

PLANNING COMMISSION MEETING MINUTES

Vancouver City Hall – Council Chambers – 415 W. Sixth Street
PO Box 1995 – Vancouver, Washington 98668-1995
www.cityofvancouver.us

Marjorie Ledell • Steve Schulte • Larry Blaufus • Zachary Pyle
Nena Cavel • Patrick Adigweme • Melissa von Borstel

July 25, 2023

REGULAR MEETING

Vancouver City Hall - 415 W. Sixth Street, Vancouver WA

CALL TO ORDER

The July 25, 2023, meeting of the Planning Commission was called to order at 4:30 p.m. by Chair Ledell.

ROLL CALL

Present: Marjorie Ledell, Zachary Pyle, Patrick Adigweme, Larry Blaufus, Nena Cavel, Steve Schulte, and Melissa von Borstel

ADOPTION OF MINUTES

Motion by Vice Chair Pyle, second by Commissioner Cavel, and carried unanimously to adopt the June 13, 2023, minutes.

WORKSHOP

2023 ANNUAL REVIEW COMPREHENSIVE PLAN AND ZONING CODE MAP AND TEXT CHANGES

Bryan Snodgrass, Principal Planner, Community Development Department

Bryan Snodgrass presented three proposed site-specific Comprehensive Plan and Zone changes. The first is located at the intersection of SE 192nd and SE 15th Street, the second (called Wood Duck Springs) is located on NE 63rd Street, and the third (called Date Park) is located on E 18th Street. The presentation summarized proposed text changes, including one Comprehensive Plan text change in the Capital Facilities Plan (CFP), and ten text changes in the zoning code, which is [Title 20](#) of the Vancouver Municipal Code.

Commission Questions and Discussion

- At what point in this process are traffic studies related to the zone changes reviewed, who reviews the studies, and what is the public engagement process during this review. Staff responded that at the rezone phase, Public Works staff review the number of trips generated under the existing and proposed zone and impacts on existing facilities. Public outreach occurs through neighborhood associations where they exist, as well as with Planning Commission workshops and the public hearing.
- The process for traffic study and public engagement after a development application is submitted. Staff responded once the site plan for a development is submitted, it is routed to the review team for concurrency and transportation review. That information is publicly available, and those who

live within 500 feet of the site are notified. At this stage of the process, the transportation development review staff may require mitigation if warranted.

- What are the height restrictions for the proposed rezone on 192nd Avenue? Staff responded for the R-30 zone, the height maximum is 50 feet.
- Going forward, further details were requested on the north end of the site of the Wood Duck Springs application.
- Proposed height for the new structure with the Date Park application.
- Contact for the Bennington Neighborhood Association.
- Tools for potential displacement at this stage of the application process.
- Regarding the text change to exempt applications for apartments with fewer than 200 units from the SEPA review process, is this in line with the State's requirements? Staff responded the State passed a law enabling, but not requiring, jurisdictions to make this change. Previously, applications for apartments with 20 or fewer units could be exempted from SEPA review unless SEPA was triggered by the presence of critical lands or other factors.
- Significance of the limit at 200 units. Staff responded the SEPA process began during a time when many jurisdictions had few or limited environmental regulations. Seldom do we receive comments or appeals during the SEPA review. Typically, when there are comments, it's in relation to critical lands, and this proposed change would still require a SEPA review if there are critical lands.

WAREHOUSE CODE CHANGES

Chad Eiken, Director; Becky Coutinho, Associate Planner, Community Development Department; Kara Hall, Fehr & Peers

Chad Eiken introduced the workshop and presented an overview of the project, the scope of the surge in large warehouse development applications submitted within the City, the goals of the warehouse study, and an analysis of available land for large warehouses. Becky Coutinho presented on the consideration of equity in proximity to industrial areas. Kara Hall presented the key takeaways from the study, including physical and operational differences in traditional and e-commerce warehouses, impacts to traffic, differences in economic impact and employment, consideration for adaptive re-use of large warehouses, and measures to align with the Climate Action Plan. Becky Coutinho presented potential code amendments to address use limitations, locational concerns, traffic impacts, parking and loading, loading bays, lot coverage, visual impacts, energy consumption, and recycling of packaging. Outreach is ongoing with environmental groups, local industry partners, and neighborhood associations.

Commission Questions and Discussion

- Residential and industrial zones coexisting next to one another. Staff responded there are ways to mitigate for impacts from the industrial zone and warehouses on residential areas.
- Would the proposed code amendments bring the City in line with other jurisdictions in this area? Staff are not aware of any other Cities that have taken on this type of code amendment. There is one example of a City or County in California that banned warehouses in a specific corridor.
- Adaptive re-use of warehouse sites. Staff responded warehouses are expensive to build, and the intent is to build them with the option of adapting the use later if needed. The buildings can also be built to be later subdivided to smaller spaces.

- Darker exterior colors of the buildings and energy efficiency. Staff responded the intent is to not use dark or bright white colors on the exterior to maximize energy efficiency and reduce visual impacts.
- With the update to the Comprehensive Plan in the next two years, will these changes apply to all industrial districts where warehouses are allowed, and could industrial lands move to accommodate more warehouses?
- Traffic mitigation strategies for 24 hour warehouses. Staff responded certain warehouses and businesses send trucks out during non-peak hours.
- Provide the employment and economic impact information per 100,000 square feet to assess impacts more consistently.

COMMUNITY FORUM

Don Steinke was present to provide comments on the warehouse code changes. He provided a list of suggestions for the proposed code changes related to solar readiness and batteries, use of heat pumps, fleet compliance with Clean Fleet rules in California, transit and bike friendly facilities, restrictions on idling, and greater financial assurances if there is a fueling station present.

Cathryn Chudy was present to provide comments on the warehouse code changes. She supported strengthening the requirements of the code amendments, especially those related to the Climate Action Policy, including requiring the rooftops be solar ready. The impacts of these facilities should be balanced with mitigation measures in the permitting and approval process to ensure the community is protected and it aligns with climate and equity policies.

COMMUNICATIONS FROM STAFF

HEIGHTS MIXED USE (HX) ZONE

Amy Zoltie, Real Estate Project Manager, Economic Prosperity & Housing

Amy Zoltie presented a brief project history and timeline and a summary of the code amendments previously reviewed and approved by the Commission. The additional proposed code changes to the HX zone are intended to slightly increase maximum building height limit in the District Gateway sub-district when not abutting single family zoned parcels, divide the definition of commercial frontage into two types, and modify the ground-floor uses diagram to reflect changes to allowed ground floor uses in certain locations.

Commission Questions and Discussion

- Examples of uses included in Commercial Type 2. Staff responded some examples could be retail, personal services, or dining. The intent of the code is to activate the areas around public spaces.
- Challenges to development of the area. Staff responded that a significant upfront investment infrastructure is needed to facilitate development. In addition, while the City has control of the parcels it owns, it does not control the development schedule for privately owned parcels.

BURNT BRIDGE CREEK WEST COMPREHENSIVE PLAN AND ZONING MAP CHANGE

Bryan Snodgrass, Principal Planner, Community Development Department

Bryan Snodgrass presented an overview of the proposed zone change, approval criteria for this rezone request, as well as information related to the critical lands on the property and the criteria for critical areas

review. Amaia Smith, Washington Department of Fish and Wildlife (WDFW), presented information on Oregon white oaks, the woodland conditions on the site, and the types of mitigation that may be required. Keith Jones, Senior Planner, presented on the City process for reviewing development applications, the additional requirements under the critical areas ordinance, and the sequencing of mitigation activities. Peter Condyles, representing the applicant, indicated the provided site plan is an example of a potential building on the site but is not intended to be final. The applicant is working with the City and the Department of Fish and Wildlife to comply with the critical areas ordinance.

Commission Discussion

- Confirmation that the submitted site plan is an example of what could be built. The applicant confirmed it was an example of the highest use of the site based on economic feasibility and in compliance with City code.
- Is the proposed zone less impactful to the site than the existing zone? The applicant responded the OCI zone allows 100% use of the site, and IL allows 75% maximum use. The maximum building height is also lower under IL than the OCI zone. Staff confirmed this assessment but noted the critical area ordinance supersedes what is allowed within the zone.
- The allowed lot usage in the OCI zone with consideration of the portion that is protected under the critical area ordinance. Staff responded the maximum lot coverage under OCI is 75%. The critical areas ordinance and analysis will indicate the portion of the land that is developable with specific mitigation measures.
- Mitigation measures for canopy loss. Staff responded the City ordinance requires maintaining no net loss of habitat function and value. The WDFW provides guidance to interpret the meaning of no net loss of habitat function and value. The site would be reviewed for the baseline function of the oaks and mitigation for physical loss of habitat removed as well as offsets to address the temporal lag that will occur while seedlings grow to a size that regains the level of functional value the current trees provide to the landscape.

ADJOURNMENT 7:33 P.M.

Marjorie Ledell, Chair

To request other formats, contact Julie Nischik, Community Development Department | 360-487-7813. WA Relay: 711 | julie.nischik@cityofvancouver.us



Burnt Bridge Creek West Zone Change – Vancouver Planning Commission Public Hearing September 12, 2023

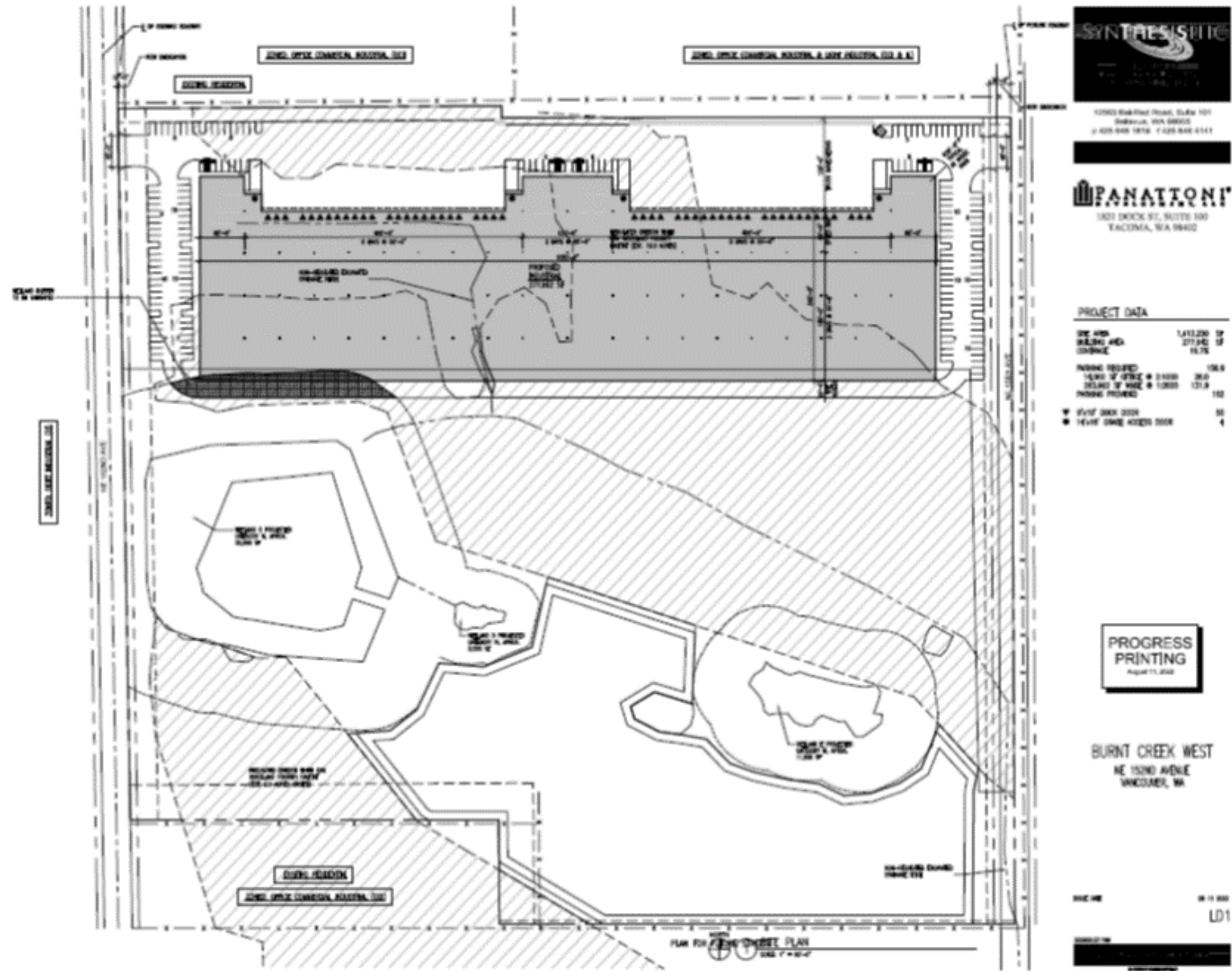


Bryan Snodgrass
Principal Planner
Community Development Department

Request to
change from OCI
to IL zoning on
33-acre site at
6103 NE 152nd
Avenue



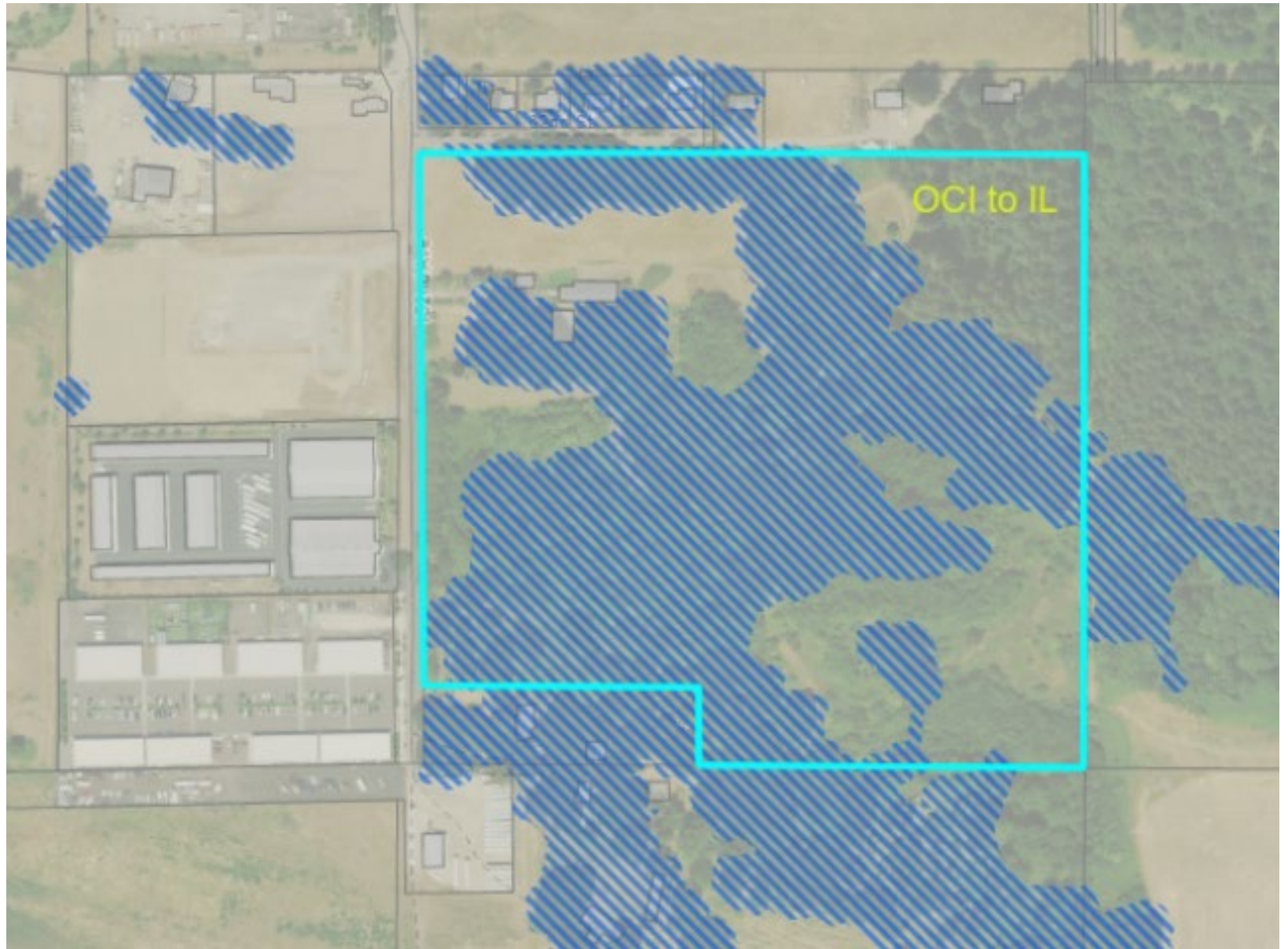
Anticipated
Development –
278,000 square
foot warehouse
on northern third
of site



Application

- Approval criteria requires demonstration that proposed zoning is more consistent than existing zoning with the City Strategic and Comprehensive Plans, and demonstration of a change in circumstances since adoption of existing designation. Possible and likely development should inform consideration of proposed and existing zones.
- Application argues the proposal offers more flexibility to meet overall industrial goals, will provide 200-300 jobs, help meet current consumer needs, and will provide fiscal benefits.

GIS mapping of critical lands— Property heavily forested with Oregon White Oak Habitat (blue)



Background – Critical areas review

- VMC 20.740 compliance required by City of Vancouver during development review process with same criteria under any zone. Demonstration of no net loss of habitat function and values required.
- Washington Department of Fish and Wildlife guidance for ensuring no net loss of Oak Habitat under review. Preliminary indication is this proposal may involve a need for potential off-site planting of 12 new acres, and off-site enhancement of 48 acres.
- Applicant's environmental consultant has begun discussion with WDFW. Likely mitigation site identified in Ridgefield.

Analysis of Consistency with Approval Criteria

- Both existing OCI and proposed IL zones support industrial employment and allow similar uses. OCI also allows residential uses. Both have similar allowances for commercial uses. The IL zone has greater allowances for various industrial and related uses that are typically larger, such as fuel storage, detention facilities, airports, wholesale sales, and warehouses.
- Rezone approval criteria broad and involve range of policy considerations. This particular proposal can be reasonably be found consistent or inconsistent.

Case for Consistency with Approval Criteria

- Site effectively located within larger IL zoned area on all sides. Small strips of OCl zoning abutting to north and south containing homesites could be changed as part of 2025 Comprehensive Plan update.
- OCl zone described as generally serving technology or research in mixed campus setting located along major roadways. IL zone described as more focused on industry.
- *General* direction of warehouse moratorium consistent or neutral with proposal. Moratorium threshold of 250,000 square feet indicates facilities almost as large as envisioned are acceptable with regulation. Information from moratorium research suggests warehouses have economic benefits, although likely lower average wages than some industries.

Case for Inconsistency with Approval Criteria

- Rezone premature given specific site, development, and timing
- 278,000 warehouse formally applied for prior to rezone, and likely development if rezone is approved
- Large warehouses are only use in recent years to be subject to moratorium citywide, as opposed to certain zones along certain roadways. Specific permanent standards to replace moratorium not yet adopted, and likely to rely on final City Green Building Policy also not yet drafted.
- City 2025 Comprehensive Plan update, likely to be most far reaching in Vancouver history, also pending.
- Rezone approval in 2023 and likely following up warehouse development application and approval in 2024 may foreclose options

Return to Planning Commission

- Commission questions, applicant and public testimony, Commission deliberations and recommendation.
- Sample Motion:
The Planning Commission recommends denial of the proposed Burnt Bridge Creek rezone proposal from OCI to IL at 6103 NE 152nd Avenue, based on the staff report and discussion at the September 12, 2023 public hearing

TO: Planning Commission
HEARING DATE: 9/12/2023
FROM: Bryan Snodgrass, Community Development Department Principal Planner
SUBJECT: Burnt Bridge Creek West Zoning Map Change



Report Date: 9/1/2023

Proposal: Change zoning map designation from Office Commercial Industrial OCI to Light Industrial IL on 33-acre property

Location: 6103 NE 152nd Avenue, parcel 159112000

Proponent/Applicant: Panattoni Development Corporation, represented by Peter Condyles of Toyer Strategic Advisors

City Staff: Bryan Snodgrass, Principal Planner

Recommendation: Forward denial recommendation to City Council

I. PRIOR REVIEW (IF APPLICABLE):

A Site Plan Review application for a 278,000 square foot warehouse on the northern third of the property was submitted by the rezone applicant in September 2022. See Attachment A. A pre-application conference was held on September 22, at which it was determined that the proposed warehouse would not be allowed on the current OCl zoning on the site.

II. BACKGROUND AND REVIEW PROCESS:

Following determination that a zone changes was needed, the applicant had correspondence and discussions with City staff regarding the substance and processing of the rezone application, which was then received on November 11, 2022. Pursuant to the State Environment Policy Act (SEPA), the City issued a Determination of Non-Significance (DNS) and circulated a checklist also published in the Columbian newspaper on March 24, 2023. One SEPA comment was received, from the Washington Department Fish and Wildlife (WDFW), included as Attachment C, describing the environmentally critical lands on the site and suggesting placing the lower portion of the property in a conservation covenant. The Planning Commission reviewed the proposal at workshops on the [March 14](#), [June 13](#), and [July 25](#), 2023. The July workshop focused on critical areas and included discussion and informal questions with Amaia Smith of WDFW, Keith Jones of the City of Vancouver, and Peter Condyles representing the applicant.

During this general timeframe, the Vancouver City Council adopted a temporary moratorium on construction of new warehouse facilities on December 12, 2022, based on concerns about significant increases in local as well as national warehouse development consuming limited industrial land supplies with potentially lower employment yields, and traffic and climate impacts. Follow up hearings established the scope of Vancouver moratorium to apply to warehouse facilities of 250,000 square feet or more, with exceptions for Port of Vancouver properties on Port-owned land, and any proposals limited to traded sector goods. More information is available [here](#). The rezone proposal is not subject to the moratorium, but proposed development applications meeting the scope would be prohibited while the moratorium is in place. It is set to expire on December 5, 2023, and anticipated to be replaced with updated permanent zoning standards. These standards are now anticipated by staff to prohibit warehouse facilities larger than 250,000 square feet in all areas outside of the Heavy Industrial IH zones, with limitations on truck traffic in those areas, lower minimum parking and maximum lot coverage requirements, and various climate-related provisions. These will be discussed separately as Planning Commission workshop item on September 12.

III. SUMMARY OF ISSUE/APPLICANT PROPOSAL:

The proposal is to change the zoning designation on a 33-acre property at 6103 NE 152nd Avenue, parcel 159112000, from OCI (Office Commercial Industrial) to IL (Light Industrial). The applicant is Panattoni Development Corporation, represented by Peter Condyles of Toyer Strategic Advisors. Hudlicky Limited Partnership is the listed owner. The rezone application indicates future development of a warehouse is envisioned, and as noted a site plan application for a 278,000 square foot warehouse on the northern third of the site was submitted by the applicant for City Site Plan Review in 2022 before the rezone process was initiated.

The site lies in the upper Burnt Bridge Creek area in northeast Vancouver, approximately 1400 feet south of Fourth Plain Blvd, 1300 feet west of 162nd Avenue, and 800 feet north of Burnt Bridge Creek. There are several small lot homesites abutting to the north and southwest, also zoned OCI. The site and the abutting small lot OCI properties are surrounded on all sides by larger, mostly undeveloped areas zoned IL. The site is not within a recognized Neighborhood Association.

Application materials are attached to this memorandum as Attachment B. The application argues that the existing zoning is intended for industrial economic development, and the proposed zoning provides more flexible opportunities for meeting this goal in a manner consistent with surrounding area zoning, while providing approximately 200-300 jobs, and providing warehousing to meet current consumer demands. The application also includes a preliminary economic impact analysis projecting the fiscal benefits from anticipated development.

The application estimates development of a warehouse under the proposed IL zoning would result in 1,112 new weekday daily trips with approximately 35% of the total daily traffic being trucks, and that future development would propose construction of half street improvements for the future NE 59th Street extension, which is planned to be extended across the proposed project's northern property line. Future development would also propose installing a new traffic signal at the NE 162nd Avenue/NE 59th Street intersection according to the rezone application.

As noted, the site is extensively forested. WDFW estimates through aerial imaging that approximately 27 of the 33 acres of the site consist of Oregon White Oak habitat (oak canopy plus associated native vegetation), including six acres that would likely be removed under the proposed site plan. Wetlands are also present. City critical areas protection standards under [VMC 20.740](#) will be applied during the development review process with the same criteria under any zone, and a demonstration of no net loss of habitat function and values would be required. WDFW guidance to achieve no net loss of function and values for Oregon White Oak habitat is currently being updated. Based on WDFW's draft guidance and the preliminary site plan, this proposal may involve need for potential off-site planting of 12 new acres, and off-site enhancement of 48 acres. The applicant's environmental consultant has begun discussion with WDFW, which indicates that off-site mitigation for enhancement will likely be pursued at a site in the Ridgefield area known as the Wapato Mitigation Bank. This area is undergoing certification for mitigation but

envisioned to be ready by the time of potential development if the rezone is approved. City Development Review and WDFW staff will be available at the September 12 hearing to answer technical questions.

IV. REVIEW CRITERIA AND FINDINGS:

20.285.060 Approval Criteria – Standalone Zoning Map Amendments.

A. Zoning map amendments not involving associated comprehensive plan map amendments shall demonstrate the following:

1. How the proposal is more consistent with applicable policies of the Vancouver strategic plan and comprehensive plan than the existing designation; and
2. That a change in circumstances has occurred since the existing designation was established.

Applicable Vancouver Strategic Plan Focus Areas

Economic Opportunity - Vancouver is a place where a wide variety of businesses of all sizes, from young startups to established enterprises, grow and thrive. A host of education and training opportunities bring prosperity to those who live here and provide a skilled workforce for companies.

Climate and Natural Systems Strategic Outcomes - Environmental stewardship and efforts to address climate change ensure that everyone has a sustainable future. We recognize the intrinsic value of the land beyond the economic benefits it provides. Vancouver protects, restores, and cares for the natural environment upon which all living things depend. The health of our natural systems supports the health of all who live, work, and play in our community.

Applicable Comprehensive Plan Policies

CD-1 Citywide land supplies

Establish land supplies and density allowances that are sufficient to accommodate adopted long-term City of Vancouver population and employment forecast allocations.

CD-9 Compatible uses

Facilitate development that minimizes adverse impacts to adjacent areas, particularly neighborhoods.

CD-16 Sustainability

Facilitate sustainable land use development through measures including but not limited to the following: (a) Develop integrated land use patterns and transportation networks that foster reduced vehicle miles traveled and associated greenhouse gas emissions (b) Develop individual buildings that minimize energy and resource consumption. Encourage home based efficiencies such as insulation retrofits, efficient water and air heating systems, and use of solar panels or other forms of energy capture. (c) Implement recommendations of the Vancouver-Clark County Sustainable Affordable Residential Development Report.

CD-10 Complementary uses.

Locate complementary land uses near one another to maximize opportunities for people to work or shop near where they live.

EC-1 Jobs-housing balance

Increase the ratio of jobs to residents in the City of Vancouver and the region.

EC-2 Family-wage employment

Promote the formation, recruitment, retention and growth of businesses that provide a wide range of employment opportunities, particularly family-wage employment. Prioritize family-wage employment in land use policies and practices.

EC-3 Public revenue enhancement

Promote development that enhances revenue generation for public services.

EC-4 Industrial and business park sanctuaries

Provide an adequate supply of industrial and/ or business park areas with opportunities for family-wage employment and revenue generation.

EC-5 No net loss of employment capacity

Restrict zone changes or legislative land use approvals that would lessen long-term capacity for high-wage employment unless accompanied by other changes within the same review cycle that would compensate for the lost capacity or unless the proposed change would promote the long-term economic health of the city.

EC-6 Efficient use of employment land

Maximize utilization of land designated for employment through more intensive new building construction and redevelopment and intensification of existing sites.

Existing Vancouver Municipal Code [Title 20, Comprehensive Plan](#) and [Strategic Plan](#)

Staff Findings:

Standards for the existing OCI zone applying to the site and proposed IL zone are available [here](#). Both are envisioned as primarily for industrial employment and allow generally similar uses. The OCI zone, as its full Office Commercial Industrial title implies, also allows residential uses. Both zones have very similar allowances for commercial uses. The IL zone has some greater allowances for various industrial and related uses that are typically larger, such as fuel storage, detention facilities, airports, wholesale sales, and warehouses.

Rezone approval criteria are broad and involve consideration of a range of policy issues, and this proposal can reasonably be found consistent or inconsistent with the balance of those standards.

Supporting a finding of consistency are the zoning designations surrounding the proposal site, which are largely IL on all sides. There are thin strips of OCI zoning immediately north

and south of the proposal site, but these contain older, large lot residences and could be converted to IL as part of the 2025 Comprehensive Plan update if the rezone is approved.

Although they are not typically determinative in considering zoning changes, the [VMC 20.440.025](#) descriptions of the typical location and function of the OCI and IL zoning codes also support a finding of consistency. The OCI zone is described as potentially serving technology or research users in a mixed campus setting located along major roadways, while the IL zone is described as more focused on industry.

Staff finds that the established parameters of the ongoing warehouse moratorium are neutral to the proposal. The City Council has effectively determined that larger warehouses are envisioned to have a place in Vancouver in the future, and by choosing a moratorium threshold of 250,000 square feet, has indicated that warehouses almost as big as the one proposed by the applicant in this case are appropriate for more limited regulation. Information developed as part of the citywide moratorium, as well as part of the economic information submitted by the rezone applicant for this proposal, also suggest that warehousing can have positive economic benefits, although average wages may be lower than some other industries.

Staff nonetheless finds that the proposal at this time is inconsistent with the balance of applicable criteria, as it is premature given the particular site, timing, and likely future development involved. The rezone is not proposed in the abstract, but with stated intent of allowing a warehouse use. The site plan for a 278,000 square foot warehouse, although non-binding, is more than a conceptual plan provided with the rezone to illustrate what could be developed. It is what the applicant formally submitted for City review in 2022 before applying for a rezone, and in staff's view is what likely would be proposed in the near term if the rezone is approved.

The current citywide moratorium on large warehouses remains in place. Ongoing development of permanent standards to replace the moratorium, while clearly anticipating allowances for warehouses under various circumstances, has not been drafted in final form or presented for public hearing review. A Planning Commission workshop discussion on potential permanent warehouse standards is also scheduled for September 12. City staff envision a simplified approach whereby warehouses larger than 250,000 square feet are allowed in the IH zone only and subject to various provisions. Warehouses of any size would also be subject to the City Green Building Policy. Adoption of a Green Building Policy was identified as an Action step under the [City of Vancouver Climate Action Framework](#) adopted in December 2022, which was centered on an ambitious goal of reaching carbon neutrality in Vancouver by 2040. Work towards adoption of the Green Building Policy is anticipated to begin in 2024.

Also pending in the near term is the adoption of a full update to the Vancouver Comprehensive Plan itself, required by state law to be completed by June 2025. The update is the first since 2011 and is envisioned as the most ambitious in Vancouver's history under the Growth Management Act, with new emphases on core City values of safety, equity, and climate recently established by the Vancouver City Council, as well as new direction from the recently updated [Vancouver Strategic Plan](#) adopted in June 2023. From an economic development standpoint it will be the first Vancouver Comprehensive Plan in

the post-recession, post-pandemic and E-commerce era. It will likely chart new directions in several aspects.

The extensive critical lands on the site and complicated regulatory measure required at the time of development review also introduces some uncertainty, although the option for off-site mitigation allows an opportunity to meet mitigation requirements.

Because of the pendency of the development of permanent warehouse standards and the Green Building Policy, of other potential implementation actions of the Climate Action Framework, and of the 2025 Comprehensive Plan, approval of a rezone at this time and a likely follow up application and development of an approximately 278,000 square foot warehouse in the near term thereafter may preclude other options in how the site is developed, or what regulatory standards are applied. Because of the importance of these policy initiatives, and the potential relationship of large warehouses to these initiatives – no other single use has been subject in recent years to a Vancouver citywide moratorium as opposed to in a particular subarea or class of roadway – staff finds that the proposal is premature, and at this time does not comply with the balance of applicable rezone approval criteria. More specifically, the proposal at this time does not comply with Strategic Plan Focus Area of Climate and Natural Systems and potentially does not comply with the Focus Area of Economic Opportunity. At this time staff finds it also does not comply with Comprehensive Plan policies CD-16, Sustainability; EC-2, Family Wage Employment; and EC-6, Efficient use of Employment Land. As with almost all rezones, staff does find that the proposal can comply with the VMC 20.285.060.A.2 requirement to show a change in circumstances since the designation was originally applied, in this case most likely through the rise of E-commerce and large scale warehousing.

As noted, staff acknowledges that a case can also be made that the proposed rezone complies with the balance of applicable criteria, as has been reflected in the process to date. Staff informed the applicant in fall 2022 correspondence and the Planning Commission at the March 2023 workshop that a staff recommendation of denial was generally anticipated, but due to the evolving status of the warehouse moratorium and other city initiatives in spring 2023, indicated at the June 13 Commission workshop a possible approval recommendation. However, based on the status of those issues and the proposal information at this time, staff finds that the balance favors denial. The June 2025 Comprehensive Plan update provides an appropriate remedy to apply an IL designation if those City initiatives are resolved in support of approval.

V. RECOMMENDED ACTION:

Staff recommends denial of the proposed zone change, with the following sample motion language offered:

The Planning Commission recommends denial of the proposed Burnt Bridge Creek rezone proposal from OCI to IL at 6103 NE 152nd Avenue, based on the staff report and discussion at the September 12, 2023 public hearing.

Bryan Snodgrass, Community Development Department Principal Planner,
bryan.snodgrass@cityofvancouver.us, 360 487-7946

Attachments:

- A. Previously proposed site plan
- B. Application and related materials
- C. SEPA comment



Attachment B: Application and related materials

Applicant is seeking a standalone rezone from Office Commercial Industrial to Light Industrial. The underlying comprehensive plan land use designation on the site is Industrial, and applicant will not be seeking a change. Below is this project consistency with The Vancouver Comprehensive Plan, and the approval criteria laid out in Vancouver Municipal Code 20.285.060.

1. How the proposal is more consistent with applicable policies of the Vancouver strategic plan and comprehensive plan than the existing designation

City of Vancouver Community Development Policies:

CD-1: Establish land supplies and density allowances that are sufficient to accommodate adopted long-term City of Vancouver population and employment forecast allocations.

This zone was originally designed to spur economic development and job creation in this part of Vancouver. While the underlying industrial comprehensive plan designation allows for certain uses, the ones that are in demand that are most likely to locate to this site are restricted by the OCI zone. With the market cooling for certain types of development, a rezone will allow flexibility in the uses that can use the site.

CD-3: Where compatible with surrounding uses, efficiently use urban land by facilitating infill of undeveloped properties, and redevelopment of underutilized and developed properties. Allow for conversion of single to multi-family housing where designed to be compatible with surrounding uses.

This site is currently underdeveloped, and with industrial development already taking place in the area this rezone would not be incompatible, and neither would any development that would take place as a result of it.

CD-9: Facilitate development that minimizes adverse impacts to adjacent areas, particularly neighborhoods.

Given other development on neighboring properties that are zoned light industrial, this would not be incompatible.

CD-12: Promote cohesive, integrated planning of areas and sites through use of subarea planning, master planning, and planned developments, or other methods.

This area was zoned and planned for industrial development, which has already taken place at various levels in this neighborhood. A rezone that will allow for flexibility in industrial development will help this area continue its already existing development patterns that are cohesive.

City of Vancouver Economic Development Policies:

EC-1: Increase the ratio of jobs to residents in the City of Vancouver and the region.

A rezone of the property would allow for a flexibility of industrial uses on this site, most if not all would bring jobs to Vancouver and help increase the ratio of jobs to residents. According to the economic analysis done on this site, there is the potential for 185 to 302 jobs that could be created on this property.

EC-2: Promote the formation, recruitment, retention and growth of businesses that provide a wide range of employment opportunities, particularly family-wage employment. Prioritize family-wage employment in land use policies and practices.

Oftentimes jobs that are created in industrial zones fill a gap in employment for those that are looking for jobs outside retail and office. These jobs pay family-wages in some cases, depending on the end user of the site once rezoned.

EC-3: Promote development that enhances revenue generation for public services.

Any business that develops this site, or moves to a finished building on this site will be contributing to the City of Vancouver's tax rolls in one way or another.

EC-4: Provide an adequate supply of industrial and/or business park areas with opportunities for family-wage employment and revenue generation.

The industrial land available in Vancouver is quickly being developed, or purchased, leaving very little left for the growing community. Given the city's position near Portland, many employers are looking to locate facilities here to serve both markets. By rezone this property and bringing it into the fold for potential light industrial development, the city is opening this site to potential family wage jobs and assured tax revenue.

EC-5: Restrict zone changes or legislative land use approvals that would lessen long-term capacity for high-wage employment unless accompanied by other changes within the same review cycle that would compensate for the lost capacity or unless the proposed change would promote the long-term economic health of the city.

A rezone of this property would not lessen long-term capacity for high-wage employment.

EC-6: Maximize utilization of land designated for employment through more intensive new building construction and redevelopment and intensification of existing sites.

One of the best ways to maximize land is to rezone it for more intensive and better uses. Given that this rezone would not change the ultimate type of use, a rezone on this property would

Clark County Land Use Planning Policies

1.2.1 The UGAs shall be consistent with the following general goals:

- reduce the inappropriate conversion of undeveloped land into sprawling, low density development

A rezone of this property would allow flexibility of use, and allow for the parcel to be developed as its highest and best use.

- maintain densities which support a multi-modal transportation system

This property is within walking distance to transit, which will allow future employees on this site to utilize transportation options other than single occupancy vehicles.

- support variety, choice and balance in living and working environments

In order to create a parity between job development and housing affordability, there must be adequate land for that job development. This rezone would help make this property for flexibility for potential job creators.

Clark County Economic Development Policies

9.1.1 The county and cities will demonstrate their commitment to long-term economic growth by promoting a diverse economic base, providing opportunity for all residents, including unemployed and disadvantaged persons. Growth which helps to measurably raise the average annual wage rate of community residents and preserves the environmental quality and livability of our community, is viable growth and will improve the lifestyle of Clark County residents.

Jobs that are created within industrial zones help create a diversity of jobs types, and in many cases pay wages that can support a family. This type of job development helps keep residents within their existing communities and can help spur economic development in other ways with their buying power. This rezone will create flexibility in what jobs can be located here, with a recent economic analysis estimating that between 185 and 302 jobs could be created on the property.

9.1.3 The county and cities will encourage long-term growth of businesses of all sizes, because economic diversification and stratification are important factors in overall job growth for the county and cities.

Industrial type jobs are very important to the economic diversity and economic health of a community. They are outnumbered greatly by retail and commercial jobs, meaning any opportunity to expand industrial uses in a community will help reach this goal overall.

9.1.4 The county and cities will promote productivity and quality among its businesses to meet world and market standards for their products and services.

Even as we see the economy begin to slow down from the boom years we saw previously, the reality is that people are now purchasing products online now more than ever. This requires distribution centers and warehousing to ensure these goods make it to the consumers safely, and in a timely manner. This is what the market is currently demanding and will be for the foreseeable future. The city and county can meet this demand by allowing these types of uses on this property, where is it already allowed on all neighboring parcels.

9.1.8 The county and cities will provide for orderly long-term commercial and industrial growth and an adequate supply of land suitable for compatible commercial and industrial development.

A large portion of the land designed and zoned for industrial uses in Vancouver have already been developed as such or have been purchased with that intention. A rezone of this property would help increase the "adequate" supply for land for industrial development, which leads to job growth and economic development overall.

9.1.9 The county and cities will encourage the recruitment of new business employers to absorb the increasing labor force and to supply long-term employment opportunities for county's residents who are currently employed outside of the State.

The land in this part of Vancouver designated as industrial was meant to house jobs for residents allowing them to work within the same community they live. By allowing additional uses such as warehousing and freight on this property there is a higher likelihood of job creation.

1.2.3 Ensure coordination of environmental protection, preservation and enhancement programs and regulations.

There will be no adverse effects environmentally to this site if a rezone is approved.

1.2.6 Concentrate development in areas already served by public facilities and services. Use the provision or planned provision of public services and facilities as a means of directing development into desirable areas.

This part of Vancouver has already seen substantial investment by both public and private entities with respect to transit, roads improvements, commercial development, and job creation. Any future development would stand to further this growth.

1.3.1 Urban densities and uses may occur throughout the urban growth area if it is provided with adequate services. Development and redevelopment in the UGA should be strongly encouraged to occur in greater intensity in major centers, transit routes and other areas characterized by both existing higher density urban development and existing urban services. Development and redevelopment should be encouraged to occur with less intensity in areas where urban development is of lower density or has not yet occurred, or in areas where urban services do not yet exist.

This area has already seen industrial development at a level greater than or equal to the development that would be expected on this property if a rezone is approved. Given the site is near developed roads and transit opportunities, this site would be compatible to neighboring ones.

1.4.1 Interrelated uses should generally be encouraged to locate in close proximity of each other:

- Commercial, industrial or other employers and the residential areas they serve should be allowed and encouraged to locate near to one another, as long as negative impacts from non-residential uses on the residential areas are mitigated.

This neighborhood has already been designated and developed for industrial uses. A rezone would serve as a continuation of this and help realize a goal of the city to create jobs for residents.

1.4.7 Higher intensity uses should be located on or near streets served by transit.

Transit is located less than a mile away from this site.

Clark County Housing Policies

2.1.2 Link economic development and housing strategies to achieve parity between job development and housing affordability.

According to a recent economic analysis of this property, there is the potential to create between 185 and 302 jobs on this site. Much of this is dependent on a rezone.

9.1.11 Conversion of industrial or employment center lands to non-industrial or nonemployment center districts may occur within the following parameters:

- a. Protect and preserve lands zoned heavy industrial for heavy industrial uses.

This rezone would not change any land zoned for heavy industrial use.

- b. Protect employment center lands from conversion to residential.

This rezone would not change any land from industrial to residential.

2. That a change in circumstances has occurred since the existing designation was established.

In the time since this zone was established much of the land designated as industrial in this part of Vancouver has been purchased with the intention of industrial development or been developed. The zoning of this property makes it an island of OCI zoning among the neighboring LI zoning on all sides. It is not an accident that a large majority of these properties around this site have been developed, while this one has remained vacant. Even at the height of the real estate market during the last few years this site did not see much activity. Now as the real estate market begins to cool and companies limit expansions due to economic uncertainty, circumstances have changed enough to warrant a rezone of this property. This will allow greater flexibility in uses, such as allowing warehousing, distribution, and freight movement, all uses that are still in demand. While the economy has slowed, the demand for items ordered online has not. This demand will only increase in the coming years, and to assure these items get to the consumer in a safe and timely manner, distribution centers, and other freight facilities are going to need to locate in and around metro areas such as Vancouver-Portland. This site is a good location for this type of development that is needed within this part of the region, and a rezone will help accomplish that.



TOYER STRATEGIC ADVISORS, INC.
10519 20th ST SE, STE 3
LAKE STEVENS, WA 98258
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November 4, 2022

Bjorn Brynestad
Panattoni Development
1821 Dock St. , Suite 100
Tacoma, WA 98402

PRELIMINARY ECONOMIC IMPACT ANALYSIS FOR BURNT CREEK WEST

Dear Mr. Brynestad:

You have asked our firm to provide a preliminary analysis of three development scenarios based on construction of a 278,000 speculative industrial building designed to accommodate one or more users. This is close to the maximum likely footprint. The intent of this analysis is to support public agency and private citizen engagement during a rezone process, recognizing that the building's ultimate use may be a single tenant or multiple tenants that range from office and R&D tenants to warehousing and from light manufacturing and kitting to breweries or wineries.

Although the scenarios that could be studied are many, we have attempted to narrow our analysis to three potential scenarios. The following highlights the process for how we model the likely impacts based on the conceptual site plan and summarizes our preliminary findings:

STEP ONE: DETERMINING A BASE EMPLOYMENT FIGURE

- A. Where feasible our model utilizes the specific employment figure provided by the project's end user (i.e. tenant). However, this is not possible in the case of a speculative buildings.
- B. Absent specific end-user data, we evaluate local and regional information, including but not limited to:
 1. Employment densities from similar projects completed by the developer
 2. Local employment density data from sources such as local reports (e.g. buildable lands reports; economic development plans; etc.), as well as proprietary data sources and our company's own database
- C. Our model anticipates this project is likely to have a mix of future tenants engaged in light manufacturing, wholesale trade, technology, and warehousing/distribution. For the single tenant, distribution facility scenario we assumed 1 job to 1,500 square feet. For the mixed tenant scenarios the average employment density was 1 job per 919 and 954 square feet.

STEP TWO: APPLYING MULTIPLIERS

- A. Multipliers for the model are pulled from the Bureau of Economic Analysis (BEA) RIMS II Multipliers which are based on the 2012 benchmark input-output (I/O) national table with updated 2020 regional data. This model reflects multiplier data specific to the Vancouver-Portland-Hillsboro, OR-WA Metropolitan Statistical Area.

STEP THREE: MODELING IMPACTS

- A. Direct and indirect jobs are those related to/tied to the new activity. Induced jobs are those jobs that are created because of the overall increase in activity. This type of analysis does not distinguish between full and part time jobs.

- B. Using the base job estimates we apply output, earnings, and value-add multipliers for each industry segment to determine the projected final demand change in economic output and projected earnings (wages, salaries and proprietor's income) as a result of the project. These figures are shown in 2020 dollars unless otherwise noted.

MODELED IMPACT (PRELIMINARY)

The following table highlights three scenarios modeled for future occupancy of a conceptual 278,000 square foot industrial building that could accommodate up to four tenants. Scenario 1 assumes the building is fully occupied by a warehouse and distribution user. Scenario 2 assumes two tenants include warehousing and distribution, as well as manufacturing. Scenario 3 assumes four tenants including warehousing and distribution, manufacturing, and technology related uses.

	Scenario 1	Scenario 2	Scenario 3
Employment	185	291	302
Related Jobs [^]	189	279	305
Total Jobs Impact	374	570	607
Direct Output (in millions)	\$ 29	\$ 57	\$ 54
Local GDP (in millions)	\$ 24	\$ 44	\$ 44
Earnings* (in millions)	\$ 7.71	\$ 14.14	\$ 17.81

[^]This includes indirect and induced jobs attributable to the estimated employment created by this project

*Earnings as defined by the model include wages, salaries, and proprietor's net income, plus employer contributions to health insurance

PROJECTED SALES TAXES FROM CONSTRUCTION

The construction of the building will generate approximately \$25.57 million in one-time sales tax revenues that benefit the City of Vancouver, Clark County, and the State of Washington. The following estimates the breakdown by tax authority:

Estimated Sales Tax from Construction		
Building SF (Approx)		277,942
Construction Cost per SF		\$92
Total Construction Cost		\$25,570,664
State	6.50%	\$1,662,093.16
City of Vancouver	0.85%	\$217,350.64
C-Tran	0.70%	\$178,994.65
Clark County	0.15%	\$38,356.00
E911	0.10%	\$25,570.66
Mental Health	0.10%	\$25,570.66
Affordable Housing	0.10%	\$25,570.66
	8.50%	\$2,173,506.44

REAL PROPERTY TAXES

The proposed development could generate over \$303,000 annually in property at full buildout, including approximately \$55,000 to the City of Vancouver. The example below is based on an estimated total valuation and the 2022 current tax levy broken down by taxing district and shown on the next page. This is roughly \$300,000 more in total annual property taxes than are being generated on the existing vacant parcel.

		Potential Taxable Value
Property Tax Broken Down by Levy		\$28,000,000
COUNTY GENERAL	0.92759	\$ 25,972
COUNTY GENERAL ADREF	0.00166	\$ 47
DEV DISABILITY	0.01087	\$ 304
MENTAL HEALTH	0.01087	\$ 304
VETERANS ASST	0.00979	\$ 274
CONSERVATION FUTURES ADREF	0.00007	\$ 2
CONSERVATION FUTURES	0.03615	\$ 1,012
FT VANCOUVER REG LIBRARY	0.34275	\$ 9,597
METROPOLITAN PARK DIST	0.17147	\$ 4,801
METROPOLITAN PARK DIST ADREF	0.00041	\$ 12
PORT VANCOUVER BONDS	0.11449	\$ 3,206
PORT VANCOUVER GENERAL	0.15073	\$ 4,220
SD114 EVERGREEN DEBT SVC	1.76351	\$ 49,378
SD114 EVERGREEN ENRICHMENT	1.71968	\$ 48,151
SD114 EVERGREEN TECHNOLOGY LE	0.42022	\$ 11,766
STATE SCHOOLS - PART 1	1.91284	\$ 53,559
STATE SCHOOLS - PART 2	1.03016	\$ 28,845
CITY VANCOUVER AFFORDABLE HOUS	0.22586	\$ 6,324
CITY VANCOUVER GENERAL	1.97136	\$ 55,198
CITY VANCOUVER GENERAL ADREF	0.00595	\$ 167
Total All	10.82644	\$ 303,140

OCCUPATIONS & WAGES

The following graphic depicts the hourly wage distribution data of full-time equivalent employees in manufacturing (allowed use in the OCI zone) and transportation and warehouse (allow in the LI zone). This data indicates that wages in both industries are very similar with the percentage of workers in manufacturing making \$38/hour or greater accounting for 22% of the manufacturing total while the same wage ranges account for 23% of the total.

NAICS	Industry	FTE	<\$14.00	\$14.00 - \$19.99	\$20.00 - \$25.99	\$26.00 - \$31.99	\$32.00 - \$37.99	\$38.00 - \$43.99	\$44.00 - \$49.99	\$50.00 - \$55.99	\$56.00+
31-33	Manufacturing	12,506	385	2,991	2,884	2,192	1,301	805	491	351	1,106
Percent Distribution			3.1%	23.9%	23.1%	17.5%	10.4%	6.4%	3.9%	2.8%	8.8%
48-49	Transportation and warehousing	2,937	106	614	708	580	257	189	154	98	230
Percent Distribution			3.6%	20.9%	24.1%	19.7%	8.8%	6.4%	5.2%	3.3%	7.8%

Source: Washington Employment Security Department, County Data Tables, Clark County, WA

OTHER ECONOMIC IMPACTS

Although not modeled in this analysis, it is also important to point out that this project will generate additional local and state revenues, including:

- real estate excise taxes generated from the sale of the property from its current owner
- permit revenues generated from the project's application, review, and inspection fees which typically fund the community development department by reducing the amount of general fund dollars which might be required for the community to provide these services
- personal property taxes on the machinery, equipment, racking, office furniture, etc. that will be within these buildings
- water and sewer connection charges, which help fund improvements to the city's water and sewer infrastructure

- traffic impact fees, which help fund identified transportation improvement needs in the community
- utility taxes, business and occupation taxes, etc. the completed project will generate these other state and local recurring tax receipts

ABOUT PRELIMINARY MODELING

The impacts modeled at this stage are very preliminary and should not be construed as final. As specific tenants are confirmed, this analysis can be updated to reflect specific tenant information including the actual number of employees, final building square feet, construction value, etc.

Should you have any questions or require additional information, please do not hesitate to contact us.



DAVID K. TOYER
PRESIDENT



TOYER STRATEGIC ADVISORS, INC.
10519 20th ST SE, SUITE 3
LAKE STEVENS, WA 98258
toyerstrategic.com

June 14, 2023

Vancouver Planning Commission
415 W 6th Street
Vancouver WA, 98660

Dear Commissioners,

Our firm represents Panattoni Development, applicant for a rezone at 6103 NE 152nd Ave, Vancouver, WA, 98682, parcel number 159112000. We are happy to respond to questions raised by the Commission during its June 13 workshop.

Site Plan:

We submitted a conceptual site plan with the rezone application based on a request from staff. It's been our experience over 20+ years, that jurisdictions often want non-project rezones to submit conceptual site plans to allow for a general analysis of potential impacts. For example, we recently did a rezone in a city that corrected an inconsistency between the comprehensive plan's land use designation (mixed use) and zone (single family residential) where the jurisdiction wanted to see the maximum development potential (even if it wasn't the final site plan proposed) in order to understand potential traffic and other concerns.

The conceptual site plan you have for this proposal is just that, a concept. It is meant to show commissioners what the maximum development footprint could look like given the zone. Given the present uncertainty resulting from the warehousing moratorium, our client has not yet developed a formal site plan and any formal site plan will more specifically reflect site and market conditions.

Further, it should be noted that in the memo for the June 13 workshop, staff states that "a detailed State Environmental Policy Act review would need to be conducted following formal submittal of a site plan." Again, it is the formal site plan review process, not a conceptual site plan presented for a standalone rezone, that will be reviewed for compliance with city codes and standards, including the items that have been commented on by the Washington Department of Fish and Wildlife.

Dimensional Standards:

We fully understand and appreciate the Commission's interest in critical areas and how they may be protected. Regardless of which zone applies, any critical areas that may be on the site are required to be protected in the same manner under the city's code. Thus, a rezone does not change the requirements to identify and protect critical areas.

Comparing the dimensional standards for the current Office Commercial Industrial (OCI) zone to the proposed Light Industrial (LI) zone would result in a reduction in the maximum site coverage allowed according to Table 20.440.040-1, which establishes the maximum site coverage for OCI at 100% versus a limit of 75% in the LI zone.

Additionally, building height in the OCI zone can be as much as 75 feet, while buildings in the LI zone have a maximum height of 45 feet. In sum, the proposed rezone from OCI to LI actually results in greater restrictions on the future development of the site because it does not allow 100% of the site to be covered by development. This should lessen concerns about future environmental impacts including those expressed by the Department of Fish and Wildlife. The most appropriate time for addressing these comments is during the formal site plan review, which process has not been applied for yet. The fact of the matter is that the proposed rezone will allow for more of the site and trees present to be preserved than if it were developed under the current zoning designation.

Warehousing Moratorium:

As the city council and city staff continue to work on the warehousing moratorium, it is important to reiterate that this rezone stands independent from those deliberations. Our client does not have a formal or final development plan for this site. It is important to note that our client submitted an application for this rezone nearly a month before the warehousing moratorium was passed and their goal

has been to gain approval of the LI zone so that whatever their formal site plan proposes, it can be marketed to the greatest range of likely industrial tenants.

We look forward to the opportunity to present at the Planning Commission hearing in July and can further address any questions you may have at that time.

Thank you.

Sincerely

Peter Condyles
Senior Project Manager

Attachment C: SEPA Comment received



State of Washington
DEPARTMENT OF FISH AND WILDLIFE
Southwest Region 5 • 5525 South 11th St Ridgefield, WA 98642
Telephone: (360) 696-6211 • Fax: (360) 906-6776

April 6, 2023

Bryan Snodgrass, Principal Planner
Vancouver Community and Economic Development
415 W 6th St
Vancouver, WA 98660

RE: Burnt Bridge Creek West Zone Change

Dear Mr. Snodgrass

Thank you for the opportunity to comment on the Burnt Bridge Creek West Zone Change. The Washington Department of Fish and Wildlife (WDFW) has reviewed the proposal and offers the following comments for your considerations.

WDFW is concerned that the proposed rezone and subsequent future development of the parcel will lead to unavoidable impacts on the priority Oregon white oak (OWO) woodland. WDFW recommends that the City of Vancouver explore other zoning options that reduces conflict between protecting the resource and reasonable use of property.

The *Proposed Burnt Bridge Creek West Zoning Map Designation Change* presentation presented by Bryan Snodgrass, Principal Planner for the City of Vancouver on March 14, 2023, indicates that a 275,000 square foot warehouse is proposed in the northern portion of this parcel tentative on zoning approval. We are concerned that changing the zoning to light industrial will not allow flexibility in avoiding impacts to the priority OWO woodland and the resulting development will degrade habitat. While we recognize the need for Light Industrial zoning and development, we do not believe this parcel is best suited to meet those needs. The OWO woodland within this parcel occupies approximately 27* of the 33 acres and is a part of a larger, contiguous OWO woodland that is approximately 41 acres*. Additionally, several acres of this contiguous oak stand are actively managed by the Terrace Oak Mitigation Bank. Stands this large are rare in Clark County and almost completely absent within the City of Vancouver. Because of the rare and valuable nature of the OWO woodland of this size, we recommend for the City of Vancouver to explore ways to keep this parcel as green space while encouraging industrial development on parcels that do not have significant conflict with priority habitats of this significance.

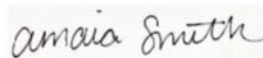
* Calculations are estimates based on WDFW PHS aerial imaging and have not been field verified.

Page 2

If this zoning is approved, however, we recommend placing the southern portion of this parcel, outside of the proposed development footprint, into a conservation easement. A significant portion of the stand is located outside the proposed footprint and protecting it in an easement would prevent future development impacts that would be difficult, if not impossible, to mitigate for. We also request being consulted for the review of the compensatory mitigation plans prior to the City approving any development on this site. We are currently updating our recommendations for mitigating for Oregon white oaks and the best available science indicates mitigation is needed to offset the temporal loss of habitat *in addition to* the physical loss of trees. Based on this information, compensatory mitigation requirements will likely be greater than what has been required in previous development proposals. Due to the significant acreage of OWO woodland on site, the compensatory mitigation required will likely be complex and we want to ensure that any mitigation achieves no net loss of function.

Thank you for considering our recommendations to protect this priority habitat. We hope that the City gives special consideration to this property due to the size and location of this priority OWO woodland. Furthermore, we encourage the City to have additional conversation to determine the best use of this property, given the valuable habitat on site.

Sincerely,

A handwritten signature in cursive script that reads "Amaia Smith". The signature is written in dark ink on a light-colored background.

Amaia Smith
Habitat Biologist,
Washington Dept of Fish and Wildlife
5525 South 11th St.
Ridgefield, WA 98642



Evergreen and Grand Commercial Corridors Strategy

Planning Commission Public Hearing
September 12, 2023

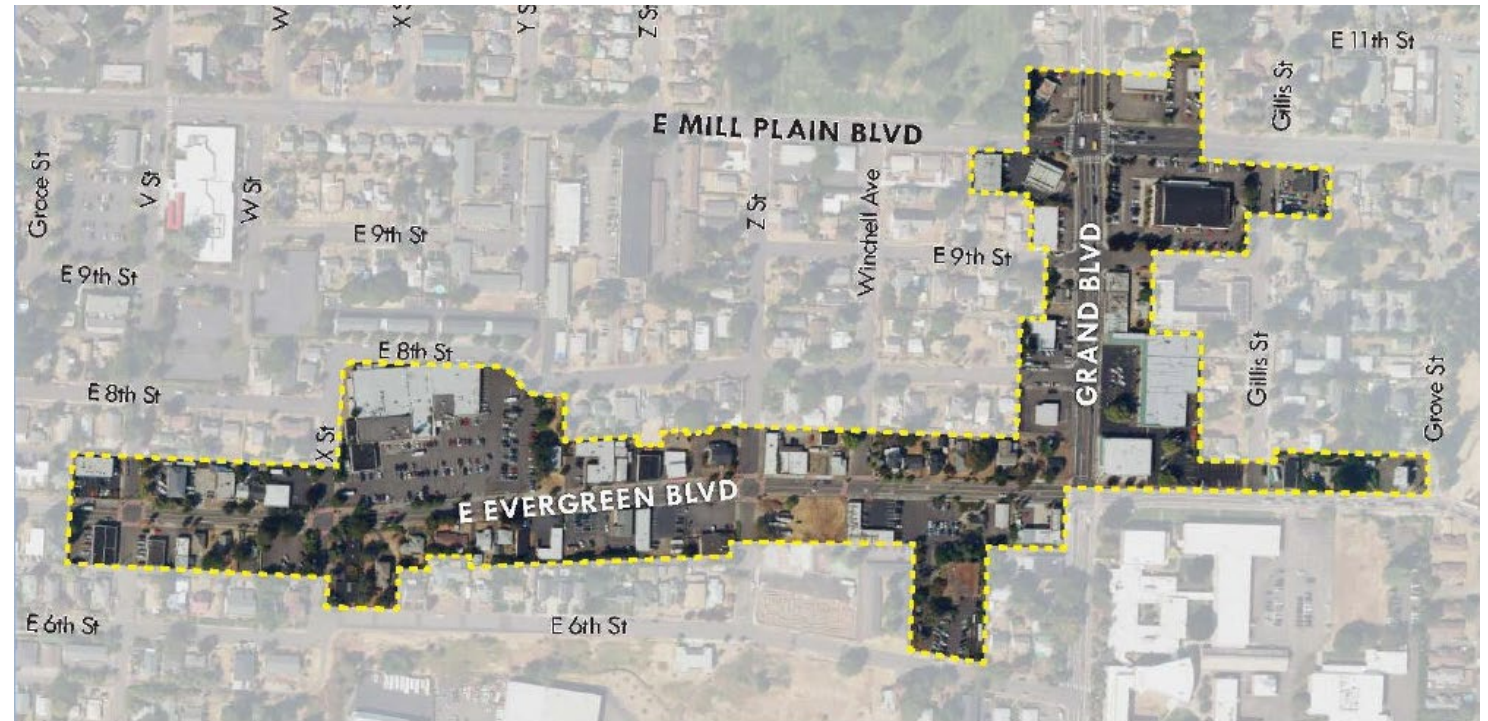


Community Development Department
Becky Coutinho, AICP, Associate Planner

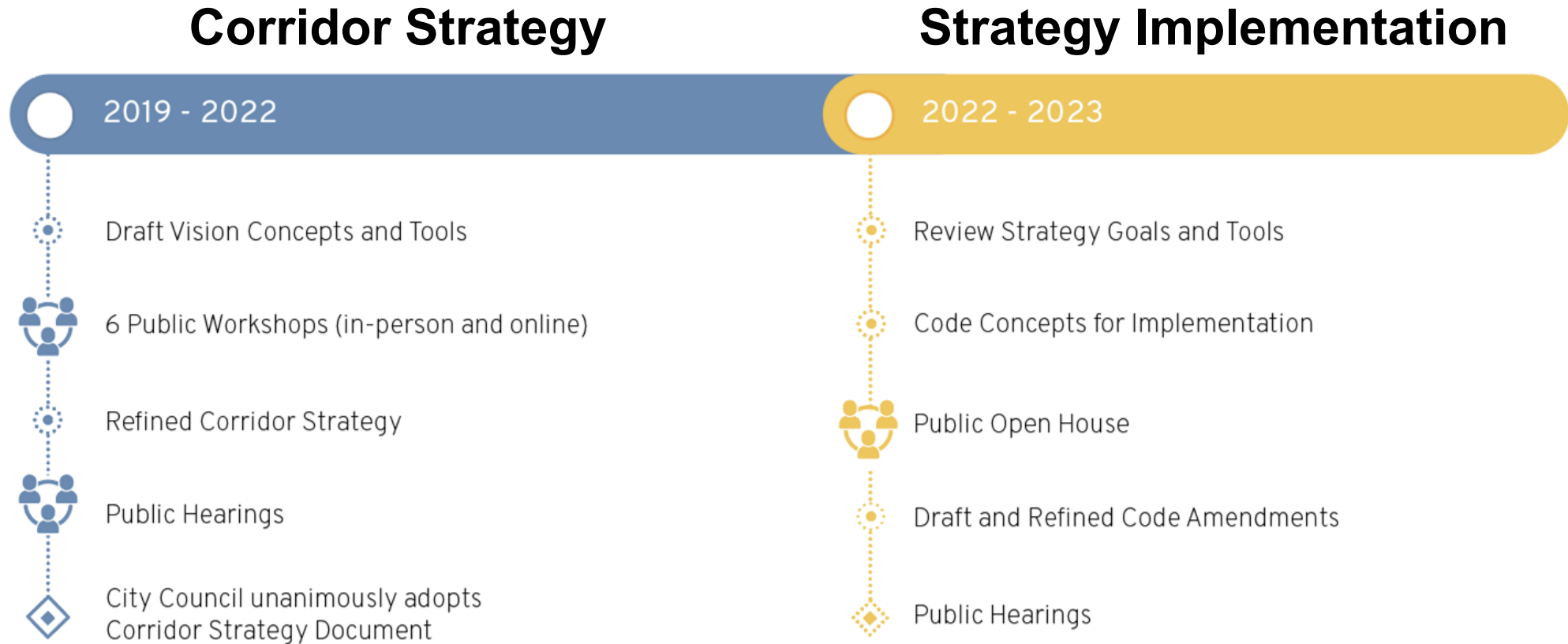
Cascadia Partners
Jamin Kimmel, AICP, Partner

Overview of Evergreen and Grand Commercial Corridors Strategy Document

- Subarea plan adopted by City Council in February 2022
- Part of larger commercial corridors Citywide initiative



Two Phases of Same Project



Evergreen and Grand Commercial Corridors Overlay District: Development and Design Standards



Uses and Density

Uses: Encourage pedestrian-oriented, active uses along the corridor.

Proposal: Prohibit auto-oriented uses such as gas stations, auto repair/sales, and self-storage.

Density: Encourage higher density development to support transit ridership and economic vitality.

Proposal: Minimum density standards:

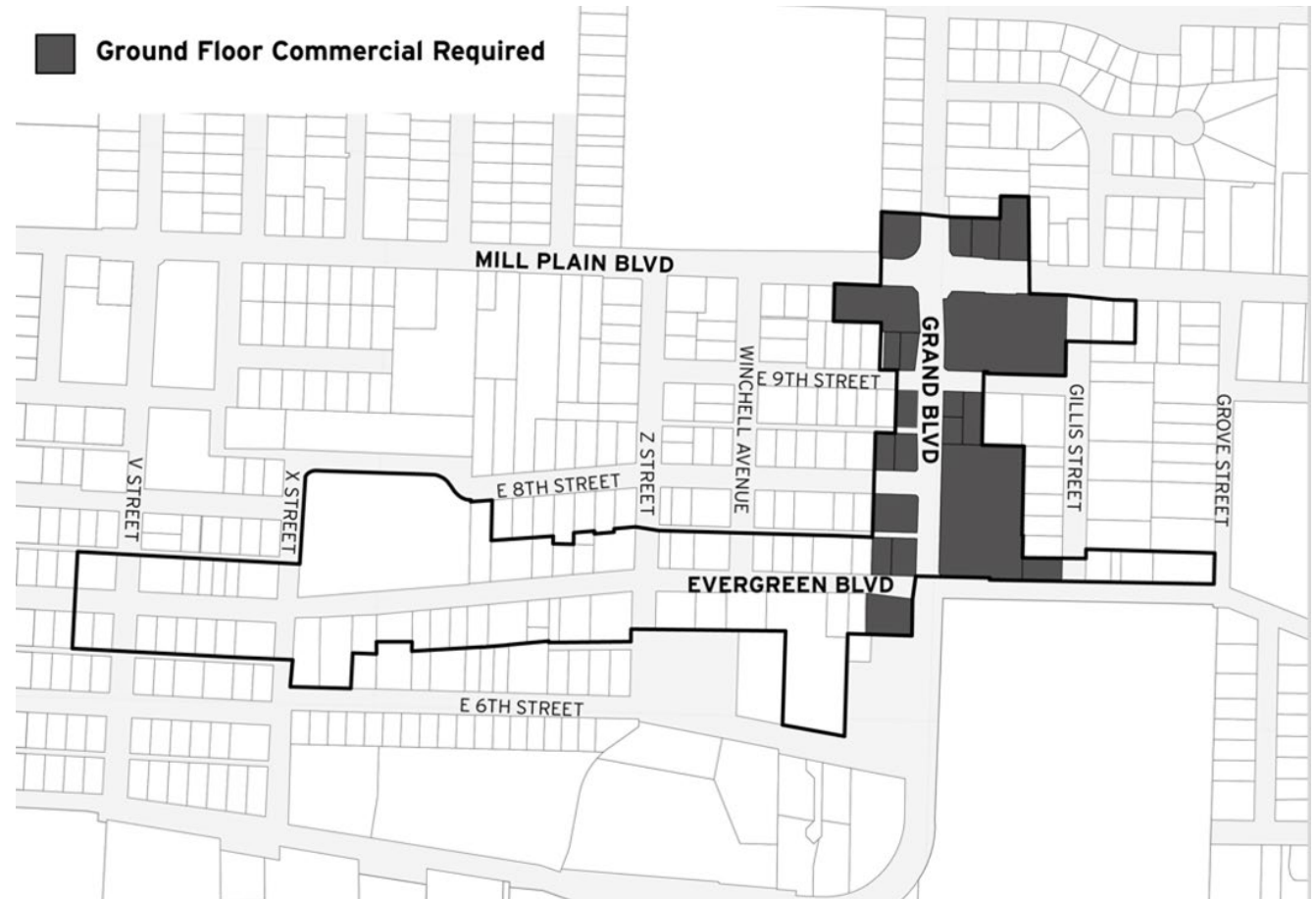
- 30 dwelling units/acre on Grand
- 22 dwelling units/acre on Evergreen



Required Ground Floor Commercial

Proposal:

- Require ground floor commercial uses for new development on Grand.
- Allow for either commercial or residential uses on the ground floor on Evergreen.



Building Orientation and Setbacks

Setbacks Proposal:

- Set a maximum front setback of 10 feet for ground floor commercial uses.
- No minimum setback.

Building Orientation Proposal:

- All buildings must have at least one primary entrance facing the street
- A minimum of 50% of all ground floor residential units must have individual main entrances.



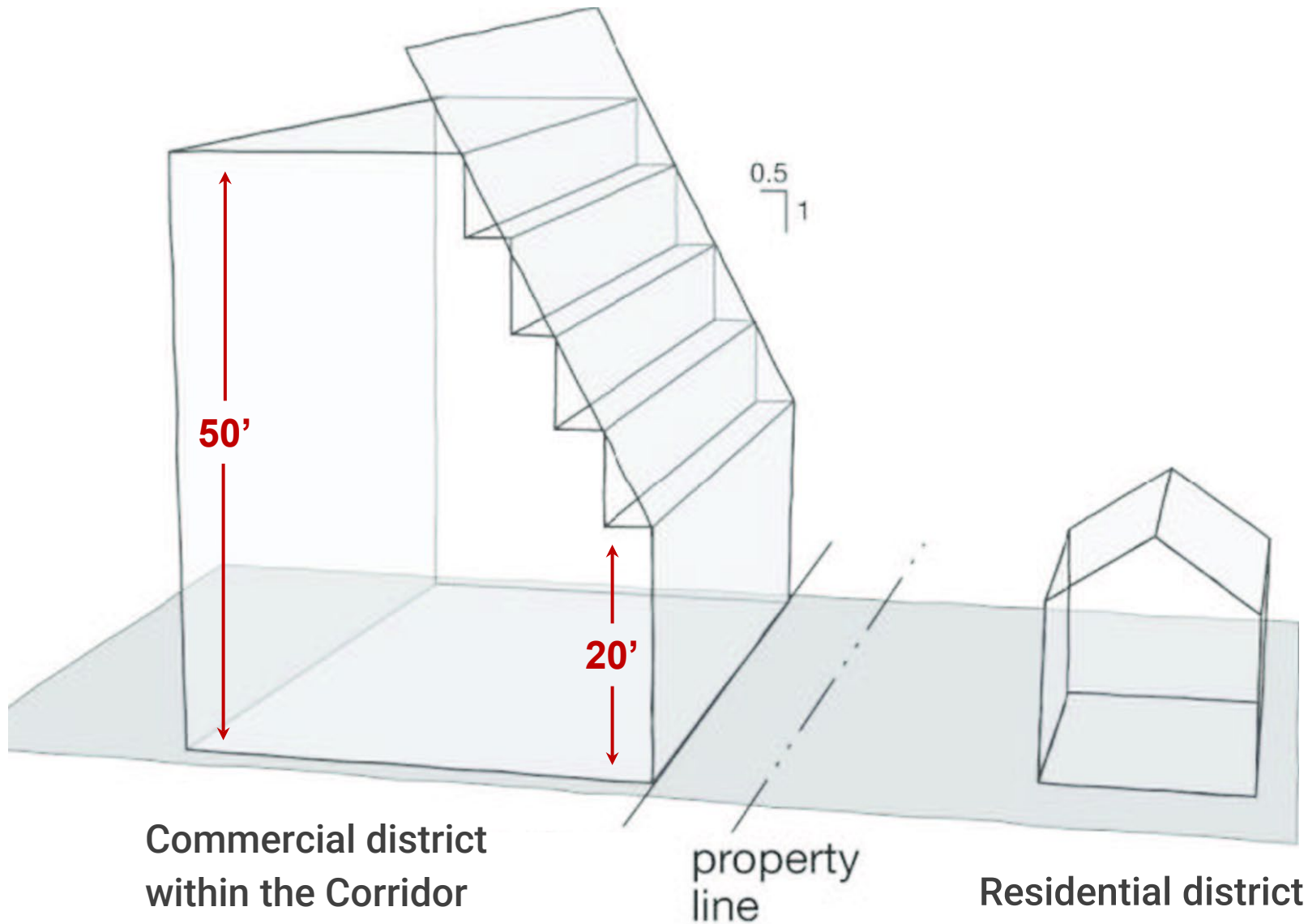
Maximum Building Height

Proposal:

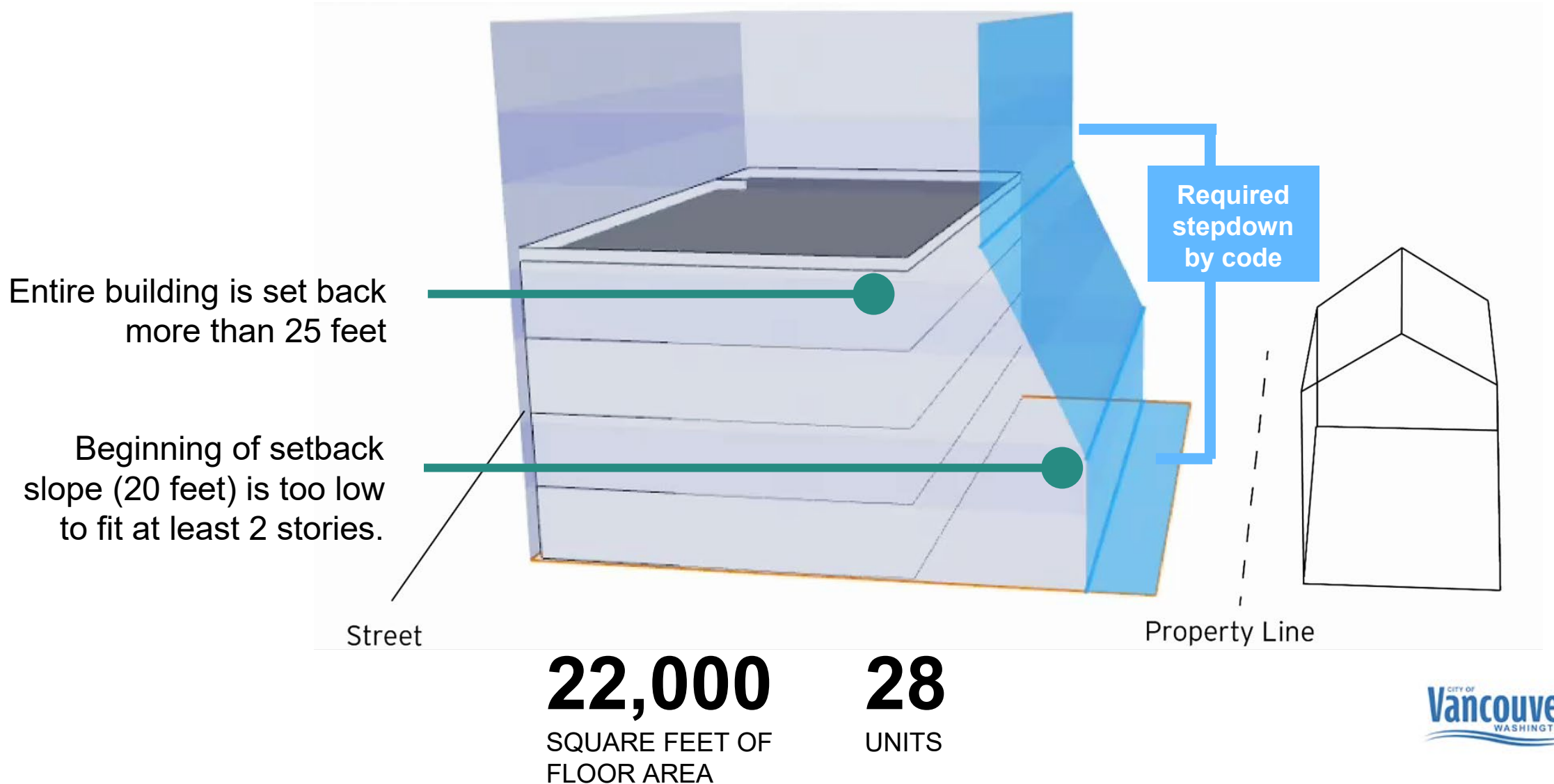
- Concentrate higher densities and building heights near bus rapid transit on Mill Plain.
- Maintain 50-foot (4-story) height limit on Evergreen and the western side of Grand.
- Increase max height to 60 feet (5-story) on eastern side of Grand and the intersection of Grand and Mill Plain.



Height Stepdown: Existing Standard

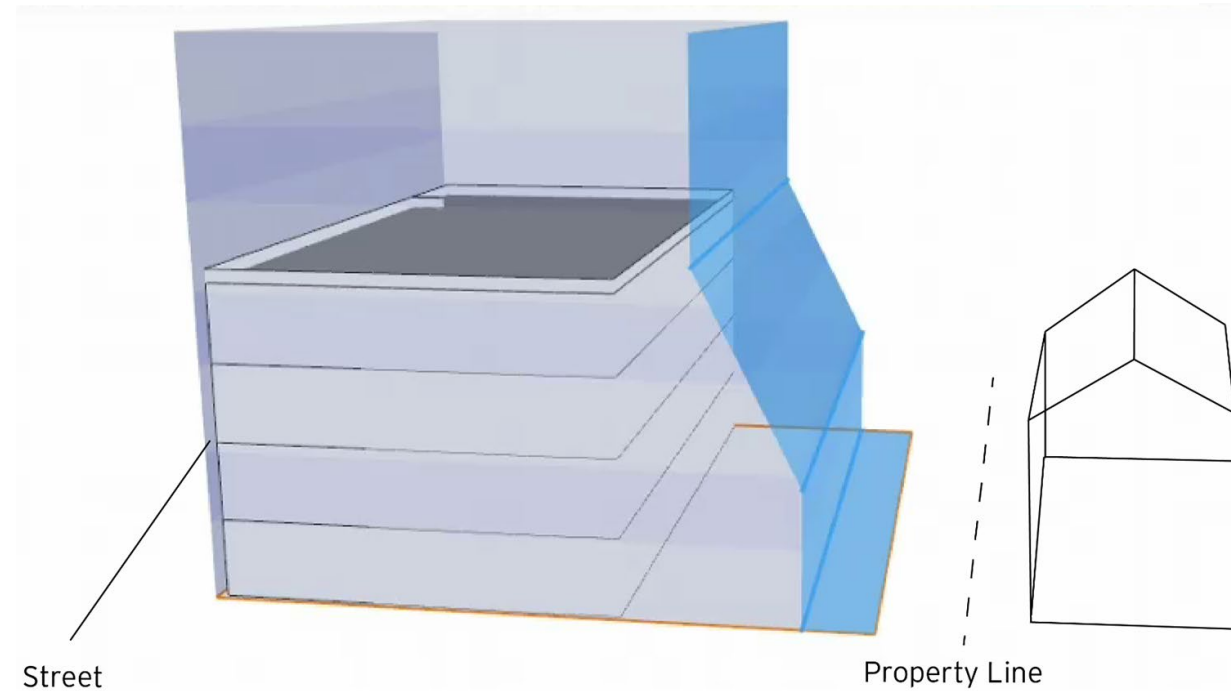


Typical Outcome Under Existing Standards

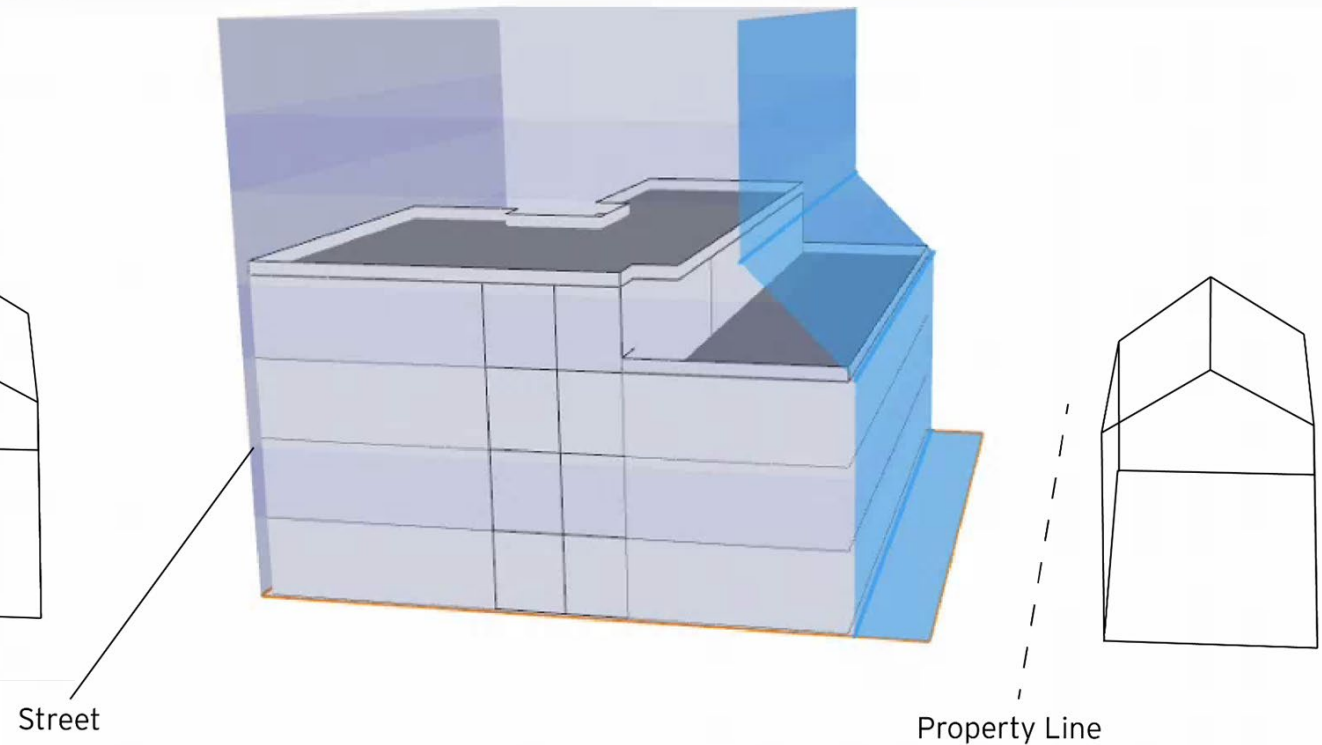


Typical Outcome: Existing vs. Proposed

Existing height step down



Proposed height step down
(next to high density zones)

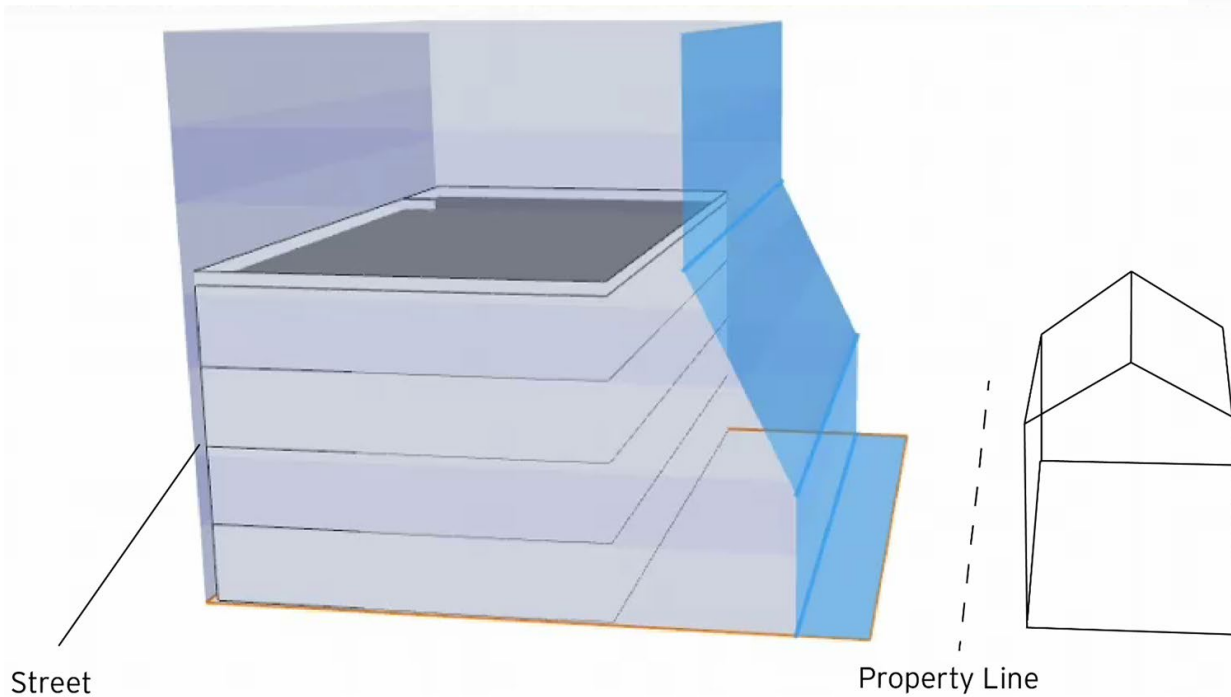


28 UNITS **22,000** SQ. FT. OF
FLOOR AREA

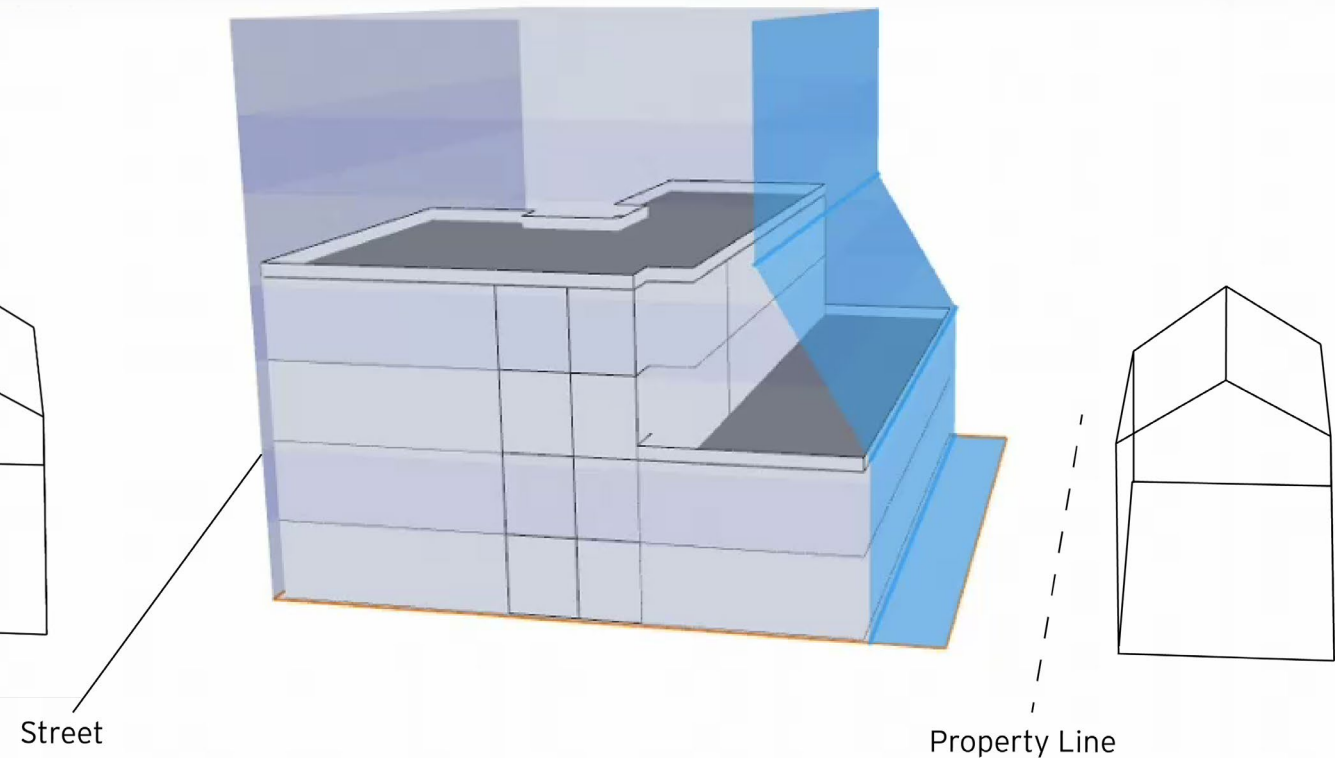
32 UNITS **24,000** SQ. FT. OF
FLOOR AREA

Typical Outcome: Existing vs. Proposed

Existing height step down



Proposed height step down
(next to low density zones)



28 UNITS **22,000** SQ. FT. OF FLOOR AREA

28 UNITS **21,000** SQ. FT. OF FLOOR AREA

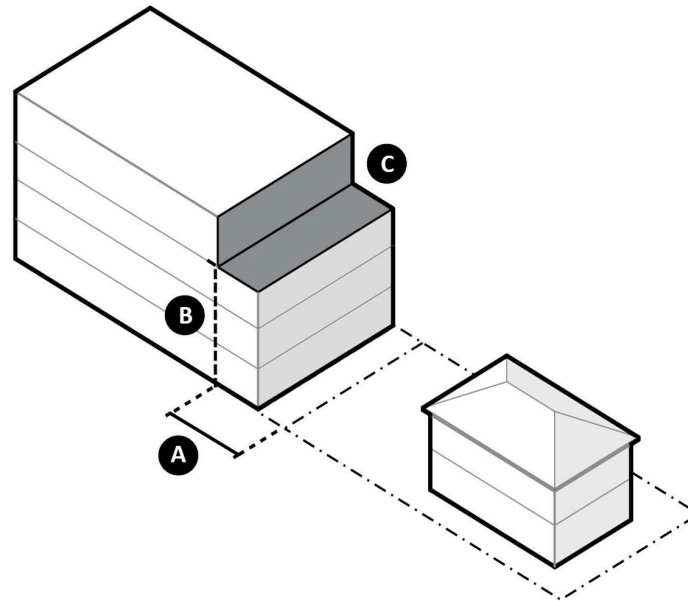
Height Stepdown Standard

Proposal:

- Adjacent to Multi-Family Zones: Any portion of the building within 25' of zone must step down to no more than **35' feet** in height.
- Adjacent to Single-Family Zones: Any portion of the building within 25' of zone must step down to no more than **25' feet** in height.

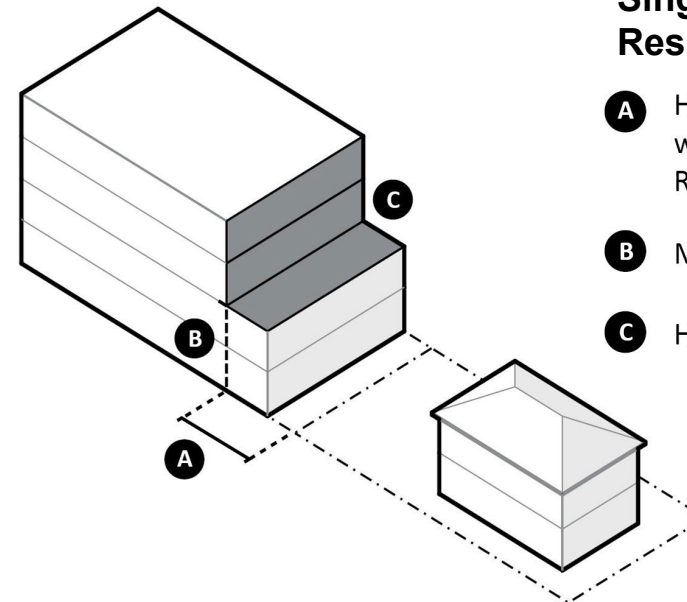
Multi-Family Residential Zone

- A** Height step-down required within 25' of Higher Density Residential Zone.
- B** Maximum height of 35'
- C** Height step-down

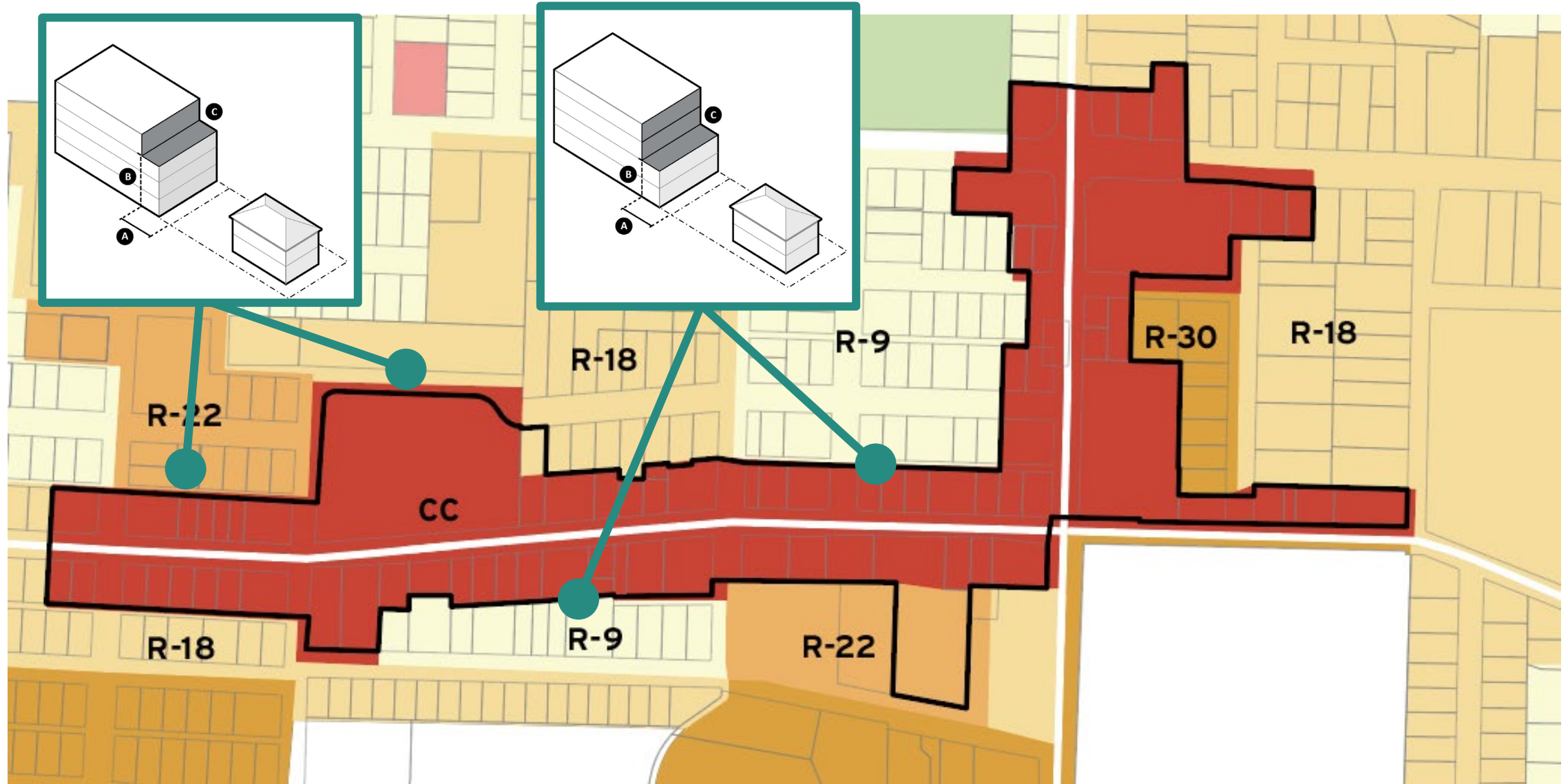


Single-Family Residential Zone

- A** Height step-down required within 25' of Lower Density Residential Zone.
- B** Maximum height of 25'
- C** Height step-down



Height Stepdown: Proposed Standard



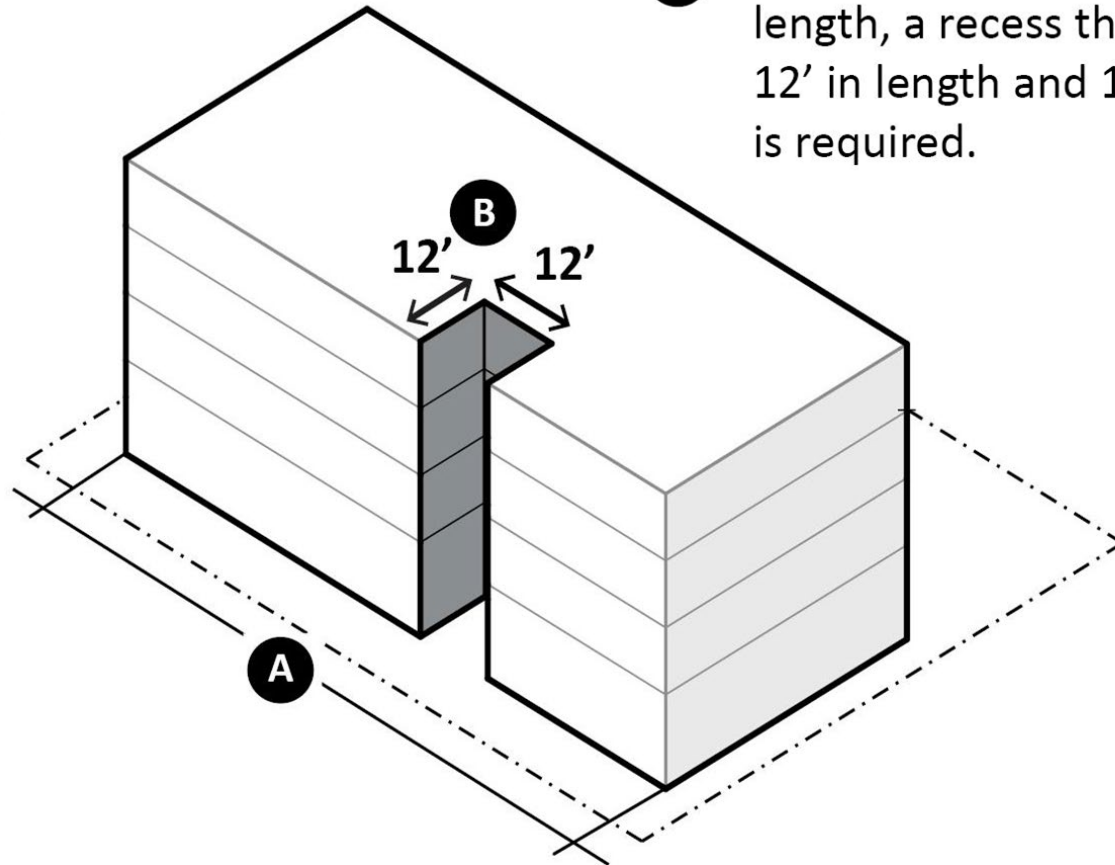
Bulk and Massing

Proposal:

- Add new standard to limit maximum building length and require breaks longer buildings.
- Contributes to building massing that is more compatible with existing buildings on the corridor.

A Maximum building length for the portion of a building located within 12' of the street lot line is 100'.

B If a building is over 100' in length, a recess that is at least 12' in length and 12' in depth is required.



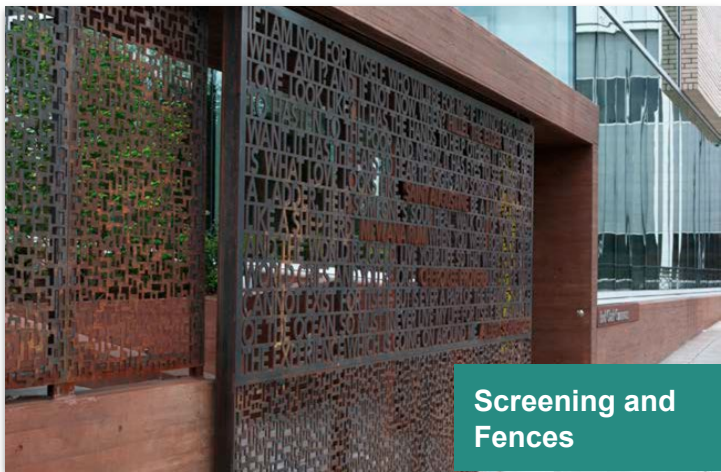
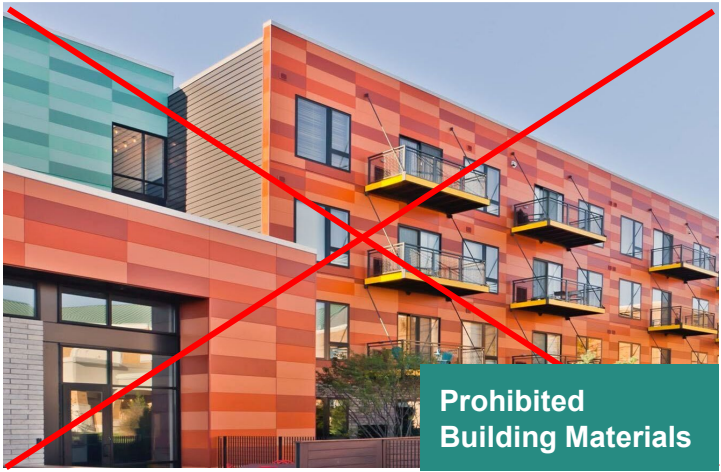
Parking Required

Proposal:

- Reduce residential requirement from 0.75 to 0.50 spaces per unit.
- Reduce ratios for commercial uses and do not require ground floor commercial uses in a mixed-use building to provide parking.
- Require bicycle parking spaces for larger buildings.

Parking Requirement	Existing	Proposed	Proposed Bicycle Parking
Multifamily	0.75/unit	0.50/unit	1/unit for buildings with 5+ units
Commercial	1/250sf	1/1000 sf	1/15,000 sf, 2 spaces minimum

Overview of Design Standards



Ground Floor Commercial

- **Minimum Height:** Ground floor commercial spaces must be 12 feet in height.
- **Windows:** Minimum 60% of the ground floor elevation must be transparent. Windows or doors may be used to meet this standard.
- **Weather Protection:** A minimum of 50% of the width of street-facing facade must include weather protection (awnings, canopies, overhangs, or other architectural features)



Ground Floor Residential

Ground floor residential requires a different approach than commercial.

- Create a transition from the public to private realm.
- Residential units must be setback a minimum of 5 feet, maximum of 10 feet from the street.
- Ground floor entrances must be separated from the street with minimum of two design treatments selected from a menu of options.



This would **not be allowed** under new standards



This would be **required** under new standards

Implementation Plan Goals & Actions



HOUSING AND ECONOMIC DEVELOPMENT

Provide ample opportunities for small-scale, locally owned businesses to thrive, while maintaining livability for current and future residents.



URBAN DESIGN

Create public and private spaces that are inclusive, integrated, and contribute positively to the livability of the corridor.



MOBILITY

Establish a balanced, multi-modal network of motor vehicle, transit, walking, and biking routes through the corridor.



PARKING

Support adequate parking to serve existing uses and future development.

7.17.23 City Council Workshop



Council discussion topics included:

- Clarification on bike parking requirements
- Potential impacts of HB 1110 & HB 1220
- Step-down requirements at the rear of new buildings
 - Should current step-down requirements remain as they currently are?
 - Should proposed step-down requirement go even further?
 - Should step-down requirements be removed entirely?

Review Context and Criteria for Hearing

- VMC 20.285.070 requires Plan and zoning text changes to be consistent with applicable policies of Comprehensive Plan and Strategic Plan, and necessary to further the public interest.

Staff Findings



- The proposed Evergreen and Grand Commercial Corridors Overlay District and Implementation Plan will facilitate economic development and housing opportunities in a well-designed, livable mixed-density, mixed-use environment with sustainable features, and provide for a 20-minute neighborhood with nearby accessible amenities, consistent with Comprehensive Plan Policies CD-2, CD-3, CD-4, CD-5, CD-6, CD-7, CD-8, CD-9, CD-10, CD-14, EC-2, EC-5, EC-8, H-1, H-5, PFS-1, PFS-9, PFS-10, PFS-13, PFS-18, and PFS-19.
- The proposal is also consistent with Strategic Plan Goals TM.PM.4, HH.PM.4, HH.PM.5, VDN.PM.1, VDN.PM.2, VDN.PM.3

Staff Recommendation

Staff recommends the Planning Commission forward to City Council a recommendation to adopt the Evergreen and Grand Commercial Corridors Overlay District and Implementation Plan, based on the findings and recommendation contained in the staff report and the Commission deliberation at the September 12 public hearing.



Next Steps

- City Council communications on October 2nd
- City Council first reading on October 16th
- City Council Public Hearing on October 23rd
- Implementation efforts will continue beyond development code and will be carried out through multiple departments and outside agency partners

Thank You

To learn more, visit <https://www.beheardvancouver.org/eag>

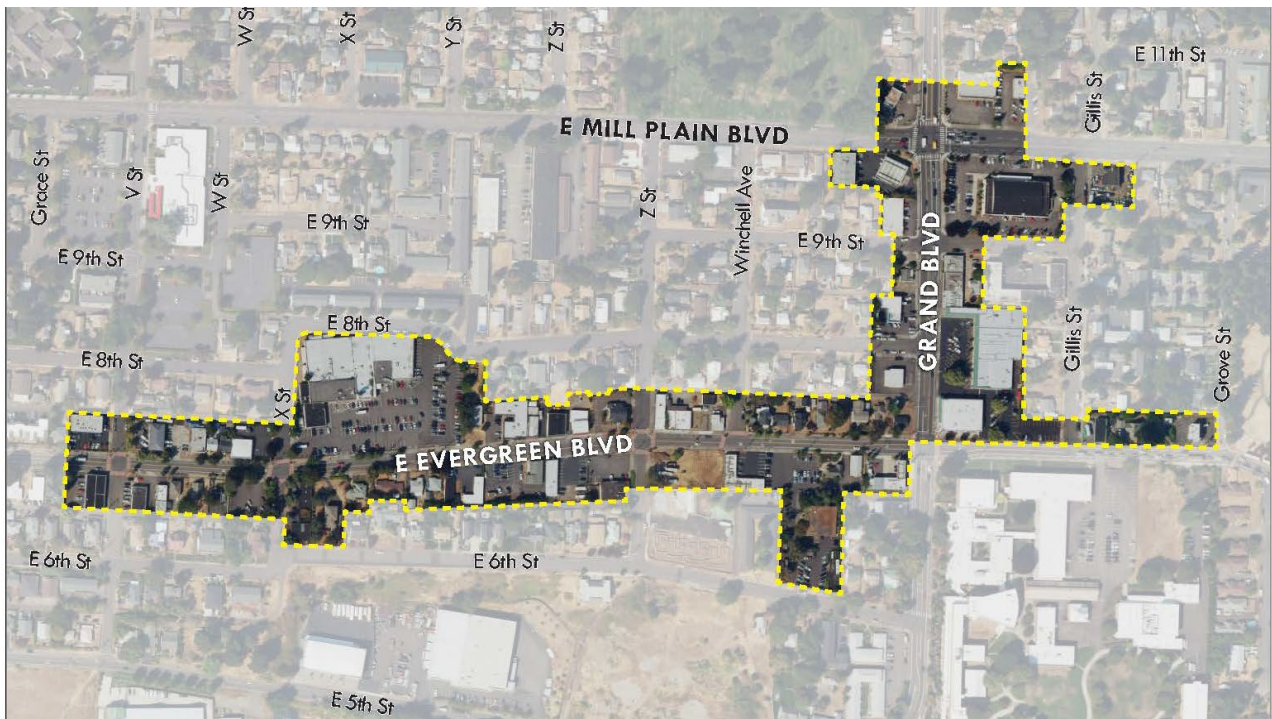


TO: Planning Commission

HEARING DATE: 9/12/2023

FROM: Becky Coutinho, Associate Planner; and Bryan Snodgrass, Principal Planner;
Community Development

SUBJECT: Evergreen and Grand Commercial Corridors Implementation



Report Date: 9/1/2023

Hearing Date: 9/12/2023

Proposal: Adopt the Evergreen and Grand Commercial Corridors Overlay District and Implementation Plan

Location: Evergreen and Grand Commercial Corridors

Proponent/Applicant: City of Vancouver

City Staff: Becky Coutinho and Bryan Snodgrass

Recommendation: Forward to City Council a recommendation to adopt the Evergreen and Grand Commercial Corridors Overlay District and Implementation Plan

I. PRIOR COMMISSION REVIEW (IF APPLICABLE):

The Planning Commission held workshops on the Evergreen and Grand Commercial Corridors Strategy Implementation on February 14, 2023, April 11, 2023, and June 13, 2023. Staff presented during City Council communications on June 5, 2023, and a City Council workshop was held on July 17, 2023. City Council has an upcoming communications presentation on October 2, 2023, first reading on October 16, 2023, and public hearing on October 23, 2023.

II. BACKGROUND AND REVIEW PROCESS:

The [Evergreen and Grand Commercial Corridors Strategy](#) document was adopted by City Council on February 28, 2022, intended to guide future zoning code text changes and other land use, community development and transportation implementation. The Strategy vision is to promote equitable and diverse corridor development that is vibrant, sustainable, and mixed use, as well as to foster development that recognizes and builds upon the neighborhood's unique setting, history, and character. Specific policy goals outlined in the Strategy were to create ground floor use requirements to aid in the creation of active edges and a pleasant pedestrian environment, update building height and parking requirements, and identify opportunities to promote walkability, vitality, and affordability in the corridors.

Following the adoption of the Strategy, City Staff completed a competitive request for proposal process to secure a consultant to aid in the work of creating development regulations and additional implementation measures. Cascadia Partners, a full-service urban planning, real estate, environmental sustainability, and public engagement firm was chosen. The project team began work in October 2022 on development of the Evergreen and Grand Commercial Corridors Overlay District and Implementation Plan. Regular progress reports were given to the Planning Commission throughout the process, including workshops on February 14, 2023, April 11, 2023, and June 13, 2023. At these workshops the Planning Commission continued to indicate overall support of the project and provided feedback on a variety of code concepts, design requirements, and implementation efforts. Planning Commission feedback and guidance have been incorporated into the proposed final version of the Overlay District and Implementation Plan (See attachments A and D below). The project team presented under City Council communications on June 5, 2023, and at a Council workshop on July 17, 2023. The Council indicated overall support for the project and the direction of implementation work. At the July workshop Council asked staff a series of clarifying questions to which staff responded via memo (See attachment E).

Implementation is intended to facilitate development consistent with the overall Strategy goals and vision, through the development code as well as longer term implementation efforts. The code development process has included community outreach, including a public open house and a developer focus group to share code concepts and gather community input. Feedback received from the open house indicated continued support for the goals of the Strategy and that the development code language was in line with the vision of the Strategy. During the conversation there was a focus on identifying the other programmatic activities the city planned to do to support the corridor's growth. At the developer focus group, developers expressed that the draft code standards struck the

right balance between high quality design outcomes and development feasibility and flexibility.

Following adoption of Overlay District, the next phase of work will focus on economic development, community building, and transportation improvements, and will occur over the next several years. The Evergreen and Grand Implementation Plan will guide this next phase of work.

III. SUMMARY OF PROPOSAL:

Evergreen & Grand Commercial Corridors Overlay District

Proposed development standards for the Evergreen & Grand Commercial Corridors Overlay District include the following code concept recommendations:

- Building Height- Maintain the existing 4-story height limit along Evergreen and western half of Grand. Increase to 5-story limit along eastern half of Grand near the new transit line.
- Building Form- Adopt new standards that address the shape and size of new buildings to address concerns about buildings being in character with existing neighborhood.
- Required Ground Floor Commercial- Require ground floor commercial uses only along Grand and allow more flexibility for ground floor residential along Evergreen.
- Parking- Reduce parking requirements for multifamily developments and for commercial uses, and eliminate required parking for ground floor commercial uses.

These code concepts have been integrated into the Evergreen and Grand Commercial Corridors Overlay District (see Attachment A) that will apply to the corridor boundaries consistent with the original Strategy document. The overlay district outlines the types of land uses permitted in the district and development standards around density, building orientation, building setbacks and buffers, building heights, building massing, and parking.

Through the implementation process, the project team has identified needed adjustments to some of the specific provisions outlined in the Strategy Document. These proposed refinements are outlined in the chart titled “Evergreen and Grand Commercial Corridors Strategy Refinements” on page 5 of this report and respond to changing market conditions reflected in the findings in the Pro Forma analysis conducted by Cascadia Partners (see Attachment B) as well as new information about the scale of the City’s housing deficit. The pro forma analysis incorporated a parcel-by-parcel site inventory, development modeling, and current development patterns. Given the development climate today, the project team believes the below changes are necessary to make development in the corridor feasible. These changes continue to reflect the Strategy vision and community aspirations for the area, and support development feasibility and flexibility. In addition to addressing current market conditions, these changes align with goals outlined in the Climate Action Framework and respond to new state regulations related to housing production and parking requirements.

Objective design standards are also included in the Evergreen and Grand Commercial Corridors Overlay District to meet the vision of the Strategy document, focusing on the ground floor of buildings to create a vibrant street and pedestrian experience, and to

address the unique challenges of creating an active street while preserving resident privacy. The standards are not intended to promote a particular architectural style or aesthetic. Use of objective standards is intended to allow for consistent administration and interpretation as opposed to more discretionary guidelines, with the goal of striking a balance between the number/complexity of standards and encouraging new development in the Corridor.

The following are the proposed design standards:

- **Building Orientation**
 - *Build-to-Line:* A minimum of 50% of the street-facing facade of the building must be located within 0-10 feet of the street.
 - *Parking Areas:* No more than 50% of the street frontage may be used for vehicle areas. Where parking is adjacent to the street, it must be screened with low wall and/or landscaping.
- **Main Entrances**
 - *Commercial Uses:* Must provide at least one entrance on either Evergreen or Grand. If on a corner, the entrance must be oriented to the corner.
 - *Residential Uses:*
 - Minimum 50% of ground floor residential units must have individual entrances.
 - Additional setback and design standards to create a transition from street to private units and activate the street.
- **Ground Floor Commercial**
 - *Minimum Height:* Ground floor commercial spaces must be 12-15 feet in height.
 - *Windows:* Minimum 60% of the ground floor elevation must be windows or other glazed openings.
 - *Weather Protection:* A minimum of 25-50% of the width of street-facing facade must include weather protection (awnings, canopies, etc.)
- **Ground Floor Residential**
 - Entrances to residential units must be setback 5-10 feet from street.
 - Must provide either a hardscape patio, landscaped private open space, raised private open space (patio, porch, etc.) or the dwelling unit must be raised above the street, or include steps to a terrace, among other design features that create a public private realm.
 - Must provide either a transparent low wall or fence (18-24") or landscape screening.
- **Facade Articulation**
 - *Applicability:* Buildings more than 20 feet high. The standard would only apply to larger buildings, not single-story commercial buildings.
 - *Standard:* Buildings must incorporate vertical and horizontal elements that articulate the facade.
 - These elements help to divide the mass of the building into a base, middle, and top with distinct physical transitions.
 - This standard does not dictate architectural style.
 - It requires details that break up larger facades, so they are interesting to people walking by and contribute to the identity of the Corridor.
- **Screening and Fences**

- *No High Fences/Walls on Street:* Fences, walls, or hedges higher than 3 feet shall be prohibited between the street and the building.
- *Ground Mounted Utilities/Equipment/Waste Receptacles:* New electric meters, gas meters, HVAC equipment, and waste receptacles must be screened from view from the street.
- *Rooftop Utilities/Equipment:* must be set back at least 15 feet from roof edges on street-facing facades and include screening

Evergreen and Grand Commercial Corridors Strategy Refinements			
	Current Development Code	2022 Strategy Document	Proposed Development Code
Maximum Building Height	50-feet throughout, typically 4 stories	3-5 stories, varying by parcel	50ft along Evergreen and west Grand (4 stories) 60ft on east side of Grand and crossroads of Grand and Mill Plain Blvd (5 stories)
Building Bulk and Massing	Silent beyond height limits and setbacks. Commercial abutting lower density residential requires 10-foot setback Upper portions need ½ foot setback for each foot of building height above 20 feet.	No standard directly proposed to address the development form beyond active edge requirements, maximum front setback of 0-5 feet at the ground floor	Maximum height step down only on rear face within 25 feet of a residentially zoned site Maximum building width, with breaks within the building
Required Ground Floor Commercial	At least half of frontage along arterial/collector streets must be commercial or office	More flexibility along Evergreen, keep existing requirement on Grand	Allow for either ground floor commercial or residential along Evergreen. Require ground floor commercial along Grand
Required Minimum Off-Street Parking Spaces	0.75 per multi-family unit near frequent transit such as Evergreen and Grand 1/300sf for goods and services, 1/250sf for eating and drinking, 1/400sf office	Zero for ground floor retail 1/1000sf for commercial uses 1 per unit for residential	0.5 per multi-family unit 1/1000sf commercial, zero for ground floor retail

Evergreen & Grand Commercial Corridors Implementation Plan

The full extent of the vision outlined in the Evergreen and Grand Commercial Corridors Strategy requires both development code regulations and other longer-term programmatic investments. The Evergreen and Grand Implementation Plan has been drafted to guide the work that falls outside the purview of the development code (see Attachments C and D) and is intended to guide ongoing City investments while also bringing in key partners like neighborhood associations, mobility advocates, businesses and technical assistance

providers, nearby schools and service providers, affordable housing developers, and the community at large. The tasks have been broken down to four focus areas including housing and economic development, urban design, mobility, and parking, as outlined below. All will require resources to implement in the coming years.

- *Economic Development:*
 - Foster a unique and attractive corridor identity
 - Establish a business-friendly climate that supports a diversity of neighborhood-serving businesses
- *Housing:*
 - Maintain economic diversity and housing affordability, especially for low- and moderate-income households
- *Urban Design:*
 - Support a vibrant and active corridor
 - Pursue opportunities for climate resilient design
- *Mobility:*
 - Leverage ongoing corridor and neighborhood-wide infrastructure projects
 - Support targeted interventions to improve mobility for all users and connectivity to transit
 - Improve safety for all corridor users
- *Parking:*
 - Evaluate and manage vehicular parking impacts to local residents
 - Support climate and parking goals by increasing micro mobility, shared parking options, and EV infrastructure

The two tasks below are highlighted here as shorter term non-regulatory implementation priorities, as they play a critical role in catalyzing several of the other implementation tasks.

- *ED 1.1:* Provide seed support for a locally based, self-created neighborhood Business District Organization that can meet the shared needs of new and future businesses through networking, marketing, promotions, special events, beautification, and advocacy
- *ED 1.2:* Provide staff and resource support to the Business District Organization so it can develop into a fully-fledged, self-sustaining, and independent organization.

The goals and associated tasks that fall under them reflect input and expertise from various City departments who will lead them, with a particular emphasis on feasibility, timing, and resource needs. It will continue to be refined as the team collaborates with other partners. Note that Housing action 1.1 – *Extend the Multi-Family Tax Exemption (MFTE) program calibrated to implement the vision and goals for the corridor and consider adding workforce housing-* has already been completed and approved by City Council.

IV. REVIEW CRITERIA AND FINDINGS:

[VMC 20.285.070](#) outlines the review criteria for Comprehensive Plan and Zoning Code Text Amendments, which are required to demonstrate the following:

1. The proposal is consistent with applicable policies of the Vancouver Strategic Plan and Comprehensive Plan; and
2. The proposal is necessary to further the public interest based on present needs and conditions.

Applicable Strategic Plan Provisions:

- TM.PM.4: Percentage of residents living within a 15-minute walk or bike to transit facilities
- HH.PM.4: Diversity of citywide housing stock by type and size
- HH.PM.5: Number of new housing units constructed (overall and affordable)
- VDN.PM.1: Existence of key businesses in neighborhood districts
- VDN.PM.2: Percentage of residents living within ¼ mile of supermarkets or food stores, restaurants, parks, schools or community centers
- VDN.PM.3 To maintain active and healthy neighborhood associations

Applicable Comprehensive Plan Provisions:

- CD-2: Efficient development patterns
Encourage efficient development throughout Vancouver to ensure achievement of average density of 8 units per acre set by Countywide Planning Policies. Encourage higher density and more intense development in areas that are more extensively served by facilities, particularly transportation and transit services.
- CD-3 Infill and redevelopment
Where compatible with surrounding uses, efficiently use urban land by facilitating infill of undeveloped properties, and redevelopment of underutilized and developed properties. Allow for conversion of single to multi-family housing where designed to be compatible with surrounding uses.
- CD-4: Urban centers and corridors
Achieve the full potential of existing and emerging urban activity centers and the corridors that connect them, by:
 - *Promoting or reinforcing a unique identity or function for individual centers and corridors*
 - *Planning for a compact urban form with an appropriate mix of uses*
 - *Working with stakeholders to develop flexible standards to implement the vision for that center or corridor*
 - *Encouraging innovative, attractive private development that efficiently uses available land and resources*
 - *Establishing connectivity within each center and to other areas to provide accessibility*
 - *Providing a range of transportation options*
 - *Investing in public facilities and amenities to enhance livability*

- CD-5: Mixed use development
Facilitate development that combines multiple uses in single buildings or integrated uses.
- CD-6: Neighborhood livability
Maintain and facilitate development of stable, multi-use neighborhoods that contain a compatible mix of housing, jobs, stores, and open and public spaces in a well-planned, safe pedestrian environment.
- CD-7: Human scale, accessible development, and interaction
Facilitate development that is human scale and encourages pedestrian use and human interaction.
- CD-8: Design
Facilitate development and create standards to achieve the following:
 - *Increased street front use, visual interest, and integration with adjacent buildings*
 - *Improved pedestrian connections and proximity of uses within developments*
 - *Enhanced sense of identity in neighborhoods and subareas*
 - *Publicly and/or privately owned gathering places facilitating interaction*
- CD-9: Compatible uses
Facilitate development that minimizes adverse impacts to adjacent areas, particularly neighborhoods.
- CD-10: Complementary uses
Locate complementary land uses near one another to maximize opportunities for people to work or shop near where they live.
- CD-12: Integrated area planning
Promote cohesive, integrated planning of areas and sites through use of subarea planning, master planning, planned developments, and other methods.
- CD-14: Sustainability
Facilitate sustainable land use development through measures including but not limited to the following:
 - *Develop integrated land use patterns and transportation networks that foster reduced vehicle miles traveled and associated greenhouse gas emissions.*
 - *Develop individual buildings that minimize energy and resource consumption.*
 - *Encourage home-based efficiencies such as installation retrofits, efficient water and air, heating systems, and use of solar panels or other forms of energy capture.*
 - *Implement recommendations of the Vancouver-Clark County Sustainable Affordable Residential Development Report.*
- EC-2: Family-wage employment
Promote the formation, recruitment, retention, and growth of businesses that provide a wide range of employment opportunities, particularly family-wage employment. Prioritize family-wage employment in land use policies and practices

- EC-5: No net loss of employment capacity
Restrict zone changes or legislative land use approvals that would lessen long-term capacity for high-wage employment unless accompanied by other changes within the same review cycle that would compensate for the lost capacity or unless the proposed change would promote the long-term economic health of the city.
- EC-8: Small business support
Support the growth of new and expanding small business through efficient permitting, incentives, and communication
- H-1: Housing options
Provide for a range of housing types and densities for all economic segments of the population. Encourage equal and fair access to housing for renters and homeowners.
- H-5: Housing placement near services and centers
Facilitate siting of higher density housing near public transportation facilities and in designated centers and corridors.
- PFS-1: Service availability
Consider water, sewer, police, transportation, fire, schools, stormwater management, and parks as necessary facilities and services. Ensure that facilities are sufficient to support planned development.
- PFS-9: Land use and transportation integration
Develop and implement innovative transportation investment, design, and program incentives to achieve the urban environment envisioned in the Comprehensive Plan.
- PFS-10: Livable streets
Design streets and sidewalks and manage vehicular traffic to encourage livability, interaction, and sense of neighborhood or district ownership in linkage with adjacent land uses. Encourage multi-modal travel, and provide accessible, human scale opportunities for transferring between travel modes.
- PFS-13: Neighborhood traffic
Protect and enhance neighborhoods with an active program that focuses on safety, safe routes to school, traffic calming, education, and enforcement.
- PFS-18: Street design
Design city streets to achieve safety and accessibility for all modes. Arterial streets shall provide facilities for automobile, bike, pedestrian, and transit mobility, and shall include landscaping and adequate lighting.
- PFS-19: Parking standards
Adopt coordinated parking standards which maintain neighborhood integrity, promote the use of a multi-modal transportation system and efficient utilization of limited land, and encourage desired economic development and growth throughout the entire urban area.

Staff Findings:

The proposed Evergreen and Grand Commercial Corridors Overlay District and Implementation Plan are consistent with the above applicable portions of the Vancouver Strategic and Comprehensive Plans. Adoption of the Overlay District and Implementation Plan will support the enhanced housing and economic development opportunities in a well-designed, livable mixed-density, mixed-use environment with sustainable features, consistent with Policies HH.PM.4, HH.PM.5, CD-2, CD-3, CD-4, CD-5, CD-6, CD-8, CD-9, CD-14, EC-2, EC-5, EC-8, H-1, and H-5. The Overlay District and Implementation allows for the creation of the corridors as a 15-minute neighborhood where residents can walk, bike, or roll to essential amenities, services, and employment opportunities which include stores, restaurants, and transit stations, consistent with Policies TM.PM.4, VDN.PM.1, VDN.PM.2, VDN.PM.3, CD-7, CD-10, PFS-1, PFS-9, PFS-10, PFS-13, PFS-18, and PFS-19. The adoption of the Evergreen and Grand Commercial Corridors Overlay District and Implementation Plan will directly support the strategic plan core values of livability, innovation, equity and inclusion, and trust and relationships.

V. RECOMMENDED ACTION:

Forward to City Council a recommendation to adopt the Evergreen and Grand Commercial Corridors Overlay District and Implementation Plan as outlined in this staff report and the attachments included below.

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Bryan Snodgrass, Principal Long Range Planner, (360) 487-7946

Attachments:

- Attachment A- Evergreen and Grand Commercial Corridors Overlay District
- Attachment B- Financial Feasibility Analysis of Code Concepts
- Attachment C- Evergreen and Grand Commercial Corridors Implementation Plan Memo
- Attachment D- Evergreen and Grand Commercial Corridors Implementation Plan
- Attachment E- City Council Update Memo from July 17 Evergreen & Grand Workshop
- Attachment F- SEPA DNS
- Attachment G- SEPA Checklist

Chapter 20.590

EVERGREEN/GRAND CORRIDOR OVERLAY DISTRICT

Sections:

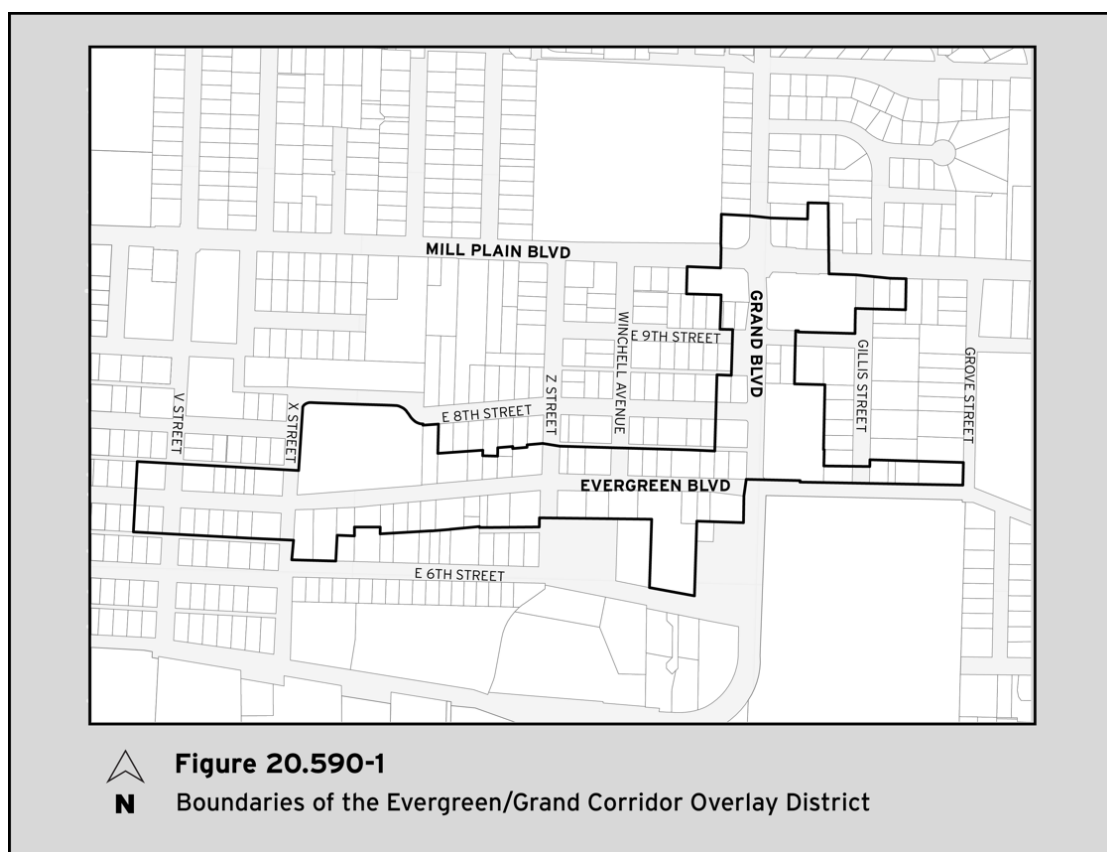
20.590.010	Purpose
20.590.020	Applicability
20.590.030	Regulation of Uses
20.590.040	Development Standards
20.590.050	Design Standards

20.590.010 Purpose

- A. *Purpose.* This chapter establishes standards for the Evergreen/Grand Corridor Overlay District (“Corridor”) in order to ensure new development contributes to achieving the goals of the Evergreen/Grand Corridor Strategy (“Strategy”) as follows:
1. Strengthen current businesses while providing an appropriate mix of commercial and residential uses.
 2. Establish a balanced, multi-modal network of motor vehicle, transit, walking, and biking routes through the corridors.
 3. Provide adequate parking to serve existing uses and future development.
 4. Create public and private spaces that are inclusive, integrated, and contribute positively to the livability of the corridors.
 5. Provide ample opportunities for small-scale, locally owned businesses to thrive.
 6. Contribute to a vibrant public realm that encourages interaction with an active edge along the ground floor, high-quality public spaces, and a walkable pedestrian environment.
- B. This chapter is not intended to prevent continued use, repair or modest expansion of lawfully existing buildings, or to render otherwise lawful development as nonconforming.

20.590.020 Applicability

- A. *Establishment of Boundaries.* The standards of this chapter apply to properties along Evergreen Boulevard and Grand Boulevard as indicated in Figure 20.590-1.

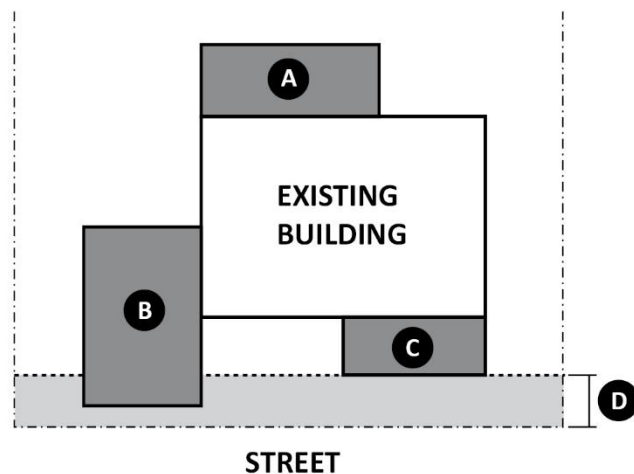


- B. *Relation to Other Standards.* These standards shall be in addition to other applicable standards of Vancouver Municipal Code or state law and shall supersede those standards where they conflict.
- C. *Types of Development.* All projects that involve new construction, modification of the exterior of an existing building or parking lot located within the area defined in Figure 20.590-1 shall be subject to approval by the Planning Official pursuant to this Chapter.
- D. *Exemptions:* The following activities shall be administratively exempt from complying with these standards:
1. Exterior work not visible from the public way;
 2. Public art; and
 3. Other minor construction such as replacement of doors, windows, awnings, etc., determined by the Planning Official to be exempt.
 4. Additions or modifications to single family dwellings and duplexes.
 5. Replacements for buildings or structures destroyed by fire or calamity as provided in VMC 20.930.
- E. *Nonconforming Development:* Existing lawful structures and/or improvements that exist at the effective date of this chapter may be continued so long as it remains otherwise lawful per Section 20.930.030.B.

- F. *Expansions and Alterations to Existing Nonresidential Buildings.* The standards of this chapter apply to expansions and alterations to nonresidential buildings that are subject to Site Plan Review. The standards are applicable as follows:
1. Expansions or additions to nonresidential buildings of over 500 square feet that are visible from a public street are required to be in conformance with the standards of this chapter. The standards only apply to the expansion or addition.
 2. Expansions or additions to nonresidential buildings must not increase the length of street-facing façade that does not conform to the maximum setback standard. The expansion or addition must, to the extent feasible, reduce the area dedicated to parking and vehicular circulation between the building and the right-of-way. See Figure 20.590-2.
 3. Exterior alterations or remodels of existing nonresidential buildings that do not conform to the design standards of Section 20.590.050 must improve compliance with these standards where possible, and at a minimum must not increase nonconformance.

Figure 20.590-2. Applying the Maximum Setback Standard to Additions/Expansions

- A** Additions not visible from a public street not required to conform to the standards of this chapter.
- B** Additions that increase the length of the street-facing façade must meet maximum setback standard.
- C** Additions that do not increase the length of the street facing façade that does not conform with the maximum setback standard are required to reduce the area dedicated to parking and vehicular circulation between the building and the right-of-way.
- D** Maximum allowed setback



20.590.030 Regulation of Uses

- A. *Uses.* Uses on properties in the Corridor shall be permitted, conditional, limited, or prohibited as per Table 20.430.030-1 Commercial and Mixed-Use Districts Use Table, with the following exceptions in Table 20.590.030-1.

Table 20.590.030-1. Special Use Regulations for Evergreen/Grand Corridor Overlay District

USE	
Household Living	L ¹
Group Living	L ¹
Home Occupation	L ^{1, 2}
HOUSING TYPES	
Single Dwelling Units, Attached	L ¹
Duplexes	X
Multi-Dwelling Units	L ¹
Affordable Housing Projects	L ^{1, 3}
CIVIC	
Park & Ride Facilities	
-Surface	X
-Structure	X
COMMERCIAL	
Motor Vehicle Related	
- Motor Vehicle Sales/Rental	X
- Motor Vehicle Servicing/Repair	X
- Vehicle Fuel Sales	X
Non-Accessory Parking	X
Self-Service Storage	X

¹ Residential uses are limited in some locations as specified by VMC 20.590.030(B)(1).

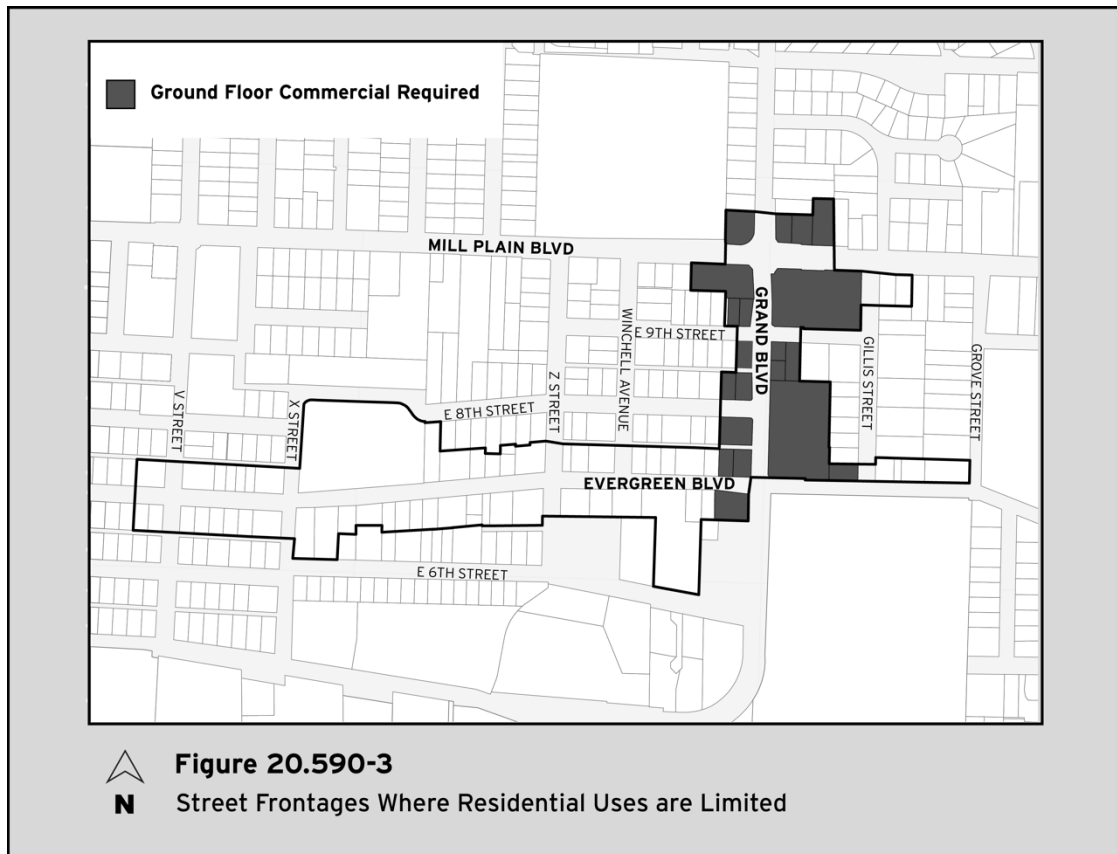
² Subject to the provisions of Chapter 20.860 VMC, Home Occupations.

³ Eligible affordable housing projects must (a) demonstrate eligibility for Washington State Housing Finance Commission Low Income Housing Tax Credits by providing at least 40 percent of units affordable to households at 60 percent of Area Median Income or otherwise as demonstrated eligible for credits; (b) include a guarantee that the threshold is maintained for at least 30 years unless specified longer by the finance commission; and (c) be located on properties whose borders are within 1,000 feet of a bus rapid transit or other high capacity transit corridor, or transit corridors with existing weekday peak service frequencies of 35 minutes or less, as indicated in the C-Tran 2018-2033 Transit Development Plan.

B. Additional Use Standards.

1. A minimum of 50% of the lineal street front of the ground floor buildings along streets designated in Figure 20.590-3 must be devoted to commercial uses.
2. Drive-through facilities are prohibited on all properties.

C. Existing Uses. Limitations on uses set forth in Section 20.590.030 do not apply to existing uses continuing in existing buildings or structures, or in buildings or structures permitted to be replaced in the event of fire or calamity pursuant, as provided in VMC 20.930.

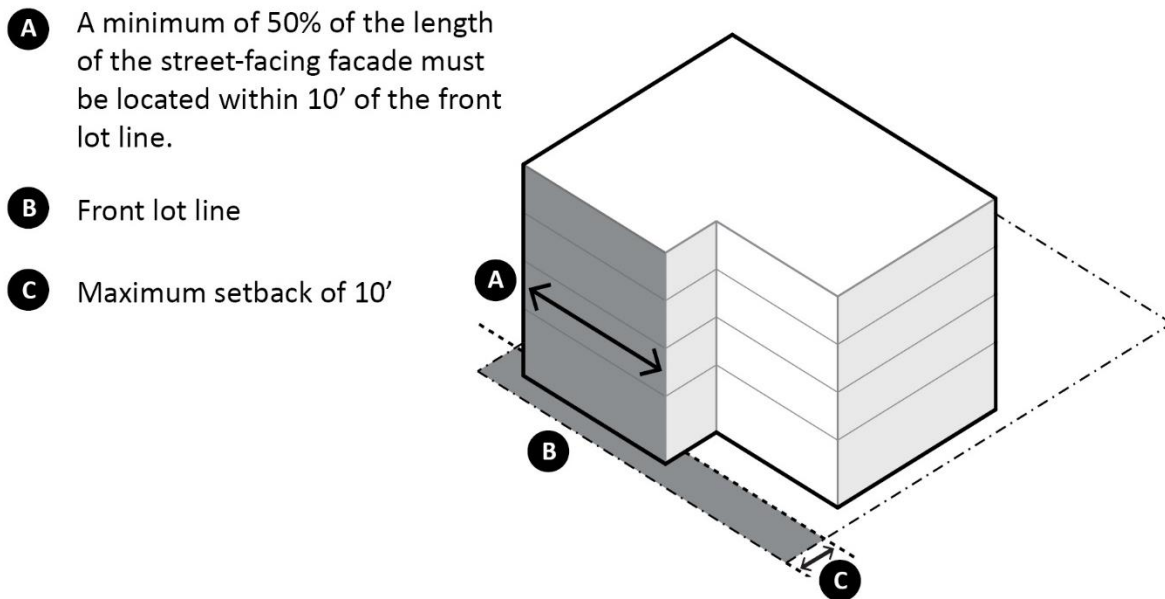


20.590.040 Development Standards

- A. *Minimum Density.* Any development that includes residential uses must include a minimum of the following number of dwelling units per acre of site area:
 1. *Sites on Grand Avenue:* 30 dwelling units per acre
 2. *Sites on Evergreen Boulevard:* 22 dwelling units per acre
- B. *Building Orientation*
 1. *Maximum Setback.* A minimum of 50 percent of the length of the street-facing façade of the building must be located within ten feet of the front lot line. See Figure 20.590-4 below.
 2. *Ground Floor Residential Setbacks.* A minimum setback of five feet and a maximum setback of ten feet is required for ground-floor residential uses. A transition area must be provided per VMC 20.590.050.3 Ground Floor Separation standard.
 3. *Improvements Between the Building and the Street.* Off-street parking is not allowed between a building and a street lot line along the following streets in the Corridor: E. Evergreen Boulevard, Grand Boulevard, and E. Mill Plain Boulevard. The land between any building and a street lot line must be landscaped to at least the L1 level (see VMC 20.925) and/or hard surfaced for use by pedestrians.
 4. *Main Entrance.* These standards apply to the primary building(s) on a site (e.g., not to accessory structures).

- a. *Entry Orientation.* All buildings must have at least one primary entrance facing the street (i.e., within 45 degrees of the street property line). For multi-tenanted nonresidential buildings, buildings with multiple entrances, or buildings with multiple frontages, only one primary entrance must comply with this standard.
- b. *Walkway Connection.* All primary entrances to a building (e.g., tenant entrance, lobby entrance, breezeway entrance, or courtyard entrance) must comply with VMC 20.945.040(H)(7) Pedestrian access, circulation and connections.
- c. *Ground Floor Residential Entrances.* A minimum of 50 percent of all ground floor residential units abutting the street must have individual main entrances that open directly onto the right of way rather than the interior of the building or parking lot. Entries must meet the Ground Floor Separation Design Standard (VMC 20.590.050.C.3). For buildings with a central common open space opening to the street, primary entries for ground floor units abutting the courtyard must open directly onto the courtyard.

Figure 20.590-4. Building Orientation Standards



C. Building Setbacks and Buffer Landscaping.

1. *Front Yard or Street Side Yard.* No front or street-side yard setback is required except for residential uses as provided in 20.590.040(B). Buildings must meet the maximum setback standard of VMC 20.590.040(B).
2. *Side or Rear Yard.*
 - a. *Abutting a Residential Zone.* Minimum building setback of 10 feet. Parking or open space areas may be placed within the side or rear setback. A 5-foot buffer that is landscaped to the L4 High Wall standard (see VMC 20.925) is required.
 - b. *Abutting a Commercial or Mixed-Use Zone.* No side or rear yard setback required.

D. Building Height

1. **Maximum Height.** Maximum building height varies by location as provided in Figure 20.590-5.
2. **Height Step Down.** Buildings must be stepped down to create a transition to adjacent residential zones with lower maximum building heights:
 - a. Sites with property lines that abut residential zones for less than a five-foot length are exempt from these standards.
 - b. Any portion of a building within 25 feet of a Lower Density Residential Zone shall be no higher than 25 feet. See Figure 20.590-6.
 - c. Any portion of a building within 25 feet of a Higher Density Residential Zone shall be no higher than 35 feet. See Figure 20.590-7.
 - d. No height step down is required on the portion of a site adjacent to a Commercial and Mixed Use Zone.

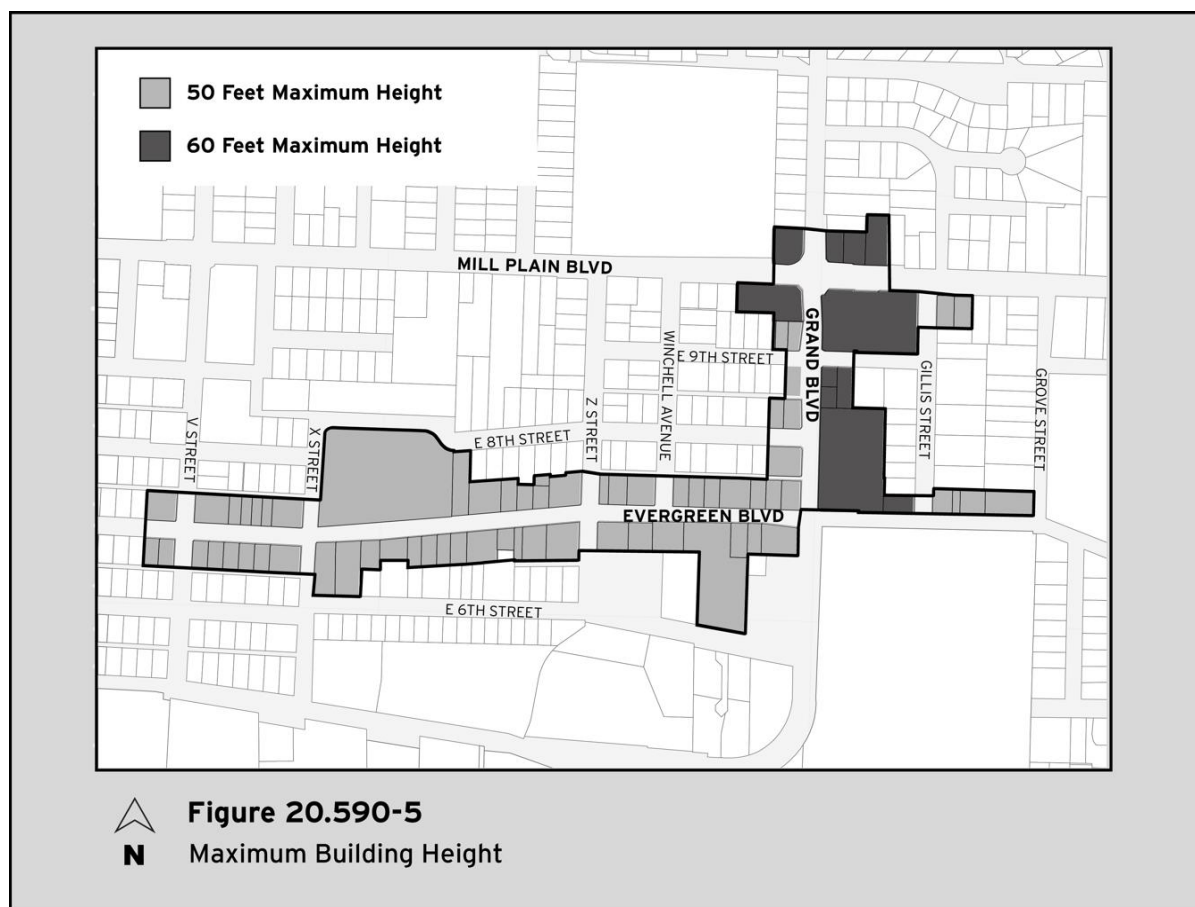
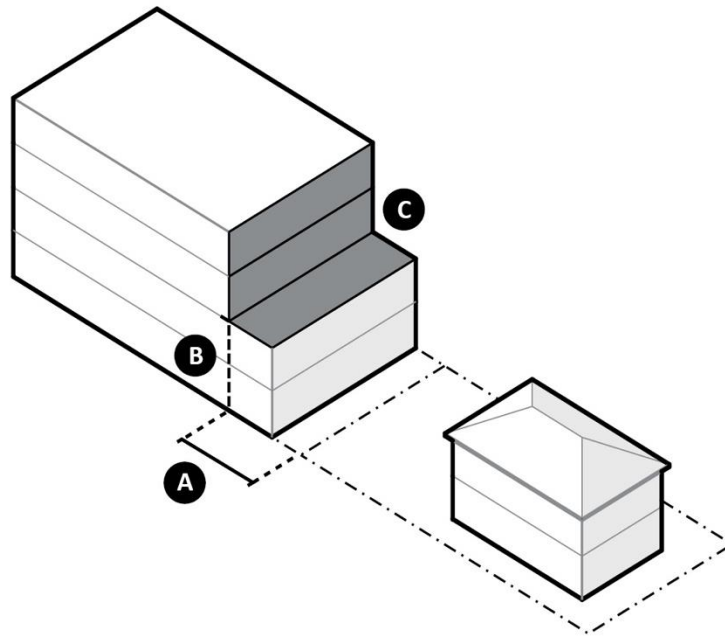
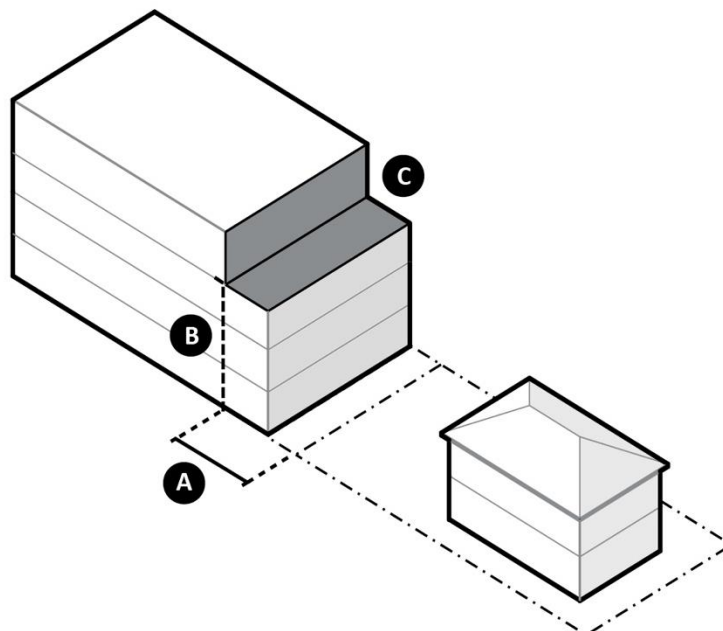


Figure 20.590-6. Height Step Down Adjacent to Lower Density Zones

- A** Height step-down required within 25' of Lower Density Residential Zone.
- B** Maximum height of 25'
- C** Height step-down

**Figure 20.590-7. Height Step Down Adjacent to Higher Density Zones**

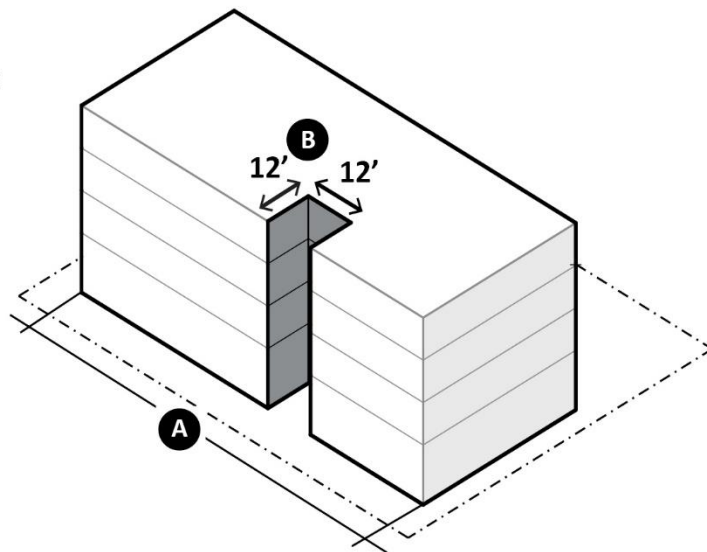
- A** Height step-down required within 25' of Higher Density Residential Zone.
- B** Maximum height of 35'
- C** Height step-down



- E. Maximum Building Length.* The maximum building length for the portion of a building located within 12' of the street lot line is 100'. This standard is met if two buildings are entirely separated, or when one building over 100' includes a recess that is at least 12 feet in length and 12 feet in depth (see Figure 20.590-8).

Figure 20.590-8. Maximum Building Length

- A** Maximum building length for the portion of a building located within 12' of the street lot line is 100'.
- B** If a building is over 100' in length, a recess that is at least 12' in length and 12' in depth is required.



F. Parking

1. *Minimum Spaces Required.* Parking and loading requirements shall be as specified in VMC 20.945, with the following exceptions for properties in the Corridor:
 - a. Market Rate Multifamily Dwelling Units: 0.5 spaces per dwelling unit.
 - b. Housing for Low-Income Households Earning Under 60% Median Area Income: 0.5 spaces per dwelling unit.
 - c. All Commercial Uses permitted in the CC zone: 1 space/1,000 gross square feet.
 - d. Commercial uses on the ground floor of a mixed use building that includes residential uses are exempt from minimum off-street parking requirements in Table 20.945.070-2.
 2. *Location of Parking Areas.* Parking and loading areas are prohibited per VMC 20.590.040.B.3. The following additional standard applies:
 - a. *Attached single dwelling units.* Garage entrances are prohibited on the street-facing façade of attached single dwelling units. A shared drive aisle may be used to access parking located to the rear of dwelling units. Where possible, access shall be provided from an alley or, if located on a corner parcel, from a secondary street.
- G. *Bicycle Parking.* Bicycle parking shall be provided in a safe, accessible, and convenient location. Bicycle parking shall meet the standards contained in Table 20.590.040-1 and shall be consistent with the standards of VMC 20.945.050 and the city of Vancouver Bicycle Parking Guidelines.

1. *Standard.* Up to 50 percent of long-term bicycle parking spaces shall be provided in individual residential dwelling units, if they meet the following criteria:
 - a. The bicycle parking is located within 15 feet of the entrance to the dwelling unit.
 - b. The bicycle parking is located in a closet or alcove of the dwelling unit that includes a rack.
 - c. For buildings with no elevators, only ground floor units can utilize in-unit long-term bicycle parking provision.

Table 20.590.040-1. Bicycle Parking Minimums

Uses	Required Short-Term Bicycle Parking	Required Long-Term Bicycle Parking
Residential	0.05 per dwelling unit, 2 spaces minimum	1 per dwelling unit for buildings with 5 or more dwelling units
Commercial	1 per 5,000 sf of floor area, 2 spaces minimum	1 per 15,000 sf of floor area, 2 spaces minimum
Office	1 per 25,000 sf of floor area, 2 spaces minimum	1 per 5,000 sf of floor area, 2 spaces minimum
Civic/Institutional Buildings	1 per 5,000 sf of floor area, 2 spaces minimum	1 per 15,000 sf of floor area, 2 minimum
Lodging	2 spaces minimum	1 per 10 rooms, 2 spaces minimum
Parks	1 per 5,000 sf park area, 2 spaces minimum	None

2. *Additional Development Standards.* The following standards apply to sites where more than 20 long-term bicycle parking spaces are required and provided in one or more shared bicycle parking facilities outside of individual dwelling units:
 - a. *Minimum Number of Horizontal Bicycle Parking Spaces.* At least 20 percent of spaces must be in a horizontal rack, or on the lower level of a stacked bicycle parking rack.
 - b. *Parking for Larger Bicycle Spaces.* At least five percent of spaces must accommodate a larger bicycle space for cargo bikes, placed in a horizontal rack. These spaces must be a minimum of three feet (36 inches) in width, 10 feet (120 inches) long with three feet and four inches (40 inches) of height clearance.

