley Road to the intersection at 74<sup>th</sup> Ave and 204<sup>th</sup> St. Community outreach included placing a project page onto the City’s website.

Smokey Point Corridor – Project is in the initial design phase in 2021. The project will include the redesign of Smokey Point Blvd from 174<sup>th</sup> PI to 200<sup>th</sup> St. Community involvement included an on-line

open house with online survey for the community to respond and provide input. The open house had a translation service for people to use to translate the writings to the needed language, see Exhibit D. The open house was advertised on social media, City E-Newsletter, the City's website and project page, and post cards were mailed to the project area residents and businesses see Exhibit E.

40<sup>th</sup> Ave Signal – This project went to bid in 2021 with construction estimated to start in May of 2022. Community outreach included post cards to the area residents and businesses, letters and maps mailed to area businesses. E-newsletter updates, website updates, a news article posting, and an online interactive project page with survey.

SR 530 Temporary Signal Replacement – Project consisted of replacing the temporary signals with a wood pole span wire signal system. Community outreach included letters to the area businesses, E-newsletter and social media updates, weekly email updates to the businesses, and weekly website updates.

59<sup>th</sup> Ave Complete Streets – Project included constructing pedestrian improvements and landscaping along the east side of 59th Avenue NE starting at the north parking lot of the Boys and Girls Club moving north approximately 450 feet north past 188th Street NE to incorporate Evans Field. The scope also includes pedestrian improvements and street trees from 59th Avenue east on 188th Street NE, along the southern gravel parking lot. Three gravel parking lots obtained drainage, paving, and striping. The parking lot off 59th for Evans Park Playground, and two off 188th St NE, to the north (Evans Field) and south (Quake Field). Solar Powered Flashing LED Pedestrian Crosswalk Signs were installed connecting the Boys and Girls Club to the Airport Trail and connecting the north and south parking lots on 188th Street. Community outreach included E-newsletter updates.

Island Crossing Roundabout - Project was in the design phase in 2020 and 2021. Project consists of a roundabout to be installed at Smokey Point Blvd and SR 530. At this time, no community outreach has begun yet.

City of Arlington website has an option available to residents to view/read/navigate the website in over 100 different languages. In 2021, the City installed a translation service on all its capital projects webpages for the public to use on all attached documents. Attachment F shows the language options available on the City's website, and Attachment G shows the instructions on how to translate a document.

**6. Right-of-way actions – Describe activities during this reporting period associated with the purchase, sale, lease/use, or transfer of real property (related to highway transportation/public right-of-way use). Include demographic information of affected populations. For example, the race, color, national origin of affected property/business owners(s)/tenant(s).**

40<sup>th</sup> Ave Signal, this project is to install a 4-way signal system at the intersection of 40<sup>th</sup> Ave and 172<sup>nd</sup> St with ADA ramps, crosswalks, and median improvements along 172<sup>nd</sup> St from Smokey Point Blvd to 46<sup>th</sup> Ave. The City of Arlington needed to purchase right-of-way from the following property owners and businesses:

- Baker-Mor, LLC
- MarkDev-Smokey Point, LLC
- CFT NV Development LLC – Asian/Caucasian
- Sauvage Real Estate LLC – Paul Sauvage – Caucasian

**7. Identify right-of-way appraisers and acquisition staff (used during this reporting period) by race, color, national origin.**

Right-of-way acquisition staff, Universal Field Services

- Mitch Legal – Caucasian
- Steve Reinhart – Caucasian
- Kelly McGill - Caucasian
- Sam Meldrum – Caucasian
- Brenda Tegman – Caucasian

Appraisal Staff, ABS Valuation

- Jim Dodge - Caucasian

**8. Studies and Plans – Were any transportation studies (including environmental reviews) conducted or transportation plans completed during this reporting period? Identify the data source(s) and provide data summary (Title VI/Environmental Justice Analysis) relative to ethnicity, race, languages spoken, neighborhoods, income levels, physical environments, and/or travel habits. Explain how data was used in these studies/reviews/plans.**

Smokey Point Blvd: 2040 Traffic Operations Analysis – The City of Arlington received a grant from the Puget Sound Regional Council (PSRC) to analyze transportation movements and needs on Smokey Point Blvd between 174<sup>th</sup> St and 200<sup>th</sup> St and to design roadway improvements to meet multimodal transportation demands for the future (design year 2040). The City contracted with Perteet to perform the analysis and complete the transportation design improvements along this section of Smokey Point Boulevard. The memorandum documents the traffic analysis that includes the volume development process for evaluation of the design year (2040), analysis of turning movements and volumes of the five study intersections, intersection operations, and average delay and Level of Service (LOS) for each of the intersections, See Exhibit H. The LOS analysis was conducted at five-year increments to determine the necessary build year to maintain city traffic network requirements.

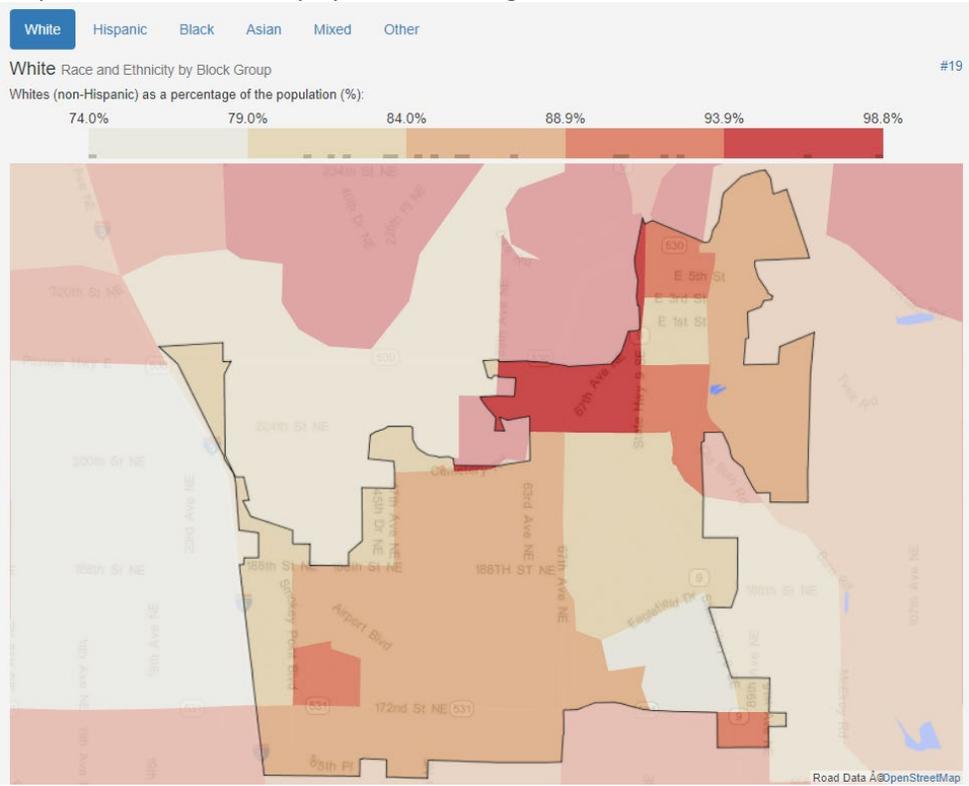
Arlington -Marysville Cascade Industrial Center (CIC) - Arlington and Marysville completed a joint traffic analysis of the core road network in the Cascade Industrial Center (CIC). The boundaries of this core road network is SR-531 (172<sup>nd</sup> St) on the north, 67<sup>th</sup> Ave on the east, 156<sup>th</sup> St on the south, and Smokey Point Blvd on the west. The study is documented in a memorandum summarizing the process and findings of the Transportation Network Analysis, See Exhibit I. This analysis intent is to redefine and confirm the internal CIC transportation network to be supportive of the adopted Comprehensive Plans by each City, but also reflect known development proposals and environmental constraints. Background information is first presented, the network alternatives analysis and findings are then discussed.

**9. Project Location and Design – Provide a list of construction projects that began during this reporting period. Using a map of the LPAs service area, identify project locations, and a brief description of the projects' benefits/burdens to affected populations. If possible, provide a map that overlays projects with the racial composition of affected neighborhoods.**

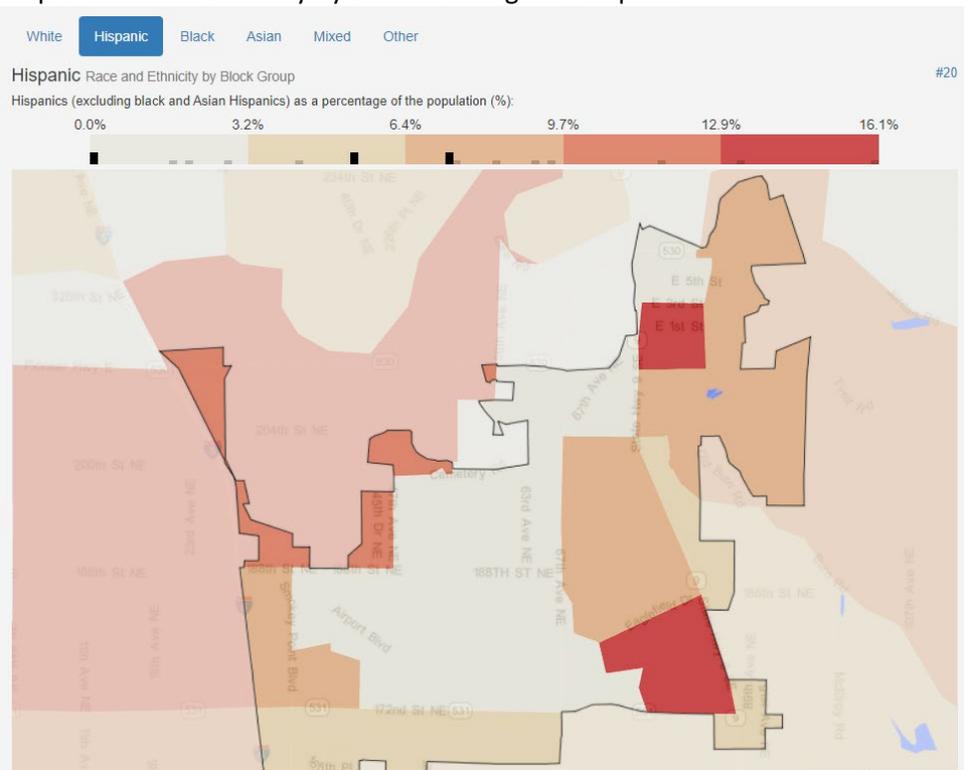
Race and Ethnicity maps for the City of Arlington are below, followed by locations where street construction projects occurred in 2021.

<https://statisticalatlas.com/place/Washington/Arlington/Race-and-Ethnicity>

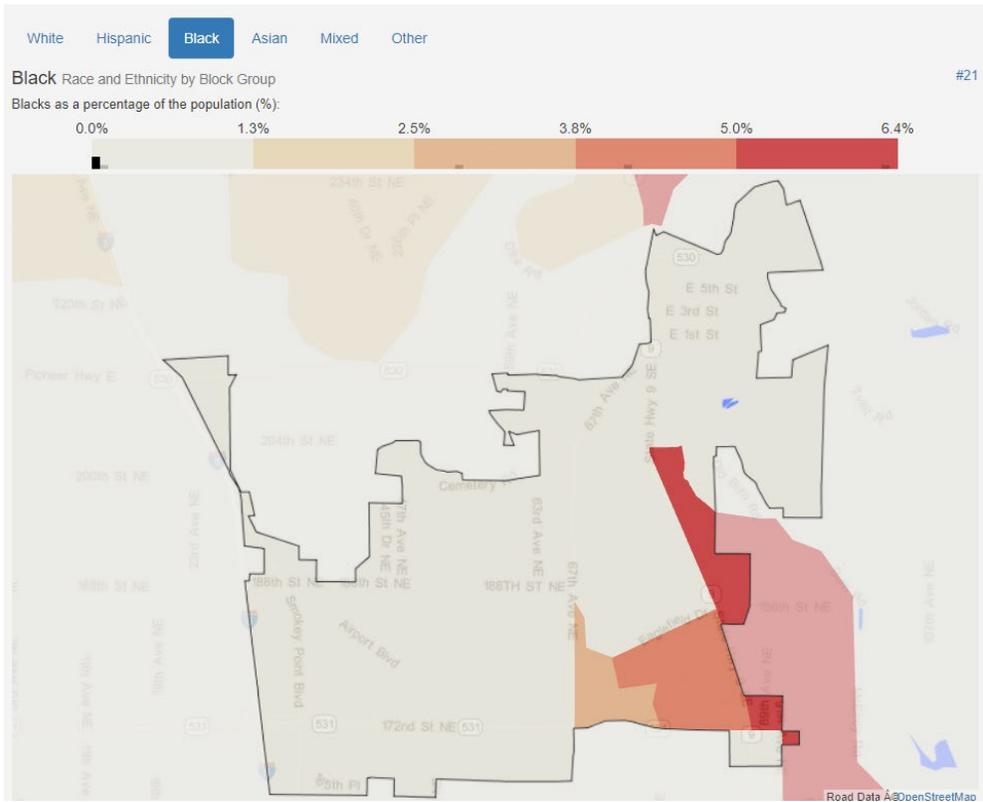
### Map of Race and Ethnicity by Block in Arlington - Caucasian



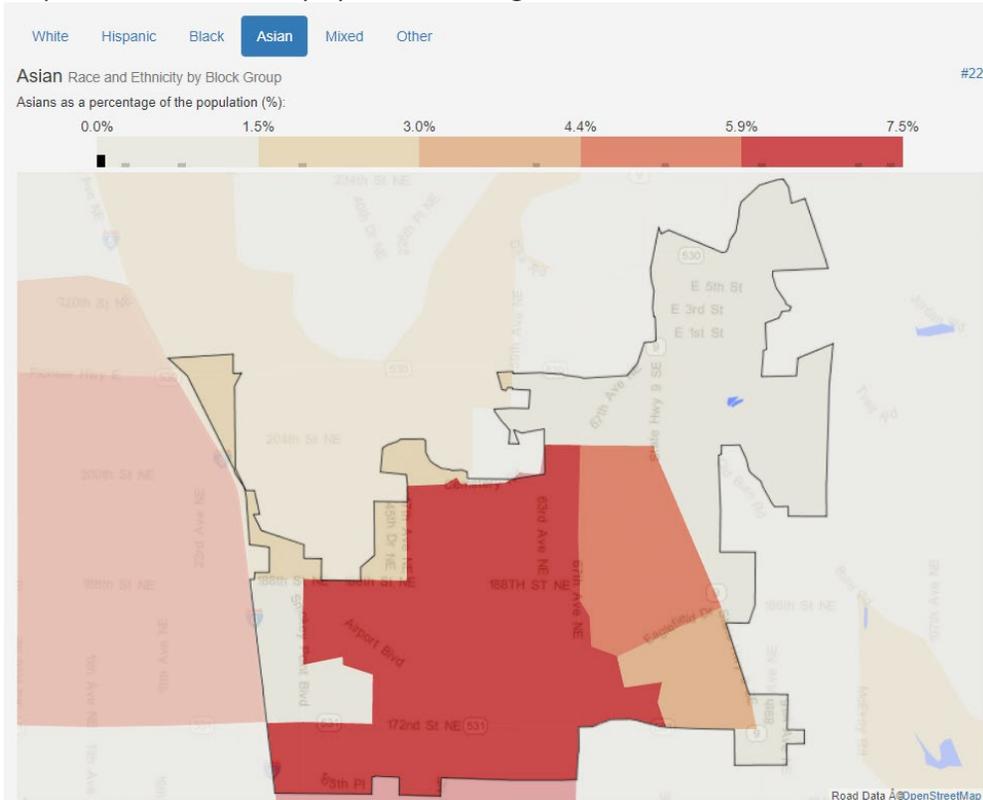
### Map of Race and Ethnicity by Block in Arlington - Hispanic



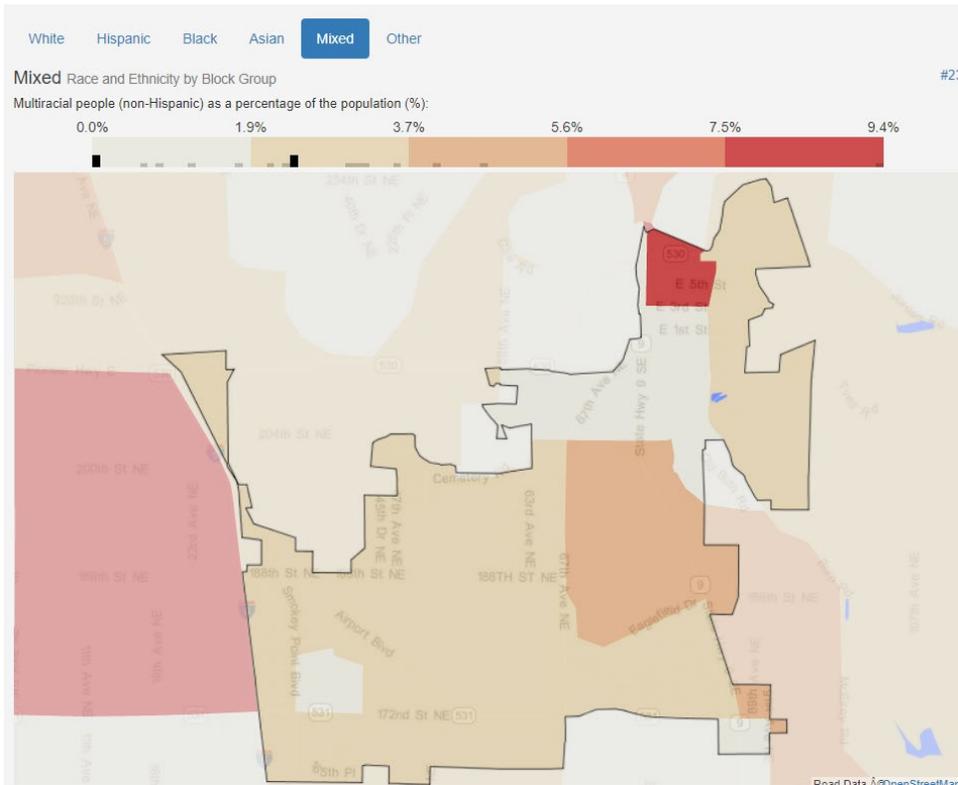
### Map of Race and Ethnicity by Block in Arlington – Black



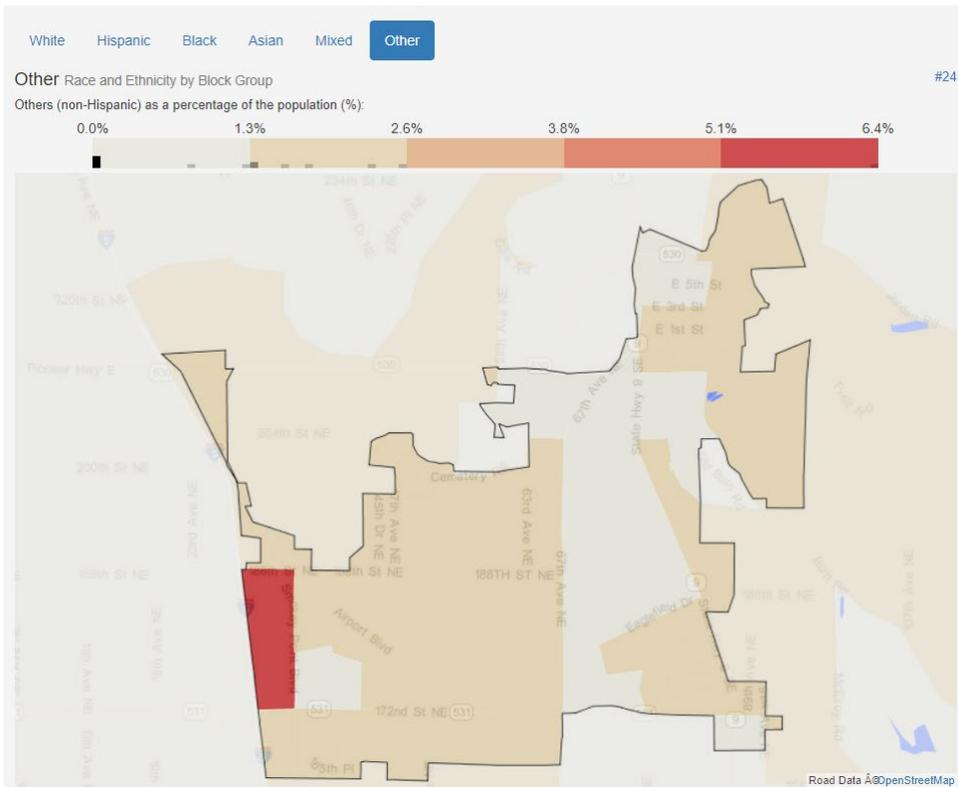
### Map of Race and Ethnicity by Block in Arlington –Asian



### Map of Race and Ethnicity by Block in Arlington – Mixed



### Map of Race and Ethnicity by Block in Arlington – Other



204<sup>th</sup>/77<sup>th</sup> Roundabout, overall impact to anyone was moderate. This project included the installation of a roundabout island, ADA ramps, flashing crosswalks, center medians, and new sidewalks. Benefits include improved roadway, and increased pedestrian and vehicle safety.

- 204<sup>th</sup> St - 11
- 77<sup>th</sup> Ave - 11

2021 Utility Improvement & Pavement Preservation, overall impact to Arlington residents was minimal. This annual project replaces old AC water mains, installs new ADA ramps, and resurfaces the roadway of existing roads. Benefits include improved roads, updated ADA ramps, and new water mains.

- E 4<sup>th</sup> St - 4
- French Ave - 7
- High St - 2
- E 3<sup>rd</sup> St - 5
- Park Hill Drive - 1
- N Washington Ave - 9
- N Lenore Ave - 8
- E 2<sup>nd</sup> St – 6, 10
- N Dunham Ave - 3
- Smokey Point Blvd - 15

173<sup>rd</sup> St Phase 1, overall impact to Arlington residents is minimal. The project includes the installation of a new roadway from Smokey Point Blvd to 40<sup>th</sup> Ave with a 12-foot wide multi use trail, ADA ramps, street lighting and a privacy fence along the north side of the roadway. Benefits include an alternative route to 172<sup>nd</sup> St, a multi-use trail, and increased pedestrian and vehicle safety.

- 173<sup>rd</sup> St - 13

Smokey Point Blvd Pavement Preservation, overall impact to people traveling along this roadway was minimal as most work was completed during night hours with low traffic volumes. The project was the grinding and 2-inch pavement overlay with new ADA ramps and center traffic median north and south of 172<sup>nd</sup> St. Benefits included new road pavement, new pavement markings, new ADA ramps, and increase traffic safety.

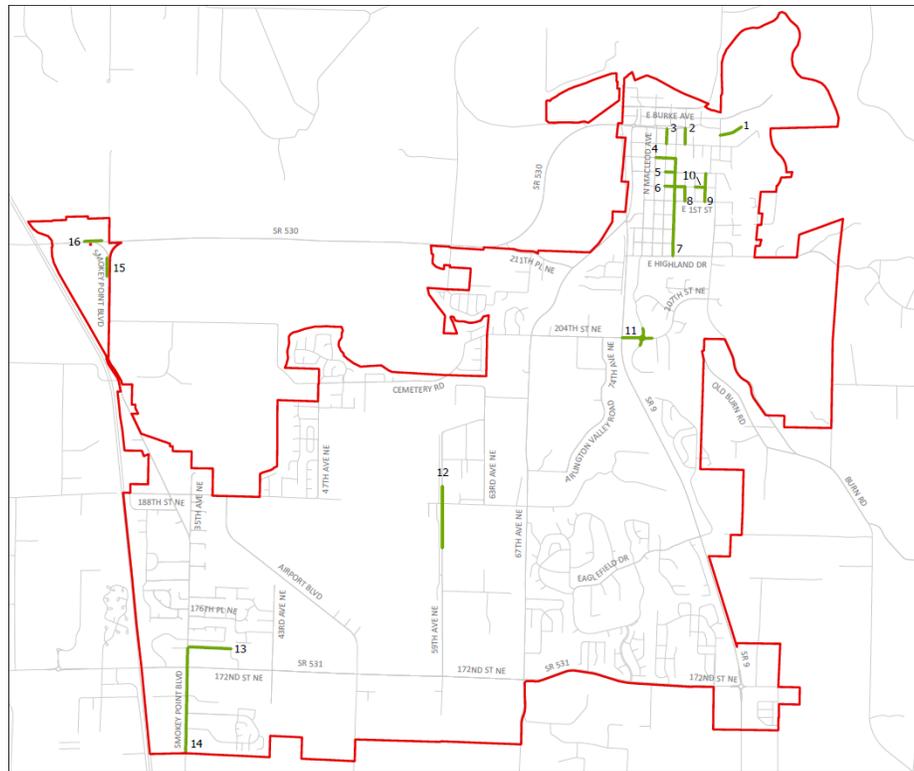
- Smokey Point Blvd - 14

SR 530 Temporary Signal Replacement, overall impact to all users was minimal. This project was mostly completed during night hours to minimize impact. It included the installation of a wood pole span wire signal system and new crosswalks at the intersection of Smokey Point Blvd and SR 530. Benefits included improved safety to pedestrians and vehicles.

- Smokey Point Blvd - 16
- SR 530 - 16

59<sup>th</sup> Ave Complete Streets, overall impact to all users is minimal. Project included the installation of sidewalks, ADA ramps, new pavement in parking lots, flashing crosswalk signs, new striping, and new drainage. Benefits include improved safety to pedestrian and vehicles, and increased parking spaces.

- 59<sup>th</sup> Ave NE – 12



\*The numbers on the map correlate with the numbers next to the streets.

**10. Other Public Meetings – List other public meetings held during this reporting period. Identify efforts used to encourage citizen participation at those meetings. Detail dates, times, locations, attendance, and provide examples of outreach materials.**

In 2021, all city public meetings continued on a virtual setting due to the Covid-19 Pandemic with some meetings allowing in person depending on spacing. All meeting information is posted on the City of Arlington website, see Exhibit J.

- City Council Meetings
  - Regular council meetings are held every other Monday at 7:00 PM, except for the month of August, unless otherwise cancelled. Meetings are posted on the Cities website, and on the City of Arlington Facebook and Twitter accounts. Meeting are held at 110 E 3<sup>rd</sup> St ,Arlington or through Zoom.
- Planning commission
  - Regular planning meetings are every other Tuesday at 7:00 PM in the council Chambers at 110 E 3<sup>rd</sup> St. Arlington.
- Youth Council
  - Regular youth council meeting are held the second Thursday every month in the evening.
- Park, Arts & Recreation Commission
  - Regular PARC meetings are held the fourth Tuesday of every month at 6:00 PM via zoom.
- Library Board Meeting
  - The Library Board was dissolved in July 2021.
- Civil Service Commission

- Regular Civil Service Meetings are held on the first Wednesday of most months at 9:00 AM in Butner Boardroom at 110 E 3<sup>rd</sup> St. Arlington.
- Citizen Salary Commission
  - The Citizen Salary Commission meets every other year, generally takes place the first of the year.
- Cemetery Board
  - The Cemetery Board meets the third Tuesday of every other month at 2:30 PM via Zoom.
- Airport Commission
  - The Airport Commission meetings are held the second Tuesday of every month at 7:00PM in Putnam Hall at 18204 59<sup>th</sup> Dr. NE. Arlington

**Identify members of the LPA's transportation planning and/or advisory groups by race, color, and national origin**

Planning Commission

- Bruce Angell - Caucasian
- Mike Thomas - Caucasian
- Tim Dean - Caucasian
- Melissa Johnson - Caucasian
- Yvonne Gallardo-Van Ornam – Hispanic

Public Works

- James Kelly – Caucasian
- Ryan Morrison – Caucasian
- Kris Wallace - Caucasian

**Specify methods used to collect demographic information from the transportation-related public meetings. (Self-identification surveys, notes by staff, etc.) Include summaries of Public Involvement Forms collected at each meeting, listing the demographics of those who attended by meeting.**

Due to the ongoing Covid-19 pandemic, no in-person public transportation meetings were scheduled. The City hosted an open house for the Smokey Point Corridor project and an interactive webpage for the 40<sup>th</sup> Ave Signal project. Postcards (Exhibit D) and letters were mailed out to all affected houses and businesses with the links and dates open, and posted on the City's website project page.

**List any language assistance services requested. For which languages? Who provided the service? In addition, list vital documents translated during the reporting period and identify the languages.**

No requests for assistance were received by the City. Due to Covid-19, no public transportation meetings were held in person. Public interaction was limited to phone and email, and online open houses. No vital documents were required to be translated.

**11. Transportation-related Construction and Consultant Contracts (if applicable) – Briefly describe the process used to advertise and award construction contracts during this reporting period. Include the process for negotiated contracts (e.g., consultants).**

2021 Utility Improvement & Pavement Preservation, Reece Construction. The City advertised for two weeks in the Daily Journal of Commerce and the Everett Herald, on the city website and with Solicit

Bid. Upon closing, a virtual bid opening occurred, and the bids were announced. The preliminary bid is posted on the City website, and then the bids are verified. The certified bid is posted online and the lowest responsible bidder is chosen.

Smokey Point Pavement Preservation, Cadman Materials. The City advertised for three weeks in the Daily Journal of Commerce and the Everett Herald, on the city website, and with Solicit Bid. Upon closing, a virtual bid opening occurred, and the bids were announced. The preliminary bid is posted on the City website, and then the bids are verified. The certified bid is posted online and the lowest responsible bidder is chosen.

173<sup>rd</sup> St Phase 1, Reece Construction. The City advertised for two weeks in the Daily Journal of Commerce and the Everett Herald, on the city website and with Solicit Bid. Upon closing, a virtual bid opening occurred, and the bids were announced. The preliminary bid is posted on the City website, and then the bids are verified. The certified bid is posted online and the lowest responsible bidder is chosen.

74<sup>th</sup> Ave Trail Design, Toole. City conducted a full RFP solicitation. Proposals were evaluated according to criteria listed in the RFP. The most qualified being selected for contract negotiations, see Exhibit N for advertisement.

40<sup>th</sup> Ave Signal Construction, Interwest. The City advertised for two weeks in the Daily Journal of Commerce and the Everett Herald, on the city website and with Solicit Bid. Upon closing, a virtual bid opening occurred, and the bids were announced. The preliminary bid is posted on the City website, and then the bids are verified. The certified bid is posted online and the lowest responsible bidder is chosen.

59<sup>th</sup> Ave Complete Streets, Reece Construction. The City advertised for one week in the Daily Journal of Commerce and the Everett Herald, on the city website and with Solicit Bid. Bid closed 14 days after publication. Upon closing, a virtual bid opening occurred, and the bids were announced. The preliminary bid is posted on the City website, and then the bids are verified. The certified bid is posted online and the lowest responsible bidder is chosen.

- Title VI language is included in the advertisement of all City of Arlington Project bid requests, and request for proposals, see Exhibit M for the standard Advertisement for Bid form.

**12. Describe the actions taken to promote construction contractor/consultant compliance with Title VI by construction contractors/consultants, including monitoring and review processes, and their outcomes/status (e.g. what Title VI language was included in contracts and agreements; were contractors and consultants reviewed to ensure compliance; what Title VI responsibilities are explained to contractors and consultants?)**

Title VI language is included in all contractor/consultant contracts. See Attached Professional Service Agreement Exhibit K, and the Construction Contract, Exhibit L. Title VI language is included in all advertisement, request for proposals, etc. Exhibit M is the standard Advertisement for Bid form.

**13. List construction, right-of-way, and consultant contracts with your LPA/MPO/entity for this report period with dollar value of each. Identify funding sources (federal, state, local, other), and how many were awarded to certified disadvantaged contractors (as a prime contractor/consultant).**

- 2021 Utility Improvement & Pavement Preservation – \$2,139,164.47, Local, DBE award

- Smokey Point Pavement Preservation - \$665,020.00, Federal, no DBE award
- 173<sup>rd</sup> St Phase 1 - \$ 2,135,740.19, Local, DBE award
- 204<sup>th</sup>/74<sup>th</sup> Signal Project - \$16,000.00, Local, no DBE award
- 74<sup>th</sup> Ave Trail - \$39,403.20, Federal, no DBE award
- Smokey Point Corridor - \$1,575,650.00, Federal, no DBE award
- 40<sup>th</sup> Ave Signal - \$1,817,509.00, State, no DBE award
- 59<sup>th</sup> Ave Complete Streets, \$1,035,287.00, State, DBE award

Three projects had a designated DBE during the reporting period.

**14. Education & Training – Describe actions taken to promote Title VI compliance through education and trainings, including monitoring and review processes, and their outcomes/status.**

Due to the continued Covid-19 pandemic, there was no in person Title VI trainings offered this reporting period. All training for Title VI was completed with online webinars or online training.