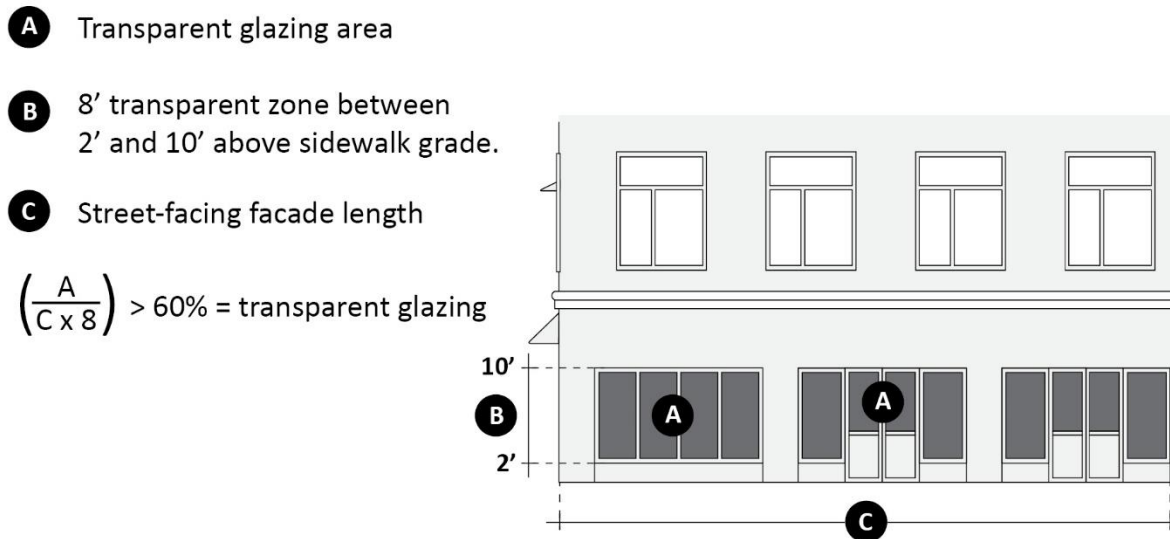
- c. *Electrical Outlet Requirement.* At least 20 percent of spaces must have electrical sockets within four feet of the spaces. Each electrical socket must be accessible to horizontal bicycle parking spaces.
- d. *Signage.* Entry and directional signs shall be provided by the property owner if bicycle parking facilities are not directly visible and obvious from the public right-of-way. The signs shall be used to properly direct bicyclists from the public right-of-way to the bicycle parking facilities.
- e. *Grade.* Bicycles should not be required to ride up and down ramps greater than 12%.

20.590.050 Design Standards

- A. *Exceptions.* The Planning Official may allow exceptions to a design standard in Section 20.590.050 without the need to obtain a variance in accordance with Section 20.290. For each standard for which an exception is sought, the applicant must demonstrate that at least one of the following criteria is met:
 - 1. The alternative design results in a variance of 20 percent or less to a numerical design standard and the design cannot be modified to meet the standard due to the physical characteristics of the site or existing structure(s).
 - 2. The alternative design better complies with the intent of the standard as described in the relevant subsection of this chapter.
- B. *Ground Floor Design, Nonresidential Uses.*
 - 1. *Applicability.* These standards apply to all multi-story buildings with non-residential uses on the ground floor. The following standards apply to the portions of ground floor walls of a street-facing façade that is 20 feet or closer to a street lot line or a publicly-accessible plaza.
 - 2. *Minimum Height.*
 - a. *Intent.* The intent of this standard is to promote building designs which maximize the visibility of ground floor spaces to passing pedestrians, emphasize the importance of the ground floor in providing access to services and amenities, and encourage active commercial uses on the ground floor.
 - b. *Standards.*
 - i. The minimum distance from the finished floor to the bottom of the ceiling structure must be at least 12 feet.
 - ii. The area meeting this standard must be at least 25 feet deep, measured from the street-facing façade.
 - 3. *Transparency.*
 - a. *Intent.* The intent of this standard is to create an interesting environment for pedestrians by opening up the ground floors of buildings for views into activity and merchandise. The intent of the standard is also to support natural surveillance of public spaces.
 - b. *Standards.* The ground floor wall of street-facing facades must provide at a minimum 60 percent transparency between 2 and 8 feet above sidewalk grade.

- i. Windows and/or doors may be used to meet this standard.
- ii. Windows shall not be mirrored or treated in such a way to block visibility into the building.
- iii. Windows into storage areas, vehicle parking areas, mechanical and utility areas, and garbage and recycling areas do not qualify.

Figure 20.590-9. Ground Floor Transparency, Non-Residential Uses



4. *Weather Protection.*

- a. *Intent.* The intent of this standard is to create a more comfortable experience for pedestrians on the sidewalk by providing protection from sun and rain.
- b. *Standards.* Weather protection must be provided along at least 50 percent of the street-facing façade located within 20 feet of a street property line. For the purposes of this standard, weather protection may be in the form of awnings, canopies, overhangs, or other architectural features. The weather protection must:
 - i. Project out at least 4 feet from the adjoining wall;
 - ii. The height must be between 9 and 15 feet above the grade underneath it and consistent with the provisions of VMC 20.630.030; and
 - iii. Where applicable, weather protection shall be designed to accommodate pedestrian signage (e.g., blade signs) while maintaining required vertical clearance.

B. Ground Floor Design, Residential Uses

- 1. *Applicability.* These standards apply to any residential dwelling unit that is located on the ground floor of a building and that is 20 feet or closer to a street lot line or a publicly accessible plaza.
- 2. *Minimum Height.*

- a. *Intent.* The intent of this standard is to promote attractive and livable ground floor residential units and emphasize the importance of the ground floor as the architectural base of the building.
- b. *Standard.* The minimum distance from the finished floor to the bottom of the ceiling structure must be at least 10 feet.

3. *Transparency.*

- a. *Intent.* The intent of this standard is to promote attractive and livable ground floor residential units and support natural surveillance of public spaces.
- b. *Standards* The ground floor wall of street-facing facades must provide at a minimum 25 percent transparency between 2 and 8 feet above sidewalk grade.
 - iv. Windows and/or doors may be used to meet this standard.
 - v. Windows shall not be mirrored or treated in such a way to block visibility into the building.
 - vi. Windows into storage areas, vehicle parking areas, mechanical and utility areas, and garbage and recycling areas do not qualify.

4. *Ground Floor Separation.*

- a. *Intent.* The intent of this standard is to provide an interesting experience for pedestrians, define the transition between public and private space, provide spaces for residents to gather and spend time outdoors, and provide sufficient privacy for residents.
- b. *Standards.* For the purposes of this standard, separation is required between the public right of way and residential entrances. Entrances must be set back at least 5 feet from the street lot line but no more than 10 feet and have at least two of the following elements within the setback to create a sense of transition from the public space to the private dwelling space and encourage interaction between residents and passerby. In addition to any elements provided from the list below, the standards of VMC 20.95.030-2 must be met.
 - i. A low wall, railing, or fence that is a maximum of 30 inches in height and at least 75 percent transparent;
 - ii. Raised landscape planters a minimum of 18 inches in height and a maximum of 30 inches in height with a minimum horizontal depth of 2 feet that contains landscaping;
 - iii. One small canopy tree per unit;
 - iv. Individual private space of at least 48 square feet with a minimum dimension of 4 feet in width that is 20% paved and areas not paved are landscaped with a combination of shrubs, groundcover, and perennials; or
 - v. A change of grade where the door to the dwelling unit is 18 to 36 inches above the grade of the right of way. All residential development must comply with all applicable state and federal accessibility requirements.

C. *Façade Articulation.*

1. *Applicability.* The standard applies to the street-facing elevations of buildings more than 20 feet in height.
2. *Intent.* The intent of this standard is to promote visually interesting building facades by prohibiting large expanses of blank walls facing the street and requiring building facades to be divided into smaller planes.
3. *Standard.* Buildings must incorporate vertical and horizontal articulation and divide the vertical mass of the building into a base, middle, and top using distinct physical transitions.
 - a. Base: The ground level of the building must be articulated using at least one of the following elements:
 - i. Materials that are different than upper stories
 - ii. Awning or canopy line
 - iii. Molding, belt course or other horizontally articulated transition piece that makes ground floor distinguishable from upper floors
 - iv. Transom windows
 - b. Middle: The middle of the building must be articulated using at least one of the following elements:
 - i. Recesses or extensions a minimum depth of two feet
 - ii. Vertically oriented windows
 - iii. Pilasters that project from the façade
 - c. Top: The top of the building must be articulated using at least one of the following elements:
 - i. Cornice that is a minimum of eight inches tall and projects a minimum of three inches beyond the façade of the façade
 - ii. Change in material or color
 - iii. Upper-level setback
 - iv. A roof overhang that is a minimum of eight inches beyond the face of the façade
 - v. Change in roof form

D. *Materials.*

1. *Intent.* The intent of this standard is to limit the use of materials that lack surface texture and visual interest, do not promote a sense of quality and permanence, or more easily deteriorate over time.
2. *Standard.* The following building materials are prohibited on street-facing building façades and shall not collectively be used on more than 35% of any other building façade:
 - a. Vinyl PVC siding
 - b. T-111 Plywood

- c. Exterior insulation finishing (EIFS)
- d. Corrugated metal
- e. Plain concrete or concrete block
- f. Sheet pressboard

E. Location of Utilities.

1. *Applicability.* These standards apply to any roof-mounted mechanical equipment under two feet in height or ground level mechanical or service equipment located at grade. These standards shall not apply to any solar energy production equipment, wind energy production equipment, and/or green roof features.
2. *Intent.* The intent of this standard is to ensure that utilities and equipment are screened, integrated into building and landscape design and/or located in less prominent locations to minimize the visual impact on the pedestrian experience.
3. *Standard.* Utilities shall be located away from primary streets and pedestrian sidewalks and located on alleys or secondary streets wherever possible. Utilities shall be located below grade in vaults or inside buildings where possible. If not possible, the following standards apply:
 - a. *Ground Level:* Ground level mechanical and service equipment shall be located behind or beside buildings. Equipment must be set back a minimum of five feet from the front lot line. Ground level mechanical and service equipment, including but not limited to electric meters, gas meters, HVAC equipment, and waste receptacles, shall be screened with landscaping or a site-obscuring fence or wall per VMC 20.970 and may not be visible from the street, ground-level private open space, or common open space.
 - b. *Rooftop:* Rooftop mechanical equipment shall be set back at least 15 feet from roof edges on street-facing facades and include screening to minimize visual impact on the public right-of-way by one of the following methods:
 - i. A screen around the equipment that is made of a primary exterior finish material used on other portions of the building, wood fencing, or masonry.
 - ii. Green roof features or regularly maintained dense evergreen foliage that forms an opaque barrier when planted.

Required screening shall not be included in the building's maximum height calculation.

- c. *Venting System Locations.* Venting of air exhaust and mechanical building systems shall be away from primary streets and main pedestrian areas and shall be architecturally incorporated into buildings.
- d. *Wall-Mounted Utilities.* Utilities mounted on building walls shall not intrude on the public right-of-way space adjacent to a pedestrian path of travel, shall be set back, or have a landscape zone for a buffer.
- e. *Mechanical Vents.* Mechanical vents required on building exteriors shall be located eight feet above grade or between grade and 18 inches and shall be integrated into the facade design to minimize visual impacts.

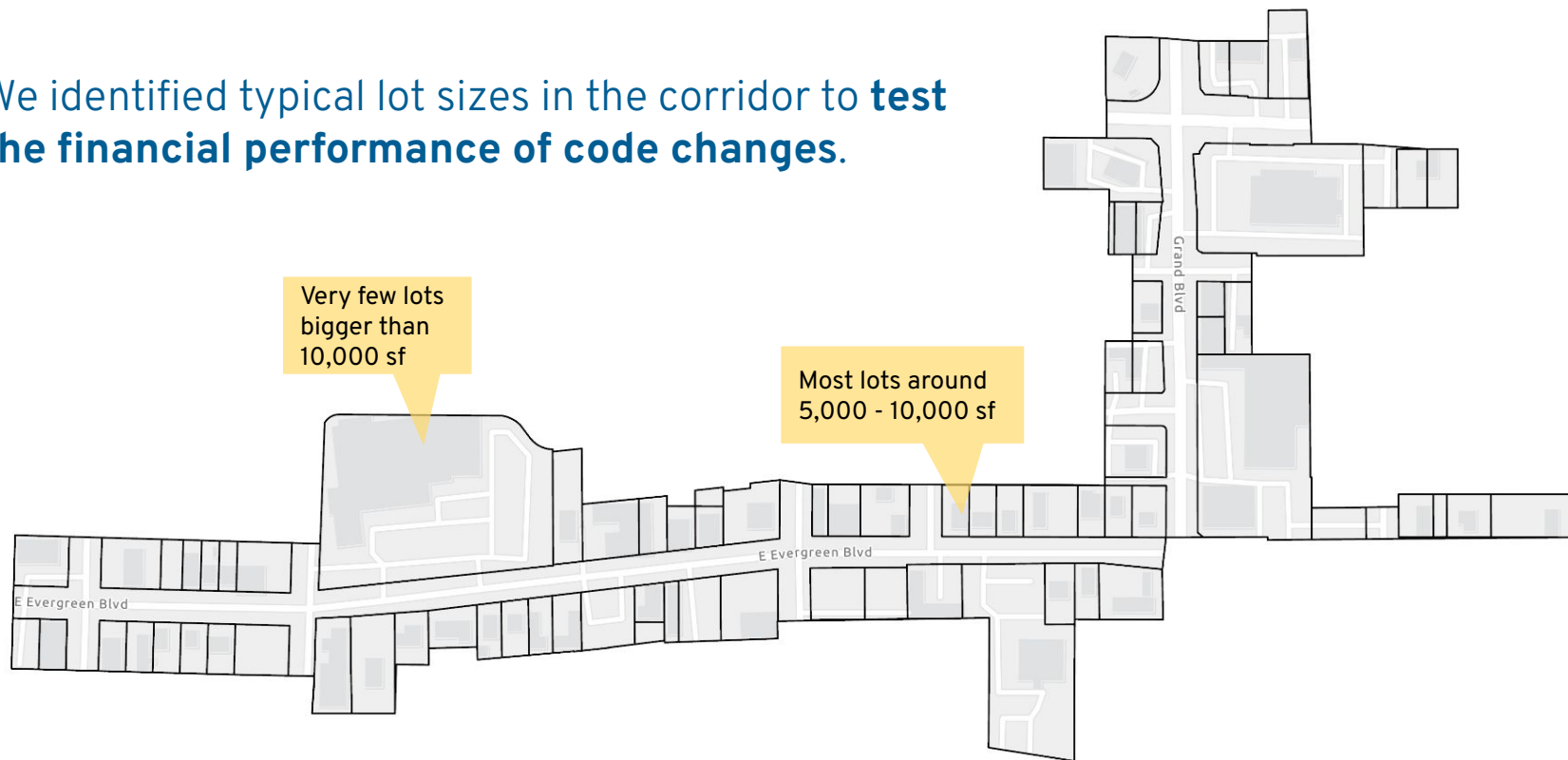
F. Fences.

1. *Applicability.* These standards shall be in addition to VMC 20.912 and shall supersede those standards where they conflict.
2. *Intent.* The intent of this standard is to limit the visual impact of taller fences and surface parking areas on the pedestrian experience and to promote natural surveillance of public spaces.
3. *Standard.*
 - a. Solid free-standing walls, fences, or hedges higher than 3 feet shall be prohibited between the street-facing façade of a building and a street lot line. Fences greater than 36" must be at least 75% transparent.
 - b. New barbed razor wire, electric, vinyl, or chain link fences shall be prohibited in the Overlay district.
 - c. Off-street parking areas shall be screened per VMC 20.945.040(1)(2) to a maximum height of 3 feet.

APPENDIX A
**FINANCIAL FEASIBILITY
ANALYSIS OF
CODE CONCEPTS**

LOT SIZE ANALYSIS: 5,000 AND 10,000 SF LOTS

We identified typical lot sizes in the corridor to **test the financial performance of code changes.**



TEST PROTOTYPES

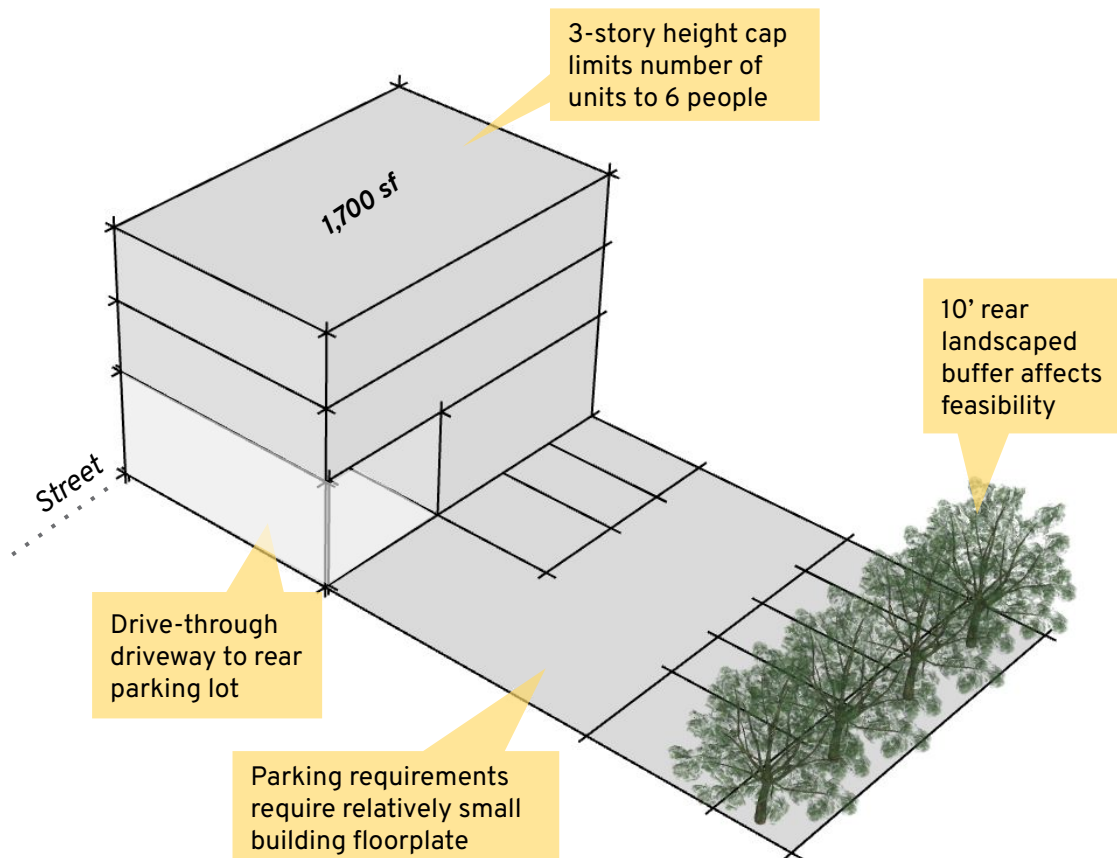
TEST NAME	LOT SIZE(S)	HEIGHT	GROUND FLOOR COMMERCIAL	PARKING RATIOS
1. Residential Small Lot (3-stories)	5,000 sf	3 stories	None	0.75 per unit
2. Mixed-Use Small Lot (3-Stories)	5,000 sf	3 stories	50% of frontage	0.75 per unit No parking for ground floor commercial spaces
3. Residential Small Lot (4-stories)	5,000 sf	4 stories	None	0.75 per unit
4. Mixed-Use Small Lot (4-stories)	5,000 sf	4 stories	50% of frontage	0.75 per unit No parking for ground floor commercial spaces
5. Residential Large Lot (5-stories)	10,000 sf	5 stories	None	0.75 per unit
6. Mixed-Use Large Lot (5-stories)	10,000 sf	5 stories	50% of frontage	0.75 per unit No parking for ground floor commercial spaces

RESIDENTIAL SMALL LOT (3-STORIES)

52 units/acre

1. Residential Small Lot

Lot Size	5,000 sf
Height	3 stories
Parking Spaces	8
# of Residential Units	6
Avg. Unit Size (sf)	600
Retail Space (sf)	-
Construction Cost	\$260/sf
Avg. Residential Rent / Unit	\$1,500/month
Retail Rent	-
Internal Rate of Return (Target 10%)	6.1%

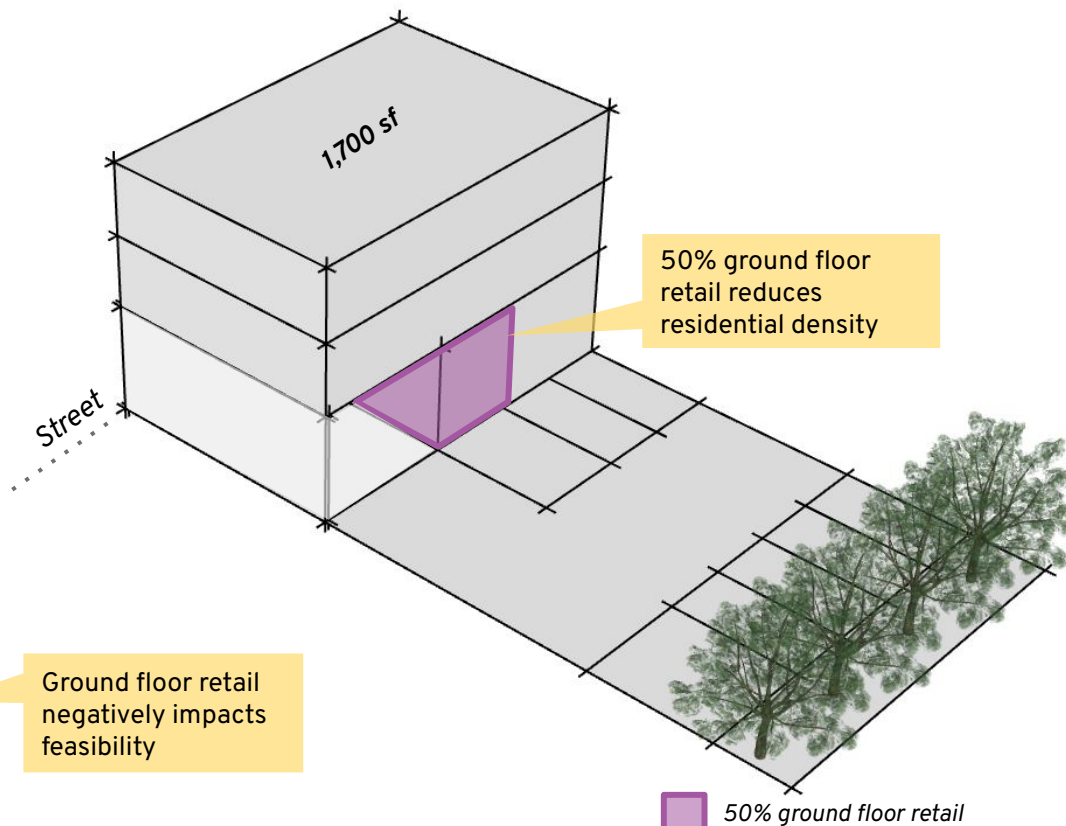


MIXED-USE SMALL LOT (3-STORIES)

44 units/acre

2. Mixed-Use Small Lot

Lot Size	5,000 sf
Height	3 stories
Parking Spaces	8
# of Residential Units	5
Avg. Unit Size (sf)	600
Retail Space (sf)	510
Construction Cost	\$260/sf
Avg. Residential Rent / Unit	\$1,500/month
Retail Rent	\$25/sf
Internal Rate of Return (Target 10%)	5.3%

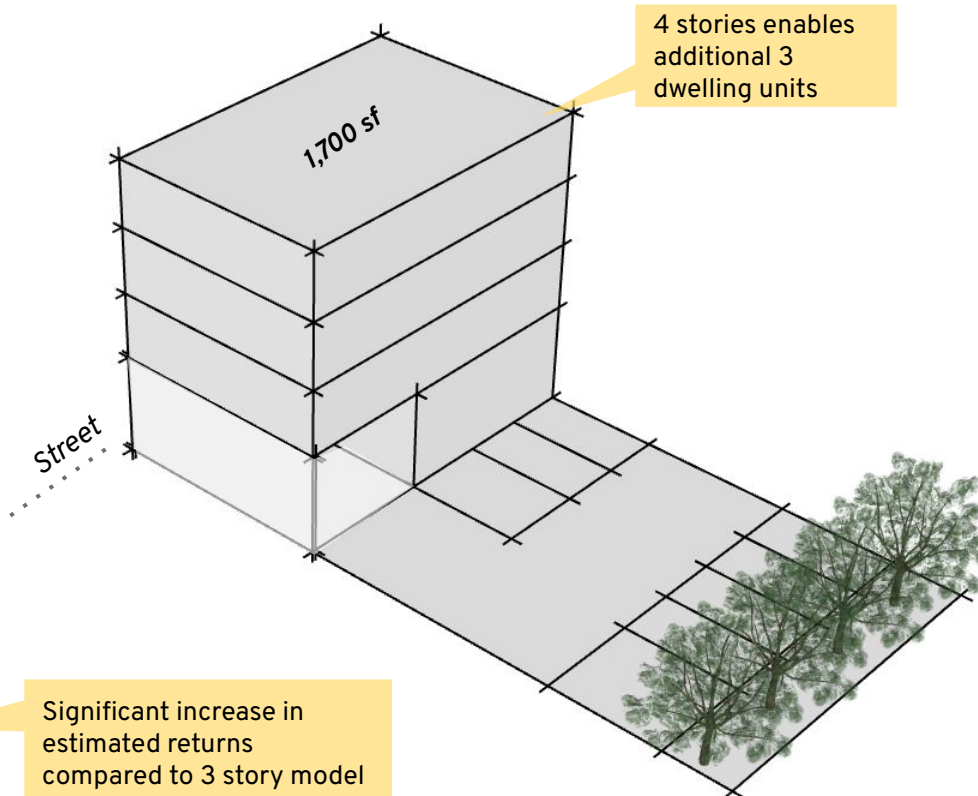


RESIDENTIAL SMALL LOT (4-STORIES)

78 units/acre

3. Residential Small Lot

Lot Size	5,000 sf
Height	4 stories
Parking Spaces	8
# of Residential Units	9
Avg. Unit Size (sf)	600
Retail Space (sf)	-
Construction Cost	\$215/sf
Avg. Residential Rent / Unit	\$1,500/month
Retail Rent	-
Internal Rate of Return (Target 10%)	7.9%

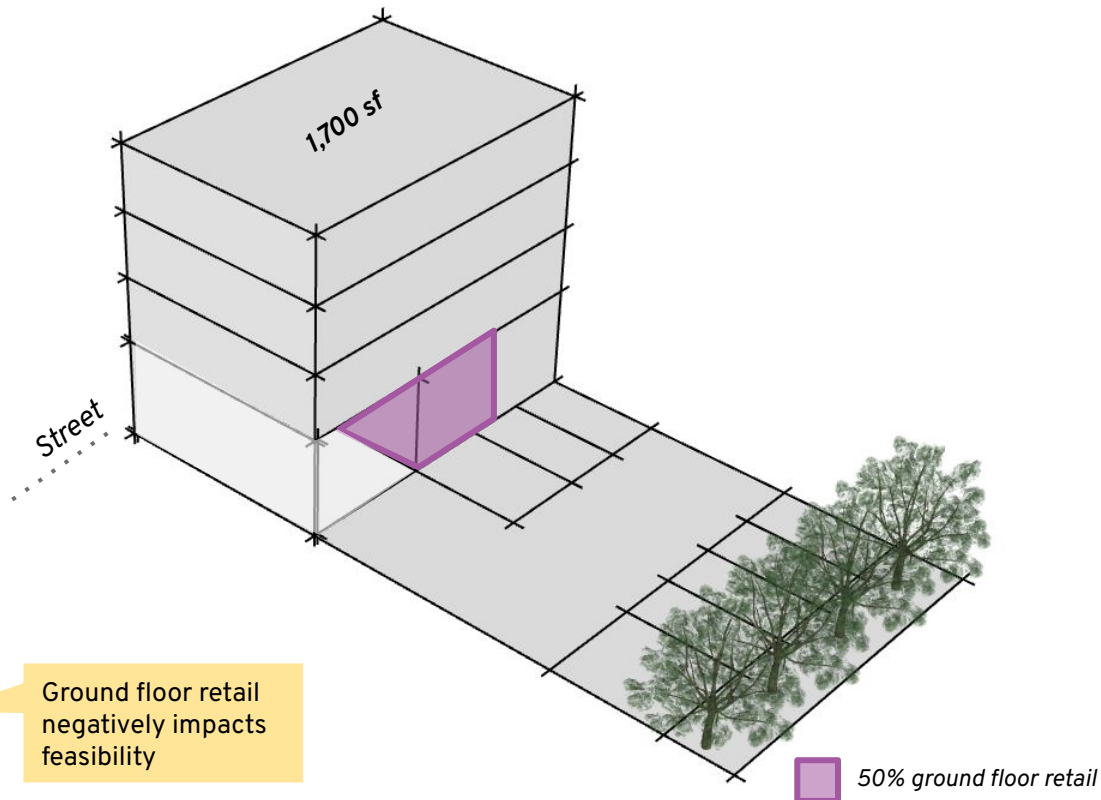


MIXED-USE SMALL LOT (4-STORIES)

70 units/acre

4. Mixed-Use Small Lot

Lot Size	5,000 sf
Height	4 stories
Parking Spaces	8
# of Residential Units	8
Avg. Unit Size (sf)	600
Retail Space (sf)	510
Construction Cost	\$260/sf
Avg. Residential Rent / Unit	\$1,500/month
Retail Rent	\$25/sf
Internal Rate of Return (Target 10%)	7.4%

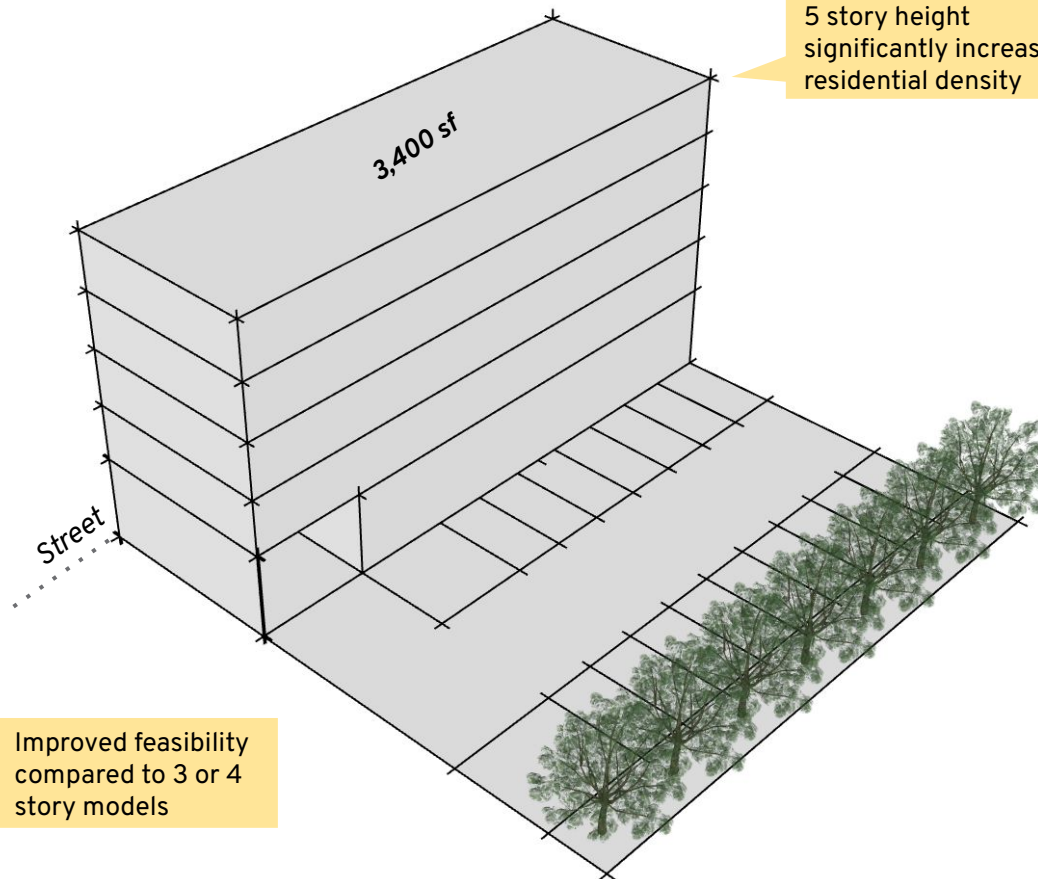


RESIDENTIAL LARGE LOT (5-STORIES)

100 units/acre

5. Residential Large Lot

Lot Size	10,000 sf
Height	5 stories
Parking Spaces	18
# of Residential Units	23
Avg. Unit Size (sf)	600
Retail Space (sf)	-
Construction Cost	\$260/sf
Avg. Residential Rent / Unit	\$1,500/month
Retail Rent	-
Internal Rate of Return (Target 10%)	8.5%

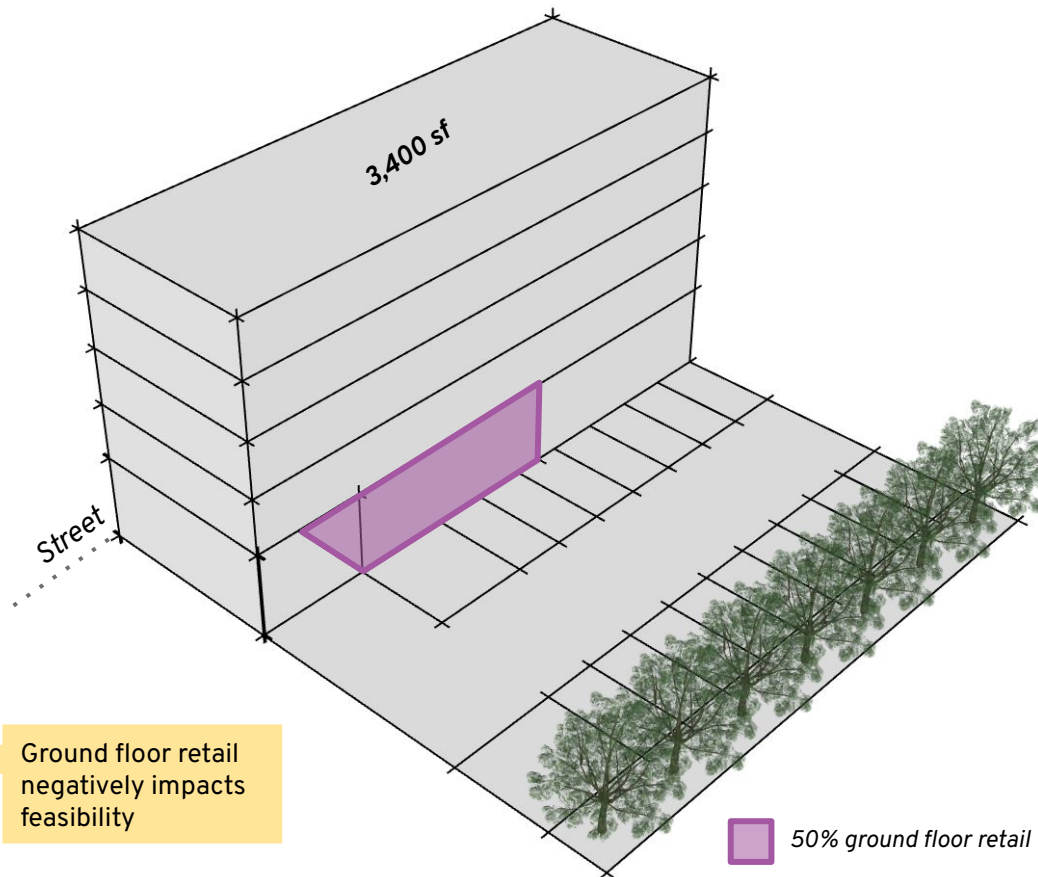


MIXED-USE LARGE LOT (5-STORIES)

91 units/acre

6. Mixed-Use Large Lot

Lot Size	10,000 sf
Height	5 stories
Parking Spaces	18
# of Residential Units	21
Avg. Unit Size (sf)	600
Retail Space (sf)	1,360
Construction Cost	\$260/sf
Avg. Residential Rent / Unit	\$1,500/month
Retail Rent	\$25/sf
Internal Rate of Return (Target 10%)	8.2%



SUMMARY OF RESULTS

SCENARIO	1. Residential Small Lot (3-Stories)	2. Mixed-Use Small Lot (3-Stories)	3. Residential Small Lot (4-Stories)	4. Mixed-Use Small Lot (4-stories)	5. Residential Large Lot (5-Stories)	6. Mixed-Use Large Lot (5-stories)
Lot Size	5,000 sf	5,000 sf	5,000 sf	5,000 sf	10,000 sf	10,000 sf
Height	3 stories	3 stories	4 stories	4 stories	5 stories	5 stories
Site Program	Pure Residential	Residential w/ 50% Ground Floor Retail	Pure Residential	Residential w/ 50% Ground Floor Retail	Pure Residential	Residential w/ 50% Ground Floor Retail
# of Residential Units	6	5	9	8	23	21
Retail Space (sf)	-	510	-	510	-	1,360
# of Parking Spaces	8	8	8	8	18	18
Internal Rate of Return (Target 10%)	6.1%	5.3%	7.9%	7.4%	8.5%	8.2%

PRO FORMA TESTING | IMPLICATIONS

- **Height increase from 3 to 4 stories has a significant positive impact on development feasibility.** The impact of increasing to 5 stories is also positive but not as significant as the increase from 3 to 4 stories. This is partly explained by the small lots on the corridor: height is more important for maximizing density on small, constrained lots.
- **All-residential buildings performed better than mixed use buildings.** Retail spaces are not as productive because rents are lower on a per square foot basis than residential units. However, the negative impact on feasibility is limited because only 50% of the ground floor is required to be commercial space. On sites larger than 10,000 square feet (not modeled here) it is not clear that overall demand for retail will support filling those spaces at the rents modeled here. Lowered rents in this situation would further erode feasibility.
- **Reduced parking standards proposed in the Corridor Strategy were critical to feasibility on smaller lots.** If current Title 20 parking standards for commercial spaces were required then many of these models would be physically impractical to build.
- **Further parking reductions may result in more projects being economically feasible.** If the residential parking standards were reduced to 0.5 spaces per unit or lower, it may stimulate more infill development in the corridor than if the current ratio of 0.75 spaces per unit were maintained. However, it is unclear if the current parking standards are binding; developers may continue to provide parking at a higher ratio than 0.5 if they are concerned about marketability.
- **The 10' rear landscaped buffer negatively impacts feasibility on smaller lots.** Allowing parking spaces, but not buildings, in this buffer area would have a meaningful impact on achievable densities on small lots.



MEMORANDUM

TO: Becky Coutinho, Bryan Snodgrass, Mark Person
FROM: Jamin Kimmell, Pauline Ruegg, Paul Runge
DATE: June 1, 2023
PROJECT: City of Vancouver: Evergreen-Grand Commercial Corridor Code Update & Implementation Plan
RE: **Overview of the Evergreen-Grand Corridor Implementation Plan**

Executive Summary

The Evergreen-Grand Corridor Implementation Plan (the Plan) recommends City actions to take alongside zoning changes to support the intent of the Evergreen-Grand Corridor Strategy. The Plan contains four sections, each pertaining to a different action area: Housing and Economic Development, Urban Design, Mobility, and Parking. The bullets below offer a high-level summary of the core approaches recommended for each section.

Housing and Economic Development

- Support the creation and operation of a Business District Organization that can take targeted action to improve economic conditions along the corridor
- Leverage existing funding streams and programs to support the corridor's economic activity and development

Urban Design

- Find partners, funding, and champions for small-scale physical improvements to the corridors as well as programming that activates the corridor as a gathering space
- Create and reinforce a corridor identity through collective branding and brand-aligned improvements to the urban fabric.

Mobility

- Leverage ongoing infrastructure investments in the area to make incremental improvements to the corridors' connectivity and function
- Invest in targeted safety and traffic calming improvements

Parking

- Study on-street parking inventory, utilization, and expansion opportunities
- Support non-car transportation modes to reduce demand for car parking

Understanding The Implementation Plan

Purpose

The purpose of the implementation plan is to:

- Augment forthcoming development code updates with a set of parallel, complementary actions and programs
- Prioritize actions to aid the City in determining the sequence of implementation
- Clearly delineate roles, steps to completion, and the level of effort and resources necessary to outline the way forward

Together with the LUC updates, the Plan should set the City on an achievable and thoughtful course toward a more vibrant Evergreen and Grand corridor.

Structure

The implementation plan is organized into four sections, each with a high-level goal:

1. **Housing and Economic Development:** Provide ample opportunities for small-scale, locally owned businesses to thrive, while maintaining livability for current and future residents.
2. **Urban Design:** Create public and private spaces that are inclusive, integrated, and contribute positively to the livability of the corridor.
3. **Mobility:** Establish a balanced, multi-modal network of motor vehicle, transit, walking, and biking routes through the corridor.
4. **Parking:** Provide adequate parking to serve existing uses and future development.

Each goal is broken down into corresponding subgoals and actions. Each subgoal and action has a text description as well as additional space for the City to clarify key

implementation details: the lead department responsible, key partners, the resources and processes needed, and the level of urgency or time priority. These goals stem directly from the Evergreen Corridor Strategy adopted by the City in 2022 and reflect the City and community input solicited through extensive community engagement.

As a comprehensive matrix, the Plan will help guide the City and map a comprehensive course of action to implement the Evergreen Corridor Strategy. The detailed strategies around delegating responsibilities, identifying contingencies, and triaging actions based on priority and resource-intensiveness position the City to act quickly and effectively. The City will be poised to act quickly on top priorities, as well as low-hanging fruit, supporting LUC amendments with complementary policies and programs that demonstrate the City's full commitment to the Evergreen Grand Corridor Vision.

EVERGREEN AND GRAND COMMERCIAL CORRIDORS STRATEGY IMPLEMENTATION PLAN

		SOURCE	LEAD	PARTNERS
HOUSING & ECONOMIC DEVELOPMENT Provide ample opportunities for small-scale, locally-owned businesses to thrive, and maintain livability for current and future residents				
Economic Development 1: Foster a unique and attractive corridor identity				
ED 1.1	Support the development of a neighborhood Business District Organization that can meet the shared needs of new and future businesses through coordinated networking, marketing, promotions, special events, beautification, and advocacy.	Commerical Corridor Strategy	Economic Prosperity and Housing Department	Communications, Office of Neighborhoods
ED 1.2	Establish a placemaking program along Grand Boulevard and in the BRT Hub, using signage, wayfinding and tactical urbanism (see Urban Design 1.2) to affordably communicate that this is a unique place and district.		Economic Prosperity and Housing Department	Communications, Office of Neighborhoods, Business District Organization
ED 1.3	Support the establishment of a storefront improvement program, based on prior programs, in partnership with the Business District Organization to promote corridor identity and attractiveness of existing business spaces.	Reside Vancouver + Vancouver Culture, Arts, & Heritage Plan	Economic Prosperity and Housing Department	Business District Organization
ED 1.4	Partner with community members from Hudson's Bay and Edgewood Park Neighborhood Associations, the business district organization, the National Park, business owners, property owners, residents and other key stakeholders to coordinate on corridor improvements and programming.	Hudson's Bay Neighborhood Action Plan (ED Action Item 1.4)	Office of Neighborhoods	Hudson's Bay and Edgewood Park NAs, Business District Organization
ED 1.5	Explore potential for state Main Street designation that will support the vision for the corridor's identity and economic development.		Economic Prosperity and Housing Department	Business District Organization
Economic Development 2: Establish a business-friendly climate that supports a diversity of neighborhood-serving businesses				
ED 2.1	Evaluate existing federal, state, and local grants and incentives that support corridor businesses or real-estate development. Promote incentives to ensure existing businesses are aware of these opportunities. Consider culturally-specific outreach efforts to broadly promote availability of incentives to black, indigenous, and people of color business owners and tenants.	Corridor Strategy	Economic Prosperity and Housing Department	Chamber of Commerce
ED 2.2	Promote the City's Pre-Lease, Adaptive Reuse, Street Eats program and other relevant programs and incentives along the corridor.	Corridor Strategy	Public Works	Community Development Department
ED 2.3	Identify if any sites on the corridor would require environmental remediation (brownfields), then leverage environmental remediation funding opportunities as an incentive to develop eligible sites.	Corridor Strategy	Economic Prosperity and Housing Department	Business District Organization
ED 2.4	Connect businesses with existing partners and technical assistance providers.		Economic Prosperity and Housing Department	Greater Vancouver Chamber of Commerce
ED 2.5	Explore opportunities for outdoor local markets, sellers, and microbusinesses.	Reside Vancouver + Vancouver Culture, Arts, & Heritage Plan	Economic Prosperity and Housing Department	Vancouver Farmers Market, Micro-Enterprise Services of Oregon
ED 2.6	Support evidence-based approaches to enhancing community safety along the corridor, including by coordinating between the Vancouver Police Department and Streets and Transportation programs, and other relevant City staff and community stakeholders. Utilize Crime Prevention Through Environmental Design (CPTED) principles.		Economic Prosperity and Housing Department	Business District Organization, Vancouver Police Department
Housing 1: Maintain economic diversity and housing affordability, especially for low- and moderate-income households				
Housing 1.1	Extend the Multi-Family Tax Exemption (MFTE) program calibrated to implement the vision and goals for the corridor and consider adding workforce housing.	Corridor Strategy	Economic Prosperity and Housing Department	Community Development Department
Housing 1.2	Leverage Vancouver Affordable Housing funds to support the creation or preservation of affordable housing in the neighborhood.	Project team	Economic Prosperity and Housing Department	Community Development Department, Local Affordable Housing Providers
Housing 1.3	Utilize the Cities' Equity Index and Displacement Risk Assessment tools to assess equity impacts, including displacement.	Project team	Community Development Department; Economic Prosperity and Housing Department	
Housing 1.4	Implement elements of Reside Vancouver, including expanding rental protections and rental assistance programs.		Community Development Department; Economic Prosperity & Housing Department	
Housing 1.5	Identify opportunities to support houseless communities.	Corridor Strategy	City Manager's Office	

URBAN DESIGN Create public and private spaces that are inclusive, integrated, and contribute positively to the livability of the corridors.				
Urban Design 1: Support a vibrant and active corridor				
Urban Design 1.1	Work with development community to identify and dedicate publicly accessible community or plaza space as part of private development projects in a central location along the corridor.	Corridor Strategy	Community Development Department	Parks and Recreation, Business District Organization
Urban Design 1.2	Identify and implement strategies affordably activate the corridor, providing a local amenity, and offer opportunities for new low-barrier businesses.	Project team	Economic Prosperity and Housing Department	
Urban Design 1.3	In partnership with the Business District Organization, execute programmatic and tactical urbanism interventions in the public spaces (such as farmers markets, arts installations, cultural events, pop-up parklets, painted intersections, mobility lanes, etc) to promote pedestrian-friendly, activated, and inviting spaces.	(1) Reside Vancouver (2) Vancouver Culture, Arts, & Heritage Plan	Community Development Department	Business District Organization, Office of Neighborhoods
Urban Design 1.4	In pursuit of a complete arts and culture ecosystem, leverage Culture, Arts, and Heritage Grant funding to fulfill critical gaps in the corridor's arts and cultural network, such as performance spaces, public art, or historical plaques in the public realm.	(1) Vancouver Culture, Arts, & Heritage Plan	Business District Organization	Parks and Recreation
Urban Design 2: Pursue opportunities for climate resilient design		Climate Strategy NS-1 - NS-3		
Urban Design 2.1	Coordinate with Surface Water Management to implement stormwater best management practices in alignment with the City's Low Impact Development standards and the Climate Action Framework.	(1) Corridor Strategy (2) Climate Strategy NS-3	Community Development Department; Public Works Department	Environmental advocacy and educational groups (Watershed Alliance, Columbia Springs, Lower Columbia Nature Network, Water Resources Education Center) and Residential and commercial building owners
Urban Design 2.2	In accordance with the Complete Streets Program and the Climate Action Plan, preserve existing street trees and identify opportunities to introduce additional climate resilient tree canopy.	(1) City's Tree Canopy Assessment (2021) (2) Climate Strategy NS-1 and NS-2 (3) Complete Streets Program	Urban Forestry Department	Community Development Department, City Manager's Office
Urban Design 2.3	Increase community awareness by using educational plaques or public art to commemorate climate-resilient infrastructure or design elements.	Project team		
MOBILITY Establish a balanced, multi-modal network of motor vehicle, transit, walking, and biking routes through the corridors.				
Mobility 1: Leverage ongoing corridor and neighborhood-wide infrastructure projects				
Mobility 1.1	Implement transportation investments that serve the entire district, such as improvements at critical intersections that connect the corridor with neighborhoods to the North and wayfinding directing users to and from the BRT station on Mill Plain to the corridor.	(1) Corridor Strategy	C-Tran	Community Development Department
Mobility 1.2	Ensure the designs for future transportation projects and real estate developments prioritize creating safe, multi-modal streets throughout the corridor, in alignment with Transportation System Plan goals and the City's Complete Streets Policy.	(1) Complete Streets Policies	Community Development Department	
Mobility 1.3	Improve the neighborhood's connectivity to nearby destinations such as Downtown Vancouver and Fort Vancouver National Historic Site by identifying and being at the table for key transportation projects (e.g.Vine BRT).	(1) Corridor Strategy	Economic Prosperity and Housing Department	Community Development Department
Mobility 1.4	Advocate on behalf of the corridor in support of sustainable and active transportation within citywide initiatives, such as the Transportation System Plan (TSP), improvements to transit, the deployment of electric scooters, and regulation and build out of public and private EV charging infrastructure.			Community Development Department
Mobility 2: Support targeted interventions to improve walkability, bikeability, and connectivity to transit		Climate Strategy TLU-1		
Mobility 2.1	Develop a funding strategy for projects that retrofit Evergreen and Grand with a street design aligned with the corridor's TSP Modal Designation.	Corridor Strategy	Public Works	City and State Transportation Departments
Mobility 2.2	Expand knowledge of and access to the City's Transportation Demand Management program through complementary programming and built environment interventions that promote multimodal travel to and through the corridor and manage overall commuting activity.	Corridor Strategy	Community Development Department	Public Works, Economic Prosperity and Housing

Mobility 3: Improve safety for all corridor users				
Mobility 3.1	Improve safety and comfort for all types of users of different abilities through traffic calming, crossing signage and improvements, speed limit reductions, and school zone demarcations in key areas.	Corridor Strategy	Public Works Department	
Mobility 3.2	Study and construct enhanced safe crossings at Grand & 6th and Evergreen & V as well as traffic calming measures along the length of Grand (e.g. school zone near Washington School for the Deaf, speed cushions).	Corridor Strategy (pg 45)	Public Works Department	
Mobility 3.3	Work with residents, businesses and property owners to request traffic calming measures through the City's Neighborhood Traffic Calming Program.	Corridor Strategy	Community Development Department; Public Works Department	Hudson's Bay and Edgewood Park Neighborhood Associations, Business District Organization
PARKING Support adequate parking to serve existing uses and future development.				
Parking 1: Evaluate and manage vehicular parking impacts to local residents				
Parking 1.1	Conduct parking study to inventory all on-street parking available and current utilization rate, and track this regularly.	Project team	Economic Prosperity and Housing Department	
Parking 1.2	Create a parking mitigation plan once parking occupancy exceeds 85% on adjacent residential streets, as found through a parking study.	Project team	Economic Prosperity and Housing Department	
Parking 1.3	Explore the possibility of a parking benefit district with permitted parking for residents to address concerns related to spillover parking.	Project team	Economic Prosperity and Housing Department	
Parking 1.4	Apply the curb management policies included in the TSP to address multiuser needs along curbs.	TSP	Economic Prosperity and Housing Department	
Parking 2: Support climate and parking goals by increasing micromobility, shared parking options, and EV infrastructure		Corridor Strategy		
Parking 2.1	Advance availability of short-term bike parking amenities by identifying suitable right of way sections on or near residential and commercial sites; support implementation of new parking stations.	TSP	Public works	
Parking 2.2	Support the Vancouver Climate Strategy by setting evidence-based EV charging station targets in the corridor and participating in any citywide code updates related to EV charging.	Climate Strategy TLU-3 (19)	Economic Prosperity and Housing Department	Community Development Department, Private Developers



MEMORANDUM

DATE: August 18, 2023

TO: Mayor and City Council

FROM: Eric Holmes, City Manager

RE: **Follow up information on the Evergreen & Grand overlay following a July 17 Council workshop on this topic.**

CC: Bryan Snodgrass, Principal Planner, and Becky Coutinho, Associate Planner, Community Development Department

Introduction

This memorandum is intended to provide additional information and clarification on the Evergreen and Grand commercial corridors implementation process, following discussion at a July 17 City Council workshop.

Response to Council Questions

- Potential impacts of HB 1110 and 1337:
HB 1110 will allow for 4 units per lot, 6 units per lot that are within a ¼ mile walk to a major transit stop, and 6 units per lot if 2 of the units are affordable on properties zoned for single family development. HB 1337 mandates that the City create development regulations to encourage the use of accessory dwelling units (ADUs), subject to a program adopted by the city with effective binding commitments or covenants that the units will be primarily utilized for long-term housing consistent with the public purpose generating the authorization. This includes the R-9 lower density zone adjacent to the Evergreen and Grand Corridors. Any units built on parcels within the R-9 zone will still have to follow the base zoning development requirements, including maximum height of 35 feet. While this law increases allowed density, it will not significantly impact the overall form of the residential development surrounding the Corridors. Regulations for the new density requirements established by both bills will be developed as part of the Comprehensive Plan and Title 20 update process that is currently underway.
- Potential impacts of HB 1220:
 - HB 1220 requires cities to plan for and accommodate set numbers of housing units for all income levels. The proposed Evergreen & Grand overlay standards accommodate for and encourage infill and medium density development, which is intended to create the maximum housing units appropriate for the Corridors. In

addition, the City extended the boundaries of the MFTE program to include the Corridors to encourage housing development that will support the production of housing units and in some cases encourage some level of affordability. A full vision for how the City will accommodate the total number of units at the affordability levels required based on our allocation (to be determined this fall through the County population and jobs allocation process) will be established through the Comprehensive Plan and Title 20 update process that is currently underway.

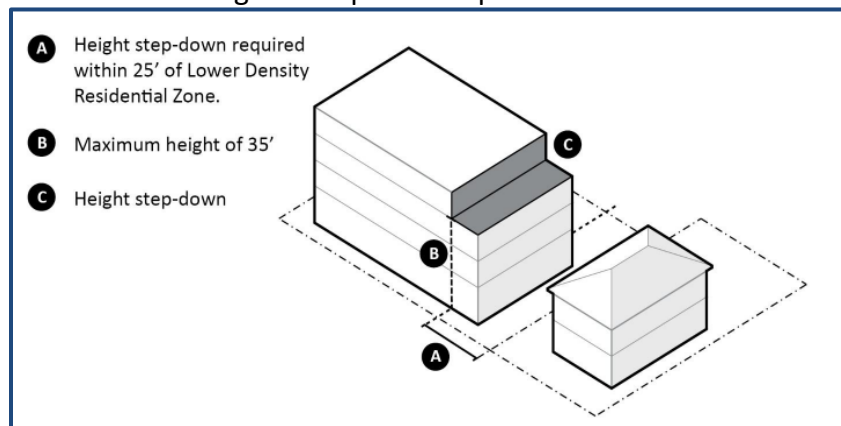
- Proposed bicycle parking standards:
 - Proposed required bicycle parking ratios are listed in the below table:

Uses	Required Short-Term Bicycle Parking	Required Long-Term Bicycle Parking
Residential	0.05 per dwelling unit, 2 spaces minimum	1 per dwelling unit for buildings with 5 or more dwelling units
Commercial	1 per 5,000 sf of floor area, 2 spaces minimum	1 per 15,000 sf of floor area, 2 spaces minimum
Office	1 per 25,000 sf of floor area, 2 spaces minimum	1 per 5,000 sf of floor area, 2 spaces minimum
Civic/Institutional Buildings	1 per 5,000 sf of floor area, 2 spaces minimum	1 per 15,000 sf of floor area, 2 spaces minimum
Lodging	2 spaces minimum	1 per 10 rooms, 2 spaces minimum
Parks	1 per 5,000 sf park area, 2 spaces minimum	None

- Up to 50% of long-term bicycle parking spaces may be provided in individual units.
- In properties where more than 20 long-term bicycle parking spaces are required (this would be in buildings with more than 20 units) and provided in a shared bicycle parking facility inside the building rather than in individual dwelling units, additional standards apply including a minimum number of spaces that are not vertically stacked, a minimum number of larger spaces for cargo-type bikes, entry and directional signage, and standards around grade to ensure ease of access for users.

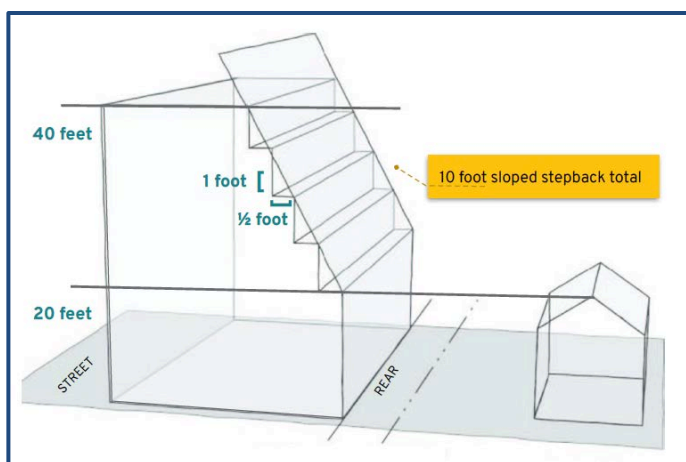
- Vehicle parking standards for use changes from commercial to residential or a flexible use:
 - See the reference [20.945.E Change of use](#) to address concerns about adequate parking. When an existing structure is changed from one use to another, the amount of required parking is required to meet the standards of the new use. This is determined through the site plan review process. If a project is proposed as a flexible use, the highest parking requirement must be followed.
- Step-down at the rear of new buildings:
 - The proposed standard requires development abutting a lower density residential zone to step-down any portion of the building within 25 feet of that lower density residential zone. The maximum height of the stepped-down portion of the building must be no higher than 35 feet. The remaining portion of the building beyond 25 feet of the lower density residential zone can be a maximum height of 50 or 60 feet, depending on the location parcel within the Corridors. In addition, buildings abutting a residential zone must be setback 10 feet. See below image 1. The intention of this standard is to create opportunities for higher density development to meet the Cities housing goals, while also allowing for a gradual transition between the Corridors and surrounding neighborhood. The new proposed standard was calibrated so that properties abutting the Corridors would maintain access to privacy and light.

Image 1- Proposed Step-down standard



- The current zoning in the Corridors require buildings in the CC zone abutting lower density zones to step-down a 1/2 foot for every foot of building height over 20 feet with a maximum height of 50 ft and must be setback 5 feet- see below image 2.

Image 2 - Existing standard



- The project team is currently reevaluating the proposal to understand if there are alternative ways to balance compatibility with existing development and allowing for higher density development on corridors to address housing needs. This will be discussed in detail with the Planning Commission at the Sept. 12 public hearing, per direction from Council at the July 17 workshop.
 - *Note: the project team is developing clearer graphics for existing versus proposed stepdown standards for the PC and Council process and will share these when available.
- Community Engagement conducted to date:
 - Outreach conducted as part of the planning phase of the Evergreen and Grand Commercial Corridors Strategy, which was adopted by Council in early 2022:
 - One-on-one and small group coordination with primary stakeholders, including neighborhood associations and leaders, property owners, businesses, neighborhood residents, agency partners like the State School for the Deaf, State School for the Blind, and C-TRAN, as well as other community stakeholders.
 - In person open house on February 13, 2020
 - Online survey in early 2020
 - Four virtual open houses on August 26, 2020, and August 27th, 2020, February 4th, 2021, October 21st, 2021
 - Offered and attended meetings with neighborhood associations.
 - Small group meetings with property owners
 - Regular email updates on project workshops and public hearings sent to project emailing list and neighborhood associations.
 - Physical mailing notice of open houses and public hearings
 - Outreach conducted to date as part of implementation of the Strategy document:
 - Virtual open house on March 16, 2023
 - Physical mailer notice of open house
 - Online survey and project webpage
 - Developer focus group on May 22, 2023

- Three Planning Commission workshops in February, April, and June of 2023
- Primary stakeholders included eight neighborhood associations and leaders, property owners, businesses, neighborhood residents, agency partners.
- Active communication with the eight neighborhood associations located in proximity to the project area throughout process, including notification of public hearings.
- Physical mailing notice of Planning Commission public hearing
- Ongoing opportunity to provide comment on project website.
- Regular email updates on project workshops and public hearings sent to project emailing list and neighborhood associations.

Next Steps

- The project team has deferred the Planning Commission public hearing to September 12 to provide additional time to notify key stakeholders and share the proposed standards, as well as to consider potential refinements to the proposed building stepdown standards based on Council feedback.
- Following Planning Commission public hearing, staff anticipate providing Council a brief update under Communications in advance of scheduled first read and public hearing.
- City Council first reading is scheduled on October 16th and the public hearing is scheduled on October 23rd. A mailer noticing the Council dates will be sent out to properties within the Evergreen and Grand Corridors and surrounding neighborhoods, in addition to email and notification and direct outreach to key partners.



July 18, 2023 - SEPA Determination of Non-Significance (DNS) for a proposed zoning code text change amending VMC Title 20 to create the Evergreen and Grand Commercial Corridor Overlay District.

Contact: Becky Coutinho, Associate Planner, Vancouver Community Development Department (360 487-7899), becky.coutinho@cityofvancouver.us The City of Vancouver, lead agency, has reviewed the Environmental Checklist as required by WAC 197-11-330(1), pursuant to the State Environmental Policy Act (SEPA), and determined that the proposals will not have a probable significant adverse impact on the environment. Under the authority of WAC 197-11-330(1) and 197-11-350, this Notice of Determination of Non-Significance (DNS) has been issued. A SEPA checklist and background information are available from City staff. Pursuant to WAC 197-11-340, comments ***on this SEPA determination*** will be received until **5:00 p.m., July 25, 2023**. Procedural appeals to the SEPA determination must be filed in writing within 14 calendar days following the end of the comment period. A City Council decision of the SEPA procedural appeal shall be final and not subject to further administrative appeal. Substantive SEPA appeals shall be filed in writing within 14 calendar days of the issuance of Council's decision.

A handwritten signature in blue ink that reads "Rebecca L. Coutinho".

July 18, 2023

Name

Date

SEPA ENVIRONMENTAL CHECKLIST

Purpose of checklist

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization, or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. **You may use “not applicable” or “does not apply” only when you can explain why it does not apply and not when the answer is unknown.** You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to **all parts of your proposal**, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for lead agencies

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B, plus the [Supplemental Sheet for Nonproject Actions \(Part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in “Part B: Environmental Elements” that do not contribute meaningfully to the analysis of the proposal.

A. Background [Find help answering background questions](#)

1. **Name of proposed project, if applicable:** creation of the Evergreen and Grand Commercial Corridors Overlay District.
2. **Name of applicant:** Becky Coutinho, Associate Planner, Community Development Department, becky.coutinho@cityofvancouver.us
3. **Address and phone number of applicant and contact person:** 415 W 6th St, Vancouver, WA 98668, (360) 487-7899
4. **Date checklist prepared:** July 12, 2023
5. **Agency requesting checklist:** City of Vancouver, WA
6. **Proposed timing or schedule (including phasing, if applicable):** Public hearings on this item is scheduled before the City of Vancouver Planning Commission on Tuesday, July 25, 2023, at 6:30 p.m. Hearings before the Vancouver City Council are scheduled on Monday, August 21, 2023 at 6:30 p.m. and Monday, August 28th, at 6:30 p.m.
7. **Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.** If the zoning code overlay district is created, there are no additional planned code text changes for the area at this time.
8. **List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.** None beyond this checklist.
9. **Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.** None known.
10. **List any government approvals or permits that will be needed for your proposal, if known.** None known.
11. **Give a brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)** The proposed code changes would amend Title 20 to create the Evergreen and Grand Commercial Corridors Overlay District. The purpose of the Overlay District is to:
 - Strengthen current businesses while providing an appropriate mix of commercial and residential uses

- Establish a balanced, multi-modal network of motor vehicle, transit, walking, and biking routes through the corridors
- Provide adequate parking to serve existing uses and future development
- Create public and private spaces that are inclusive, integrated, and contribute positively to the livability of the corridors
- Provide ample opportunities for small-scale, locally owned businesses to thrive
- Contribute to a vibrant public realm that encourages interaction with an active edge along the ground floor, high-quality public spaces, and a walkable pedestrian environment.

The Overlay District creates regulations for building heights, parking requirements, building setbacks, bicycle parking, design standards for ground floor design, weather protection, minimum height, transparency of buildings, façade articulation, building materials, location of utilities, fencing, and landscaping.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. The location of the proposal includes the portions of E Evergreen Boulevard and Grand Boulevard. Located North of Lewis and Clarke Highway, South of E Mill Plain Boulevard, East of Interstate 5, and West of Interstate 205. Boundary of the Evergreen and Grand Commercial Corridors Overlay District on page 4 of the SEPA Checklist.

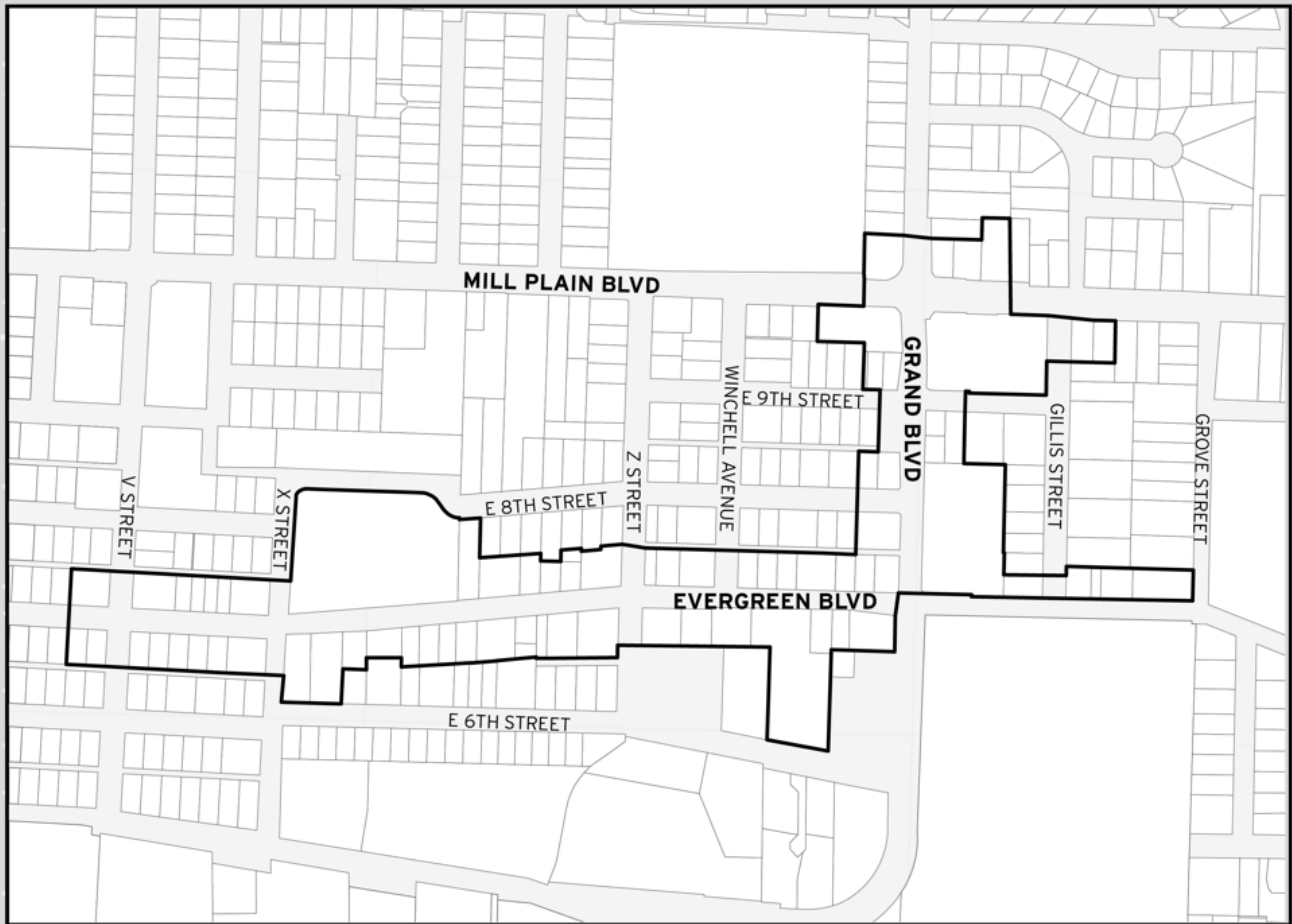


Figure 20.590-1

Boundaries of the Evergreen/Grand Corridor Overlay District

B. Environmental Elements

1. Earth [Find help answering earth questions](#) Not applicable to non-project actions.

- a. **General description of the site:** Portions of Evergreen and Grand Boulevard- Overlay District boundary shown on page 3

Circle or highlight one: Flat, rolling, hilly, steep slopes, mountainous, other: Does not apply

- b. **What is the steepest slope on the site (approximate percent slope)?** Does not apply
- c. **What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them, and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.** Does not apply
- d. **Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.** Does not apply
- e. **Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.** Does not apply
- f. **Could erosion occur because of clearing, construction, or use? If so, generally describe.** Does not apply
- g. **About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?** Does not apply
- h. **Proposed measures to reduce or control erosion, or other impacts to the earth, if any.** Does not apply

2. Air [Find help answering air questions](#) Not applicable to non-project actions.

- a. **What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.** Does not apply
- b. **Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.** Does not apply
- c. **Proposed measures to reduce or control emissions or other impacts to air, if any.** Does not apply

3. Water [Find help answering water questions](#) Not applicable to non-project actions

a. Surface Water: [Find help answering surface water questions](#) Not applicable to non-project actions

1. Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. Does not apply
2. Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. Does not apply
3. Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. Does not apply
4. Will the proposal require surface water withdrawals or diversions? Give a general description, purpose, and approximate quantities if known. Does not apply
5. Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. Does not apply
6. Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. Does not apply

b. Ground Water: [Find help answering ground water questions](#) Not applicable to non-project actions

1. Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give a general description, purpose, and approximate quantities if known. Does not apply
2. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. Does not apply

c. Water Runoff (including stormwater): Not applicable to non-project actions

- a) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe. Does not apply
- b) Could waste materials enter ground or surface waters? If so, generally describe. Does not apply
- c) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe. Does not apply

- d) **Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any.** Not applicable to non-project actions

4. Plants [Find help answering plants questions](#) Not applicable to non-project actions

- a. **Check the types of vegetation found on the site:** Does not apply

- ☐ deciduous tree: alder, maple, aspen, other
- ☐ evergreen tree: fir, cedar, pine, other
- ☐ shrubs
- ☐ grass
- ☐ pasture
- ☐ crop or grain
- ☐ orchards, vineyards, or other permanent crops.
- ☐ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
- ☐ water plants: water lily, eelgrass, milfoil, other
- ☐ other types of vegetation:

- b. **What kind and amount of vegetation will be removed or altered?** Does not apply

- c. **List threatened and endangered species known to be on or near the site.** Does not apply

- d. **Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any.** Does not apply

- e. **List all noxious weeds and invasive species known to be on or near the site.** Does not apply

5. Animals [Find help answering animal questions](#) Not applicable to non-project actions

- a. **List any birds and other animals that have been observed on or near the site or are known to be on or near the site.** Does not apply

Examples include:

- **Birds:** hawk, heron, eagle, songbirds, other:
- **Mammals:** deer, bear, elk, beaver, other:
- **Fish:** bass, salmon, trout, herring, shellfish, other:

- b. **List any threatened and endangered species known to be on or near the site.** Does not apply

- c. **Is the site part of a migration route? If so, explain.** Does not apply
- d. **Proposed measures to preserve or enhance wildlife, if any.** Not applicable to non-project actions
- e. **List any invasive animal species known to be on or near the site.** Does not apply

6. Energy and Natural Resources [Find help answering energy and natural resource questions](#) Not applicable to non-project actions

- 1. **What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.** Does not apply
- 2. **Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.** Does not apply
- 3. **What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any.** Does not apply

7. Environmental Health [Find help with answering environmental health questions](#) Not applicable to non-project actions

- a. **Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur because of this proposal? If so, describe.** Does not apply
- 1. **Describe any known or possible contamination at the site from present or past uses.** Does not apply
- 2. **Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.** Does not apply

3. Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project. Does not apply

4. Describe special emergency services that might be required. Does not apply

5. Proposed measures to reduce or control environmental health hazards, if any. Not applicable to non-project actions

b. Noise Not applicable to non-project actions

1. What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? Does not apply

2. What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site)? Does not apply

3. Proposed measures to reduce or control noise impacts, if any. Not applicable to non-project actions

8. Land and Shoreline Use [Find help answering land and shoreline use questions](#) Not applicable to non-project actions

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. Does not apply

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses because of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or non-forest use? Does not apply

1. Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how? Does not apply

- c. **Describe any structures on the site.** Does not apply
- d. **Will any structures be demolished? If so, what?** Does not apply
- e. **What is the current zoning classification of the site?** Does not apply
- f. **What is the current comprehensive plan designation of the site?** Does not apply
- g. **If applicable, what is the current shoreline master program designation of the site?** Does not apply
- h. **Has any part of the site been classified as a critical area by the city or county? If so, specify.** Does not apply
- i. **Approximately how many people would reside or work in the completed project?** Does not apply
- j. **Approximately how many people would the completed project displace?** Does not apply
- k. **Proposed measures to avoid or reduce displacement impacts, if any.** Not applicable to non-project actions
- l. **Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any.** Not applicable to non-project actions
- m. **Proposed measures to reduce or control impacts to agricultural and forest lands of long-term commercial significance, if any.** Not applicable to non-project actions

9. Housing [Find help answering housing questions](#) Not applicable to non-project actions

- a. **Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.** Does not apply
- b. **Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.** Does not apply
- c. **Proposed measures to reduce or control housing impacts, if any.** Not applicable to non-project actions

10. Aesthetics [Find help answering aesthetics questions](#) Not applicable to non-project actions

- a. **What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?** Does not apply
- b. **What views in the immediate vicinity would be altered or obstructed?** Does not apply
- c. **Proposed measures to reduce or control aesthetic impacts, if any.** Not applicable to non-project actions

11. Light and Glare [Find help answering light and glare questions](#) Not applicable to non-project actions

- a. **What type of light or glare will the proposal produce? What time of day would it mainly occur?** Does not apply
- b. **Could light or glare from the finished project be a safety hazard or interfere with views?** Does not apply
- c. **What existing off-site sources of light or glare may affect your proposal?** Does not apply
- d. **Proposed measures to reduce or control light and glare impacts, if any.** Not applicable to non-project actions

12. Recreation [Find help answering recreation questions](#) Not applicable to non-project actions

- a. **What designated and informal recreational opportunities are in the immediate vicinity?**
Does not apply
- b. **Would the proposed project displace any existing recreational uses? If so, describe.** Does not apply
- c. **Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any.** Not applicable to non-project actions

13. Historic and Cultural Preservation [Find help answering historic and cultural preservation questions](#) Not applicable to non-project actions. Existing development throughout the commercial corridors.

- a. **Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers? If so, specifically describe.** Does not apply
- b. **Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.** Does not apply
- c. **Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.** Does not apply
- d. **Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.** Not applicable to non-project actions

14. Transportation [Find help with answering transportation questions](#) Not applicable to non-project actions

- a. **Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.** Does not apply

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? Does not apply
- c. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle, or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). Does not apply
- d. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. Does not apply
- e. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and non-passenger vehicles). What data or transportation models were used to make these estimates? Does not apply
- f. Will the proposal interfere with, affect, or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe. Does not apply
- g. Proposed measures to reduce or control transportation impacts, if any. Not applicable to non-project actions

15. Public Services [Find help answering public service questions](#) Not applicable to non-project actions

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. Does not apply
- b. Proposed measures to reduce or control direct impacts on public services, if any. Not applicable to non-project actions

16. Utilities [Find help answering utilities questions](#) Not applicable to non-project actions

- a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other: Does not apply

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. Does not apply

C. Signature [Find help about who should sign](#)

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

X 

Type name of signee: Rebecca L Coutinho

Position and agency/organization: Associate Long Range Planner/ City of Vancouver

Date submitted: 7/18/2023

D. Supplemental sheet for nonproject actions [Find help for the nonproject actions worksheet](#)

IT IS NOT REQUIRED to use this section for project actions.

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise? The creation of Evergreen and Grand Commercial Corridors Overlay District would not be likely to increase discharge to water, emissions to air, production, storage, or release of toxic or hazardous substances, or production of noise. While the overlay district is meant to encourage mixed use, commercial, and residential development, it is not anticipated any additional development will increase outputs to the surrounding environment by significant, adverse amounts.

- **Proposed measures to avoid or reduce such increases are:** No measures anticipated to be needed

2. How would the proposal be likely to affect plants, animals, fish, or marine life? The creation of Evergreen and Grand Commercial Corridors Overlay District would not likely affect plants, animals, fish, or marine life in the overlay area. While the overlay district is meant to encourage mixed use, commercial, and residential development, the area is already developed with these land uses. All requirements, regulations, and laws to preserve native vegetation and wildlife will be observed during any development.

- **Proposed measures to protect or conserve plants, animals, fish, or marine life are:** No measures anticipated to be needed

3. How would the proposal be likely to deplete energy or natural resources? The creation of Evergreen and Grand Commercial Corridors Overlay District would not be likely to deplete energy or natural resources. While the overlay district is meant to encourage mixed use, commercial, and residential development, it is not anticipated any new development will significantly impact or deplete energy and natural resource use.

- **Proposed measures to protect or conserve energy and natural resources are:** No measures anticipated to be needed

4. **How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection, such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?** Portions of Evergreen Boulevard are located within an environmentally sensitive area, specifically steep slope. These areas currently have improvements on the land, already disturbed from its natural state. Any development spurred from the implementation of the Evergreen and Grand Commercial Corridors Overlay District located within the steep slope area would follow all required additional development reviews under the critical areas ordinance or other required
- **Proposed measures to protect such resources or to avoid or reduce impacts are:** Any development on environmentally sensitive lands will follow all required additional development reviews under the critical areas ordinance.
5. **How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?** There are currently no land or shoreline use in the Evergreen and Grand Commercial Corridors Overlay District that would be affected by any development resulting from the passage of the overlay district.
- **Proposed measures to avoid or reduce shoreline and land use impacts are:** No measures anticipated to be needed
6. **How would the proposal be likely to increase demands on transportation or public services and utilities?** The proposed Evergreen and Grand Commercial Corridors Overlay District is meant to encourage compact, mixed-used development that may result in increased transit ridership. The exact amount and timing of development resulting from the passage of the Overlay District are unknown, it is not anticipated any resulting development would significantly or adversely impact City utilities or the transportation network.
- **Proposed measures to reduce or respond to such demand(s) are:** No measures anticipated to be needed
7. **Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.** The Evergreen and Grand Commercial Corridors Overlay District does not conflict with any local, state, or federal laws or requirements for the protection of the environment. Any development resulting from the implementation of the Overlay District will obey any such laws, regulations, and requirements.



Proposed Warehouse Code Amendments

Planning Commission Workshop
September 12, 2023



Chad Eiken, Director, CDD
Becky Coutinho, Associate Planner, CDD

Agenda

- Warehouse Moratorium and Study Goals
- Recap of Process To-Date
- Proposed Code Amendments
- Next Steps



Warehouse Moratorium/Study Goals



**Understand
Differences
& Impacts**



**Gather Public
and
Stakeholder Input**



**Propose Code
Amendments**

Conclusions Regarding Key Differences

E-commerce vs.
Traditional Warehouses

- **Building size** | E-commerce facilities typically much larger than traditional warehouses; can dominate visual landscape
- **Operations** | Around-the-clock operations at e-commerce facilities entail more daily medium/heavy truck and van trips
- **Economic Impact** | E-commerce facilities have a greater economic impact than traditional warehouses (jobs and tax revenue)
- **Adaptive Reuse** | Examples of reuse can include smaller warehouse spaces, manufacturing, sports facilities

Proposed Amendments to VMC Title 20

1. Make warehouses $\geq 250,000$ s.f. (in a single building) a limited use ('L' in use table) in the IH, Heavy Industrial District subject to additional standards and restrictions
2. Reduce minimum parking space requirement for all warehouses from 1:2,000 s.f. to 1:5,000 s.f.
3. Decrease maximum lot coverage for large warehouses in IH District from 100% to 75%



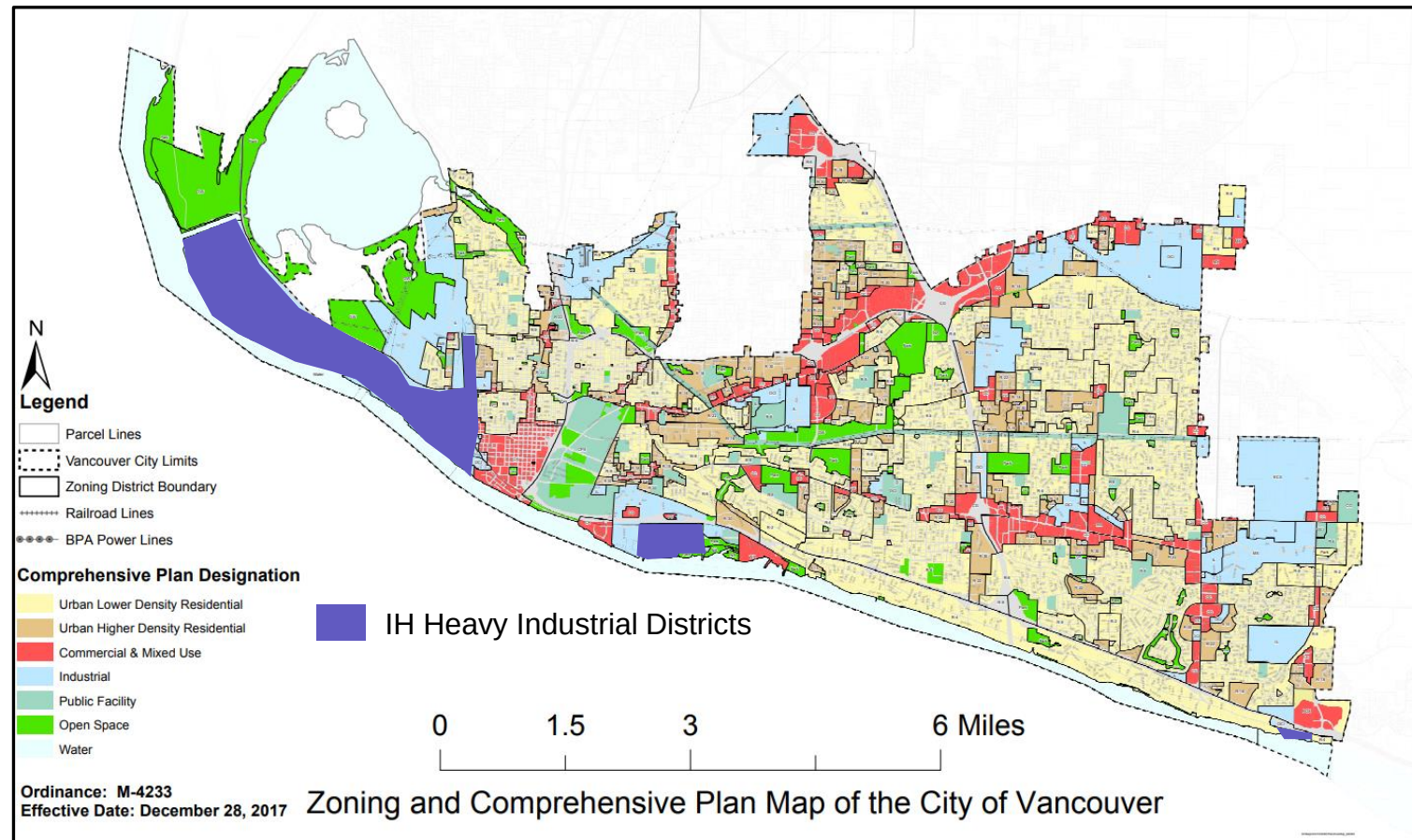
Proposed Amendments to VMC Title 20 (continued)

4. Add limited use/development standards for warehouses $\geq$ 250,000 s.f. such as:
- Prohibit truck traffic to/from large warehouses on Fruit Valley Road
 - Reduce visual impacts if next to public street or highway: 1) architectural elements, e.g. windows, articulation of façade, and/or moderately-dark wall color, and 2) 25-foot wide landscaped buffer with evergreen trees that mature at 30-40 feet in height



IH Heavy Industrial Districts

- Proposed changes would only allow $\geq 250,000$ s.f. or larger warehouses in IH Districts only
- Effectively, could only locate in Port of Vancouver or Columbia Business Center



Proposed Amendments to VMC Title 20 (continued)

5. Add climate action measures for warehouses $\geq 250,000$ s.f. such as:
- Min. area of 20% of building footprint to be planted with trees at 30 per acre
 - Building roofs to be designed/constructed to handle structural load of solar panels/equipment; 'solar ready' equipment
 - Skylights and/or clerestory windows
 - Roofs to be white/light colored



Proposed Amendments to VMC Title 20 (continued)

Climate action measures (continued)

- Truck engine idling prohibited while parked or loading/unloading
- All loading docks to be outfitted with outlets for charging electric-powered trucks
- Electric vehicle charging stations to be provided at a minimum of 20% of parking spaces
- Indoor bike parking room to be provided for employees



Ongoing Outreach

City's BeHeard Webpage

Alliance for Community
Engagement (ACE)

Identity Clark County (ICC)

Port of Vancouver

Neighborhood Associations

- Fruit Valley N.A.
- Burnt Bridge Creek N.A.
- North Image N.A.



Next Steps



**Issue SEPA
Determination**



**Additional
Public/Stakeholder
Input**



**PC/CC Workshops
Public Hearings**

Questions and Discussion

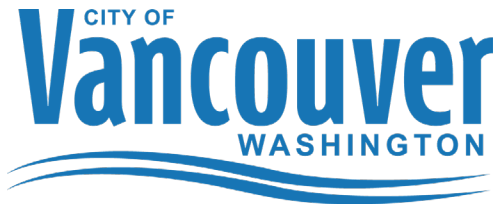
- Does PC agree that use limitations and standards, including climate measures, should only apply to warehouses larger than 250,000 s.f.?
- Does PC agree that limitations should be for any *single* building larger than 250,000 s.f. (vs. group of buildings on a site)?



Thank You

To learn more, visit: beheardvancouver.org/warehouse





Memorandum

DATE: September 12, 2023

TO: Chair Ledell and Planning Commission

FROM: Chad Eiken, Director, Community Development Department
Becky Coutinho, Associate Planner, Community Development Department

RE: Proposed Warehouse Code Amendments

At the July 25, 2023 workshop, planning staff provided the Planning Commission with an overview of the moratorium on large warehouses, the purpose and results of the study completed by the City's consultants to help understand key differences between large e-commerce warehouses and (typically smaller) traditional warehouses. Additionally, staff outlined potential development code amendments to address adverse impacts from very large warehouses, as well as measures that can further the City Council's stated climate action policy goals. Planning Commission discussed the potential development code changes, and provided their initial feedback to staff at the workshop.

On August 14, 2023, City Council also held a workshop to review the potential code amendments and provided their initial feedback to staff.

Subsequent to both workshops, planning staff has refined the list of potential code amendments and developed more specific "ordinance-ready" text in anticipation of bringing an ordinance to Planning Commission and City Council for environmental review, public comment, and then public hearings in October.

Key Changes in Applicability of Proposed Standards

As a result of additional analysis by planning staff, several notable changes are proposed to the applicability of development standards to warehouses. Planning staff welcomes input from the Planning Commission in regard to the following areas:

1. Rather than allowing warehouses larger than 250,000 square feet in the IL Light Industrial and IH Heavy Industrial Districts by conditional use permit, staff is proposing to allow such warehouses as a limited use in the IH District only.
2. To stay within the scope of the moratorium and identified concerns with very large warehouses, new special use and development standards (under the limited use provisions) would only apply to warehouses larger than 250,000 square feet (with the exception of minimum parking

requirement and maximum lot coverage). Warehouses smaller than 250,000 square feet would not be subject to additional limitations under the proposed set of code amendments.

3. For ease of tracking and to remove unintended consequences from partially-completed warehouse complexes in the IL District, the new use and development standards would only apply to single buildings of 250,000 square feet in size, as opposed to groups of multiple buildings on one site that have a total building area more than 250,000 square feet.

Proposed Amendments to VMC Title 20

The following amendments to the City's Land Use and Development Code, VMC Title 20, are proposed to address concerns regarding large warehouse developments that exceed 250,000 square feet in total building area.

1. Amend Use Table VMC 20.440.030-1, Industrial Zoning Districts Use Table

Current Situation: Warehouse/Freight Movement Use is allowed as a limited use in the Light Industrial (IL) District subject to no outdoor storage, and as a permitted use in the Heavy Industrial (IH) District with no limitations. Such use is prohibited in all other zoning districts.

Proposed Change: Make Warehouse/Freight Movement Use 250,000 square feet or larger in a single building prohibited in the IL District (smaller facilities continue as a limited use) and allow warehouses 250,000 square feet or larger as a limited use in the IH District, subject to certain requirements (smaller warehouse facilities continue as a permitted use).

Intended Outcome: Large warehouses would effectively be allowed in the Port of Vancouver or Columbia Business Center where they are more compatible with surrounding uses (and away from residential districts), and would be subject to certain additional development requirements.

Proposed Language (changes shown in red):

USE	OCI	IL	IH	ECX
Warehouse/Freight Movement	X	L/ X ¹²	P/ L ³⁸	X

¹² Warehouse/Freight Movement buildings up to 250,000 square feet of gross floor area on the ground floor of the building ~~Permitted~~ allowed as a limited use, provided all activities, except outdoor storage of materials are wholly contained within building(s); buildings larger than 250,000 square feet of gross floor area on the ground floor of the building are prohibited.

³⁸ Warehouse/Freight Movement uses larger than 250,000 square feet of gross floor area on the ground floor of the building allowed as a limited use, subject to miscellaneous special use standards of VMC 20.895.120.

2. Amend the IH, Heavy Industrial Dimensional Standards at VMC 20.440.040-1 to lower the maximum lot coverage for warehouses to 75%.

Current Situation: The lot coverage standard determines how much area of a property can be occupied by a structure, and is shown as a percentage. The current standard in the IH, Heavy Industrial District is 100%, which means that 100% of the property can be developed for a building, which does not leave any room on-site for parking, loading, or tree planting.

Proposed Change: Reduce the maximum lot coverage standard from 100% to 75% for all warehouse/freight movement uses.

Intended Outcome: Allow for on-site space to plant trees to reduce climate impacts from very large warehouse buildings.

Proposed Language:

STANDARD	OCI	IL	IH
Maximum Lot Coverage	100%	75%	100% <u>/75%⁷</u>

⁷ Warehouse/Freight Distribution uses in buildings over 250,000 square feet of gross floor area on the ground floor shall have a maximum lot coverage of 75%

3. Amend Miscellaneous Special Use Standards VMC 20.895 to add a new section regarding Large Warehouse special standards, as VMC 20.895.120.

Current Situation: There are currently no special use or development standards for large warehouses, which generate significantly more freight movement both day and night, and have potential to contribute to adverse environmental and climate outcomes through fossil fuel consumption for power, heat absorption by building materials, and impervious surfaces. Minimum required parking spaces are calculated at 1 space per 2,000 square feet of building area. The maximum lot coverage (percent of a parcel that is occupied by a building) in the IH district is 100%.

Proposed Change: Warehouses larger than 250,000 square feet would be allowed in the IH, Heavy Industrial District subject to special development standards that prohibit truck traffic along Fruit Valley Road, reduce the minimum parking requirement, reduce the maximum lot coverage, and require certain climate action measures such as: solar-ready roofs (weight load capacity and electrical), EV and truck dock charging outlets, white-colored roofs to reduce heat storage, skylights or clerestory windows to allow natural light, prohibit truck idling, architectural features (such as windows, darker colors,

articulation of façade, etc.) or treed buffer if adjacent to public streets to reduce visual impacts.

Intended Outcome: Reduce impacts from large truck traffic to priority equity areas, reduce visual impacts along public streets, and improve environmental and climate action outcomes.

Proposed Language:

20.895.120 Warehouses Larger than 250,000 Square Feet (NEW)

- A. Defined. The standards in this section apply to warehouse/freight movement buildings larger than 250,000 square feet of gross floor area on the ground floor.
- B. Traffic. Tractor trailers delivering goods to or from warehouses covered by this section shall not travel on Fruit Valley Road.
- C. Visual impact reduction. Warehouses covered by this section located adjacent to a public street or highway shall provide a combination of:
 - 1. Architectural elements such as windows, articulation of the façade, and/or moderately-dark color (e.g. not white or light-colored) walls, and
 - 2. A 25-foot deep landscaped buffer between the building and street or highway consisting of evergreen trees that will reach 30-40 feet in height at maturity.
- D. Climate action measures.
 - 1. An area of the project site equivalent to 20% of the building footprint area shall be planted with trees at a density of at least thirty trees per acre.
 - 2. Building roofs shall be designed and constructed to handle the structural load of solar panels and equipment, and electrical panels and conduit shall be installed to facilitate rooftop solar panels in the future.
 - 3. Skylights and/or clerestory windows shall be provided to facilitate natural light.
 - 4. Roofs shall be white or light colored to reduce heat retention.
 - 5. Truck engine idling is prohibited while parked or loading/unloading.
 - 6. All loading docks shall be outfitted with outlets for charging electric-powered trucks.
 - 7. Electric Vehicle Charging. EV charging stations shall be provided at a minimum of 20% of parking spaces.

4. Amend Table 20.945.070-2 Minimum Off-Street Vehicle Parking Requirements to lower the parking requirement for all warehouse uses.

Current Situation: Warehouses must provide a minimum of one parking space for every 2,000 square feet of building area, typically for employees as opposed to customers. While this rate has not caused any major problems, larger facilities which are increasingly more automated may not need as much parking for employees, so the minimum requirement may inadvertently be resulting in more impervious surface and spaces that will not be used.

Proposed Change: Require that parking spaces be provided for warehouses at a minimum rate of 1.0 space per 5,000 square feet.

Intended Outcome: Reduce the minimum amount of parking and impervious surface that is needed to serve warehouse uses. Warehouse developers would be able to provide more parking if they choose to, but city regulations would not be the reason that more parking spaces are provided than are needed. As an example, a 250,000 square foot building would be required to provide only 50 spaces, as opposed to 125 spaces under current regulations. Reducing the amount of paved surfaces improves storm water and climate outcomes (less heat retention) and creates more space for tree plantings.

Proposed Language:

Table 20.945.070-2 Minimum Off-Street Parking Requirements

Use	Minimum
Warehouse/Freight Movement	1.0/ 2,000-5,000

Next Steps

Following the Planning Commission workshop, staff will prepare an ordinance amending VMC Title 20, incorporating feedback received by the Commission and then will prepare and issue a SEPA Environmental Determination which will assess any significant adverse impacts created by the ordinance if approved. The SEPA determination will be published and made available for public and agency comment.

City Council will hold a workshop on the proposed ordinance on October 2, 2023.

Additional stakeholder outreach is anticipated following the Planning Commission's workshop.

Staff anticipates being able to bring a draft ordinance to Planning Commission for a public hearing in October, after which a public hearing will be scheduled with the City Council.

The moratorium on large warehouses is scheduled to expire on December 6, 2023.

Staff Contact

- Chad Eiken, Community Development Director, Chad.Eiken@cityofvancouver.us



Fall 2023 Comprehensive Plan and Zoning Amendments Vancouver Planning Commission Workshop September 12, 2023

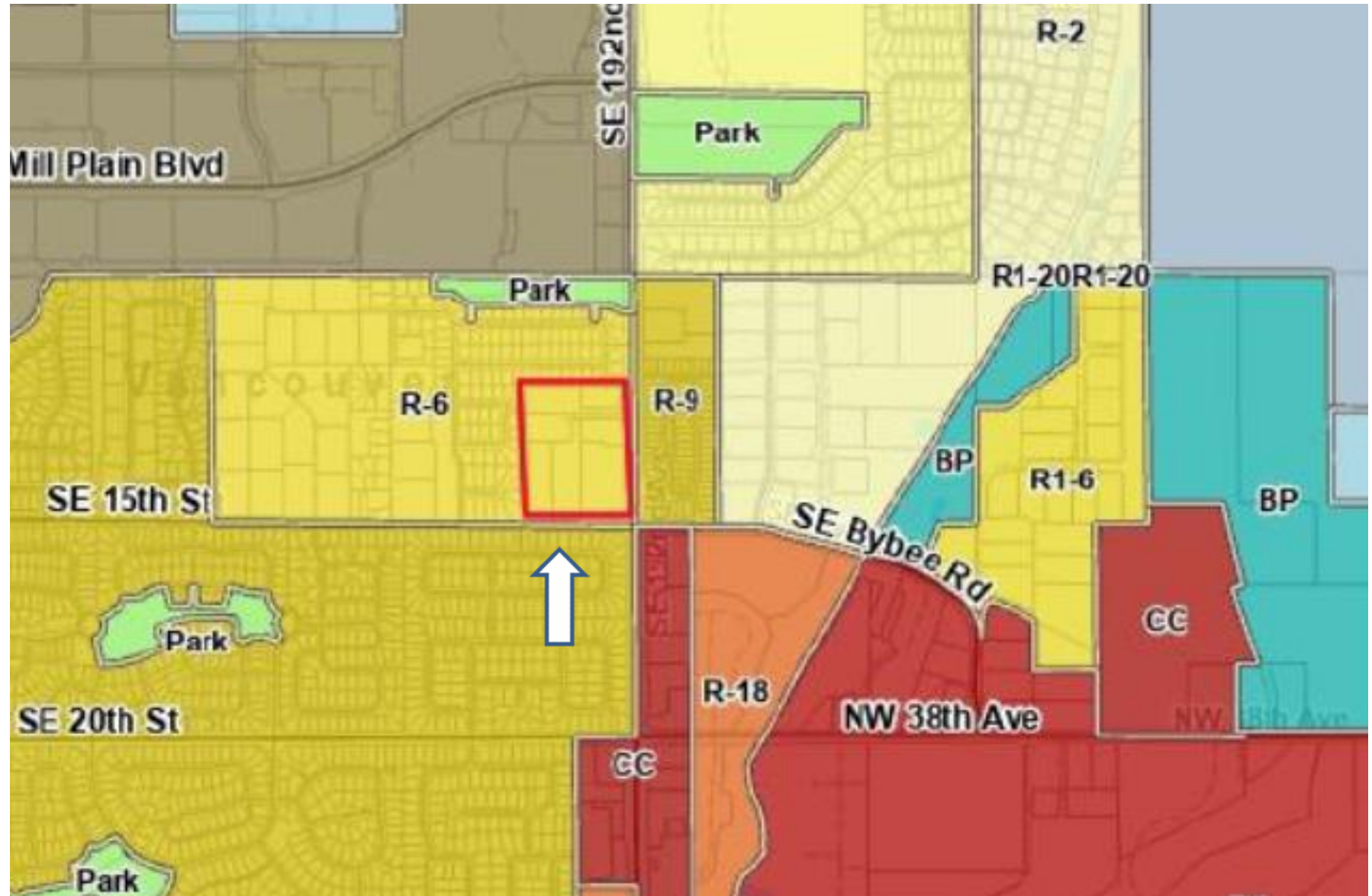


Bryan Snodgrass
Principal Planner
City of Vancouver Community Development Department

192nd Avenue
Comprehensive
Plan and zoning
map change -
UL/R-6 to UH/R-
30 on 9.8 acres
at the
intersection of
192nd Avenue
and 15th Street



192nd Avenue Comprehensive Plan and zoning map change – Regional zoning



192nd Avenue Comprehensive Plan and zoning map change – Conceptual site plan for 296 units in 3 and 4 story buildings, and conversion of existing home



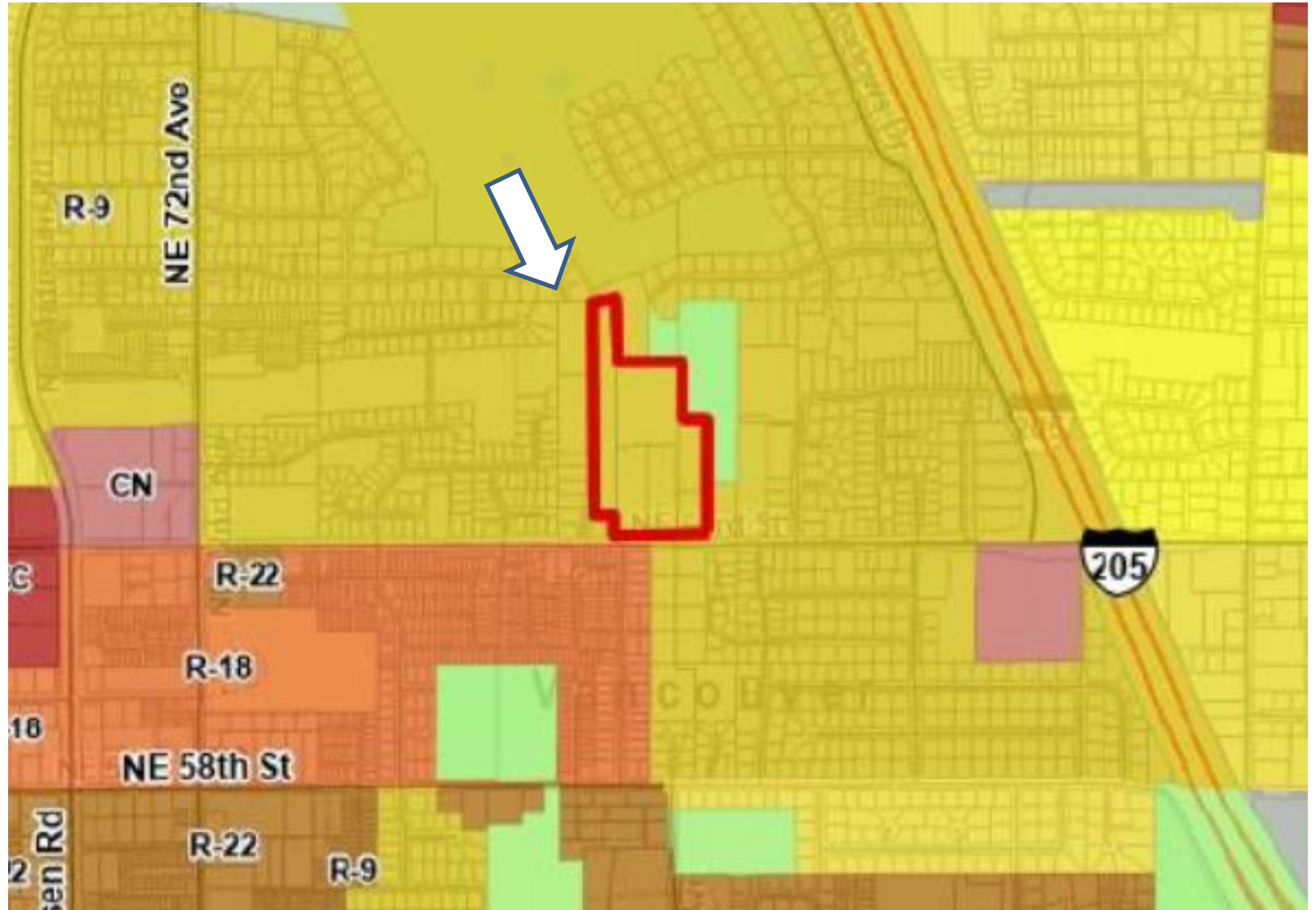
192nd Avenue Comprehensive Plan and zoning map change – Background

- 5% of units affordable at 80% of Area Median Income
- Development Agreement to be provided
- Likely increase of 1,457 daily trips compared to development under current zoning, approximately 89 more in PM peak hour.

Wood Duck
Springs
Comprehensive
Plan and zoning
map change -
UL/R-9 to UH/R-
18 on 13 acres
on 63rd Street



Wood Duck Springs Comprehensive Plan and zoning map change – Regional zoning



Wood Duck Springs Comprehensive Plan and zoning map change – Background

- Conceptual site plan not included. 224 units of market rate apartments and townhomes envisioned, along with retention of two existing houses.
- Approximately 35% increase in daily trips estimated
- Staff seeking to rezone to include a commercial component to potentially serve residential development on the site and surrounding area. Nearest commercial services approximately 3000 feet west of site. Nearest undeveloped commercial land 1500 feet east.

(New) Miller
Comprehensive
Plan and zoning
map change -
UL/R-9 to UH/R-
30 on 4 acres on
63rd Street and
72nd Avenue



Miller Comprehensive Plan and zone change— Regional zoning



Miller

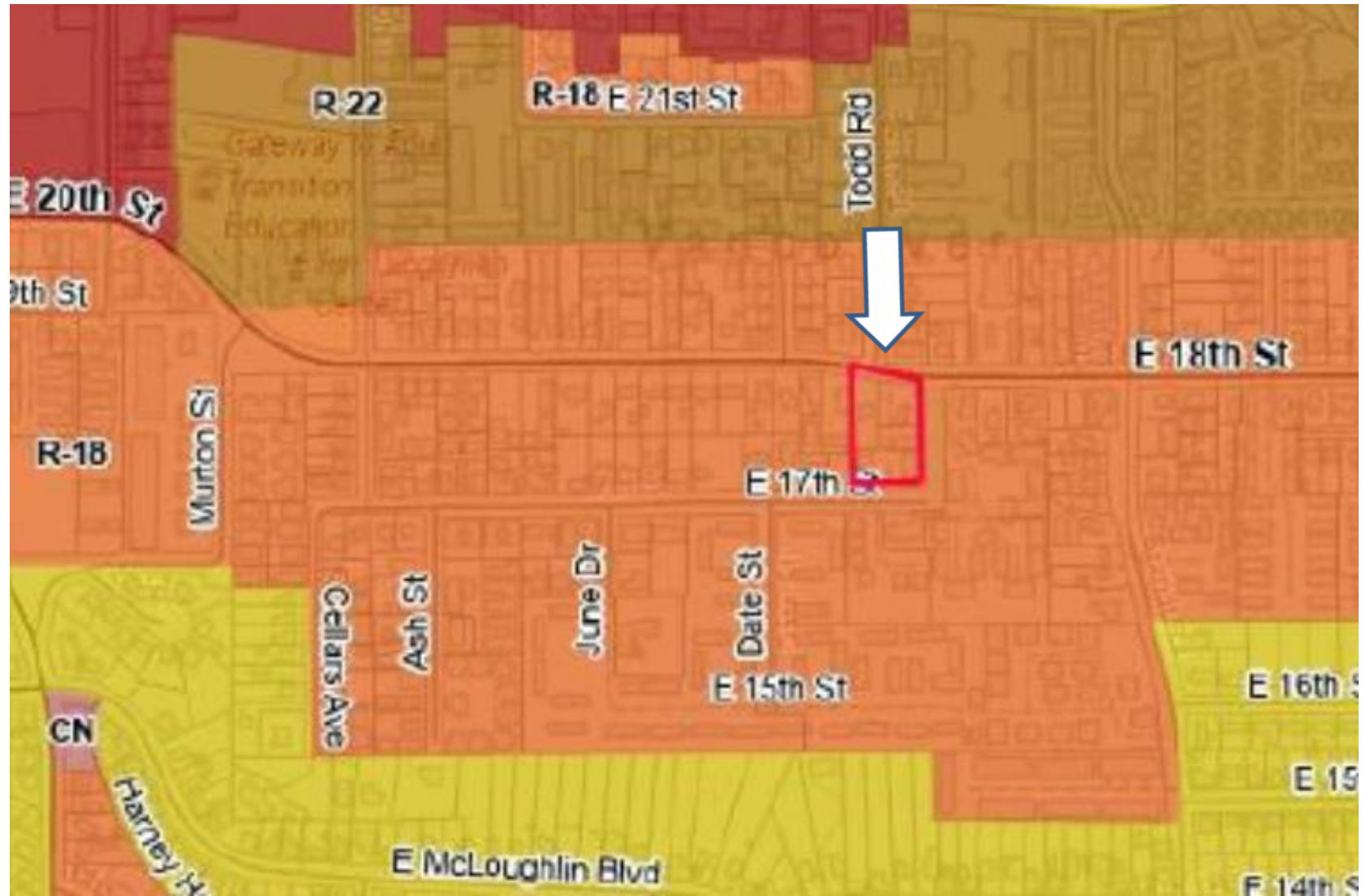
Comprehensive Plan and zoning map change – Background

- Conceptual site plan not included. Site has extensive wetlands likely to limit full development options.
- Originally proposed as standalone rezone to R-17. Changed to R-30 proposal following staff advice to consider multi-family designation given site proximity to transit and commercial services.
- Adjacent property on south side of 63rd Street developed for apartments by same applicant following zone change to R-22 in 2021.

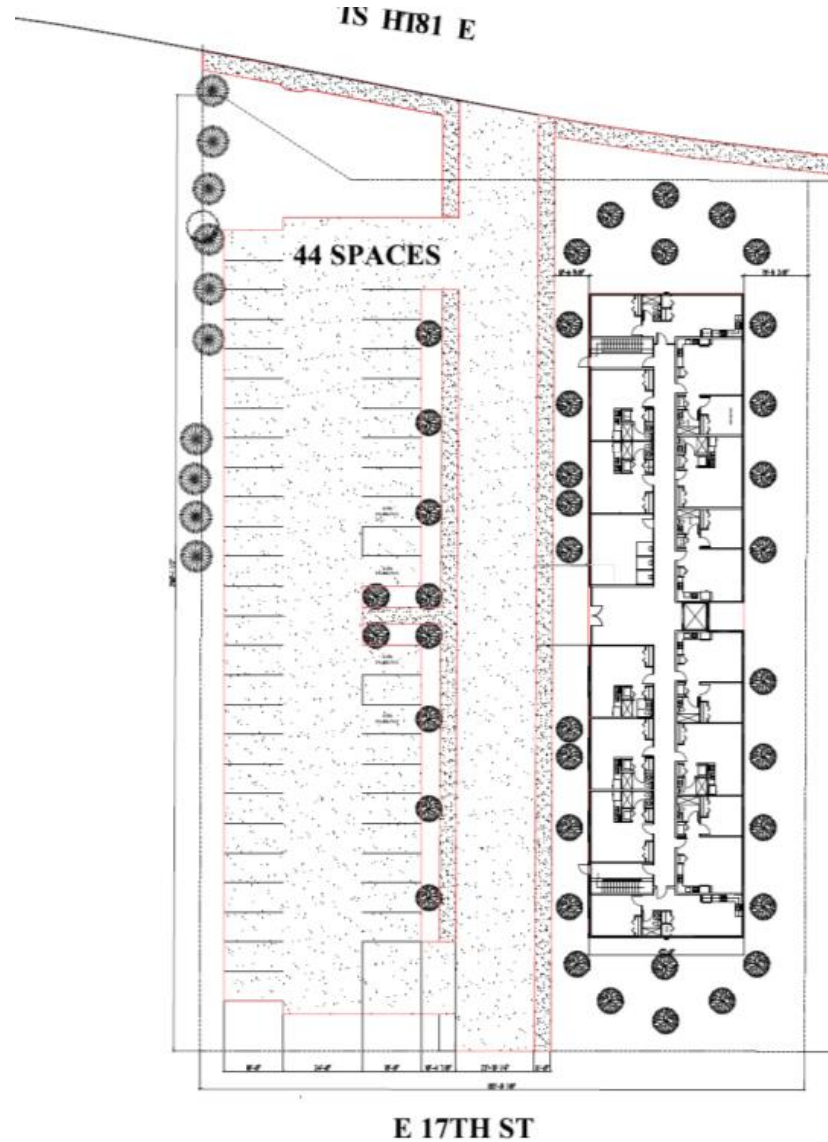
Date Park
zoning map
change –
R-18 to R-30 on
1.2 acres south
of Fourth Plain
Blvd.



Date Park zoning map change – Regional zoning



Date Park
zoning map
change –
Conceptual site
plan for
replacement of
existing
buildings with
54 affordable
housing units
and parking



Date Park zoning map change – Background

- Per existing policy for affordable housing rezones, City serves as co-sponsor

Questions



Comprehensive Plan and zoning text changes

1. Comprehensive Plan capital project list - Add Library Square/Riverwest Parking Structure, and Downtown Parking Extension Project
2. (New) Comprehensive Plan parks related changes – Update Chapter 5 discussion of parks service areas and capital facilities list, Appendix E list of documents adopted by reference, and latest Parks Comprehensive Plan
3. VMC 20.150 Definitions - Define breezeways linking structures (so that a second structure is not separate and accessory) to include a roof

Comprehensive Plan and zoning text changes (cont.)

4. VMC 20.160 Use Classifications
 - a. Move bus barns from the VMC 20.160.020.D.5 category of Warehouse/Freight Movement to the VMC 20.160.020.B.14 category of Transportation Facilities
 - b. Add associated fuel storage to VMC 20.160.020.B.14 category of Transportation Facilities to clarify that fuel storage associated with transportation facilities is an allowed use.
 - c. Add description of Temporary Use
5. VMC 20.170 Measurements - Clarify width and depth for flag lots
6. VMC 20.180 Fees - Eliminate redundant reference to short subdivision
7. (New) VMC 20.210 Type II (Administrative) provisions. Remove outdated requirement for notices to be through “regular” mail only

Comprehensive Plan and zoning text changes (cont.)

8. VMC 20.245 Conditional Use Permits - Clean up electronic submittal provisions
9. VMC 20.270 Site Plan Review - Include easement location and dimensions
10. VMC 20.330 Binding Site Plans - Fix links and require easements
11. VMC 20.410 Lower Density Residential Districts
 - a. Clarify that single family streetfront standards adopted as part of 2022 Housing Code Updates apply to land divisions submitted after the 7/27/22 ordinance adoption date
 - b. Clarify role of Planned Developments, Infill, and Clusters in maximum density calculations

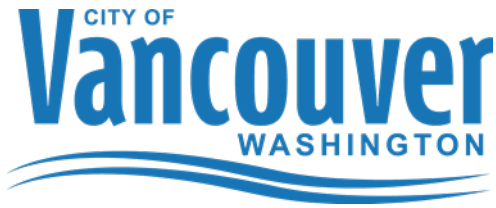
Comprehensive Plan and zoning text changes (cont.)

12. (New) VMC 20.740 Critical Areas Protection— In response to new Flood Insurance Rate Maps (FIRM), update definitions and references, modify variance procedure for historic structures in floodplain.
13. VMC 20.790 SEPA - Pursuant to recent statutory changes, exempt apartments with fewer than 200 units from requiring SEPA review unless critical lands or other factor are present to trigger review.
14. VMC 20.950 Cottage Clusters - Clarify definition of density bonus and common area. Address minimum lots sizes and frontages, and allowance for pre-existing homes exceeding cluster requirements.

Questions

Bryan Snodgrass, Principal Planner, Community Development Department
bryan.snodgrass@cityofvancouver.us, 360-487-7946





Memorandum

DATE: September 5, 2023

TO: Chair Ledell and Planning Commission members

FROM: Bryan Snodgrass, Principal Planner, Community Development Department

RE: September 12 workshop review of fall 2023 Comprehensive Plan and zoning code map and text changes

The September 12 workshop review of the 2023 map and text changes follows an introductory workshop on July 25. A Commission public hearing is scheduled for October 10. Under state law Comprehensive Plan changes, map or text, must be reviewed generally concurrently to evaluate cumulative impacts, but zoning map or text changes can be considered at any time. This year's items consist of three Comprehensive Plan and associated zoning map changes submitted by property owners, one standalone rezone map designation change submitted by a property owner, two Comprehensive Plan text changes developed by staff, and 14 zoning code text changes also developed by staff. ¹ New items introduced since July are highlighted in yellow. The map changes all propose higher allowed densities on properties already zoned for residential use, and are being evaluated by staff with consideration of the pending citywide Comprehensive Plan update required to be adopted in June 2025. The text changes are relatively limited in policy impact.

The GMA requirement to review annual Comprehensive Plan changes concurrently is intended to allow for review of cumulative impacts. As indicated in below table, the five Comprehensive Plan changes proposed this year apply in different areas and are very small relative to citywide land supplies, and do not have significant impacts on each other.

Comprehensive Plan amendments (map or text) for cumulative assessment

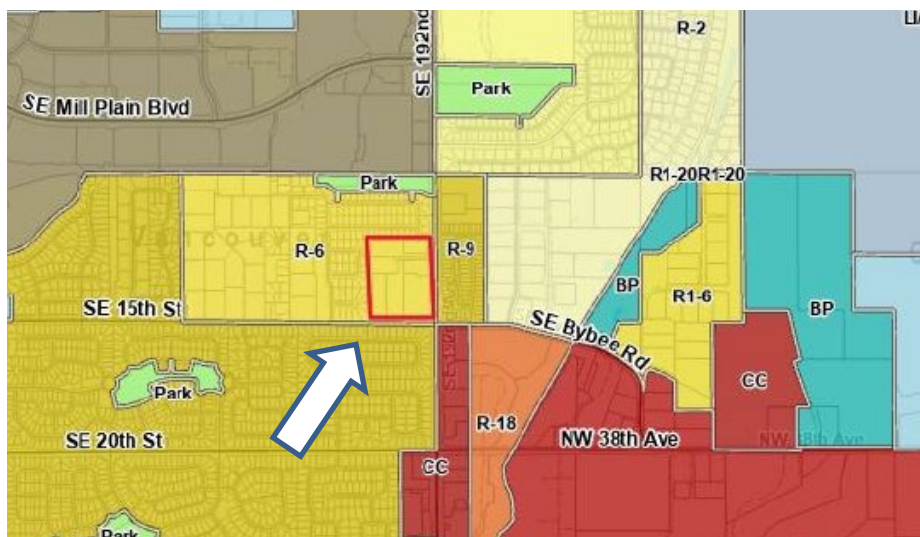
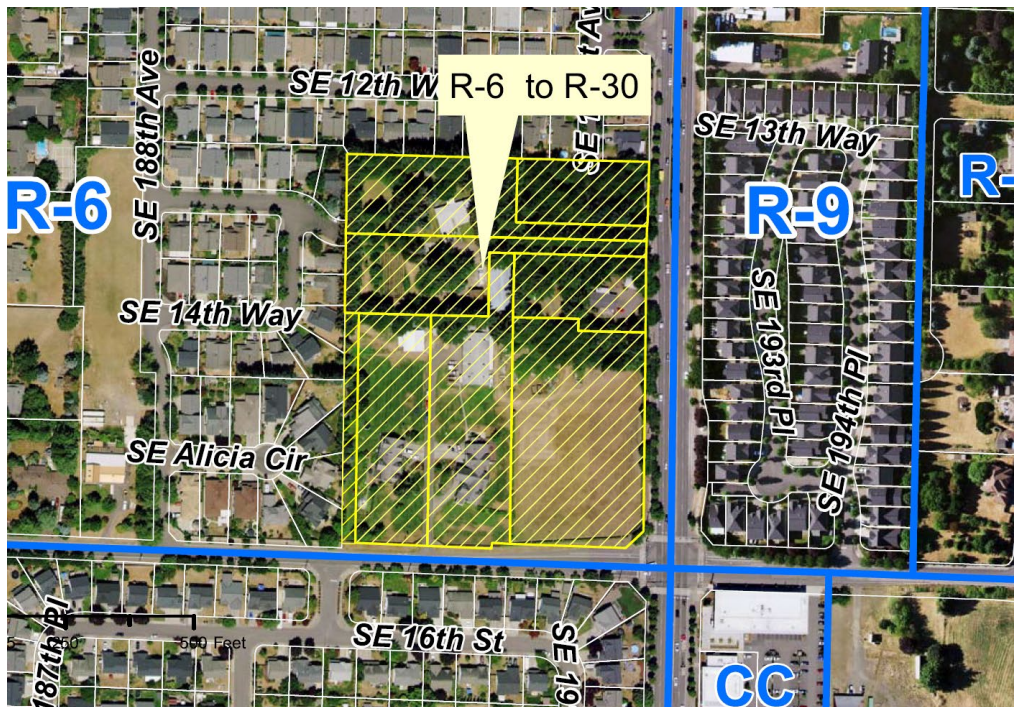
Comprehensive Plan Change Proposal	Applicable Area
192 nd Avenue map change - UL/R-6 to UH/R-30	9.8 acres on in east Vancouver
Wood Duck Springs map change - UL/R-9 to UH/R-18	13 acres in northern Vancouver
(new) Miller map change - UL/R-9 to UH/R-30	4 acres in northern Vancouver

¹ As noted previously an additional proposed Comprehensive Plan and zoning change has not been included because of a dispute over its eligibility. A change from GC to R-30 is proposed on the west side of 143rd Avenue south of Fourth Plain Blvd. The property is subject to an existing development agreement which City legal staff believes precludes the City from changing to residential zoning without approval of area property owners who are also formal parties to the agreement. The applicant believes the City can do so, and has appealed the City staff determination that the rezone application is incomplete without a revised development agreement to the Hearings Examiner. If the Examiner rules in favor of the applicant, the proposal may be brought for Commission review.

Text change to capital facilities plan to add downtown capital projects	Downtown Vancouver
(new) Text change to parks section of Chapter 5	Citywide

1. Comprehensive Plan and zoning map changes

- a. 192nd Avenue rezone – Urban Low Density/R-6 to Urban High Density/R-30 on 9.8 acres at the intersection 192nd Avenue and 15th Street



As indicated in the memorandum for the prior workshop, the site is in the Bennington Neighborhood and located in an area of detached single family homes to west and north zoned R-6, across 15th Street and 192nd Avenue to the south and east zoned R-9. On the diagonally opposite corner of the intersection 15th Street and 192nd Avenue are medical offices and restaurants zoned CC. Approximately 700 ft. north of the site is the Columbia Tech Center with a range of commercial activities. The application includes a conceptual site plan indicating ultimate development of 296 housing units in three and four-story buildings, and conversion of an existing single-family home on the site. Five percent of the units would be affordable to household earning 80% of Area Median Income (AMI) or lower. Buildings near the north and west property lines abutting adjacent single-family areas would be three stories in height and set back 45 and 50 feet from the property lines, respectively, behind a landscaped buffer. The four-story building is envisioned in the center of the site. The applicant indicates a Development Agreement will be provided shortly to formalize these features. The maximum height in the R-30 zone is 50 feet.



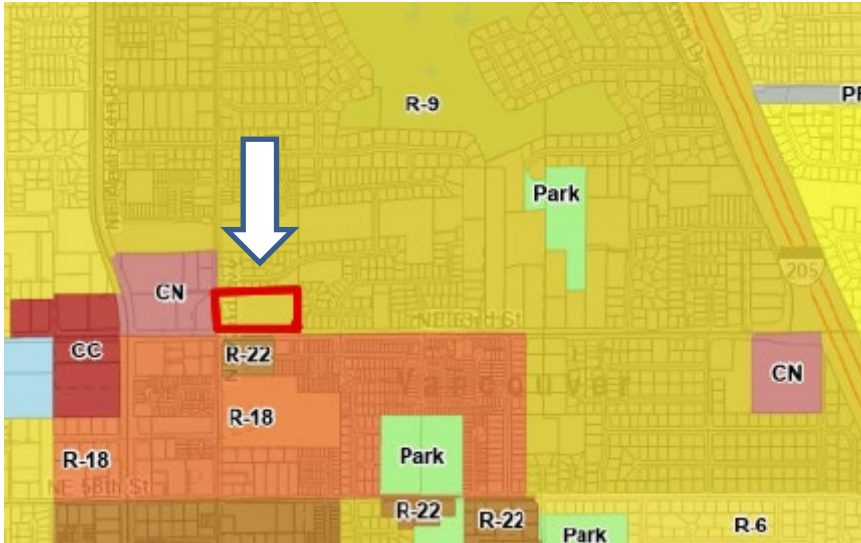
An initial traffic analysis submitted with the application indicates that future development under proposed zoning would likely result in 1,457 more daily vehicular trips than development under the current zoning, and approximately 89 more trips in the evening peak hour. An expanded traffic study indicates the proposal would result in limited overall difference in traffic operations in the nearby area. Some of the intersections will experience an incremental increase in delay

times, but the Level of Service for each intersection will remain the same. Further work will be undertaken at the development review stage.

The C-Tran #37 bus runs north and south along 192nd Avenue abutting the site, with service between downtown and the Fisher's Landing Transit Center, at generally 15-minute intervals.

- b. **(New)** Miller – Urban Low Density/R-9 to Urban High Density/R-30 on 4.1 acres at 63rd Street and 72nd Avenue





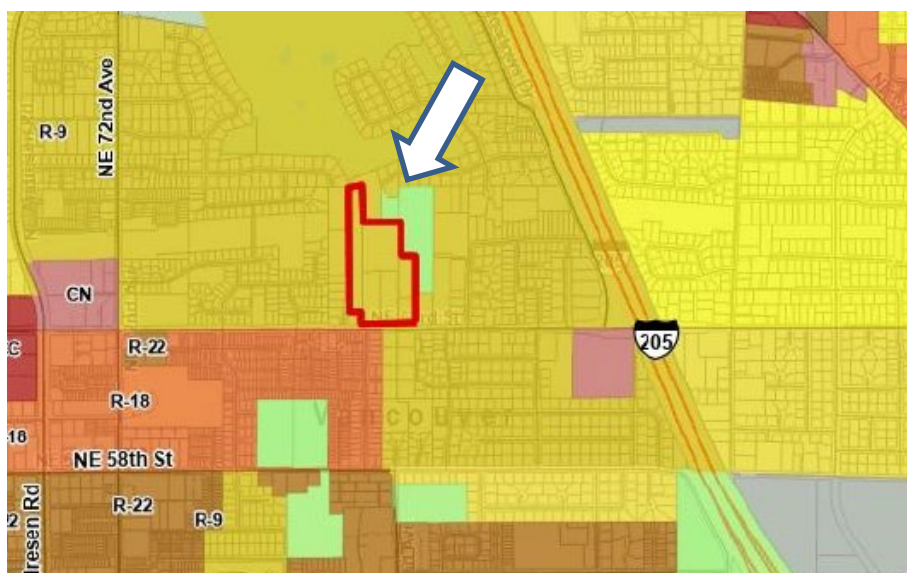
The proposal is located on the northeast corner of the intersection 63rd Street and 72nd Avenue. The rezone site contains several existing single-family homes, outbuildings, and vacant land. North and east of the rezone site are single family homes zoned R-9. West across 72nd Avenue is a City of Vancouver Fire Station and training facility. To the south across 63rd Street are newly constructed apartments (not shown in the above aerial) zoned R-22. The Miller rezone site is approximately ¼ mile west of the proposed Wood Duck Springs rezone site also under review in 2023, and approximately 900 feet east of a commercial center at the southwest corner of 63rd Street and Andresen.

The application from Sergei Cormanitchi represented by PLS Engineering appears as a new item because it was originally a standalone rezone from R-9 to R-17 not subject to Commission review because it was a change only to the next higher density designation. On advice of City staff it has been changed to a Comprehensive Plan and zone change request from Urban Low/R-9 to Urban High/R-30. The higher density designation allows the site to better address the citywide housing affordability crisis, provide for new housing units required by recent GMA changes, and position new residential growth near a commercial center to the west with nearby transit service. The application envisions market rate apartment development. A conceptual site plan is not included. The maximum allowed height in the R-30 zone is 50 feet.

Land to the south of the Miller rezone site across 63rd Street was approved for rezone from R-18 to R-22 in 2021, with the same applicant and representative as the Miller rezone. The original applicant request and Planning Commission recommendation in that case was to R-30, which the City Council reduced to R-22 to better align with single family zoning north of 63rd Avenue. The Miller rezone application indicates that market rate apartments similar in style to those on the south side of 63rd are envisioned if the rezone is approved. The Miller site contains extensive wetlands, so future development may not be able to utilize all of the property. Additional information on the critical lands implications will be provided at the workshop.

The C-Tran #32 bus runs north and south along Andresen Road approximately 900 feet west of the site, with service between downtown and the Vancouver Mall Transit Center, at generally 30 minute intervals.

- c. Wood Duck Springs – Urban Low Density/R-9 to Urban High Density/R-18 on 13 acres at 63rd Street and 82nd Court



The proposal is located on the north side of 63rd Street approximately one mile north of Vancouver Mall. The rezone site contains several existing single-family homes, outbuildings, and vacant land. North and east of the rezone site is Kelly Meadows Park, zoned R-9. East and west along 63rd Street are large lot single family homesites also zoned R-9. To the south across 63rd Street are smaller single- family homes zoned R-18 and R-9.

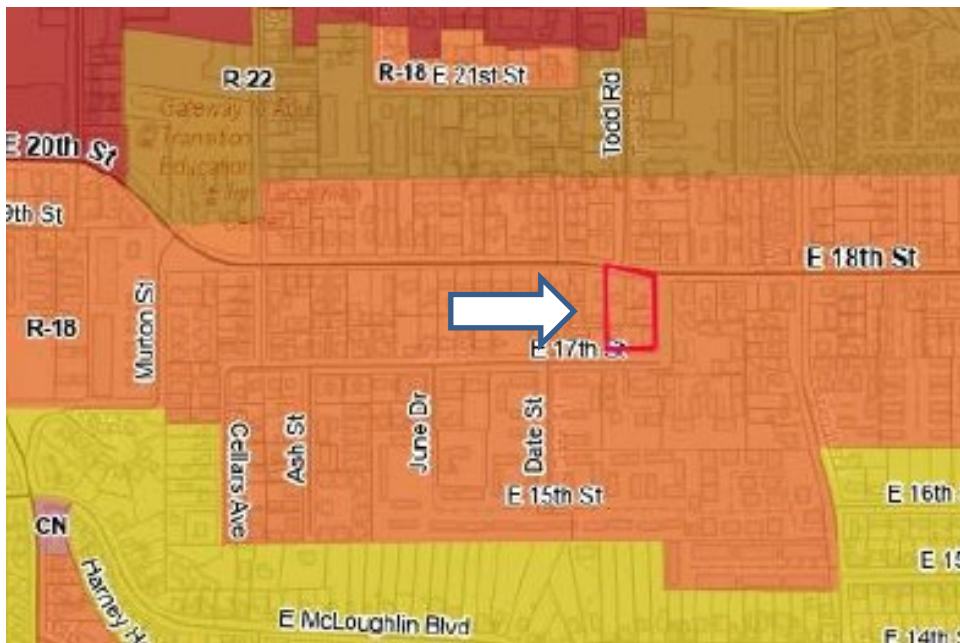
The application from Songbird Homes represented by PLS Engineering indicates that the applicant will likely develop the site with two of the existing homes retained, and the remainder developed with a mix of market rate apartments and townhomes. The application indicates townhomes are envisioned on the western portion of the site. A conceptual site plan has not been submitted. The application estimates a maximum of 224 units could be developed. The application estimates development envisioned if the rezone is approved would result in approximately 35% more daily trips than likely development under the current zoning. The north central portion of the site contains wetland mapping indicators, which may reduce overall site development slightly, to be determined at the time of development review.

The C-Tran #32 bus runs north and south along Andresen Road approximately ½ mile west of the site, with service between downtown and the Vancouver Mall Transit Center, at generally 30-minute intervals.

As with any larger residential upzone, potential issues that may arise at the site plan review phase include transportation and other service impacts. Because of the relatively large size of the property and its options for development in the interior or east portions of the site with less impacts to abutting neighbors, the absence of higher density or affordable housing components to meet citywide housing needs, and legal requirements may be an issue. A commercial component could also serve the site and surroundings, as the nearest commercial services are approximately 1/2 of a mile to the west, and the nearest undeveloped commercial land over ¼ mile to the east.

2. Zoning map change

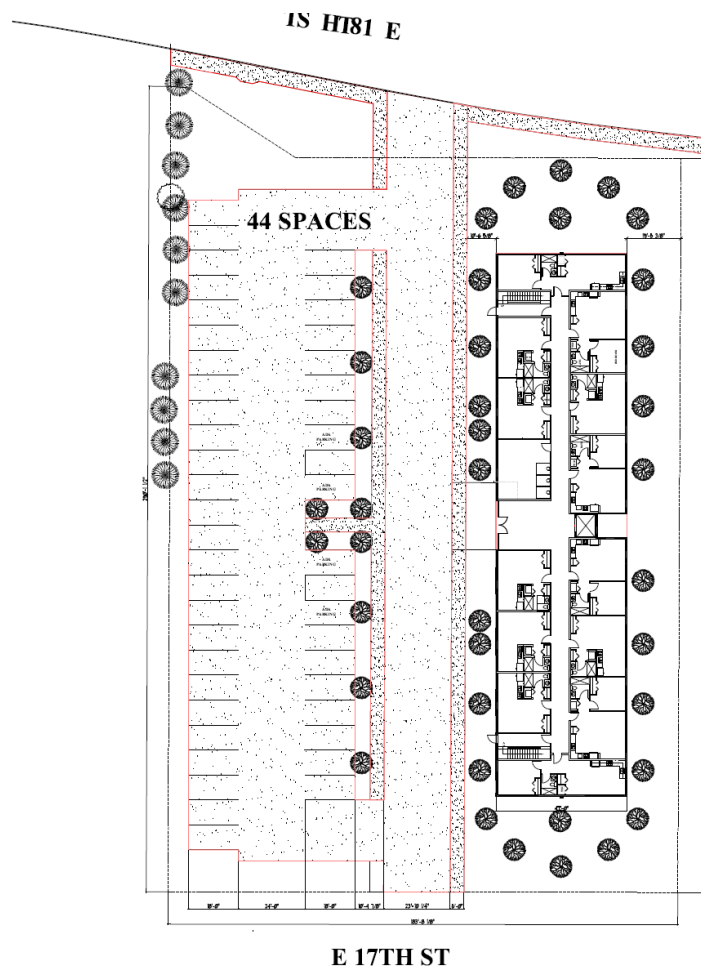
- a. Date Park – R-18 to R-30 on 1.2 acres in the Maplewood Neighborhood Association approximately 1000 feet south of Fourth Plain Boulevard



The proposal is located in an older residential area with a mix of housing types zoned R-18. North of the site across E. 18th Street at the intersection with Todd Road is a small apartment building and a single-family home. West of the rezone site is a single-family home and a duplex. South across E 17th Street is a single-family home and small apartment. East is MyPark, a narrow park owned and operated by the City of Vancouver.

The site contains two existing homes and 13 Second Chance rental units. If the rezone is approved, the application from Datepark Condominiums, Inc, proposes to replace all of the existing structures with four buildings providing 54 affordable housing units consisting of 24 studios and 30 one-bedroom units. The City of Vancouver Community Development Department is co-sponsoring the application, consistent with existing CDD policy in support of rezone applications which staff finds are consistent with rezone criteria, and facilitate housing projects where at least 40% of units will be affordable to households earning 60% or less of Area Median Income.

The applicant has provided a conceptual site plan indicating the buildings are proposed on the east end of the site adjacent to the park, with parking on the west side. Traffic and the interface with abutting residential development to the west are issues that may arise during the hearings process.



3. Comprehensive Plan and Zoning Code Text Changes

Comprehensive Plan Section	Issue/Action
1. Comprehensive Plan Capital Facilities Project list (separate document adopted by reference into Comprehensive Pan)	Add two capital parking projects to citywide capital project list, Library Square/Riverwest Parking Structure, and Downtown Parking Extension Project.
2. (New) Comprehensive Plan Chapter 5, Public Facilities and Services, Appendix E, and	- Amend Comprehensive Plan text on page 5-33 to clarify parks service areas as being within 1.5 miles of public access points - Amend Comprehensive Plan text on page 5-38, replacing outdated Table 5-15, the 2011-16 Parks Capital Facilities Plan, with new 2023-32 Capital Facilities Plan. - Amend Comprehensive Plan Appendix E, Documents adopted by reference, to include updated parks document references - Amend Vancouver Parks, Recreation & Cultural Services Comprehensive Plan (2022-2031) to update capital facilities plans, service area provisions, and other provisions
Zoning Code Section	Issue/Action
3. Zoning Code Definitions, Breezeway, VMC 20.450	Require breezeways linking structures (so that a second structure is not separate and accessory) to include a roof
4. Use Classifications. VMC 20.160	- Move bus barns from the VMC 20.160.020.D.5 category of Warehouse/Freight Movement to the VMC 20.160.020.B.14 category of Transportation Facilities - Add associated fuel storage to VMC 20.160.020.B.14 category of Transportation Facilities to clarify that fuel storage associated with transportation facilities is an allowed use. - Add description of Temporary Use
5. Measurements 20.170.070	Clarify width and depth for flag lots
6. Fees, VMC 20.180.060 37.A (2-9 lots)	Delete 'short subdivision' reference which is addressed elsewhere in the fee code
7. (New) VMC 20.210 Provisions for Type II (Administrative) applications	Remove outdated requirement that notices be through "regular" mail only, which eliminates option of notice via email, including to parties that have already commented through email.
8. Conditional Use Permits, VMC 20.245.030	Clean up submittal requirements for electronic submittals
9. Site Plan Review, VMC 20.270.040.C	Include location and dimensions of easements

10. Binding Site Plans, VMC 20.330	Fix broken links, add requirement for binding site plans to show easements with dimensions
11. Lower Density Residential Districts, VMC 20.410.050 Development	-Clarify that single family streetfront standards adopted as part of 2022 Housing Code Updates apply to land divisions submitted after the 7/27/22 ordinance adoption date -Clarify role of Planned Developments, Infill, and Clusters in maximum density calculations
12. (new) Critical Areas Protection, VMC 20.740	In response to new federal Flood Insurance Rate Maps (FIRM) going into effect in November, update local definitions, add reference to new FIRM maps, and modify the variance process for historic structures in the floodplain
13. SEPA Categorical Exemptions, VMC 20.790.200	Pursuant to recent statutory changes, exempt apartments with fewer than 200 units from requiring SEPA review unless critical lands or other factors are present to trigger review
14. Cottage Clusters, VMC 20.950	Clarify definition of density bonus and common area. Address minimum lots sizes and frontages, and allowance for pre-existing homes exceeding cluster requirements.

SE 192ND AVENUE COMPREHENSIVE PLAN AMENDMENT AND ZONE CHANGE REQUEST

2481.14946.01

June 2023

Prepared for:

Vance Development
2005 SE 192nd Avenue, Suite 200
Camas, WA 98607

Prepared by:



7200 NE 41st Street, Suite 204
Vancouver, WA 98662

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- A. Application Form
- B. Pre-Application Conference Summary
- C. SEPA Checklist
- D. Trip Generation Comparison Report
- E. Conceptual Site Plan

1.0 INTRODUCTION

General Information

Applicant:	Vance Development 2005 SE 192 nd Avenue, Suite 200 Camas, WA 98607 Contact: Gary Vance Phone: 360.365.2453 Email: Gary@VanceDevelopment.com
Prepared by:	DOWL 7200 NE 41 st Street, Suite 204 Vancouver, WA 98662 Contact: Jessica Herceg Phone: 971.280.8641 Email: jherceg@DOWL.com
Project Location	1320 SE 192 nd Avenue Vancouver, WA 98683
Parcel ID Number(s):	177224000, 177224005, 177224010, 177238000, 177239000, 177240000, 177242000, Unimproved 27-foot-wide by 445.25 feet long unimproved right-of- way
Comprehensive Plan Designation:	Urban Low-Density (UL)
Zoning:	Urban Low-Density Residential (6 DU/Acre)
Overlay(s):	None
Site Area:	Approximately 10 acres

2.0 PROJECT SUMMARY

2.1 Existing Conditions

Description of Requested Amendment

On behalf of the applicant, Vance Development, DOWL has prepared a request for a Comprehensive Plan Amendment and concurrent Zone Change (CPA/ZC) for a group of parcels located northwest of SE 192nd Avenue and SE 15th Street intersection in East Vancouver. This request includes a Comprehensive Plan Map change from Urban Low-Density (UL) to Urban High-Density (UH) and a corresponding Zone Change from Urban Low-Density Residential, R-6 (6 dwelling units (du) per acre) to Urban High-Density Residential, R-30 (30 du per acre). A Land Use Preliminary Application form has been completed and is included with this narrative as Exhibit A.

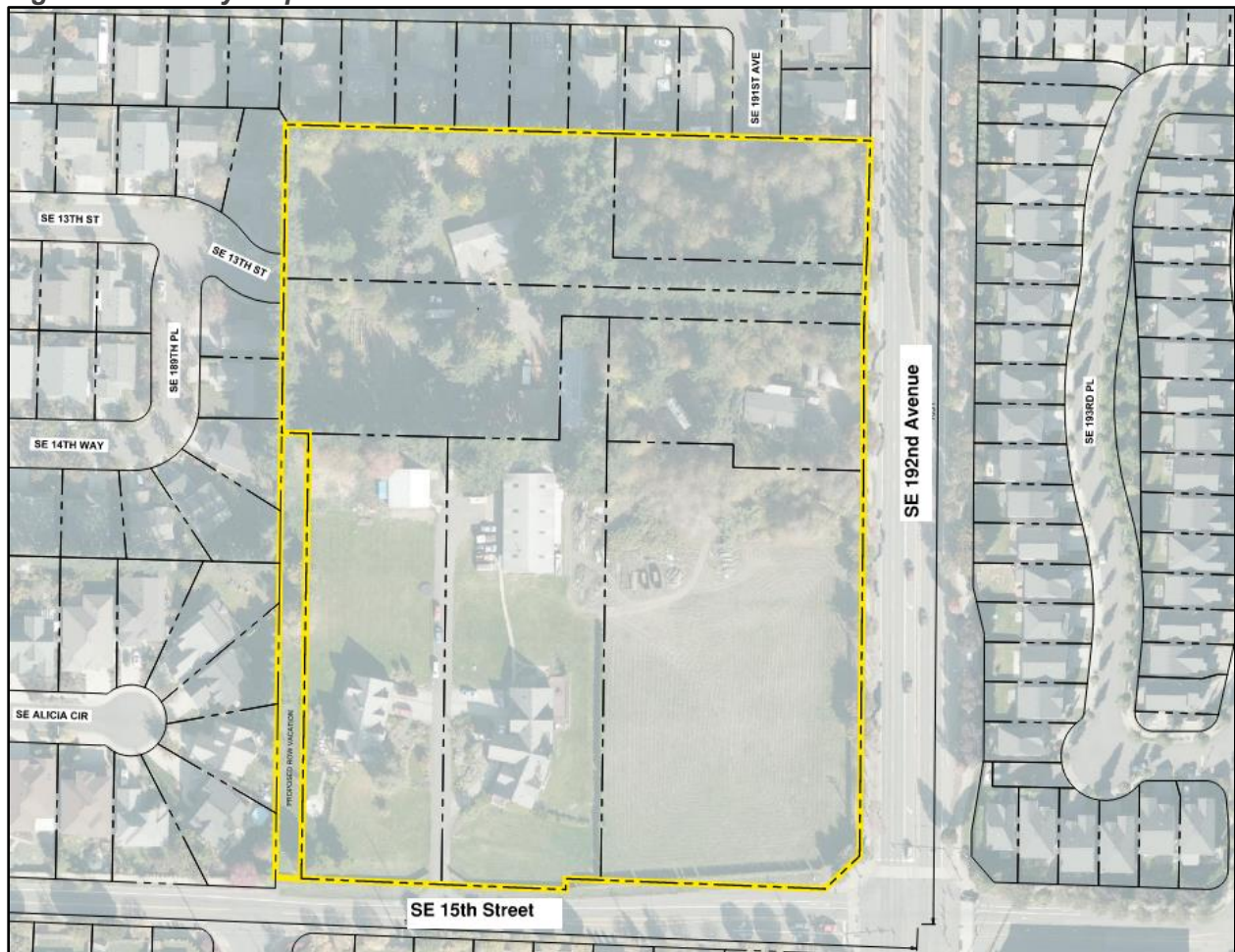
No development requests are included with this CPA/ZC application. However, a conceptual site plan is provided and discussed briefly with the CPA/ZC to provide context for the future development scenario which could follow approval of this CPA/ZC request. A Trip Generation Comparison Report (Trip Report) has been prepared by Kittelson and Associates, Inc. (KAI) to establish trip generation estimates under both the existing and proposed zoning scenarios to identify the net increase that could be experienced if the CPA/ZC is approved. The Trip Report is included as Exhibit D. As requested by city staff during the pre-application conference, the applicant has provided the comparison as an initial step in the scoping process for a full transportation impact study (TIS) which will be prepared and submitted for review prior to the first public meeting regarding the proposal.

Existing Site Conditions

The project site consists of tax lots 177224000, 177224005, 177224010, together with a 27-foot-wide by approximately 445-foot-long unimproved right-of-way (ROW), further identified as Lots 1, 2, and 3 in the Nielsen Short Plat (Book 2, Page 634), and tax lots 177240000, 177242000, 177238000, and 177239000. The property is approximately 10 acres. Portions of the project are developed with single-family houses and appurtenant structures including carports, garages, decks, well(s), and on-site sewage facilities. There are no mapped indicators of critical areas on the project site. The project site is also relatively flat, with slopes typically ranging between 0-5 percent. A summary of the site is provided in Table 1 below. The assemblage sits northwest of the intersection of SE 192nd Avenue and SE 15th Street as reflected in the Site Vicinity Map, Figure 1, below, developed from Clark County Maps Online.

Table 1: Site Summary

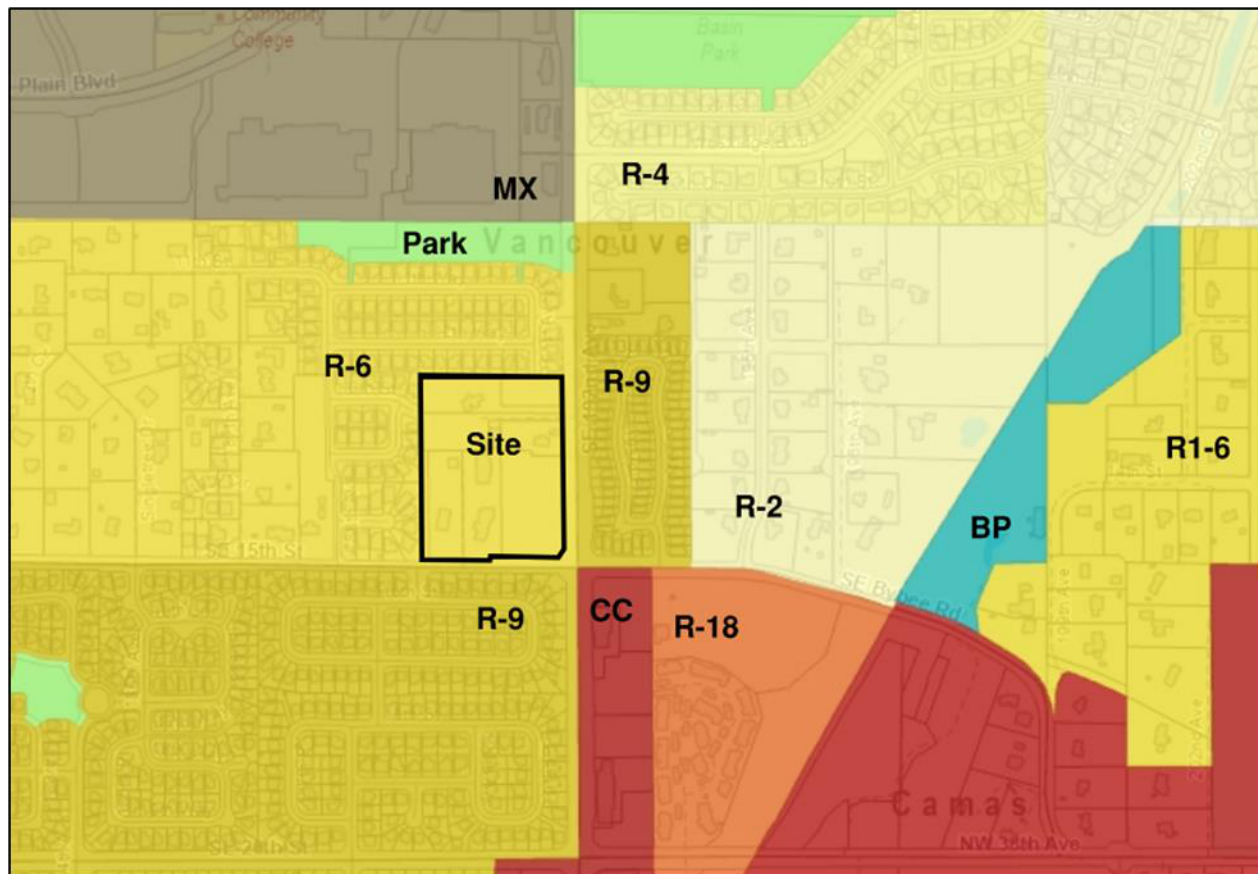
Parcel ID	Zoning	Critical Areas	Use	Acreage
177224000	R-6	No mapping indicators	Single-Family Residential	1.43
177224005	R-6	No mapping indicators	Single-Family Residential	1.74
177224010	R-6	No mapping indicators	Vacant	2.52
177240000	R-6	No mapping indicators	Single-Family Residential	0.82
177242000	R-6	No mapping indicators	Vacant	0.79
177238000	R-6	No mapping indicators	Vacant	1.21
177239000	R-6	No mapping indicators	Single-Family Residential	1.36
Unimproved ROW	R-6	No mapping indicators	Vacant	0.28
Total:				10.15

Figure 1: Vicinity Map

The site is bordered to the north and west by single-family dwellings, to the south by SE 15th Street and to the east by SE 192nd Avenue. Adjacent uses and underlying zoning of the land is identified in Table 2 below. Zoning in the vicinity of the project site is depicted on Figure 2, obtained from Clark County Maps Online.

Table 2: Adjacent Uses

	Zoning	Use
North	R-6	Single-Family Residential
South	R-9	Single-Family Residential
East	R-9	Single-Family Residential
West	R-6	Single-Family Residential

Figure 2: Zoning Map**Public Infrastructure Projects**

There are no known public infrastructure projects planned within proximity of the CPA/Rezone property on the City's current six-year Transportation Improvement Program (TIP) or Capital Improvement Program (CIP).

Development Agreement

A Development Agreement (DA) is anticipated to be developed as the CPA/ZC request is evaluated by staff. The Applicant anticipates that the DA could outline site development expectations and potentially vest trips outlined in the forthcoming Transportation Impact Study (TIS). A draft would likely be provided in advance of the first public hearing regarding the proposal.

Related Land Use Activity

A pre-application conference request for the subject CPA/ZC was submitted and processed in 2023 (PIR 83420). A copy of the pre-application conference notes issued by City staff is included with this request as Exhibit B. Additionally, the requested amendment is subject to regulation under the State Environmental Policy Act (SEPA) and as such a non-project SEPA Checklist has been prepared and is included with this request as Exhibit C.

No development requests are included with this CPA/ZC request. However, a conceptual site plan is provided with this request as Exhibit D and discussed briefly within the context of the CPA/ZC to provide an example of a potential development scenario for the site following approval of the requested change.

A review of the requested CPA/ZC and its consistency with elements of the City's Comprehensive Plan, Draft Housing Action Plan, Strategic Plan and applicable sections of the City's Municipal Code, and state law is offered within this narrative and supplemented by the exhibits included with the application packet.

3.0 REVISED CODE OF WASHINGTON (RCW)

The applicable code provisions are set forth below with responses demonstrating the project's consistency with these provisions.

Planning Goals (RCW 36.70A.020)

The following goals are adopted to guide the development and adoption of comprehensive plans and development regulations of those counties and cities that are required or choose to plan under RCW 36.70A.040. The following goals are not listed in order of priority and shall be used exclusively for the purpose of guiding the development of comprehensive plans and development regulations:

- (1) **Urban growth. Encourage development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner.**

Response: The project site is located within the Vancouver city limits in an area currently served by public facilities and services. More specifically, water, sewer, stormwater, and franchise utilities are located along the entire project frontage on SE 192nd Avenue and along portions of the project frontage on SE 15th Street. As such, the applicant anticipates that the proposed R-30 zoning designation could be accommodated by existing urban services and that laterals to provide service to the site could be identified and addressed at the time of site development in the future. A review of transportation system capacity will be completed for the requested CPA/ZC following scoping of the TIS by city staff. If deficiencies are identified during the analysis, mitigation will be proposed and reflected in the TIS.

- (2) **Reduce sprawl. Reduce the inappropriate conversion of undeveloped land into sprawling, low-density development.**

Response: The project site is underdeveloped and consists of single-family structures interspersed with vacant lots. Under the proposed CPA/ZC, land would be converted from low-density residential R-6 to the high-density residential R-30 zoning designation. The proposed conversion encourages higher density housing in an urban area within close proximity to employment opportunities, as well as personal and professional services located at the southeast corner of the intersection of SE 192nd Avenue and SE 15th Street. Additionally, public parks, schools and significant retail and employment opportunities are present within ½ mile of the site in either direction along SE 192nd Avenue, a major transportation corridor which is served by public transportation.

- (3) **Transportation. Encourage efficient multimodal transportation systems that are based on regional priorities and coordinated with county and city comprehensive plans.**

Response: As stated above, the CPA/ZC site is located in the northwest corner of the intersection of SE 192nd Avenue, a principal arterial, and SE 15th Street, a minor arterial. SE 192nd Avenue consists of two northbound and two southbound lanes a center median which is converted to a turn lane at intersections. The

roadway includes detached sidewalks and striped bike lanes on each side. SE 15th Avenue is a variable width minor arterial with one travel lane in the east and one travel lane in the west direction. The road includes striped bike lanes and detached sidewalks along the south side of the roadway adjacent to the site. The requested CPA/ZC will not impact existing multi-modal facilities present along either roadway. Frontage improvements to SE 15th Avenue, including the installation of curb, gutter, sidewalk and the continuation of bike lanes would be expected for any future development of the site whether under the existing or proposed zoning. C-Tran Route 37, referred to as the Mill Plain/Fishers Route runs along SE 192nd Avenue between Mill Plain and SE 34th Street before heading west to connect with SE 164th Avenue and the Fisher's Landing Transit Center and eventually tying back in with Mill Plain. The route continues down Mill Plain and connects with Downtown Vancouver. The proximity to public transportation as well as multi-modal facilities including sidewalks and bike lanes make the subject site an ideal location for increased density to better meet other policy goals while also supporting and eventually enhancing multi-modal facilities by constructing a missing segment of public sidewalk along SE 15th Avenue adjacent to the site.

- (4) Housing. Plan for and accommodate housing affordable to all economic segments of the population of this state, promote a variety of residential densities and housing types, and encourage preservation of existing housing stock.**

Response: The requested CPA/ZC will convert land currently zoned primarily for detached single family residential development to high-density residential which allows a much wider variety of housing types which can serve more diverse economic segments of the population. The implementation of the R-30 zone at the site will set a new density range of 22.1 units (minimum) to 30 units (maximum) and will likely result in the development of multi-family units, a product type which is not widely available in the immediate vicinity. Further, the applicant will voluntarily commit to offering 5% of units to be leased at 80% of area median income (AMI). It is likely that some or all of the existing single-family homes within the site could be removed at the time of redevelopment, however the net increase in housing inventory, and the inclusion of some units at 80% AMI that would occur with future development responds to current shortages in the market for all housing, especially middle housing and affordable housing.

- (5) Economic development. Encourage economic development throughout the state that is consistent with adopted comprehensive plans, promote economic opportunity for all citizens of this state, especially for unemployed and for disadvantaged persons, promote the retention and expansion of existing businesses and recruitment of new businesses, recognize regional differences impacting economic development opportunities, and encourage growth in areas experiencing insufficient economic growth, all within the capacities of the state's natural resources, public services, and public facilities.**

Response: The requested zone change permits the development of high-density residential uses which will add to the diversity of housing types and price points. The infusion of additional housing in the area will bring additional residents to the area and will reinforce economic vitality for existing and aspiring businesses within the immediate vicinity and in East Vancouver.

- (9) Open space and recreation. Retain open space, enhance recreational opportunities, conserve fish and wildlife habitat, increase access to natural resource lands and water, and develop parks and recreation facilities.**

Response: The project site has mature trees clustered along the northern and western property lines that contribute to the unique character and aesthetic of the project site. The requested CPA/ZC does not prohibit the retention of open space or passive recreational activity and the applicant intends to preserve mature trees located within a 20-foot-wide landscape buffer along the western and northern site boundaries. The preservation of mature trees along the west and north property boundary provides a substantial benefit to the site and the existing neighborhoods. While the buffer may not provide active recreation opportunities, it will enhance aesthetics and provide shade, both of which are of public benefit. A Conceptual Site Plan has been provided to illustrate a possible development scenario for the site assuming a development of 296 units. The plan incorporates the aforementioned buffer to illustrate the value it could provide to both existing residents adjacent to the site as well as future residents of this site following redevelopment. The Conceptual Site Plan is included with this request as Exhibit E.

- (11) Citizen participation and coordination. Encourage the involvement of citizens in the planning process and ensure coordination between communities and jurisdictions to reconcile conflicts.**

Response: The review of this proposal is anticipated to follow the procedural requirements for a Type IV legislative review, including public notice and consideration by both Planning Commission and City Council. Citizen participation and coordination are encouraged through soliciting public comments and attendance at public hearings, consistent with this planning goal. The applicant has also met with neighbors to the west of the subject site to discuss the proposal and plans to meet with neighbors north and west of the subject site prior to the first planning commission hearing.

- (12) Public facilities and services. Ensure that those public facilities and services necessary to support development shall be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.**

Response: The proposed CPA/ZC will result in an increase in density at the site, and thus higher demand on utilities than the current zoning. However, public facilities and services including water, sewer, stormwater, and franchise utilities are located along the entire project frontage on SE 192nd Avenue and along portions of the project frontage on SE 15th Street. The extension of utilities to serve development is likely and would occur at the time of site development. This, coupled with the payment of applicable impact fees and system development charges will ensure that services are adequate to serve a higher density development.

In response to feedback provided by city staff, the applicant is currently developing a TIS to evaluate the traffic impacts of the CPA/ZC. The applicant anticipates that

this TIS will evaluate level of service and that mitigation measures may be applied if necessary.

4.0 WASHINGTON ADMINISTRATIVE CODE (WAC)

4.1 Urban Density. (WAC 365-196-300)

- (2) How the urban density requirements in the act are interrelated. The act involves a consideration of density in three contexts:
- (a) **Allowed densities:** The density, expressed in dwelling units per acre, allowed under a county's or city's development regulations when considering the combined effects of all applicable development regulations.
 - (b) **Assumed densities:** The density at which future development is expected to occur as specified in the land capacity analysis or the future land use element. Assumed densities are also referred to in RCW 36.70A.110 as densities sufficient to permit the urban growth that is projected to occur.
 - (c) **Achieved density:** The density at which new development occurred in the period preceding the analysis required in either RCW 36.70A.130(3) or 36.70A.215.

Response: According to the 2022 Buildable Lands Inventory (BLI) prepared by Clark County, the City of Vancouver had an observed residential density of 18.3 dwelling units per acre, between 2016-2020, which exceeds the assumed residential density target of eight (8) dwelling units per acre (Clark County BLI, Figure 9). Housing developed in the city during the study period consisted of 24% single-family residential and 76% multi-family residential units, which exceeds the County-wide planning policy of no more than 75% of the new housing stock of a single product type.

Despite the residential density achieved in the study period outlined in the BLI, housing production in the city, and county as a whole, is not keeping up with population growth resulting in a deficit in housing supply. In a Housing Strategies Workshop presentation prepared by City staff and delivered to City Council in July of 2022, staff indicated that home production has not kept up with growth and demand for housing. It was determined that the County had a deficit of 13,500 units through 2019, and of that deficit, 5,670 units (42%) of the underproduction was within the City of Vancouver. Staff estimated that the City would need to produce at least 2,500 housing units annually in order to keep pace with population projections and eliminate the housing deficit within 10 years. Housing strategies were identified to help the city close the gap, including:

- **Land Use:** use regulatory tools to upzone land in support of more housing development at greater densities;
- **Direct Investment:** invest public funds into development of income-based housing not otherwise provided by the market;
- **Incentives:** tax and fee incentives as well as regulatory flexibility to encourage development of new additional housing and density.
- **Process:** development regulations and review processes that are clear, consistent, fair and efficient.

The presentation concluded with recommended short- and medium-term actions to address the housing supply deficit including re-evaluation of density goals and strategies and updates to single family zoning to achieve naturally affordable housing.

The applicant's request implements the identified "Land Use" strategy by utilizing an existing regulatory process (annual comprehensive plan amendment and concurrent zone change) to upzone the site from R-6, a low-density residential zone with a net density range of 4.5 to 5.8 units per acre, to R-30, a high-density residential zone with a net density range of 22.1 -30 units per acre. The CPA/ZC request better meets the current direction of staff and the City Council to address the housing shortage in an urbanized area of the city.

4.2 Land Use Element. (WAC 365-196-405)

(2) Recommendations for meeting requirements. The land use assumptions in the land use element form the basis for all growth-related planning functions in the comprehensive plan, including transportation, housing, capital facilities, and, for counties, the rural element. Preparing the land use element is an iterative process. Linking all plan elements to the land use assumptions in the land use element helps meet the act's requirement for internal consistency. The following steps are recommended in preparing the land use element:

(f) Counties and cities must obtain twenty-year population allocations for their planning area as part of a county-wide process described in WAC 365-196-305(4) and 365-196-310. Using information from the housing needs analysis, identify the amount of land suitable for development at a variety of densities consistent with the number and type of residential units likely to be needed over the planning period. At a minimum, cities must plan for the population allocated to them, but may plan for additional population within incorporated areas.

(i) Counties and cities should select land use designations and implement zoning. Select appropriate commercial, industrial, and residential densities and their distribution based on the total analysis of land features, population to be supported, implementation of regional planning strategies, and needed capital facilities.

Response: As stated previously, the 2022 BLI suggests that sufficient land capacity is available to support the forecasted population across the city through 2035, however, the BLI is applying the observed density of 18.3 dwelling units uniformly across all residential land in the city, including lands zoned for lower density which could overstate the residential land capacity based upon established zoning and related density standards.

Recent research conducted by the city indicates that there is a deficit of housing within the city and across the county. The city is developing housing strategies to not only look at opportunities to reduce the gap, but also provide for population growth through 2035, which could exceed the projections from the current Vancouver Comprehensive Plan. Actions outlined in the strategy include,

upzoning of existing residential land, revision to the Multifamily Tax Exemption (MFTE) program, code updates to remove barriers to density and more diverse housing typologies, refinement of the land use review process to increase efficiency, etc. The requested CPA/ZC will convert property zoned for detached single family residential to high density residential in an urban area with sufficient public and transportation facilities, thus presenting an opportunity for the site to develop consistent with the housing strategy.

(j) Wherever possible, counties and cities should consider urban planning approaches that promote physical activity. Urban planning approaches that promote physical activity may include:

(i) Higher intensity residential or mixed-use land use designations to support walkable and diverse urban, town and neighborhood centers.

(ii) Transit-oriented districts around public transportation transfer facilities, rail stations, or higher intensity development along a corridor served by high quality transit service.

Response: Increasing the density of the site would result in more efficient development of housing in a highly urbanized area with both employment and services. The construction of frontage improvements, including restriping of bicycle lanes and addition of sidewalks along SE 15th Street at the time of site development will connect with existing facilities on SE 192nd Avenue and will promote walkability to adjacent commercial and institutional uses in the vicinity and in particular along the SE 192nd Avenue corridor. Additionally, C-TRAN Route 37 runs north/south on SE 192nd Avenue and loops from Mill Plain to the Fisher's Landing Transit Center on SE 164th Avenue and from there, direct, and convenient access to Portland. Other significant transit facilities served by the relevant C-TRAN line include Clark College, the Vancouver Clinic, and shopping centers. The proximity of high-density residential to these significant transportation and urban service centers will reinforce economic vitality in the area.

4.3 Housing Element. (WAC 365-196-410)

(2) Recommendations for meeting requirements. The housing element shows how a county or city will accommodate anticipated growth, provide a variety of housing types at a variety of densities, provide opportunities for affordable housing for all economic segments of the community, and ensure the vitality of established residential neighborhoods. The following components should appear in the housing element:

(a) Housing goals and policies.

(iii) Housing goals and policies should address at least the following:

(A) Affordable housing;

(B) Preservation of neighborhood character; and

(C) Provision of a variety of housing types along with a variety of densities.

Response: The property is currently zoned low-density residential (R-6) which permits a maximum net density of 5.8 dwelling units per acre and a minimum net density of

4.5 dwelling units per acre in accordance with VMC Table 20.410.040-1. Housing on site and in the vicinity is predominately single family and thus are not attainable to persons at all income levels. The applicant requests a CPA/ZC to upzone the site to R-30, high-density residential, which has a minimum of 22.1 and a maximum of 30 dwelling units per net acre. The R-30 zone permits a variety of housing types, including townhouses and apartments which customarily have lower rents than single family homes.

If approved, the site could provide an opportunity to infuse the market with up to 296 dwelling units, a net increase of 239 units over the existing zone. It will also likely result in development of apartments, a housing type that is not widely available in this area. Market rate units will likely have a lower monthly rental rate compared to single family detached units in the area thus offering up more options to a wider range of income levels. Finally, the applicant will commit to leaving 5% of the future housing units at 80% of AMI. The forthcoming development agreement will outline the applicant's affordable housing commitments.

4.4 Transportation Element (WAC 365-196-430)

(1) Requirements. Each comprehensive plan shall include a transportation element that implements, and is consistent with, the land use element. The transportation element shall contain at least the following sub elements:

- (a) Land use assumptions used in estimating travel;**
- (b) Estimated traffic impacts to state-owned transportation facilities resulting from land use assumptions to assist the department of transportation in monitoring the performance of state facilities, to plan improvements for the facilities, and to assess the impact of land-use decisions on state-owned transportation facilities;**
- (g) Pedestrian and bicycle component to include collaborative efforts to identify and designate planned improvements for pedestrian and bicycle facilities and corridors that address and encourage enhanced community access and promote healthy lifestyles;**

Response: Preliminary communications with the City indicate that a full TIS will be required in order to compare generated trips under the existing and proposed zoning designations as well as the anticipated distribution of traffic and impacts on nearby intersections. A Trip Generation Comparison Report is included with this narrative as Exhibit D to aid the City in scoping the TIS.

In advance of the TIS, the Trip Generation Comparison Report (Exhibit D) concludes that the difference between existing and proposed zoning is an additional 1,457 weekday daily trips, including an additional 70 weekday AM peak hour trips, and 89 weekday PM peak hour trips. A TIA is being prepared and will be submitted in July to be reviewed concurrently with the CPA/ZC request.

As previously discussed, C-TRAN Route 37 runs north/south on SE 192nd Avenue and loops from Mill Plain to the Fisher's Landing Transit Center on SE 164th Avenue and from there, direct, and convenient access to Portland. Other

significant transit facilities served by the relevant C-TRAN line include Clark College, the Vancouver Clinic, and shopping centers.

This proposal does not include a request for development. However, at the time of development, frontage improvements will occur consistent with the design standards for Principal Arterials (SE 192nd Avenue) and Collector Arterials (SE 15th Street), which include sidewalks and bicycle lanes consistent with this element.

5.0 VANCOUVER COMPREHENSIVE PLAN

5.1 Community Development (Chapter 1)

Community Development Policies

The City of Vancouver adopts the following policies to guide land use and development in the city over the next 20 years. These policies are consistent with and implement Policy Sections 1.0, 2.0, and 12.0 of the Community Framework Plan, adopted by Clark County and local jurisdictions, and planning policies 36.70.A.020(1), (2) and (13) of the Washington Growth Management Act (see Appendix A).

CD-1 Citywide land supplies.

Establish land supplies and density allowances that are sufficient to accommodate adopted long-term City of Vancouver population and employment forecast allocations.

Response: The Vancouver Comprehensive Plan projects that the city's population will reach 202,300 persons and have an estimated 139,200 jobs by 2030. However, the April 1, 2022, Population of Cities, Towns and Counties annual report issued by the Office of Financial Management reported that the population estimate for the City of Vancouver reached 197,600 people in 2022. The rapid population growth coupled with underproduction of housing in the area has led to a housing deficit of approximately 5,670 units at the end of 2019 as reported by City staff during the Housing Strategies Workshop in July of 2022. The requested CPA/ZC will establish a significantly higher minimum and maximum density on the subject property which can provide some relief for the housing shortage in the short term as the city looks to update their Comprehensive Plan and incorporate housing strategies to comply with state law and to address housing insecurities in the city.

CD-2 Efficient development patterns.

Encourage efficient development throughout Vancouver to ensure achievement of average density of 8 units per acre set by countywide planning policies. Encourage higher density and more intense development in areas that are more extensively served by facilities, particularly transportation and transit services.

Response: As discussed, the property is currently zoned low-density residential (R-6) which permits a maximum density of 5.8 dwelling units per net acre and a minimum of

4.5 dwelling units per net acre as stated in VMC Table 20.410.040-1. The requested CPA/ZC will convert the site to high-density residential use and establish a minimum of 22.1 and a maximum density of 30 units per net acre in accordance with VMC Table 20.429.040-1. Higher density residential use within the site will introduce greater variety in housing density and types within an established area of the city with urban services, including a C-Tran bus route which serves the Fisher's Landing Transit Facility and downtown Vancouver.

As discussed, adequate public utilities and transportation facilities exist on the project site or can be extended to serve future development. Additionally, higher density development will result in additional payment of applicable impact fees and system development charge, both of which will ensure that development pays for the necessary capital improvements outlined in the adopted facility plans.

CD-3 Infill and redevelopment.

Where compatible with surrounding uses, efficiently use urban land by facilitating infill of undeveloped properties, and redevelopment of underutilized and developed properties. Allow for conversion of single to multi-family housing where designed to be compatible with surrounding uses.

Response: The retention of the existing low-density residential zoning designation will result in the site remaining underdeveloped in an area with a surplus of single-family homes. The proposed CPA/ZC will permit high-density development in an urban area and lead to desired infill development, consistent with the desired effect of this policy.

CD-6 Neighborhood livability.

Maintain and facilitate development of stable, multi-use neighborhoods that contain a compatible mix of housing, jobs, stores, and open and public spaces in a well-planned, safe pedestrian environment.

Response: Existing neighborhood primarily consists of single-family homes with little variability in housing types and homogenous development patterns. Businesses are located along the SE 192nd Avenue corridor to the north and south of the site. The requested CPA/ZC offers a transition between the adjacent low-density residential (R-6) to the north and west and the major arterial roadways located south and east of the site. Within the context of the immediate area, the requested CPA/ZC would permit development of multi-family housing in a neighborhood that currently lacks multi-family housing options and within proximity of developed commercial development centers with stores, restaurants and other personal and professional services, public and higher education facilities and various public parks and recreational facilities which are connected by pedestrian sidewalks and bicycle paths along SE 192nd Avenue and served by C-Tran Route #37.

CD-9 Compatible uses.

Facilitate development that minimizes adverse impacts to adjacent areas, particularly neighborhoods.

Response: Zoning designations adjacent to the project site consist of R-6 to the north and west and R-9 located across public roads to the south and east. The requested CPA/ZC would permit a higher density than those adjacent uses. In an effort to ensure compatibility with adjacent uses and to minimize any impact, the applicant is proposing to implement the following design requirements:

- Buildings adjacent to the west property line will be setback at least 50 feet from the property line and will be limited to three stories;
- Buildings adjacent to the north property line will be setback at least 45 feet from the property line and will be limited to three stories;
- Any four-story building will be setback at least 120 feet from the north and west property line;
- A 20-foot-wide landscape buffer will be provided along the north and west property lines and will consist of existing mature trees to the extent practical.

The applicant will proceed with the submittal of a development agreement that will formalize its commitment to these compatibility-related design standards.

The request is for a CPA/ZC, and therefore a formal development plan has not yet been developed. However, a conceptual plan has been included with this application to illustrate a possible development scenario under the proposed CPA/AC. The Conceptual Site Plan, included as Exhibit E implements the setbacks, building height and buffer standards detailed within this section and demonstrates how thoughtful site planning can produce a high-density residential development that is compatible with adjacent low density residential.

CD-10 Complementary uses.

Locate complementary land uses near one another to maximize opportunities for people to work or shop nearer to where they live.

Response: As discussed, the requested CPA/ZC would permit multi-family housing in an area currently lacking housing variety. The addition of multi-family housing offers more diversity in housing options to broader economic segments of the population in an urbanized area with adjacent commercial and institutional uses, connected by public sidewalks, bicycle lanes and a public transit line.

5.2 Housing (Chapter 3)

Housing Policies

The City of Vancouver adopts the following policies to ensure an adequate supply of housing for all economic segments of the community. These policies are consistent with and implement Policy Section 2.0 of the Community Framework Plan, adopted by Clark County and local jurisdictions, and planning policy 36.70.A.020(4) of the Washington Growth Management Act (see Appendix A).

H-1 Housing options. Provide for a range of housing types and densities for all economic segments of the population. Encourage equal and fair access to housing for renters and homeowners.

H-4 Innovative zoning. Encourage innovative housing policies that provide for affordable housing and maintain neighborhood character.

Response: The subject property is located at the intersection of two major roadways within the city, SE 192nd Avenue (Major Arterial) and SE 15th Street (Minor Arterial) with existing residential development primarily consisting of single family detached homes. Major retail, business and service centers are located along the SE 192nd Avenue to serve east Vancouver residents. Development of the site following approval of the requested CPA/ZC will result in a significantly higher yield of housing units, will introduce a housing type not broadly available in the immediate area and will provide a combination of market rate rental units and affordable rental units (80% of AMI) which will serve broader economic segments of the population and will help address an immediate housing need identified by the city.

H-5 Housing placement near services and centers. Facilitate siting of higher density housing near public transportation facilities and in designated centers and corridors.

Response: The requested CPA/ZC will result in higher density housing in an area with adequate public transportation facilities including SE 192nd Avenue, which is improved with sidewalks, bicycle lanes and is served by public transportation. Further, at the time of redevelopment, it is anticipated that frontage improvements would be completed along SE 15th Street, including the installation of sidewalks and restriping of bicycle lanes currently present within the road. Consistent with the Transportation System Plan, the subject site is located within the “Special Transit Service Area”, a designated center, thereby consistent with these policies.

5.3 Public Facilities and Services (Chapter 5)

Transportation

The Vancouver Transportation Plan Vision establishes the framework for improving the city’s transportation system and is supplemented by the updated Transportation Analysis (2011) and regionally coordinated with the MTP and Clark County Transportation Resource Document (2002). The Transportation Analysis (2011) and reference plans provide extensive information about the transportation system conditions, forecast travel demands and patterns, and corresponding transportation system improvement needs.

PFS-1 Service availability. Consider water, sewer, police, transportation, fire, schools, storm water management, and parks as necessary facilities and services. Ensure that facilities are sufficient to support planned development.

PFS-2 Service standards. Establish service standards or planning assumptions for estimating needed public facilities, based on service capabilities, local land use designations and nationally recognized standards. Use LOS standards to encourage growth in designated centers and corridors

PFS-4 Transportation system. Develop and maintain an interconnected and overlapping transportation system grid of pedestrian walkways, bicycle facilities, roadways for automobiles and freight, transit and high-capacity transit service. Include support programs such as traffic operations, transportation demand management, neighborhood traffic management, and the regional trails program. Work towards

completing and sustaining individual components and programs to ensure success of the entire system.

Response: A Trip Generation Comparison Report is included with this request as Exhibit D and discusses trips under existing and proposed zoning designations. Forecasted travel demands and patterns and corresponding transportation system improvement needs, and if appropriate, mitigation measures will be outlined in a pending full TIS consistent with the above referenced policies.

This proposal does not include a request for development. However, at the time of development, frontage improvements will occur consistent with the design standards for Principal Arterials (SE 192nd Avenue) and Collector Arterials (SE 15th Street) adopted by the City. The completion of frontage improvements advances the policies of the Comprehensive Plan by completing a missing segment of the public sidewalk along the roadway and improving the roadway to meet standards.

6.0 VANCOUVER STRATEGIC PLAN

6.1 Goal 1

Ensure our built urban environment is one of the safest, most environmentally responsible and well maintained in the Pacific Northwest.

Objective 1.1

Develop and maintain a safe, balanced and innovative transportation system that will meet the needs of future generations.

Response: As specified earlier in this response, the applicant has provided a Trip Generation Comparison Report that outlines the change in vehicular trips anticipated under the proposed R-30 zoning designation compared to the current R-6 zone. A TIS will be prepared in support of this request that addresses the applicant's proposed CPA/ZC and consistency with the City's TSP.

This proposal does not include a request for development. However, at the time of development, frontage improvements will occur consistent with the design standards for Principal Arterials (SE 192nd Avenue) and Collector Arterials (SE 15th Street), thus presenting an opportunity for the site to develop consistent with these policies.

6.2 Goal 6

Facilitate the creation of neighborhoods where residents can walk or bike to essential amenities and services — “20-minute neighborhoods”.

Objective 6.1

Support a strong, active neighborhood program that enhances livability and community connections.

Response: The proposed R-30 zoning designation will permit high-density residential development, create diversity of housing options within a largely homogenous housing area, and will be immediately adjacent to commercial and employment

uses. The prevalence of high-density residential in an urban environment well served with public community services is consistent with the intent of this policy.

7.0 VANCOUVER MUNICIPAL CODE

7.1 Text and Map Amendments (Chapter 20.285)

7.1.1 Applicability (20.285.020)

A. Types of proposals. The following types of proposals are reviewed under this chapter:

1. Map amendments to the comprehensive plan or to VMC Title 20 zoning designations applying to one or more properties.
2. Development agreements that are included with property specific comprehensive plan or zoning map changes being reviewed under this chapter.

Response: This request is for a Comprehensive Plan Amendment from Urban Low-Density (UL) to Urban High-Density (UH) and a corresponding Zone Change from Urban Low-Density Residential, R-6 (6 DU/Acre) to Urban High-Density Residential, R-30 (30 DU/Acre).

In an effort to ensure compatibility with adjacent uses and to minimize any impact, the applicant is proposing to implement the following design requirements:

- Buildings adjacent to the west property line will be setback at least 50 feet from the property line and will be limited to three stories;
- Buildings adjacent to the north property line will be setback at least 45 feet from the property line and will be limited to three stories;
- Any four-story building will be setback at least 120 feet from the north and west property line;
- A 20-foot-wide landscape buffer will be provided along the north and west property lines and will consist of existing mature trees to the extent practical.

In an effort to ensure compatibility with adjacent uses and to minimize any impact, the applicant is proposing to implement certain site design requirements to achieve compatibility with adjacent uses and is also interested in vesting transportation trips following review and acceptance of the forthcoming TIS. As such, the applicant anticipates submittal of a Development Agreement (DA). The applicant anticipates the DA will be submitted and reviewed concurrently with the CPA/ZC request. A draft is anticipated in advance of the first Planning Commission Workshop.

7.1.2 Initiation (20.285.030)

A. Proposals reviewed under this chapter may be initiated by property owners or their representatives, the city of Vancouver, or private citizens or groups as follows:

- 1. Map Changes.** Property owners or any individual, group or organization may initiate comprehensive plan and associated zoning map designation changes applying to one or more properties, through submittal of an annual review application and associated fees specified in Chapter 20.180 VMC. Standalone zoning changes not requiring a comprehensive plan change shall be subject to zone change application and associated fees per Chapter 20.180 VMC

Response: A CPA/ZC is submitted by DOWL on behalf of the client for review by the City, consistent with this provision.

7.1.3 Review Process (20.285.040)

B. Pre-Application. Comprehensive plan or zoning map amendments proposed by private parties shall require a pre-application conference. The conference shall be scheduled upon receipt of a complete Map Amendment Pre-application Form. Based on the information provided, the pre-application conference is intended to provide for a discussion of major issues and concerns and possible staff recommendation. Staff will provide a written summary within 14 days following the conference. Pre-application conferences are nonbinding, and do not vest the development rights of the proposals involved. Pre-application conferences shall not be required for city-initiated map amendments, or text amendments initiated by any party.

Response: A Pre-application Conference for this CPA/ZC was submitted and processed in 2023 (PIR 83420). A copy of the final comments issued by City staff are included with this request as Exhibit B.

7.1.4 Approval Criteria – Comprehensive Plan and Concurrent Zoning Map Amendments (20.285.050)

A. Overall proposed map amendments reviewed under this chapter shall be approved only if demonstrated by the proponent to be in the public interest, as based on a review of all applicable principals from the following:

- 1. How the proposal is more consistent than the existing designation with applicable policies of the Vancouver strategic plan and comprehensive plan.**

Response: The proposed R-30 zoning designation permits high-density residential use in an urban environment lacking variety in housing, both in terms of affordability and type. The addition of housing units in the area is consistent with recent studies which reflect a significant housing deficit across Clark County and within the City of Vancouver. Development of the site following approval of the requested CPA/ZC will result in a higher yield of housing units, will introduce a housing type

not broadly available in the immediate area and will provide a combination of market rate rental units and affordable rental units (80% of AMI) which serve broader economic segments of the population. Further, the request is consistent with actions outlined in the city's Housing Strategies presentation before the City Council in July of 2022 which included upzoning land to increase density.

As detailed in prior sections of this narrative, the request is consistent with Community Development, Housing and Public Facilities elements of the Comprehensive Plan in that it facilitates dense residential development in an urban area with adequate public services, including utilities, and is adjacent to employment and personal services such as grocery, restaurant and leisure. Redevelopment of the site is expected to include the completion of frontage improvements which will improve multi-modal connectivity in the neighborhood. Further, a TIS is also being completed to evaluate project impacts on the transportation system and verify level of service is or can be maintained. Finally, the incorporation of specific site development compatibility considerations will facilitate integration with the existing neighborhood.

Similarly, the request is consistent with both neighborhood development and transportation goals outlined within the Vancouver Strategic Plan in that it seeks to site dense residential development within an existing urban area interconnected with roads, sidewalks, bicycle lanes and public transportation routes. Further, the proximity to personal and professional services as well as employment and educational opportunities along the SE 192nd Avenue corridor reinforces connectivity within the existing neighborhood.

2. How the proposal is more consistent than the existing designation with each of the following objectives as applicable:

- a. Encourage more intensive development to locate in major urban centers and corridors, particularly downtown Vancouver. Encourage development of distinct neighborhoods served by commercial nodes, and discourage urban sprawl and strip commercial development;**

Response:

The project site is located in an urban area adjacent to developed neighborhoods, and the SE 192nd Avenue corridor which has significant retail, commercial, employment, education and public uses. Under the proposed CPA/ZC, the land would be converted from low-density residential R-6 (UL) to high-density residential R-30 (UH). The proposed conversion encourages higher density in the immediate area, in close proximity to areas of employment (commercial zoning to the southeast and mixed-use institutional zoning farther north and south) with adequate urban services. It also supports new housing strategies which are in development by the city to address a significant deficit in housing inventory within the city.

- b. Provide development of uses which are functionally integrated with surrounding areas and neighborhoods in terms of local shopping, employment, recreational or other opportunities;**

Response: The retention of the existing low-density residential zoning designation will result in the site remaining underdeveloped in an area with a surplus of single-family homes. The requested zone change permits the development of high-density residential uses which will add to the diversity of both housing variety and associated rental costs. The site is located at the intersection of SE 192nd Avenue and SE 15th Street and is within close proximity to retail, services, and employment, including the commercial development at SE Mill Plain Boulevard and SE 192nd Avenue. The area also includes a variety of educational facilities including Columbia Valley Elementary School, Illahee Elementary School and Shahala Middle School and Union High School as well as the Columbia Tech Center Campus of Clark College, all within 1.5 miles of the site. Public recreational areas including Fisher Basin Community Park, Hannah Acres Park and Columbia Tech Center Park are also within approximately 1 mile of the site. The area is also served by a multi-modal transportation network consisting of sidewalks, bicycle lanes and public transit which connect with many of the service, education and recreational amenities outlined above.

c. Provide development which is compatible and integrated with surrounding uses in terms of scale, orientation, pedestrian enhancements, and landscaping;

Response: The greatest difference in terms of development scale between the existing and proposed zoning designations is likely the maximum building height. Whereas the existing R-6 zone allows buildings of up to 35 feet in height, the proposed R-30 zone allows buildings of up to 50 feet in height. Site design considerations can be implemented to reduce the affect the change in building height could have on adjacent uses. A Conceptual Site Plan is included with this request as Exhibit E. The plan reflects a 296-unit multi-family residential development. All multi-family buildings adjacent the property boundary lines will be three stories in height, transitioning from the maximum building height in low-density residential zoning designations (35 feet maximum) to a four-story structure. The applicant anticipates a four-story building could be situated towards the center of the site, but not closer than 120 feet from the west or north property line. This self-imposed setback will help ensure compatibility with surrounding uses and reduce visual impacts of the larger structures which will have a maximum height of 50 feet in compliance with R-30 standards. Maintaining consistency with the adjacent neighborhoods and commercial buildings diagonal from the project site will be achieved through a combination of orientation and siting requirements and screening by the mature tree canopy along the northern and western property boundaries. As stated previously, the applicant is prepared to enter into a development agreement to memorialize design standards which restrict building heights and setbacks relative to the east and north property lines to achieve compatibility and integrate with the existing neighborhood.

d. Conserve or enhance significant natural or historical features;

Response: There are no mapped indicators on or immediately adjacent the project site to suggest the presence of significant natural or historical features. While not identified as a significant natural feature, the applicant intends to preserve the mature tree canopy along the northern and western property boundaries. The

mature trees will serve as a natural buffer between the adjacent R-6 zoning designation and the proposed R-30 zoning designation, while providing privacy and visual enhancement of the site.

e. Provide adequate provision of transportation, water, sewer, and other public services;

Response: The project site is located in an area with existing public facilities, including road, water, sewer, and other public services. Additionally, a TIS will be prepared and submitted in support of this request that demonstrates the proposed R-30 zoning designation is compatible with transportation facilities, consistent with the intent of this provision.

f. Provide significant family wage employment opportunities and broadening of the Vancouver economy;

Response: Development of the project will create permanent property management/leasing and maintenance jobs, as well as temporary design, engineering, and construction jobs for the community. No commercial or industrial uses are proposed with this project.

g. Provide for the formation and enhancement of neighborhoods and communities; and

Response: The requested zone change permits the development of high-density residential uses which will add to the diversity of both housing variety and a broader range of economic groups. The increased density in the area will further support existing and new businesses in the area thus strengthening the neighborhood. The resulting development permitted under the proposed zoning designation would reduce sprawl and develop the site to its best use. The applicant also anticipates the project site will provide new pedestrian amenities that enhance walkability along public roadways and between adjacent neighborhoods.

h. Provide affordable or below-market-rate housing opportunities.

Response: The implementation of the R-30 zone at the site will set a new density range of 22.1 units (minimum) to 30 units (maximum) and will likely result in the development of multi-family units, a product type which is not widely available in the immediate vicinity and is more affordable to broader economic groups. Additionally, the applicant will voluntarily commit to offering 5% of units to be leased at 80% of AMI through the forthcoming DA.

8.0 CONCLUSION

As evidenced through this narrative and associated documents, the applicant's CPA/ZC is consistent with long-range policies and regulations governing the allowance of these requests. Furthermore, the increase in housing yield and density is consistent with recent studies and policy discussions led by the City related to housing availability, diversity and affordability and directly implements an identified strategy to upzone land to encourage housing development. It is for

these reasons and others outlined within this narrative that the applicant respectfully requests the City of Vancouver's approval of this application.

Memorandum

July 27, 2023

Project# 29273

To: Eric Hahn, PE – City of Vancouver
Cc: Gary Vance – Vance Development LLC
From: Kristine Connolly, PE, Megan Mannion, & Ana Silva
Project: SE 192nd Avenue CPA and Zone Change
Subject: Transportation Impact Analysis (Proposed CPA and Zone Change)



This transportation impact analysis documents the traffic impacts of the proposed Comprehensive Plan Amendment (CPA) and Zone Change request (from existing R-6 zoning to R-30 zoning) for the 9.85 acres of land on the northwest corner of SE 15th Street and SE 192nd Avenue in Vancouver. With approval of the proposed CPA and Zone Change request, site development is expected to commence in 2027. Further traffic analysis and concurrency review of a specific site development plan will be provided under separate cover at a later date as part of a site land use application assuming approval of the CPA and Zone Change request.

A summary of the findings and recommendations of the CPA and Zone Change traffic analysis is provided below. The methodology of our analysis, pertinent findings, and our recommendations are documented herein.

Findings

- All of the study intersections were found to operate acceptably under opening year (2027) and five-year horizon (2032) traffic conditions with reasonable worst-case development of the site under both the existing (R-6) and proposed (R-30) zoning.
- The eastbound left-turn queues at SE 192nd Avenue / SE 15th Street are anticipated to exceed the currently available storage length under future five-year 2032 background (existing zoning) and total (proposed zoning) traffic conditions during the AM and PM peak hours assuming reasonable worst-case development of the site under both the existing (R-6) and proposed (R-30) zoning.
 - Subject to City of Vancouver direction and the specific traffic impacts of potential future site development, the eastbound left-turn lane at SE 192nd Avenue / SE 15th Street may need to be extended to provide up to 175 feet of storage based on the projections in this study.
 - The actual turn lane storage length needs will depend in part on the density of site development that is proposed in the future and can be best assessed at the time of site plan application as required by the Vancouver Municipal Code (VMC, Reference 1).
- No safety-based mitigation needs were identified based on review of historic crash data at the study intersections.
- Washington State Department of Transportation (WSDOT) volume-based criteria for providing turn lanes at the anticipated site driveways on SE 192nd Avenue and SE 15th Street are not met under either weekday AM or PM peak hour traffic conditions. Southbound volumes on SE 192nd Avenue do meet the criteria for considering a right-turn pocket or taper; however, installation of tapers is not recommended given the presence of the bicycle lane and intersection sight distance considerations. Potential turn lane needs at the site access driveways can be revisited at the time of a future site development application.

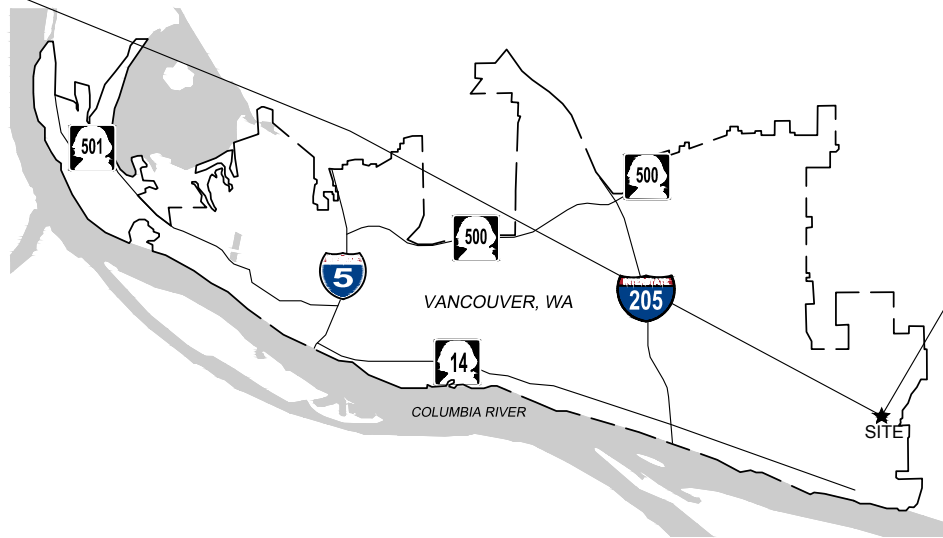
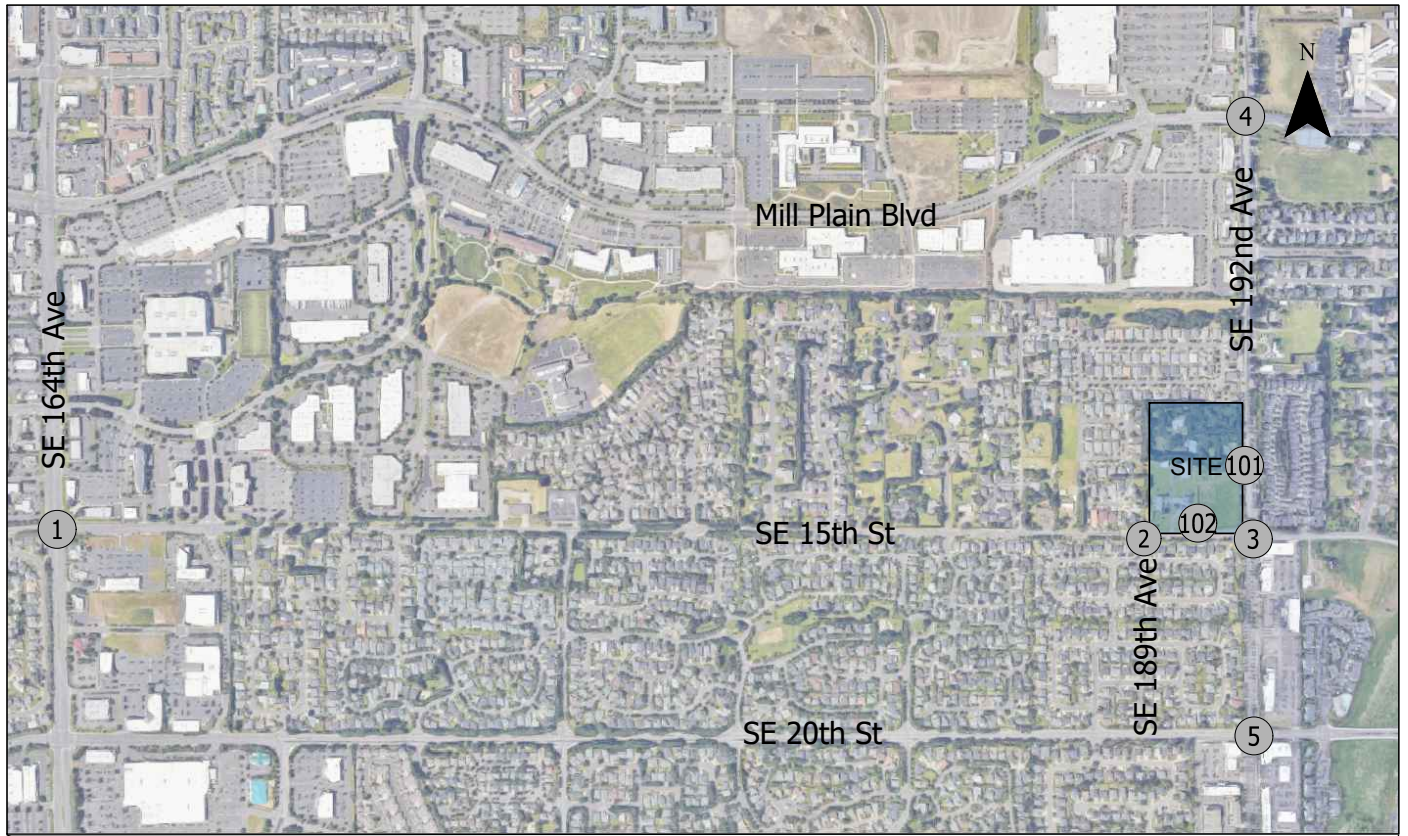
Recommendations

- Subject to City of Vancouver direction and per standard City development review practice, future site development applications for the study site (as well as other development in the area) should continue to assess the need for additional eastbound left-turn lane queue storage on SE 15th Street at SE 192nd Avenue. The City of Vancouver can monitor turn lane storage length needs through the City's development review process and require an extension of the turn lane in conjunction with a future site plan application based on the documented turn lane storage needs at the time of site plan application in accordance with the VMC.

INTRODUCTION

Vance Development LLC is proposing a CPA and Zone Change request for the 9.85 acres of land on the northwest corner of SE 15th Street and SE 192nd Avenue from its existing R-6 zoning designation to R-30. Access to homes within the new subdivision is assumed to be provide via SE 192nd Avenue and SE 15th Street. Figure 1 shows the site vicinity map and Figure 2 shows a preliminary concept site development plan for CPA and Zone Change assessment purposes. A specific site development plan will be provided under separate cover at a later date as part of a site land use application assuming approval of the CPA and Zone Change request.

H:\20\20273 - SE 192nd Avenue CPA_Zone Change\report\figs\20273 - SE 192nd Avenue - Figures.dwg Jul 18, 2023 - 6:35pm - mmannion Layout Tab: Site Vicinity Map

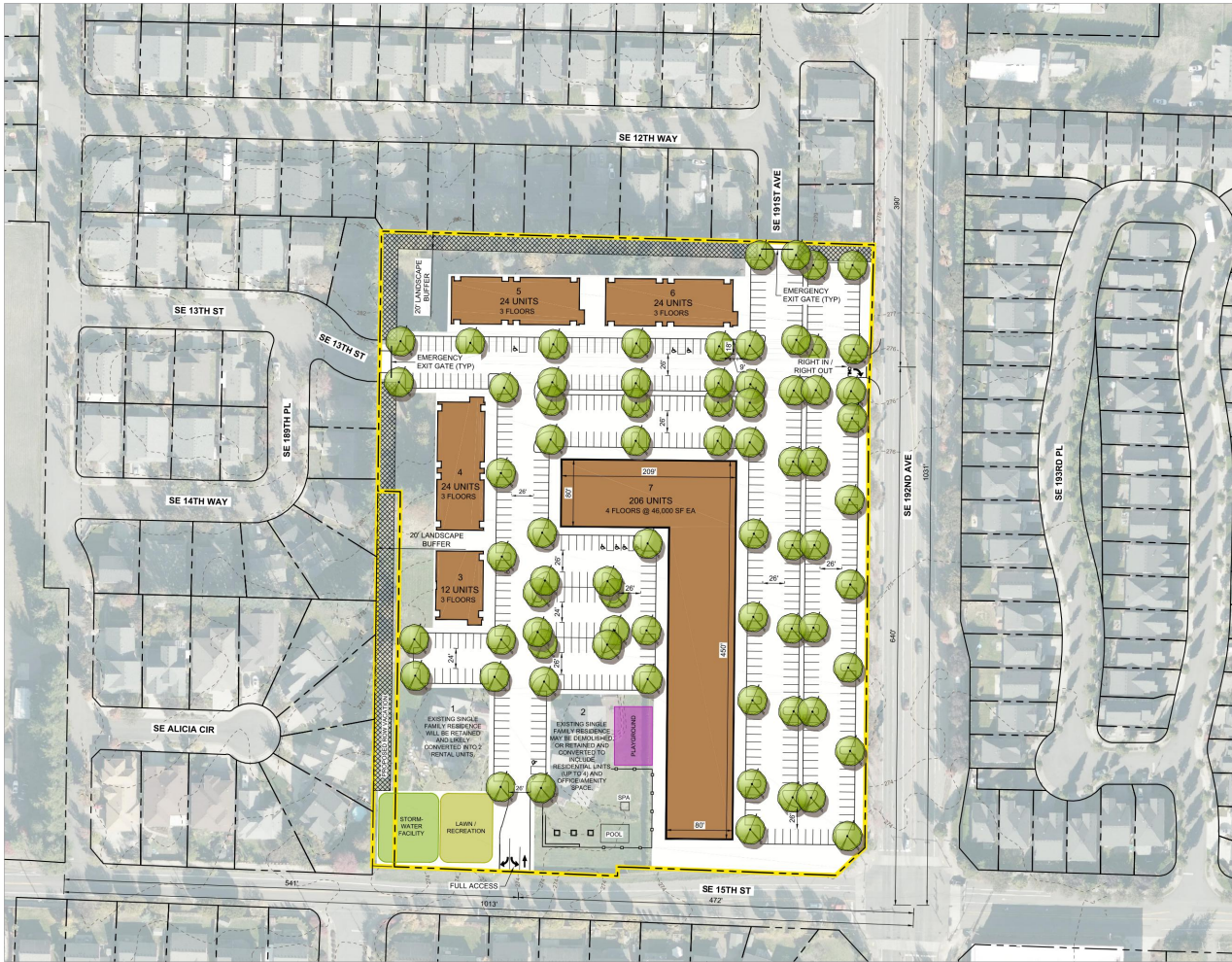


- STUDY INTERSECTION

Site Vicinity Map
Vancouver, WA

Figure
1

H:\2022\2023 - SE 192nd Avenue CPA_Zone Change\report\figs\29273 - SE 192nd Avenue - Figures.dwg Jul 26, 2023 - 1:37pm - asilva Layout 'Tab: Proposed Site Plan



Conceptual Development Plan Information

Gross Area:	= 9.85 ac
Street Vacation	= 0.27 ac
Total Gross Area	= 10.12 ac*

Development Standards: Vancouver, Washington

Existing Zoning Base:	R-6
Proposed Re-Zoning:	R-30 (Chapter 20.420.040)
Net Density - Min & Max	= 22.1 - 30 units / ac
Lot Size - Min	= 1,500 sf
Lot Coverage - Max	= 55%
Front Yard Setback - Min	= 10'
Rear & Through Lot Yard - Min	= 0' / 5'
Side Yard Setback - Min	= 0' / 5'
Street Side Yard Setback - Min	= 10'
Landscaping - Min	= 10% net area

Proposed Development:

Existing SF Building Conversion	= 6 units
Apartment	= 290 units
Total Units	= 296 units or 29.25 units / gross area*

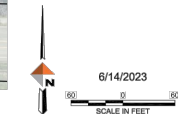
Total Proposed Parking (9' X 18' typ)	= 511 spaces (10 ADA)
	= (1.73 spaces / unit)

Notes:

1. Map information based on GIS data obtained from Clark County and Microsoft Bing. Survey data was not used for this plan and area calculations are approximate. DOWL has not verified accuracy of this information.
- * Concept plan does not reflect potential ROW dedication along SE 192nd Avenue or SE 15th Street.

Legend

	Project Boundary
	Property Lines
	20' Landscape Buffer



SE 192nd Avenue Comprehensive Plan Amendment and Zone Change

Conceptual Site Plan

Vancouver, Wa

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Preliminary Concept Site Plan
Vancouver, WA

Figure
2

SCOPE OF THE REPORT

This analysis determines the transportation-related impacts associated with the proposed CPA and Zone Change. The study intersections and overall study area for this project were determined based on a review of existing travel patterns, the traffic impact analysis requirements pursuant to VMC Sections 11.80.080 and 11.80.130, the City's Traffic Study Guidelines, and direction provided by City of Vancouver staff.

Study Intersections

Five study intersections were identified by City of Vancouver staff as shown in Figure 1 and listed below.

1. SE 164th Avenue and SE 15th Street
2. SE 189th Avenue and SE 15th Street
3. SE 192nd Avenue and SE 15th Street
4. SE 192nd Avenue and Mill Plain Boulevard
5. SE 192nd Avenue and SE 20th Street

Analysis Periods

Weekday AM and PM peak hour traffic conditions were analyzed at the study intersections. Traffic counts were collected in June 2023 at Intersections 1-3, and in 2017 at Intersections 3-5. The previous and current traffic counts at Intersection 3 were compared and the June 2017 counts were generally higher than the counts collected in June 2023. Therefore, no growth factor was applied to the 2017 counts at Intersections 4 and 5 to reflect existing year 2023 conditions. *Appendix "A" includes the count data at each of the study intersections.*

The remaining sections of this report address the following transportation issues:

- Analysis methodology;
- Existing land use and transportation system conditions within the site vicinity;
- Study intersection crash history review;
- Reasonable worst-case development scenario trip generation estimates for the site under the existing and proposed zoning;
- Trip distribution estimates and concurrency corridor trip assignment under the existing and proposed zoning;
- Existing year (2023) traffic conditions during the weekday AM and PM peak hours;
- Opening year (2027) background traffic conditions assuming site development under the existing zoning during the weekday AM and PM peak hours;
- Opening year (2027) total traffic conditions assuming site development under the proposed zoning during the weekday AM and PM peak hours;
- Five-year horizon year (2032) background traffic conditions assuming site development under the existing zoning during the weekday AM and PM peak hours;
- Five-year horizon year (2032) total traffic conditions assuming site development under the proposed zoning during the weekday AM and PM peak hours;
- Anticipated site driveway turn lane considerations; and,
- Conclusions and recommendations.

ANALYSIS METHODOLOGY

Intersection Levels-of-Service

All level-of-service analyses described in this report were performed in accordance with the procedures stated in the *2000 Highway Capacity Manual* (HCM, Reference 2)¹ for signalized intersections and HCM 6th Edition (Reference 3) for unsignalized intersections using Synchro 11 software. Peak 15-minute flow rates were used in the evaluation of all intersection levels of service to provide analyses based on a reasonable worst-case scenario. Queuing analyses presented in this report reflect 95th percentile queues and were also obtained from Synchro 11 software.

Operating Standards

VMC Section 11.80.130.B states the following:

A proposed development that adds at least five net new peak hour trips to an intersection approach operating at an LOS E or lower within the required traffic impact analysis area may be denied based upon any of the following:

- 1. For signalized intersections, when off-site intersection conditions are at a LOS F, or*
- 2. For signalized intersections, when the LOS E and the volume to capacity ratio is greater than 0.95, or*
- 3. For unsignalized intersections, when the volume to capacity ratio for any lane on any approach is greater than 0.95, and*
- 4. When significant traffic hazards would be caused or materially aggravated by the proposed development.*

EXISTING CONDITIONS

The existing conditions analysis identifies site conditions and geometric characteristics of roadways within the study area. Kittelson & Associates, Inc. (KAI) staff visited and inventoried the site of the proposed CPA and Zone Change and surrounding area in June 2023 to observe site conditions, adjacent land uses, existing study intersection traffic operations, and transportation facilities in the study area.

Site Conditions and Adjacent Land Uses

The majority of the study site is currently undeveloped. Six single family residences and one commercial space are located on the northern and western portions of the site, accessible via existing driveways on SE 15th Street and SE 192nd Avenue. Existing residential development borders the site in all directions.

¹ The HCM 2000 methodology in Synchro was used because the Synchro HCM 6th Edition methodology does not produce an overall intersection volume to capacity (V/C) ratio calculation (City standards are predicated in part on the overall intersection V/C ratio).

Adjacent Roadway Facilities

Table 1 summarizes the existing transportation facilities and roadways in the study area.

Table 1. Existing Transportation Facilities and Roadway Designations

Roadway	Functional Classification ¹	Number of Travel Lanes	Posted Speed (mph)	Sidewalks?	Bicycle Lanes?	Raised Median?	On-Street Parking?
SE 192 nd Avenue	Principal Arterial	4-5	40	Yes	Yes	Yes	No
SE 189 th Avenue	Neighborhood Circulator	2	Not posted	Yes	No	No	No
SE 164 th Avenue	Principal Arterial	6-7	40	Yes	No	Yes	No
SE Mill Plain Boulevard	Principal Arterial	4-5	40	Yes	Yes	Yes	No
SE 20 th Street	Minor Arterial	2-3	40	Yes	Yes	Partial	No
SE 15 th Street	Collector Arterial	2-3	35	Partial ²	Yes	No	No

¹ Source: *City of Vancouver Arterial Street System and Classification Map*, Adopted June 2022.

² Sidewalks are provided along the south side of SE 15th Street adjacent to the site. There are no sidewalks on the north side of SE 15th Street along the site, but intermittent sidewalks are provided on the north side of SE 15th Street west of SE 189th Avenue.

Pedestrian and Bicycle Facilities

As indicated by Table 1, sidewalks and bicycle facilities in the study area are generally present and the available facilities appear to have been completed in conjunction with adjacent development projects.

Transit Facilities

C-Tran currently offers a fixed transit route within the general site vicinity. The route is summarized below.

- Route 37 (Mill Plain/Fisher's) provides bus service between Downtown Vancouver to Fisher's Landing Transit Center, including service along SE Mill Plain Boulevard, SE 192nd Avenue and SE 164th Avenue. The service operates on weekdays from approximately 4:55 AM to 1:00 AM, with 15-minute headways for most of the day. On weekends, the route operates with 20-minute headways on Saturdays and 30-minute headways on Sundays.

The transit stops for Route 37 are located approximately 200 feet south and east of the site at the SE 192nd Street & SE 15th Street intersection.

Crash Analysis

The study intersection crash history was obtained from WSDOT for the period from January 1, 2017 to December 31, 2021. Table 2 summarizes the reported crash frequency, type, and severity by intersection. Generally, the City of Vancouver considers a crash rate greater than one crash per million entering

vehicles (MEV) to be an indicator that a potential geometric or operational issue may exist, and that further evaluation should be considered.

Table 2. Study Intersection Crash Frequency and Severity (January 2017 through December 2021)

Intersection	No. of Crashes	Crash Type						Crash Severity		Crash Rate ¹
		Rear-End	Object	Turning	Angle	Side-swipe	Ped/Bike	Non-Injury	Injury	
192 nd Avenue & SE 15 th Street	9	3	1	1	4	0	0	5	4	0.19
192 nd Avenue & Mill Plain Blvd.	10	4	1	2	2	1	0	6	4	0.20
192 nd Avenue & SE 20 th Street	12	7	1	1	2	0	1	8	4	0.22
164 th Avenue & SE 15 th Street	19	8	3	0	6	2	0	15	4	0.32
189 th Avenue & SE 15 th Street	1	0	0	1	0	0	0	0	1	0.11

¹ Crash rate is calculated as the number of crashes per million entering vehicles. Average daily traffic volumes were estimated using PM peak hour total entering volume at the intersection.

As shown in Table 2, each of the study intersections has a crash rate of less than 1.0 per million entering vehicles. There was one reported crash on SE 192nd Avenue at SE 20th Street involving a passenger vehicle making an eastbound right-turn and a bicyclist, for which no contributing circumstances were recorded. No crashes involving pedestrians were reported.

Additionally, one crash at SE 164th Avenue / SE 15th Street resulted in a fatality. The crash involved a motorcycle and a truck (under 10,000 lb.) The motorcycle was reported to be traveling southbound and the truck was traveling westbound. Speeding was recorded as a contributing factor in the crash report.

No safety-based mitigation needs were identified through review of the available crash data. *Appendix "B" includes the crash data provided for each of the study intersections.*

TRIP GENERATION

A trip generation estimate was prepared for the existing R-6 zoning using the Institute of Transportation Engineer's (ITE) *Trip Generation Manual, 11th Edition* (Reference 4). The current allowed usage of the property can be best described as "single family detached housing" (ITE Code 210). According to VMC Section 20.410.020.C (Reference 1), the maximum density for the current zoning district R-6 is 5.8 units/net acre. With a lot size of 9.85 acres, this leads to a maximum allotment of 57 units.

For a conservative estimate, the allowed usage of the property after the proposed CPA/Zone Change can be described as "multi-family housing (low-rise)" (ITE Code 220). The maximum density in the VMC for the proposed zoning district R-30 is 30 units/net acre. For consistency with the analysis of the worst-case development scenario under existing conditions, the maximum density was applied to the gross site acreage. With a lot size of 9.85 acres, this leads to a maximum allotment of 296 units.

The resulting weekend daily, AM, and PM peak hour vehicle trip ends are summarized in Table 3. Per the ITE *Trip Generation Handbook* (Reference 5), the fitted curve equation was utilized for the AM and PM peak hour trips, while the weighted average was used for weekday daily trips.

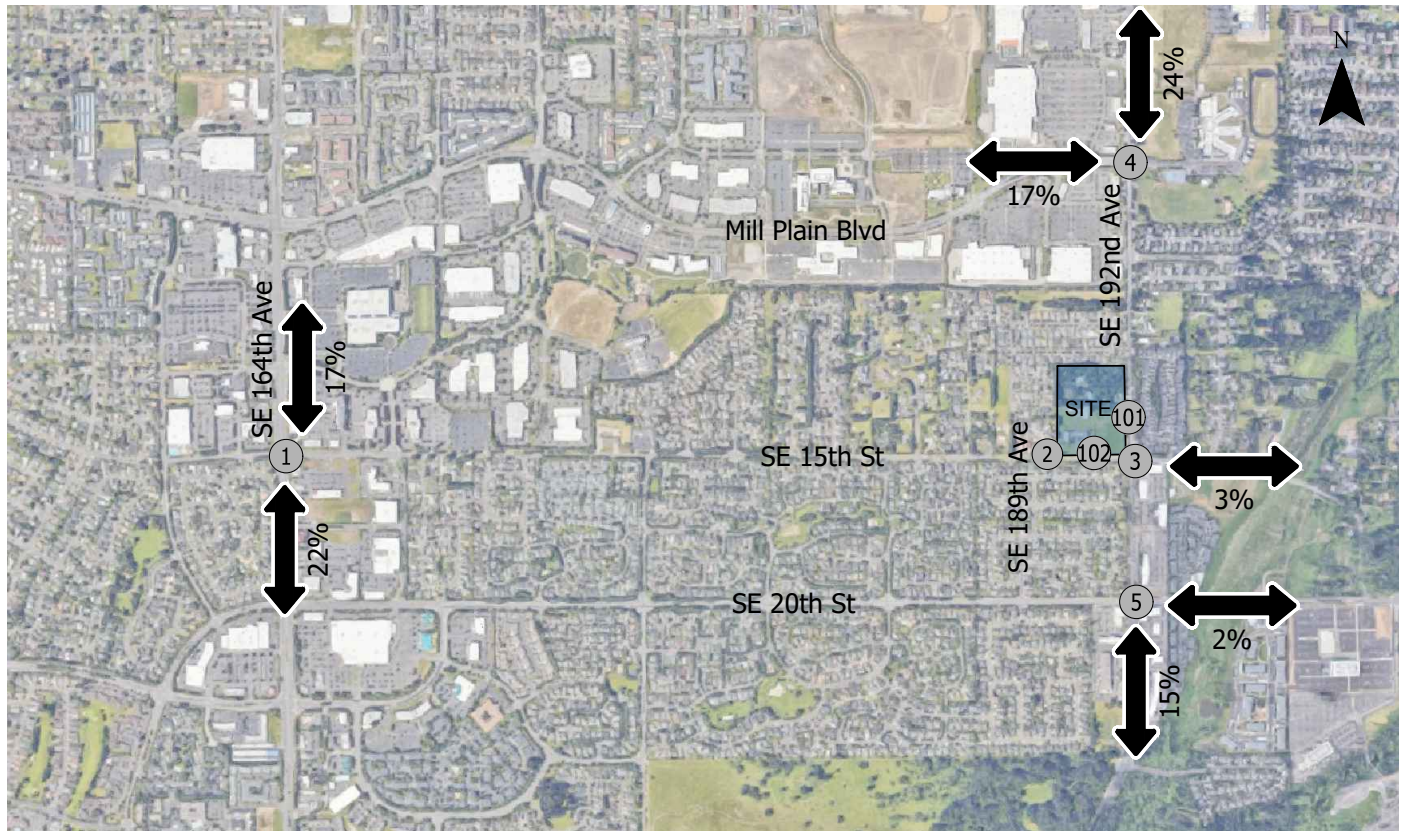
Table 3. Trip Generation Estimate

Land Use	ITE Code	Size (Units)	Weekday Daily Trips	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
				Total	In	Out	Total	In	Out
Existing R-6 Single-Family Detached Housing Reasonable Worst Case Development Scenario									
Single-Family Detached Housing	210	57	538	45	11	34	59	37	22
Proposed R-30 Multi-Family Housing (Low-Rise) Reasonable Worst Case Development Scenario									
Multi-Family Housing (Low-Rise)	220	296	1,995	115	28	87	148	93	55
Trip Difference = (Proposed – Existing)									
			1,457	70	17	53	89	56	33

TRIP DISTRIBUTION AND ASSIGNMENT

The site-generated trips shown in Table 3 were distributed to the study area roadways based on a trip distribution pattern derived from the Southwest Washington Regional Transportation Council travel demand model (select zone analysis of Transportation Analysis Zone 1752) as well as existing travel patterns in the site vicinity.

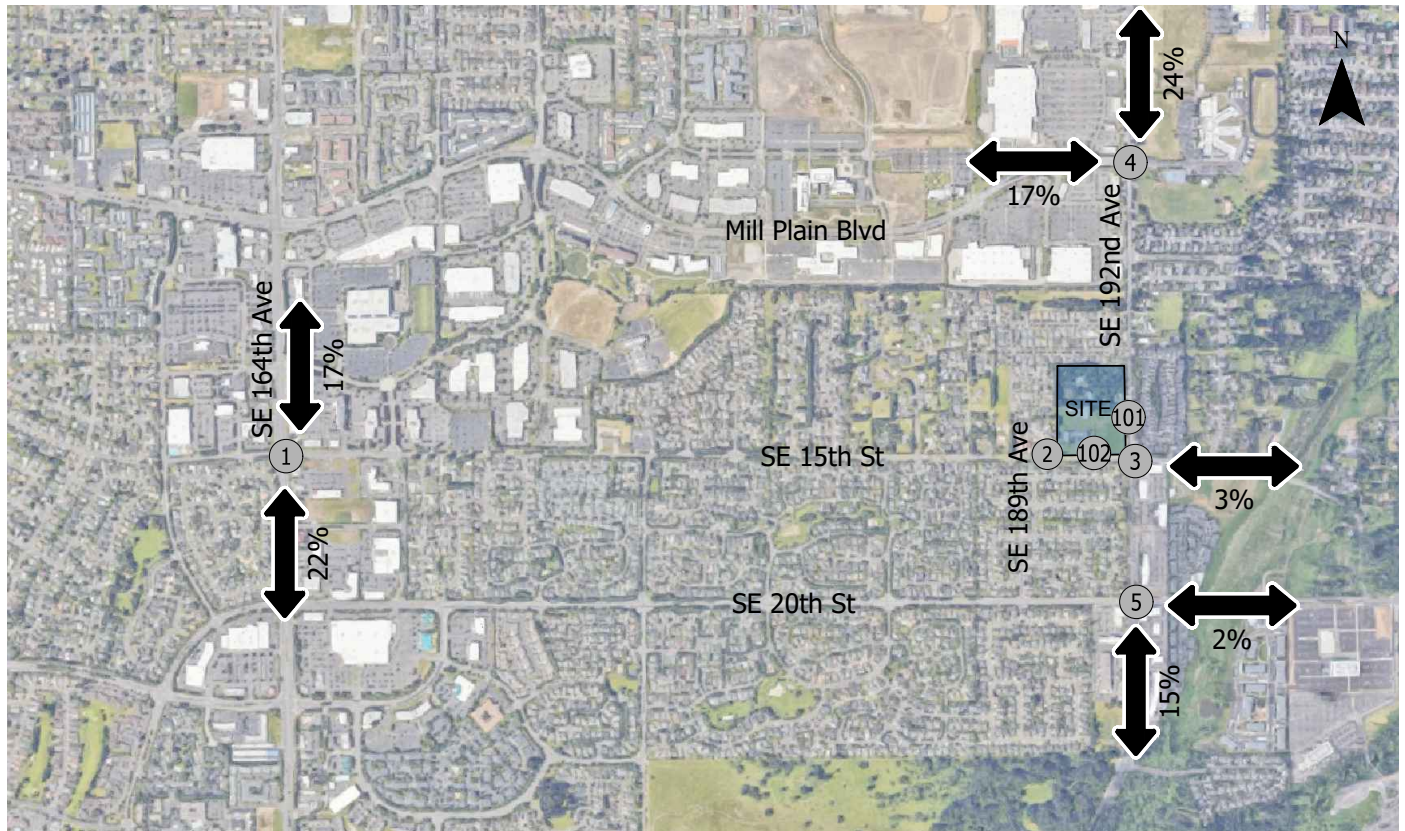
Figures 3 to 6 show the estimated trip distribution pattern and site-generated traffic volumes assigned to the five study intersections and the two anticipated site driveways under the existing and proposed zoning, respectively.



 Trip Distribution
X%

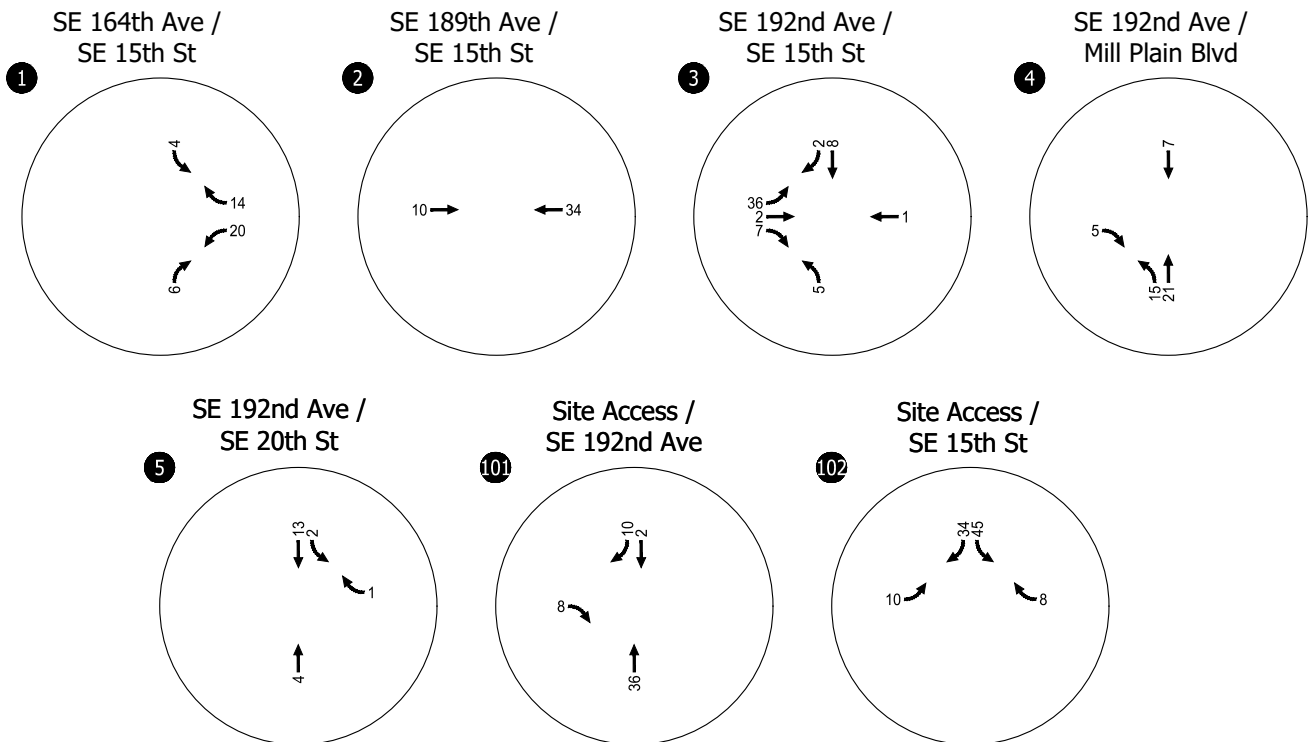
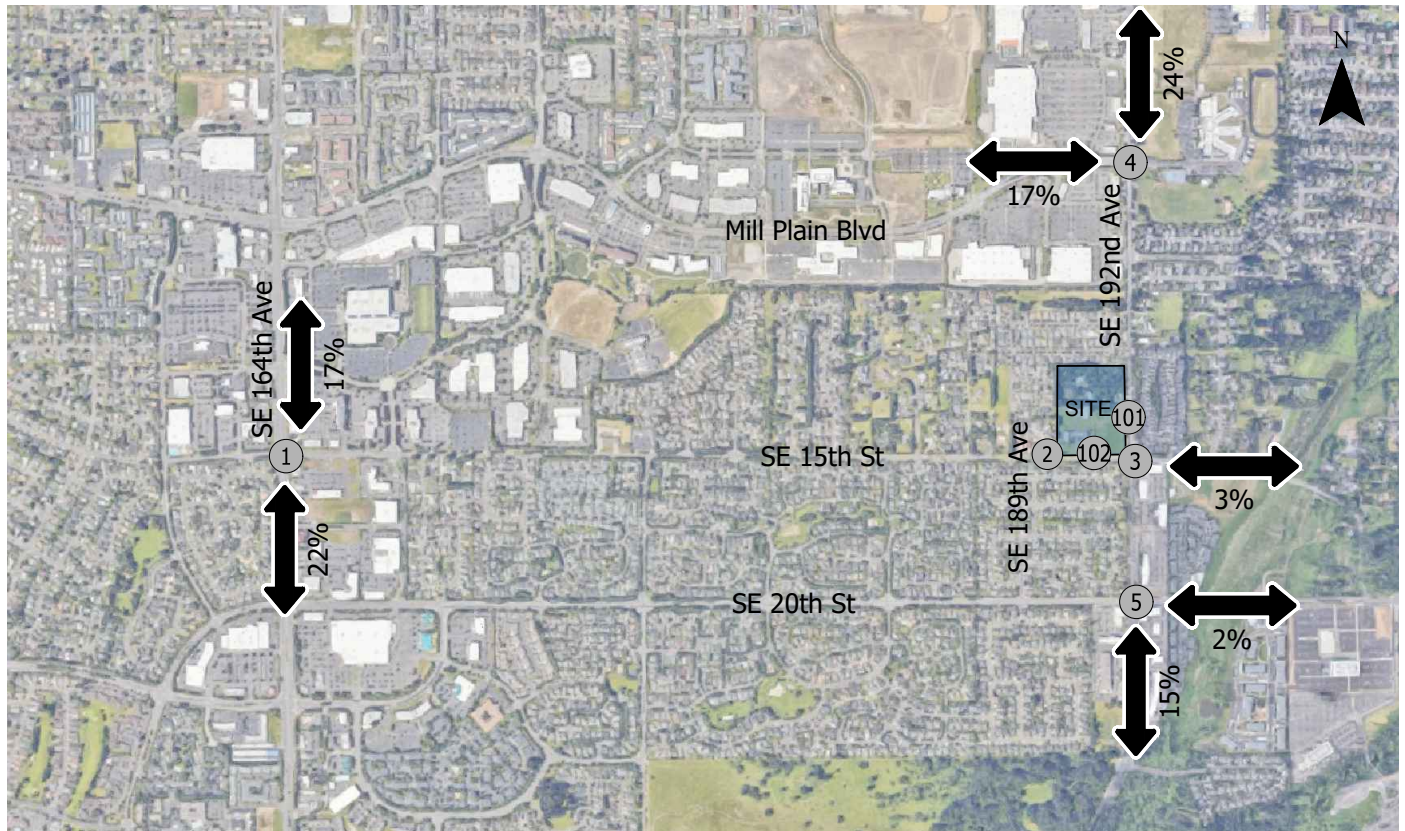
Trip Distribution and Assignment (Existing Zoning)
Weekday AM Peak Hour
Vancouver, WA

Figure
3



Trip Distribution and Assignment (Existing Zoning)
Weekday PM Peak Hour
Vancouver, WA

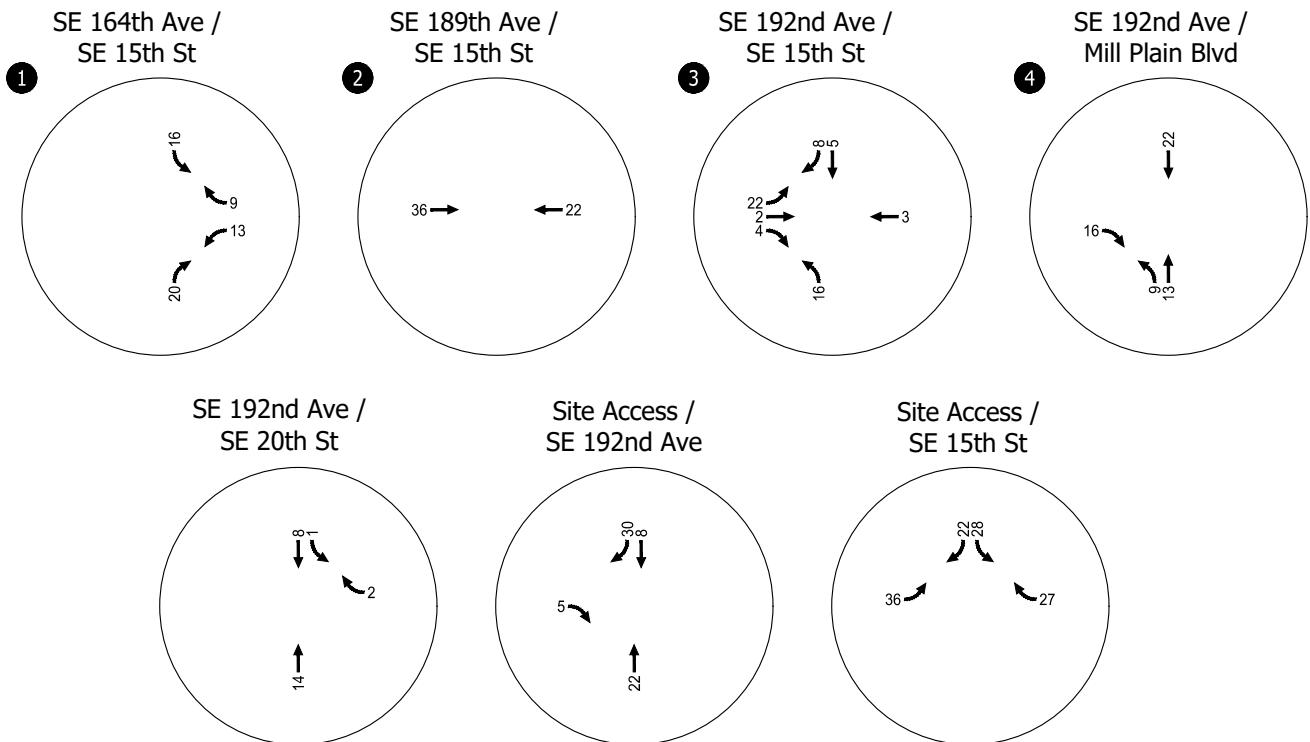
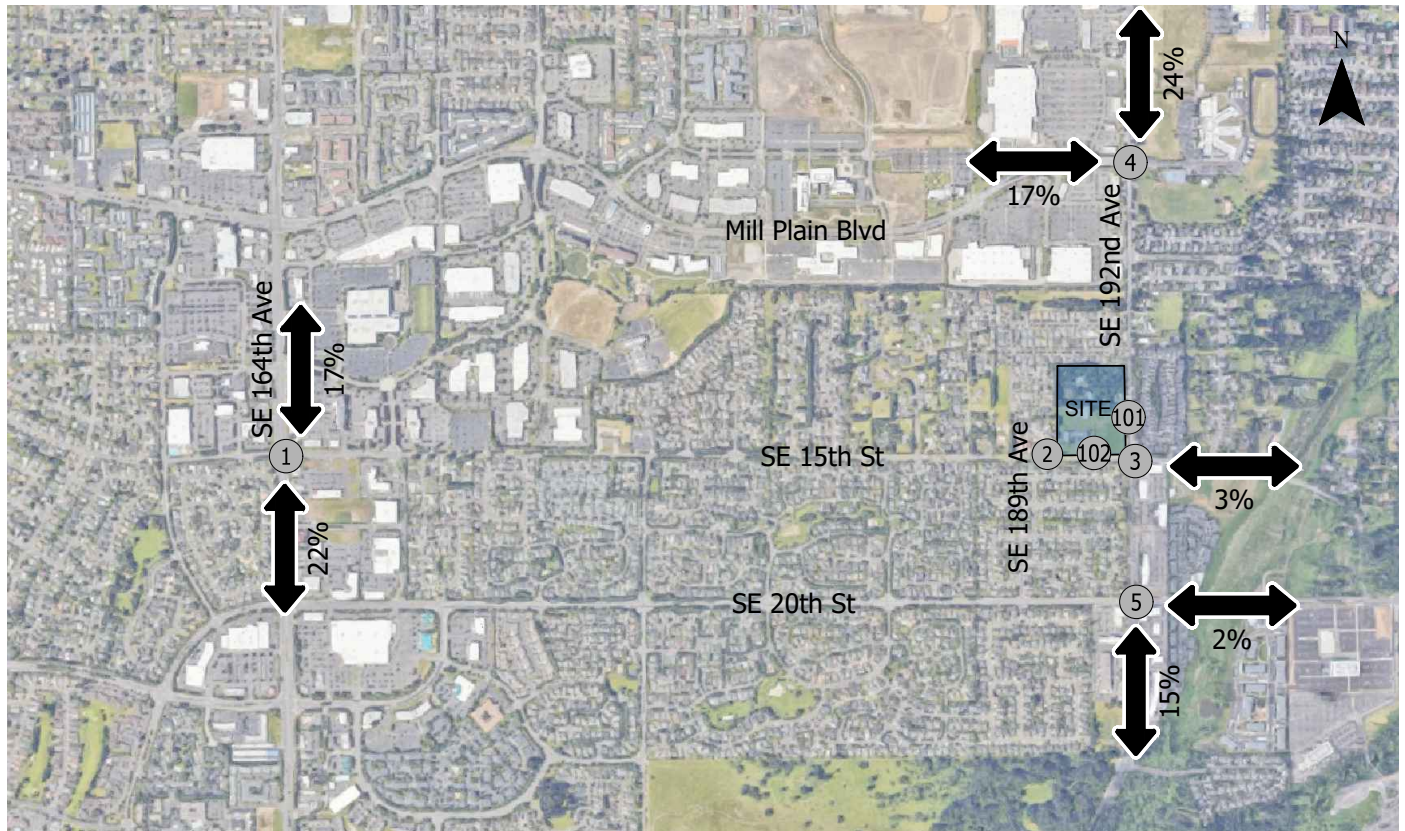
Figure
4



Trip Distribution and Assignment (Proposed Zoning)
Weekday AM Peak Hour
Vancouver, WA

X% Trip Distribution

Figure
5



Trip Distribution and Assignment (Proposed Zoning)
Weekday PM Peak Hour
Vancouver, WA

Figure
6

Concurrency Corridor Trip Assignment

Per City of Vancouver requirements, Table 4 summarizes the estimated number of site-generated weekday PM peak hour trips entering each of the City's adopted concurrency corridors before and after the proposed CPA and zone change for illustrative comparison purposes. Assigned trips were recorded counting trips only once along each of the specified corridors. Because the trips shown in Table 4 represent reasonable worst case development, the actual trip assignment for concurrency purposes may be different and will need to be re-assessed in conjunction with a future site development review application.

Table 4. Concurrency Corridor Weekday PM Peak Hour Trip Assignment

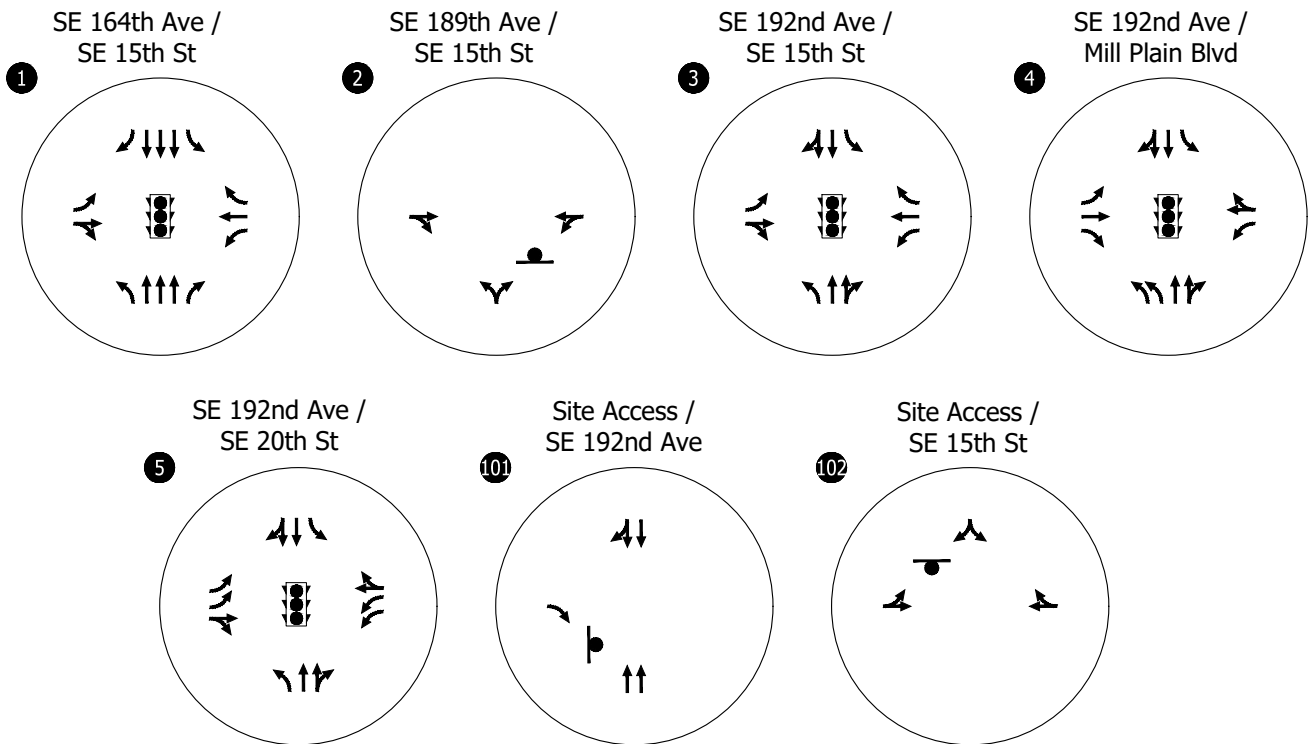
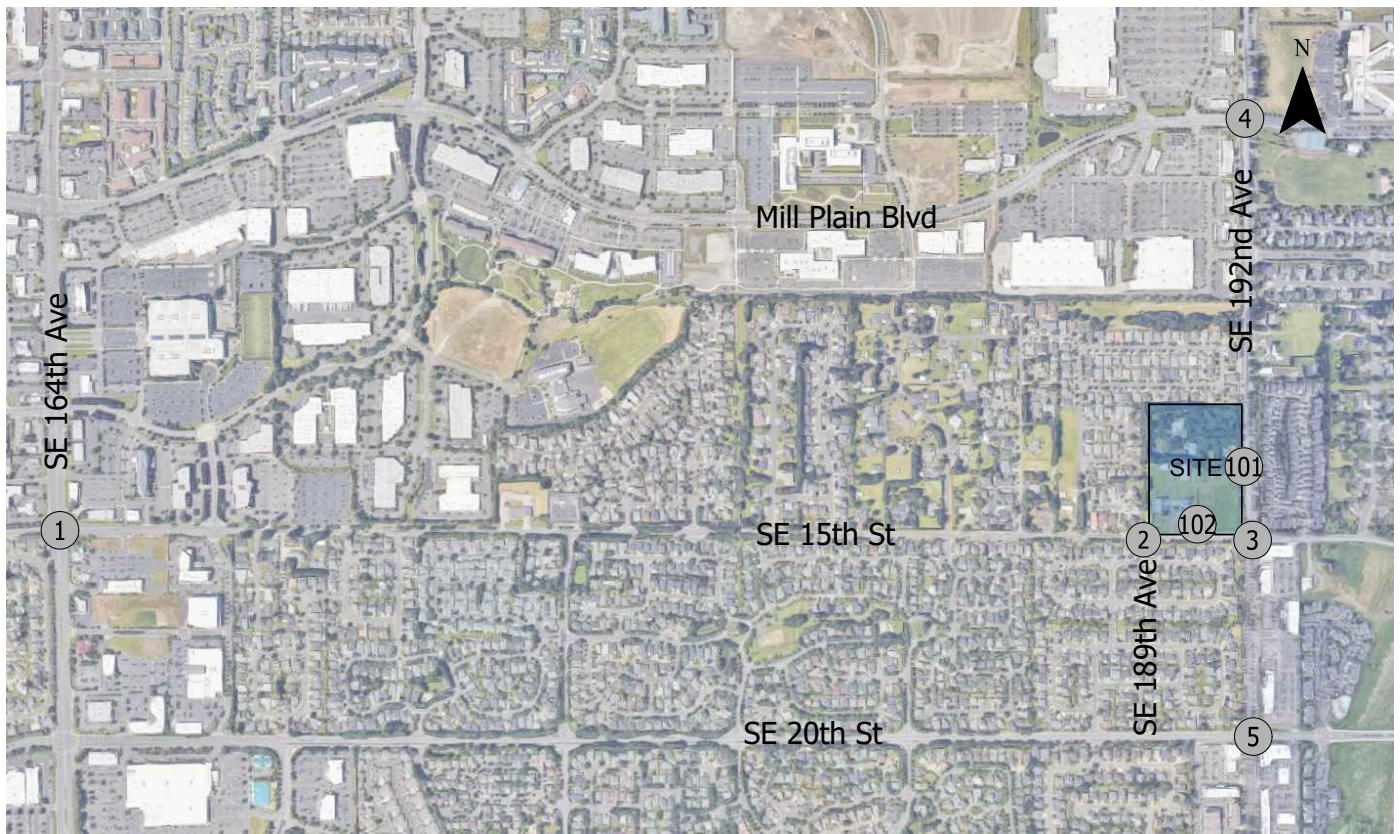
Corridor Name	Corridor Limit	PM Peak Trips to Corridor (Existing Zoning)	PM Peak Trips to Corridor (Proposed Zoning)
Mill Plain Blvd.	Fourth Plain to I-5	1	3
	I-5 to Andresen	2	5
	Andresen to I-205	3	8
	I-205 to 136 th Ave.	7	16
	136 th Ave. to 164 th Ave.	9	22
	164 th Ave. to 192 nd Ave.	10	25
St. Johns / Ft. Van Way	Mill Plain to 63 rd St.	-	-
Fourth Plain Blvd.	Mill Plain to I-5	-	-
	I-5 to Andresen	-	-
	Andresen to I-205	-	-
	I-205 to 162 nd Ave.	1	3
Andresen Road	Mill Plain to SR500	-	-
	SR500 to 78 th St.	-	-
112 th Avenue	Mill Plain to 28 th St.	1	3
	28 th St. to 51 st St.	-	-
164 th /162 nd Avenue	SR14 to SE 1 st St.	30	75
	SE 1 st St. to Fourth Plain	16	39
Burton Road / 28 th Street	18 th St. to 112 th Ave.	-	-
	112 th Ave. to 138 th Ave.	-	-
	138 th Ave. to 162 nd Ave.	-	-
18 th Street	112 th Ave. to 138 th Ave.	1	3
	138 th Ave. to 164 th Ave.	2	5
136 th /137 th Avenue	Mill Plain to 28 th St.	1	3
	28 th St. to Fourth Plain	-	-
192 nd Avenue	SR14 to NE 18 th St.	34	85

STUDY INTERSECTION OPERATIONS REVIEW

This section provides an overview of operations at the study intersections under existing conditions as well as opening year and five-year horizon year background and total traffic conditions for both the existing and proposed zoning. The analysis determined that the study intersections all operate acceptably today and will continue to do so in the future, during both the weekday AM and PM peak hours. Figures 8 through 17 illustrate weekday AM and PM peak hour conditions under existing and future traffic conditions. Derivation of the existing and future conditions analysis at the study intersections is further described below.

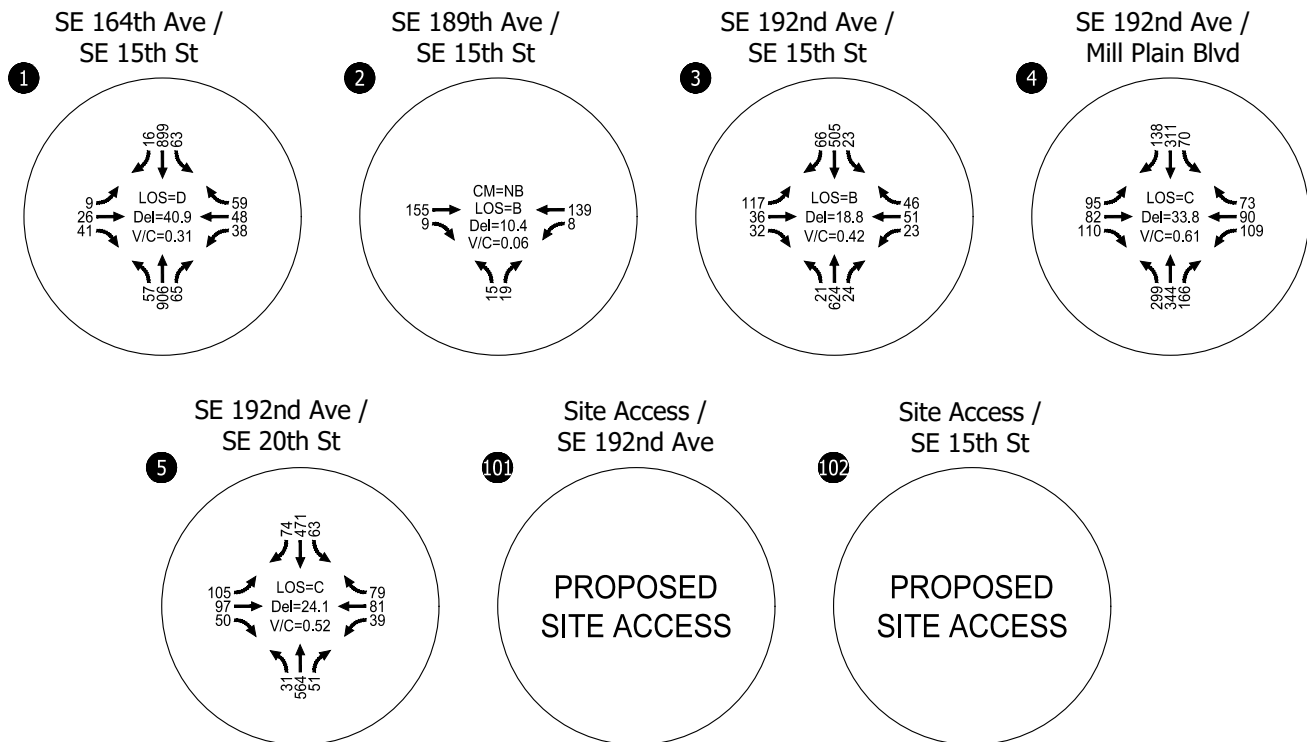
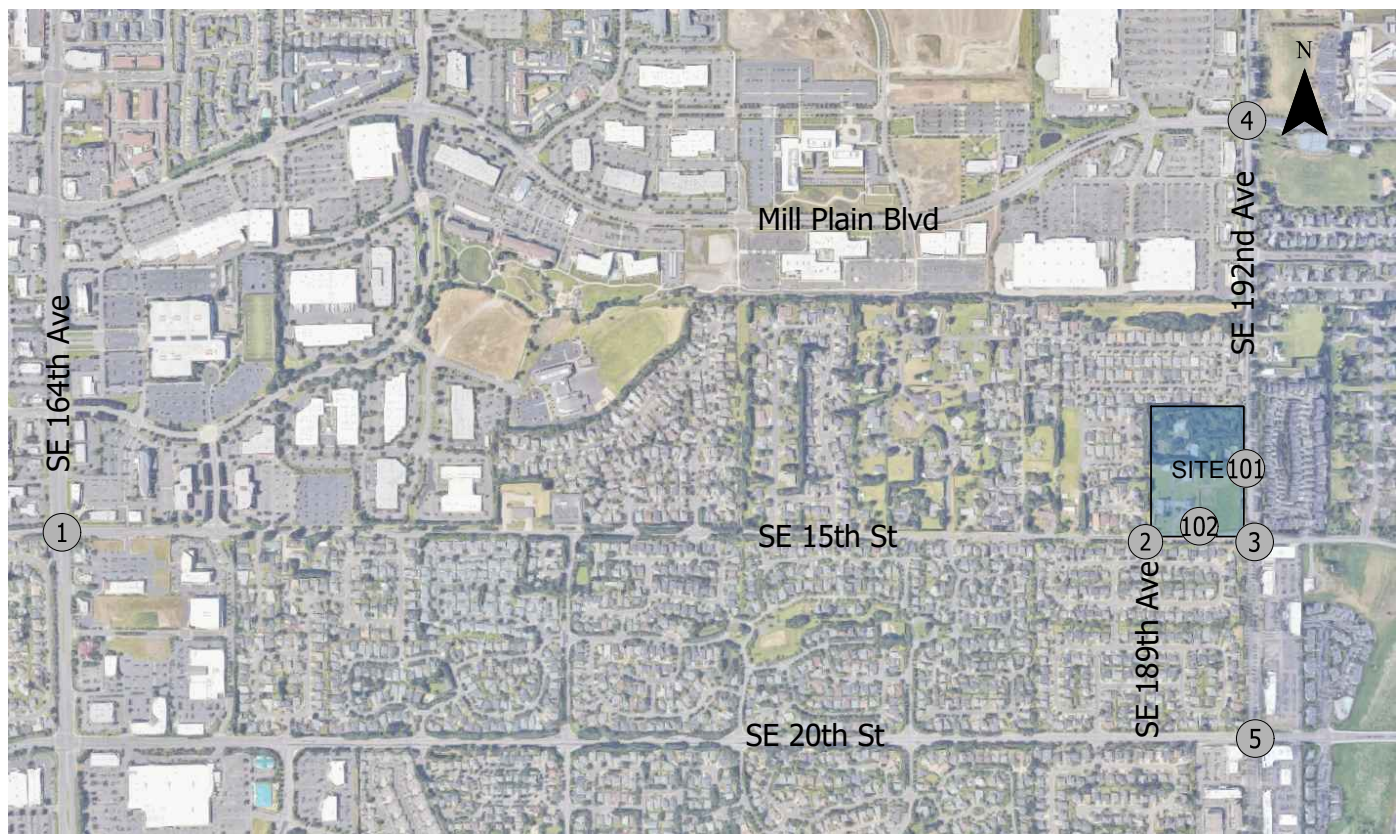
Existing 2023 Traffic Conditions

Figure 7 illustrates the existing lane configuration and traffic control devices at each of the study intersections. Figures 8 and 9 present the existing traffic volumes and corresponding intersection operations. All study intersections satisfy City of Vancouver operational thresholds under existing conditions. *Appendix "C" contains the existing operational analysis worksheets.*



Existing Lane Configurations
& Traffic Control Devices
Vancouver, WA

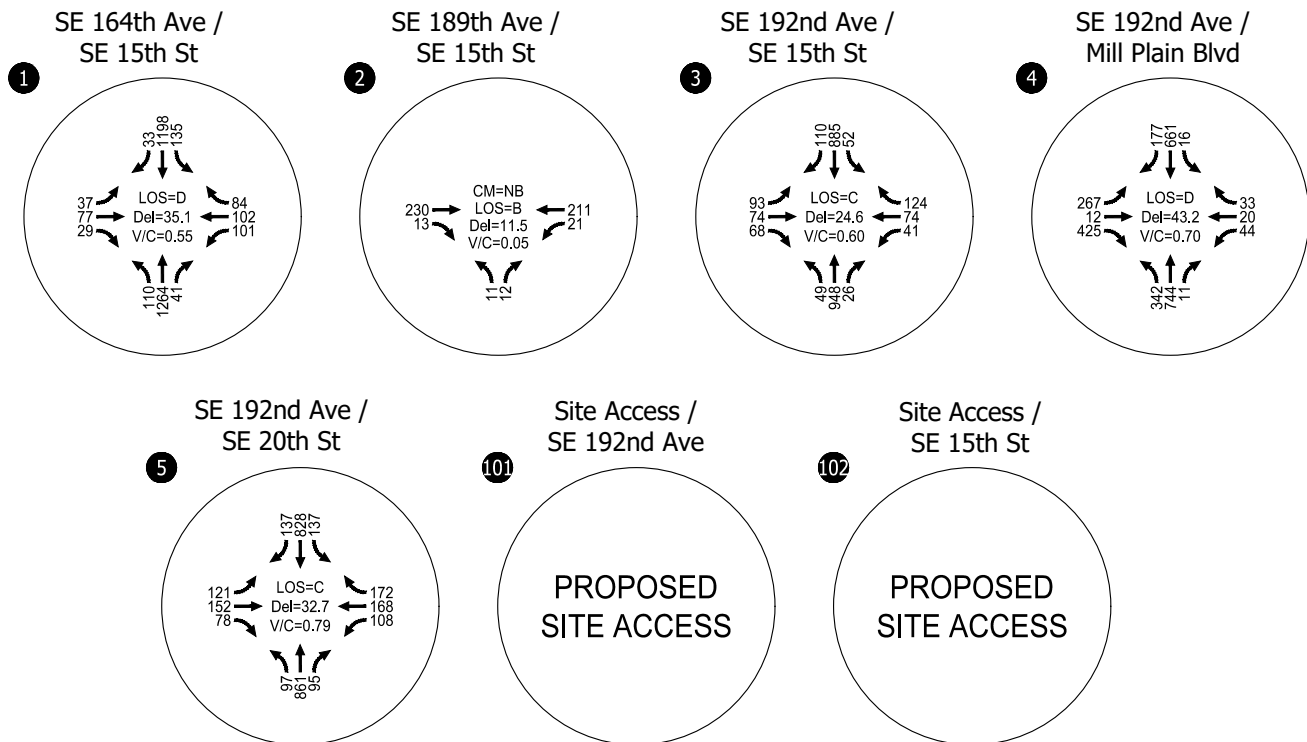
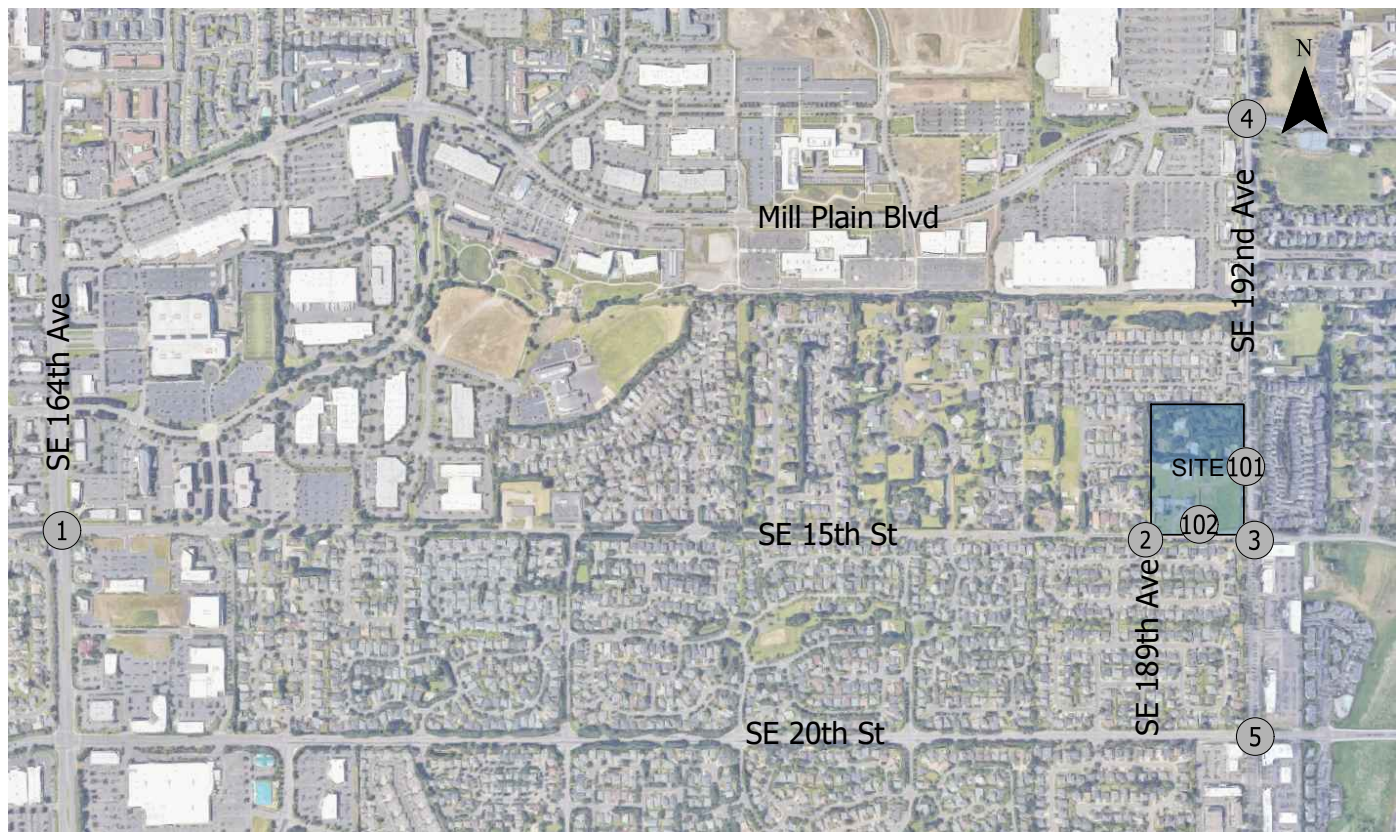
Figure
7



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = INTERSECTION VOLUME-TO-CAPACITY RATIO/ APPROACH VOLUME-TO-CAPACITY RATIO (UNSIGNALIZED)

Existing Traffic Operations
 Weekday AM Peak Hour
 Vancouver, WA

Figure
 8



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = INTERSECTION VOLUME-TO-CAPACITY RATIO/ APPROACH VOLUME-TO-CAPACITY RATIO (UNSIGNALIZED)

Existing Traffic Operations
 Weekday PM Peak Hour
 Vancouver, WA

Figure
 9

Opening Year 2027 Traffic Conditions

Opening year 2027 traffic volumes include the addition of estimated trips from general growth in the region (application of a 1.5 percent compounded annual growth). In-process trips associated with the following nearby developments were also added to the study intersections:

- HP Phase 1, to be developed north of this study;
- Vancouver Innovation Center, to be developed south of this study;
- Grass Valley (retail trips only²), to be developed southeast of this study;
- Kate Woods, to be developed southeast of this study; and
- Rerouting a portion of westbound right-turning vehicles at SE 20th Street / SE 192nd Avenue to use SE Bybee Road to SE 15th Street / SE 192nd Avenue during the PM peak hour, consistent with the Section 30 Study assumption³.

Appendix "D" contains the in-process trip for the weekday AM and PM peak hours.

Background Traffic Conditions (Existing Zoning)

The opening year 2027 background traffic conditions analysis identifies how the study area's transportation system will operate during the anticipated opening year with the addition of trips generated by a reasonable worst-case development scenario under the existing zoning (see Table 3).

The site-generated trips in Figures 3 and 4 were added to the general growth and in-process trips to produce year 2027 background traffic volumes. Figures 10 and 11 illustrate the resultant "existing zoning" conditions. As shown, inclusive of regional growth, all the study intersections continue to operate acceptably under year 2027 background conditions. *Appendix "E" contains the 2027 background traffic operational analysis worksheets.*

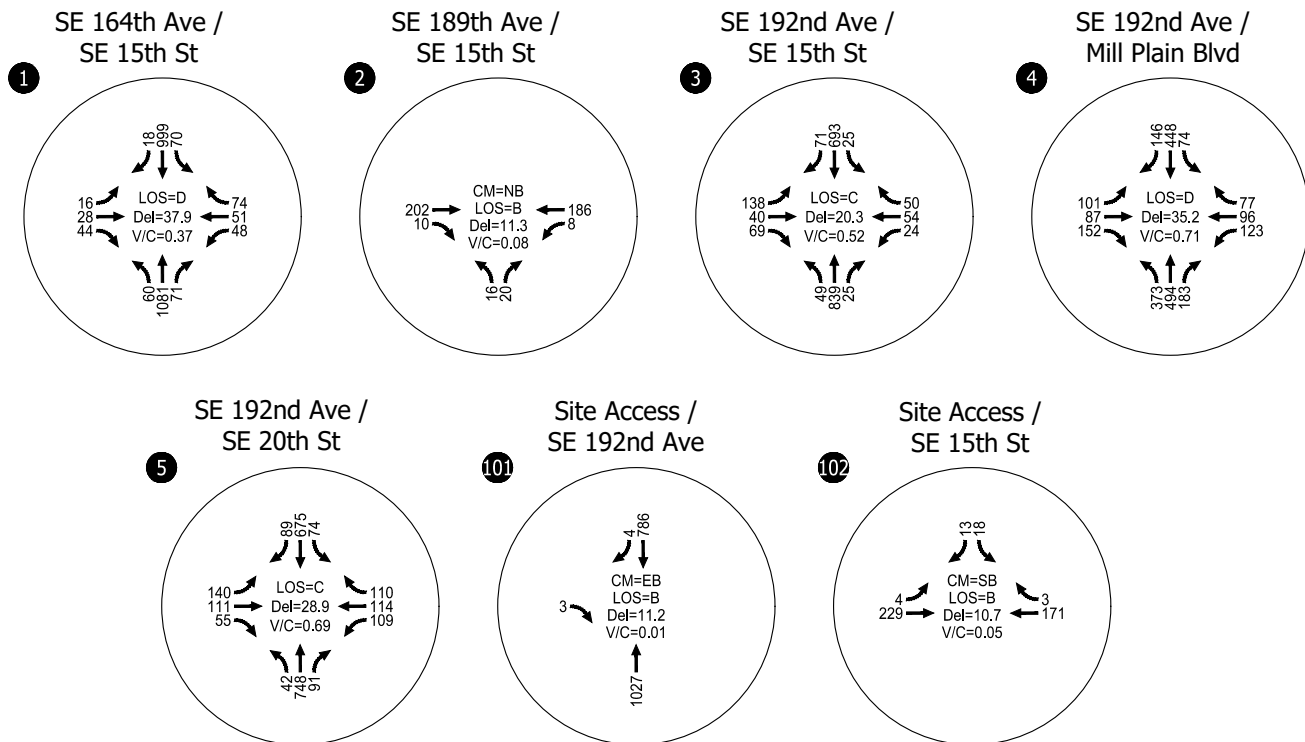
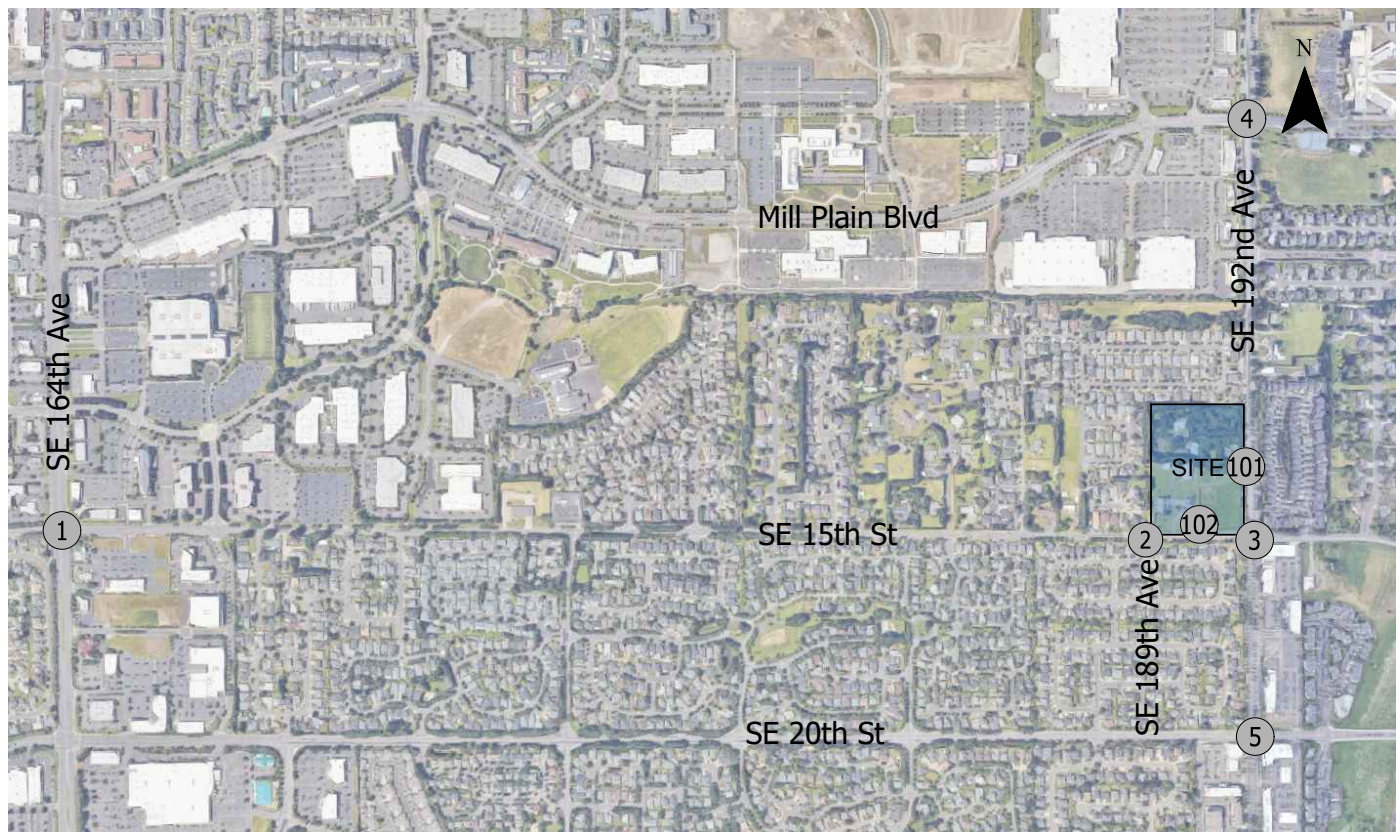
Total Traffic Conditions (Proposed Zoning)

The opening year 2027 total traffic conditions analysis identifies how the study area's transportation system will operate during the anticipated opening year with the addition of trips generated by a reasonable worst-case development scenario under the proposed zoning (see Table 3).

The site-generated trips in Figures 5 and 6 were added to the general growth and in-process trips to produce year 2027 total traffic volumes. Figures 12 and 13 illustrate the resultant "proposed zoning" conditions. As shown, inclusive of regional growth, all the study intersections continue to operate acceptably under the year 2027 total traffic conditions with the proposed zoning. *Appendix "F" contains the year 2027 total traffic operational analysis worksheets.*

²The residential and office components of the Grass Valley development have been constructed and were operational at the time of the traffic counts.

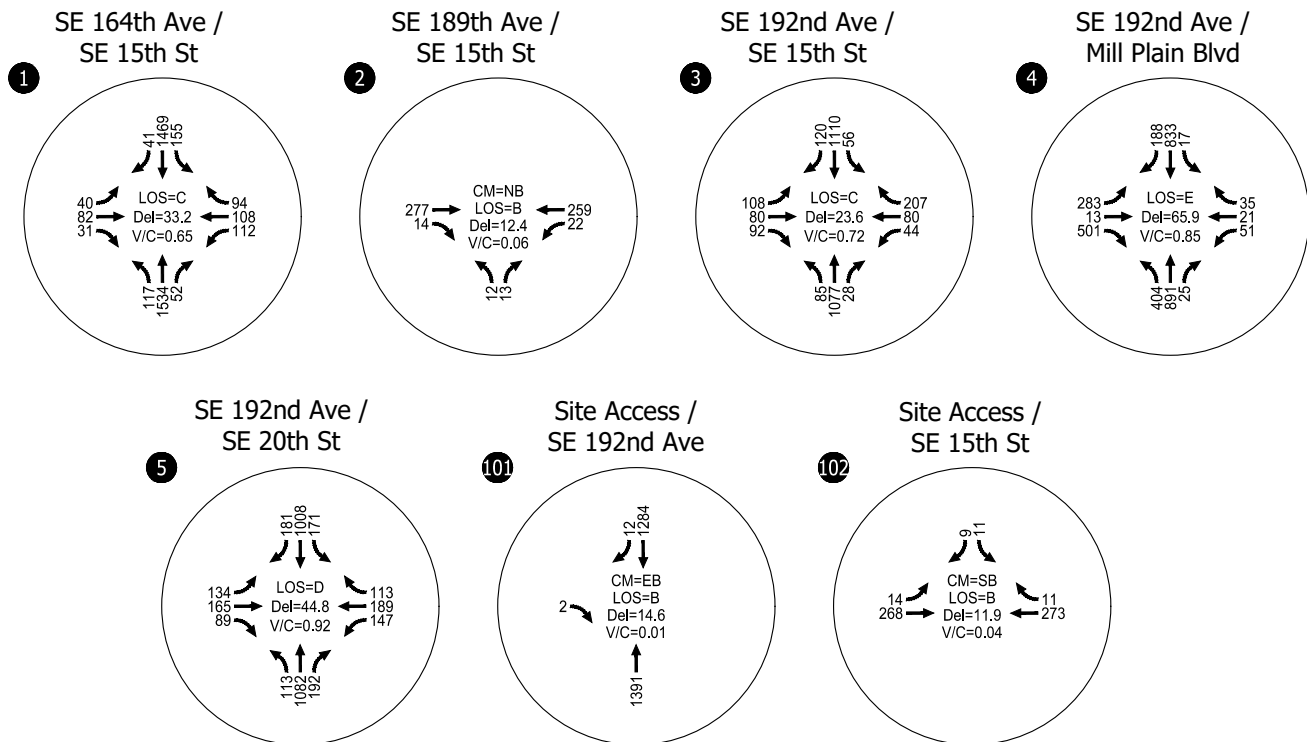
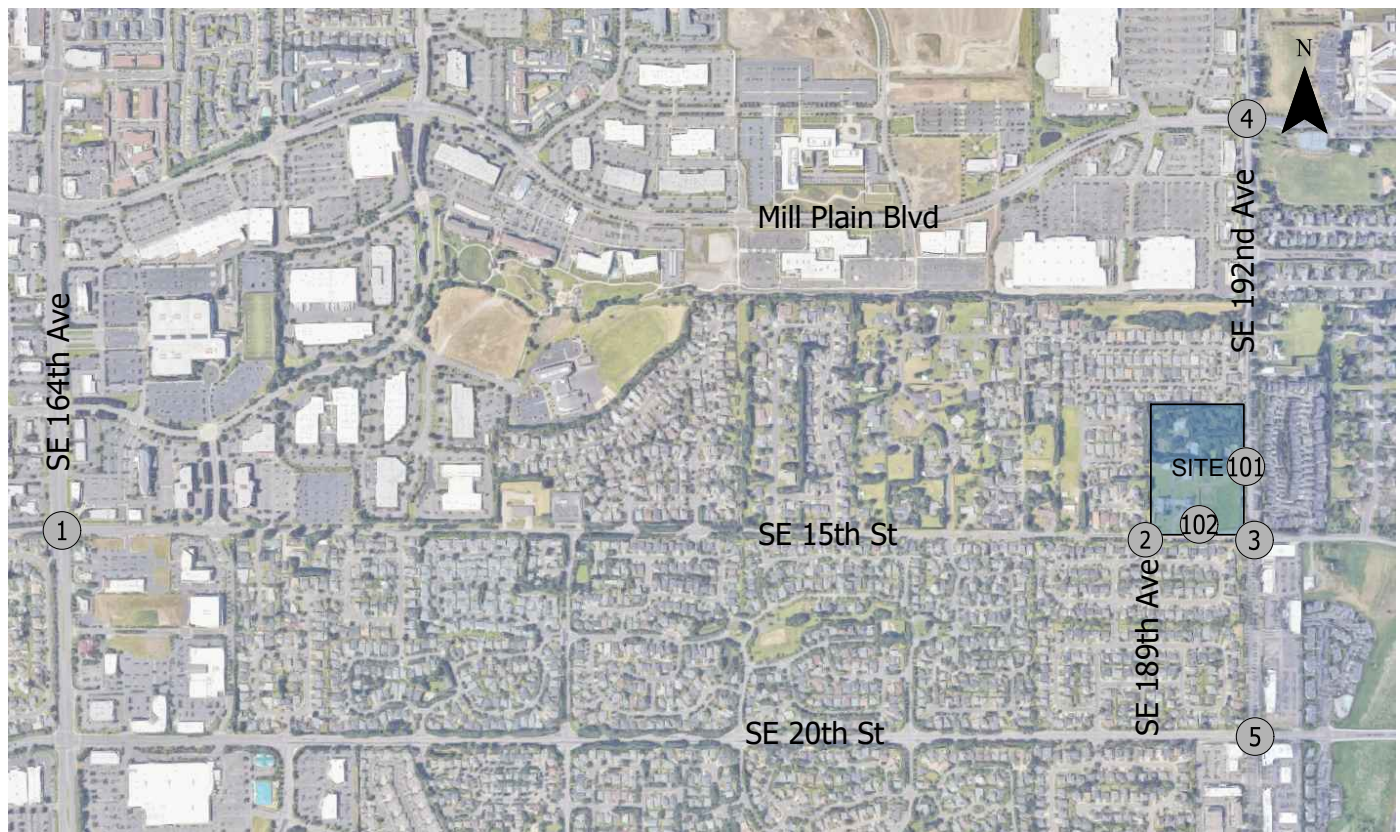
³Given the anticipated year of the SE Bybee Road realignment is uncertain, to provide a conservative approach southbound left-turning trips were not rerouted from SE 20th Avenue / SE 192nd Avenue.



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = INTERSECTION VOLUME-TO-CAPACITY RATIO/ APPROACH VOLUME-TO-CAPACITY RATIO (UNSIGNALIZED)

2027 Background Conditions
 Weekday AM Peak Hour
 Vancouver, WA

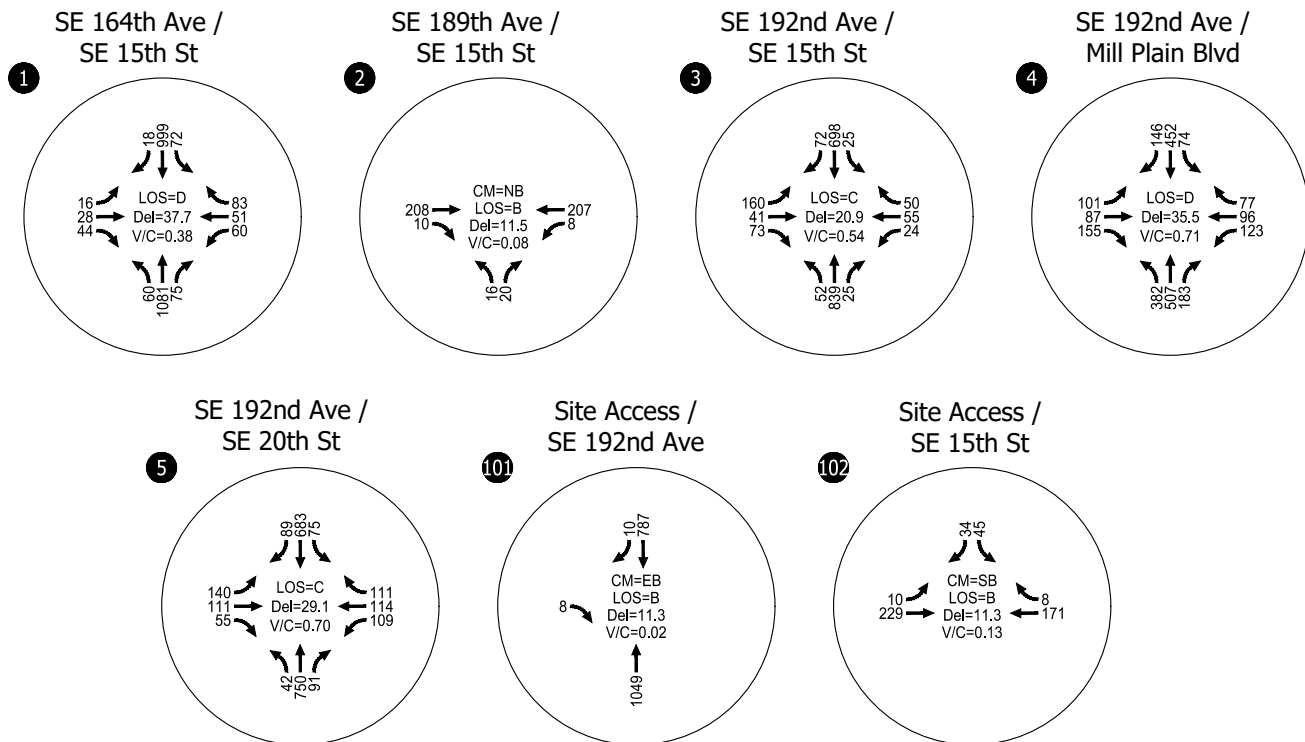
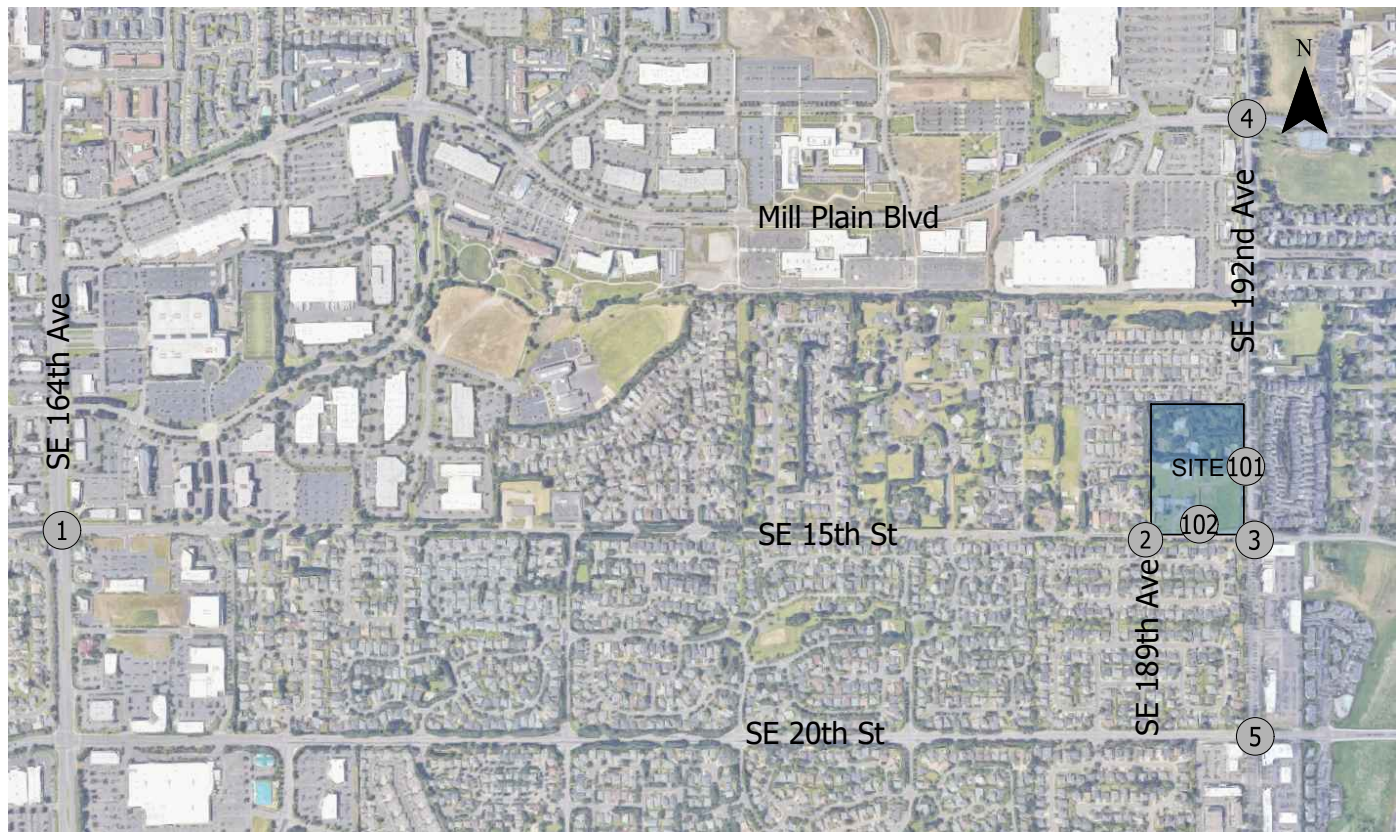
Figure
 10



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = INTERSECTION VOLUME-TO-CAPACITY RATIO/ APPROACH VOLUME-TO-CAPACITY RATIO (UNSIGNALIZED)

2027 Background Conditions
 Weekday PM Peak Hour
 Vancouver, WA

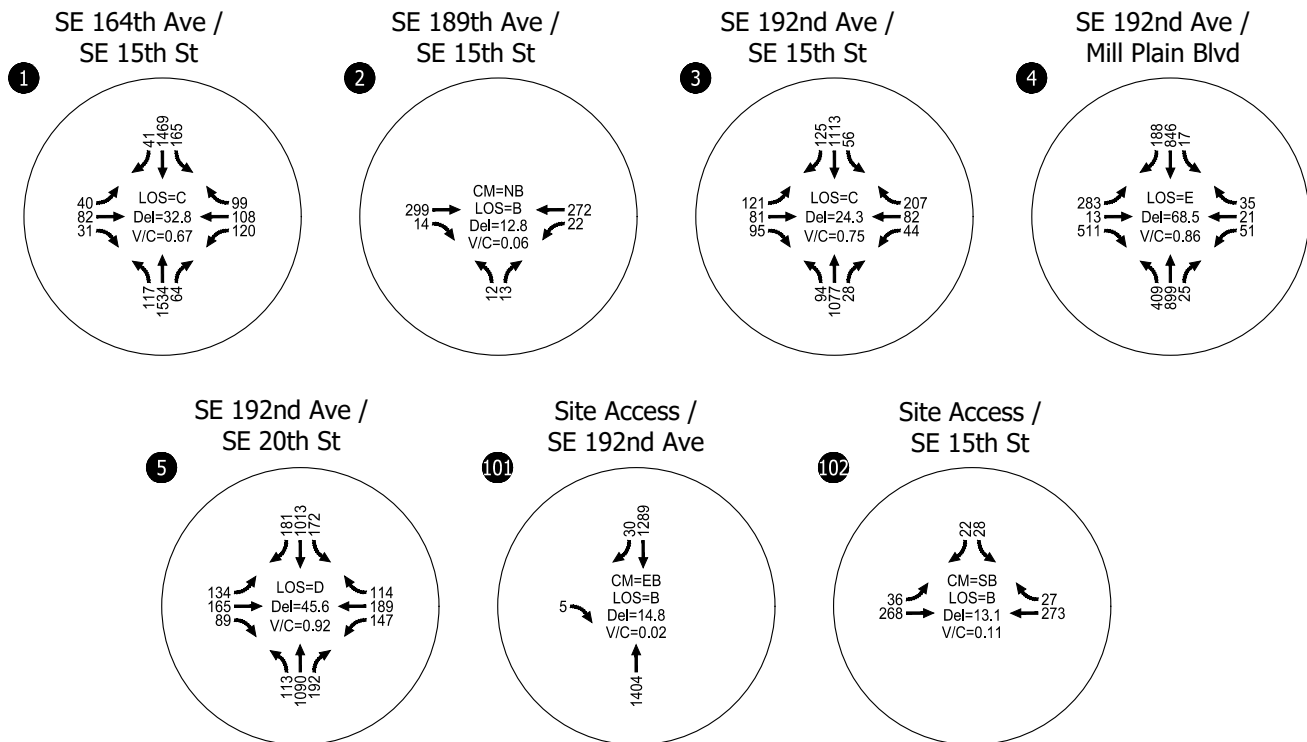
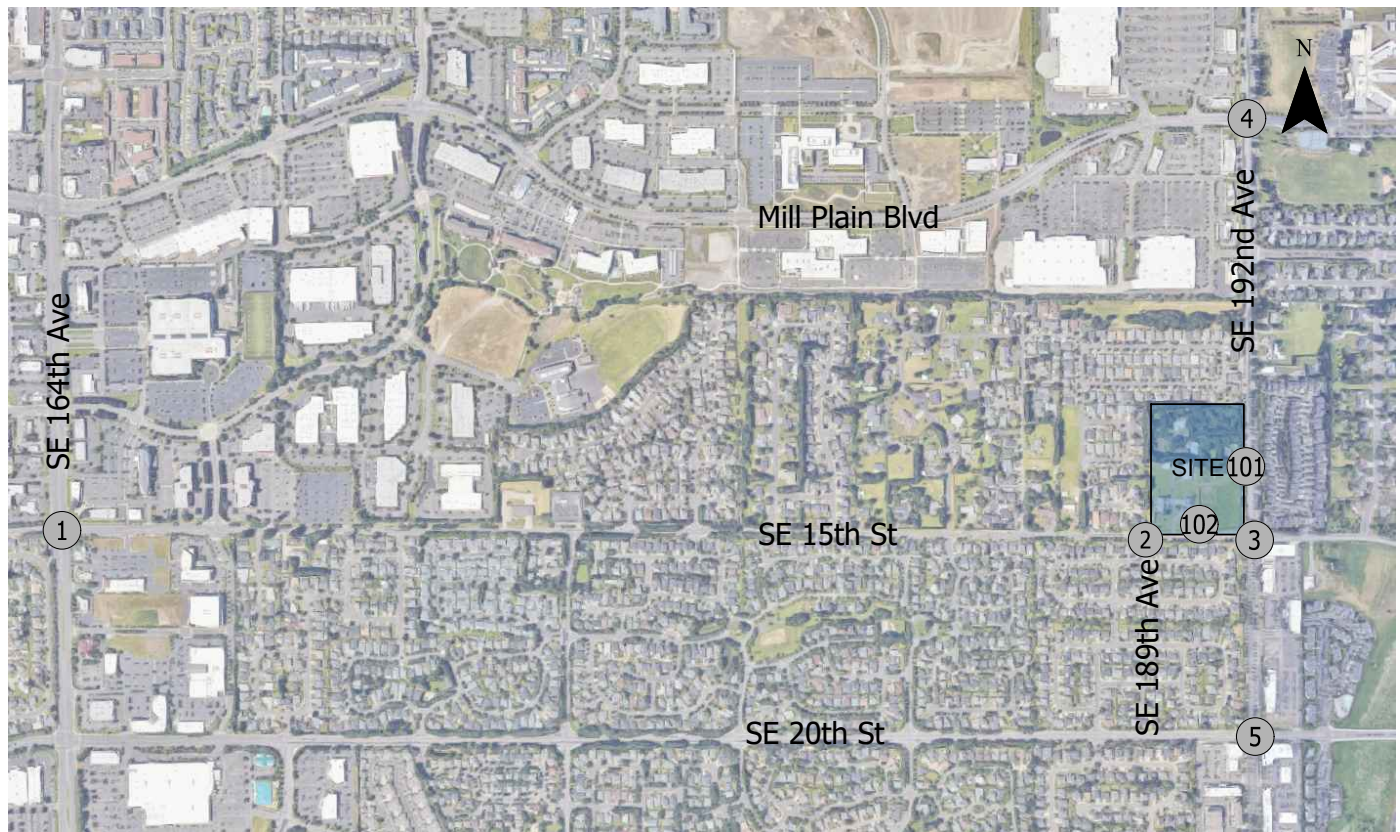
Figure
 11



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = INTERSECTION VOLUME-TO-CAPACITY RATIO/ APPROACH VOLUME-TO-CAPACITY RATIO (UNSIGNALIZED)

2027 Total Conditions
 Weekday AM Peak Hour
 Vancouver, WA

Figure
 12



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = INTERSECTION VOLUME-TO-CAPACITY RATIO/ APPROACH VOLUME-TO-CAPACITY RATIO (UNSIGNALIZED)

2027 Total Conditions
 Weekday PM Peak Hour
 Vancouver, WA

Figure
 13

Future Five-year (2032) Traffic Conditions

Future year 2032 traffic volumes were projected assuming a 1.5 percent compound annual growth from 2023 to 2027, and compound annual growth consistent with the Section 30 Subarea Study TIA to project growth from 2027 to 2032⁴. In-process trips were also added to the study intersections consistent with opening year 2027 traffic conditions.

Background Traffic Conditions (Existing Zoning)

The future five-year 2032 background traffic conditions analysis identifies how the study area's transportation system will operate five years after the anticipated opening year with the addition of trips generated by a reasonable worst-case development scenario under the existing zoning (see Table 3).

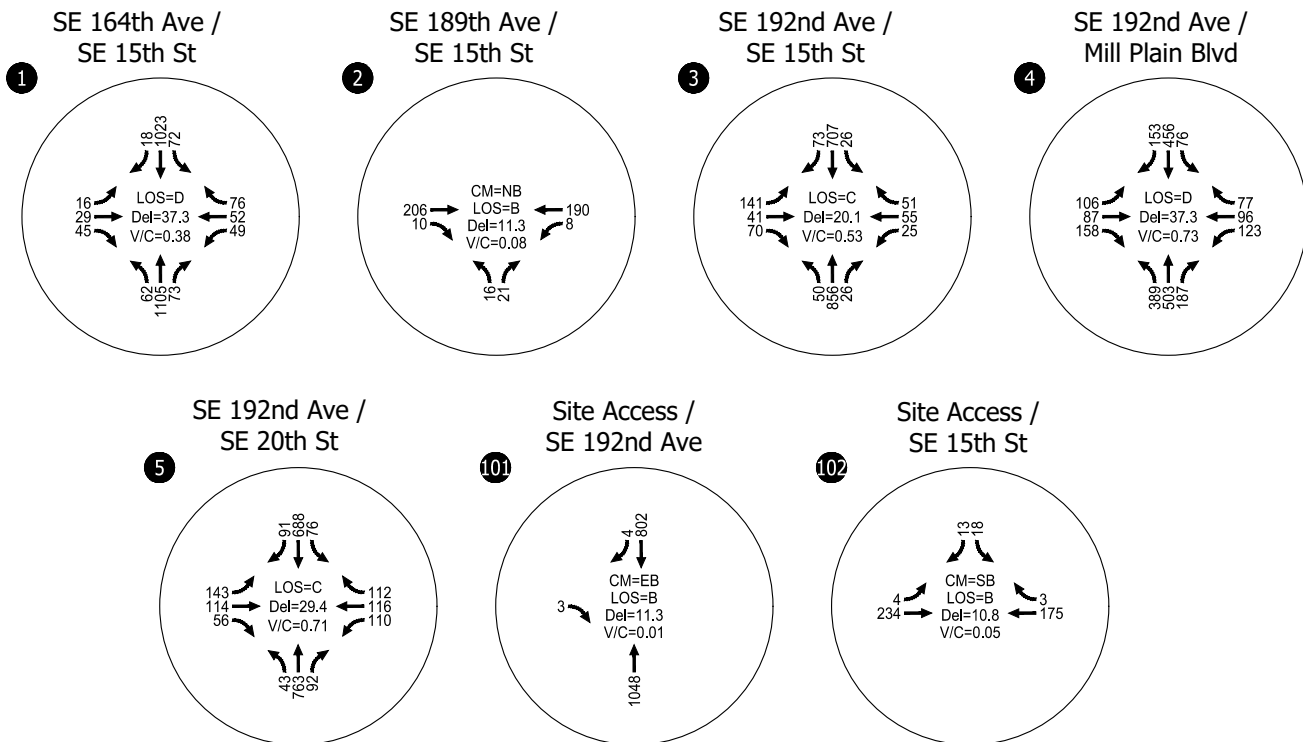
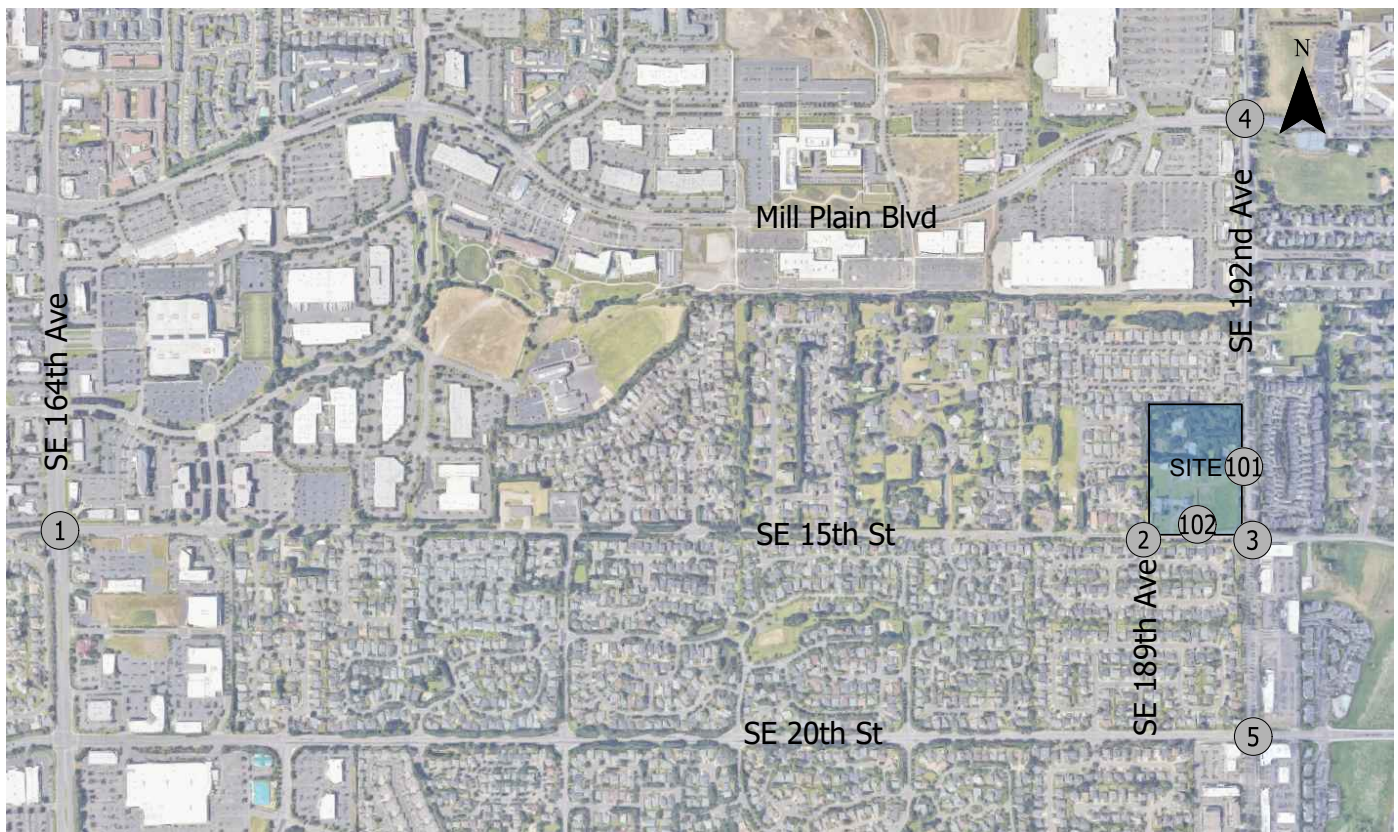
The site-generated trips in Figures 3 and 4 were added to the general growth and in-process trips to produce year 2032 background traffic volumes. Figures 14 and 15 illustrate the resultant "existing zoning" conditions. As shown, inclusive of regional growth, all the study intersections continue to operate acceptably under year 2032 background conditions. *Appendix "G" contains the 2032 background traffic operational analysis worksheets.*

Total Traffic Conditions (Proposed Zoning)

The future five-year 2032 total traffic conditions analysis identifies how the study area's transportation system will operate five years after the anticipated opening year with the addition of trips generated by a reasonable worst-case development scenario under the proposed zoning (see Table 3).

The site-generated trips in Figures 5 and 6 were added to the general growth and in-process trips to produce year 2032 total traffic volumes. Figures 16 and 17 illustrate the resultant "proposed zoning" conditions. As shown, inclusive of regional growth, all the study intersections continue to operate acceptably under year 2032 total traffic conditions with the proposed zoning. *Appendix "H" contains the year 2032 total traffic operational analysis worksheets.*

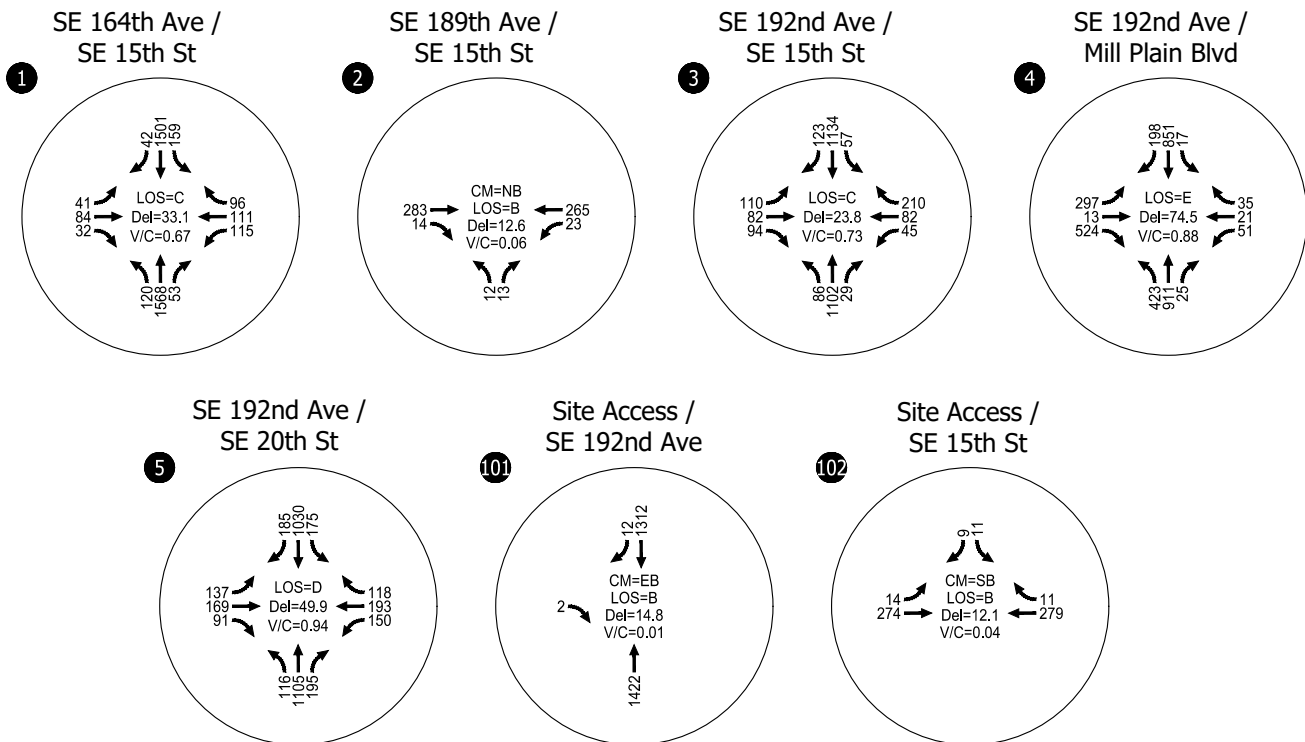
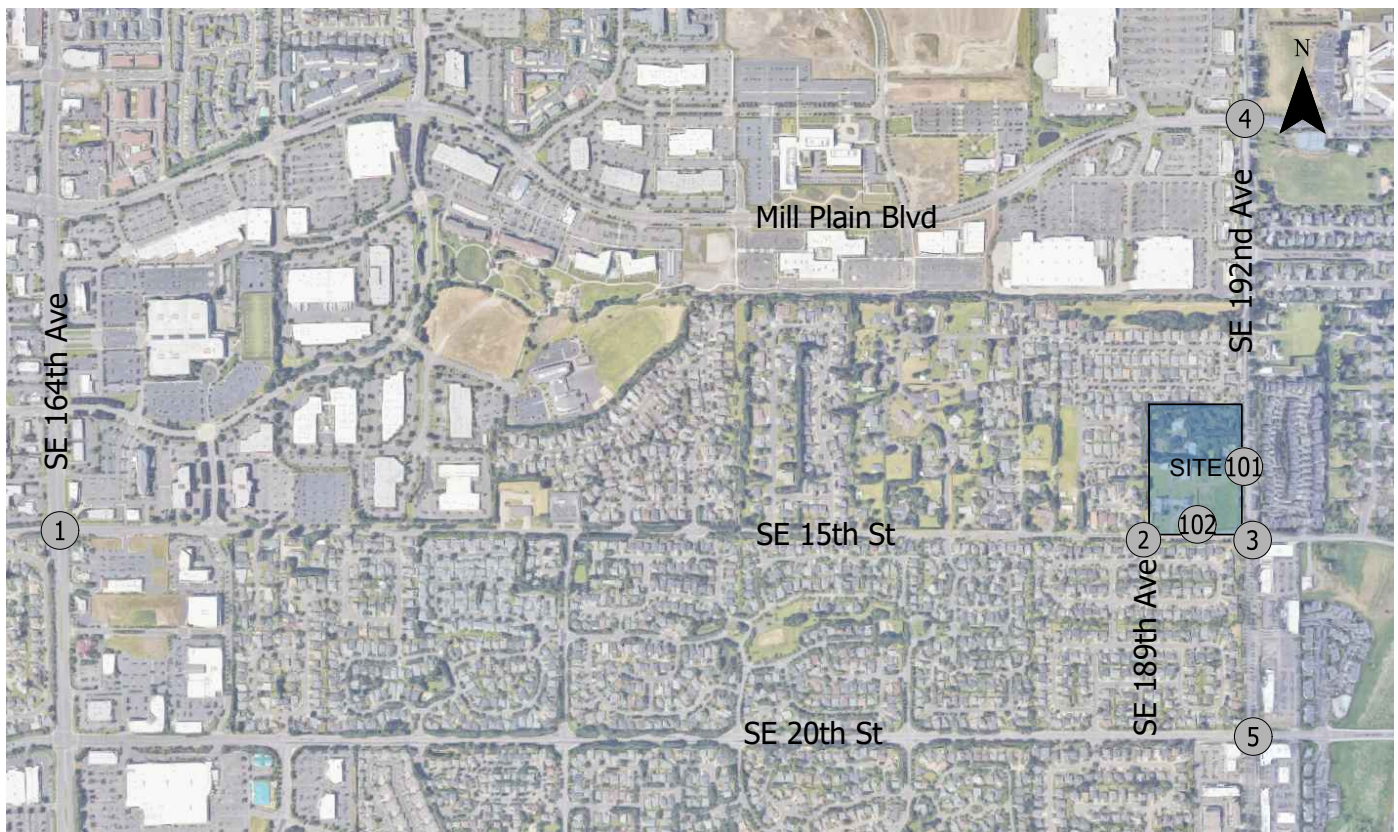
⁴ Consistent with the Section 30 study, a 0.5% compound growth rate was assumed for SE 192nd Avenue, SE 15th Street, and SE 20th Street. Also, a 1% annual growth rate was assumed along SE Mill Plain Boulevard and no growth was assumed for movements providing local access.



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = INTERSECTION VOLUME-TO-CAPACITY RATIO/ APPROACH VOLUME-TO-CAPACITY RATIO (UNSIGNALIZED)

2032 Background Conditions
 Weekday AM Peak Hour
 Vancouver, WA

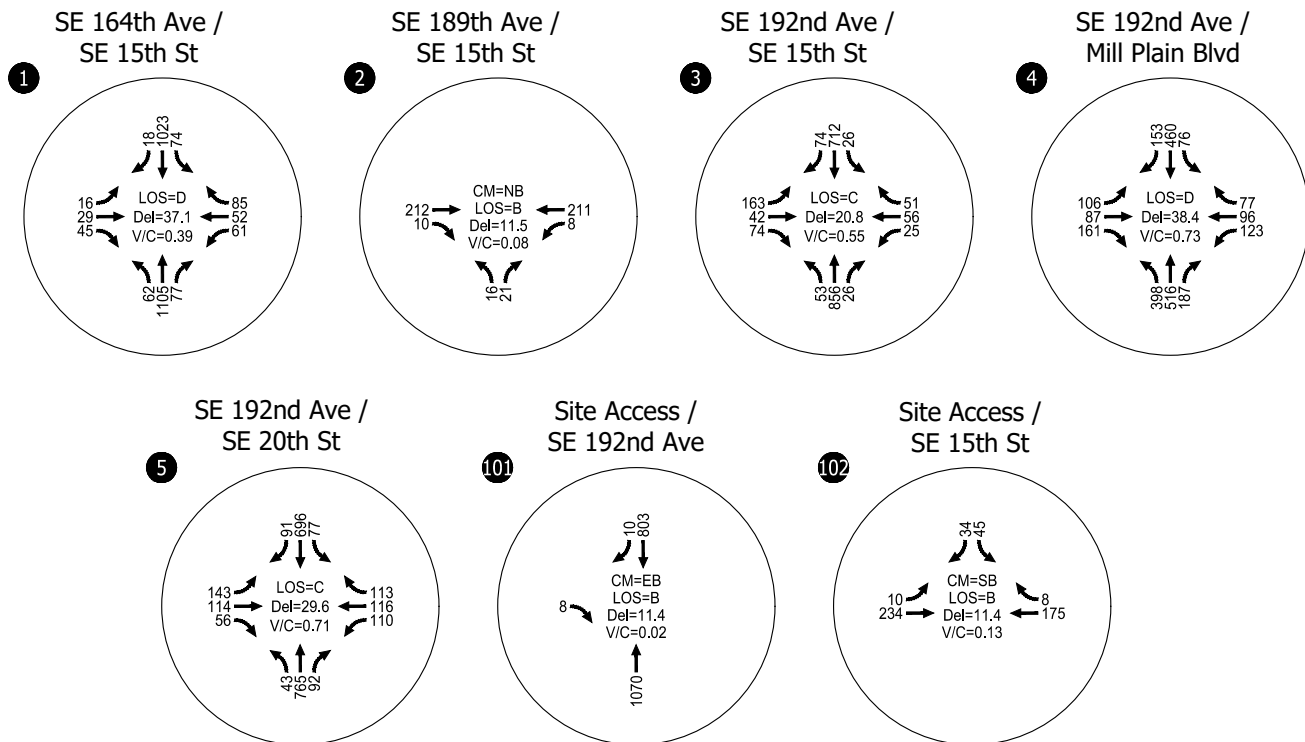
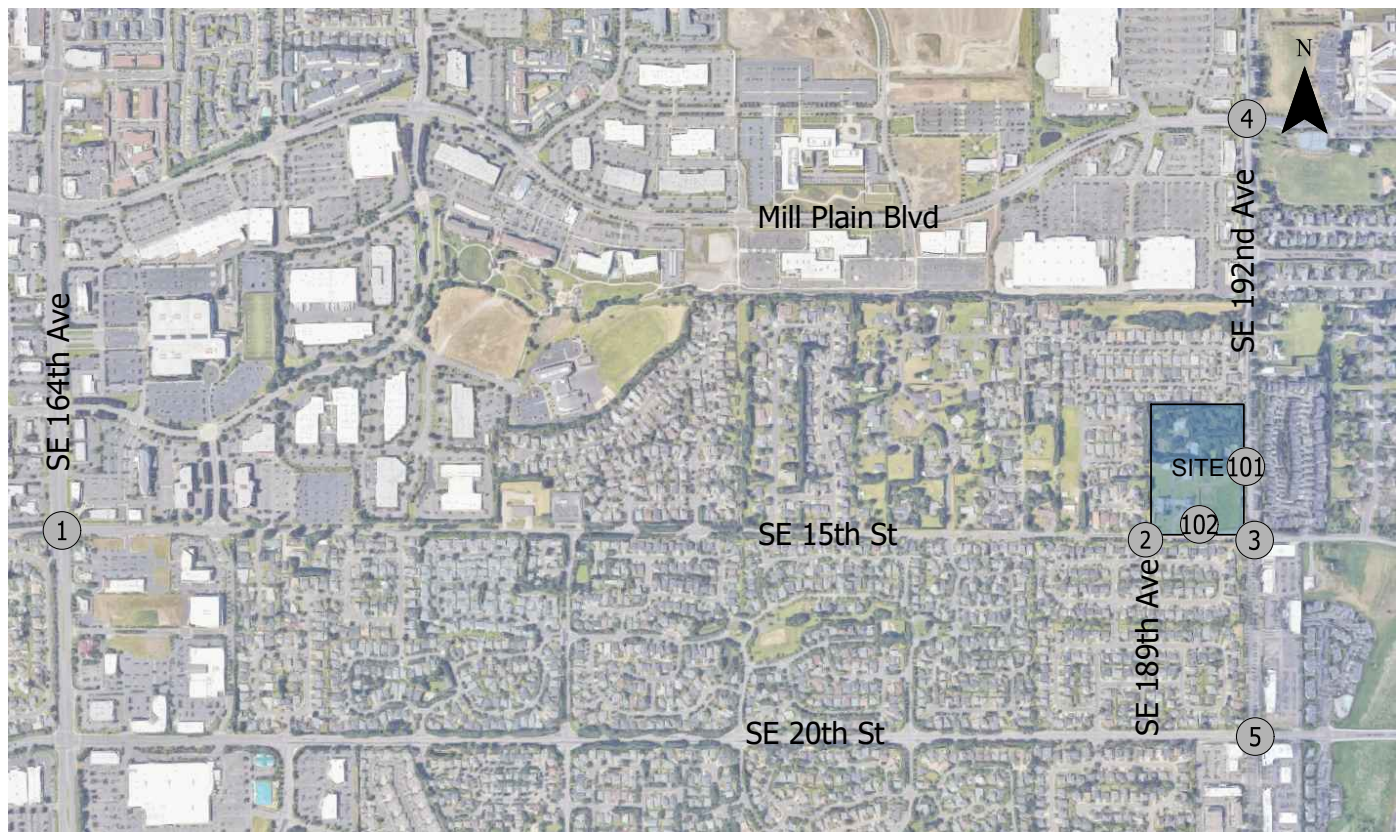
Figure
 14



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = INTERSECTION VOLUME-TO-CAPACITY RATIO/ APPROACH VOLUME-TO-CAPACITY RATIO (UNSIGNALIZED)

2032 Background Conditions
 Weekday PM Peak Hour
 Vancouver, WA

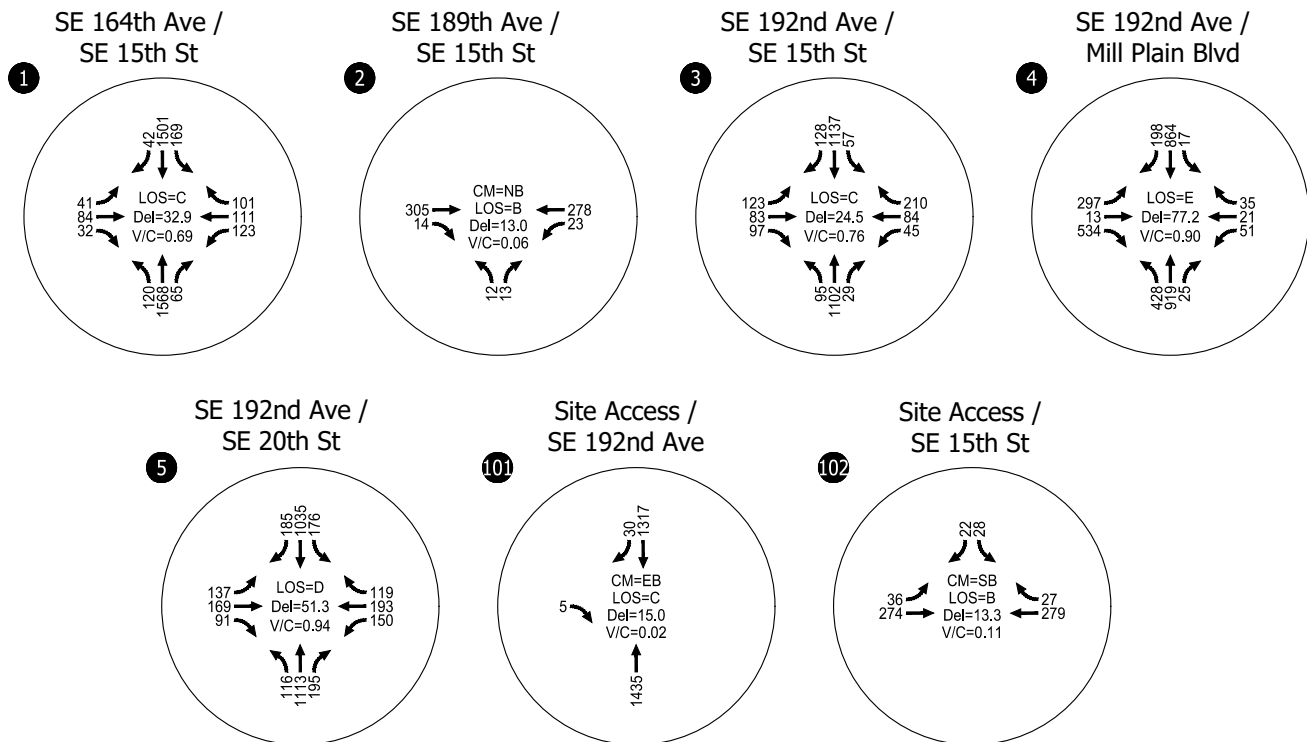
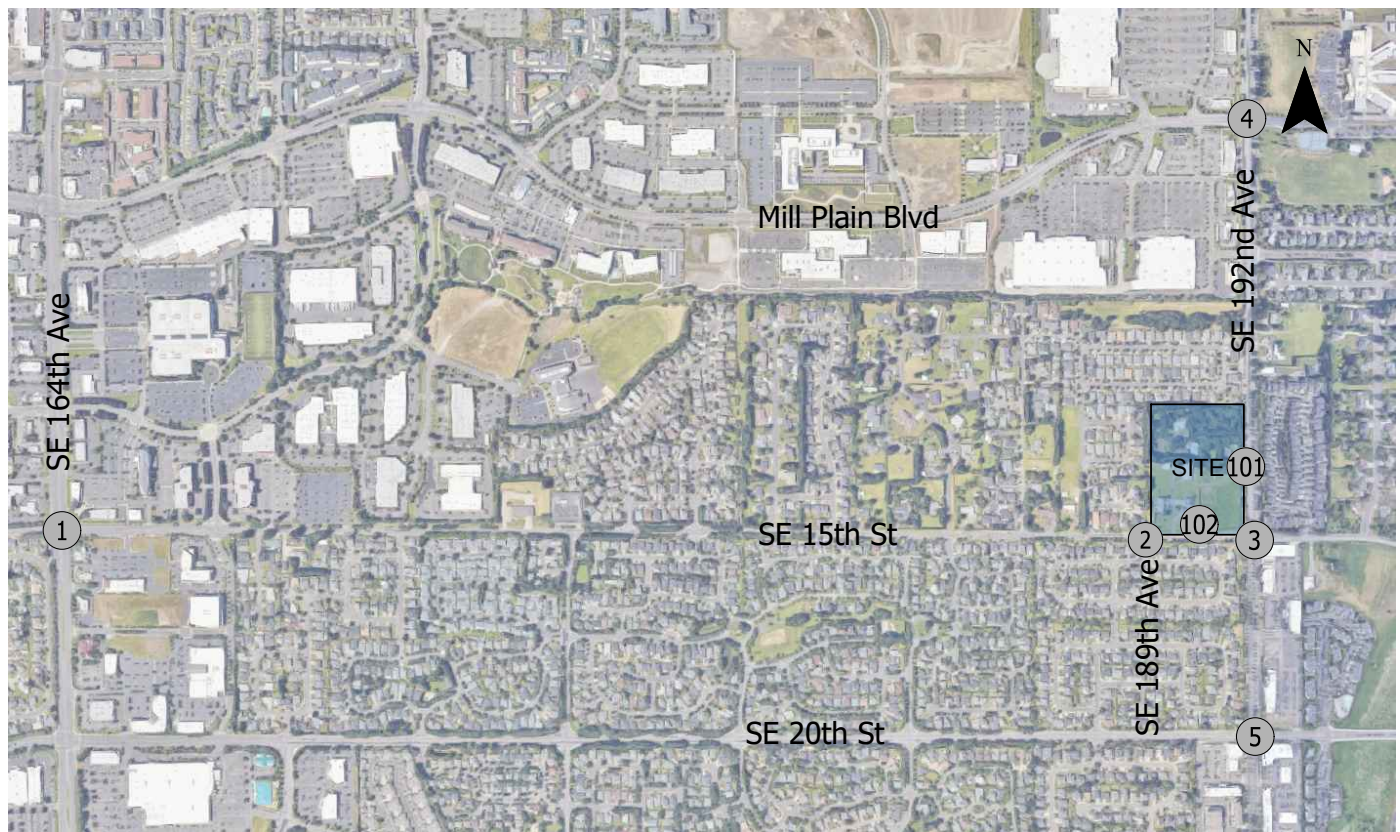
Figure
 15



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = INTERSECTION VOLUME-TO-CAPACITY RATIO/ APPROACH VOLUME-TO-CAPACITY RATIO (UNSIGNALIZED)

2032 Total Conditions
 Weekday AM Peak Hour
 Vancouver, WA

Figure
 16



CM = CRITICAL MOVEMENT (UNSIGNALIZED)
 LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
 Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
 V/C = INTERSECTION VOLUME-TO-CAPACITY RATIO/ APPROACH VOLUME-TO-CAPACITY RATIO (UNSIGNALIZED)

2032 Total Conditions
 Weekday PM Peak Hour
 Vancouver, WA

Figure
 17

Signalized Intersection Queuing Analysis

Queue lengths were evaluated at each of the signalized study intersections to identify potential queue spillback occurring during the future five-year 2032 background and total traffic scenarios. Tables 5 and 6 summarize 95th percentile queue lengths estimated by Synchro 11 at each of the study intersection's respective turn lanes and the through lanes adjacent to the anticipated site driveways.