**List Title VI training/webinars your Title VI Coordinator attended this reporting period. Include dates and entity that conducted the training.**

Title VI Basics for LPA's – WSDOT online (See Exhibit O for Certificates)

- Kris Wallace – PW Accountant – 9/14/2021

**When was Title VI internal training provided to staff? Who conducted the training? What was the subject of the training? Provide the job titles and race/color/national origin of attendees.**

Title VI Basics for LPA's – WSDOT online

- Katy Shores – Administrative Specialist II – 11/3/2021– Caucasian

**List other civil rights training conducted locally. Provide dates and a list of participants by job title and Title VI role, if applicable.**

Foundations of Implicit Bias – WCIA webinar – 10/6/2021 & 10/7/2021 (see Exhibit P for Certifications)

- Katy Shores – Administrative Specialist II – Title VI Specialist
- Josh Jones – PW Inspector – Title VI Designee

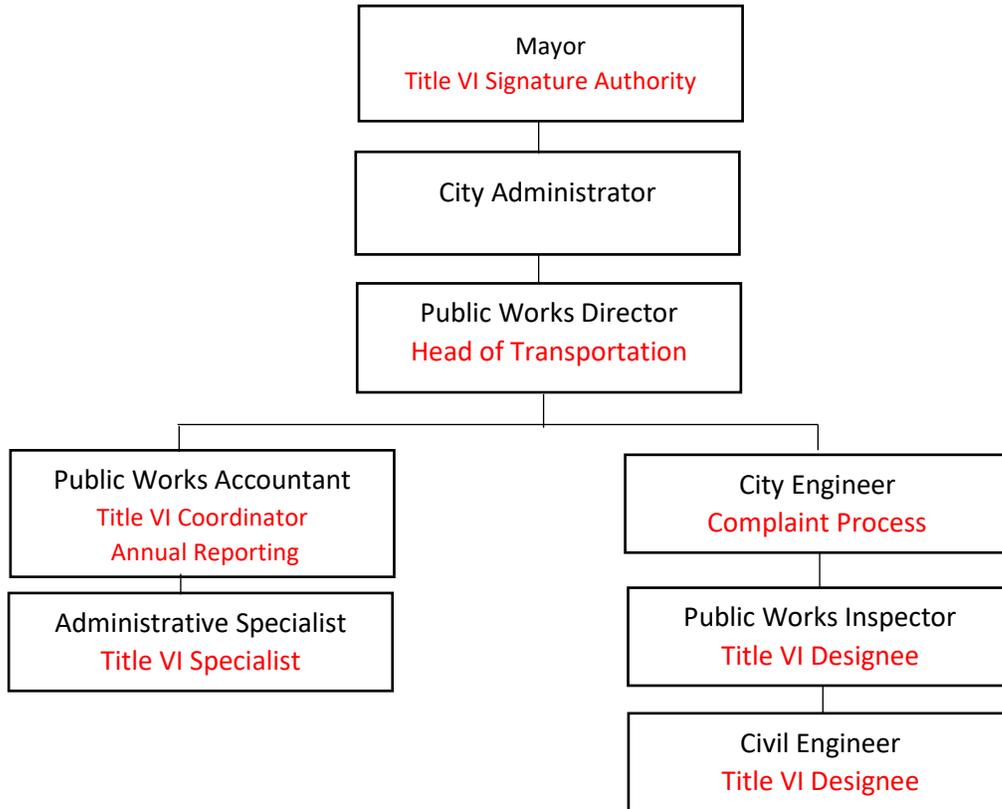
**Title VI Goals for Upcoming Year**

**What area(s) of Title VI does your agency plan to focus on in the upcoming year? Describe by particular program area what your agency hopes to accomplish. Include any significant problem areas to focus on and plans to address those.**

- Continue to ensure that all projects, programs and activities are in compliance with WSDOT Title VI Plan.
- Train any new staff on Title VI program
- Keep the City project webpages updated accordingly with all Title VI information.

# City of Arlington

## Title VI Organizational Chart



**Complaint Process:** Intake and investigation of Title VI complaints

**Annual Reporting:** Identifies Transportation projects and programs and reports annually to WSDOT as required for Title VI compliance.

**Title VI Specialist:** Responsible for community outreach

**Designee:** Assist with documentation and compilation of reports





ADDITIONAL INFORMATION

**What remedy are you seeking for the alleged discrimination? Please note that this process will not result in the payment of punitive damages or financial compensation.**

**List any other persons that we should contact for additional information in support of your complaint. Please include their phone numbers, addresses, email addresses, etc.**

**List any other agencies with whom you have filed this same complaint:**

Signature (REQUIRED)

Date

## Title VI Complaint Procedures

If you believe that you have been discriminated against because of your race, color, or national origin, then you have the right to file a formal complaint with City of Arlington within 180 days of the alleged incident.

### HOW TO FILE A COMPLAINT

1. Complete the Title VI Complaint Form, answering every question.
2. Submit the **signed** complaint as directed on the form. We cannot accept unless it has been signed.
3. Upon receipt the complaint form, it will be reviewed to ensure that it is complete. A notice acknowledging receipt will be provided within 10 working days. The complaint will then be forwarded to WSDOT, the federal funding agency through Washington State Department of Transportation-Office of Equal Opportunity. The federal funding agency is responsible for all decisions regarding whether a complaint should be accepted (and investigated), dismissed, or referred to another agency.
4. When the federal funding agency decides whether to accept, dismiss, or transfer the complaint, it will notify the complainant and the other agencies (as appropriate) as to the status of the complaint.

These procedures do not deny you the right to file a formal complaint directly with the federal funding agencies or seek private counsel for complaints alleging discrimination. Federal law prohibits intimidation or retaliation against you of any kind.

These procedures cover all complaints filed under Title VI of the Civil Rights Act of 1964 as amended and the Civil Rights Restoration Act of 1987, relating to any program, service, or activity administered by WSDOT as well as its sub-recipients, consultants, and contractors.



City of Arlington  
Ciudad de Arlington

**EXHIBIT C**

Spanish

## Formulario de queja del Título VI

### Uso exclusivo de la agencia

Received	____/____/____
Response	____/____/____
Report	____/____/____
Briefing	____/____/____

Si cree que ha sido discriminado debido a su raza, color o nacionalidad (incluido el dominio limitado del inglés) en programas o actividades de la agencia, puede presentar una queja formal.

Instrucciones: Complete el siguiente formulario y envíelo a: City of Arlington Attn: Ryan Morrison 238 N Olympic Ave, Arlington, WA 98223 o por correo electrónico a: [rmorrison@arlingtonwa.gov](mailto:rmorrison@arlingtonwa.gov)

<b>Su nombre:</b>		<b>Su teléfono:</b>	
		<b>Mejor momento del día para contactarlo sobre esta queja:</b> 7am a 10am    10am a 1pm    1pm a 4pm    4pm a 7pm	
<b>Su dirección de correo electrónico:</b>			
<b>Su dirección de correo postal:</b> (Calle/PO Box, ciudad, estado, código postal)			
<b>Nombre, dirección y número de teléfono de las personas que supuestamente lo discriminaron.</b>			
<b>Fecha del supuesto incidente:</b>		<b>Discriminación por:</b>	
		<input type="checkbox"/> Raza <input type="checkbox"/> Color <input type="checkbox"/> Nacionalidad (incluye dominio limitado del inglés)	
<b>Explique lo que sucedió, por qué cree que sucedió y cómo fue discriminado. Indique quién estuvo involucrado. Asegúrese de indicar de qué manera siente que otras personas son tratadas de forma diferente a usted. Si tiene alguna otra información sobre lo que sucedió, adjunte los documentos probatorios a este formulario.</b>			

INFORMACIÓN ADICIONAL

**¿Qué solución está buscando por la supuesta discriminación? Tenga en cuenta que este proceso no resultará en el pago de daños punitivos ni compensación económica.**

**Enumere a otras personas con las que deberíamos comunicarnos para obtener información adicional en apoyo de su queja. Incluya sus números de teléfono, domicilios, direcciones de correo electrónico, etc.**

**Enumere cualquier otra agencia con la que haya presentado esta misma queja:**

**Firma: (OBLIGATORIA)**

**Fecha:**

## Procedimientos de queja del Título VI

Si cree que ha sido discriminado por su raza, color u origen nacional, tiene derecho a presentar una queja formal ante la ciudad de Arlington dentro de los 180 días posteriores al presunto incidente.

### CÓMO PRESENTAR UNA QUEJA

1. Complete el Formulario de Queja del Título VI, respondiendo cada una de las preguntas.
2. Envíe la queja firmada como se indica en el formulario. No podemos aceptarla a menos que la haya firmado.
3. Una vez recibido el formulario de queja, será controlado para verificar que está completo. Se enviará un aviso de acuse de recibo dentro de los 10 días hábiles. La queja será enviada a la agencia federal de financiamiento a través de la Oficina de Igualdad de Oportunidades del Departamento de Transporte del Estado de Washington. La agencia federal de financiamiento es responsable de todas las decisiones con respecto a si una queja debe ser aceptada (e investigada), desestimada o remitida a otra agencia.
4. Cuando la agencia federal de financiamiento decida si acepta, rechaza o transfiere la queja, notificará al demandante y a las demás agencias (según corresponda) sobre el estado de la queja.

Estos procedimientos no le niegan el derecho de presentar una queja formal directamente ante las agencias federales de financiamiento o buscar un abogado particular para las quejas que alegan discriminación. La ley federal prohíbe cualquier tipo de intimidación o represalia contra usted.

Estos procedimientos contemplan todas las quejas presentadas bajo el Título VI de la Ley de Derechos Civiles de 1964 y sus modificaciones y la Ley de Restauración de Derechos Civiles de 1987, relacionadas con cualquier programa, servicio o actividad administrados por el WSDOT o Washington State Department of Transportation así como sus subreceptores, consultores y contratistas.



# SMOKEY POINT BLVD CORRIDOR PROJECT

CITY OF ARLINGTON

[Welcome](#) [Background](#) [About the plan](#) [Preliminary design concepts](#) [Feedback !\[\]\(ef62519991500c3a77af2e8766280b93\_img.jpg\)](#) [Next steps](#)

## Welcome

Welcome to the online open house for the Smokey Point Boulevard Corridor Project!

The City of Arlington wants to hear from you! We want your feedback about Smokey Point Boulevard to better plan for future growth and development along this corridor.

These improvements will support future growth and help create a community corridor for small businesses and residents.

**You can use this site to:**

- Learn more about the project
- Understand the opportunities for changes on the corridor
- Share your feedback by taking the survey below or by leaving a comment on our project map by 11:59 p.m. on November 30.



Project area map

### Sign up for email updates

First Name

Last Name



# SMOKEY POINT BLVD CORRIDOR PROJECT

CITY OF ARLINGTON

Share your feedback: [smokeypoint.participate.online](https://smokeypoint.participate.online)

To plan for growth in Arlington, the City of Arlington is designing improvements to Smokey Point Boulevard from 174th Place NE to 200th Street NE. We are in the preliminary stages of this important project and want to engage the public to make sure we develop a project that meets the community's needs.

### The project will have multiple benefits for the community, including:

- Improving mobility of the corridor for drivers, transit users, pedestrians and bicyclists.
- Fostering the development of a commercial corridor to serve the surrounding neighborhood.
- Increasing safety for all users, including pedestrians and bicyclists.
- Improving transit facilities.

Preliminary design work is under way and we want to hear from you. We are launching an online open house in early November. Visit [smokeypoint.participate.online](https://smokeypoint.participate.online) to learn more about the project and provide feedback on what you would like to see in a redesigned Smokey Point Blvd. The online open house will be live until Tuesday, November 30.

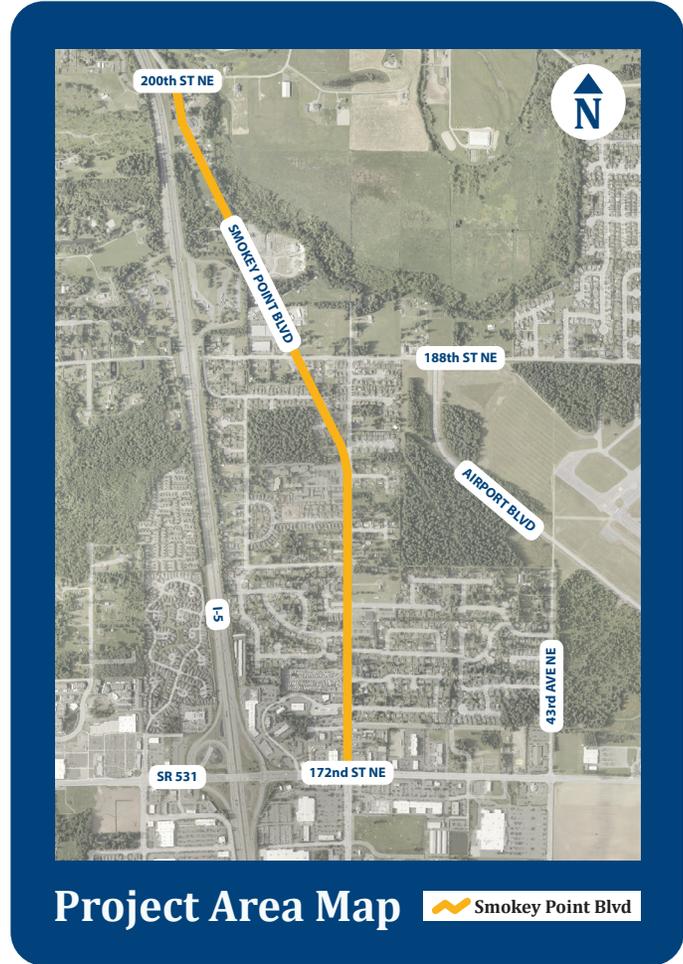


**Contact information:** [www.arlingtonwa.gov/663/Smokey-Point-Blvd-Corridor-Project](http://www.arlingtonwa.gov/663/Smokey-Point-Blvd-Corridor-Project)  
(360) 403-3544 | [cityprojects@arlingtonwa.gov](mailto:cityprojects@arlingtonwa.gov)

**MAYOR:** BARB TOLBERT

**CITY COUNCIL:** MICHELE BLYTHE, MIKE HOPSON, HEATHER LOGAN, DEBORA NELSON, MARILYN OERTLE, JAN SCHUETTE, DON VANNEY

Visita el sitio web del Proyecto Smokey Point Blvd para aprender mas sobre el proyecto y para participar en nuestra sesión virtual



Project Area Map

The screenshot shows the City of Arlington website with a COVID-19 information banner at the top. Below the banner is a navigation menu with links for Government, Departments, Doing Business, Living, Visiting, and How Do I... A search bar is located in the center of the page. A language selection dropdown menu is open, displaying a grid of languages. At the bottom of the page, there are four circular icons: Notify Me, Report a Concern, Pay Online, and Agendas & Minutes.

**COVID-19 INFORMATION** COVID-19 Information  
Read On...

Create an Account - Increase your productivity, customize your experience, and engage in information you care about. Sign In

**GOVERNMENT** Government Departments Doing Business Living Visiting How Do I...

**Arlington**  
WASHINGTON

Search...

Select Language

Afrikaans	Bulgarian	Esperanto	Italian	Latin	Mongolian	Russian	Spanish	Ukrainian
Albanian	Catalan	Estonian	Haitian Creole	Latvian	Myanmar (Burmese)	Samoan	Sundanese	Urdu
Amharic	Chichewa	Finnish	Hawaiian	Lithuanian	Nepali	Scots Gaelic	Swahili	Uyghur
Arabic	Chinese (Simplified)	French	Hebrew	Kannada	Luxembourgish	Norwegian	Serbian	Swedish
Azerbaijani	Chinese (Traditional)	Frisian	Hmong	Khmer	Malagasy	Pashto	Shona	Tamil
Basque	Corsican	Gaelic	Hungarian	Kinyarwanda	Malay	Persian	Sindhi	Tatar
Belarusian	Croatian	Georgian	Icelandic	Korean	Malayalam	Polish	Sinhala	Telugu
Bengali	Czech	German	Igbo	Kurdish (Kurmanji)	Maltese	Portuguese	Slovak	Thai
Bosnian	Danish	Greek	Indonesian	Kyrgyz	Maori	Punjabi	Slovenian	Turkish
	Dutch	Gujarati	Irish	Lao	Marathi	Romanian	Somali	Turkmen

www.arlingtonwa.gov

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Select Language

 Government	Departments	Doing Business	Living	Visiting	How Do I...
<ul style="list-style-type: none"> <li>204th St NE / 74th Ave Intersection Improvement Project</li> <li>74th Ave Trail Project</li> <li>Gleneagle Reservoir Roof Replacement Project</li> <li>Prairie Creek / BNSF Culvert Replacement</li> <li>Smokey Point Blvd Corridor Project</li> <li>Smokey Point Blvd Overlay Project</li> <li>South Cascade Industrial Center Utilities Project</li> <li>SR 530 - 59th &amp; 211th Roundabouts</li> <li>SR-530/Smokey Point Blvd Roundabout</li> <li>SR 531 (172nd St NE)/40th Ave Intersection</li> <li>SR 531 Widening Project</li> <li>Stormwater Wetland Park Maintenance Projects</li> <li>Water Reclamation Facility Modifications</li> </ul>	<p>The City of Arlington will be constructing the first phase of a new two-lane road, 173<sup>rd</sup> St NE. While the planned 173<sup>rd</sup> St alignment will eventually extend between Smokey Point Blvd and Airport Blvd, this first phase will extend from Smokey Point Blvd to 40<sup>th</sup> Ave.</p> <p>This roadway will include a 12-foot wide multi-use path, street lighting, landscaping, low-impact drainage and a privacy and sound fence along the north side of the roadway.</p> <p><b>Project Benefits</b></p> <ul style="list-style-type: none"> <li>• Improve access</li> <li>• Alleviate congestion on 172<sup>nd</sup></li> <li>• Increase Pedestrian Safety</li> <li>• Boost vehicle safety</li> </ul> <p><b>Project Cost and Funding</b></p> <ul style="list-style-type: none"> <li>• Engineer's Estimate: \$2,351,700.00</li> <li>• Funding source: Transportation Improvement Funds</li> </ul> <p><b>Project Schedule</b></p> <ul style="list-style-type: none"> <li>• Design 2020/2021</li> <li>• Estimated bid time: spring 2021</li> <li>• Construction: Fall 2021</li> </ul> <p><b>FAQ's</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Project FAQ Sheet</a></li> </ul> <p><b>Coordination with Local Residents</b></p>		<p><b>Project Documents</b></p> <ul style="list-style-type: none"> <li>• <a href="#">Project Conceptual Plan</a></li> <li>• <a href="#">Fence Alternative Memo</a></li> <li>• <a href="#">Open House Presentation</a></li> <li>• <a href="#">Preliminary Bid Tab</a></li> <li>• <a href="#">Certified Bid Tab</a></li> </ul> <p>To translate documents, download the document then click the link: <a href="https://translate.google.com/">https://translate.google.com/</a></p> <p><b>Project Updates</b></p>		

**MEMORANDUM**

2707 Colby Avenue, Suite 900, Everett, WA 98201 | P 425.252.7700

To: Jim Kelly, PE  
 City of Arlington  
 Public Works Director

From: Dan Hansen, PE  
 Mike Hendrix, PE, PTOE  
 Jillian Backman, EIT

Date: October 1, 2021

Re: DRAFT Smokey Point Boulevard: 2040 Traffic Operations Analysis

**INTRODUCTION**

The City of Arlington has hired Perteet to design improvements along Smokey Point Boulevard from 174th Place NE to 200th Street NE. As part of this work, a traffic analysis is necessary to evaluate roadway sections, traffic control treatments, and intersection configuration to meet the city’s level of service (LOS) and safety requirements.

This memorandum documents the traffic volume development process for evaluation of the design year (2040) analysis volumes of the five study intersections. It also includes any assumptions or calculations that were made as part of the traffic analysis process. Further, these numbers are then applied to the intersection operations to determine average delay and level of service for each of these intersections. This work will be utilized to determine the final configuration of Smokey Point Boulevard. A level of service analysis of the recommended traffic control type was also conducted at five-year increments to determine the necessary build year to maintain city traffic network requirements.

**EXISTING CONDITIONS**

Within the project limits, five intersections will undergo a traffic analysis. Table 1 details the cross streets that intersect Smokey Point Boulevard within the project limits.

**Table 1. Study Intersections**

Cross Street	Speed Limit	Intersection Control	Functional Roadway Classification	
174th Place NE	25mph	Signal	Local roadway	
180th Street NE	25mph	Minor Street Stop Controlled	Local roadway	
183rd Place NE	25mph	Minor Street Stop Controlled	Local roadway	
188th Street NE	35mph	All-Way Stop Controlled	West of Smokey Point Boulevard	Local Roadway
			East of Smokey Point Boulevard	Urban Major Collector
200th Street NE	25mph	Minor Street Stop Controlled	Local Roadway	

## MEMORANDUM

## TRAFFIC VOLUMES ANALYSIS AND FORECAST

This project traffic analysis will conduct review of intersection configurations under the following two conditions:

- 2020 PM peak hour
- 2040 PM peak hour

## Existing Traffic Volumes and Data

The 2020 AM and PM peak hour volumes were established using collected turning movement count data. Due to COVID-19 related shutdowns, turning movement counts were not collected. Historical turning movement count data taken at 15-minute intervals were collected at the following cross streets of Smokey Point Boulevard:

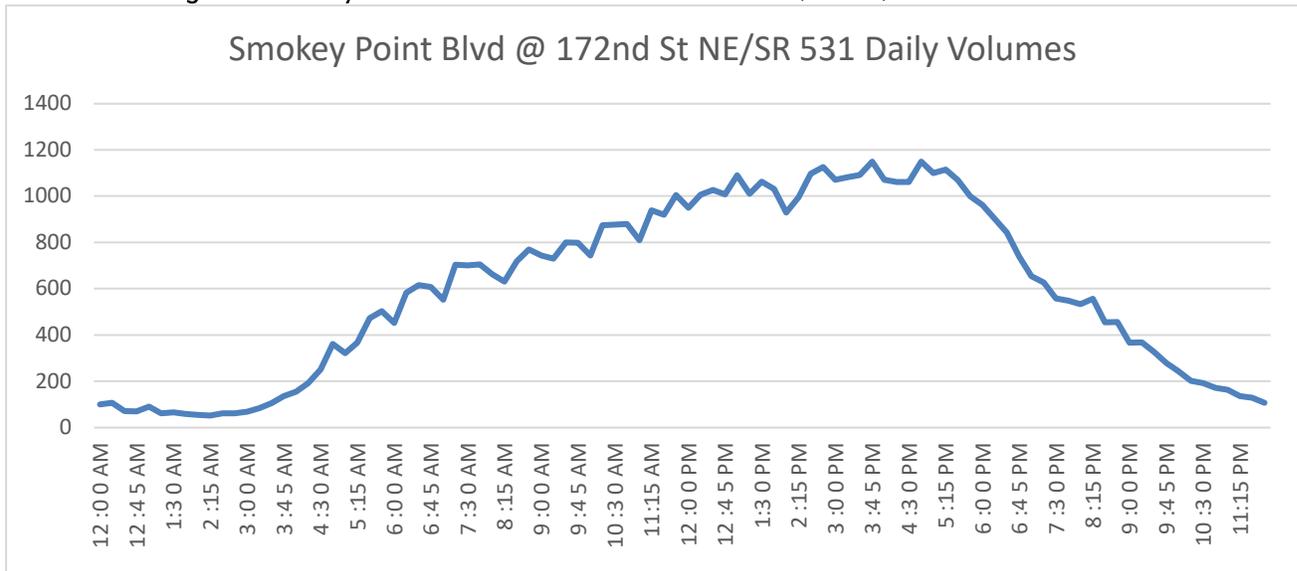
- 172nd Street NE (SR 531)
- Smokey Point Drive / 174th Place NE
- 35th Avenue NE
- 180th Street NE
- 186th Place NE
- 188th Street NE
- 200th Street NE

No historical traffic count data was available for the intersection of Smokey Point Boulevard NE and 183rd Place NE. Patterns of similar intersections, specifically at the 180th Street NE and 186th Place NE intersections, were used to approximate the 183rd Place NE turning movement counts. See Table 3 for assumptions for this approximation.

All of the counts were taken during PM peak hours except for Smokey Point Boulevard and 172nd Street NE (SR 531) where a 24-hour 15-minute interval count was conducted. This 24-hour count was used to evaluate the AM volumes compared to the daily volumes and PM peak volumes. The total volume of vehicles passing through this intersection at 15-minute intervals over the course of a day can be seen in Figure 1.

MEMORANDUM

Figure 1. Smokey Point Boulevard and 172nd Street NE (SR 531) 24-Hour Volumes



Often traffic analysis includes models of both the AM and PM peaks to account for the possible differences of traffic flow and turning movements during each peak. It was found from this 24-hour count, that there were not two independent peaks in the AM and PM hours at this location. Rather, there was a steady increase of volume through the morning and afternoon to the PM peak before volumes decreased again.

The AM peak hour is simply the highest volume counts within the AM hours, which in this case is the 11:00 AM to 12:00 PM hour. The PM peak hour was determined to be 3:00 PM to 4:00 PM. When comparing the directionality of traffic during each of these hours, it was determined the split between northbound and southbound approach volumes was similar when comparing these two peak hours. Some change in directionality was noted earlier in the AM hours, however the total intersection volumes at these times were considerably lower than the peak hours. This indicates an analysis of just the PM peak hour is sufficient when analyzing average delay and level of service of various types of intersection control. This additionally allows modeling to be based on historical turning movement counts during the PM peak hour rather than an approximation of hourly volumes based on a percentage of the daily traffic volumes.

The expected growth rate, included in Table 2, was then applied to the PM historic volumes to estimate anticipated 2020 turning movement counts without the impact of the COVID-19 pandemic related shutdowns.

### 2040 Traffic Volumes Forecast Methodology

The City of Arlington developed a traffic model in the 2017 Comprehensive Plan update. This model projected traffic volumes to 2035. The intersections of Smokey Point Boulevard and 174th Place NE, Smokey Point Boulevard and 188th Street NE, and Smokey Point Boulevard and 200th Street NE were included in the model. To obtain 2040 traffic volumes, the 2035 traffic volumes forecast was adjusted to account for the following:

- Regional growth percentage
- Arlington-Marysville Cascade Industrial Center (CIC)

MEMORANDUM

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- Transportation network modifications including:
  - Completion of 173rd Street NE to 43rd Avenue NE
  - Extension of 43rd Avenue NE to 180th Place NE allowing connections to Airport Boulevard
  - Extension of 180th Place NE to Airport Boulevard
  - Extension of 183rd Place NE to Airport Boulevard

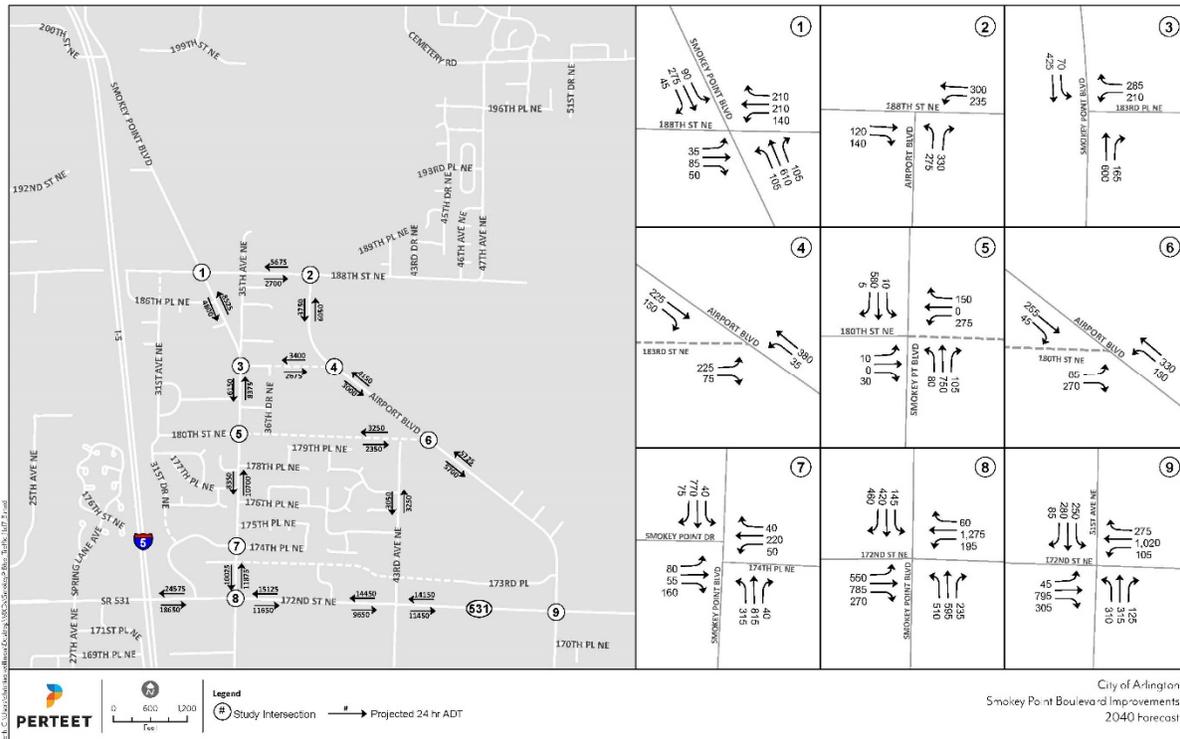
The Arlington-Marysville (CIC) Planned Action Environmental Impact Statement (EIS) released January 2021 also proposed adopting a Planned Action to amend the Comprehensive Plan. This resulted in an updated future land use map accounting for the preferred alternative from the Arlington CIC FEIS which included a blend of the Action Alternative 1 (population and number of dwelling units) and Alternative 2 (jobs). This land use map was then used to make adjustments and volume predictions for the remaining project intersections.

For future land uses on the new streets of 180th Place NE and 183rd Place NE between Smokey Point Boulevard and Airport Boulevard, the team applied the Institute of Transportation Engineers' *Trip Generation Manual* rates to determine the amount of trips added to the network. These rates were applied based on the land area zoned and in the impacted Traffic Analysis Zones (TAZ) as defined by the Puget Sound Regional Council.

The forecasting relied on existing traffic counts and the 2010 and 2040 travel demand models. Traffic counts collected prior to 2021 were grown at an average annual growth rate of 1 percent consistent with previous work completed in the area. Additionally, any existing traffic counts collected following the start of the COVID-19 pandemic were factored, as necessary, based on historic counts to account for changes in traffic volumes or travel patterns. Model volumes were post processed following standard procedures described by NCHRP 765 and represent the forecast 2040 conditions in the area. The turning movements derived from this effort are shown in Figure 2.

### MEMORANDUM

Figure 2. Projected 2040 Volumes and PM Peak Turning Movement Counts



Note that additional intersections are shown in the figure to show the distribution of trips through the local area for reference.

## TRAFFIC OPERATIONS ANALYSIS

Traffic operations were reviewed for the five intersections noted above for the 2040 PM peak hour to assist in determining what the intersection control and configuration should be to accommodate traffic volumes at an acceptable level of service. To determine the roadway section, a two-lane configuration was first analyzed with each form of intersection control to determine if the cross-section would meet the City’s LOS standards. This approach minimizes the potential to overbuild the corridor. Such widening could inflate project costs, increase negative community impacts through right-of-way acquisitions, and reduce flexibility for providing multi-modal facilities within the roadway section.

### Intersection Level of Service Analysis

To determine the treatment, an analysis of traffic control was reviewed. The following types of traffic control were analyzed using a two-lane configuration on Smokey Point Boulevard (SPB):

- Side street stop control (i.e. Smokey Point Boulevard would be free flowing)
- Traffic signal control
- Roundabout

### MEMORANDUM

Table 2 shows the level of service (LOS) results for side street stop control for each intersection, not including the signalized intersection of Smokey Point Boulevard and 174th Place NE. Note that the level of service (LOS) for stop controlled intersections is determined by the highest delay on an approach. LOS for traffic signal-controlled intersections and intersections with roundabouts are an average control delay for the entire intersection.

**Table 2. 2040 PM Peak Hour Stop Control Delay and LOS.**

SPB Intersection	Minor Street Control Delay (sec/veh)	LOS
180th Street NE	1,782.1	F
183rd Place NE	541.3	F
188th Street NE	4,178.7	F
200th Street NE	28.6	D

The intersections of 188th Street NE, 180th Street NE, and 183rd Place NE all operate at LOS F with substantial delays on the stop-controlled side streets. The intersection with 200th Street NE similarly shows some delay on the stop-controlled side streets but operates at an acceptable LOS during the PM peak.

Due to the high delays for the three of the four intersections, the traffic signal control option was reviewed. This was once again conducted using a two-lane configuration on Smokey Point Boulevard. These results are shown in Table 3 below.

**Table 3. 2040 PM Peak Hour Traffic Signal Control Delays and LOS.**

SPB Intersection	Average Control Delay (sec/veh)	LOS
174th Street NE	52.5	D
180th Street NE	31.3	C
183rd Place NE	20.3	C
188th Street NE	26.3	C
200th Street NE	7.1	A

This analysis shows signaling each intersection north of 174th Place NE improves overall performance of the corridor compared to maintaining the existing two-way stop-controlled condition. Additionally, the existing signal at SMP and 174th Place NE continues to meet city level of service requirements through 2040 and a change in traffic control of this intersection is not warranted.

The intersection of SPB and 200th Street NE will operate at LOS A in the signalized two-lane SPB configuration. However, prior to installing a signal at 200th Street and SPB, a signal warrant analysis should be conducted. Based on projected volumes in 2040, the approach volumes on 200th Street would be roughly 150 vehicles. Of these, 104 vehicles are expected to turn right and head southbound. A traffic signal would be helpful for this movement but would add delay to through traffic and not necessarily reduce the delay for right turning traffic to compensate for the additional mainline delay. As such, a traffic signal is not considered an appropriate traffic control treatment for capacity reasons.

MEMORANDUM

Finally, a roundabout analysis was conducted to determine the impacts on delay. Due to the high westbound right turn movements projected at the intersection of SPB and 188th Street NE, two roundabout configurations were evaluated: a standard single lane roundabout, and a single lane roundabout with a westbound slip lane for right turning traffic (i.e. westbound to northbound). The results of this analysis are shown in Table 4.

**Table 4. 2040 PM Peak Hour Roundabout Control Delays (second/vehicle) and LOS.**

Intersection	Slip Lane	Average Control Delay	LOS
180th Street NE	None	14.9	B
183rd Place NE	None	15.5	C
188th Street NE	None	63.9	E
	Westbound	13.5	B
200th Street NE	None	13.6	B

As shown in Table 4, the intersection of SPB and 188th Street will not meet the City’s LOS requirement with a single lane roundabout in 2040 based on projected traffic volumes. However, the installation of a westbound right-turn slip lane will reduce overall delays and result in operations at a LOS B, exceeding the City’s LOS requirement. A further analysis was conducted to determine when the slip lane would be warranted.

The intersection was modeled at five-year intervals: 2025, 2030, 2035, and 2040, to identify delay and LOS for each period. Turning movement volumes were assumed to grow linearly between 2020 and 2040 for this analysis.

Table 5 summarizes the level of service (LOS) for each of these conditions.

**Table 5. 5-Year Interval LOS Comparison for Roundabout Configuration at SPB and 188th Street NE**

Year	Single Lane Roundabout	Single Lane Roundabout with WB Slip Lane
2025	A	A
2030	A	A
2035	B	A
2040	E	B

Comparing the single lane roundabout options with and without a westbound slip lane, it is also apparent that a westbound slip lane will be needed by 2040, but a single lane roundabout without a slip lane would meet city LOS requirements until at least 2035. This indicates that a single lane roundabout could be constructed in 2025 with a westbound slip lane added at a future date.

The roundabout analysis, like the traffic signal control results, shows an acceptable level of LOS for all intersections with a single-lane roundabout with the exception of the intersection of 188th Street NE. For the intersection of SPB and 188th Street NE, a right-turn slip lane for westbound to northbound movements would be required to meet LOS requirements in 2040.

MEMORANDUM

Intersection Traffic Control

Determination of the appropriate intersection traffic control is dependent on a number of factors including safety, warrants, and intersection capacity. From the analysis conducted, it is evident that a two-lane SPB corridor would operate at or above LOS requirements and, thus, a four-lane SPB corridor would not to be necessary. Except for the intersection of SPB and 200th Street NE, the LOS calculation results show side street stop control for the remaining intersections would not meet the City’s LOS standard by the year 2040. Therefore, the choice of traffic control for the intersections south of 200th Street is limited to traffic signals or roundabouts.

Table 5 below summarizes the roundabout and traffic signal analysis for the two-lane SPB configuration.

Table 5. Comparison between Roundabout and Signal Control

Intersection	Roundabout			Traffic Signal	
	Slip Lane	Average Control Delay	LOS	Average Control Delay	LOS
180th Street NE	None	14.9	B	31.3	C
183rd Place NE	None	15.5	C	20.3	C
188th Street NE	None	63.9	E	26.3	C
	Westbound	13.5	B	-	-
200th Street NE	None	13.6	B	7.1	A

The roundabout control alternative results in less average delay per vehicle than traffic signal control with the exception of the 200th Street intersection. Even with the increased delay at the 200th Street intersection, the LOS still meets the City’s concurrency standard. Further, the use of roundabouts on the SPB corridor would produce additional benefits that conventional signals cannot accommodate easily. These include:

- Speed Control. A properly designed roundabout can control operating speeds on a corridor through a combination of horizontal curvature inherent to the roundabout design. Further, aesthetic treatments such as landscaping can prevent a driver seeing a line of green lights common to signal controlled corridors resulting in increased operating speeds.
- Reduced number and severity of collisions. Roundabouts are commonly used to reduce collisions. Due to their design, collisions at roundabouts are often restricted to rear-end and sideswipe style of collisions. As such, these types of collisions result in more property damage collisions compared to severe injury or fatal collisions. Traffic signals, by comparison, can have more severe injury collisions since there is no deflection to slow approaching vehicles which may violate a traffic signal indication.
- Reduced maintenance. Compared to a traffic signal, roundabouts do not have annual maintenance costs such as relamping. Emergency callouts for signal outages are also not required. The City does not have signal maintenance crews inhouse and utilizes Snohomish County forces for signal work. The use of roundabouts would allow in-house City maintenance crews to continue to maintain the infrastructure for lower costs.
- Aesthetics. Roundabouts provide a community the opportunity to add landscaping or other treatments to soften the appearance of roadway infrastructure.

These benefits and LOS results indicate roundabouts would be the most appropriate traffic control option for the corridor.

## MEMORANDUM

**Opening Year Operations**

Once the recommended final build recommendation was determined, an analysis was conducted to determine the year of opening conditions for the single-lane roundabout configuration.

Turning movement volumes were assumed to grow linearly between 2020 and 2040. The assumed opening year is projected to be 2025.

Table 6 summarizes the results of the analysis for the intersections of SPB with 180th Street NE, 183rd Place NE, and 188th Street NE.

**Table 6. Year of Opening (2025) LOS Summary**

SPB Intersection	LOS
180th Street NE	A
183rd Place NE	A
188th Street NE	A

Thus, the 180th Street NE, 183rd Place NE and 188th Street NE intersections still are within the City's level of service requirements by 2025 with the proposed improvements.

**CONCLUSIONS AND RECOMMENDATIONS**

The following are the conclusions and recommendations based on the traffic analysis.

1. A two-lane configuration on Smokey Point Boulevard between 174th Place NE and 200th Street NE would be sufficient for the projected 2040 traffic volumes to meet City concurrency standards. A four-lane configuration is not warranted based on 2040 projected traffic volumes.
2. Single-lane roundabouts at the major intersections of SPB with 180th Street NE, 183rd Place NE, and 188th Street NE are recommended. This would allow for minimal delay and maintain safety. A westbound slip lane addition to the roundabout at 188th Street NE would be warranted by 2040.

# EXHIBIT H

APPENDIX

Synchro and Sidra Worksheets

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# EXHIBIT H

## Lanes, Volumes, Timings 24: Smokey Point Blvd & Smokey Point Dr

10/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕↔		↗	↕↔	
Traffic Volume (vph)	58	0	96	10	0	6	131	791	23	2	549	46
Future Volume (vph)	58	0	96	10	0	6	131	791	23	2	549	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		0	200		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.916			0.952			0.996			0.988	
Flt Protected		0.982			0.969		0.950			0.950		
Satd. Flow (prot)	0	1628	0	0	1753	0	1770	3525	0	1752	3463	0
Flt Permitted		0.982			0.969		0.409			0.307		
Satd. Flow (perm)	0	1628	0	0	1753	0	762	3525	0	566	3463	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		101			91			5			14	
Link Speed (mph)		25			25			40			40	
Link Distance (ft)		383			497			851			227	
Travel Time (s)		10.4			13.6			14.5			3.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	2%	2%	2%	3%	3%	3%
Adj. Flow (vph)	61	0	101	11	0	6	138	833	24	2	578	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	162	0	0	17	0	138	857	0	2	626	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		-12			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA		custom	NA		Perm	NA		Perm	NA	
Protected Phases	4	4		8	8			2			6	

## Lanes, Volumes, Timings 24: Smokey Point Blvd & Smokey Point Dr

10/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
<b>Switch Phase</b>												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
<b>Lead/Lag</b>												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		8.2			5.5		44.6	44.6		44.6	44.6	
Actuated g/C Ratio		0.14			0.09		0.74	0.74		0.74	0.74	
v/c Ratio		0.52			0.07		0.24	0.33		0.00	0.24	
Control Delay		16.4			0.6		6.8	5.0		5.5	4.5	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		16.4			0.6		6.8	5.0		5.5	4.5	
LOS		B			A		A	A		A	A	
Approach Delay		16.4			0.6			5.2			4.5	
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		20			0		11	40		0	26	
Queue Length 95th (ft)		62			0		66	141		3	97	
Internal Link Dist (ft)		303			417			771			147	
Turn Bay Length (ft)							200			200		
Base Capacity (vph)		508			534		566	2619		420	2575	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.32			0.03		0.24	0.33		0.00	0.24	

Intersection Summary	
Area Type:	Other
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.52
Intersection Signal Delay:	5.9
Intersection LOS:	A
Intersection Capacity Utilization:	45.5%
ICU Level of Service:	A
Analysis Period (min):	15

## Lanes, Volumes, Timings

### 24: Smokey Point Blvd & Smokey Point Dr

10/01/2021

Splits and Phases: 24: Smokey Point Blvd & Smokey Point Dr

Ø2 (R) 20 s	Ø4 20 s	Ø8 20 s
Ø6 (R) 20 s		

HCM 6th TWSC  
107: Smokey Point Blvd & 180th St NE

10/01/2021

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T	T	
Traffic Vol, veh/h	11	30	29	614	472	7
Future Vol, veh/h	11	30	29	614	472	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	33	32	667	513	8

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1248	517	521	0	-	0
Stage 1	517	-	-	-	-	-
Stage 2	731	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	191	558	1045	-	-	-
Stage 1	598	-	-	-	-	-
Stage 2	476	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	182	558	1045	-	-	-
Mov Cap-2 Maneuver	182	-	-	-	-	-
Stage 1	569	-	-	-	-	-
Stage 2	476	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.4	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1045	-	359	-	-
HCM Lane V/C Ratio	0.03	-	0.124	-	-
HCM Control Delay (s)	8.6	0	16.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

HCM 6th TWSC  
110: Smokey Point Blvd & 183th PI NE

10/01/2021

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	T		T			T
Traffic Vol, veh/h	5	3	604	8	6	458
Future Vol, veh/h	5	3	604	8	6	458
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	3	657	9	7	498

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1174	662	0	0	666
Stage 1	662	-	-	-	-
Stage 2	512	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	212	462	-	-	923
Stage 1	513	-	-	-	-
Stage 2	602	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	210	462	-	-	923
Mov Cap-2 Maneuver	210	-	-	-	-
Stage 1	513	-	-	-	-
Stage 2	596	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	19.1	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	264	923
HCM Lane V/C Ratio	-	-	0.033	0.007
HCM Control Delay (s)	-	-	19.1	8.9
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.1	0

## HCM 6th TWSC

### 16: Smokey Point Blvd/Smokey Pt Blvd & 188th St

10/01/2021

Intersection												
Int Delay, s/veh	13.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	8	7	23	174	5	49	20	291	209	41	202	7
Future Vol, veh/h	8	7	23	174	5	49	20	291	209	41	202	7
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	9	9	9	4	4	4	2	2	2	0	0	0
Mvmt Flow	9	8	25	191	5	54	22	320	230	45	222	8

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	825	910	226	812	799	435	230	0	0	550	0	0
Stage 1	316	316	-	479	479	-	-	-	-	-	-	-
Stage 2	509	594	-	333	320	-	-	-	-	-	-	-
Critical Hdwy	7.19	6.59	6.29	7.14	6.54	6.24	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.19	5.59	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.19	5.59	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.581	4.081	3.381	3.536	4.036	3.336	2.218	-	-	2.2	-	-
Pot Cap-1 Maneuver	284	267	796	295	316	617	1338	-	-	1030	-	-
Stage 1	680	643	-	564	552	-	-	-	-	-	-	-
Stage 2	534	482	-	676	649	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	241	247	796	263	293	617	1338	-	-	1030	-	-
Mov Cap-2 Maneuver	241	247	-	263	293	-	-	-	-	-	-	-
Stage 1	663	611	-	550	538	-	-	-	-	-	-	-
Stage 2	470	470	-	614	617	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.5		56.1		0.3		1.4	
HCM LOS	B		F					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1338	-	-	420	301	1030	-	-
HCM Lane V/C Ratio	0.016	-	-	0.099	0.832	0.044	-	-
HCM Control Delay (s)	7.7	0	-	14.5	56.1	8.7	0	-
HCM Lane LOS	A	A	-	B	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	7	0.1	-	-

HCM 6th TWSC  
27: 200th St & Smokey Point Blvd

10/01/2021

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔		
Traffic Vol, veh/h	23	28	30	269	184	40
Future Vol, veh/h	23	28	30	269	184	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	3	3	5	5
Mvmt Flow	25	30	33	292	200	43

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	580	222	243	0	0
Stage 1	222	-	-	-	-
Stage 2	358	-	-	-	-
Critical Hdwy	6.42	6.22	4.13	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.227	-	-
Pot Cap-1 Maneuver	477	818	1317	-	-
Stage 1	815	-	-	-	-
Stage 2	707	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	463	818	1317	-	-
Mov Cap-2 Maneuver	463	-	-	-	-
Stage 1	791	-	-	-	-
Stage 2	707	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1317	-	608	-	-
HCM Lane V/C Ratio	0.025	-	0.091	-	-
HCM Control Delay (s)	7.8	0	11.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

## HCM 6th TWSC 109: Smokey Point Blvd & 180th St NE

10/01/2021

Intersection												
Int Delay, s/veh	381.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	10	0	30	275	0	150	80	750	105	10	580	5
Future Vol, veh/h	10	0	30	275	0	150	80	750	105	10	580	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	3	3	3	0	0	0	3	3	3	1	1	1
Mvmt Flow	11	0	32	289	0	158	84	789	111	11	611	5

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1728	1704	614	1665	1651	845	616	0	0	900	0	0
Stage 1	636	636	-	1013	1013	-	-	-	-	-	-	-
Stage 2	1092	1068	-	652	638	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.1	6.5	6.2	4.13	-	-	4.11	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.5	4	3.3	2.227	-	-	2.209	-	-
Pot Cap-1 Maneuver	69	91	490	~ 78	100	366	959	-	-	759	-	-
Stage 1	464	470	-	291	319	-	-	-	-	-	-	-
Stage 2	259	297	-	460	474	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	36	82	490	~ 67	90	366	959	-	-	759	-	-
Mov Cap-2 Maneuver	36	82	-	~ 67	90	-	-	-	-	-	-	-
Stage 1	423	463	-	~ 265	291	-	-	-	-	-	-	-
Stage 2	134	271	-	424	467	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	51.5	\$ 1782.1	0.8	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	959	-	-	118	94	759	-	-
HCM Lane V/C Ratio	0.088	-	-	0.357	4.759	0.014	-	-
HCM Control Delay (s)	9.1	-	-	51.	\$ 1782.1	9.8	-	-
HCM Lane LOS	A	-	-	F	F	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	1.4	47.7	0	-	-

**Notes**  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 6th TWSC  
111: Smokey Point Blvd & 183rd PI NE

10/01/2021

Intersection						
Int Delay, s/veh	153.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	T		T		T	T
Traffic Vol, veh/h	210	285	600	165	70	425
Future Vol, veh/h	210	285	600	165	70	425
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	221	300	632	174	74	447

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1314	719	0	0	806
Stage 1	719	-	-	-	-
Stage 2	595	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	~ 174	428	-	-	819
Stage 1	483	-	-	-	-
Stage 2	551	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 158	428	-	-	819
Mov Cap-2 Maneuver	~ 158	-	-	-	-
Stage 1	483	-	-	-	-
Stage 2	501	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	541.3	0	1.4
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	248	819
HCM Lane V/C Ratio	-	-	2.101	0.09
HCM Control Delay (s)	-	-	541.3	9.8
HCM Lane LOS	-	-	F	A
HCM 95th %tile Q(veh)	-	-	39.1	0.3

**Notes**  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

## HCM 6th TWSC

### 16: Smokey Point Blvd/Smokey Pt Blvd & 188th St

10/01/2021

Intersection												
Int Delay, s/veh	1194.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	35	85	50	140	210	210	105	610	105	90	275	45
Future Vol, veh/h	35	85	50	140	210	210	105	610	105	90	275	45
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	4	4	4	3	3	3	2	2	2	1	1	1
Mvmt Flow	37	89	53	147	221	221	111	642	111	95	289	47

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1644	1478	313	1494	1446	698	336	0	0	753	0	0
Stage 1	503	503	-	920	920	-	-	-	-	-	-	-
Stage 2	1141	975	-	574	526	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.13	6.53	6.23	4.12	-	-	4.11	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.527	4.027	3.327	2.218	-	-	2.209	-	-
Pot Cap-1 Maneuver	79	125	723	~ 101	~ 131	439	1223	-	-	861	-	-
Stage 1	547	538	-	323	348	-	-	-	-	-	-	-
Stage 2	242	327	-	502	527	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	-	101	723	~ 20	~ 106	439	1223	-	-	861	-	-
Mov Cap-2 Maneuver	-	101	-	~ 20	~ 106	-	-	-	-	-	-	-
Stage 1	497	479	-	294	316	-	-	-	-	-	-	-
Stage 2	~ 33	297	-	337	469	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s		\$ 4178.7	1.1	2.1
HCM LOS	-	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1223	-	-	-	59	861	-
HCM Lane V/C Ratio	0.09	-	-	-	9.991	0.11	-
HCM Control Delay (s)	8.2	-	-	-	\$ 4178.7	9.7	-
HCM Lane LOS	A	-	-	-	F	A	-
HCM 95th %tile Q(veh)	0.3	-	-	-	69.5	0.4	-

**Notes**  
 ~: Volume exceeds capacity    \$: Delay exceeds 300s    +: Computation Not Defined    \*: All major volume in platoon

HCM 6th TWSC  
27: 200th St & Smokey Point Blvd

10/01/2021

Intersection						
Int Delay, s/veh	2.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	37	104	2	969	487	90
Future Vol, veh/h	37	104	2	969	487	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	39	109	2	1020	513	95

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	1537	513	608	0	-	0
Stage 1	513	-	-	-	-	-
Stage 2	1024	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	128	561	970	-	-	-
Stage 1	601	-	-	-	-	-
Stage 2	347	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	128	561	970	-	-	-
Mov Cap-2 Maneuver	128	-	-	-	-	-
Stage 1	600	-	-	-	-	-
Stage 2	347	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	28.6	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	970	-	297	-	-
HCM Lane V/C Ratio	0.002	-	0.5	-	-
HCM Control Delay (s)	8.7	-	28.6	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	2.6	-	-

## Lanes, Volumes, Timings 24: Smokey Point Blvd & Smokey Point Dr

10/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (vph)	80	55	160	50	220	40	315	815	40	40	770	75
Future Volume (vph)	80	55	160	50	220	40	315	815	40	40	770	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	200		0	200		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.927			0.983			0.993			0.987	
Flt Protected		0.987			0.992		0.950			0.950		
Satd. Flow (prot)	0	1704	0	0	1816	0	1770	3514	0	1770	3493	0
Flt Permitted		0.987			0.992		0.254			0.250		
Satd. Flow (perm)	0	1704	0	0	1816	0	473	3514	0	466	3493	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		51			6			8			17	
Link Speed (mph)		25			25			35			35	
Link Distance (ft)		383			497			851			227	
Travel Time (s)		10.4			13.6			16.6			4.4	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	58	168	53	232	42	332	858	42	42	811	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	310	0	0	327	0	332	900	0	42	890	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		-12			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	custom	NA		custom	NA		Perm	NA		Perm	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases	4			8			2			6		

## Lanes, Volumes, Timings 24: Smokey Point Blvd & Smokey Point Dr

10/01/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	20.0	20.0		20.0	20.0		60.0	60.0		60.0	60.0	
Total Split (%)	20.0%	20.0%		20.0%	20.0%		60.0%	60.0%		60.0%	60.0%	
Maximum Green (s)	16.0	16.0		16.0	16.0		56.0	56.0		56.0	56.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)		0.0			0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		16.0			16.0		56.0	56.0		56.0	56.0	
Actuated g/C Ratio		0.16			0.16		0.56	0.56		0.56	0.56	
v/c Ratio		0.98			1.11		1.26	0.46		0.16	0.45	
Control Delay		83.5			124.4		167.3	13.8		12.7	13.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		83.5			124.4		167.3	13.8		12.7	13.6	
LOS		F			F		F	B		B	B	
Approach Delay		83.5			124.4			55.2			13.6	
Approach LOS		F			F			E			B	
Queue Length 50th (ft)		169			~236		~266	166		12	162	
Queue Length 95th (ft)		#345			#411		#438	213		32	209	
Internal Link Dist (ft)		303			417			771			147	
Turn Bay Length (ft)							200			200		
Base Capacity (vph)		315			295		264	1971		260	1963	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.98			1.11		1.26	0.46		0.16	0.45	

### Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.26
Intersection Signal Delay:	52.5
Intersection LOS:	D
Intersection Capacity Utilization:	79.5%
ICU Level of Service:	D
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

## Lanes, Volumes, Timings

### 24: Smokey Point Blvd & Smokey Point Dr

10/01/2021

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 24: Smokey Point Blvd & Smokey Point Dr

 60 s	 20 s	 20 s
 60 s		

## HCM 6th Signalized Intersection Capacity Analysis 109: Smokey Point Blvd & 180th St NE

10/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	30	275	0	150	80	750	105	10	580	5
Future Volume (veh/h)	10	0	30	275	0	150	80	750	105	10	580	5
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1856	1856	1856	1900	1900	1900	1856	1856	1856	1885	1885	1885
Adj Flow Rate, veh/h	11	0	32	289	0	158	84	789	111	11	611	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	0	0	0	3	3	3	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	133	0	88	272	0	199	107	1078	152	19	1172	10
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
Prop Arrive On Green	0.01	0.00	0.06	0.08	0.00	0.12	0.06	0.68	0.68	0.01	0.63	0.63
Unsig. Movement Delay												
Ln Grp Delay, s/veh	34.6	0.0	43.4	112.4	0.0	45.4	61.3	0.0	13.1	66.3	0.0	10.8
Ln Grp LOS	C	A	D	F	A	D	E	A	B	E	A	B
Approach Vol, veh/h		43			447			984			627	
Approach Delay, s/veh		41.2			88.7			17.3			11.7	
Approach LOS		D			F			B			B	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	7	8			
Case No		2.0	4.0	1.1	4.0	2.0	4.0	1.1	4.0			
Phs Duration (G+Y+Rc), s		5.0	65.0	11.0	9.1	9.5	60.5	5.0	15.1			
Change Period (Y+Rc), s		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Max Green (Gmax), s		4.0	47.0	7.0	16.0	7.0	44.0	4.0	19.0			
Max Allow Headway (MAH), s		3.7	5.0	3.8	5.6	3.7	5.0	3.8	5.6			
Max Q Clear (g_c+I1), s		2.5	30.5	9.0	3.8	6.2	18.3	2.5	10.6			
Green Ext Time (g_e), s		0.0	6.1	0.0	0.1	0.0	4.1	0.0	0.5			
Prob of Phs Call (p_c)		0.24	1.00	1.00	0.99	0.88	1.00	0.24	1.00			
Prob of Max Out (p_x)		1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.23			
<b>Left-Turn Movement Data</b>												
Assigned Mvmt		1		3		5		7				
Mvmt Sat Flow, veh/h		1795		1810		1767		1767				
<b>Through Movement Data</b>												
Assigned Mvmt			2		4		6		8			
Mvmt Sat Flow, veh/h			1591		0		1867		0			
<b>Right-Turn Movement Data</b>												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			224		1572		15		1610			
<b>Left Lane Group Data</b>												
Assigned Mvmt		1	0	3	0	5	0	7	0			
Lane Assignment		L (Prot)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)				

## HCM 6th Signalized Intersection Capacity Analysis 109: Smokey Point Blvd & 180th St NE

10/01/2021

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	11	0	289	0	84	0	11	0
Grp Sat Flow (s), veh/h/ln	1795	0	1810	0	1767	0	1767	0
Q Serve Time (g_s), s	0.5	0.0	7.0	0.0	4.2	0.0	0.5	0.0
Cycle Q Clear Time (g_c), s	0.5	0.0	7.0	0.0	4.2	0.0	0.5	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	1399	0	0	0	1219	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	5.1	0.0	0.0	0.0	11.1	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	3.3	0.0	0.0	0.0	2.5	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	3.3	0.0	0.0	0.0	0.1	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	19	0	272	0	107	0	133	0
V/C Ratio (X)	0.57	0.00	1.06	0.00	0.78	0.00	0.08	0.00
Avail Cap (c_a), veh/h	80	0	272	0	137	0	193	0
Upstream Filter (I)	0.90	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	44.3	0.0	40.3	0.0	41.7	0.0	34.4	0.0
Incr Delay (d2), s/veh	22.0	0.0	72.1	0.0	19.6	0.0	0.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	66.3	0.0	112.4	0.0	61.3	0.0	34.6	0.0
1st-Term Q (Q1), veh/ln	0.2	0.0	6.0	0.0	1.8	0.0	0.2	0.0
2nd-Term Q (Q2), veh/ln	0.1	0.0	5.4	0.0	0.6	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.4	0.0	11.5	0.0	2.4	0.0	0.2	0.0
%ile Storage Ratio (RQ%)	0.06	0.00	1.15	0.00	0.40	0.00	0.06	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	0	4	0	6	0	8
<b>Lane Assignment</b>								
Lanes in Grp	0	0	0	0	0	0	0	0
Grp Vol (v), veh/h	0	0	0	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	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
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

## HCM 6th Signalized Intersection Capacity Analysis 109: Smokey Point Blvd & 180th St NE

10/01/2021

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		T+R		T+R		T+R		T+R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	900	0	32	0	616	0	158
Grp Sat Flow (s), veh/h/ln	0	1815	0	1572	0	1882	0	1610
Q Serve Time (g_s), s	0.0	28.5	0.0	1.8	0.0	16.3	0.0	8.6
Cycle Q Clear Time (g_c), s	0.0	28.5	0.0	1.8	0.0	16.3	0.0	8.6
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.12	0.00	1.00	0.00	0.01	0.00	1.00
Lane Grp Cap (c), veh/h	0	1230	0	88	0	1181	0	199
V/C Ratio (X)	0.00	0.73	0.00	0.36	0.00	0.52	0.00	0.80
Avail Cap (c_a), veh/h	0	1230	0	280	0	1181	0	340
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.90	0.00	1.00
Uniform Delay (d1), s/veh	0.0	9.3	0.0	40.9	0.0	9.3	0.0	38.4
Incr Delay (d2), s/veh	0.0	3.9	0.0	2.5	0.0	1.5	0.0	7.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	13.1	0.0	43.4	0.0	10.8	0.0	45.4
1st-Term Q (Q1), veh/ln	0.0	8.5	0.0	0.7	0.0	5.5	0.0	3.3
2nd-Term Q (Q2), veh/ln	0.0	1.3	0.0	0.1	0.0	0.5	0.0	0.4
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	9.8	0.0	0.7	0.0	6.0	0.0	3.7
%ile Storage Ratio (RQ%)	0.00	0.16	0.00	0.03	0.00	0.14	0.00	0.14
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Intersection Summary

HCM 6th Ctrl Delay	31.3
HCM 6th LOS	C

## HCM 6th Signalized Intersection Capacity Analysis 111: Smokey Point Blvd & 183rd PI NE

10/01/2021

									
Movement	WBL	WBR	NBT	NBR	SBL	SBT			
Lane Configurations									
Traffic Volume (veh/h)	210	285	600	165	70	425			
Future Volume (veh/h)	210	285	600	165	70	425			
Number	3	18	2	12	1	6			
Initial Q, veh	0	0	0	0	0	0			
Ped-Bike Adj (A_pbT)	1.00	1.00		1.00	1.00				
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No		No			No			
Lanes Open During Work Zone									
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	221	300	632	174	74	447			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	2	2	2	2	2	2			
Opposing Right Turn Influence	Yes				Yes				
Cap, veh/h	400	356	738	203	94	1201			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00			
Prop Arrive On Green	0.22	0.22	0.52	0.52	0.05	0.64			
Unsig. Movement Delay									
Ln Grp Delay, s/veh	21.8	34.8	0.0	19.6	51.5	5.9			
Ln Grp LOS	C	C	A	B	D	A			
Approach Vol, veh/h	521		806			521			
Approach Delay, s/veh	29.3		19.6			12.4			
Approach LOS	C		B			B			
Timer:		1	2	3	4	5	6	7	8
Assigned Phs		1	2	8			6		
Case No		2.0	8.0	9.0			4.0		
Phs Duration (G+Y+Rc), s		7.2	35.4	17.5			42.5		
Change Period (Y+Rc), s		4.0	4.0	4.0			4.0		
Max Green (Gmax), s		4.0	28.0	16.0			36.0		
Max Allow Headway (MAH), s		3.7	5.1	4.0			5.0		
Max Q Clear (g_c+I1), s		4.5	25.2	12.9			8.7		
Green Ext Time (g_e), s		0.0	1.4	0.6			2.7		
Prob of Phs Call (p_c)		0.71	1.00	1.00			1.00		
Prob of Max Out (p_x)		1.00	0.00	1.00			0.00		
Left-Turn Movement Data									
Assigned Mvmt		1	5	3					
Mvmt Sat Flow, veh/h		1781	0	1781					
Through Movement Data									
Assigned Mvmt			2	8			6		
Mvmt Sat Flow, veh/h			1412	0			1870		
Right-Turn Movement Data									
Assigned Mvmt			12	18			16		
Mvmt Sat Flow, veh/h			389	1585			0		
Left Lane Group Data									
Assigned Mvmt		1	5	3	0	0	0	0	0
Lane Assignment		L (Prot)		L					

## HCM 6th Signalized Intersection Capacity Analysis 111: Smokey Point Blvd & 183rd PI NE

10/01/2021

Lanes in Grp	1	0	1	0	0	0	0	0
Grp Vol (v), veh/h	74	0	221	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	1781	0	1781	0	0	0	0	0
Q Serve Time (g_s), s	2.5	0.0	6.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	2.5	0.0	6.6	0.0	0.0	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	1781	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	31.4	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	94	0	400	0	0	0	0	0
V/C Ratio (X)	0.79	0.00	0.55	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	119	0	475	0	0	0	0	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	28.1	0.0	20.6	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	23.4	0.0	1.2	0.0	0.0	0.0	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
Control Delay (d), s/veh	51.5	0.0	21.8	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	1.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.1	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
%ile Back of Q (50%), veh/ln	1.6	0.0	2.7	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.27	0.00	0.18	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	8	0	0	6	0	0
Lane Assignment	T							
Lanes in Grp	0	0	0	0	0	1	0	0
Grp Vol (v), veh/h	0	0	0	0	0	447	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	1870	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0
Lane Grp Cap (c), veh/h	0	0	0	0	0	1201	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	1201	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.9	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
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0

## HCM 6th Signalized Intersection Capacity Analysis 111: Smokey Point Blvd & 183rd PI NE

10/01/2021

3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	1.8	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Right Lane Group Data

Assigned Mvmt	0	12	18	0	0	16	0	0
Lane Assignment		T+R	R					
Lanes in Grp	0	1	1	0	0	0	0	0
Grp Vol (v), veh/h	0	806	300	0	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	1800	1585	0	0	0	0	0
Q Serve Time (g_s), s	0.0	23.2	10.9	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	23.2	10.9	0.0	0.0	0.0	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.22	1.00	0.00	0.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	941	356	0	0	0	0	0
V/C Ratio (X)	0.00	0.86	0.84	0.00	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	941	423	0	0	0	0	0
Upstream Filter (I)	0.00	0.70	1.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	12.4	22.2	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	7.2	12.5	0.0	0.0	0.0	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
Control Delay (d), s/veh	0.0	19.6	34.8	0.0	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	6.7	3.7	0.0	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	1.9	1.2	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	8.6	5.0	0.0	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.20	1.26	0.00	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Intersection Summary

HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C

## HCM 6th Signalized Intersection Capacity Analysis 16: Smokey Point Blvd/Smokey Pt Blvd & 188th St

10/01/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	85	50	140	210	210	105	610	105	90	275	45
Future Volume (veh/h)	35	85	50	140	210	210	105	610	105	90	275	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	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	
Lanes Open During Work Zone												
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	37	89	53	147	221	221	111	642	111	95	289	47
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	4	4	4	3	3	3	2	2	2	1	1	1
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	194	151	90	267	305	363	142	819	142	120	813	132
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
Prop Arrive On Green	0.03	0.14	0.14	0.05	0.16	0.16	0.08	0.53	0.53	0.07	0.51	0.51
Unsig. Movement Delay												
Ln Grp Delay, s/veh	25.9	0.0	32.6	30.8	34.4	27.5	42.7	0.0	20.7	64.2	0.0	11.9
Ln Grp LOS	C	A	C	C	C	C	D	A	C	E	A	B
Approach Vol, veh/h		179			589			864			431	
Approach Delay, s/veh		31.2			30.9			23.5			23.4	
Approach LOS		C			C			C			C	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		1	2	3	4	5	6	7	8			
Case No		2.0	4.0	1.1	4.0	2.0	4.0	1.1	3.0			
Phs Duration (G+Y+Rc), s		9.0	43.5	8.0	14.5	10.0	42.5	6.1	16.3			
Change Period (Y+Rc), s		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0			
Max Green (Gmax), s		5.0	34.0	4.0	16.0	10.0	29.0	4.0	16.0			
Max Allow Headway (MAH), s		3.7	5.1	3.8	5.4	3.7	5.0	3.8	4.7			
Max Q Clear (g_c+I1), s		5.9	27.0	6.0	7.8	6.6	10.2	3.3	11.4			
Green Ext Time (g_e), s		0.0	2.8	0.0	0.4	0.1	1.8	0.0	0.9			
Prob of Phs Call (p_c)		0.86	1.00	0.95	1.00	0.90	1.00	0.54	1.00			
Prob of Max Out (p_x)		1.00	0.00	1.00	0.19	1.00	0.00	1.00	1.00			
<b>Left-Turn Movement Data</b>												
Assigned Mvmt		1		3		5		7				
Mvmt Sat Flow, veh/h		1795		1767		1781		1753				
<b>Through Movement Data</b>												
Assigned Mvmt			2		4		6		8			
Mvmt Sat Flow, veh/h			1553		1081		1582		1856			
<b>Right-Turn Movement Data</b>												
Assigned Mvmt			12		14		16		18			
Mvmt Sat Flow, veh/h			269		644		257		1572			
<b>Left Lane Group Data</b>												
Assigned Mvmt		1	0	3	0	5	0	7	0			
Lane Assignment		L (Prot)		L (Pr/Pm)		L (Prot)		L (Pr/Pm)				

## HCM 6th Signalized Intersection Capacity Analysis 16: Smokey Point Blvd/Smokey Pt Blvd & 188th St

10/01/2021

Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	95	0	147	0	111	0	37	0
Grp Sat Flow (s), veh/h/ln	1795	0	1767	0	1781	0	1753	0
Q Serve Time (g_s), s	3.9	0.0	4.0	0.0	4.6	0.0	1.3	0.0
Cycle Q Clear Time (g_c), s	3.9	0.0	4.0	0.0	4.6	0.0	1.3	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	0	1237	0	0	0	932	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	0.0	10.5	0.0	0.0	0.0	12.3	0.0
Perm LT Serve Time (g_u), s	0.0	0.0	4.7	0.0	0.0	0.0	3.8	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	3.0	0.0	0.0	0.0	0.4	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	120	0	267	0	142	0	194	0
V/C Ratio (X)	0.79	0.00	0.55	0.00	0.78	0.00	0.19	0.00
Avail Cap (c_a), veh/h	120	0	267	0	238	0	237	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	34.5	0.0	28.4	0.0	33.9	0.0	25.5	0.0
Incr Delay (d2), s/veh	29.7	0.0	2.4	0.0	8.9	0.0	0.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	64.2	0.0	30.8	0.0	42.7	0.0	25.9	0.0
1st-Term Q (Q1), veh/ln	1.6	0.0	0.5	0.0	1.9	0.0	0.5	0.0
2nd-Term Q (Q2), veh/ln	1.0	0.0	0.2	0.0	0.4	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	2.6	0.0	0.7	0.0	2.2	0.0	0.5	0.0
%ile Storage Ratio (RQ%)	0.44	0.00	0.09	0.00	0.38	0.00	0.14	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	0	4	0	6	0	8
Lane Assignment	T							
Lanes in Grp	0	0	0	0	0	0	0	1
Grp Vol (v), veh/h	0	0	0	0	0	0	0	221
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	0	0	1856
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.5
Lane Grp Cap (c), veh/h	0	0	0	0	0	0	0	305
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73
Avail Cap (c_a), veh/h	0	0	0	0	0	0	0	396
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.7
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.4
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4