Table 5. Future Five-Year (2032) Background Traffic Conditions (Existing Zoning) 95th Percentile Queue Lengths at Signalized Study Intersections

Intersection	Queue Length (feet)	Eastbound			Westbound		Northbound		Southbound		
		Left	Thru	Right	Left	Right	Left	Right	Left	Thru	Right
SE 164 th Avenue & SE 15 th Street	Storage	100	-	-	250	325	150	150	225	-	225
	AM Peak	25	-	-	75	50	100	25	125	-	25
	PM Peak	75	-	-	150	50	175	25	200	-	25
SE 192 nd Avenue & SE 15 th Street	Storage	110	-	-	110	110	175	-	475	-	-
	AM Peak	175	75	-	50	0	50	-	50	300	-
	PM Peak	150	175	-	100	100	50	-	100	475	-
SE 192 nd Avenue & SE Mill Plain Boulevard	Storage	225	-	150	100	-	200	-	150	-	-
	AM Peak	125	-	50	150	-	250	-	100	-	-
	PM Peak	500	-	325	75	-	300	-	50	-	-
SE 192 nd Avenue & SE 20 th Street	Storage	100	-	-	100	-	325	-	400	-	-
	AM Peak	100	-	-	75	-	75	-	125	-	-
	PM Peak	75	-	-	100	-	175	-	225	-	-

Notes:

95th percentile queue lengths have been rounded up to the nearest vehicle length, assuming one vehicle equals 25 feet

Bold cells indicate 95th percentile queue lengths greater than the storage length

Storage measured as the length of white gore stripe for turn lane

Table 6. Future Five-Year (2032) Total Traffic Conditions (Proposed Zoning) 95th Percentile Queue Lengths at Signalized Study Intersections

Intersection	Queue Length (feet)	Eastbound			Westbound		Northbound		Southbound		
		Left	Thru	Right	Left	Right	Left	Right	Left	Thru	Right
SE 164 th Avenue & SE 15 th Street	Storage	100	-	-	250	325	150	150	225	-	225
	AM Peak	25	-	-	75	50	100	25	125	-	25
	PM Peak	75	-	-	150	50	175	25	225	-	25
SE 192 nd Avenue & SE 15 th Street	Storage	110	400 ¹	-	110	110	175	-	475	525 ²	-
	AM Peak	175	75	-	50	0	50	-	50	300	-
	PM Peak	150	175	-	100	100	75	-	100	500	-
SE 192 nd Avenue & SE Mill Plain Boulevard	Storage	225	-	150	100	-	200	-	150	-	-
	AM Peak	125	-	50	150	-	250	-	100	-	-
	PM Peak	500	-	325	75	-	300	-	50	-	-
SE 192 nd Avenue & SE 20 th Street	Storage	100	-	-	100	-	325	-	400	-	-
	AM Peak	100	-	-	75	-	75	-	125	-	-
	PM Peak	75	-	-	100	-	175	-	200	-	-

Notes:

95th percentile queue lengths have been rounded up to the nearest vehicle length, assuming one vehicle equals 25 feet

Bold cells indicate 95th percentile queue lengths greater than the storage length

Storage measured as the length of white gore stripe for turn lane

¹There is approximately 400 feet between the eastbound traffic signal stop bar at SE 192nd Avenue and the conceptual site driveway location assumed on SE 15th Street

²There is approximately 525 feet between the southbound traffic signal stop bar at SE 15th Street and the conceptual site driveway location assumed on SE 192nd Avenue

As shown in Tables 5 and 6, at the intersection of SE 164th Avenue & SE 15th Street, the northbound left-turn queues are projected to experience 95th percentile queues that exceed the existing striped storage length during the weekday PM peak hour under 2032 background and total traffic conditions. Note that while only 150 feet of left-turn storage is striped, there is approximately 50 feet of additional storage available before the queue would block northbound through vehicles. Given that the proposed CPA and Zone Change does not change the projected northbound left-turn queue and does not add any additional trips to this movement, no mitigation is recommended at this time. Potential turn lane queue storage needs at the intersection can be revisited at the time of a future site development application.

At the intersection of SE 192nd Avenue & SE 15th Street, the eastbound left-turn queues are projected to experience 95th percentile queues that exceed the existing striped storage length during the weekday AM and PM peak hours under 2032 background and total traffic conditions. The proposed CPA and zone change does not impact the projected queue storage and thus does not need to be mitigated as a function of the site zoning. The queue projections indicate the eastbound left-turn lane at SE 192nd Avenue / SE 15th Street may need to be extended to provide up to 175 feet of storage based on the projections in this study. The actual turn lane storage length needs will depend in part on the density of site development that is proposed in the future and can be best assessed at the time of site plan application as required by the VMC. Subject to City of Vancouver direction and per standard City development review practice, future site development applications for the study site (as well as other development in the area) should continue to assess the need for additional eastbound left-turn lane queue storage on SE 15th Street at SE 192nd Avenue. The City of Vancouver can monitor turn lane storage length needs through the City's development review process and require an extension of the turn lane in conjunction with a future site plan application based on the documented turn lane storage needs at the time of site plan application in

accordance with the VMC. For these reasons, no queuing mitigation is recommended as a function of the proposed CPA and zone change.

The eastbound through and southbound through queues are not expected to extend past the anticipated site driveways on SE 15th Street and SE 192nd Avenue.

At the intersection of SE 192nd Avenue & SE Mill Plain Boulevard the eastbound left-turn and right-turn, westbound left-turn, and northbound left-turn queues are projected to experience 95th percentile queues that exceed the existing striped storage length regardless of the proposed CPA and zone change. Given the proposed CPA and Zone Change does not alter the projected queue lengths and does not add trips to the eastbound left-turn or westbound left-turn movements, no mitigation is recommended as a function of the proposed CPA and zone change. Potential turn lane queues storage needs at the intersection can be revisited at the time of a future site development application.

Unsignalized Intersection Queuing Analysis

A 95th percentile queuing analysis was completed using HCM 6th Edition analysis at the unsignalized study intersections. All of the 95th percentile stop-controlled approach queues were projected to be one vehicle length or less and can be accommodated within available storage.

There is approximately 150 feet between SE 189th Avenue and the anticipated site driveway on SE 15th Street. The 95th percentile queues for the westbound left-turn at SE 189th Avenue and the eastbound left-turn at the anticipated site driveway were projected to be one vehicle length or less and therefore are not expected to back up through the adjacent driveway.

Driveway Turn Lane Considerations

Right-turn and left-turn lane needs were evaluated at the anticipated site driveways, a right-in/right-out driveway along SE 192nd Avenue and a full access driveway along SE 15th Street, using WSDOT turn lane guidelines (Reference 6).

Under 2032 total traffic conditions, assuming the reasonable worst-case development under the proposed zoning, WSDOT volume-based criteria for providing turn lanes at the anticipated site driveways on SE 192nd Avenue and SE 15th Street are not met under either weekday AM or PM peak hour traffic conditions. Southbound volumes on SE 192nd Avenue do meet the criteria for considering a right-turn pocket or taper; however, installation of tapers is not recommended given the presence of the bicycle lane and intersection sight distance considerations. Potential turn lane needs at the site access driveways can be revisited at the time of a future site development application.

Appendix "I" includes the WSDOT turn lane criteria at the anticipated site driveways.

FINDINGS AND RECOMMENDATIONS

Based on the results of this Traffic Impact Analysis, the proposed CPA and Zone Change can be approved while maintaining acceptable study intersection operations. The analysis developed the findings and recommendations listed below.

Findings

- All of the study intersections were found to operate acceptably under opening year (2027) and five-year horizon (2032) traffic conditions with reasonable worst-case development of the site under both the existing (R-6) and proposed (R-30) zoning.
- The eastbound left-turn queues at SE 192nd Avenue / SE 15th Street are anticipated to exceed the currently available storage length under future five-year 2032 background (existing zoning) and total (proposed zoning) traffic conditions during the AM and PM peak hours assuming reasonable worst-case development of the site under both the existing (R-6) and proposed (R-30) zoning.
 - Subject to City of Vancouver direction and the specific traffic impacts of potential future site development, the eastbound left-turn lane at SE 192nd Avenue / SE 15th Street may need to be extended to provide up to 175 feet of storage based on the projections in this study.
 - The actual turn lane storage length needs will depend in part on the density of site development that is proposed in the future and can be best assessed at the time of site plan application as required by the VMC.
- No safety-based mitigation needs were identified based on review of historic crash data at the study intersections.
- WSDOT volume-based criteria for providing turn lanes at the anticipated site driveways on SE 192nd Avenue and SE 15th Street are not met under either weekday AM or PM peak hour traffic conditions. Southbound volumes on SE 192nd Avenue do meet the criteria for considering a right-turn pocket or taper; however, installation of tapers is not recommended given the presence of the bicycle lane and intersection sight distance considerations. Potential turn lane needs at the site access driveways can be revisited at the time of a future site development application.

Recommendations

- Subject to City of Vancouver direction and per standard City development review practice, future site development applications for the study site (as well as other development in the area) should continue to assess the need for additional eastbound left-turn lane queue storage on SE 15th Street at SE 192nd Avenue. The City of Vancouver can monitor turn lane storage length needs through the City's development review process and require an extension of the turn lane in conjunction with a future site plan application based on the documented turn lane storage needs at the time of site plan application in accordance with the VMC.

We trust this transportation impact analysis adequately addresses the traffic impacts associated with the proposed SE 192nd Avenue CPA and Zone Change request. Please contact us at 503.535.7445 or kconnolly@kittelson.com if you have questions or require additional information.

References

1. City of Vancouver Washington. *Vancouver Municipal Code*. 2023.
2. Transportation Research Board. *2000 Highway Capacity Manual*. 2000.
3. Transportation Research Board. *Highway Capacity Manual 6th Edition*. 2016.
4. Institute of Transportation Engineers. *Trip Generation Manual, 11th Edition*. 2021.
5. Institute of Transportation Engineers. *Trip Generation Handbook, 3rd Edition*. 2017.
6. Washington State Department of Transportation. *Design Manual*. September 2022.

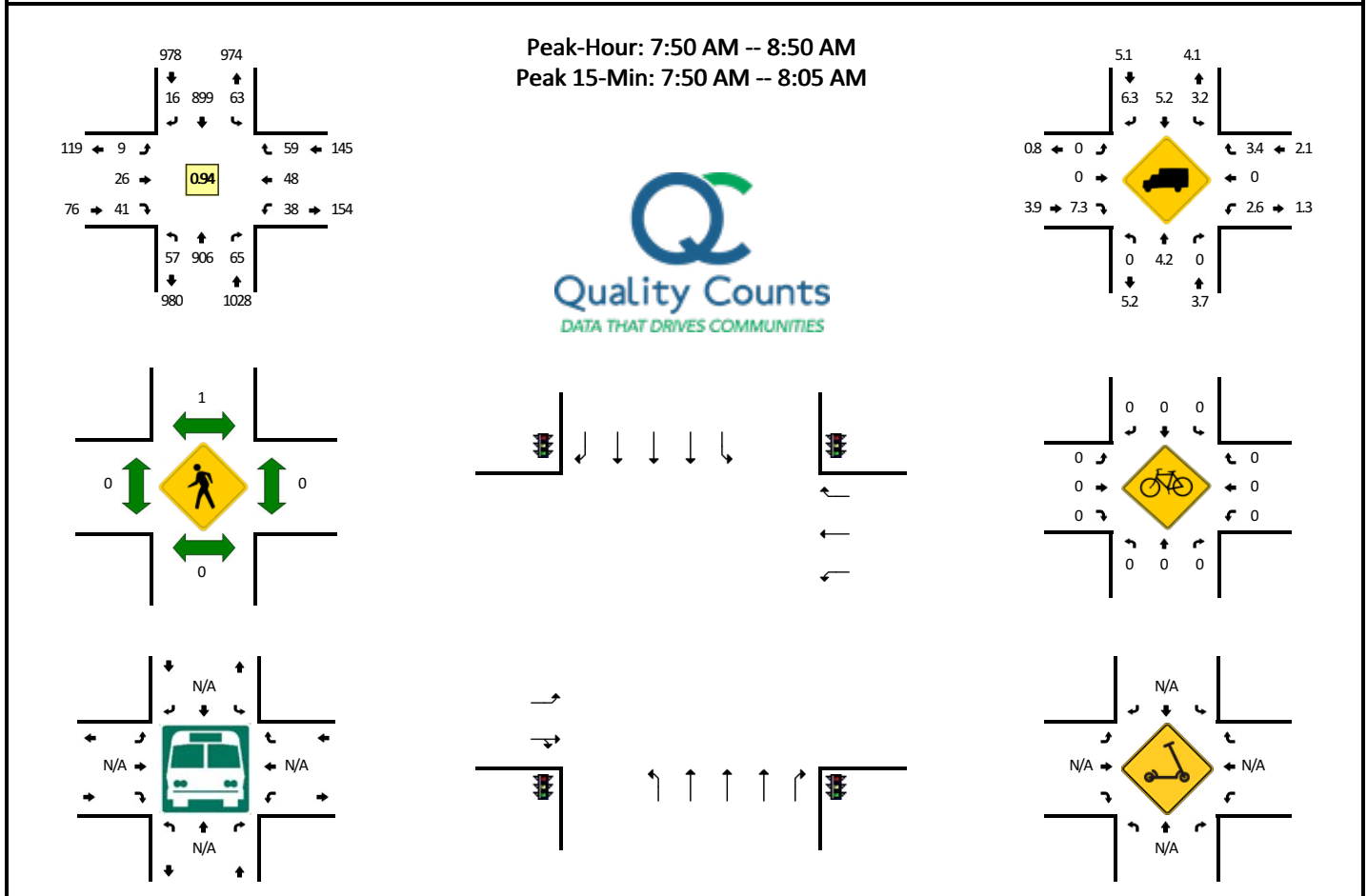
Appendices

- A. Traffic Count Data
- B. WSDOT Crash Data
- C. 2023 Existing Operations Worksheets
- D. In-process Trips
- E. 2027 Background Operations (Existing Zoning) Worksheets
- F. 2027 Total Operations (Proposed Zoning) Worksheets
- G. 2032 Background Operations (Existing Zoning) Worksheets
- H. 2032 Total Operations (Proposed Zoning) Worksheets
- I. WSDOT Turn Lane Criteria

Appendix A Traffic Count Data

LOCATION: SE 164th Ave -- SE 15th St
CITY/STATE: Vancouver, WA

QC JOB #: 16228505
DATE: Tue, Jun 6 2023

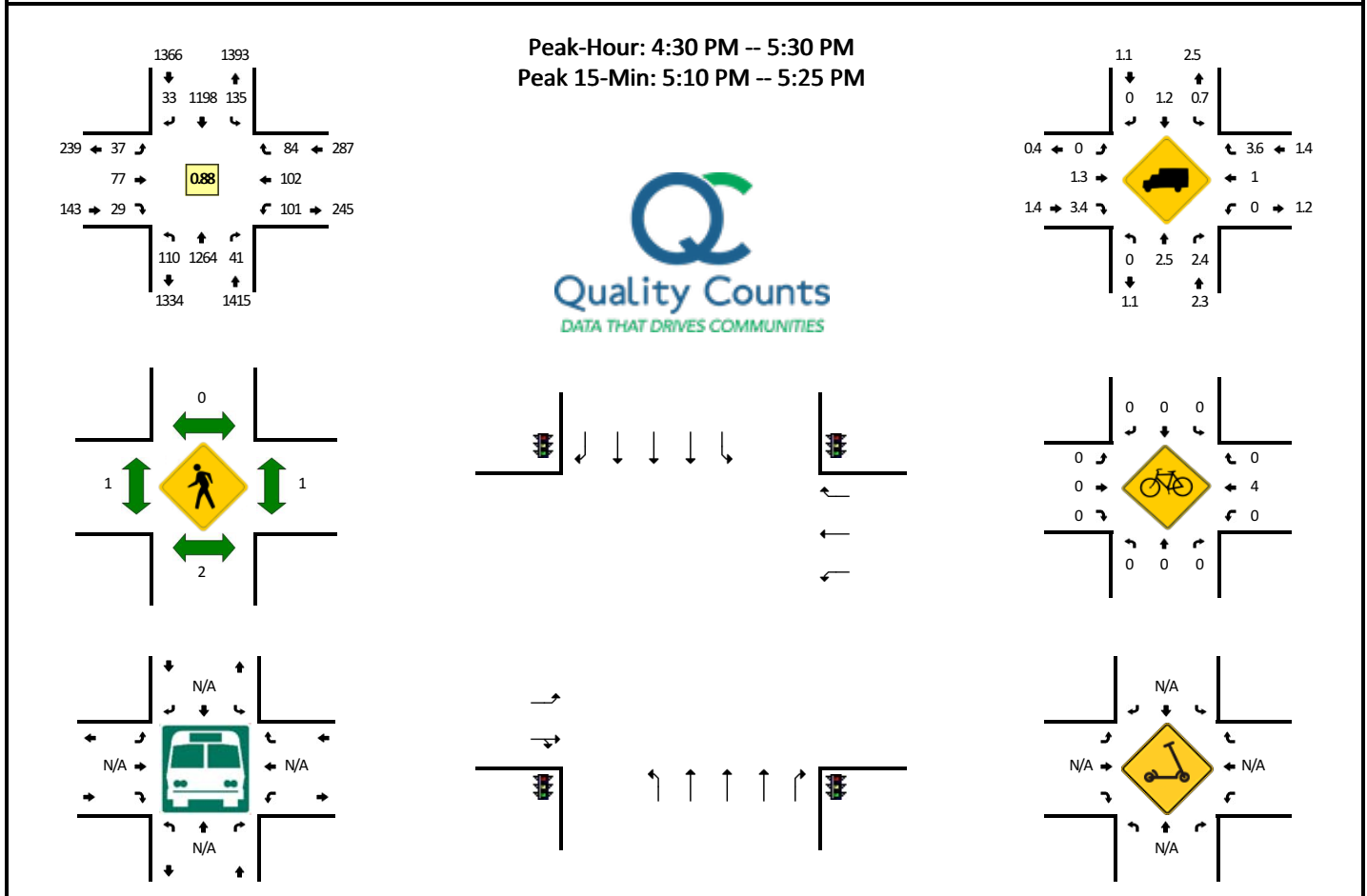


5-Min Count Period Beginning At	SE 164th Ave (Northbound)				SE 164th Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	36	2	0	4	66	2	0	1	1	1	0	1	0	6	0	120	
7:05 AM	5	61	2	0	1	41	1	0	2	2	0	0	5	1	3	0	124	
7:10 AM	1	48	1	0	4	57	1	0	0	1	2	0	4	2	6	0	127	
7:15 AM	1	47	4	0	1	51	0	0	1	0	2	0	6	3	9	0	125	
7:20 AM	0	49	1	0	6	63	0	0	2	0	2	0	1	5	7	0	136	
7:25 AM	4	56	2	0	1	46	0	0	0	2	2	0	2	3	11	0	129	
7:30 AM	1	71	2	0	3	69	1	0	1	1	3	0	2	0	6	0	160	
7:35 AM	0	75	3	0	4	49	1	0	0	1	3	0	3	1	4	0	144	
7:40 AM	3	63	3	0	8	74	0	0	0	0	3	0	3	1	3	0	161	
7:45 AM	6	71	4	0	0	74	3	0	4	3	0	0	2	0	9	0	176	
7:50 AM	2	91	9	0	9	74	2	0	1	7	2	0	2	5	6	0	210	
7:55 AM	4	75	6	0	5	75	4	0	0	3	2	0	0	2	7	0	183	1795
8:00 AM	5	76	7	0	5	84	2	0	2	1	4	0	5	5	5	0	201	1876
8:05 AM	4	78	4	0	6	62	0	0	0	3	4	0	5	6	3	0	175	1927
8:10 AM	6	64	8	0	6	82	1	0	1	2	1	0	6	2	3	0	182	1982
8:15 AM	7	79	6	0	7	70	1	0	0	2	6	0	4	6	1	0	189	2046
8:20 AM	4	67	7	0	4	76	0	0	0	0	4	0	1	2	7	0	172	2082
8:25 AM	8	88	5	0	4	50	1	0	3	0	2	0	6	2	8	0	177	2130
8:30 AM	2	62	2	0	3	97	1	0	1	1	7	0	0	7	5	0	188	2158
8:35 AM	2	77	4	1	1	61	2	0	0	1	5	0	4	2	3	0	163	2177
8:40 AM	7	69	1	1	6	86	1	0	1	3	4	0	1	4	6	0	190	2206
8:45 AM	4	80	6	0	7	82	1	0	0	3	0	0	4	5	5	0	197	2227
8:50 AM	3	82	4	0	9	91	1	0	0	0	2	0	5	6	4	0	207	2224
8:55 AM	9	74	8	0	7	62	3	0	1	1	2	0	4	3	5	0	179	2220
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	44	968	88	0	76	932	32	0	12	44	32	0	28	48	72	0	2376	
Heavy Trucks	0	32	0	0	0	52	4	0	0	0	4	0	0	0	4	0	96	
Buses																		
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Scooters																		

Comments:

LOCATION: SE 164th Ave -- SE 15th St
CITY/STATE: Vancouver, WA

QC JOB #: 16228506
DATE: Tue, Jun 6 2023

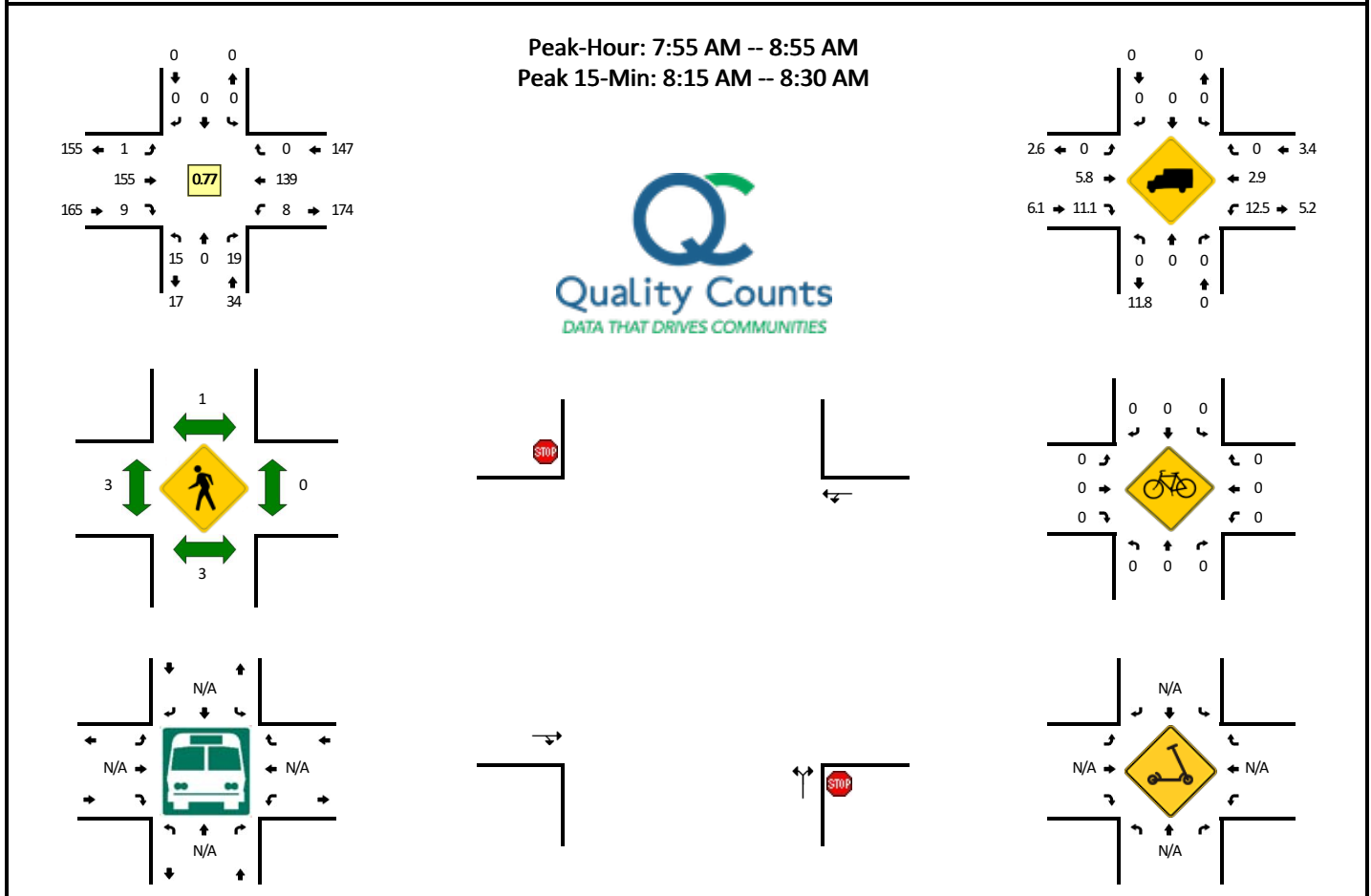


5-Min Count Period Beginning At	SE 164th Ave (Northbound)				SE 164th Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	117	5	0	3	100	2	0	4	2	5	0	9	6	3	0	261	
4:05 PM	13	84	4	0	7	64	3	0	6	8	3	0	16	4	6	0	218	
4:10 PM	8	106	6	0	6	119	5	0	6	5	3	0	7	2	11	0	284	
4:15 PM	9	95	2	0	9	87	1	0	2	10	2	0	13	6	9	0	245	
4:20 PM	6	150	3	0	6	110	1	0	3	2	3	0	7	4	9	0	304	
4:25 PM	5	98	5	0	12	73	3	0	3	2	2	0	7	8	4	0	222	
4:30 PM	6	132	5	0	7	79	3	0	2	4	3	0	5	6	9	0	261	
4:35 PM	6	75	2	0	15	88	0	1	3	5	8	0	14	6	4	0	227	
4:40 PM	11	116	3	1	5	114	1	2	0	3	0	0	5	13	6	0	280	
4:45 PM	7	112	3	2	9	71	1	1	2	11	1	0	18	6	8	0	252	
4:50 PM	12	117	4	0	8	95	2	0	2	3	0	0	5	10	9	0	267	
4:55 PM	4	95	2	0	12	78	2	1	1	8	1	0	5	10	7	0	226	
5:00 PM	6	112	2	1	10	114	7	1	3	3	2	0	7	5	6	0	279	3047
5:05 PM	9	86	2	0	11	93	3	0	9	9	4	0	12	11	10	0	259	3065
5:10 PM	8	116	2	0	9	147	5	2	5	5	2	0	11	3	4	0	319	3106
5:15 PM	13	88	6	1	17	78	3	0	4	8	2	0	11	15	8	0	254	
5:20 PM	10	137	3	0	10	139	6	0	4	9	5	0	4	11	6	0	344	3141
5:25 PM	12	78	7	1	14	102	0	0	2	9	1	0	4	6	7	0	243	3150
5:30 PM	3	91	4	0	8	85	4	0	5	8	11	0	5	1	6	0	231	3190
5:35 PM	4	72	1	0	5	67	4	1	1	8	5	0	4	5	6	0	183	3211
5:40 PM	6	97	6	0	6	114	2	2	1	3	7	0	1	5	4	0	254	3111
5:45 PM	11	83	4	1	10	82	1	0	3	4	5	0	5	10	10	0	229	3088
5:50 PM	8	111	2	0	7	99	5	0	2	6	6	0	7	5	6	0	264	3085
5:55 PM	4	68	0	0	5	70	3	0	4	0	2	0	1	11	4	0	172	3031
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	124	1364	44	4	144	1456	56	8	52	88	36	0	104	116	72	0	3668	
Heavy Trucks	0	20	0		0	16	0		0	4	0		0	0	4		44	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	8	0		8	
Scooters																		

Comments:

LOCATION: SE 189th Ave -- SE 15th St
CITY/STATE: Vancouver, WA

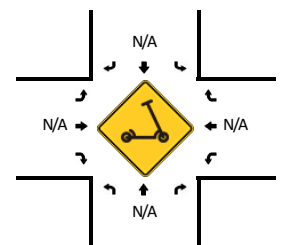
QC JOB #: 16228503
DATE: Tue, Jun 6 2023



5-Min Count Period Beginning At	SE 189th Ave (Northbound)				SE 189th Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	1	0	0	0	0	0	0	5	0	0	0	2	0	0	8	
7:05 AM	0	0	3	0	0	0	0	0	0	5	0	0	0	6	0	0	14	
7:10 AM	0	0	2	0	0	0	0	0	0	6	1	0	0	6	0	0	15	
7:15 AM	1	0	0	0	0	0	0	0	0	5	1	0	0	7	0	0	14	
7:20 AM	0	0	2	0	0	0	0	0	0	9	0	0	0	6	0	0	18	
7:25 AM	1	0	1	0	0	0	0	0	0	6	0	0	0	4	0	0	13	
7:30 AM	0	0	1	0	0	0	0	0	0	10	2	0	0	6	0	0	20	
7:35 AM	3	0	2	0	0	0	0	0	0	12	0	0	0	4	0	0	23	
7:40 AM	0	0	1	0	0	0	0	0	0	10	0	0	0	4	0	0	16	
7:45 AM	1	0	2	0	0	0	0	0	0	11	0	0	0	11	0	0	28	
7:50 AM	1	0	0	0	0	0	0	0	0	13	0	0	0	8	0	0	23	
7:55 AM	0	0	1	0	0	0	0	0	0	9	0	0	0	18	0	0	29	221
8:00 AM	1	0	1	0	0	0	0	0	0	10	0	0	0	13	0	0	25	238
8:05 AM	1	0	1	0	0	0	0	0	0	15	0	0	0	9	0	0	27	251
8:10 AM	2	0	2	0	0	0	0	0	0	18	0	0	0	12	0	0	34	270
8:15 AM	2	0	3	0	0	0	0	0	0	18	0	0	0	8	0	0	32	288
8:20 AM	0	0	5	0	0	0	0	0	0	19	1	1	0	9	0	0	35	305
8:25 AM	2	0	2	0	0	0	0	0	0	22	1	0	0	18	0	0	45	337
8:30 AM	2	0	0	0	0	0	0	0	0	8	1	0	0	4	0	0	15	332
8:35 AM	1	0	1	0	0	0	0	0	0	8	0	0	0	11	0	0	24	333
8:40 AM	0	0	1	0	0	0	0	0	0	10	1	0	0	11	0	0	23	340
8:45 AM	3	0	0	0	0	0	0	0	0	10	3	0	0	10	0	0	26	338
8:50 AM	1	0	2	0	0	0	0	0	0	8	2	0	0	16	0	0	31	346
8:55 AM	2	0	2	0	0	0	0	0	0	9	1	0	0	14	0	0	28	345
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	16	0	40	0	0	0	0	0	0	236	8	4	4	140	0	0	448	
Heavy Trucks	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	20	
Buses																		
Pedestrians		0				0				8				0			8	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

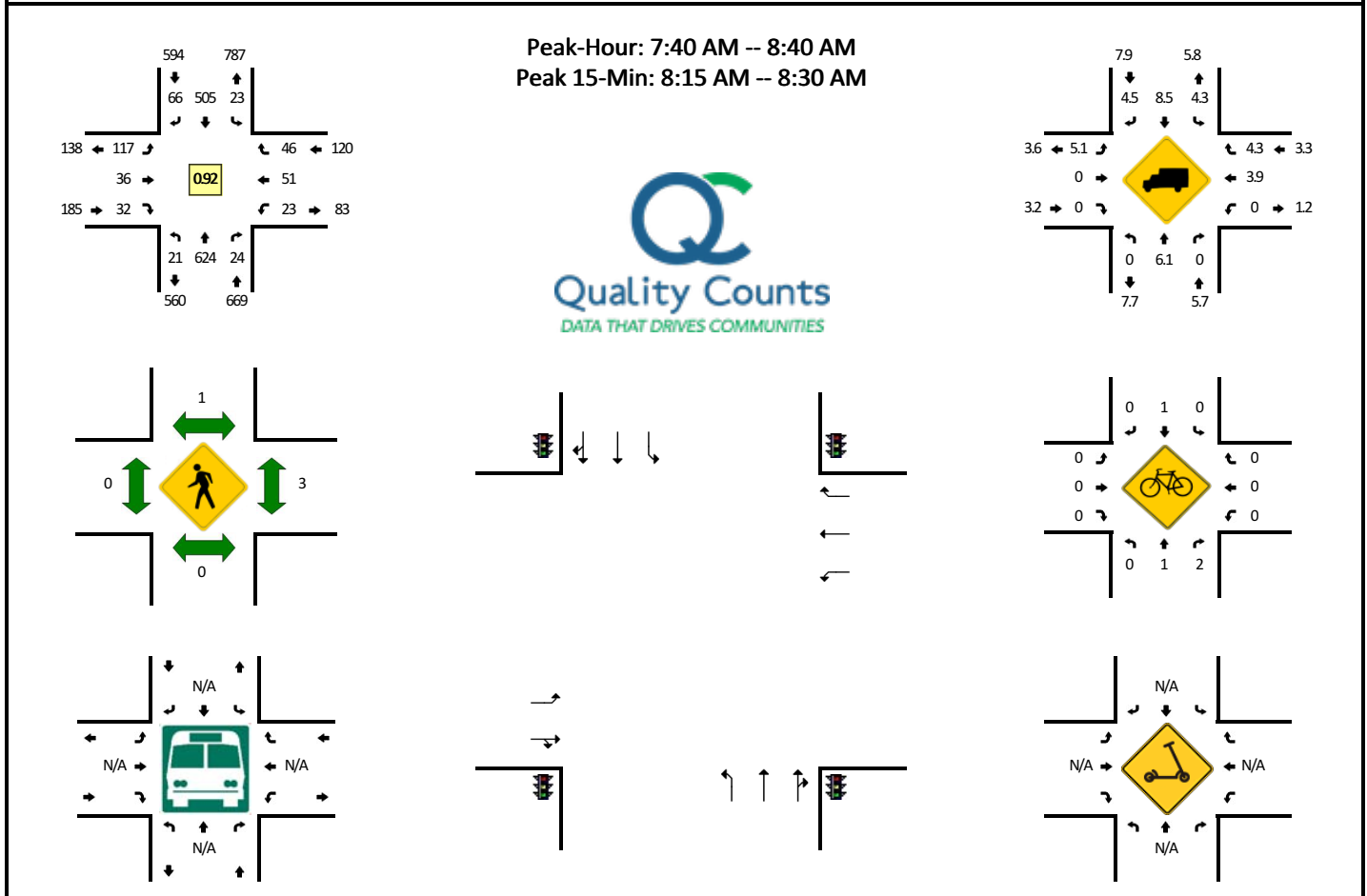
QC JOB #: 16228504
DATE: Tue, Jun 6 2023



Comments:

LOCATION: SE 192nd Ave -- SE 15th St
CITY/STATE: Vancouver, WA

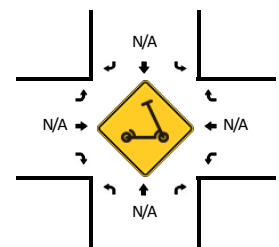
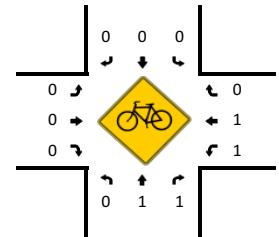
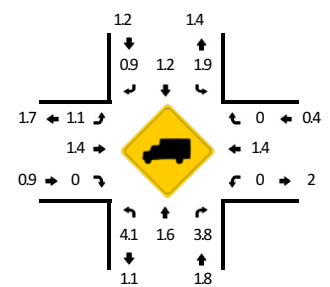
QC JOB #: 16228501
DATE: Tue, Jun 6 2023



5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	25	0	0	3	29	1	0	1	1	2	0	1	0	2	0	66	
7:05 AM	1	33	0	0	0	35	4	0	3	2	0	0	1	0	2	0	81	
7:10 AM	0	24	1	0	1	32	4	0	5	3	0	0	0	2	3	0	75	
7:15 AM	1	36	0	0	0	52	4	0	2	1	1	0	0	2	2	0	101	
7:20 AM	1	41	1	0	2	32	3	0	3	4	4	0	1	3	2	0	97	
7:25 AM	0	39	0	0	4	40	3	0	2	1	2	0	1	2	2	0	96	
7:30 AM	3	50	1	0	0	31	4	0	7	2	1	0	0	1	2	0	102	
7:35 AM	2	47	2	0	2	35	1	0	11	4	4	0	1	3	0	0	112	
7:40 AM	2	59	4	0	3	34	1	0	6	1	4	0	2	2	3	0	121	
7:45 AM	1	59	2	0	1	43	8	0	10	3	3	0	3	5	5	0	143	
7:50 AM	4	55	1	0	2	57	5	0	12	3	6	0	2	2	4	0	153	
7:55 AM	2	43	3	0	3	41	10	0	2	5	2	0	2	8	5	0	126	1273
8:00 AM	0	46	3	0	3	43	9	0	6	3	2	0	1	3	3	0	122	1329
8:05 AM	2	47	1	0	1	35	5	0	11	3	0	0	2	3	3	0	113	1361
8:10 AM	4	42	1	0	1	39	2	0	9	3	6	0	0	6	3	0	116	1402
8:15 AM	0	66	1	0	3	39	4	0	16	4	2	0	1	5	6	0	147	1448
8:20 AM	1	56	2	0	0	31	3	0	13	3	3	0	4	8	3	0	127	1478
8:25 AM	3	46	2	0	1	52	9	0	20	5	4	0	4	5	2	0	153	1535
8:30 AM	0	48	2	0	2	39	2	0	8	1	0	0	0	1	6	0	109	1542
8:35 AM	2	57	2	0	3	52	8	0	4	2	0	0	2	3	3	0	138	1568
8:40 AM	3	39	0	0	2	43	4	0	8	1	3	0	1	4	3	0	111	1558
8:45 AM	6	57	2	0	0	47	1	0	7	1	2	0	2	4	1	0	130	1545
8:50 AM	3	41	1	0	5	48	8	0	5	2	2	0	1	6	3	0	125	1517
8:55 AM	4	50	2	0	0	51	8	0	5	3	2	0	0	2	6	0	133	1524
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	16	672	20	0	16	488	64	0	196	48	36	0	36	72	44	0	1708	
Heavy Trucks	0	44	0	0	0	48	4	0	20	0	0	0	0	4	8	0	128	
Buses																		
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Scooters																		

Comments:

QC JOB #: 16228502
DATE: Tue, Jun 6 2023

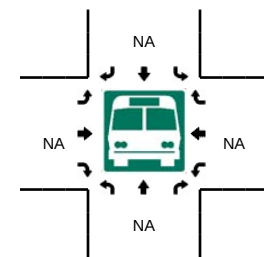
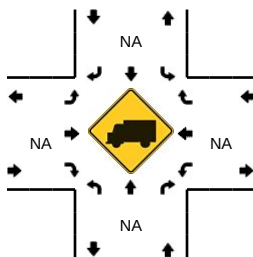
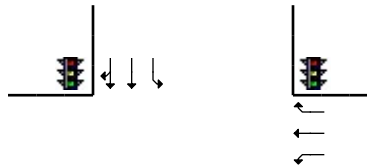
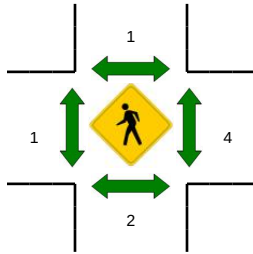
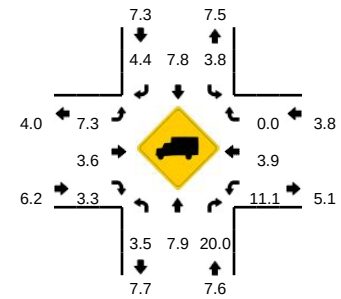
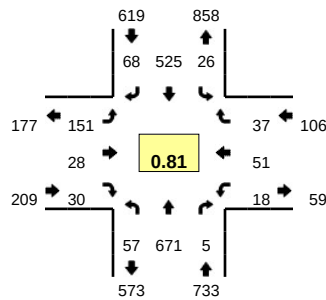


Comments:

LOCATION: SE 192nd Ave -- SE 15th St
CITY/STATE: Camas, WA

QC JOB #: 14421313
DATE: Thu, Jun 08 2017

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



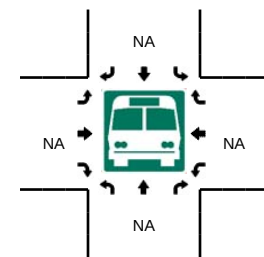
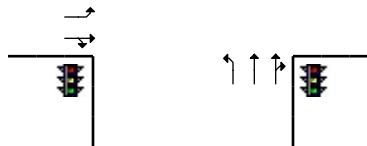
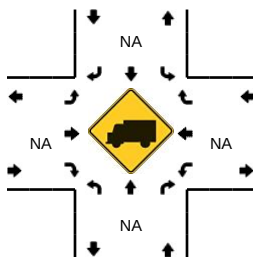
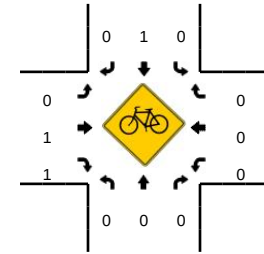
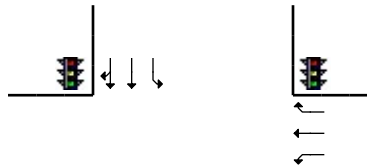
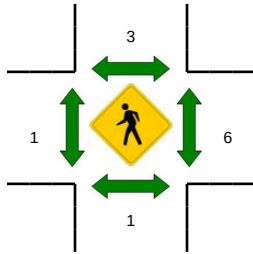
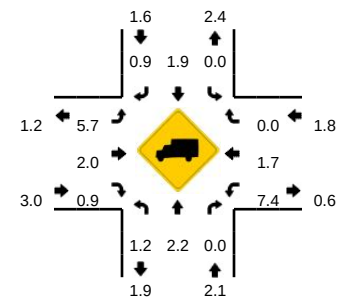
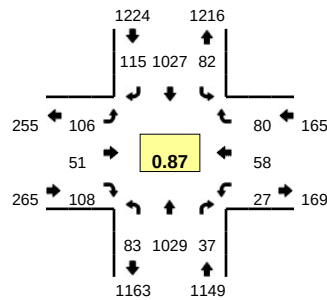
5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	37	2	0	5	40	1	0	3	1	1	0	0	2	0	0	97	
7:05 AM	0	40	0	0	4	30	0	0	3	3	5	0	2	1	0	0	88	
7:10 AM	1	38	0	0	1	16	1	0	2	3	6	0	1	3	5	0	77	
7:15 AM	3	37	0	0	2	34	6	0	3	3	3	0	5	2	5	0	103	
7:20 AM	5	40	1	0	0	43	4	0	3	0	0	0	1	3	0	0	100	
7:25 AM	5	43	0	0	2	27	2	0	2	2	2	0	2	2	0	0	89	
7:30 AM	4	58	0	0	0	28	0	0	11	0	5	0	1	2	2	0	111	
7:35 AM	2	67	1	0	2	39	7	0	16	1	0	0	1	2	3	0	141	
7:40 AM	4	62	0	0	2	43	6	0	13	3	5	0	1	6	6	0	151	
7:45 AM	6	61	1	0	0	51	6	0	12	4	4	0	2	7	5	0	159	
7:50 AM	4	72	0	0	3	67	7	0	17	1	0	0	2	6	3	0	182	
7:55 AM	5	67	2	0	5	62	9	0	8	1	3	0	5	7	1	0	175	1473
8:00 AM	11	63	0	0	2	49	10	0	14	2	3	0	1	3	1	0	159	
8:05 AM	4	38	1	0	5	46	8	0	9	4	1	0	0	7	5	0	128	1575
8:10 AM	3	40	0	0	1	39	3	0	11	4	1	0	2	3	6	0	113	1611
8:15 AM	4	49	0	0	0	25	4	0	13	4	3	0	1	2	2	0	107	1615
8:20 AM	7	39	0	0	4	43	4	0	12	1	2	1	2	2	2	0	119	1634
8:25 AM	3	55	0	0	2	33	4	0	14	3	3	0	0	4	1	0	122	1667
8:30 AM	6	36	0	0	0	39	5	0	9	2	2	0	0	2	1	0	102	1658
8:35 AM	2	44	0	0	0	45	8	0	7	4	1	0	3	0	3	0	117	1634
8:40 AM	7	55	0	0	1	43	10	0	6	1	2	0	1	2	4	0	132	1615
8:45 AM	3	51	0	0	1	45	11	0	5	0	1	0	1	6	2	0	126	1582
8:50 AM	6	60	0	0	0	56	2	0	5	1	6	0	4	5	4	0	149	1549
8:55 AM	7	68	1	0	0	41	3	0	9	0	4	0	1	7	3	0	144	1518
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	60	800	12	0	32	720	88	0	148	24	28	0	36	80	36	0	2064	
Heavy Trucks	0	44	0	0	0	48	4	0	4	0	0	0	0	0	0	0	100	
Pedestrians	8				4				0				8				20	
Bicycles	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	3	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE 192nd Ave -- SE 15th St
CITY/STATE: Camas, WA

QC JOB #: 14421314
DATE: Thu, Jun 08 2017

Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:10 PM -- 5:25 PM



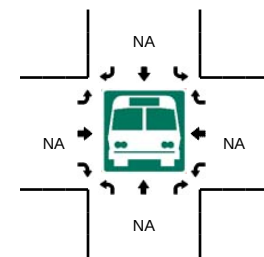
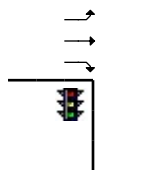
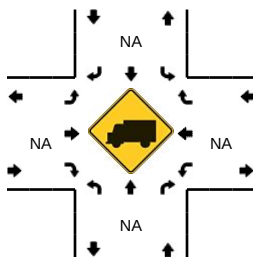
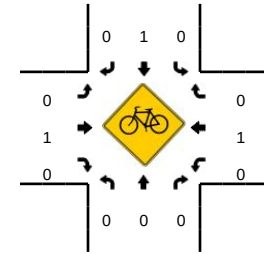
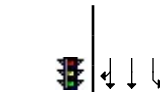
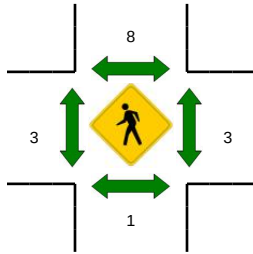
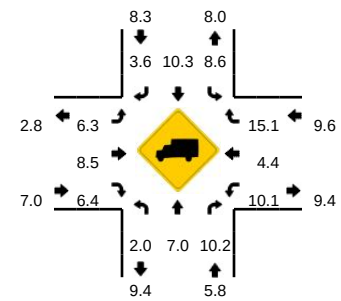
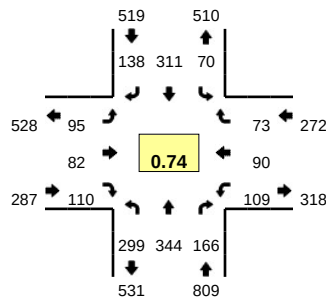
5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	89	0	1	2	85	14	0	5	7	8	0	2	7	1	0	224	
4:05 PM	5	87	5	0	4	79	14	0	6	4	2	0	5	8	6	0	225	
4:10 PM	10	87	3	0	2	97	10	0	7	7	9	0	4	8	6	0	250	
4:15 PM	3	84	3	0	8	79	16	0	6	7	5	0	0	2	3	0	216	
4:20 PM	10	75	0	0	4	82	12	0	12	6	7	0	2	3	2	0	215	
4:25 PM	3	89	3	0	4	70	4	0	8	2	8	0	3	2	6	0	202	
4:30 PM	5	98	6	0	5	90	8	0	10	5	9	0	1	5	2	0	244	
4:35 PM	5	81	1	0	6	69	7	0	9	5	7	0	3	2	10	0	205	
4:40 PM	10	87	2	0	7	81	9	0	6	4	5	0	5	1	1	0	218	
4:45 PM	8	85	2	1	11	75	12	0	10	1	6	0	1	5	7	0	224	
4:50 PM	7	72	2	0	6	71	12	0	14	6	16	0	0	7	7	0	220	
4:55 PM	7	90	2	0	4	77	5	0	10	2	7	0	4	4	7	0	219	
5:00 PM	5	87	6	0	7	83	8	0	5	1	8	0	1	3	6	0	220	2662
5:05 PM	10	75	2	0	6	87	5	0	11	7	12	0	3	6	10	0	234	2658
5:10 PM	10	110	7	0	8	113	13	0	7	4	5	0	2	4	6	0	289	2667
5:15 PM	7	78	2	0	11	96	14	0	5	4	14	0	4	11	4	0	250	2706
5:20 PM	5	89	4	0	4	103	14	1	11	9	10	0	0	6	13	0	269	2740
5:25 PM	3	77	1	0	6	82	8	0	8	3	9	0	3	4	7	0	211	2794
5:30 PM	5	76	3	0	0	73	7	0	8	5	5	0	1	4	6	0	193	2803
5:35 PM	4	76	0	0	4	79	4	0	10	8	5	0	0	7	3	0	200	2752
5:40 PM	7	96	2	0	3	98	4	0	7	3	8	0	1	0	8	0	237	2747
5:45 PM	5	81	6	1	3	86	9	0	9	3	8	0	3	5	3	0	222	2766
5:50 PM	6	84	5	0	4	67	8	0	6	5	5	0	2	1	5	0	198	2764
5:55 PM	1	81	2	0	4	66	8	0	6	5	4	0	1	4	5	0	187	2742
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	88	1108	52	0	92	1248	164	4	92	68	116	0	24	84	92	0	3232	
Heavy Trucks	0	20	0		0	36	0		8	4	4		0	0	0		72	
Pedestrians	0	0			0	0			0	0			0	0			0	
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE 192nd Ave -- Mill Plain Blvd
CITY/STATE: Vancouver, WA

QC JOB #: 14493301
DATE: Tue, Sep 26 2017

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:40 AM -- 7:55 AM

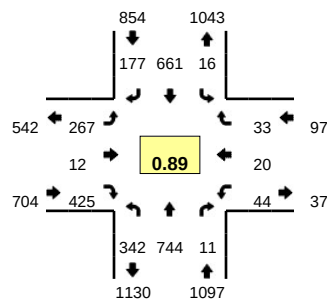


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				Mill Plain Blvd (Eastbound)				Mill Plain Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	13	10	3	0	2	21	2	0	2	2	9	0	1	0	0	0	65	
7:05 AM	8	22	4	0	4	19	5	0	7	2	4	0	1	0	0	0	76	
7:10 AM	24	23	3	0	2	22	2	0	3	1	6	0	0	0	1	0	87	
7:15 AM	25	18	3	0	3	15	7	0	8	3	14	0	0	0	1	0	97	
7:20 AM	24	29	7	0	2	22	11	0	8	2	7	0	0	0	1	0	113	
7:25 AM	19	25	6	0	7	21	8	0	6	2	9	0	4	0	1	0	108	
7:30 AM	15	26	24	0	10	24	8	0	5	6	7	1	7	3	2	0	138	
7:35 AM	24	13	31	0	8	9	11	0	1	17	7	0	17	5	5	0	148	
7:40 AM	42	29	37	1	18	32	17	0	1	12	4	0	11	16	7	0	227	
7:45 AM	23	20	11	0	11	32	13	0	7	6	11	1	12	13	15	0	175	
7:50 AM	33	28	36	0	10	19	12	0	13	15	12	0	22	13	20	0	233	
7:55 AM	32	21	14	0	6	34	13	0	12	23	15	0	19	23	14	0	226	1693
8:00 AM	22	25	4	0	3	22	10	0	6	2	9	0	13	10	3	0	129	1757
8:05 AM	21	32	1	0	3	25	9	0	9	1	5	0	6	4	1	0	117	1798
8:10 AM	24	38	3	0	0	26	9	0	9	0	8	0	1	2	2	0	122	1833
8:15 AM	14	36	2	0	0	35	15	0	12	0	6	0	1	1	2	0	124	1860
8:20 AM	33	33	1	0	1	25	4	0	3	0	15	0	0	0	1	0	116	1863
8:25 AM	15	43	2	0	0	28	17	0	15	0	11	0	0	0	1	0	132	1887
8:30 AM	14	38	0	0	2	45	15	0	8	0	4	0	1	0	0	0	127	1876
8:35 AM	20	31	0	0	0	37	16	0	13	3	12	0	0	1	0	0	133	1861
8:40 AM	29	33	0	0	0	30	8	0	4	0	4	0	0	1	0	0	109	1743
8:45 AM	20	27	0	0	2	42	18	0	1	1	9	0	0	1	2	0	123	1691
8:50 AM	32	25	1	0	0	24	15	0	5	1	11	0	2	1	1	0	118	1576
8:55 AM	29	33	1	0	1	24	6	0	7	1	11	0	1	0	0	0	114	1464
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	392	308	336	4	156	332	168	0	84	132	108	4	180	168	168	0	2540	
Heavy Trucks	12	20	48		16	32	0		4	8	0		28	8	40		216	
Pedestrians	0	0	0		8	0	0		0	0	0		0	0	0		8	
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1	
Railroad																		
Stopped Buses																		

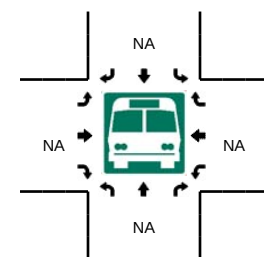
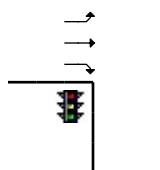
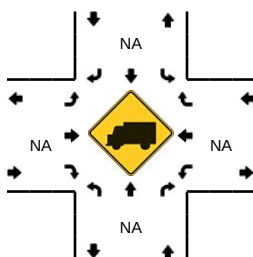
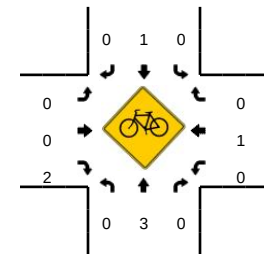
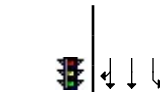
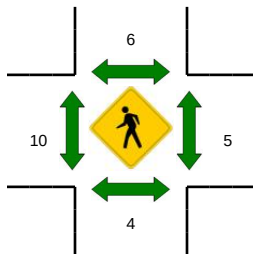
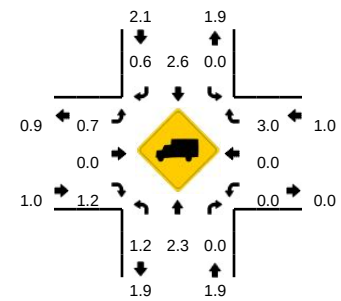
Comments:

LOCATION: SE 192nd Ave -- Mill Plain Blvd
CITY/STATE: Vancouver, WA

QC JOB #: 14493302
DATE: Tue, Sep 26 2017



Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:00 PM -- 5:15 PM



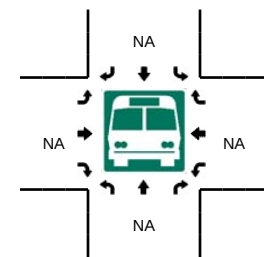
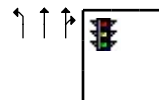
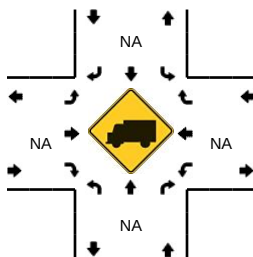
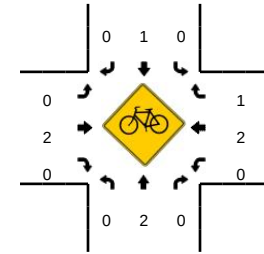
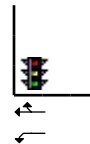
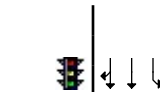
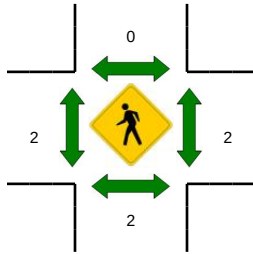
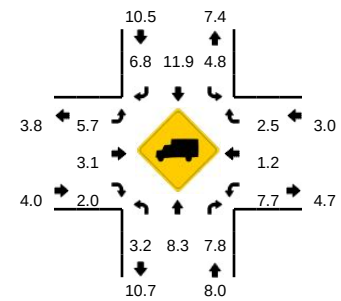
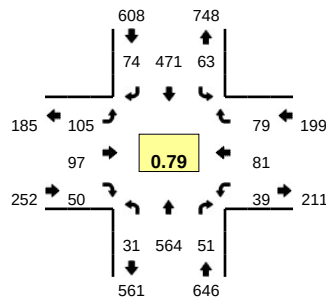
5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				Mill Plain Blvd (Eastbound)				Mill Plain Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	23	60	2	0	2	56	15	1	23	2	28	0	12	7	5	0	236	
4:05 PM	28	59	1	0	2	59	11	0	26	1	34	0	4	2	3	0	230	
4:10 PM	33	48	3	0	3	57	16	0	19	1	21	0	6	4	1	0	212	
4:15 PM	22	44	0	0	0	53	14	0	26	5	28	0	5	4	1	0	202	
4:20 PM	15	52	3	0	0	45	15	0	23	2	32	1	4	3	5	0	200	
4:25 PM	28	35	0	0	0	55	19	0	18	0	21	0	5	1	7	0	189	
4:30 PM	30	56	1	0	2	41	10	0	14	2	28	0	1	1	7	0	193	
4:35 PM	31	62	2	0	2	42	14	0	14	0	30	0	11	4	7	0	219	
4:40 PM	24	53	0	0	1	58	13	0	26	1	36	0	10	5	10	0	237	
4:45 PM	26	67	1	0	2	46	14	1	18	2	30	0	2	0	0	0	209	
4:50 PM	25	56	3	0	3	64	11	0	18	3	27	0	1	1	3	0	215	
4:55 PM	31	56	0	0	2	57	17	0	29	1	30	1	5	1	3	0	233	2575
5:00 PM	29	55	2	0	2	60	16	0	14	1	34	1	6	4	2	0	226	2565
5:05 PM	24	71	2	0	0	74	13	0	30	1	54	0	6	0	1	0	276	2611
5:10 PM	30	72	0	0	0	66	16	1	30	0	51	0	2	1	2	0	271	2670
5:15 PM	32	64	1	0	0	47	20	0	12	2	39	0	1	0	2	0	220	2688
5:20 PM	35	72	0	0	0	49	15	0	31	1	34	0	0	1	2	0	240	2728
5:25 PM	29	57	0	0	2	40	12	0	21	0	25	0	0	3	1	0	190	2729
5:30 PM	26	59	0	0	0	58	16	0	21	0	35	1	0	0	0	0	216	2752
5:35 PM	23	56	0	0	0	47	17	0	29	1	32	0	0	0	0	0	205	2738
5:40 PM	24	61	0	0	2	67	18	0	21	1	25	0	0	0	1	0	220	2721
5:45 PM	24	51	2	0	1	46	12	0	24	0	32	0	1	0	0	0	193	2705
5:50 PM	23	53	0	0	0	61	19	0	26	1	28	0	0	0	0	0	211	2701
5:55 PM	23	48	1	0	0	51	13	0	16	2	28	0	0	0	1	0	183	2651
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	332	792	16	0	8	800	180	4	296	8	556	4	56	20	20	0	3092	
Heavy Trucks	0	16	0	0	0	12	0	0	0	0	4	0	0	0	0	0	32	
Pedestrians	12				12				0				16				40	
Bicycles	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE 192nd Ave -- SE 20th St
CITY/STATE: Camas, WA

QC JOB #: 14421305
DATE: Thu, May 25 2017

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



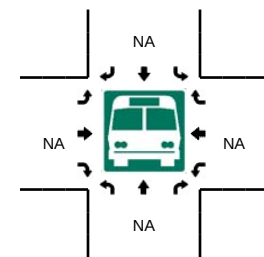
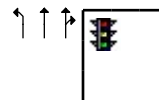
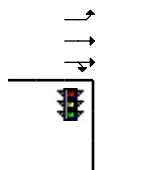
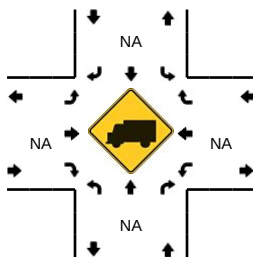
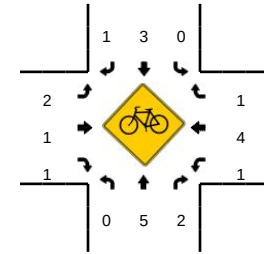
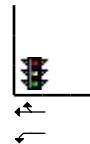
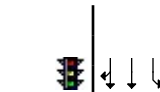
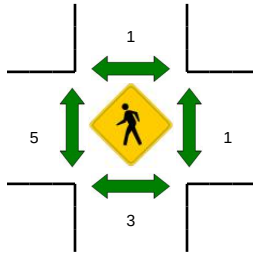
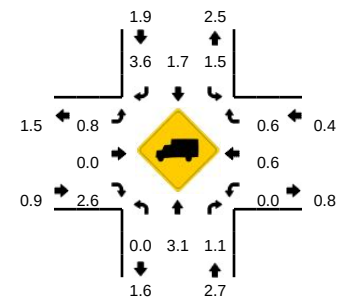
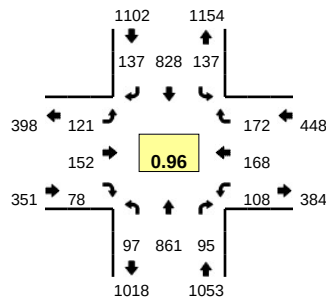
5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	28	1	0	8	22	0	0	1	14	0	0	0	7	3	0	86	
7:05 AM	5	33	3	0	7	18	4	0	1	1	5	0	1	8	7	0	93	
7:10 AM	1	31	2	0	4	23	2	0	3	2	8	0	2	7	1	0	86	
7:15 AM	1	32	1	0	2	25	4	0	1	6	2	0	1	4	5	0	84	
7:20 AM	1	29	1	0	2	26	2	0	2	5	7	0	4	8	2	0	89	
7:25 AM	3	38	3	0	0	40	2	0	6	5	5	0	2	7	2	0	113	
7:30 AM	1	51	4	0	3	22	5	0	7	11	5	0	2	5	7	0	123	
7:35 AM	2	59	0	0	4	39	8	0	16	9	5	0	3	8	12	0	165	
7:40 AM	2	43	8	0	5	38	6	0	9	10	5	0	2	10	7	0	145	
7:45 AM	7	55	11	0	5	61	9	0	16	9	2	0	2	4	11	0	192	
7:50 AM	4	69	6	0	11	47	10	0	12	9	2	0	1	5	5	0	181	
7:55 AM	3	45	4	0	10	47	9	0	9	13	5	0	2	6	11	0	164	1521
8:00 AM	2	39	3	0	8	46	8	0	3	7	3	0	6	4	7	0	136	1571
8:05 AM	4	38	4	0	3	35	5	0	12	8	2	0	5	10	7	0	133	1611
8:10 AM	1	40	1	1	1	33	4	0	4	4	2	0	3	3	0	0	97	1622
8:15 AM	1	36	3	0	4	30	1	0	7	8	5	0	3	7	6	0	111	1649
8:20 AM	2	40	5	0	4	36	7	0	5	3	7	0	5	9	3	0	126	1686
8:25 AM	1	49	2	0	5	37	2	0	5	6	7	0	5	10	3	0	132	1705
8:30 AM	4	37	4	1	5	31	3	0	2	5	7	0	8	0	3	0	110	1692
8:35 AM	4	48	6	0	2	30	6	0	3	5	4	0	7	5	5	0	125	1652
8:40 AM	2	32	2	0	0	44	0	0	7	5	3	0	9	13	3	0	120	1627
8:45 AM	3	49	3	0	10	27	3	0	9	10	5	0	2	8	6	0	135	1570
8:50 AM	3	54	4	0	1	29	4	0	2	7	12	0	6	10	7	0	139	1528
8:55 AM	2	43	4	0	8	46	5	0	9	7	11	0	4	10	11	0	160	1524
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	56	676	84	0	104	620	112	0	148	124	36	0	20	60	108	0	2148	
Heavy Trucks	0	40	0		4	60	4		0	0	0		0	0	4		112	
Pedestrians	0	0	0		0	0	0		0	0	0		0	0	0		0	
Bicycles	0	0	0		0	0	0		0	1	0		0	1	0		2	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: SE 192nd Ave -- SE 20th St
CITY/STATE: Camas, WA

QC JOB #: 14421306
DATE: Wed, May 24 2017

Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:00 PM -- 5:15 PM



5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	53	4	0	12	60	14	0	13	8	4	0	7	14	9	0	206	
4:05 PM	6	66	4	0	7	73	13	0	11	16	6	0	10	13	11	0	236	
4:10 PM	7	58	3	0	7	72	8	0	6	8	4	0	3	12	8	0	196	
4:15 PM	7	49	2	0	10	62	6	0	15	14	5	0	6	12	10	0	198	
4:20 PM	12	78	6	0	10	77	12	0	11	12	5	0	7	11	6	0	247	
4:25 PM	11	74	6	1	10	67	10	0	11	18	9	0	11	9	6	0	243	
4:30 PM	7	60	2	1	14	77	16	0	13	11	3	0	8	10	11	0	233	
4:35 PM	9	80	8	0	9	82	7	0	7	7	5	0	10	12	22	0	258	
4:40 PM	9	49	6	0	7	70	20	0	7	12	8	0	9	11	13	0	221	
4:45 PM	7	71	9	1	11	58	14	0	12	14	9	0	10	14	15	0	245	
4:50 PM	11	76	9	0	13	56	12	0	6	16	3	0	6	13	3	0	224	
4:55 PM	6	71	10	1	13	72	16	0	14	12	7	0	7	15	13	0	257	2764
5:00 PM	6	63	6	1	9	64	13	0	15	11	8	0	9	17	7	0	229	2787
5:05 PM	8	81	6	1	9	75	13	0	9	19	3	0	13	23	16	0	276	2827
5:10 PM	3	71	4	0	15	92	12	0	7	14	6	0	12	16	16	0	268	2899
5:15 PM	11	66	6	0	9	72	4	0	8	9	6	0	9	7	18	0	225	2926
5:20 PM	9	73	13	0	13	59	9	0	17	11	15	0	5	18	15	0	257	2936
5:25 PM	5	86	9	0	14	61	11	0	6	17	4	0	9	10	15	0	247	2940
5:30 PM	9	74	9	0	15	67	6	0	13	10	4	0	9	12	19	0	247	2954
5:35 PM	7	68	6	0	15	61	9	0	14	17	8	0	5	17	9	0	236	2932
5:40 PM	6	61	4	0	8	86	5	0	13	9	4	0	6	15	5	0	222	2933
5:45 PM	9	50	5	0	10	82	9	0	10	15	9	0	7	10	14	0	230	2918
5:50 PM	6	65	5	0	4	67	10	0	15	6	2	0	9	14	8	0	211	2905
5:55 PM	8	43	3	0	10	68	6	0	9	9	3	0	3	5	5	0	172	2820
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	68	860	64	8	132	924	152	0	124	176	68	0	136	224	156	0	3092	
Heavy Trucks	0	20	0		4	16	4		4	0	0		0	0	0		48	
Pedestrians		4				0				0				0			4	
Bicycles	0	2	0		0	2	0		1	0	0		0	0	0		5	
Railroad																		
Stopped Buses																		

Comments:

Appendix B WSDOT Crash Data

OFFICER REPORTED CRASHES THAT OCCURRED at OR in the vicinity of MULTIPLE INTERSECTIONS IN THE CITY OF VANCOUVER

01/01/2017 - 12/31/2021 See 2nd tab below for road information

Under 23 U.S. Code § 148 and 23 U.S. Code § 407, safety data, reports, surveys, schedules, lists compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or railway-highway crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFICWAY	BLOCK NUMBER	INTERSECTING TRAFFICWAY	DIST FROM REF POINT	MI or FT	COMP DIR FROM REF POINT	REFERENCE POINT NAME	MILEPOST	A / B	SR ONLY HISTORY/ SUSPENSE	REPORT NUMBER	DATE	TIME	MOST SEVERE INJURY TYPE	# I N J U R I E S	# F A T A L S	# V E H I C L E S	# P E R S O N S	VEHICLE 1 TYPE	VEHICLE 2 TYPE	JUNCTION RELATIONSHIP
City Street	Clark	Vancouver	SE 15TH ST	0	SE 189TH AVE						No	E820956	07/23/2018	13:04	Suspected Serious Injury	2	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 15TH ST		SE 192ND AVE						No	E999464	01/02/2020	15:52	No Apparent Injury	0	0	2	0	Passenger Car	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE 15TH ST	0	SE 192ND AVE						No	E744865	12/08/2017	02:14	Possible Injury	1	0	1	0	Passenger Car		At Intersection and Related	
City Street	Clark	Vancouver	SE 15TH ST	9900	SE 192ND AVE						No	E735632	11/14/2017	15:40	Possible Injury	3	0	2	0	Truck (Flatbad,Van,etc)	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE 15TH ST	16200		150	F	E	SE 164TH AVE		No	E837473	09/11/2018	23:23	No Apparent Injury	0	0	1	0	Pickup,Panel Truck or Vanette under 10,000 lb		Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 164TH AVE	0	SE 15TH ST						No	E788423	04/07/2018	16:00	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Not Stated	At Intersection and Related	
City Street	Clark	Vancouver	SE 164TH AVE	0	SE 15TH ST						No	E903320	03/16/2019	21:25	No Apparent Injury	0	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 164TH AVE	0	SE 15TH ST						No	E996754	12/23/2019	08:55	No Apparent Injury	0	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 164TH AVE	0	SE 15TH ST						No	EA10410	02/02/2020	14:47	Died in Hospital	0	1	2	0	Motorcycle	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 164TH AVE	0	SE 15TH ST						No	E958122	09/04/2019	18:24	No Apparent Injury	0	0	3	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 164TH AVE	0	SE 15TH ST						No	E870893	12/05/2018	10:05	No Apparent Injury	0	0	3	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 164TH AVE	1415	SE 15TH ST						No	EA68616	10/01/2020	10:29	Possible Injury	1	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 164TH AVE	1411	SE 15TH ST						No	EA59678	08/31/2020	03:28	Suspected Minor Injury	2	0	3	0	Passenger Car	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE 164TH AVE	1400		201	F	N	SE 15TH ST		No	EA86193	11/20/2020	13:55	No Apparent Injury	0	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	
City Street	Clark	Vancouver	SE 164TH AVE	1500		257	F	S	SE 15TH ST		No	E819663	07/10/2018	18:38	No Apparent Injury	0	0	1	0	Pickup,Panel Truck or Vanette under 10,000 lb		Not at Intersection and Not Related	
City Street	Clark	Vancouver	SE 164TH AVE	1400		158	F	N	SE 15TH ST		No	E877511	12/29/2018	15:30	Possible Injury	1	0	3	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	
City Street	Clark	Vancouver	SE 164TH AVE	1400		306	F	N	SE 15TH ST		No	E653226	03/17/2017	22:26	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Not at Intersection and Not Related	
City Street	Clark	Vancouver	SE 164TH AVE	1500		44	F	S	SE 15TH ST		No	E884544	01/17/2019	18:14	No Apparent Injury	0	0	2	0	Not Stated	Passenger Car	Not at Intersection and Not Related	
City Street	Clark	Vancouver	SE 164TH AVE	1500		105	F	S	SE 15TH ST		No	E924809	05/28/2019	13:05	No Apparent Injury	0	0	3	0	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 164TH AVE	1000		0.25	M	N	SE 15TH ST		No	E741189	11/25/2017	01:59	No Apparent Injury	0	0	1	0	Pickup,Panel Truck or Vanette under 10,000 lb		Not at Intersection and Not Related	
City Street	Clark	Vancouver	SE 164TH AVE	1400		201	F	N	SE 15TH ST		No	E794893	04/25/2018	14:58	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	
City Street	Clark	Vancouver	SE 164TH AVE	1500		162	F	S	SE 15TH ST		No	E683023	06/19/2017	13:25	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 164TH AVE	1400		100	F	NE	SE 15TH ST		No	EA07058	01/24/2020	13:40	No Apparent Injury	0	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	Not at Intersection and Not Related	
City Street	Clark	Vancouver	SE 192ND AVE	0	SE 15TH ST						No	E795421	05/07/2018	09:56	No Apparent Injury	0	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	0	SE 15TH ST						No	E880276	01/07/2019	19:05	No Apparent Injury	0	0	2	0	Passenger Car	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	0	SE 15TH ST						No	EA07064	01/15/2020	16:40	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	0	SE 15TH ST						No	E908184	04/04/2019	11:56	Suspected Minor Injury	1	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	9900	SE 20TH ST						No	E697125	07/13/2017	10:45	No Apparent Injury	0	0	2	0	Passenger Car	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	2000	SE 20TH ST						No	EB49012	07/15/2021	14:21	Possible Injury	1	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	0	SE 20TH ST						No	EA53822	07/31/2020	09:46	No Apparent Injury	0	0	2	0	Truck (Flatbad,Van,etc)	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	0	SE 20TH ST						No	E995917	12/03/2019	12:49	No Apparent Injury	0	0	1	0	Passenger Car		At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	400	SE MILL PLAIN BLVD						No	EB22831	04/17/2021	08:42	Possible Injury	1	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	0	SE MILL PLAIN BLVD						No	E938013	07/07/2019	15:12	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	0	SE MILL PLAIN BLVD						No	E951144	08/16/2019	23:05	Possible Injury	1	0	2	0	Passenger Car	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE		SE MILL PLAIN BLVD						No	EA76264	10/26/2020	13:35	Possible Injury	1	0	2	0	Passenger Car	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	0	SE MILL PLAIN BLVD						No	E641871	02/09/2017	17:06	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	At Intersection and Related	
City Street	Clark	Vancouver	SE 192ND AVE	1400		93	F	N	SE 15TH ST		No	E988844	12/02/2019	13:40	Possible Injury	1	0	3	0	Passenger Car	Passenger Car	Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 192ND AVE	1600		318	F	S	SE 15TH ST		No	E785221	04/03/2018	16:10	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 192ND AVE	1900		114	F	N	SE 20TH ST		No	E653540	03/20/2017	12:40	No Apparent Injury	0	0	3	0	Truck (Flatbad,Van,etc)	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 192ND AVE	1900		44	F	N	SE 20TH ST		No	E917443	05/03/2019	13:44	No Apparent Injury	0	0	2	0	Passenger Car	Passenger Car	Not at Intersection and Not Related	
City Street	Clark	Vancouver	SE 192ND AVE	1900		162	F	N	SE 20TH ST		No	E788428	04/12/2018	17:02	No Apparent Injury	0	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 192ND AVE	2000		54	F	SE	SE 20TH ST		No	E762873	01/26/2018	10:57	Possible Injury	2	0	2	0	Passenger Car	Passenger Car	Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 192ND AVE	1700		492	F	N	SE 20TH ST		No	E841909	09/19/2018	16:04	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 192ND AVE	2000		117	F	S	SE 20TH ST		No	E786001	04/06/2018	08:59	No Apparent Injury	0	0	3	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 192ND AVE	400		109	F	N	SE MILL PLAIN BLVD		No	E853517	10/25/2018	12:15	No Apparent Injury	0	0	1	0	Passenger Car		Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 192ND AVE	400		197	F	N	SE MILL PLAIN BLVD		No	E715983	09/25/2017	15:35	No Apparent Injury	0	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Pickup,Panel Truck or Vanette under 10,000 lb	Intersection Related but Not at Intersection	
City Street	Clark	Vancouver	SE 20TH ST	0	SE 192ND AVE						No	E707718	08/30/2017	17:38	Suspected Minor Injury	1	0	1	0	Passenger Car		At Intersection and Related	
City Street	Clark	Vancouver	SE 20TH ST	2000	SE 192ND AVE						No	EA91782	12/20/2020	19:29	Possible Injury	2	0	2	0	Passenger Car	Passenger Car	At Intersection and Related	
City Street	Clark	Vancouver	SE MILL PLAIN BLVD	19200		281	F	W	SE 192ND AVE		No	E809763	06/19/2018	10:28	No Apparent Injury	0	0	2	0	Truck Tractor	Passenger Car	At Driveway	
City Street	Clark	Vancouver	SE MILL PLAIN BLVD	19100		284	F	W	SE 192ND AVE		No	E849322	10/10/2018	15:53	No Apparent Injury	0	0	2	0	Passenger Car	Pickup,Panel Truck or Vanette under 10,000 lb	At Driveway	
City Street	Clark	Vancouver	SE MILL PLAIN BLVD	19200		319	F	W	SE 192ND AVE		No	E894254	02/17/2019	15:47	Possible Injury	1	0	2	0	Pickup,Panel Truck or Vanette under 10,000 lb	Passenger Car	At Driveway	

WEATHER	ROADWAY SURFACE CONDITION	LIGHTING CONDITION	FIRST COLLISION TYPE / OBJECT STRUCK	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTION FROM	VEHICLE 1 COMPASS DIRECTION TO	VEHICLE 2 COMPASS DIRECTION FROM	VEHICLE 2 COMPASS DIRECTION TO	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)
Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Left Turn	Going Straight Ahead	South	West	West	East	Did Not Grant RW to Vehicle	
Raining	Wet	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	East	West	Disregard Traffic Sign and Signals	
Clear or Partly Cloudy	Dry	Dark-Street Lights On	Utility Box	Making Right Turn		West	South			Under Influence of Alcohol	
Clear or Partly Cloudy	Dry	Dusk	Entering at angle	Going Straight Ahead	Going Straight Ahead	South	North	West	East	Inattention	
Raining	Wet	Dark-Street Lights On	Tree or Stump (stationary)	Making Left Turn		North	East			Operating Defective Equipment	Other Contributing Circ Not Listed
Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Stopped at Signal or Stop Sign	Other*	Vehicle Stopped	Vehicle Stopped	South	North	None	
Clear or Partly Cloudy	Dry	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Making Left Turn	North	South	East	Southwest	Disregard Stop and Go Light	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	South	North	Vehicle Stopped	Vehicle Stopped	Under Influence of Alcohol	
Clear	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	East	West	Exceeding Stated Speed Limit	
Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Other*	Going Straight Ahead	North	South	West	East	Under Influence of Alcohol	
Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Making Left Turn	North	South	East	South	Disregard Stop and Go Light	
Overcast	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	East	West	Other Contributing Circ Not Listed	
Clear	Dry	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	East	West	North	South	Other Contributing Circ Not Listed	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	South	North	Vehicle Stopped	Vehicle Stopped	Unknown Distraction	Follow Too Closely
Clear or Partly Cloudy	Dry	Daylight	Street Light Pole or Base	Going Straight Ahead		South	North			Under Influence of Alcohol	
Raining	Wet	Daylight	From same direction - both going straight - both moving - sideswipe	Changing Lanes	Going Straight Ahead	North	South	North	South	Did Not Grant RW to Vehicle	
Overcast	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end	Changing Lanes	Slowing	North	South	North	South	Under Influence of Alcohol	Follow Too Closely
Raining	Wet	Dark-Street Lights On	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Going Straight Ahead			South	North	Other Contributing Circ Not Listed	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Slowing	Stopped for Traffic	South	North	South	Vehicle Stopped	Follow Too Closely	
Clear or Partly Cloudy	Dry	Dark-Street Lights On	Street Light Pole or Base	Going Straight Ahead		Northwest	North			Under Influence of Alcohol	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Changing Lanes	Slowing	South	North	South	North	Follow Too Closely	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - sideswipe	Other*	Stopped for Traffic			Vehicle Stopped	Vehicle Stopped	Other Contributing Circ Not Listed	
Overcast	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	South	North	Vehicle Stopped	Vehicle Stopped	Follow Too Closely	
Overcast	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	South	North	East	West	Disregard Stop and Go Light	
Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	North	South	Vehicle Stopped	Vehicle Stopped	Other Contributing Circ Not Listed	
Raining	Wet	Dark-Street Lights On	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	East	West	Lost in Thought / Day Dreaming	
Clear or Partly Cloudy	Ice	Daylight	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	South	North	North	East	Inattention	
Overcast	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Slowing	Slowing	South	North	South	North	Operating Defective Equipment	
Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Going Straight Ahead	Going Straight Ahead	North	South	West	East	Disregard Traffic Sign and Signals	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	South	North	South	East	Follow Too Closely	
Clear	Dry	Daylight	Signal Pole	Going Straight Ahead		North	South			Under Influence of Alcohol	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	North	South	Vehicle Stopped	Vehicle Stopped	Distracted by Adjusting Vehicle Cntrl	
Overcast	Dry	Daylight	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	North	South	South	West	Disregard Stop and Go Light	Inattention
Clear or Partly Cloudy	Dry	Dark-Street Lights On	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped at Signal or Stop Sign	North	South	North	Vehicle Stopped	Follow Too Closely	
Clear or Partly Cloudy	Dry	Daylight	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	North	South	South	West	Disregard Traffic Sign and Signals	
Raining	Wet	Dusk	From same direction - both going straight - one stopped - rear-end	Slowing	Stopped at Signal or Stop Sign	South	North	South	Vehicle Stopped	Under Influence of Alcohol	
Overcast	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	North	South	North	South	Eating or Drinking	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	North	South	Vehicle Stopped	Vehicle Stopped	Inattention	
Overcast	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	North	South	Vehicle Stopped	Vehicle Stopped	Inattention	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - both moving - rear-end	Going Straight Ahead	Slowing	North	South	North	South	Inattention	
Overcast	Wet	Daylight	From opposite direction - all others	Going Straight Ahead	Stopped for Traffic	South	North	Vehicle Stopped	Vehicle Stopped	None	
Overcast	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Stopped for Traffic	Going Straight Ahead	Vehicle Stopped	Vehicle Stopped	South	North	None	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Stopped for Traffic	Going Straight Ahead	Vehicle Stopped	Vehicle Stopped	North	South	None	
Raining	Wet	Daylight	From same direction - both going straight - one stopped - rear-end	Going Straight Ahead	Stopped for Traffic	South	North	Vehicle Stopped	Vehicle Stopped	Disregard Stop and Go Light	Inattention
Raining	Wet	Daylight	Tree or Stump (stationary)	Making Left Turn		West	North			Inattention	
Clear or Partly Cloudy	Dry	Daylight	From same direction - both going straight - one stopped - rear-end	Stopped at Signal or Stop Sign	Going Straight Ahead	Vehicle Stopped	Vehicle Stopped	North	South	None	
Clear or Partly Cloudy	Dry	Daylight	Vehicle - Pedalcyclist	Making Right Turn		West	South			Other Contributing Circ Not Listed	
Raining	Wet	Dark-Street Lights Off	From opposite direction - one left turn - one straight	Going Straight Ahead	Making Left Turn	West	East	East	South	Other Contributing Circ Not Listed	
Clear or Partly Cloudy	Dry	Daylight	Same direction -- both turning right -- both moving -- sideswipe	Making Right Turn	Making Right Turn	East	North	East	North	Inattention	
Clear or Partly Cloudy	Dry	Daylight	Entering at angle	Making Right Turn	Stopped at Signal or Stop Sign	West	South	Vehicle Stopped	Vehicle Stopped	Under Influence of Alcohol	Improper Turn/Merge
Overcast	Dry	Daylight	Entering at angle	Making Right Turn	Going Straight Ahead	North	West	East	West	Improper Turn/Merge	Inattention

MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 1)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 2 (UNIT 2)	MV DRIVER CONTRIBUTING CIRCUMSTANCE 3 (UNIT 2)	BICYCLIST CONTRIBUTING CIRCUMSTANCE 1 (UNIT 1)	BICYCLIST CONTRIBUTING CIRCUMSTANCE 2 (UNIT 1)	BICYCLIST CONTRIBUTING CIRCUMSTANCE 3 (UNIT 1)	BICYCLIST CONTRIBUTING CIRCUMSTANCE 1 (UNIT 2)	BICYCLIST CONTRIBUTING CIRCUMSTANCE 2 (UNIT 2)	BICYCLIST CONTRIBUTING CIRCUMSTANCE 3 (UNIT 2)	FIRST IMPACT LOCATION (City, County & Misc Trafficways - 2010 forward)	WA STATE PLANE SOUTH - X 2010 - FORWARD	WA STATE PLANE SOUTH - Y 2010 - FORWARD
	None									Lane of Primary Trafficway	#####	107262.09
	None									Lane of Primary Trafficway	#####	107246
										Past the Outside Shoulder of Primary Trafficway	#####	107246.01
	None									Lane of Primary Trafficway	#####	107244.68
Exceeding Reas. Safe Speed										Past the Outside Shoulder of Primary Trafficway	#####	107447.65
	Other Contributing Circ Not Listed									Lane of Primary Trafficway	#####	107463.95
	None									Lane of Primary Trafficway	#####	107463.95
	None									Lane of Primary Trafficway	#####	107463.94
	None									Lane of Primary Trafficway	#####	107463.94
	None									Lane of Primary Trafficway	#####	107463.95
	None									Lane of Primary Trafficway	#####	107463.95
	None									Lane of Primary Trafficway	#####	107463.94
	None									Lane of Primary Trafficway	#####	107463.94
	None									Lane of Primary Trafficway	#####	107664.61
										Past the Outside Shoulder of Primary Trafficway	#####	107206.13
	None									Lane of Primary Trafficway	#####	107610.87
	None									Lane of Primary Trafficway	#####	107763.98
	None									Lane of Primary Trafficway	#####	107419.67
	Follow Too Closely									Lane of Primary Trafficway	#####	107357.55
										Past the Outside Shoulder of Primary Trafficway	#####	108783.65
	None									Lane of Primary Trafficway	#####	107664.04
	None									Lane of Primary Trafficway	#####	107301
	None									Lane of Primary Trafficway	#####	107546.94
	None									Lane of Primary Trafficway	#####	107244.69
	None									Lane of Primary Trafficway	#####	107246.01
	None									Lane of Primary Trafficway	#####	107246
	None									Lane of Primary Trafficway	#####	107244.69
	None									Lane of Primary Trafficway	#####	106040.18
	None									Lane of Primary Trafficway	#####	106043.19
	None									Lane of Primary Trafficway	1134715.4	106044.3
										Past the Outside Shoulder of Primary Trafficway	1134715.4	106044.3
	None									Lane of Primary Trafficway	#####	109835.36
	None									Lane of Primary Trafficway	#####	109748.15
	None									Lane of Primary Trafficway	#####	109777.29
	None									Lane of Primary Trafficway	#####	109748.14
	None									Lane of Primary Trafficway	#####	109748.15
	Follow Too Closely									Lane of Primary Trafficway	#####	107338.59
	None									Lane of Primary Trafficway	#####	106925.8
	None									Lane of Primary Trafficway	#####	106158.53
	Inattention									Lane of Primary Trafficway	#####	106087.97
	None									Lane of Primary Trafficway	#####	106201.88
	Exceeding Reas. Safe Speed									Lane of Primary Trafficway	#####	106001.97
	Follow Too Closely									Lane of Primary Trafficway	#####	106536.85
	None									Lane of Primary Trafficway	#####	105927.02
										Median of Primary Trafficway	1134783.6	109885.6
	Other Contributing Circ Not Listed									Lane of Primary Trafficway	1134784.2	109973.53
							None			Lane of Primary Trafficway	1134715.4	106044.31
	None									Lane of Primary Trafficway	#####	106043.61
	Inattention									Intersecting Trafficway	1134498.6	109786.52
	None									Intersecting Trafficway	#####	109749.48
Did Not Grant RW to Vehicle	None									Lane of Primary Trafficway	1134462.6	109787.42

Appendix C 2023 Existing Operations Worksheets

Queues

1: SE 164th Ave & SE 15th St

Existing Traffic Conditions

AM Peak Hour Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	10	72	40	51	63	61	964	69	67	956	17
v/c Ratio	0.01	0.09	0.06	0.05	0.07	0.43	0.76	0.14	0.47	0.75	0.04
Control Delay	16.1	11.7	15.7	18.6	1.7	61.4	45.0	2.9	62.1	44.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	11.7	15.7	18.6	1.7	61.4	45.0	2.9	62.1	44.4	0.1
Queue Length 50th (ft)	3	12	14	18	0	46	253	0	50	249	0
Queue Length 95th (ft)	14	48	38	54	11	89	281	16	95	276	0
Internal Link Dist (ft)		600		638			842			586	
Turn Bay Length (ft)	100		250		325	150		150	230		230
Base Capacity (vph)	799	817	728	1026	881	166	1995	706	165	1976	669
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.09	0.05	0.05	0.07	0.37	0.48	0.10	0.41	0.48	0.03
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: SE 164th Ave & SE 15th St

Existing Traffic Conditions

AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	26	41	38	48	59	57	906	65	63	899	16
Future Volume (vph)	9	26	41	38	48	59	57	906	65	63	899	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1802	1655		1752	1900	1546	1805	4988	1615	1752	4940	1524
Flt Permitted	0.72	1.00		0.66	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1373	1655		1212	1900	1546	1805	4988	1615	1752	4940	1524
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	10	28	44	40	51	63	61	964	69	67	956	17
RTOR Reduction (vph)	0	24	0	0	0	31	0	0	51	0	0	13
Lane Group Flow (vph)	10	48	0	40	51	32	61	964	18	67	956	4
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	0%	7%	3%	0%	3%	0%	4%	0%	3%	5%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6			4			8
Actuated Green, G (s)	57.2	55.9		66.2	60.4	60.4	8.2	30.6	30.6	8.7	31.1	31.1
Effective Green, g (s)	57.2	55.9		66.2	60.4	60.4	8.2	30.6	30.6	8.7	31.1	31.1
Actuated g/C Ratio	0.48	0.47		0.55	0.50	0.50	0.07	0.26	0.26	0.07	0.26	0.26
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	3.0	2.0		3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	659	770		694	956	778	123	1271	411	127	1280	394
v/s Ratio Prot	0.00	c0.03		c0.00	0.03		0.03	0.19		c0.04	c0.19	
v/s Ratio Perm	0.01			0.03		0.02			0.01			0.00
v/c Ratio	0.02	0.06		0.06	0.05	0.04	0.50	0.76	0.04	0.53	0.75	0.01
Uniform Delay, d1	16.5	17.6		12.4	15.2	15.1	53.9	41.3	33.7	53.7	40.8	33.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.2		0.0	0.0	0.0	3.1	2.4	0.0	3.9	2.1	0.0
Delay (s)	16.5	17.8		12.5	15.2	15.1	57.0	43.6	33.7	57.6	43.0	33.0
Level of Service	B	B		B	B	B	E	D	C	E	D	C
Approach Delay (s)		17.6			14.5			43.8			43.7	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			40.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			46.3%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC
2: SE 189th Ave & SE 15th St

Existing Traffic Conditions
AM Peak Hour Conditions

Intersection						
Int Delay, s/veh	1.2					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	155	9	8	139	15	19
Future Vol, veh/h	155	9	8	139	15	19
Conflicting Peds, #/hr	0	3	3	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	6	11	12	3	0	0
Mvmt Flow	201	12	10	181	19	25
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	216	0	414	210
Stage 1	-	-	-	-	210	-
Stage 2	-	-	-	-	204	-
Critical Hdwy	-	-	4.22	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.308	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1297	-	599	835
Stage 1	-	-	-	-	830	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1293	-	590	833
Mov Cap-2 Maneuver	-	-	-	-	590	-
Stage 1	-	-	-	-	828	-
Stage 2	-	-	-	-	825	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.4		10.4	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	705	-	-	1293	-	
HCM Lane V/C Ratio	0.063	-	-	0.008	-	
HCM Control Delay (s)	10.4	-	-	7.8	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0	-	

Queues
3: SE 192nd Ave & SE 15th St

Existing Traffic Conditions
AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	127	74	25	55	50	23	704	25	621
v/c Ratio	0.68	0.20	0.25	0.31	0.15	0.19	0.36	0.26	0.31
Control Delay	60.6	18.9	51.3	43.2	1.0	39.0	13.2	51.7	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.6	18.9	51.3	43.2	1.0	39.0	13.2	51.7	14.7
Queue Length 50th (ft)	79	20	16	35	0	15	90	16	72
Queue Length 95th (ft)	133	48	42	59	0	m23	159	42	237
Internal Link Dist (ft)		318		1016			1126		227
Turn Bay Length (ft)	115		110		110	150		475	
Base Capacity (vph)	222	497	252	493	383	181	1957	156	1987
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.15	0.10	0.11	0.13	0.13	0.36	0.16	0.31

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 15th St

Existing Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	36	32	23	51	46	21	624	24	23	505	66
Future Volume (vph)	117	36	32	23	51	46	21	624	24	23	505	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1765		1805	1827	1539	1805	3390		1736	3260	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	1765		1805	1827	1539	1805	3390		1736	3260	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	39	35	25	55	50	23	678	26	25	549	72
RTOR Reduction (vph)	0	28	0	0	0	43	0	2	0	0	7	0
Lane Group Flow (vph)	127	46	0	25	55	7	23	702	0	25	614	0
Confl. Peds. (#/hr)	1						1			3		
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	5%	0%	0%	0%	4%	4%	0%	6%	0%	4%	9%	5%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	12.8	19.2		2.5	8.9	13.5	3.9	53.7		4.6	54.4	
Effective Green, g (s)	12.8	19.2		2.5	8.9	13.5	3.9	53.7		4.6	54.4	
Actuated g/C Ratio	0.13	0.19		0.02	0.09	0.14	0.04	0.54		0.05	0.54	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	220	338		45	162	207	70	1820		79	1773	
v/s Ratio Prot	c0.07	0.03		0.01	c0.03	0.00	0.01	c0.21		0.01	c0.19	
v/s Ratio Perm						0.00						
v/c Ratio	0.58	0.14		0.56	0.34	0.03	0.33	0.39		0.32	0.35	
Uniform Delay, d1	41.1	33.5		48.2	42.8	37.6	46.8	13.5		46.2	12.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.84	0.84		1.00	1.00	
Incremental Delay, d2	2.3	0.1		8.2	0.5	0.0	0.9	0.6		0.8	0.0	
Delay (s)	43.3	33.6		56.4	43.2	37.6	40.4	11.9		47.0	12.9	
Level of Service	D	C		E	D	D	D	B		D	B	
Approach Delay (s)		39.7			43.6			12.8			14.2	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.8									
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			42.3%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: SE 192nd Ave & Mill Plain Blvd

Existing Traffic Conditions
AM Peak Hour Conditions

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	128	111	149	147	221	404	689	95	606
v/c Ratio	0.69	0.41	0.26	0.75	0.73	0.77	0.46	0.70	0.50
Control Delay	61.7	40.2	3.0	66.0	45.1	52.1	20.4	70.3	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	40.2	3.0	66.0	45.1	52.1	20.4	70.3	25.0
Queue Length 50th (ft)	79	66	0	90	111	126	139	60	138
Queue Length 95th (ft)	110	80	11	127	127	#157	187	90	170
Internal Link Dist (ft)		628			391		457		709
Turn Bay Length (ft)	240		130			205		150	
Base Capacity (vph)	226	488	567	218	482	524	1502	167	1225
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.23	0.26	0.67	0.46	0.77	0.46	0.57	0.49

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & Mill Plain Blvd

Existing Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	82	110	109	90	73	299	344	166	70	311	138
Future Volume (vph)	95	82	110	109	90	73	299	344	166	70	311	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.95		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1703	1743	1508	1641	1617		3433	3152		1656	3168	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1703	1743	1508	1641	1617		3433	3152		1656	3168	
Peak-hour factor, PHF	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Adj. Flow (vph)	128	111	149	147	122	99	404	465	224	95	420	186
RTOR Reduction (vph)	0	0	101	0	34	0	0	45	0	0	44	0
Lane Group Flow (vph)	128	111	48	147	187	0	404	644	0	95	562	0
Confl. Peds. (#/hr)	1		8	8		1	3		3	3		3
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	6%	9%	6%	10%	4%	15%	2%	7%	10%	9%	10%	4%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	10.9	15.6	31.9	11.9	16.6		16.3	45.3		7.2	36.2	
Effective Green, g (s)	10.9	15.6	31.9	11.9	16.6		16.3	45.3		7.2	36.2	
Actuated g/C Ratio	0.11	0.16	0.32	0.12	0.17		0.16	0.45		0.07	0.36	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5	0.5	2.0	2.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)	185	271	481	195	268		559	1427		119	1146	
v/s Ratio Prot	c0.08	c0.06	0.02	0.09	c0.12		c0.12	0.20		c0.06	c0.18	
v/s Ratio Perm			0.02									
v/c Ratio	0.69	0.41	0.10	0.75	0.70		0.72	0.45		0.80	0.49	
Uniform Delay, d1	42.9	38.0	23.9	42.6	39.3		39.7	18.8		45.7	24.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.7	0.4	0.0	13.6	6.2		3.9	1.0		28.3	0.1	
Delay (s)	51.6	38.4	24.0	56.2	45.6		43.6	19.8		74.0	24.9	
Level of Service	D	D	C	E	D		D	B		E	C	
Approach Delay (s)		37.2			49.8			28.6			31.5	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			53.9%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: SE 192nd Ave & SE 20th St

Existing Traffic Conditions
AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	133	186	49	203	39	779	80	690
v/c Ratio	0.48	0.54	0.25	0.72	0.33	0.47	0.52	0.40
Control Delay	49.2	37.5	47.5	45.5	51.1	19.9	65.0	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	37.5	47.5	45.5	51.1	19.9	65.0	11.5
Queue Length 50th (ft)	42	96	15	97	24	166	54	86
Queue Length 95th (ft)	61	127	29	132	49	241	90	110
Internal Link Dist (ft)		1997		3145		1320		1126
Turn Bay Length (ft)	100		150		335		410	
Base Capacity (vph)	396	456	356	445	175	1667	183	1742
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.41	0.14	0.46	0.22	0.47	0.44	0.40
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

5: SE 192nd Ave & SE 20th St

Existing Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	97	50	39	81	79	31	564	51	63	471	74
Future Volume (vph)	105	97	50	39	81	79	31	564	51	63	471	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.93		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3303	1748		3242	1710		1752	3294		1719	3166	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3303	1748		3242	1710		1752	3294		1719	3166	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	133	123	63	49	103	100	39	714	65	80	596	94
RTOR Reduction (vph)	0	20	0	0	39	0	0	5	0	0	9	0
Lane Group Flow (vph)	133	166	0	49	164	0	39	774	0	80	681	0
Confl. Peds. (#/hr)	2						2	2		2	2	
Confl. Bikes (#/hr)			2				2			2		1
Heavy Vehicles (%)	6%	3%	2%	8%	1%	3%	3%	8%	8%	5%	12%	7%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	8.4	18.4		5.1	15.1		4.7	48.5		8.0	51.8	
Effective Green, g (s)	8.4	18.4		5.1	15.1		4.7	48.5		8.0	51.8	
Actuated g/C Ratio	0.08	0.18		0.05	0.15		0.05	0.48		0.08	0.52	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	277	321		165	258		82	1597		137	1639	
v/s Ratio Prot	c0.04	c0.09		0.02	c0.10		0.02	c0.23		c0.05	c0.22	
v/s Ratio Perm												
v/c Ratio	0.48	0.52		0.30	0.64		0.48	0.48		0.58	0.42	
Uniform Delay, d1	43.7	36.8		45.7	39.9		46.4	17.3		44.4	14.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.25	0.69	
Incremental Delay, d2	0.5	0.6		0.4	3.7		1.6	1.1		4.0	0.1	
Delay (s)	44.2	37.4		46.1	43.6		48.0	18.4		59.5	10.3	
Level of Service	D	D		D	D		D	B		E	B	
Approach Delay (s)		40.2			44.1			19.8			15.4	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			53.1%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Queues
1: SE 164th Ave & SE 15th St

Existing Traffic Conditions
PM Peak Hour Conditions

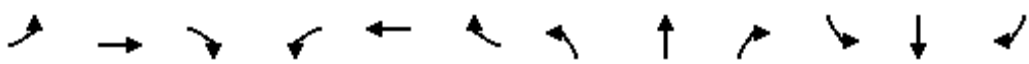
											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	42	121	115	116	95	125	1436	47	153	1361	38
v/c Ratio	0.09	0.26	0.24	0.21	0.18	0.61	0.79	0.08	0.63	0.69	0.06
Control Delay	28.3	36.7	28.8	37.9	8.4	62.4	37.4	0.2	60.1	32.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	36.7	28.8	37.9	8.4	62.4	37.4	0.2	60.1	32.7	0.2
Queue Length 50th (ft)	20	66	58	69	0	94	360	0	113	317	0
Queue Length 95th (ft)	51	135	116	137	42	148	364	0	172	324	0
Internal Link Dist (ft)		642		766			1016			601	
Turn Bay Length (ft)	100		250		325	150		150	230		230
Base Capacity (vph)	499	548	480	614	567	220	1973	667	247	2060	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.22	0.24	0.19	0.17	0.57	0.73	0.07	0.62	0.66	0.05
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: SE 164th Ave & SE 15th St

Existing Traffic Conditions

PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	→	↱	↰	→	↱	↰	↰↰↰	↱	↰	↰↰↰	↱
Traffic Volume (vph)	37	77	29	101	102	84	110	1264	41	135	1198	33
Future Volume (vph)	37	77	29	101	102	84	110	1264	41	135	1198	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1787		1803	1881	1530	1805	5036	1549	1787	5136	1580
Flt Permitted	0.68	1.00		0.58	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1296	1787		1093	1881	1530	1805	5036	1549	1787	5136	1580
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	42	88	33	115	116	95	125	1436	47	153	1361	38
RTOR Reduction (vph)	0	11	0	0	0	67	0	0	30	0	0	23
Lane Group Flow (vph)	42	110	0	115	116	28	125	1436	17	153	1361	15
Confl. Peds. (#/hr)			2	2			1		1	1		1
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	0%	1%	3%	0%	1%	4%	0%	3%	2%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6			4			8
Actuated Green, G (s)	37.3	31.0		45.1	34.9	34.9	13.7	43.4	43.4	16.4	46.1	46.1
Effective Green, g (s)	37.3	31.0		45.1	34.9	34.9	13.7	43.4	43.4	16.4	46.1	46.1
Actuated g/C Ratio	0.31	0.26		0.38	0.29	0.29	0.11	0.36	0.36	0.14	0.38	0.38
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	3.0	2.0		3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	429	461		471	547	444	206	1821	560	244	1973	606
v/s Ratio Prot	0.01	0.06		c0.02	0.06		0.07	c0.29		c0.09	c0.27	
v/s Ratio Perm	0.03			c0.07		0.02			0.01			0.01
v/c Ratio	0.10	0.24		0.24	0.21	0.06	0.61	0.79	0.03	0.63	0.69	0.02
Uniform Delay, d1	29.2	35.2		25.1	32.2	30.7	50.6	34.2	24.7	48.9	31.0	23.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.2		0.3	0.9	0.3	5.0	2.2	0.0	5.0	0.8	0.0
Delay (s)	29.3	36.4		25.4	33.0	31.0	55.6	36.4	24.7	53.9	31.8	23.0
Level of Service	C	D		C	C	C	E	D	C	D	C	C
Approach Delay (s)		34.6			29.7			37.5			33.7	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			35.1									
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			62.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC
2: SE 189th Ave & SE 15th St

Existing Traffic Conditions
PM Peak Hour Conditions

Intersection						
Int Delay, s/veh	0.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	230	13	21	211	11	12
Future Vol, veh/h	230	13	21	211	11	12
Conflicting Peds, #/hr	0	4	4	0	6	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	1	8	5	1	0	8
Mvmt Flow	267	15	24	245	13	14
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	286	0	578	279
Stage 1	-	-	-	-	279	-
Stage 2	-	-	-	-	299	-
Critical Hdwy	-	-	4.15	-	6.4	6.28
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.245	-	3.5	3.372
Pot Cap-1 Maneuver	-	-	1259	-	481	746
Stage 1	-	-	-	-	773	-
Stage 2	-	-	-	-	757	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1254	-	466	743
Mov Cap-2 Maneuver	-	-	-	-	466	-
Stage 1	-	-	-	-	770	-
Stage 2	-	-	-	-	736	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.7		11.5	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	579	-	-	1254	-	
HCM Lane V/C Ratio	0.046	-	-	0.019	-	
HCM Control Delay (s)	11.5	-	-	7.9	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	

Queues
3: SE 192nd Ave & SE 15th St

Existing Traffic Conditions
PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	102	156	45	81	136	54	1071	57	1094
v/c Ratio	0.65	0.51	0.39	0.40	0.36	0.38	0.55	0.46	0.55
Control Delay	64.5	32.7	54.5	44.8	7.5	55.5	24.5	56.4	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	32.7	54.5	44.8	7.5	55.5	24.5	56.4	18.7
Queue Length 50th (ft)	63	68	28	51	3	27	277	36	233
Queue Length 95th (ft)	#159	115	63	79	37	m38	293	75	405
Internal Link Dist (ft)		206		1016			1126		238
Turn Bay Length (ft)	115		110		110	150		475	
Base Capacity (vph)	160	471	162	507	437	160	1953	194	1973
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.33	0.28	0.16	0.31	0.34	0.55	0.29	0.55

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 15th St

Existing Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	93	74	68	41	74	124	49	948	26	52	885	110
Future Volume (vph)	93	74	68	41	74	124	49	948	26	52	885	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1754		1805	1881	1602	1736	3520		1770	3505	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1754		1805	1881	1602	1736	3520		1770	3505	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	102	81	75	45	81	136	54	1042	29	57	973	121
RTOR Reduction (vph)	0	37	0	0	0	108	0	1	0	0	7	0
Lane Group Flow (vph)	102	119	0	45	81	28	54	1070	0	57	1087	0
Confl. Peds. (#/hr)							3		4	4		3
Confl. Bikes (#/hr)						1			1			
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	4%	2%	4%	2%	1%	1%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	8.8	15.2		4.4	10.8	17.8	7.3	53.4		7.0	53.1	
Effective Green, g (s)	8.8	15.2		4.4	10.8	17.8	7.3	53.4		7.0	53.1	
Actuated g/C Ratio	0.09	0.15		0.04	0.11	0.18	0.07	0.53		0.07	0.53	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	157	266		79	203	365	126	1879		123	1861	
v/s Ratio Prot	c0.06	c0.07		0.02	0.04	0.01	0.03	c0.30		0.03	c0.31	
v/s Ratio Perm						0.01						
v/c Ratio	0.65	0.45		0.57	0.40	0.08	0.43	0.57		0.46	0.58	
Uniform Delay, d1	44.1	38.6		46.9	41.6	34.3	44.4	15.6		44.7	15.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.16	1.38		1.00	1.00	
Incremental Delay, d2	6.8	0.4		5.5	0.5	0.0	0.6	0.9		1.0	0.3	
Delay (s)	50.9	39.0		52.4	42.0	34.3	52.2	22.4		45.7	16.2	
Level of Service	D	D		D	D	C	D	C		D	B	
Approach Delay (s)		43.7			39.8			23.8			17.7	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM 2000 Control Delay			24.6									
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			61.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: SE 192nd Ave & Mill Plain Blvd

Existing Traffic Conditions
PM Peak Hour Conditions

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	300	13	478	49	59	384	848	18	942
v/c Ratio	0.58	0.05	0.94	0.13	0.29	0.88	0.54	0.19	0.88
Control Delay	40.7	31.3	45.1	36.4	21.7	65.4	22.8	50.3	42.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	31.3	45.1	36.4	21.7	65.4	22.8	50.3	42.3
Queue Length 50th (ft)	165	8	~281	19	14	125	174	11	275
Queue Length 95th (ft)	#440	21	157	65	41	#210	293	33	#389
Internal Link Dist (ft)		628			391		457		709
Turn Bay Length (ft)	240		130			205		150	
Base Capacity (vph)	513	513	513	400	477	441	1557	180	1125
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.03	0.93	0.12	0.12	0.87	0.54	0.10	0.84

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & Mill Plain Blvd

Existing Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	267	12	425	44	20	33	342	744	11	16	661	177
Future Volume (vph)	267	12	425	44	20	33	342	744	11	16	661	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1900	1583	1805	1665		3467	3530		1805	3417	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1900	1583	1805	1665		3467	3530		1805	3417	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	300	13	478	49	22	37	384	836	12	18	743	199
RTOR Reduction (vph)	0	0	126	0	34	0	0	1	0	0	26	0
Lane Group Flow (vph)	300	13	352	49	25	0	384	847	0	18	916	0
Confl. Peds. (#/hr)	8		6	6		8	9		9	9		9
Confl. Bikes (#/hr)						1			3			1
Heavy Vehicles (%)	1%	0%	1%	0%	0%	3%	1%	2%	0%	0%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	28.8	18.0	33.7	19.8	9.0		15.7	40.0		2.2	26.5	
Effective Green, g (s)	28.8	18.0	33.7	19.8	9.0		15.7	40.0		2.2	26.5	
Actuated g/C Ratio	0.29	0.18	0.34	0.20	0.09		0.16	0.40		0.02	0.26	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5	0.5	2.0	2.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)	514	342	533	357	149		544	1412		39	905	
v/s Ratio Prot	c0.17	0.01	0.10	c0.03	0.02		c0.11	0.24		0.01	c0.27	
v/s Ratio Perm			0.12									
v/c Ratio	0.58	0.04	0.66	0.14	0.17		0.71	0.60		0.46	1.01	
Uniform Delay, d1	30.5	33.9	28.3	33.1	42.0		40.0	23.7		48.3	36.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.0	2.4	0.1	0.2		3.4	1.9		3.1	33.0	
Delay (s)	31.6	33.9	30.7	33.1	42.2		43.4	25.6		51.4	69.8	
Level of Service	C	C	C	C	D		D	C		D	E	
Approach Delay (s)		31.0			38.1			31.1			69.4	
Approach LOS		C			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			43.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			68.0%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: SE 192nd Ave & SE 20th St

Existing Traffic Conditions
PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	126	239	113	354	101	996	143	1006
v/c Ratio	0.45	0.76	0.24	0.85	0.62	0.75	0.70	0.68
Control Delay	48.8	50.6	39.5	50.6	59.8	33.0	64.7	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	50.6	39.5	50.6	59.8	33.0	64.7	19.8
Queue Length 50th (ft)	40	132	32	187	62	291	67	290
Queue Length 95th (ft)	68	200	59	284	117	#458	#158	#277
Internal Link Dist (ft)		1997		3145		1320		1126
Turn Bay Length (ft)	100		150		335		410	
Base Capacity (vph)	450	462	486	465	186	1330	237	1489
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.52	0.23	0.76	0.54	0.75	0.60	0.68

Intersection Summary

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

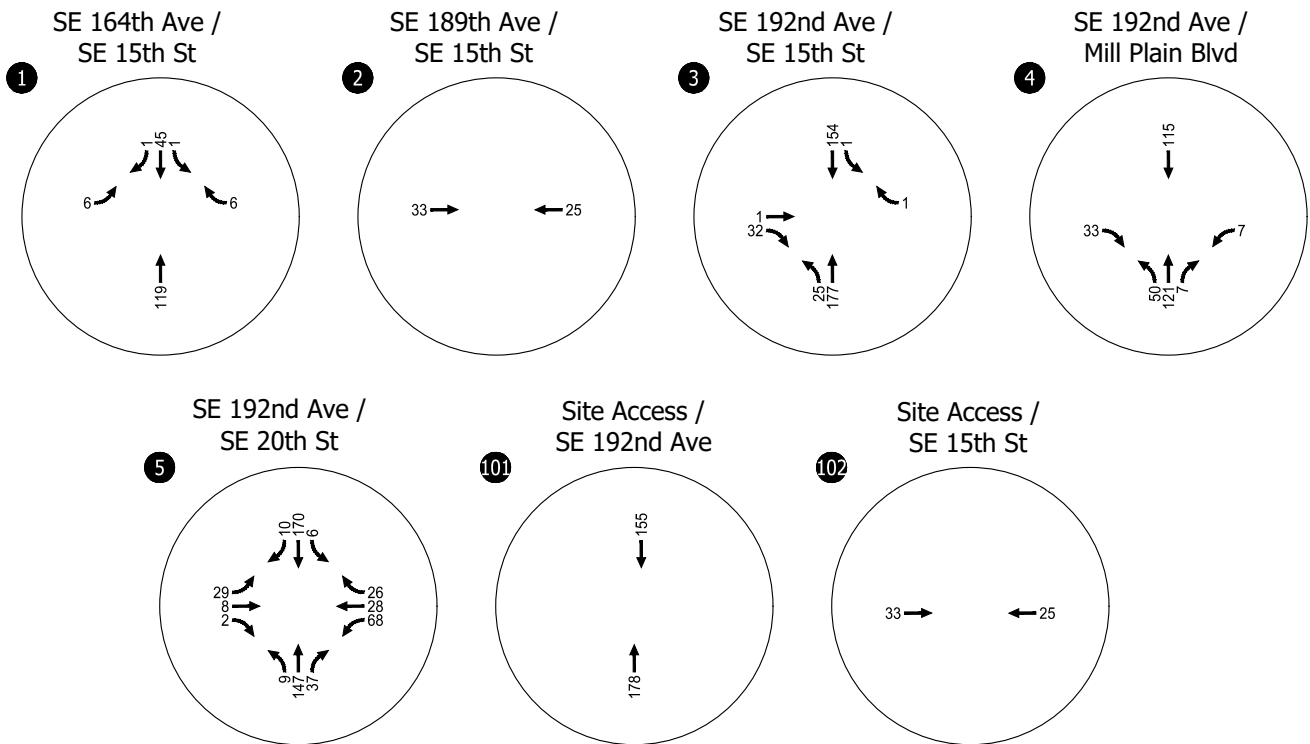
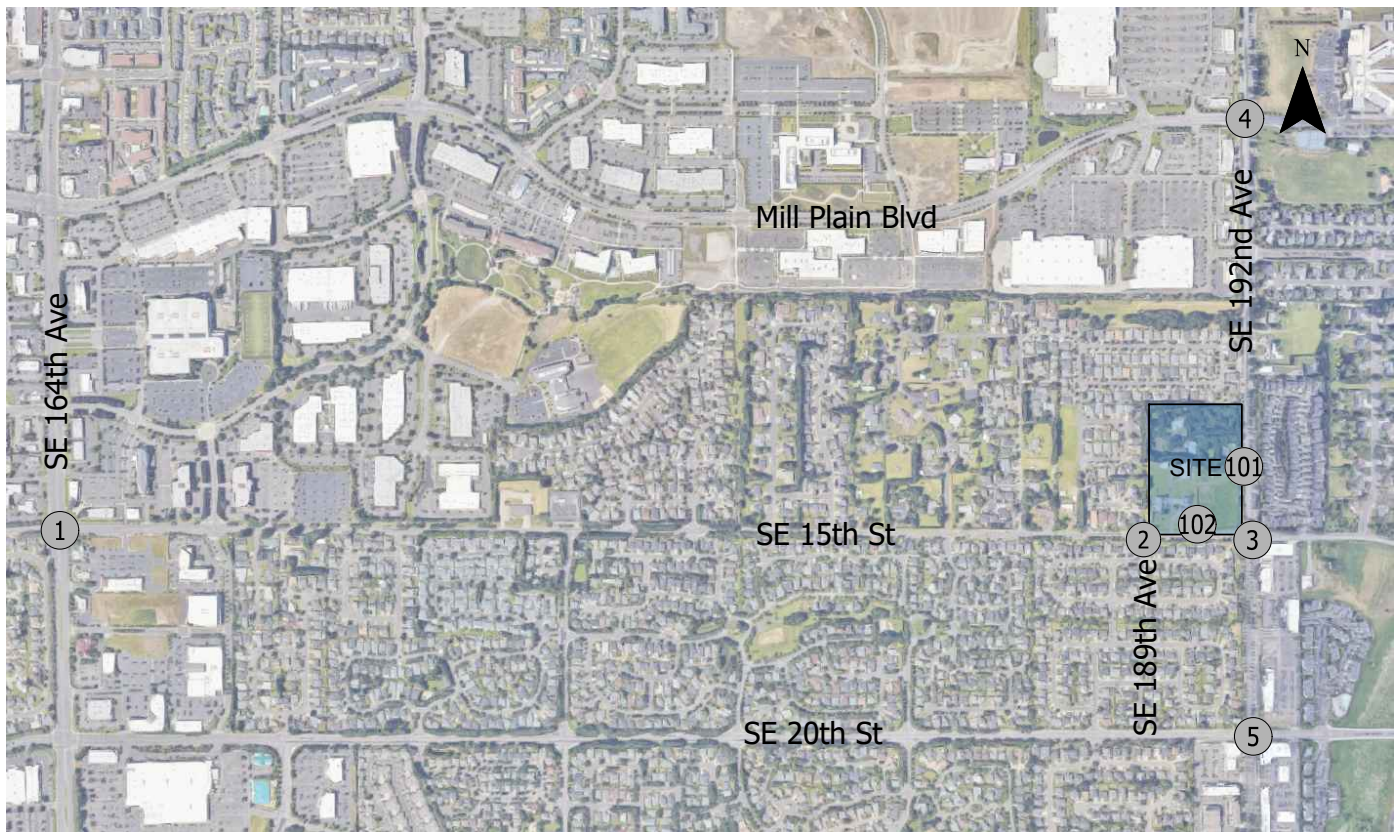
HCM Signalized Intersection Capacity Analysis

5: SE 192nd Ave & SE 20th St

Existing Traffic Conditions
PM Peak Hour Conditions

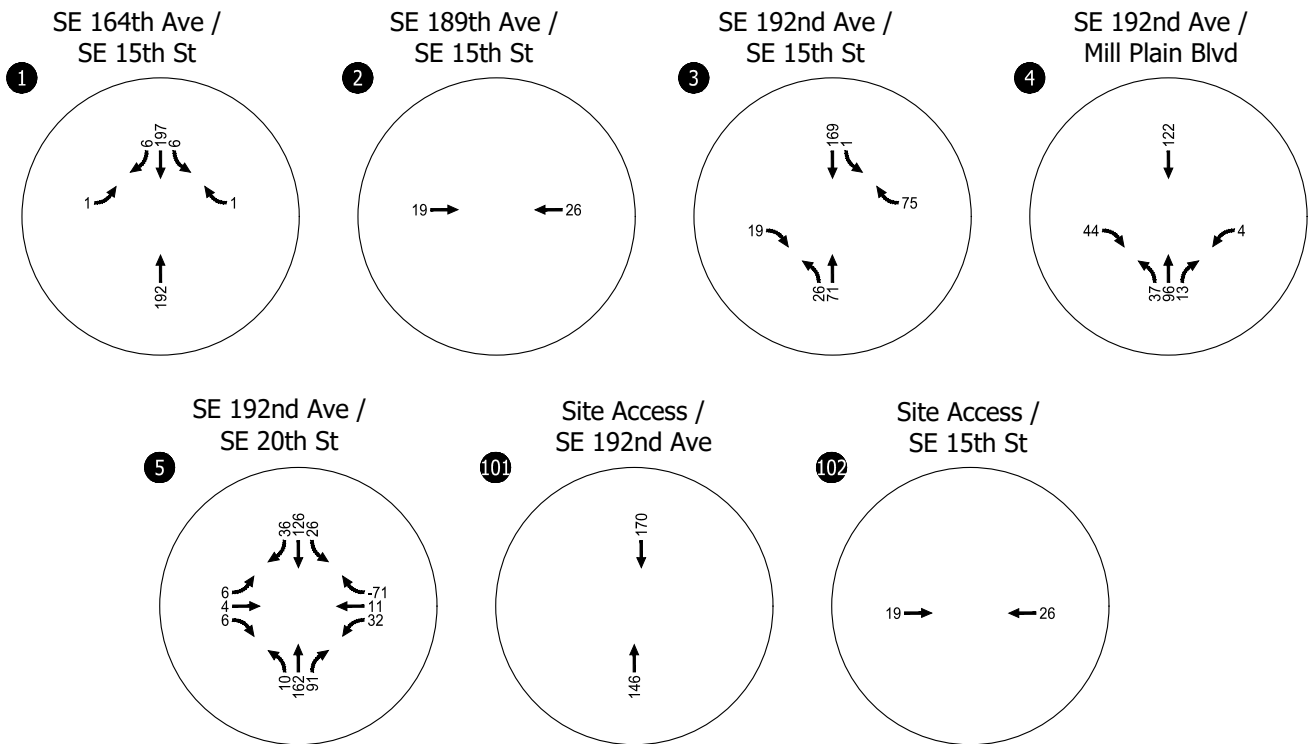
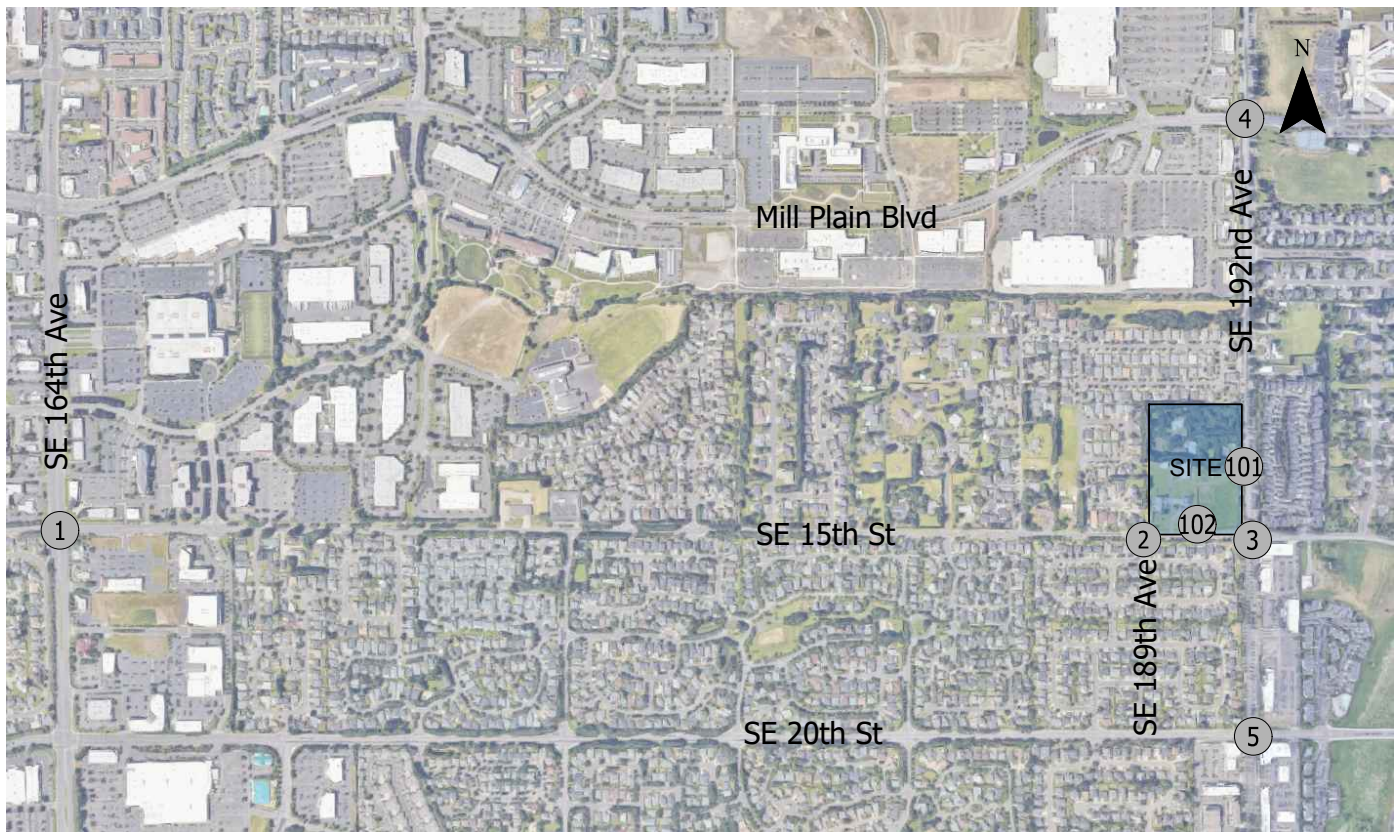
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	152	78	108	168	172	97	861	95	137	828	137
Future Volume (vph)	121	152	78	108	168	172	97	861	95	137	828	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.92		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1776		3502	1721		1805	3447		1787	3442	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1776		3502	1721		1805	3447		1787	3442	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	126	158	81	112	175	179	101	897	99	143	862	143
RTOR Reduction (vph)	0	21	0	0	37	0	0	7	0	0	12	0
Lane Group Flow (vph)	126	218	0	113	317	0	101	989	0	143	994	0
Confl. Peds. (#/hr)	3		1	1		3	1		5	5		1
Confl. Bikes (#/hr)			1			4			5			2
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	4%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	8.0	16.6		13.6	22.2		7.9	38.3		11.5	41.9	
Effective Green, g (s)	8.0	16.6		13.6	22.2		7.9	38.3		11.5	41.9	
Actuated g/C Ratio	0.08	0.17		0.14	0.22		0.08	0.38		0.12	0.42	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	277	294		476	382		142	1320		205	1442	
v/s Ratio Prot	0.04	c0.12		0.03	c0.18		0.06	c0.29		c0.08	c0.29	
v/s Ratio Perm												
v/c Ratio	0.45	0.74		0.24	0.83		0.71	0.75		0.70	0.69	
Uniform Delay, d1	43.9	39.7		38.6	37.1		44.9	26.7		42.6	23.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.15	0.67	
Incremental Delay, d2	0.4	8.5		0.1	13.2		13.1	3.9		7.2	1.0	
Delay (s)	44.4	48.2		38.7	50.3		58.0	30.6		56.0	16.9	
Level of Service	D	D		D	D		E	C		E	B	
Approach Delay (s)		46.9			47.5			33.1			21.8	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			32.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			74.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Appendix D In Process Trips



In-Process Trips
Weekday AM Peak Hour
Vancouver, WA

Figure
D-1



In-Process Trips
Weekday PM Peak Hour
Vancouver, WA

Figure
D-2

Appendix E 2027 Background Operations
(Existing Zoning) Worksheets

Queues

1: SE 164th Ave & SE 15th St

Background 2027 Traffic Conditions

AM Peak Hour Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	17	77	51	54	79	64	1150	76	74	1063	19
v/c Ratio	0.03	0.10	0.08	0.06	0.10	0.44	0.77	0.14	0.49	0.70	0.03
Control Delay	19.1	13.8	18.9	24.0	3.7	61.6	41.9	3.1	62.3	39.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	13.8	18.9	24.0	3.7	61.6	41.9	3.1	62.3	39.1	0.1
Queue Length 50th (ft)	6	14	20	21	0	48	297	0	56	265	0
Queue Length 95th (ft)	23	55	50	62	24	92	320	20	103	286	0
Internal Link Dist (ft)		600		638			842			586	
Turn Bay Length (ft)	100		250		325	150		150	230		230
Base Capacity (vph)	729	756	674	903	787	167	2014	706	169	2014	687
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.10	0.08	0.06	0.10	0.38	0.57	0.11	0.44	0.53	0.03
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: SE 164th Ave & SE 15th St

Background 2027 Traffic Conditions

AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	28	44	48	51	74	60	1081	71	70	999	18
Future Volume (vph)	16	28	44	48	51	74	60	1081	71	70	999	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1802	1695		1752	1900	1546	1805	5036	1615	1752	5036	1568
Flt Permitted	0.72	1.00		0.66	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1369	1695		1219	1900	1546	1805	5036	1615	1752	5036	1568
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	17	30	47	51	54	79	64	1150	76	74	1063	19
RTOR Reduction (vph)	0	27	0	0	0	44	0	0	53	0	0	13
Lane Group Flow (vph)	17	50	0	51	54	35	64	1150	23	74	1063	6
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	0%	3%	3%	0%	3%	0%	3%	0%	3%	3%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6			4			8
Actuated Green, G (s)	52.7	49.9		59.7	53.4	53.4	8.4	35.7	35.7	9.1	36.4	36.4
Effective Green, g (s)	52.7	49.9		59.7	53.4	53.4	8.4	35.7	35.7	9.1	36.4	36.4
Actuated g/C Ratio	0.44	0.42		0.50	0.44	0.44	0.07	0.30	0.30	0.08	0.30	0.30
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	3.0	2.0		3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	611	704		634	845	687	126	1498	480	132	1527	475
v/s Ratio Prot	0.00	0.03		c0.00	0.03		0.04	c0.23		c0.04	0.21	
v/s Ratio Perm	0.01			c0.04		0.02			0.01			0.00
v/c Ratio	0.03	0.07		0.08	0.06	0.05	0.51	0.77	0.05	0.56	0.70	0.01
Uniform Delay, d1	19.1	21.1		15.7	19.0	18.9	53.8	38.4	30.0	53.5	36.9	29.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.2		0.1	0.0	0.0	3.2	2.2	0.0	5.4	1.1	0.0
Delay (s)	19.1	21.3		15.7	19.0	18.9	57.0	40.6	30.0	58.9	38.0	29.2
Level of Service	B	C		B	B	B	E	D	C	E	D	C
Approach Delay (s)		20.9			18.1			40.8			39.2	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			37.9				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			49.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	202	10	8	186	16	20
Future Vol, veh/h	202	10	8	186	16	20
Conflicting Peds, #/hr	0	3	3	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	3	3	3	3	0	0
Mvmt Flow	262	13	10	242	21	26
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	278	0	537	272
Stage 1	-	-	-	-	272	-
Stage 2	-	-	-	-	265	-
Critical Hdwy	-	-	4.13	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1279	-	508	772
Stage 1	-	-	-	-	778	-
Stage 2	-	-	-	-	784	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1275	-	500	770
Mov Cap-2 Maneuver	-	-	-	-	500	-
Stage 1	-	-	-	-	776	-
Stage 2	-	-	-	-	775	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.3		11.3	
HCM LOS	B					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	621	-	-	1275	-	
HCM Lane V/C Ratio	0.075	-	-	0.008	-	
HCM Control Delay (s)	11.3	-	-	7.8	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0	-	

Queues
3: SE 192nd Ave & SE 15th St

Background 2027 Traffic Conditions
AM Peak Hour Conditions



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	150	118	26	59	54	53	939	27	830
v/c Ratio	0.72	0.31	0.26	0.40	0.17	0.39	0.46	0.28	0.43
Control Delay	60.5	16.0	51.4	50.0	1.2	44.1	14.4	52.0	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	16.0	51.4	50.0	1.2	44.1	14.4	52.0	16.5
Queue Length 50th (ft)	93	22	16	37	0	26	162	17	158
Queue Length 95th (ft)	151	66	43	71	0	m42	147	44	288
Internal Link Dist (ft)		318		1016			1126		227
Turn Bay Length (ft)	115		110		110	150		475	
Base Capacity (vph)	350	464	100	175	320	151	2080	109	1995
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.25	0.26	0.34	0.17	0.35	0.45	0.25	0.42

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 15th St

Background 2027 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	40	69	24	54	50	49	839	25	25	693	71
Future Volume (vph)	138	40	69	24	54	50	49	839	25	25	693	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1719		1805	1845	1555	1805	3490		1752	3449	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1719		1805	1845	1555	1805	3490		1752	3449	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	150	43	75	26	59	54	53	912	27	27	753	77
RTOR Reduction (vph)	0	61	0	0	0	48	0	2	0	0	7	0
Lane Group Flow (vph)	150	57	0	26	59	6	53	937	0	27	823	0
Confl. Peds. (#/hr)	1					1			3	3		
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	3%	0%	0%	0%	3%	3%	0%	3%	0%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	14.0	18.5		2.6	7.1	11.7	6.6	54.3		4.6	52.3	
Effective Green, g (s)	14.0	18.5		2.6	7.1	11.7	6.6	54.3		4.6	52.3	
Actuated g/C Ratio	0.14	0.18		0.03	0.07	0.12	0.07	0.54		0.05	0.52	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	245	318		46	130	181	119	1895		80	1803	
v/s Ratio Prot	c0.09	c0.03		0.01	c0.03	0.00	0.03	c0.27		0.02	c0.24	
v/s Ratio Perm						0.00						
v/c Ratio	0.61	0.18		0.57	0.45	0.03	0.45	0.49		0.34	0.46	
Uniform Delay, d1	40.4	34.3		48.1	44.6	39.1	44.9	14.3		46.2	14.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	0.92		1.00	1.00	
Incremental Delay, d2	3.2	0.1		9.1	0.9	0.0	0.7	0.7		0.9	0.1	
Delay (s)	43.6	34.4		57.3	45.5	39.2	39.9	13.8		47.1	15.0	
Level of Service	D	C		E	D	D	D	B		D	B	
Approach Delay (s)		39.6			45.2			15.2			16.0	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.3									
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			55.0%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: SE 192nd Ave & Mill Plain Blvd

Background 2027 Traffic Conditions
AM Peak Hour Conditions

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	136	118	205	166	234	504	915	100	802
v/c Ratio	0.70	0.40	0.34	0.79	0.73	0.85	0.59	0.70	0.67
Control Delay	61.7	39.3	6.4	69.6	44.9	57.4	24.3	69.1	30.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	39.3	6.4	69.6	44.9	57.4	24.3	69.1	30.5
Queue Length 50th (ft)	84	70	21	103	120	162	217	63	213
Queue Length 95th (ft)	116	84	29	139	135	#227	273	94	242
Internal Link Dist (ft)		628			391		457		709
Turn Bay Length (ft)	240		130			205		150	
Base Capacity (vph)	233	516	602	227	507	591	1561	176	1200
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.23	0.34	0.73	0.46	0.85	0.59	0.57	0.67

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

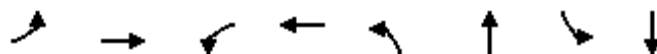
4: SE 192nd Ave & Mill Plain Blvd

Background 2027 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	87	152	123	96	77	373	494	183	74	448	146
Future Volume (vph)	101	87	152	123	96	77	373	494	183	74	448	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1845	1552	1752	1711		3433	3338		1752	3362	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1845	1552	1752	1711		3433	3338		1752	3362	
Peak-hour factor, PHF	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Adj. Flow (vph)	136	118	205	166	130	104	504	668	247	100	605	197
RTOR Reduction (vph)	0	0	86	0	33	0	0	29	0	0	28	0
Lane Group Flow (vph)	136	118	119	166	201	0	504	886	0	100	774	0
Confl. Peds. (#/hr)	1		8	8		1	3		3	3		3
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	2%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	11.1	16.0	34.2	11.9	16.8		18.2	44.9		7.2	33.9	
Effective Green, g (s)	11.1	16.0	34.2	11.9	16.8		18.2	44.9		7.2	33.9	
Actuated g/C Ratio	0.11	0.16	0.34	0.12	0.17		0.18	0.45		0.07	0.34	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5	0.5	2.0	2.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)	194	295	530	208	287		624	1498		126	1139	
v/s Ratio Prot	c0.08	c0.06	0.04	0.09	c0.12		c0.15	0.27		0.06	c0.23	
v/s Ratio Perm			0.04									
v/c Ratio	0.70	0.40	0.22	0.80	0.70		0.81	0.59		0.79	0.68	
Uniform Delay, d1	42.9	37.7	23.4	42.9	39.2		39.2	20.7		45.7	28.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.0	0.3	0.1	17.7	5.9		7.2	1.7		26.5	1.3	
Delay (s)	51.8	38.0	23.5	60.6	45.1		46.4	22.4		72.2	29.7	
Level of Service	D	D	C	E	D		D	C		E	C	
Approach Delay (s)		35.6			51.6			30.9			34.4	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			35.2			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			60.5%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: SE 192nd Ave & SE 20th St

Background 2027 Traffic Conditions
AM Peak Hour Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	177	211	138	283	53	1062	94	967
v/c Ratio	0.55	0.60	0.48	0.82	0.41	0.67	0.60	0.60
Control Delay	49.5	38.8	49.0	50.9	52.9	26.8	73.9	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	38.8	49.0	50.9	52.9	26.8	73.9	17.7
Queue Length 50th (ft)	56	108	44	146	33	287	62	247
Queue Length 95th (ft)	76	145	63	187	61	346	98	206
Internal Link Dist (ft)		1997		3145		1320		1126
Turn Bay Length (ft)	100		150		335		410	
Base Capacity (vph)	408	455	374	445	175	1576	180	1621
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.46	0.37	0.64	0.30	0.67	0.52	0.60
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

5: SE 192nd Ave & SE 20th St

Background 2027 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	111	55	109	114	110	42	748	91	74	675	89
Future Volume (vph)	140	111	55	109	114	110	42	748	91	74	675	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.93		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3400	1750		3400	1711		1752	3438		1752	3433	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3400	1750		3400	1711		1752	3438		1752	3433	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	177	141	70	138	144	139	53	947	115	94	854	113
RTOR Reduction (vph)	0	19	0	0	38	0	0	8	0	0	9	0
Lane Group Flow (vph)	177	192	0	138	245	0	53	1054	0	94	958	0
Confl. Peds. (#/hr)	2					2	2		2	2		2
Confl. Bikes (#/hr)			2			2			2			1
Heavy Vehicles (%)	3%	3%	2%	3%	1%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	9.5	19.2		8.4	18.1		6.4	44.6		7.8	46.0	
Effective Green, g (s)	9.5	19.2		8.4	18.1		6.4	44.6		7.8	46.0	
Actuated g/C Ratio	0.10	0.19		0.08	0.18		0.06	0.45		0.08	0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	323	336		285	309		112	1533		136	1579	
v/s Ratio Prot	c0.05	0.11		0.04	c0.14		0.03	c0.31		c0.05	0.28	
v/s Ratio Perm												
v/c Ratio	0.55	0.57		0.48	0.79		0.47	0.69		0.69	0.61	
Uniform Delay, d1	43.2	36.7		43.7	39.2		45.2	22.1		44.9	20.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.34	0.72	
Incremental Delay, d2	1.0	1.5		0.5	12.3		1.1	2.5		11.1	0.4	
Delay (s)	44.2	38.1		44.2	51.5		46.3	24.7		71.2	15.0	
Level of Service	D	D		D	D		D	C		E	B	
Approach Delay (s)		40.9			49.1			25.7			20.0	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.9			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			61.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	3	0	1027	786	4
Future Vol, veh/h	0	3	0	1027	786	4
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, %	0	0	0	3	3	0
Mvmt Flow	0	3	0	1116	854	4
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	429	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	580	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	580	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	11.2	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	580	-	-		
HCM Lane V/C Ratio	-	0.006	-	-		
HCM Control Delay (s)	-	11.2	-	-		
HCM Lane LOS	-	B	-	-		
HCM 95th %tile Q(veh)	-	0	-	-		

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	229	171	3	18	13
Future Vol, veh/h	4	229	171	3	18	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	3	0	0	0
Mvmt Flow	4	249	186	3	20	14
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	189	0	-	0	445	188
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	257	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1397	-	-	-	574	859
Stage 1	-	-	-	-	849	-
Stage 2	-	-	-	-	791	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1397	-	-	-	572	859
Mov Cap-2 Maneuver	-	-	-	-	572	-
Stage 1	-	-	-	-	846	-
Stage 2	-	-	-	-	791	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.1	0		10.7		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1397	-	-	-	665	
HCM Lane V/C Ratio	0.003	-	-	-	0.051	
HCM Control Delay (s)	7.6	0	-	-	10.7	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

Queues

1: SE 164th Ave & SE 15th St

Background 2027 Traffic Conditions

PM Peak Hour Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	45	128	127	123	107	133	1743	59	176	1669	47
v/c Ratio	0.13	0.38	0.35	0.30	0.25	0.62	0.83	0.08	0.62	0.72	0.06
Control Delay	33.4	44.1	36.0	45.6	10.2	61.9	35.4	1.1	56.8	28.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	44.1	36.0	45.6	10.2	61.9	35.4	1.1	56.8	28.5	0.1
Queue Length 50th (ft)	25	81	75	84	0	99	420	0	128	359	0
Queue Length 95th (ft)	55	140	128	146	48	156	479	6	193	421	0
Internal Link Dist (ft)		642		766			1016			601	
Turn Bay Length (ft)	100		250		325	150		150	230		230
Base Capacity (vph)	400	497	365	549	527	226	2111	707	283	2331	771
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.26	0.35	0.22	0.20	0.59	0.83	0.08	0.62	0.72	0.06
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: SE 164th Ave & SE 15th St

Background 2027 Traffic Conditions

PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	82	31	112	108	94	117	1534	52	155	1469	41
Future Volume (vph)	40	82	31	112	108	94	117	1534	52	155	1469	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1787		1803	1881	1543	1805	5036	1549	1787	5136	1580
Flt Permitted	0.68	1.00		0.52	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1288	1787		985	1881	1543	1805	5036	1549	1787	5136	1580
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	45	93	35	127	123	107	133	1743	59	176	1669	47
RTOR Reduction (vph)	0	12	0	0	0	84	0	0	34	0	0	26
Lane Group Flow (vph)	45	116	0	127	123	23	133	1743	25	176	1669	21
Confl. Peds. (#/hr)			2	2			1		1	1		1
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	0%	1%	3%	0%	1%	3%	0%	3%	2%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6			4			8
Actuated Green, G (s)	28.7	22.1		35.5	25.5	25.5	14.4	49.9	49.9	19.0	54.5	54.5
Effective Green, g (s)	28.7	22.1		35.5	25.5	25.5	14.4	49.9	49.9	19.0	54.5	54.5
Actuated g/C Ratio	0.24	0.18		0.30	0.21	0.21	0.12	0.42	0.42	0.16	0.45	0.45
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	3.0	2.0		3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	336	329		359	399	327	216	2094	644	282	2332	717
v/s Ratio Prot	0.01	0.06		c0.03	0.07		0.07	c0.35		c0.10	0.32	
v/s Ratio Perm	0.02			c0.08		0.01			0.02			0.01
v/c Ratio	0.13	0.35		0.35	0.31	0.07	0.62	0.83	0.04	0.62	0.72	0.03
Uniform Delay, d1	35.6	42.7		32.2	39.8	37.8	50.2	31.3	20.8	47.2	26.5	18.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	2.9		0.6	2.0	0.4	5.1	2.9	0.0	4.3	0.9	0.0
Delay (s)	35.8	45.6		32.8	41.8	38.2	55.3	34.2	20.8	51.4	27.4	18.1
Level of Service	D	D		C	D	D	E	C	C	D	C	B
Approach Delay (s)		43.1			37.5			35.2			29.4	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			33.2									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			68.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	277	14	22	259	12	13
Future Vol, veh/h	277	14	22	259	12	13
Conflicting Peds, #/hr	0	4	4	0	6	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	1	3	3	1	0	3
Mvmt Flow	322	16	26	301	14	15
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	342	0	693	334
Stage 1	-	-	-	-	334	-
Stage 2	-	-	-	-	359	-
Critical Hdwy	-	-	4.13	-	6.4	6.23
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.327
Pot Cap-1 Maneuver	-	-	1211	-	412	706
Stage 1	-	-	-	-	730	-
Stage 2	-	-	-	-	711	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1206	-	397	703
Mov Cap-2 Maneuver	-	-	-	-	397	-
Stage 1	-	-	-	-	727	-
Stage 2	-	-	-	-	688	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.6		12.4	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	513	-	-	1206	-	
HCM Lane V/C Ratio	0.057	-	-	0.021	-	
HCM Control Delay (s)	12.4	-	-	8.1	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	

Queues
3: SE 192nd Ave & SE 15th St

Background 2027 Traffic Conditions
PM Peak Hour Conditions



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	119	189	48	88	227	93	1215	62	1352
v/c Ratio	0.69	0.77	0.47	0.61	0.60	0.65	0.60	0.49	0.66
Control Delay	63.1	50.7	61.0	62.5	15.0	44.1	16.9	57.3	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.1	50.7	61.0	62.5	15.0	44.1	16.9	57.3	18.8
Queue Length 50th (ft)	74	86	30	55	22	49	255	39	324
Queue Length 95th (ft)	130	154	#79	105	84	m49	m121	79	457
Internal Link Dist (ft)		206		1016			1126		238
Turn Bay Length (ft)	115		110		110	150		475	
Base Capacity (vph)	232	337	103	172	421	176	2026	177	2057
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.56	0.47	0.51	0.54	0.53	0.60	0.35	0.66

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

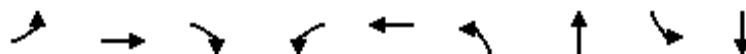
3: SE 192nd Ave & SE 15th St

Background 2027 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	80	92	44	80	207	85	1077	28	56	1110	120
Future Volume (vph)	108	80	92	44	80	207	85	1077	28	56	1110	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1740		1805	1881	1604	1752	3522		1770	3513	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1740		1805	1881	1604	1752	3522		1770	3513	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	119	88	101	48	88	227	93	1184	31	62	1220	132
RTOR Reduction (vph)	0	44	0	0	0	159	0	2	0	0	7	0
Lane Group Flow (vph)	119	145	0	48	88	68	93	1213	0	62	1345	0
Confl. Peds. (#/hr)							3		4	4		3
Confl. Bikes (#/hr)						1			1			
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	3%	2%	3%	2%	1%	1%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	9.7	11.7		4.7	6.7	13.8	7.2	56.5		7.1	56.4	
Effective Green, g (s)	9.7	11.7		4.7	6.7	13.8	7.2	56.5		7.1	56.4	
Actuated g/C Ratio	0.10	0.12		0.05	0.07	0.14	0.07	0.56		0.07	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	173	203		84	126	301	126	1989		125	1981	
v/s Ratio Prot	c0.07	c0.08		0.03	0.05	0.02	0.05	c0.34		0.04	c0.38	
v/s Ratio Perm						0.03						
v/c Ratio	0.69	0.71		0.57	0.70	0.22	0.74	0.61		0.50	0.68	
Uniform Delay, d1	43.7	42.5		46.7	45.7	38.3	45.5	14.4		44.7	15.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.82	1.03		1.00	1.00	
Incremental Delay, d2	8.7	9.5		5.7	12.8	0.1	6.7	0.5		1.1	0.7	
Delay (s)	52.4	52.0		52.4	58.4	38.5	44.1	15.4		45.9	16.1	
Level of Service	D	D		D	E	D	D	B		D	B	
Approach Delay (s)		52.2			45.2			17.5			17.4	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			23.6									
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			69.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: SE 192nd Ave & Mill Plain Blvd

Background 2027 Traffic Conditions
PM Peak Hour Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	318	15	563	57	63	454	1029	19	1147
v/c Ratio	0.63	0.06	1.17	0.22	0.31	1.09	0.66	0.20	1.04
Control Delay	41.5	31.4	119.8	40.5	21.8	113.3	25.3	50.5	72.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	31.4	119.8	40.5	21.8	113.3	25.3	50.5	72.5
Queue Length 50th (ft)	172	9	~441	22	15	~169	238	12	~406
Queue Length 95th (ft)	#468	22	234	73	42	#263	376	35	#541
Internal Link Dist (ft)		628			391		457		709
Turn Bay Length (ft)	240		130			205		150	
Base Capacity (vph)	507	513	481	292	479	416	1563	180	1100
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.03	1.17	0.20	0.13	1.09	0.66	0.11	1.04

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

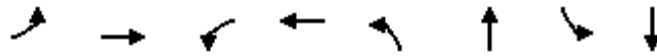
4: SE 192nd Ave & Mill Plain Blvd

Background 2027 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	13	501	51	21	35	404	891	25	17	833	188
Future Volume (vph)	283	13	501	51	21	35	404	891	25	17	833	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1900	1580	1805	1668		3467	3522		1805	3433	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1900	1580	1805	1668		3467	3522		1805	3433	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	318	15	563	57	24	39	454	1001	28	19	936	211
RTOR Reduction (vph)	0	0	93	0	35	0	0	2	0	0	20	0
Lane Group Flow (vph)	318	15	470	57	28	0	454	1027	0	19	1127	0
Confl. Peds. (#/hr)	8		6	6		8	9		9	9		9
Confl. Bikes (#/hr)						1			3			1
Heavy Vehicles (%)	1%	0%	1%	0%	0%	3%	1%	2%	0%	0%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	28.4	25.5	40.5	12.0	9.1		15.0	40.3		2.2	27.5	
Effective Green, g (s)	28.4	25.5	40.5	12.0	9.1		15.0	40.3		2.2	27.5	
Actuated g/C Ratio	0.28	0.26	0.40	0.12	0.09		0.15	0.40		0.02	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5	0.5	2.0	2.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)	507	484	639	216	151		520	1419		39	944	
v/s Ratio Prot	c0.18	0.01	c0.11	c0.03	0.02		c0.13	0.29		0.01	c0.33	
v/s Ratio Perm			0.19									
v/c Ratio	0.63	0.03	0.73	0.26	0.18		0.87	0.72		0.49	1.19	
Uniform Delay, d1	31.2	28.0	25.2	40.0	42.0		41.6	25.2		48.3	36.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.0	3.8	0.2	0.2		14.5	3.2		3.5	97.6	
Delay (s)	32.9	28.0	29.0	40.2	42.2		56.1	28.4		51.8	133.8	
Level of Service	C	C	C	D	D		E	C		D	F	
Approach Delay (s)		30.4			41.3			36.9			132.5	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			65.9			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			77.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: SE 192nd Ave & SE 20th St

Background 2027 Traffic Conditions
PM Peak Hour Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	265	153	315	118	1327	178	1239
v/c Ratio	0.48	0.78	0.41	0.83	0.66	1.01	0.75	0.87
Control Delay	48.9	50.5	44.6	52.4	60.7	61.2	70.7	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	50.5	44.6	52.4	60.7	61.2	70.7	28.2
Queue Length 50th (ft)	44	147	47	176	73	~494	119	326
Queue Length 95th (ft)	73	217	78	259	#150	#702	m#211	#578
Internal Link Dist (ft)		1997		3145		1320		1126
Turn Bay Length (ft)	100		150		335		410	
Base Capacity (vph)	450	462	425	451	195	1309	251	1430
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.57	0.36	0.70	0.61	1.01	0.71	0.87