## HCM 6th Signalized Intersection Capacity Analysis 16: Smokey Point Blvd/Smokey Pt Blvd & 188th St

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	18
Lane Assignment		T+R		T+R		T+R		R
Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	753	0	142	0	336	0	221
Grp Sat Flow (s), veh/h/ln	0	1822	0	1725	0	1839	0	1572
Q Serve Time (g_s), s	0.0	25.0	0.0	5.8	0.0	8.2	0.0	9.4
Cycle Q Clear Time (g_c), s	0.0	25.0	0.0	5.8	0.0	8.2	0.0	9.4
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1572.5
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0
Prop RT Outside Lane (P_R)	0.00	0.15	0.00	0.37	0.00	0.14	0.00	1.00
Lane Grp Cap (c), veh/h	0	961	0	241	0	945	0	363
V/C Ratio (X)	0.00	0.78	0.00	0.59	0.00	0.36	0.00	0.61
Avail Cap (c_a), veh/h	0	961	0	368	0	945	0	440
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	14.3	0.0	30.3	0.0	10.8	0.0	25.8
Incr Delay (d2), s/veh	0.0	6.4	0.0	2.3	0.0	1.0	0.0	1.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	20.7	0.0	32.6	0.0	11.9	0.0	27.5
1st-Term Q (Q1), veh/ln	0.0	8.4	0.0	2.3	0.0	2.8	0.0	3.4
2nd-Term Q (Q2), veh/ln	0.0	1.7	0.0	0.2	0.0	0.3	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	10.1	0.0	2.5	0.0	3.1	0.0	3.5
%ile Storage Ratio (RQ%)	0.00	0.20	0.00	0.07	0.00	0.03	0.00	0.45
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Intersection Summary

HCM 6th Ctrl Delay	26.3
HCM 6th LOS	C

## HCM 6th Signalized Intersection Capacity Analysis 27: 200th St & Smokey Point Blvd

10/01/2021



Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations									
Traffic Volume (veh/h)	32	116	2	748	437	76			
Future Volume (veh/h)	32	116	2	748	437	76			
Number	7	14	5	2	6	16			
Initial Q, veh	0	0	0	0	0	0			
Ped-Bike Adj (A_pbT)	1.00	1.00	1.00			1.00			
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach	No			No	No				
Lanes Open During Work Zone									
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	34	122	2	787	460	80			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95			
Percent Heavy Veh, %	2	2	2	2	2	2			
Opposing Right Turn Influence	Yes		Yes						
Cap, veh/h	43	155	688	1368	1368	1160			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00			
Prop Arrive On Green	0.12	0.12	0.73	0.73	0.73	0.73			
Unsig. Movement Delay									
Ln Grp Delay, s/veh	30.1	0.0	3.5	5.2	3.3	2.2			
Ln Grp LOS	C	A	A	A	A	A			
Approach Vol, veh/h	157			789	540				
Approach Delay, s/veh	30.1			5.2	3.1				
Approach LOS	C			A	A				
Timer:		1	2	3	4	5	6	7	8
Assigned Phs			2		4		6		
Case No			6.0		12.0		7.0		
Phs Duration (G+Y+Rc), s			44.2		10.8		44.2		
Change Period (Y+Rc), s			4.0		4.0		4.0		
Max Green (Gmax), s			31.0		16.0		31.0		
Max Allow Headway (MAH), s			5.0		4.0		4.9		
Max Q Clear (g_c+I1), s			12.7		7.2		6.8		
Green Ext Time (g_e), s			5.2		0.3		3.0		
Prob of Phs Call (p_c)			1.00		0.91		1.00		
Prob of Max Out (p_x)			0.00		0.02		0.00		
Left-Turn Movement Data									
Assigned Mvmt			5		7		1		
Mvmt Sat Flow, veh/h			866		352		0		
Through Movement Data									
Assigned Mvmt			2		4		6		
Mvmt Sat Flow, veh/h			1870		10		1870		
Right-Turn Movement Data									
Assigned Mvmt			12		14		16		
Mvmt Sat Flow, veh/h			0		1263		1585		
Left Lane Group Data									
Assigned Mvmt	0	5	0	7	0	1	0	0	
Lane Assignment		L		L+T+R					

## HCM 6th Signalized Intersection Capacity Analysis 27: 200th St & Smokey Point Blvd

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Lanes in Grp	0	1	0	1	0	0	0	0
Grp Vol (v), veh/h	0	2	0	157	0	0	0	0
Grp Sat Flow (s), veh/h/ln	0	866	0	1625	0	0	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	4.9	0.0	5.2	0.0	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	866	0	0	0	0	0	0
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	40.2	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Serve Time (g_u), s	0.0	35.4	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	40.2	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	0.22	0.00	0.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	688	0	200	0	0	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.79	0.00	0.00	0.00	0.00
Avail Cap (c_a), veh/h	0	688	0	473	0	0	0	0
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	3.5	0.0	23.4	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	6.7	0.0	0.0	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
Control Delay (d), s/veh	0.0	3.5	0.0	30.1	0.0	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	2.2	0.0	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Middle Lane Group Data</b>								
Assigned Mvmt	0	2	0	4	0	6	0	0
Lane Assignment		T				T		
Lanes in Grp	0	1	0	0	0	1	0	0
Grp Vol (v), veh/h	0	787	0	0	0	460	0	0
Grp Sat Flow (s), veh/h/ln	0	1870	0	0	0	1870	0	0
Q Serve Time (g_s), s	0.0	10.7	0.0	0.0	0.0	4.8	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	10.7	0.0	0.0	0.0	4.8	0.0	0.0
Lane Grp Cap (c), veh/h	0	1368	0	0	0	1368	0	0
V/C Ratio (X)	0.00	0.58	0.00	0.00	0.00	0.34	0.00	0.00
Avail Cap (c_a), veh/h	0	1368	0	0	0	1368	0	0
Upstream Filter (I)	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	3.4	0.0	0.0	0.0	2.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.8	0.0	0.0	0.0	0.7	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
Control Delay (d), s/veh	0.0	5.2	0.0	0.0	0.0	3.3	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	1.0	0.0	0.0	0.0	0.5	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.7	0.0	0.0	0.0	0.3	0.0	0.0

## HCM 6th Signalized Intersection Capacity Analysis 27: 200th St & Smokey Point Blvd

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3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.7	0.0	0.0	0.0	0.7	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.07	0.00	0.00	0.00	0.02	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Right Lane Group Data

Assigned Mvmt	0	12	0	14	0	16	0	0
Lane Assignment	R							
Lanes in Grp	0	0	0	0	0	1	0	0
Grp Vol (v), veh/h	0	0	0	0	0	80	0	0
Grp Sat Flow (s), veh/h/ln	0	0	0	0	0	1585	0	0
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	0.00	0.00	0.78	0.00	1.00	0.00	0.00
Lane Grp Cap (c), veh/h	0	0	0	0	0	1160	0	0
V/C Ratio (X)	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00
Avail Cap (c_a), veh/h	0	0	0	0	0	1160	0	0
Upstream Filter (I)	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	0.0	0.0	0.0	0.0	0.0	2.1	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1	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
Control Delay (d), s/veh	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0
1st-Term Q (Q1), veh/ln	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00
%ile Back of Q (50%), veh/ln	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

### Intersection Summary

HCM 6th Ctrl Delay	7.1
HCM 6th LOS	A

## INTERSECTION SUMMARY

 **Site: 101 [Smokey Point Blvd at 180th - 2 Lane - PM]**

New Site  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	26.8 mph	26.8 mph
Travel Distance (Total)	1282.6 veh-mi/h	1539.1 pers-mi/h
Travel Time (Total)	47.8 veh-h/h	57.4 pers-h/h
Demand Flows (Total)	2035 veh/h	2442 pers/h
Percent Heavy Vehicles (Demand)	1.9 %	
Degree of Saturation	0.777	
Practical Spare Capacity	9.4 %	
Effective Intersection Capacity	2619 veh/h	
Control Delay (Total)	8.40 veh-h/h	10.08 pers-h/h
Control Delay (Average)	14.9 sec	14.9 sec
Control Delay (Worst Lane)	20.3 sec	
Control Delay (Worst Movement)	20.3 sec	20.3 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	14.9 sec	
Idling Time (Average)	11.0 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	12.0 veh	
95% Back of Queue - Distance (Worst Lane)	306.5 ft	
Queue Storage Ratio (Worst Lane)	0.08	
Total Effective Stops	928 veh/h	1114 pers/h
Effective Stop Rate	0.46	0.46
Proportion Queued	0.54	0.54
Performance Index	103.6	103.6
Cost (Total)	617.49 \$/h	617.49 \$/h
Fuel Consumption (Total)	46.7 gal/h	
Carbon Dioxide (Total)	417.3 kg/h	
Hydrocarbons (Total)	0.033 kg/h	
Carbon Monoxide (Total)	0.390 kg/h	
NOx (Total)	0.399 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 94.7% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	976,696 veh/y	1,172,035 pers/y
Delay	4,032 veh-h/y	4,838 pers-h/y
Effective Stops	445,676 veh/y	534,811 pers/y
Travel Distance	615,656 veh-mi/y	738,787 pers-mi/y
Travel Time	22,947 veh-h/y	27,537 pers-h/y
Cost	296,395 \$/y	296,395 \$/y

Fuel Consumption	22,403 gal/y
Carbon Dioxide	200,327 kg/y
Hydrocarbons	16 kg/y
Carbon Monoxide	187 kg/y
NOx	192 kg/y

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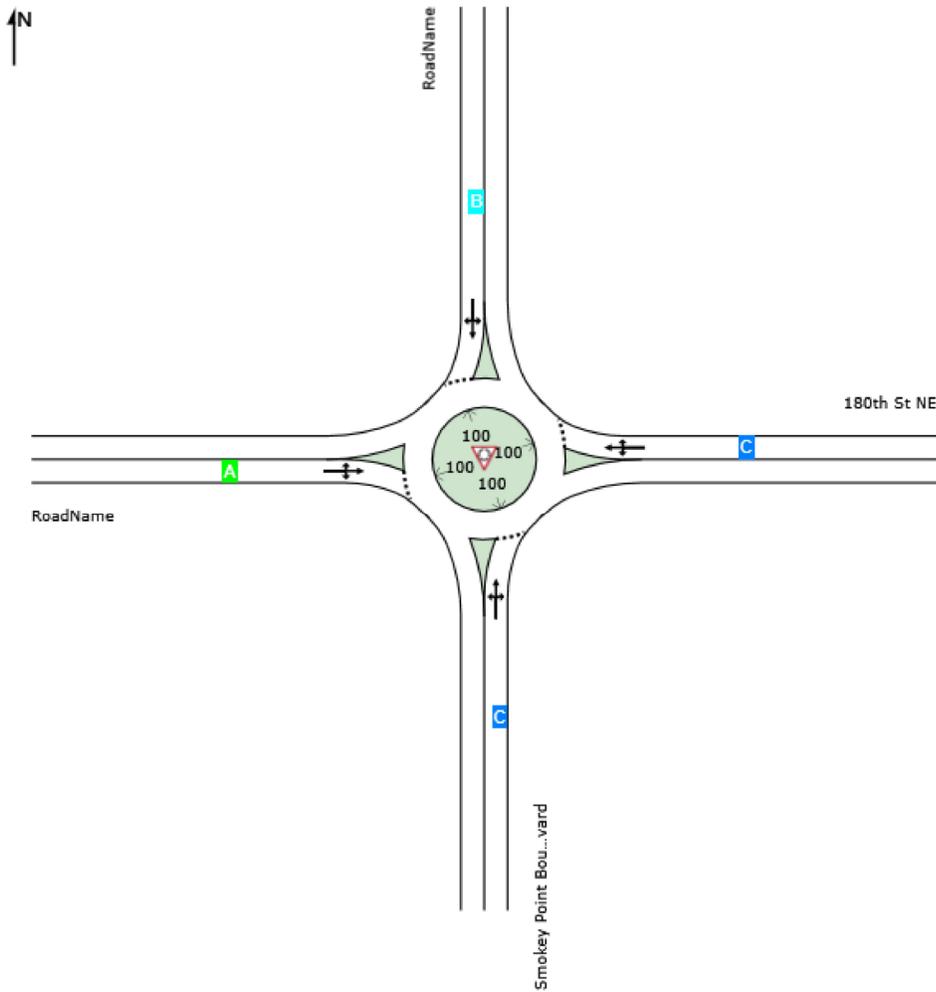
## LANE LEVEL OF SERVICE

### Lane Level of Service

 **Site: 101 [Smokey Point Blvd at 180th - 2 Lane - PM]**

New Site  
 Site Category: (None)  
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	B	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Sign Control.  
 Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
 LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# EXHIBIT H

\\04-Models\02-Sidra\01\_SMP\_2040\_2In\_PM.sip8

## MOVEMENT SUMMARY

**Site: 101 [Smokey Point Blvd at 180th - 2 Lane - PM]**

New Site  
 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: Smokey Point Boulevard												
3	L2	87	3.0	0.777	15.4	LOS C	12.0	306.5	0.36	0.12	0.36	25.1
8	T1	815	3.0	0.777	15.4	LOS C	12.0	306.5	0.36	0.12	0.36	27.8
18	R2	114	3.0	0.777	15.4	LOS C	12.0	306.5	0.36	0.12	0.36	24.0
Approach		1016	3.0	0.777	15.4	LOS C	12.0	306.5	0.36	0.12	0.36	27.1
East: 180th St NE												
1	L2	163	0.0	0.619	20.3	LOS C	4.2	105.7	0.83	1.10	1.46	22.9
6	T1	1	0.0	0.619	20.3	LOS C	4.2	105.7	0.83	1.10	1.46	19.9
16	R2	163	0.0	0.619	20.3	LOS C	4.2	105.7	0.83	1.10	1.46	22.3
Approach		327	0.0	0.619	20.3	LOS C	4.2	105.7	0.83	1.10	1.46	22.6
North: RoadName												
7	L2	11	1.0	0.613	11.7	LOS B	6.6	167.0	0.68	0.65	0.88	26.3
4	T1	630	1.0	0.613	11.7	LOS B	6.6	167.0	0.68	0.65	0.88	29.4
14	R2	5	1.0	0.613	11.7	LOS B	6.6	167.0	0.68	0.65	0.88	25.1
Approach		647	1.0	0.613	11.7	LOS B	6.6	167.0	0.68	0.65	0.88	29.3
West: RoadName												
5	L2	11	3.0	0.076	7.0	LOS A	0.3	7.2	0.62	0.60	0.62	26.7
2	T1	1	3.0	0.076	7.0	LOS A	0.3	7.2	0.62	0.60	0.62	22.7
12	R2	33	3.0	0.076	7.0	LOS A	0.3	7.2	0.62	0.60	0.62	25.9
Approach		45	3.0	0.076	7.0	LOS A	0.3	7.2	0.62	0.60	0.62	26.0
All Vehicles		2035	1.9	0.777	14.9	LOS B	12.0	306.5	0.54	0.46	0.71	26.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

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

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

## INTERSECTION SUMMARY

 **Site: 101 [Smokey Point Blvd at 183rd - 2 Lane - PM ]**

New Site  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	26.1 mph	26.1 mph
Travel Distance (Total)	1200.5 veh-mi/h	1440.6 pers-mi/h
Travel Time (Total)	46.0 veh-h/h	55.3 pers-h/h
Demand Flows (Total)	1908 veh/h	2289 pers/h
Percent Heavy Vehicles (Demand)	3.0 %	
Degree of Saturation	0.797	
Practical Spare Capacity	6.7 %	
Effective Intersection Capacity	2394 veh/h	
Control Delay (Total)	8.21 veh-h/h	9.85 pers-h/h
Control Delay (Average)	15.5 sec	15.5 sec
Control Delay (Worst Lane)	26.9 sec	
Control Delay (Worst Movement)	26.9 sec	26.9 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	15.5 sec	
Idling Time (Average)	10.4 sec	
Intersection Level of Service (LOS)	LOS C	
95% Back of Queue - Vehicles (Worst Lane)	10.1 veh	
95% Back of Queue - Distance (Worst Lane)	259.1 ft	
Queue Storage Ratio (Worst Lane)	0.07	
Total Effective Stops	1267 veh/h	1521 pers/h
Effective Stop Rate	0.66	0.66
Proportion Queued	0.63	0.63
Performance Index	86.0	86.0
Cost (Total)	611.71 \$/h	611.71 \$/h
Fuel Consumption (Total)	47.1 gal/h	
Carbon Dioxide (Total)	422.2 kg/h	
Hydrocarbons (Total)	0.034 kg/h	
Carbon Monoxide (Total)	0.384 kg/h	
NOx (Total)	0.584 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 93.2% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	915,652 veh/y	1,098,783 pers/y
Delay	3,939 veh-h/y	4,726 pers-h/y
Effective Stops	608,242 veh/y	729,890 pers/y
Travel Distance	576,252 veh-mi/y	691,502 pers-mi/y
Travel Time	22,104 veh-h/y	26,524 pers-h/y
Cost	293,622 \$/y	293,622 \$/y

Fuel Consumption	22,602 gal/y
Carbon Dioxide	202,663 kg/y
Hydrocarbons	16 kg/y
Carbon Monoxide	184 kg/y
NOx	280 kg/y

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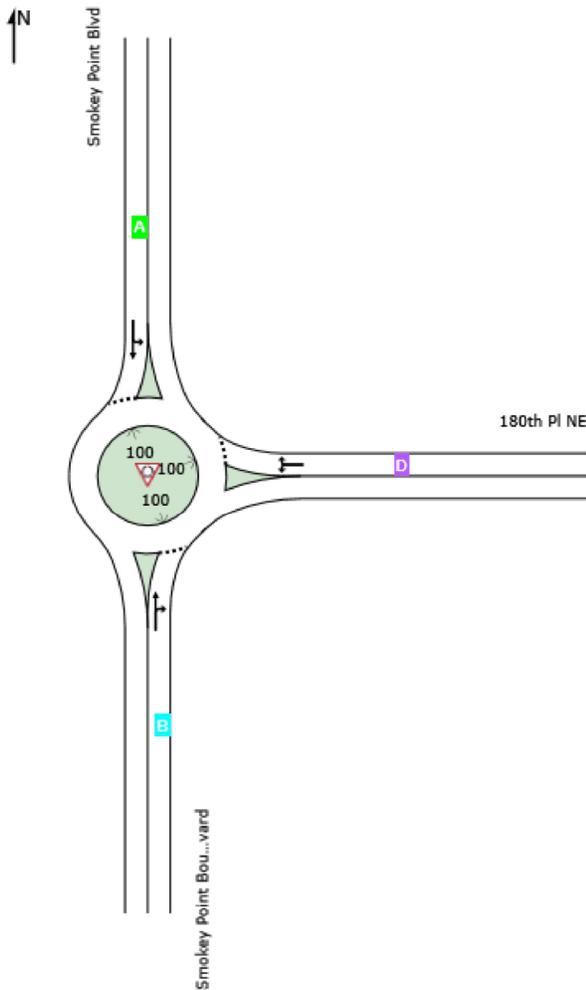
## LANE LEVEL OF SERVICE

### Lane Level of Service

 **Site: 101 [Smokey Point Blvd at 183rd - 2 Lane - PM ]**

New Site  
 Site Category: (None)  
 Roundabout

	Approaches			Intersection
	South	East	North	
LOS	B	D	A	C



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Sign Control.  
 Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
 LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# EXHIBIT H

\\04-Models\02-Sidra\01\_SMP\_2040\_2In\_PM.sip8

## MOVEMENT SUMMARY

 **Site: 101 [Smokey Point Blvd at 183rd - 2 Lane - PM ]**

New Site  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total	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: Smokey Point Boulevard												
8	T1	652	3.0	0.672	12.0	LOS B	6.8	174.4	0.48	0.25	0.48	29.2
18	R2	179	3.0	0.672	12.0	LOS B	6.8	174.4	0.48	0.25	0.48	25.0
Approach		832	3.0	0.672	12.0	LOS B	6.8	174.4	0.48	0.25	0.48	28.2
East: 180th PI NE												
1	L2	228	3.0	0.797	26.9	LOS D	10.1	259.1	0.92	1.53	2.16	21.5
16	R2	310	3.0	0.797	26.9	LOS D	10.1	259.1	0.92	1.53	2.16	21.0
Approach		538	3.0	0.797	26.9	LOS D	10.1	259.1	0.92	1.53	2.16	21.2
North: Smokey Point Blvd												
7	L2	76	3.0	0.510	9.5	LOS A	3.3	84.2	0.57	0.44	0.57	26.8
4	T1	462	3.0	0.510	9.5	LOS A	3.3	84.2	0.57	0.44	0.57	29.9
Approach		538	3.0	0.510	9.5	LOS A	3.3	84.2	0.57	0.44	0.57	29.5
All Vehicles		1908	3.0	0.797	15.5	LOS C	10.1	259.1	0.63	0.66	0.98	26.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

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

LOS F will result if  $v/c > 1$  irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

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## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - NB Slip Lane]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	20.6 mph	20.6 mph
Travel Distance (Total)	1333.3 veh-mi/h	1599.9 pers-mi/h
Travel Time (Total)	64.8 veh-h/h	77.8 pers-h/h
Demand Flows (Total)	2125 veh/h	2550 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	1.218	
Practical Spare Capacity	-30.2 %	
Effective Intersection Capacity	1745 veh/h	
Control Delay (Total)	24.89 veh-h/h	29.86 pers-h/h
Control Delay (Average)	42.2 sec	42.2 sec
Control Delay (Worst Lane)	130.2 sec	
Control Delay (Worst Movement)	134.2 sec	134.2 sec
Geometric Delay (Average)	3.8 sec	
Stop-Line Delay (Average)	38.3 sec	
Idling Time (Average)	27.5 sec	
Intersection Level of Service (LOS)	LOS D	
95% Back of Queue - Vehicles (Worst Lane)	52.2 veh	
95% Back of Queue - Distance (Worst Lane)	1335.3 ft	
Queue Storage Ratio (Worst Lane)	0.34	
Total Effective Stops	2752 veh/h	3302 pers/h
Effective Stop Rate	1.30	1.30
Proportion Queued	0.79	0.79
Performance Index	232.1	232.1
Cost (Total)	901.11 \$/h	901.11 \$/h
Fuel Consumption (Total)	57.1 gal/h	
Carbon Dioxide (Total)	510.7 kg/h	
Hydrocarbons (Total)	0.045 kg/h	
Carbon Monoxide (Total)	0.472 kg/h	
NOx (Total)	0.583 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 4.0 %

Number of Iterations: 7 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.1% 1.6% 0.8%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,019,808 veh/y	1,223,769 pers/y
Delay	11,945 veh-h/y	14,334 pers-h/y
Effective Stops	1,320,836 veh/y	1,585,003 pers/y
Travel Distance	639,979 veh-mi/y	767,975 pers-mi/y
Travel Time	31,109 veh-h/y	37,331 pers-h/y
Cost	432,532 \$/y	432,532 \$/y

Fuel Consumption	27,398 gal/y
Carbon Dioxide	245,158 kg/y
Hydrocarbons	21 kg/y
Carbon Monoxide	227 kg/y
NOx	280 kg/y

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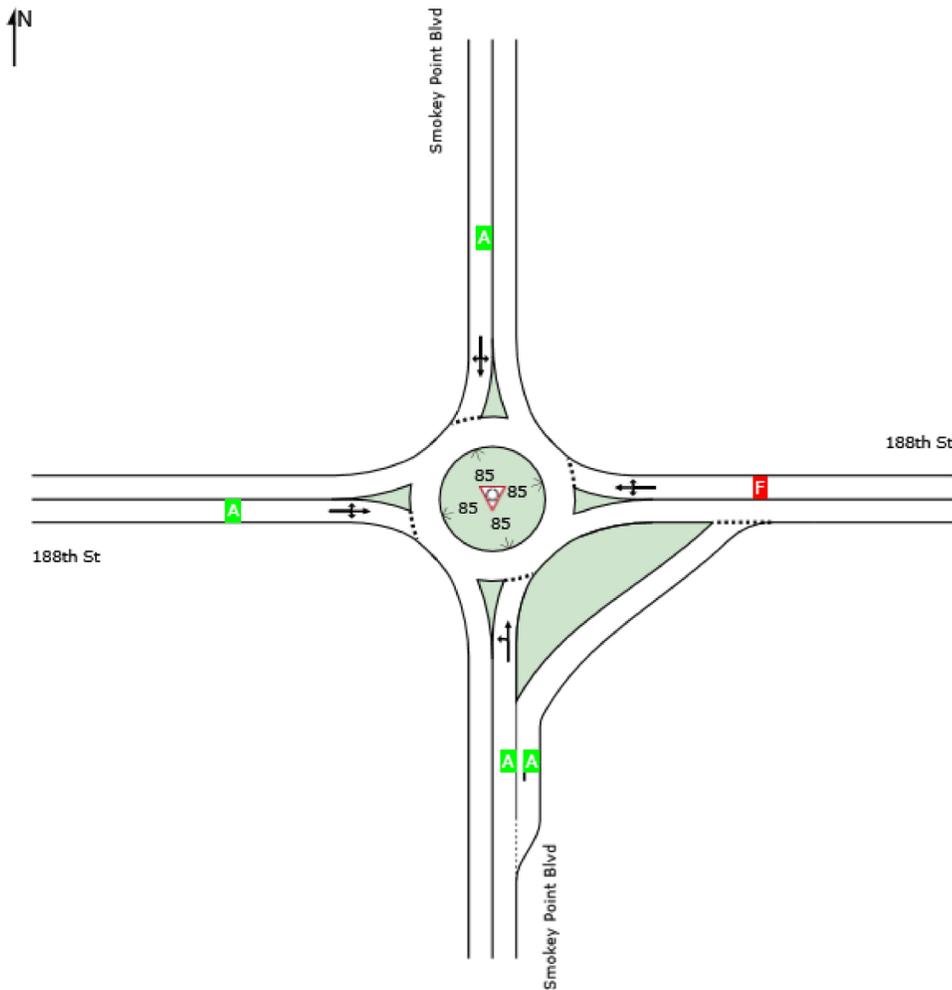
## LANE LEVEL OF SERVICE

### Lane Level of Service

**Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - NB Slip Lane]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	F	A	A	D



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
 LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# EXHIBIT H

\\04-Models\02-Sidra\01\_SMP\_2040\_2In\_PM.sip8

## MOVEMENT SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - NB Slip Lane]**

Projected 2035 with Improvements  
 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: Smokey Point Blvd												
3	L2	114	2.0	0.652	10.6	LOS B	6.4	162.3	0.69	0.62	0.70	28.2
8	T1	663	2.0	0.652	5.2	LOS A	6.4	162.3	0.69	0.62	0.70	32.0
18	R2	114	2.0	0.093	4.0	LOS A	0.5	12.8	0.37	0.48	0.37	32.4
Approach		891	2.0	0.652	5.7	LOS A	6.4	162.3	0.65	0.60	0.66	31.5
East: 188th St												
1	L2	152	3.0	1.218	134.2	LOS F	52.2	1335.3	1.00	2.81	5.42	11.6
6	T1	228	3.0	1.218	128.8	LOS F	52.2	1335.3	1.00	2.81	5.42	11.0
16	R2	228	3.0	1.218	129.0	LOS F	52.2	1335.3	1.00	2.81	5.42	11.5
Approach		609	3.0	1.218	130.2	LOS F	52.2	1335.3	1.00	2.81	5.42	11.3
North: Smokey Point Blvd												
7	L2	98	1.0	0.568	13.6	LOS B	5.0	126.8	0.82	0.87	0.94	31.3
4	T1	299	1.0	0.568	8.2	LOS A	5.0	126.8	0.82	0.87	0.94	31.2
14	R2	49	1.0	0.568	8.4	LOS A	5.0	126.8	0.82	0.87	0.94	26.5
Approach		446	1.0	0.568	9.4	LOS A	5.0	126.8	0.82	0.87	0.94	30.6
West: 188th St												
5	L2	37	4.0	0.255	9.4	LOS A	1.6	40.0	0.71	0.69	0.71	27.5
2	T1	89	4.0	0.255	4.4	LOS A	1.6	40.0	0.71	0.69	0.71	27.5
12	R2	53	4.0	0.255	5.2	LOS A	1.6	40.0	0.71	0.69	0.71	26.9
Approach		179	4.0	0.255	5.7	LOS A	1.6	40.0	0.71	0.69	0.71	27.3
All Vehicles		2125	2.2	1.218	42.2	LOS D	52.2	1335.3	0.79	1.30	2.09	20.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). 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.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

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.

## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - NB & WB Slip Lane]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	29.8 mph	29.8 mph
Travel Distance (Total)	1333.3 veh-mi/h	1599.9 pers-mi/h
Travel Time (Total)	44.8 veh-h/h	53.8 pers-h/h
Demand Flows (Total)	2125 veh/h	2550 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	0.652	
Practical Spare Capacity	30.4 %	
Effective Intersection Capacity	3258 veh/h	
Control Delay (Total)	5.19 veh-h/h	6.23 pers-h/h
Control Delay (Average)	8.8 sec	8.8 sec
Control Delay (Worst Lane)	15.4 sec	
Control Delay (Worst Movement)	18.7 sec	18.7 sec
Geometric Delay (Average)	3.8 sec	
Stop-Line Delay (Average)	5.0 sec	
Idling Time (Average)	1.1 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	6.4 veh	
95% Back of Queue - Distance (Worst Lane)	162.7 ft	
Queue Storage Ratio (Worst Lane)	0.04	
Total Effective Stops	1691 veh/h	2029 pers/h
Effective Stop Rate	0.80	0.80
Proportion Queued	0.79	0.79
Performance Index	94.1	94.1
Cost (Total)	606.75 \$/h	606.75 \$/h
Fuel Consumption (Total)	49.0 gal/h	
Carbon Dioxide (Total)	438.4 kg/h	
Hydrocarbons (Total)	0.035 kg/h	
Carbon Monoxide (Total)	0.415 kg/h	
NOx (Total)	0.510 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 4.0 %

Number of Iterations: 7 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.1% 1.6% 0.8%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,019,808 veh/y	1,223,769 pers/y
Delay	2,492 veh-h/y	2,991 pers-h/y
Effective Stops	811,615 veh/y	973,938 pers/y
Travel Distance	639,978 veh-mi/y	767,974 pers-mi/y
Travel Time	21,505 veh-h/y	25,806 pers-h/y
Cost	291,240 \$/y	291,240 \$/y

Fuel Consumption	23,509 gal/y
Carbon Dioxide	210,439 kg/y
Hydrocarbons	17 kg/y
Carbon Monoxide	199 kg/y
NOx	245 kg/y

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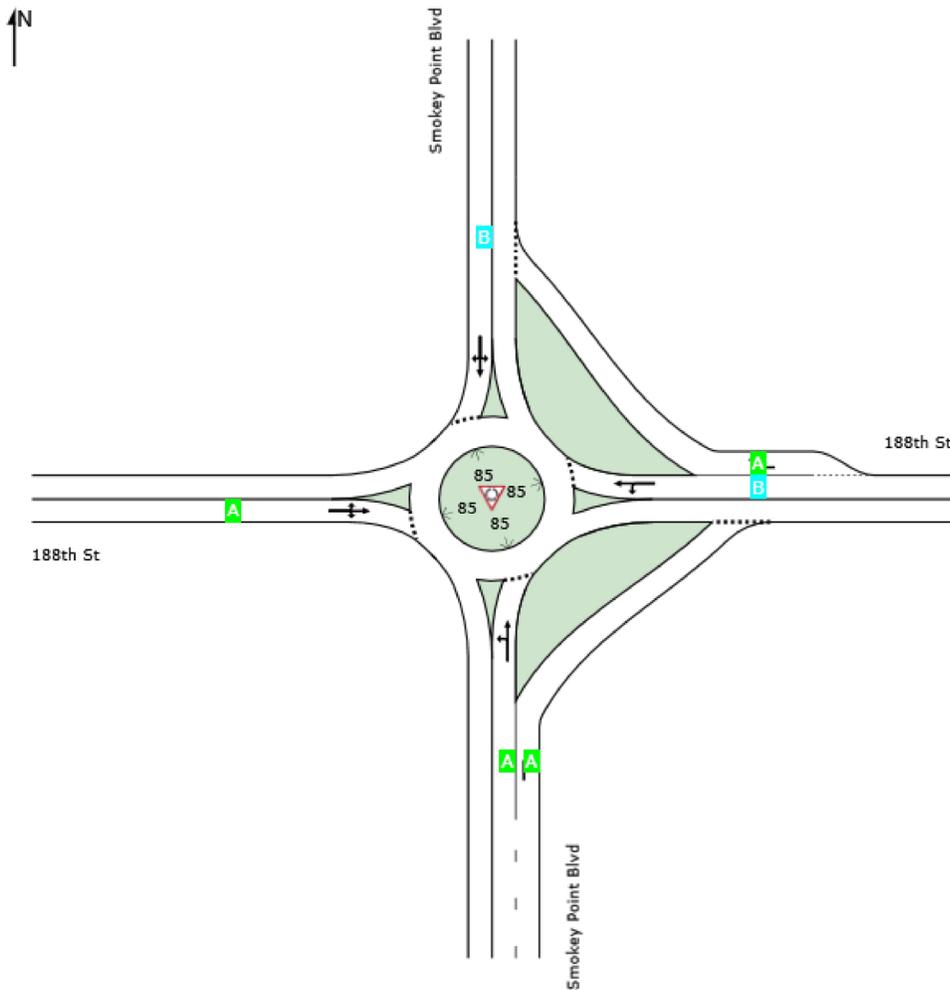
## LANE LEVEL OF SERVICE

### Lane Level of Service

**Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - NB & WB Slip Lane]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	B	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
 LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# EXHIBIT H

\\04-Models\02-Sidra\01\_SMP\_2040\_2In\_PM.sip8

## MOVEMENT SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - NB & WB Slip Lane]**

Projected 2035 with Improvements  
 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: Smokey Point Blvd												
3	L2	114	2.0	0.652	10.6	LOS B	6.4	162.7	0.69	0.62	0.71	28.2
8	T1	663	2.0	0.652	5.2	LOS A	6.4	162.7	0.69	0.62	0.71	32.0
18	R2	114	2.0	0.093	4.0	LOS A	0.5	12.9	0.37	0.48	0.37	32.4
Approach		891	2.0	0.652	5.7	LOS A	6.4	162.7	0.65	0.60	0.66	31.5
East: 188th St												
1	L2	152	3.0	0.589	18.7	LOS B	6.0	154.0	0.99	1.10	1.27	28.9
6	T1	228	3.0	0.589	13.2	LOS B	6.0	154.0	0.99	1.10	1.27	25.3
16	R2	228	3.0	0.308	7.7	LOS A	2.2	56.5	0.83	0.81	0.83	31.0
Approach		609	3.0	0.589	12.5	LOS B	6.0	154.0	0.93	0.99	1.10	28.1
North: Smokey Point Blvd												
7	L2	98	1.0	0.605	15.2	LOS B	5.8	147.0	0.88	0.96	1.07	30.6
4	T1	299	1.0	0.605	9.8	LOS A	5.8	147.0	0.88	0.96	1.07	30.5
14	R2	49	1.0	0.605	10.0	LOS B	5.8	147.0	0.88	0.96	1.07	26.0
Approach		446	1.0	0.605	11.0	LOS B	5.8	147.0	0.88	0.96	1.07	29.9
West: 188th St												
5	L2	37	4.0	0.261	9.6	LOS A	1.6	41.6	0.73	0.71	0.73	27.5
2	T1	89	4.0	0.261	4.7	LOS A	1.6	41.6	0.73	0.71	0.73	27.4
12	R2	53	4.0	0.261	5.5	LOS A	1.6	41.6	0.73	0.71	0.73	26.8
Approach		179	4.0	0.261	5.9	LOS A	1.6	41.6	0.73	0.71	0.73	27.2
All Vehicles		2125	2.2	0.652	8.8	LOS A	6.4	162.7	0.79	0.80	0.88	29.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). 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.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

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.

## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - No Slip Lane]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	17.2 mph	17.2 mph
Travel Distance (Total)	1333.3 veh-mi/h	1599.9 pers-mi/h
Travel Time (Total)	77.4 veh-h/h	92.9 pers-h/h
Demand Flows (Total)	2125 veh/h	2550 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	1.367	
Practical Spare Capacity	-37.8 %	
Effective Intersection Capacity	1554 veh/h	
Control Delay (Total)	37.70 veh-h/h	45.24 pers-h/h
Control Delay (Average)	63.9 sec	63.9 sec
Control Delay (Worst Lane)	191.6 sec	
Control Delay (Worst Movement)	195.6 sec	195.6 sec
Geometric Delay (Average)	3.8 sec	
Stop-Line Delay (Average)	60.0 sec	
Idling Time (Average)	45.3 sec	
Intersection Level of Service (LOS)	LOS E	
95% Back of Queue - Vehicles (Worst Lane)	68.2 veh	
95% Back of Queue - Distance (Worst Lane)	1745.2 ft	
Queue Storage Ratio (Worst Lane)	0.44	
Total Effective Stops	3334 veh/h	4001 pers/h
Effective Stop Rate	1.57	1.57
Proportion Queued	0.93	0.93
Performance Index	327.1	327.1
Cost (Total)	1090.45 \$/h	1090.45 \$/h
Fuel Consumption (Total)	62.6 gal/h	
Carbon Dioxide (Total)	560.2 kg/h	
Hydrocarbons (Total)	0.051 kg/h	
Carbon Monoxide (Total)	0.512 kg/h	
NOx (Total)	0.632 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 5.2 %

Number of Iterations: 8 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.3% 1.2% 0.8%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,019,808 veh/y	1,223,769 pers/y
Delay	18,097 veh-h/y	21,717 pers-h/y
Effective Stops	1,600,336 veh/y	1,920,403 pers/y
Travel Distance	639,979 veh-mi/y	767,975 pers-mi/y
Travel Time	37,158 veh-h/y	44,590 pers-h/y
Cost	523,414 \$/y	523,414 \$/y

# EXHIBIT H

Fuel Consumption	30,056 gal/y
Carbon Dioxide	268,887 kg/y
Hydrocarbons	25 kg/y
Carbon Monoxide	246 kg/y
NOx	303 kg/y

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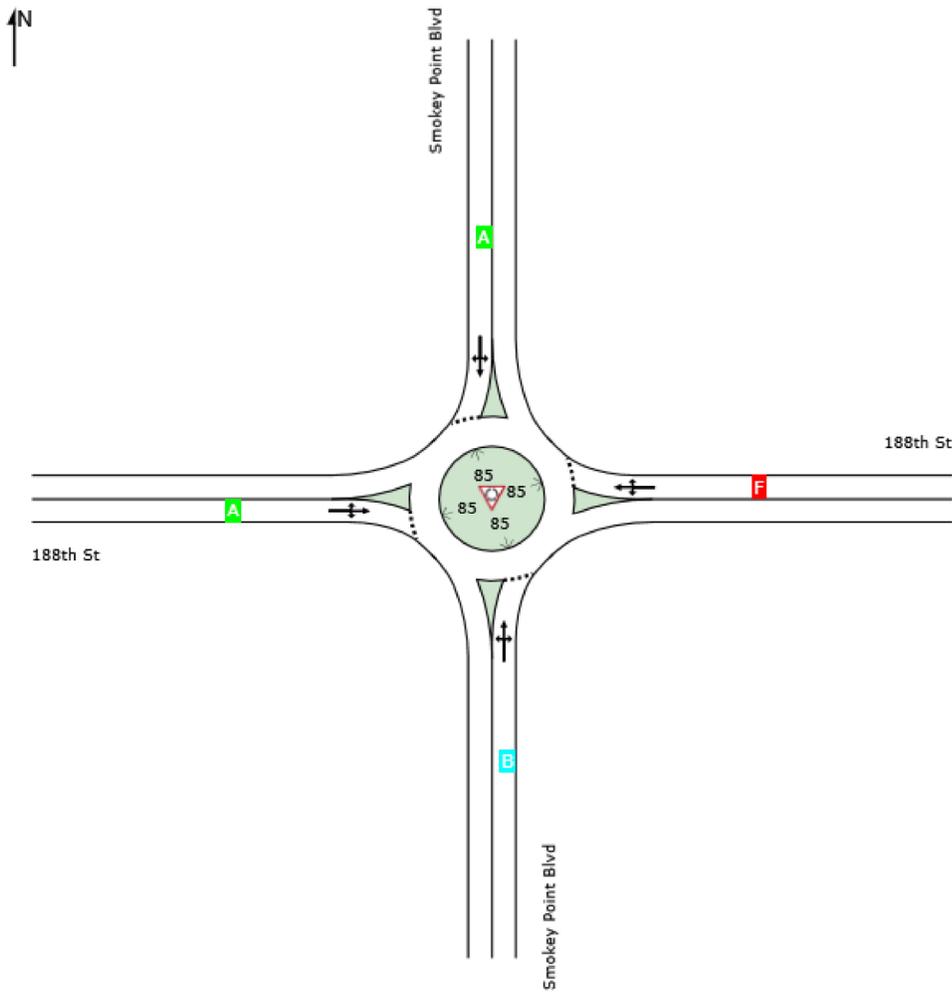
## LANE LEVEL OF SERVICE

### Lane Level of Service

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - No Slip Lane]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	F	A	A	E



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
 LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# EXHIBIT H

\\04-Models\02-Sidra\01\_SMP\_2040\_2In\_PM.sip8

## MOVEMENT SUMMARY

**Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - No Slip Lane]**

Projected 2035 with Improvements  
 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: Smokey Point Blvd												
3	L2	114	2.0	0.907	20.7	LOS C	21.6	548.2	1.00	1.03	1.42	25.5
8	T1	663	2.0	0.907	15.3	LOS B	21.6	548.2	1.00	1.03	1.42	28.6
18	R2	114	2.0	0.907	15.5	LOS B	21.6	548.2	1.00	1.03	1.42	27.9
Approach		891	2.0	0.907	16.0	LOS B	21.6	548.2	1.00	1.03	1.42	28.1
East: 188th St												
1	L2	152	3.0	1.367	195.6	LOS F	68.2	1745.2	1.00	3.17	6.32	8.8
6	T1	228	3.0	1.367	190.2	LOS F	68.2	1745.2	1.00	3.17	6.32	8.4
16	R2	228	3.0	1.367	190.4	LOS F	68.2	1745.2	1.00	3.17	6.32	8.7
Approach		609	3.0	1.367	191.6	LOS F	68.2	1745.2	1.00	3.17	6.32	8.6
North: Smokey Point Blvd												
7	L2	98	1.0	0.546	12.8	LOS B	4.6	116.4	0.79	0.82	0.86	31.6
4	T1	299	1.0	0.546	7.4	LOS A	4.6	116.4	0.79	0.82	0.86	31.5
14	R2	49	1.0	0.546	7.6	LOS A	4.6	116.4	0.79	0.82	0.86	26.7
Approach		446	1.0	0.546	8.6	LOS A	4.6	116.4	0.79	0.82	0.86	30.9
West: 188th St												
5	L2	37	4.0	0.251	9.2	LOS A	1.5	39.1	0.70	0.68	0.70	27.6
2	T1	89	4.0	0.251	4.3	LOS A	1.5	39.1	0.70	0.68	0.70	27.5
12	R2	53	4.0	0.251	5.1	LOS A	1.5	39.1	0.70	0.68	0.70	26.9
Approach		179	4.0	0.251	5.5	LOS A	1.5	39.1	0.70	0.68	0.70	27.3
All Vehicles		2125	2.2	1.367	63.9	LOS E	68.2	1745.2	0.93	1.57	2.65	17.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). 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.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

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.

## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - WB Slip Lane]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	28.2 mph	28.2 mph
Travel Distance (Total)	1333.3 veh-mi/h	1599.9 pers-mi/h
Travel Time (Total)	47.2 veh-h/h	56.7 pers-h/h
Demand Flows (Total)	2125 veh/h	2550 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	0.908	
Practical Spare Capacity	-6.3 %	
Effective Intersection Capacity	2341 veh/h	
Control Delay (Total)	7.99 veh-h/h	9.58 pers-h/h
Control Delay (Average)	13.5 sec	13.5 sec
Control Delay (Worst Lane)	17.7 sec	
Control Delay (Worst Movement)	20.9 sec	20.9 sec
Geometric Delay (Average)	3.8 sec	
Stop-Line Delay (Average)	9.7 sec	
Idling Time (Average)	3.0 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	21.7 veh	
95% Back of Queue - Distance (Worst Lane)	550.8 ft	
Queue Storage Ratio (Worst Lane)	0.14	
Total Effective Stops	2103 veh/h	2523 pers/h
Effective Stop Rate	0.99	0.99
Proportion Queued	0.94	0.94
Performance Index	143.6	143.6
Cost (Total)	653.04 \$/h	653.04 \$/h
Fuel Consumption (Total)	51.0 gal/h	
Carbon Dioxide (Total)	456.4 kg/h	
Hydrocarbons (Total)	0.037 kg/h	
Carbon Monoxide (Total)	0.431 kg/h	
NOx (Total)	0.535 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 5.1 %

Number of Iterations: 8 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.3% 1.2% 0.6%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,019,808 veh/y	1,223,769 pers/y
Delay	3,834 veh-h/y	4,601 pers-h/y
Effective Stops	1,009,396 veh/y	1,211,275 pers/y
Travel Distance	639,979 veh-mi/y	767,974 pers-mi/y
Travel Time	22,674 veh-h/y	27,209 pers-h/y
Cost	313,459 \$/y	313,459 \$/y

Fuel Consumption	24,474 gal/y
Carbon Dioxide	219,050 kg/y
Hydrocarbons	18 kg/y
Carbon Monoxide	207 kg/y
NOx	257 kg/y

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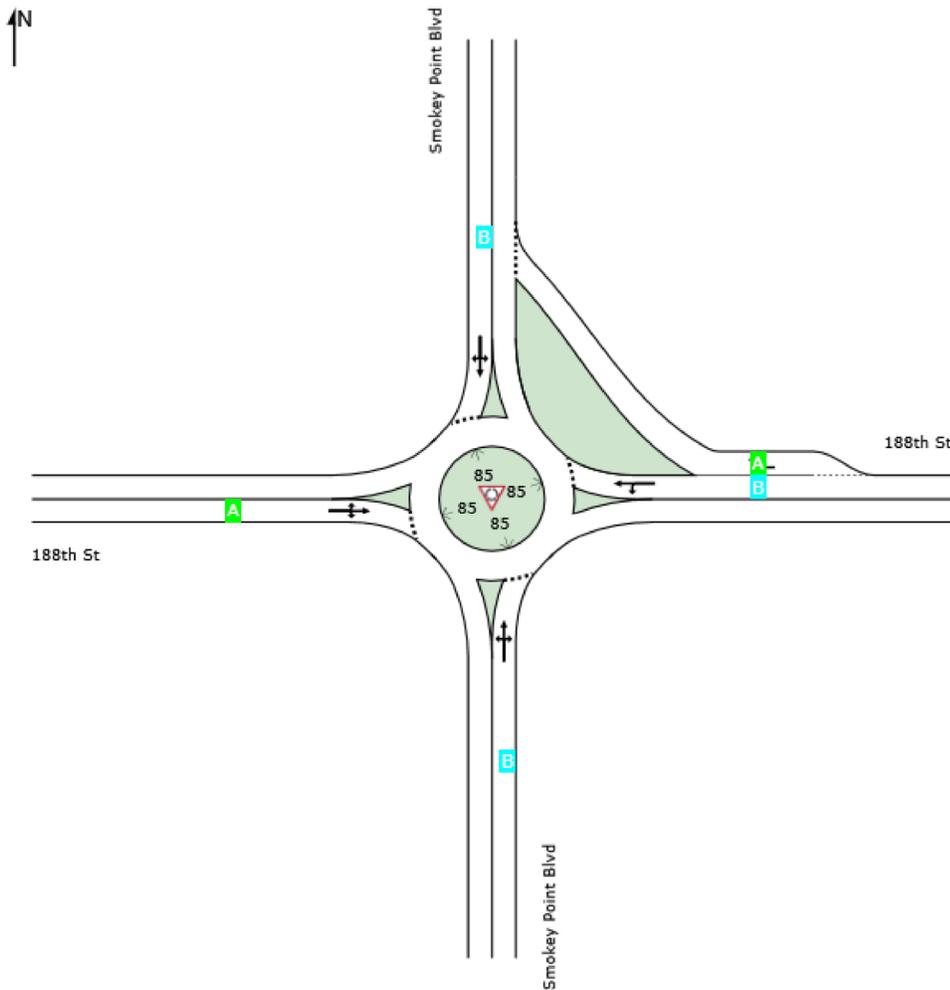
## LANE LEVEL OF SERVICE

### Lane Level of Service

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - WB Slip Lane]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	B	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Signalised Intersections.  
 Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
 LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 2010).  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

# EXHIBIT H

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## MOVEMENT SUMMARY

**Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - WB Slip Lane]**

Projected 2035 with Improvements  
 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: Smokey Point Blvd												
3	L2	114	2.0	0.908	20.7	LOS C	21.7	550.8	1.00	1.03	1.43	25.5
8	T1	663	2.0	0.908	15.3	LOS B	21.7	550.8	1.00	1.03	1.43	28.5
18	R2	114	2.0	0.908	15.6	LOS B	21.7	550.8	1.00	1.03	1.43	27.9
Approach		891	2.0	0.908	16.0	LOS B	21.7	550.8	1.00	1.03	1.43	28.0
East: 188th St												
1	L2	152	3.0	0.661	20.9	LOS C	7.5	191.6	1.00	1.15	1.36	28.1
6	T1	228	3.0	0.661	15.5	LOS B	7.5	191.6	1.00	1.15	1.36	24.7
16	R2	228	3.0	0.335	7.7	LOS A	2.6	65.6	0.88	0.84	0.88	31.0
Approach		609	3.0	0.661	13.9	LOS B	7.5	191.6	0.96	1.03	1.18	27.6
North: Smokey Point Blvd												
7	L2	98	1.0	0.607	15.2	LOS B	5.9	147.7	0.88	0.96	1.07	30.6
4	T1	299	1.0	0.607	9.8	LOS A	5.9	147.7	0.88	0.96	1.07	30.5
14	R2	49	1.0	0.607	10.1	LOS B	5.9	147.7	0.88	0.96	1.07	26.0
Approach		446	1.0	0.607	11.1	LOS B	5.9	147.7	0.88	0.96	1.07	29.9
West: 188th St												
5	L2	37	4.0	0.262	9.6	LOS A	1.6	41.6	0.73	0.71	0.73	27.5
2	T1	89	4.0	0.262	4.7	LOS A	1.6	41.6	0.73	0.71	0.73	27.4
12	R2	53	4.0	0.262	5.5	LOS A	1.6	41.6	0.73	0.71	0.73	26.8
Approach		179	4.0	0.262	5.9	LOS A	1.6	41.6	0.73	0.71	0.73	27.2
All Vehicles		2125	2.2	0.908	13.5	LOS B	21.7	550.8	0.94	0.99	1.22	28.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). 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.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

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.

## INTERSECTION SUMMARY

 **Site: 101 [Smokey Point Blvd at 200th - 2 Lane - PM]**

New Site  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	28.0 mph	28.0 mph
Travel Distance (Total)	1154.7 veh-mi/h	1385.6 pers-mi/h
Travel Time (Total)	41.2 veh-h/h	49.5 pers-h/h
Demand Flows (Total)	1836 veh/h	2203 pers/h
Percent Heavy Vehicles (Demand)	3.0 %	
Degree of Saturation	0.822	
Practical Spare Capacity	3.4 %	
Effective Intersection Capacity	2234 veh/h	
Control Delay (Total)	6.93 veh-h/h	8.31 pers-h/h
Control Delay (Average)	13.6 sec	13.6 sec
Control Delay (Worst Lane)	18.2 sec	
Control Delay (Worst Movement)	18.2 sec	18.2 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	13.6 sec	
Idling Time (Average)	11.3 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	14.2 veh	
95% Back of Queue - Distance (Worst Lane)	362.3 ft	
Queue Storage Ratio (Worst Lane)	0.09	
Total Effective Stops	331 veh/h	398 pers/h
Effective Stop Rate	0.18	0.18
Proportion Queued	0.39	0.39
Performance Index	72.6	72.6
Cost (Total)	527.20 \$/h	527.20 \$/h
Fuel Consumption (Total)	42.3 gal/h	
Carbon Dioxide (Total)	379.5 kg/h	
Hydrocarbons (Total)	0.030 kg/h	
Carbon Monoxide (Total)	0.366 kg/h	
NOx (Total)	0.519 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 92.3% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	881,217 veh/y	1,057,461 pers/y
Delay	3,325 veh-h/y	3,989 pers-h/y
Effective Stops	159,110 veh/y	190,932 pers/y
Travel Distance	554,253 veh-mi/y	665,103 pers-mi/y
Travel Time	19,795 veh-h/y	23,754 pers-h/y
Cost	253,057 \$/y	253,057 \$/y

Fuel Consumption	20,308 gal/y
Carbon Dioxide	182,143 kg/y
Hydrocarbons	14 kg/y
Carbon Monoxide	176 kg/y
NOx	249 kg/y

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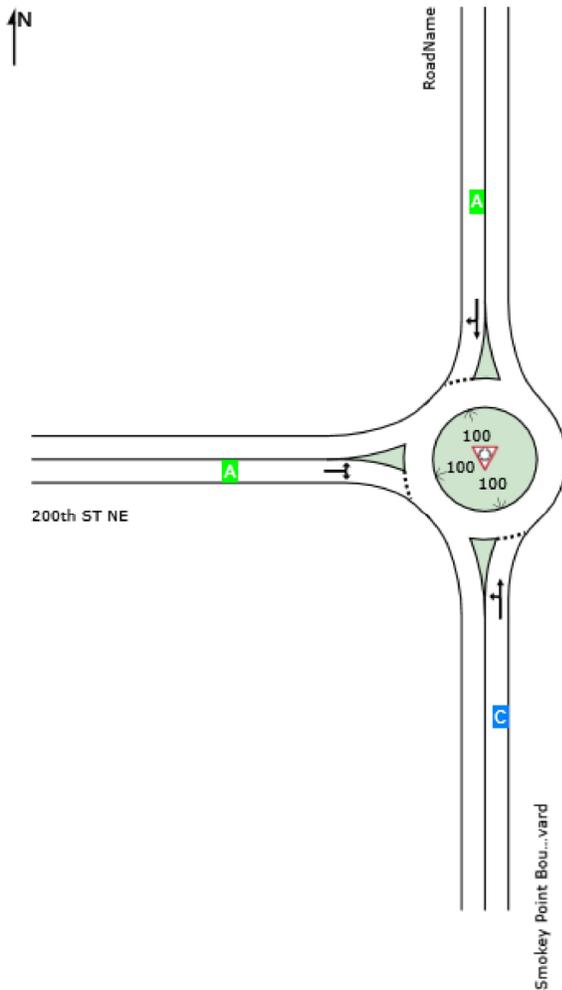
## LANE LEVEL OF SERVICE

### Lane Level of Service

 **Site: 101 [Smokey Point Blvd at 200th - 2 Lane - PM]**

New Site  
 Site Category: (None)  
 Roundabout

	Approaches			Intersection
	South	North	West	
LOS	C	A	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Roundabout LOS Method: Same as Sign Control.  
 Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.  
 LOS F will result if  $v/c > 1$  irrespective of lane delay value (does not apply for approaches and intersection).  
 Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).  
 HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

# EXHIBIT H

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## MOVEMENT SUMMARY

 **Site: 101 [Smokey Point Blvd at 200th - 2 Lane - PM]**

New Site  
 Site Category: (None)  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles	of Queue Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Smokey Point Boulevard												
3	L2	2	3.0	0.822	18.2	LOS C	14.2	362.3	0.56	0.23	0.56	24.5
8	T1	1053	3.0	0.822	18.2	LOS C	14.2	362.3	0.56	0.23	0.56	27.1
Approach		1055	3.0	0.822	18.2	LOS C	14.2	362.3	0.56	0.23	0.56	27.1
North: RoadName												
4	T1	529	3.0	0.469	7.4	LOS A	3.5	89.7	0.04	0.01	0.04	31.1
14	R2	98	3.0	0.469	7.4	LOS A	3.5	89.7	0.04	0.01	0.04	26.3
Approach		627	3.0	0.469	7.4	LOS A	3.5	89.7	0.04	0.01	0.04	30.2
West: 200th ST NE												
5	L2	40	3.0	0.199	6.8	LOS A	0.8	21.5	0.58	0.55	0.58	26.7
12	R2	113	3.0	0.199	6.8	LOS A	0.8	21.5	0.58	0.55	0.58	26.0
Approach		153	3.0	0.199	6.8	LOS A	0.8	21.5	0.58	0.55	0.58	26.2
All Vehicles		1836	3.0	0.822	13.6	LOS B	14.2	362.3	0.39	0.18	0.39	28.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

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

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

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## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - Standard RB - 2020]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	31.9 mph	31.9 mph
Travel Distance (Total)	705.6 veh-mi/h	846.8 pers-mi/h
Travel Time (Total)	22.1 veh-h/h	26.5 pers-h/h
Demand Flows (Total)	1125 veh/h	1350 pers/h
Percent Heavy Vehicles (Demand)	2.0 %	
Degree of Saturation	0.485	
Practical Spare Capacity	75.2 %	
Effective Intersection Capacity	2318 veh/h	
Control Delay (Total)	1.74 veh-h/h	2.09 pers-h/h
Control Delay (Average)	5.6 sec	5.6 sec
Control Delay (Worst Lane)	9.7 sec	
Control Delay (Worst Movement)	11.0 sec	11.0 sec
Geometric Delay (Average)	4.2 sec	
Stop-Line Delay (Average)	1.4 sec	
Idling Time (Average)	0.1 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	4.0 veh	
95% Back of Queue - Distance (Worst Lane)	102.3 ft	
Queue Storage Ratio (Worst Lane)	0.03	
Total Effective Stops	583 veh/h	700 pers/h
Effective Stop Rate	0.52	0.52
Proportion Queued	0.44	0.44
Performance Index	43.9	43.9
Cost (Total)	304.28 \$/h	304.28 \$/h
Fuel Consumption (Total)	25.2 gal/h	
Carbon Dioxide (Total)	225.1 kg/h	
Hydrocarbons (Total)	0.018 kg/h	
Carbon Monoxide (Total)	0.224 kg/h	
NOx (Total)	0.250 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 1.3 %

Number of Iterations: 4 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 91.8% 1.6% 1.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	539,896 veh/y	647,875 pers/y
Delay	838 veh-h/y	1,005 pers-h/y
Effective Stops	279,801 veh/y	335,761 pers/y
Travel Distance	338,711 veh-mi/y	406,453 pers-mi/y
Travel Time	10,604 veh-h/y	12,725 pers-h/y
Cost	146,054 \$/y	146,054 \$/y

Fuel Consumption	12,076 gal/y
Carbon Dioxide	108,052 kg/y
Hydrocarbons	8 kg/y
Carbon Monoxide	107 kg/y
NOx	120 kg/y

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## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - Standard RB - 2025]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	31.2 mph	31.2 mph
Travel Distance (Total)	862.8 veh-mi/h	1035.3 pers-mi/h
Travel Time (Total)	27.7 veh-h/h	33.2 pers-h/h
Demand Flows (Total)	1376 veh/h	1651 pers/h
Percent Heavy Vehicles (Demand)	3.8 %	
Degree of Saturation	0.604	
Practical Spare Capacity	40.8 %	
Effective Intersection Capacity	2279 veh/h	
Control Delay (Total)	2.50 veh-h/h	3.00 pers-h/h
Control Delay (Average)	6.5 sec	6.5 sec
Control Delay (Worst Lane)	10.4 sec	
Control Delay (Worst Movement)	12.8 sec	12.8 sec
Geometric Delay (Average)	4.1 sec	
Stop-Line Delay (Average)	2.4 sec	
Idling Time (Average)	0.4 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	5.7 veh	
95% Back of Queue - Distance (Worst Lane)	148.5 ft	
Queue Storage Ratio (Worst Lane)	0.04	
Total Effective Stops	844 veh/h	1012 pers/h
Effective Stop Rate	0.61	0.61
Proportion Queued	0.60	0.60
Performance Index	60.5	60.5
Cost (Total)	388.39 \$/h	388.39 \$/h
Fuel Consumption (Total)	33.0 gal/h	
Carbon Dioxide (Total)	296.4 kg/h	
Hydrocarbons (Total)	0.023 kg/h	
Carbon Monoxide (Total)	0.291 kg/h	
NOx (Total)	0.469 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 2.0 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.1% 1.8% 1.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	660,379 veh/y	792,455 pers/y
Delay	1,199 veh-h/y	1,439 pers-h/y
Effective Stops	404,909 veh/y	485,890 pers/y
Travel Distance	414,136 veh-mi/y	496,963 pers-mi/y
Travel Time	13,288 veh-h/y	15,945 pers-h/y
Cost	186,426 \$/y	186,426 \$/y

Fuel Consumption	15,828 gal/y
Carbon Dioxide	142,270 kg/y
Hydrocarbons	11 kg/y
Carbon Monoxide	140 kg/y
NOx	225 kg/y

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## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - Standard RB - 2030 ]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	30.2 mph	30.2 mph
Travel Distance (Total)	1022.2 veh-mi/h	1226.6 pers-mi/h
Travel Time (Total)	33.8 veh-h/h	40.6 pers-h/h
Demand Flows (Total)	1629 veh/h	1955 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	0.683	
Practical Spare Capacity	24.4 %	
Effective Intersection Capacity	2383 veh/h	
Control Delay (Total)	3.71 veh-h/h	4.45 pers-h/h
Control Delay (Average)	8.2 sec	8.2 sec
Control Delay (Worst Lane)	14.5 sec	
Control Delay (Worst Movement)	17.7 sec	17.7 sec
Geometric Delay (Average)	4.0 sec	
Stop-Line Delay (Average)	4.2 sec	
Idling Time (Average)	1.0 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	7.1 veh	
95% Back of Queue - Distance (Worst Lane)	179.6 ft	
Queue Storage Ratio (Worst Lane)	0.05	
Total Effective Stops	1196 veh/h	1435 pers/h
Effective Stop Rate	0.73	0.73
Proportion Queued	0.74	0.74
Performance Index	82.3	82.3
Cost (Total)	464.72 \$/h	464.72 \$/h
Fuel Consumption (Total)	37.6 gal/h	
Carbon Dioxide (Total)	336.3 kg/h	
Hydrocarbons (Total)	0.027 kg/h	
Carbon Monoxide (Total)	0.324 kg/h	
NOx (Total)	0.387 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 2.7 %

Number of Iterations: 6 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.1% 1.7% 0.8%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	781,922 veh/y	938,307 pers/y
Delay	1,780 veh-h/y	2,136 pers-h/y
Effective Stops	573,983 veh/y	688,780 pers/y
Travel Distance	490,649 veh-mi/y	588,779 pers-mi/y
Travel Time	16,248 veh-h/y	19,497 pers-h/y
Cost	223,066 \$/y	223,066 \$/y

Fuel Consumption	18,036 gal/y
Carbon Dioxide	161,416 kg/y
Hydrocarbons	13 kg/y
Carbon Monoxide	156 kg/y
NOx	186 kg/y

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## INTERSECTION SUMMARY

**Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - Standard RB - 2035 ]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	27.3 mph	27.3 mph
Travel Distance (Total)	1177.7 veh-mi/h	1413.3 pers-mi/h
Travel Time (Total)	43.2 veh-h/h	51.8 pers-h/h
Demand Flows (Total)	1877 veh/h	2252 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	0.936	
Practical Spare Capacity	-9.2 %	
Effective Intersection Capacity	2005 veh/h	
Control Delay (Total)	8.67 veh-h/h	10.41 pers-h/h
Control Delay (Average)	16.6 sec	16.6 sec
Control Delay (Worst Lane)	38.4 sec	
Control Delay (Worst Movement)	42.1 sec	42.1 sec
Geometric Delay (Average)	3.9 sec	
Stop-Line Delay (Average)	12.7 sec	
Idling Time (Average)	6.0 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	18.5 veh	
95% Back of Queue - Distance (Worst Lane)	474.4 ft	
Queue Storage Ratio (Worst Lane)	0.12	
Total Effective Stops	1851 veh/h	2222 pers/h
Effective Stop Rate	0.99	0.99
Proportion Queued	0.87	0.87
Performance Index	140.0	140.0
Cost (Total)	598.39 \$/h	598.39 \$/h
Fuel Consumption (Total)	45.4 gal/h	
Carbon Dioxide (Total)	406.1 kg/h	
Hydrocarbons (Total)	0.033 kg/h	
Carbon Monoxide (Total)	0.386 kg/h	
NOx (Total)	0.472 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 4.0 %

Number of Iterations: 7 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.0% 1.6% 0.8%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	900,873 veh/y	1,081,048 pers/y
Delay	4,163 veh-h/y	4,995 pers-h/y
Effective Stops	888,622 veh/y	1,066,346 pers/y
Travel Distance	565,319 veh-mi/y	678,383 pers-mi/y
Travel Time	20,737 veh-h/y	24,885 pers-h/y
Cost	287,229 \$/y	287,229 \$/y

Fuel Consumption	21,778 gal/y
Carbon Dioxide	194,908 kg/y
Hydrocarbons	16 kg/y
Carbon Monoxide	185 kg/y
NOx	227 kg/y

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## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - Standard RB - 2040 ]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	17.2 mph	17.2 mph
Travel Distance (Total)	1333.3 veh-mi/h	1599.9 pers-mi/h
Travel Time (Total)	77.4 veh-h/h	92.9 pers-h/h
Demand Flows (Total)	2125 veh/h	2550 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	1.367	
Practical Spare Capacity	-37.8 %	
Effective Intersection Capacity	1554 veh/h	
Control Delay (Total)	37.70 veh-h/h	45.24 pers-h/h
Control Delay (Average)	63.9 sec	63.9 sec
Control Delay (Worst Lane)	191.6 sec	
Control Delay (Worst Movement)	195.6 sec	195.6 sec
Geometric Delay (Average)	3.8 sec	
Stop-Line Delay (Average)	60.0 sec	
Idling Time (Average)	45.3 sec	
Intersection Level of Service (LOS)	LOS E	
95% Back of Queue - Vehicles (Worst Lane)	68.2 veh	
95% Back of Queue - Distance (Worst Lane)	1745.2 ft	
Queue Storage Ratio (Worst Lane)	0.44	
Total Effective Stops	3334 veh/h	4001 pers/h
Effective Stop Rate	1.57	1.57
Proportion Queued	0.93	0.93
Performance Index	327.1	327.1
Cost (Total)	1090.45 \$/h	1090.45 \$/h
Fuel Consumption (Total)	62.6 gal/h	
Carbon Dioxide (Total)	560.2 kg/h	
Hydrocarbons (Total)	0.051 kg/h	
Carbon Monoxide (Total)	0.512 kg/h	
NOx (Total)	0.632 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 5.2 %

Number of Iterations: 8 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.3% 1.2% 0.8%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,019,808 veh/y	1,223,769 pers/y
Delay	18,097 veh-h/y	21,717 pers-h/y
Effective Stops	1,600,336 veh/y	1,920,403 pers/y
Travel Distance	639,979 veh-mi/y	767,975 pers-mi/y
Travel Time	37,158 veh-h/y	44,590 pers-h/y
Cost	523,414 \$/y	523,414 \$/y

Fuel Consumption	30,056 gal/y
Carbon Dioxide	268,887 kg/y
Hydrocarbons	25 kg/y
Carbon Monoxide	246 kg/y
NOx	303 kg/y

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## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - WB Slip Lane - 2020]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	32.0 mph	32.0 mph
Travel Distance (Total)	705.6 veh-mi/h	846.8 pers-mi/h
Travel Time (Total)	22.1 veh-h/h	26.5 pers-h/h
Demand Flows (Total)	1125 veh/h	1350 pers/h
Percent Heavy Vehicles (Demand)	2.0 %	
Degree of Saturation	0.485	
Practical Spare Capacity	75.2 %	
Effective Intersection Capacity	2318 veh/h	
Control Delay (Total)	1.68 veh-h/h	2.02 pers-h/h
Control Delay (Average)	5.4 sec	5.4 sec
Control Delay (Worst Lane)	10.0 sec	
Control Delay (Worst Movement)	10.2 sec	10.2 sec
Geometric Delay (Average)	4.2 sec	
Stop-Line Delay (Average)	1.2 sec	
Idling Time (Average)	0.0 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	4.0 veh	
95% Back of Queue - Distance (Worst Lane)	102.2 ft	
Queue Storage Ratio (Worst Lane)	0.03	
Total Effective Stops	564 veh/h	677 pers/h
Effective Stop Rate	0.50	0.50
Proportion Queued	0.42	0.42
Performance Index	41.5	41.5
Cost (Total)	303.57 \$/h	303.57 \$/h
Fuel Consumption (Total)	25.1 gal/h	
Carbon Dioxide (Total)	224.7 kg/h	
Hydrocarbons (Total)	0.017 kg/h	
Carbon Monoxide (Total)	0.223 kg/h	
NOx (Total)	0.249 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 1.3 %

Number of Iterations: 4 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 91.8% 1.6% 0.9%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	539,896 veh/y	647,875 pers/y
Delay	808 veh-h/y	970 pers-h/y
Effective Stops	270,835 veh/y	325,002 pers/y
Travel Distance	338,710 veh-mi/y	406,453 pers-mi/y
Travel Time	10,591 veh-h/y	12,710 pers-h/y
Cost	145,711 \$/y	145,711 \$/y

Fuel Consumption	12,053 gal/y
Carbon Dioxide	107,842 kg/y
Hydrocarbons	8 kg/y
Carbon Monoxide	107 kg/y
NOx	120 kg/y

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## INTERSECTION SUMMARY

**Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - WB Slip Lane - 2025]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	31.3 mph	31.3 mph
Travel Distance (Total)	862.8 veh-mi/h	1035.3 pers-mi/h
Travel Time (Total)	27.5 veh-h/h	33.0 pers-h/h
Demand Flows (Total)	1376 veh/h	1651 pers/h
Percent Heavy Vehicles (Demand)	3.8 %	
Degree of Saturation	0.603	
Practical Spare Capacity	40.8 %	
Effective Intersection Capacity	2280 veh/h	
Control Delay (Total)	2.32 veh-h/h	2.78 pers-h/h
Control Delay (Average)	6.1 sec	6.1 sec
Control Delay (Worst Lane)	9.8 sec	
Control Delay (Worst Movement)	11.5 sec	11.5 sec
Geometric Delay (Average)	4.1 sec	
Stop-Line Delay (Average)	2.0 sec	
Idling Time (Average)	0.1 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	5.7 veh	
95% Back of Queue - Distance (Worst Lane)	148.4 ft	
Queue Storage Ratio (Worst Lane)	0.04	
Total Effective Stops	795 veh/h	954 pers/h
Effective Stop Rate	0.58	0.58
Proportion Queued	0.57	0.57
Performance Index	55.4	55.4
Cost (Total)	384.98 \$/h	384.98 \$/h
Fuel Consumption (Total)	32.8 gal/h	
Carbon Dioxide (Total)	295.0 kg/h	
Hydrocarbons (Total)	0.023 kg/h	
Carbon Monoxide (Total)	0.289 kg/h	
NOx (Total)	0.467 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 2.0 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.1% 1.8% 1.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	660,379 veh/y	792,455 pers/y
Delay	1,112 veh-h/y	1,335 pers-h/y
Effective Stops	381,502 veh/y	457,802 pers/y
Travel Distance	414,136 veh-mi/y	496,963 pers-mi/y
Travel Time	13,211 veh-h/y	15,854 pers-h/y
Cost	184,793 \$/y	184,793 \$/y

Fuel Consumption	15,752 gal/y
Carbon Dioxide	141,584 kg/y
Hydrocarbons	11 kg/y
Carbon Monoxide	139 kg/y
NOx	224 kg/y

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## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - WB Slip Lane - 2030]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	30.8 mph	30.8 mph
Travel Distance (Total)	1022.2 veh-mi/h	1226.6 pers-mi/h
Travel Time (Total)	33.2 veh-h/h	39.8 pers-h/h
Demand Flows (Total)	1629 veh/h	1955 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	0.683	
Practical Spare Capacity	24.4 %	
Effective Intersection Capacity	2384 veh/h	
Control Delay (Total)	2.99 veh-h/h	3.59 pers-h/h
Control Delay (Average)	6.6 sec	6.6 sec
Control Delay (Worst Lane)	9.8 sec	
Control Delay (Worst Movement)	12.0 sec	12.0 sec
Geometric Delay (Average)	4.0 sec	
Stop-Line Delay (Average)	2.6 sec	
Idling Time (Average)	0.2 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	7.1 veh	
95% Back of Queue - Distance (Worst Lane)	179.3 ft	
Queue Storage Ratio (Worst Lane)	0.05	
Total Effective Stops	1058 veh/h	1270 pers/h
Effective Stop Rate	0.65	0.65
Proportion Queued	0.68	0.68
Performance Index	69.6	69.6
Cost (Total)	451.68 \$/h	451.68 \$/h
Fuel Consumption (Total)	37.1 gal/h	
Carbon Dioxide (Total)	331.6 kg/h	
Hydrocarbons (Total)	0.026 kg/h	
Carbon Monoxide (Total)	0.320 kg/h	
NOx (Total)	0.380 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 2.7 %

Number of Iterations: 6 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.1% 1.6% 0.8%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	781,922 veh/y	938,307 pers/y
Delay	1,436 veh-h/y	1,723 pers-h/y
Effective Stops	508,033 veh/y	609,640 pers/y
Travel Distance	490,649 veh-mi/y	588,778 pers-mi/y
Travel Time	15,915 veh-h/y	19,097 pers-h/y
Cost	216,806 \$/y	216,806 \$/y

Fuel Consumption	17,785 gal/y
Carbon Dioxide	159,175 kg/y
Hydrocarbons	12 kg/y
Carbon Monoxide	154 kg/y
NOx	182 kg/y

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## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - WB Slip Lane - 2035]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	30.2 mph	30.2 mph
Travel Distance (Total)	1177.7 veh-mi/h	1413.3 pers-mi/h
Travel Time (Total)	39.0 veh-h/h	46.9 pers-h/h
Demand Flows (Total)	1877 veh/h	2252 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	0.791	
Practical Spare Capacity	7.5 %	
Effective Intersection Capacity	2373 veh/h	
Control Delay (Total)	4.52 veh-h/h	5.42 pers-h/h
Control Delay (Average)	8.7 sec	8.7 sec
Control Delay (Worst Lane)	11.4 sec	
Control Delay (Worst Movement)	14.2 sec	14.2 sec
Geometric Delay (Average)	3.9 sec	
Stop-Line Delay (Average)	4.8 sec	
Idling Time (Average)	0.6 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	11.9 veh	
95% Back of Queue - Distance (Worst Lane)	302.0 ft	
Queue Storage Ratio (Worst Lane)	0.08	
Total Effective Stops	1482 veh/h	1778 pers/h
Effective Stop Rate	0.79	0.79
Proportion Queued	0.83	0.83
Performance Index	96.6	96.6
Cost (Total)	533.96 \$/h	533.96 \$/h
Fuel Consumption (Total)	43.4 gal/h	
Carbon Dioxide (Total)	388.4 kg/h	
Hydrocarbons (Total)	0.031 kg/h	
Carbon Monoxide (Total)	0.372 kg/h	
NOx (Total)	0.451 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 4.0 %

Number of Iterations: 7 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.0% 1.6% 0.8%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	900,873 veh/y	1,081,048 pers/y
Delay	2,170 veh-h/y	2,604 pers-h/y
Effective Stops	711,166 veh/y	853,399 pers/y
Travel Distance	565,319 veh-mi/y	678,383 pers-mi/y
Travel Time	18,744 veh-h/y	22,492 pers-h/y
Cost	256,302 \$/y	256,302 \$/y

Fuel Consumption	20,830 gal/y
Carbon Dioxide	186,437 kg/y
Hydrocarbons	15 kg/y
Carbon Monoxide	178 kg/y
NOx	216 kg/y

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## INTERSECTION SUMMARY

 **Site: 1 [Smokey Point Blvd at 188th St - 2 Lane - PM - WB Slip Lane - 2040]**

Projected 2035 with Improvements  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	28.2 mph	28.2 mph
Travel Distance (Total)	1333.3 veh-mi/h	1599.9 pers-mi/h
Travel Time (Total)	47.2 veh-h/h	56.7 pers-h/h
Demand Flows (Total)	2125 veh/h	2550 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	0.908	
Practical Spare Capacity	-6.3 %	
Effective Intersection Capacity	2341 veh/h	
Control Delay (Total)	7.99 veh-h/h	9.58 pers-h/h
Control Delay (Average)	13.5 sec	13.5 sec
Control Delay (Worst Lane)	17.7 sec	
Control Delay (Worst Movement)	20.9 sec	20.9 sec
Geometric Delay (Average)	3.8 sec	
Stop-Line Delay (Average)	9.7 sec	
Idling Time (Average)	3.0 sec	
Intersection Level of Service (LOS)	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	21.7 veh	
95% Back of Queue - Distance (Worst Lane)	550.8 ft	
Queue Storage Ratio (Worst Lane)	0.14	
Total Effective Stops	2103 veh/h	2523 pers/h
Effective Stop Rate	0.99	0.99
Proportion Queued	0.94	0.94
Performance Index	143.6	143.6
Cost (Total)	653.04 \$/h	653.04 \$/h
Fuel Consumption (Total)	51.0 gal/h	
Carbon Dioxide (Total)	456.4 kg/h	
Hydrocarbons (Total)	0.037 kg/h	
Carbon Monoxide (Total)	0.431 kg/h	
NOx (Total)	0.535 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Site Model Variability Index (Iterations 3 to N): 5.1 %

Number of Iterations: 8 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.3% 1.2% 0.6%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,019,808 veh/y	1,223,769 pers/y
Delay	3,834 veh-h/y	4,601 pers-h/y
Effective Stops	1,009,396 veh/y	1,211,275 pers/y
Travel Distance	639,979 veh-mi/y	767,974 pers-mi/y
Travel Time	22,674 veh-h/y	27,209 pers-h/y
Cost	313,459 \$/y	313,459 \$/y

Fuel Consumption	24,474 gal/y
Carbon Dioxide	219,050 kg/y
Hydrocarbons	18 kg/y
Carbon Monoxide	207 kg/y
NOx	257 kg/y

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## INTERSECTION SUMMARY

**Site: 101 [Smokey Point Blvd at 180th - 2 Lane - PM - 2025]**

New Site  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	30.5 mph	30.5 mph
Travel Distance (Total)	844.2 veh-mi/h	1013.0 pers-mi/h
Travel Time (Total)	27.7 veh-h/h	33.2 pers-h/h
Demand Flows (Total)	1339 veh/h	1607 pers/h
Percent Heavy Vehicles (Demand)	2.2 %	
Degree of Saturation	0.561	
Practical Spare Capacity	51.6 %	
Effective Intersection Capacity	2389 veh/h	
Control Delay (Total)	2.95 veh-h/h	3.54 pers-h/h
Control Delay (Average)	7.9 sec	7.9 sec
Control Delay (Worst Lane)	9.0 sec	
Control Delay (Worst Movement)	9.0 sec	9.0 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	7.9 sec	
Idling Time (Average)	6.8 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	4.9 veh	
95% Back of Queue - Distance (Worst Lane)	125.7 ft	
Queue Storage Ratio (Worst Lane)	0.03	
Total Effective Stops	96 veh/h	115 pers/h
Effective Stop Rate	0.07	0.07
Proportion Queued	0.19	0.19
Performance Index	47.3	47.3
Cost (Total)	343.24 \$/h	343.24 \$/h
Fuel Consumption (Total)	28.4 gal/h	
Carbon Dioxide (Total)	254.7 kg/h	
Hydrocarbons (Total)	0.019 kg/h	
Carbon Monoxide (Total)	0.251 kg/h	
NOx (Total)	0.275 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 93.7% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	642,783 veh/y	771,339 pers/y
Delay	1,415 veh-h/y	1,698 pers-h/y
Effective Stops	46,005 veh/y	55,206 pers/y
Travel Distance	405,194 veh-mi/y	486,232 pers-mi/y
Travel Time	13,299 veh-h/y	15,959 pers-h/y
Cost	164,753 \$/y	164,753 \$/y

Fuel Consumption	13,655 gal/y
Carbon Dioxide	122,235 kg/y
Hydrocarbons	9 kg/y
Carbon Monoxide	120 kg/y
NOx	132 kg/y

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## INTERSECTION SUMMARY

 **Site: 101 [Smokey Point Blvd at 183rd - 2 Lane - PM - 2025 ]**

New Site  
 Site Category: (None)  
 Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	30.9 mph	30.9 mph
Travel Distance (Total)	783.0 veh-mi/h	939.6 pers-mi/h
Travel Time (Total)	25.3 veh-h/h	30.4 pers-h/h
Demand Flows (Total)	1242 veh/h	1491 pers/h
Percent Heavy Vehicles (Demand)	3.0 %	
Degree of Saturation	0.527	
Practical Spare Capacity	61.4 %	
Effective Intersection Capacity	2359 veh/h	
Control Delay (Total)	2.59 veh-h/h	3.11 pers-h/h
Control Delay (Average)	7.5 sec	7.5 sec
Control Delay (Worst Lane)	8.3 sec	
Control Delay (Worst Movement)	8.3 sec	8.3 sec
Geometric Delay (Average)	0.0 sec	
Stop-Line Delay (Average)	7.5 sec	
Idling Time (Average)	7.0 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	4.4 veh	
95% Back of Queue - Distance (Worst Lane)	111.4 ft	
Queue Storage Ratio (Worst Lane)	0.03	
Total Effective Stops	26 veh/h	32 pers/h
Effective Stop Rate	0.02	0.02
Proportion Queued	0.09	0.09
Performance Index	36.5	36.5
Cost (Total)	314.57 \$/h	314.57 \$/h
Fuel Consumption (Total)	26.9 gal/h	
Carbon Dioxide (Total)	240.9 kg/h	
Hydrocarbons (Total)	0.018 kg/h	
Carbon Monoxide (Total)	0.238 kg/h	
NOx (Total)	0.324 kg/h	

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 93.5% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	596,348 veh/y	715,617 pers/y
Delay	1,244 veh-h/y	1,493 pers-h/y
Effective Stops	12,717 veh/y	15,260 pers/y
Travel Distance	375,852 veh-mi/y	451,023 pers-mi/y
Travel Time	12,148 veh-h/y	14,578 pers-h/y
Cost	150,992 \$/y	150,992 \$/y

Fuel Consumption	12,889 gal/y
Carbon Dioxide	115,631 kg/y
Hydrocarbons	9 kg/y
Carbon Monoxide	114 kg/y
NOx	155 kg/y

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HCM 6th TWSC  
107: Smokey Point Blvd & 180th St NE

09/23/2021

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔		
Traffic Vol, veh/h	12	32	31	646	497	8
Future Vol, veh/h	12	32	31	646	497	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	35	34	702	540	9

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	1315	545	549	0	0
Stage 1	545	-	-	-	-
Stage 2	770	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-
Pot Cap-1 Maneuver	174	538	1021	-	-
Stage 1	581	-	-	-	-
Stage 2	457	-	-	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	164	538	1021	-	-
Mov Cap-2 Maneuver	164	-	-	-	-
Stage 1	549	-	-	-	-
Stage 2	457	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.7	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1021	-	332	-	-
HCM Lane V/C Ratio	0.033	-	0.144	-	-
HCM Control Delay (s)	8.6	0	17.7	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

HCM 6th TWSC  
110: Smokey Point Blvd & 183th PI NE

09/23/2021

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	T		T			T
Traffic Vol, veh/h	6	4	635	9	7	482
Future Vol, veh/h	6	4	635	9	7	482
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	4	690	10	8	524

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1235	695	0	0	700
Stage 1	695	-	-	-	-
Stage 2	540	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	195	442	-	-	897
Stage 1	495	-	-	-	-
Stage 2	584	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	192	442	-	-	897
Mov Cap-2 Maneuver	192	-	-	-	-
Stage 1	495	-	-	-	-
Stage 2	576	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	20.2	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	248	897
HCM Lane V/C Ratio	-	-	0.044	0.008
HCM Control Delay (s)	-	-	20.2	9
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.1	0

## MEMORANDUM

<b>Date:</b>	June 11, 2021	<b>TG:</b> 1.21064/1.21086
<b>To:</b>	Jesse Hannahs, PE, City of Marysville Ryan Morrison, PE, City of Arlington	
<b>From:</b>	Brent Turley, PE Transpo Group	
<b>cc:</b>	Jon Pascal, PE, Transpo Group Jeff Laycock, PE, City of Marysville Nova Heaton, City of Arlington	
<b>Subject:</b>	Marysville-Arlington CIC Transportation Network Analysis	

The purpose of this memorandum is to document the process and findings of the Marysville-Arlington CIC Transportation Network Analysis. This analysis is meant to redefine and confirm the internal CIC transportation network to be supportive of the adopted Comprehensive Plans by each City, but also reflect known development proposals and environmental constraints. Background information is first presented, then the network alternatives analysis and findings are then discussed.

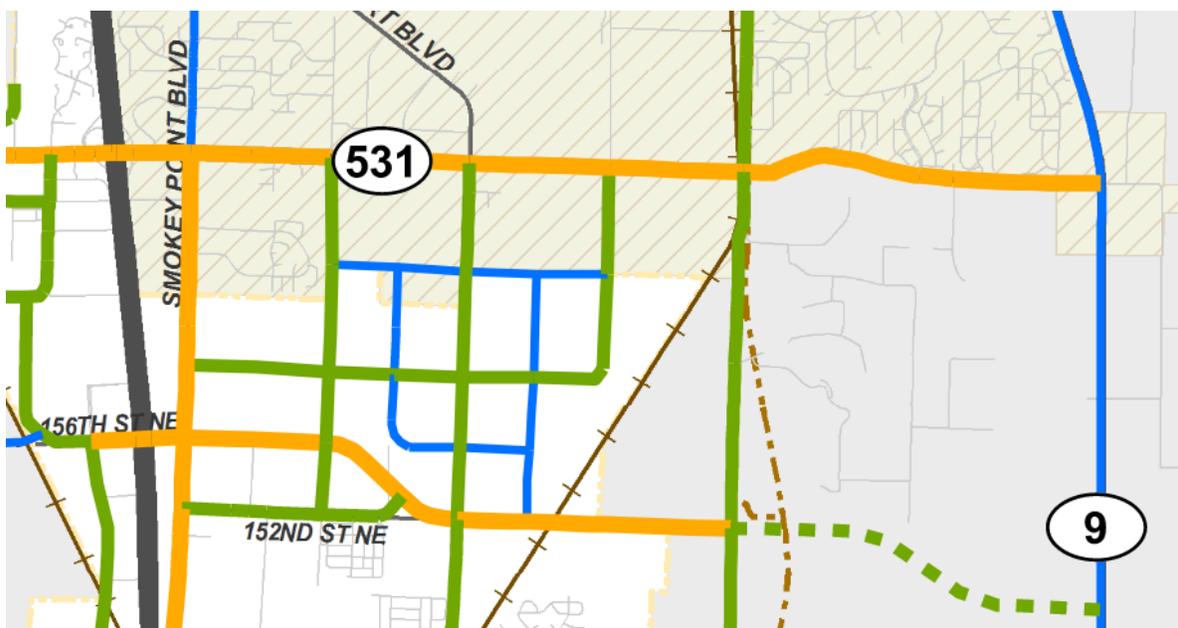
### Background

The Comprehensive Plans of Marysville and Arlington indicate a series of arterial roadways within the CIC area that were intended to support future development. The main intent of the network was to take traffic pressure off the major arterials (and major intersections) by providing more direct routes to desired destinations, or alternate routes given likely peak period congestion. Figures 1 and 2 show the anticipated supporting internal roadways in Marysville and Arlington.

One major element was to provide alternative routes to 51st Avenue NE to allow for the corridor to remain as a three-lane facility through the City of Marysville. Past analysis has shown that connecting 156th Street NE directly east to 51st Avenue NE would overload 51st Avenue NE and create a problematic intersection at 51st Avenue NE/152nd Street intersection with very high left-turning traffic. To avoid potential future bottlenecks, the 156th Street NE corridor transitions to the 152nd Street NE alignment in the vicinity of 47th Avenue NE (see Figure 1). Any direct connection between 156th Street NE and 51st Avenue, even for local streets is to be avoided.

With more detailed development applications being presented to each City, it became clear that the supporting network alignments in the CIC would need to be updated for the following reasons:

1. Environmental constraints make the construction of certain roadway segments not feasible. With key street connections in doubt, it calls into question the effectiveness of future network plan.
2. Street network density does not match desired industrial developments. In other words, the proposed industrial building site plans can require a half-mile area, and the proposed grid system only allows quarter-mile areas.



(Source: Comprehensive Plan Transportation Element, City of Marysville, 2015)

Figure 1. Example of City of Marysville Planned Supporting Network



(Source: Smokey Point Transportation Improvement Plan, City of Arlington, 2021)

Figure 2. Example of City of Arlington Planned Supporting Network

## Alternatives Analysis

To evaluate potential changes to the CIC transportation network, a series of network alternatives were evaluated. The key goals, network alternatives, analysis, and city coordination are discussed in the following sections.

### Key Goals

The following key goals were established to help guide the network alternatives and supporting analysis. They include:

- Avoid expanding 51st Avenue NE beyond a three-lane facility
- Leave the most buildable land possible for each parcel in area
- Avoid sensitive areas and other feasibility issues

In addition to these goals, the major outcome of the alternatives analysis was to identify the CIC transportation network corridors so that right-of-way can be preserved and the roadways eventually built. This includes identifying the general cross-section needs of the corridor and the type of traffic control that would be necessary at the major intersections in the CIC.

### Transportation Network Alternatives

Four CIC transportation network alternatives were developed for the purposes of this study as shown in Attachments 1-4.

**Scenario 1** represents the “No Change” scenario, which provides the network as envisioned by the Arlington and Marysville adopted Comprehensive Plans. However, some roadway segments that were unlikely to be built due to environmental or new development constraints were removed. The most notable change is that a proposed north-south minor arterial roadway at 43rd Avenue NE is not expected to be built within the CIC.

Minor arterials were assumed to be 35 mph roadway facilities with traffic controls favoring through movements to promote greater mobility. Collector streets were assumed to be 30 mph roadway facilities, and are meant to support minor and principal arterials.

**Scenario 2** provides a minor arterial at 43rd Avenue NE that bends to become 164th Street NE. The goal with this alternative is to funnel more traffic from the center of the CIC area to use this 164th Street NE/43rd Avenue NE corridor, to reduce overall traffic volumes on 51st Avenue NE so it can continue to function as a 3-lane roadway. This scenario also removes the 43rd Avenue NE connection to 152nd Street NE because 43rd Avenue NE no longer is a complete north-south corridor, and it allows more buildable acres. Similarly, 47th Avenue NE (south of 164th Street NE) and 156th Place NE collector streets were removed to increase buildable areas. The 166th Street NE collector street was also removed as it was considered redundant with the parallel 168th Street NE corridor.

**Scenario 3** is similar to Scenario 2, but 43rd Avenue NE bends to become 47th Avenue NE in Arlington to avoid environmental constraints but still create a north-south minor arterial connection between 156th Street NE and 168th Street NE, as an alternative to 51st Avenue NE. This alternative also upgrades the 168th Street NE corridor to a minor arterial (rather than collector street) between 47th Avenue NE and 59th Avenue NE. The 168th Street NE change is meant to divert traffic away from the 172nd Street NE corridor and also guide traffic directly to the new 47th/43rd Avenue NE north-south corridor. The section of 43rd Avenue NE south of 156th Street NE continued to be omitted from this Scenario in favor of more buildable parcel areas.

**Scenario 4** is similar to Scenario 3, but shifts the north-south minor arterial to 47th Avenue NE in Marysville. Having a good north-south parallel corridor to 51st Avenue NE reduces the level of traffic on 51st Avenue NE. This scenario also assumes this corridor is extended south to 152nd Street NE (near 44th Avenue NE intersection). This is meant to remove the need of a traffic signal at the 156th Street NE/ 152nd Street NE intersection, which would decrease overall delays along the 156th/152nd Street NE east-west corridor. However, this short section south of 156th Street does reduce some developable acres.

### Forecast and Analysis

The volume forecasts were based on existing traffic counts in the area (pre-COVID) and forecasted land use growth provided by the City of Marysville Travel Demand Model (Marysville Model). The model land use was based on the “2035 Plan” version of the model, with minor adjustments. Land use in some CIC traffic analysis zones (TAZs) were shifted to neighboring TAZs to balance expected growth more evenly, which is more consistent with the number and scale of development proposals submitted to the Cities. However, the total land use in the CIC remained the same.

The land use in the Marysville Model was cross-referenced with land use in the Arlington Travel Demand Model (Arlington Model). The Arlington Model was developed after the Marysville Model and adopted many of the same land use and model parameters. However, the City of Arlington adjusted land use within their jurisdiction based on the City’s adopted Comprehensive Plan and local knowledge of the area. For the CIC area along 172nd Street NE, the Arlington Model generally assumes less growth than the Marysville Model. For the purposes of this study, the analysis used the higher land use in the Marysville Model to conservatively forecast traffic growth in the area.

Major intersections in the CIC area were evaluated using Highway Capacity Manual (TRB, 2016) methods for level of service (LOS). LOS is average delays at the intersection during peak traffic conditions, assumed to be the PM peak hour, and are given a letter grade A (good operations) through F (poor operations). Synchro software was used for stop-controlled and signalized intersections. Sidra software was used for roundabout intersections. Attachment 5 shows the study intersection locations.

The City of Marysville has an LOS Standard of LOS D for all signalized intersection and intersections of two or more arterials, except for a few selected corridors in the City where the standard is LOS E. The LOS Standard for unsignalized intersections is also LOS D. For the purposes of this analysis, the Marysville Standard is LOS D for CIC study intersections.

The City of Arlington has an LOS Standard of LOS D for all City arterials, and LOS C for other City streets. Nearly every study intersection involves at least one arterial. For the purposes of this analysis, the Arlington Standard is LOS D for CIC study intersections.

Table 1 shows the results of the intersection analysis by scenario. Intersection traffic control was selected based on traffic volumes. If poor LOS was expected (generally LOS E or F), the traffic control or channelization was updated to achieve acceptable LOS. Table 2 shows a comparison of the alternatives to the overall study goals. Detailed LOS worksheets are included as attachments.

As shown in Table 1, most study intersections are expected to operate at LOS D or better given the traffic control listed in the table. The intersection of 160th Street NE/59th Avenue is shown as LOS E in Scenario 4, but could be mitigated with a signal if needed.

The intersection of 152nd Street NE/51st Avenue NE is LOS E in all scenarios, but Scenarios 2, 3, and 4 show much improvement compared to Scenario 1. It is difficult to reduce the LOS to D without significant widening to the 51st Avenue NE corridor. For the purposes of this study and

given the study goals, this intersection was left at LOS E. It is recommended that the City of Marysville change its LOS standard for this intersection to LOS E, reflecting build-out conditions.

**Table 1. Future Intersection Traffic Control and Level of Service**

Intersection <sup>1</sup>	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
	Control <sup>2</sup>	LOS <sup>3</sup>	Control	LOS	Control	LOS	Control	LOS
<b>172nd Street NE Corridor</b>								
1. 172nd St NE/ 43rd Ave NE	RAB2	A (9)	RAB2	A (9)	RAB2	A (9)	RAB2	A (9)
2. 172nd St NE/ 51st Ave NE	RAB2	A (9)	RAB2	A (9)	RAB2	A (9)	RAB2	A (9)
3. 172nd St NE/ 59th Ave NE	RAB2	B (10)	RAB2	B (10)	RAB2	B (10)	RAB2	B (10)
4. 172nd St NE/ 63rd Ave NE	RAB2	A (8)	RAB2	A (8)	RAB2	A (8)	RAB2	A (8)
<b>168th/169th Street NE Corridor</b>								
5. 169th St NE/ Smokey Point Blvd	Signal	D (55)	Signal	D (55)	Signal	D (55)	Signal	D (51)
6. 168th St NE/ 47th Ave NE	TWSC	D (34)	TWSC	C (19)	Signal	B (19)	Signal	C (21)
7. 168th St NE/ 51st Ave NE	RAB	A (9)	RAB	A (9)	RAB2	A (9)	RAB	C (21)
8. 168th St NE/ 59th Ave NE	RAB	A (9)	RAB	B (11)	RAB	B (18)	RAB	B (18)
<b>City Boundary Intersections</b>								
9. 166th St NE/ 47th Ave NE	TWSC	B (15)	---	---	---	---	---	---
10. 165th St NE/ 47th Ave NE	---	---	---	---	TWSC	B (15)	---	---
11. 165th St NE/ 51st Ave NE	---	---	---	---	TWSC	B (14)	---	---
12. 164th St NE/ 47th Ave NE	---	---	TWSC	C (20)	---	---	---	---
13. 164th St NE/ 51st Ave NE	---	---	RAB	A (7)	---	---	---	---
<b>160th Street NE Corridor</b>								
14. 160th St NE/ Smokey Point Blvd	Signal	C (32)	Signal	C (36)	Signal	C (34)	Signal	D (46)
15. 160th St NE/ 43rd Ave NE	Signal	C (33)	Signal	D (51)	Signal	D (49)	---	---
16. 160th St NE/ 47th Ave NE	---	---	---	---	---	---	Signal	D (55)
17. 160th St NE/ 51st Ave NE	Signal	D (41)	Signal	D (55)	Signal	D (50)	Signal <sup>4</sup>	C (34)
18. 160th St NE/ 59th Ave NE	TWSC	C (25)	Signal	C (22)	TWSC	D (31)	TWSC	E (43)
<b>156th/152nd Street NE Corridors</b>								
19. 156th St NE/ 43rd Ave NE	Signal	C (35)	Signal	C (30)	Signal	C (32)	---	---
20. 156th St NE/ 47th Ave NE	---	---	---	---	---	---	Signal	D (39)
21. 152nd St NE/ 44th Ave NE	---	---	---	---	---	---	Signal	C (31)
22. 152nd St NE/ 51st Ave NE	Signal	E (78)	Signal	E (62)	Signal	E (66)	Signal	E (65)
23. 152nd St NE/ 59th Ave NE	Signal	B (16)	Signal	B (16)	Signal	B (16)	Signal	B (14)

Source: Transpo Group, 2021

- Attachment 5 shows a map of the study intersections.
- Assigned traffic control for intersection. TWSC = Two-way-stop-control; RAB = One-lane Roundabout; RAB2 = Two-lane Roundabout
- Level of Service (A-F) and average delay in seconds. For TWSC, delay is for worst movement. For all others, delay is average for all movements.
- For Scenario 4, the 160th St NE/ 47th Ave NE intersection was assumed to have right-turn lanes for all approaches. All other scenarios no separate right-turn lanes are assumed.

**Table 2. Comparison of Alternatives to Study Goals**

	Goal 1	Goal 2	Goal 3
	Avoid expanding 51st Avenue NE beyond a three-lane facility	Leave the most buildable land possible for each parcel in area	Avoid sensitive areas and other feasibility issues
<b>Scenario 1</b>	<p>With no major parallel corridor west of 51st Avenue NE, this scenario has the highest traffic volumes along mid-section of 51st corridor. The intersection of 51st Avenue NE/152nd Street NE has the worst LOS, with delays approaching the LOS F threshold. The delays at this intersection suggest that 51st Avenue NE may need to be expanded beyond 3 lanes.</p>	<p>This scenario creates several parcels with 3 or 4 frontages, which can remove a large amount of land from being developed, or limit parcel assemblages. The area most impacted is between 43rd Avenue NE and 51st Avenue NE in Marysville.</p> <p>The 166th Street NE corridor may also unnecessarily remove frontage areas from development.</p>	<p>Scenario 1 was developed by removing roads in environmental sensitive areas.</p>
<b>Scenario 2</b>	<p>With the eastern terminus of the new 43rd Avenue NE/164th Street NE corridor at 51st Avenue NE, this still puts pressure on the 51st Avenue NE corridor. However it is expected that a 3-lane 51st corridor is sufficient. Operations at 51st Avenue NE/152nd Street NE is much better than Scenario 1.</p> <p>It should be noted that Scenario 2 removes the 156th Place NE collector road that provides an alternate route to 160th Street NE. This puts added pressure on the 51st Avenue NE/160th Street NE intersection. If a collector street isn't feasible, orienting major access points to 160th Street NE rather than 51st Avenue would help the 51st corridor. Same for Scenario 2 and 3.</p>	<p>Scenario 2 attempts to remove to buildable land concerns as noted in Scenario 1.</p> <p>43rd Avenue NE south of 156th Street NE was also removed to increase buildable areas.</p>	<p>In Scenario 2, the 43rd Avenue corridor creates a natural boundary at the edge of environmentally sensitive areas. The road is shifted slightly east to account for anticipated buffers.</p>
<b>Scenario 3</b>	<p>The 51st corridor volumes are generally lower than Scenario 2. This is due to a more defined north-south arterial west of the 51st corridor.</p> <p>Scenario 3 also shifts east-west traffic from 172nd Street NE corridor to 168th Street NE. This creates more east-west traffic crossing the 51st corridor.</p>	<p>Scenario 3 has many of the same benefits to buildable land as Scenario 2.</p> <p>The main drawback is that the curved corridor near 165th Street NE/47th Avenue NE may create one awkward parcel for development.</p>	<p>Scenario 3 is very similar to Scenario 2 in avoiding sensitive areas.</p>
<b>Scenario 4</b>	<p>Similar comments as Scenario 3, but 51st corridor volumes are generally lower than Scenario 3 and much lower than Scenario 2.</p>	<p>Scenario 4 has similar benefits as Scenarios 2 and 3, but does limit parcel assemblages east-west across the 47th Avenue NE corridor.</p> <p>The small connection of 47th Avenue NE south to 152nd Street NE does use more buildable land.</p>	<p>Scenario 4 also avoids sensitive areas.</p> <p>This scenario also tries to avoid a feasibility issue by removing the signal at 152nd/156th Street NE, which potentially was too close to the proposed 47th Avenue NE/156th Street NE signal.</p>

Source: Transpo Group, 2021

Based on the analysis results shown in Tables 1 and 2, both Scenarios 3 and 4 best met the study objectives.

### City Coordination

The project team met with City of Arlington and City of Marysville staff several times during April and May 2021 to discuss the scenario network alignments, traffic controls, and analysis findings. The following are major points based on feedback from staff from each City.