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: SE 192nd Ave & SE 20th St

Background 2027 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	165	89	147	189	113	113	1082	192	171	1008	181
Future Volume (vph)	134	165	89	147	189	113	113	1082	192	171	1008	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1772		3502	1762		1805	3417		1787	3440	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1772		3502	1762		1805	3417		1787	3440	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	140	172	93	153	197	118	118	1127	200	178	1050	189
RTOR Reduction (vph)	0	21	0	0	22	0	0	13	0	0	13	0
Lane Group Flow (vph)	140	244	0	153	293	0	118	1314	0	178	1226	0
Confl. Peds. (#/hr)	3		1	1		3	1		5	5		1
Confl. Bikes (#/hr)			1			4			5			2
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	3%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	8.4	18.0		10.8	20.4		10.0	37.9		13.3	41.2	
Effective Green, g (s)	8.4	18.0		10.8	20.4		10.0	37.9		13.3	41.2	
Actuated g/C Ratio	0.08	0.18		0.11	0.20		0.10	0.38		0.13	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	291	318		378	359		180	1295		237	1417	
v/s Ratio Prot	0.04	c0.14		0.04	c0.17		0.07	c0.38		c0.10	c0.36	
v/s Ratio Perm												
v/c Ratio	0.48	0.77		0.40	0.82		0.66	1.01		0.75	0.87	
Uniform Delay, d1	43.7	39.0		41.6	38.0		43.3	31.1		41.8	26.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.32	0.72	
Incremental Delay, d2	0.5	9.5		0.3	12.6		6.4	28.7		9.0	4.5	
Delay (s)	44.2	48.5		41.9	50.6		49.7	59.8		64.0	23.7	
Level of Service	D	D		D	D		D	E		E	C	
Approach Delay (s)		47.0			47.8			58.9			28.7	
Approach LOS		D			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			44.8			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			83.5%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	2	0	1391	1284	12
Future Vol, veh/h	0	2	0	1391	1284	12
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	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	2	1	0
Mvmt Flow	0	2	0	1529	1411	13
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	712	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	379	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	379	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	14.6	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	379	-	-		
HCM Lane V/C Ratio	-	0.006	-	-		
HCM Control Delay (s)	-	14.6	-	-		
HCM Lane LOS	-	B	-	-		
HCM 95th %tile Q(veh)	-	0	-	-		

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	268	273	11	11	9
Future Vol, veh/h	14	268	273	11	11	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	15	295	300	12	12	10
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	312	0	-	0	631	306
Stage 1	-	-	-	-	306	-
Stage 2	-	-	-	-	325	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1260	-	-	-	448	739
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	737	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1260	-	-	-	442	739
Mov Cap-2 Maneuver	-	-	-	-	442	-
Stage 1	-	-	-	-	740	-
Stage 2	-	-	-	-	737	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		11.9		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1260	-	-	-	540	
HCM Lane V/C Ratio	0.012	-	-	-	0.041	
HCM Control Delay (s)	7.9	0	-	-	11.9	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Appendix F 2027 Total Operations (Proposed Zoning) Worksheets

Queues

1: SE 164th Ave & SE 15th St

Total 2027 Traffic Conditions

AM Peak Hour Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	17	77	64	54	88	64	1150	80	77	1063	19
v/c Ratio	0.03	0.10	0.10	0.06	0.11	0.44	0.77	0.15	0.50	0.69	0.03
Control Delay	19.3	14.1	18.9	24.2	4.9	61.6	41.9	3.7	62.5	38.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	14.1	18.9	24.2	4.9	61.6	41.9	3.7	62.5	38.9	0.1
Queue Length 50th (ft)	6	14	25	21	0	48	297	0	58	264	0
Queue Length 95th (ft)	23	56	60	62	31	92	320	23	105	285	0
Internal Link Dist (ft)		600		638			842			586	
Turn Bay Length (ft)	100		250		325	150		150	230		230
Base Capacity (vph)	721	747	667	900	785	167	2014	706	171	2014	687
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.10	0.10	0.06	0.11	0.38	0.57	0.11	0.45	0.53	0.03
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: SE 164th Ave & SE 15th St

Total 2027 Traffic Conditions

AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	28	44	60	51	83	60	1081	75	72	999	18
Future Volume (vph)	16	28	44	60	51	83	60	1081	75	72	999	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1802	1695		1752	1900	1546	1805	5036	1615	1752	5036	1568
Flt Permitted	0.72	1.00		0.65	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1369	1695		1206	1900	1546	1805	5036	1615	1752	5036	1568
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	17	30	47	64	54	88	64	1150	80	77	1063	19
RTOR Reduction (vph)	0	28	0	0	0	49	0	0	56	0	0	13
Lane Group Flow (vph)	17	49	0	64	54	39	64	1150	24	77	1063	6
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	0%	3%	3%	0%	3%	0%	3%	0%	3%	3%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6			4			8
Actuated Green, G (s)	52.0	49.2		60.0	53.2	53.2	8.4	35.7	35.7	9.3	36.6	36.6
Effective Green, g (s)	52.0	49.2		60.0	53.2	53.2	8.4	35.7	35.7	9.3	36.6	36.6
Actuated g/C Ratio	0.43	0.41		0.50	0.44	0.44	0.07	0.30	0.30	0.08	0.31	0.31
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	3.0	2.0		3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	603	694		633	842	685	126	1498	480	135	1535	478
v/s Ratio Prot	0.00	0.03		c0.01	0.03		0.04	c0.23		c0.04	0.21	
v/s Ratio Perm	0.01			c0.04		0.03			0.01			0.00
v/c Ratio	0.03	0.07		0.10	0.06	0.06	0.51	0.77	0.05	0.57	0.69	0.01
Uniform Delay, d1	19.5	21.5		15.6	19.1	19.1	53.8	38.4	30.1	53.4	36.7	29.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.2		0.1	0.0	0.0	3.2	2.2	0.0	5.7	1.1	0.0
Delay (s)	19.5	21.7		15.7	19.1	19.1	57.0	40.6	30.1	59.1	37.8	29.1
Level of Service	B	C		B	B	B	E	D	C	E	D	C
Approach Delay (s)		21.3			18.1			40.7			39.1	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			37.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			49.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC
2: SE 189th Ave & SE 15th St

Total 2027 Traffic Conditions
AM Peak Hour Conditions

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	208	10	8	207	16	20
Future Vol, veh/h	208	10	8	207	16	20
Conflicting Peds, #/hr	0	3	3	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	3	3	3	3	0	0
Mvmt Flow	270	13	10	269	21	26
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	286	0	572	280
Stage 1	-	-	-	-	280	-
Stage 2	-	-	-	-	292	-
Critical Hdwy	-	-	4.13	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1270	-	485	764
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	762	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1266	-	478	762
Mov Cap-2 Maneuver	-	-	-	-	478	-
Stage 1	-	-	-	-	770	-
Stage 2	-	-	-	-	753	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.3		11.5	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	603	-	-	1266	-	
HCM Lane V/C Ratio	0.078	-	-	0.008	-	
HCM Control Delay (s)	11.5	-	-	7.9	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

Queues
3: SE 192nd Ave & SE 15th St

Total 2027 Traffic Conditions
AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	174	124	26	60	54	57	939	27	837
v/c Ratio	0.75	0.31	0.26	0.41	0.17	0.42	0.47	0.28	0.44
Control Delay	60.3	15.3	51.4	50.8	1.2	44.4	14.6	52.2	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.3	15.3	51.4	50.8	1.2	44.4	14.6	52.2	17.3
Queue Length 50th (ft)	108	22	16	38	0	28	165	17	166
Queue Length 95th (ft)	169	67	43	72	0	m46	140	44	295
Internal Link Dist (ft)		318		1016			1126		227
Turn Bay Length (ft)	115		110		110	150		475	
Base Capacity (vph)	350	474	100	171	318	150	2042	108	1958
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.26	0.26	0.35	0.17	0.38	0.46	0.25	0.43

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 15th St

Total 2027 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	41	73	24	55	50	52	839	25	25	698	72
Future Volume (vph)	160	41	73	24	55	50	52	839	25	25	698	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1718		1805	1845	1556	1805	3490		1752	3449	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1718		1805	1845	1556	1805	3490		1752	3449	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	45	79	26	60	54	57	912	27	27	759	78
RTOR Reduction (vph)	0	63	0	0	0	48	0	2	0	0	7	0
Lane Group Flow (vph)	174	61	0	26	60	6	57	937	0	27	830	0
Confl. Peds. (#/hr)	1					1			3	3		
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	3%	0%	0%	0%	3%	3%	0%	3%	0%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	15.4	19.7		2.6	6.9	11.5	6.6	53.1		4.6	51.1	
Effective Green, g (s)	15.4	19.7		2.6	6.9	11.5	6.6	53.1		4.6	51.1	
Actuated g/C Ratio	0.15	0.20		0.03	0.07	0.12	0.07	0.53		0.05	0.51	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	269	338		46	127	178	119	1853		80	1762	
v/s Ratio Prot	c0.10	c0.04		0.01	c0.03	0.00	0.03	c0.27		0.02	c0.24	
v/s Ratio Perm						0.00						
v/c Ratio	0.65	0.18		0.57	0.47	0.03	0.48	0.51		0.34	0.47	
Uniform Delay, d1	39.7	33.4		48.1	44.8	39.3	45.0	15.0		46.2	15.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.85	0.89		1.00	1.00	
Incremental Delay, d2	4.0	0.1		9.1	1.0	0.0	0.8	0.8		0.9	0.1	
Delay (s)	43.7	33.5		57.3	45.8	39.3	39.3	14.1		47.1	15.8	
Level of Service	D	C		E	D	D	D	B		D	B	
Approach Delay (s)		39.5			45.4			15.5			16.8	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.9									
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			56.2%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: SE 192nd Ave & Mill Plain Blvd

Total 2027 Traffic Conditions
AM Peak Hour Conditions

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	136	118	209	166	234	516	932	100	808
v/c Ratio	0.70	0.40	0.35	0.79	0.73	0.88	0.60	0.70	0.67
Control Delay	61.7	39.3	6.7	69.6	44.9	60.1	24.6	69.1	30.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	39.3	6.7	69.6	44.9	60.1	24.6	69.1	30.6
Queue Length 50th (ft)	84	70	22	103	120	167	223	63	214
Queue Length 95th (ft)	116	84	30	139	135	#235	280	94	244
Internal Link Dist (ft)		628			391		457		709
Turn Bay Length (ft)	240		130			205		150	
Base Capacity (vph)	233	516	601	227	507	587	1561	176	1204
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.23	0.35	0.73	0.46	0.88	0.60	0.57	0.67

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & Mill Plain Blvd

Total 2027 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	87	155	123	96	77	382	507	183	74	452	146
Future Volume (vph)	101	87	155	123	96	77	382	507	183	74	452	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1845	1552	1752	1711		3433	3341		1752	3363	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1845	1552	1752	1711		3433	3341		1752	3363	
Peak-hour factor, PHF	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Adj. Flow (vph)	136	118	209	166	130	104	516	685	247	100	611	197
RTOR Reduction (vph)	0	0	86	0	33	0	0	28	0	0	28	0
Lane Group Flow (vph)	136	118	123	166	201	0	516	904	0	100	780	0
Confl. Peds. (#/hr)	1		8	8		1	3		3	3		3
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	2%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	11.1	16.0	34.1	11.9	16.8		18.1	44.9		7.2	34.0	
Effective Green, g (s)	11.1	16.0	34.1	11.9	16.8		18.1	44.9		7.2	34.0	
Actuated g/C Ratio	0.11	0.16	0.34	0.12	0.17		0.18	0.45		0.07	0.34	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5	0.5	2.0	2.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)	194	295	529	208	287		621	1500		126	1143	
v/s Ratio Prot	c0.08	c0.06	0.04	0.09	c0.12		c0.15	0.27		0.06	c0.23	
v/s Ratio Perm			0.04									
v/c Ratio	0.70	0.40	0.23	0.80	0.70		0.83	0.60		0.79	0.68	
Uniform Delay, d1	42.9	37.7	23.6	42.9	39.2		39.5	20.8		45.7	28.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.0	0.3	0.1	17.7	5.9		8.9	1.8		26.5	1.4	
Delay (s)	51.8	38.0	23.7	60.6	45.1		48.3	22.6		72.2	29.7	
Level of Service	D	D	C	E	D		D	C		E	C	
Approach Delay (s)		35.6			51.6			31.8			34.4	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			35.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			60.9%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: SE 192nd Ave & SE 20th St

Total 2027 Traffic Conditions
AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	177	211	138	285	53	1064	95	978
v/c Ratio	0.55	0.59	0.48	0.82	0.41	0.68	0.61	0.60
Control Delay	49.5	38.7	49.0	51.1	52.9	27.0	73.1	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	38.7	49.0	51.1	52.9	27.0	73.1	18.3
Queue Length 50th (ft)	56	108	44	148	33	288	64	252
Queue Length 95th (ft)	76	145	63	189	61	347	99	225
Internal Link Dist (ft)		1997		3145		1320		1126
Turn Bay Length (ft)	100		150		335		410	
Base Capacity (vph)	408	455	374	445	175	1572	180	1619
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.46	0.37	0.64	0.30	0.68	0.53	0.60
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

5: SE 192nd Ave & SE 20th St

Total 2027 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	111	55	109	114	111	42	750	91	75	683	89
Future Volume (vph)	140	111	55	109	114	111	42	750	91	75	683	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.93		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3400	1750		3400	1710		1752	3438		1752	3434	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3400	1750		3400	1710		1752	3438		1752	3434	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	177	141	70	138	144	141	53	949	115	95	865	113
RTOR Reduction (vph)	0	19	0	0	38	0	0	8	0	0	8	0
Lane Group Flow (vph)	177	192	0	138	247	0	53	1056	0	95	970	0
Confl. Peds. (#/hr)	2						2	2		2	2	
Confl. Bikes (#/hr)			2				2			2		1
Heavy Vehicles (%)	3%	3%	2%	3%	1%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	9.5	19.3		8.4	18.2		6.4	44.4		7.9	45.9	
Effective Green, g (s)	9.5	19.3		8.4	18.2		6.4	44.4		7.9	45.9	
Actuated g/C Ratio	0.10	0.19		0.08	0.18		0.06	0.44		0.08	0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	323	337		285	311		112	1526		138	1576	
v/s Ratio Prot	c0.05	0.11		0.04	c0.14		0.03	c0.31		c0.05	0.28	
v/s Ratio Perm												
v/c Ratio	0.55	0.57		0.48	0.80		0.47	0.69		0.69	0.62	
Uniform Delay, d1	43.2	36.6		43.7	39.1		45.2	22.3		44.9	20.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.32	0.74	
Incremental Delay, d2	1.0	1.3		0.5	12.3		1.1	2.6		10.4	0.5	
Delay (s)	44.2	37.9		44.2	51.4		46.3	24.9		69.6	15.5	
Level of Service	D	D		D	D		D	C		E	B	
Approach Delay (s)		40.8			49.1			25.9			20.3	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			61.9%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	8	0	1049	787	10
Future Vol, veh/h	0	8	0	1049	787	10
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, %	0	0	0	3	3	0
Mvmt Flow	0	9	0	1140	855	11
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	433	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	576	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	576	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	11.3	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	576	-	-		
HCM Lane V/C Ratio	-	0.015	-	-		
HCM Control Delay (s)	-	11.3	-	-		
HCM Lane LOS	-	B	-	-		
HCM 95th %tile Q(veh)	-	0	-	-		

Intersection

Int Delay, s/veh 1.9

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations 

Traffic Vol, veh/h 10 229 171 8 45 34

Future Vol, veh/h 10 229 171 8 45 34

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length - - - - 0 -

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 0 0 3 0 0 0

Mvmt Flow 11 249 186 9 49 37

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 195 0 - 0 462 191

Stage 1 - - - - 191 -

Stage 2 - - - - 271 -

Critical Hdwy 4.1 - - - 6.4 6.2

Critical Hdwy Stg 1 - - - - 5.4 -

Critical Hdwy Stg 2 - - - - 5.4 -

Follow-up Hdwy 2.2 - - - 3.5 3.3

Pot Cap-1 Maneuver 1390 - - - 562 856

Stage 1 - - - - 846 -

Stage 2 - - - - 779 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 1390 - - - 557 856

Mov Cap-2 Maneuver - - - - 557 -

Stage 1 - - - - 838 -

Stage 2 - - - - 779 -

Approach EB WB SB

HCM Control Delay, s 0.3 0 11.3

HCM LOS B

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h) 1390 - - - 656

HCM Lane V/C Ratio 0.008 - - - 0.131

HCM Control Delay (s) 7.6 0 - - 11.3

HCM Lane LOS A A - - B

HCM 95th %tile Q(veh) 0 - - - 0.4

Queues

1: SE 164th Ave & SE 15th St

Total 2027 Traffic Conditions

PM Peak Hour Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	45	128	136	123	113	133	1743	73	188	1669	47
v/c Ratio	0.13	0.41	0.40	0.32	0.28	0.62	0.84	0.10	0.60	0.69	0.06
Control Delay	34.0	45.8	37.8	46.8	10.3	61.9	35.8	2.2	54.3	27.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.0	45.8	37.8	46.8	10.3	61.9	35.8	2.2	54.3	27.1	0.1
Queue Length 50th (ft)	26	83	83	86	0	99	414	0	136	345	0
Queue Length 95th (ft)	55	140	135	146	50	156	486	15	204	421	0
Internal Link Dist (ft)		642		766			1016			601	
Turn Bay Length (ft)	100		250		325	150		150	230		230
Base Capacity (vph)	379	487	343	536	521	226	2102	704	311	2403	792
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.26	0.40	0.23	0.22	0.59	0.83	0.10	0.60	0.69	0.06
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: SE 164th Ave & SE 15th St

Total 2027 Traffic Conditions

PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	82	31	120	108	99	117	1534	64	165	1469	41
Future Volume (vph)	40	82	31	120	108	99	117	1534	64	165	1469	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1787		1803	1881	1542	1805	5036	1549	1787	5136	1580
Flt Permitted	0.68	1.00		0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1288	1787		939	1881	1542	1805	5036	1549	1787	5136	1580
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	45	93	35	136	123	112	133	1743	73	188	1669	47
RTOR Reduction (vph)	0	12	0	0	0	91	0	0	43	0	0	25
Lane Group Flow (vph)	45	116	0	136	123	22	133	1743	30	188	1669	22
Confl. Peds. (#/hr)			2	2			1		1	1		1
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	0%	1%	3%	0%	1%	3%	0%	3%	2%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6			4			8
Actuated Green, G (s)	26.7	20.1		34.1	23.8	23.8	14.4	49.7	49.7	20.9	56.2	56.2
Effective Green, g (s)	26.7	20.1		34.1	23.8	23.8	14.4	49.7	49.7	20.9	56.2	56.2
Actuated g/C Ratio	0.22	0.17		0.28	0.20	0.20	0.12	0.41	0.41	0.17	0.47	0.47
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	3.0	2.0		3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	315	299		340	373	305	216	2085	641	311	2405	739
v/s Ratio Prot	0.01	0.06		c0.03	0.07		0.07	c0.35		c0.11	c0.32	
v/s Ratio Perm	0.02			c0.08		0.01			0.02			0.01
v/c Ratio	0.14	0.39		0.40	0.33	0.07	0.62	0.84	0.05	0.60	0.69	0.03
Uniform Delay, d1	37.2	44.5		33.4	41.3	39.1	50.2	31.5	21.0	45.7	25.1	17.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	3.7		0.8	2.4	0.5	5.1	2.9	0.0	3.3	0.7	0.0
Delay (s)	37.4	48.2		34.2	43.6	39.6	55.3	34.4	21.0	49.0	25.8	17.2
Level of Service	D	D		C	D	D	E	C	C	D	C	B
Approach Delay (s)		45.4			39.0			35.4			27.9	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			32.8									
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			69.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC
2: SE 189th Ave & SE 15th St

Total 2027 Traffic Conditions
PM Peak Hour Conditions

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	299	14	22	272	12	13
Future Vol, veh/h	299	14	22	272	12	13
Conflicting Peds, #/hr	0	4	4	0	6	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	1	3	3	1	0	3
Mvmt Flow	348	16	26	316	14	15
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	368	0	734	360
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	374	-
Critical Hdwy	-	-	4.13	-	6.4	6.23
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.327
Pot Cap-1 Maneuver	-	-	1185	-	390	682
Stage 1	-	-	-	-	710	-
Stage 2	-	-	-	-	700	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1180	-	376	679
Mov Cap-2 Maneuver	-	-	-	-	376	-
Stage 1	-	-	-	-	707	-
Stage 2	-	-	-	-	677	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.6		12.8	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	490	-	-	1180	-	
HCM Lane V/C Ratio	0.059	-	-	0.022	-	
HCM Control Delay (s)	12.8	-	-	8.1	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	

Queues

3: SE 192nd Ave & SE 15th St

Total 2027 Traffic Conditions

PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	133	193	48	90	227	103	1215	62	1360
v/c Ratio	0.73	0.74	0.49	0.62	0.60	0.61	0.61	0.49	0.71
Control Delay	65.3	46.8	63.7	62.9	15.0	40.0	16.0	57.3	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.3	46.8	63.7	62.9	15.0	40.0	16.0	57.3	21.0
Queue Length 50th (ft)	83	88	30	56	22	53	236	39	339
Queue Length 95th (ft)	143	156	#79	108	84	m54	m120	79	462
Internal Link Dist (ft)		206		1016			1126		238
Turn Bay Length (ft)	115		110		110	150		475	
Base Capacity (vph)	232	337	97	172	422	179	2005	177	1929
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.57	0.49	0.52	0.54	0.58	0.61	0.35	0.71

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 15th St

Total 2027 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	81	95	44	82	207	94	1077	28	56	1113	125
Future Volume (vph)	121	81	95	44	82	207	94	1077	28	56	1113	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1738		1805	1881	1604	1752	3522		1770	3511	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1738		1805	1881	1604	1752	3522		1770	3511	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	133	89	104	48	90	227	103	1184	31	62	1223	137
RTOR Reduction (vph)	0	45	0	0	0	159	0	2	0	0	7	0
Lane Group Flow (vph)	133	148	0	48	90	68	103	1213	0	62	1353	0
Confl. Peds. (#/hr)							3		4	4		3
Confl. Bikes (#/hr)						1			1			
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	3%	2%	3%	2%	1%	1%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	10.3	12.6		4.4	6.7	13.8	9.6	55.9		7.1	53.4	
Effective Green, g (s)	10.3	12.6		4.4	6.7	13.8	9.6	55.9		7.1	53.4	
Actuated g/C Ratio	0.10	0.13		0.04	0.07	0.14	0.10	0.56		0.07	0.53	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	184	218		79	126	301	168	1968		125	1874	
v/s Ratio Prot	c0.07	c0.09		0.03	0.05	0.02	0.06	c0.34		0.04	c0.39	
v/s Ratio Perm						0.03						
v/c Ratio	0.72	0.68		0.61	0.71	0.22	0.61	0.62		0.50	0.72	
Uniform Delay, d1	43.5	41.8		47.0	45.7	38.3	43.4	14.8		44.7	17.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.78	0.95		1.00	1.00	
Incremental Delay, d2	11.2	6.8		8.7	14.7	0.1	1.6	0.5		1.1	1.2	
Delay (s)	54.7	48.6		55.7	60.5	38.5	35.5	14.6		45.9	18.9	
Level of Service	D	D		E	E	D	D	B		D	B	
Approach Delay (s)		51.1			46.2			16.2			20.0	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			24.3									
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			70.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: SE 192nd Ave & Mill Plain Blvd

Total 2027 Traffic Conditions
PM Peak Hour Conditions

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	318	15	574	57	63	460	1038	19	1162
v/c Ratio	0.63	0.06	1.20	0.22	0.31	1.11	0.66	0.20	1.06
Control Delay	41.5	31.4	129.9	40.5	21.8	117.8	25.4	50.5	76.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	31.4	129.9	40.5	21.8	117.8	25.4	50.5	76.5
Queue Length 50th (ft)	172	9	~458	22	15	~173	241	12	~417
Queue Length 95th (ft)	#468	22	#261	73	42	#268	380	35	#552
Internal Link Dist (ft)		628			391		457		709
Turn Bay Length (ft)	240		130			205		150	
Base Capacity (vph)	507	513	480	292	479	416	1563	180	1101
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.03	1.20	0.20	0.13	1.11	0.66	0.11	1.06

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & Mill Plain Blvd

Total 2027 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	13	511	51	21	35	409	899	25	17	846	188
Future Volume (vph)	283	13	511	51	21	35	409	899	25	17	846	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1900	1580	1805	1668		3467	3523		1805	3434	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1900	1580	1805	1668		3467	3523		1805	3434	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	318	15	574	57	24	39	460	1010	28	19	951	211
RTOR Reduction (vph)	0	0	93	0	35	0	0	2	0	0	20	0
Lane Group Flow (vph)	318	15	481	57	28	0	460	1036	0	19	1142	0
Confl. Peds. (#/hr)	8		6	6		8	9		9	9		9
Confl. Bikes (#/hr)						1			3			1
Heavy Vehicles (%)	1%	0%	1%	0%	0%	3%	1%	2%	0%	0%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	28.4	25.5	40.5	12.0	9.1		15.0	40.3		2.2	27.5	
Effective Green, g (s)	28.4	25.5	40.5	12.0	9.1		15.0	40.3		2.2	27.5	
Actuated g/C Ratio	0.28	0.26	0.40	0.12	0.09		0.15	0.40		0.02	0.28	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5	0.5	2.0	2.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)	507	484	639	216	151		520	1419		39	944	
v/s Ratio Prot	c0.18	0.01	c0.11	c0.03	0.02		c0.13	0.29		0.01	c0.33	
v/s Ratio Perm			0.19									
v/c Ratio	0.63	0.03	0.75	0.26	0.18		0.88	0.73		0.49	1.21	
Uniform Delay, d1	31.2	28.0	25.5	40.0	42.0		41.7	25.3		48.3	36.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.0	4.5	0.2	0.2		15.9	3.3		3.5	104.5	
Delay (s)	32.9	28.0	29.9	40.2	42.2		57.6	28.6		51.8	140.8	
Level of Service	C	C	C	D	D		E	C		D	F	
Approach Delay (s)		31.0			41.3			37.5			139.3	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			68.5			HCM 2000 Level of Service		E				
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)		20.0				
Intersection Capacity Utilization			78.5%			ICU Level of Service		D				
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: SE 192nd Ave & SE 20th St

Total 2027 Traffic Conditions
PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	140	265	153	316	118	1335	179	1244
v/c Ratio	0.48	0.78	0.41	0.83	0.66	1.02	0.76	0.87
Control Delay	48.9	50.5	44.6	52.3	60.7	63.2	69.4	28.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	50.5	44.6	52.3	60.7	63.2	69.4	28.8
Queue Length 50th (ft)	44	147	47	176	73	~501	120	196
Queue Length 95th (ft)	73	217	78	259	#150	#708	m#191	#583
Internal Link Dist (ft)		1997		3145		1320		1126
Turn Bay Length (ft)	100		150		335		410	
Base Capacity (vph)	450	462	425	452	195	1308	252	1430
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.57	0.36	0.70	0.61	1.02	0.71	0.87
Intersection Summary								
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.								
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.								
m Volume for 95th percentile queue is metered by upstream signal.								

HCM Signalized Intersection Capacity Analysis

5: SE 192nd Ave & SE 20th St

Total 2027 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	165	89	147	189	114	113	1090	192	172	1013	181
Future Volume (vph)	134	165	89	147	189	114	113	1090	192	172	1013	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1772		3502	1761		1805	3418		1787	3441	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1772		3502	1761		1805	3418		1787	3441	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	140	172	93	153	197	119	118	1135	200	179	1055	189
RTOR Reduction (vph)	0	21	0	0	23	0	0	12	0	0	13	0
Lane Group Flow (vph)	140	244	0	153	293	0	118	1323	0	179	1231	0
Confl. Peds. (#/hr)	3		1	1		3	1		5	5		1
Confl. Bikes (#/hr)			1			4			5			2
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	3%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	8.4	18.0		10.8	20.4		10.0	37.9		13.3	41.2	
Effective Green, g (s)	8.4	18.0		10.8	20.4		10.0	37.9		13.3	41.2	
Actuated g/C Ratio	0.08	0.18		0.11	0.20		0.10	0.38		0.13	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	291	318		378	359		180	1295		237	1417	
v/s Ratio Prot	0.04	c0.14		0.04	c0.17		0.07	c0.39		c0.10	c0.36	
v/s Ratio Perm												
v/c Ratio	0.48	0.77		0.40	0.82		0.66	1.02		0.76	0.87	
Uniform Delay, d1	43.7	39.0		41.6	38.0		43.3	31.1		41.8	26.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.30	0.74	
Incremental Delay, d2	0.5	9.5		0.3	12.7		6.4	30.5		8.7	4.3	
Delay (s)	44.2	48.5		41.9	50.7		49.7	61.6		63.1	24.3	
Level of Service	D	D		D	D		D	E		E	C	
Approach Delay (s)		47.0			47.8			60.6			29.2	
Approach LOS		D			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			45.6			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			83.8%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	5	0	1404	1289	30
Future Vol, veh/h	0	5	0	1404	1289	30
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	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	2	1	0
Mvmt Flow	0	5	0	1543	1416	33
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	725	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	372	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	372	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	14.8	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	372	-	-		
HCM Lane V/C Ratio	-	0.015	-	-		
HCM Control Delay (s)	-	14.8	-	-		
HCM Lane LOS	-	B	-	-		
HCM 95th %tile Q(veh)	-	0	-	-		

Intersection

Int Delay, s/veh 1.4

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations 

Traffic Vol, veh/h 36 268 273 27 28 22

Future Vol, veh/h 36 268 273 27 28 22

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length - - - - 0 -

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 91 91 91 91 91 91

Heavy Vehicles, % 0 1 1 0 0 0

Mvmt Flow 40 295 300 30 31 24

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 330 0 - 0 690 315

Stage 1 - - - - 315 -

Stage 2 - - - - 375 -

Critical Hdwy 4.1 - - - 6.4 6.2

Critical Hdwy Stg 1 - - - - 5.4 -

Critical Hdwy Stg 2 - - - - 5.4 -

Follow-up Hdwy 2.2 - - - 3.5 3.3

Pot Cap-1 Maneuver 1241 - - - 414 730

Stage 1 - - - - 744 -

Stage 2 - - - - 699 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 1241 - - - 398 730

Mov Cap-2 Maneuver - - - - 398 -

Stage 1 - - - - 715 -

Stage 2 - - - - 699 -

Approach EB WB SB

HCM Control Delay, s 0.9 0 13.1

HCM LOS B

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h) 1241 - - - 498

HCM Lane V/C Ratio 0.032 - - - 0.11

HCM Control Delay (s) 8 0 - - 13.1

HCM Lane LOS A A - - B

HCM 95th %tile Q(veh) 0.1 - - - 0.4

Appendix G 2032 Background Operations (Existing Zoning) Worksheets

Queues

1: SE 164th Ave & SE 15th St

Background 2032 Traffic Conditions

AM Peak Hour Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	17	79	52	55	81	66	1176	78	77	1088	19
v/c Ratio	0.03	0.11	0.08	0.06	0.10	0.46	0.76	0.14	0.50	0.69	0.03
Control Delay	19.8	14.2	19.7	24.7	4.0	61.7	41.0	3.3	62.5	38.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	14.2	19.7	24.7	4.0	61.7	41.0	3.3	62.5	38.3	0.1
Queue Length 50th (ft)	7	15	21	22	0	50	300	0	58	268	0
Queue Length 95th (ft)	23	57	51	64	26	94	326	21	105	291	0
Internal Link Dist (ft)		600		638			842			586	
Turn Bay Length (ft)	100		250		325	150		150	230		230
Base Capacity (vph)	713	740	658	884	773	168	2014	706	171	2014	687
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.11	0.08	0.06	0.10	0.39	0.58	0.11	0.45	0.54	0.03
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: SE 164th Ave & SE 15th St

Background 2032 Traffic Conditions

AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	29	45	49	52	76	62	1105	73	72	1023	18
Future Volume (vph)	16	29	45	49	52	76	62	1105	73	72	1023	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1802	1696		1752	1900	1546	1805	5036	1615	1752	5036	1568
Flt Permitted	0.72	1.00		0.66	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1368	1696		1212	1900	1546	1805	5036	1615	1752	5036	1568
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	17	31	48	52	55	81	66	1176	78	77	1088	19
RTOR Reduction (vph)	0	29	0	0	0	46	0	0	54	0	0	13
Lane Group Flow (vph)	17	50	0	52	55	35	66	1176	24	77	1088	6
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	0%	3%	3%	0%	3%	0%	3%	0%	3%	3%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6			4			8
Actuated Green, G (s)	51.4	48.6		58.6	52.2	52.2	8.5	36.7	36.7	9.3	37.5	37.5
Effective Green, g (s)	51.4	48.6		58.6	52.2	52.2	8.5	36.7	36.7	9.3	37.5	37.5
Actuated g/C Ratio	0.43	0.41		0.49	0.44	0.44	0.07	0.31	0.31	0.08	0.31	0.31
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	3.0	2.0		3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	596	686		620	826	672	127	1540	493	135	1573	490
v/s Ratio Prot	0.00	0.03		c0.00	0.03		0.04	c0.23		c0.04	0.22	
v/s Ratio Perm	0.01			c0.04		0.02			0.01			0.00
v/c Ratio	0.03	0.07		0.08	0.07	0.05	0.52	0.76	0.05	0.57	0.69	0.01
Uniform Delay, d1	19.8	21.9		16.2	19.7	19.6	53.8	37.7	29.3	53.4	36.2	28.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.2		0.1	0.0	0.0	3.6	2.1	0.0	5.7	1.1	0.0
Delay (s)	19.8	22.1		16.3	19.7	19.6	57.3	39.8	29.4	59.1	37.3	28.5
Level of Service	B	C		B	B	B	E	D	C	E	D	C
Approach Delay (s)		21.7			18.7			40.1			38.5	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			37.3				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.38									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			50.2%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	206	10	8	190	16	21
Future Vol, veh/h	206	10	8	190	16	21
Conflicting Peds, #/hr	0	3	3	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	3	3	3	3	0	0
Mvmt Flow	268	13	10	247	21	27
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	284	0	548	278
Stage 1	-	-	-	-	278	-
Stage 2	-	-	-	-	270	-
Critical Hdwy	-	-	4.13	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1273	-	501	766
Stage 1	-	-	-	-	774	-
Stage 2	-	-	-	-	780	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1269	-	493	764
Mov Cap-2 Maneuver	-	-	-	-	493	-
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	771	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.3		11.3	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	617	-	-	1269	-	
HCM Lane V/C Ratio	0.078	-	-	0.008	-	
HCM Control Delay (s)	11.3	-	-	7.9	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

Queues
3: SE 192nd Ave & SE 15th St

Background 2032 Traffic Conditions
AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	153	121	27	60	55	54	958	28	847
v/c Ratio	0.72	0.35	0.27	0.41	0.18	0.39	0.47	0.28	0.44
Control Delay	60.5	17.5	51.6	50.6	1.2	43.9	14.5	52.2	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	17.5	51.6	50.6	1.2	43.9	14.5	52.2	16.6
Queue Length 50th (ft)	95	26	17	38	0	27	171	18	165
Queue Length 95th (ft)	154	68	44	72	0	m42	144	45	294
Internal Link Dist (ft)		318		1016			1126		227
Turn Bay Length (ft)	115		110		110	150		475	
Base Capacity (vph)	350	461	100	172	319	152	2073	109	1987
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.26	0.27	0.35	0.17	0.36	0.46	0.26	0.43

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 15th St

Background 2032 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	141	41	70	25	55	51	50	856	26	26	707	73
Future Volume (vph)	141	41	70	25	55	51	50	856	26	26	707	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1721		1805	1845	1556	1805	3490		1752	3449	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1721		1805	1845	1556	1805	3490		1752	3449	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	153	45	76	27	60	55	54	930	28	28	768	79
RTOR Reduction (vph)	0	63	0	0	0	49	0	2	0	0	7	0
Lane Group Flow (vph)	153	58	0	27	60	6	54	956	0	28	840	0
Confl. Peds. (#/hr)	1					1			3	3		
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	3%	0%	0%	0%	3%	3%	0%	3%	0%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	13.1	16.5		3.6	7.0	11.7	6.7	55.2		4.7	53.2	
Effective Green, g (s)	13.1	16.5		3.6	7.0	11.7	6.7	55.2		4.7	53.2	
Actuated g/C Ratio	0.13	0.16		0.04	0.07	0.12	0.07	0.55		0.05	0.53	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	229	283		64	129	182	120	1926		82	1834	
v/s Ratio Prot	c0.09	c0.03		0.01	c0.03	0.00	0.03	c0.27		0.02	c0.24	
v/s Ratio Perm						0.00						
v/c Ratio	0.67	0.20		0.42	0.47	0.04	0.45	0.50		0.34	0.46	
Uniform Delay, d1	41.4	36.1		47.2	44.7	39.1	44.9	13.8		46.2	14.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	0.91		1.00	1.00	
Incremental Delay, d2	5.6	0.1		1.6	1.0	0.0	0.7	0.7		0.9	0.1	
Delay (s)	47.0	36.2		48.8	45.7	39.2	39.7	13.3		47.1	14.5	
Level of Service	D	D		D	D	D	D	B		D	B	
Approach Delay (s)		42.2			43.8			14.7			15.6	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.1									
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			55.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: SE 192nd Ave & Mill Plain Blvd

Background 2032 Traffic Conditions
AM Peak Hour Conditions

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	143	118	214	166	234	526	933	103	823
v/c Ratio	0.71	0.39	0.36	0.79	0.73	0.92	0.63	0.71	0.68
Control Delay	62.0	38.8	6.9	69.6	44.9	65.7	25.8	69.6	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	38.8	6.9	69.6	44.9	65.7	25.8	69.6	30.8
Queue Length 50th (ft)	89	69	24	103	120	172	226	65	219
Queue Length 95th (ft)	121	84	32	139	135	#240	279	96	248
Internal Link Dist (ft)		628			391		457		709
Turn Bay Length (ft)	240		130			205		150	
Base Capacity (vph)	235	516	600	227	507	573	1478	177	1205
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.23	0.36	0.73	0.46	0.92	0.63	0.58	0.68

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & Mill Plain Blvd

Background 2032 Traffic Conditions

AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	87	158	123	96	77	389	503	187	76	456	153
Future Volume (vph)	106	87	158	123	96	77	389	503	187	76	456	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1845	1551	1752	1711		3433	3338		1752	3359	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1845	1551	1752	1711		3433	3338		1752	3359	
Peak-hour factor, PHF	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Adj. Flow (vph)	143	118	214	166	130	104	526	680	253	103	616	207
RTOR Reduction (vph)	0	0	88	0	33	0	0	31	0	0	29	0
Lane Group Flow (vph)	143	118	126	166	201	0	526	902	0	103	794	0
Confl. Peds. (#/hr)	1		8	8		1	3		3	3		3
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	2%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	11.4	16.3	33.0	11.9	16.8		16.7	43.5		8.3	35.1	
Effective Green, g (s)	11.4	16.3	33.0	11.9	16.8		16.7	43.5		8.3	35.1	
Actuated g/C Ratio	0.11	0.16	0.33	0.12	0.17		0.17	0.44		0.08	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5	0.5	2.0	2.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)	199	300	511	208	287		573	1452		145	1179	
v/s Ratio Prot	c0.08	c0.06	0.04	0.09	c0.12		c0.15	0.27		0.06	c0.24	
v/s Ratio Perm			0.04									
v/c Ratio	0.72	0.39	0.25	0.80	0.70		0.92	0.62		0.71	0.67	
Uniform Delay, d1	42.8	37.4	24.4	42.9	39.2		41.0	21.9		44.7	27.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.9	0.3	0.1	17.7	5.9		19.3	2.0		12.8	1.2	
Delay (s)	52.6	37.7	24.5	60.6	45.1		60.3	23.9		57.4	28.8	
Level of Service	D	D	C	E	D		E	C		E	C	
Approach Delay (s)		36.3			51.6			37.0			32.0	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			37.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			61.7%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: SE 192nd Ave & SE 20th St

Background 2032 Traffic Conditions
AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	181	215	139	289	54	1082	96	986
v/c Ratio	0.56	0.60	0.48	0.82	0.41	0.69	0.61	0.61
Control Delay	49.6	38.7	49.1	51.5	52.9	27.6	74.3	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.6	38.7	49.1	51.5	52.9	27.6	74.3	18.3
Queue Length 50th (ft)	57	111	44	150	33	298	64	256
Queue Length 95th (ft)	78	148	63	192	62	355	101	215
Internal Link Dist (ft)		1997		3145		1320		1126
Turn Bay Length (ft)	100		150		335		410	
Base Capacity (vph)	408	455	374	445	175	1562	180	1609
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.47	0.37	0.65	0.31	0.69	0.53	0.61
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

5: SE 192nd Ave & SE 20th St

Background 2032 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	143	114	56	110	116	112	43	763	92	76	688	91
Future Volume (vph)	143	114	56	110	116	112	43	763	92	76	688	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.93		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3400	1751		3400	1711		1752	3439		1752	3433	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3400	1751		3400	1711		1752	3439		1752	3433	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	181	144	71	139	147	142	54	966	116	96	871	115
RTOR Reduction (vph)	0	19	0	0	38	0	0	8	0	0	9	0
Lane Group Flow (vph)	181	196	0	139	251	0	54	1074	0	96	977	0
Confl. Peds. (#/hr)	2					2	2		2	2		2
Confl. Bikes (#/hr)			2			2			2			1
Heavy Vehicles (%)	3%	3%	2%	3%	1%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	9.6	19.5		8.4	18.3		6.5	44.2		7.9	45.6	
Effective Green, g (s)	9.6	19.5		8.4	18.3		6.5	44.2		7.9	45.6	
Actuated g/C Ratio	0.10	0.20		0.08	0.18		0.06	0.44		0.08	0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	326	341		285	313		113	1520		138	1565	
v/s Ratio Prot	c0.05	0.11		0.04	c0.15		0.03	c0.31		c0.05	0.28	
v/s Ratio Perm												
v/c Ratio	0.56	0.57		0.49	0.80		0.48	0.71		0.70	0.62	
Uniform Delay, d1	43.2	36.5		43.7	39.1		45.1	22.6		44.9	20.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.34	0.72	
Incremental Delay, d2	1.2	1.5		0.5	13.1		1.2	2.8		11.2	0.5	
Delay (s)	44.3	37.9		44.2	52.2		46.3	25.4		71.2	15.5	
Level of Service	D	D		D	D		D	C		E	B	
Approach Delay (s)		40.9			49.6			26.4			20.5	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			62.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	3	0	1048	802	4
Future Vol, veh/h	0	3	0	1048	802	4
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, %	0	0	0	3	3	0
Mvmt Flow	0	3	0	1139	872	4
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	-	438	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	572	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	572	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.3	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBT EBLn1		SBT	SBR		
Capacity (veh/h)	- 572		-	-		
HCM Lane V/C Ratio	- 0.006		-	-		
HCM Control Delay (s)	- 11.3		-	-		
HCM Lane LOS	- B		-	-		
HCM 95th %tile Q(veh)	- 0		-	-		

Intersection

Int Delay, s/veh 0.8

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations 

Traffic Vol, veh/h 4 234 175 3 18 13

Future Vol, veh/h 4 234 175 3 18 13

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length - - - - 0 -

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 0 0 3 0 0 0

Mvmt Flow 4 254 190 3 20 14

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 193 0 - 0 454 192

Stage 1 - - - - 192 -

Stage 2 - - - - 262 -

Critical Hdwy 4.1 - - - 6.4 6.2

Critical Hdwy Stg 1 - - - - 5.4 -

Critical Hdwy Stg 2 - - - - 5.4 -

Follow-up Hdwy 2.2 - - - 3.5 3.3

Pot Cap-1 Maneuver 1392 - - - 568 855

Stage 1 - - - - 845 -

Stage 2 - - - - 786 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 1392 - - - 566 855

Mov Cap-2 Maneuver - - - - 566 -

Stage 1 - - - - 842 -

Stage 2 - - - - 786 -

Approach EB WB SB

HCM Control Delay, s 0.1 0 10.8

HCM LOS B

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h) 1392 - - - 659

HCM Lane V/C Ratio 0.003 - - - 0.051

HCM Control Delay (s) 7.6 0 - - 10.8

HCM Lane LOS A A - - B

HCM 95th %tile Q(veh) 0 - - - 0.2

Queues

1: SE 164th Ave & SE 15th St

Background 2032 Traffic Conditions

PM Peak Hour Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	131	131	126	109	136	1782	60	181	1706	48
v/c Ratio	0.14	0.41	0.39	0.32	0.27	0.62	0.84	0.08	0.62	0.72	0.06
Control Delay	34.0	45.3	37.4	46.9	10.3	61.9	35.4	1.2	55.7	27.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.0	45.3	37.4	46.9	10.3	61.9	35.4	1.2	55.7	27.8	0.1
Queue Length 50th (ft)	28	85	80	89	0	101	420	0	131	354	0
Queue Length 95th (ft)	57	143	131	149	49	158	500	6	197	438	0
Internal Link Dist (ft)		642		766			1016			601	
Turn Bay Length (ft)	100		250		325	150		150	230		230
Base Capacity (vph)	382	488	344	539	520	229	2126	712	294	2385	787
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.27	0.38	0.23	0.21	0.59	0.84	0.08	0.62	0.72	0.06
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: SE 164th Ave & SE 15th St

Background 2032 Traffic Conditions

PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	84	32	115	111	96	120	1568	53	159	1501	42
Future Volume (vph)	41	84	32	115	111	96	120	1568	53	159	1501	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1786		1803	1881	1542	1805	5036	1549	1787	5136	1580
Flt Permitted	0.68	1.00		0.50	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1285	1786		947	1881	1542	1805	5036	1549	1787	5136	1580
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	47	95	36	131	126	109	136	1782	60	181	1706	48
RTOR Reduction (vph)	0	13	0	0	0	87	0	0	35	0	0	26
Lane Group Flow (vph)	47	118	0	131	126	22	136	1782	25	181	1706	22
Confl. Peds. (#/hr)			2	2			1		1	1		1
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	0%	1%	3%	0%	1%	3%	0%	3%	2%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6			4			8
Actuated Green, G (s)	27.3	20.6		34.1	24.0	24.0	14.6	50.5	50.5	19.8	55.7	55.7
Effective Green, g (s)	27.3	20.6		34.1	24.0	24.0	14.6	50.5	50.5	19.8	55.7	55.7
Actuated g/C Ratio	0.23	0.17		0.28	0.20	0.20	0.12	0.42	0.42	0.17	0.46	0.46
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	3.0	2.0		3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	321	306		341	376	308	219	2119	651	294	2383	733
v/s Ratio Prot	0.01	0.07		c0.03	0.07		0.08	c0.35		c0.10	0.33	
v/s Ratio Perm	0.03			c0.08		0.01			0.02			0.01
v/c Ratio	0.15	0.38		0.38	0.34	0.07	0.62	0.84	0.04	0.62	0.72	0.03
Uniform Delay, d1	36.8	44.1		33.3	41.2	39.0	50.1	31.2	20.5	46.6	25.8	17.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	3.6		0.7	2.4	0.4	5.4	3.1	0.0	3.8	0.9	0.0
Delay (s)	37.0	47.7		34.1	43.6	39.4	55.5	34.2	20.5	50.4	26.7	17.5
Level of Service	D	D		C	D	D	E	C	C	D	C	B
Approach Delay (s)		44.9			38.9			35.3			28.7	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			33.1									
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			69.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	283	14	23	265	12	13
Future Vol, veh/h	283	14	23	265	12	13
Conflicting Peds, #/hr	0	4	4	0	6	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	1	3	3	1	0	3
Mvmt Flow	329	16	27	308	14	15
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	349	0	709	341
Stage 1	-	-	-	-	341	-
Stage 2	-	-	-	-	368	-
Critical Hdwy	-	-	4.13	-	6.4	6.23
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.327
Pot Cap-1 Maneuver	-	-	1204	-	404	699
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	704	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1199	-	389	696
Mov Cap-2 Maneuver	-	-	-	-	389	-
Stage 1	-	-	-	-	722	-
Stage 2	-	-	-	-	681	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.6		12.6	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	505	-	-	1199	-	
HCM Lane V/C Ratio	0.058	-	-	0.022	-	
HCM Control Delay (s)	12.6	-	-	8.1	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	

Queues
3: SE 192nd Ave & SE 15th St

Background 2032 Traffic Conditions
PM Peak Hour Conditions



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	121	193	49	90	231	95	1243	63	1381
v/c Ratio	0.69	0.77	0.49	0.62	0.60	0.66	0.62	0.50	0.67
Control Delay	63.2	50.6	62.7	62.9	15.5	42.1	17.0	57.4	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	50.6	62.7	62.9	15.5	42.1	17.0	57.4	19.4
Queue Length 50th (ft)	76	89	31	56	24	49	252	40	338
Queue Length 95th (ft)	132	157	#81	108	88	m48	m121	80	473
Internal Link Dist (ft)		206		1016			1126		238
Turn Bay Length (ft)	115		110		110	150		475	
Base Capacity (vph)	232	337	101	172	422	177	2018	177	2052
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.57	0.49	0.52	0.55	0.54	0.62	0.36	0.67

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

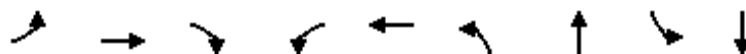
3: SE 192nd Ave & SE 15th St

Background 2032 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	110	82	94	45	82	210	86	1102	29	57	1134	123
Future Volume (vph)	110	82	94	45	82	210	86	1102	29	57	1134	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1740		1805	1881	1604	1752	3522		1770	3513	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1740		1805	1881	1604	1752	3522		1770	3513	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	121	90	103	49	90	231	95	1211	32	63	1246	135
RTOR Reduction (vph)	0	44	0	0	0	159	0	2	0	0	7	0
Lane Group Flow (vph)	121	149	0	49	90	72	95	1241	0	63	1374	0
Confl. Peds. (#/hr)							3		4	4		3
Confl. Bikes (#/hr)						1			1			
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	3%	2%	3%	2%	1%	1%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	9.8	11.9		4.6	6.7	13.9	7.3	56.3		7.2	56.2	
Effective Green, g (s)	9.8	11.9		4.6	6.7	13.9	7.3	56.3		7.2	56.2	
Actuated g/C Ratio	0.10	0.12		0.05	0.07	0.14	0.07	0.56		0.07	0.56	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	175	207		83	126	303	127	1982		127	1974	
v/s Ratio Prot	c0.07	c0.09		0.03	0.05	0.02	0.05	c0.35		0.04	c0.39	
v/s Ratio Perm						0.03						
v/c Ratio	0.69	0.72		0.59	0.71	0.24	0.75	0.63		0.50	0.70	
Uniform Delay, d1	43.6	42.4		46.8	45.7	38.3	45.4	14.7		44.7	15.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.81	1.02		1.00	1.00	
Incremental Delay, d2	9.1	9.5		7.3	14.7	0.1	5.9	0.4		1.1	0.9	
Delay (s)	52.8	52.0		54.1	60.5	38.5	42.6	15.5		45.8	16.6	
Level of Service	D	D		D	E	D	D	B		D	B	
Approach Delay (s)		52.3			45.9			17.4			17.9	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			23.8									
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			71.0%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: SE 192nd Ave & Mill Plain Blvd

Background 2032 Traffic Conditions
PM Peak Hour Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	334	15	589	57	63	475	1052	19	1178
v/c Ratio	0.65	0.06	1.21	0.22	0.31	1.14	0.68	0.20	1.09
Control Delay	41.6	31.0	137.6	40.3	21.8	129.6	26.2	50.5	87.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	31.0	137.6	40.3	21.8	129.6	26.2	50.5	87.6
Queue Length 50th (ft)	179	9	~478	21	15	~183	251	12	~440
Queue Length 95th (ft)	#490	22	#312	73	42	#279	387	35	#564
Internal Link Dist (ft)		628			391		457		709
Turn Bay Length (ft)	240		130			205		150	
Base Capacity (vph)	516	517	485	296	479	416	1545	180	1083
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.03	1.21	0.19	0.13	1.14	0.68	0.11	1.09

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

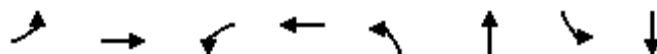
4: SE 192nd Ave & Mill Plain Blvd

Background 2032 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	13	524	51	21	35	423	911	25	17	851	198
Future Volume (vph)	297	13	524	51	21	35	423	911	25	17	851	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1900	1580	1805	1668		3467	3523		1805	3430	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1900	1580	1805	1668		3467	3523		1805	3430	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	334	15	589	57	24	39	475	1024	28	19	956	222
RTOR Reduction (vph)	0	0	92	0	35	0	0	2	0	0	21	0
Lane Group Flow (vph)	334	15	497	57	28	0	475	1050	0	19	1157	0
Confl. Peds. (#/hr)	8		6	6		8	9		9	9		9
Confl. Bikes (#/hr)						1			3			1
Heavy Vehicles (%)	1%	0%	1%	0%	0%	3%	1%	2%	0%	0%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	28.9	25.8	40.8	12.2	9.1		15.0	39.8		2.2	27.0	
Effective Green, g (s)	28.9	25.8	40.8	12.2	9.1		15.0	39.8		2.2	27.0	
Actuated g/C Ratio	0.29	0.26	0.41	0.12	0.09		0.15	0.40		0.02	0.27	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5	0.5	2.0	2.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)	516	490	644	220	151		520	1402		39	926	
v/s Ratio Prot	c0.19	0.01	c0.12	c0.03	0.02		c0.14	0.30		0.01	c0.34	
v/s Ratio Perm			0.20									
v/c Ratio	0.65	0.03	0.77	0.26	0.18		0.91	0.75		0.49	1.25	
Uniform Delay, d1	31.1	27.7	25.6	39.8	42.0		41.9	25.8		48.3	36.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	0.0	5.2	0.2	0.2		20.2	3.7		3.5	121.2	
Delay (s)	33.2	27.8	30.8	40.0	42.2		62.0	29.5		51.8	157.7	
Level of Service	C	C	C	D	D		E	C		D	F	
Approach Delay (s)		31.6			41.2			39.6			156.0	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			74.5			HCM 2000 Level of Service		E				
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)		20.0				
Intersection Capacity Utilization			79.8%			ICU Level of Service		D				
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: SE 192nd Ave & SE 20th St

Background 2032 Traffic Conditions
PM Peak Hour Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	143	271	156	324	121	1354	182	1266
v/c Ratio	0.49	0.79	0.40	0.83	0.66	1.05	0.76	0.90
Control Delay	48.9	51.0	44.3	52.5	61.5	72.0	71.0	31.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	51.0	44.3	52.5	61.5	72.0	71.0	31.3
Queue Length 50th (ft)	45	151	47	181	74	~526	122	324
Queue Length 95th (ft)	74	222	79	268	#156	#722	m#213	#598
Internal Link Dist (ft)		1997		3145		1320		1126
Turn Bay Length (ft)	100		150		335		410	
Base Capacity (vph)	450	462	426	453	195	1289	250	1409
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.59	0.37	0.72	0.62	1.05	0.73	0.90

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

5: SE 192nd Ave & SE 20th St

Background 2032 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	169	91	150	193	118	116	1105	195	175	1030	185
Future Volume (vph)	137	169	91	150	193	118	116	1105	195	175	1030	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1772		3502	1760		1805	3417		1787	3440	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1772		3502	1760		1805	3417		1787	3440	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	143	176	95	156	201	123	121	1151	203	182	1073	193
RTOR Reduction (vph)	0	21	0	0	23	0	0	13	0	0	13	0
Lane Group Flow (vph)	143	250	0	156	301	0	121	1341	0	182	1253	0
Confl. Peds. (#/hr)	3		1	1		3	1		5	5		1
Confl. Bikes (#/hr)			1			4			5			2
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	3%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	8.5	18.2		11.1	20.8		10.1	37.4		13.3	40.6	
Effective Green, g (s)	8.5	18.2		11.1	20.8		10.1	37.4		13.3	40.6	
Actuated g/C Ratio	0.08	0.18		0.11	0.21		0.10	0.37		0.13	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	294	322		388	366		182	1277		237	1396	
v/s Ratio Prot	0.04	c0.14		0.04	c0.17		0.07	c0.39		c0.10	c0.36	
v/s Ratio Perm												
v/c Ratio	0.49	0.78		0.40	0.82		0.66	1.05		0.77	0.90	
Uniform Delay, d1	43.7	39.0		41.4	37.8		43.3	31.3		41.9	27.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.31	0.74	
Incremental Delay, d2	0.5	10.2		0.2	13.2		6.9	39.6		9.9	6.1	
Delay (s)	44.1	49.1		41.6	51.1		50.2	70.9		64.7	26.8	
Level of Service	D	D		D	D		D	E		E	C	
Approach Delay (s)		47.4			48.0			69.2			31.5	
Approach LOS		D			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			49.9			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			84.9%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	2	0	1422	1312	12
Future Vol, veh/h	0	2	0	1422	1312	12
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	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	2	1	0
Mvmt Flow	0	2	0	1563	1442	13
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	728	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	370	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	370	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	14.8	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	370	-	-		
HCM Lane V/C Ratio	-	0.006	-	-		
HCM Control Delay (s)	-	14.8	-	-		
HCM Lane LOS	-	B	-	-		
HCM 95th %tile Q(veh)	-	0	-	-		

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	274	279	11	11	9
Future Vol, veh/h	14	274	279	11	11	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	1	1	0	0	0
Mvmt Flow	15	301	307	12	12	10
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	319	0	-	0	644	313
Stage 1	-	-	-	-	313	-
Stage 2	-	-	-	-	331	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1252	-	-	-	440	732
Stage 1	-	-	-	-	746	-
Stage 2	-	-	-	-	732	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1252	-	-	-	434	732
Mov Cap-2 Maneuver	-	-	-	-	434	-
Stage 1	-	-	-	-	736	-
Stage 2	-	-	-	-	732	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.4	0		12.1		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1252	-	-	-	531	
HCM Lane V/C Ratio	0.012	-	-	-	0.041	
HCM Control Delay (s)	7.9	0	-	-	12.1	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Appendix H Total Operations (Proposed Zoning) Worksheets

Queues

1: SE 164th Ave & SE 15th St

Total 2032 Traffic Conditions

AM Peak Hour Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	17	79	65	55	90	66	1176	82	79	1088	19
v/c Ratio	0.03	0.11	0.10	0.06	0.12	0.46	0.76	0.15	0.51	0.69	0.03
Control Delay	20.2	14.6	19.7	25.0	5.3	61.7	40.8	3.8	62.6	38.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	14.6	19.7	25.0	5.3	61.7	40.8	3.8	62.6	38.0	0.1
Queue Length 50th (ft)	7	15	26	22	0	50	300	0	59	268	0
Queue Length 95th (ft)	23	58	62	64	33	94	323	24	107	289	0
Internal Link Dist (ft)		600		638			842			586	
Turn Bay Length (ft)	100		250		325	150		150	230		230
Base Capacity (vph)	705	732	651	880	770	168	2014	706	172	2014	687
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.11	0.10	0.06	0.12	0.39	0.58	0.12	0.46	0.54	0.03
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: SE 164th Ave & SE 15th St

Total 2032 Traffic Conditions

AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	29	45	61	52	85	62	1105	77	74	1023	18
Future Volume (vph)	16	29	45	61	52	85	62	1105	77	74	1023	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1802	1696		1752	1900	1546	1805	5036	1615	1752	5036	1568
Flt Permitted	0.72	1.00		0.65	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1368	1696		1199	1900	1546	1805	5036	1615	1752	5036	1568
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	17	31	48	65	55	90	66	1176	82	79	1088	19
RTOR Reduction (vph)	0	29	0	0	0	51	0	0	57	0	0	13
Lane Group Flow (vph)	17	50	0	65	55	39	66	1176	25	79	1088	6
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	0%	3%	3%	0%	3%	0%	3%	0%	3%	3%	3%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6			4			8
Actuated Green, G (s)	50.7	47.9		58.9	52.0	52.0	8.5	36.8	36.8	9.4	37.7	37.7
Effective Green, g (s)	50.7	47.9		58.9	52.0	52.0	8.5	36.8	36.8	9.4	37.7	37.7
Actuated g/C Ratio	0.42	0.40		0.49	0.43	0.43	0.07	0.31	0.31	0.08	0.31	0.31
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	3.0	2.0		3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	588	676		620	823	669	127	1544	495	137	1582	492
v/s Ratio Prot	0.00	0.03		c0.01	0.03		0.04	c0.23		c0.05	0.22	
v/s Ratio Perm	0.01			c0.05		0.03			0.02			0.00
v/c Ratio	0.03	0.07		0.10	0.07	0.06	0.52	0.76	0.05	0.58	0.69	0.01
Uniform Delay, d1	20.2	22.3		16.2	19.8	19.8	53.8	37.6	29.3	53.4	36.0	28.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.2		0.1	0.0	0.0	3.6	2.0	0.0	5.8	1.0	0.0
Delay (s)	20.2	22.5		16.3	19.9	19.8	57.3	39.7	29.3	59.1	37.0	28.3
Level of Service	C	C		B	B	B	E	D	C	E	D	C
Approach Delay (s)		22.1			18.7			39.9			38.3	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			37.1									
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			50.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC
2: SE 189th Ave & SE 15th St

Total 2032 Traffic Conditions
AM Peak Hour Conditions

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	212	10	8	211	16	21
Future Vol, veh/h	212	10	8	211	16	21
Conflicting Peds, #/hr	0	3	3	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	3	3	3	3	0	0
Mvmt Flow	275	13	10	274	21	27
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	291	0	582	285
Stage 1	-	-	-	-	285	-
Stage 2	-	-	-	-	297	-
Critical Hdwy	-	-	4.13	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1265	-	479	759
Stage 1	-	-	-	-	768	-
Stage 2	-	-	-	-	758	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1261	-	472	757
Mov Cap-2 Maneuver	-	-	-	-	472	-
Stage 1	-	-	-	-	766	-
Stage 2	-	-	-	-	749	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.3		11.5	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	600	-	-	1261	-	
HCM Lane V/C Ratio	0.08	-	-	0.008	-	
HCM Control Delay (s)	11.5	-	-	7.9	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	0	-	

Queues
3: SE 192nd Ave & SE 15th St

Total 2032 Traffic Conditions
AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	177	126	27	61	55	58	958	28	854
v/c Ratio	0.75	0.34	0.27	0.43	0.18	0.42	0.48	0.29	0.45
Control Delay	60.5	16.5	51.6	51.8	1.3	44.1	14.6	52.7	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	16.5	51.6	51.8	1.3	44.1	14.6	52.7	17.4
Queue Length 50th (ft)	110	26	17	38	0	29	173	18	172
Queue Length 95th (ft)	171	68	44	74	0	m45	134	45	300
Internal Link Dist (ft)		318		1016			1126		227
Turn Bay Length (ft)	115		110		110	150		475	
Base Capacity (vph)	350	466	100	169	315	152	2037	108	1952
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.27	0.27	0.36	0.17	0.38	0.47	0.26	0.44

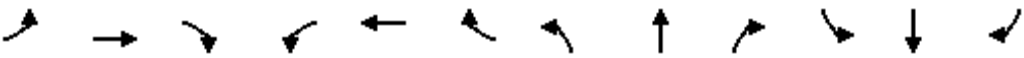
Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 15th St

Total 2032 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	42	74	25	56	51	53	856	26	26	712	74
Future Volume (vph)	163	42	74	25	56	51	53	856	26	26	712	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1719		1805	1845	1556	1805	3490		1752	3449	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1719		1805	1845	1556	1805	3490		1752	3449	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	46	80	27	61	55	58	930	28	28	774	80
RTOR Reduction (vph)	0	66	0	0	0	49	0	2	0	0	7	0
Lane Group Flow (vph)	177	60	0	27	61	6	58	956	0	28	847	0
Confl. Peds. (#/hr)	1					1			3	3		
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	3%	0%	0%	0%	3%	3%	0%	3%	0%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	14.5	17.7		3.6	6.8	11.4	6.7	54.1		4.6	52.0	
Effective Green, g (s)	14.5	17.7		3.6	6.8	11.4	6.7	54.1		4.6	52.0	
Actuated g/C Ratio	0.14	0.18		0.04	0.07	0.11	0.07	0.54		0.05	0.52	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	254	304		64	125	177	120	1888		80	1793	
v/s Ratio Prot	c0.10	c0.03		0.01	c0.03	0.00	0.03	c0.27		0.02	c0.25	
v/s Ratio Perm						0.00						
v/c Ratio	0.70	0.20		0.42	0.49	0.04	0.48	0.51		0.35	0.47	
Uniform Delay, d1	40.7	35.1		47.2	44.9	39.4	45.0	14.5		46.3	15.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.85	0.88		1.00	1.00	
Incremental Delay, d2	6.6	0.1		1.6	1.1	0.0	0.8	0.7		1.0	0.1	
Delay (s)	47.2	35.2		48.8	46.0	39.4	39.1	13.5		47.2	15.3	
Level of Service	D	D		D	D	D	D	B		D	B	
Approach Delay (s)		42.2			44.0			15.0			16.4	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.8									
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			56.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: SE 192nd Ave & Mill Plain Blvd

Total 2032 Traffic Conditions
AM Peak Hour Conditions

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	143	118	218	166	234	538	950	103	829
v/c Ratio	0.71	0.39	0.37	0.79	0.73	0.95	0.64	0.71	0.68
Control Delay	62.0	38.8	7.1	69.6	44.9	71.0	26.2	69.6	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	38.8	7.1	69.6	44.9	71.0	26.2	69.6	30.8
Queue Length 50th (ft)	89	69	25	103	120	177	233	65	221
Queue Length 95th (ft)	121	84	33	139	135	#248	286	96	251
Internal Link Dist (ft)		628			391		457		709
Turn Bay Length (ft)	240		130			205		150	
Base Capacity (vph)	235	516	597	227	507	567	1478	177	1211
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.23	0.37	0.73	0.46	0.95	0.64	0.58	0.68

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & Mill Plain Blvd

Total 2032 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	87	161	123	96	77	398	516	187	76	460	153
Future Volume (vph)	106	87	161	123	96	77	398	516	187	76	460	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.93		1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1845	1551	1752	1711		3433	3341		1752	3360	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1845	1551	1752	1711		3433	3341		1752	3360	
Peak-hour factor, PHF	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Adj. Flow (vph)	143	118	218	166	130	104	538	697	253	103	622	207
RTOR Reduction (vph)	0	0	88	0	33	0	0	29	0	0	29	0
Lane Group Flow (vph)	143	118	130	166	201	0	538	921	0	103	800	0
Confl. Peds. (#/hr)	1		8	8		1	3		3	3		3
Confl. Bikes (#/hr)			1			1						1
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	2%	3%	3%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	11.4	16.3	32.8	11.9	16.8		16.5	43.5		8.3	35.3	
Effective Green, g (s)	11.4	16.3	32.8	11.9	16.8		16.5	43.5		8.3	35.3	
Actuated g/C Ratio	0.11	0.16	0.33	0.12	0.17		0.16	0.44		0.08	0.35	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5	0.5	2.0	2.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)	199	300	508	208	287		566	1453		145	1186	
v/s Ratio Prot	c0.08	c0.06	0.04	0.09	c0.12		c0.16	0.28		0.06	c0.24	
v/s Ratio Perm			0.04									
v/c Ratio	0.72	0.39	0.26	0.80	0.70		0.95	0.63		0.71	0.67	
Uniform Delay, d1	42.8	37.4	24.6	42.9	39.2		41.3	22.0		44.7	27.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.9	0.3	0.1	17.7	5.9		25.8	2.1		12.8	1.2	
Delay (s)	52.6	37.7	24.7	60.6	45.1		67.1	24.1		57.4	28.7	
Level of Service	D	D	C	E	D		E	C		E	C	
Approach Delay (s)		36.3			51.6			39.7			31.9	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			38.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			62.0%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: SE 192nd Ave & SE 20th St

Total 2032 Traffic Conditions
AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	181	215	139	290	54	1084	97	996
v/c Ratio	0.56	0.60	0.48	0.82	0.41	0.70	0.61	0.62
Control Delay	49.6	38.6	49.1	51.4	52.9	27.7	73.4	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.6	38.6	49.1	51.4	52.9	27.7	73.4	18.8
Queue Length 50th (ft)	57	111	44	151	33	300	66	260
Queue Length 95th (ft)	78	148	63	193	62	356	101	234
Internal Link Dist (ft)		1997		3145		1320		1126
Turn Bay Length (ft)	100		150		335		410	
Base Capacity (vph)	408	455	374	445	175	1558	181	1605
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.47	0.37	0.65	0.31	0.70	0.54	0.62
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

5: SE 192nd Ave & SE 20th St

Total 2032 Traffic Conditions
AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	🔴🔴	🔴		🔴🔴	🔴		🔴	🔴🔴		🔴	🔴🔴	
Traffic Volume (vph)	143	114	56	110	116	113	43	765	92	77	696	91
Future Volume (vph)	143	114	56	110	116	113	43	765	92	77	696	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.93		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3400	1751		3400	1711		1752	3439		1752	3434	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3400	1751		3400	1711		1752	3439		1752	3434	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	181	144	71	139	147	143	54	968	116	97	881	115
RTOR Reduction (vph)	0	19	0	0	38	0	0	8	0	0	8	0
Lane Group Flow (vph)	181	196	0	139	252	0	54	1076	0	97	988	0
Confl. Peds. (#/hr)	2						2	2		2	2	
Confl. Bikes (#/hr)			2				2			2		1
Heavy Vehicles (%)	3%	3%	2%	3%	1%	3%	3%	3%	3%	3%	3%	3%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	9.6	19.6		8.4	18.4		6.5	44.1		7.9	45.5	
Effective Green, g (s)	9.6	19.6		8.4	18.4		6.5	44.1		7.9	45.5	
Actuated g/C Ratio	0.10	0.20		0.08	0.18		0.06	0.44		0.08	0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	326	343		285	314		113	1516		138	1562	
v/s Ratio Prot	c0.05	0.11		0.04	c0.15		0.03	c0.31		c0.06	0.29	
v/s Ratio Perm												
v/c Ratio	0.56	0.57		0.49	0.80		0.48	0.71		0.70	0.63	
Uniform Delay, d1	43.2	36.4		43.7	39.1		45.1	22.7		44.9	20.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.32	0.74	
Incremental Delay, d2	1.2	1.4		0.5	13.1		1.2	2.8		11.9	0.6	
Delay (s)	44.3	37.8		44.2	52.2		46.3	25.6		71.1	16.0	
Level of Service	D	D		D	D		D	C		E	B	
Approach Delay (s)		40.8			49.6			26.6			20.9	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.6			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			62.7%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th TWSC
101: SE 192nd Ave & Site Driveway

Total 2032 Traffic Conditions
AM Peak Hour Conditions

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	8	0	1070	803	10
Future Vol, veh/h	0	8	0	1070	803	10
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, %	0	0	0	3	3	0
Mvmt Flow	0	9	0	1163	873	11
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	442	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	569	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	569	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	11.4	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	569	-	-		
HCM Lane V/C Ratio	-	0.015	-	-		
HCM Control Delay (s)	-	11.4	-	-		
HCM Lane LOS	-	B	-	-		
HCM 95th %tile Q(veh)	-	0	-	-		

Intersection

Int Delay, s/veh 1.9

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations 

Traffic Vol, veh/h 10 234 175 8 45 34

Future Vol, veh/h 10 234 175 8 45 34

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length - - - - 0 -

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 92 92 92 92 92 92

Heavy Vehicles, % 0 0 3 0 0 0

Mvmt Flow 11 254 190 9 49 37

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 199 0 - 0 471 195

Stage 1 - - - - 195 -

Stage 2 - - - - 276 -

Critical Hdwy 4.1 - - - 6.4 6.2

Critical Hdwy Stg 1 - - - - 5.4 -

Critical Hdwy Stg 2 - - - - 5.4 -

Follow-up Hdwy 2.2 - - - 3.5 3.3

Pot Cap-1 Maneuver 1385 - - - 555 851

Stage 1 - - - - 843 -

Stage 2 - - - - 775 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 1385 - - - 550 851

Mov Cap-2 Maneuver - - - - 550 -

Stage 1 - - - - 835 -

Stage 2 - - - - 775 -

Approach EB WB SB

HCM Control Delay, s 0.3 0 11.4

HCM LOS B

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h) 1385 - - - 649

HCM Lane V/C Ratio 0.008 - - - 0.132

HCM Control Delay (s) 7.6 0 - - 11.4

HCM Lane LOS A A - - B

HCM 95th %tile Q(veh) 0 - - - 0.5

Queues

1: SE 164th Ave & SE 15th St

Total 2032 Traffic Conditions

PM Peak Hour Conditions

											
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	47	131	140	126	115	136	1782	74	192	1706	48
v/c Ratio	0.14	0.44	0.43	0.34	0.29	0.62	0.85	0.10	0.60	0.70	0.06
Control Delay	34.5	46.5	39.2	47.9	10.3	61.9	36.0	2.3	53.6	26.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	46.5	39.2	47.9	10.3	61.9	36.0	2.3	53.6	26.7	0.1
Queue Length 50th (ft)	28	85	88	90	0	101	418	0	139	345	0
Queue Length 95th (ft)	57	143	138	149	50	158	506	16	207	438	0
Internal Link Dist (ft)		642		766			1016			601	
Turn Bay Length (ft)	100		250		325	150		150	230		230
Base Capacity (vph)	368	488	326	527	516	229	2113	708	320	2444	804
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.27	0.43	0.24	0.22	0.59	0.84	0.10	0.60	0.70	0.06
Intersection Summary											

HCM Signalized Intersection Capacity Analysis

1: SE 164th Ave & SE 15th St

Total 2032 Traffic Conditions

PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	84	32	123	111	101	120	1568	65	169	1501	42
Future Volume (vph)	41	84	32	123	111	101	120	1568	65	169	1501	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1786		1803	1881	1542	1805	5036	1549	1787	5136	1580
Flt Permitted	0.68	1.00		0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1285	1786		927	1881	1542	1805	5036	1549	1787	5136	1580
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	47	95	36	140	126	115	136	1782	74	192	1706	48
RTOR Reduction (vph)	0	13	0	0	0	93	0	0	43	0	0	25
Lane Group Flow (vph)	47	118	0	140	126	22	136	1782	31	192	1706	23
Confl. Peds. (#/hr)			2	2			1		1	1		1
Confl. Bikes (#/hr)						4						
Heavy Vehicles (%)	0%	1%	3%	0%	1%	3%	0%	3%	2%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6			4			8
Actuated Green, G (s)	26.0	19.3		32.6	22.6	22.6	14.6	50.2	50.2	21.5	57.1	57.1
Effective Green, g (s)	26.0	19.3		32.6	22.6	22.6	14.6	50.2	50.2	21.5	57.1	57.1
Actuated g/C Ratio	0.22	0.16		0.27	0.19	0.19	0.12	0.42	0.42	0.18	0.48	0.48
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.5	5.0	5.0	4.5	5.0	5.0
Vehicle Extension (s)	3.0	2.0		3.0	2.0	2.0	3.0	2.0	2.0	3.0	2.0	2.0
Lane Grp Cap (vph)	307	287		324	354	290	219	2106	647	320	2443	751
v/s Ratio Prot	0.01	0.07		c0.04	0.07		0.08	c0.35		c0.11	c0.33	
v/s Ratio Perm	0.02			c0.08		0.01			0.02			0.01
v/c Ratio	0.15	0.41		0.43	0.36	0.07	0.62	0.85	0.05	0.60	0.70	0.03
Uniform Delay, d1	37.8	45.2		34.7	42.4	40.1	50.1	31.4	20.7	45.3	24.7	16.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	4.3		0.9	2.8	0.5	5.4	3.2	0.0	3.0	0.7	0.0
Delay (s)	38.0	49.5		35.6	45.2	40.6	55.5	34.6	20.7	48.3	25.4	16.7
Level of Service	D	D		D	D	D	E	C	C	D	C	B
Approach Delay (s)		46.5			40.3			35.5			27.5	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			32.9				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			70.1%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	305	14	23	278	12	13
Future Vol, veh/h	305	14	23	278	12	13
Conflicting Peds, #/hr	0	4	4	0	6	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	1	3	3	1	0	3
Mvmt Flow	355	16	27	323	14	15
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	375	0	750	367
Stage 1	-	-	-	-	367	-
Stage 2	-	-	-	-	383	-
Critical Hdwy	-	-	4.13	-	6.4	6.23
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.227	-	3.5	3.327
Pot Cap-1 Maneuver	-	-	1178	-	382	676
Stage 1	-	-	-	-	705	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1174	-	367	673
Mov Cap-2 Maneuver	-	-	-	-	367	-
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	670	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.6		13	
HCM LOS					B	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	481	-	-	1174	-	
HCM Lane V/C Ratio	0.06	-	-	0.023	-	
HCM Control Delay (s)	13	-	-	8.1	0	
HCM Lane LOS	B	-	-	A	A	
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-	

Queues
3: SE 192nd Ave & SE 15th St

Total 2032 Traffic Conditions
PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	135	198	49	92	231	104	1243	63	1390
v/c Ratio	0.73	0.75	0.52	0.64	0.61	0.66	0.62	0.50	0.72
Control Delay	65.3	47.9	65.9	65.1	15.7	40.3	16.0	57.4	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.3	47.9	65.9	65.1	15.7	40.3	16.0	57.4	21.0
Queue Length 50th (ft)	84	91	31	58	24	54	220	40	353
Queue Length 95th (ft)	145	161	#81	109	88	m54	m116	80	477
Internal Link Dist (ft)		206		1016			1126		238
Turn Bay Length (ft)	115		110		110	150		475	
Base Capacity (vph)	232	337	95	169	420	177	2003	177	1943
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.59	0.52	0.54	0.55	0.59	0.62	0.36	0.72

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

3: SE 192nd Ave & SE 15th St

Total 2032 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	83	97	45	84	210	95	1102	29	57	1137	128
Future Volume (vph)	123	83	97	45	84	210	95	1102	29	57	1137	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1738		1805	1881	1604	1752	3522		1770	3511	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1738		1805	1881	1604	1752	3522		1770	3511	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	135	91	107	49	92	231	104	1211	32	63	1249	141
RTOR Reduction (vph)	0	45	0	0	0	159	0	2	0	0	8	0
Lane Group Flow (vph)	135	153	0	49	92	72	104	1241	0	63	1382	0
Confl. Peds. (#/hr)							3		4	4		3
Confl. Bikes (#/hr)						1			1			
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	3%	2%	3%	2%	1%	1%
Turn Type	Prot	NA		Prot	NA	pm+ov	Prot	NA		Prot	NA	
Protected Phases	5	2		1	6	3	7	4		3	8	
Permitted Phases						6						
Actuated Green, G (s)	10.4	12.7		4.3	6.6	13.8	9.0	55.8		7.2	54.0	
Effective Green, g (s)	10.4	12.7		4.3	6.6	13.8	9.0	55.8		7.2	54.0	
Actuated g/C Ratio	0.10	0.13		0.04	0.07	0.14	0.09	0.56		0.07	0.54	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	185	220		77	124	301	157	1965		127	1895	
v/s Ratio Prot	c0.08	c0.09		0.03	0.05	0.02	0.06	c0.35		0.04	c0.39	
v/s Ratio Perm						0.03						
v/c Ratio	0.73	0.70		0.64	0.74	0.24	0.66	0.63		0.50	0.73	
Uniform Delay, d1	43.4	41.8		47.1	45.9	38.4	44.0	15.1		44.7	17.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.75	0.94		1.00	1.00	
Incremental Delay, d2	11.5	7.5		12.0	18.7	0.1	2.6	0.5		1.1	1.2	
Delay (s)	55.0	49.4		59.1	64.6	38.6	35.6	14.7		45.8	18.7	
Level of Service	D	D		E	E	D	D	B		D	B	
Approach Delay (s)		51.6			47.7			16.4			19.8	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.5									
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			71.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Queues
4: SE 192nd Ave & Mill Plain Blvd

Total 2032 Traffic Conditions
PM Peak Hour Conditions

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	334	15	600	57	63	481	1061	19	1193
v/c Ratio	0.65	0.06	1.24	0.22	0.31	1.16	0.69	0.20	1.10
Control Delay	41.6	31.0	147.7	40.3	21.8	134.6	26.4	50.5	92.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	31.0	147.7	40.3	21.8	134.6	26.4	50.5	92.5
Queue Length 50th (ft)	179	9	~494	21	15	~187	254	12	~451
Queue Length 95th (ft)	#490	22	#311	73	42	#283	392	35	#574
Internal Link Dist (ft)		628			391		457		709
Turn Bay Length (ft)	240		130			205		150	
Base Capacity (vph)	516	517	484	296	479	416	1545	180	1083
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.03	1.24	0.19	0.13	1.16	0.69	0.11	1.10

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: SE 192nd Ave & Mill Plain Blvd

Total 2032 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	13	534	51	21	35	428	919	25	17	864	198
Future Volume (vph)	297	13	534	51	21	35	428	919	25	17	864	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	1900	1580	1805	1668		3467	3523		1805	3431	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1787	1900	1580	1805	1668		3467	3523		1805	3431	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	334	15	600	57	24	39	481	1033	28	19	971	222
RTOR Reduction (vph)	0	0	92	0	35	0	0	2	0	0	21	0
Lane Group Flow (vph)	334	15	508	57	28	0	481	1059	0	19	1172	0
Confl. Peds. (#/hr)	8		6	6		8	9		9	9		9
Confl. Bikes (#/hr)						1			3			1
Heavy Vehicles (%)	1%	0%	1%	0%	0%	3%	1%	2%	0%	0%	2%	1%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	7	1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	28.9	25.8	40.8	12.2	9.1		15.0	39.8		2.2	27.0	
Effective Green, g (s)	28.9	25.8	40.8	12.2	9.1		15.0	39.8		2.2	27.0	
Actuated g/C Ratio	0.29	0.26	0.41	0.12	0.09		0.15	0.40		0.02	0.27	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	1.5	1.5	0.5	2.0	2.0		0.5	0.5		0.5	0.5	
Lane Grp Cap (vph)	516	490	644	220	151		520	1402		39	926	
v/s Ratio Prot	c0.19	0.01	c0.12	c0.03	0.02		c0.14	0.30		0.01	c0.34	
v/s Ratio Perm			0.20									
v/c Ratio	0.65	0.03	0.79	0.26	0.18		0.93	0.76		0.49	1.27	
Uniform Delay, d1	31.1	27.7	25.8	39.8	42.0		41.9	25.9		48.3	36.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	0.0	5.9	0.2	0.2		22.1	3.8		3.5	128.1	
Delay (s)	33.2	27.8	31.8	40.0	42.2		64.0	29.7		51.8	164.6	
Level of Service	C	C	C	D	D		E	C		D	F	
Approach Delay (s)		32.2			41.2			40.4			162.8	
Approach LOS		C			D			D			F	
Intersection Summary												
HCM 2000 Control Delay			77.2			HCM 2000 Level of Service		E				
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)		20.0				
Intersection Capacity Utilization			80.7%			ICU Level of Service		D				
Analysis Period (min)			15									
c Critical Lane Group												

Queues
5: SE 192nd Ave & SE 20th St

Total 2032 Traffic Conditions
PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	143	271	156	325	121	1362	183	1271
v/c Ratio	0.49	0.79	0.40	0.83	0.67	1.06	0.77	0.90
Control Delay	48.9	51.0	44.2	52.5	61.6	74.7	69.9	31.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	51.0	44.2	52.5	61.6	74.7	69.9	31.4
Queue Length 50th (ft)	45	151	47	181	74	~535	122	206
Queue Length 95th (ft)	74	222	79	269	#156	#727	m#198	#604
Internal Link Dist (ft)		1997		3145		1320		1126
Turn Bay Length (ft)	100		150		335		410	
Base Capacity (vph)	450	462	427	453	195	1287	250	1408
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.59	0.37	0.72	0.62	1.06	0.73	0.90
Intersection Summary								
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.								
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.								
m Volume for 95th percentile queue is metered by upstream signal.								

HCM Signalized Intersection Capacity Analysis

5: SE 192nd Ave & SE 20th St

Total 2032 Traffic Conditions
PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	137	169	91	150	193	119	116	1113	195	176	1035	185
Future Volume (vph)	137	169	91	150	193	119	116	1113	195	176	1035	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	0.97	1.00		0.97	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3467	1772		3502	1760		1805	3418		1787	3441	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3467	1772		3502	1760		1805	3418		1787	3441	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	143	176	95	156	201	124	121	1159	203	183	1078	193
RTOR Reduction (vph)	0	21	0	0	23	0	0	13	0	0	13	0
Lane Group Flow (vph)	143	250	0	156	302	0	121	1349	0	183	1258	0
Confl. Peds. (#/hr)	3		1	1		3	1		5	5		1
Confl. Bikes (#/hr)			1			4			5			2
Heavy Vehicles (%)	1%	0%	3%	0%	1%	1%	0%	3%	1%	1%	2%	3%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	8.5	18.2		11.2	20.9		10.1	37.2		13.4	40.5	
Effective Green, g (s)	8.5	18.2		11.2	20.9		10.1	37.2		13.4	40.5	
Actuated g/C Ratio	0.08	0.18		0.11	0.21		0.10	0.37		0.13	0.40	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	294	322		392	367		182	1271		239	1393	
v/s Ratio Prot	0.04	c0.14		0.04	c0.17		0.07	c0.39		c0.10	c0.37	
v/s Ratio Perm												
v/c Ratio	0.49	0.78		0.40	0.82		0.66	1.06		0.77	0.90	
Uniform Delay, d1	43.7	39.0		41.3	37.8		43.3	31.4		41.8	27.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.30	0.75	
Incremental Delay, d2	0.5	10.2		0.2	13.2		6.9	43.4		9.2	6.3	
Delay (s)	44.1	49.1		41.5	51.0		50.2	74.8		63.4	27.1	
Level of Service	D	D		D	D		D	E		E	C	
Approach Delay (s)		47.4			47.9			72.8			31.7	
Approach LOS		D			D			E			C	
Intersection Summary												
HCM 2000 Control Delay			51.3			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			85.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	
Traffic Vol, veh/h	0	5	0	1435	1317	30
Future Vol, veh/h	0	5	0	1435	1317	30
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	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	2	1	0
Mvmt Flow	0	5	0	1577	1447	33
Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	-	740	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	364	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	364	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	NB	SB			
HCM Control Delay, s	15	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR		
Capacity (veh/h)	-	364	-	-		
HCM Lane V/C Ratio	-	0.015	-	-		
HCM Control Delay (s)	-	15	-	-		
HCM Lane LOS	-	C	-	-		
HCM 95th %tile Q(veh)	-	0	-	-		

Intersection

Int Delay, s/veh 1.4

Movement EBL EBT WBT WBR SBL SBR

Lane Configurations 

Traffic Vol, veh/h 36 274 279 27 28 22

Future Vol, veh/h 36 274 279 27 28 22

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Free Free Free Free Stop Stop

RT Channelized - None - None - None

Storage Length - - - - 0 -

Veh in Median Storage, # - 0 0 - 0 -

Grade, % - 0 0 - 0 -

Peak Hour Factor 91 91 91 91 91 91

Heavy Vehicles, % 0 1 1 0 0 0

Mvmt Flow 40 301 307 30 31 24

Major/Minor Major1 Major2 Minor2

Conflicting Flow All 337 0 - 0 703 322

Stage 1 - - - - 322 -

Stage 2 - - - - 381 -

Critical Hdwy 4.1 - - - 6.4 6.2

Critical Hdwy Stg 1 - - - - 5.4 -

Critical Hdwy Stg 2 - - - - 5.4 -

Follow-up Hdwy 2.2 - - - 3.5 3.3

Pot Cap-1 Maneuver 1234 - - - 407 724

Stage 1 - - - - 739 -

Stage 2 - - - - 695 -

Platoon blocked, % - - - -

Mov Cap-1 Maneuver 1234 - - - 391 724

Mov Cap-2 Maneuver - - - - 391 -

Stage 1 - - - - 710 -

Stage 2 - - - - 695 -

Approach EB WB SB

HCM Control Delay, s 0.9 0 13.3

HCM LOS B

Minor Lane/Major Mvmt EBL EBT WBT WBR SBLn1

Capacity (veh/h) 1234 - - - 490

HCM Lane V/C Ratio 0.032 - - - 0.112

HCM Control Delay (s) 8 0 - - 13.3

HCM Lane LOS A A - - B

HCM 95th %tile Q(veh) 0.1 - - - 0.4

Appendix I WSDOT Turn Lane Criteria

Exhibit 1310-7 Left-Turn Storage Guidelines: Two-Lane, Unsignalized

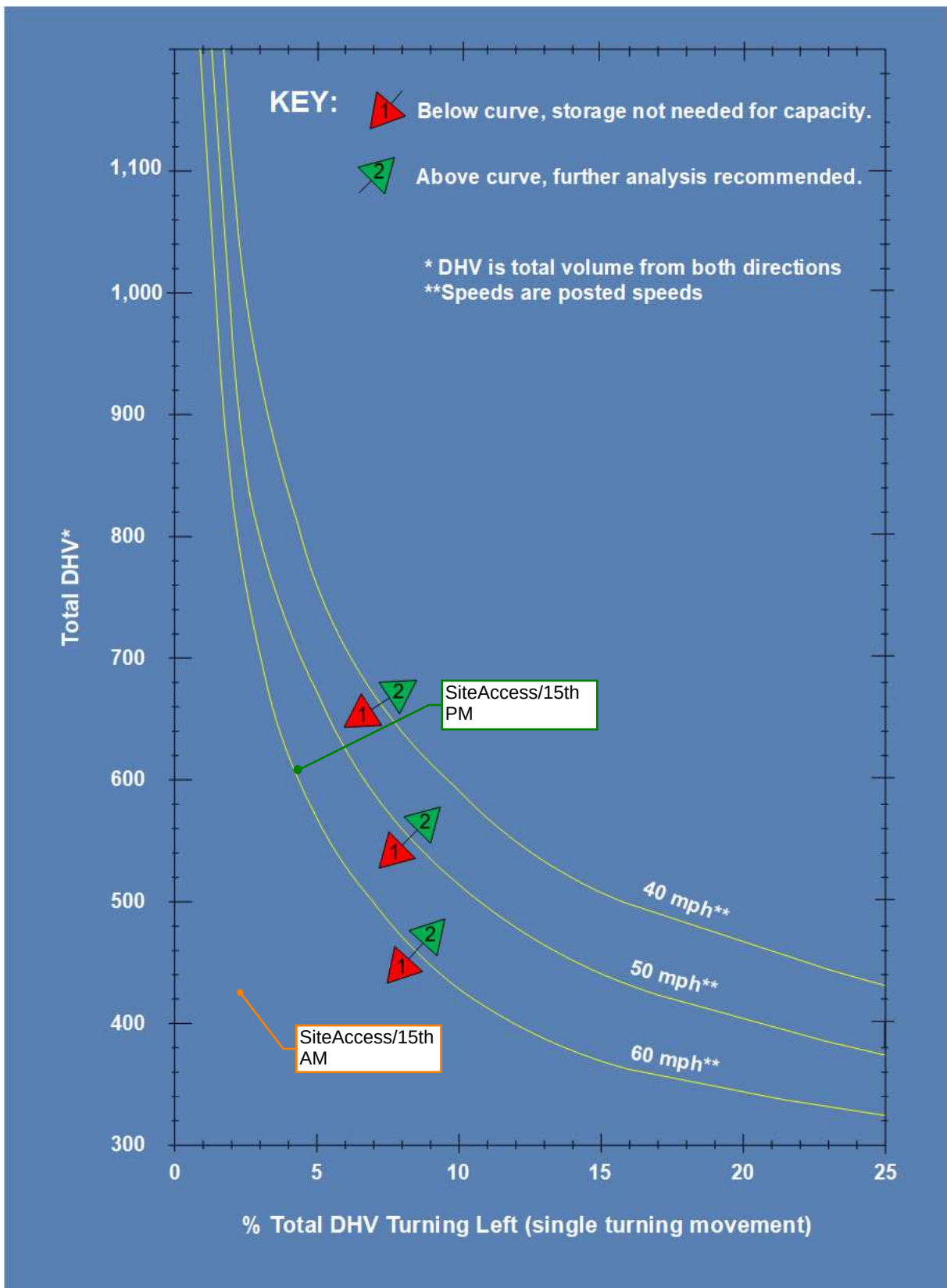
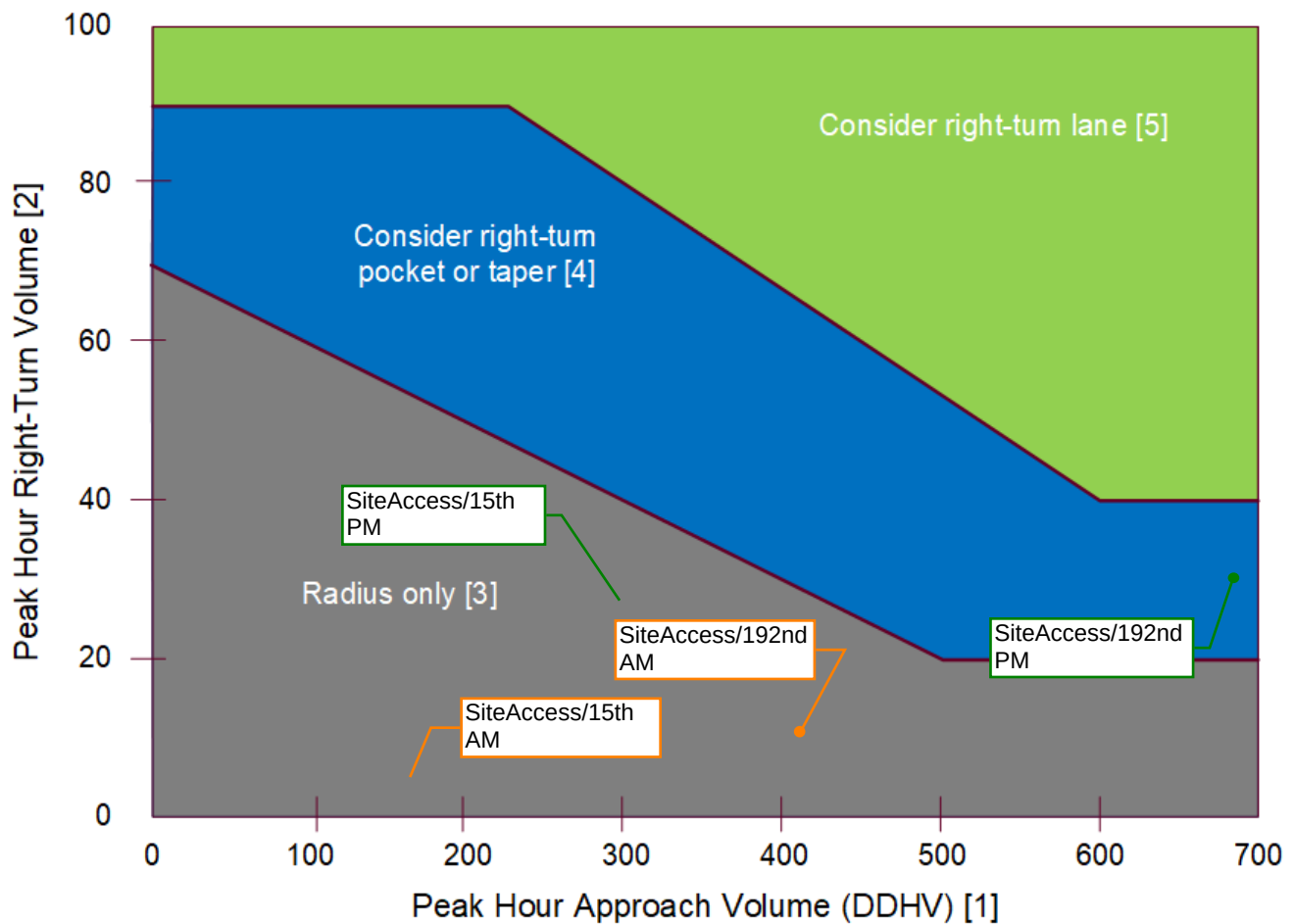


Exhibit 1310-19 Right-Turn Lane Guidelines



Notes:

- [1] For two-lane highways, use the peak hour DDHV (through + right-turn).
For multilane, highways (posted speed 45 mph or above), use the right-lane peak hour approach volume (through + right-turn).
- [2] When all three of the following conditions are met, reduce the right-turn DDHV by 20:
 - The posted speed is 45 mph or below
 - The right-turn volume is greater than 40 VPH
 - The peak hour approach volume (DDHV) is less than 300 VPH
- [3] For right-turn corner design, see [Exhibit 1310-6](#).
- [4] For right-turn pocket or taper design, see [Exhibit 1310-20](#).
- [5] For right-turn lane design, see [Exhibit 1310-21](#).

Datepark Residence Re-zoning Narrative:

Datepark Condominium Inc is an organization that provides “Second Chance” housing to help members of our community since 2005. This organization provides sustainable housing to low-income tenants in Clark County, City of Vancouver, City of Battleground, City of Camas, and other surrounding areas. We provide affordable housing for individuals who have barriers that prevent them from meeting common rental qualifications to obtain housing elsewhere in our community.

Our organization pertains of 4 female board members, with three of the four being East Indian. We have a combined experience of over 25 years in different fields that correlate to this project, including general construction and site development, property management, and real estate. Some past projects our board members have completed are a 45-mixed use apartment complex in Gresham, Oregon and a 31-unit apartment complex in NE Portland, Oregon. We have also remodeled and updated 7 Burger King locations throughout the Portland area.

In addition to that, we have 18 years of experience operating second chance housing complexes, and pride ourselves in serving our community and helping individuals in need to have a safe and stable place to call home. Our vision for Datepark is to provide a larger number of affordable rental units to our community. We intend to develop this property, while maintaining ownership. We will then maintain control of the complex and will be operating as the owners and property management team. We do not have any plans or intention to sell the complex at any point after this development is complete.

The property is located at 3607,3701 and 3701 ½ E 18th St Vancouver, WA 98661. It has been operating as a second chance housing complex since we acquired it in 2005. It currently has 13 rental units and two houses on four parcels of land. We will be tearing down all existing buildings to construct a 4-story, 54-unit complex on the property. We are very excited about this project. This new complex will stay a second chance housing complex and be financially affordable for all. We hope to help fill the need for low-income housing, and to maximize the amount of community members we can help in having a safe and secure place to call home.

Our plan is to develop Datepark Residence into an affordable housing complex. The land is subdivided into four parcels currently zoned at R-18 making our ability to help make an impact with the housing crisis severely limited. The existing houses and townhomes are older, with a large parking lot in the middle. There is some basic existing landscaping, but aesthetically the way the property is, it will need some maintenance. The property currently has a 20-unit parking lot, which will be increased to a total of 44 parking units. We are delighted to be able to move forward with building a beautiful new complex that will also be visually pleasing to the neighborhood and community. We are currently working with our architects and engineers to ensure the complex is functional, visually attractive and appealing on all sides of the property. We realize that a view of a beautiful building is better than a plain building, an aging

building, and we want all our neighbors to be happy with their new view and the changes.

Sadly, housing is a comfort many individuals in our community do not have. A home is a safe space that provides stability and security to all families and individuals. High housing costs can cause individuals and families to spend less on basic needs such as food, clothing, and health care. In addition, everyday many individuals in our community experience mental health crises. If they had a safe haven, it would build a sense of security, and help them with a better future.

This development is in the Fourth Plain International District. Residents will have access to local city parks, major department stores, shopping, and retail commerce. This project goes hand-in-hand with Fourth Plain Forward. Increased residents in the neighborhood will directly impact the local economy by bringing in more funds spent at local surrounding businesses in the International District.

In addition to potentially lessening the impact of the financial burden of a large homeless populace, we will be adding greater value to our local economy. As stated above, our property is in the Fourth Plain International District. We are also close to cultural centers, community centers, shopping and businesses, the VA Hospital, and many other healthcare facilities. We are located on a bus line to assist our residents in visiting locations that are not within walking distance, and to help individuals travel to and from work. Our tenants will shop locally, visit, and utilize these local resources, work in our community and even help ease the “lack of workers” many businesses are struggling with.

From our years of experience, we have a rich understanding of how to assist individuals in our community who face challenges such as mental health concerns, homelessness, addiction, and other struggles. We are not only seen as landlords to these families and individuals, but they also see us as counselors, friends, and most importantly, as someone who is willing to “take a chance on them” and help provide them with stability. This project will continue to build upon our past efforts and allow us to be a better benefit and invaluable resource to our community.

Each parcel is currently zoned at R-18. Rather than developing up to four smaller buildings on each parcel, we want to group the parcels and rezone all four lots to R-30. We intend on applying for the “affordable housing density bonus”. This will double the zoning and allow us to build one 54-unit complex. The main purpose for rezoning the site is to allow us to consolidate all units into one complex. The city has approved rezoning in the past to help increase affordable housing; we are hoping to utilize this practice and apply this policy to our property. We need the city’s help to achieve our

dream of becoming a beneficial resource and making a positive impact towards addressing our housing crisis while housing up to 162 individuals. With our proposed plan to keep 80% of our units below the Area Median Income (AMI) we can help create stability for individuals and families. This is why we are hoping the city will serve as the sponsor of our rezoning application.

PLS

ENGINEERING

NARRATIVE

FOR THE

**MILLER COMPREHENSIVE
PLAN AND ZONING MAP
AMENDMENT**

Submitted to

THE CITY OF VANCOUVER

FOR

SERGHEI COMARNITCHI

2804 NE 65th Avenue, Suite D

Vancouver, WA 98661

(360) 772-5563

August 2023

General Information

Applicant:

Sunlight Rentals LLC

Contact: Serghei Comarnitchi
2804 NE 65th Avenue, Suite D
Vancouver, WA 98661
(360) 772-5563
sunlight.inc@comcast.net

Owners:

Gary Miller

6403 NE 72nd Ave.
Vancouver, WA 98661

Haley Gibson

7208 NE 63rd Street
Vancouver, WA 98662

Project Contact:

PLS Engineering

Travis Johnson, PE
604 W Evergreen Boulevard
Vancouver, WA 98660
(360) 944-6519
pm@plsengineering.com

Location:

SW ¼ of Section 8, T2N, R2E, WM

Address:

7318 NE 63rd Street Vancouver, WA 98662

Project Size:

4.17 acres

Zoning:

R-9

Comprehensive Plan:

UL

Current Use:

Single-family residences

Tax Lot:

105145000, 105150000, 105155000

School District:

Vancouver

Elementary:

Walnut Grove

Middle School:

Gaiser

High School:

Fort Vancouver

Water District:

Vancouver

Sewer District:

Clark Regional

Fire District:

Vancouver Fire

Park District:

B

Transportation Impact Fee:

Pacific

Project Description

The Miller Comprehensive Plan and Zoning Map Amendment proposes to rezone parcels 105145000, 105150000, and 105155000 from R-9 to R-30. This involves a Comprehensive Plan Amendment to move the parcels from an Urban Low to an Urban High designation. The site encompasses three parcels totaling approximately 4.17 acres. Currently the project site includes three separate owners. There is not a current plan for the development of all three parcels at this time. The larger parcel is being purchased by a developer and would be developed in the near future. The smaller parcels could be integrated into the development proposal or be developed separately. A formal application for site development will be submitted after the proposed comprehensive plan and zoning map amendment.

Density:

With 4.17 acres, the site could accommodate a maximum of 125 units (30 units per acre). Under the current zone (R-9) the maximum density would be approximately 36 single family units (8.7 units per acre). The larger site could develop separately from the spaller parcels and would have a density range of 60-99 units. The existing constraints of the site have not been studied to the extent that a reliable future unit count can be provided. It would be best to assume the maximum density when evaluating potential impacts of the proposed rezone.

Traffic Impacts:

Apartment buildings generate 6.74 average daily trips (ADT) per unit and single-family homes generate approximately 10 ADT per unit according to the ITE trip generation manual. The maximum possible development could generate up to 842.5 ADT, and development under the current zone would likely generate 360 ADT. The proposed rezone could result in a 57% increase in trips that would have otherwise been planned for in this area. A traffic study specific to the future development will be completed to ensure that the existing street system has adequate capacity for the increase in trips.

Comprehensive Plan and Zoning Map Amendment Approval Criteria

VMC 20.285.050

The following discusses the criteria that must be addressed for a comprehensive plan and zoning map amendment, and how this proposal complies:

A. Overall proposed map amendments reviewed under this chapter shall be approved only if demonstrated by the proponent to be in the public interest, as based on a review of all applicable principals from the following:

1. How the proposal is more consistent than the existing designation with applicable policies of the Vancouver strategic plan and comprehensive plan.

Response: The request is consistent with Objective 6.2.1 of the Vancouver Strategic Plan: “Develop a broader range of housing choices through incentives, changes in regulations and implementation of the Affordable Housing Task Force recommendations.” The intent of this amendment would be to allow zoning that would increase the overall supply of housing in the city, which would result in lower purchase prices and rental costs. While this does not provide “affordable housing” it goes a long way to make housing more affordable. Since the adoption of the strategic plan housing prices have continued to soar. This is partly due to a high demand for housing in the Vancouver region that far outpaces the new housing supply. Apartment units will provide additional housing at a lower price point.

2. How the proposal is more consistent than the existing designation with each of the following objectives as applicable:

a. Encourage more intensive development to locate in major urban centers and corridors, particularly downtown Vancouver. Encourage development of distinct neighborhoods served by commercial nodes, and discourage urban sprawl and strip commercial development;

Response: The site is within 0.25 miles of NE Andresen Rd. and approximately 2 miles from the nearest access to I-205, both major corridors in the area. Higher density residential development in this area would discourage urban sprawl.

b. Provide development of uses which are functionally integrated with surrounding areas and neighborhoods in terms of local shopping, employment, recreational or other opportunities;

Response: The site is within 0.5 miles of Raymond E. Shaffer Community Park and 1.5 miles from Orchards Community Park, providing ample recreational opportunities. Vancouver Mall, Costco and Home Depot are nearby providing employment and local shopping opportunities. A higher density multi-family residential development would integrate well with these areas.

c. Provide development which is compatible and integrated with surrounding uses in terms of scale, orientation, pedestrian enhancements, and landscaping;

Response: The south end of the site is bounded by NE 63rd Street, a collector arterial. South of the street are existing townhome and apartment developments. West of the site is a fire station. North and east of the site are existing single-family residences. This site is well positioned to be developed with a higher intensity use that will not have a significant effect on the existing neighboring uses. The site will have direct access to NE 63rd street and will not take access from the existing single-family residential streets.

d. Conserve or enhance significant natural or historical features;

Response: The applicant will hire a biologist to delineate any possible critical areas onsite and will work to avoid or minimize impacts where feasible.

e. Provide adequate provision of transportation, water, sewer, and other public services;

Response: Site access will be provided directly from NE 63rd Street. Water mains are located in NE 63rd Street NE 72nd Avenue adjacent to the site. CRWWD will be the sanitary sewer purveyor. Sanitary sewer lines run along both NE 63rd Street and NE 72nd Avenue.

f. Provide significant family wage employment opportunities and broadening of the Vancouver economy;

Response: Not applicable, this is a proposal for residential zoned property.

g. Provide for the formation and enhancement of neighborhoods and communities; and

Response: The redevelopment of these parcels will result in an attractive development at the corner of two arterial streets.

h. Provide affordable or below-market-rate housing opportunities.

Response: The proposal does not include affordable or below-market-rate housing, but the increase in housing supply will help make housing more affordable in the area. Apartments are an attractive affordable alternative in today's market.

3. Scope of review. Review and evaluation of proposed comprehensive plan or zoning map changes shall consider both the likely and possible future use of the site and associated impacts.

Response: The applicant intends to provide apartment units after the comprehensive plan and zoning map change approval. The request is a change from a lower density to a higher density, however it is still a residential zone so only residences will be proposed. Impacts created would be those of a higher density residential development, with typical impacts to local schools, emergency services and streets. Impact fees will be required to be paid to offset these impacts.

4. Cumulative Impacts. The review of individual comprehensive plan map or policy amendments, other than exceptions noted in VMC [20.285.040](#), shall also consider the cumulative transportation, land supply, and environmental impacts of other plan amendments proposed within the same annual cycle. (Ord. M-3922 § 13, 07/06/2009; Ord. M-3701 § 9, 05/02/2005; Ord. M-3643, 01/26/2004)

Response: The impacts of this development will need to be reviewed in conjunction with the other plan amendments within this review cycle.

ZONING MAP AMENDMENT APPROVAL CRITERIA

VMC 20.285.060.A. sets out the applicable zoning map amendment approval criteria not involving associated comprehensive plan map amendments.

This proposal is required to demonstrate the following:

1. How the proposal is more consistent with applicable policies of the Vancouver strategic plan and comprehensive plan than the existing designation; and
2. That a change in circumstances has occurred since the existing designation was established.

A. Consistency with Vancouver Strategic Plan

The City adopted a 2016-2021 Strategic Plan, and updated it in November 2018. The city is currently working on a new Strategic Plan, but it has not yet been adopted.

The request is consistent with Objective 6.2.1:

6.2.1 Develop a broader range of housing choices through incentives, changes in regulations and implementation of the Affordable Housing Task Force recommendations. Page 23.

In the final 2016 report the Affordable Housing Task Force discussed potential tools and programs to increase the supply of affordable housing units in the city. One of the high priority items discussed amending zoning/development regulations to encourage affordable housing options.

Option for Council Consideration	Description	Estimated Time for Staff to Develop and Present to Council	City Direct Costs/ Staff Time	Cost to Property Owner/ Developer	Potential to Increase Affordable Units	Considerations and Details Additional information to follow based on Council guidance and staff analysis.	Task Force Priority
EXPAND SUPPLY OF AFFORDABLE HOUSING							
Amend zoning/ development regulations to encourage affordable housing options	• Allow/promote alternative housing, e.g.: ○ Cluster/cottage housing ○ Corner-lot duplexes ○ Micro-housing and single room occupancy (SRO) housing ○ Shared housing, including rooming/boarding houses • Reduced parking requirements	Medium to Long	\$	\$	Medium	Details: • May be effective at increasing overall supply over a long period of time, but affordability not guaranteed • Marketing incentives/opportunities to property owners and developers • Can use current staff, but may be contracted out Questions: • Requires determination of priorities among several options • Need to determine appropriate level of incentives Task Force comments: Support for allowing a wider variety of housing types and sizes. This option may also provide low-income homeownership units, an opportunity to address affordable housing apart from rentals.	High

The intent of the option would be to increase overall supply of housing in the city which would result in lower purchase prices and rental costs. While this does not provide “affordable housing” it goes a long way to make housing more affordable. Since the adoption of the strategic plan housing prices have continued to soar. This is partly due to a high demand for housing in the Vancouver region that far outpaces the new housing supply.

In response to the strategic plan and the Affordable Housing Task Force recommendations, the City Council studied and approved housing code updates. The Housing Code Updates webpage states the following as a purpose of the update:

“Vancouver, like many communities, is facing a housing crisis. As the city continues to grow, there is a desire and need for new types of housing that would allow residents to live more affordably while also maintaining neighborhood livability. However, current city zoning rules prohibit many of these

housing options. Changes to the development code can create opportunities for the private sector to deliver a more diverse, affordable housing stock.”

The project goals of the housing update are stated as the following:

“The goal of the project is to update City codes to allow for different, smaller and more affordable types of housing choices. Many are recommended in the Affordable Housing Task Force report (2016) and many are similar to what is allowed in Clark County and other Washington cities nearby and statewide.”

The specific goals include:

- Allowing for the development of diverse housing types to meet changing demographic needs and consumer preferences
- Expanding market rate, middle income, and affordable housing choices
- Maintaining neighborhood livability with incremental, rather than wholesale, change
- Providing more opportunities for people to live near where they work and attend school, and reduce costly commutes
- Facilitating development in areas with full existing public services

The current proposal is consistent with this plan and will help meet the City’s goals. The general proposal associated with the zone change will accomplish the following:

- The Miller Rezone project will add diversity to the housing options in the immediate vicinity of the site.
- The rezone will not have a large effect on adjacent homes as the proposed access is directly from an arterial street.
- The future project would match the style of apartments to the south and could result in an attractive development at the corner of two arterial streets.
- The site is located near schools, stores, and public transport that has the potential to reduce costly commutes.
- The project is in an area with full existing public services.

B. Consistency with the Comprehensive Plan

The applicant is requesting a concurrent change in the Comprehensive Plan designation. The current and proposed plan designations are residential and are compatible. The proposed plan results in a higher density, but can be designed to have less of an impact on the neighboring lower density community.

Table 1-5. Vancouver comprehensive plan land use designations

Comprehensive Plan designation	Corresponding Zoning	General Intent
Residential		
Urban Lower Density	R-2, R-4, R-6, R-9	Predominantly single-family detached residential development, with some allowances for duplexes, townhouses, and single-family homes on small lots using infill standards
Urban Higher Density	R-18, R-22, R-30, R-35, MX	Predominantly apartments and condominiums, with some allowance for attached housing (such as duplexes, townhouses, and small-lot single-family homes) and mixed use

This request furthers the Community Development policies on page 1-14 to 1-15 of the Comprehensive Plan:

CD-2 Efficient development patterns Encourage efficient development throughout Vancouver to ensure achievement of average density of 8 units per acre set by countywide planning policies. Encourage higher density and more intense development in areas that are more extensively served by facilities, particularly transportation and transit services.

Response:

- The site is near a full-service grocery store/commercial area, elementary school, community park, and C-Tran Bus route 78 on NE Andresen Rd.
 - Safeway and Walgreens are both approximately 1/4 mile from the site. This is approximately a 5-minute walk. There is also a Starbucks (inside Safeway), Chase Bank, State Farm Insurance, The UPS Store, Sprint Store, Great Clips, Nail Salon, Drive through Coffee, and Subway.
 - Walnut Grove Elementary is south of the site.
 - Raymond E Shaffer Community Park is located approximately ¼ mile to the southeast. This is a 10-acre park that connects to another 7-acre park to the south.
 - C-Tran Bus route 78 stops at NE Andresen Rd and NE 63rd Street. This is less than a ½ mile from the site.
 - The northbound and southbound busses arrive every 30 min from 6:00am to 9:00am and 3:00pm to 6pm
 - The northbound and southbound busses arrive every 60 min from 9:00am to 3:00pm and 6:00pm to 10pm

CD-3 Infill and redevelopment- Where compatible with surrounding uses, efficiently use urban land by facilitating infill of undeveloped properties, and redevelopment of underutilized and developed properties. Allow for conversion of single to multi-family housing where designed to be compatible with surrounding uses.

Response:

- This is a relatively small infill project, where the intent is to convert the existing underutilized land into an apartment housing project.

In addition, the request fulfills both CD-9, facilitating compatible uses adjacent to each other, and CD-10, placing housing near services (complementary land uses).

Chapter 3 of the Comprehensive Plan contains the City's Housing element. The Plan recognizes the need for diverse housing:

As the baby boom generation ages over the next 20 years, there is likely to be a greater need and demand for smaller units, retirement homes, and assisted living.
Page 3-3.

The plan notes that most residential housing is single-family housing (57%). *Id.* Housing affordability is also a City concern:

The Growth Management Act requires local jurisdictions to demonstrate that regulations allow and encourage housing for all economic segments of the community. Table 3-3 provides a breakdown of local households by income ranges, and the general share of Vancouver housing they can afford to buy or rent without having to spend more than 30% of their income.

There are several policies that would be furthered by this request, including:

H-1 Housing options
Provide for a range of housing types and densities for all economic segments of the population. Encourage equal and fair access to housing for renters and homeowners.

H-2 Affordability
Provide affordable housing by formulating innovative policies, regulations and practices, and establishing secure funding mechanisms. Target affordability programs toward households with incomes below the median.

C. Change in Circumstances

The proposed zone change is in response to the current housing shortage and affordability crisis that is currently occurring in SW Washington. This shortage of housing within the area that the subject property lies represents a change in conditions or circumstances since the zoning designation was established. The proposed zone change will result in additional housing units that will increase the housing supply in the area and contribute to improving housing affordability.

According to the 2016 Affordable Housing Task Force Report issued by the City of Vancouver, it was noted that:

Vancouver, Washington and the surrounding communities are experiencing an unprecedented demand for rental units. In June 2015, the vacancy rate in Vancouver was just below 2%, down from 3.8% at the end of 2010.¹ The tightening market has led to a dramatic increase in rents. Between October 2014 and October 2015, the increase in median rent for a 2-bedroom, 1-bath unit in Vancouver was the highest in the nation at 15.6% (a jump from \$900 to \$1,040 per month). Page 2.

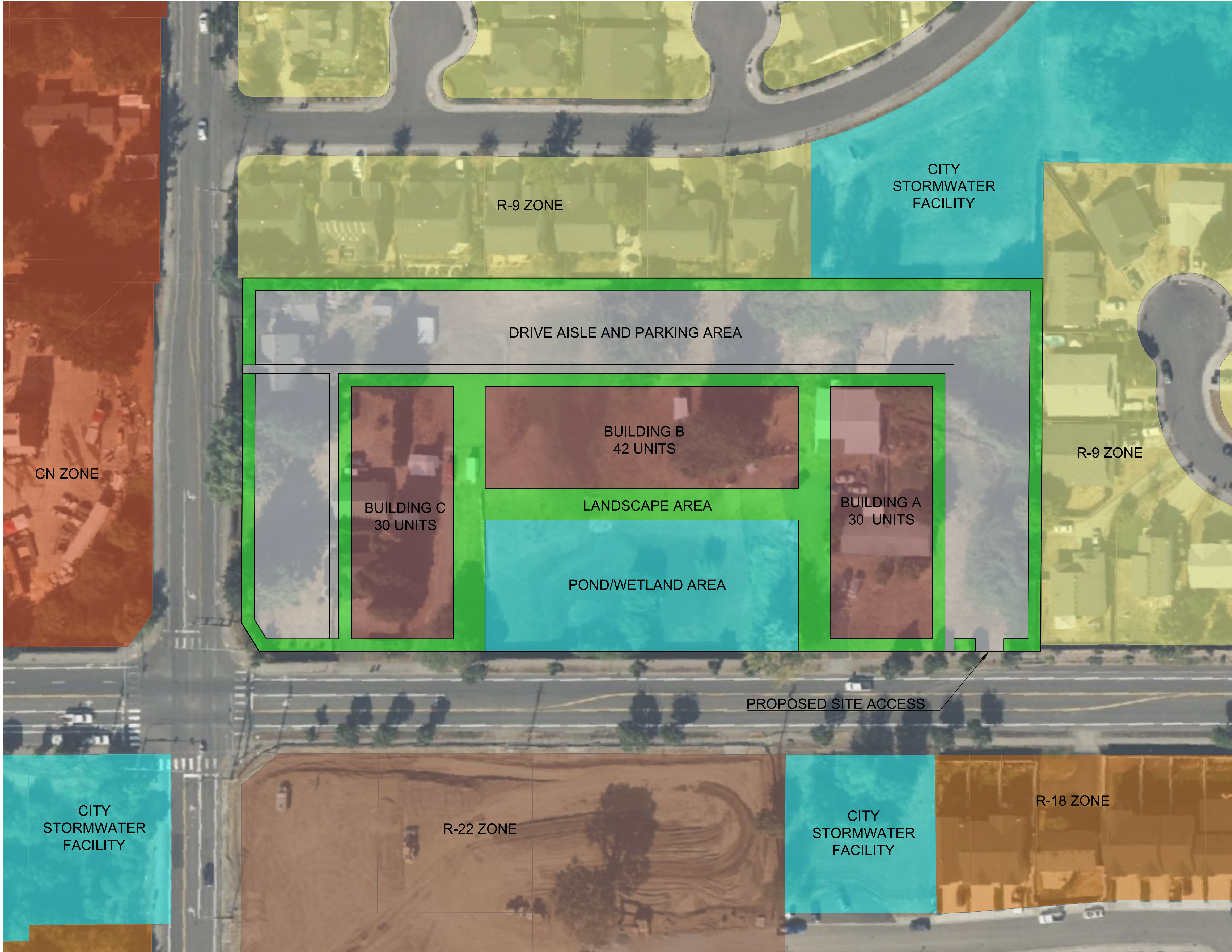
While this report was issued in 2016, conditions have not improved in recent years. This report recognizes that higher densities can promote more affordable housing.

CONCLUSION

Approval of this application would result in a development that can be served by existing urban public services and will provide more flexibility in density and housing types, resulting in more affordable housing.

Miller Rezone

Located in the SW ¼ of Section 8, T2N, R2E W.M.
Clark County, Washington



APPLICANT/OWNERS:

Sunlight Rentals LLC
Contact: Serghei Comarnitchi
2804 NE 65th Avenue, Suite D
Vancouver, WA 98661
(360) 772-5563
sunlight.inc@comcast.net

Gary Miller
6403 NE 72nd Ave.
Vancouver, WA 98661

Haley Gibson
7208 NE 63rd Street
Vancouver, WA 98662

PROJECT CONTACT:
PLS Engineering
Contact: Jayson Taylor
604 W Evergreen Blvd
Vancouver, WA 98660
(360) 944-6519
pm@plsengineering.com

LAND USE NOTES:

The Miller Comprehensive Plan and Zoning Map Amendment proposes to rezone parcels 105145000, 105150000, and 105155000 from R-9 to R-30. This involves a Comprehensive Plan Amendment to move the parcels from an Urban Low to an Urban High designation. The site encompasses three parcels totaling approximately 4.17 acres. Currently the project site includes three separate owners. This proposed plan shows how the overall site can be developed together. The larger parcel is owned by an apartment developer and is intended to be developed in the near future. The smaller parcels could be integrated into the development proposal or be developed separately. A formal application for site development will be submitted after the proposed comprehensive plan and zoning map amendment.

With 4.17 acres, the site could accommodate a maximum of 125 units (30 units per acre). Under the current zone (R-9) the maximum density would be approximately 36 single family units (8.7 units per acre). The larger site could develop separately from the smaller parcels and would have a density range of 60-99 units.

TRANSPORTATION AND UTILITY NOTES:

Site access has frontage on NE 63rd Street and NE 72nd Ave. Both of these streets are collector arterial roadways. The likely site access will be from NE 63rd Street as far east as possible.

Public sanitary sewer and public water mains are located in NE 63rd Street and NE 72nd Ave and can be used to serve the site.

CRITICAL AREAS:

An isolated category III wetland is located onsite. This wetland is likely of low quality with a low habitat score. Some direct wetland and buffer impacts may be necessary for the proposal. The larger portion of the wetland/pond can likely be retained as shown on the plan.

Scale 1" = 40'

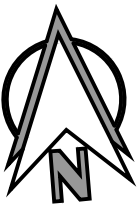
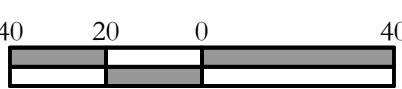


Exhibit For:

Miller Rezone

A Site Located In The City of Vancouver

Engineering - Surveying - Planning - 604 W. Evergreen Blvd., Vancouver, WA 98660 | PH (360) 944-6519 | Fax (360) 944-6539

PLS

ENGINEERING

Revisions

1	2	3	4	5	6

Project No. 3691

SCALE: H: 1"= 40'
V: N/A

DESIGNED BY: MAG

DRAFTED BY: MAG

REVIEWED BY: TGJ

01

01

**NARRATIVE
FOR THE
WOOD DUCK SPRINGS
COMPREHENSIVE PLAN AND
ZONING MAP AMENDMENT**

**Submitted to
THE CITY OF VANCOUVER**

**FOR
SONGBIRD HOMES LLC
10013 NE Hazel Dell Ave. PMB 504
Vancouver, WA 98685
(360) 901-1024**

June 2023

General Information

Applicant:

Songbird Homes

Contact: Nick Zodrow
10013 NE Hazel Dell Ave., PMB 504
Vancouver, WA 98685
(360) 901-1024
nick@songbirdhomes.com

Owners:

Songbird Holdings LLC

Contact Same as above

Rick & Kathleen Richart

6510 NE 82nd Ct.
Vancouver, WA 98662
rickr@richartbuilders.com

Linnley & Margarete Richart Trustees

6506 NE 82nd Ct.
Vancouver, WA 98662
robertr@richartbuilders.com

Therese D Griffin & James Crawford

8008 Unit A Ne 63rd St .
Vancouver, WA 98662
360-608-7008

Project Contacts:

PLS Engineering

Travis Johnson, PE
604 W Evergreen Boulevard
Vancouver, WA 98660
(360) 944-6519
pm@plsengineering.com

Location:

SW & SE ¼ of Section 8, T2N, R2E, WM

Parcels:

105241000, 105242000, 105190-000,005;010, 986042813

Address:

8008 Unit A ,8208 and 8122 NE 63rd St.
6506 and 6510 NE 82nd Ct.

Project Size:

13.86 acres

Zoning:

R-9

Comprehensive Plan:

UL

Current Use:

Single family residential

School District:

Vancouver

Elementary:

Walnut Grove

Middle School:

Gaiser

High School:

Fort Vancouver

Water District:

Vancouver

Sewer District:

Clark Regional

Fire District:

Vancouver Fire

Park District:

B

Transportation Impact Fee:

Pacific

Project Discussion

The Wood Duck Springs Comprehensive Plan and Zoning Map Amendment proposes to rezone parcels 105241000, 105242000, 105190005, 105190010, 105190000, 986042813 from R-9 to R-18. This involves a Comprehensive Plan Amendment to move the parcels from an Urban Low to an Urban High designation. The site encompasses six parcels totaling approximately 13.89 acres. Currently the project site includes a mix of existing single-family residences and vacant land. Future development plans for the site would likely retain two of the existing homes as an office or amenity space with the remainder of the site developed with apartments and condo/townhomes in a variety of densities. The applicant intends to provide a diversity of unit types and unit styles so that a wider range of housing needs may be met. This would include apartment units ranging from 1 to 3 bedrooms, townhouse style units that are 2 stories without garages and townhouse style units that are larger and have garages. The applicant is desirous of creating homes for sale at the bottom portion of the ownership market as they believe that the first step to wealth creation is a long-term controlled housing costs created via a 30-year mortgage. But the applicant is concerned about the negative legal environment for condominiums in Washington State at this time and would most likely create rentals for those units. One of the options that the applicant is reviewing is to build larger 3-bedroom units that could be condo converted at a later date if the liability laws become more favorable. The current applicant would likely also be the one to develop the site including site and building construction. A formal application for site development will be submitted after the proposed comprehensive plan and zoning map amendment.

Neighborhood Layout –

The applicant would propose that the 2 story tall townhouse style units would be built along the western side of the project in an attempt to build into the existing neighborhood. This is the only section of the abutting property that is expected to remain nearly the same for the foreseeable future due to the small existing lots as well as a long term commercial business; all of which are served by the existing private road that directly abuts to the projects west side. The applicant would also look at placing more townhouse units along a portion of the east side in an attempt to blend into the neighborhood as the parcel to the east with an existing house would be large enough for some infill redevelopment in the future.

The project north and a portion of the east abuts to City of Vancouver open space that is an undeveloped park. The applicant has already had discussions with the City of Vancouver Parks department in efforts to understand future park (Kelly Meadows) development plans as well as how the projects could benefit each other through better planning. This discussion included being able to generate better open space utilization, reducing expected parks impact on wetlands by moving a planned path from parks land to the applicant land, options for recreation along the trails, exploring build/PIF credits, trail connectivity, donations, trail materials within wetland buffers, land donation and overall planning and timing.

Density:

With 13.89 acres, the site could accommodate a maximum of 250 units (18 units per acre). With potential roadway dedications the net site area may be less, and the maximum unit count could be

around 235 units. Under the current zone (R-9) the maximum density would be approximately half of the proposed plan or 125 single family units.

Traffic Impacts:

Apartment buildings generate 6.74 average daily trips (ADT) per unit and single-family homes generate approximately 10 ADT per unit according to the ITE trip generation manual. Development under the proposed plan would generate 1685 ADT, and development under the current zone would likely generate 1250 ADT. The proposed rezone would result in a 35% increase in trips that would have otherwise been planned for in this area. Based on previous projects and traffic studies in the area, we do not believe the additional traffic will cause any capacity issues on NE 63rd Street. A traffic study specific to the proposed development will be completed to ensure that the existing street system has adequate capacity for the proposed development.

Additionally, this project solves a major issue around intersection spacing along 63rd by moving the access portion of this project to its east boundary directly opposite the intersection that is one of the major direct routes to the south.

Comprehensive Plan Map Amendment Approval Criteria

VMC 20.285.050

The following discusses the criteria that must be addressed for a comprehensive plan and zoning map amendment, and how this proposal complies:

A. Overall proposed map amendments reviewed under this chapter shall be approved only if demonstrated by the proponent to be in the public interest, as based on a review of all applicable principals from the following:

1. How the proposal is more consistent than the existing designation with applicable policies of the Vancouver strategic plan and comprehensive plan.

Response: The request is consistent with Objective 6.2.1 of the Vancouver Strategic Plan: “Develop a broader range of housing choices through incentives, changes in regulations and implementation of the Affordable Housing Task Force recommendations.” The intent of this amendment would be to allow zoning that would increase the overall supply of housing in the city, which would result in lower purchase prices and rental costs. While this does not provide “affordable housing” it goes a long way to make housing more affordable. The applicant has a great deal of experience in townhouse construction and has ideas that can create even more affordable products in the for-sale market. Unfortunately, within the existing codes this would require a condominium development which currently has significant issues due to current laws and insurance issues. In the event that laws change and the project can be converted into condominiums, the site would allow for home ownership at a relatively low price point. Since the adoption of the strategic plan housing prices have continued to soar. This is partly due to a high demand for housing in the Vancouver region that far outpaces the new housing supply. The first step to increasing affordability is to increase supply so that the basic tenants of the Econ 101 supply demand curve can be followed.

2. *How the proposal is more consistent than the existing designation with each of the following objectives as applicable:*

a. *Encourage more intensive development to locate in major urban centers and corridors, particularly downtown Vancouver. Encourage development of distinct neighborhoods served by commercial nodes, and discourage urban sprawl and strip commercial development;*

Response: The site is within 0.5 miles of NE Andresen Rd. and approximately 1.5 miles from the nearest access to I-205, both major corridors in the area. Higher density residential development in this area would discourage urban sprawl. NE 63rd Ave is an arterial that crosses I-205 and should be expected to be even more of a corridor as redevelopment happens.

b. *Provide development of uses which are functionally integrated with surrounding areas and neighborhoods in terms of local shopping, employment, recreational or other opportunities;*

Response: The site is adjacent to Kelley Meadows Park and very near to Green Meadows Golf Course, providing ample recreational opportunities. Vancouver Mall, Costco and Home Depot are nearby providing employment and local shopping opportunities. A higher density residential development would integrate well with these areas. The applicant is also willing to work with the City of Vancouver Parks department on the development and integration of recreation required by the development and advantageous to the Park and the neighborhood.

c. *Provide development which is compatible and integrated with surrounding uses in terms of scale, orientation, pedestrian enhancements, and landscaping;*

Response: The north end of the site includes a wetland area that will create a buffer between the site and the uses to the north, directly north of that wetland area is Green Meadows Golf Course. To the east is a city park along a majority of the shared property line. At the SE corner there is a single-family residence adjacent to the site. The south end of the site is bounded by NE 63rd Street, a collector arterial. On the west end of the site the applicant is proposing to 2 story townhomes that will blend in better to the neighborhood and will abut the existing private road to the west. This site is well positioned to be developed with a higher intensity use that will not have a significant effect on the existing neighboring uses. The site will have direct access to NE 63rd street and will only be directly adjacent to one single-family home that also has redevelopment potential.

To the SW of the proposed area is an area that was developed under R-18 code while that land was under Clark County jurisdiction.

d. *Conserve or enhance significant natural or historical features;*

Response: The applicant will retain the existing wetland and buffer areas located on the north end of the site. Additionally, the applicant is willing to work with the City Parks department to move planned park trails out of the wetland area and onto adjoining lands, thus reducing wetland impacts. The applicant has also demonstrated unique design features in the past in an effort to enhance wetland function. If possible, they will seek to duplicate this demonstrated success.

The applicant would also explore solar systems atop parking lot covers as well as on top of southerly facing apartment roofs. The applicant has used innovative hot water systems, lighting, appliances and design elements to reduce energy usage and would use these as well as others to reduce the carbon footprint of this development.

e. Provide adequate provision of transportation, water, sewer, and other public services;

Response: Site access will be provided directly from NE 63rd Street with access across from the existing 81st Ave intersection. A water main is located in NE 63rd Street and CRWWD will be the sanitary sewer purveyor. The site can be served with sanitary sewer with the development of parcel 105210000, and a potential easement from the park property (105240000) as well as a portion of it from sanitary sewer located within NE 63rd Street.

f. Provide significant family wage employment opportunities and broadening of the Vancouver economy;

Response: Not applicable, this is a proposal for residential zoned property. The applicant is investigating commercial uses that are appropriate to the area and development and is open to having 5% of the gross floor space being commercial use.

g. Provide for the formation and enhancement of neighborhoods and communities; and

Response: The redevelopment of these parcels will result in an attractive development, with improved public roadways that will be designed to build in with the nearby neighborhood.

h. Provide affordable or below-market-rate housing opportunities.

Response: The proposal does not include affordable or below-market-rate housing, but the increase in housing supply will help make housing more affordable in the area. Apartments are an attractive affordable alternative in today's market. If laws changed at the State of Washington level the applicant would be interested in developing smaller units that would most commonly be sold as a condominium.

3. Scope of review. Review and evaluation of proposed comprehensive plan or zoning map changes shall consider both the likely and possible future use of the site and associated impacts.

Response: The applicant intends to provide typical apartment units within the central portion of the project after the comprehensive plan and zoning map change approval and blend into the neighborhood with 2 story townhouse units along the west side. The request is a change from a lower density to a higher density, however it is still a residential zone so only residences will be proposed. Impacts created would be those of a higher density residential development, with typical impacts to local schools, emergency services and streets. Impact fees will be required to be paid to offset these impacts.

4. Cumulative Impacts. The review of individual comprehensive plan map or policy amendments, other than exceptions noted in VMC [20.285.040](#), shall also consider the cumulative transportation, land supply, and environmental impacts of other plan amendments proposed within the same

annual cycle. (Ord. M-3922 § 13, 07/06/2009; Ord. M-3701 § 9, 05/02/2005; Ord. M-3643, 01/26/2004)

Response: The impacts of this development will need to be reviewed in conjunction with the other plan amendments within this review cycle.

ZONING MAP AMENDMENT APPROVAL CRITERIA

VMC 20.285.060.A. sets out the applicable zoning map amendment approval criteria not involving associated comprehensive plan map amendments.

This proposal is required to demonstrate the following:

1. How the proposal is more consistent with applicable policies of the Vancouver strategic plan and comprehensive plan than the existing designation; and
2. That a change in circumstances has occurred since the existing designation was established.

A. Consistency with Vancouver Strategic Plan

The City adopted a 2016-2021 Strategic Plan, and updated it in November 2018.

The request is consistent with Objective 6.2.1:

6.2.1 Develop a broader range of housing choices through incentives, changes in regulations and implementation of the Affordable Housing Task Force recommendations. Page 23.

In the final 2016 report the Affordable Housing Task Force discussed potential tools and programs to increase the supply of affordable housing units in the city. One of the high priority items discussed was amending zoning/development regulations to encourage affordable housing options.

Option for Council Consideration	Description	Estimated Time for Staff to Develop and Present to Council	City Direct Costs/ Staff Time	Cost to Property Owner/ Developer	Potential to Increase Affordable Units	Considerations and Details Additional information to follow based on Council guidance and staff analysis.	Task Force Priority
EXPAND SUPPLY OF AFFORDABLE HOUSING							
Amend zoning/ development regulations to encourage affordable housing options	- Allow/promote alternative housing, e.g.: - Cluster/cottage housing - Corner-lot duplexes - Micro-housing and single room occupancy (SRO) housing - Shared housing, including rooming/boarding houses - Reduced parking requirements	Medium to Long	\$	\$	Medium	Details: - May be effective at increasing overall supply over a long period of time, but affordability not guaranteed - Marketing incentives/opportunities to property owners and developers - Can use current staff, but may be contracted out Questions: - Requires determination of priorities among several options - Need to determine appropriate level of incentives Task Force comments: Support for allowing a wider variety of housing types and sizes. This option may also provide low-income homeownership units, an opportunity to address affordable housing apart from rentals.	High

The intent of the option would be to increase the overall supply of housing in the city which would result in lower purchase prices and rental costs. While this does not provide “affordable housing” it goes a long way to make housing more affordable. Since the adoption of the strategic plan housing prices have continued to soar. This is partly due to a high demand for housing in the Vancouver region that far outpaces the new housing supply.

In response to the strategic plan and the Affordable Housing Task Force recommendations, the City Council studied and approved housing code updates. The Housing Code Updates webpage states the following as a

purpose of the update:

“Vancouver, like many communities, is facing a housing crisis. As the city continues to grow, there is a desire and need for new types of housing that would allow residents to live more affordably while also maintaining neighborhood livability. However, current city zoning rules prohibit many of these housing options. Changes to the development code can create opportunities for the private sector to deliver a more diverse, affordable housing stock.”

The project goals of the housing update are stated as the following:

“The goal of the project is to update City codes to allow for different, smaller and more affordable types of housing choices. Many are recommended in the Affordable Housing Task Force report (2016) and many are similar to what is allowed in Clark County and other Washington cities nearby and statewide.”

The specific goals include:

- Allowing for the development of diverse housing types to meet changing demographic needs and consumer preferences
- Expanding market rate, middle income, and affordable housing choices
- Maintaining neighborhood livability with incremental, rather than wholesale, change
- Providing more opportunities for people to live near where they work and attend school, and reduce costly commutes
- Facilitating development in areas with full existing public services

The current proposal is consistent with this plan and will help meet the City’s goals. The general proposal associated with the zone change will accomplish the following:

- The Wood Ducks Springs Rezone project will add diversity to the housing options in the immediate vicinity of the site.
- The rezone will not have a large effect on adjacent homes as the proposed access is directly from an arterial street.
- The future project would blend into the existing neighborhood as it would place 2 story townhomes on the west side by existing small lots, place apartments within the center and north portions of the project. This would also match the streetscape to the west in the R-18 zones.
- The site is located near schools, stores, and public transport that has the potential to reduce costly commutes.
- The project is in an area with full existing public services.

B. Consistency with the Comprehensive Plan

The applicant is requesting a concurrent change in the Comprehensive Plan designation. The current and proposed plan designations are residential and are compatible. The proposed plan results in a higher density but can be designed to have less of an impact on the neighboring lower density community.

Table 1-5. Vancouver comprehensive plan land use designations

Comprehensive Plan designation	Corresponding Zoning	General Intent
Residential		
Urban Lower Density	R-2, R-4, R-6, R-9	Predominantly single-family detached residential development, with some allowances for duplexes, townhouses, and single-family homes on small lots using infill standards
Urban Higher Density	R-18, R-22, R-30, R-35, MX	Predominantly apartments and condominiums, with some allowance for attached housing (such as duplexes, townhouses, and small-lot single-family homes) and mixed use

This request furthers the Community Development policies on page 1-14 to 1-15 of the Comprehensive Plan:

CD-2 Efficient development patterns Encourage efficient development throughout Vancouver to ensure achievement of average density of 8 units per acre set by countywide planning policies. Encourage higher density and more intense development in areas that are more extensively served by facilities, particularly transportation and transit services.

Response:

- The site is near a full-service grocery store/commercial area, elementary school, community park, and C-Tran Bus route 78 on NE Andresen Rd.
 - Safeway and Walgreens are both approximately 1/4 mile from the site. This is approximately a 5-minute walk. There is also a Starbucks (inside Safeway), Chase Bank, State Farm Insurance, The UPS Store, Sprint Store, Great Clips, Nail Salon, Drive through Coffee, and Subway.
 - Walnut Grove Elementary is south of the site.
 - Raymond E Shaffer Community Park is located approximately ¼ mile to the southeast. This is a 10-acre park that connects to another 7-acre park to the south.
 - C-Tran Bus route 78 stops at NE Andresen Rd and NE 63rd Street. This is less than a ½ mile from the site.
 - The northbound and southbound busses arrive every 30 min from 6:00am to 9:00am and 3:00pm to 6pm
 - The northbound and southbound busses arrive every 60 min from 9:00am to 3:00pm and 6:00pm to 10pm

CD-3 Infill and redevelopment- Where compatible with surrounding uses, efficiently use urban land by facilitating infill of undeveloped properties, and redevelopment of underutilized and developed properties. Allow for conversion of single to multi-family housing where designed to be compatible with surrounding uses.

Response:

- This is a relatively small infill project, where the intent is to convert the existing underutilized land into an apartment housing project.

In addition, the request fulfills both CD-9, facilitating compatible uses adjacent to each other, and CD-10, placing housing near services (complementary land uses).

Chapter 3 of the Comprehensive Plan contains the City's Housing element. The Plan recognizes the need for diverse housing:

As the baby boom generation ages over the next 20 years, there is likely to be a greater need and demand for smaller units, retirement homes, and assisted living.
Page 3-3.

The plan notes that most residential housing is single-family housing (57%). *Id.* Housing affordability is also a City concern:

The Growth Management Act requires local jurisdictions to demonstrate that regulations allow and encourage housing for all economic segments of the community. Table 3-3 provides a breakdown of local households by income ranges, and the general share of Vancouver housing they can afford to buy or rent without having to spend more than 30% of their income.

There are several policies that would be furthered by this request, including:

H-1 Housing options

Provide for a range of housing types and densities for all economic segments of the population. Encourage equal and fair access to housing for renters and homeowners.

H-2 Affordability

Provide affordable housing by formulating innovative policies, regulations and practices, and establishing secure funding mechanisms. Target affordability programs toward households with incomes below the median.

C. Change in Circumstances

The proposed zone change is in response to the current housing shortage and affordability crisis that is currently occurring in SW Washington. This shortage of housing within the area that the subject property lies represents a change in conditions or circumstances since the zoning designation was established. The proposed zone change will result in additional housing units that will increase the housing supply in the area and contribute to improving housing affordability.

According to the 2016 Affordable Housing Task Force Report issued by the City of Vancouver, it was noted that:

Vancouver, Washington and the surrounding communities are experiencing an unprecedented demand for rental units. In June 2015, the vacancy rate in Vancouver was just below 2%, down from 3.8% at the end of 2010.¹ The tightening market has led to a dramatic increase in rents. Between October 2014 and October 2015, the increase in median rent for a 2-bedroom, 1-bath unit in Vancouver was the highest in the nation at 15.6% (a jump from \$900 to \$1,040 per month). Page 2.

While this report was issued in 2016, conditions have not improved in recent years. This report recognizes that higher densities can promote more affordable housing.

CONCLUSION

Approval of this application would result in a development that can be served by existing urban public services and will provide more flexibility in density and housing types, resulting in more affordable housing.



August 27, 2018

City of Vancouver Water Resource Protection
Attn: Nikki Guillot
PO Box 1995
Vancouver, WA 98668
(360) 487-7187
Nikki.guillot@cityofvancouver.us

Re: 63rd Street Restoration and Planting Plan | Vancouver, WA

Dear Ms. Guillot,

Ecological Land Services, Inc. (ELS) has prepared this restoration and planting plan on behalf of Legacy 6 Construction (Mark Wubben), addressing inadvertent impacts to a wetland and its buffer in response to stop work order No. S18-000006 for Clark County Parcel No. 105190000, at 8122 NE 63rd Street, in Vancouver, Washington.

Introduction and Background

The subject parcel is approximately 3.35-acres in size and is located within Section 8, Township 2 North, and Range 2 East of the Willamette Meridian. The restoration plan was requested by the City of Vancouver following inadvertent fill placement and grading, resulting in the loss of pasture-dominated vegetation and the natural grade within the impact area. On June 18, 2018 the property owner received a stop work order (No. S18-000006) from the City of Vancouver for violations of the Vancouver Municipal Code (VMC) *Sections 20.740.090, Unauthorized Critical Areas Alterations, 14.25.204, Preservation of Natural Drainage Areas, 14.25.208, Wetlands Protection, and 17.12.010, Adopted International Building Code*. ELS biologists visited the site on July 30, 2018 to assess site conditions and determine the extent of impacts to the existing wetland.

Methodology and Wetland Impacts

One onsite wetland, Wetland A, was delineated by ELS using the Routine Determination Method according to the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), *the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (2010). Soil, hydrology, and vegetation data was gathered from eight test plots during the site visit. The wetland boundary was primarily determined by a transition from hydric to non-hydric soils, changes in topography, and shifts in vegetation communities, as observed in undisturbed portions of the wetland both east and west of the area of impact.

The study area consists of a single family residence with several outbuildings in the southern portion of the parcel, and a grazed horse pasture in the northern portion, where the majority of the fill material was placed. The onsite wetland is located within the northern portion of the parcel and was categorized through a preliminary rating using Washington State Department of Ecology's *Wetland Rating System for Western Washington: 2014 Update* as a Category III, depressional, emergent, forested wetland. The VMC *Section 20.740.140: Wetlands* defines buffers for Category III wetlands with a low habitat score adjacent to high intensity land use as 80 feet (Figure 2). During the site visit, ELS biologists noted that fill had been placed in the onsite wetland and buffer, save a small linear strip along the western property boundary, causing approximately 0.92 acres of direct wetland impacts, and 0.45 acres of buffer impacts. The impact varies from a fill depth of just one or two inches, up to 1.5 feet in a small area. The average depth of fill over the entire area is about 0.5 feet.

Restoration Plan

Restoration will be implemented to restore the impacted portion of the onsite wetland to its pre-existing topography, hydrology, and vegetation where grading and fill placement occurred. Proposed restoration will occur through excavation of approximately 250 cubic yards of fill material within the wetland, down to the original soil surface, and removing the material to the uplands, with care taken to create a grade of no greater than 4:1 where it will be deposited. The uplands prior to the fill placement consisted of pasture grasses. The post-placement spoils within the uplands will be seeded to grass and will continue to be used for horse pasture. No net change to the wetland buffer is anticipated as a result of this soil placement, provided the area is seeded and no final grades exceed a 4:1 slope.

Prior to and during the removal, best management practices will be implemented to prevent erosion and further damage to the wetland, including the installation of silt fencing. Fill material removed from the wetland will be evenly distributed within the southern upland portion of the parcel including portions of the wetland buffer. All disturbed areas will then be planted with respective native wetland and upland seed mixes to restore their pre-existing herbaceous vegetation communities. The use of native seed mix in the wetland and a pasture grass seed mix in the uplands will fully reestablish the impacted wetland and buffer functions by providing improved soil stabilization, increased water filtration, food source for horses, and cover and wildlife habitat. Tables 1-2 depict the seed mix planting specifications.

Planting Plan

Site Specifications

1. Stake or flag wetland boundaries.
2. Install silt fencing and erosion protection measures
3. Excavate fill material from wetland and place in uplands.
4. Install native seed mix according to plant specifications.
5. Remove silt fencing once disturbed area has been stabilized.

Planting Specifications

The planting plan proposes to install an appropriate native seed mix, purchased from a local nursery, within the disturbed wetland and a pasture grass mix in the upland areas to encourage

the development of a dense herbaceous community. Work will occur in late summer immediately following excavation to prevent soils from being exposed for an extended period. Irrigation may be necessary if site conditions are seasonally dry. The following tables summarize the species composition for the native wetland and upland seed mixes.

Table 1. Planting Specifications for native wetland seed mix

Botanical Name	Common Name	Mix Composition
<i>Beckmannia syzigachne</i>	American sloughgrass	80%
<i>Alopecurus aequalis</i>	foxtail	15%
<i>Glyceria occidentalis</i>	Western mannagrass	5%

Table 2. Planting Specifications for upland pasture seed mix

Botanical Name	Common Name	Mix Composition
<i>Dactylis glomerata</i>	Orchardgrass	30%
<i>Lolium perenne</i>	Perennial Ryegrass	20%
<i>Poa pratensis</i>	Kentucky bluegrass	20%
<i>Phleum pratense</i>	Timothy	20%
<i>Medicago sativa</i>	Alfalfa	10%

Performance Standards, As Built, and Contingency Plan

The goal of this restoration plan is to restore all wetland and buffer functions lost due to impacts from grading and fill placement. Restoration will occur by removing fill material from the wetland and dispersing it within adjacent uplands to restore the pre-existing grade of the site. All disturbed areas will then be planted with a native seed mix to achieve pre-existing wetland and buffer functions. The following performance standards have been outlined to ensure the success of the restoration area.

Performance Standards

Restoration performance standards include:

1(a) All fill material placed within the wetland will be excavated and relocated within onsite uplands to be graded.

1(b) All disturbed areas will be replanted with native seed mix chosen to replicate pre-existing vegetation communities in the respective wetland and uplands.

As Built

Photo and written documentation will be submitted to the City of Vancouver immediately upon completion of re-seeding to depict compliance with the restoration plan. The as-built report will include:

- Project location
- Site photos before and after excavation and seeding
- Short description of work completed with performance standards addressed

Contingency Plan

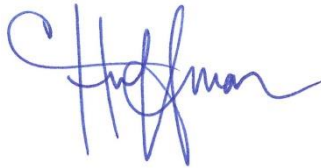
Corrective actions will be undertaken if the land owner observes that the seed mix is not providing vegetative cover following one full growing season following installation. If this is the case, the landowner will contact ELS to prepare a contingency plan following approval by the City.

Corrective actions include, but are not limited to, the following:

- Re-seed the impact area
- Implement a fertilizing and/or watering schedule.

If you have additional questions, please feel free to contact myself at coli@eco-land.com, or call (360) 578-1371.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Coli Huffman', with a stylized, cursive script.

Coli Huffman
Biologist

Attachments:

Figure 1: Vicinity Map

Figure 2: Site Map

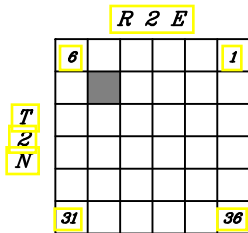
Figure 3: Planting Detail

WASHINGTON



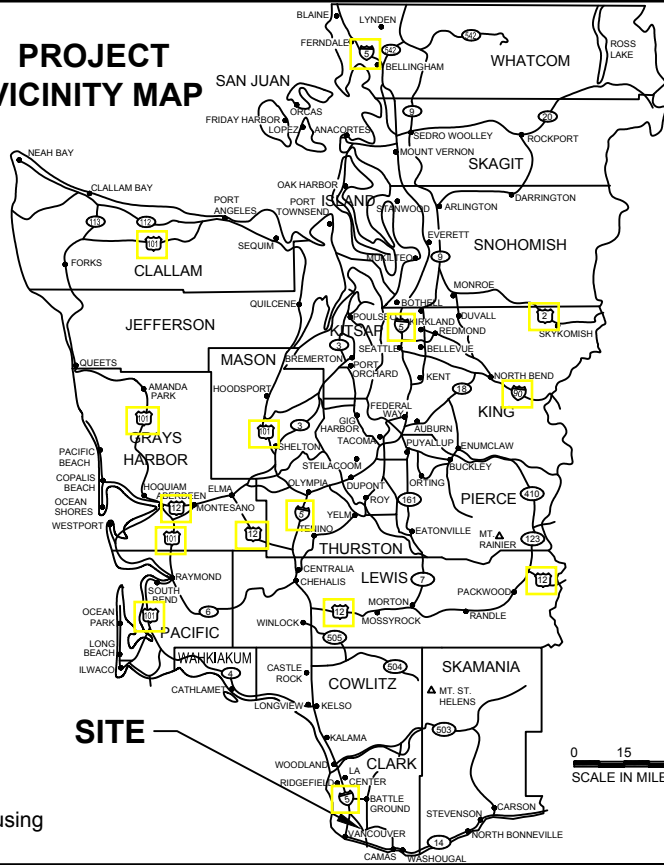
Latitude: 45.6701°
Longitude: -122.5897°

LOCATION MAP



NOTE:
USGS topographic quadrangle map reproduced using
MAPTECH Inc., Terrain Navigator Pro software.

PROJECT VICINITY MAP



0 15 30
SCALE IN MILES

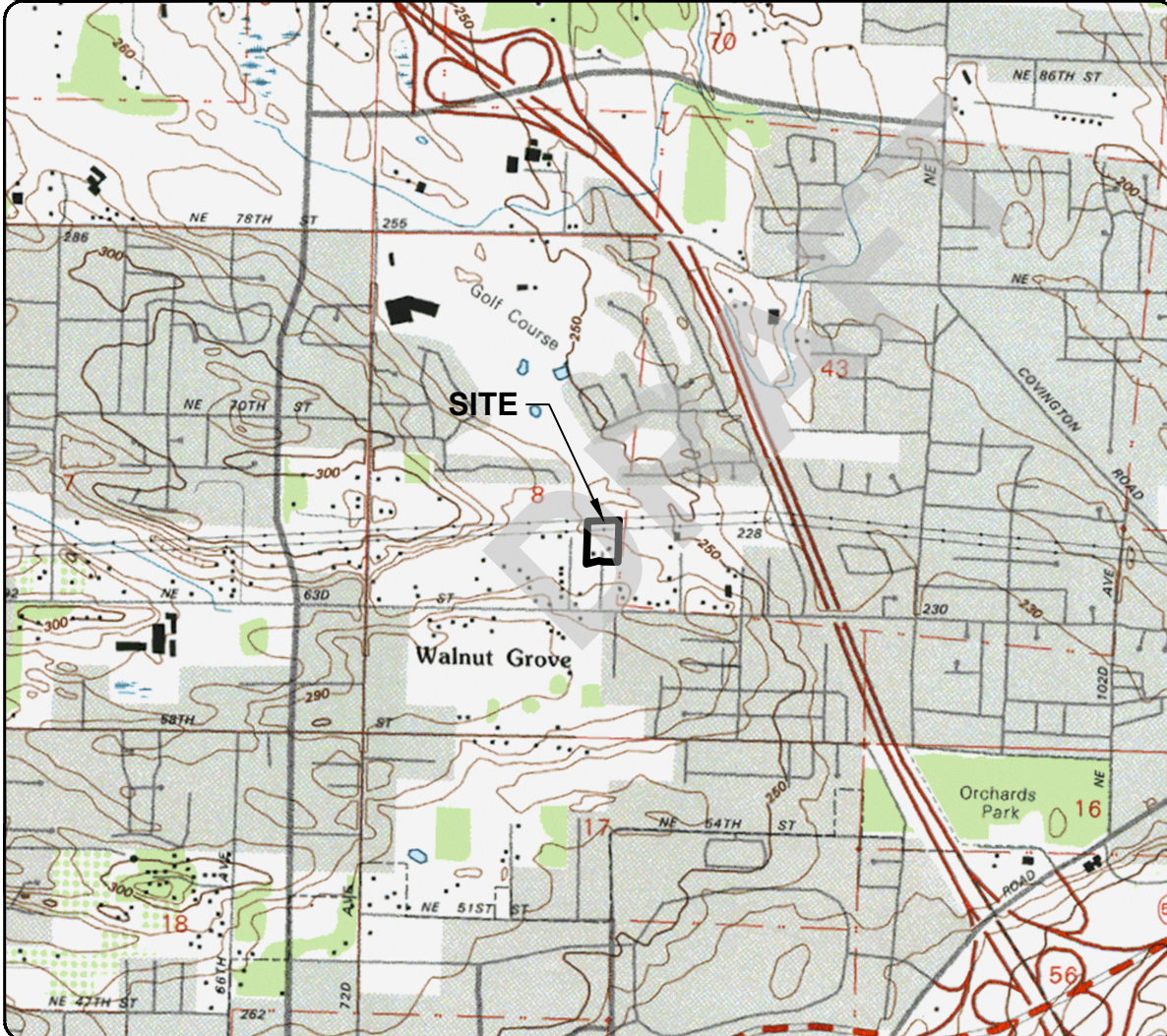
Figure 1

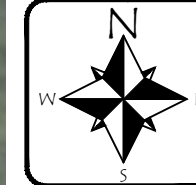
VICINITY MAP
63rd Street Property
Legacy 6, Inc.

City of Vancouver, Clark County, Washington
Section 8, Township 2N, Range 2E, W.M.

DATE: 8/21/18
DWN: CDP
REQ. BY: CH
PRJ. MGR: FN
CHK: MLM
PROJECT NO:
2703.02

1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305
www.eco-land.com





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DATE: 8/21/18
DWN: CDP
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CHK: MLM
PROJECT NO:
2703.02

Figure 2
SITE MAP
63rd Street Property
Legacy 6, Inc.
City of Vancouver, Clark County, Washington
Section 8, Township 2N, Range 2E, W.M.

Wetland A
Category III
Depressional,
Forested,
Emergent

Continues
Offsite

The image is an aerial photograph showing a large, dark green, forested area. A black line runs vertically through the center of the image, separating the wetland area on the left from a more developed area on the right. On the right side, there is a building and a parking lot with several vehicles. A red line with an arrow points from the text 'Continues Offsite' to the right edge of the wetland area. Another red line with an arrow points from the text 'Wetland A Category III Depressional, Forested, Emergent' to the wetland area. The wetland area is labeled as 'Wetland A Category III Depressional, Forested, Emergent'.

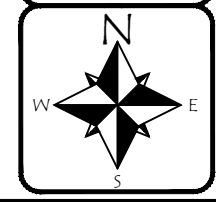
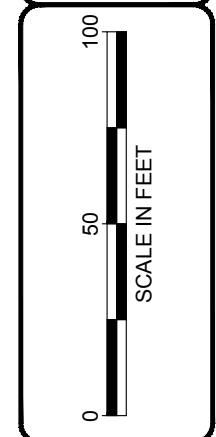
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<i>Poa pratensis</i>	Kentucky bluegrass	20%
<i>Phleum pratense</i>	Timothy	20%
<i>Medicago sativa</i>	Alfalfa	10%



Figure 3
PLANTING DETAIL
63rd Street Property
Legacy 6, Inc.
City of Vancouver, Clark County, Washington
Section 8, Township 2N, Range 2E, W.M.

DATE: 8/21/18
DWN: CDP
REQ. BY: CH
PRJ. MGR: FN
CHK: MLM
PROJECT NO:
2703.02

1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305
www.eco-land.com





WALKING TRAIL

BPA EASEMENT

166 APARTMENT UNITS
82 TOWNHOUSE STYLE UNITS
248 TOTAL UNITS

BPA EASEMENT

WALKING TRAIL



SCALE: 1" = 40'

9/6/2023

KELLEY MEADOWS
PARK

6
TOWNHOUSE
STYLE UNITS

4
TOWNHOUSE
STYLE UNITS

33
APARTMENT
UNITS

33
APARTMENT
UNITS

4
TOWNHOUSE
STYLE UNITS

4
TOWNHOUSE
STYLE UNITS

4
TOWNHOUSE
STYLE UNITS

6
TOWNHOUSE
STYLE UNITS

6
TOWNHOUSE
STYLE UNITS

6
TOWNHOUSE
STYLE UNITS

6
TOWNHOUSE
STYLE UNITS

EX HOUSE

EX HOUSE

6
TOWNHOUSE
STYLE UNITS

20
APARTMENT
UNITS

20
APARTMENT
UNITS

RECREATION AND PARKING AREA

6
TOWNHOUSE
STYLE UNITS

6
TOWNHOUSE
STYLE UNITS

6
TOWNHOUSE
STYLE UNITS

6
TOWNHOUSE
STYLE UNITS

6
TOWNHOUSE
STYLE UNITS

30
APARTMENT
UNITS

30
APARTMENT
UNITS

NE 81ST AVE

NE 63ST STREET



Vancouver Innovation Center Proposed Revised Master Plan and Development Agreement



Joana Filgueiras, Real Estate Project Manager, Economic Prosperity and Housing

Mark Person, Senior Planner, Community Development

Agenda

- Site History
- Approved Plan
- Policy Context
- Revised Plan
- Approval Criteria
- Next Steps

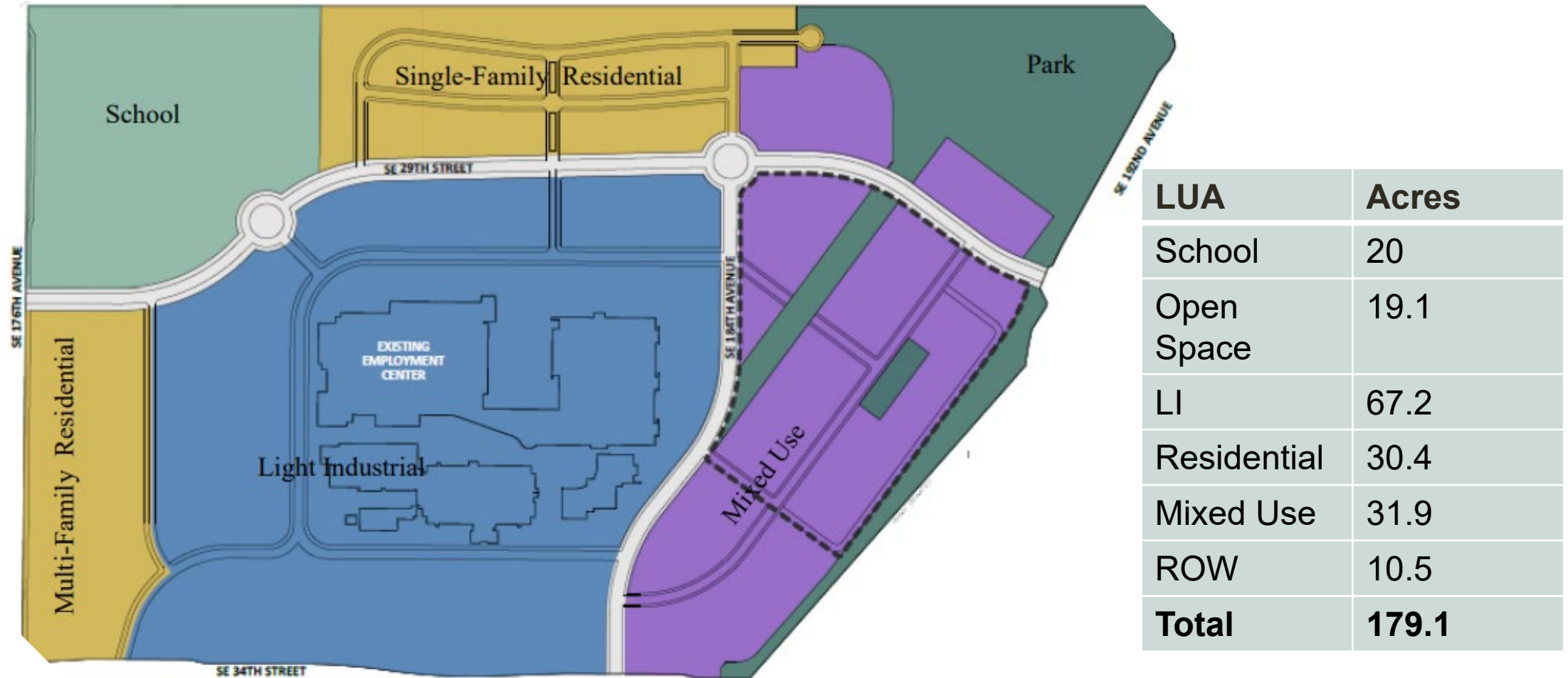
Subject Site



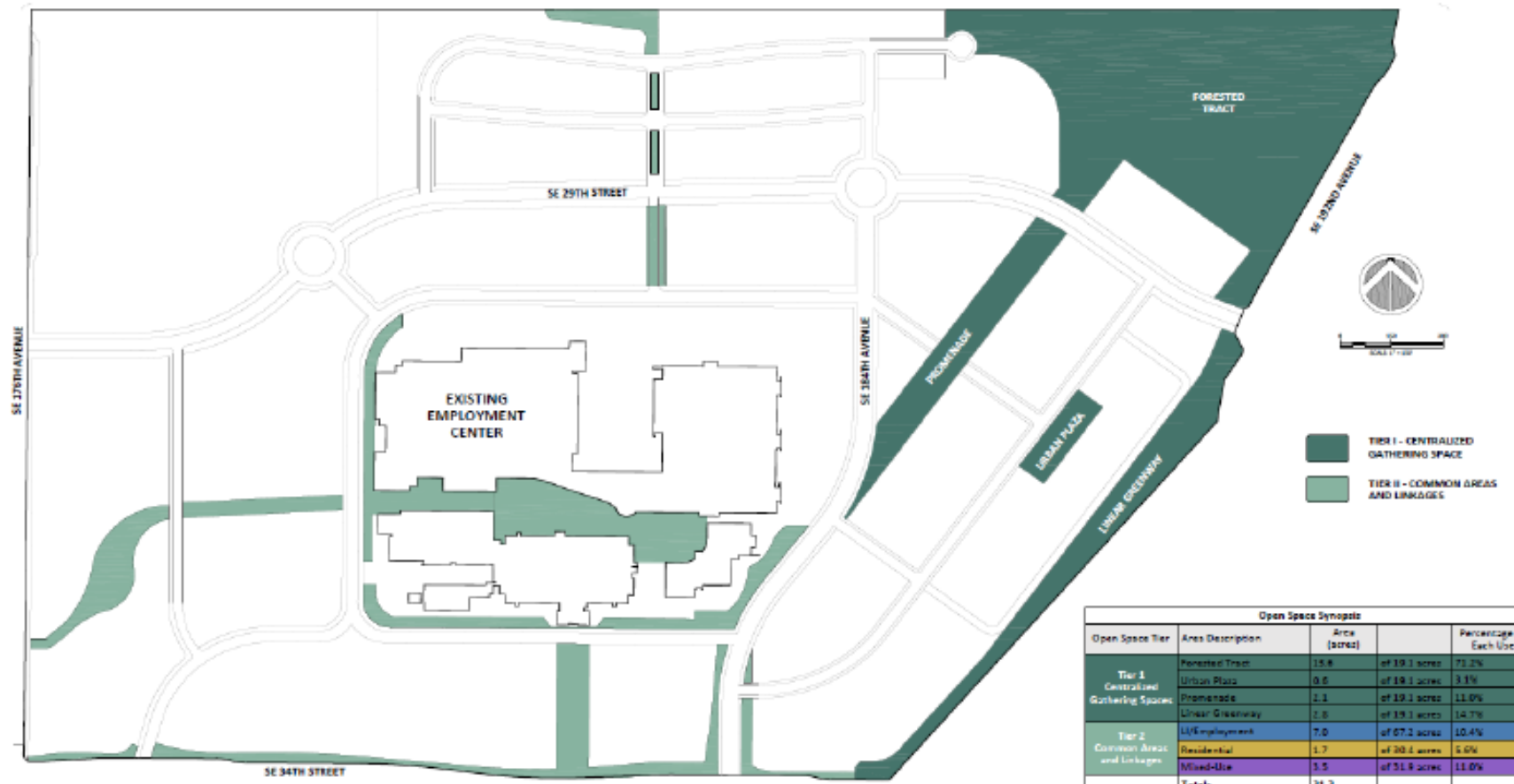
Site History

- 179-acre site originally developed by Hewlett-Packard, approximately 715,000 square feet of existing buildings onsite
- Rezone and Comprehensive Plan Amendment (changed from IL to MX) and Master Plan and associated development agreement approved in 2021
- 200,981 square foot industrial building has been approved north of the existing building under the master plan as a Type II Site Plan

Approved Land Use Allocation



Approved Open Space Plan



- 13.6 acres forested tract
- 2.7 acre urban plaza and promenade
- 2.8 acre linear greenway

19.7 total acres of publicly accessible open space

Approved Master Plan



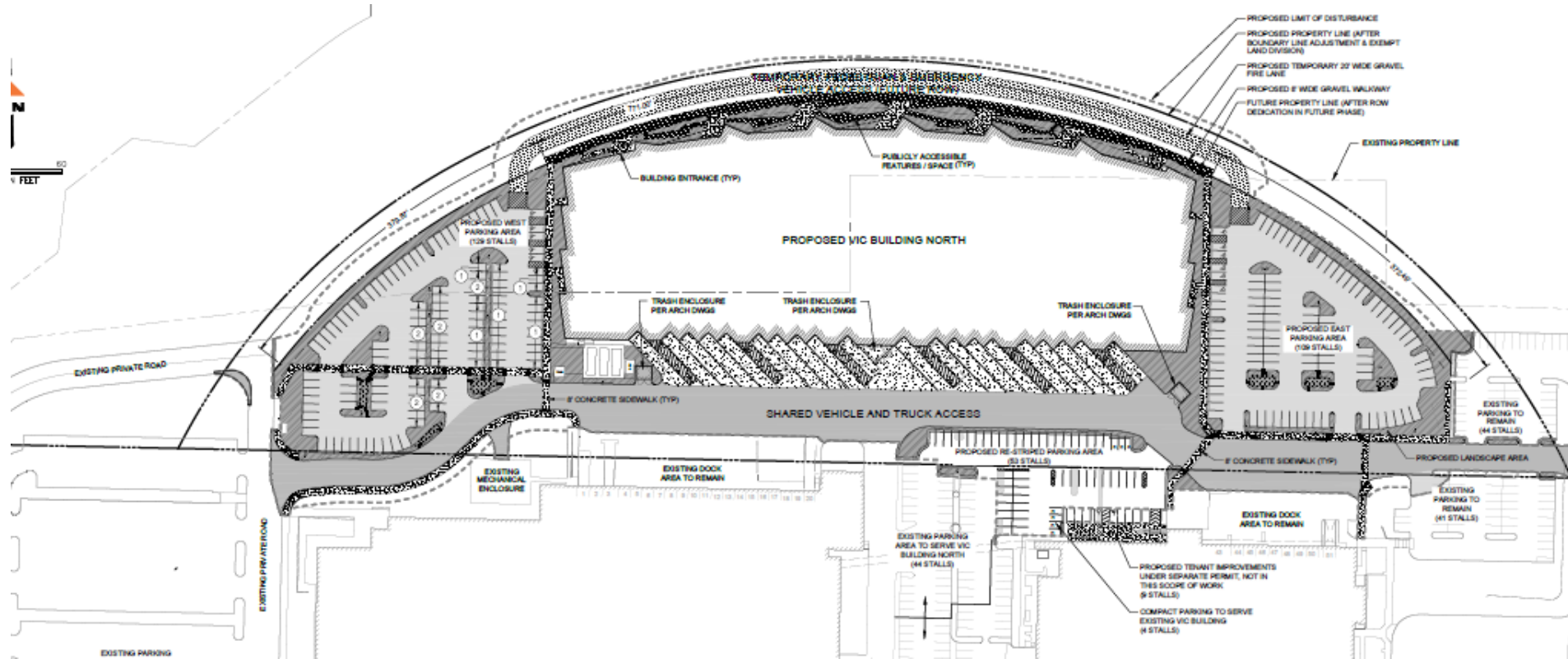
**Planning
Commission
hearing:**

July 6, 2021

**City Council
Hearing:**

August 16, 2021

Industrial Building 1



Alignment with Existing Policy Guidance

Climate Action Framework

- Strategy TLU-1. Create neighborhoods that support clean modes of transportation, Actions 1-4.

Interim Green Building Policy

- LEED for Neighborhood Development Gold standard or equivalent

Alignment with the [Strategic Plan](#)

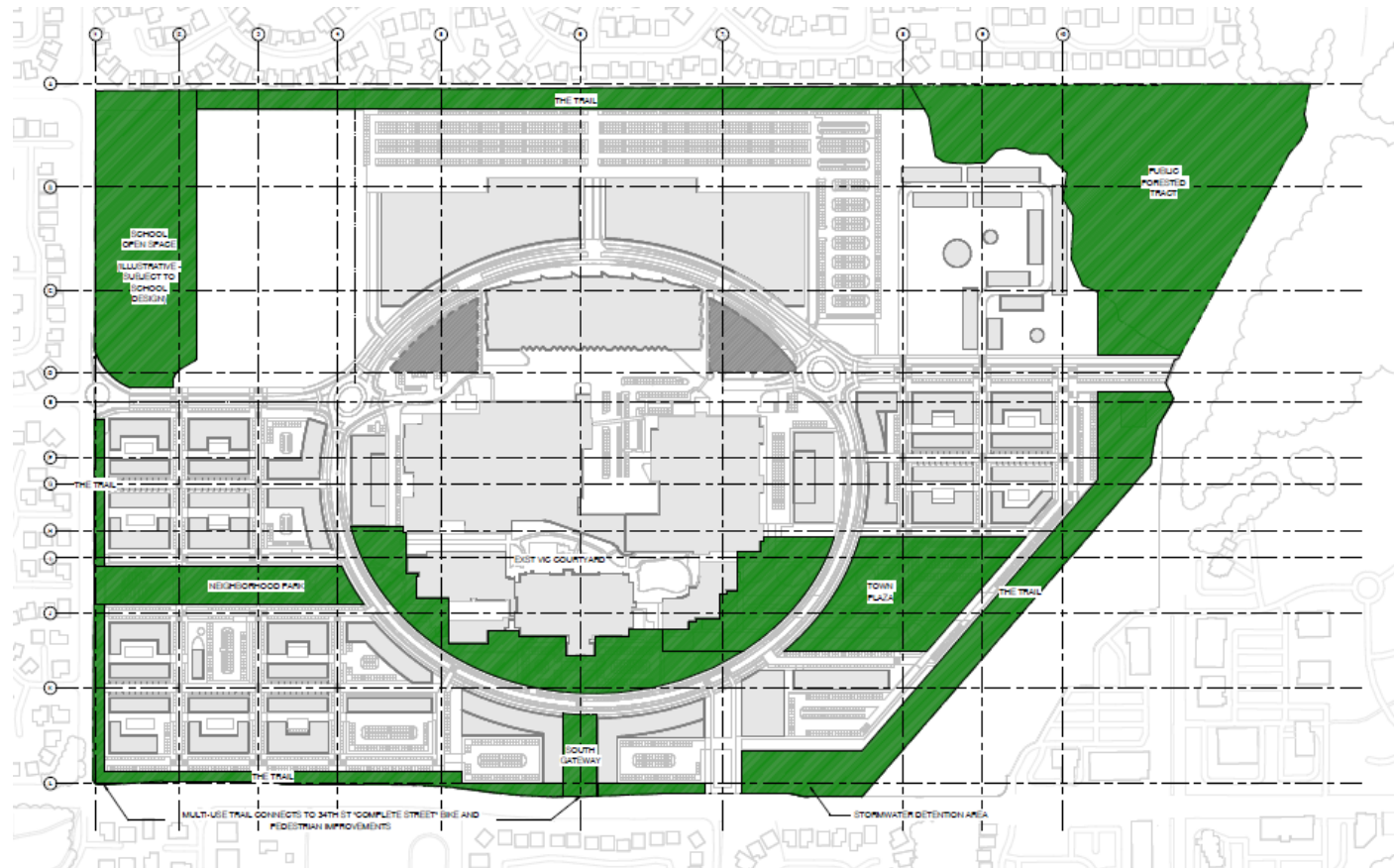
- Livability
- Equity and Inclusion
- Innovation
- Sustainability & Resiliency
- Trust & Relationships

Revised Land Use Allocations



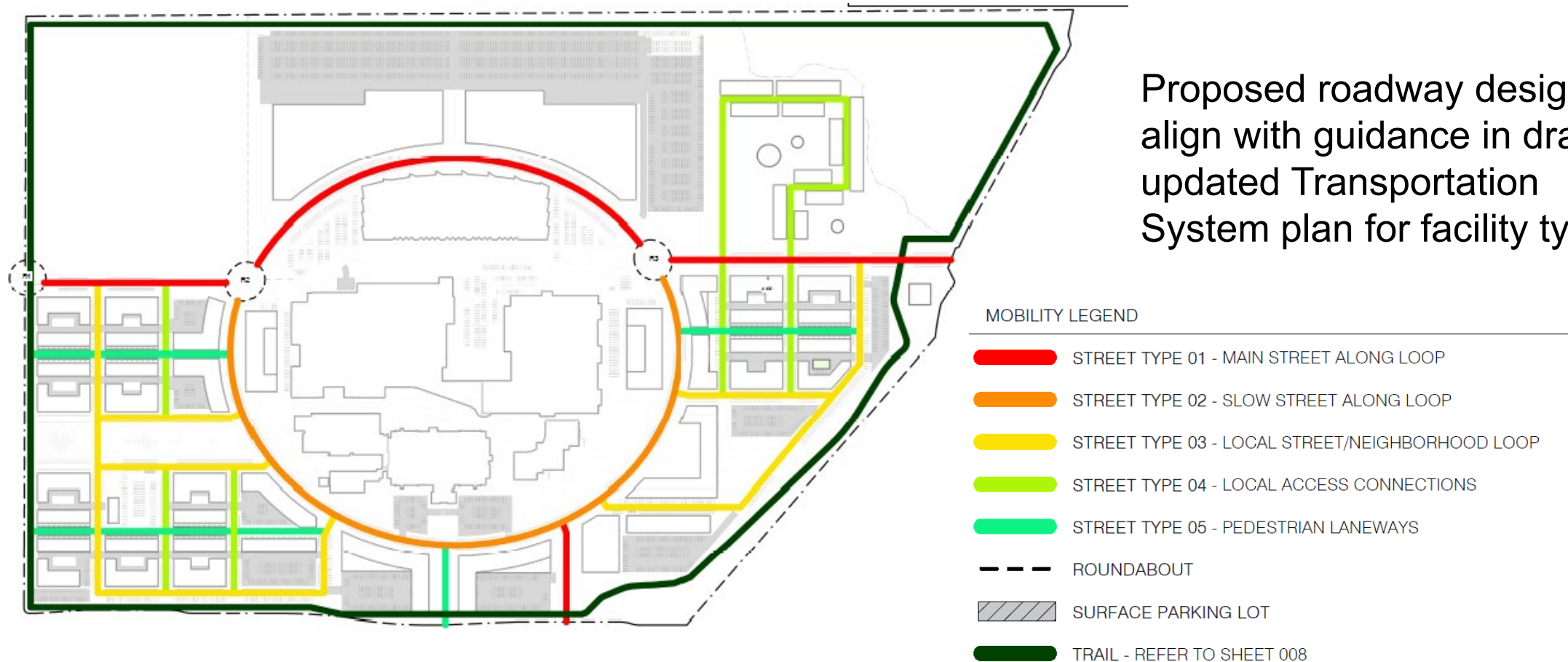
LUA	Acres
School	20
Forested Tract	13.7
LI	74.13
Residential	38.12
Mixed Use	33.15
Total	179.1

Revised Master Plan/Open Space



- 13.7-acre forested tract
- 10.3 acres within LUAs
- 24 total acres proposed

Revised Transportation Network



Revisions to the master plan

- Central loop/ring road configuration change
- Revised Land Use Areas (right-of-way now included)
- Increased density and the elimination of detached single-family residential
- Consolidated Residential Areas
- Updated Phasing
- Hotel and community center allowed as a Type II instead of Type III application
- Updated Design Guidelines

Approval Criteria ([VMC 20.430.060.C.3.a.2](#))

- a. The Master Plan and associated conditions of approval ensure future development will meet all applicable criteria of this chapter; and**
- b. The proposal complies with applicable rezone criteria of VMC [20.285.080](#); and
- c. There is or will be sufficient capacity within the transportation system and public sewer, water, police, fire, and stormwater services to adequately serve all portions of the site at the time of development; and**
- d. A change in circumstances has occurred since existing zoning designations at the site were originally adopted. For the purposes of a multiple building mixed use plan only, compliance with the development standards of VMC [20.430.060C2](#) and the applicable Comprehensive Plan policies shall be sufficient to demonstrate that a change in circumstances has occurred.

Next Steps

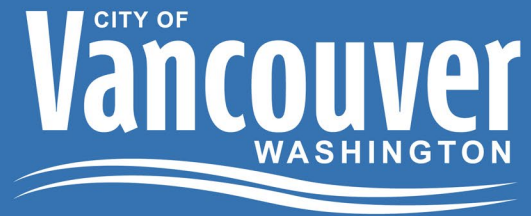
Planning Commission

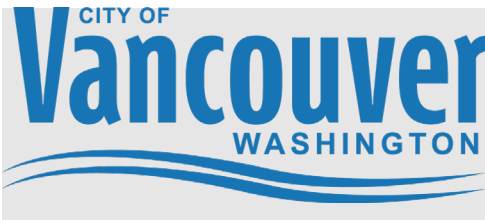
- September 26: Planning Commission Workshop- more detail on revised master plan components and associated development agreement
- October 10: Planning Commission Workshop
- November 14: Planning Commission Workshop (if needed)
- December 12: Tentative Planning Commission Public Hearing

City Council dates not yet scheduled

Thank You

Questions





MEMORANDUM

DATE: September 12, 2023

TO: Chair Ledell and Planning Commission members
CC: Rebecca Kennedy, Deputy Director, Community Development Department

FROM: Mark Person, Senior Planner, Community Development Department
Joana Filgueiras, Real Estate Project Manager, Economic Prosperity and Housing

RE: **Proposed Revised Vancouver Innovation Center Master Plan and Development Agreement**

SUBJECT SITE

The Vancouver Innovation Center (VIC) encompasses approximately 179 acres and is located at 8110 SE 34th Street. The site consists of parcels 986060362, 986056494, 126455000, and 126816000 within the NE, NW, SW, and SE ¼ of Section 6, Township 1N, Range 3E of the Willamette Meridian.

The site is located among single family neighborhoods on three sides. SE 34th Street, a four-lane arterial road with a center landscaped median, forms the southern edge of the site and the main access point, and is served by the C-Tran #37 bus with 15-minute peak hour service intervals to downtown and the Fisher's Landing Transit center. Below 34th Street are master planned single-family subdivisions, and the Fisher's Landing Elementary School. SE 176th Avenue, a two-lane collector road, forms the western edge of the rezone site, and west of that are additional master planned single family subdivisions. Single family development is also north of the rezone site, but without any separating roadway. To the east the site is bounded by 192nd Avenue and Fisher's Creek. Beyond the creek to the east is a commercial development consisting of a tire store, bank and offices.

The site is located within the Fisher's Landing East Neighborhood Association. The Fisher's Creek Neighborhood Association is directly south of 34th Street.

The 179-acre rezone site was originally developed by Hewlett-Packard prior to annexation to Vancouver in 1997 and was sold to S-E Incorporated in 2009. New Blueprint Partners purchased the site in 2020. The approximately 47-acre light industrial building complex encompasses approximately 715,000 square feet in six linked buildings, surrounded by approximately 2,100 surface parking stalls. The building complex is approximately 80 percent leased, up from 50 percent leased when the development was first proposed, according to the applicant. Since acquiring the site, the applicant has made substantial upgrades to the existing

buildings that include energy efficiency and modernization. Most of the undeveloped portion of the rezone is grasslands, except for the northeast area which remains heavily forested.

PREVIOUS ZONE CHANGE AND EXISTING MASTER PLAN APPROVAL

VMC 20.285 assigns the Vancouver Planning Commission as the review body for Mixed-Use Master Plans greater than 25 acres in size, and Development Agreements accompanying any proposal already before the Commission. The Planning Commission purview is limited to land use matters; budgetary decisions are solely the purview of the City Council. Planning Commission recommendations are forwarded to the Vancouver City Council for further public hearing review and final decision.

The Planning Commission reviewed and recommended approval of the zone change from IL to MX and associated master plan in 2020 and 2021. The proposal was reviewed at six Planning Commission public workshops and approval recommended to the City Council at a public hearing on July 6, 2021. The City Council approved the master plan, zone change and development agreement at a public hearing on August 16, 2021.

The existing master plan and development agreement anticipates 600,000 to 860,000 square feet of new employment buildings and up to 1,200 residential units. Under the existing master plan, the applicant received land use and engineering approval for a 200,981 square foot industrial building north of the existing building onsite.

As part of the new proposed master plan revision and development agreement update, the applicant held two online open houses open to the community, one on January 30th, 2023, and one on January 31, 2023.

PROPOSED MASTER PLAN REVISIONS

The applicant requests the following changes to the master plan:

- Central loop/ring road configuration change
- Town center is now a commercial corridor
- Revised Land Use Areas
- Increased density and the elimination of detached single-family residential
- Consolidated Residential Areas
- Updated Phasing
- Hotel and community center allowed as a Type II instead of Type III CUP application
- Updated Design Guidelines

Land Use Allocation	Existing Master Plan (acres)	Proposed Master Plan (acres)
School	20	20
Open Space	19.1	24 - (13.7 in the forested tract plus 10.3 within LUAs)
Light Industrial/Employment	67.2	74.13

Residential	30.4	38.12
Mixed use	31.9	33.15
Right-of-way	10.5	Incorporated into LUAs

As part of the master plan revision and development agreement update, the applicant held two online open houses, one on January 30th, 2023, and one on January 31, 2023.

Section 7 of the development agreement outlines the process for revisions. The proposed changes are subject to a major revision and subject to a Type IV process. This application is only for revision to the master plan and associated development agreement. No changes to zoning or the comprehensive plan are proposed.

The revised master plan proposes a minimum of 600,000 square feet of employment use and up to 1,800 residential units. Applicant has agreed to include 20% affordable units at 80% AMI.

ALIGNMENT WITH EXISTING POLICY GUIDANCE

Climate Action Framework

- Strategy TLU-1. Create neighborhoods that support clean modes of transportation
 - Action #1 – Mixed-use, transit-oriented development
 - Action #2 – Sustainable neighborhood-scale development
 - Action #3 – Diversified housing options
 - Action #4 – Concentrated development along retail and commercial corridors

Compliance with the Interim Green Building Policy

- LEED for Neighborhood Development Gold standard or equivalent
 - Certification not required, only that the proposal shows equivalency

The Master Plan outlines sustainability initiatives that extend beyond code mandates, aligning with the City's objective of reducing Greenhouse Gas emissions. A comprehensive Sustainability Plan will be submitted to the Planning Commission prior to the workshop on September 26, 2023.

Alignment with the [Strategic Plan](#)

- Livability
- Equity and Inclusion
- Innovation
- Sustainability & Resiliency
- Trust & Relationships

MIXED USE MASTER PLAN APPROVAL CRITERIA

Approval Criteria ([VMC 20.430.060.C.3.a.2](#))

2. Approval Criteria and Zoning. proposed Mixed Use Master Plans 25 acres or larger in size shall be reviewed as Type IV application by the Planning Commission. Proposals less than 25 acres shall be reviewed as Type IV applications by the Hearings Examiner. Approvals, or approval with conditions shall be granted upon findings that:

- a. The Master Plan and associated conditions of approval ensure future development will meet all applicable criteria of this chapter; and*
- b. The proposal complies with applicable rezone criteria of VMC [20.285.080](#); and*
- c. There is or will be sufficient capacity within the transportation system and public sewer, water, police, fire, and stormwater services to adequately serve all portions of the site at the time of development; and*
- d. A change in circumstances has occurred since existing zoning designations at the site were originally adopted. For the purposes of a multiple building mixed use plan only, compliance with the development standards of VMC [20.430.060](#)C2 and the applicable Comprehensive Plan policies shall be sufficient to demonstrate that a change in circumstances has occurred.*

Also:

The multiple building mixed use sites standards of VMC [20.430.060.C.2](#) shall apply unless otherwise noted in the development agreement.

VMC 20.430.060.D. Adjustment to Numerical Standards – Single Building and Mixed Use Sites Numerical standards contained in this chapter may be adjusted by up to 25% if a clear demonstration is provided that the proposed mixed use development with the adjustment would fully comply with the purpose statement and all other applicable standards of this chapter, and that the proposal would clearly not be able to comply with those standards without the proposed adjustments.

VMC 20.430.060.E. Incentives – Single Building and Mixed Use Sites Traffic impact fees for mixed use developments shall be reduced to account for internal trips between uses on the site or building as demonstrated by an approved traffic study.

Subsequent applications for development within the master plan will be reviewed under the procedures outlined in VMC [20.210](#), in most cases a Type II Site Plan.

Staff is seeking Planning Commission's input on the updated master plan concept.

VIC Master Plan and DA Revision

September 12, 2023

Page 5 of 5

Next Steps:

- September 26, Planning Commission Workshop
- October 10, Planning Commission Workshop
- November 14, Planning Commission Workshop (if needed)
- December 12, Tentative Planning Commission Public Hearing

Mark Person, Senior Planner, Community Development Department
mark.person@cityofvancouver.us 360-487-7885

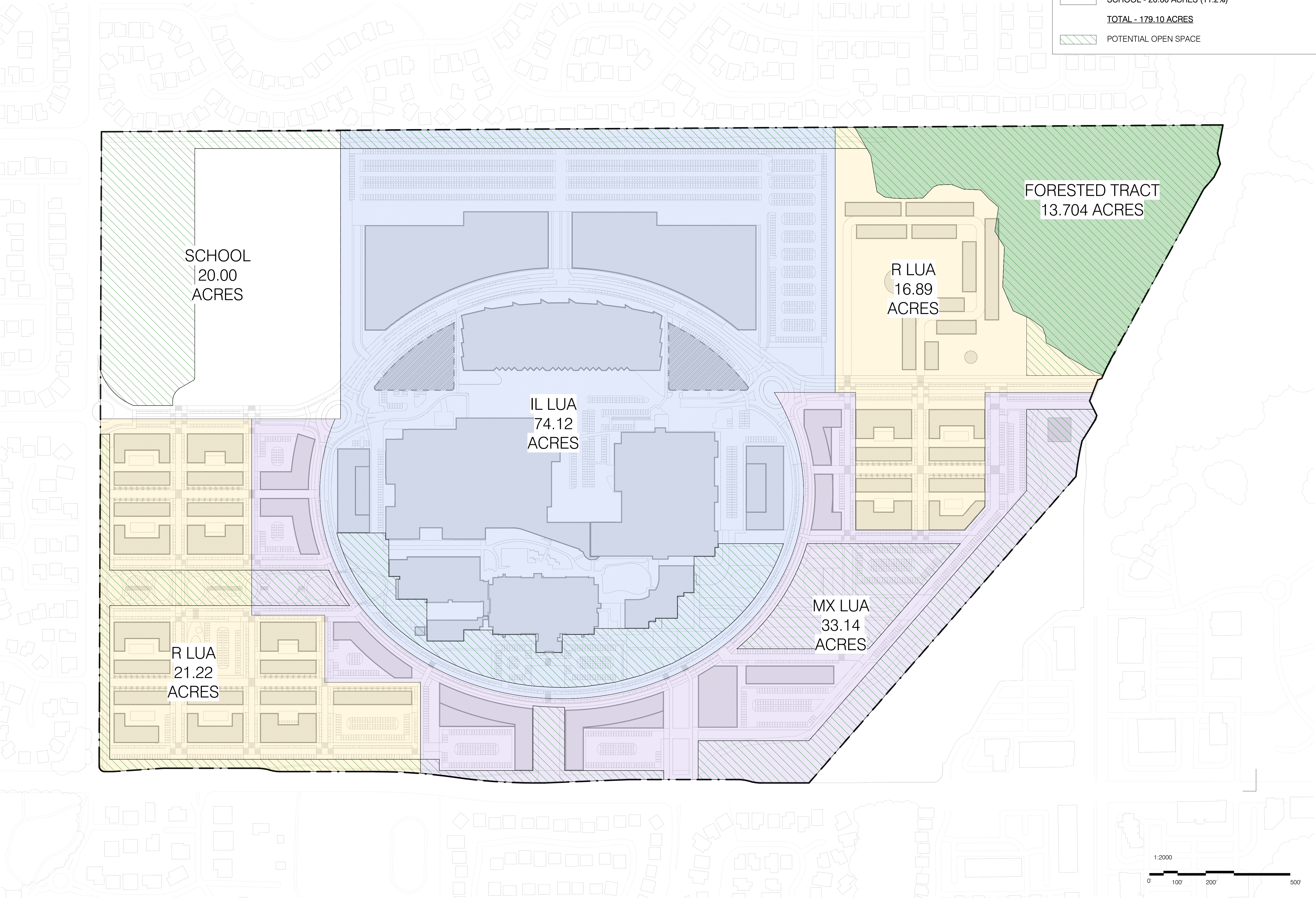
Joana Filgueiras, Real Estate Project Manager, Economic Prosperity and Housing
Joana.filgueiras@cityofvancouver.us 360-601-1196

Attachment(s):

1. Proposed Revised Master Plan
2. Existing Master Plan Map
3. Applicant Narrative
4. Revised Traffic Impact Analysis
5. Applicant Sustainability Goals
6. VIC Renderings
7. [City Council Materials from August 16, 2021 Public Hearing](#)

GENERAL NOTES:

1. BUILDING FOOTPRINTS ARE ILLUSTRATIVE AND SUBJECT TO CHANGE.
2. OPEN SPACE BOUNDARIES ARE CONCEPTUAL. THE LOCATIONS AND SIZE OF EACH OPEN SPACE AREA WILL BE REFINED AT THE SITE DEVELOPMENT STAGE.

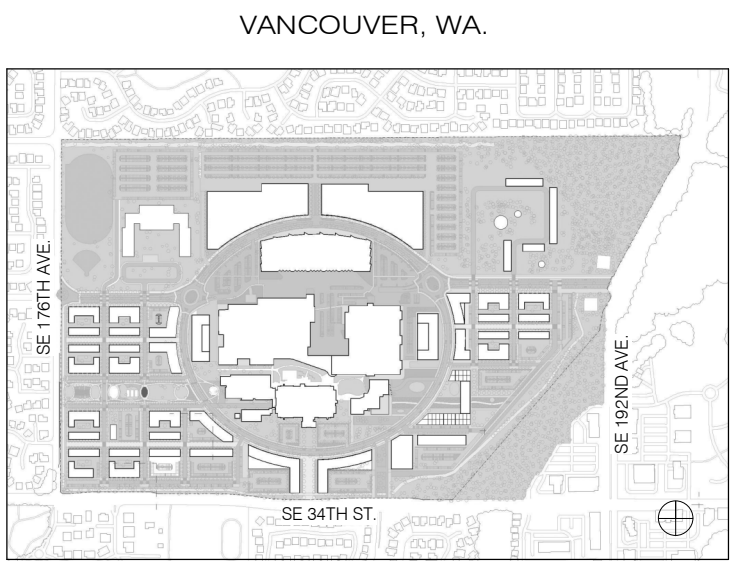


LAND USE LEGEND	
	LIGHT INDUSTRIAL (IL) - 74.13 ACRES (41.4%)
	RESIDENTIAL (R) - 38.12 ACRES (21.3%)
	MIXED-USE (MX) - 33.15 ACRES (18.5%)
	FORESTED TRACT - 13.704 ACRES (7.6%)
	SCHOOL - 20.00 ACRES (11.2%)
TOTAL - 179.10 ACRES	
	POTENTIAL OPEN SPACE

sh p	
CLIENT	CLIENT
RABINA 505 FIFTH AVENUE, 27TH FLOOR NEW YORK, NY 10017 Tel 212.680.4500	NEW BLUEPRINT PARTNERS 44 S. BROADWAY WHITE PLAINS, NY 10601
URBAN DESIGN + MASTERPLAN ARCHITECT ShoP ARCHITECTS 233 BROADWAY 11TH FLOOR NEW YORK, NY 10029 Tel 212.889.9005	MASTERPLAN LOCAL ARCHITECT EL DORADO ARCHITECTS 1623 NW MARSHAL STREET PORTLAND, OR 97209 Tel 971.266.8665
LANDSCAPE ARCHITECT SITEWORKSHOP 3800 WOODLAND PARK AVE. N, SUITE 200 SEATTLE, WA 98103 Tel 206.285.3026	CIVIL ENGINEER KPF 111 SW 5TH AVENUE #2600 PORTLAND, OR 97204 Tel 503.227.3251
TRAFFIC ENGINEER KITTELSON & ASSOCIATES 651 SW 6TH AVE., SUITE 600 PORTLAND, OR 97204 Tel 800.878.6290	LAND USE CONSULTANT DOWL 720 SW WASHINGTON ST., SUITE 750 PORTLAND, OR 97205 Tel 971.280.8641
ENERGY & WATER USE DISTRICT PLANNING PAE ENGINEERS 151 SW 1ST AVENUE PORTLAND, OR 97204 Tel 503.226.2921	SUSTAINABILITY PAE ENGINEERS 151 SW 1ST AVENUE PORTLAND, OR 97204 Tel 503.226.2921

VANCOUVER INNOVATION CENTER

URBAN DESIGN / MASTERPLAN



NO.	DATE	REVISION
THESE DRAWINGS ARE INSTRUMENTS OF SERVICE AND AS SUCH MAY NOT BE USED FOR OTHER PROJECTS, FOR ADDITIONS TO THIS PROJECT OR COMPLETION OF THIS PROJECT BY OTHERS.		
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● NOT FOR CONSTRUCTION		
SHEET INFORMATION: ARCH D 24"x36"		
DRAWING TITLE		
MASTER PLAN - PROPOSED LAND-USE		
SEAL & SIGNATURE	DATE	
	PROJECT NO.	210917
	DRAWN BY	Author
	CHECKED BY	Checker
DRAWING NUMBER		



APPENDIX B

NARRATIVE

Vancouver Innovation Center Master Plan Revision

Vancouver, Washington

A Land Use Application For:
**Major Revisions to the
Vancouver Innovation Center Master Plan**

Submitted: May 5, 2023

Prepared for:
The VIC Building Owner LLC
505 Fifth Avenue, 27th Floor
New York, NY 10017
Contact: Jennifer Rabina
Phone: 212-680-4500

Prepared by:
DOWL
7200 NE 41st Street, Suite 204
Vancouver, WA 98662
Contact: Jessica Herceg, Senior Planner
Phone: 971-280-8653



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I. Introduction

General Information

Applicant:	The VIC Building Owner LLC 505 Fifth Avenue, 27 th Floor New York, NY 10017 Contact: Jennifer Rabina Phone: 212-680-4500 Email: jrabina@rabina.com
Prepared by:	DOWL 7200 NE 41 st Street, Suite 204 Vancouver, WA 98662 Contact: Jessica Herceg Phone: 971-280-8653 Email: jherceg@dowl.com
Property Owner:	The VIC Building Owner LLC 505 Fifth Avenue, 27 th Floor New York, NY 10017 Contact: Josh Rabina Phone: 212-398-2030 Email: josh@rabina.com
Project Location	18110 SE 34 th Street
Parcel ID Numbers:	126455-000; 126816-000; 986056-494 and 986060-362
Zoning:	Mixed Use (MX)
Comprehensive Plan:	Commercial (COM)
Project Site Area:	Approximately 179 acres

II. Mixed Use Master Plan Executive Summary

Existing Conditions

The Vancouver Innovation Center (VIC) is the site of a mixed-use master plan located at the former Hewlett Packard (HP) industrial complex, encompassing an approximately 179-acre site located at 18110 SE 34th Street. The site is bound on the north by the Clearmeadows and Fisher's Grove residential subdivisions, on the south by SE 34th Street, on the east by SE 192nd Avenue and on the west by SE 176th Avenue. The site currently has six (6) existing buildings totaling approximately 715,000 square feet (SF), along with associated surface parking and circulation. These buildings were built in the 1980s and 1990s by Hewlett-Packard. Since Hewlett Packard's departure from the site, the interior of these buildings has been updated and leased to a variety of tenants with operations ranging from research and development, light manufacturing, high-tech machinery repair, and other industrial/commercial employment uses. Access to the site is provided via SE 34th Street. A private vehicle circulation route extends north into the site from the signalized intersection of SE Hiddenbrook Drive and SE 34th Street along the site frontage. The private road loops around the existing VIC building and connects with SE 34th Street at a stop-controlled intersection near the southwest corner of the site.

The former Hewlett Packard campus was subject to a Development Agreement beginning in 2001. A series of amendments occurred prior to the applicant's purchase of the property in 2020. The VIC multiple building employment focused Mixed-Use Master Plan, Comprehensive Plan Amendment (CPA), Zone Change Request and Third Amended and Restated Development Agreement (Restated DA) were approved concurrently by the Vancouver City Council by Ordinance 4346 on August 16, 2021. With the approval of the development agreement and an associated Comprehensive Plan Amendment/Zone Change, the zoning designation changed to Mixed Use (MX) with a Commercial (COM) comprehensive plan designation. See Figure 1 below for the current VIC Master Plan.

Since approval of the current VIC Master Plan, the VIC Building Owner LLC (applicant) has received Site Plan Review and construction document approvals for a new 200,981 square foot industrial building, referred to as VIC Building North, to be located immediately north of the existing buildings. The applicant completed an exempt land division to establish a discrete parcel for VIC Building North on December 6, 2022, however a new parcel number has not yet been assigned by Clark County. The documentation was recorded under Clark County Auditor's File Number 6094243 and is on file with the City of Vancouver under File LUP #82838.

Project Description

The applicant is requesting City of Vancouver (City) approval for master plan revisions to amend elements of the current VIC Master Plan. The revised master plan design consolidates industrial areas to optimize opportunities for employment-generating development without reducing the number of jobs provided for in the current master plan, provides a higher level of integration of uses to allow for greater density, thus creating an opportunity to provide more open space, and introduces a new roadway loop geometry at the center of the VIC that establishes a mixed-use center at the core of the site. The revised master plan is included as Sheet 003 of the Master Plan Design Set (Appendix E) and reflects the proposed land use area configuration.

The land use areas (LUAs) on the site include a school (approximately 20 acres), residential area (approximately 38 acres), light industrial/employment area (approximately 74 acres), mixed use area (approximately 33 acres) and a 13.7-acre forested tract. Potential open space areas are reflected across the Residential LUA (RLUA), Mixed-Use LUA (MX LUA), and Light Industrial LUA (IL LUA), and School LUA (S LUA),

but acreage and boundaries for these future open space areas are conceptual and will be refined at site development.

Noteworthy changes to the master plan include:

- A central right-of-way loop or “ring road” is proposed for main site circulation. The northern arc of the loop will serve as the SE 29th Street collector.
- Reconfiguration and relocation of land use areas to achieve the desired product type mix and scale in each LUA and provide greater integration of uses throughout the site. The consolidation allows for the development of large-footprint light industrial buildings in the IL LUA to optimize opportunities for employment-generating development and is critical to achieve both the Project’s and the City’s employment generation goals.
- The plan improves the integration of the mixed-use elements of the project by changing from the “Town Center District” within the MX LUA to a mixed-use corridor along the proposed ring road which serves as the gravitational center of the revised master plan and contemplates a substantial public plaza opposite the existing VIC Commons. The revised master plan will incorporate all necessary changes for the VIC and will not propose a separate/future master plan revision for a Town Center district within the master plan area.
- Single Family Residential (SFR) and Multi-Family Residential (MFR) land use areas (LUAs) are now consolidated and listed as “Residential Land Use Area (R LUA)” and the applicant has removed detached single family residential use from the plan.
- The master plan anticipates an overall increase in open space and will provide approximately 24 acres of open space across the master plan area including an approximately 13.7-acre forested tract. Open space projections in the revised plan represent a 26% increase over the 19 acres proposed in the current master plan. To allow greater design discretion in the precise limits of open space with future site development, the applicant is proposing to represent open space within the plan as an overlay rather than a discrete Open Space LUA, a common approach with master plan entitlements.
- The forested tract and the school parcel are identified independent of other LUA’s to reflect the separate ownership of the school parcel by the Evergreen School District and the applicant’s establishment of a tract for forest preservation. While the forested tract boundary has been altered in the revised master plan—a project arborist has made recommendations to better preserve key tree stands—the acreage of the tract has been retained.
- As opposed to the current master plan, which segregated rights of way for SE 29th Street and SE 184th Avenue from LUA acreages, the proposed revision plan has assumed that all rights of way will be internal to land use areas, similar to how rights of way would be treated in a zoning context.
- The revised master plan proposes a more fluid approach to phasing, whereby the size, location, and order of development within the property be determined by the applicant so that they may respond in real time to market conditions and demand.

New Employment Square Footage

The master plan revision proposes construction of a minimum of 600,000 square feet of gross floor area for employment uses.

Open Space

The applicant anticipates providing approximately 24 acres of open space, including the approximately 13.7-acre Forested Tract. Sheet 004 of the Master Plan Design Set (Appendix E) illustrates potential open spaces, including a two-mile multi-use trail around the entire perimeter of the property. Distinct cross sections are provided as Sheet 007 (Appendix E) to illustrate the open space design at key locations in the site, including the northern site edge. Other open space features include a neighborhood park within the Residential LUA in the southwest corner of the site and a town plaza in the southeast corner.

Residential Units and Density

The revised master plan will consolidate the Single-Family Residential LUA and Multi-Family Residential LUA into a single, non-contiguous Residential LUA. The revised master plan proposes a maximum of 1,800 dwelling units which can be constructed within either the R LUA, the MX LUA, or the IL LUA, with a maximum of 100 dwelling units allowable within the IL LUA. The proposed increase in residential density is in response to the City's continuing concern about housing availability, as well as to market demands for housing co-located with the future businesses on the site. In addition, rather than specify quantities of distinct housing types (apartments, townhomes, etc.) within each LUA, the revised master plan proposes to build housing types in response to market demand, limited to the residential housing types permitted within the VMC. Single-family detached homes, however, will be removed from the master plan.

The current and revised master plans are classified as "multiple building mixed use master plan" pursuant to VMC 20.430.060.C. Figures 1 and 2 are the Current VIC Master Plan and the proposed Revised VIC Master Plan, respectively. The figures reflect the requested changes to the land use area configuration within the site.

Figure 1. Current VIC Master Plan

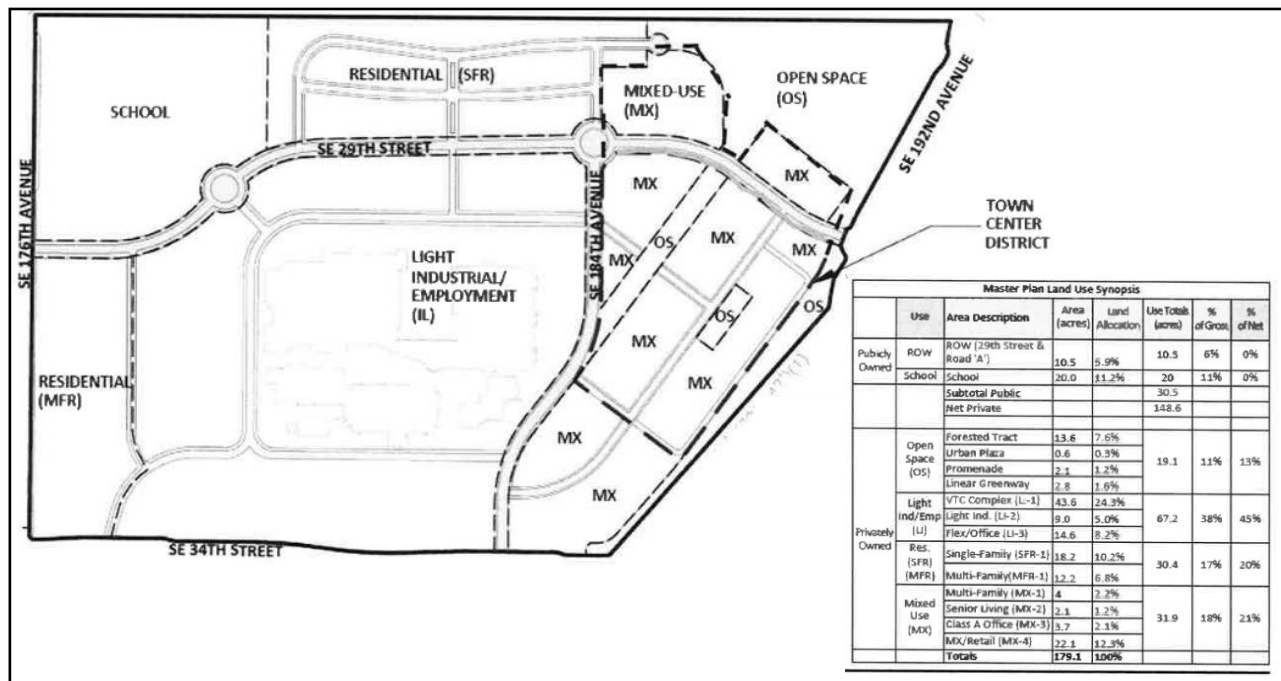
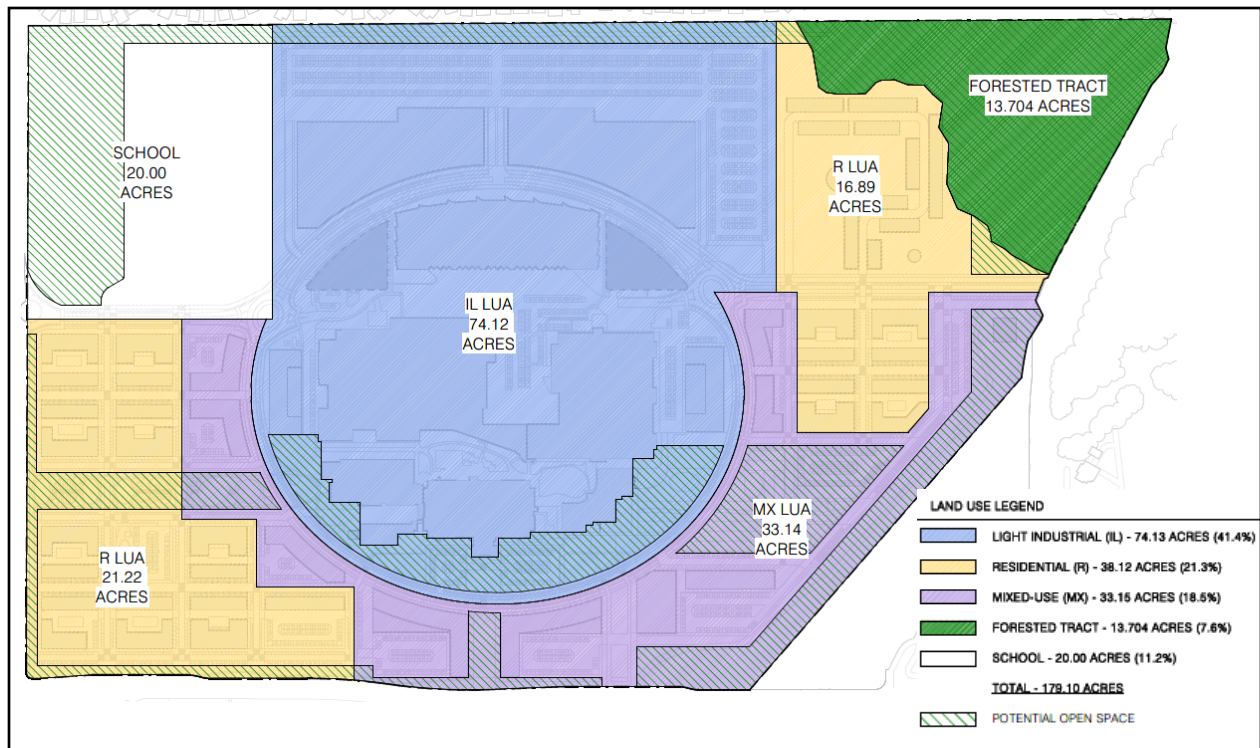


Figure 2. Revised VIC Master Plan



Phasing and Timing of Transportation Improvements

The Revised VIC Master Plan proposes a more fluid approach to phasing to provide flexibility to pursue discrete developments in response to market conditions and needs. Synchronicity standards outlined in Section 6.4 of the Restated DA will be amended to align with updated unit counts but will largely be maintained. It should be noted that a phasing plan is reflected in the Traffic Impact Analysis (TIA), prepared by Kittelson and Associates (Appendix D) to better understand the timing and trigger for transportation improvements. The plan is not intended to suggest that phases must build out in the sequence shown.

III. Applicable Review Criteria

The proposal is subject to the Section 7 Master Plan Revision provisions of the 2021 Vancouver Innovation Center Third Amended and Restated Development Agreement (Restated DA), and applicable goals and policies within the Vancouver Strategic Plan, and Vancouver Comprehensive Plan, respectively and Memorandum of Understanding between the City and the Developer proposing modifications to the Development Agreement currently being finalized. The applicable approval criteria of the Vancouver Municipal Code (VMC) Section 20.430 Mixed Use Standards and District are set forth below with findings demonstrating the project's consistency with these provisions that govern the respective request. Provisions that are not applicable to this proposal are not included.

Vancouver Innovation Center Third Amended and Restated Development Agreement

DA Section 7 Master Plan Revisions

There shall be three categories of Master Plan revisions: Major, Minor, and De Minimis Revision requests. Developer may request Major revisions to the Master Plan (including the Town Center Amendment discussed in section 6.11 of the Restated DA) no more than once in any calendar year, unless mutually agreed to by the City. All proposed revisions shall be considered under the approval criteria identified below.

Response: Pursuant to the Restated DA Section 7, the applicant is requesting a major master plan revision to the current VIC master plan. The primary objectives of the proposed changes to the master plan are to (a) consolidate industrial areas to optimize opportunities for employment-generating development and (b) more substantially integrate development types to allow for greater density, which is a key goal for the City, thus creating an opportunity to provide more open spaces throughout the site to enhance design and placemaking opportunities. As stated in the project summary, the applicant has integrated the "Town Center District" into the mixed-use corridor along the proposed ring road. The Revised VIC Master Plan will incorporate all necessary changes for the VIC and will not propose a separate/future master plan revision for a Town Center district within the master plan area. Responses to the applicable approval criteria for plan revisions are provided below.

DA Section 7.1 Major Revisions

Requests to modify or revise the Master Plan as follows shall be subject to a Type IV review process.

- a. **Greater than 10% increase in total residential units on the Property;**
- b. **A reduction of non-residential square footage on the Property by more than 10%;**
- c. **Reduction or increase of parking square footage by more than 10%;**
- d. **Greater than 10% decrease in the amount of open space approved in the Master Plan;**
- e. **New uses not included in the Master Plan and this Restated DA;**
- f. **Changes in the boundaries between LUAs that alter the total acreage of any LUA by more than 10%;**
- g. **Development of the School LUA for any purpose other than School, to modify the use limitations in Exhibit D and address the requirements of RCW 20.430.060.C.2.e.4;**
- h. **A change from a single family detached home to any other structure, along the northern boundary of the SFR LUA and the abutting neighborhood; and**

i. A reduction in size, change of location, or removal of the open space (treed) area between the SFR LUA and the abutting neighborhood.

Response: As detailed in the project summary above, a series of changes are proposed to the master plan site which meet criteria noted above and thus require a major revision subject to a Type IV process. Specific adjustments which require a major revision include:

- Increasing the maximum residential dwelling unit count from 1,200 units in the current VIC Master Plan, to a maximum of 1,800 residential dwelling units in the Revised VIC Master Plan represents a 50% increase in total residential units on the site.
- The Revised Master Plan proposes removal of the SFR LUA along the northern boundary of the site and the removal of single family detached homes from the master plan.
- The Revised Master Plan proposes significant changes to the street network, most notably the addition of a ring road at the center of the site. Further, the plan does not segregate rights of way for SE 29th and SE 184th Avenue from LUA acreages but rather assumes that all rights of way will be internal to land use areas. The combination of these refinements results in a change to the boundaries and total acreage of the MX, R and IL LUAs beyond 10%.

The applicant presented these changes to City staff through a pre-application conference. Upon review staff concluded that the proposed adjustments to the plan require a major modification subject to a Type IV process and City Council approval.

DA Section 7.4 Approval Criteria

All major, minor, and de minimis changes shall be reviewed according to the following approval criteria:

a. The proposed change meets the intent of the adopted Master Plan;

Response: The intent of the adopted master plan was (a) to reimagine the approximately 179-acre site as a “20-minute” mixed use neighborhood, (b) to meet the growing demand for light industrial, manufacturing, and commercial spaces, (c) to develop a distinct, authentic identity on the site, (d) to create a community with that connects both new and existing neighborhoods and (e) to design sustainably.

The revised master plan continues to achieve the intent of the adopted master plan with the primary objectives being (a) the consolidation of the industrial areas to optimize opportunities for employment-generating development, (b) more substantially integrate uses on campus, including the provision of additional multi-family housing, to align with the City’s density goals, (c) provide a larger, more contiguous open space network throughout the site to enhance design and placemaking opportunities, and (d) streamline the internal street network, and separation of traffic flow to enhance integration of the master plan site and neighboring residential subdivisions.

b. The proposed change will not result in a substantial impact to transportation, water, sewer or storm water management systems, after considering all mitigation plans;

Response: The Revised VIC Master Plan does not anticipate significant impact or demand to transportation, water, sewer or stormwater management systems and infrastructure as further described below.

The Restated DA between the applicant and the City vested trips for the Current VIC Master Plan. Per the Restated DA, vested net new trips include a total of 26,982 average daily trips (ADTs), 2,088 AM peak hour trips, and 1,991 PM peak hour trips. On- and off-site transportation capacity mitigation is predicated on the number of AM and PM peak hour trips while transportation concurrency corridor mitigation is determined based on PM peak hour trips.

The April 28, 2023, Traffic Impact Analysis (TIA) prepared by Kittelson and Associates, Inc. (Appendix D) demonstrates that the proposed uses within the Revised VIC Master Plan will result in a modest increase in weekday AM peak hour trip generation (141 net new trips added) and will not change the total net new PM peak hour trip generation compared to the Current VIC Master Plan. As indicated on Table 4 of the TIA, the Revised VIC Master Plan is estimated to generate 2,229 net new weekday AM peak hour trips and 1,991 net new PM peak hour trips. The TIA updated on- and off-site impacts of the project based upon the revised peak hour trip generation and recalibrated identified mitigation as appropriate. No new off-site traffic mitigation improvements were identified.

As requested by City Transportation staff in the December 1, 2022, Pre-Application Conference Summary, the TIA addresses compatibility and coordination with the City of Vancouver's on-going *SE 34th Street Safety & Mobility Project*. Future conditions in the TIA are modeled to reflect City-anticipated transportation system changes along SE 34th Street to enhance safety-based mitigation needs and mobility for all users on the SE 34th Street corridor. The applicant also coordinated with staff to provide early opportunities to review and offer feedback on the proposed street network and roadway cross sections, including modifications to SE 29th Street, a major east west collector. The proposed Mobility Plan Streetscape Summary sheets included in Appendix B reflect comments offered by staff.

Water utilities are readily available to the overall VIC site and can be feasibly extended to provide potable water for the future phased site buildout. Subsequent site plan approval for future phased development will adhere to applicable regulations and charges as necessary. As noted in the Revised Design Standards (Appendix F), the applicant will prioritize potable water use reductions, and efficiency strategies in its design through water-saving plumbing fixtures with future proposed buildings.

Sewer utilities are readily available to the overall VIC site and can be feasibly extended to provide service connections for the future phased site buildout. Subsequent site plan approval for future phased development will adhere to applicable regulations and charges as necessary.

An existing stormwater facility located in the southeast portion of the site treats surface runoff from the existing building and parking areas. The stormwater pond is designed to overflow to Fisher Creek during severe storm events. The existing facility will be maintained, matching the existing condition. New site development and disturbance of impervious surfaces within the approximately 179-acre VIC master plan site will comply with local and state stormwater management requirements including the implementation of erosion control, and low impact development (LID) Best Management Practices (BMPs) to reduce impacts on surface, ground water, runoff, and drainage patterns on the site.

As noted in the Revised Design Guidelines (Appendix F) the applicant is committing to manage stormwater on-site and promote surface water quality through native and adaptive plant selections to reduce irrigation, minimization of impervious surfaces and implementation of a surface stormwater strategy synopsis describing anticipated collection, treatment, and discharge strategies. This includes the implementation of low impact development (LID) Best Management Practices (BMPs) planned for future

development on the site. Subsequent site plan approval for future phased development will include erosion control mitigation measures during construction and post site buildout.

- c. **The proposed change will not result in adverse impacts to adjacent properties or uses, after considering all mitigation plans; and**

Response: The character of the periphery of the master plan site under the revised master plan will be generally consistent with the approved master plan with the exception of the northern boundary, where the plan has been revised to provide greater buffering and open space adjacent to this edge. Where the current master plan formerly proposed single-family uses at the site's northern boundary adjacent to the existing Clearmeadows and Fisher's Grove residential subdivisions, the proposed plan locates the IL LUA north of proposed SE 29th Street. To ensure compatibility with neighbors to the north, the Revised VIC Master Plan includes a significant approximately 65-foot-wide linear open space trail. Further, the plan contemplates placing parking lots to serve the IL between the open space and buildings, resulting in an approximately 265-foot horizontal separation between industrial buildings and the northern edge. Figures 1 and 2 below illustrate the north edge condition under the current and revised master plans.

Figure 3. North Edge Condition with Single Family Uses – Current VIC Master Plan

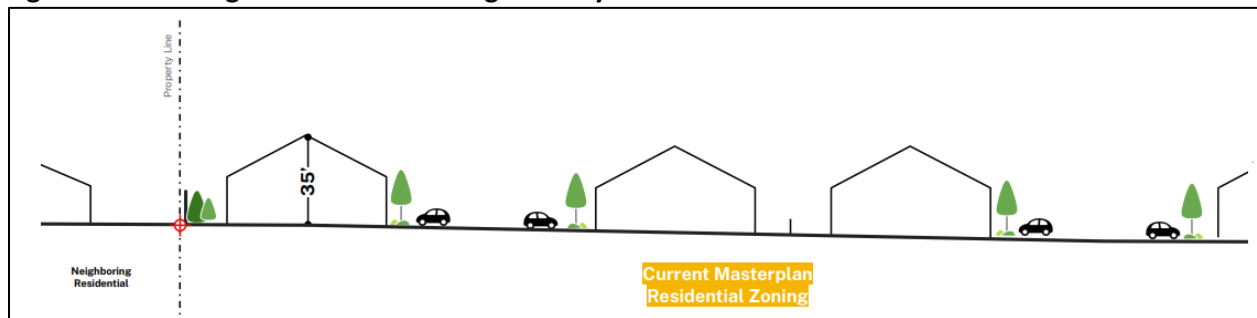


Figure not to scale.

Figure 4. North Edge Condition with Proposed Open Space – Revised VIC Master Plan

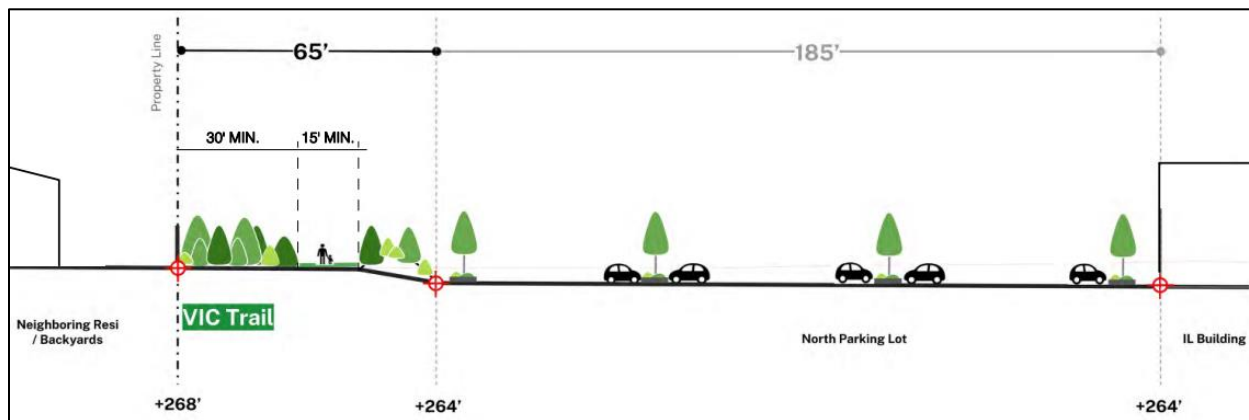


Figure not to scale.

- d. **The proposed change is consistent with Vancouver Municipal Code and Vancouver Comprehensive Plan.**

Response: The applicant demonstrates consistency with applicable criteria of the Vancouver Municipal Code, Vancouver Strategic Plan and Vancouver Comprehensive Plan within this narrative.

Vancouver Municipal Code (VMC)

VMC Title 20 Land Use and Development Code

VMC 20.430.060 Mixed Use Standards and District.

C. Multiple Building Mixed Use Sites

2. Standards – Mixed Use Sites

- a. **Overall uses. Uses shall be allowed as indicated in the MX column of Table 20.430.030-1, except that automobile service stations and drive-through facilities shall be prohibited.**

Response: Similar to the current master plan, the revised master plan envisions employees living and working on the VIC campus within a “20-minute” neighborhood. The revised master plan design creates a better integration of uses whereby those living and/or working on the campus will now be within a five-minute walk of mixed-use opportunities and those living in the nearby neighborhoods will be within a 20-minute walk. Allowed land uses on the site are consistent with those provided in Vancouver Municipal Code for the most-closely analogous land use area. For example, the southwest corner will be designated residential land use area (LUA), near the residential neighborhoods to the west. The northern part of the property, which abuts a residential neighborhood, will have a school land use area, a linear open space that buffers an IL LUA, and an approximately 13.7-acre forested tract to be used as park space. The denser light industrial and mixed-use land use areas (LUAs) will generally be in the core, to the south, and to the east of the property, to ensure a smooth transition toward the more commercial areas along SE 192nd Avenue.

The majority of the proposed land use areas (LUAs) on the site are permitted outright in the MX column of Table 20.430.030-1 (e.g., uses such as general and medical offices, general retail, multi-family housing, parks/open space, and a school) with the exception of light industrial (IL) uses that comprise a large portion of the overall site. Within the IL LUA, the applicant is proposing a variety of light industrial land uses (e.g., research and development, manufacturing, and production) consistent with IL uses in VMC Table 20.440.030-1. These uses are intended to support and attract employment-based businesses on the site, and are consistent with the current tenant mix at the VIC

There are no automobile service stations or drive-through facilities proposed.

- b. **Site Mix. At least 20% of the combined gross floor area of the buildings proposed on the site shall be devoted to residential uses, and at least 20% to nonresidential uses. Parking garages or portions of garages devoted to residential or nonresidential uses may be counted towards this requirement, but surface parking may not.**

Response: The applicant is proposing residential uses throughout the site, primarily within the MX and R LUAs however, as many as 100 residential units may also be constructed within the IL LUA, consistent with

the Current VIC Master Plan. It is anticipated that the revised master plan will include approximately 2,407,798 gross square feet (GSF) of residential uses and 1,703,065 GSF of non-residential uses. Overall, the revised master plan is anticipated to provide a total of 4,110,863 GSF of building area, with approximately 59 percent of total building area for residential uses and approximately 41 percent for non-residential uses. Therefore, this standard is met.

- c. Functional integration of uses. Land uses in mixed use sites shall be selected and designed to encourage interaction among uses. Examples include but are not limited to commercial developments which are significantly used for shopping by on-site or adjacent residents or office workers.**

Response: Like the current approved master plan, the revised master plan has been designed to be a “20-minute neighborhood”, a term used to describe neighborhoods in which all of life’s daily needs—work, recreation, school, commercial services, etc.—are located within a 20-minute walk from home. The reconfigured LUA orientation further integrates uses across the site and as a result has ensured that all residential uses are within a 5-minute walk of a mixed-use site. The design is compatible with on-site and off-site uses while activating the site and optimizing use synergies. Examples of the applicant’s functional integration of uses on the site include:

- *Public schools* – The northwest corner of the development is designated for a 20-acre middle school site for the Evergreen School District. This new site, in combination with the existing Fisher’s Landing Elementary school located on the south side of SE 34th Street opposite the site, will provide K-8 educational services within walking distance of proposed residential uses within the project.
- *Outdoor public spaces* – The applicant has designed the site to provide active and passive recreation including the 13.7-acre forested tract in the northeast corner of the site, and a variable width trail along the perimeter of the project. Other opportunities for open space are contemplated across the site as reflected in the Potential Open Space plan.
- *Shared parking* –Significant expanses of surface parking exist from the former HP facilities. Because the peak parking period for the employment uses and residential uses are not the same, the applicant anticipates that surface parking for the light industrial LUA will be utilized for multiple use areas in an interim basis as the site builds out. As development occurs new parking areas will be constructed in concert with buildings and uses. Shared parking is expected to continue throughout the site including the use of on-street parking as well as the potential development of standalone parking facilities. Note that the City intends to provide dedicated parking for the Forested Tract adjacent to the site on additional land purchased from the applicant.
- *Gradation of use intensity* – The applicant has intentionally located residential-compatible land uses adjacent to the existing single-family residences to the west and north and has located the highest density use, the mixed use towards the center and southeast portion of the site, locations that are substantially shielded from off-site views from the north and from residences farther to the west. The MX LUA and IL LUA are oriented along the loop road and will have convenient access to SE 192nd Avenue, SE 176th Avenue and SE 34th Street which should minimize the need for vehicles to travel through residential areas to exit the site. The northern part of the property, which abuts a residential neighborhood, will have a school land use area, a linear open space feature that buffers IL LUA, and a park. Denser areas of light industrial and mixed-use land use areas are intentionally located in the core, to the south, and to the east of the property, to ensure a smooth transition toward the more commercial areas along SE 192nd Avenue.

d. Physical integration of uses.

- 1. All buildings and improvements on the site shall be located and designed to look and function as an integrated development and to encourage pedestrian travel between buildings and uses. Complete segregation of use types, such as placement of multiple commercial structures all on one side of a mixed use site and multiple residential structures all on the other, shall be prohibited.**

Response: The applicant has planned the project to ensure that uses will look and function as an integrated development. As reflected on the Proposed Land Use plan (Sheet 003) the project features a school site, consolidated IL LUA, two RLUA areas and a MX LUA which is concentrated in the southeast of the site and extends along the south half of the loop road ensuring that residential uses are within a short walk to services. The loop road, coupled with the pedestrian laneways and other proposed infrastructure, provides multi-modal connection between the uses while the Forested Tract, VIC Trail, Town Plaza and other potential open space areas identified on the Potential Open Space plan (Sheet 004) provide alternative connections between LUAs.

The Revised Design Guidelines included in Appendix F provide details regarding the design and character of future buildings to ensure high quality design within the development. In addition, the applicant plans to establish and maintain thematic elements throughout the development to solidify a sense of place throughout the project. These include uniform wayfinding signage, public street furniture elements (benches, waste receptacles, etc.), playground design, bicycle racks, street lighting, street trees and other consistent treatments. The combination of land planning and implementation of district wide design guidelines will produce a well-integrated, cohesive development consistent with this standard.

- 2. Separate buildings shall be connected through pedestrian linkages delineated through landscaping, differentiated surface materials or texture. Delineation through striping alone shall not be considered sufficient.**

Response: Pedestrian linkages through the site will be delineated through designated laneways, landscaping and/or different surface materials. The precise treatments will be defined with future site plan review requests within each LUA.

- 3. One or more similar design characteristics among separate structures shall be provided, including but not limited to similar or complimentary building facades, surface materials, colors, landscaping, or signage.**

Response: The applicant has proposed limited revisions to the design guidelines approved with the current VIC Master Plan, primarily removing references to single-family detached dwellings, and other refinements to better align with the Revised VIC Master Plan. The Revised Design Guidelines are included as Appendix F. With adherence to the revised guidelines structures within the district will have complimentary building facades, surface materials, colors, landscaping, and signage. The Open Space Plan Sheet 004 (Appendix E) and the Mobility Plan Sheet 005 (Appendix E) illustrate the corridors that will facilitate bicycle and pedestrian travel between each development on the property. The applicant will

ensure each site plan, plat or other preliminary entitlement application is consistent with these design standards.

4. **One or more outdoor publicly accessible features shall be provided to encourage interaction among residents or users of the site, including but not limited to courtyards, delineated gathering spaces, or seating areas. These areas may be paved and/or landscaped and must comprise at least 5% of the total site area and be centrally located within the site to fullest extent possible.**

Response: The applicant is proposing numerous outdoor publicly accessible open space areas throughout the project as indicated in the Potential Open Space plan Sheet 004 (Appendix E). Exact dimensions and boundaries of publicly accessible open space areas are not yet known; however, the applicant intends to provide a neighborhood park, town plaza and other open space areas along the south portion of the loop to establish a band of open space and publicly accessible amenities from east to west. A perimeter trail has also been identified and will vary in width and character along different site boundaries as reflected on the Enlarged Trail Sections plan (Sheet 007, Appendix E). The revised plan maintains the 13.7-acre forested tract identified in the prior plan. The applicant is diligently working with the City to negotiate a Purchase and Sale Agreement to sell the Forested Tract to the City to be developed into a municipal park. The applicant previously recorded a deed restriction preserving the Forested Tract and limiting its development as outlined in the current Master Plan. The applicant has committed to providing a minimum of 24 acres of open space features within the master plan site which equates to approximately 13.4 percent thereby exceeding the minimum required.

e. **Development and building density/intensity standards.**

1. **Residential buildings shall achieve a minimum density of at least 12 units per net acre, as measured by the total number of residential units divided by the portion of the site devoted to residential use, not including public or private streets, or critical areas and associated buffers on that portion.**

Response: After subtracting out the school site (20-acres), the proposed forested tract and open space area (24-acres), right of way (21.79-acres) and industrial use area (74.12-acres) from the 179-acre site area total, the net master plan area available for residential use is approximately 39.09 acres and is comprised of both the R LUA and MX LUA. With an anticipated maximum buildout of 1,800 residential dwelling units, the resulting density within residential and/or mixed-use areas is approximately 46.05 units per acre, thereby exceeding the minimum density standard above. Given the availability of the IL LUA for up to 100 dwelling units per this proposed master plan, the density of the residential area may ultimately be slightly below this 46.05 units per acre target but will not affect the project's compliance with this provision. Specific compliance with the 12 units per net acre will be demonstrated with each Site Plan Review request within the master plan.

2. **Non-residential buildings shall achieve a floor area ratio (FAR) of at least .5, as measured by the gross square footage of the nonresidential buildings divided by the site area or areas devoted to nonresidential use. Individual nonresidential buildings and associated attached structures shall be counted as floor space. The site or portion of the site**

devoted to those buildings, not including public right-of-way, parks or pedestrian trails, shall be counted as site area. Parking garages may be counted towards the FAR requirement provided that 60% of the ground floor is devoted to an office or commercial use.

Response: Because the project is planned for highly integrated mixed-use buildings, the only LUAs that will contain minimal to no residential component are the School LUA and the IL LUA. Consistent with the Current VIC Master Plan, the applicant proposes to apply the development standards most analogous to each LUA within each LUA, thus the .5 FAR does not apply to the Residential, School, or Light Industrial LUAs within the Revised VIC Master Plan.

3. Development standards shall be as indicated in the MX column of Table 20.430.040-1.

Response: The applicant is proposing to apply development standards for these areas that align with existing development standards for comparable land use districts in the City as provided for and modified in the Restated DA. For example, the applicant is proposing to apply the light industrial development standards found in VMC 20.440, for intended light industrial uses and R-30 development standards outlined in VMC 20.420 for the RLUA. Limited exceptions to those standards were authorized with the Current VIC Master Plan as detailed in Exhibit D of the Restated DA. Updates to the Restated DA are anticipated to align with the Revised VIC Master Plan proposal.

4. Screening. Non-residential uses, including off-street parking, which directly abut off-site single-family residential zones without an intervening public or private street shall provide screening as per 20.440.030(C)(3).

Response: The only instance in which non-residential uses will abut a single-family zone without an intervening street is along the northern boundary of the VIC site where the School and IL LUA's abut an existing single-family residential neighborhood. As reflected in the Master Plan Design Set (Appendix E) a minimum 65-foot-wide open space area is proposed along the northern boundary of the site and will include a minimum 30-foot-wide vegetative buffer, a minimum 15-foot-wide trail, with an approximate 20-foot transitional area between the trail and future parking areas for buildings within the IL LUA. The combination of buffer and horizontal separation will adequately screen the neighborhood from the non-residential uses proposed within the site.

f. Frontage standards.

1. Buildings shall be placed to encourage pedestrian activity within and along the site. No more than 50% of each site frontage along arterial or collector streets shall be devoted to off-street parking or vehicular access. Portions of site frontages devoted to off-street parking or access shall include design features such as landscaping or columns so as to maintain visual continuity of the street and sidewalk to the fullest extent possible.

Response: All three roads on the perimeter of the site are either a collector (SE 176th Avenue) or an arterial (SE 34th Street and SE 192nd Avenue). In addition, the northern half of the loop road, SE 29th

Street, is proposed as a new urban collector arterial which will run east- through the site. Tentative massing and development diagrams reflected on the Master Plan Design Set (Appendix E) indicate that the use along the site frontages will be predominantly occupied by buildings and will likely incorporate landscaping and pedestrian facilities between buildings and the right of way. While some parking and vehicular access areas will be present, they will not occupy more than 50% of the site frontage. Demonstration of compliance with this provision will be provided at the site plan review stage with each future development request. The applicant has sold the school LUA to Evergreen School District (ESD). ESD will address this frontage requirement as part of its school site development proposal.

- 2. At least one fully functional and visibly identifiable public entrance shall be provided along the frontage of each building adjacent to an arterial or collector street.**

Response: The property will be designed to comply with this provision. The site is bounded by a collector (SE 176th Avenue), and arterial streets (SE 34th Street and SE 192nd Avenue). Due to SE 29th Street's designation as an urban collector arterial, minimal access points have been proposed to facilitate vehicular circulation to the north IL LUA area. Roundabouts along the loop road will provide access to an internal private vehicular accessway to serve the existing VIC and VIC Building North which recently obtained construction plan approval. Buildings fronting these higher classification roadways can incorporate public entrances to comply with this criterion.

- 3. Blank walls longer than 30 feet without windows or an unbroken series of garage doors are not permitted on any street frontage, including frontage to controlled access highways and freeways.**

Response: Per the Revised Design Guidelines (Appendix F), blank walls longer than 20 feet without windows or an unbroken series of garage doors are not to be permitted on any street frontage. Demonstration of compliance with this provision will be provided at the time of site plan review submittal for future developments.

- g. Multiple parcel sites. Mixed use sites may be developed pursuant to this chapter on sites which consist of multiple parcels and internal public or private roads, provided that all applicable standards herein are met. Pedestrian connections required by 20.430.060 (C)(2)(d)(2) crossing internal arterial streets shall not require differentiated surface materials if striping is provided.**

Response: The applicant's request involves a mixed-use master plan on a site with multiple parcels. Demonstration of project compliance with the standards of this chapter is provided throughout this narrative and the remaining application materials.

- h. Parking – The following shall apply in addition to the standards of VMC 20.945.**
 - 1. The maximum number of spaces provided shall be no more than 125% of applicable minimum requirement for sites 10 acres or less, and no more than 115% of the minimum for sites larger than 10 acres.**

Response: The current master plan developed parking strategies centered around utilization of existing surface parking facilities. As reflected in the revised master plan, many of the existing parking facilities

will not be retained. Most of the facilities located to the south, east and west of the existing VIC will be incrementally demolished as development occurs within the site. New parking lots, stalls, and/or facilities will be constructed with each phase of new development. The applicant will provide parking consistent with the ratios specified in the Restated DA with the following exceptions:

- Given that the applicant anticipates having studio apartments on campus, the applicant proposes a parking ratio of 1 stall/studio dwelling unit. The current DA does not specify a parking ratio for studio apartments.
- As noted during the pre-app, there was a scrivener's error in the approved DA stating that parking in the IL LUA was to be at a minimum of 4.5 stalls/1,000 SF. This should have stated that 4.5 stalls/1,000 SF was the maximum allowed. Applicant proposes to adhere to VMC 20.945.070 requirements as the minimum for parking in the IL LUA. The maximum for the light industrial LUA is being removed and not being reinstated as 4.5 stalls/1,000 SF in order to allow the applicant to respond to tenant/market demand
- Uses in all LUAs may count available on-street and off-site parking spaces which are within 1,000-foot walking distance (4 minutes) to the development toward the minimum on-site parking requirement.
- The table below summarizes the proposed parking ratios to be used throughout the Revised VIC Master Plan site.

Table 1. Revised VIC Master Plan Parking Ratio

Program	Prior DA (Masterplan 1.0)	Proposed for Masterplan 2.0	Proposed Change
SFR	1 – 2 stall/DU	1 stall/DU min.	No change
MFR	1.5 - 2 stall/DU	1.5 stall/DU min.	No change
SFR/MFR/MX/IL Senior	0.3 stall/DU	0.3 stall/DU min.	No change
SFR/MFR/MX/IL Studio	N/A	1 stall/DU min.	Masterplan 1.0 did not address parking ratio for studios so proposing to include one
MX Non-residential	2 – 2.5 stalls/1,000 SF	2 – 2.5 stalls/ 1,000 SF	No change
IL Non-Residential	4.5 stalls/1,000 SF	min per VMC 20.945.070; remove maximum	Reduced minimum; removed maximum

2. **The Planning Official may authorize shared or joint use parking among uses which are likely to be visited with a single driving trip and are adequately linked to their parking, provided an adequate legal agreement for the joint parking usage for the duration of the arrangement is recorded.**

Response: The applicant is anticipating the use of shared or joint parking across the site. The variety of uses proposed within the site do not have coinciding peak parking demands and therefore, provide a unique opportunity to allow shared parking. Additionally, as noted above, the applicant is seeking the use

of shared off-site parking facilities and on-street parking to satisfy parking demand for each use. Instances such as these in which the applicant seeks joint parking will be requested in conjunction with site plan review requests for future development actions. As noted previously, the City intends to provide its own dedicated parking for the Forested Tract so shared parking will not be needed for that use.

- 3. The Planning Official may authorize shared or joint use parking among uses which have differing hours of operation or usage, such as residences and offices, provided an adequate legal agreement for the joint parking usage for the duration of the arrangement is recorded.**

Response: As discussed above, the applicant anticipates that joint parking will be utilized in instances where adjoining uses have different peak parking demands.

- 4. The Planning Official may authorize up to a 25% reduction in required parking if transit service is available to the site.**

Response: A request for reduced parking is not anticipated at this time. C-TRAN Route 37 provides loop service between SE 164th Avenue and Mill Plain Boulevard. Bus stops currently exist in both directions on SE 34th Street at SE 189th Avenue and on SE 192nd Avenue at SE 31st Street. The future intersection of SE 29th Street at SE 192nd Avenue is only approximately 800-feet north of the current bus stops at SE 192nd Avenue and SE 31st Street. Pedestrian facilities through the site will facilitate access to these bus stops to encourage the redevelopment of the site, and, in particular, the dense MX LUA at the center of the site. The applicant is interested in facilitating additional bus routes to and through the property, with C-TRAN's concurrence.

- i. Vesting**
Vesting and concurrency provisions shall be as indicated in 20.260.090 and 20.260.100.

Response: Vesting and concurrency has been addressed in previous development agreements for the site. Concurrent with the current VIC Master Plan, the applicant requested City approval of the Restated DA that updated the vesting and transportation concurrency provisions to reflect the specific uses and implemented standards anticipated for future development of the site.

3. Review Process – Mixed Use Sites

- a. Mixed Use Plan. Initial development of a multiple building mixed use site or portions of a mixed use site shall require submittal and approval of a Mixed Use Master Plan, unless already subject to previous Mixed Use or Master Plan approval. The following requirements shall apply:**
 - 2. Approval Criteria and Zoning. Proposed Mixed Use Master Plans 25 acres or larger in size shall be reviewed as Type IV application by the Planning Commission. Proposals less than 25 acres shall be reviewed as Type IV applications by the hearings Examiner. Approvals, or approval with conditions shall be granted upon findings that:**

- a. **The Master Plan and associated conditions of approval ensure future development will meet all applicable criteria of this chapter; and**

Response: Compliance with the provisions of this chapter is demonstrated in the responses provided throughout this narrative and in the associated application materials. Subsequent site plan approval will meet all applicable criteria of the VMC 20.430.060 multiple building mixed use standards unless modified by the Development Agreement and this Master Plan.

- b. **The proposal complies with applicable rezone criteria of VMC 20.285.080; and**

Response: Per Ordinance 4346 on August 6, 2021, the site has been rezoned from Industrial to Mixed Use. Compliance with the rezone criteria found in VMC 20.285.080 is not required to be demonstrated with this application.

- c. **There is or will be sufficient capacity within the transportation system and public sewer, water, police, fire, and stormwater services to adequately serve all portions of the site at the time of development; and**

Response: The revised TIA prepared by Kittelson and Associates, Inc. (Appendix D) demonstrates that the proposed uses within the master plan will generate a modest increase in weekday AM peak hour trips and the same number of weekday PM peak hour trips as compared to those already reserved for the site through the existing development agreement. The combined impact of refinements to the on-site transportation network, closure of one existing VIC campus vehicular access on SE 34th Street and revised site land uses results in changes to off-site proportional share contribution amounts but does not trigger new off-site transportation capacity mitigation construction beyond those measures required of the current VIC Master Plan development agreement. Because the City's transportation planning department has already reserved capacity in the system for the trips associated with the site, sufficient capacity exists within the transportation system with resolution of infrastructure improvements and other mitigation requirements outlined in the revised TIA. Consistent with the current VIC Master Plan, the applicant will improve the long-term capacity of the surrounding road network to address future growth in part by completing a segment of SE 29th Street from SE 192nd Avenue to SE 176th Avenue to provide an alternate east-west corridor to help relieve demands on SE 34th Street between SE 164th and SE 192nd Avenues. The revised TIA finds there will be sufficient capacity within the transportation system to adequately serve all portions of the site at the time of development and identifies implementation timing for each of the recommended mitigation measures associated with project phases. No new off-site mitigation measures were identified in the revised TIA.

Water and sewer utilities are readily available to the site and can be feasibly extended to serve the properties. All stormwater runoff from impervious surfaces on the site will be treated and infiltrated on-site as noted above. Stormwater runoff will be addressed in detail with future development plans and Stormwater Technical Information Report(s) with site plan review requests. Police, fire, and emergency services are generally available to serve the site and project impacts on these services will be incremental over the course of the buildout of the master plan.

- d. **A change in circumstances has occurred since existing zoning designations at the site were originally adopted. For the purposes of a multiple building mixed use plan only, compliance with the development standards of VMC 20.430.060.C.2 and the applicable Comprehensive Plan policies shall be sufficient to demonstrate that a change in circumstances has occurred.**

Response: Per Ordinance 4346 on August 6, 2021, the site has been rezoned from Industrial to Mixed Use. Compliance with the rezone criteria found in VMC 20.285.080 is not required to be demonstrated with this application. The revision to the prior master plan does not change the overall composition of the mixed-use master plan but rather reconfigures land use areas within the boundaries for larger, consolidated industrial sites and increases residential density in response to unprecedented demand for housing.

3. **Proposed modifications to previously approved mixed use concept plans shall require Type I, II or III review depending on the modification required, as specified in VMC 20.260.030.**

Response: The applicant is requesting a modification to an approved mixed use master plan, and pursuant to DA Section 7, the requested changes constitute a major revision thus prompting a Type IV review.

- b. **Development proposals on sites subject to an existing Mixed Use Master Plan or existing mixed use zoning:**

1. **Development on sites or portions of sites subject to Mixed Use Master Plan approval under this chapter, or under equivalent mixed use approval prior to this chapter, shall require site plan approval as Type II review under VMC 20.270. Approval or approval with conditions shall be granted if the proposal is fully consistent with the approved Mixed Use Master Plan or equivalent, applicable portions of this chapter, and VMC 20.270 procedural standards.**

Response: The applicant anticipates site plan review submittals for future development requests within the master plan.

2. **Development on sites or portions of sites zoned MX but not subject to an approved Mixed Use Master Plan under this chapter or other shall submit for master plan review under this chapter as a Type III application for sites less than 25 acres, and a Type IV application for sites 25 acres or larger.**

Response: The entire site area was previously rezoned to Mixed Use (MX) and therefore, will be subject to review under the governing land use entitlements associated with this revised mixed use master plan request.

3. **No more than 50% of the total square footage envisioned by the Master Plan for any one major use type (commercial, office or residential) can be granted occupancy permit approval until occupancy permit approval is provided for at least 25% of the total square footage of all of the major use types envisioned in the Master Plan. This requirement may be waived by the planning official, if the applicant provides a security or other form of binding assurance that the remaining major use types contemplated in the Master Plan will be built.**

Response: The Restated DA includes “Synchronicity” provisions. These provisions limit the extent of residential uses allowed on the site based on the applicant’s delivery of new employment use square footage within the development. Specifically, Section 6.4(d) of the Restated DA stipulates that the applicant will be unable to construct greater than 50% of the residential units within the project until the developer has built at least 215,000 SF (25%) of the proposed new employment square footage on the site. Refinement of this language is anticipated to address additional housing units proposed with the project. However, as previously stated, the applicant has recently secured final engineering and building permit approvals for a new 200,981 square foot industrial building, VIC Building North, which largely meets this initial obligation for non-residential square footage.

- D. **Adjustment to Numerical Standards – Single Building and Mixed Use Sites. Numerical standards contained in this chapter may be adjusted by up to 25% if a clear demonstration is provided that the proposed mixed use development with the adjustment would fully comply with the purpose statement and all other applicable standards of this chapter, and that the proposal would clearly not be able to comply with those standards without the proposed adjustments.**

Response: The applicant proposed land use area-specific development standard adjustments with the Restated DA that was approved by the Vancouver City Council by Ordinance 4346 on August 16, 2021. An adjustment to numerical standards is not proposed as part of the revised master plan request at this time, however, application of this provision may be requested at the time of individual site development.

- E. **Incentives – Single Building and Mixed Use Sites. Traffic impact fees for mixes use developments shall be reduced to account for internal trips between uses on the site or building as demonstrated by an approved traffic study.**

Response: The TIA prepared by Kittelson and Associates (Appendix D) has considered an internalization factor for trips that will be retained on site due to the proposed mixture of land uses. It is assumed that any traffic impact fees applicable to future developments within the site would be based on the net increase of trips after this internalization factor is applied.

Vancouver Strategic Plan

GOAL 1: Ensure our built urban environment is one of the safest, most environmentally responsible and well maintained in the Pacific Northwest.

Response: The revision to the VIC mixed use master plan serves Goal 1 as the developer is committed to ensuring a safe, environmentally responsible, and well-maintained property. The applicant demonstrates

this commitment through the Revised Design Guidelines (Appendix F) for the site that promote design principles to incorporate sustainability and energy efficiency measures such as vehicle charging stations, solar panels, low impact development (LID) stormwater management approaches, shared parking strategies, and site design that supports a 20-Minute Neighborhood. The concept of the 20-Minute Neighborhood, and the 5-Minute derivative proposed with the Revised VIC Master Plan is to encourage accessibility, active (walking, cycling) transport and public transport in proximity to housing, employment opportunities, recreational opportunities, and open spaces. The Revised VIC Master Plan proposes a network of passive and active open space areas that utilize existing trees and natural resources, a balance of community gathering spaces and areas, the creation of a compact urban form composed of well-articulated buildings and ample pedestrian areas to encourage multi-modal travel throughout the site between the various on-site uses and open space areas and enable building design that encourages pedestrian access, ground floor visibility and community spaces for socialization and collaboration.

GOAL 4: Ensure that Vancouver's parks and trails system is the highest quality and most complete in the region.

- **Objective 4.1: Increase maintenance levels and accessibility to parks**
- **Objective 4.2: Increase recreational opportunities in our parks**

Response: As demonstrated with the Potential Open Space Site Plan Sheet 004 (Appendix E), the revised master plan serves Goal 4 by promoting a town plaza, neighborhood parks and providing a network of active and passive open space areas on the site including a multi-use trail that connects to 34th Street as part of the City's Complete Streets Program to enhance safety, efficiency, and mobility for all users. The master plan preserves an approximately 13.7-acre designated forested tract at the northeast corner of the site. Additionally, the Mobility Plan Sheet 005 (Appendix E) demonstrates functional connections to the site-wide bicycle and walking path network.

GOAL 6: Facilitate the creation of neighborhoods where residents can walk or bike to essential amenities and services—"20-minute neighborhoods"

- **Objective 6.1: Support a strong, active neighborhood program that enhance livability and community connections**
- **Objective 6.2: Improve amenities and services that allow residents to "age in place"**

Response: As mentioned, the proposed mixed use master plan supports the 20-minute neighborhood concept that encourages accessibility, active (walking, cycling) transport and public transport in proximity to housing, employment opportunities, recreational opportunities, and open spaces. The Mobility Plan Sheet 005 (Appendix E) demonstrates functional connections to the site-wide bicycle and walking path network. This mixed-use community will strengthen east Vancouver's commercial, light industrial, retail and community districts, helping to build a strong, resilient economy.

GOAL 8: Strengthen commercial, retail and community districts throughout the city

- **Objective 8.1: Make downtown Vancouver a vibrant destination for the community and the region**
- **Objective 8.2: Strengthen neighborhood business districts**

Response: The Revised VIC Master Plan proposes a more integrated mixed-use community in east Vancouver in a location where residents can work, shop, go to school and recreate all within a 20-minute walk from home. The diversity of residential housing products will offer a diversity of price points to allow housing opportunities for persons of a wide range of incomes within the community. The increase in residential density within the site will respond to shortages in the market. The additional residential rooftops will help support the neighborhood retail uses within and near the master plan site, supporting the existing and future neighborhood business districts.

GOAL 9: Build the strongest, most resilient economy in the region

- **Objective 9.1: Create infrastructure and policies that support job creation**

Response: The Revised VIC Master Plan reconfigures land use areas to provide greater integration of uses throughout the site including development of large-footprint light industrial buildings which allow for more flexibility to respond to market demands and tenant needs and is critical to achieve both the project and City's employment generation goals. As demonstrated with the Master Plan – Proposed Land Use Sheet 003 (Appendix E), of the approximately 179-acre site, approximately 74 acres of IL land and approximately 33 acres of MX land is proposed to create infrastructure that supports job creation and employment opportunities in research and development, light industrial/manufacturing uses, professional office, medical, retail, education and in the short term, construction and trade industries. The mixed-use environment enhances the experience for residents, employees and patrons by offering a variety of services and amenities which will not only support the immediate businesses within the site but will support other uses in the broader Vancouver area.

In addition, the developer will be constructing a segment of SE 29th Street between SE 192nd Avenue and SE 176th Avenue through the site. The facility is planned as an urban collector arterial and will relieve east-west congestion occurring on SE 34th Street and increase mobility and convenience in east Vancouver. The addition of this facility and other public infrastructure will enhance the marketability and interest in the employment uses on the site. The proposed location for SE 29th Street and the SE 29th Street streetscape will provide a transition between residential, and office/flex uses on the site, provide for truck traffic to and through the IL LUA, and offer safe and convenient pedestrian and bicycle access between the uses on the site.

Vancouver Comprehensive Plan

EC-1 Jobs-housing balance

Increase the ratio of jobs to residents in the City of Vancouver and the region.

Response: The June 30, 2020, Market & Economic Analysis for Vancouver Innovation Center, prepared by Eric Hovee discusses the various market factors influencing the development of the site and the respective benefits of the applicant's proposal to diversify the uses within the site and broaden the array of employment uses allowed. The study estimated that the Current VIC Master Plan could add approximately 3,500 net new jobs at build out. As discussed throughout this narrative and reflected in the various appendices, the Revised VIC Master Plan maintains the nonemployment square footage targets and thus the potential job creation is consistent. The increase in residential density will improve the jobs to residents ratio in the East Vancouver area.

EC-2 Family-wage employment

Promote the formation, recruitment, retention and growth of businesses that provide a wide range of employment opportunities, particularly family-wage employment. Prioritize family-wage employment in land use policies and practices.

Response: New jobs anticipated at build-out will provide a wide range of employment – in tech and light industrial activities, good paying professional/technical office-related occupations, and including entry-level and part-time retail/service employment suited to a range of employee interests and needs.

EC-3 Public revenue enhancement

Promote development that enhances revenue generation for public services.

Response: Per Clark County GIS, from 2006-2019, property taxes paid on the HP property declined by approximately 22%. Re-occupancy of the full existing space should stem this erosion. New development will add substantially to the property values and resulting tax revenues (in amounts not yet estimated). While on-going sales tax potential is greatest for commercial retail, dining and personal service uses (as compared with many industrial or office activities), the City will also generate considerable one-time sales tax revenue from new construction over the course of development to project build-out.

EC-4 Industrial and business park sanctuaries

Provide an adequate supply of industrial and/ or business park areas with opportunities for family-wage employment and revenue generation.

Response: The Revised VIC Master Plan concept can accommodate approximately 5,000 jobs including significant and diverse family-wage employment opportunities consistent with the current master plan. The revised master plan will maintain the mix of residential and commercial uses contemplated in the current plan, uses which yield higher per square foot values than industrial-only uses, resulting in increases to both property and sales tax revenue beyond what would be generated by less-intensely developed industrial-only uses.

EC-5 No net loss of employment capacity

Restrict zone changes or legislative land use approvals that would lessen long-term capacity for high-wage employment unless accompanied by other changes within the same review cycle that would compensate for the lost capacity or unless the proposed change would promote the long-term economic health of the city.

Response: As noted with the current VIC Master Plan, it is expected that a highly integrated mixed-use center that incorporates housing and amenities with employment will result in a greater employment potential on the site and greater business retention. When formerly considering if the property should be zoned from industrial to MX, Jones Lang LaSalle Americas, Inc. prepared a Comparative Valuation Analysis on December 8th, 2020, that concluded: “the property will exceed its current value significantly under the proposed mixed use (MX) zoning due to the added diversity of the asset mix and the construction of retail, lifestyle, and educational amenities for tenants and the surrounding community.” The revised master plan retains the integrity of this assessment and offers an even greater degree of

mixed-use integration, which will further this objective of increasing business and business retention through the creation of place.

EC-6 Efficient use of employment land

Maximize utilization of land designated for employment through more intensive new building construction and redevelopment and intensification of existing sites.

Response: The VIC proposal serves EC-6, efficient use of employment land, by consolidating and reconfiguring the IL LUA and leveraging more shared parking strategies. The Revised VIC Master Plan offers a more efficient overall land plan that provides greater flexibility for site design and development to respond to market drivers.

EC-7 Regional focus

Work with the larger Portland-Vancouver region to leverage opportunities, unique site availability, and marketing to promote the region nationally and globally to attract new business.

Response: The vision of the revised master plan is to honor and build around the innovative roots of the site as a high-tech employment hub, by building around the existing buildings and making that the core of the community. This will create a unique environment unlike others in the region and an environment that can be promoted at both a national and global level. The applicant has already made strides by securing tenants in the existing VIC who have national and international reach in their individual business markets. The implementation of the Revised VIC Master Plan will only improve upon this tenant portfolio.

EC-8 Small business support

Support the growth of new and expanding small business through efficient permitting, incentives, and communication.

Response: The proposed master plan revision will retain the capacity for small business within the site. There is substantial opportunity for new and expanding small businesses to find a home within the existing VIC or one of its future buildings. The variety of spaces provide great flexibility for tenant configurations to meet a wide range of businesses. This is especially critical in the near term as a visible sign that Vancouver is open for business to promote economic recovery over the next 2-3 years. The applicant is interested in collaborating with the City of Vancouver to identify and promote development and employer-based incentives – most ideally with coordination offering features of one-stop permitting that should work with an already approved master plan.

Chapter 4: Housing

H-1 Housing options

Provide for a range of housing types and densities for all economic segments of the population. Encourage equal and fair access to housing for renters and homeowners.

Response: The revised master plan proposes to increase density to a maximum of 1,800 dwelling units and will allow a variety of residential product types including single family attached, garden style apartments and vertical mixed use residential. Considerable effort has been expended to evaluate market needs for the various housing types and building composition including a mix of unit sizes which will serve

demand more efficiently. These product types can provide either rental or ownership opportunities at a variety of price points. This is particularly critical to ensure that housing is available for a variety of workers in various positions within the employment uses on the site and to relieve housing shortage within the broader Vancouver area.

H-2 Affordability

Provide affordable housing by formulating innovative policies, regulations and practices, and establishing secure funding mechanisms. Target affordability programs toward households with incomes below the median.

Response: The Revised VIC Master Plan proposes to increase density to a maximum of 1,800 dwelling units and will allow a variety of residential product types including single family attached, garden style apartments and vertical mixed use residential with a wide range of price points to serve broader economic groups. If the City were to adopt an MFTE zone that included the property, the applicant may seek to participate in the program for some portions of the site.

H-3 Housing improvement

Encourage preservation, rehabilitation and redevelopment of existing housing stock. Support neighborhood based improvement efforts.

Response: There are no existing homes on the master plan site. The Revised VIC Master Plan proposes two non-contiguous R LUAs and anticipates residential uses within the MX LUA. A variety of amenities are proposed throughout the site including publicly accessible open spaces, the perimeter trail, and other pedestrian and bike friendly facilities along roadways within the site. Uses anticipated within the site including office, retail, services, employment and education will add to the nature and feel of the neighborhood and community.

H-4 Innovative zoning

Encourage innovative housing policies that provide for affordable housing and maintain neighborhood character.

Response: The MX master plan allows for higher density housing on the site, thereby increasing housing inventory and allowing new housing at multiple price points. If the City were to adopt an MFTE zone that included the property, the applicant may seek to participate in the program for some portions of the site.

H-5 Housing placement near services and centers

Facilitate siting of higher density housing near public transportation facilities and in designated centers and corridors.

Response: C-TRAN Route 37 provides loop service between SE 164th Avenue and Mill Plain Boulevard. Bus stops currently exist in both directions on SE 34th Street at SE 189th Avenue and on SE 192nd Avenue at SE 31st Street. The future intersection of SE 29th Street at SE 192nd Avenue is only approximately 800-feet north of the current bus stops at SE 192nd Avenue and SE 31st Street. Pedestrian facilities through the site will facilitate access to these bus stops to encourage and will further encourage the redevelopment of the site.

H-6 Special needs housing

Facilitate housing for special needs populations dispersed throughout Vancouver and the region. Such housing may consist of residential-care facilities, shelters, group homes, or low-income housing, and should be located near transportation and other services such as health care, schools, and stores.

Response: While the applicant is not currently planning an affordable housing project on the site, they are willing to explore such a project if the City were to help with incentives such as adopting an MFTE zone for the site.

H-7 Home ownership

Promote opportunities for home ownership and owner occupancy of single- and multifamily housing.

Response: The Revised VIC Master Plan proposes to remove single family detached units from the project and will focus on other housing typologies which will increase housing inventory in the city and will allow for new housing at a variety of price points which may be available for sale or lease.

H-8 Public-private partnerships

Facilitate enhanced partnerships between public, private, and non-profit sectors to address affordable housing.

Response: The applicant is open to pursuing public-private opportunities that would enable an affordable housing project at the site.

H-9 Funding for housing

Pursue funding mechanisms to support affordable housing.

Response: Programs such as the MFTE program, Community Development Block Grants (CDBG), Tax Increment Financing (TIF) and other opportunities exist to help facilitate affordable housing projects. The applicant is open to further dialogue over the course of the development of the Revised VIC Master Plan to develop affordable housing on the site should the City seek to partner to make incentives available for such a project.

Chapter 5: Public Facilities and Services

PFS-1 Service availability

Consider water, sewer, police, transportation, fire, schools, storm water management, and parks as necessary facilities and services. Ensure that facilities are sufficient to support planned development.

Response: The applicant and developer of the VIC will be making significant investments to develop a robust on-site infrastructure system to support the uses on the site. These investments include the development of SE 29th Street to an urban collector arterial standard, and the installation of public water, sanitary sewer, and LID stormwater facilities throughout the project site. In addition, the applicant has sold a 20-acre site to the Evergreen School District for a future middle school. The master plan also calls for significant areas of open space across the campus including the 13.7-acre forested tract identified in the prior plan which the applicant is in negotiations with the City to sell this land to be developed as a

municipal park in the future. Other open space areas are proposed including the VIC Trail which will run along the perimeter of the site, a town plaza and a neighborhood park. In total, the revised master plan proposed 24 acres of open space, approximately five (5) acres more than what was contemplated in the current master plan. Additionally, the payment of system development charges or impact fees applicable for new development as well as property taxes help fund public services including police, fire, emergency management, schools, etc.

PFS-4 Transportation system

Develop and maintain an interconnected and overlapping transportation system grid of pedestrian walkways, bicycle facilities, roadways for automobiles and freight, transit and high-capacity transit service. Include support programs such as traffic operations, transportation demand management, neighborhood traffic management, and the regional trails program. Work towards completing and sustaining individual components and programs to ensure success of the entire system.

Response: Figure 5-3 of the City's Comprehensive Plan illustrates planned connection routes through the City. This map identifies a new east-west route through the VIC site in the alignment of NE 25th Street. Following discussions with the City during the current master plan review, it was determined that this route will be provided in the alignment of NE 29th Street. This route will help ease the number of vehicular trips that have to use SE 34th Street for connectivity between SE 164th Avenue and SE 192nd Avenue so long as the exiting configuration of SE 34th Street is maintained subject to any improvements required for this project. The revised master plan maintains the NE 29th Street extension thus providing of this important link in the regional transportation network.

PFS-5 System balance

Allocate resources to balance transportation choices. Promote development of a broader range of transportation options including pedestrian, bike, and transit systems, rather than focusing all resources on satisfying peak commuting demand with roadway capacity alone.

Response: The revised master plan will include an extensive network of pedestrian pathways or trails, sidewalks, bike lanes, plaza, and promenade areas to help provide alternative routes of travel for pedestrians and bicyclists to travel within the site and to off-site locations, including transit stops located on SE 192nd Avenue at SE 31st Street and on SE 34th Street at SE 189th Avenue.

PFS-8 Transportation circulation and system connectivity

Develop a transportation grid that provides good connections to surrounding land uses and activity centers and allows for multiple circulation routes to/from each location. Close gaps and complete system connections through the development and capital improvement processes.

Response: The applicant's completion of the SE 29th Street link will be an important improvement in the local regional traffic network, which lacks a continuous grid in many areas. The installation of SE 29th Street will relieve the burden currently being placed on existing corridors for vehicular throughput.

PFS-10 Livable streets

Design streets and sidewalks and manage vehicular traffic to encourage livability, interaction, and sense

of neighborhood or district ownership in linkage with adjacent land uses. Encourage multi-modal travel, and provide accessible, human scale opportunities for transferring between travel modes.

Response: The revised master plan will include an extensive network of pedestrian pathways, sidewalks, bike lanes, plaza, and promenade areas to help provide alternative routes of travel for pedestrians and bicyclists to travel within the site and to off-site locations, including transit stops located on SE 192nd Avenue at SE 31st Street and on SE 34th Street at SE 189th Avenue.

PFS-13 Neighborhood traffic

Protect and enhance neighborhoods with an active program that focuses on safety, safe routes to school, traffic calming, education, and enforcement.

Response: The proposed future middle school is located at the northwest corner of the site and near residential uses on the site providing for shorter routes of travel for many of the residents on the site. New public sidewalks and additional trails on the site will further help to facilitate safe pedestrian routes to this school. The Mobility Plan and associated Streetscapes Summary included in the Master Plan Design Set (Appendix E) reflect a thoughtful approach to both vehicular and non-vehicular transportation. For example, the use of laneways in neighborhoods place more emphasis on pedestrian movements and shared space with lower vehicle use, while SE 29th Street is designed for higher volumes of traffic and separated bike and pedestrian facilities to buffer against traffic. The applicant has been working with City staff and has refined the designs to respond to feedback.

PFS-17 Vehicle miles traveled

Use transportation and land use measures to maintain or reduce single occupant motor vehicle miles traveled per capita to increase system efficiency and lower overall environmental impacts.

Response: One of the fundamental goals of the existing master plan was to create a 20-minute community in which residents can fulfill most of their daily trip needs within a 20-minute walk. By establishing a 20-minute community, the applicant can minimize the need for vehicular trips, which in many cases would be conducted in a single-occupant vehicle and with a significantly greater carbon footprint. The revised master plan improves upon the 20-minute community concept and now has mixed use buildings within a five-minute walk for those living and/or working on the campus.

PFS-28 Schools

Work with local school districts to facilitate an adequate supply of schools and associated facilities. Facilitate timely and efficient siting processes which allow for assessment and mitigation of impacts.

Response: The applicant worked with the ESD to reserve an approximately 20-acre site on the property for a future middle school during the entitlement for the current master plan. Since then, ESD has purchased the parcel and the applicant continues to work with them as party and some further boundary adjustments need to be made to the school parcel to align with the proposed roadway network in the revised master plan. ESD staff has indicated that the proposed boundary adjustments provide a more developable parcel for the school district and the total acreage of the parcel remains 20-acres as in the current master plan.

PFS-30 Open spaces and parks

Provide and maintain parks, open spaces, and recreational services for all segments of the community consistent with adopted level-of-service standards. Facilities and services should support recreational activities, environmental or historical resource protection, and should preserve and enhance neighborhood identity and function.

Response: The applicant began discussions with the City to reserve a 13.7-acre location at the northeast corner of the site for a park that will be open to the public during the first master plan entitlement. Discussions have continued as the applicant has refined the master plan. The forested tract is delineated within the Master Plan Design Set and reflects a slightly modified boundary to encapsulate mature and healthy trees which have been surveyed since the current master plan approval.

PFS-31 Trails

Provide a system of trails linking public and private open spaces, parks, recreational uses and transportation facilities within and between jurisdictions. Encourage use of greenspaces and riparian corridors as pedestrian and nonauto-oriented linkages within the urban area, in balance with habitat protection.

Response: The proposed master plan will include an extensive network of pedestrian pathways and trails, sidewalks, a neighborhood park, town plaza, and promenade areas to help provide alternative routes of travel for pedestrians and bicyclists to travel within the site and to off-site locations. See Sheets 004 and 5 of the Master Plan Design Set (Appendix E).

PFS-32 Parks Coordination

Plan for parks, trails, open spaces and recreational services in coordination with other local and regional public agencies and private entities. Facilitate provision of lands and/or impact fees for parks as part of the development review process.

Response: The applicant began discussions with the City during the Current VIC Master Plan entitlement process to reserve an approximately 13.7-acre location at the northeast corner of the site for a park that will be open to the public. The Revised VIC Master Plan reflects the proposed forested tract, and the applicant continues to work with the City to negotiate the terms of this reservation including the potential for additional land which the City will use to provide dedicated off-street parking for the new municipal park.

6.2.2 Coordinate with service providers to identify the land and facility requirements of each and ensure that sufficient land is provided in urban and rural areas to accommodate these uses.

- 2. How the proposal is more consistent than the existing designation with each of the following objectives as applicable:**

Response: The applicant is not proposing a Comprehensive Plan amendment or rezone application with this revised master plan submittal. This standard does not apply.

IV. Conclusion

As demonstrated in this narrative and in the associated application appendices, the proposed major revisions to the current mixed use master plan will further the goals and policies of the City's Comprehensive and Strategic Plans and facilitate investment in the community. As the proposal has been found to meet the approval criteria governing the request, the applicant respectfully requests City approval of these land use applications.

APPENDIX D

REVISED TRAFFIC IMPACT ANALYSIS

April 28, 2023

Project #: 27715.5

Eric Hahn, PE
City of Vancouver Public Works
4500 SE Columbia Way
Vancouver, WA 97668-1995

RE: Traffic Impact Analysis for the Revised Vancouver Innovation Center (The VIC) Mixed Use Master Plan

Dear Eric,

The VIC Building Owner LLC (the Applicant) proposes revisions to The VIC Mixed Use Master Plan and Development Agreement¹. Primary objectives of the revisions are to 1) consolidate industrial areas to optimize opportunities for employment-generating development and 2) more substantially integrate development types to allow for greater density while creating an opportunity to provide more open spaces throughout the site to enhance design and placemaking opportunities.

From a traffic impact perspective, key changes associated with the revised Master Plan include:

- A small reduction in overall daily campus trip generation, a modest increase in AM peak hour trip generation, and no change in the PM peak hour trip generation compared to the current approvals and trip vesting;
- Refinement of the on-site transportation network;
- Elimination of one existing campus vehicular access on SE 34th Street; and
- Refinement of the on and-off site transportation mitigation measures into four distinct project phases.

In addition to the Master Plan changes noted above, this study incorporates transportation system changes anticipated associated with the City of Vancouver's *SE 34th Street Safety & Mobility Project*². The documentation presented in this report is prepared to inform updates to the Development Agreement, in particular memorialization of The VIC trip vesting and transportation mitigation requirements with additional specificity by each of four master plan phases.

BACKGROUND

The VIC is an approximately 179-acre site located at 18110 SE 34th Street and is developed with approximately 715,000 square feet of campus building area supported by surface parking. Today, the

¹ Third Amended and Restated Development Agreement (Restated DA) approved by the Vancouver City Council by Ordinance 4346 on August 16, 2021.

² <https://www.cityofvancouver.us/cdd/page/se-34th-street-safety-and-mobility-project>

campus is accessible at two locations on SE 34th Street including 1) a private vehicle circulation route that extends north into the site from the signalized intersection of SE Hiddenbrook Drive and 2) a private vehicle route that extends north into the site from the stop-controlled intersection near the southwest corner of the site aligned with SE 177th Avenue to the south. Figure 1 shows the site vicinity map and Figure 2 illustrates the revised Master Plan land use areas.

Master Plan development is generally anticipated in four phases that each have different supporting transportation infrastructure, with Phases 2-4 providing new on-site public roadways:

- Phase 1 includes the VIC Building North and up to 300 homes using existing campus access.
- Phase 2 will construct the southwest portion of a new on-site loop road between SE Hiddenbrook Drive and SE 29th Street, SE 29th Street between the new west loop road roundabout and a new roundabout at SE 176th Avenue, and will close the existing The VIC campus roadway connection to SE 34th Street aligned with SE 177th Avenue upon completion of the on-site loop road and Hiddenbrook Drive renovations.
- Phase 3 will extend SE 29th travel from the Phase 2 west roundabout terminus east across the VIC campus to a new signalized intersection at SE 192nd Avenue.
- Phase 4 will complete the loop road between a new east roundabout on the loop road and SE Hiddenbrook Drive to the south. Upon completion of Phase 4 all roadways shall be complete.

Some site development was already underway at the time this report was prepared consistent with the approved master plan and development agreement. Consistent with the prior master plan, full build-out and occupancy is anticipated to occur over a 15-year period. Accordingly, current and future year 2038 transportation conditions were analyzed.

This letter documents the methodology and findings of a traffic impact analysis (TIA) prepared for the proposed revisions to the Master Plan. Consistent with current obligations, future site development applications under the proposed revised Master Plan and Development Agreement will each be required to demonstrate compliance with the Master Plan transportation requirements through preparation of a Transportation Compliance letter.

TRANSPORTATION MITIGATION SUMMARY

In addition to typical roadway frontage improvements along the streets abutting VIC, several transportation improvements are recommended in conjunction with Master Plan site development (subject to City of Vancouver approval). Table 1 summarizes the recommended transportation improvements and reflects which are triggered by the VIC Master Plan versus those needed regardless of any additional development within the campus. Further details on each improvement are described more fully in later sections of this report.

H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\report\figs\27715-Figures_Fig 1 Site Vicinity Map
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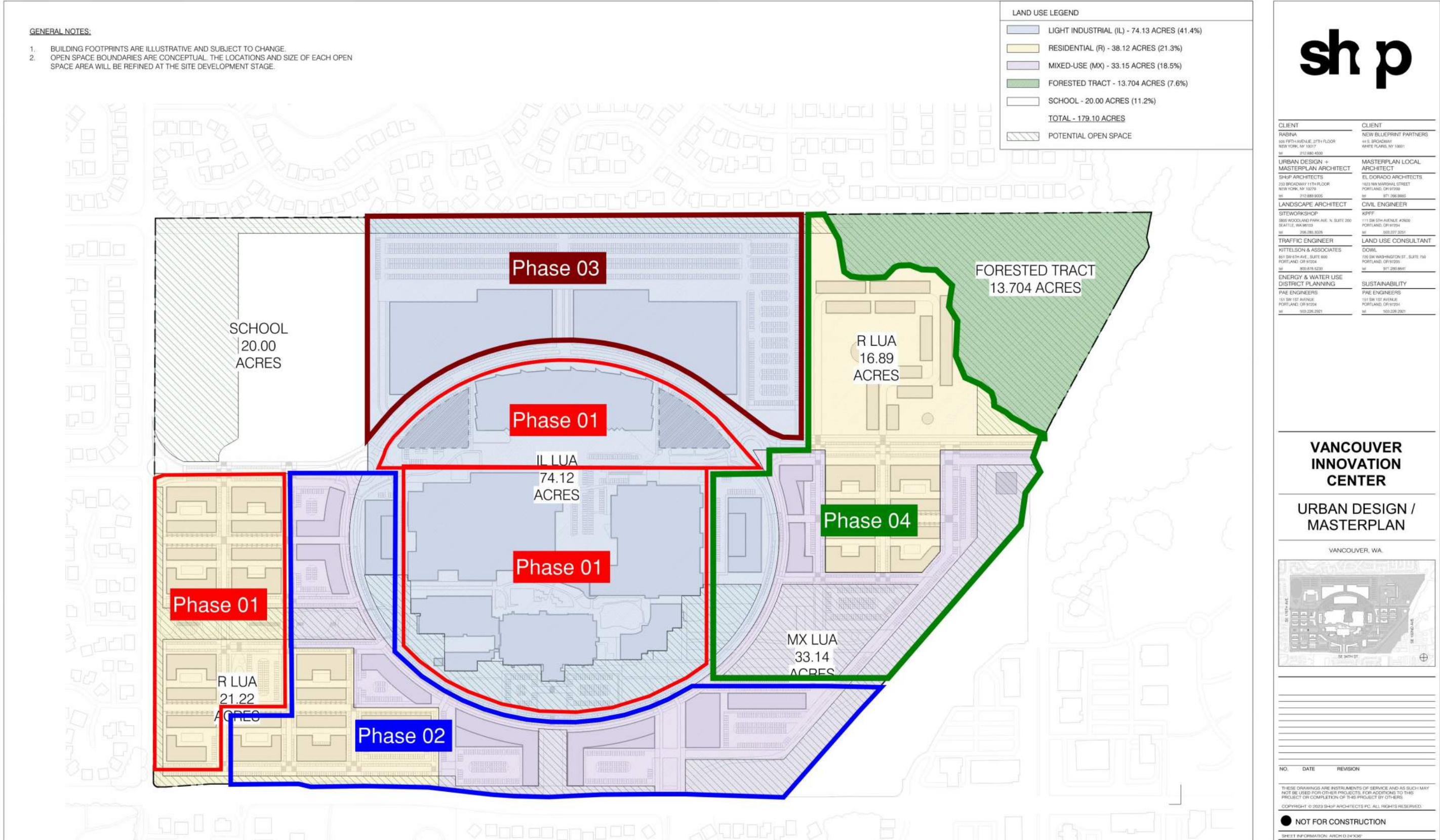


Study Intersections

Site Vicinity Map
 Vancouver, Washington

Figure
 1

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Phasing plan provided by The VIC Building Owner, LLC 4/6/2023

Proposed Master Plan
Vancouver, WA

Figure
2

Table 1. Summary of Mitigation Recommendations

Facility	Segment/ Study Intersection ID	Mitigation Recommendation	Needed Pre- VIC Master Plan?	Triggered by VIC Master Plan Trips?	VIC Master Plan Trigger Phase?
On-Site Roadways & Intersections					
SE 29 th Street	<i>Extend collector arterial roadway across the VIC Master Plan site in three segments</i>				
	West Segment	From SE 176 th Avenue to West Loop Road	N/A	Yes	2
	North Segment	From West Loop Road to East Loop Road	N/A	Yes	3
	East Segment	From East Loop Road to SE 192 nd Avenue	N/A	Yes	3
SE 184 th Avenue	N/A	Renovate collector arterial roadway within The VIC Master Plan site from SE 34 th Street to Loop Road	N/A	Yes	2
West Loop Road	N/A	From SE 184 th Avenue to SE 29 th Street	N/A	Yes	2
East Loop Road	N/A	From SE 184 th Avenue to SE 29 th Street	N/A	Yes	4
West Loop Road/ SE 29 th Street	N/A	Construct single lane roundabout	N/A	Yes	2
East Loop Road/ SE 29 th Street	N/A	Construct single lane roundabout	N/A	Yes	3
Site-Access Changes					
West Site Access/ SE 34 th Street	7	Close and vacate motor vehicle site-access (intersection north approach)	No	No	2
SE 29 th Street/ SE 176 th Avenue	9	Reconstruct as a single lane roundabout	No	Yes	2
SE 29 th Street/ SE 192 nd Avenue	4	Install traffic signal with interconnect Construct and stripe separate eastbound left and right turn lanes with 250 feet of storage each Stripe northbound left-turn lane with 200 feet of storage	No	Yes	3
Off-site Intersection Mitigations with Master Plan Development					
SE 29 th Street/ SE 164 th Avenue	11	Modify traffic signal to provide east-west protected/permissive left-turn phasing	No	Yes	2
		Extend westbound left-turn lane striping to provide 225 feet of storage (striping only)	No	Yes	2
		Extend southbound left-turn storage to provide 300 feet of storage (reconstruct center median area)	No	Yes	2
SE 192 nd Avenue/ SR-14 Westbound Ramp Terminal	N/A	Pay proportionate share contribution toward future capacity improvements with each site development application. Estimated total fee of \$430,000 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added
SE 20 th Street/ SE 176 th Avenue	10	Pay proportionate share contribution toward future capacity improvements with each site development application. Estimated total fee of \$33,600 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added
SE 34 th Street/ SE 192 nd Avenue	5	Pay proportional share contribution towards re-constructing streets with a more durable pavement treatment to reduce maintenance needs. Estimated total fee of \$83,400 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added

N/A = Not applicable

SCOPE OF THE REPORT

The TIA identifies the transportation-related impacts associated with the proposed development. Per Vancouver Municipal Code (VMC) Section 11.80.130, a TIA is needed given the trips collectively generated by the proposed Master Plan land uses will exceed 20 net new weekday PM peak hour trips.

The study intersections and overall study area for the Master Plan were determined based on a review of the prior master plan, existing travel patterns, TIA requirements pursuant to Vancouver Municipal Code (VMC) Sections 11.80.080 and 11.80.130 as well as scoping direction provided by City staff.

Study Intersections

As coordinated with City staff, the following 12 intersections were analyzed:

- 1) SE 15th Street/SE 192nd Avenue
- 2) SE 20th Street/SE 192nd Avenue
- 3) SE 25th Street/SE 192nd Avenue
- 4) SE 29th Street/SE 192nd Avenue (analyzed in year 2038 with Master Plan development only)
- 5) SE 34th Street/SE 192nd Avenue
- 6) SE 34th Street/SE Hiddenbrook Drive-East Site Access
- 7) SE 34th Street/SE 177th Place-West Site Access
- 8) SE 34th Street/SE 176th Avenue
- 9) SE 29th Street/SE 176th Avenue
- 10) SE 20th Street/SE 176th Avenue
- 11) SE 29th Street/SE 164th Avenue
- 12) SE 34th Street/SE 164th Avenue

Additionally, though not a study intersection, future site-generated trips projected to travel through the SR-14/SE 192nd Avenue westbound ramp terminal are documented to estimate proportional share contributions that will be required of future Master Plan development site plan applications.

Analysis Periods

Weekday AM and PM peak hour conditions were assessed for three analysis periods:

- Existing conditions;
- Future 15-year conditions (year 2038) that do not include any Master Plan build-out; and
- Year 2038 Build Out conditions with full Master Plan development and occupancy.

Report Format

The remaining sections of this report address the following transportation issues:

- Existing land use and transportation system conditions near The VIC;
- Study intersection crash history review;
- Trip generation and distribution estimates for the proposed The VIC land uses;
- Concurrency corridor trip assignment;
- Forecast future year (2038) baseline traffic conditions;
- Forecast future year (2038) Phase 1 to Phase 4 build out traffic conditions;
- A review of potential mitigation options;
- Intersection sight distance considerations; and,
- Findings and recommendations.

ANALYSIS METHODOLOGY

Intersection Levels-of-Service

Study intersection performance was evaluated using Synchro 11 and Sidra 9 software. All level-of-service (LOS) analyses for the intersections described in this report were performed in accordance with the procedures stated in the *Highway Capacity Manual 6th Edition* (HCM, Reference 1).

Queuing Analysis

Queuing analyses were prepared by reporting Synchro 95th percentile queues for the peak 15-minute analysis during both the weekday AM and PM peak hours.

Operating Standards

City of Vancouver Municipal Code Section 11.80.130.B states the following:

A proposed development that adds at least five net new peak hour trips to an intersection approach operating at a LOS E or lower within the required traffic impact analysis area may be denied based upon any of the following:

- 1. For signalized intersections, when off-site intersection conditions are at a LOS F, or*
- 2. For signalized intersections, when the LOS E and the volume to capacity ratio is greater than 0.95, or*
- 3. For unsignalized intersections, when the volume to capacity ratio for any lane on any approach is greater than 0.95, and*
- 4. When significant traffic hazards would be caused or materially aggravated by the proposed development.*

The above operating standards are applicable to all study intersections. Existing and year 2038 operational analyses at the study intersections were prepared using Synchro 11 and Sidra 9 software and compared to these standards. Current timing parameters and phasing information for the signalized study intersections was provided by City staff.

Existing Conditions Traffic Volume Development

Turning movement counts were obtained at the study intersections on a mid-week day during the morning (7:00 to 9:00 AM) and evening (4:00 to 6:00 PM) peak hour periods. Traffic counts collected at the SE 34th Street corridor study intersections by the City of Vancouver in early December 2022 were used in this study (the December 2022 counts were conducted as part of the City's *SE 34th Street Safety and Mobility Project* to provide consistency in the base existing conditions analyses presented in this report and the City's study). Traffic counts at the remaining study intersection counts were completed on a mid-week day in January 2023 while local schools were in-session when no inclement weather occurred that would alter traffic patterns³. *Appendix "A" provides the traffic count data sheets.*

EXISTING CONDITIONS

The existing conditions analysis identifies site conditions and the current operational and geometric characteristics of roadways within the study area. These conditions are compared with future conditions later in this report.

³ At the time of the traffic counts, a portion of the existing buildings on the VIC campus had been leased but not yet re-occupied. Trips associated with re-occupancy of the vacant space are addressed in the future 2038 baseline analysis.

Site Conditions and Adjacent Land Uses

Today, a portion of the VIC campus is occupied by a total building area of 715,000 square feet and associated surface parking lots. The campus has two gated accesses to SE 34th Street and is bounded by existing residential developments to the north, west and south with a commercial development and SE 192nd Avenue to the east. Fisher's Landing Elementary School is located south across SE 34th Street and is accessed via SE Hiddenbrook Drive.

Adjacent Roadway Facilities

Table 2 summarizes the existing transportation facilities and roadways in the study area.

Table 2: Existing Transportation Facilities and Roadway Designations

Roadway	Functional Classification ¹	Number of Travel Lanes	Posted Speed (mph)	Sidewalks?	Bicycle Lanes?	Median?	On-Street Parking?
SE 15 th Street	Collector Arterial	2	30	Yes ²	Yes ³	No	No
SE 20 th Street	Minor Arterial	2-3	40	Yes	Yes	Striped	No
SE 192 nd Avenue	Principal Arterial	4-5	40	Yes	Yes	Raised	No
SE 34 th Street	Principal Arterial	4-5	40	Yes	No	Raised	No
SE Hiddenbrook Drive	Local Street	2	25	Yes ⁴	Yes	No	No
SE 177 th Place	Local Street	2	25	Yes	No	No	Yes
SE 176 th Avenue	Collector Arterial	2	35	Yes	No	Striped	No
SE 29 th Street	Collector Arterial	2	25	Yes	Yes	No	No
SE 164 th Avenue	Principal Arterial	5-6	40	Yes	No	Raised	No

¹ Source: *City of Vancouver Arterial Street System and Classification Map*, Adopted June 27, 2022 (Reference 2).

² Continuous sidewalks only provided on the south side of SE 15th Street, west of SE 192nd Avenue. Sidewalks terminate approximately 900 feet east of SE 192nd Avenue.

³ Bicycle lanes are only provided west of SE 192nd Avenue.

⁴ Continuous sidewalks only provided on west side on SE Hiddenbrook Drive.

Transit Facilities

C-Tran currently offers multiple fixed transit routes that service the Fisher's Landing Transit Center (Reference 3) located approximately two-thirds of a mile west of the VIC. Route 30 - *Burton* operates daily along the SE 164th Avenue/NE 162nd Avenue corridor and has a stop located between SE 29th Street and SE 34th Street, approximately ½ mile west of the site. Additionally, Route 37 - *Mill Plain/Fisher's* operates along SE 164th Avenue, SE 192nd Avenue and along the site frontage on SE 34th Street, with daily service. A posted westbound transit stop for Route 37 is provided near both existing The VIC site access points on SE 34th Street. No shelter area is provided at either stop location.

Crash Analysis

Table 3 summarizes the crash frequency at the study intersections. Generally, the City of Vancouver considers a crash rate greater than one crash per million entering vehicles (MEV) to be an indicator that a potential geometric or operational issue may exist, and that further evaluation should be considered.

Table 3: Study Intersection Crash Frequency and Severity (January 2018 through December 2022)

Study Intersection		Crash Type ¹						Severity			Total	Crash Rate ³
ID	Location	Angle	Turn	Rear-End	Side Swipe	Fixed Object	Ped/Bike	PDO ²	Injury	Fatal		
1	SE 15 th Street/ SE 192 nd Avenue	4	1	3	-	-	-	5	3	0	8	0.18
2	SE 20 th Street/ SE 192 nd Avenue	2	1	5	1	1	-	6	4	0	10	0.21
3	SE 25 th Street/ SE 192 nd Avenue	-	-	-	-	-	-	0	0	0	0	0.00
4	SE 29 th Street/ SE 192 nd Avenue	No data reported (Future Intersection)										
5	SE 34 th Street/ SE 192 nd Avenue	3	14	-	-	-	-	8	9	0	17	0.34
6	SE 34 th Street/ SE Hiddenbrook Drive (East Site Access)	-	1	-	-	-	-	1	0	0	1	0.06
7	SE 34 th Street/ SE 177 th Place (West Site Access)	1	-	-	-	-	-	1	0	0	1	0.06
8	SE 34 th Street/ SE 176 th Avenue	1	5	-	-	2	-	4	4	0	8	0.38
9	SE 29 th Street/ SE 176 th Avenue	1	-	-	-	-	1	1	1	0	2	0.24
10	SE 20 th Street/ SE 176 th Avenue	1	1	6	-	-	1	7	2	0	9	0.41
11	SE 29 th Street/ SE 164 th Avenue	-	2	-	-	-	-	2	0	0	2	0.04
12	SE 34 th Street/ SE 164 th Avenue	8	4	11	-	-	-	15	8	0	23	0.33

¹ No backing or head-on crashes were reported.

² PDO = Property Damage Only

³ Crash rate is calculated as the number of crashes per million entering vehicles (Crashes/MEV). Average daily traffic volumes were estimated using PM peak hour total entering volume at the intersection.

As shown in Table 3, there were no reported fatal collisions, and each study intersection experienced a crash rate less than 1.0 per million entering vehicles. Three trends were noted in reviewing the crash data. First, the SE 34th Street/SE 176th Avenue intersection was noted to have two fixed object collisions, both of which involved a median placed traffic sign on the east-west intersection approaches. The median on the west approach to the intersection was observed to interface with the marked crosswalk. Considering the crash history and current median placement, regardless of the proposed Master Plan, the City may consider reinstallation/replacement of the median end treatments nearest the intersection on SE 34th Street, additional median nose striping, or reflective bollards to increase the visibility of the narrow median curb and signs (the existing end treatments are shown in Exhibits 1 and 2 for reference).

Such changes could be evaluated and addressed as part of the City's planned *SE 34th Street Safety & Mobility Project*.

Exhibit 1: Facing East at the SE 34th Street/ SE 176th Avenue intersection (image source Google Earth)



Exhibit 2: Facing West at the SE 34th Street / SE 176th Avenue intersection (image source Google Earth)



A second apparent trend amongst the crash data is that 6 of the reported 11 rear-end crashes at the SE 34th Street/SE 164th Avenue intersection involved southbound vehicles. This pattern may be reflective of the tendency for motorists to congregate towards the right-most through lane to reach the single SR-14 westbound on-ramp lane to the south of the intersection.

The third trend amongst the crash data is that 12 of the reported 14 turning crashes at the SE 34th Street/SE 192nd Avenue intersection involved eastbound (6) and westbound (6) vehicles turning left to travel north and south respectively. This pattern may be reflective of the motorists who error in selecting

gaps to complete their turn during the permissive portion of the protected/permissive left-turn phase. The City's 34th Street Safety & Mobility project may be changing the intersection lane configuration as discussed later in this report which would impact gap acceptance.

There were two reported crashes involving a cyclist:

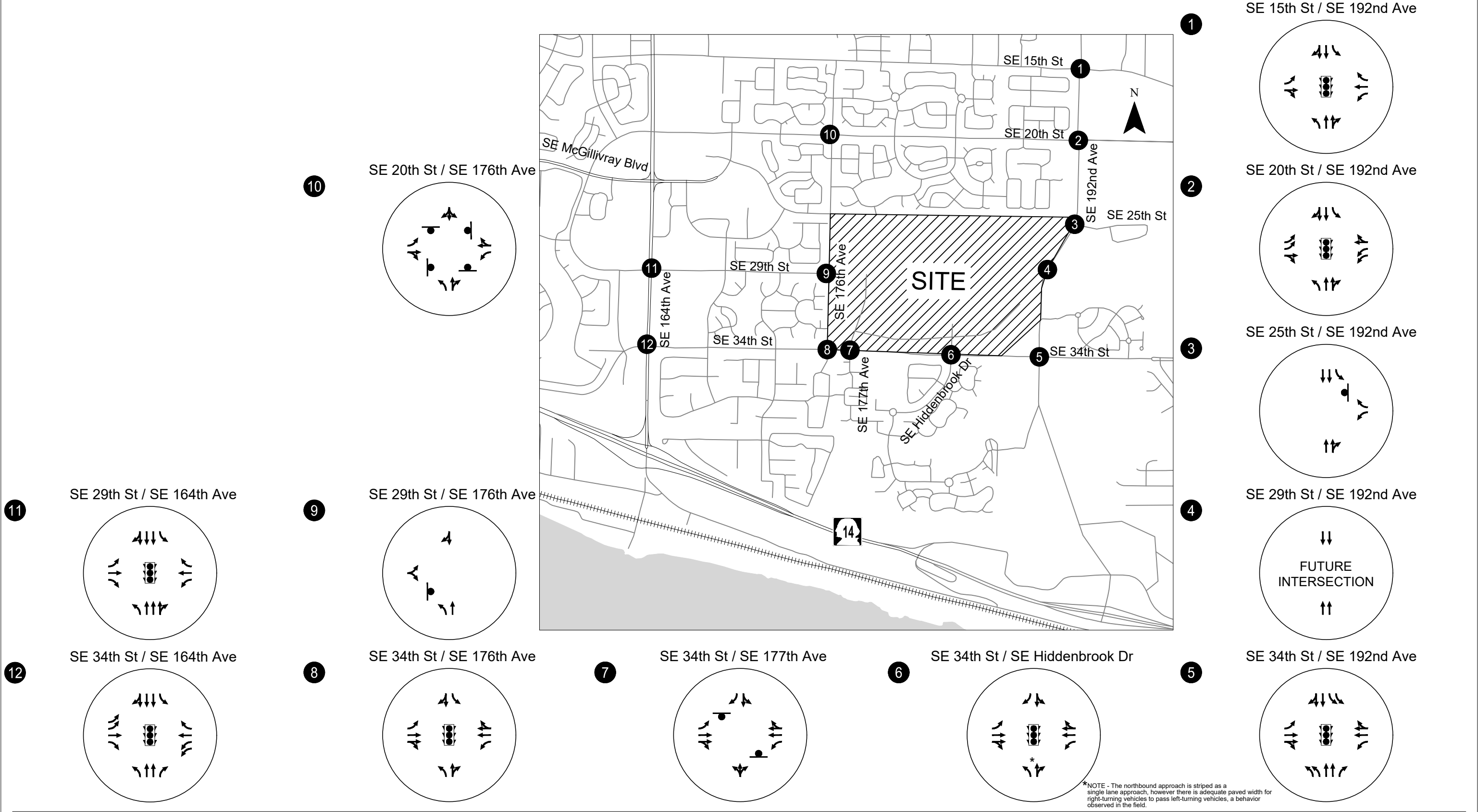
- In July 2020 on a clear dry day, a motorist struck a cyclist at the SE 20th Street/SE 176th Avenue AWSC intersection. No cause of the crash was provided in the crash report.
- In May 2022 on a wet rainy day, a motorist struck a cyclist at the SE 29th Street/SE 176th Avenue TWSC intersection. Per the crash report, the driver was inattentive.

No other safety-based mitigation needs were identified through review of the available crash data. *Appendix "B" includes the crash data provided for each of the study intersections.*

Existing Traffic Conditions

Figure 3 illustrates the existing lane configuration and traffic control devices at each of the study intersections. Figure 4 presents the existing traffic volumes and corresponding intersection operations during the weekday AM and PM peak hours. As shown, all intersections currently satisfy applicable City standards during both peak hours. *Appendix "C" contains the existing conditions operational analysis worksheets.*

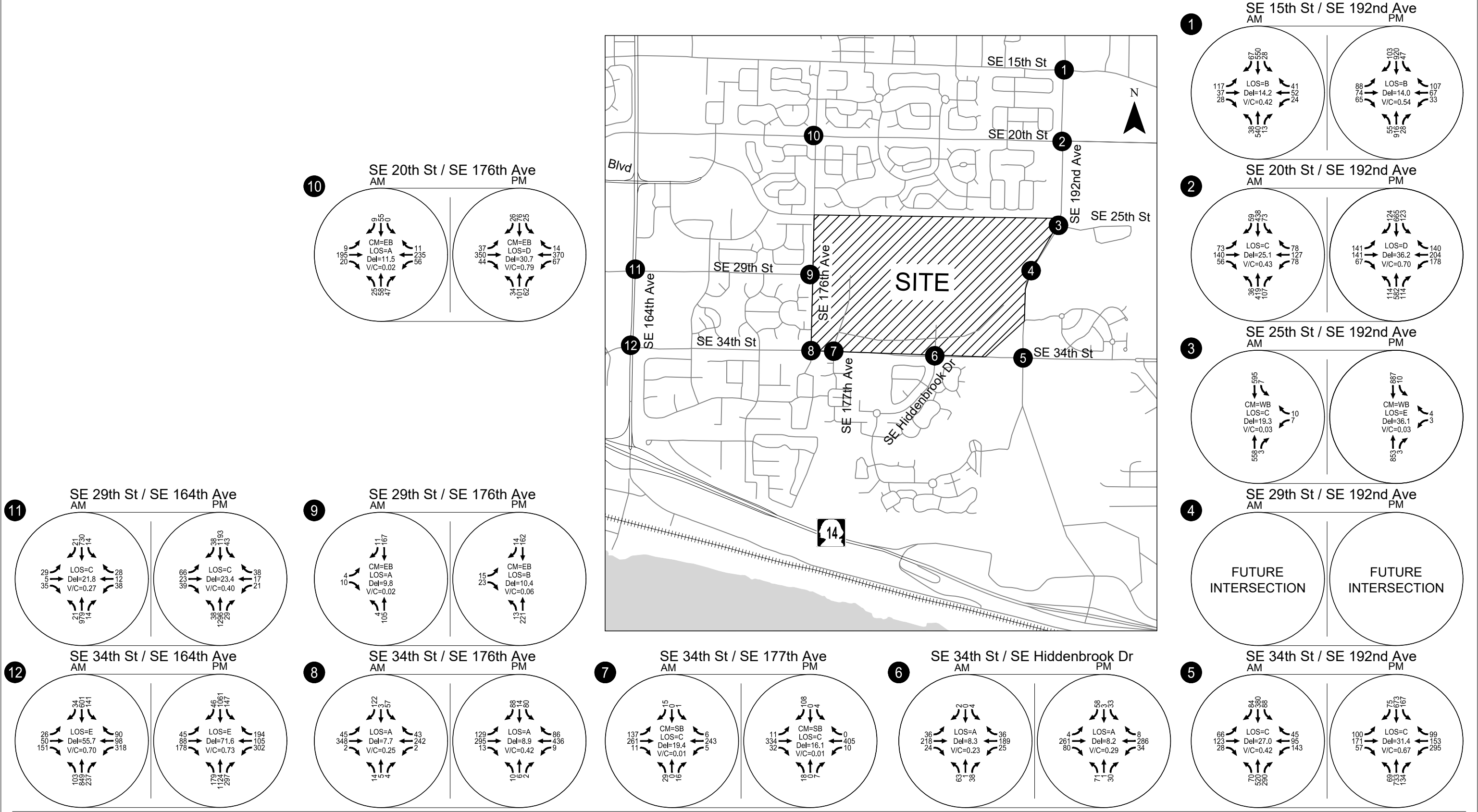
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Existing Lane Configurations and Traffic Control Devices
Vancouver, WA

Figure 3

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CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C = Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Existing Year 2023 Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA
Figure 4

PROPOSED MASTER PLAN

The VIC Building Owner LLC is requesting City of Vancouver approval of a major revision to the VIC Mixed Use Master Plan that was approved by the Vancouver City Council by Ordinance 4346 on August 16, 2021. The Revised Master Plan maintains a mixture of uses and land use areas (LUAs) on the site similar to the original plan. The proposed LUAs on the site include a school (approximately 20 acres), residential (approximately 38.12 acres), light industrial/employment area (approximately 74.13 acres), mixed use area (approximately 33.15 acres) and open space (approximately 24 acres) including the approximately 13.7-acre forested tract. The master plan revision proposes a maximum of 1,800 residential dwelling units and a minimum of 1,703,065 square feet of gross floor area for employment uses.

Key transportation elements of the revised Master Plan vision include:

- The east-west extension of SE 29th Street as a new collector arterial across the campus;
- A central right-of-way loop or “ring road” for main site circulation, the northern arc of the loop will serve as the SE 29th Street collector;
- A vibrant and pedestrian friendly mixed-use corridor along the proposed ring road; and
- An enhanced pedestrian and bicycle network.

The SE 29th Street collector arterial extension east-west across the site completes the anticipated network connection identified in the City’s Transportation Plan. The addition of a future traffic signal at the SE 29th Street/SE 192nd Avenue intersection and a single lane roundabout at the SE 29th Street/SE 176th Avenue intersection are planned in conjunction with the new SE 29th Street roadway corridor. SE 29th Street will serve as the designated freight delivery route to and from the campus with trucks entering the campus at SE 192nd Avenue, traveling across SE 29th Street to the industrial areas, completing delivery, and then returning to SE 192nd Avenue across SE 29th Street upon completion of all four phases.

The northern portion of the new ring road will include two single lane roundabouts where the southern segments of the ring road intersect with SE 29th Street. The existing unsignalized western campus access to SE 34th Street aligned with SE 177th Place will be closed and vacated. Vehicular access to SE 34th Street will be via the signalized SE 34th Street/SE Hiddenbrook Drive-East Site Access intersection which will be reconstructed to one travel lane in each direction between SE 34th Street and the loop road on-site with left-turn lanes provided at SE 34th Street and the loop road.

Master Plan development is generally anticipated in four phases. Phase 1, uses by right, will allow for the VIC Building North (previously entitled) and up to 300 homes using the existing site access. Phase 1 access will be via the two existing campus roadway connections to SE 34th Street. Phase 2 will provide the southwest portion of the new on-site loop road between SE Hiddenbrook Drive and SE 29th Street as well as construction of SE 29th Street between the new west loop road roundabout and a new roundabout at SE 176th Avenue. The existing VIC campus roadway connection to SE 34th Street (aligned with SE 177th Avenue to the south) will be closed and vacated with Phase 2 site development. Phase 3 will extend SE 29th Street from the Phase 2 west roundabout terminus east across the VIC campus to a new signalized

intersection at SE 192nd Avenue. Phase 4 will complete the loop road between a new east roundabout on the loop road and SE Hiddenbrook Drive to the south.

Trip Generation Estimates

Trip generation estimates for The VIC Master Plan land uses were developed using trip rates contained within the *Trip Generation Manual, 11th Edition* as published by the Institute of Transportation Engineers (Reference 4)⁴. The trip estimates account for “internal trip-making” that reflects the interaction between the employment, residential, and retail uses within the VIC campus (including the existing VIC buildings but excluding the potential middle school). Table 4 presents the trip estimates. Peak hour trip estimates for the residential uses were developed using the fitted equation trip rates while the average peak hour trip rates were used for the remaining new uses as well as for all the daily trip estimates. Trips associated with the existing VIC buildings are shown for the purpose of tracking internal trip sharing that will occur as a function of the proposed new uses.

Given no new PM peak hour trips are anticipated because of the proposed mater plan revisions, the Applicant requests that the current daily and PM peak hour trip vesting in the VIC Development Agreement be retained to allow maximum flexibility to respond to market conditions over the life of the master plan.

⁴ Weekday AM and PM peak hour trips associated with the 715,000 square feet of existing building at VIC were included in the existing conditions analysis based on trip rates previously measured at the campus when it was in full use.

Table 4: Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Existing The VIC Buildings ¹	1996 Traffic Counts	715,000 Square Feet	10,200 ²	382	262	120	444	76	368
Less Trips Internal to the Campus Area			(236)	(24)	(12)	(12)	(26)	(8)	(18)
Net New			9,964	358	250	108	418	68	350
General Light Industrial	110	600,565 Square Feet	2,925	444	391	53	390	55	335
Less Trips Internal to the Campus Area			(198)	(20)	(10)	(10)	(22)	(7)	(15)
Net New			2,727	424	381	43	368	48	320
General Office Building	710	87,500 Square Feet	949	133	117	16	126	21	105
Less Trips Internal to the Campus Area			(29)	(2)	(1)	(1)	(3)	(1)	(2)
Net New			920	131	116	15	123	20	103
Medical Office Building	720	10,000 square feet	360	31	24	7	39	12	27
Less Trips Internal to the Campus Area			(4)	(1)	(1)	(0)	(0)	(0)	(0)
Net New			356	30	23	7	39	12	27
Shopping Center	820	140,000 square feet	5,181	118	73	45	476	228	248
Less Trips Internal to the Campus Area			(1,607)	(45)	(29)	(16)	(110)	(41)	(69)
Less Pass-by Reduction			(1,036)	(21)	(13)	(8)	(106)	(54)	(52)
Net New			2,538	52	31	21	260	133	127
Multifamily Housing (Mid-Rise)	221	1,248 Units	5,666	538	124	414	487	297	190
Less Trips Internal to the Campus Area			(790)	(14)	(2)	(12)	(80)	(56)	(24)
Net New			4,876	524	122	402	407	241	166
Multifamily Housing (Low-Rise)	220	552 Units	3,720	194	47	147	258	163	98
Less Trips Internal to the Campus Area			(350)	(6)	(1)	(5)	(35)	(25)	(10)
Net New			3,370	188	46	142	223	138	85
Middle School ²	522	900 Students	1,917	522	282	240	153	75	78
Total Trips			30,918	2,362	1,320	1,042	2,373	927	1,446
Less Total Trips Internal to the Campus Area			(3,214)	(112)	(56)	(56)	(276)	(138)	(138)
Less Total Pass-by Reduction			(1,036)	(21)	(13)	(8)	(106)	(54)	(52)
Total Net New Trips			26,668	2,229	1,251	978	1,991	735	1,256
The VIC Development Agreement Vested Net New Trips			26,982	2,088	1,343	745	1,991	627	1,364
Proposed Total Net New – The VIC DA Vested Net New			-314	141	-92	233	0	108	-108
Total Net New Trips – Existing The VIC Building Net New Trips			16,704	1,871	1,001	870	1,573	667	906

¹ Source: Traffic Impact Analysis for The VIC Master Plan dated November 20, 2020.

² Trip estimates from approved 2020 The VIC Traffic Impact Analysis. The potential for internal trips associated with a school could be revisited in conjunction with a more specific school development proposal.

Trip Distribution and Assignment

The site-generated trips shown in Table 4 (total net new trips less the existing VIC buildings net new trips along with the pass-by trips) were assigned to the study area roadways based on four trip distribution patterns developed for the VIC campus. The distribution estimates and associated vehicular trips at campus buildout are shown in Figure 5 and Figure 6 and summarized below.

- *On-site employment trip distribution pattern:* applied to office and light industrial uses, this distribution pattern was derived from the Southwest Washington Regional Transportation Council travel demand model transportation analysis zone (TAZ 1758) for the VIC site⁵.
- *Residential trip distribution pattern:* this pattern was estimated based on review of other recent traffic studies prepared for nearby residential areas, review of the surrounding land uses and review of the existing traffic turning movement patterns.
- *Middle school trip distribution pattern:* this pattern was estimated based on review of the existing school district middle schools and boundaries, surrounding residential uses as well as the roadway network (the school distribution estimate is preliminary given there was no specific school proposal or boundary change proposed at the time this study was prepared). No vehicle trips were assigned between the school site and homes within the VIC, rather, these were assumed to be walking trips. The full school site vehicle trip generation was assigned off-site from the VIC.
- *Retail trip distribution pattern:* this pattern was estimated based on the location of other commercial/retail uses in the area and in recognizing that the anticipated retail uses within The VIC are expected to be smaller, locally serving retail type uses (as opposed to destination or “big box” retailers).

⁵ The land use assumptions in the RTC model for this TAZ were reflective of employment uses only and do not offer insight as to residential or retail use travel patterns.