#### *City of Arlington Areas*

- The 59th Avenue NE corridor is a key north-south corridor for CIC area. This corridor guides traffic directly to the new 152nd Street NE corridor to the south and the 172nd Street NE corridor to the north.
- The 63rd Avenue NE/172nd Street NE intersection is critical to the success of the CIC network. Without this connection to 172nd Street NE, CIC-generated traffic in that area would be concentrated at the 59th Avenue NE/172nd Street NE intersection and cause a traffic bottleneck for both north-south traffic and east-west traffic. As mentioned above, the 59th Avenue NE corridor is a key corridor; the 63rd Avenue NE/172nd Street NE intersection is needed to make the 59th Avenue NE corridor and 172nd Avenue NE corridor work effectively.
- City of Arlington noted that the area just south of the 43rd Avenue NE/169th Street NE intersection, and west of the Olympic Pipeline, is planned for a recreational/open space area. In other words, a south leg at the 43rd Avenue NE/169th Street NE is not considered feasible.
- While most new major intersections in the City of Arlington are roundabouts, the intersection of 47th Avenue NE/168th Street NE would be difficult to convert into a roundabout due to approved developments in the area. A traffic signal is recommended if more traffic controls are needed.

#### *City of Marysville Areas*

- At the intersection of 51st Avenue NE/160th Street NE, the City of Marysville is already requiring right-turn lanes to be provided on all approaches. This is consistent with the assumptions in Scenario 4.
- For Scenario 4, the City of Marysville was concerned about having two closely spaced signalized intersections along the 156th Street NE corridor at 47th Avenue NE and at 152nd Street NE. This is mitigated by providing a short 47th Avenue NE connection south to 152nd Street NE and removing the signal at the 152nd/156th Street NE intersection. Specific analysis of this trade-off (short connection versus two corridor signals) should be revisited as the area gets developed.
- Based on feedback from each city, Scenario 4 is considered the Preferred Scenario. Scenario 3 leaves some significant questions regarding feasibility of 43rd Avenue NE between 156th Street NE and 160th Street NE due to wetlands and dividing parcels in a way that could limit development in the area.

### Preferred Scenario Intersection Design Details

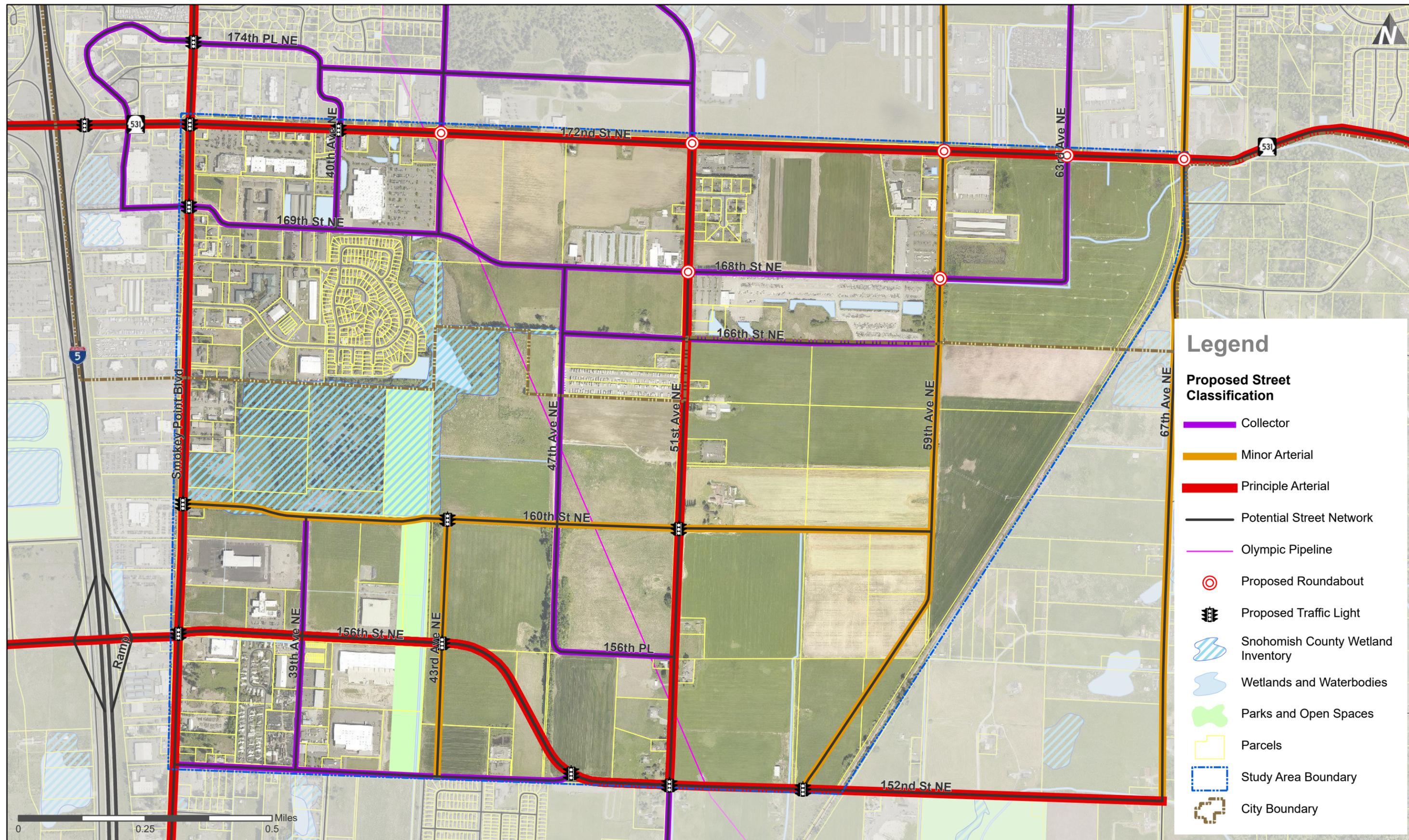
Table 3 provides the intersection traffic control and channelization details assumed for each study intersection. It should be noted that the 172nd Street NE corridor is expected to be evaluated in much more detail by the City of Arlington in the coming months, and that analysis will better determine intersection geometry for those study intersections.

**Table 3. Preferred Scenario: Intersection Traffic Control and Channelization**

Intersection <sup>1</sup>	Control <sup>2</sup>	Channelization <sup>3</sup>				Comments <sup>4</sup>
		EB	WB	NB	SB	
<b>172nd Street NE Corridor</b>						
1. 172nd St NE/ 43rd Ave NE	RAB2	LT-TR	LT-TR	LT-TR	LT-TR	North-south movements may be simplified to a single through movement
2. 172nd St NE/ 51st Ave NE	RAB2	LT-TR	LT-TR	LT-TR	LT-TR	North-south movements may be simplified to a single through movement
3. 172nd St NE/ 59th Ave NE	RAB2	LT-TR	LT-TR	LT-TR	LT-TR	North-south movements may be simplified to a single through movement
4. 172nd St NE/ 63rd Ave NE	RAB2	LT-TR	LT-TR	L-T-R	LT-R	
<b>168th/169th Street NE Corridor</b>						
5. 169th St NE/ Smokey Point Blvd	Signal	L-TR	L-TR	L-T-TR	L-T-TR	
6. 168th St NE/ 47th Ave NE	Signal	TR	L-T	L-R	---	Each road is assumed to be a 3-lane street
7. 168th St NE/ 51st Ave NE	RAB	LTR	LTR	LTR	LTR	Given the nature of 51st Ave NE and variability of potential developments, a larger roundabout footprint should be preserved.
8. 168th St NE/ 59th Ave NE	RAB	LTR	LTR	LTR	LTR	
<b>160th Street NE Corridor</b>						
14. 160th St NE/ Smokey Point Blvd	Signal	---	L-R	T-TR	L-T-TR	
16. 160th St NE/ 47th Ave NE	Signal	L-TR	L-TR	L-TR	L-TR	
17. 160th St NE/ 51st Ave NE	Signal	L-T-R	L-T-R	L-T-R	L-T-R	Given the nature of 51st Ave NE and variability of potential developments, right-turn lanes are proposed for all legs
18. 160th St NE/ 59th Ave NE	TWSC	L-R	---	L-T	TR	
<b>156th/152nd Street NE Corridors</b>						
20. 156th St NE/ 47th Ave NE	Signal	L-T-TR	L-T-TR	L-TR	L-TR	If the south leg does not extend south to 152nd St NE, then the SB approach should be LT-R.
21. 152nd St NE/ 44th Ave NE	Signal	L-TR	L-TR	L-TR	L-TR	
22. 152nd St NE/ 51st Ave NE	Signal	L-T-T-R	L-T-T-R	L-T-R	L-T-R	This represents the maximum that this intersection can be widened. LOS standard may need to be LOS E to avoid further widening.
23. 152nd St NE/ 59th Ave NE	Signal	L-T-T	T-TR	---	L-R	

Source: Transpo Group, 2021

- Attachment 5 shows a map of the study intersections.
- Assigned traffic control for intersection. TWSC = Two-way-stop-control; RAB = One-lane Roundabout; RAB2 = Two-lane Roundabout
- Channelization for each intersection approach (EB = Eastbound, etc.). The channelization code represents the lane-by-lane assignment with lanes separated by a hyphen: L = left-turn lane only; T = through lane only; R = right-turn lane only; LT = shared left-turn and through lane; TR = shared right-turn and through lane; LTR = shared left-through-right lane.



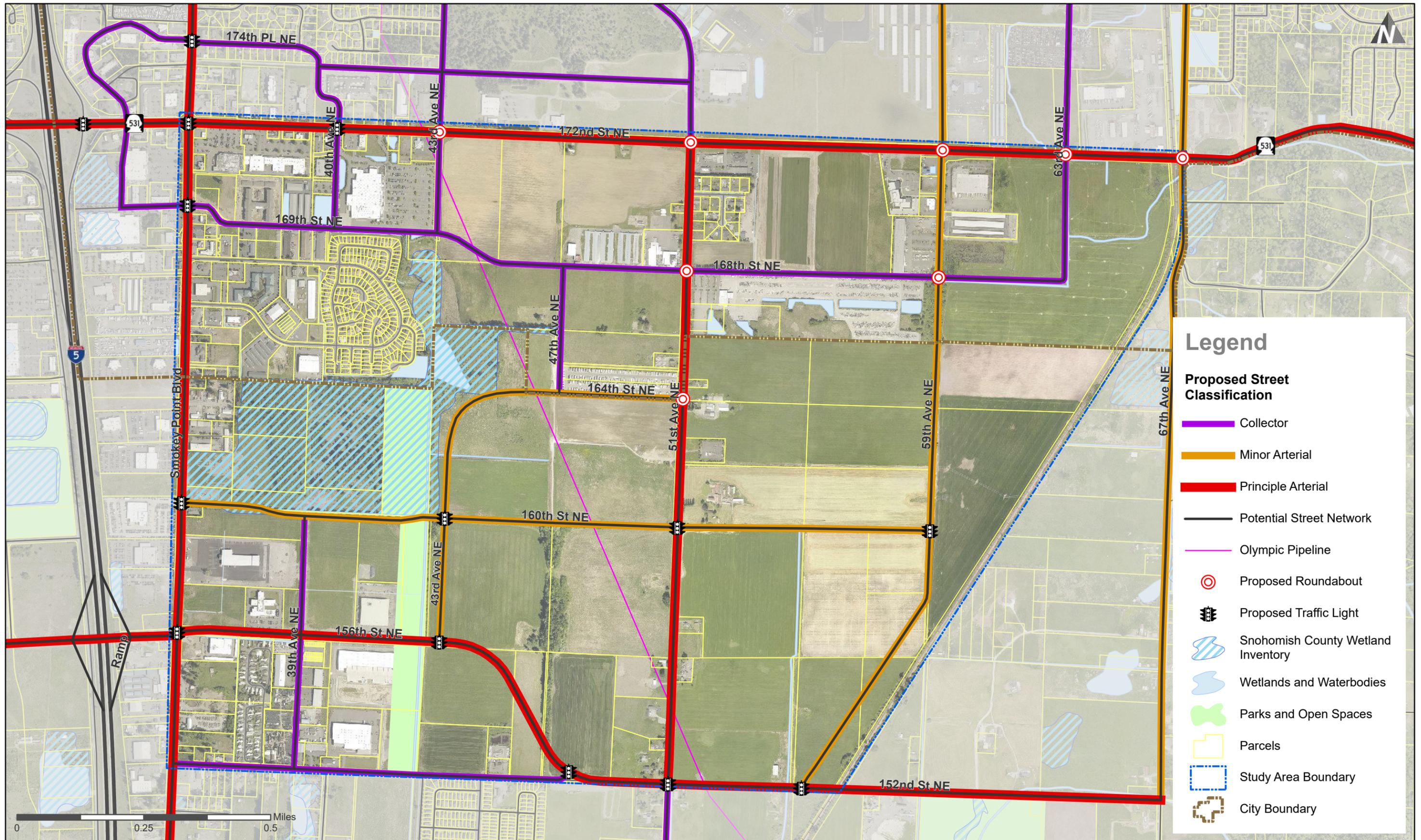
### Legend

**Proposed Street Classification**

- Collector
- Minor Arterial
- Principle Arterial
- Potential Street Network

Olympic Pipeline

- Proposed Roundabout
- Proposed Traffic Light
- Snohomish County Wetland Inventory
- Wetlands and Waterbodies
- Parks and Open Spaces
- Parcels
- Study Area Boundary
- City Boundary



### Legend

**Proposed Street Classification**

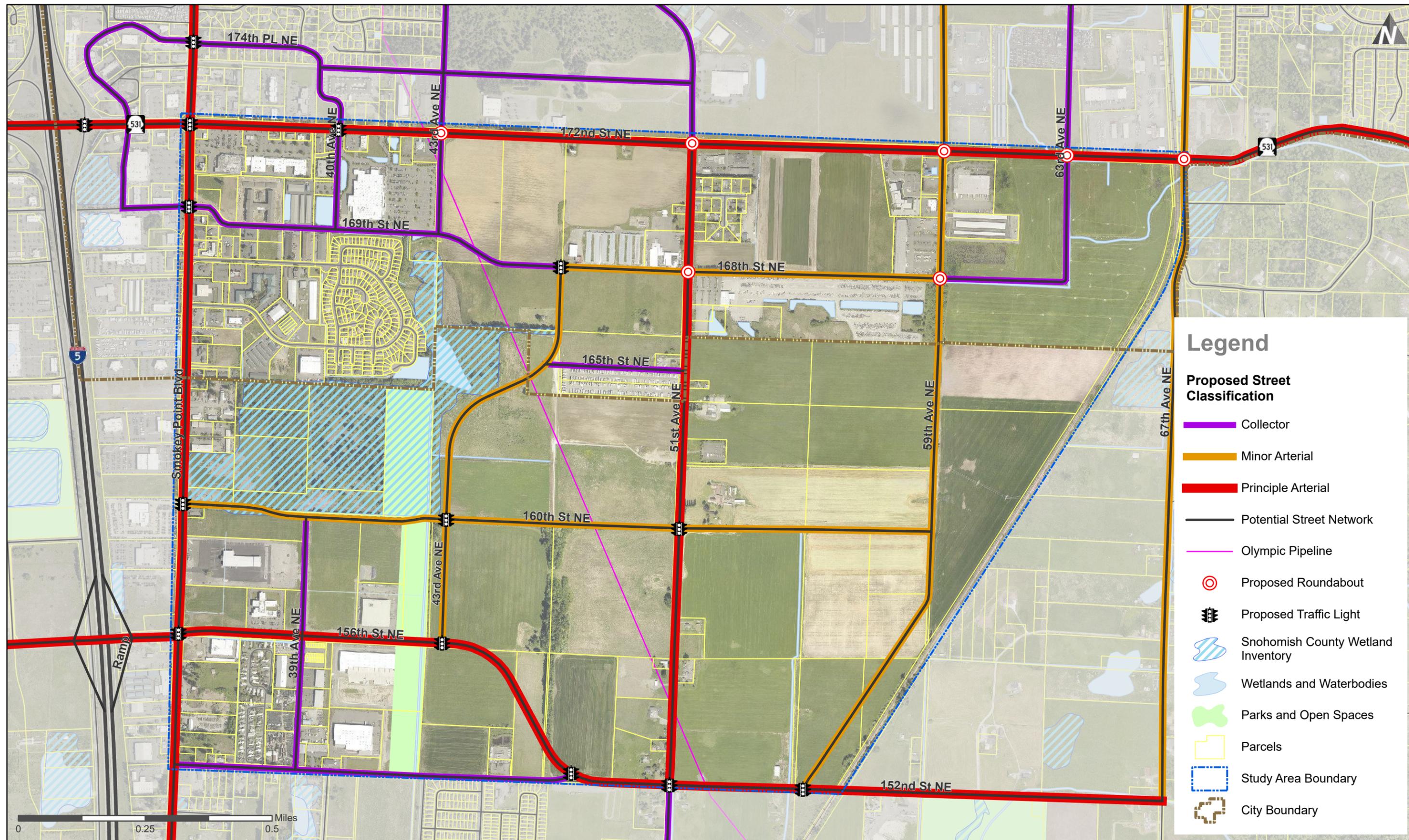
- Collector
- Minor Arterial
- Principle Arterial

**Potential Street Network**

- Potential Street Network

**Other Features**

- Olympic Pipeline
- Proposed Roundabout
- Proposed Traffic Light
- Snohomish County Wetland Inventory
- Wetlands and Waterbodies
- Parks and Open Spaces
- Parcels
- Study Area Boundary
- City Boundary



### Legend

**Proposed Street Classification**

- Collector
- Minor Arterial
- Principle Arterial
- Potential Street Network
- Olympic Pipeline

Proposed Roundabout

Proposed Traffic Light

Snohomish County Wetland Inventory

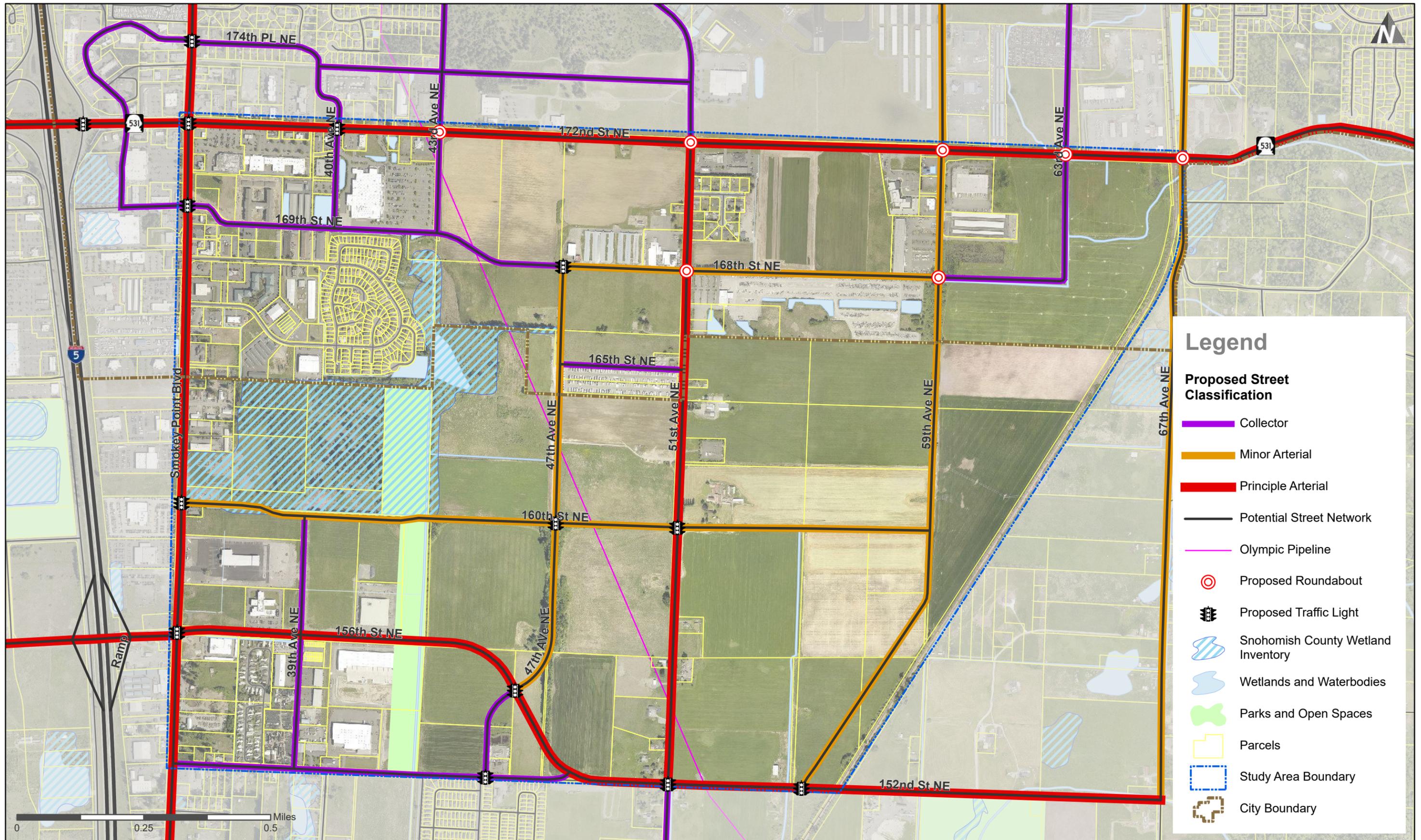
Wetlands and Waterbodies

Parks and Open Spaces

Parcels

Study Area Boundary

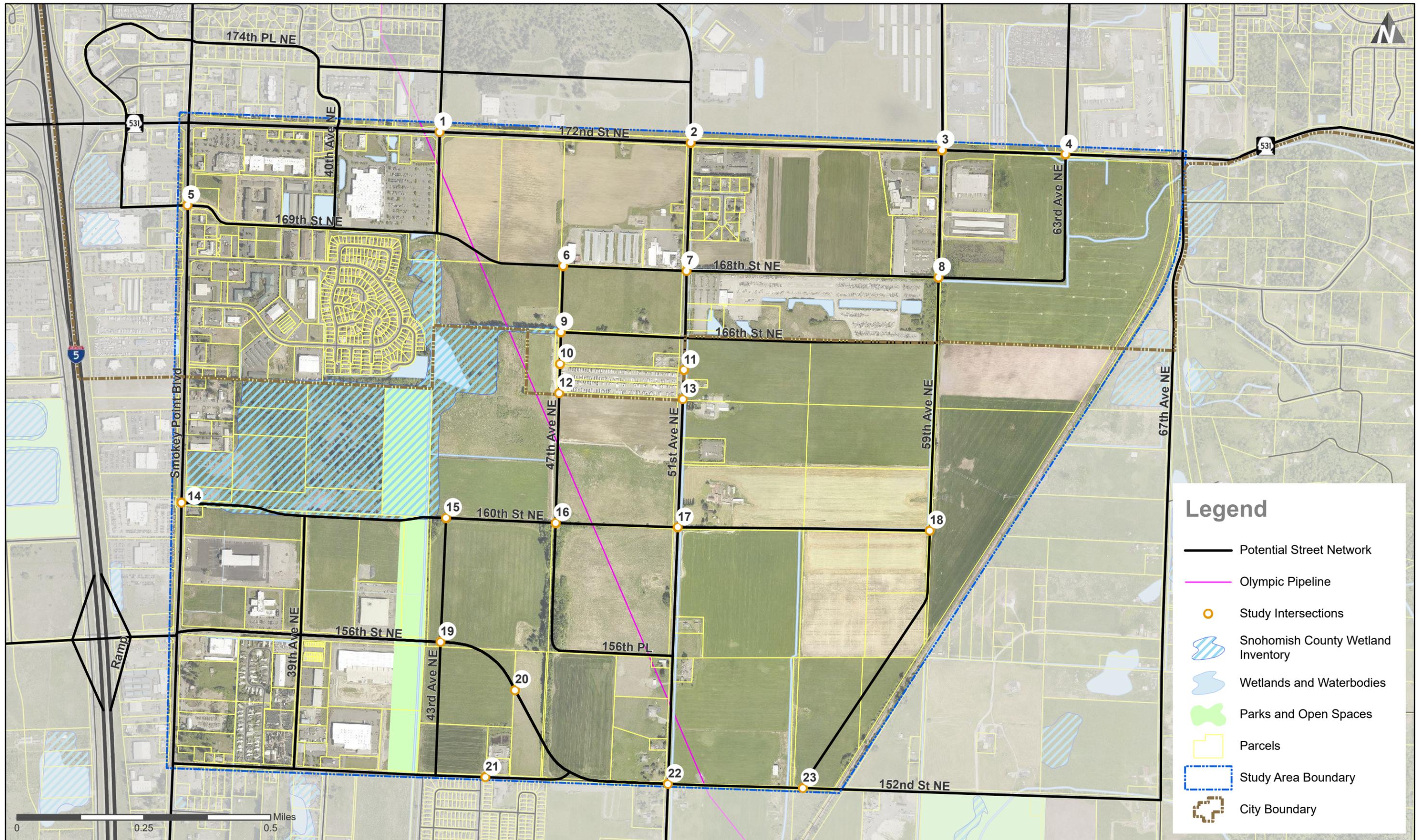
City Boundary



### Legend

**Proposed Street Classification**

- Collector
- Minor Arterial
- Principle Arterial
- Potential Street Network
- Olympic Pipeline
- ⊙ Proposed Roundabout
- ⚡ Proposed Traffic Light
- ▨ Snohomish County Wetland Inventory
- Wetlands and Waterbodies
- Parks and Open Spaces
- ▭ Parcels
- ▭ Study Area Boundary
- ▭ City Boundary



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### Meetings

Calendar

January 2022

Su	M	Tu	W	Th	F	Sa
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

View All

### Events

**Tue Jan. 11**  
[Airport Commission Meeting](#)  
[Read On](#)

**Wed Jan. 12**  
[Civil Service Commission Meeting](#)  
[Read On](#)

**Wed Jan. 12**  
[Civil Service Commission Meeting](#)  
[Read On](#)

Select Language
 Select Language

**PROFESSIONAL SERVICES AGREEMENT**

THIS AGREEMENT, is made and entered into in duplicate this \_\_\_\_ day of \_\_\_\_\_, 20\_\_, by and between the CITY OF ARLINGTON, a Washington municipal corporation, hereinafter referred to as the "CITY" and \_\_\_\_\_ (CONSULTANT NAME) hereinafter referred to as the "PROFESSIONAL."

IN CONSIDERATION of the terms, conditions, and covenants contained herein, the parties hereto agree as follows:

**1. SCOPE OF SERVICES**

The PROFESSIONAL shall perform such services and accomplish such tasks, including the furnishing of all materials and equipment necessary for full performance thereof, as are identified and designated as PROFESSIONAL responsibilities throughout this Agreement and as detailed in Exhibit "A" \_\_\_\_\_ (PROJECT NAME) attached hereto and incorporated herein (the "Project").

**2. TERM**

The Project shall begin upon full execution of this Agreement and shall be completed no later than \_\_\_\_\_, 20\_\_, unless sooner terminated according to the provisions herein.

**3. COMPENSATION AND METHOD OF PAYMENT**

3.1 Payments for services provided hereunder shall be made following the performance of such services, unless otherwise permitted by law and approved in writing by the CITY.

3.2 No payment shall be made for any service rendered by the PROFESSIONAL except for services identified and set forth in this Agreement.

3.3 The CITY shall pay the PROFESSIONAL for work performed under this Agreement as follows:

3.3.1 PROFESSIONAL shall submit monthly invoices detailing work performed and expenses for which reimbursement is sought.

3.3.2 CITY shall approve all invoices before payment is issued. Payment shall occur within thirty (30) days of receipt and approval of an invoice.

3.4 CITY shall pay PROFESSIONAL for such services: (check one)

Hourly: \$ \_\_\_\_\_ per hour, plus actual expenses, but not to exceed a total of \$ \_\_\_\_\_ without an amendment to this Agreement.

Fixed Sum: A total amount of \$ \_\_\_\_\_.

Other: \_\_\_\_\_.

for all work performed and expenses incurred under this Agreement.

3.5 CITY reserves the right to withhold payment under this Agreement which is determined, in the reasonable judgment of the City Administrator or his/her designee to be noncompliant with this Agreement, the Scope of Services attached hereto, City standards, or city, state or federal law.

**4. REPRESENTATIONS**

CITY has relied upon the qualifications of PROFESSIONAL in entering into this Agreement. By execution of this Agreement, PROFESSIONAL represents it possesses the ability, skill and resources necessary to perform the work and is familiar with all applicable current laws, rules and regulations which reasonably relate to the Scope of Services detailed in Exhibit "A" hereto.

**5. STANDARD OF CARE**

PROFESSIONAL shall exercise the degree of skill and diligence normally employed by professional consultants engaged in the same profession, and performing the same or similar services at the time such services are performed. PROFESSIONAL will be responsible for the technical accuracy of its services and documents resulting therefrom, and CITY shall not be responsible for discovering deficiencies therein. PROFESSIONAL agrees to correct any deficiencies discovered without additional compensation, except to the extent such deficiencies are directly attributable to deficiencies or omissions in City-furnished information.

**6. REPRESENTATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS**

6.1 By executing this Agreement, the PROFESSIONAL certifies to the best of its knowledge and belief, that it and its principles:

6.1.1 are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency;

6.1.2 have not, within a three-year period preceding this proposal, been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state, or local) transaction or contract under a

public transaction; violation of federal or state anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

6.1.3 are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state, or local) with commission of any of the offenses enumerated in paragraph 6.1.2 of this certification; and

6.1.4 have not, within a three-year period preceding this application/proposal, had one or more public transactions (federal, state, or local) terminated for cause or fault.

6.2 Where the PROFESSIONAL is unable to certify to any of the statements in this certification, such PROFESSIONAL shall attach an explanation to this Agreement.

## **7. REPORTS AND INSPECTIONS**

7.1 The PROFESSIONAL at such times and in such forms as the CITY may require, shall furnish to the CITY such statements, records, reports, data, and information as the CITY may request pertaining to matters covered by this Agreement.

7.2 The PROFESSIONAL shall at any time during normal business hours and as often as the CITY or State Auditor may deem necessary, make available for examination all of its records and data with respect to all matters covered, directly or indirectly, by this Agreement and shall permit the CITY or its designated authorized representative to audit and inspect other data relating to all matters covered by this Agreement. The CITY shall receive a copy of all audit reports made by the agency or firm as to the PROFESSIONAL's activities. The CITY may, at its discretion, conduct an audit at its expense, using its own or outside auditors, of the PROFESSIONAL'S activities which relate, directly or indirectly, to this Agreement.

## **8. INDEPENDENT CONTRACTOR RELATIONSHIP**

8.1 The parties intend that an independent contractor relationship will be created by this Agreement. The CITY is interested primarily in the results to be achieved; subject to paragraphs herein, the implementation of services will lie solely with the discretion of the PROFESSIONAL. No agent, employee, servant or representative of the PROFESSIONAL shall be deemed to be an employee, agent, servant or representative of the CITY for any purpose, and the employees of the PROFESSIONAL are not entitled to any of the benefits the CITY provides for its employees. The PROFESSIONAL will be solely and entirely responsible for its acts and for the acts of its agents, employees, servants, subcontractors or representatives during the performance of this Agreement.

- 8.2 In the performance of the services herein contemplated the PROFESSIONAL is an independent contractor with the authority to control and direct the performance of the details of the work, however, the results of the work contemplated herein must meet the approval of the CITY and shall be subject to the CITY's general rights of inspection and review to secure the satisfactory completion thereof.

**9. PROFESSIONAL'S EMPLOYEES/AGENTS**

The CITY may at its sole discretion require the PROFESSIONAL to remove any employee, agent or servant from employment on this Project. The PROFESSIONAL may however employ those individual(s) on other non-CITY related projects.

**10. HOLD HARMLESS/INDEMNIFICATION**

- 10.1 PROFESSIONAL shall, at its sole expense, defend, indemnify and hold the CITY, its officers, officials, employees and volunteers harmless from any and all claims, actions, suits, liability, loss, or costs including attorney fees, caused by the wrongful or negligent acts, errors or omissions of the PROFESSIONAL or the PROFESSIONAL's agents, employees or subcontractors in performance of this Agreement, except for injuries and damages caused by the sole negligence of the CITY or the CITY's agents or employees.
- 10.2 PROFESSIONAL's duty to indemnify and hold the CITY harmless against liability for damages arising out of or caused by the concurrent negligence of CITY or CITY's employees or agents and PROFESSIONAL or PROFESSIONAL's employees or agents shall apply only to the extent of the negligence or wrongdoing of PROFESSIONAL and PROFESSIONAL's employees or agents.
- 10.3 Should a court of competent jurisdiction determine that this Agreement is subject to RCW 4.24.115, then, in the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of the PROFESSIONAL and the CITY, its officers, officials, employees, and volunteers, the PROFESSIONAL's liability, including the duty and cost to defend, hereunder shall be only to the extent of the PROFESSIONAL's negligence. It is further specifically and expressly understood that the indemnification provided herein constitutes the PROFESSIONAL's waiver of immunity under Industrial Insurance, Title 51 RCW, solely for the purposes of this indemnification. PROFESSIONAL certifies, by signing this Agreement, that this indemnification provision was mutually negotiated. The provisions of this section shall survive the expiration or termination of this Agreement.
- 10.4 No liability shall attach to the CITY by reason of entering into this Agreement except as expressly provided herein.

**11. INSURANCE**

The PROFESSIONAL shall procure and maintain for the duration of the Agreement,

insurance against claims for injuries to persons or damage to property which may arise from or in connection with the performance of the work hereunder by the PROFESSIONAL, its agents, representatives, or employees.

- 11.1 Insurance Term. The PROFESSIONAL shall procure and maintain for the duration of the Project, insurance against claims for injuries to persons or damage to property which may arise from or in connection with the performance of the work hereunder by the PROFESSIONAL, its agents, representatives, or employees.
- 11.2 No Limitation. The PROFESSIONAL's maintenance of insurance as required by the Agreement shall not be construed to limit the liability of the PROFESSIONAL to the coverage provided by such insurance, or otherwise limit the CITY's recourse to any remedy available at law or in equity.
- 11.3 Minimum Scope of Insurance. PROFESSIONAL shall obtain insurance of the types described below:
  - 11.3.1 Automobile Liability insurance covering all owned, non-owned, hired and leased vehicles. Coverage shall be written on Insurance Services Office (ISO) form CA 00 01. If necessary, the policy shall be endorsed to provide contractual liability coverage.
  - 11.3.2 Commercial General Liability insurance shall be written on ISO occurrence form CG 00 01 and shall cover liability arising from premises, operations, independent contractors and personal injury and advertising injury. The City shall be named as an insured under the PROFESSIONAL's Commercial General Liability insurance policy with respect to the work performed for the City using an additional insured endorsement at least as broad as ISO CG 20 26.
  - 11.3.3 Workers' Compensation coverage as required by the Industrial Insurance laws of the State of Washington.
  - 11.3.4 Professional Liability insurance appropriate to the PROFESSIONAL's profession.
- 11.4 Minimum Amounts of Insurance. PROFESSIONAL shall maintain the following insurance limits:
  - 11.4.1 Automobile Liability insurance with a minimum combined single limit for bodily injury and property damage of \$1,000,000 per accident.
  - 11.4.2 Commercial General Liability insurance shall be written with limits no less than \$2,000,000 each occurrence, \$2,000,000 general aggregate.
  - 11.4.3 Professional Liability insurance shall be written with limits no less than

\$2,000,000 per claim and \$2,000,000 policy aggregate limit.