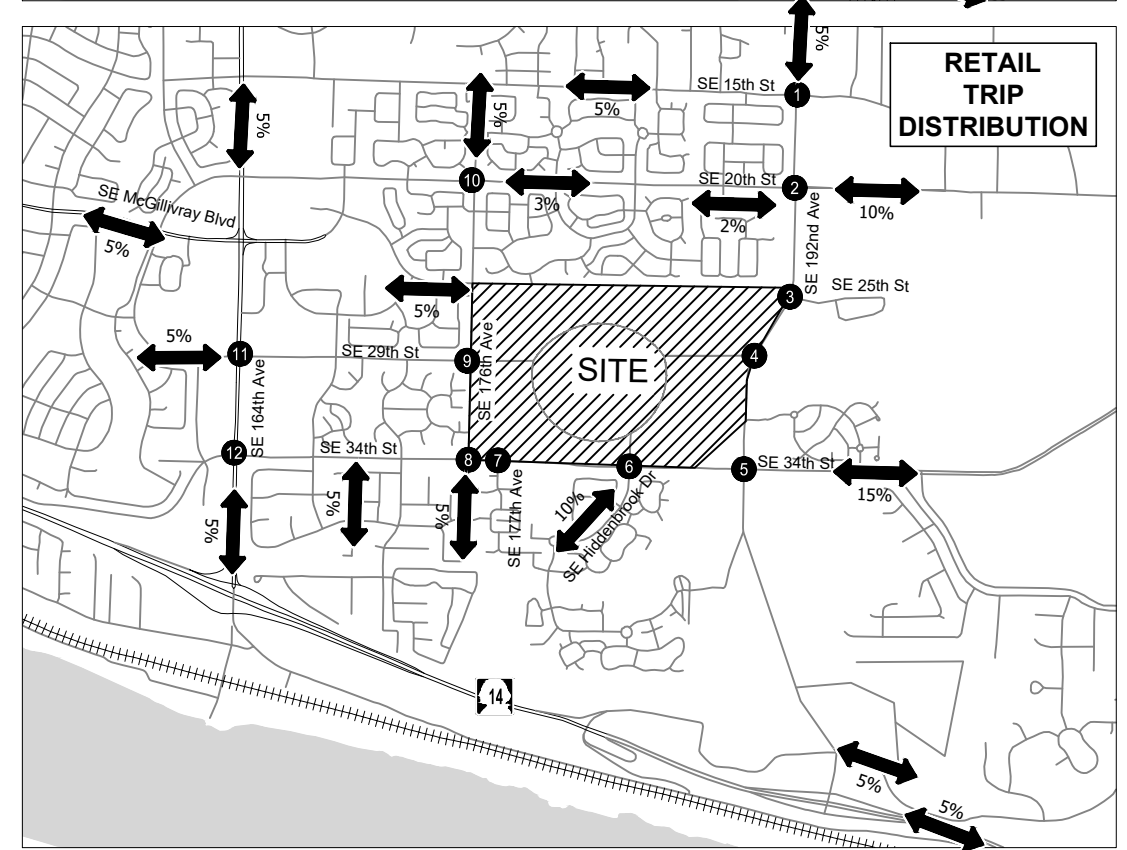
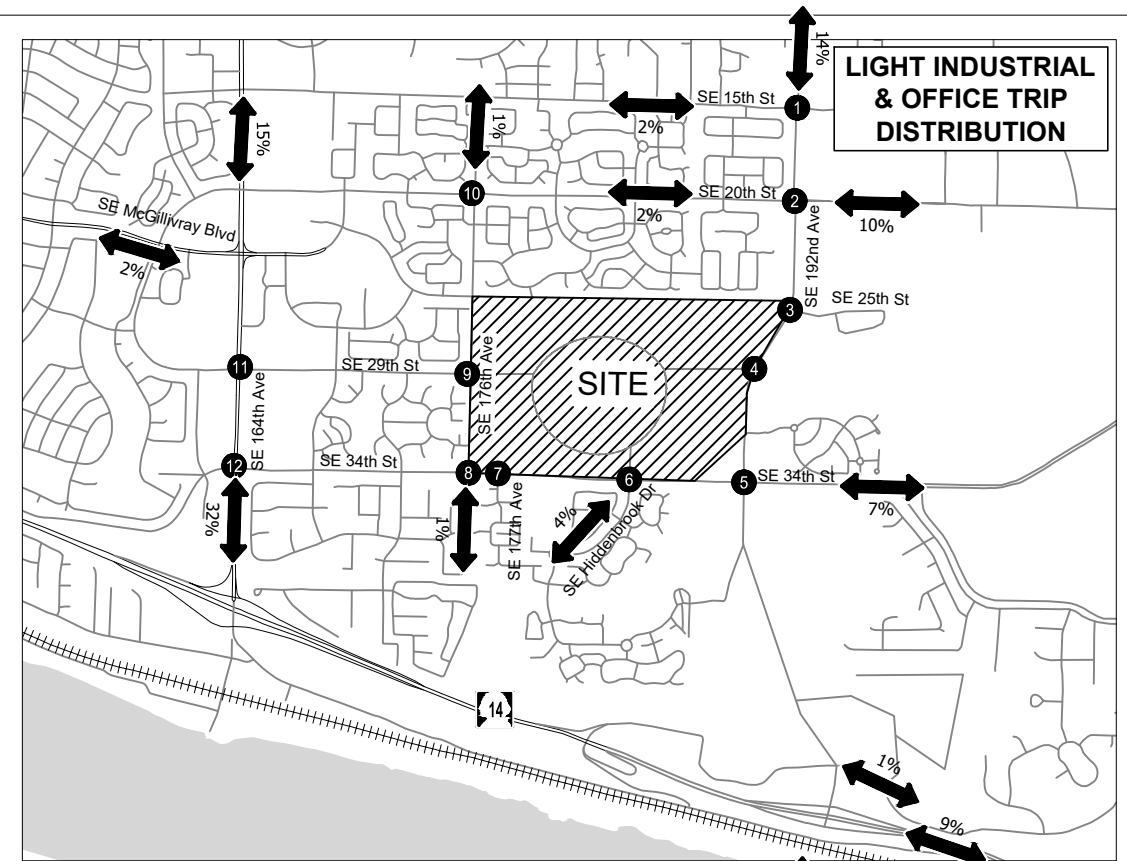
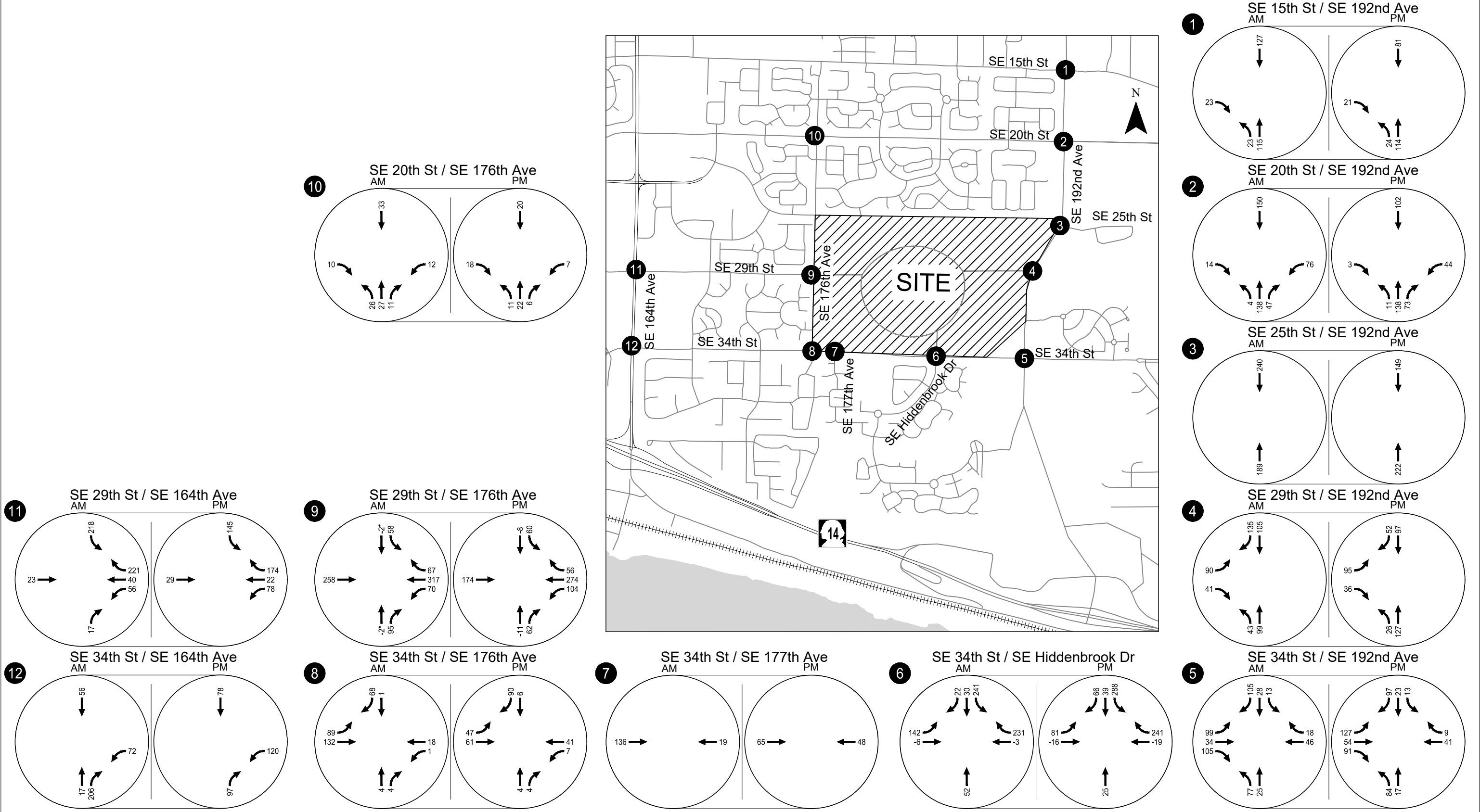


Figure
5

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NOTE - Trips shown include net new trip assignment (all land uses) and pass-by trip assignment (retail use only).
Negative trips represent pass-by trips.

Trip Assignment at Campus Buildout (Phase 1 - 4)
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
6

CONCURRENCY CORRIDOR TRIP ASSIGNMENT

Per City of Vancouver requirements, Table 5 summarizes the estimated number of complete build-out site-generated weekday PM peak hour trips entering each of the City's adopted concurrency corridors per development phase. Assigned trips were recorded counting trips only once along each of the specified corridors. Further concurrency corridor tracking by individual buildings or phases can be provided with subsequent trip compliance letters if needed.

Table 5: Concurrency Corridor Weekday PM Peak Hour Trip Assignment

Corridor Name	Corridor Limit	PM Peak Trips to Corridor
Mill Plain Blvd.	Fourth Plain to I-5	0
	I-5 to Andresen	0
	Andresen to I-205	5
	I-205 to 136 th Ave.	9
	136 th Ave. to 164 th Ave.	86
	164 th Ave. to 192 nd Ave.	10
St. Johns / Ft. Van Way	Mill Plain to 63 rd St.	0
Fourth Plain Blvd.	Mill Plain to I-5	0
	I-5 to Andresen	0
	Andresen to I-205	0
	I-205 to 162 nd Ave.	6
Andresen Road	Mill Plain to SR500	2
	SR500 to 78 th St.	2
112 th Avenue	Mill Plain to 28 th St.	2
	28 th St. to 51 st St.	1
164 th /162 nd Avenue	SR14 to SE 1 st St.	388
	SE 1 st St. to Fourth Plain	250
Burton Road / 28 th Street	18 th St. to 112 th Ave.	3
	112 th Ave. to 138 th Ave.	5
	138 th Ave. to 162 nd Ave.	10
18 th Street	112 th Ave. to 138 th Ave.	1
	138 th Ave. to 164 th Ave.	26
136 th /137 th Avenue	Mill Plain to 28 th St.	6
	28 th St. to Fourth Plain	2
192 nd Avenue	SR14 to NE 18 th St.	498

TRAFFIC IMPACT ANALYSIS

The remainder of this report documents intersection operations under future year conditions without and with phased Master Plan development. Four phases of site development were considered to inform the traffic mitigations analysis. While the site land uses will buildout incrementally over the life of the master plan based on market conditions, the traffic impacts were assessed by phase using a common future horizon year of 2038.

FUTURE YEAR 2038 BASELINE TRAFFIC CONDITIONS

The baseline traffic analysis identifies how the study intersections will operate in the proposed 15-year horizon of the Master Plan Development Agreement after accounting for traffic growth from approved in-process developments within the study area and anticipated regional traffic growth, but only assuming full occupancy of the existing VIC site buildings (no additional Master Plan development assumed).

To reflect the anticipated re-use of the vacant existing building space on-site, previously documented trips associated with typical operations of the site were added to the study intersections to arrive at existing AM and PM peak period traffic volumes.⁶

Study Intersection Changes

The City of Vancouver's *SE 34th Street Safety & Mobility Project* proposes to implement several changes at the study intersections to improve safety and mobility on SE 34th Street between SE 164th Avenue and SE 192nd Avenue. The project anticipates repurposing a travel lane in each direction to add dedicated space for people walking, biking, rolling, and using mobility-assistance devices, and other safety improvements in the corridor for all users. The following changes were assumed at the study intersections by year the 2038 as part of the City project:

- Intersection 5, SE 34th Street/SE 192nd Avenue:
 - Remove 1 northbound left-turn lane
 - Remove 1 eastbound and 1 westbound through lane

⁶ For reference, a total of 382 weekday AM peak hour trips (262 in/120 out) and 444 weekday PM peak hour trips (76 in/368 out) were previously documented to be generated by the existing 715,000 square feet of campus buildings. The traffic volumes measured at the campus access points in December 2022 were increased and the additional trips assigned to the study intersections to reflect full occupancy. Further details of the volume adjustments are presented in Appendix "D".

- Intersection 6), SE 34th Street/SE Hiddenbrook Drive-East Site Access
 - Remove 1 eastbound and 1 westbound through lane
- Intersection 7) SE 34th Street/SE 177th Place-West Site Access
 - Remove 1 eastbound and 1 westbound through lane
 - Add 1 westbound right-turn lane
- Intersection 8) SE 34th Street/SE 176th Avenue
 - Remove 1 eastbound and 1 westbound through lane
- Intersection 12) SE 34th Street/SE 164th Avenue
 - Remove 1 eastbound and 1 westbound left-turn lane

Figure 7 illustrates the assumed lane configurations and traffic control devices at the study intersections under year 2038 baseline conditions.



In-process Developments

Trips from the following approved but not yet constructed (in-process) developments were included in the future baseline traffic volumes estimates per coordination with City Transportation staff.

- 192nd Station West II Lofts (located northwest of the SE 192nd Avenue/SE 34th Street intersection);
- Columbia Palisades Subdivision (located within the Columbia Palisades Master Plan area; 30% of the units were assumed to be sold and occupied at the time of the traffic counts for this study);
- Valley View Estates (located near the intersection of SE Grand Ridge Drive and SE 40th Street);
- The Casey (formerly Kate's Woods located along SE 34th Street to the east of SE Payne Road);
- Dawson's Ridge (located near the intersection of NW Sacajawea Street and NW McIntosh Road);
- First Street Village (located near intersection SE 1st Street/NE 197th Avenue);
- Vancouver Clinic Phase 2 (located within the Columbia Palisades master plan area along SE Columbia Palisades Drive);
- Columbia Palisades Lots 2 & 3 (located within the Columbia Palisades master plan area with access via the west leg of the SE Brady Road/SE Columbia Palisades Drive roundabout);
- Fisher's Creek Subdivision (located at 17700 SE Evergreen Highway);
- Kirkland Car Wash and Medical Building (located on the east side of SE 192nd Avenue and north of SE 20th Street);
- Oak Tree Station (located near the intersection of NW Lake Road/NW Friberg-Strunk Street);
- Lacamas Creek Tech Center (located near the intersection of NE 13th Street/NW Friberg-Strunk Street);
- Panattoni Industrial Building Lot 6 (located near the intersection of NE Goodwin Road/NW Camas Meadows Drive);
- Camas Business Center (located at 4704 NW Lake Road); and,
- Parklands Archery Business Center – Commercial component (located at 542 NW 218th Street); Section 30 (located north of SE 1st Street, including HP);
- PeaceHealth Ambulatory Care Center (located at the southeast corner of the SE 1st Street/SE 192nd Avenue intersection

Regional Traffic Growth

In addition to the in-process development trips, a 0.5 percent annual growth rate was identified along public roadway corridors to account for regional growth over the next 15 years. This growth rate was derived based on review of the Travel Demand Model 2015 and 2040 PM peak hour model outputs provided by the Southwest Washington Regional Transportation Council (RTC) for the study area and in consideration of the numerous in-process development trips identified for inclusion by City staff.

FUTURE YEAR 2038 BASELINE TRAFFIC OPERATIONS

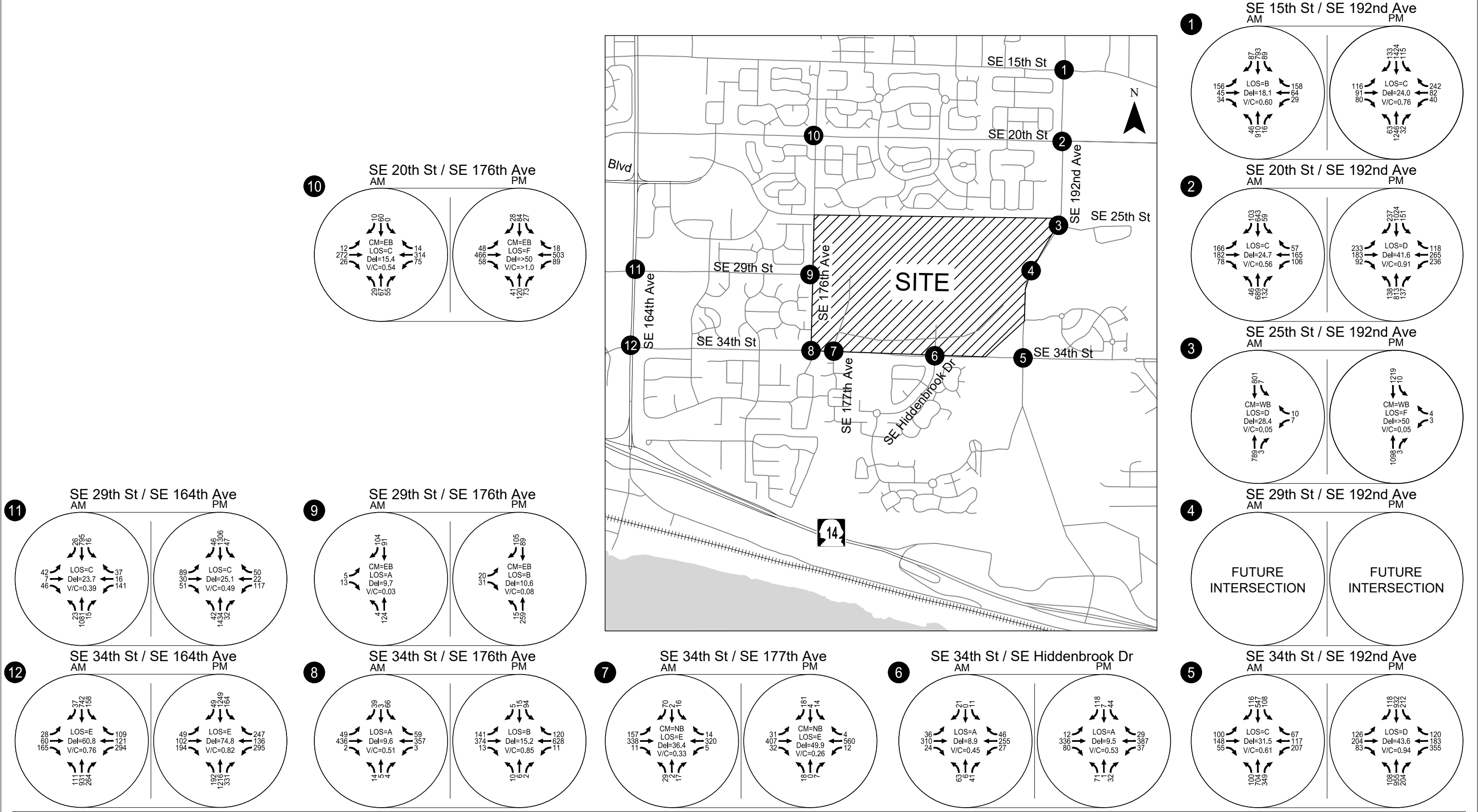
Figure 8 shows the projected 2038 baseline traffic volumes and resulting operations for all study intersections during the weekday AM and PM peak hours. Although the study intersections are projected to operate acceptably per City standards during the AM peak hour, two are projected to exceed City standards during the PM peak hour, including:

- The stop-controlled westbound left-turn movement on SE 25th Street at SE 192nd Avenue (Intersection #3) is projected to operate at LOS F during the PM peak hour but well under capacity (V/C ratio of 0.05). Despite the high delays forecast for this movement, a review of the projected weekday PM peak hour volumes at the intersection confirms that installation of a traffic signal is not warranted.
- The SE 20th Street/SE 176th Avenue intersection (Intersection #10) is forecast to operate at LOS F with the eastbound and westbound approaches over capacity during the weekday PM peak hour. The City of Vancouver is collecting proportional share mitigation fees in the amount of \$400 for each weekday PM peak hour trip added to this intersection.

Note the SE 34th Street/SE 192nd Avenue intersection (Intersection #5) is forecast to operate at an acceptable LOS D with the westbound left-turn lane at capacity (V/C ratio of 1.0). The City of Vancouver is collecting proportional share mitigation fees in the amount of \$150 for each weekday PM peak hour trip added to this intersection. Further, the SE 34th Street/SE 164th Avenue intersection (Intersection #12) is forecast to operate at LOS E during both the AM and PM peak hours. The westbound left-turn V/C ratio is projected to be 1.1 during the AM peak hour and 1.72 with a 35+ vehicle 95th percentile queue during the PM peak hour.

Appendix "E" contains the 2038 baseline operational analysis worksheets and Figure E-1 (a summary of the cumulative in-process trip assignment that was included in the baseline 2038 volumes).

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CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C= Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Future Year 2038 Baseline Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
8

FUTURE YEAR 2038 WITH PROJECT TRAFFIC CONDITIONS

The with project traffic analysis identifies how the study intersections will operate in the proposed 15-year horizon of the Master Plan Development Agreement upon phased development of the VIC. The proposed transportation infrastructure, site trip generation and corresponding traffic impacts associated with each phase of master plan site development were assessed as documented herein.

Master Plan Roadway Network

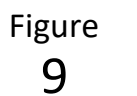
Multiple roadway network and study intersection changes are anticipated in conjunction with continued The VIC Master Plan development. As previously indicated, implementation is expected to occur in four distinct phases with the following transportation changes anticipated by phase (refer also to Figure 9).

Master Plan Phase 1

- No changes to the transportation system, access to the VIC campus will remain as it exists today.

Master Plan Phase 2

- Construct SE 29th Street between SE 176th Avenue and the west portion of the loop road within the VIC campus;
- Implement the previously identified VIC capacity mitigations at the signalized SE 29th Street/SE 164th Avenue intersection including:
 - Convert the existing east-west left-turn permissive signal phasing on SE 29th Street to protected/permissive left-turn phasing;
 - Extend the westbound left-turn lane striping to provide 225 feet of storage; and
 - Extend the existing southbound left-turn lane on SE 162nd Avenue at SE 29th Street to provide 300 feet of left-turn storage (the existing left-turn storage is approximately 135 feet long; the extension will required reconstruction of the existing median area and drainage facilities within the median).
- Construct the southwest portion of the loop road within the VIC campus between the SE Hiddenbrook site access and SE 29th Street;
- Close and vacate the existing west campus access connection to SE 34th Street (the site access aligned with SE 177th Avenue);
- Reconstruct the existing east campus access connection to SE 34th Street (the site access aligned with SE Hiddenbrook Drive) to have one northbound lane, one southbound left-turn lane and one southbound shared through/right lane at the SE 34th Street traffic signal;
- Construct a new single lane roundabout at SE 29th Street/SE 176th Avenue; and
- Construct a new single lane roundabout at SE 29th Street/west loop road intersection.



Master Plan Phase 3

- Extend SE 29th Street to SE 192nd Avenue, including signalization of the intersection at SE 192nd Avenue.

Master Plan Phase 4

- Construct the southeast portion of the loop road within the VIC campus between the SE Hiddenbrook site access and SE 29th Street, completing the loop road.

Trip Generation

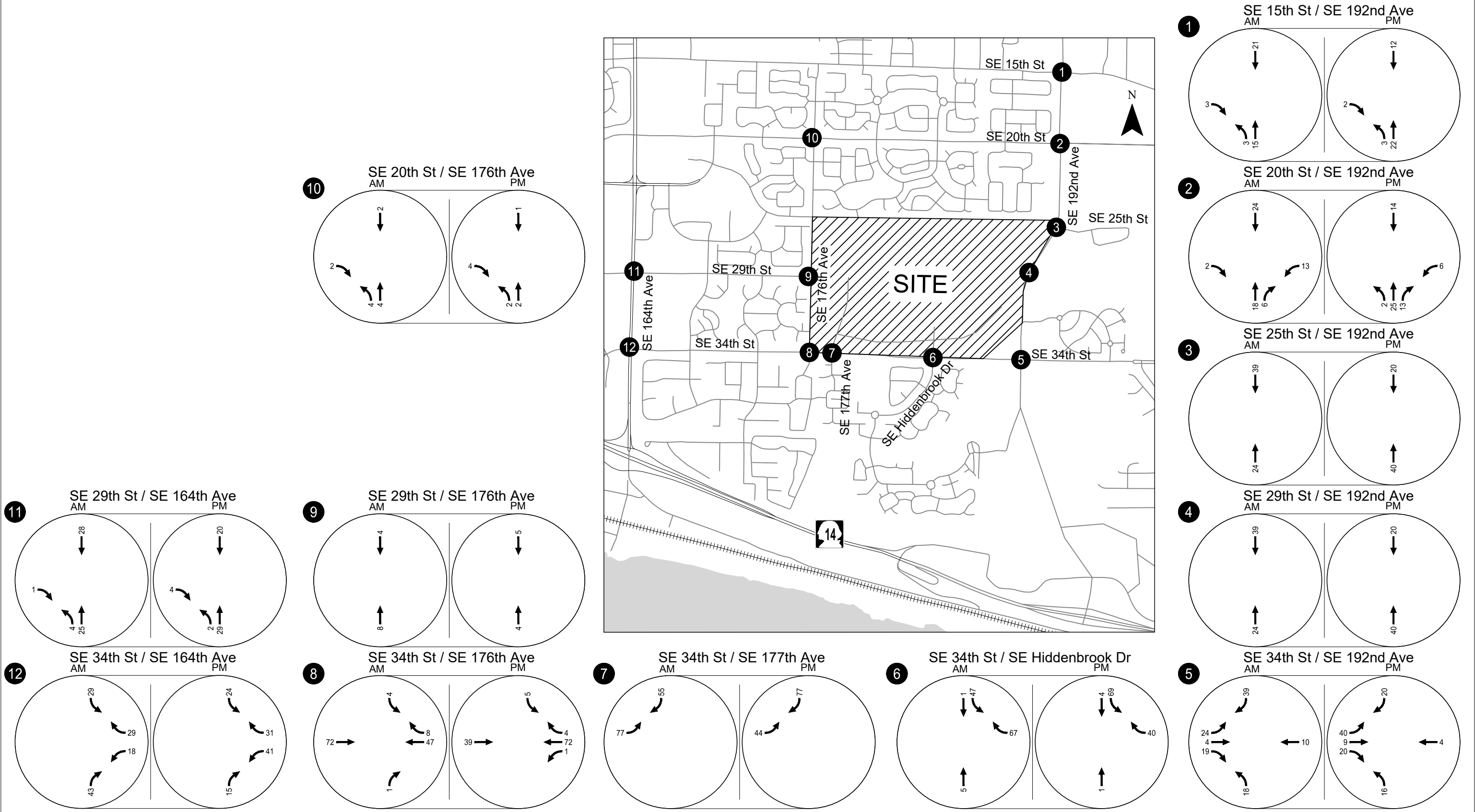
The VIC site trip generation estimates by phase are shown in Tables 6 through 9 and are a subset of the trip generation previously presented in Table 4. Figures 10 through 13 show the corresponding site-generated trip assignment to the study intersections. Note that Master Plan Phase 1 site development reflects uses that are approved “by right” under the current VIC development agreement. The Phase 1 uses and their traffic impacts can be constructed today.

Table 6: Phase 1 Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
General Light Industrial ¹	110	200,700 (Square Feet)	995	140	123	17	126	16	110
Less Trips Internal to the Campus Area			(43)	(4)	(2)	(2)	(4)	(0)	(4)
Net New			952	136	121	15	122	16	106
Multifamily Housing (Mid-Rise)	221	134 units	608	58	13	45	52	32	20
Less Trips Internal to the Campus Area			(85)	(1)	(0)	(1)	(9)	(6)	(3)
Net New			523	57	13	44	43	26	17
Multifamily Housing (Low-Rise)	220	174 units	1,173	61	15	46	81	51	30
Less Trips Internal to the Campus Area			(110)	(2)	(0)	(2)	(11)	(8)	(3)
Net New			1,063	59	15	44	70	43	27
Total Trips			2,776	259	151	108	259	99	160
Less Total Trips Internal to the Campus Area			(238)	(7)	(2)	(5)	(24)	(14)	(10)
Total Net New Trips			2,538	252	149	103	235	85	150

¹ Source: Refer to September 2, 2022 VIC Building North Trip Compliance Letter (PRJ-168116, PIR-82415)

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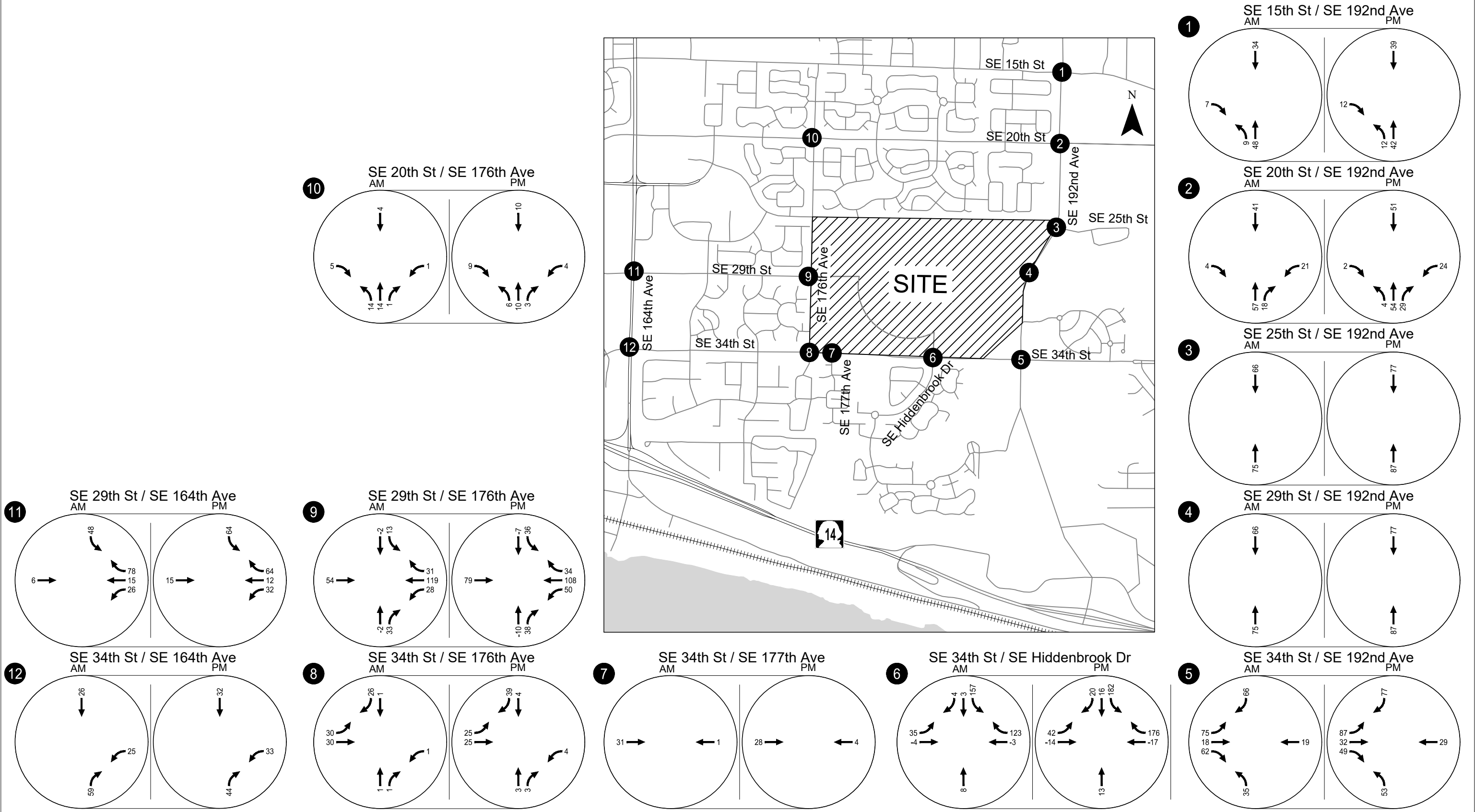
NOTE - Trips shown include net new trip assignment (all land uses) and pass-by trip assignment (retail use only).

Phase 1 Trip Assignment
Weekday AM & PM Peak Hour
Vancouver, WA
Figure 10

Table 7: Phase 2 Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
General Light Industrial	110	34,439 Square Feet	166	26	23	3	22	3	19
Less Trips Internal to the Campus Area			(13)	(2)	(1)	(1)	(2)	(1)	(1)
Net New			153	24	22	2	20	2	18
Medical Office Building	720	8,200 Square Feet	295	26	20	6	32	1	22
Less Trips Internal to the Campus Area			(3)	(1)	(1)	(0)	(0)	(0)	(0)
Net New			292	25	19	6	32	10	22
General Office Building	710	71,750 square feet	778	109	96	13	103	17	86
Less Trips Internal to the Campus Area			(24)	(2)	(1)	(1)	(3)	(1)	(2)
Net New			754	107	95	12	100	16	84
Shopping Center	820	123,200 square feet	4,559	103	64	39	419	201	218
Less Trips Internal to the Campus Area			(1,414)	(40)	(26)	(14)	(97)	(36)	(61)
Less Pass-by Reduction			(912)	(18)	(11)	(7)	(94)	(48)	(46)
Net New			2,233	45	27	18	228	117	111
Multifamily Housing (Mid-Rise)	221	824 Units	3,741	355	82	273	322	196	126
Less Trips Internal to the Campus Area			(522)	(9)	(1)	(8)	(53)	(37)	(16)
Net New			763	43	11	32	51	32	19
Multifamily Housing (Low-Rise)	220	125 Units	842	44	11	33	59	38	21
Less Trips Internal to the Campus Area			(79)	(1)	(0)	(1)	(8)	(6)	(2)
Net New			763	43	11	32	51	32	19
Total Phase 2 Trips			10,381	663	296	367	957	465	492
Less Total Trips Internal to the Campus Area			(2,055)	(55)	(30)	(25)	(163)	(81)	(82)
Less Total Pass-by Reduction			(912)	(18)	(11)	(7)	(94)	(48)	(46)
Total Phase 2 Net New Trips			7,414	590	255	335	700	336	364

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NOTE - Trips shown include net new trip assignment (all land uses) and pass-by trip assignment (retail use only). Negative trips represent pass-by trips.

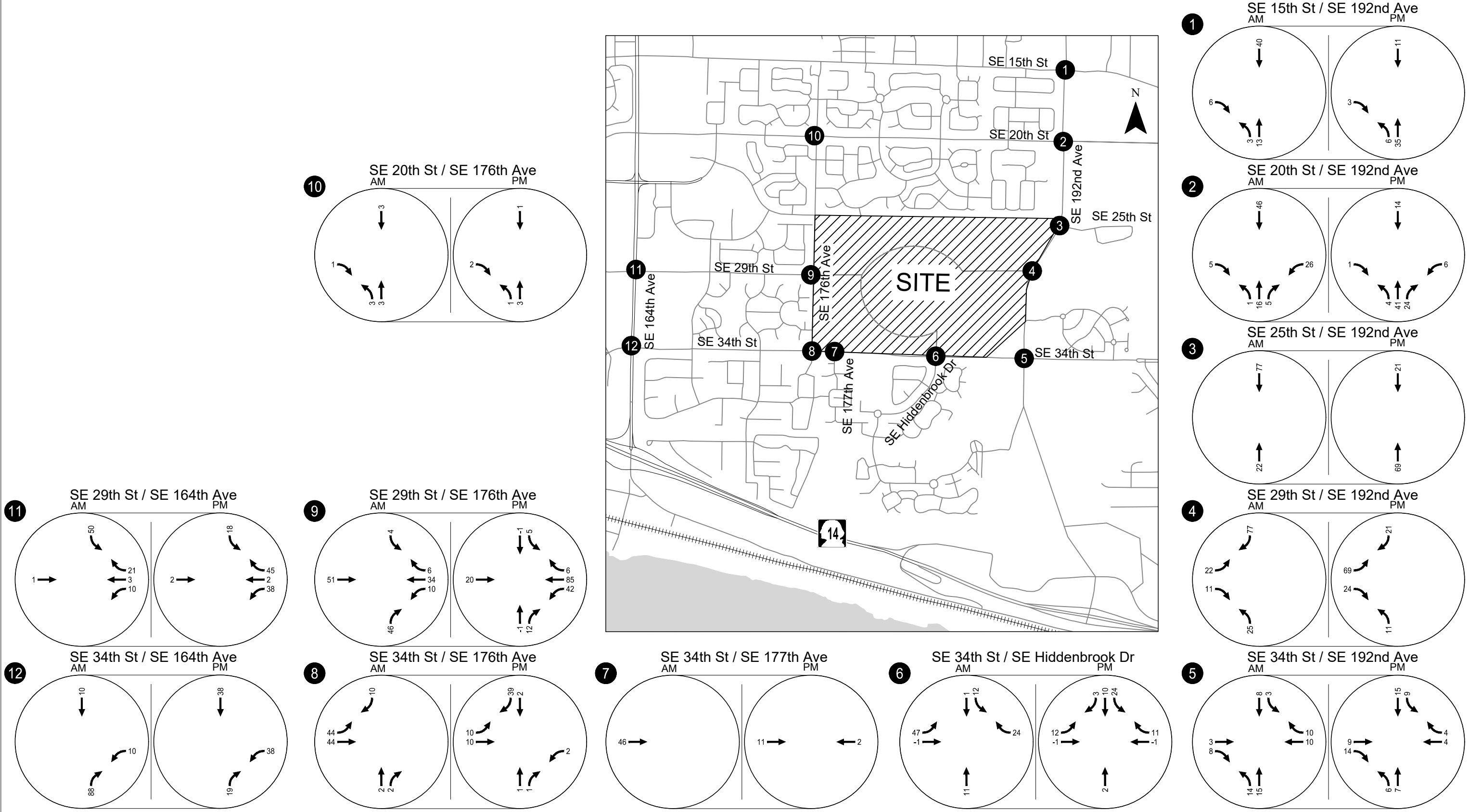
Phase 2 Trip Assignment
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
11

Table 8: Phase 3 Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
General Light Industrial	110	365,426 Square Feet	1,764	278	245	33	242	36	206
Less Trips Internal to the Campus Area			(142)	(14)	(7)	(7)	(16)	(6)	(10)
Net New			1,622	264	238	26	226	30	196
Medical Office Building	720	1,800 Square Feet	65	5	4	1	7	2	5
Less Trips Internal to the Campus Area			(1)	(0)	(0)	(0)	(0)	(0)	(0)
Net New			64	5	4	1	7	2	5
General Office Building	710	15,750 square feet	171	24	21	3	23	4	19
Less Trips Internal to the Campus Area			(5)	(0)	(0)	(0)	(0)	(0)	(0)
Net New			166	24	21	3	23	4	19
Shopping Center	820	11,200 square feet	415	10	6	4	38	18	20
Less Trips Internal to the Campus Area			(129)	(3)	(2)	(1)	(9)	(3)	(6)
Less Pass-by Reduction			(83)	(2)	(1)	(1)	(8)	(4)	(4)
Net New			203	5	3	2	21	11	10
Multifamily Housing (Mid-Rise)	221	154 Units	699	66	15	51	60	37	23
Less Trips Internal to the Campus Area			(97)	(2)	(0)	(2)	(9)	(7)	(2)
Net New			602	64	15	49	51	30	21
Multifamily Housing (Low-Rise)	220	52 Units	350	18	4	14	24	15	9
Less Trips Internal to the Campus Area			(33)	(1)	(1)	(0)	(3)	(2)	(1)
Net New			317	17	3	14	21	13	8
Total Phase 3 Trips			3,464	401	295	106	394	112	282
Less Total Trips Internal to the Campus Area			(407)	(20)	(10)	(10)	(37)	(18)	(19)
Less Total Pass-by Reduction			(83)	(2)	(1)	(1)	(8)	(4)	(4)
Total Phase 3 Net New Trips			2,974	379	284	95	349	90	259

H:\27\2715 - VIC Implementation\005 - Master Plan Update TIA\report\figs\2715-Figures_For TIA.dwg Apr 04, 2023 - 2:21pm - ckeyhans Layout Tab: Fig 12_Phase 3 Trip Assignment



NOTE - Trips shown include net new trip assignment (all land uses) and pass-by trip assignment (retail use only).
Negative trips represent pass-by trips.

Phase 3 Trip Assignment
Weekday AM & PM Peak Hour
Vancouver, WA
Figure 12

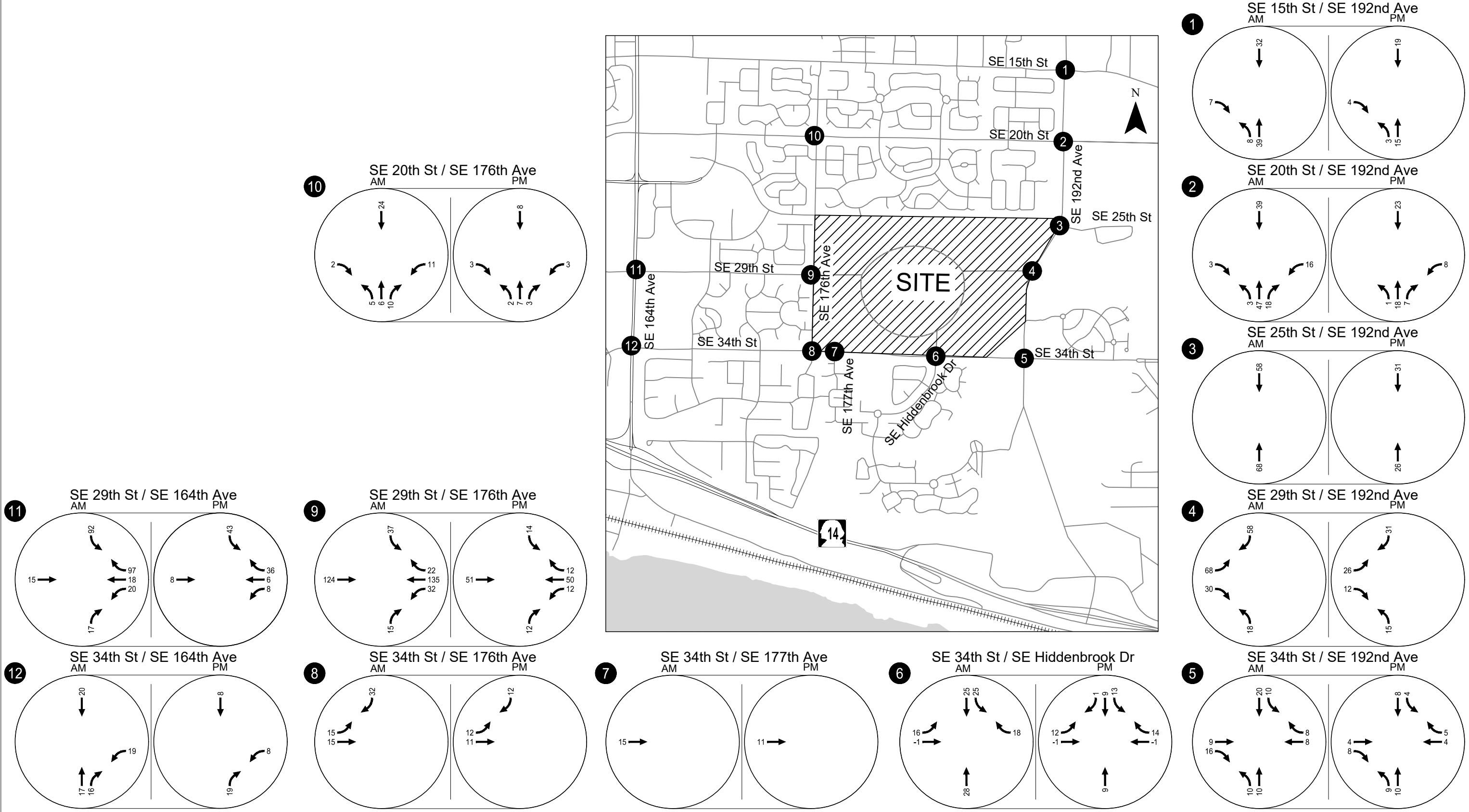
Table 9: Phase 4 Site Trip Generation Estimate

Land Use	ITE Code	Size	Daily Trips	Weekday AM Peak Hour			Weekday PM Peak Hour		
				Total	In	Out	Total	In	Out
Shopping Center	820	5,600 square feet	207	5	3	2	19	9	10
<i>Less Trips Internal to the Campus Area</i>			(64)	(2)	(1)	(1)	(4)	(2)	(2)
<i>Less Pass-by Reduction</i>			(41)	(1)	(1)	(0)	(4)	(2)	(2)
Net New			102	2	1	1	11	5	6
Multifamily Housing (Mid-Rise)	221	136 Units	618	59	14	45	53	32	21
<i>Less Trips Internal to the Campus Area</i>			(86)	(2)	(1)	(1)	(9)	(6)	(3)
Net New			532	57	13	44	44	26	18
Multifamily Housing (Low-Rise)	220	201 Units	1,355	71	17	54	94	59	35
<i>Less Trips Internal to the Campus Area</i>			(128)	(2)	(0)	(2)	(13)	(9)	(4)
Net New			1,227	69	17	52	81	50	31
Middle School ²	522	900 Students	1,917	522	282	240	153	75	78
Total Phase 4 Trips			4,097	657	316	341	319	175	144
<i>Less Total Trips Internal to the Campus Area</i>			(278)	(6)	(2)	(4)	(26)	(17)	(9)
<i>Less Total Pass-by Reduction</i>			(41)	(69)	(17)	(52)	(81)	(50)	(31)
Total Phase 4 Net New Trips			3,778	582	297	285	212	108	104

¹ Source: Traffic Impact Analysis for VIC Master Plan dated November 20, 2020.

² Trip estimates from approved 2020 VIC Traffic Impact Analysis. The potential for internal trips associated with a school could be revisited in conjunction with a more specific school development proposal.

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NOTE - Trips shown include net new trip assignment (all land uses) and pass-by trip assignment (retail use only).
Negative trips represent pass-by trips.

Phase 4 Trip Assignment
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
13

FUTURE YEAR 2038 MASTER PLAN TRAFFIC CONDITIONS

The site-generated trips associated with each phase were added to the baseline traffic volumes to yield with project traffic volumes that were then analyzed. Re-routing of localized trips was assumed in conjunction with the introduction of new road connections by phase where appropriate. The discussion below summarizes key changes and findings by development phase.

Phase 1 With Project Conditions

Vehicle access to and from the VIC campus will remain the same as it is today under Phase 1 master plan development. As such, the Phase 1 site-generated trips (reflected in Figure 10) were added to the baseline traffic volumes in Figure 8 to result in the Master Plan build-out traffic volumes and intersection operations reflected in Figure 14. Note that actual build-out of Phase 1 is allowed by-right today and is anticipated well before 2028 as previously noted.

Two study intersections are projected to not satisfy City performance standards with buildout of the Phase 1 Master Plan land uses:

- SE 25th Street/SE 192nd Avenue (did not satisfy standards under baseline conditions)
- SE 20th Street/SE 176th Avenue (did not satisfy standards under baseline conditions)

Additional details regarding the operations of the two intersections above and mitigation considerations is described below. *Appendix "F" contains the 2038 With Project Phase 1 operational analysis worksheets.*

SE 25th Street/SE 192nd Avenue (Study Intersection #3)

The stop-controlled westbound left-turn lane on SE 25th Street is projected to continue to operate at LOS F during the weekday PM peak hour but well under capacity (V/C ratio of 0.05). The proposed The VIC project is not projected to add any turning movements to the westbound approach and therefore does not trigger mitigation per Vancouver Municipal Code Section 11.80.130.B.

SE 20th Street/SE 176th Avenue (Study Intersection #10)

Consistent with 2038 Baseline conditions, intersection is forecast to continue to operate at LOS F with the eastbound and westbound approaches over capacity during the weekday PM peak hour. As previously noted, the City of Vancouver has previously identified capacity mitigation needs at the intersection and is collecting proportional share mitigation fees from new development (current fee of \$400 per weekday PM peak hour trip added to the intersection) to be used to fund the intersection improvements. Accordingly, the proposed development will be required to pay a proportional share contribution to the SE 20th Street/SE 176th Avenue intersection for mitigation purposes. Further details on the proportionate share amounts to be assessed are documented separately in this report.



Phase 2 With Project Conditions

The Phase 2 site-generated volumes shown in Figure 11 were added to the Phase 1 with project volumes to obtain the Phase 2 Master Plan build-out traffic volumes and intersection operations shown in Figure 15. In addition to assigning the new site-generated trips, some existing VIC campus trips destined to the east were re-routed from the existing SE 34th Street campus access to the assumed new SE 29th Street connection to SE 192nd Avenue (re-routing reflects more direct campus connection to SE 192nd Avenue for buildings on the western portion of the VIC campus, refer to Appendix “G” Figure G-1 and Figure G-2).

Upon buildout of the Phase 2 Master Plan transportation network and land uses, study intersections projected to not satisfy City performance standards and/or that experience projected 95th percentile queues that exceed the available queue storage include:

- SE 25th Street/SE 192nd Avenue (did not satisfy standards under baseline conditions)
- SE 34th Street/SE 192nd Avenue
- SE 20th Street/SE 176th Avenue (did not satisfy standards under baseline conditions)

Additional details regarding the operations of the three intersections above and mitigation considerations are described below. *Appendix “G” contains the 2038 With Project Phase 2 operational analysis worksheets.*

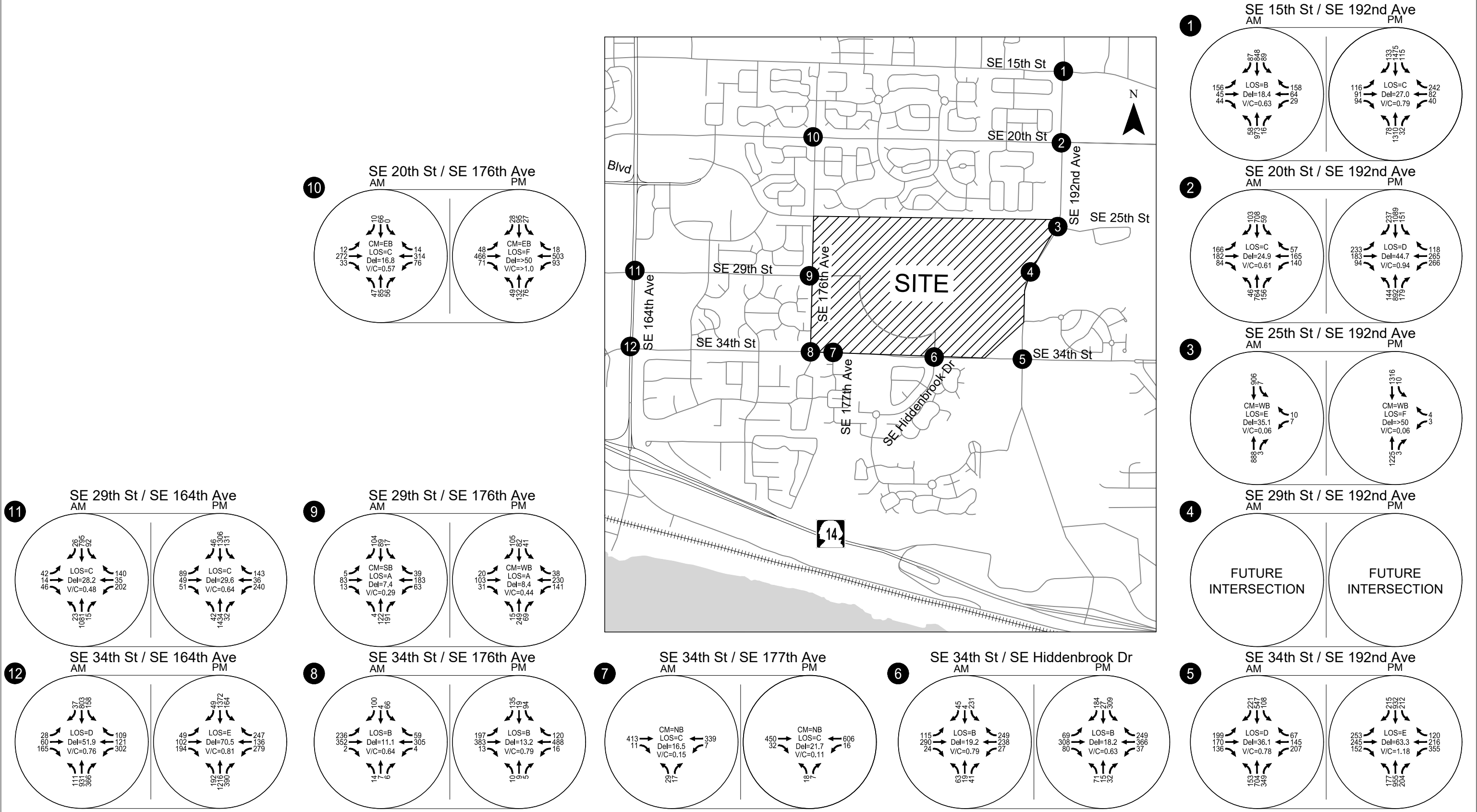
SE 25th Street/SE 192nd Avenue (Study Intersection #3)

The stop-controlled westbound left-turn lane on SE 25th Street is projected to continue to operate at LOS F during the weekday PM peak hour but well under capacity (V/C ratio of 0.06). The proposed The VIC project is not projected to add any turning movements to the westbound approach and therefore does not trigger mitigation per Vancouver Municipal Code Section 11.80.130.B.

SE 34th Street/SE 192nd Avenue (Study Intersection #5)

As shown, the SE 192nd Avenue/SE 34th Street signalized intersection is projected to at LOS E and over capacity during the weekday PM peak hour. The City of Vancouver has previously determined that no additional capacity will be added to the intersection and is collecting proportional share mitigation fees from new development (current fee of \$150 per weekday PM peak hour trip added to the intersection) to be used to reconstruct the intersection with a concrete surface. Accordingly, the proposed development will be required to pay a proportional share contribution to the SE 192nd Avenue/SE 34th Street intersection for mitigation purposes. Further details on the proportionate share amounts to be assessed are documented separately in this report.

H:\27\2715 - VIC Implementation\005 - Master Plan Update TIA\report\figs\2715-Figures_Fig 15 - Phase 2 Total Layout Tab: Fig 15 - Phase 2 Total



CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C= Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Future Year 2038 Phase 2 With-Project Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
15

SE 20th Street/SE 176th Avenue (Study Intersection #10)

The intersection is forecast to continue to operate over capacity during the weekday PM peak hour and the proposed development will be required to pay a proportional share contribution for mitigation purposes.

It is further noted that northbound vehicles on SE 177th Avenue at SE 34th Street experience much less delay due to closure of the opposing VIC west campus access to SE 34th Street with Master Plan Phase 2.

Phase 3 With Project Conditions

The Phase 3 site-generated volumes shown in Figure 12 were added to the 2038 Phase 2 With Project volumes shown in Figure 14 to obtain the Phase 3 Master Plan build-out traffic volumes and intersection operations shown in Figure 16. In addition to assigning the new site-generated trips, previously assigned The VIC trips were re-routed from the existing SE 34th Street campus access to the assumed new SE 29th Street connection to SE 192nd Avenue (re-routing reflects the more direct campus connection to SE 192nd Avenue for buildings on the eastern portion of the VIC campus, refer to Appendix “H” Figure H-1). Further, some local trips were also re-routed, reflecting the new alternative path compared to prior conditions where local trips use the SE 34th Street corridor to travel to and from SE 192nd Avenue.

Upon buildout of the Phase 3 Master Plan transportation network and land uses, study intersections projected to not satisfy City performance standards and/or that experience projected 95th percentile queues that exceed the available queue storage include:

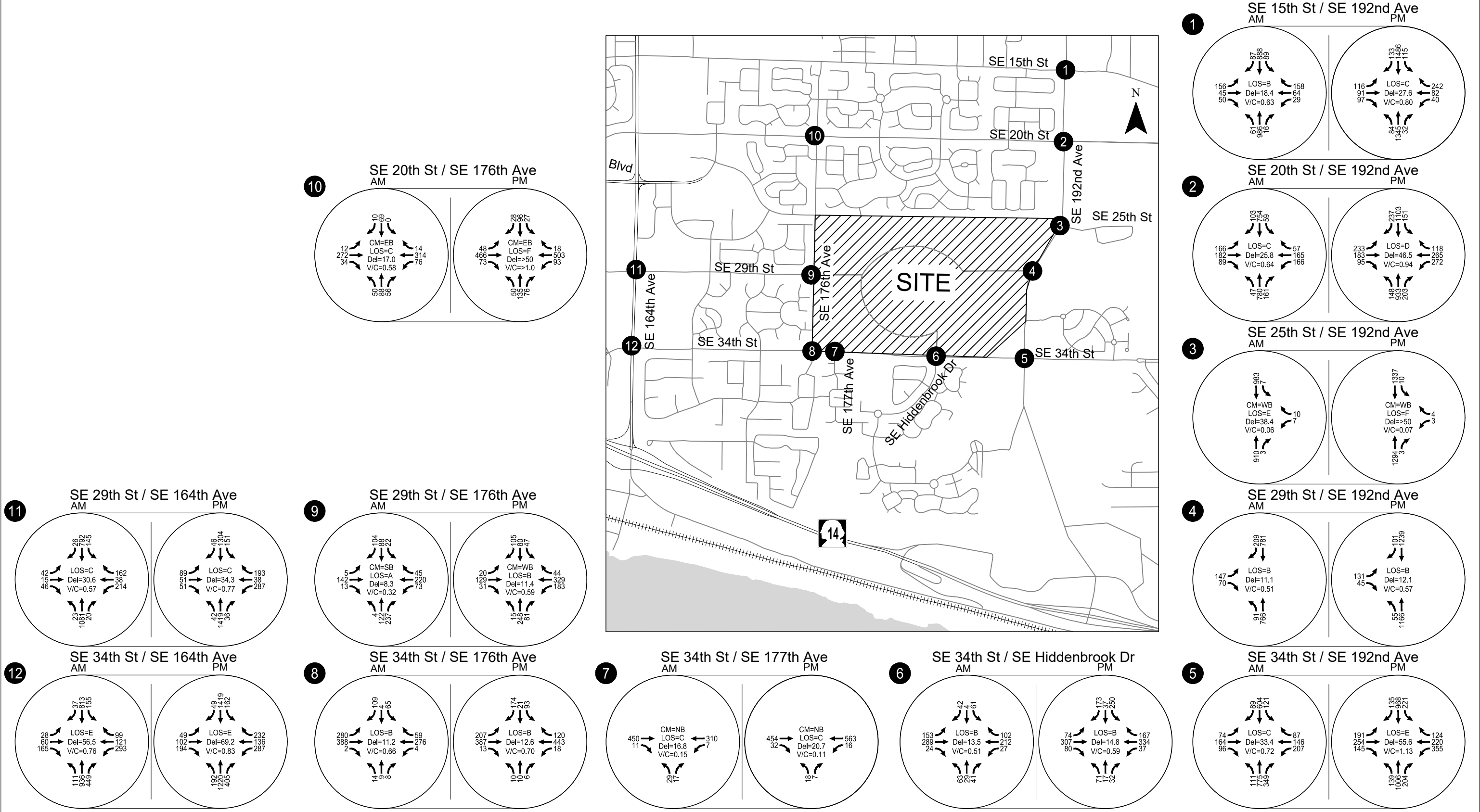
- SE 25th Street/SE 192nd Avenue (did not satisfy standards under baseline conditions)
- SE 34th Street/SE 192nd Avenue (improved compared to Phase 2 conditions)
- SE 20th Street/SE 176th Avenue (did not satisfy standards under baseline conditions)

Additional details regarding the operations of each intersection and mitigation considerations is described below. *Appendix “H” contains the 2038 With Project Phase 3 operational analysis worksheets, the traffic signal warrant analysis worksheets.*

SE 25th Street/SE 192nd Avenue (Study Intersection #3)

The stop-controlled westbound left-turn lane on SE 25th Street is projected to continue to operate at LOS F with a V/C ratio of 0.07 during the weekday PM peak hour. The proposed The VIC project is not projected to add any turning movements to the westbound approach and therefore does not trigger mitigation per Vancouver Municipal Code Section 11.80.130.B.

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CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C = Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Future Year 2038 Phase 3 With-Project Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
16

SE 34th Street/SE 192nd Avenue (Study Intersection #5)

The intersection is forecast to continue to operate over capacity during the weekday PM peak hour but operates comparatively better than under Phase 2 conditions due to the diversion of VIC and local traffic to the new parallel SE 29th Street corridor through the VIC campus. The proposed development will be required to pay a proportional share contribution for mitigation purposes.

SE 20th Street/SE 176th Avenue (Study Intersection #10)

The intersection is forecast to continue to operate over capacity during the weekday PM peak hour and the proposed development will be required to pay a proportional share contribution for mitigation purposes.

Phase 4 With Project Conditions

The Phase 4 site-generated volumes shown in Figure 13 were added to the 2038 Phase 3 With Project volumes shown in Figure 16 to obtain the Phase 4 Master Plan build-out traffic volumes and intersection operations shown in Figure 17.

Upon buildout of the Phase 4 Master Plan (full buildout of the VIC Master Plan uses) transportation network and land uses, study intersections projected to not satisfy City performance standards and/or that experience projected 95th percentile queues that exceed the available queue storage include:

- SE 25th Street/SE 192nd Avenue (did not satisfy standards under baseline conditions)
- SE 34th Street/SE 192nd Avenue
- SE 20th Street/SE 176th Avenue (did not satisfy standards under baseline conditions)

Additional details regarding the operations of each intersection and mitigation considerations is described below. *Appendix "I" contains the 2038 With Project Phase 4 operational analysis worksheets, .*

SE 25th Street/SE 192nd Avenue (Study Intersection #3)

The stop-controlled westbound left-turn lane on SE 25th Street is projected to continue to operate at LOS F with a V/C ratio of 0.08 during the weekday PM peak hour. The proposed The VIC project is not projected to add any turning movements to the westbound approach and therefore does not trigger mitigation per Vancouver Municipal Code Section 11.80.130.B.

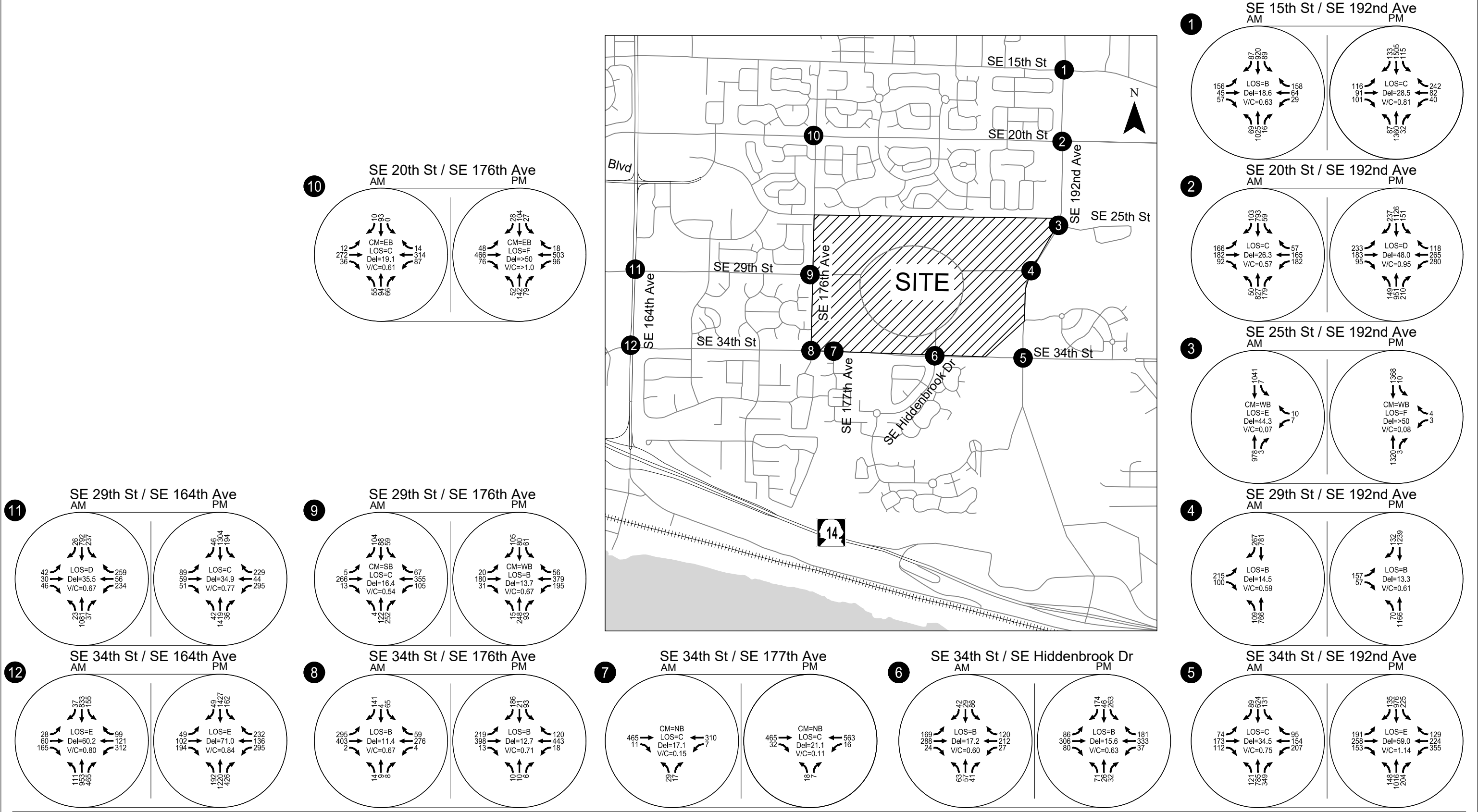
SE 34th Street/SE 192nd Avenue (Study Intersection #5)

The intersection is forecast to continue to operate over capacity during the weekday PM peak hour and proposed development will be required to pay a proportional share contribution for mitigation purposes.

SE 20th Street/SE 176th Avenue (Study Intersection #10)

The intersection is forecast to continue to operate over capacity during the weekday PM peak hour and the proposed development will be required to pay a proportional share contribution for mitigation purposes.

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CM = Critical Movement (Unsignalized)
LOS = Intersection Level of Service (Signalized) / Critical Movement Level of Service (Unsignalized)
Del = Intersection Average Control Delay (Signalized) / Critical Movement Control Delay (Unsignalized)
V/C= Intersection Volume-to-Capacity Ratio (Signalized) / Critical Movement Volume-to-Capacity Ratio (Unsignalized)

Future Year 2038 Phase 4 With-Project Traffic Conditions
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
17

PROPORTIONAL SHARE FEE CONTRIBUTIONS

The City of Vancouver is collecting proportional share fee contributions from all future development adding site-generated trips to multiple intersections in the study area. Intersections impacted by the VIC Master Plan that are projected to experience concurrency failures and for mitigation is being required in the form of the proportional share fee include:

- SE 34th Street/SE 192nd Avenue
- SE 20th Street/SE 176th Avenue
- SE 192nd Avenue/SR-14 Westbound

Information about the current applicable fees and anticipated total project impact is documented for each intersection below based on the current site plan and trip estimates previously presented in Table 4. The fee amount due for each new building at The VIC will be determined at the time of site plan application and payment will be paid prior to building permit issuance.

SE 34th Street/SE 192nd Avenue (Study Intersection #5)

- A fee payment of \$150 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection.
- Full Master Plan buildout is projected to add 556 weekday PM peak hour trips to the intersection, resulting in a projected fee of \$83,400.

SE 20th Street/SE 176th Avenue (Study Intersection #10)

- A fee payment of \$400 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection.
- Full Master Plan buildout is projected to add 84 weekday PM peak hour trips to the intersection, resulting in a projected fee of \$33,600.

SE 192nd Avenue & SR-14 Westbound Ramp Terminal Mitigation

- A fee payment of \$2,000 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection. The fee will be used to fund the installation of a traffic signal and a second westbound right-turn lane at the intersection along with related modifications.
- Full Master Plan buildout is projected to add 215 weekday PM peak hour trips to the intersection, resulting in a projected fee of \$430,000 as follows:
 - Light industrial and office uses: 53 trips (\$106,000);
 - Residential uses: 126 trips (\$252,000);
 - Commercial retail uses: 28 trips (\$56,000); and
 - Middle School: 8 trips (\$16,000).

SITE ACCESS SIGHT DISTANCE CONSIDERATIONS

The final VIC Master Plan site plan design should provide intersection sight clear areas at each on-site intersection and connections to the public roadway network surrounding the campus in accordance with City of Vancouver standards. Further, it is recommended that above-ground utilities, monuments, fencing, and vegetation be appropriately located and maintained on-site to preserve adequate intersection sight lines per City of Vancouver standards.

FINDINGS & RECOMMENDATIONS

Based on the results of this Traffic Impact Analysis, the proposed VIC Master Plan can be developed while maintaining acceptable study intersection operations and/or mitigating site development impacts. The analysis developed the findings and recommendations listed below.

Findings

- Each of the study intersections satisfies City operating standards today.
- By the future baseline year 2038, the following study intersections do not satisfy City performance standards:
 - SE 25th Street/SE 192nd Avenue
 - SE 20th Street/SE 176th Avenue
- The VIC project will provide several new roadways and transportation capacity mitigations including construction of:
 - SE 29th Street as a collector between SE 176th Avenue and SE 192nd Avenue;
 - A new loop road within the VIC campus linking SE 34th Street and SE 29th Street;
 - A new single lane roundabout at the SE 29th Street/SE 176th Avenue intersection;
 - A new single lane roundabout at SE 29th Street/west loop road intersection;
 - A new single lane roundabout at SE 29th Street/east loop road intersection;
 - A new signalized intersection at SE 29th Street/SE 192nd Avenue intersection;
 - Capacity mitigations at the signalized SE 29th Street/SE 164th Avenue intersection including:
 - Convert the existing east-west left-turn permissive signal phasing on SE 29th Street to protected/permissive left-turn phasing;
 - Extend the westbound left-turn lane storage on SE 29th Street; and
 - Extend the existing southbound left-turn lane on SE 162nd Avenue.

- Closure of the existing west campus access connection to SE 34th Street (the site access aligned with SE 177th Avenue); and
 - Modify the existing east campus access connection to SE 34th Street (the site access aligned with SE Hiddenbrook Drive) to have one northbound lane, one southbound left-turn lane and one southbound shared through/right lane at the SE 34th Street traffic signal.
- The VIC Master Plan site-generated trips will impact three intersections where the City of Vancouver is collecting proportional share fee contributions including:
 - SE 34th Street/SE 192nd Avenue
 - SE 20th Street/SE 176th Avenue
 - SE 192nd Avenue/SR-14 Westbound

Recommended Off-site Intersection Mitigations with Master Plan Development

SE 29th Street/SE 164th Avenue (Study Intersection #11) With Phase 2 Site Development

- The existing east-west left-turn signal phasing on SE 29th Street at SE 162nd Avenue should be converted from permissive operations to protected/permissive left-turn phasing;
- The westbound left-turn lane striping should be extended to provide 225 feet of storage; and
- The existing southbound left-turn lane on SE 162nd Avenue at SE 29th Street should be extended to provide 300 feet of left-turn storage (the existing left-turn storage is approximately 135 feet long; the extension will required reconstruction of the existing median area and drainage facilities within the median).

SE 29th Street/SE 192nd Avenue (Study Intersection #4) With Master Plan Phase 3

- Construct a traffic signal along with:
 - separate left and right-turn lanes with at least 250 feet of storage on the eastbound SE 29th Street approach;
 - a separate left-turn lane with at least 200 feet of storage on the northbound approach; and
 - protected northbound left-turn phasing on SE 192nd Avenue at the intersection.

Proportional Share Contributions

The VIC should make a proportionate share contribution toward future capacity improvements at each of these three intersections with each site development application. The fee for individual site plan applications will be determined as part of each application and should be paid prior to building permit issuance.

- SE 34th Street/SE 192nd Avenue (Study Intersection #5)
 - A fee payment of \$150 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection.
- SE 192nd Avenue & SR-14 Westbound Ramp Terminal
 - A fee payment of \$2,000 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection.
- SE 20th Street/SE 176th Avenue (Study Intersection #10)
 - The VIC should make a proportionate share contribution toward future capacity improvements at the unsignalized SE 20th Street/SE 176th Avenue intersection with each site development application. A fee payment of \$400 is currently required by the City for each weekday PM peak hour site-generated trip traveling through the intersection.

Other Recommendations

- Above-ground utilities, monuments, fencing, and vegetation should be appropriately located and maintained on-site and at all site access intersections to provide adequate intersection sight lines per City of Vancouver standards.

We trust this letter adequately addresses the traffic impacts associated with the revised The VIC Master Plan proposal. Please contact us if you have any questions or comments.

Sincerely,
KITTELSON & ASSOCIATES, INC.



Chris Brehmer, PE
Senior Principal Engineer



Julia Kuhn, PE
Senior Principal Engineer



REFERENCES

- 1) Transportation Research Board. *Highway Capacity Manual*, 6th Edition. 2016.
- 2) City of Vancouver. Arterial Street System and Classification Map. 2022.
https://www.cityofvancouver.us/sites/default/files/fileattachments/public_works/page/1744/arterial_map_large_2022.pdf
- 3) C-Tran. <http://www.c-tran.com>. Accessed March 2021.
- 4) Institute of Transportation Engineers. *Trip Generation Manual*, 11th Edition. 2021.

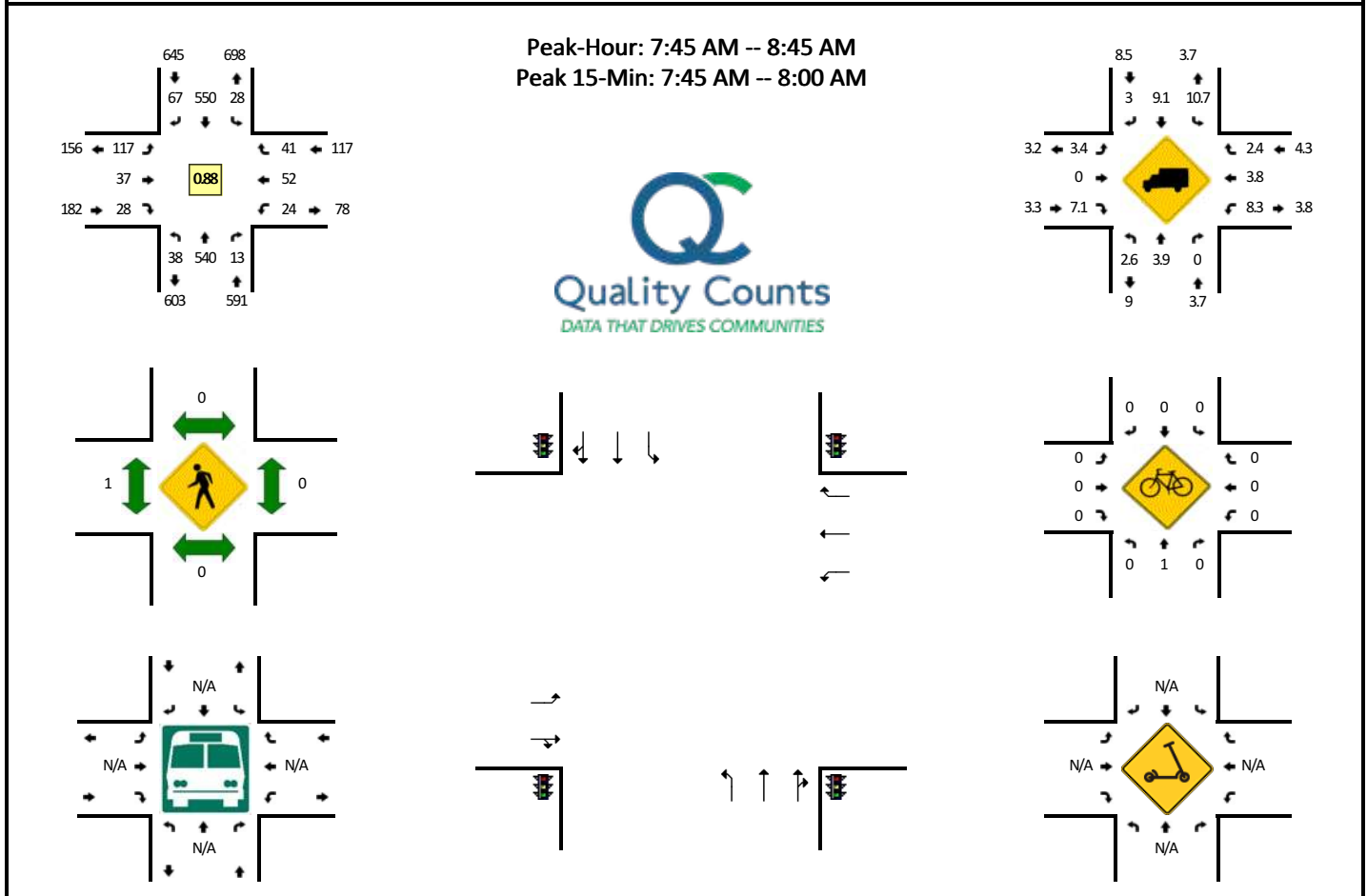
APPENDICES

- Appendix A: Traffic Count Data
- Appendix B: WSDOT Crash Data
- Appendix C: Existing Operations Worksheets
- Appendix D: The VIC Campus Volume Adjustment
- Appendix E: 2038 Baseline Operations Worksheets and Total In-process Trip Assignment
- Appendix F: 2038 With-Project Phase 1 Operations Worksheets
- Appendix G: 2038 With-Project Phase 2 Operations Worksheets and Re-route Trips
- Appendix H: 2038 With-Project Phase 3 Operations Worksheets and Re-route Trips
- Appendix I: 2038 With-Project Phase 4 Operations Worksheets

Appendix A Traffic Count Data

LOCATION: SE 192nd Ave -- SE 15th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050501
DATE: Tue, Jan 10 2023

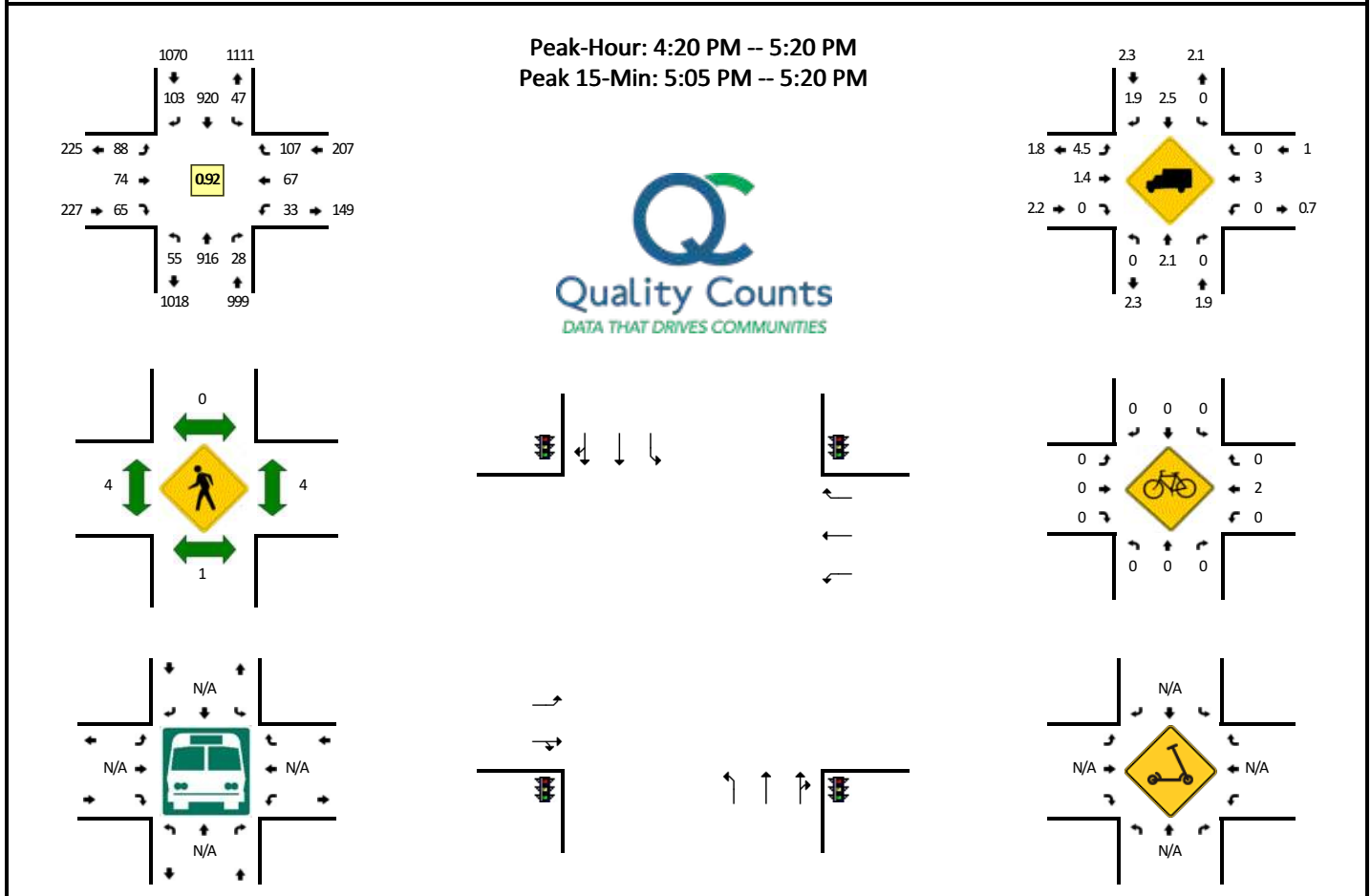


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	31	0	0	1	51	4	0	2	2	1	0	0	1	0	0	94	
7:05 AM	0	23	0	0	1	35	4	0	2	1	1	0	2	0	2	0	71	
7:10 AM	2	31	0	0	0	36	3	0	6	2	3	0	1	1	1	0	86	
7:15 AM	2	39	0	0	6	36	1	0	7	6	3	0	1	0	2	0	103	
7:20 AM	4	35	0	0	1	32	3	0	7	2	2	0	1	0	6	0	93	
7:25 AM	2	39	0	1	1	39	4	0	1	2	1	0	2	6	0	0	98	
7:30 AM	1	43	2	0	0	30	4	0	2	5	2	0	2	0	3	0	94	
7:35 AM	3	46	0	0	1	37	2	0	10	1	4	0	3	3	2	0	112	
7:40 AM	1	65	3	0	1	42	2	0	11	5	3	0	3	4	3	0	143	
7:45 AM	5	56	1	0	1	50	4	0	11	4	1	0	2	4	7	0	146	
7:50 AM	2	44	1	1	4	63	4	0	10	5	4	0	3	5	5	0	151	
7:55 AM	0	39	3	0	7	59	12	0	6	3	5	0	1	2	2	0	139	1330
8:00 AM	1	41	1	0	0	43	13	0	8	3	2	0	2	5	1	0	120	1356
8:05 AM	9	39	0	0	1	43	4	0	5	1	6	0	0	6	0	0	114	1399
8:10 AM	0	35	2	0	3	38	5	0	6	4	1	0	1	8	2	0	105	1418
8:15 AM	1	43	0	0	2	27	3	0	8	2	1	0	4	4	5	0	100	1415
8:20 AM	6	43	2	0	1	51	6	0	9	2	0	0	1	4	2	0	127	1449
8:25 AM	4	51	2	0	2	42	5	0	17	3	1	0	1	3	6	0	137	1488
8:30 AM	1	41	1	0	2	31	1	0	19	6	3	0	3	5	6	0	119	1513
8:35 AM	2	57	0	0	3	52	4	0	6	1	1	0	1	4	1	0	132	1533
8:40 AM	6	51	0	0	2	51	6	0	12	3	3	0	5	2	4	0	145	1535
8:45 AM	6	43	2	0	5	47	7	0	3	1	5	0	2	9	3	0	133	1522
8:50 AM	0	62	1	0	0	45	6	0	3	4	2	0	3	3	4	0	133	1504
8:55 AM	3	57	0	0	5	45	2	0	2	5	3	0	2	5	1	0	130	1495
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	28	556	20	4	48	688	80	0	108	48	40	0	24	44	56	0	1744	
Heavy Trucks	0	4	0		8	56	4		0	0	0		0	0	0		72	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 192nd Ave -- SE 15th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050502
DATE: Tue, Jan 10 2023

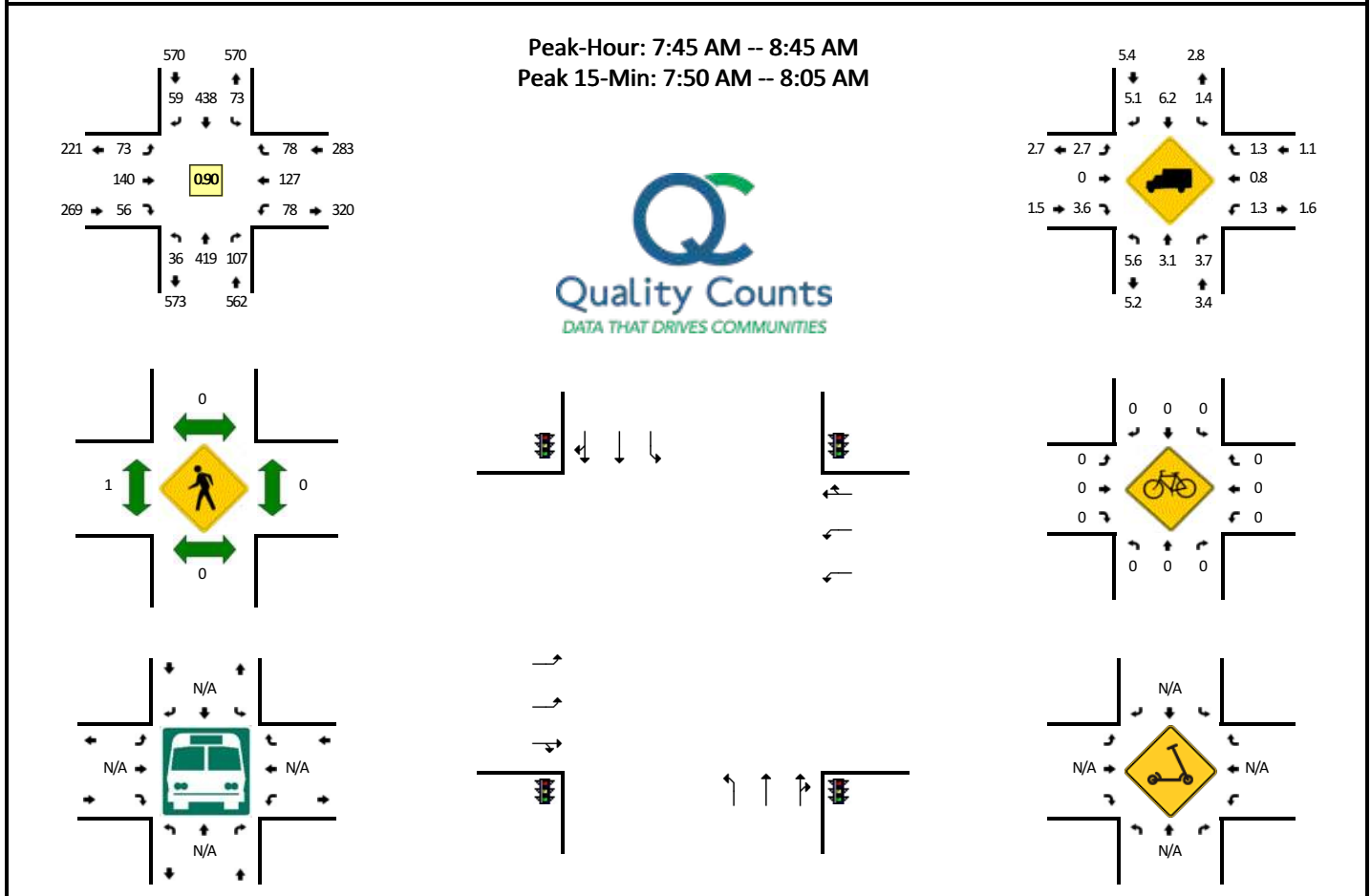


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 15th St (Eastbound)				SE 15th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	87	0	0	2	89	14	0	10	3	3	0	4	4	11	0	231	
4:05 PM	8	66	1	0	6	70	15	1	7	6	4	0	4	7	12	0	207	
4:10 PM	13	93	2	0	1	71	9	0	5	3	5	0	1	11	11	0	225	
4:15 PM	7	79	3	0	6	48	8	0	7	8	1	0	1	4	11	0	183	
4:20 PM	1	90	3	0	3	66	9	0	10	6	6	0	5	6	12	0	217	
4:25 PM	6	66	2	0	4	86	7	0	9	3	5	0	2	2	7	0	199	
4:30 PM	7	70	3	0	5	63	8	0	4	7	4	0	2	2	3	0	178	
4:35 PM	5	77	2	0	2	69	8	0	5	6	6	0	5	5	12	0	202	
4:40 PM	4	85	1	0	2	92	9	0	12	4	0	0	2	5	6	0	222	
4:45 PM	4	85	3	0	1	76	13	0	6	9	8	0	1	4	6	0	216	
4:50 PM	10	74	2	0	2	67	4	0	5	7	8	0	3	4	4	0	190	
4:55 PM	3	93	3	0	5	66	13	0	9	5	6	0	2	3	5	0	213	2483
5:00 PM	4	70	1	0	3	74	7	0	8	5	5	0	1	3	8	0	189	2441
5:05 PM	5	47	1	0	3	87	4	0	9	3	8	0	4	9	20	0	200	2434
5:10 PM	4	79	2	0	9	87	11	0	8	9	4	0	3	12	13	0	241	2450
5:15 PM	2	80	5	0	8	87	10	0	3	10	5	0	3	12	11	0	236	2503
5:20 PM	3	78	5	0	5	76	9	0	8	8	7	0	3	4	10	0	216	2502
5:25 PM	4	60	3	0	2	56	7	0	4	10	5	0	3	3	5	0	162	2465
5:30 PM	2	59	0	0	3	68	8	0	6	7	7	0	1	7	7	0	175	2462
5:35 PM	3	72	3	0	5	57	7	0	6	4	5	0	1	3	3	0	169	2429
5:40 PM	5	57	3	0	2	61	8	0	4	4	4	0	2	3	5	0	158	2365
5:45 PM	5	59	4	0	8	66	10	0	8	8	6	0	5	7	9	0	195	2344
5:50 PM	6	72	1	0	7	63	6	0	8	8	1	0	3	9	5	0	189	2343
5:55 PM	2	72	8	0	4	57	7	0	9	6	2	0	4	6	5	0	182	2312
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	44	824	32	0	80	1044	100	0	80	88	68	0	40	132	176	0	2708	
Heavy Trucks	0	8	0	0	0	32	0	0	4	0	0	0	0	4	0	0	48	
Buses																		
Pedestrians		4				0				4				8			16	
Bicycles	0	0	0		0	0	0		0	0	0		0	8	0		8	
Scooters																		

Comments:

LOCATION: SE 192nd Ave -- SE 20th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050503
DATE: Tue, Jan 10 2023

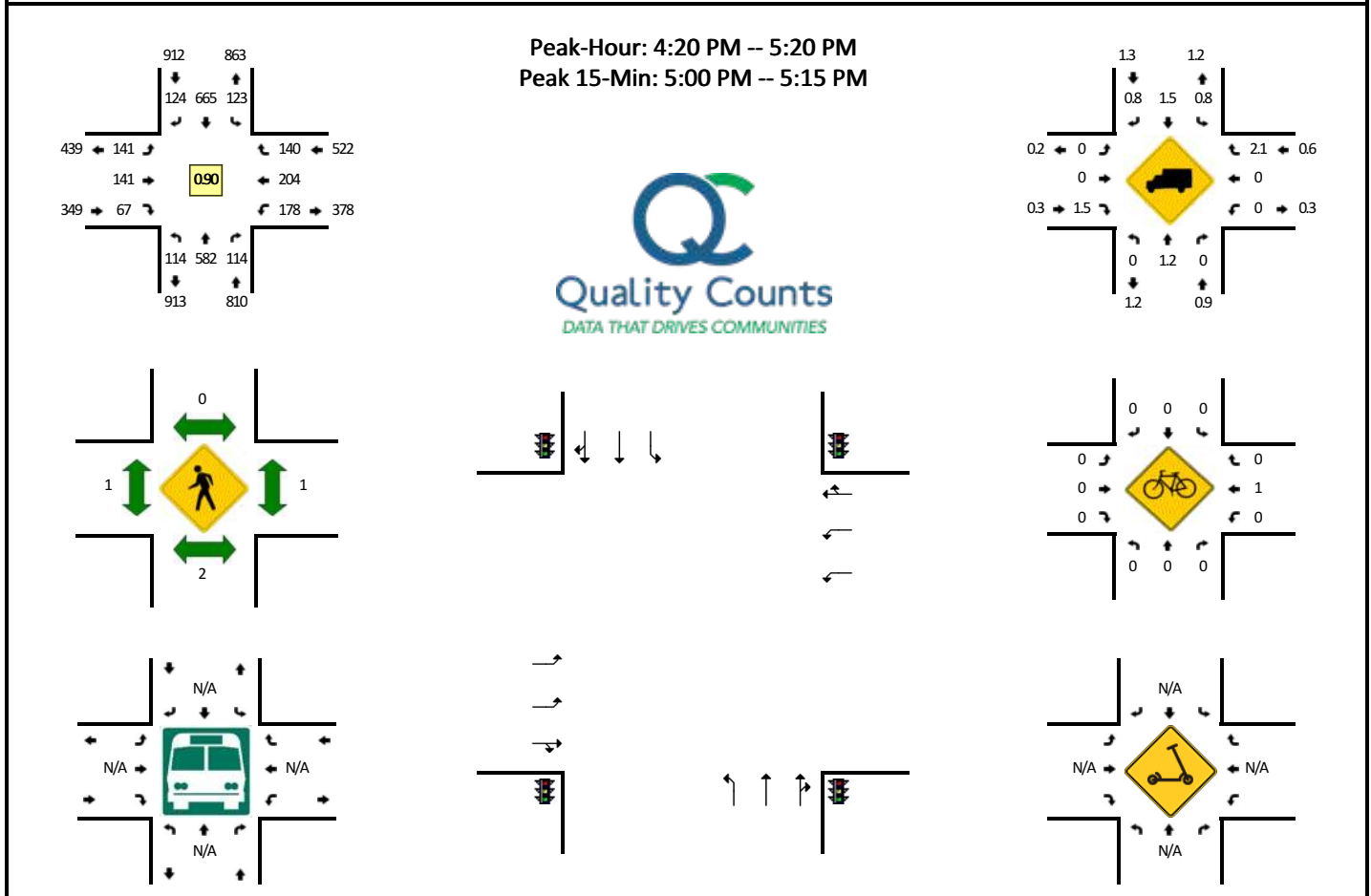


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	16	16	0	10	32	9	0	5	9	5	0	8	2	2	0	116	
7:05 AM	2	13	13	0	5	18	5	1	3	10	4	0	8	5	9	0	96	
7:10 AM	3	20	13	0	6	31	2	0	5	6	6	0	8	9	5	0	114	
7:15 AM	1	26	9	0	5	32	4	3	4	15	7	0	6	8	8	0	128	
7:20 AM	2	32	8	0	5	24	4	0	3	11	7	0	8	4	4	0	112	
7:25 AM	3	28	12	0	8	27	2	0	7	13	4	0	8	4	8	0	124	
7:30 AM	3	23	8	0	5	32	4	0	6	13	4	0	5	7	9	0	119	
7:35 AM	0	34	14	0	4	30	1	0	8	11	7	0	6	10	8	0	133	
7:40 AM	1	34	14	0	8	35	6	0	11	13	5	0	5	8	10	0	150	
7:45 AM	3	43	10	1	6	32	8	0	11	12	4	0	7	9	4	0	150	
7:50 AM	3	29	8	0	7	46	10	0	7	20	7	0	6	13	8	0	164	
7:55 AM	5	33	10	0	8	41	7	0	3	14	7	0	8	11	4	0	151	1557
8:00 AM	1	27	18	0	6	42	7	0	2	18	2	0	6	14	10	0	153	1594
8:05 AM	2	31	11	0	6	41	4	0	5	12	7	0	6	13	8	0	146	1644
8:10 AM	2	31	12	0	8	26	2	0	4	9	3	0	7	12	3	0	119	1649
8:15 AM	2	29	5	0	4	24	5	0	6	11	3	0	4	12	9	0	114	1635
8:20 AM	7	39	4	0	10	30	3	0	4	5	4	0	6	6	7	0	125	1648
8:25 AM	1	40	4	0	7	33	4	0	11	9	3	0	6	10	4	0	132	1656
8:30 AM	4	41	10	0	1	39	1	0	8	11	4	0	8	8	5	0	140	1677
8:35 AM	1	30	5	0	5	38	6	0	8	10	4	0	8	10	10	0	135	1679
8:40 AM	4	46	10	0	5	46	2	0	4	9	8	0	6	9	6	0	155	1684
8:45 AM	2	43	4	0	6	35	15	0	4	8	7	0	9	8	5	0	146	1680
8:50 AM	7	43	5	0	3	41	2	0	9	18	3	0	3	15	7	0	156	1672
8:55 AM	4	44	5	0	5	42	6	0	2	5	4	0	11	14	7	0	149	1670
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	36	356	144	0	84	516	96	0	48	208	64	0	80	152	88	0	1872	
Heavy Trucks	0	12	0	0	0	20	4	0	4	0	0	0	0	0	0	0	40	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: SE 192nd Ave -- SE 20th St
CITY/STATE: Vancouver, WA

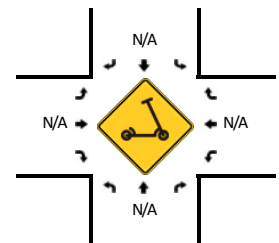
QC JOB #: 16050504
DATE: Tue, Jan 10 2023



5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	11	59	5	0	10	51	18	0	12	16	4	0	18	13	8	0	225	
4:05 PM	14	42	7	0	11	55	12	0	19	12	8	0	31	20	16	0	247	
4:10 PM	8	68	10	0	6	64	11	0	10	17	5	0	9	16	16	0	240	
4:15 PM	8	58	8	0	4	44	11	0	15	7	2	0	17	9	8	0	191	
4:20 PM	10	72	7	0	7	48	7	0	18	9	4	0	15	15	10	0	222	
4:25 PM	14	49	8	0	7	62	14	0	17	13	6	0	13	18	6	0	227	
4:30 PM	12	47	5	0	2	56	10	0	9	10	4	0	7	12	11	0	185	
4:35 PM	9	51	6	0	9	51	12	0	8	7	5	0	19	19	11	0	207	
4:40 PM	6	38	6	0	11	58	9	0	10	9	4	0	7	12	15	0	185	
4:45 PM	8	51	9	0	16	54	11	0	14	11	13	0	11	13	10	0	221	
4:50 PM	7	46	9	1	17	47	11	0	9	7	5	0	18	15	12	0	204	
4:55 PM	9	66	10	0	10	50	7	0	10	11	0	0	16	18	12	0	219	2573
5:00 PM	7	40	17	1	9	56	11	0	14	12	7	0	18	13	8	0	213	2561
5:05 PM	8	45	12	0	13	70	9	0	5	19	3	0	20	29	13	0	246	2560
5:10 PM	9	54	18	0	6	68	9	0	14	14	10	0	17	24	15	0	258	2578
5:15 PM	12	23	7	1	16	45	14	0	13	19	6	0	17	16	17	0	206	2593
5:20 PM	10	49	12	0	11	52	15	0	13	21	5	0	7	12	7	0	214	2585
5:25 PM	11	25	7	0	8	44	14	0	6	14	8	0	4	9	11	0	161	2519
5:30 PM	9	29	4	0	11	37	9	0	10	15	5	0	6	11	11	0	157	2491
5:35 PM	7	47	16	0	5	46	9	0	9	17	4	0	7	13	9	0	189	2473
5:40 PM	12	32	8	0	8	26	10	0	10	11	3	0	7	9	7	0	143	2431
5:45 PM	6	44	8	0	13	50	9	0	8	17	5	0	8	20	8	0	196	2406
5:50 PM	4	48	8	0	11	34	7	0	9	7	8	0	6	15	8	0	165	2367
5:55 PM	8	48	13	0	9	39	8	0	12	9	3	0	4	9	9	0	171	2319
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	96	556	188	4	112	776	116	0	132	180	80	0	220	264	144	0	2868	
Heavy Trucks	0	0	0		0	8	0		0	0	0		0	0	0		8	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

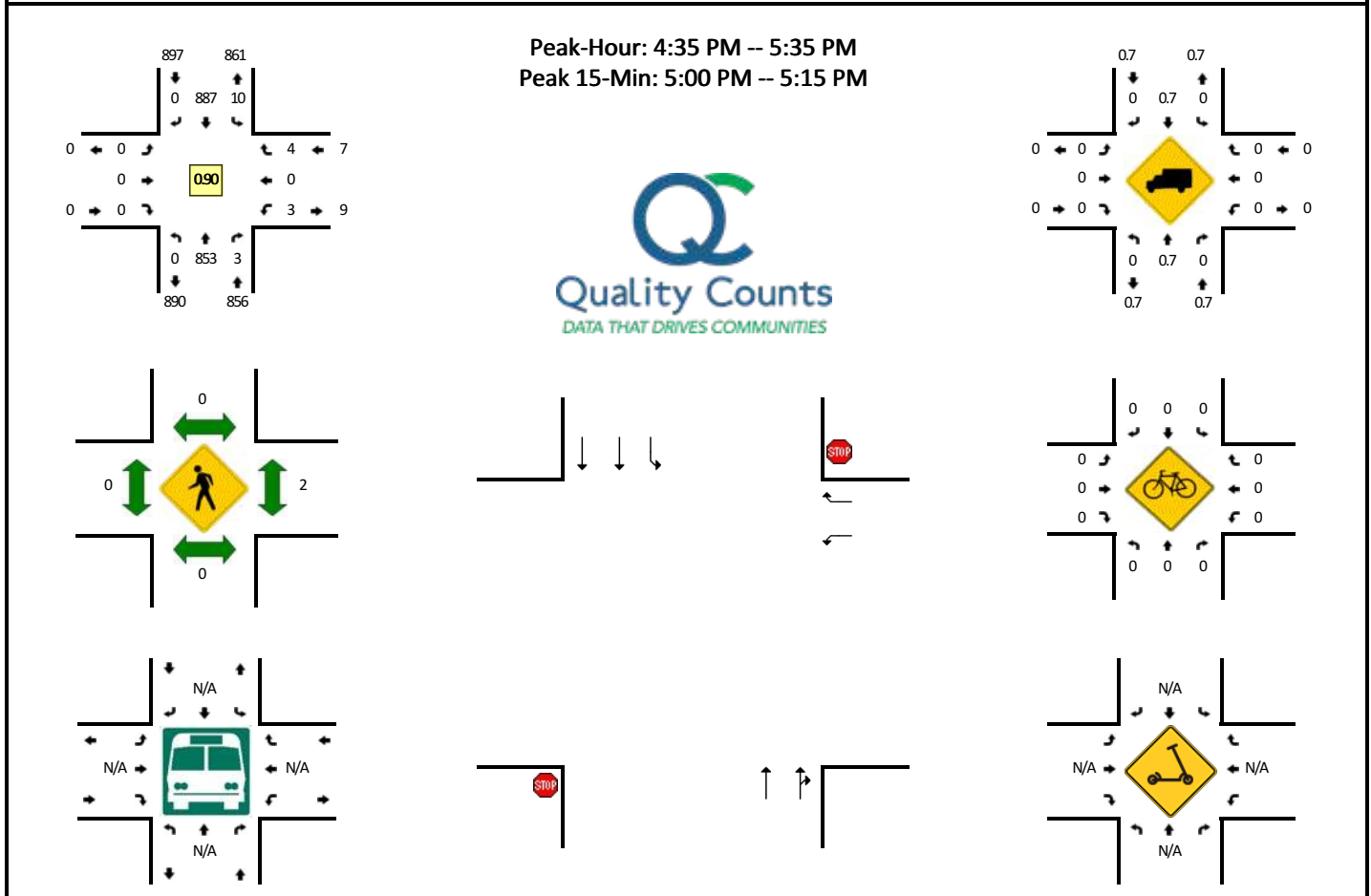
QC JOB #: 16050505
DATE: Thu, Jan 12 2023



Comments:

LOCATION: SE 192nd Ave -- SE 25th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050506
DATE: Thu, Jan 12 2023

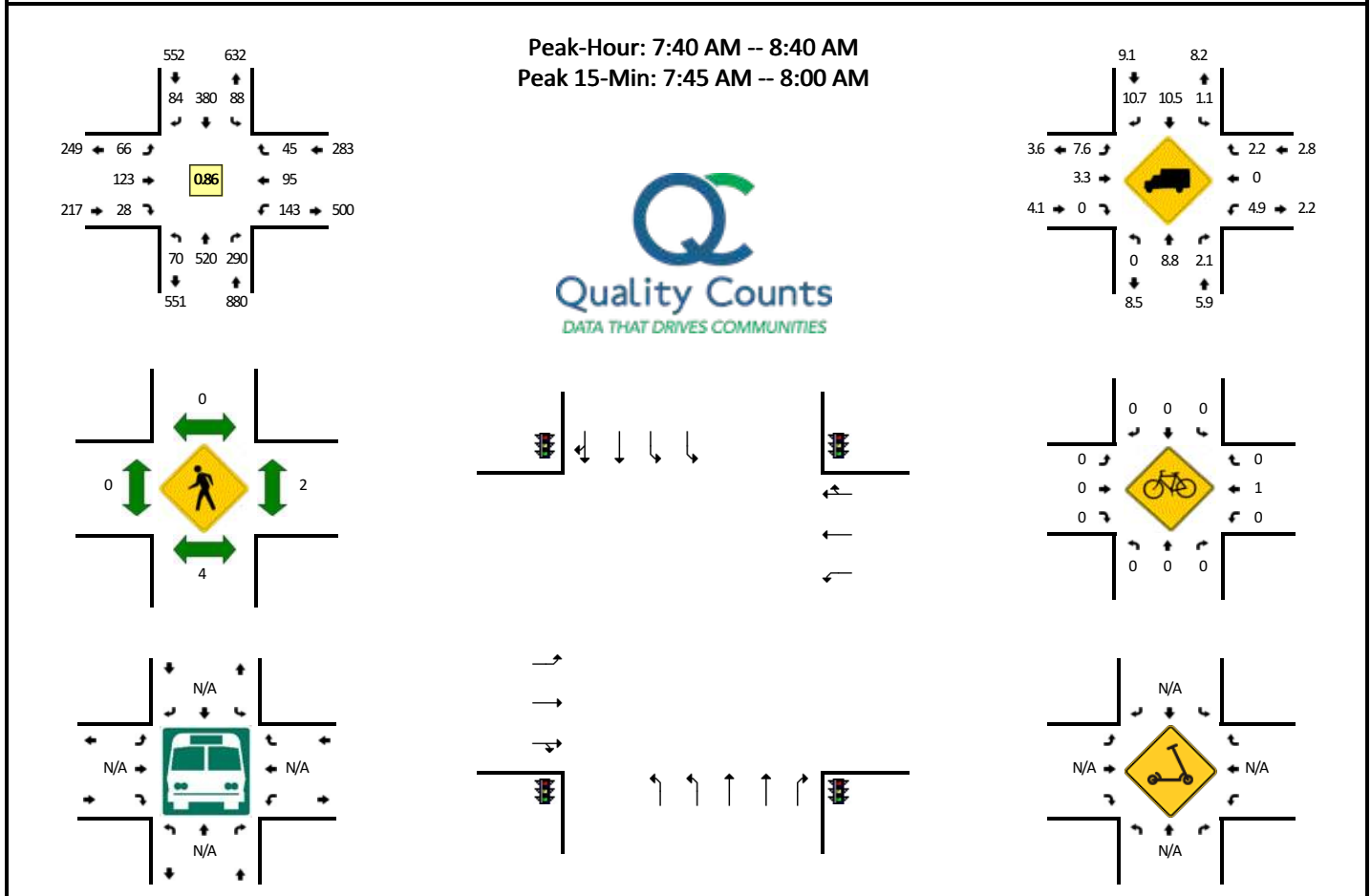


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 25th St (Eastbound)				SE 25th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	70	1	0	2	69	0	0	0	0	0	0	0	0	2	0	144	
4:05 PM	0	65	0	0	0	84	0	0	0	0	0	0	0	0	1	0	150	
4:10 PM	0	50	1	0	0	74	0	1	0	0	0	0	0	0	1	0	127	
4:15 PM	0	70	1	0	2	74	0	0	0	0	0	0	0	0	0	0	147	
4:20 PM	0	69	1	0	0	97	0	0	0	0	0	0	1	0	1	0	169	
4:25 PM	0	63	0	0	0	59	0	0	0	0	0	0	2	0	1	0	125	
4:30 PM	0	62	0	0	0	74	0	0	0	0	0	0	0	0	0	0	136	
4:35 PM	0	71	0	0	1	69	0	0	0	0	0	0	0	0	0	0	141	
4:40 PM	0	65	1	0	0	73	0	0	0	0	0	0	0	0	0	0	139	
4:45 PM	0	56	1	0	0	85	0	1	0	0	0	0	0	0	0	0	143	
4:50 PM	0	63	0	0	0	71	0	0	0	0	0	0	1	0	2	0	137	
4:55 PM	0	62	0	0	0	66	0	0	0	0	0	0	0	0	0	0	128	1686
5:00 PM	0	88	0	0	0	70	0	1	0	0	0	0	0	0	0	0	159	1701
5:05 PM	0	84	0	0	1	85	0	0	0	0	0	0	0	0	0	0	170	1721
5:10 PM	0	74	0	0	0	84	0	0	0	0	0	0	0	0	0	0	158	1752
5:15 PM	0	74	1	0	2	75	0	0	0	0	0	0	0	0	1	0	153	1758
5:20 PM	0	69	0	0	0	69	0	2	0	0	0	0	0	0	1	0	141	1730
5:25 PM	0	63	0	0	1	68	0	0	0	0	0	0	0	0	0	0	132	1737
5:30 PM	0	84	0	0	1	72	0	0	0	0	0	0	2	0	0	0	159	1760
5:35 PM	0	52	0	0	1	64	0	0	0	0	0	0	0	0	0	0	117	1736
5:40 PM	0	70	0	0	2	70	0	3	0	0	0	0	0	0	1	0	146	1743
5:45 PM	0	65	0	0	0	45	0	0	0	0	0	0	1	0	0	0	111	1711
5:50 PM	0	68	1	0	2	59	0	0	0	0	0	0	0	0	1	0	131	1705
5:55 PM	0	61	1	0	1	58	0	2	0	0	0	0	0	0	2	0	125	1702
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	984	0	0	4	956	0	4	0	0	0	0	0	0	0	0	1948	
Heavy Trucks	0	20	0	0	0	8	0	0	0	0	0	0	0	0	0	0	28	
Buses																		
Pedestrians		0				0				0				4			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 192nd Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019615
DATE: Tue, Dec 6 2022

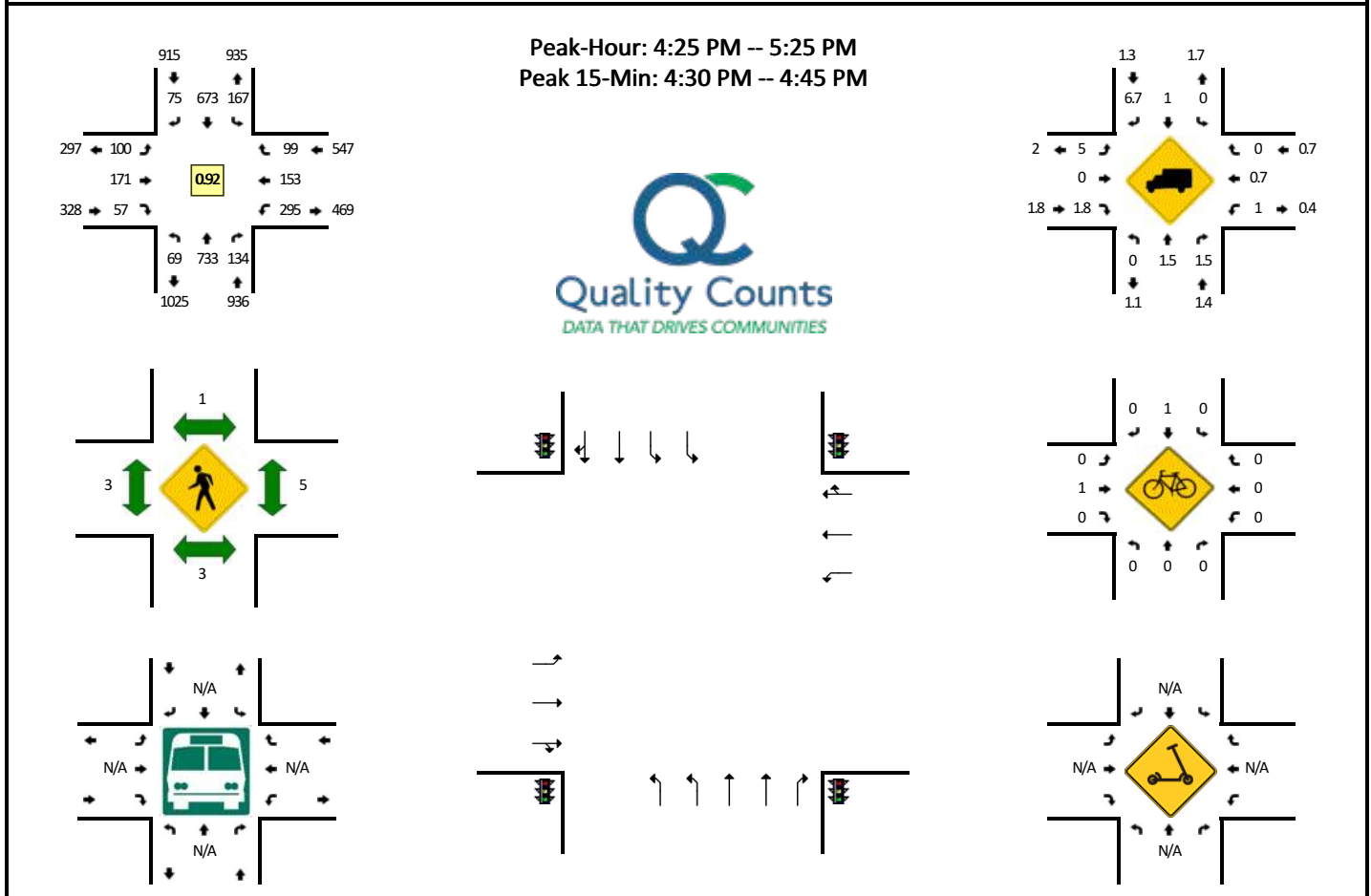


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	28	36	0	5	29	2	0	3	6	2	0	11	4	1	0	130	
7:05 AM	2	30	26	0	12	30	6	0	4	15	3	0	12	3	3	0	146	
7:10 AM	0	30	19	0	5	38	7	0	2	10	2	0	14	5	5	0	137	
7:15 AM	1	30	24	0	2	24	4	0	1	3	1	0	8	7	4	0	109	
7:20 AM	1	43	24	0	11	24	6	0	4	7	0	0	14	6	7	0	147	
7:25 AM	7	42	16	0	8	30	5	0	3	8	1	0	11	4	1	0	136	
7:30 AM	8	40	26	1	6	30	6	0	6	9	2	0	14	9	3	0	160	
7:35 AM	4	36	20	1	7	27	1	0	6	10	3	0	16	7	5	0	143	
7:40 AM	4	51	31	0	3	28	14	0	5	8	4	0	7	7	0	0	162	
7:45 AM	8	57	30	0	8	30	5	0	11	17	1	0	18	7	1	0	193	
7:50 AM	9	50	29	0	10	32	7	0	9	17	3	0	8	8	3	0	185	
7:55 AM	11	49	22	0	13	35	11	0	5	11	1	0	10	15	3	0	186	1834
8:00 AM	4	48	31	0	8	29	11	1	4	7	4	0	6	5	5	0	163	1867
8:05 AM	3	35	23	0	8	36	3	0	2	4	2	0	10	11	5	0	142	1863
8:10 AM	7	38	22	0	7	35	7	0	3	10	1	0	21	12	3	0	166	1892
8:15 AM	2	29	17	0	6	29	4	0	6	6	4	0	16	8	6	0	133	1916
8:20 AM	5	46	20	0	7	30	3	0	7	13	5	0	5	10	5	0	156	1925
8:25 AM	5	41	21	0	4	32	5	0	4	14	0	0	10	2	4	0	142	1931
8:30 AM	3	34	22	0	9	29	9	0	5	7	1	0	9	4	5	0	137	1908
8:35 AM	9	42	22	0	4	35	5	0	5	9	2	0	23	6	5	0	167	1932
8:40 AM	3	38	10	0	9	38	4	0	3	13	1	0	18	12	12	0	161	1931
8:45 AM	9	48	14	1	12	38	4	0	3	12	3	0	17	7	11	0	179	1917
8:50 AM	5	43	17	0	8	29	3	0	1	7	7	0	10	15	3	0	148	1880
8:55 AM	3	46	7	0	13	42	5	0	4	6	1	0	4	9	5	0	145	1839
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	112	624	324	0	124	388	92	0	100	180	20	0	144	120	28	0	2256	
Heavy Trucks	0	72	4		4	40	4		4	8	0		4	0	0		140	
Buses																		
Pedestrians		8				0				0				4			12	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: SE 192nd Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019616
DATE: Tue, Dec 6 2022

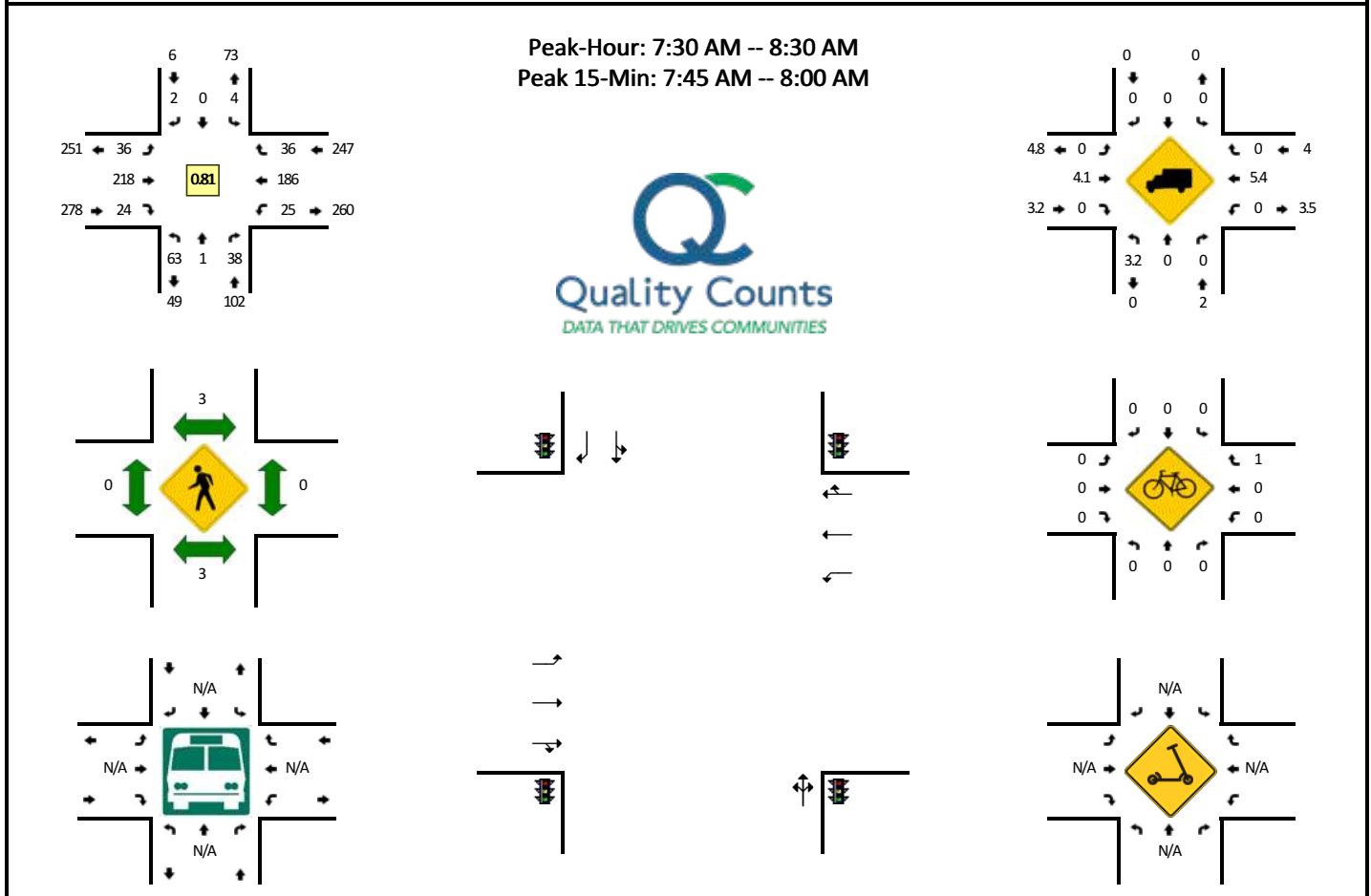


5-Min Count Period Beginning At	SE 192nd Ave (Northbound)				SE 192nd Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	10	64	13	0	17	44	9	0	12	18	4	0	28	11	11	0	241	
4:05 PM	11	68	11	0	5	68	11	0	4	9	7	0	26	12	5	0	237	
4:10 PM	12	54	13	0	13	62	9	0	9	16	3	0	26	15	11	0	243	
4:15 PM	6	61	10	0	9	48	4	1	6	18	5	0	26	12	5	0	211	
4:20 PM	4	57	7	0	11	64	5	0	12	8	3	0	22	10	10	0	213	
4:25 PM	6	72	9	0	11	65	3	0	9	13	5	0	29	14	2	0	238	
4:30 PM	8	78	12	0	10	46	7	0	4	11	2	0	22	11	11	0	222	
4:35 PM	6	65	9	0	16	57	5	0	15	15	3	0	18	13	14	0	236	
4:40 PM	5	62	18	0	19	83	6	0	9	15	4	0	33	19	6	0	279	
4:45 PM	6	56	10	0	14	38	15	0	5	15	6	0	24	15	6	0	210	
4:50 PM	8	57	7	0	9	48	6	2	9	20	5	0	16	12	5	0	204	
4:55 PM	3	41	15	0	15	49	7	0	5	11	6	0	21	10	7	0	190	2724
5:00 PM	7	62	10	0	15	50	4	0	9	7	5	0	24	14	10	0	217	2700
5:05 PM	3	59	14	0	10	66	6	0	12	11	7	0	27	9	9	0	233	2696
5:10 PM	6	51	9	0	16	61	4	0	5	18	8	0	27	15	10	0	230	2683
5:15 PM	4	62	10	0	14	69	6	0	13	18	1	0	33	11	8	0	249	2721
5:20 PM	7	68	11	0	15	41	6	1	5	17	5	0	21	10	11	0	218	2726
5:25 PM	7	51	14	0	19	52	5	0	4	18	7	0	21	16	16	0	230	2718
5:30 PM	5	55	16	0	19	31	3	0	3	19	1	0	14	12	12	0	190	2686
5:35 PM	3	46	9	1	6	39	5	0	7	10	2	0	12	7	4	0	151	2601
5:40 PM	3	52	14	0	17	46	5	0	4	17	4	0	15	4	5	0	186	2508
5:45 PM	6	60	13	0	12	43	7	0	12	9	2	0	9	4	5	0	182	2480
5:50 PM	2	42	7	0	10	60	5	0	4	7	3	0	12	9	9	0	170	2446
5:55 PM	9	49	8	0	14	41	4	0	4	9	6	0	16	8	2	0	170	2426
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	76	820	156	0	180	744	72	0	112	164	36	0	292	172	124	0	2948	
Heavy Trucks	0	16	4		0	8	4		0	0	0		4	0	0		36	
Buses																		
Pedestrians		0				4				0				12			16	
Bicycles	0	0	0		0	4	0		0	4	0		0	0	0		8	
Scooters																		

Comments:

LOCATION: SE Hiddenbrook Dr -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019613
DATE: Tue, Dec 6 2022

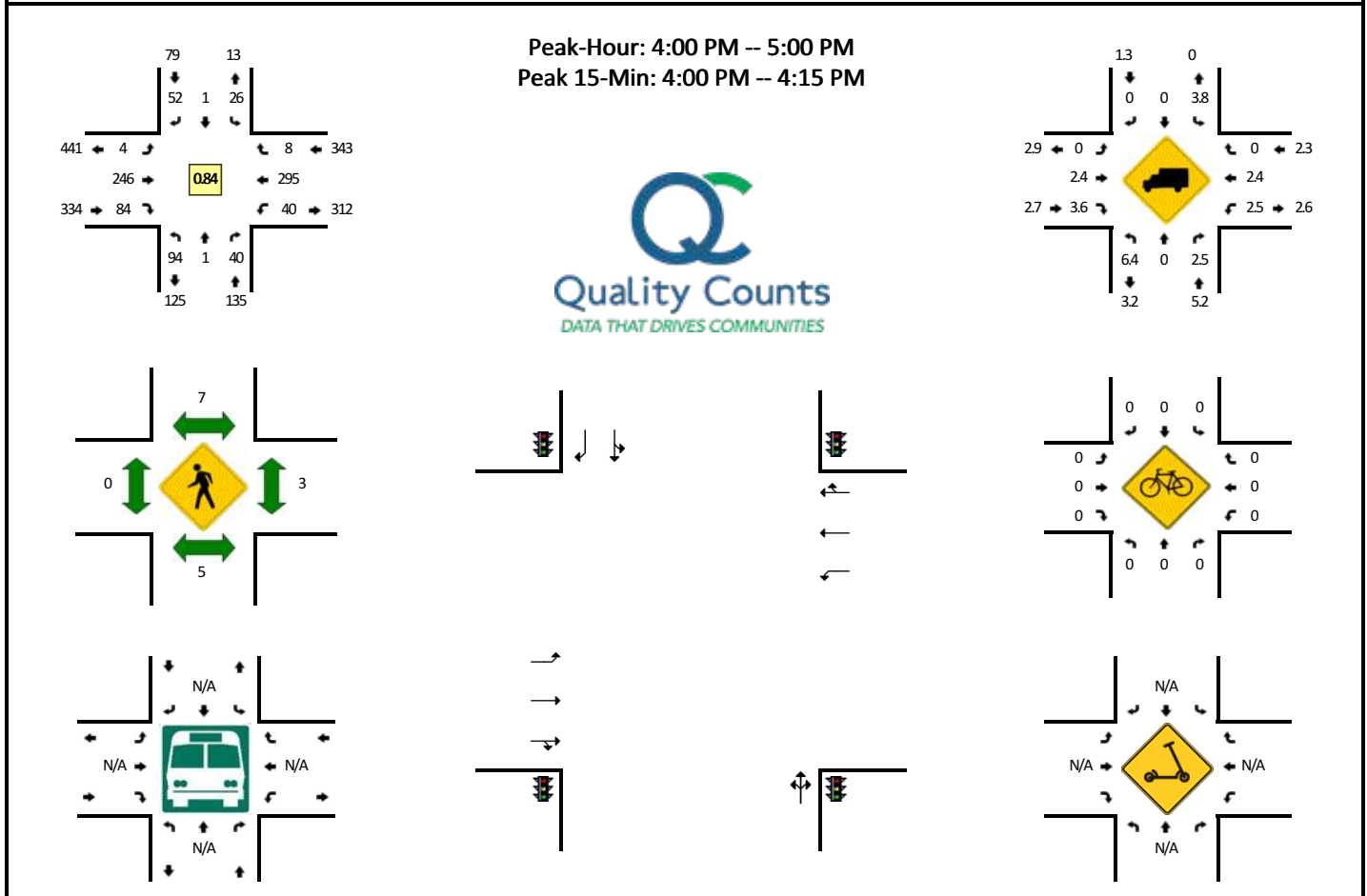


5-Min Count Period Beginning At	SE Hiddenbrook Dr (Northbound)				SE Hiddenbrook Dr (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	0	3	0	0	0	0	0	1	12	0	0	0	9	0	0	27	
7:05 AM	5	0	0	0	1	0	0	0	3	16	0	0	0	8	3	0	36	
7:10 AM	1	0	1	0	0	0	0	0	1	12	0	0	0	11	2	0	28	
7:15 AM	4	0	2	0	0	0	0	0	3	9	2	0	0	16	1	0	37	
7:20 AM	5	0	0	0	0	0	0	0	3	10	0	0	2	11	2	0	33	
7:25 AM	3	1	2	0	0	0	0	0	1	13	1	0	1	14	2	0	38	
7:30 AM	4	0	3	0	0	0	0	0	1	17	0	0	0	20	3	0	48	
7:35 AM	5	0	2	0	0	0	0	0	4	18	1	0	2	9	2	0	43	
7:40 AM	3	0	4	0	0	0	0	0	2	21	3	0	1	12	6	0	52	
7:45 AM	7	0	6	0	0	0	0	0	2	26	1	0	4	17	4	0	67	
7:50 AM	1	0	2	0	2	0	1	0	5	21	3	0	3	16	2	0	56	
7:55 AM	2	0	3	0	0	0	0	0	4	28	3	0	6	23	4	0	73	538
8:00 AM	7	0	2	0	0	0	0	0	3	14	1	0	2	16	3	0	48	559
8:05 AM	5	1	2	0	1	0	0	0	3	11	3	0	3	15	2	0	46	569
8:10 AM	12	0	1	0	0	0	0	0	3	8	2	0	1	23	4	0	54	595
8:15 AM	7	0	6	0	1	0	0	0	5	21	2	0	0	14	1	0	57	615
8:20 AM	5	0	5	0	0	0	0	0	2	21	2	0	1	12	2	0	50	632
8:25 AM	5	0	2	0	0	0	1	0	2	12	3	0	2	9	3	0	39	633
8:30 AM	4	1	2	0	0	0	0	0	4	16	3	0	4	13	0	0	47	632
8:35 AM	4	0	1	0	0	0	1	0	1	10	6	0	3	13	4	0	43	632
8:40 AM	9	0	0	0	0	0	1	0	2	19	5	0	2	11	2	0	51	631
8:45 AM	2	0	4	0	0	0	0	0	6	17	1	0	4	18	1	0	53	617
8:50 AM	4	0	3	0	0	0	0	0	4	15	5	0	4	19	2	0	56	617
8:55 AM	4	0	1	0	0	0	0	0	1	16	8	0	2	13	1	0	46	590
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	40	0	44	0	8	0	4	0	44	300	28	0	52	224	40	0	784	
Heavy Trucks	0	0	0	0	0	0	0	0	0	12	0	0	0	8	0	0	20	
Buses																		
Pedestrians		12				0				0				0			12	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE Hiddenbrook Dr -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019614
DATE: Tue, Dec 6 2022

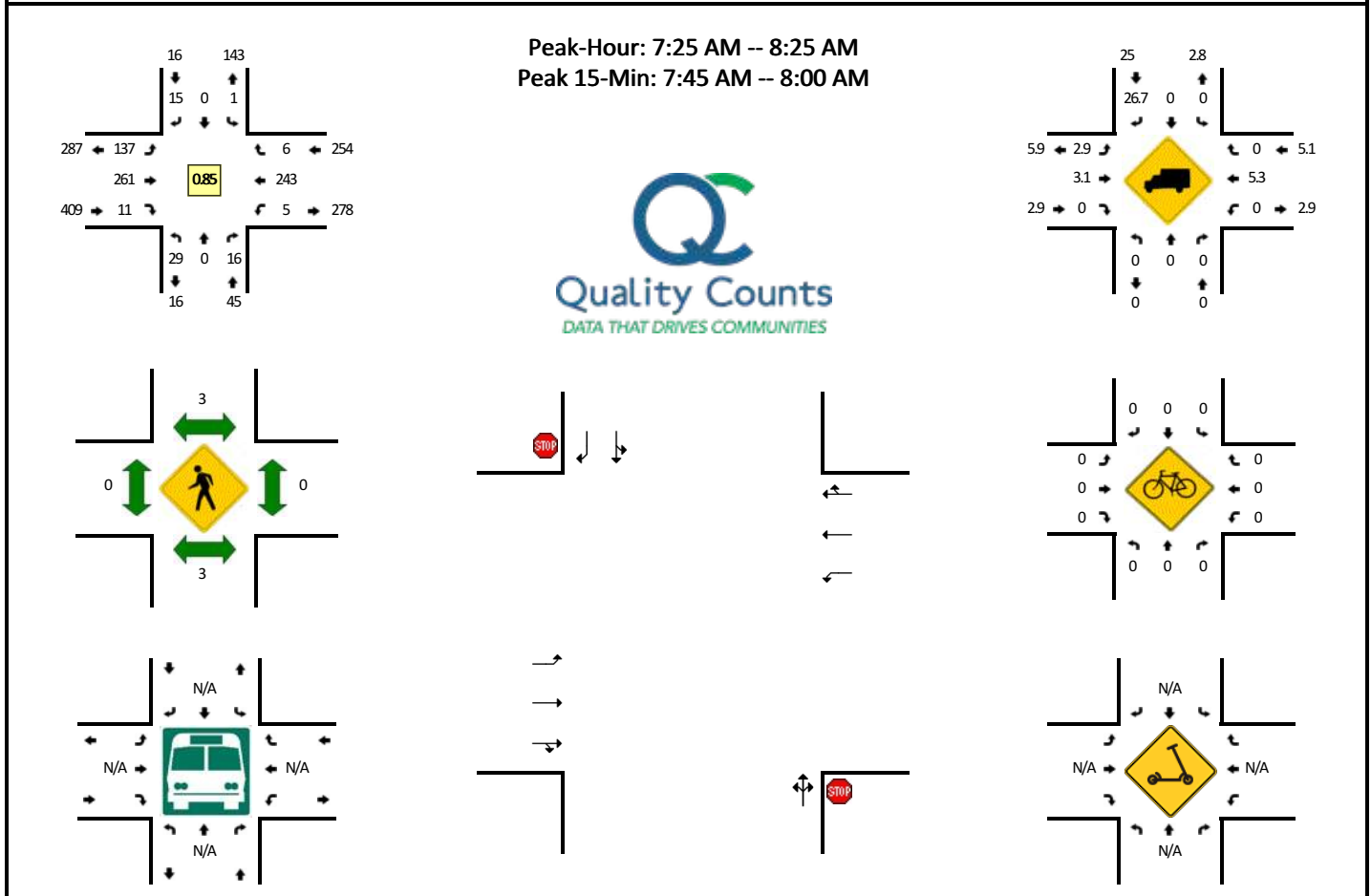


5-Min Count Period Beginning At	SE Hiddenbrook Dr (Northbound)				SE Hiddenbrook Dr (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	21	0	11	0	0	0	5	0	0	24	9	0	4	26	0	0	100	
4:05 PM	10	0	4	0	4	0	4	0	1	11	6	0	3	28	3	0	74	
4:10 PM	4	0	3	0	1	0	3	0	0	27	10	0	4	39	0	0	91	
4:15 PM	6	0	4	0	1	0	3	0	0	15	7	0	2	18	0	0	56	
4:20 PM	8	0	4	0	4	0	4	0	1	25	8	0	1	15	0	0	70	
4:25 PM	13	1	2	0	1	0	4	0	0	17	8	0	3	20	1	0	70	
4:30 PM	3	0	1	0	3	0	1	0	0	20	6	0	3	22	0	0	59	
4:35 PM	10	0	2	0	5	0	12	0	0	21	5	0	5	25	0	0	85	
4:40 PM	2	0	3	0	1	0	6	0	0	23	6	0	3	29	0	0	73	
4:45 PM	1	0	0	0	1	1	2	0	0	24	7	0	4	25	3	0	68	
4:50 PM	13	0	3	0	4	0	4	0	1	22	6	0	4	23	1	0	81	
4:55 PM	3	0	3	0	1	0	4	0	1	17	6	0	4	25	0	0	64	891
5:00 PM	3	0	5	0	1	0	9	0	0	23	6	0	3	33	1	0	84	875
5:05 PM	4	0	3	0	4	1	4	0	0	16	5	0	2	18	2	0	59	860
5:10 PM	4	0	0	0	3	1	6	0	1	30	12	0	1	30	0	0	88	857
5:15 PM	7	0	4	0	5	0	2	0	0	23	5	0	1	21	0	0	68	869
5:20 PM	5	0	1	0	2	0	3	0	0	20	7	0	2	24	0	0	64	863
5:25 PM	6	0	3	0	2	0	2	0	1	24	4	0	4	23	1	0	70	863
5:30 PM	7	0	1	0	0	0	7	0	0	19	2	0	2	19	0	0	57	861
5:35 PM	1	0	2	0	1	0	7	0	1	19	7	0	2	20	0	0	60	836
5:40 PM	1	0	1	0	2	0	8	0	1	29	3	0	1	12	2	0	60	823
5:45 PM	1	0	0	0	1	0	4	0	0	21	4	0	5	14	0	0	50	805
5:50 PM	3	0	0	0	1	0	2	0	0	15	4	0	0	15	0	0	40	764
5:55 PM	2	0	4	0	1	0	1	0	0	10	5	0	4	22	0	0	49	749
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	140	0	72	0	20	0	48	0	4	248	100	0	44	372	12	0	1060	
Heavy Trucks	16	0	4		4	0	0		0	4	4		0	12	0		44	
Buses																		
Pedestrians		4				4				0				4			12	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 177th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

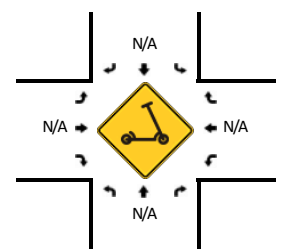
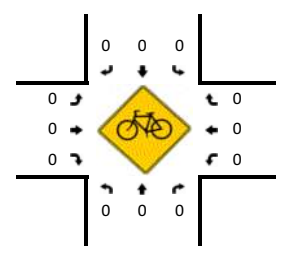
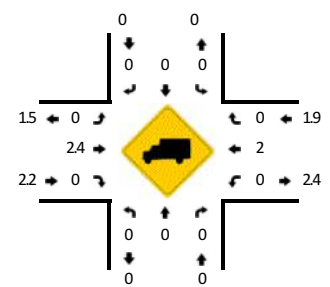
QC JOB #: 16019611
DATE: Tue, Dec 6 2022



5-Min Count Period Beginning At	SE 177th Ave (Northbound)				SE 177th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	0	1	0	0	0	0	0	6	13	0	0	1	10	1	0	34	
7:05 AM	2	0	1	0	0	0	0	0	5	18	0	0	0	12	1	0	39	
7:10 AM	1	0	1	0	0	0	0	0	4	11	1	0	0	12	0	0	30	
7:15 AM	4	0	2	0	0	0	0	0	6	13	0	0	1	16	0	0	42	
7:20 AM	1	0	0	0	0	0	0	0	4	13	0	0	0	18	0	0	36	
7:25 AM	4	0	0	0	0	0	1	0	10	17	0	0	0	17	0	0	49	
7:30 AM	4	0	2	0	0	0	3	0	7	13	1	0	0	23	0	0	53	
7:35 AM	5	0	1	0	0	0	1	0	6	21	2	0	0	16	0	0	52	
7:40 AM	1	0	0	0	0	0	1	0	16	28	1	0	0	15	0	0	62	
7:45 AM	3	0	1	0	0	0	0	0	11	31	2	0	1	21	1	0	71	
7:50 AM	1	0	3	0	0	0	0	0	13	28	1	0	0	16	0	0	62	
7:55 AM	2	0	2	0	0	0	2	0	19	27	1	0	1	25	1	0	80	610
8:00 AM	1	0	1	0	1	0	1	0	16	16	0	0	1	22	0	0	59	635
8:05 AM	2	0	1	0	0	0	1	0	10	18	0	0	0	16	2	0	50	646
8:10 AM	2	0	0	0	0	0	3	0	12	15	0	0	1	32	1	0	66	682
8:15 AM	2	0	2	0	0	0	0	0	10	25	1	0	0	23	1	0	64	704
8:20 AM	2	0	3	0	0	0	2	0	7	22	2	0	1	17	0	0	56	724
8:25 AM	0	0	0	0	0	0	0	0	11	16	1	0	0	14	1	0	43	718
8:30 AM	0	0	0	0	1	0	3	0	7	23	2	0	1	14	0	0	51	716
8:35 AM	1	0	0	0	0	0	0	0	4	15	0	0	0	18	0	0	38	702
8:40 AM	4	0	3	0	0	0	1	0	9	22	0	0	0	21	0	0	60	700
8:45 AM	2	0	1	0	0	0	0	0	5	22	0	0	0	14	0	0	44	673
8:50 AM	2	0	1	0	0	0	0	0	7	25	1	0	0	27	2	0	65	676
8:55 AM	1	0	0	0	0	0	1	0	8	27	1	0	1	15	0	0	54	650
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	24	0	24	0	0	0	8	0	172	344	16	0	8	248	8	0	852	
Heavy Trucks	0	0	0	0	0	0	4	0	0	12	0	0	0	8	0	0	24	
Buses																		
Pedestrians		4				0				0				0			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

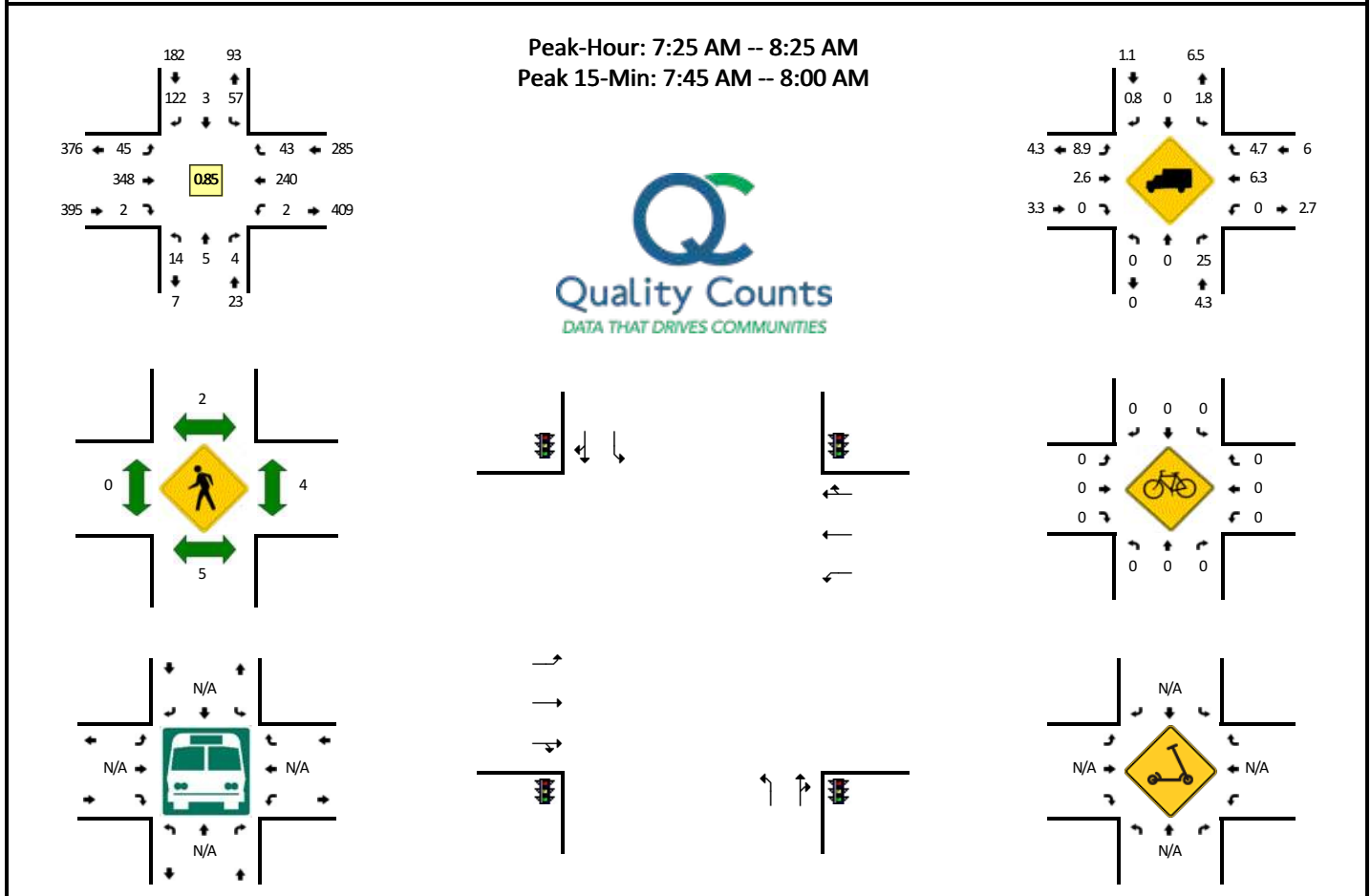
QC JOB #: 16019612
DATE: Tue, Dec 6 2022



Comments:

LOCATION: SE 176th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019609
DATE: Tue, Dec 6 2022

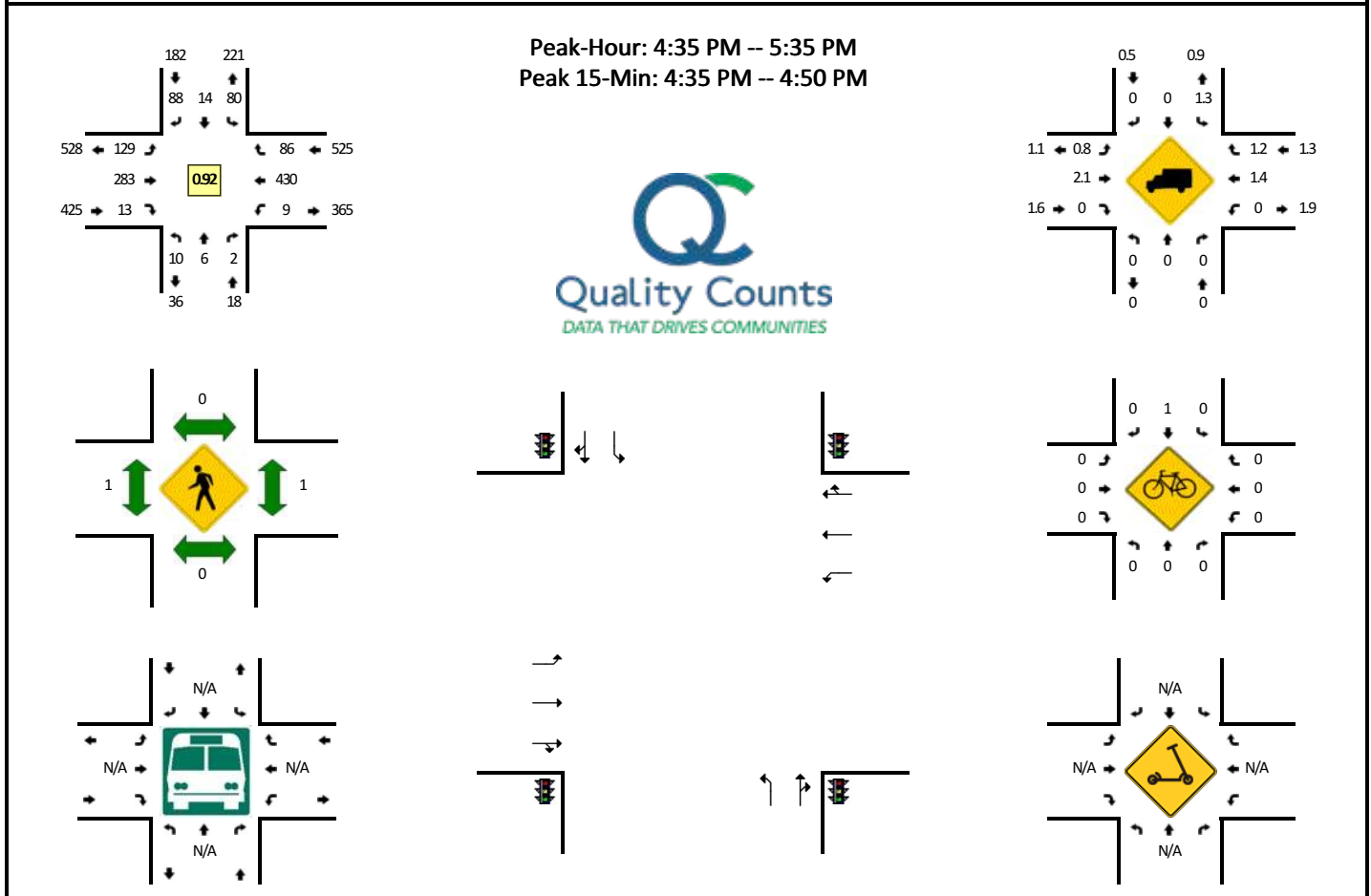


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	1	0	0	3	0	6	0	2	15	0	0	1	10	1	0	40	
7:05 AM	3	2	1	0	2	0	10	0	4	20	0	0	0	12	2	0	56	
7:10 AM	2	2	0	0	1	0	11	0	2	15	0	0	0	11	1	0	45	
7:15 AM	2	2	0	0	1	0	7	0	3	18	0	0	0	18	3	0	54	
7:20 AM	1	1	0	0	0	0	8	0	4	16	1	0	0	16	3	0	50	
7:25 AM	1	0	0	0	2	0	10	0	5	25	0	0	0	20	2	0	65	
7:30 AM	1	0	1	0	3	0	10	0	3	20	0	0	0	24	4	0	66	
7:35 AM	2	1	0	0	4	0	10	0	1	23	0	0	0	19	4	0	64	
7:40 AM	2	0	1	0	3	0	13	0	3	41	0	0	0	14	4	0	81	
7:45 AM	0	0	1	0	7	0	14	0	9	35	0	0	0	20	4	0	90	
7:50 AM	2	1	0	0	6	1	8	0	4	37	1	0	0	14	3	0	77	
7:55 AM	1	1	1	0	5	0	10	0	5	42	0	0	2	24	3	0	94	782
8:00 AM	1	0	0	0	3	1	12	0	6	28	0	0	0	21	2	0	74	816
8:05 AM	1	0	0	0	4	0	8	0	3	23	1	0	0	18	3	0	61	821
8:10 AM	1	1	0	0	2	1	10	0	2	27	0	0	0	30	6	0	80	856
8:15 AM	0	0	0	0	10	0	6	0	2	26	0	0	0	22	3	0	69	871
8:20 AM	2	1	0	0	8	0	11	0	2	21	0	0	0	14	5	0	64	885
8:25 AM	2	1	0	0	1	0	8	0	1	27	0	0	0	13	3	0	56	876
8:30 AM	0	0	0	0	7	0	8	0	2	27	0	0	0	10	6	0	60	870
8:35 AM	3	0	0	0	0	0	10	0	2	20	1	0	1	16	3	0	56	862
8:40 AM	0	0	0	0	8	1	20	0	2	21	2	0	0	20	7	0	81	862
8:45 AM	1	1	0	0	3	0	5	0	3	25	1	0	0	14	2	0	55	827
8:50 AM	3	0	0	0	5	1	8	0	4	35	0	0	0	24	5	0	85	835
8:55 AM	0	2	0	0	6	0	4	0	4	23	0	0	1	12	5	0	57	798
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	12	8	8	0	72	4	128	0	72	456	4	0	8	232	40	0	1044	
Heavy Trucks	0	0	0	0	4	0	0	0	0	8	0	0	0	8	4	0	24	
Buses																		
Pedestrians		8				4				0				4			16	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 176th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019610
DATE: Tue, Dec 6 2022

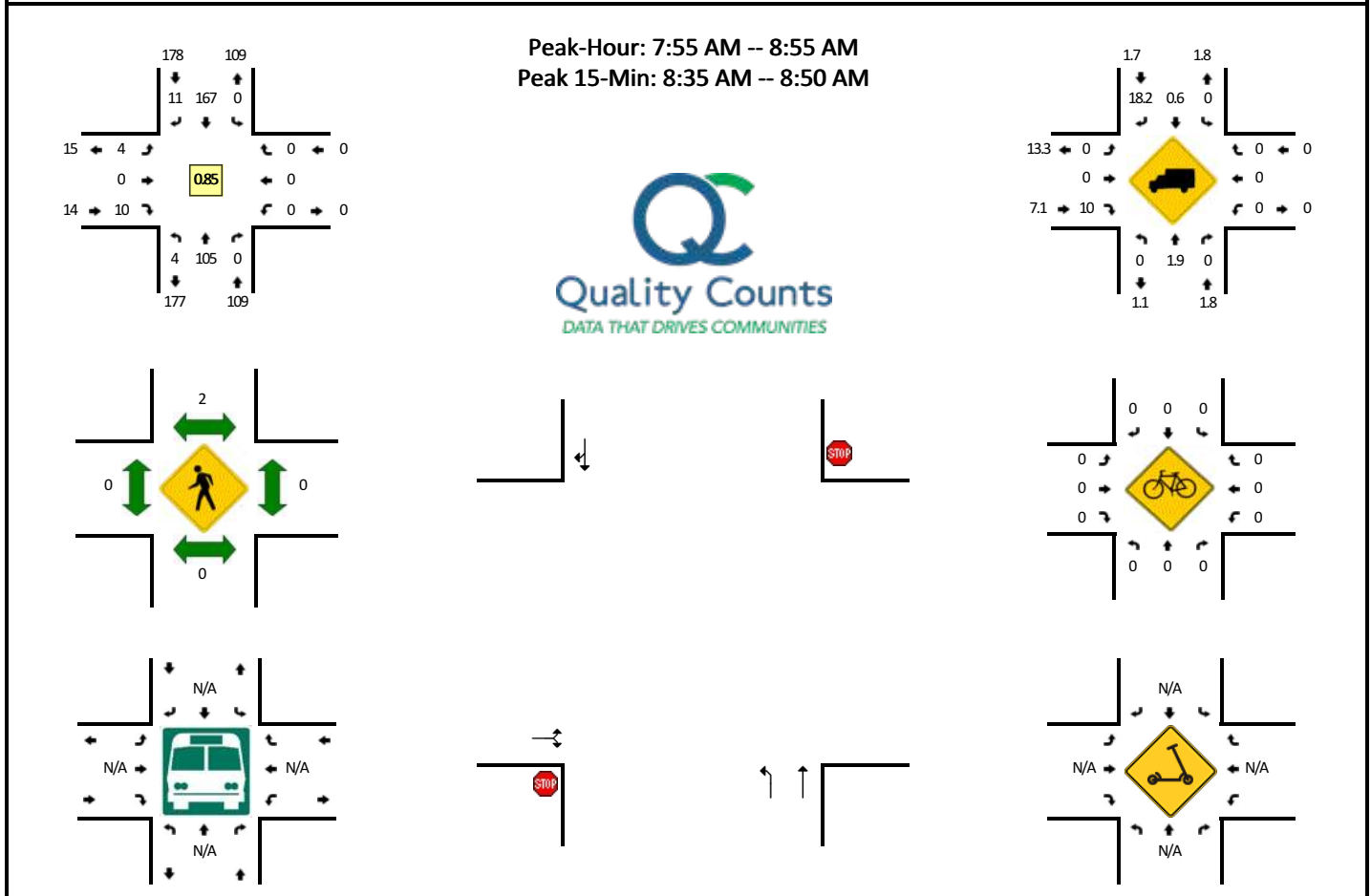


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	0	0	11	1	4	0	12	19	0	0	0	46	9	0	103	
4:05 PM	5	2	0	0	6	2	9	0	6	13	4	0	0	36	11	0	94	
4:10 PM	3	0	0	0	7	2	7	0	5	27	2	0	1	45	11	0	110	
4:15 PM	0	1	0	0	9	0	4	0	6	17	0	0	1	29	8	0	75	
4:20 PM	0	1	0	0	7	0	3	0	13	25	0	0	0	29	7	0	85	
4:25 PM	1	0	0	0	7	0	4	0	10	25	0	0	0	33	7	0	87	
4:30 PM	1	0	0	0	6	2	5	0	11	22	1	0	0	18	11	0	77	
4:35 PM	1	0	0	0	7	0	10	0	6	26	1	0	1	51	9	0	112	
4:40 PM	0	1	0	0	8	1	11	0	11	19	0	0	0	46	10	0	107	
4:45 PM	1	0	0	0	5	2	4	0	9	33	2	0	0	36	3	0	95	
4:50 PM	1	2	0	0	5	2	14	0	11	24	2	0	0	32	9	0	102	
4:55 PM	1	0	2	0	5	1	6	0	8	19	2	0	2	36	9	0	91	1138
5:00 PM	1	0	0	0	7	0	9	0	14	24	1	0	0	51	5	0	112	1147
5:05 PM	0	0	0	0	1	1	5	0	9	26	0	0	1	31	8	0	82	1135
5:10 PM	0	1	0	0	19	3	3	0	7	22	1	0	2	37	5	0	100	1125
5:15 PM	0	0	0	0	5	1	3	0	10	24	1	0	2	29	5	0	80	1130
5:20 PM	3	0	0	0	5	2	5	0	17	19	2	0	1	25	8	0	87	1132
5:25 PM	1	1	0	0	5	0	10	0	13	25	1	0	0	33	8	0	97	1142
5:30 PM	1	1	0	0	8	1	8	0	14	22	0	0	0	23	7	0	85	1150
5:35 PM	2	2	0	0	4	1	13	0	14	24	1	0	0	29	8	0	98	1136
5:40 PM	1	2	1	0	11	1	7	0	9	21	3	0	0	25	2	0	83	1112
5:45 PM	4	0	0	0	4	2	6	0	11	26	4	0	0	21	1	0	79	1096
5:50 PM	1	0	0	0	6	2	3	0	14	12	0	0	0	22	9	0	69	1063
5:55 PM	0	1	0	0	7	2	7	0	5	14	1	0	0	15	7	0	59	1031
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	8	4	0	0	80	12	100	0	104	312	12	0	4	532	88	0	1256	
Heavy Trucks	0	0	0	0	0	0	0	0	0	8	0	0	0	4	0	0	12	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 176th Ave -- SE 29th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050509
DATE: Tue, Jan 10 2023