- 11.5 Other Insurance Provisions. The PROFESSIONAL's Automobile Liability and Commercial General Liability insurance policies are to contain, or be endorsed to contain that they shall be primary insurance as respect the CITY. Any Insurance, self-insurance, or self-insured pool coverage maintained by the CITY shall be excess of the PROFESSIONAL's insurance and shall not contribute with it.
- 11.6 Acceptability of Insurers. Insurance is to be placed with insurers with a current A.M. Best rating of not less than A: VII.
- 11.7 Verification of Coverage. PROFESSIONAL shall furnish the City with original certificates and a copy of the amendatory endorsements, including but not necessarily limited to the additional insured endorsement, evidencing the insurance requirements of the PROFESSIONAL before commencement of the work.
- 11.8 Notice of Cancellation. PROFESSIONAL shall provide the CITY with written notice of any policy cancellation within two business days of their receipt of such notice.
- 11.9 Failure to Maintain Insurance. Failure on the part of the PROFESSIONAL to maintain the insurance as required shall constitute a material breach of contract, upon which the CITY may, after giving five business days' notice to the PROFESSIONAL to correct the breach, immediately terminate this Agreement or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so expended to be repaid to the CITY on demand, or at the sole discretion of the CITY, offset against funds due the PROFESSIONAL from the CITY.
- 11.10 City Full Availability of Professional Limits. If the PROFESSIONAL maintains higher insurance limits than the minimums shown above, the CITY shall be insured for the full available limits of Commercial General and Excess or Umbrella liability maintained by the PROFESSIONAL, irrespective of whether such limits maintained by the PROFESSIONAL are greater than those required by this Agreement or whether any certificate of insurance furnished to the CITY evidences limits of liability lower than those maintained by the PROFESSIONAL.

## 12. OWNERSHIP OF ASSETS

Title to all property furnished by the CITY shall remain in the name of the CITY and the CITY shall become the owner of the work product and other documents, if any, prepared by the PROFESSIONAL pursuant to this Agreement.

## 13. COMPLIANCE WITH LAWS

- 13.1 The PROFESSIONAL, in the performance of this Agreement, shall comply with all applicable federal, state or local laws and ordinances, including regulations for licensing, certification and operation of facilities, programs and accreditation, and licensing of individuals, and any other standards or criteria as described in this Agreement to assure quality of services.
- 13.2 The PROFESSIONAL specifically agrees to pay any applicable business and occupation (B & O) taxes which may be due on account of this Agreement.

**14. NONDISCRIMINATION**

- 14.1 The CITY is an equal opportunity employer.
- 14.2 Nondiscrimination in Employment. In the performance of this Agreement, the PROFESSIONAL will not discriminate against any employee or applicant for employment on the grounds of race, creed, color, national origin, sex, marital status, age or the presence of any sensory, mental or physical handicap; provided that the prohibition against discrimination in employment because of handicap shall not apply if the particular disability prevents the proper performance of the particular worker involved. The PROFESSIONAL shall ensure that applicants are employed, and that employees are treated during employment without discrimination because of their race, creed, color, national origin, sex, marital status, age or the presence of any sensory, mental or physical handicap. Such action shall include, but not be limited to: employment, upgrading, demotion or transfers, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and programs for training including apprenticeships. The PROFESSIONAL shall take such action with respect to this Agreement as may be required to ensure full compliance with local, state and federal laws prohibiting discrimination in employment.
- 14.3 Nondiscrimination in Services. The PROFESSIONAL will not discriminate against any recipient of any services or benefits provided for in this Agreement on the grounds of race, creed, color, national origin, sex, marital status, age or the presence of any sensory, mental or physical handicap.
- 14.4 If any assignment and/or subcontracting has been authorized by the CITY, said assignment or subcontract shall include appropriate safeguards against discrimination. The PROFESSIONAL shall take such action as may be required to ensure full compliance with the provisions in the immediately preceding paragraphs herein.

**15. ASSIGNMENT/SUBCONTRACTING**

- 15.1 The PROFESSIONAL shall not assign its performance under this Agreement or any portion of this Agreement without the written consent of the CITY, and it is further agreed that said consent must be sought in writing by the PROFESSIONAL

not less than thirty (30) days prior to the date of any proposed assignment. The CITY reserves the right to reject without cause any such assignment.

- 15.2 Any work or services assigned hereunder shall be subject to each provision of this Agreement and proper bidding procedures where applicable as set forth in local, state and/or federal statutes, ordinances and guidelines.
- 15.3 Any technical/professional service subcontract not listed in this Agreement, must have express advance approval by the CITY.

**16. CHANGES OR AMENDMENTS**

Either party may request changes to the scope of services and performance to be provided hereunder, however, no change or addition to this Agreement shall be valid or binding upon either party unless such change or addition be in writing and signed by both parties. Such amendments shall be attached to and made part of this Agreement.

**17. OWNERSHIP, MAINTENANCE AND INSPECTION OF RECORDS**

- 17.1 All drawings, plans, specifications, and other related documents prepared by PROFESSIONAL under this Agreement are and shall be the property of CITY, and may be subject to disclosure pursuant to RCW Chapter 42.56 or other applicable public records laws. The written, graphic, mapped, photographic, or visual documents prepared by PROFESSIONAL under this Agreement shall, unless otherwise provided, be deemed the property of the CITY. CITY shall be permitted to retain these documents, including reproducible camera-ready originals of reports, reproduction quality mylars of maps, and copies in the form of computer files, for the CITY's use. CITY shall have unrestricted authority to publish, disclose, distribute and otherwise use, in whole or part, and reports, data, drawings, images or other material prepared under this Agreement, provided that PROFESSIONAL shall have no liability for the use of PROFESSIONAL's work product outside of the scope of its intended purpose, and the CITY agrees to indemnify and hold the PROFESSIONAL harmless from such use.
- 17.2 The PROFESSIONAL shall maintain books, records and documents, which sufficiently and properly reflect all direct and indirect costs related to the performance of this Agreement and shall maintain such accounting procedures and practices as may be necessary to assure proper accounting of all funds paid pursuant to this Agreement. These records shall be subject at all reasonable times to inspection, review, or audit, by the CITY, its authorized representative, the State Auditor, or other governmental officials authorized by law to monitor this Agreement.
- 17.3 The PROFESSIONAL shall retain all books, records, documents and other material relevant to this Agreement, for six (6) years after its expiration. The PROFESSIONAL agrees that the CITY or its designee shall have full access and

right to examine any of said materials at all reasonable times during said period. PROFESSIONAL agrees to cooperate with the CITY to produce in a timely manner any records in the possession of PROFESSIONAL relating to the performance of this Agreement which are or may be the subject of a valid request under the Public Records Act, RCW Chapter 42.56.

**18. OTHER PROVISIONS**

If changes in state law necessitate that services hereunder be expanded, the parties shall negotiate an appropriate amendment. If, after thirty (30) days of negotiation, an agreement cannot be reached, this Agreement may be terminated by the City no sooner than sixty (60) days thereafter.

**19. TERMINATION**

19.1 Termination for Convenience. The CITY may terminate this Agreement, in whole or in part, at any time, by at least five (5) days written notice to the PROFESSIONAL.

19.2 Termination for Cause. If the PROFESSIONAL fails to perform in the manner called for in this Agreement, or if the PROFESSIONAL fails to comply with any other provisions of this Agreement and fails to correct such noncompliance within five (5) days written notice thereof, the CITY may terminate this Agreement for cause. Termination shall be effected by serving a notice of termination on the PROFESSIONAL setting forth the manner in which the PROFESSIONAL is in default. The PROFESSIONAL will only be paid for services performed in accordance with the manner of performance set forth in this Agreement.

**20. NOTICE**

Notices, other than applications for payment, shall be given in writing to the persons named below:

**TO THE CITY:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**TO THE PROFESSIONAL:**

CONSULTANT NAME:

\_\_\_\_\_

CONSULTANT FIRM:

ADDRESS:

CITY, STATE, ZIP:

\_\_\_\_\_

**21. ATTORNEYS FEES AND COSTS**

If any legal proceeding is brought for the enforcement of this Agreement, or because of a dispute, breach, default, or misrepresentation in connection with any of the provisions of this Agreement, the prevailing party shall be entitled to recover from the other party, in addition to any other relief to which such party may be entitled, reasonable attorney's fees and other costs incurred in that action or proceeding.

**22. WAIVER**

No officer, employee, agent or other individual acting on behalf of either party has the power, right or authority to waive any of the conditions or provisions of this Agreement. No waiver in one instance shall be held to be a waiver of any other subsequent breach or nonperformance. Failure of either party to enforce at any time any of the provisions of this Agreement or to require at any time performance by the other party of any provision hereof shall in no way be construed to be a waiver of such provisions nor shall it affect the validity of this Agreement or any part thereof.

**23. JURISDICTION AND VENUE**

This Agreement has been and shall be construed as having been made and delivered within the State of Washington, and it is agreed by each party hereto that this Agreement shall be governed by laws of the State of Washington, both as to interpretation and performance.

Any action of law, suit in equity, or judicial proceeding for the enforcement of this Agreement or any provisions thereof, shall be instituted and maintained only in any of the courts of competent jurisdiction in Snohomish County, Washington.

**24. SEVERABILITY**

24.1 If, for any reason, any part, term or provision of this Agreement is held by a court of the United States to be illegal, void or unenforceable, the validity of the remaining provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular provision held to be invalid.

24.2 If it should appear that any provision hereof is in conflict with any statutory provision of the State of Washington, said provision which may conflict therewith shall be deemed inoperative and null and void insofar as it may be in conflict therewith, and shall be deemed modified to conform to such statutory provisions.

**25. ENTIRE AGREEMENT**

The parties agree that this Agreement is the complete expression of the terms hereto and any oral representations or understandings not incorporated herein are excluded. Further, any modification of this Agreement shall be in writing and signed by both parties. Failure to comply

with any of the provisions stated herein shall constitute material breach of contract and cause for termination. Both parties recognize time is of the essence in the performance of the provisions of this Agreement. It is also agreed by the parties that the forgiveness of the nonperformance of any provision of this Agreement does not constitute a waiver of the provisions of this Agreement.

**IN WITNESS WHEREOF** the parties hereto have caused this Agreement to be executed the day and year first hereinabove written.

**CITY:**

**PROFESSIONAL:**

CITY OF ARLINGTON

CONSULTANT NAME

\_\_\_\_\_  
City Authorized Representative

\_\_\_\_\_

\_\_\_\_\_  
(Print)

\_\_\_\_\_  
Title

**EXHIBIT A**  
**SCOPE OF SERVICES**  
( PROJECT NAME )

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**CONSTRUCTION CONTRACT**

THIS CONTRACT, dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, is by and between the City of Arlington, a municipal corporation of the State of Washington, hereinafter referred to as the CITY, and \_\_\_\_\_ referred to as the CONTRACTOR.

WHEREAS, the City desires \_\_\_\_\_, and  
WHEREAS, the Contractor is qualified, willing and able to perform the necessary work.

NOW, THEREFORE, in consideration of the mutual promises and covenants herein contained, to be kept, performed and fulfilled by the respective parties thereto, and other valuable considerations, it is mutually agreed as follows:

**1.0**  
**SERVICE BY CONTRACTOR**

Contractor agrees to perform the services described in the following project specification \_\_\_\_\_  
\_\_\_\_\_. These documents are on file with the Project Manager, a copy is held by the contractor, and by this reference incorporated herein.

**2.0**  
**TIME OF COMPLETION**

All work under this Agreement is to be done within \_\_\_\_\_ of notice to proceed.

**3.0**  
**RESPONSIBILITY OF CONTRACTOR**

3.1 **Safety** Contractor shall take all necessary precautions for the safety of employees on the work and shall comply with all applicable provisions of Federal, State and municipal safety laws and building codes. Contractor shall erect and properly maintain, at all times, as required by the conditions and progress of the work, all necessary safeguards for protection of workmen and the public; shall post danger signs warning against known or unusual hazards.

3.2 **Warranty** The Contractor shall be responsible for correcting all defects in workmanship and material within one year after acceptance of this work. When corrections of defects are made, Contractor shall be responsible for correcting all defects in workmanship and/or materials in the corrected work for one year after acceptance of the corrections by the City. The Contractor shall start work to remedy such defects within seven (7) days of mailing notice of discovery thereof by the City and shall complete such work within a reasonable time. In emergencies where damage may result from delay or where loss of services may result, such corrections may be made by the City, in which case the cost shall be borne by the Contractor. In the event the Contractor does not accomplish corrections at

the time specified, the work will be otherwise accomplished and the cost of same shall be paid by Contractor.

The Contractor shall be liable for any costs, losses, expenses or damages including consequential damages suffered by the City resulting from defects in the Contractor's work including, but not limited to, cost of materials and labor extended by the City in making emergency repairs and cost of engineer, inspection and supervision by the City. The Contractor shall hold the City harmless from any and all claims which may be made against the City as a result of any defect work and the Contractor shall defend any such claim at his own expense. Where materials or procedures are not specified in the contract, the City relies on the professional judgment of the Contractor to make appropriate selections.

**3.3. Prevailing Wages** Contractor shall comply with every provision of Chapter 39.12 of the Revised Code of Washington.

**3.4. Non-discrimination** Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, age, national origin, marital status, physical or other motor handicap, unless based upon a bonfide occupational qualification.

**3.5 Employment** Any and all employees of the Contractor while engaged in the performance of any work or services required by the Contractor under this agreement, shall be considered employees of the Contractor only and not of the City and any and all claims that may or might arise under the Worker's Compensation Act on behalf of said employees, while so engaged and any and all claims made by a third party as consequence of any negligent act or omission on the part of the Contractor's employees, while so engaged on any of the work or services provided or rendered herein, shall be the sole obligation and responsibility of the Contractor.

#### 4.0

#### **SUBCONTRACTOR RESPONSIBILITY**

4.1 The Contractor shall include the language of this section in each of its first tier subcontracts, and shall require each of its subcontractors to include the same language of this section in each of their subcontracts, adjusting only as necessary the terms used for the contracting parties. The requirements of this section apply to all subcontractors regardless of tier.

At the time of subcontract execution, the Contractor shall verify that each of its first tier subcontractors meets the following bidder responsibility criteria:

1. Have a current certificate of registration as a contractor in compliance with chapter 18.27 RCW, which must have been in effect at the time of subcontract bid submittal;
2. Have a current Washington Unified Business Identifier (UBI) number;
3. If applicable, have:
  - a. Industrial Insurance (worker's compensation) coverage for the subcontractor's employees working in Washington, as required in Title 51 RCW;
  - b. A Washington Employment Security Department number, as required in Title 50 RCW;
  - c. A Washington Department of Revenue state excise tax registration number, as required in Title 82 RCW;

- d. An electrical contractor license, if required by Chapter 19.28 RCW;
  - e. An elevator contractor license, if required by Chapter 70.87 RCW.
4. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).

## **5.0** **COMPENSATION**

5.1 The City shall pay the Contractor for the services identified in this contract the total amount of \$ \_\_\_\_\_ plus tax. Contractor shall submit monthly, for the City's acceptance, a written Contract Project Estimate setting forth the quantities of work satisfactorily performed to date, and an invoice covering the contract price applicable to the work, unless otherwise directed. The City will, within 30 days after receipt of acceptable Contractor's estimate and invoice, pay the Contractor the accepted progress invoice less actual accumulated amount previously paid.

5.2 The City shall have the right to withhold payment to Contractor for any work not completed in a satisfactory manner until such time as Contractor modifies such work so that the same is satisfactory.

## **6.0** **CITY'S RIGHT TO TERMINATE CONTRACT**

6.1 The City may terminate the contract upon the occurrence of any one or more of the events hereafter specified:

- a. If the Contractor should be adjudged bankrupt.
- b. If the Contractor should make a general assignment of benefit of his creditors.
- c. If a receiver should be appointed on the account of insolvency of the Contractor.
- d. If Contractor should persistently or repeatedly refuse or fail to supply a sufficient number of properly skilled workmen or proper materials for completion of the work.
- e. If the Contractor shall fail to complete the work within the time specified in the contract.
- f. If the Contractor shall fail to make a prompt payment to subcontractors or for material or labor.
- g. If Contractor should persistently disregard laws, ordinances or regulations of Federal, State or municipal agencies or subdivisions thereof.
- h. If Contractor should persistently disregard instructions of Management, or otherwise be guilty of a substantial violation of the contract.

6.2 This contract Agreement, and any amendments or extensions to said Agreement may be terminated for any reason not previously identified by either party by giving ten (10) days written notice to the other party. In the event that the contract is terminated by the City, Contractor shall not be entitled to receive any further balance of the amount to be paid under this contract until the work shall have been fully finished. At such time, if the unpaid balance of the amount to be paid under this contract exceeds the expense incurred by the City in finishing the work, all of the damages sustained or which may be sustained by reason of such refusal, neglect, failure of discontinuance of employment, such excess shall be paid by the City to Contractor. If such expense and damages shall exceed the unpaid balance, Contractor and his surety and each thereof shall be jointly and severally liable therefore to City and shall pay the difference to the City. Such expense

and damage shall include all legal costs incurred by the City in employment of attorneys to protect the rights and interests of the City under the contract; provided such legal costs shall be reasonable.

**7.0**  
**OWNERSHIP OF DOCUMENTS**

7.1 On payment to the Contractor by the City of all compensation due under this Agreement all finished or unfinished documents and material prepared by the Contractor with funds provided by this Agreement shall become the property of the City and shall be forwarded to the City at its request.

7.2 Any records, reports, information, data or other documents or materials given to or prepared or assembled by the Contractor under this Agreement will be kept as confidential and shall not be made available to any individual or organization by the Contractor without prior written approval of the City or by court order.

**8.0**  
**CLAIMS**

8.1 Any claim against the City for damages, expenses, costs or extras arising out of the performance of the contract must be made in writing to the City within thirty (30) days after the discovery of such damage, and in no event later than the time of approval by owner of final payment. Contractor, upon making applications for final payment, shall be deemed to have waived this right to claim for any other damages for which claim has not been made, unless such claim for final payment includes notice of additional claim and fully describes the alleged damage.

**9.0**  
**ASSIGNMENT**

9.1 This Agreement may not be assigned or otherwise transferred by the parties hereto without the written consent of the other party.

**10.0**  
**MODIFICATION**

10.1 No change, alteration, modification or addition to the Agreement will be effective unless it is in writing and properly signed by all parties thereto.

**11.0**  
**HOLD HARMLESS**

11.1 Contractor shall hold the City and its officers, agents and employees harmless, from all suits, claims or liabilities of any nature, including attorney's fees, costs and expenses for or on account of injuries or damages sustained by any persons or property resulting in whole or in part from negligent activities or omissions of the Contractor, its agents or other remuneration for services; and if a suit in respect to the above be filed, the Contractor shall appear and defend the same at its own cost and expense, and if judgment is rendered or

settlement made requiring payment of damages by the City, which damages are based in whole or in part on the negligent activities or omissions of the Contractor, its agents or employees, the Contractor shall pay same.

**12.0**  
**INSURANCE**

The Contractor's required insurance shall be of the types and coverage as stated below:

**12.1 Insurance required.** Contractor shall maintain at all times the following insurance during the term of this agreement:

- a. Automobile Liability insurance covering all owned, non-owned, hired and leased vehicles. Coverage shall be at least as broad as Insurance Services Office (ISO) form CA 00 01.
- b. Commercial General Liability insurance shall be as least at broad as ISO occurrence form CG 00 01 and shall cover liability arising from premises, operations, independent contractors, products-completed operations, stop gap liability, personal injury and advertising injury, and liability assumed under an insured contract. The Commercial General Liability insurance shall be endorsed to provide a per project general aggregate limit using ISO form CG 25 03 05 09 or an equivalent endorsement. There shall be no exclusion for liability arising from explosion, collapse or underground property damage. The Public Entity shall be named as an additional insured under the Contractor's Commercial General Liability insurance policy with respect to the work performed for the Public Entity using ISO Additional Insured endorsement CG 20 10 10 01 and Additional Insured-Completed Operations endorsement CG 20 37 10 01 or substitute endorsements providing at least as broad coverage.
- c. Workers' Compensation coverage as required by the Industrial Insurance laws of the State of Washington.

**12.1 Minimum Limits of Insurance** Contractor shall maintain limits no less than:  
The Contractor shall maintain the following insurance limits:

- a. Automobile Liability insurance with a minimum combined single limit for bodily injury and property damage of \$1,000,000 per accident.
- b. Commercial General Liability insurance shall be written with limits no less than \$1,000,000 each occurrence, \$2,000,000 general aggregate and \$2,000,000 products-completed operations aggregate limit.
- c. **Builders Risk Insurance shall be written in the amount of the completed value of the project with no coinsurance provisions. (If Applicable)**
- d. **Contractor is required to procure and maintain Pollution Legal Liability Insurance covering losses caused by pollution conditions that arise from the operations of**

**the Contractor. The Pollution Legal Liability Insurance shall be written in an amount of at least \$1,000,000. Coverage may be written on a claims-made basis. (If Applicable)**

**12.2 The Policies are to contain, and be endorsed to contain the following provisions:**

- a. **General Liability, Builders Risk Insurance (If Applicable), and Pollution Legal Liability (If Applicable)**
  1. The City, its officials, employees and volunteers are to be covered as additional insured as respect to liability arising out of activities performed by or on behalf of the Contractor.
  2. Contractor's insurance coverage shall be primary insurance as respects the City, its officials, employees and volunteers. Any insurance or self-insurance maintained by the City, its officials, employees and volunteers shall be excess of the Contractor's insurance and shall not contribute with it.
  3. Any failure to comply with the reporting provisions of all policies shall not affect the coverage provided to the City, its officials, employees or volunteers.
- b. **All Coverage** Each insurance policy required by this clause shall state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the City.

**12.3 Acceptability of Insurers** Insurance is to be placed with insurers with a Best's rating of no less than A:XIII, or with an insurer acceptable to the City.

**12.4 Verification of Coverage** Contractor shall furnish the City with certificates of insurance effecting coverage required by this clause. The certification for each insurance policy is to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates are to be received and approved by the City before work commences. The City reserves the right to require complete, certified copies of all required insurance policies, at any time.

**12.5 Subcontractors** The Contractor shall have sole responsibility for determining the insurance coverage and limits required, if any, to be obtained by subcontractors, which determination shall be made in accordance with reasonable and prudent business practices.

**12.6 Asbestos Or Hazardous Materials Abatement Work** If asbestos abatement or hazardous materials work is performed, Contractor shall review coverage with the City's Risk Manager and provide scope and limits of coverage that are appropriate for the scope of work. No asbestos abatement work will be performed until coverage is approved by Risk Manager.

**12.7 Notice of Cancellation** The Contractor shall provide the City and all Additional Insureds for this work with written notice of any policy cancellation, within two business days of their receipt of such notice.

**12.8 Failure to Maintain Insurance.** Failure on the part of the Contractor to maintain the insurance as required shall constitute a material breach of contract, upon which the City may, after giving five business days notice to the Contractor to correct the breach, immediately terminate the contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so

expended to be repaid to the City on demand, or at the sole discretion of the City, offset against funds due the Contractor from the City.

**13.0**  
**INDEPENDENT CONTRACTOR**

13.1 Contractor is and shall be at all times during the term of this Agreement an independent contractor.

IN WITNESS WHEREOF, the parties have executed this Agreement on the date first above written.

CITY OF ARLINGTON, WASHINGTON:

CONTRACTOR:

By \_\_\_\_\_  
Barbara Tolbert, Mayor

By \_\_\_\_\_

Attest

\_\_\_\_\_  
Wendy Van Der Meersche, City Clerk

Approved as to Form

\_\_\_\_\_  
City Attorney

**ADVERTISEMENT FOR BID**  
**City of Arlington**  
**PROJECT TITLE (P0X.XXX)**

Notice is hereby given that sealed proposals will be received by the City of Arlington Public Works Department, 154 W. Cox, Arlington, Washington 98223, until **2:00 PM, local time** on **(DATE)**, for furnishing the necessary labor, materials, equipment, tools, and guarantees thereof to perform the project.

**(Optional)** A non-mandatory pre-bid meeting has been scheduled for **(TIME AND DATE)** to be held at the Public Works Department, address above.

Work shall include **(PROJECT DESCRIPTION)**

All bidding and construction is to be performed in compliance with the Contract Documents for this project and any Addenda issued thereto, which are on file with the City of Arlington Public Works Department.

Proposals received after the date and time stated above will not be considered. Immediately following the deadline for submission, the proposals will be publicly opened and read aloud in the Stillaguamish Conference Room at the Public Works Administration Building located at 154 W. Cox Ave, Arlington, WA 98223. Proposals must be submitted on the forms provided with the contract documents. All proposals must be accompanied by a bid deposit in the form of a certified or cashier’s check, or bid bond, for not less than five percent (5%) of the total amount bid, including additives and alternates, if any. Refer to Instructions to Bidders for more information. Should the successful Bidder fail to enter into such contract and furnish satisfactory payment and performance bonds within the time stated in the specifications, the bid deposit shall be forfeited to the City of Arlington.

Plans and specifications are available for viewing only at the City of Arlington Public Works Department, 154 W. Cox Ave, Arlington, Washington 98223. Purchase of Contract Documents are available through [SolicitBid](#).

Free-of-charge access to bidding information (plans, specifications, addenda, and Bidders List) is available through the City of Arlington’s on-line plan room hosted by [SolicitBid](#); simply go to [www.solicitbid.com](http://www.solicitbid.com) and click on "Posted Projects". This online plan room provides Bidders with fully usable online documents with the ability to: download, view, print, order full/partial plan sets from numerous reprographic sources. Printing costs shall be by the individual bidders, and not provide by the City. It is recommended that Bidders “Register” in order to receive automatic e-mail notification of future addenda and to place themselves on the bidders list. Bidders that do not register will not be automatically notified of addenda and will need to periodically check the on-line plan room for addenda issued on this project. Contact SolicitBid at (206) 219-6481 or [support@solicitbid.com](mailto:support@solicitbid.com) for website assistance.

The City of Arlington expressly reserves the right to reject any and all bids, to waive minor irregularities or informalities, and to further make award of the project to the lowest responsible Bidder as it best serves the interest of the City of Arlington. No proposal may be withdrawn after the time stated above, or before Award of Contract, unless said award is delayed for a period exceeding sixty (60) calendar days after opening of the proposals, or Bidder withdraws proposal due to error in accordance with Section 1-03.1 of the WSDOT Standard Specifications.

The City of Arlington in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 USC 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-Assisted Programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises as defined at 49 CFR Part 26 will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

Published:	Everett Herald	Seattle Daily Journal of Commerce	Arlington Times
	1 <sup>st</sup> Pub: _____	1 <sup>st</sup> Pub: _____	1 <sup>st</sup> Pub: _____
	2 <sup>nd</sup> Pub: _____	2 <sup>nd</sup> Pub: _____	2 <sup>nd</sup> Pub: _____



# REQUEST FOR QUALIFICATIONS (RFQ)

## Design Services

Proposals Due: April 29, 2021

### 1.0 PROJECT INFORMATION

**Project Name:** 74<sup>th</sup> Ave Trail (P02.417)

**Federal Aid No.:** STPUS-2695(001)

**Project Location:** 74<sup>th</sup> Ave

**Request Summary:** The City of Arlington is requesting interested consulting engineering firms to submit proposals for providing engineering design and analysis, and other services necessary for the successful completion of the 74<sup>th</sup> Ave Trail Project as described herein. More information is available on the City of Arlington website under RFQs.

### 2.0 PROJECT DESCRIPTION

This project proposes to construct a 12-foot wide multiuse asphalt trail from the north terminus of the Arlington Valley Road Trail (197<sup>th</sup> Place) to the 204th St and 74th Ave intersection; this will complete the Arlington Valley Road trail that connects Centennial Trail to a transit location (bus stop) and retail center. The multiuse trail construction will include ADA compliant curb ramps, trail lighting, landscape and site amenities.

### 3.0 SCOPE OF WORK

The City of Arlington has obtained a full project survey including ROW and abutting property boundary lines, utility identifications, and project limit topography. The anticipated tasks for this project are summarized below, these may be added to or modified based on the Consultant's project approach and will be detailed in the RFQ.

- **Preliminary Design Data Collection:** Consultant team shall collect necessary data and information for the successful completion of this project. Data may include, but not be limited to lighting analysis, traffic counts, and geotechnical borings.
- **Design Reports and Studies:** Consultant team shall complete all studies and evaluations necessary for the successful completion of this project design and permitting. Studies include, but are not limited to, stormwater analysis, geotechnical evaluation, cultural resource evaluation, and NEPA assessment.
- **Project Design and Specifications:** Consultant team shall prepare preliminary and final engineering plans and specifications (30%, 90% and 100%), and project bid documents; all submittals to be consistent with WSDOT standards.
- **Estimate of Project Costs:** Consultant Team shall prepare an estimate of probable costs for the construction phase (30%, 90%, and 100%).

### 4.0 QUALIFICATION REQUIREMENTS

City RFQ evaluation team will score and rank RFQs based on the following criteria:

- **Team Composition and Key Personnel:** Scoring will look at firms included in the Consultant's project team, the qualifications and availability of staff assigned to this project. Consideration will be given to specialized project experience or technical competence relating to the Project Area, and familiarity with work in the north Snohomish County area. Demonstrate the ability to provide the proposed staff for the full duration of this project and that continuity will be maintained. (25 points)

- **Project Approach and Schedule:** Consultant shall demonstrate a full understanding of the City’s concerns, goals and objectives with this very important project; and how the Consultant’s team will meet these goals in a “Consultant defined” timeline. (25 points)
- **Experience with Similar Projects Utilizing Federal Funding:** Scoring will evaluate Consultant’s team experience with projects of similar complexity and function. Also included in the evaluation will be past experience with similar federally funded projects and coordinate with WSDOT local programs. (20 points)
- **Process and Quality Control Methods:** Demonstrated ability of the Consultant and team, especially the Project Manager, to perform high quality work, to control costs and to meet schedules. Evaluation will include quality control measures and Project Manager communication protocols. (20 points)
- **Familiarity of Relevant Codes and Standards:** Demonstrated understanding of relevant codes (*Arlington, FHWA, AASHTO, and WSDOT*) and ability to coordinate projects with jurisdictional agencies and multidisciplinary projects. (10 points)

Written proposals will be reviewed and evaluated by an Evaluation Committee comprised of City staff. Interviews will be scheduled with the top five scoring proposals.

## **5.0 SUBMITTAL REQUIREMENTS**

The entire submittal package, excluding front and back cover sheets, shall not exceed twenty (20) double-sided pages. At a minimum, the Consultant’s qualifications should include:

- An introductory letter stating your firm’s interest in the project,
- A clear concise description of the general approach to be undertaken on the project,
- A list of similar projects in the past five years with brief resumes of key members and project references,
- Organizational chart of project team, and
- Description and examples of process and quality control measures.

Four (4) hard copies of the RFQ must be delivered to the City of Arlington in a sealed package clearly labeled **“RFQ for 74<sup>th</sup> Ave Trail Project”**. In person deliveries will be accepted at the Public Works Office at 154 W Cox, Arlington, WA 98223 **until 2:00 PM on April 29, 2021**. Deliveries via US Post shall be mailed to 238 N. Olympic Ave, Arlington, WA 98223 and must be postmarked **by April 29, 2021**.

Address all RFQ questions to the Project Administrator, Linda Taylor, at [ltaylor@arlingtonwa.gov](mailto:ltaylor@arlingtonwa.gov). Questions and inquiries received before **2:00 pm on April 23, 2021** will be answered. The City reserves the right to reject any and all submittals that are not responsive to this RFQ request.

## **6.0 EQUITY IN PROPOSAL SELECTION**

The City of Arlington is an equal opportunity employer and encourages disadvantaged, minority, and women- owned consultant firms to respond.

### **Title VI Statement**

The City of Arlington in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, nondiscrimination in federally-assisted programs of the Department of Transportation

issued pursuant to such Act, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises as defined at 49 CFR Part 26 will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

**Americans with Disabilities Act (ADA) Information**

The City of Arlington, in accordance with Section 504 of the Rehabilitation Act (Section 504) and the Americans with Disabilities Act (ADA), commits to nondiscrimination on the basis of disability, in all of its programs and activities. This material can be made available in an alternate format by emailing Ryan Morrison at [RMorrison@arlingtonwa.gov](mailto:RMorrison@arlingtonwa.gov) or by calling 360-403-3526.

# Certificate of Completion

Awarded to

***Kris Wallace***

For successful completion of

## **Title VI Basics for LPAs**

**Washington State Department of Transportation  
Office of Equal Opportunity**

Completed **Sept. 14, 2021**



Gretchen Gleue, Title VI Local Agency Compliance Lead  
WSDOT Office of Equal Opportunity

# Certificate of Completion

Awarded to

***Katy Shores***

For successful completion of

## Title VI Basics for LPAs

**Washington State Department of Transportation  
Office of Equal Opportunity**

Completed **Nov. 3, 2021**



Gretchen Gleue, Title VI Local Agency Compliance Lead  
WSDOT Office of Equal Opportunity



# Certificate of Training

This certifies that

**Katy Shores**

Arlington, City Of (ar)

has successfully completed:

**Foundations Of Implicit Bias-webinar-10/6/2021 And 10/7/2021**

October 6, 2021

Webinar-at Your Desk

A handwritten signature in black ink that reads "Patti H. Crane". The signature is written in a cursive style and is positioned above a horizontal line.

Patti H. Crane, Member Services Manager

Washington Cities Insurance Authority