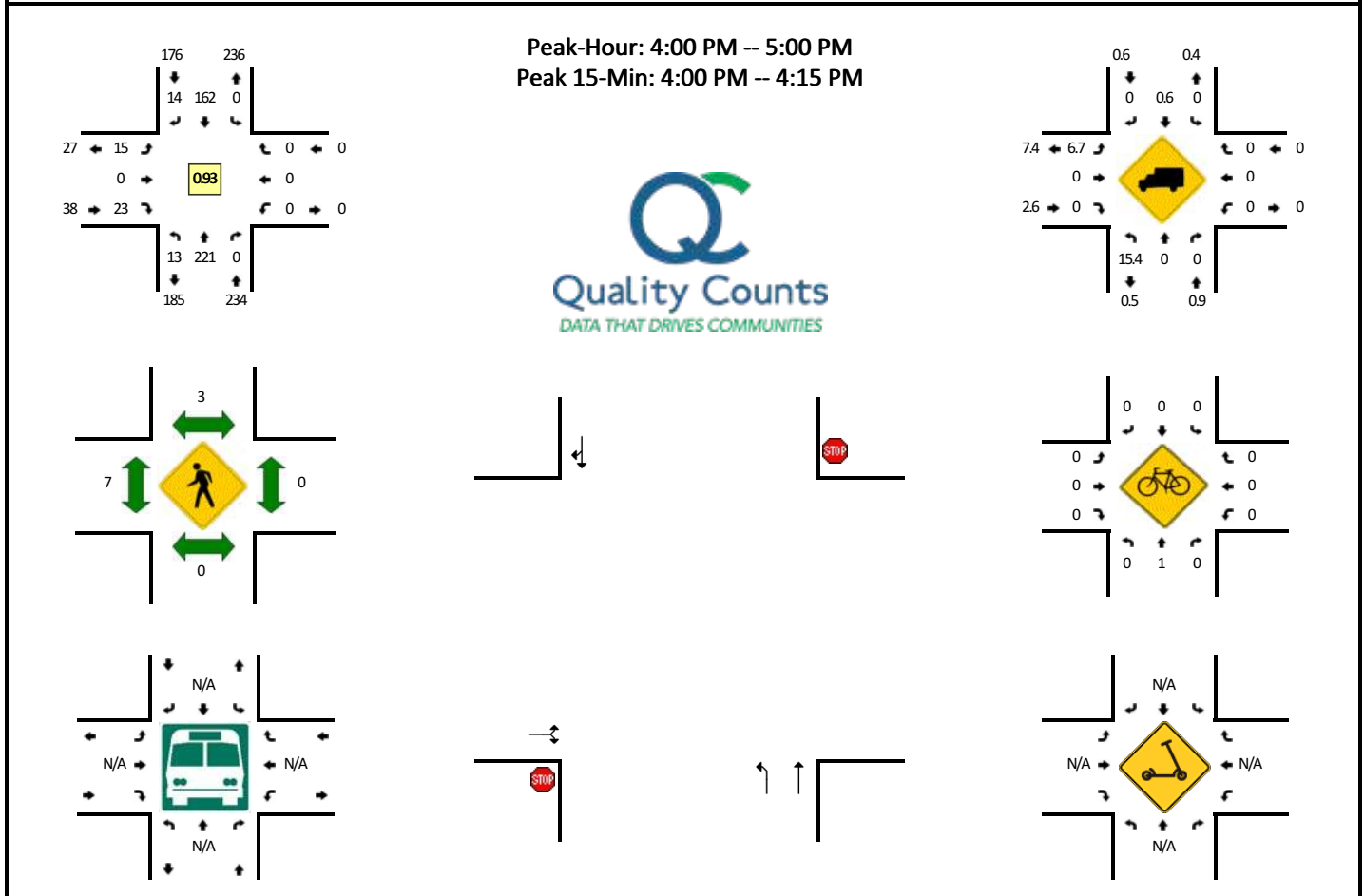


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 29th St (Eastbound)				SE 29th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	6	0	0	0	12	0	0	1	0	0	0	0	0	0	0	20	
7:05 AM	0	3	0	0	0	12	1	0	0	0	0	0	0	0	0	0	16	
7:10 AM	1	9	0	0	0	11	3	0	3	0	1	0	0	0	0	0	28	
7:15 AM	0	7	0	0	0	11	1	0	0	0	0	0	0	0	0	0	19	
7:20 AM	1	7	0	0	0	13	0	0	0	0	0	0	0	0	0	0	21	
7:25 AM	0	8	0	0	0	3	1	0	2	0	0	0	0	0	0	0	14	
7:30 AM	0	4	0	0	0	8	1	0	1	0	0	0	0	0	0	0	14	
7:35 AM	0	7	0	0	0	12	0	0	1	0	0	0	0	0	0	0	20	
7:40 AM	0	6	0	0	0	9	1	0	0	0	2	0	0	0	0	0	18	
7:45 AM	0	4	0	0	0	6	0	0	2	0	1	0	0	0	0	0	13	
7:50 AM	1	7	0	0	0	7	0	0	2	0	0	0	0	0	0	0	17	
7:55 AM	0	7	0	0	0	17	2	0	0	0	1	0	0	0	0	0	27	227
8:00 AM	0	11	0	0	0	13	2	0	0	0	1	0	0	0	0	0	27	234
8:05 AM	0	8	0	0	0	13	1	0	0	0	2	0	0	0	0	0	24	242
8:10 AM	0	6	0	0	0	14	0	0	1	0	0	0	0	0	0	0	21	235
8:15 AM	0	9	0	0	0	14	1	0	0	0	0	0	0	0	0	0	24	240
8:20 AM	0	11	0	0	0	12	0	0	0	0	1	0	0	0	0	0	24	243
8:25 AM	1	7	0	0	0	13	0	0	1	0	0	0	0	0	0	0	22	251
8:30 AM	0	6	0	0	0	12	1	0	0	0	0	0	0	0	0	0	19	256
8:35 AM	0	9	0	0	0	14	0	0	1	0	1	0	0	0	0	0	25	261
8:40 AM	1	13	0	0	0	16	2	0	1	0	2	0	0	0	0	0	35	278
8:45 AM	1	12	0	0	0	12	2	0	0	0	2	0	0	0	0	0	29	294
8:50 AM	1	6	0	0	0	17	0	0	0	0	0	0	0	0	0	0	24	301
8:55 AM	1	6	0	0	0	8	0	0	0	0	3	0	0	0	0	0	18	292
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	8	136	0	0	0	168	16	0	8	0	20	0	0	0	0	0	356	
Heavy Trucks	0	4	0	0	0	0	0	0	0	0	4	0	0	0	0	0	8	
Buses																		
Pedestrians		0				4				0				0			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 176th Ave -- SE 29th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050510
DATE: Tue, Jan 10 2023

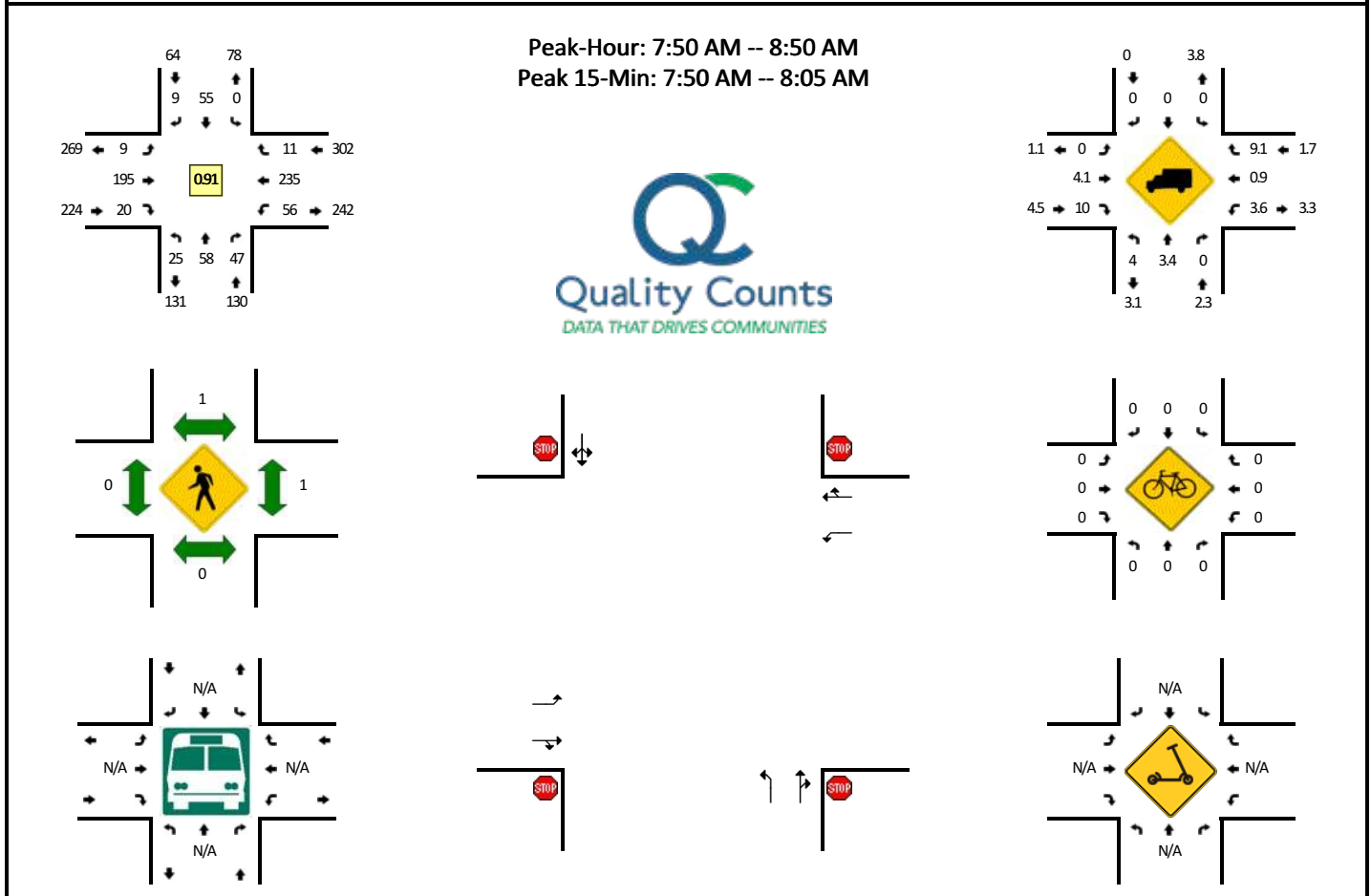


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 29th St (Eastbound)				SE 29th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	21	0	0	0	11	0	0	4	0	2	0	0	0	0	0	40	
4:05 PM	0	21	0	0	0	14	4	0	2	0	2	0	0	0	0	0	43	
4:10 PM	0	19	0	0	0	12	3	0	0	0	3	0	0	0	0	0	37	
4:15 PM	2	18	0	0	0	12	2	0	1	0	1	0	0	0	0	0	36	
4:20 PM	2	18	0	0	0	11	1	0	1	0	1	0	0	0	0	0	34	
4:25 PM	0	18	0	0	0	10	1	0	2	0	0	0	0	0	0	0	31	
4:30 PM	1	24	0	0	0	17	3	0	1	0	3	0	0	0	0	0	49	
4:35 PM	3	15	0	0	0	15	0	0	1	0	4	0	0	0	0	0	38	
4:40 PM	1	11	0	0	0	12	0	0	1	0	3	0	0	0	0	0	28	
4:45 PM	1	22	0	0	0	17	0	0	0	0	4	0	0	0	0	0	44	
4:50 PM	1	14	0	0	0	20	0	0	1	0	0	0	0	0	0	0	36	
4:55 PM	0	20	0	0	0	11	0	0	1	0	0	0	0	0	0	0	32	448
5:00 PM	0	19	0	0	0	13	3	0	2	0	0	0	0	0	0	0	37	445
5:05 PM	0	22	0	0	0	13	1	0	1	0	1	0	0	0	0	0	38	440
5:10 PM	2	12	0	0	0	7	1	0	1	0	1	0	0	0	0	0	24	427
5:15 PM	2	15	0	0	0	10	2	0	2	0	0	0	0	0	0	0	31	422
5:20 PM	1	14	0	0	0	15	2	0	2	0	1	0	0	0	0	0	35	423
5:25 PM	0	18	0	0	0	10	3	0	1	0	1	0	0	0	0	0	33	425
5:30 PM	0	12	0	0	0	12	2	0	3	0	1	0	0	0	0	0	30	406
5:35 PM	0	16	0	0	0	15	1	0	0	0	0	0	0	0	0	0	32	400
5:40 PM	0	15	0	0	0	12	1	0	4	0	2	0	0	0	0	0	34	406
5:45 PM	0	20	0	0	0	10	0	0	1	0	1	0	0	0	0	0	32	394
5:50 PM	0	16	0	0	0	12	1	0	3	0	1	0	0	0	0	0	33	391
5:55 PM	0	19	0	0	0	12	2	0	0	0	0	0	0	0	0	0	33	392
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	8	244	0	0	0	148	28	0	24	0	28	0	0	0	0	0	480	
Heavy Trucks	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	4	
Buses																		
Pedestrians	0				0				4				0				4	
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4	
Scooters																		

Comments:

LOCATION: SE 176th Ave -- SE 20th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050507
DATE: Tue, Jan 10 2023

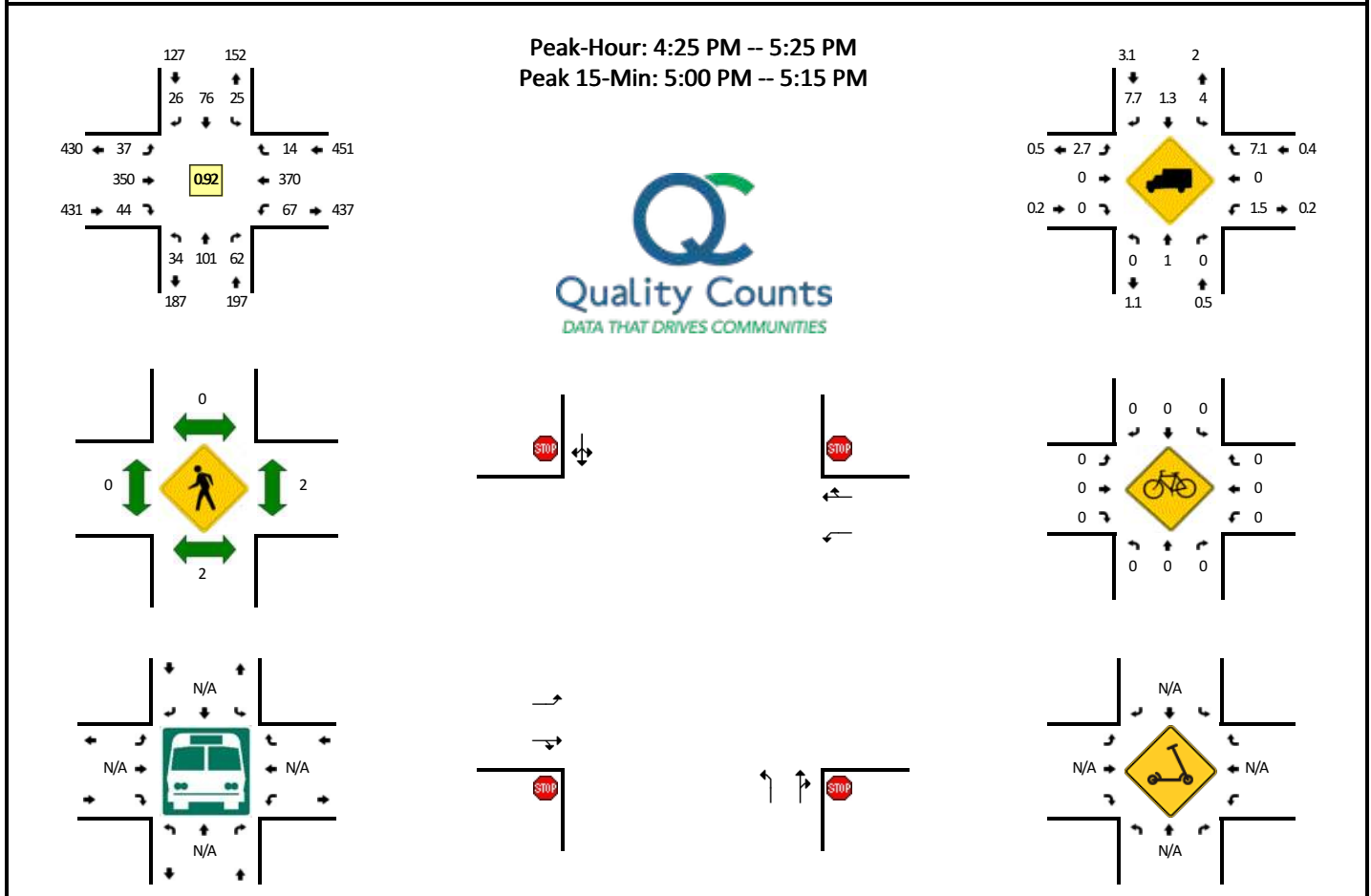


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	2	3	0	0	4	3	0	1	12	1	0	3	8	0	0	38	
7:05 AM	0	0	2	0	1	3	3	0	1	11	2	0	3	10	2	0	38	
7:10 AM	1	2	3	0	0	4	3	0	0	14	1	0	3	14	0	0	45	
7:15 AM	0	2	2	0	0	4	1	0	0	8	1	0	5	12	1	0	36	
7:20 AM	1	2	0	0	0	5	2	0	0	19	1	0	1	18	0	0	49	
7:25 AM	1	4	6	0	0	4	0	0	0	17	2	0	5	10	0	0	49	
7:30 AM	1	2	3	0	0	4	1	0	1	11	1	0	5	18	2	0	49	
7:35 AM	0	6	6	0	0	7	1	0	0	15	0	0	4	8	0	0	47	
7:40 AM	3	3	6	0	1	5	3	0	1	21	1	0	5	22	3	0	74	
7:45 AM	1	1	4	0	1	5	1	0	0	13	0	0	4	15	1	0	46	
7:50 AM	1	7	4	0	0	3	1	0	0	27	3	0	7	19	1	0	73	
7:55 AM	5	5	4	0	0	10	0	0	1	13	1	0	5	18	2	0	64	608
8:00 AM	4	5	1	0	0	6	0	0	0	21	0	0	6	17	1	0	61	631
8:05 AM	1	3	5	0	0	5	2	0	0	13	4	0	1	27	1	0	62	655
8:10 AM	0	1	6	0	0	5	1	0	0	16	1	0	6	18	1	0	55	665
8:15 AM	1	6	2	0	0	2	0	0	1	8	2	0	3	22	1	0	48	677
8:20 AM	3	4	4	0	0	3	2	0	2	13	1	0	6	24	1	0	63	691
8:25 AM	1	7	4	0	0	6	0	0	1	14	2	0	3	20	1	0	59	701
8:30 AM	0	4	5	0	0	4	1	0	2	20	3	0	1	17	1	0	58	710
8:35 AM	2	4	2	0	0	2	1	0	1	18	0	0	3	17	1	0	51	714
8:40 AM	2	6	5	0	0	6	1	0	1	13	2	0	7	15	0	0	58	698
8:45 AM	5	6	5	0	0	3	0	0	0	19	1	0	8	21	0	0	68	720
8:50 AM	3	3	4	0	1	7	2	0	2	12	1	0	3	20	1	0	59	706
8:55 AM	0	2	2	0	1	3	0	0	1	10	4	0	0	22	1	0	46	688
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	40	68	36	0	0	76	4	0	4	244	16	0	72	216	16	0	792	
Heavy Trucks	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	8	
Buses																		
Pedestrians		0				0				0				4			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 176th Ave -- SE 20th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050508
DATE: Tue, Jan 10 2023

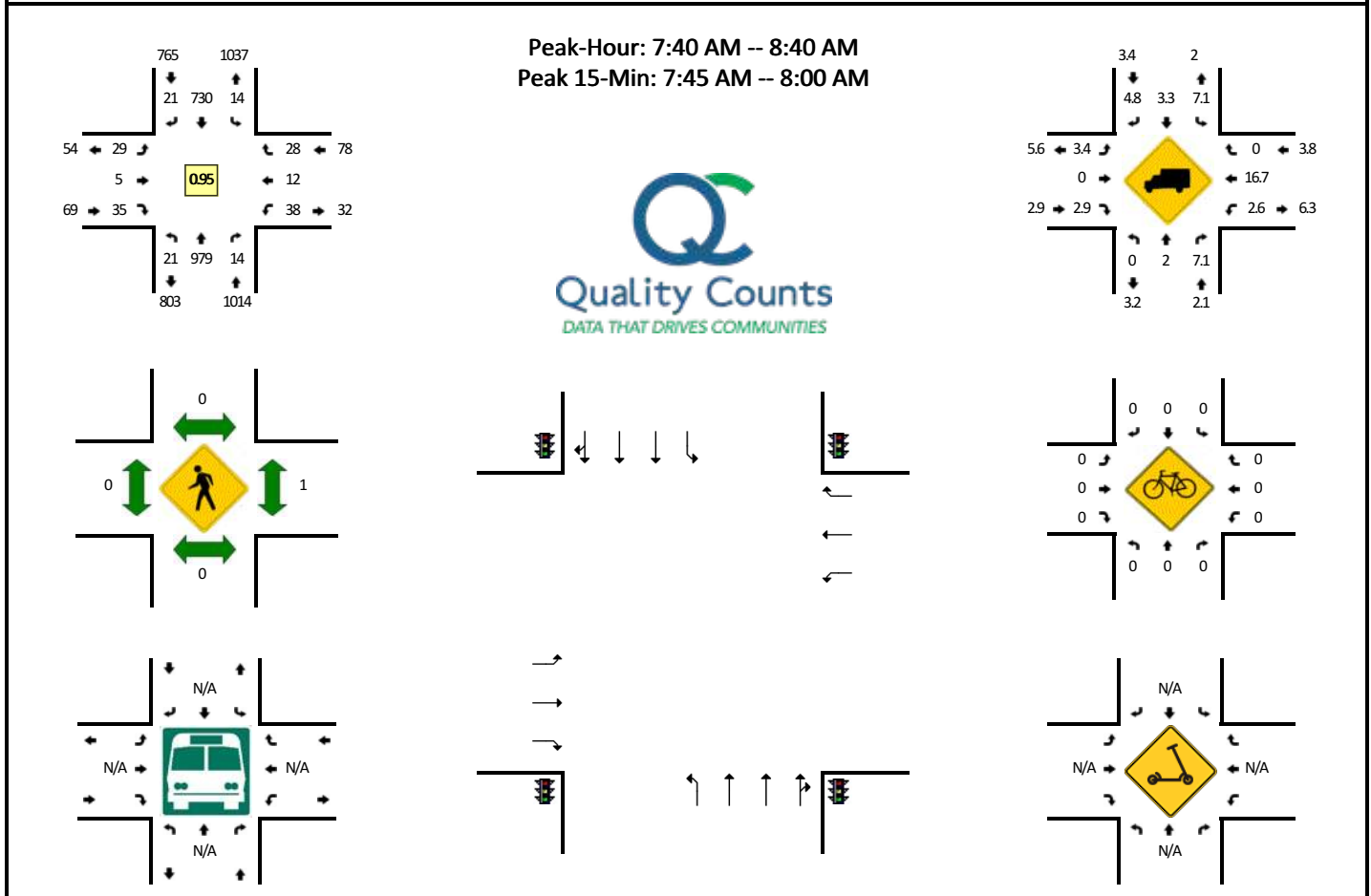


5-Min Count Period Beginning At	SE 176th Ave (Northbound)				SE 176th Ave (Southbound)				SE 20th St (Eastbound)				SE 20th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	6	5	0	3	10	2	0	4	31	0	0	3	32	1	0	99	
4:05 PM	2	9	8	0	1	11	1	0	2	35	1	0	6	37	1	0	114	
4:10 PM	3	3	9	0	4	3	2	0	1	30	2	0	2	33	1	0	93	
4:15 PM	2	5	7	0	0	8	2	0	5	18	2	0	7	23	1	0	80	
4:20 PM	4	3	10	0	0	5	1	0	2	23	2	0	1	27	0	0	78	
4:25 PM	2	3	3	0	1	6	5	0	2	32	5	0	4	36	1	0	100	
4:30 PM	4	12	9	0	2	6	3	0	7	20	2	0	8	30	0	0	103	
4:35 PM	0	9	5	0	2	7	2	0	2	20	3	0	3	35	1	0	89	
4:40 PM	2	10	3	0	3	8	1	0	4	30	2	0	5	24	3	0	95	
4:45 PM	4	8	7	0	2	3	3	0	2	33	6	0	4	21	0	0	93	
4:50 PM	3	10	5	0	1	7	2	0	4	26	4	0	4	38	1	0	105	
4:55 PM	9	12	3	0	3	4	3	0	3	31	2	0	5	29	0	0	104	1153
5:00 PM	3	10	9	0	0	6	0	0	5	23	7	0	7	36	0	0	106	1160
5:05 PM	2	8	5	0	3	13	1	0	1	34	6	0	10	32	2	0	117	1163
5:10 PM	3	6	4	0	2	3	3	0	2	36	3	0	6	35	2	0	105	1175
5:15 PM	2	5	3	0	3	8	1	0	2	34	2	0	5	27	1	0	93	1188
5:20 PM	0	8	6	0	3	5	2	0	3	31	2	0	6	27	3	0	96	1206
5:25 PM	2	11	4	0	1	9	4	0	3	21	2	0	5	29	1	0	92	1198
5:30 PM	2	5	4	0	1	7	1	0	1	26	2	0	5	27	1	0	82	1177
5:35 PM	1	2	5	0	2	8	1	0	1	19	1	0	9	22	2	0	73	1161
5:40 PM	1	7	9	0	2	3	3	0	6	25	2	0	7	21	2	0	88	1154
5:45 PM	2	5	9	0	2	2	2	0	2	28	2	0	4	22	1	0	81	1142
5:50 PM	3	8	8	0	0	4	0	0	2	19	3	0	4	28	1	0	80	1117
5:55 PM	2	6	11	0	1	8	2	0	3	15	2	0	0	22	2	0	74	1087
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	32	96	72	0	20	88	16	0	32	372	64	0	92	412	16	0	1312	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: SE 164th Ave -- SE 29th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050511
DATE: Tue, Jan 10 2023

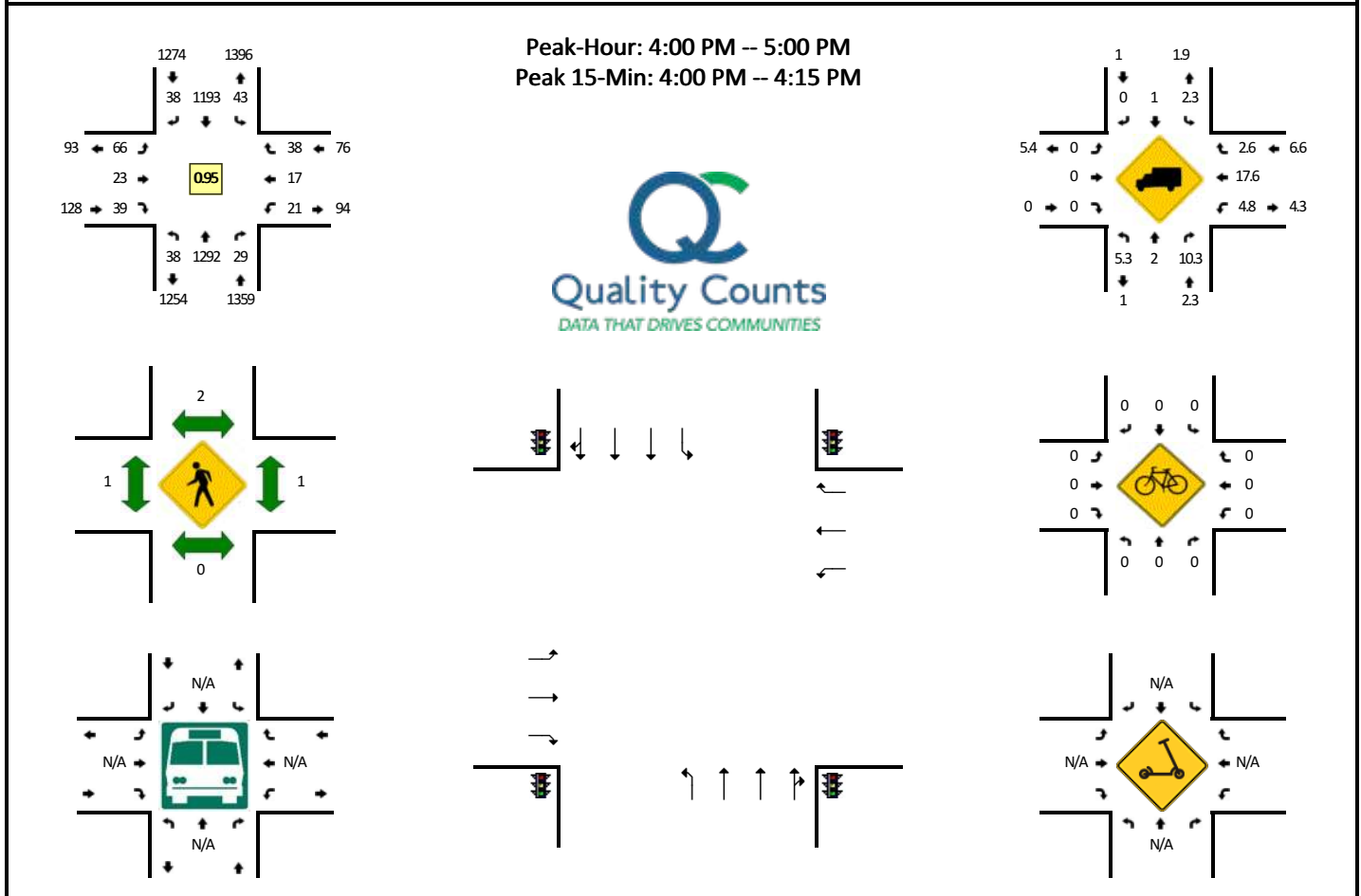


5-Min Count Period Beginning At	SE 164th Ave (Northbound)				SE 164th Ave (Southbound)				SE 29th St (Eastbound)				SE 29th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	25	0	0	0	54	1	0	0	1	0	0	5	1	2	0	92	
7:05 AM	1	26	0	0	1	71	2	0	2	0	1	0	3	0	2	0	109	
7:10 AM	0	39	0	0	0	46	1	1	0	0	4	0	10	0	4	0	105	
7:15 AM	2	50	2	0	1	59	1	0	0	1	1	0	5	1	1	0	124	
7:20 AM	0	41	1	0	2	60	1	1	1	0	1	0	7	0	1	0	116	
7:25 AM	1	60	1	0	3	67	5	0	0	0	0	0	3	2	1	0	143	
7:30 AM	1	67	3	0	1	47	3	0	1	0	3	0	2	2	2	0	132	
7:35 AM	1	55	0	0	0	52	2	0	5	0	3	0	1	0	1	0	120	
7:40 AM	2	77	1	0	1	57	2	0	3	0	7	0	5	1	5	0	161	
7:45 AM	1	89	0	0	2	59	1	0	1	2	2	0	3	1	3	0	164	
7:50 AM	2	95	3	0	1	50	2	0	5	0	4	0	4	0	2	0	168	
7:55 AM	3	94	0	0	1	64	4	0	1	0	2	0	3	2	1	0	175	1609
8:00 AM	3	90	1	0	1	45	1	0	1	1	0	0	2	1	3	0	149	1666
8:05 AM	2	63	2	0	1	78	1	0	5	0	4	0	2	0	2	0	160	1717
8:10 AM	2	98	2	0	1	48	1	1	2	1	4	0	2	1	5	0	168	1780
8:15 AM	1	57	2	0	2	70	0	0	2	1	2	0	1	1	4	0	143	1799
8:20 AM	0	95	1	0	0	62	1	0	3	0	1	0	4	2	1	0	170	1853
8:25 AM	3	82	0	0	2	71	1	0	2	0	3	0	2	2	0	0	168	1878
8:30 AM	1	69	2	0	0	48	3	0	2	0	3	0	7	1	1	0	137	1883
8:35 AM	1	70	0	0	1	78	4	0	2	0	3	0	3	0	1	0	163	1926
8:40 AM	2	71	1	0	0	56	1	0	1	1	2	0	3	2	1	0	141	1906
8:45 AM	4	87	1	0	0	67	3	0	2	1	0	0	3	1	1	0	170	1912
8:50 AM	2	91	0	0	0	46	2	0	2	2	1	0	3	1	3	0	153	1897
8:55 AM	3	73	0	0	0	60	0	0	2	1	1	0	2	0	3	0	145	1867
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	24	1112	12	0	16	692	28	0	28	8	32	0	40	12	24	0	2028	
Heavy Trucks	0	8	0	0	0	28	0	0	0	0	0	0	0	0	0	0	36	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

LOCATION: SE 164th Ave -- SE 29th St
CITY/STATE: Vancouver, WA

QC JOB #: 16050512
DATE: Tue, Jan 10 2023

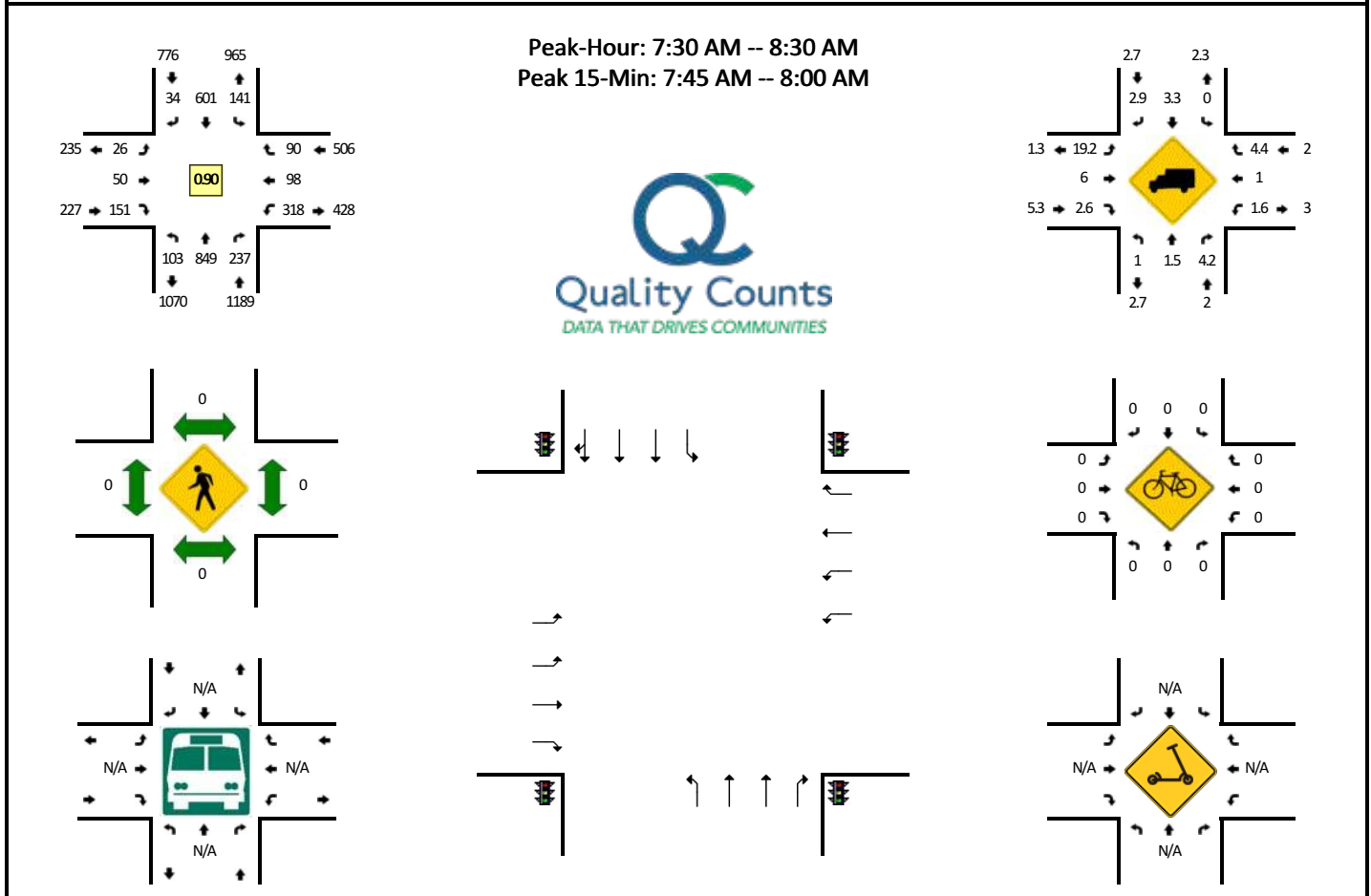


5-Min Count Period Beginning At	SE 164th Ave (Northbound)				SE 164th Ave (Southbound)				SE 29th St (Eastbound)				SE 29th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	108	4	0	3	111	4	0	8	2	1	1	0	3	2	0	249	
4:05 PM	4	114	0	0	7	81	1	0	7	5	3	0	3	3	5	0	233	
4:10 PM	1	112	1	0	5	125	3	1	3	3	2	0	1	1	4	0	262	
4:15 PM	1	118	7	1	3	91	2	0	4	0	4	0	2	4	1	0	238	
4:20 PM	5	83	3	0	6	110	3	0	6	1	0	0	3	1	4	0	225	
4:25 PM	5	110	2	0	5	64	4	0	5	0	5	0	0	3	6	0	209	
4:30 PM	0	86	0	0	2	110	7	0	2	4	7	0	1	0	3	0	222	
4:35 PM	4	112	1	0	3	89	5	0	6	4	3	0	2	2	3	0	234	
4:40 PM	5	115	5	0	3	121	2	0	14	3	2	0	5	0	4	0	279	
4:45 PM	1	130	2	0	1	87	2	0	3	0	1	0	2	0	1	0	230	
4:50 PM	3	96	2	0	2	113	4	0	4	1	6	0	0	0	1	0	232	
4:55 PM	6	108	2	0	2	91	1	0	3	0	5	0	2	0	4	0	224	2837
5:00 PM	2	81	4	0	7	108	1	0	5	2	4	0	0	0	2	0	216	2804
5:05 PM	1	99	6	1	2	99	2	0	5	3	1	0	4	1	5	0	229	2800
5:10 PM	0	87	2	0	6	128	1	0	8	0	6	0	0	1	4	0	243	2781
5:15 PM	2	117	3	0	6	89	1	2	4	2	7	0	2	0	2	0	237	2780
5:20 PM	3	87	2	0	5	125	5	2	7	3	5	0	0	1	8	0	253	2808
5:25 PM	3	70	1	0	1	77	2	0	3	2	4	0	5	4	6	0	178	2777
5:30 PM	1	72	5	0	3	110	1	3	5	1	2	0	1	2	5	0	211	2766
5:35 PM	2	105	6	0	8	72	3	0	9	1	0	0	1	0	1	0	208	2740
5:40 PM	4	94	4	0	3	99	3	0	9	2	2	0	2	3	2	0	227	2688
5:45 PM	4	96	6	0	3	72	1	0	6	4	2	0	0	1	3	0	198	2656
5:50 PM	2	97	6	0	6	105	4	1	2	1	10	0	2	0	2	0	238	2662
5:55 PM	4	70	5	0	4	63	0	1	5	1	3	0	4	0	2	0	162	2600
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	28	1336	20	0	60	1268	32	4	72	40	24	4	16	28	44	0	2976	
Heavy Trucks	0	32	4	0	4	12	0	0	0	0	0	0	4	4	0	0	60	
Buses																		
Pedestrians	0	0			0	0			0	0			4				4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scoters																		

Comments:

LOCATION: SE 164th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019601
DATE: Tue, Dec 6 2022

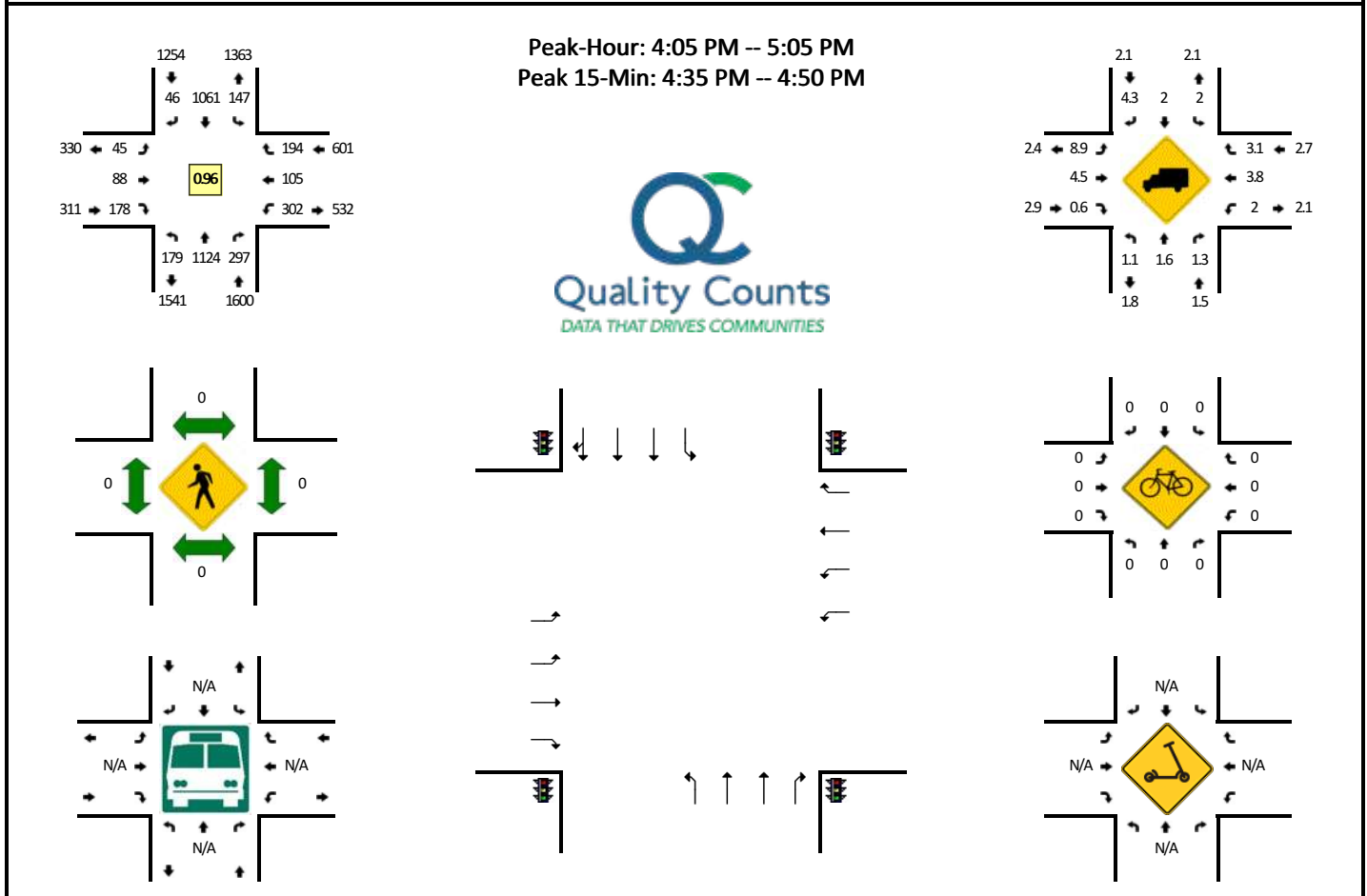


5-Min Count Period Beginning At	SE 164th Ave (Northbound)				SE 164th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	6	49	8	0	6	31	1	0	3	2	8	0	20	4	1	0	139	
7:05 AM	7	44	10	0	9	46	3	0	1	3	13	0	16	3	4	0	159	
7:10 AM	5	31	7	0	3	48	3	0	0	3	15	0	23	7	2	0	147	
7:15 AM	4	50	18	0	9	46	2	0	4	2	11	0	27	4	6	0	183	
7:20 AM	9	54	11	0	5	41	1	0	0	4	11	0	22	11	5	0	174	
7:25 AM	2	65	12	0	10	58	2	0	3	5	8	0	26	5	8	0	204	
7:30 AM	10	43	10	0	8	47	1	0	1	4	14	0	33	20	7	0	198	
7:35 AM	5	68	21	0	13	59	4	0	2	2	8	0	22	5	10	0	219	
7:40 AM	9	54	19	0	9	58	3	0	3	5	12	0	32	8	5	0	217	
7:45 AM	12	86	27	0	19	57	6	0	1	4	6	0	24	1	9	0	252	
7:50 AM	8	81	23	0	10	46	3	0	2	8	13	0	31	11	3	0	239	
7:55 AM	7	95	24	0	19	55	4	0	0	6	15	0	24	8	4	0	261	2392
8:00 AM	8	56	22	0	13	32	0	0	4	2	9	0	27	10	13	0	196	2449
8:05 AM	8	73	16	0	14	68	3	0	0	4	5	0	32	11	7	0	241	2531
8:10 AM	11	58	25	0	4	34	1	0	3	6	15	0	25	6	9	0	197	2581
8:15 AM	10	93	17	0	14	50	5	0	2	1	19	0	16	7	12	0	246	2644
8:20 AM	9	62	15	0	8	39	3	0	5	4	24	0	30	6	7	0	212	2682
8:25 AM	6	80	18	0	10	56	1	0	3	4	11	0	22	5	4	0	220	2698
8:30 AM	10	50	9	0	11	46	4	0	4	4	12	0	23	1	9	0	183	2683
8:35 AM	5	63	12	0	14	60	1	0	1	4	10	0	20	4	6	0	200	2664
8:40 AM	8	70	16	0	7	47	2	0	2	7	9	0	29	4	12	0	213	2660
8:45 AM	4	68	18	0	15	67	4	0	2	0	8	0	33	4	6	0	229	2637
8:50 AM	9	69	22	0	11	38	0	0	2	8	16	0	17	14	9	0	215	2613
8:55 AM	8	83	21	0	9	57	2	0	2	4	8	0	26	5	4	0	229	2581
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	108	1048	296	0	192	632	52	0	12	72	136	0	316	80	64	0	3008	
Heavy Trucks	0	8	0	0	0	24	4	0	4	8	0	0	12	0	0	0	60	
Buses																		
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles																		
Scoters																		

Comments:

LOCATION: SE 164th Ave -- SE 34th St
CITY/STATE: Vancouver, WA

QC JOB #: 16019602
DATE: Tue, Dec 6 2022



5-Min Count Period Beginning At	SE 164th Ave (Northbound)				SE 164th Ave (Southbound)				SE 34th St (Eastbound)				SE 34th St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	11	81	26	0	10	70	7	0	5	3	9	0	31	10	11	0	274	
4:05 PM	18	116	26	0	6	79	3	0	3	6	24	0	24	8	15	0	328	
4:10 PM	14	84	23	0	16	94	3	0	1	8	10	0	40	10	18	0	321	
4:15 PM	19	104	31	0	8	89	4	0	1	3	14	0	13	5	15	0	306	
4:20 PM	10	73	31	0	16	106	2	0	3	7	11	0	24	7	13	0	303	
4:25 PM	17	125	23	0	14	75	6	0	1	1	17	0	19	9	12	0	319	
4:30 PM	12	81	26	0	13	80	3	0	3	7	9	0	28	3	13	0	278	
4:35 PM	18	105	22	0	5	84	5	0	6	10	20	0	24	11	13	0	323	
4:40 PM	11	77	26	0	13	96	4	0	10	10	14	0	36	14	28	0	339	
4:45 PM	22	114	21	0	14	77	5	0	2	9	17	0	21	8	12	0	322	
4:50 PM	11	81	20	0	17	80	3	0	8	13	11	0	20	10	21	0	295	
4:55 PM	17	98	26	0	11	94	6	0	2	4	12	0	22	12	16	0	320	3728
5:00 PM	10	66	22	0	14	107	2	0	5	10	19	0	31	8	18	0	312	3766
5:05 PM	16	106	23	0	12	89	4	0	5	9	17	0	23	4	16	0	324	3762
5:10 PM	8	72	24	0	14	107	5	0	4	6	14	0	27	14	21	0	316	3757
5:15 PM	11	114	29	0	10	74	1	0	4	8	14	0	14	6	9	0	294	3745
5:20 PM	11	59	26	0	18	83	0	0	2	5	10	0	22	6	18	0	260	3702
5:25 PM	19	101	32	0	10	88	3	0	6	7	17	0	12	13	15	0	323	3706
5:30 PM	12	63	24	0	21	77	3	0	1	10	16	0	19	8	15	0	269	3697
5:35 PM	15	113	35	0	10	73	2	0	5	3	14	0	26	3	11	0	310	3684
5:40 PM	6	84	23	0	10	104	1	0	8	6	15	0	27	7	9	0	300	3645
5:45 PM	14	89	35	0	5	74	6	0	3	4	10	0	16	1	9	0	266	3589
5:50 PM	11	75	25	0	7	83	3	0	0	3	13	0	22	4	9	0	255	3549
5:55 PM	17	70	21	0	7	57	2	0	3	4	9	0	12	1	10	0	213	3442
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	204	1184	276	0	128	1028	56	0	72	116	204	0	324	132	212	0	3936	
Heavy Trucks	0	28	8		0	12	4		4	8	4		0	12	0		80	
Buses																		
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Scooters																		

Comments:

Appendix B WSDOT Crash Data

OFFICER REPORTED CRASHES THAT OCCURRED AT OR IN THE VICINITY OF MULTIPLE INTERSECTIONS IN THE CITY OF VANCOUVER
01/01/2017 - available 0022 - see 2nd tab below for road information
Under 23 U.S. Code 1405, 221 U.S. Code 1401 - injury data, reports, surveys, schedules, lists compiled or collected for the purpose of
identifying, evaluating, or planning the safety enhancement of potential crash sites, hazardous roadway conditions, or roadway-highway
crossings are not subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for purposes in any
action for damages arising from any occurrence at a location maintained or addressed in such reports, surveys, schedules, lists, or data.

JURISDICTION	COUNTY	CITY	PRIMARY TRAFFIC	BLOCK	INTERSECTION	DIST. FROM REF.	COMP. DIR. FROM REF.	REFERENCE NAME	MILEPOST	A/B	SR ONLY HISTORY/SUSPENSE	REPORT NUMBER	DATE	TIME	TYPE	# INJ	# FATAL	# VEH	# PEDS	# BIKES	VEHICLE 1 TYPE	VEHICLE 2 TYPE	SHIP	WEATHER	ROADWAY CONDITION	LIGHTING	FIRST COLLISION N TYPE / OBJECT	VEHICLE 1 ACTION	VEHICLE 2 ACTION	VEHICLE 1 COMPASS DIRECTIO	VEHICLE 2 COMPASS DIRECTIO		
City Street Clark	Vancouver	SE 157H ST	0	0	SE 152ND AVE						No	0734485	2:11 Possible Inj	1	0	0	0	0	0	0	Passenger Car	At Intersection	Clear or Pa Dry	Dusk	Dark-Street	Utility Box Making Right Turn	West	South					
City Street Clark	Vancouver	SE 157H ST	0	0	SE 152ND AVE			No	0735632	15:40 Possible Inj	1	0	2	0	0	0	0	0	0	0	Truck (Flat)Passenger	At Intersection	Clear or Pa Dry	Dusk	Dark-Street	Entering at Going Straight Going South	South	North					
City Street Clark	Vancouver	SE 157H ST	0	0	SE 152ND AVE			No	0999464	1/2/2020	15:52 No Appare	0	0	2	0	0	0	0	0	0	Passenger	Passenger	At Intersection	Raining	Wet	Dark-Street	Entering at Going Straight Going South	South	North				
City Street Clark	Vancouver	SE 164TH H	0	0	SE 29TH ST			No	0813134	16:14 Unknown	0	0	2	0	0	0	0	0	0	0	Pickup/Pan	Pickup/Pan	At Intersection	Clear or Pa Dry	Dusk	Dark-Street	From oppo Making Left Going South	South	East				
City Street Clark	Vancouver	SE 164TH H	2800	200	F	S	SE 29TH ST	No	0534752	21:00 No Appare	0	0	1	0	0	0	0	0	0	0	Pickup/Pan	Truck or Not at Inter	Clear or Pa Wet	Dusk	Dark-Street	Tree or Stu/Going Straight Ahead	South	West					
City Street Clark	Vancouver	SE 164TH H	2800	41	F	N	SE 29TH ST	No	0915671	13:31 No Appare	0	0	2	0	0	0	0	0	0	0	Pickup	Pickup	Pan Not at Inter	Overcast	Wet	Dusk	Dark-Street	From same Going Str Stopped in South	South	North			
City Street Clark	Vancouver	SE 167H H	0	0	SE 20TH ST			No	0967588	19:17 No Appare	0	0	2	0	0	0	0	0	0	0	Pickup/Pan	Passenger	At Intersection	Overcast	Standing	Dark-Street	Entering at Going Straight Going North	North	South				
City Street Clark	Vancouver	SE 167H H	17500	SE 34TH ST				No	0756777	1/6/2018	22:05 Suspected	1	0	1	0	0	0	0	0	0	Passenger Car	At Intersection	Overcast	Wet	Dark-Street	Medal Sign Making Left Turn	North	East					
City Street Clark	Vancouver	SE 167H H	17500	SE 34TH ST				No	0581455	9/6/2019	11:28 No Appare	0	0	2	0	0	0	0	0	0	Passenger Car	At Intersection	Clear or Pa Dry	Dusk	Dark-Street	Medal Sign Making Right Turn	North	East					
City Street Clark	Vancouver	SE 177TH H	0	0	SE 34TH ST			No	0873724	9:08 No Appare	0	0	2	0	0	0	0	0	0	0	Passenger	Pickup/Pan	At Intersection	Clear or Pa Wet	Dusk	Dark-Street	Entering at Making Left Going South	South	West				
City Street Clark	Vancouver	SE 192ND	1498	SE 15TH ST				No	0528001	6/3/2022	10:27 Possible Inj	1	0	3	0	0	0	0	0	0	Pickup/Pan	Pickup/Pan	At Intersection	Raining	Wet	Dusk	Dark-Street	Entering at Making Left Making Left	South	West			
City Street Clark	Vancouver	SE 192ND	0	0	SE 15TH ST			No	0880276	1/7/2019	19:05 No Appare	0	0	2	0	0	0	0	0	0	Passenger	Passenger	At Intersection	Clear or Pa Dry	Dusk	Dark-Street	From same Going Str Stopped at North	North	South				
City Street Clark	Vancouver	SE 192ND	0	0	SE 15TH ST			No	0420704	16:40 No Appare	0	0	2	0	0	0	0	0	0	0	Pickup Pan	Passenger	At Intersection	Raining	Wet	Dark-Street	Entering at Going Straight Going North	North	South				
City Street Clark	Vancouver	SE 192ND	0	0	SE 15TH ST			No	0795421	5/7/2018	9:56 No Appare	0	0	2	0	0	0	0	0	0	Passenger	Pickup/Pan	At Intersection	Overcast	Dry	Dusk	Dark-Street	Entering at Going Straight Going North	North	South			
City Street Clark	Vancouver	SE 192ND	0	0	SE 15TH ST			No	0900814	4/4/2019	11:56 Suspected	1	0	2	0	0	0	0	0	0	Passenger	Pickup/Pan	At Intersection	Clear or Pa Ice	Dusk	Dark-Street	From oppo Going Str Making Left	South	North				
City Street Clark	Vancouver	SE 192ND	0	0	SE 15TH ST			No	0697125	10:45 No Appare	0	0	2	0	0	0	0	0	0	0	Passenger	Passenger	At Intersection	Overcast	Dry	Dusk	Dark-Street	From same Slowing	Slowing	South	North		
City Street Clark	Vancouver	SE 192ND	2000	SE 20TH ST				No	0846012	14:21 Possible Inj	1	0	2	0	0	0	0	0	0	0	Passenger	Pickup/Pan	At Intersection	Clear or Pa Dry	Dusk	Dark-Street	Entering at Going Straight Going North	North	South				
City Street Clark	Vancouver	SE 192ND	0	0	SE 20TH ST			No	0453822	9:46 No Appare	0	0	2	0	0	0	0	0	0	0	Truck (Flat)Pickup/Pan	At Intersection	Clear or Pa Dry	Dusk	Dark-Street	From same Going Str Stopped to South	South	North					
City Street Clark	Vancouver	SE 192ND	0	0	SE 20TH ST			No	0959517	12:49 No Appare	0	0	1	0	0	0	0	0	0	0	Passenger Car	At Intersection	Clear	Dry	Dusk	Dark-Street	Signal Pole Going Straight Ahead	South	North				
City Street Clark	Vancouver	SE 192ND	0	0	SE 20TH ST			No	0944488	7:36 No Appare	0	0	2	0	0	0	0	0	0	0	Pickup/Pan	Passenger	At Intersection	Clear or Pa Dry	Dusk	Dark-Street	From oppo Making Left Going West	West	North				
City Street Clark	Vancouver	SE 192ND	0	0	SE 20TH ST			No	0784445	16:18 Possible Inj	1	0	2	0	0	0	0	0	0	0	Pickup/Pan	Pickup/Pan	At Intersection	Overcast	Dry	Dusk	Dark-Street	From oppo Making Left Going West	West	North			
City Street Clark	Vancouver	SE 192ND	0	0	SE 20TH ST			No	0841694	9:23 Suspected	1	0	2	0	0	0	0	0	0	0	Passenger	Passenger	At Intersection	Clear	Dry	Dusk	Dark-Street	From oppo Making Left Going South	South	West			
City Street Clark	Vancouver	SE 192ND AVE	SE 34TH ST					No	0531788	4:00 No Appare	0	0	2	0	0	0	0	0	0	0	Passenger	Pickup/Pan	At Intersection	Overcast	Dry	Dark-Street	Entering at Going Straight Going West	West	East				
City Street Clark	Vancouver	SE 192ND AVE	1600	93	F	N	SE 15TH ST	No	0988824	13:40 Possible Inj	1	0	1	0	0	0	0	0	0	0	Passenger	Passenger	Intersection	Clear or Pa Dry	Dusk	Dark-Street	From same Going Str Stopped to North	North	South				
City Street Clark	Vancouver	SE 192ND	1400	318	F	S	SE 15TH ST	No	0785221	4/3/2018	10:10 No Appare	0	0	2	0	0	0	0	0	0	Truck	Pickup/Pan	Intersection	Clear or Pa Dry	Dusk	Dark-Street	From same Going Str Stopped to North	North	South				
City Street Clark	Vancouver	SE 192ND	2100	334	F	S	SE 20TH ST	No	0501318	11:18 Suspected	1	0	2	0	0	0	0	0	0	0	Truck	Do-Pickup/Pan	Not at Inter	Clear or Pa Dry	Dusk	Dark-Street	From same Going Str Going Straight	South	North				
City Street Clark	Vancouver	SE 192ND	2000	250	F	S	SE 20TH ST	No	0537243	13:59 No Appare	0	0	2	0	0	0	0	0	0	0	Truck	Pickup/Pan	Intersection	Raining	Wet	Dusk	Dark-Street	From same Going Str Slowing	Slowing	South	North		
City Street Clark	Vancouver	SE 192ND	2000	250	F	S	SE 20TH ST	No	0762873	13:59 No Appare	0	0	2	0	0	0	0	0	0	0	Passenger	Passenger	Intersection	Clear or Pa Dry	Dusk	Dark-Street	From same Going Str Stopped to North	North	South				
City Street Clark	Vancouver	SE 192ND	1900	162	F	N	SE 20TH ST	No	0784828	17:02 No Appare	0	0	2	0	0	0	0	0	0	0	Passenger	Pickup/Pan	Intersection	Overcast	Wet	Dusk	Dark-Street	From oppo Going Str Stopped to South	South	North			
City Street Clark	Vancouver	SE 192ND	1900	114	F	N	SE 20TH ST	No	0653540	12:40 No Appare	0	0	3	0	0	0	0	0	0	0	Truck (Flat)Pickup/Pan	Intersection	Overcast	Dry	Dusk	Dark-Street	From same Going Str Stopped to North	North	South				
City Street Clark	Vancouver	SE 192ND	1700	492	F	N	SE 20TH ST	No	0841509	16:04 No Appare	0	0	2	0	0	0	0	0	0	0	Pickup/Pan	Pickup/Pan	Intersection	Clear or Pa Dry	Dusk	Dark-Street	From same Stopped to Going Straight South	South	Vehicle Sto				
City Street Clark	Vancouver	SE 192ND	1700	SE 192ND AVE				No	0932443	5/2/2019	13:44 No Appare	0	0	2	0	0	0	0	0	0	Passenger	Passenger	Intersection	Clear or Pa Dry	Dusk	Dark-Street	From same Going Str Stopped to North	North	South				
City Street Clark	Vancouver	SE 192ND	2000	117	F	S	SE 20TH ST	No	0808001	4/6/2018	8:58 No Appare	0	0	3	0	0	0	0	0	0	Pickup/Pan	Passenger	Intersection	Raining	Wet	Dusk	Dark-Street	From same Going Str Stopped to South	South	North			
City Street Clark	Vancouver	SE 192ND	2100	291	F	S	SE 20TH ST	No	0515456	16:02 Possible Inj	1	0	2	0	0	0	0	0	0	0	Passenger	Pickup/Pan	At Driveway	Clear	Dusk	Dark-Street	Entering at Making Right Going Straight	South	North				
City Street Clark	Vancouver	SE 192ND	2400	86	F	N	SE 25TH ST	No	0442584	2:52 No Appare	0	0	1	0	0	0	0	0	0	0	Pickup/Panel	Truck or Not at Inter	Clear or Pa Dry	Dusk	Dark-Street	Tree or Stu/Going Straight Ahead	North	South					
City Street Clark	Vancouver	SE 192ND	2500	0.22	M	N	SE 25TH ST	No	0721495	22:37 No Appare	0	0	1	0	0	0	0	0	0	0	Passenger Car	Not at Inter	Clear or Pa Dry	Overcast	Wet	Dark-Street	Tree or Stu/Going Straight Ahead	South	North				
City Street Clark	Vancouver	SE 192ND	2700	0.11	M	SW	SE 25TH ST	No	0842701	9:26 No Appare	0	0	1	0	0	0	0	0	0	0	Pickup/Panel	Truck or Not at Inter	Clear or Pa Dry	Overcast	Wet	Dark-Street	Vehicle Str Going Straight Ahead	South	North				
City Street Clark	Vancouver	SE 192ND	2700	476	F	M	SE 25TH ST	No	0802199	22:00 No Appare	0	0	1	0	0	0	0	0	0	0	Passenger Car	Not at Inter	Clear or Pa Dry	Overcast	Wet	Dark-Street	Vehicle Str Going Straight Ahead	North	South				
City Street Clark	Vancouver	SE 192ND	2400	200	F	NE	SE 25TH ST	No	0445610	7/2/2020	17:47 Died in Ho	0	1	1	0	0	0	0	0	0	Passenger Car	Not at Inter	Clear	Dry	Dusk	Dark-Street	Utility Pole Going Straight Ahead	South	North				
City Street Clark	Vancouver	SE 192ND	2500	0.25	M	N	SE 25TH ST	No	0988824	13:40 Possible Inj	1	0	1	0	0	0	0	0	0	0	Pickup/Panel	Truck or Not at Inter	Clear or Pa Dry	Overcast	Wet	Dark-Street	Vehicle Str Going Straight Ahead	South	North				
City Street Clark	Vancouver	SE 192ND	3100	0.5	M	SE	SE 34TH ST	No	0760882	16:55 No Appare	0	0	2	0	0	0	0	0	0	0	Passenger	Passenger	Truck or Not at Inter	Clear or Pa Dry	Dusk	Dark-Street	From same Going Str Going Straight	South	North				
City Street Clark	Vancouver	SE 20TH ST	16602	SE 167H AVE				No	0856936	20:57 No Appare	0	0	2	0	0	0	0	0	0	0	Passenger	Passenger	At Intersection	Clear or Pa Dry	Dusk	Dark-Street	From same Going Str Stopped at East	East	West				
City Street Clark	Vancouver	SE 20TH ST	16602	SE 167H AVE				No	0809354	11:09 Suspected	1	0	2	0	0	0	0	0	0	0	Passenger	Pickup/Pan	At Intersection	Overcast	Dry	Dusk	Dark-Street	From same Going Str Stopped at East	East	West			
City Street Clark	Vancouver	SE 20TH ST	0	0	SE 167H AVE			No	0770111	18:25 No Appare	0	0	2	0	0	0	0	0	0	0	Pickup/Pan	Passenger	At Intersection	Overcast	Dry	Dark-Street	From oppo Starting in Making Left	West	North				
City Street Clark	Vancouver	SE 20TH ST	0	0	SE 167H AVE			No	0448810	19:53 Suspected	1	0	1	0	0	0	0	0	0	0	1	Pickup/Panel	Truck or At Intersection	Clear	Dry	Dusk	Dark-Street	Vehicle Str Starting in Traffic Lane	West	Vehicle Sto			
City Street Clark	Vancouver	SE 20TH ST	16700	SE 167H AVE				No	0510668	13:08 No Appare	0	0	2	0	0	0	0	0	0	0	Passenger	Pickup/Pan	At Intersection	Clear or Pa Dry	Dusk	Dark-Street	From same Going Str Stopped to East	East	West				
City Street Clark	Vancouver	SE 20TH ST	16602	SE 167H AVE				No	0409463	10:11 No Appare	0	0	2	0	0	0	0	0	0	0	Passenger	Pickup/Pan	Pan At Intersection	Overcast	Dry	Dusk	Dark-Street	From same Slowing	Slowed at East	East	West		
City Street Clark	Vancouver	SE 20TH ST	0	0	SE 167H AVE			No	0779994	21:50 No Appare	0	0	2	0	0	0	0	0	0	0	Pickup/Pan	Passenger	At Intersection	Overcast	Dry	Dark-Street	From same Going Str Stopped to East	East	West				
City Street Clark	Vancouver	SE 20TH ST	2000	SE 192ND AVE				No	0491782	19:29 Possible Inj	2	0	2	0	0	0	0	0	0	0	Passenger	Passenger	At Intersection	Raining	Wet	Dark-Street	From oppo Making Left Making Left	West	East				
City Street Clark	Vancouver	SE 20TH ST	0	0	SE 192ND AVE			No	0707718	17:28 Suspected	1	0	1	0	0	0	0	0	0	0	1	Passenger Car	At Intersection	Clear or Pa Dry	Overcast	Dusk	Dark-Street	Vehicle - Making Right Turn	West	South			
City Street Clark	Vancouver	SE 20TH ST	16600	76	F	W	SE 167H AVE	No	0551636	12:26 No Appare	0	0	2	0	0	0	0	0	0	0	Passenger	Passenger	Not at Inter	Clear or Pa Dry	Overcast	Wet	Dark-Street	From same Going Str Stopped to East					

VEHICLE 2 COMPASS DIRECTION N FROM	VEHICLE 1 COMPASS DIRECTION N TO	DRIVER CONTRIB CIRCUMS TANCE 1 (UNIT 1)	DRIVER CONTRIB CIRCUMS TANCE 2 (UNIT 1)	DRIVER CONTRIB CIRCUMS TANCE 3 (UNIT 1)	DRIVER CONTRIB CIRCUMS TANCE 1 (UNIT 2)	DRIVER CONTRIB CIRCUMS TANCE 2 (UNIT 2)	DRIVER CONTRIB CIRCUMS TANCE 3 (UNIT 2)	BICYCLIST CONTRIB CIRCUMS TANCE 1 (UNIT 1)	BICYCLIST CONTRIB CIRCUMS TANCE 2 (UNIT 1)	BICYCLIST CONTRIB CIRCUMS TANCE 3 (UNIT 1)	BICYCLIST CONTRIB CIRCUMS TANCE 1 (UNIT 2)	BICYCLIST CONTRIB CIRCUMS TANCE 2 (UNIT 2)	BICYCLIST CONTRIB CIRCUMS TANCE 3 (UNIT 2)	AN CONTRIB CIRCUMS TANCE 1 (UNIT 2)	AN CONTRIB CIRCUMS TANCE 2 (UNIT 2)	AN CONTRIB CIRCUMS TANCE 3 (UNIT 2)	IMPACT LOCATIO N CTRY County & Misc Trafficw D	WA STATE PLANE PLANE 2010 - FORWARD D	WA STATE PLANE PLANE 2010 - FORWARD D
West	East	Under Influence of Alcohol	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Past the Cr	1134740	107246
East	West	Disregard Traffic Sign and Signals	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134778	107244.7
South	North	Disregard 1 Inattention	Driver Not Distracted	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134740	107246
Vehicle StoVehicle Stc	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1127533	103833.3
East	West	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Past the Cr	1127523	103531.1
None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1127534	103903.5
None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1120577	106130.2
None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Median of	1130488	102486.5
None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Past the Cr	1120538	102488.5
West	East	Did Not Grant RW to Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130865	102504.3
West	North	Unknown Distraction	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134740	107247.5
Vehicle StoVehicle Stc	Other Contributing Circ Not Listed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134740	107246
East	West	Lost in Thought / Day Dreaming	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134740	107246
East	West	Disregard Stop and Go Light	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134777	107244.7
North	East	Inattention	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134777	107244.7
South	North	Operating Defective Equipment	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134750	106040.2
West	East	Disregard Traffic Sign and Signals	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134715	106043.2
South	East	Follow Too Closely	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134715	106044.3
East	West	Under Influence of Alcohol	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Past the Cr	1134715	106044.3
East	West	Improper Turn/Merge	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134035	102365.8
North	South	Did Not Grant RW to Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134082	102401.8
South	North	Other Contributing Circ Not Listed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134036	102366.8
North	South	Eating or Drinking	Follow Too Closely	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134740	107338.6
Vehicle StoVehicle Stc	Inattention	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134772	106925.8
South	North	Follow Too Closely	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134743	105708.5
South	North	Operating Defective Equipment	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134709	105793.3
South	North	None	Exceeding Reas. Safe Speed	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134749	106002.2
Vehicle StoVehicle Stc	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134754	106201.9
Vehicle StoVehicle Stc	Inattention	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134718	106158.5
North	South	None	Follow Too Closely	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134724	106336.9
North	South	Inattention	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134716	106088
Vehicle StoVehicle Stc	Disregard 1 Inattention	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134748	105927
South	North	Did Not Grant RW to Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134708	105753
None	None	Apparently Asleep or Fatigued	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Past the Cr	1134640	104752.7
None	None	Exceeding Reas. Safe Speed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Median of	1134632	104621.8
None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134352	104179.8
None	None	Unknown Distraction	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134391	104249.2
None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Past the Cr	1134710	104844.9
North	South	Distractions Outside Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134149	103871.6
East	Vehicle Stc	Lost in Thought / Day Dreaming	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134798	99963.43
Vehicle StoVehicle Stc	Operating Handheld Cell Phone	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130576	106107.9
West	North	Unknown Distraction	Unknown Distraction	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130650	105128.4
pped	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130577	106130.2
Vehicle StoVehicle Stc	Operating Defective Equipment	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130576	106107.2
Vehicle StoVehicle Stc	Other Contributing Circ Not Listed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130642	106110.3
East	West	Under Infl Inattention Did Not Go	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130576	106107.9
East	South	Other Contributing Circ Not Listed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130577	106130.2
None	None	Other Contributing Circ Not Listed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134756	106043.6
East	West	Disregard 1 Apparently Asleep or 1 None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134715	106044.3
East	West	Unknown Distraction	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130509	105131.6
None	None	Exceeding Reas. Safe Speed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130643	106128.6
West	East	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Outside Sh	1130276	106136.1
South	North	Other Contributing Circ Not Listed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Past the Cr	1127533	103863.9
None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1127535	103831.4
None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Intersectin	1130524	103788.2
East	West	Improper Turn/Merge	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130524	103788.1
East	West	Did Not Gr Distractions Outside Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130488	102508.7
East	West	Improper Turn/Merge	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130488	102509.4
East	West	Disregard 1 Inattention Did Not Gr	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130488	102509.4
North	Southeast	Unknown 1 Disregard Traffic Sign	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130488	102509.4
East	West	Did Not Grant RW to Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1130488	102509.4
East	South	Inattention	Inattention	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134035	102365.8
West	East	Under Infl Did Not Grant RW to	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134036	102366.8
East	West	Improper Turn/Merge	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134081	102401.8
East	West	Apparently Ill	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134036	102402.6
West	East	Operating Other Electronic Devis	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134035	102365.8
South	South	Disregard 1 Exceeding Operating	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134035	102365.8
West	East	Did Not Grant RW to Vehicle	Exceeding Reas. Safe Speed	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134081	102363.0
East	West	Did Not Grant RW to Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134079	102401.8
South	North	Disregard 1 Distractions Outside V	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134082	102401.8
East	West	Did Not Grant RW to Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134036	102366.8
None	None	Other Contributing Circ Not Listed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Past the Cr	1134082	102401.8
West	East	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134035	102365.8
East	West	Inattention	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134035	102365.8
West	East	Did Not Grant RW to Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134036	102366.8
West	East	Disregard Traffic Sign and Signals	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134036	102366.8
West	South	Exceeding Reas. Safe Speed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1132562	102384.2
East	East	Other Contributing Circ Not Listed	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134549	102354.6
South	North	None	Did Not Grant RW to Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134558	102354.5
West	East	Under Influence of Alcohol	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Past the Cr	1134792	102350.2
West	East	Did Not Grant RW to Vehicle	None	None	None	None	None	None	None	None	None	None	None	None	None	None	Lane of Pri	1134535	102354.9
None	None																		

Appendix C Existing Operations Worksheets

Timings
1: SE 192nd & SE 15th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	117	37	24	52	41	38	540	28	550
Future Volume (vph)	117	37	24	52	41	38	540	28	550
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	10.8	16.9	5.7	9.8	18.8	6.3	57.4	6.0	59.1
Actuated g/C Ratio	0.11	0.17	0.06	0.10	0.19	0.06	0.57	0.06	0.59
v/c Ratio	0.71	0.23	0.28	0.33	0.13	0.39	0.32	0.33	0.36
Control Delay	62.4	21.8	52.5	44.1	2.8	59.1	12.5	53.7	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.4	21.8	52.5	44.1	2.8	59.1	12.5	53.7	15.3
LOS	E	C	D	D	A	E	B	D	B
Approach Delay		47.9		31.2			15.5		17.0
Approach LOS		D		C			B		B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 21.2

Intersection LOS: C

Intersection Capacity Utilization 49.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St

			
Ø1	Ø2	Ø3	Ø4 (R)
20 s	29 s	14 s	37 s
			
Ø5	Ø6	Ø7	Ø8
20 s	29 s	15 s	36 s

HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	117	37	28	24	52	41	38	540	13	28	550	67
Future Volume (veh/h)	117	37	28	24	52	41	38	540	13	28	550	67
Initial Q (Qb), 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		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	133	42	1	27	59	0	43	614	14	32	625	69
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	162	215	5	45	93	127	62	2194	50	49	1898	209
Arrive On Green	0.09	0.12	0.12	0.03	0.05	0.00	0.07	1.00	1.00	0.03	0.62	0.62
Sat Flow, veh/h	1767	1848	44	1697	1841	1585	1767	3493	80	1654	3048	336
Grp Volume(v), veh/h	133	0	43	27	59	0	43	307	321	32	344	350
Grp Sat Flow(s),veh/h/ln	1767	0	1892	1697	1841	1585	1767	1749	1824	1654	1678	1706
Q Serve(g_s), s	7.4	0.0	2.1	1.6	3.1	0.0	2.4	0.0	0.0	1.9	9.7	9.8
Cycle Q Clear(g_c), s	7.4	0.0	2.1	1.6	3.1	0.0	2.4	0.0	0.0	1.9	9.7	9.8
Prop In Lane	1.00		0.02	1.00		1.00	1.00		0.04	1.00		0.20
Lane Grp Cap(c), veh/h	162	0	220	45	93	127	62	1098	1146	49	1045	1062
V/C Ratio(X)	0.82	0.00	0.20	0.60	0.63	0.00	0.70	0.28	0.28	0.66	0.33	0.33
Avail Cap(c_a), veh/h	265	0	454	254	442	427	177	1098	1146	149	1045	1062
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	0.95	0.95	0.95	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.6	0.0	40.0	48.2	46.5	0.0	46.0	0.0	0.0	48.0	9.0	9.0
Incr Delay (d2), s/veh	4.0	0.0	0.2	4.8	2.6	0.0	5.0	0.6	0.6	5.5	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.0	0.0	1.7	1.3	2.7	0.0	1.9	0.3	0.3	1.5	6.0	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.6	0.0	40.1	52.9	49.2	0.0	51.0	0.6	0.6	53.5	9.8	9.8
LnGrp LOS	D	A	D	D	D	A	D	A	A	D	A	A
Approach Vol, veh/h		176			86			671			726	
Approach Delay, s/veh		46.5			50.3			3.8			11.7	
Approach LOS		D			D			A			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.6	16.6	7.9	67.8	14.2	10.1	8.5	67.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.6	4.1	3.9	2.0	9.4	5.1	4.4	11.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.1	0.0	0.1	0.0	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			14.2									
HCM 6th LOS			B									

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Existing AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	73	140	78	127	36	419	73	438
Future Volume (vph)	73	140	78	127	36	419	73	438
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	6.8	15.6	6.9	15.7	7.0	52.5	8.9	52.4
Actuated g/C Ratio	0.07	0.16	0.07	0.16	0.07	0.52	0.09	0.52
v/c Ratio	0.35	0.73	0.36	0.75	0.34	0.33	0.51	0.31
Control Delay	48.2	50.7	48.2	50.0	68.1	5.9	54.0	20.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	50.7	48.2	50.0	68.1	5.9	54.0	20.7
LOS	D	D	D	D	E	A	D	C
Approach Delay		50.0		49.5		9.9		25.0
Approach LOS		D		D		A		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 28.1

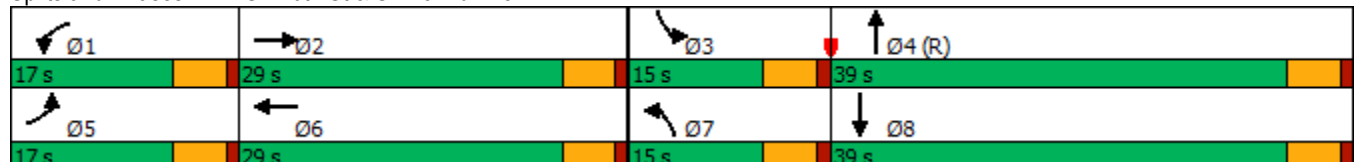
Intersection LOS: C

Intersection Capacity Utilization 54.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	140	56	78	127	78	36	419	107	73	438	59
Future Volume (veh/h)	73	140	56	78	127	78	36	419	107	73	438	59
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	81	156	44	87	141	60	40	466	100	81	487	57
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	153	190	54	159	169	72	86	1628	347	104	1772	207
Arrive On Green	0.04	0.13	0.13	0.05	0.13	0.13	0.05	0.56	0.56	0.06	0.57	0.57
Sat Flow, veh/h	3428	1426	402	3483	1255	534	1725	2890	616	1795	3104	362
Grp Volume(v), veh/h	81	0	200	87	0	201	40	283	283	81	269	275
Grp Sat Flow(s),veh/h/ln	1714	0	1828	1742	0	1789	1725	1763	1744	1795	1721	1746
Q Serve(g_s), s	2.3	0.0	10.6	2.4	0.0	11.0	2.3	8.4	8.5	4.5	8.0	8.0
Cycle Q Clear(g_c), s	2.3	0.0	10.6	2.4	0.0	11.0	2.3	8.4	8.5	4.5	8.0	8.0
Prop In Lane	1.00		0.22	1.00		0.30	1.00		0.35	1.00		0.21
Lane Grp Cap(c), veh/h	153	0	244	159	0	240	86	993	982	104	982	997
V/C Ratio(X)	0.53	0.00	0.82	0.55	0.00	0.84	0.46	0.29	0.29	0.78	0.27	0.28
Avail Cap(c_a), veh/h	411	0	439	418	0	429	172	993	982	180	982	997
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94
Uniform Delay (d), s/veh	46.7	0.0	42.2	46.7	0.0	42.2	46.2	11.4	11.4	46.5	10.9	10.9
Incr Delay (d2), s/veh	1.0	0.0	2.6	1.1	0.0	3.0	1.4	0.7	0.7	4.4	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.8	0.0	8.4	1.9	0.0	8.5	1.8	5.7	5.7	3.7	5.3	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.8	0.0	44.8	47.8	0.0	45.2	47.6	12.1	12.1	50.9	11.6	11.6
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	B	B
Approach Vol, veh/h	281			288			606			625		
Approach Delay, s/veh	45.6			46.0			14.5			16.7		
Approach LOS	D			D			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.6	18.3	10.8	61.3	9.5	18.4	10.0	62.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	4.4	12.6	6.5	10.5	4.3	13.0	4.3	10.0				
Green Ext Time (p_c), s	0.1	0.5	0.0	2.0	0.1	0.5	0.0	1.9				

Intersection Summary

HCM 6th Ctrl Delay 25.1
HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	558	3	7	595
Future Vol, veh/h	7	10	558	3	7	595
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	20	4	67	0	7
Mvmt Flow	8	11	607	3	8	647
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	950	306	0	0	611	0
Stage 1	610	-	-	-	-	-
Stage 2	340	-	-	-	-	-
Critical Hdwy	6.8	7.3	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.5	-	-	2.2	-
Pot Cap-1 Maneuver	262	639	-	-	978	-
Stage 1	510	-	-	-	-	-
Stage 2	698	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	260	638	-	-	977	-
Mov Cap-2 Maneuver	260	-	-	-	-	-
Stage 1	509	-	-	-	-	-
Stage 2	692	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	14.2	0	0.1			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 260 638	977	-		
HCM Lane V/C Ratio	-	- 0.029 0.017	0.008	-		
HCM Control Delay (s)	-	- 19.3 10.7	8.7	-		
HCM Lane LOS	-	- C B	A	-		
HCM 95th %tile Q(veh)	-	- 0.1 0.1	0	-		

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	66	123	143	95	70	520	290	88	380
Future Volume (vph)	66	123	143	95	70	520	290	88	380
Turn Type	pm+pt	NA	pm+pt	NA	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6	7	4	1	3	8
Permitted Phases	2		6				4		
Detector Phase	5	2	1	6	7	4	1	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	None	Max
Act Effect Green (s)	19.0	11.9	24.1	16.2	6.0	51.8	62.1	9.0	54.8
Actuated g/C Ratio	0.19	0.12	0.24	0.16	0.06	0.52	0.62	0.09	0.55
v/c Ratio	0.31	0.41	0.55	0.27	0.38	0.35	0.30	0.33	0.31
Control Delay	29.0	34.7	35.3	24.8	50.2	18.2	1.8	36.9	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.0	34.7	35.3	24.8	50.2	18.2	1.8	36.9	11.1
LOS	C	C	D	C	D	B	A	D	B
Approach Delay		33.0		30.1		15.3			15.2
Approach LOS		C		C		B			B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 19.4

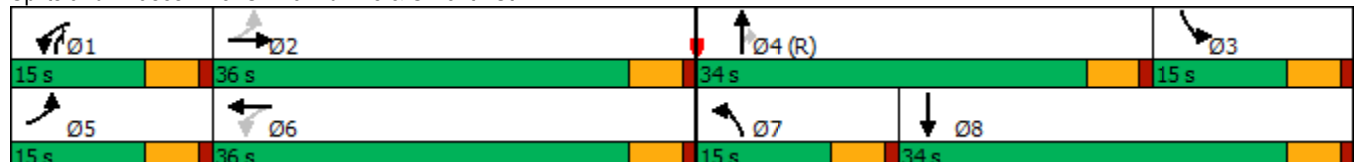
Intersection LOS: B

Intersection Capacity Utilization 56.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	123	28	143	95	45	70	520	290	88	380	84
Future Volume (veh/h)	66	123	28	143	95	45	70	520	290	88	380	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.98	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	
Adj Sat Flow, veh/h/ln	1728	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1684
Adj Flow Rate, veh/h	77	143	4	166	110	1	81	605	177	102	442	83
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	8	3	0	5	0	2	0	9	2	1	11	11
Cap, veh/h	266	302	8	315	514	5	167	1037	652	1094	1530	285
Arrive On Green	0.05	0.09	0.09	0.10	0.13	0.13	0.04	0.29	0.29	0.32	0.57	0.57
Sat Flow, veh/h	1646	3402	95	1850	3892	35	3728	3578	1681	3385	2691	502
Grp Volume(v), veh/h	77	72	75	166	54	57	81	605	177	102	262	263
Grp Sat Flow(s),veh/h/ln	1646	1712	1784	1850	1917	2011	1864	1789	1681	1693	1600	1593
Q Serve(g_s), s	4.2	4.0	4.0	7.9	2.5	2.5	2.1	14.5	1.6	2.1	8.4	8.6
Cycle Q Clear(g_c), s	4.2	4.0	4.0	7.9	2.5	2.5	2.1	14.5	1.6	2.1	8.4	8.6
Prop In Lane	1.00		0.05	1.00		0.02	1.00		1.00	1.00		0.32
Lane Grp Cap(c), veh/h	266	152	159	315	253	265	167	1037	652	1094	909	906
V/C Ratio(X)	0.29	0.47	0.47	0.53	0.21	0.21	0.49	0.58	0.27	0.09	0.29	0.29
Avail Cap(c_a), veh/h	341	531	553	319	594	623	373	1037	652	1094	909	906
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.5	43.3	43.3	35.3	38.8	38.8	46.6	30.3	8.9	23.6	11.1	11.2
Incr Delay (d2), s/veh	0.2	0.8	0.8	0.7	0.2	0.1	0.8	2.4	1.0	0.0	0.8	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	3.0	3.2	6.3	2.1	2.2	1.8	10.4	2.8	1.5	5.2	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.7	44.2	44.1	36.1	38.9	38.9	47.5	32.7	9.9	23.6	11.9	12.0
LnGrp LOS	D	D	D	D	D	D	D	C	A	C	B	B
Approach Vol, veh/h		224			277			863			627	
Approach Delay, s/veh		42.3			37.2			29.4			13.8	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.8	13.9	37.3	34.0	10.5	18.2	9.5	61.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	9.9	6.0	4.1	16.5	6.2	4.5	4.1	10.6				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.3	0.0	0.2	0.0	0.9				
Intersection Summary												
HCM 6th Ctrl Delay			27.0									
HCM 6th LOS			C									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Existing AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	36	218	25	189	63	1	4	0	2
Future Volume (vph)	36	218	25	189	63	1	4	0	2
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effect Green (s)	5.5	24.3	5.5	22.3	8.8	8.8		8.8	8.8
Actuated g/C Ratio	0.13	0.58	0.13	0.53	0.21	0.21		0.21	0.21
v/c Ratio	0.18	0.15	0.13	0.15	0.27	0.13		0.02	0.01
Control Delay	24.1	8.4	24.0	9.5	16.0	6.1		13.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	24.1	8.4	24.0	9.5	16.0	6.1		13.2	0.0
LOS	C	A	C	A	B	A		B	A
Approach Delay		10.4		10.9		12.2		9.5	
Approach LOS		B		B		B		A	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 41.8

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.27

Intersection Signal Delay: 10.9

Intersection LOS: B

Intersection Capacity Utilization 39.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	218	24	25	189	36	63	1	38	4	0	2
Future Volume (veh/h)	36	218	24	25	189	36	63	1	38	4	0	2
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	44	269	19	31	233	24	78	1	0	5	0	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	90	1493	105	67	1374	140	320	150	0	322	0	129
Arrive On Green	0.05	0.45	0.45	0.04	0.44	0.44	0.08	0.08	0.00	0.08	0.00	0.00
Sat Flow, veh/h	1810	3314	233	1787	3136	320	1388	1876	0	1430	0	1610
Grp Volume(v), veh/h	44	141	147	31	126	131	78	1	0	5	0	0
Grp Sat Flow(s),veh/h/ln	1810	1749	1798	1787	1712	1743	1388	1876	0	1430	0	1610
Q Serve(g_s), s	0.8	1.7	1.7	0.6	1.6	1.6	1.7	0.0	0.0	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.8	1.7	1.7	0.6	1.6	1.6	1.9	0.0	0.0	0.1	0.0	0.0
Prop In Lane	1.00		0.13	1.00		0.18	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	788	810	67	750	764	320	150	0	322	0	129
V/C Ratio(X)	0.49	0.18	0.18	0.47	0.17	0.17	0.24	0.01	0.00	0.02	0.00	0.00
Avail Cap(c_a), veh/h	261	4031	4144	257	3947	4019	1409	1622	0	1450	0	1392
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.1	5.7	5.7	16.4	5.9	5.9	15.5	14.7	0.0	14.8	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	1.9	0.0	0.0	0.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.6	0.6	0.4	0.5	0.5	0.9	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.6	5.7	5.7	18.2	6.0	6.0	15.7	14.7	0.0	14.8	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	B	A	B	A	A
Approach Vol, veh/h	332				288				79			
Approach Delay, s/veh	7.3				7.3				15.7			
Approach LOS	A				A				B			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	20.6		7.8	6.7	20.2		7.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.6	3.7		2.1	2.8	3.6		3.9				
Green Ext Time (p_c), s	0.0	0.5		0.0	0.0	0.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	8.3											
HCM 6th LOS	A											

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	137	261	11	5	243	6	29	0	16	1	0	15
Future Vol, veh/h	137	261	11	5	243	6	29	0	16	1	0	15
Conflicting Peds, #/hr	3	0	3	3	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	0	0	5	0	0	0	0	0	0	27
Mvmt Flow	161	307	13	6	286	7	34	0	19	1	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	296	0	0	323	0	0	794	947	163	781	950	150
Stage 1	-	-	-	-	-	-	639	639	-	305	305	-
Stage 2	-	-	-	-	-	-	155	308	-	476	645	-
Critical Hdwy	4.16	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	7.44
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.23	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.57
Pot Cap-1 Maneuver	1255	-	-	1248	-	-	282	263	859	288	262	796
Stage 1	-	-	-	-	-	-	436	474	-	685	666	-
Stage 2	-	-	-	-	-	-	838	664	-	544	471	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1251	-	-	1244	-	-	247	226	857	252	226	794
Mov Cap-2 Maneuver	-	-	-	-	-	-	247	226	-	252	226	-
Stage 1	-	-	-	-	-	-	379	411	-	595	661	-
Stage 2	-	-	-	-	-	-	815	659	-	464	409	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.8			0.2			17.9			10.2		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	331	1251	-	-	1244	-	-	252	794
HCM Lane V/C Ratio	0.16	0.129	-	-	0.005	-	-	0.005	0.022
HCM Control Delay (s)	17.9	8.3	-	-	7.9	-	-	19.4	9.6
HCM Lane LOS	C	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.6	0.4	-	-	0	-	-	0	0.1

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	45	348	2	242	14	5	57	3
Future Volume (vph)	45	348	2	242	14	5	57	3
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	24.9	22.8	24.7	21.3	8.7	8.7	8.7	8.7
Actuated g/C Ratio	0.61	0.56	0.61	0.53	0.21	0.21	0.21	0.21
v/c Ratio	0.08	0.21	0.00	0.19	0.06	0.03	0.22	0.33
Control Delay	6.7	9.5	7.0	9.5	13.4	10.6	15.0	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	9.5	7.0	9.5	13.4	10.6	15.0	5.5
LOS	A	A	A	A	B	B	B	A
Approach Delay		9.2		9.5		12.2		8.5
Approach LOS		A		A		B		A

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 40.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 9.2

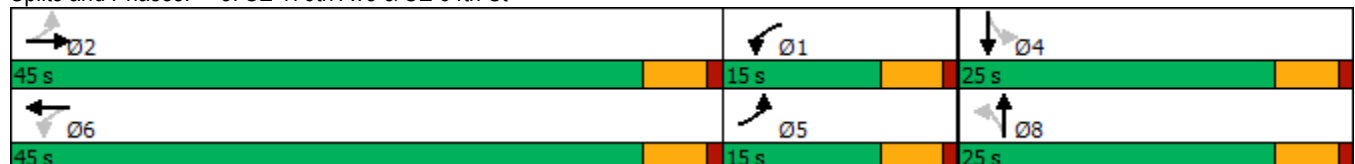
Intersection LOS: A

Intersection Capacity Utilization 41.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	348	2	2	242	43	14	5	4	57	3	122
Future Volume (veh/h)	45	348	2	2	242	43	14	5	4	57	3	122
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.99		1.00	0.99		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	53	409	1	2	285	30	16	6	0	67	4	3
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	657	1510	4	648	1321	138	343	199	0	342	105	79
Arrive On Green	0.06	0.42	0.42	0.06	0.42	0.42	0.10	0.10	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1682	3608	9	1810	3142	328	1415	1900	0	1394	1004	753
Grp Volume(v), veh/h	53	200	210	2	155	160	16	6	0	67	0	7
Grp Sat Flow(s),veh/h/ln	1682	1763	1854	1810	1721	1750	1415	1900	0	1394	0	1757
Q Serve(g_s), s	0.0	2.7	2.7	0.0	2.1	2.1	0.4	0.1	0.0	1.6	0.0	0.1
Cycle Q Clear(g_c), s	0.0	2.7	2.7	0.0	2.1	2.1	0.5	0.1	0.0	1.7	0.0	0.1
Prop In Lane	1.00		0.00	1.00		0.19	1.00		0.00	1.00		0.43
Lane Grp Cap(c), veh/h	657	738	776	648	724	736	343	199	0	342	0	184
V/C Ratio(X)	0.08	0.27	0.27	0.00	0.21	0.22	0.05	0.03	0.00	0.20	0.00	0.04
Avail Cap(c_a), veh/h	1030	1964	2065	1044	1917	1949	984	1058	0	973	0	978
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	6.4	6.8	6.8	6.4	6.6	6.6	14.7	14.4	0.0	15.2	0.0	14.5
Incr Delay (d2), s/veh	0.0	0.1	0.1	0.0	0.1	0.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	1.0	1.1	0.0	0.8	0.8	0.2	0.1	0.0	0.8	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.5	6.9	6.9	6.4	6.7	6.7	14.7	14.5	0.0	15.3	0.0	14.5
LnGrp LOS	A	A	A	A	A	A	B	B	A	B	A	B
Approach Vol, veh/h	463				317				22			
Approach Delay, s/veh	6.9				6.7				14.6			
Approach LOS	A				A				B			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	20.0		8.8	7.1	20.1		8.8				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	4.7		3.7	2.0	4.1		2.5				
Green Ext Time (p_c), s	0.0	1.4		0.1	0.0	1.1		0.0				

Intersection Summary

HCM 6th Ctrl Delay	7.7
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	10	4	105	167	11
Future Vol, veh/h	4	10	4	105	167	11
Conflicting Peds, #/hr	0	2	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	10	0	2	1	18
Mvmt Flow	5	12	5	124	196	13

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	337	205	209	0	-	0
Stage 1	203	-	-	-	-	-
Stage 2	134	-	-	-	-	-
Critical Hdwy	6.4	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	2.2	-	-	-
Pot Cap-1 Maneuver	663	816	1374	-	-	-
Stage 1	836	-	-	-	-	-
Stage 2	897	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	660	814	1374	-	-	-
Mov Cap-2 Maneuver	660	-	-	-	-	-
Stage 1	833	-	-	-	-	-
Stage 2	897	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.8	0.3	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1374	-	763	-	-
HCM Lane V/C Ratio	0.003	-	0.022	-	-
HCM Control Delay (s)	7.6	-	9.8	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection

Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	195	20	56	235	11	25	58	47	0	55	9
Future Vol, veh/h	9	195	20	56	235	11	25	58	47	0	55	9
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	10	214	22	62	258	12	27	64	52	0	60	10
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	11.4	11.5	10	10.1
HCM LOS	B	B	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	55%	0%	91%	0%	96%	86%
Vol Right, %	0%	45%	0%	9%	0%	4%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	105	9	215	56	246	64
LT Vol	25	0	9	0	56	0	0
Through Vol	0	58	0	195	0	235	55
RT Vol	0	47	0	20	0	11	9
Lane Flow Rate	27	115	10	236	62	270	70
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.051	0.189	0.017	0.366	0.103	0.41	0.122
Departure Headway (Hd)	6.732	5.892	6.086	5.584	6.049	5.461	6.224
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	533	609	591	647	595	662	576
Service Time	4.463	3.623	3.794	3.291	3.756	3.168	4.258
HCM Lane V/C Ratio	0.051	0.189	0.017	0.365	0.104	0.408	0.122
HCM Control Delay	9.8	10	8.9	11.5	9.5	11.9	10.1
HCM Lane LOS	A	A	A	B	A	B	B
HCM 95th-tile Q	0.2	0.7	0.1	1.7	0.3	2	0.4

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations											
Traffic Volume (vph)	29	5	35	38	12	28	21	979	14	730	
Future Volume (vph)	29	5	35	38	12	28	21	979	14	730	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	
Protected Phases	2				6		7		4	3	8
Permitted Phases	2		2		6						
Detector Phase	2	2	2	6	6	6	7	4	3	8	
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0	
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	10.0	32.0	
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	17.0	64.0	17.0	64.0	
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	14.2%	53.3%	14.2%	53.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag							Lead	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max	
Act Effct Green (s)	14.6	14.6	14.6	14.6	14.6	14.6	5.6	95.1	5.3	92.8	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.05	0.79	0.04	0.77	
v/c Ratio	0.18	0.02	0.15	0.24	0.07	0.12	0.26	0.26	0.20	0.20	
Control Delay	46.2	40.2	3.9	47.7	42.3	1.5	39.6	18.0	61.4	6.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.2	40.2	3.9	47.7	42.3	1.5	39.6	18.0	61.4	6.3	
LOS	D	D	A	D	D	A	D	B	E	A	
Approach Delay	24.4				30.5			18.4		7.3	
Approach LOS	C				C			B		A	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 85 (71%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.26

Intersection Signal Delay: 14.7

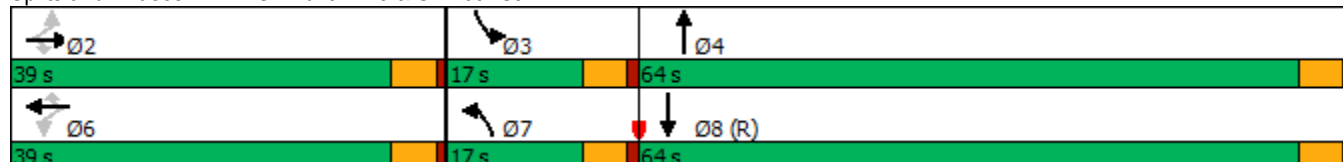
Intersection LOS: B

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	5	35	38	12	28	21	979	14	14	730	21
Future Volume (veh/h)	29	5	35	38	12	28	21	979	14	14	730	21
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1856	1900	1856	1856	1648	1900	1900	1870	1796	1796	1856	1826
Adj Flow Rate, veh/h	31	5	2	40	13	2	22	1031	15	15	768	21
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	0	3	3	17	0	0	2	7	7	3	5
Cap, veh/h	160	151	125	168	131	128	39	2577	37	28	2492	68
Arrive On Green	0.08	0.08	0.08	0.08	0.08	0.08	0.02	0.50	0.50	0.02	0.49	0.49
Sat Flow, veh/h	1387	1900	1572	1397	1648	1610	1810	5185	75	1711	5069	138
Grp Volume(v), veh/h	31	5	2	40	13	2	22	677	369	15	511	278
Grp Sat Flow(s),veh/h/ln	1387	1900	1572	1397	1648	1610	1810	1702	1857	1711	1689	1830
Q Serve(g_s), s	2.5	0.3	0.1	3.3	0.9	0.1	1.4	15.0	15.0	1.0	10.9	10.9
Cycle Q Clear(g_c), s	3.4	0.3	0.1	3.6	0.9	0.1	1.4	15.0	15.0	1.0	10.9	10.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.08
Lane Grp Cap(c), veh/h	160	151	125	168	131	128	39	1692	923	28	1660	900
V/C Ratio(X)	0.19	0.03	0.02	0.24	0.10	0.02	0.56	0.40	0.40	0.53	0.31	0.31
Avail Cap(c_a), veh/h	443	538	446	453	467	456	181	1692	923	171	1660	900
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.85	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.8	51.0	50.9	52.6	51.2	50.9	58.1	19.0	19.0	58.6	18.3	18.3
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.3	0.1	0.0	3.9	0.6	1.1	5.7	0.5	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.6	0.3	0.1	2.1	0.7	0.1	1.3	9.5	10.3	0.9	7.6	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.0	51.0	50.9	52.9	51.4	50.9	62.1	19.6	20.1	64.3	18.8	19.2
LnGrp LOS	D	D	D	D	D	D	E	B	C	E	B	B
Approach Vol, veh/h	38			55			1068			804		
Approach Delay, s/veh	52.7			52.4			20.6			19.7		
Approach LOS	D			D			C			B		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	14.5			7.0			64.6			14.5		
Change Period (Y+Rc), s	5.0			5.0			5.0			5.0		
Max Green Setting (Gmax), s	34.0			12.0			59.0			34.0		
Max Q Clear Time (g_c+I1), s	5.4			3.0			17.0			5.6		
Green Ext Time (p_c), s	0.0			0.0			4.7			0.1		
Intersection Summary												
HCM 6th Ctrl Delay	21.8											
HCM 6th LOS	C											

Timings
12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Existing AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	26	50	151	318	98	90	103	849	237	141	601
Future Volume (vph)	26	50	151	318	98	90	103	849	237	141	601
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	22.5	32.0	10.0	10.0	31.0	22.5	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	5.3	7.5	21.7	20.0	24.2	45.6	11.2	58.1	83.1	16.4	63.3
Actuated g/C Ratio	0.04	0.06	0.18	0.17	0.20	0.38	0.09	0.48	0.69	0.14	0.53
v/c Ratio	0.23	0.51	0.51	1.07	0.29	0.15	0.70	0.56	0.23	0.65	0.27
Control Delay	59.5	69.5	30.2	116.8	42.9	4.8	74.0	25.2	1.6	55.1	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.5	69.5	30.2	116.8	42.9	4.8	74.0	25.2	1.6	55.1	15.7
LOS	E	E	C	F	D	A	E	C	A	E	B
Approach Delay		42.3			82.5			24.7			22.9
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 36.5

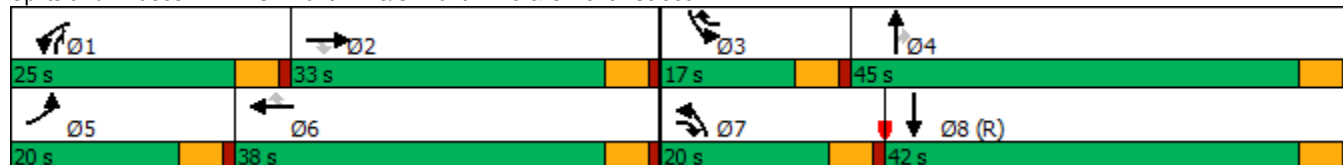
Intersection LOS: D

Intersection Capacity Utilization 59.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Existing AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	50	151	318	98	90	103	849	237	141	601	34
Future Volume (veh/h)	26	50	151	318	98	90	103	849	237	141	601	34
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	29	56	108	353	109	22	114	943	157	157	668	35
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	75	143	248	333	419	503	138	1125	740	172	1649	86
Arrive On Green	0.03	0.08	0.08	0.17	0.22	0.22	0.08	0.33	0.33	0.03	0.12	0.12
Sat Flow, veh/h	2892	1758	1528	1995	1885	1560	1706	3375	1480	1720	4679	244
Grp Volume(v), veh/h	29	56	108	353	109	22	114	943	157	157	457	246
Grp Sat Flow(s),veh/h/ln	1446	1758	1528	998	1885	1560	1706	1687	1480	1720	1603	1717
Q Serve(g_s), s	1.2	3.6	7.6	20.0	5.7	1.2	7.9	31.0	7.1	10.9	15.9	16.0
Cycle Q Clear(g_c), s	1.2	3.6	7.6	20.0	5.7	1.2	7.9	31.0	7.1	10.9	15.9	16.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	75	143	248	333	419	503	138	1125	740	172	1130	605
V/C Ratio(X)	0.39	0.39	0.44	1.06	0.26	0.04	0.83	0.84	0.21	0.91	0.40	0.41
Avail Cap(c_a), veh/h	362	410	480	333	518	585	213	1125	740	172	1130	605
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
Uniform Delay (d), s/veh	57.5	52.3	45.3	50.0	38.5	28.0	54.3	37.0	16.8	57.5	41.3	41.4
Incr Delay (d2), s/veh	1.2	0.6	0.4	66.6	0.1	0.0	8.1	7.5	0.7	43.3	1.1	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.8	2.9	5.2	12.9	4.7	0.8	6.6	19.5	4.4	11.4	11.3	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	52.9	45.8	116.6	38.6	28.0	62.5	44.5	17.4	100.8	42.4	43.4
LnGrp LOS	E	D	D	F	D	C	E	D	B	F	D	D
Approach Vol, veh/h	193			484			1214			860		
Approach Delay, s/veh	49.8			95.0			42.7			53.3		
Approach LOS	D			F			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	14.8	17.0	45.0	8.1	31.7	14.7	47.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	9.6	12.9	33.0	3.2	7.7	9.9	18.0				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.7	0.0	0.2	0.0	2.6				
Intersection Summary												
HCM 6th Ctrl Delay	55.7											
HCM 6th LOS	E											

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Existing PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	88	74	33	67	107	55	916	47	920
Future Volume (vph)	88	74	33	67	107	55	916	47	920
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effect Green (s)	8.2	14.5	6.0	10.2	16.9	6.8	56.9	6.6	58.7
Actuated g/C Ratio	0.08	0.14	0.06	0.10	0.17	0.07	0.57	0.07	0.59
v/c Ratio	0.68	0.52	0.33	0.39	0.34	0.49	0.51	0.43	0.54
Control Delay	67.9	33.3	53.1	45.3	11.9	54.2	14.8	55.3	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.9	33.3	53.1	45.3	11.9	54.2	14.8	55.3	17.5
LOS	E	C	D	D	B	D	B	E	B
Approach Delay		46.8		29.3			16.9		19.2
Approach LOS		D		C			B		B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 21.6

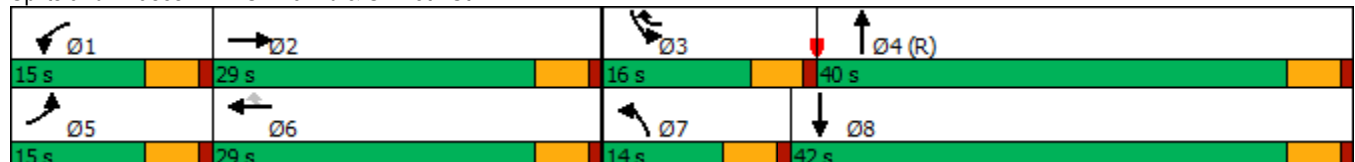
Intersection LOS: C

Intersection Capacity Utilization 61.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	74	65	33	67	107	55	916	28	47	920	103
Future Volume (veh/h)	88	74	65	33	67	107	55	916	28	47	920	103
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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		
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	96	80	32	36	73	13	60	996	29	51	1000	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	120	131	52	57	119	162	77	2216	65	69	2024	212
Arrive On Green	0.07	0.10	0.10	0.03	0.06	0.06	0.09	1.00	1.00	0.04	0.62	0.62
Sat Flow, veh/h	1739	1279	512	1810	1856	1572	1810	3526	103	1810	3244	341
Grp Volume(v), veh/h	96	0	112	36	73	13	60	502	523	51	548	557
Grp Sat Flow(s),veh/h/ln	1739	0	1791	1810	1856	1572	1810	1777	1851	1810	1777	1808
Q Serve(g_s), s	5.4	0.0	6.0	2.0	3.8	0.7	3.2	0.0	0.0	2.8	16.8	16.8
Cycle Q Clear(g_c), s	5.4	0.0	6.0	2.0	3.8	0.7	3.2	0.0	0.0	2.8	16.8	16.8
Prop In Lane	1.00		0.29	1.00		1.00	1.00		0.06	1.00		0.19
Lane Grp Cap(c), veh/h	120	0	183	57	119	162	77	1117	1164	69	1108	1128
V/C Ratio(X)	0.80	0.00	0.61	0.63	0.61	0.08	0.78	0.45	0.45	0.74	0.49	0.49
Avail Cap(c_a), veh/h	174	0	430	181	445	438	163	1117	1164	199	1108	1128
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.77	0.77	0.77	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.8	0.0	43.0	47.8	45.6	40.6	45.3	0.0	0.0	47.6	10.2	10.2
Incr Delay (d2), s/veh	9.3	0.0	1.2	4.2	1.9	0.1	4.8	1.0	1.0	5.8	1.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	0.0	4.8	1.7	3.3	0.5	2.7	0.6	0.6	2.4	10.2	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.2	0.0	44.2	52.0	47.4	40.7	50.1	1.0	1.0	53.4	11.8	11.8
LnGrp LOS	E	A	D	D	D	D	D	A	A	D	B	B
Approach Vol, veh/h	208			122			1085			1156		
Approach Delay, s/veh	49.3			48.1			3.7			13.6		
Approach LOS	D			D			A			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.2	15.2	8.8	67.9	11.9	11.4	9.3	67.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.0	8.0	4.8	2.0	7.4	5.8	5.2	18.8				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.0	0.0	0.1	0.0	2.2				
Intersection Summary												
HCM 6th Ctrl Delay	14.0											
HCM 6th LOS	B											

Timings
2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 		 			 		 
Traffic Volume (vph)	141	141	178	204	114	582	123	665
Future Volume (vph)	141	141	178	204	114	582	123	665
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	15.0	35.0	18.0	38.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	15.0%	35.0%	18.0%	38.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	8.9	16.0	17.7	24.7	9.6	35.4	11.0	36.8
Actuated g/C Ratio	0.09	0.16	0.18	0.25	0.10	0.35	0.11	0.37
v/c Ratio	0.50	0.75	0.32	0.83	0.74	0.62	0.70	0.68
Control Delay	48.8	51.4	37.8	49.4	84.4	17.2	67.9	28.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	51.4	37.8	49.4	84.4	17.2	67.9	28.7
LOS	D	D	D	D	F	B	E	C
Approach Delay		50.3		45.5		26.7		34.0
Approach LOS		D		D		C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 36.2

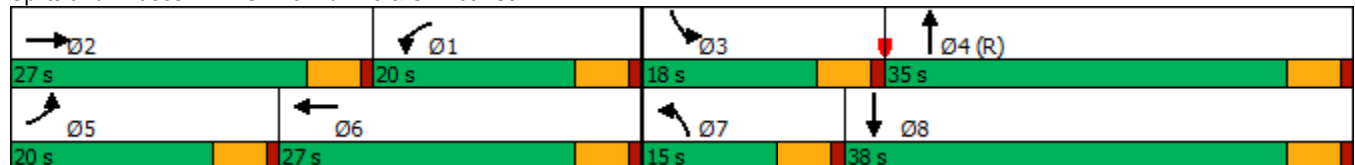
Intersection LOS: D

Intersection Capacity Utilization 68.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary

2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center

Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	141	67	178	204	140	114	582	114	123	665	124
Future Volume (veh/h)	141	141	67	178	204	140	114	582	114	123	665	124
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	157	157	54	198	227	129	127	647	110	137	739	121
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	229	191	66	495	246	140	161	1292	219	171	1309	214
Arrive On Green	0.07	0.14	0.14	0.14	0.22	0.22	0.09	0.42	0.42	0.10	0.43	0.43
Sat Flow, veh/h	3510	1350	464	3510	1130	642	1810	3062	520	1795	3056	500
Grp Volume(v), veh/h	157	0	211	198	0	356	127	378	379	137	430	430
Grp Sat Flow(s),veh/h/ln	1755	0	1814	1755	0	1772	1810	1791	1791	1795	1777	1780
Q Serve(g_s), s	4.4	0.0	11.3	5.1	0.0	19.7	6.9	15.5	15.5	7.5	18.2	18.2
Cycle Q Clear(g_c), s	4.4	0.0	11.3	5.1	0.0	19.7	6.9	15.5	15.5	7.5	18.2	18.2
Prop In Lane	1.00		0.26	1.00		0.36	1.00		0.29	1.00		0.28
Lane Grp Cap(c), veh/h	229	0	257	495	0	385	161	756	756	171	761	762
V/C Ratio(X)	0.68	0.00	0.82	0.40	0.00	0.92	0.79	0.50	0.50	0.80	0.56	0.56
Avail Cap(c_a), veh/h	527	0	399	527	0	390	181	756	756	233	761	762
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.83	0.83	0.83
Uniform Delay (d), s/veh	45.7	0.0	41.7	39.1	0.0	38.3	44.6	21.2	21.2	44.3	21.5	21.6
Incr Delay (d2), s/veh	1.4	0.0	4.0	0.2	0.0	26.8	16.2	2.4	2.4	7.8	2.5	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.4	0.0	8.9	3.9	0.0	16.5	6.7	10.8	10.8	6.4	11.8	11.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.1	0.0	45.7	39.3	0.0	65.1	60.8	23.5	23.6	52.1	24.1	24.1
LnGrp LOS	D	A	D	D	A	E	E	C	C	D	C	C
Approach Vol, veh/h		368			554			884			997	
Approach Delay, s/veh		46.3			55.9			28.9			27.9	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.1	19.2	14.5	47.2	11.5	26.7	13.9	47.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	10.0	33.0				
Max Q Clear Time (g_c+I1), s	7.1	13.3	9.5	17.5	6.4	21.7	8.9	20.2				
Green Ext Time (p_c), s	0.2	0.4	0.1	2.4	0.2	0.1	0.0	2.8				
Intersection Summary												
HCM 6th Ctrl Delay			36.2									
HCM 6th LOS			D									

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	4	853	3	10	887
Future Vol, veh/h	3	4	853	3	10	887
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	3	4	948	3	11	986
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1465	476	0	0	951	0
Stage 1	950	-	-	-	-	-
Stage 2	515	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	121	541	-	-	730	-
Stage 1	341	-	-	-	-	-
Stage 2	570	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	119	541	-	-	730	-
Mov Cap-2 Maneuver	119	-	-	-	-	-
Stage 1	341	-	-	-	-	-
Stage 2	561	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	22.2	0	0.1			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 119 541	730	-		
HCM Lane V/C Ratio	-	- 0.028 0.008	0.015	-		
HCM Control Delay (s)	-	- 36.1 11.7	10	-		
HCM Lane LOS	-	- E B	B	-		
HCM 95th %tile Q(veh)	-	- 0.1 0	0	-		

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	100	171	295	153	69	733	134	167	673
Future Volume (vph)	100	171	295	153	69	733	134	167	673
Turn Type	pm+pt	NA	pm+pt	NA	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6	7	4	1	3	8
Permitted Phases	2		6				4		
Detector Phase	5	2	1	6	7	4	1	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	20.0	12.3	31.0	18.3	5.8	44.0	57.7	10.0	50.2
Actuated g/C Ratio	0.20	0.12	0.31	0.18	0.06	0.44	0.58	0.10	0.50
v/c Ratio	0.42	0.54	0.87	0.38	0.36	0.50	0.15	0.53	0.47
Control Delay	29.3	36.8	52.7	21.8	50.0	23.3	1.7	36.3	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	36.8	52.7	21.8	50.0	23.3	1.7	36.3	13.2
LOS	C	D	D	C	D	C	A	D	B
Approach Delay		34.5		38.4		22.1			17.4
Approach LOS		C		D		C			B

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 25.3

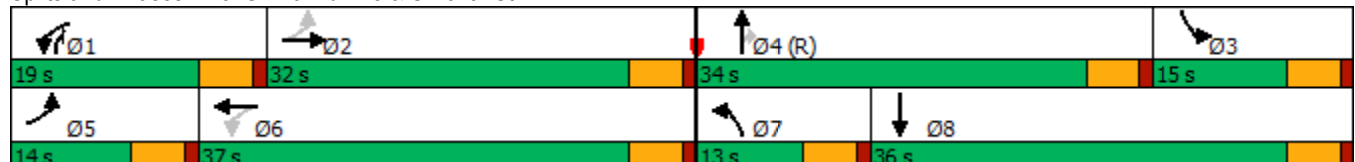
Intersection LOS: C

Intersection Capacity Utilization 67.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	171	57	295	153	99	69	733	134	167	673	75
Future Volume (veh/h)	100	171	57	295	153	99	69	733	134	167	673	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.98	1.00		0.99	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1773	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1743
Adj Flow Rate, veh/h	109	186	20	321	166	12	75	797	78	182	732	75
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	0	2	1	1	0	0	2	1	0	1	7
Cap, veh/h	305	304	32	387	582	42	163	1095	727	937	1658	170
Arrive On Green	0.07	0.10	0.10	0.14	0.16	0.16	0.04	0.29	0.29	0.27	0.52	0.52
Sat Flow, veh/h	1688	3192	339	1908	3600	258	3728	3777	1689	3413	3182	326
Grp Volume(v), veh/h	109	101	105	321	87	91	75	797	78	182	400	407
Grp Sat Flow(s), veh/h/ln	1688	1755	1776	1908	1903	1955	1864	1889	1689	1706	1741	1768
Q Serve(g_s), s	5.7	5.5	5.7	14.0	4.0	4.1	2.0	19.0	0.7	4.1	14.3	14.3
Cycle Q Clear(g_c), s	5.7	5.5	5.7	14.0	4.0	4.1	2.0	19.0	0.7	4.1	14.3	14.3
Prop In Lane	1.00		0.19	1.00		0.13	1.00		1.00	1.00		0.18
Lane Grp Cap(c), veh/h	305	167	169	387	308	316	163	1095	727	937	907	921
V/C Ratio(X)	0.36	0.60	0.62	0.83	0.28	0.29	0.46	0.73	0.11	0.19	0.44	0.44
Avail Cap(c_a), veh/h	332	474	480	387	609	626	298	1095	727	937	907	921
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.9	43.4	43.5	34.3	36.8	36.9	46.7	31.9	6.6	27.8	14.9	14.9
Incr Delay (d2), s/veh	0.3	1.3	1.4	13.1	0.2	0.2	0.7	4.2	0.3	0.0	1.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.2	4.3	4.5	12.8	3.3	3.5	1.6	13.8	0.9	2.9	9.4	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.2	44.7	44.8	47.4	37.0	37.0	47.4	36.2	6.9	27.8	16.5	16.4
LnGrp LOS	D	D	D	D	D	D	D	D	A	C	B	B
Approach Vol, veh/h		315			499			950			989	
Approach Delay, s/veh		42.1			43.7			34.7			18.5	
Approach LOS		D			D			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	14.5	32.5	34.0	12.4	21.2	9.4	57.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	7.7	6.1	21.0	7.7	6.1	4.0	16.3				
Green Ext Time (p_c), s	0.0	0.3	0.0	1.5	0.0	0.3	0.0	1.4				
Intersection Summary												
HCM 6th Ctrl Delay			31.4									
HCM 6th LOS			C									
Notes												
User approved pedestrian interval to be less than phase max green.												

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Existing PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	4	261	34	286	71	1	33	3	58
Future Volume (vph)	4	261	34	286	71	1	33	3	58
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effct Green (s)	5.5	22.0	5.5	24.0	8.6	8.6		8.6	8.6
Actuated g/C Ratio	0.13	0.53	0.13	0.58	0.21	0.21		0.21	0.21
v/c Ratio	0.02	0.20	0.16	0.15	0.28	0.10		0.13	0.16
Control Delay	23.5	8.8	23.6	8.4	16.4	6.8		14.6	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	23.5	8.8	23.6	8.4	16.4	6.8		14.6	5.8
LOS	C	A	C	A	B	A		B	A
Approach Delay		8.9		10.0		13.5		9.1	
Approach LOS		A		A		B		A	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 41.2

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.28

Intersection Signal Delay: 9.9

Intersection LOS: A

Intersection Capacity Utilization 41.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary 6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	261	80	34	286	8	71	1	30	33	3	58
Future Volume (veh/h)	4	261	80	34	286	8	71	1	30	33	3	58
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		1.00	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1900	1900	1900
Adj Flow Rate, veh/h	4	278	53	36	304	7	76	1	3	35	3	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	0	0	0
Cap, veh/h	10	1276	240	73	1629	37	324	47	140	338	21	182
Arrive On Green	0.01	0.43	0.43	0.04	0.46	0.46	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1810	2982	560	1745	3506	81	1358	412	1236	1285	189	1603
Grp Volume(v), veh/h	4	164	167	36	152	159	76	0	4	38	0	7
Grp Sat Flow(s),veh/h/ln	1810	1777	1765	1745	1754	1832	1358	0	1648	1474	0	1603
Q Serve(g_s), s	0.1	2.1	2.2	0.7	1.8	1.8	1.9	0.0	0.1	0.6	0.0	0.1
Cycle Q Clear(g_c), s	0.1	2.1	2.2	0.7	1.8	1.8	2.7	0.0	0.1	0.8	0.0	0.1
Prop In Lane	1.00		0.32	1.00		0.04	1.00		0.75	0.92		1.00
Lane Grp Cap(c), veh/h	10	761	756	73	815	851	324	0	187	359	0	182
V/C Ratio(X)	0.41	0.22	0.22	0.49	0.19	0.19	0.23	0.00	0.02	0.11	0.00	0.04
Avail Cap(c_a), veh/h	251	3948	3921	242	3898	4069	1301	0	1373	1407	0	1336
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.8	6.5	6.5	16.9	5.6	5.7	15.8	0.0	14.2	14.5	0.0	14.2
Incr Delay (d2), s/veh	9.6	0.1	0.1	1.9	0.0	0.0	0.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.1	0.8	0.8	0.5	0.6	0.6	1.0	0.0	0.0	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.5	6.5	6.6	18.8	5.7	5.7	15.9	0.0	14.2	14.5	0.0	14.2
LnGrp LOS	C	A	A	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h	335			347			80			45		
Approach Delay, s/veh	6.8			7.0			15.8			14.5		
Approach LOS	A			A			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	20.4		9.1	5.2	21.7		9.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.7	4.2		2.8	2.1	3.8		4.7				
Green Ext Time (p_c), s	0.0	0.6		0.1	0.0	0.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	8.2											
HCM 6th LOS	A											

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	334	32	10	405	0	18	0	7	4	0	108
Future Vol, veh/h	11	334	32	10	405	0	18	0	7	4	0	108
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	-	-	-	-	-	-	0
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, %	0	2	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	12	367	35	11	445	0	20	0	8	4	0	119

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	451	0	0	402	0	0	654	882	202	682	899	229
Stage 1	-	-	-	-	-	-	409	409	-	473	473	-
Stage 2	-	-	-	-	-	-	245	473	-	209	426	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	6.5	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1120	-	-	1168	-	-	356	287	811	340	281	780
Stage 1	-	-	-	-	-	-	596	600	-	546	562	-
Stage 2	-	-	-	-	-	-	743	562	-	779	589	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1114	-	-	1168	-	-	297	280	810	329	274	776
Mov Cap-2 Maneuver	-	-	-	-	-	-	297	280	-	329	274	-
Stage 1	-	-	-	-	-	-	589	593	-	537	554	-
Stage 2	-	-	-	-	-	-	623	554	-	763	583	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.2			15.8			10.7		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	361	1114	-	-	1168	-	-	329	776
HCM Lane V/C Ratio	0.076	0.011	-	-	0.009	-	-	0.013	0.153
HCM Control Delay (s)	15.8	8.3	-	-	8.1	-	-	16.1	10.5
HCM Lane LOS	C	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0	0.5

Timings
8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	129	295	9	436	10	6	80	14
Future Volume (vph)	129	295	9	436	10	6	80	14
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	27.0	27.4	24.6	21.4	9.2	9.2	9.2	9.2
Actuated g/C Ratio	0.60	0.61	0.54	0.47	0.20	0.20	0.20	0.20
v/c Ratio	0.24	0.16	0.02	0.34	0.04	0.02	0.30	0.27
Control Delay	9.1	9.2	7.1	12.2	13.9	12.4	17.7	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	9.2	7.1	12.2	13.9	12.4	17.7	6.7
LOS	A	A	A	B	B	B	B	A
Approach Delay		9.2		12.2		13.2		11.5
Approach LOS		A		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 45.2

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.34

Intersection Signal Delay: 11.0

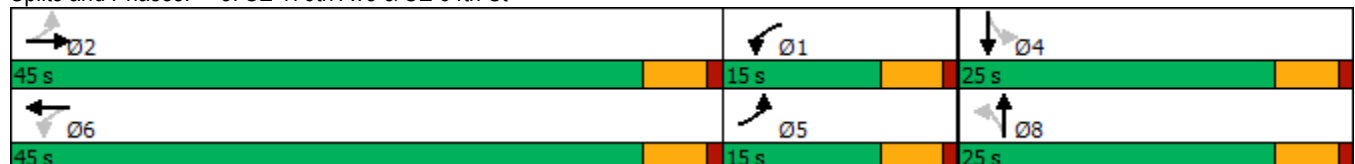
Intersection LOS: B

Intersection Capacity Utilization 45.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	129	295	13	9	436	86	10	6	2	80	14	88
Future Volume (veh/h)	129	295	13	9	436	86	10	6	2	80	14	88
Initial Q (Qb), 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		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	140	321	11	10	474	69	11	7	0	87	15	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	626	1394	48	734	1249	181	319	195	0	331	119	63
Arrive On Green	0.10	0.40	0.40	0.10	0.40	0.40	0.10	0.10	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1795	3506	120	1810	3139	455	1407	1900	0	1416	1159	618
Grp Volume(v), veh/h	140	162	170	10	269	274	11	7	0	87	0	23
Grp Sat Flow(s),veh/h/ln	1795	1777	1849	1810	1791	1803	1407	1900	0	1416	0	1777
Q Serve(g_s), s	0.0	2.3	2.3	0.0	4.0	4.1	0.3	0.1	0.0	2.2	0.0	0.4
Cycle Q Clear(g_c), s	0.0	2.3	2.3	0.0	4.0	4.1	0.7	0.1	0.0	2.3	0.0	0.4
Prop In Lane	1.00		0.06	1.00		0.25	1.00		0.00	1.00		0.35
Lane Grp Cap(c), veh/h	626	707	735	734	712	717	319	195	0	331	0	182
V/C Ratio(X)	0.22	0.23	0.23	0.01	0.38	0.38	0.03	0.04	0.00	0.26	0.00	0.13
Avail Cap(c_a), veh/h	919	1885	1961	1029	1900	1913	920	1008	0	937	0	942
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	8.3	7.5	7.5	6.0	8.0	8.1	15.7	15.2	0.0	16.3	0.0	15.4
Incr Delay (d2), s/veh	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.9	1.0	1.0	0.0	1.7	1.8	0.1	0.1	0.0	1.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.4	7.6	7.6	6.0	8.2	8.2	15.7	15.3	0.0	16.5	0.0	15.5
LnGrp LOS	A	A	A	A	A	A	B	B	A	B	A	B
Approach Vol, veh/h	472			553			18			110		
Approach Delay, s/veh	7.8			8.1			15.6			16.3		
Approach LOS	A			A			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	20.0		8.9	8.8	20.0		8.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	4.3		4.3	2.0	6.1		2.7				
Green Ext Time (p_c), s	0.0	1.1		0.1	0.1	2.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	23	13	221	162	14
Future Vol, veh/h	15	23	13	221	162	14
Conflicting Peds, #/hr	0	3	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	7	0	15	0	1	0
Mvmt Flow	16	25	14	238	174	15
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	448	185	189	0	-	0
Stage 1	182	-	-	-	-	-
Stage 2	266	-	-	-	-	-
Critical Hdwy	6.47	6.2	4.25	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.3	2.335	-	-	-
Pot Cap-1 Maneuver	559	862	1311	-	-	-
Stage 1	837	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	553	860	1311	-	-	-
Mov Cap-2 Maneuver	553	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.4	0.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1311	-	705	-	-	
HCM Lane V/C Ratio	0.011	-	0.058	-	-	
HCM Control Delay (s)	7.8	-	10.4	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

Intersection	
Intersection Delay, s/veh	24.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	37	350	44	67	370	14	34	101	62	25	76	26
Future Vol, veh/h	37	350	44	67	370	14	34	101	62	25	76	26
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	40	380	48	73	402	15	37	110	67	27	83	28
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	29	26.6	14.2	14.7
HCM LOS	D	D	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	20%
Vol Thru, %	0%	62%	0%	89%	0%	96%	60%
Vol Right, %	0%	38%	0%	11%	0%	4%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	34	163	37	394	67	384	127
LT Vol	34	0	37	0	67	0	25
Through Vol	0	101	0	350	0	370	76
RT Vol	0	62	0	44	0	14	26
Lane Flow Rate	37	177	40	428	73	417	138
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.085	0.37	0.082	0.795	0.147	0.778	0.309
Departure Headway (Hd)	8.289	7.518	7.33	6.686	7.266	6.711	8.057
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	432	477	488	540	493	538	444
Service Time	6.053	5.282	5.085	4.441	5.022	4.466	6.133
HCM Lane V/C Ratio	0.086	0.371	0.082	0.793	0.148	0.775	0.311
HCM Control Delay	11.8	14.7	10.7	30.7	11.3	29.3	14.7
HCM Lane LOS	B	B	B	D	B	D	B
HCM 95th-tile Q	0.3	1.7	0.3	7.5	0.5	7.1	1.3

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations											
Traffic Volume (vph)	66	23	39	21	17	38	38	1296	43	1193	
Future Volume (vph)	66	23	39	21	17	38	38	1296	43	1193	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	
Protected Phases		2			6		7	4	3	8	
Permitted Phases	2		2	6		6					
Detector Phase	2	2	2	6	6	6	7	4	3	8	
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0	
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	19.5	32.0	
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	15.0	66.0	15.0	66.0	
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	12.5%	55.0%	12.5%	55.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag							Lead	Lead	Lag	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max	
Act Effct Green (s)	14.7	14.7	14.7	14.7	14.7	14.7	6.1	87.3	9.0	90.2	
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.05	0.73	0.08	0.75	
v/c Ratio	0.40	0.10	0.14	0.13	0.09	0.14	0.46	0.38	0.34	0.34	
Control Delay	52.8	43.6	1.0	44.5	43.1	1.0	52.3	18.3	59.3	8.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.8	43.6	1.0	44.5	43.1	1.0	52.3	18.3	59.3	8.0	
LOS	D	D	A	D	D	A	D	B	E	A	
Approach Delay		35.3			22.4			19.3		9.7	
Approach LOS		D			C			B		A	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 15.8

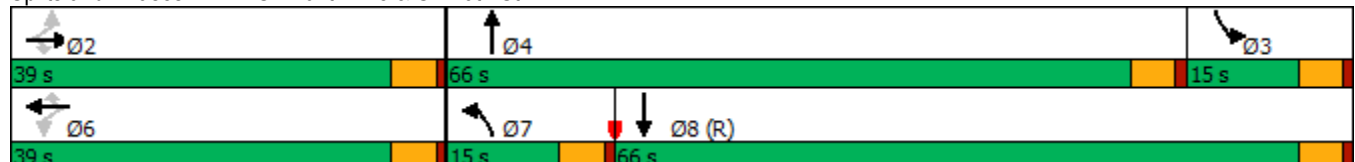
Intersection LOS: B

Intersection Capacity Utilization 54.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	23	39	21	17	38	38	1296	29	43	1193	38
Future Volume (veh/h)	66	23	39	21	17	38	38	1296	29	43	1193	38
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	0.99		0.99	1.00		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	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1826	1633	1856	1826	1870	1752	1870	1885	1900
Adj Flow Rate, veh/h	69	24	2	22	18	2	40	1364	30	45	1256	38
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, %	0	0	0	5	18	3	5	2	10	2	1	0
Cap, veh/h	180	182	153	173	156	150	53	2613	57	58	2618	79
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.10	0.03	0.51	0.51	0.03	0.51	0.51
Sat Flow, veh/h	1406	1900	1600	1344	1633	1563	1739	5141	113	1781	5133	155
Grp Volume(v), veh/h	69	24	2	22	18	2	40	903	491	45	840	454
Grp Sat Flow(s),veh/h/ln	1406	1900	1600	1344	1633	1563	1739	1702	1850	1781	1716	1857
Q Serve(g_s), s	5.7	1.4	0.1	1.8	1.2	0.1	2.7	21.3	21.3	3.0	19.0	19.0
Cycle Q Clear(g_c), s	6.9	1.4	0.1	3.2	1.2	0.1	2.7	21.3	21.3	3.0	19.0	19.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.08
Lane Grp Cap(c), veh/h	180	182	153	173	156	150	53	1730	940	58	1750	947
V/C Ratio(X)	0.38	0.13	0.01	0.13	0.12	0.01	0.75	0.52	0.52	0.78	0.48	0.48
Avail Cap(c_a), veh/h	444	538	453	425	463	443	145	1730	940	148	1750	947
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.79	0.79	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.8	49.7	49.1	51.2	49.6	49.1	57.7	19.7	19.7	57.6	19.1	19.1
Incr Delay (d2), s/veh	0.5	0.1	0.0	0.1	0.1	0.0	6.1	0.9	1.6	8.1	0.9	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.7	1.2	0.1	1.1	0.9	0.1	2.3	12.4	13.5	2.6	11.9	13.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.3	49.8	49.1	51.3	49.7	49.1	63.8	20.6	21.4	65.7	20.0	20.8
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	C	C
Approach Vol, veh/h		95			42			1434			1339	
Approach Delay, s/veh		52.3			50.5			22.1			21.8	
Approach LOS		D			D			C			C	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		16.5	8.9	66.0		16.5	8.7	66.2				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		34.0	10.0	61.0		34.0	10.0	61.0				
Max Q Clear Time (g_c+I1), s		8.9	5.0	23.3		5.2	4.7	21.0				
Green Ext Time (p_c), s		0.0	0.0	1.5		0.0	0.0	1.4				
Intersection Summary												
HCM 6th Ctrl Delay			23.4									
HCM 6th LOS			C									

Timings
12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Existing PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	 		 	 		 		 	 	 	  
Traffic Volume (vph)	45	88	178	302	105	194	179	1124	297	147	1061
Future Volume (vph)	45	88	178	302	105	194	179	1124	297	147	1061
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	5.6	9.7	31.9	12.0	18.0	37.3	17.2	64.1	81.1	14.3	61.1
Actuated g/C Ratio	0.05	0.08	0.27	0.10	0.15	0.31	0.14	0.53	0.68	0.12	0.51
v/c Ratio	0.32	0.64	0.40	1.59	0.40	0.36	0.74	0.63	0.27	0.74	0.46
Control Delay	60.7	72.8	24.2	323.8	51.2	15.7	66.6	23.0	2.7	69.4	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.7	72.8	24.2	323.8	51.2	15.7	66.6	23.0	2.7	69.4	18.7
LOS	E	E	C	F	D	B	E	C	A	E	B
Approach Delay		43.3			176.9			24.1			24.6
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.59

Intersection Signal Delay: 50.2

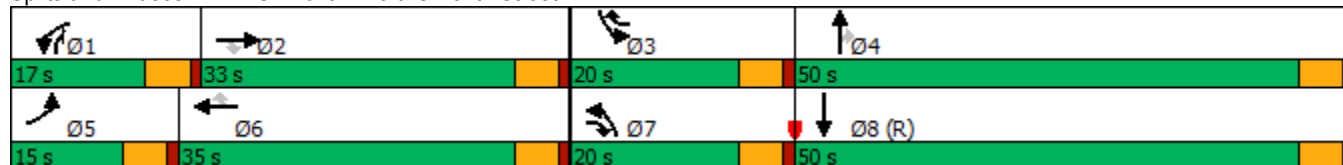
Intersection LOS: D

Intersection Capacity Utilization 67.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Existing PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	88	178	302	105	194	179	1124	297	147	1061	46
Future Volume (veh/h)	45	88	178	302	105	194	179	1124	297	147	1061	46
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1714	1773	1832	1870	1841	1856	1791	1776	1791	1776	1776	1746
Adj Flow Rate, veh/h	47	92	134	315	109	120	186	1171	210	153	1105	45
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	104	164	335	200	293	417	211	1325	748	179	1792	73
Arrive On Green	0.03	0.09	0.09	0.10	0.16	0.16	0.12	0.39	0.39	0.04	0.12	0.12
Sat Flow, veh/h	3166	1773	1553	1995	1841	1572	1706	3375	1518	1692	4779	195
Grp Volume(v), veh/h	47	92	134	315	109	120	186	1171	210	153	747	403
Grp Sat Flow(s),veh/h/ln	1583	1773	1553	998	1841	1572	1706	1687	1518	1692	1616	1741
Q Serve(g_s), s	1.7	6.0	8.9	12.0	6.3	7.3	12.9	38.7	9.8	10.8	26.3	26.3
Cycle Q Clear(g_c), s	1.7	6.0	8.9	12.0	6.3	7.3	12.9	38.7	9.8	10.8	26.3	26.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	104	164	335	200	293	417	211	1325	748	179	1212	653
V/C Ratio(X)	0.45	0.56	0.40	1.58	0.37	0.29	0.88	0.88	0.28	0.85	0.62	0.62
Avail Cap(c_a), veh/h	264	414	554	200	460	560	213	1325	748	211	1212	653
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Uniform Delay (d), s/veh	57.0	52.1	40.4	54.0	45.1	35.1	51.7	33.9	17.9	57.0	44.4	44.4
Incr Delay (d2), s/veh	1.1	1.1	0.3	283.1	0.3	0.1	30.8	8.8	0.9	20.6	2.2	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.3	4.8	6.1	18.5	5.2	5.0	11.6	23.5	6.3	9.7	17.2	18.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	53.3	40.7	337.1	45.4	35.2	82.5	42.7	18.9	77.6	46.6	48.5
LnGrp LOS	E	D	D	F	D	D	F	D	B	E	D	D
Approach Vol, veh/h	273			544			1567			1303		
Approach Delay, s/veh	47.9			212.1			44.3			50.8		
Approach LOS	D			F			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	16.1	17.7	52.1	9.0	24.1	19.8	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+l1), s	14.0	10.9	12.8	40.7	3.7	9.3	14.9	28.3				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.6	0.0	0.2	0.0	2.5				
Intersection Summary												
HCM 6th Ctrl Delay	71.6											
HCM 6th LOS	E											

Appendix D VIC Campus Volume Adjustment

Table 1 summarizes the combined traffic counts at 10th s main and west gates during the time intervals determined by the County in 1994. Table 1 also indicates the specific trip generation rates derived from these counts according to the actual development on HP's South Campus.

Impact of HP North Campus Development on 10th S Avenue
Page 1 of 2



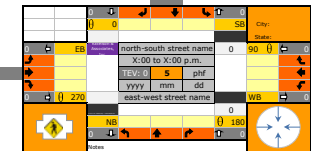
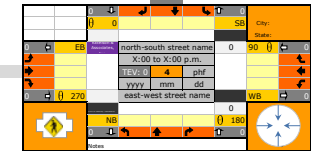
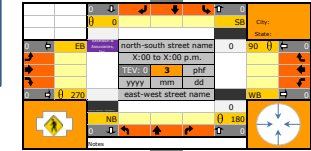
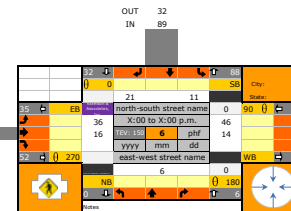
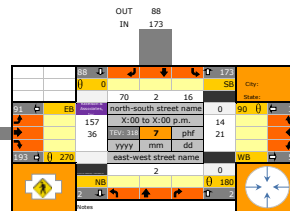
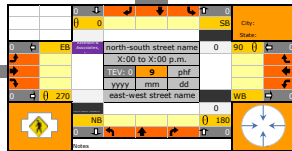
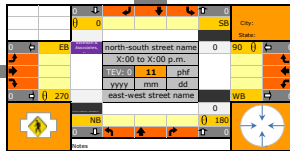
	Traffic Counts	Trip Rate per Thousand Gross Square Feet
AM Peak (7:45 AM - 8:45 AM)		
Entering	261	0.37
Exiting	119	0.17
Total	380	0.53
PM Peak (4:35 PM - 5:35 PM)		
Entering	76	0.11
Exiting	346	0.51
Total	422	0.62

Total for 712,000K
+3,000 K since 1996 count' #####
TOTAL IN OUT
380 261 119
2 1 1
382 262 120

OUT 0.65 IN 0.60 IN 0.35	OUT 0.35 IN 0.37 IN 0.41	OUT 0.15 IN 0.65 IN 0.36	OUT 0.34 IN 0.09 IN 0.04	OUT 0.27 IN 0.34 IN 0.43	OUT 0.04 IN 0.00 IN 0.43
--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------

Note: the outward distribution percentages programmed in the spreadsheet for intersection 7 is slightly different to what was calculated above . I kept to what was programmed in the spreadsheet.

TOTAL IN OUT
262 120
2020 Site Driveway Count Distribution - Same Pattern used for Assignment of Historic Trips



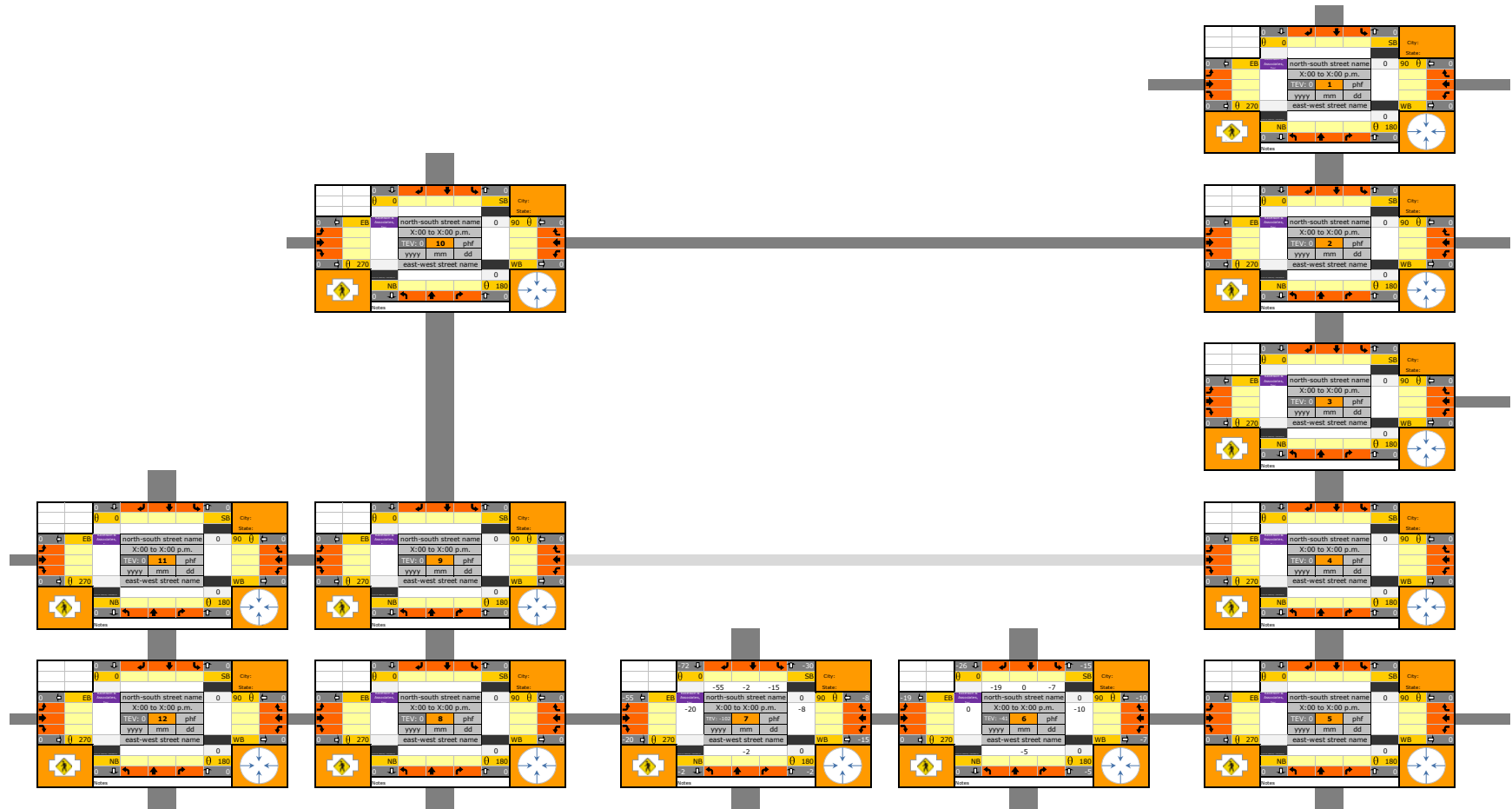


Table 1 summarizes the combined traffic counts at HP's east and west gates during the time intervals determined by the County in 1996. Table 1 also indicates the specific trip generation rates derived from these counts according to the actual development on HP's South Campus.

Report of HP South Campus Development on 104th Avenue
Page 1 of 3

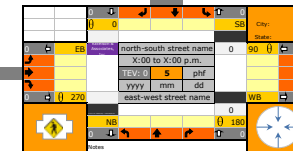
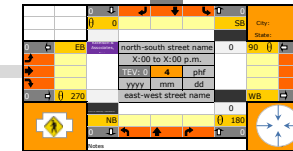
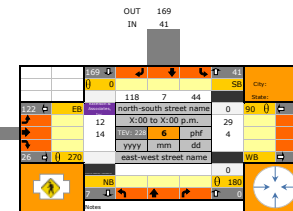
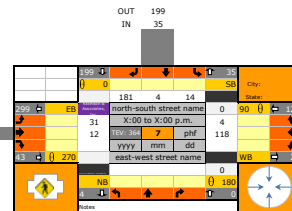
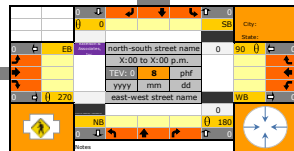
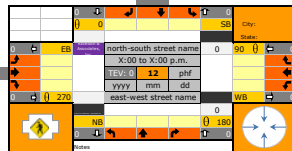
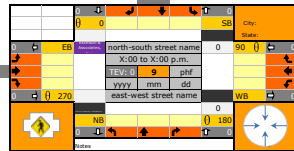
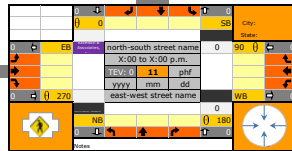


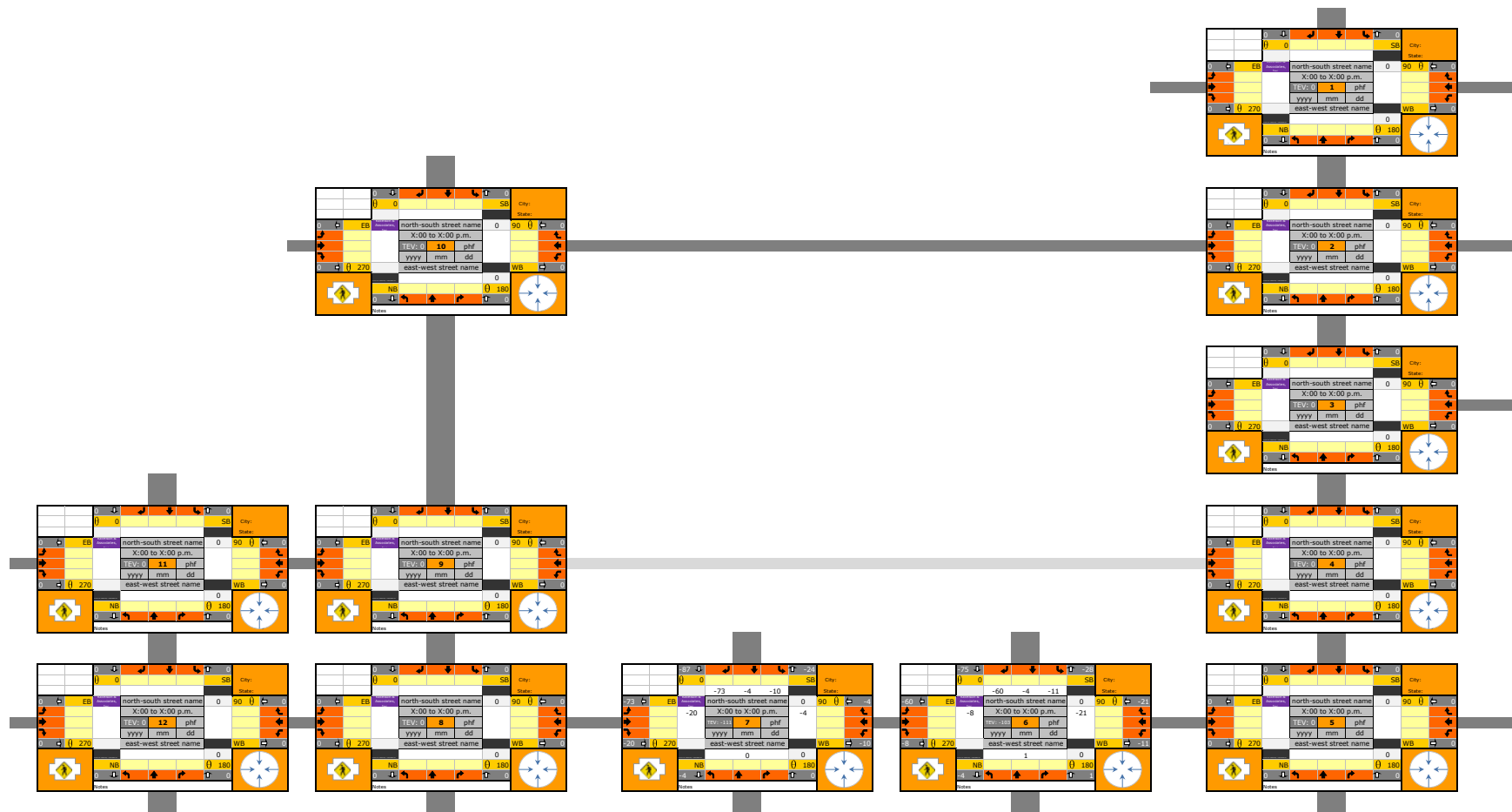
	Traffic Counts	Trip Rate per Thousand Gross Square Feet
AM Peak (7:05 AM - 8:05 AM)		
Entering	261	0.37
Exiting	119	0.17
Total	380	0.53
PM Peak (4:35 PM - 5:35 PM)		
Entering	76	0.11
Exiting	366	0.51
Total	442	0.62

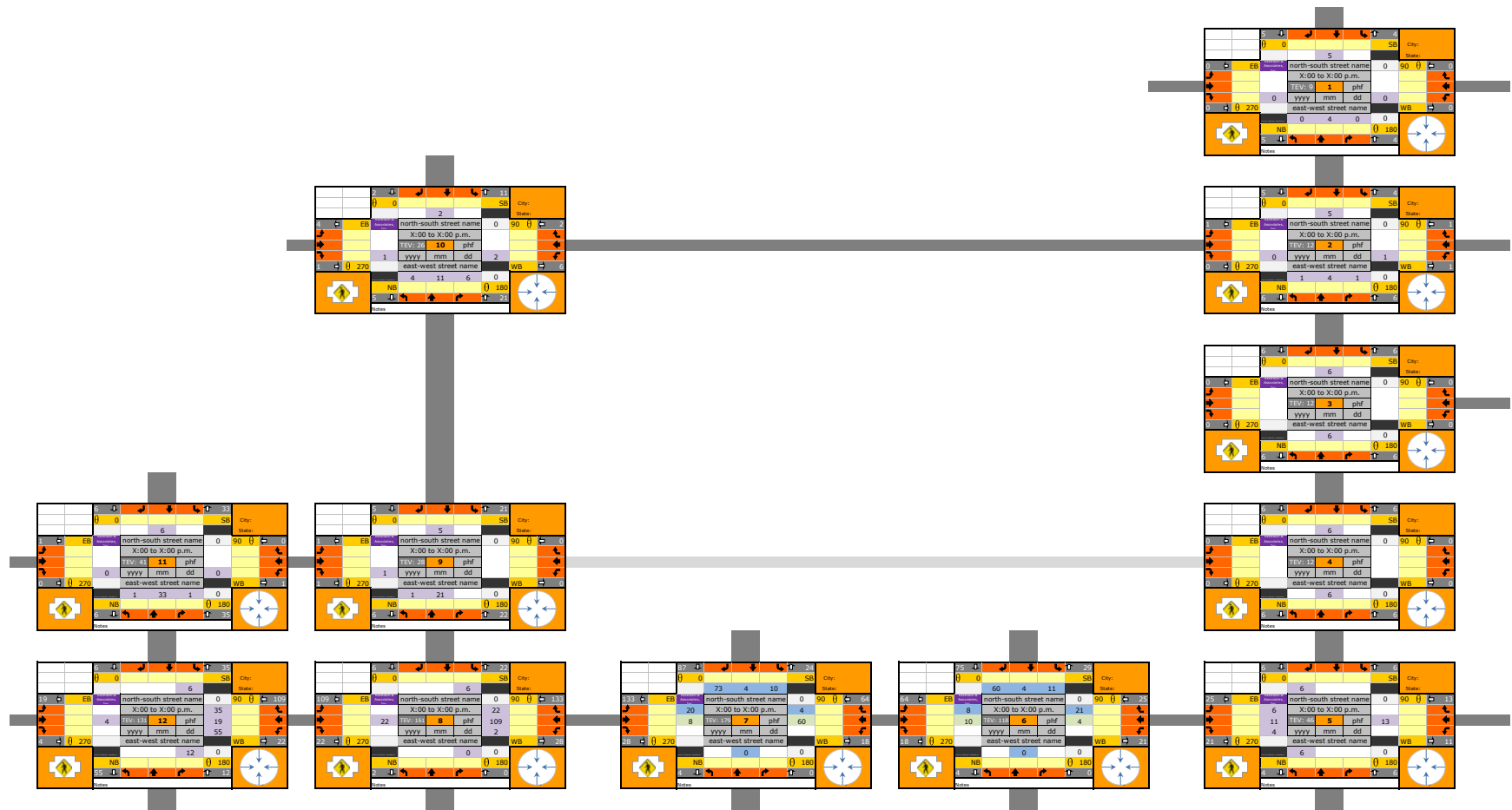
Total for 712,000K
+3,000 K since 1996 count
###

OUT 0.47 IN 0.56 OUT 0.31 0.02 0.07 IN 0.89 0.11	Previous version - use	OUT 0.53 IN 0.44 OUT 0.70 0.04 0.25 IN 0.29 0.71	Latest version - in/out split	OUT 0.46 IN 0.54 OUT 0.62 0.03 0.35 IN 0.31 0.62
TOTAL 76 368		TOTAL 76 368		TOTAL 76 368

2020 Site Driveway Count Distribution - Same Pattern used for Assignment of Historic Trips







■ Calculated as difference of 2023 count trips and historical (1996) site trips
■ Carried through
■ Back distributed to system based on 2023 volume ratios (see previous network tool versions for volume ratios)

Appendix E 2038 Baseline Operations
Worksheets & Total In-process
Trip Assignment

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Baseline 2038 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	45	29	64	158	46	910	89	793
Future Volume (vph)	156	45	29	64	158	46	910	89	793
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	12.4	18.7	5.9	10.2	22.0	6.7	50.6	8.8	54.7
Actuated g/C Ratio	0.12	0.19	0.06	0.10	0.22	0.07	0.51	0.09	0.55
v/c Ratio	0.80	0.25	0.32	0.38	0.42	0.44	0.59	0.69	0.54
Control Delay	67.8	21.5	53.4	45.3	17.3	59.9	18.2	69.1	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	21.5	53.4	45.3	17.3	59.9	18.2	69.1	20.4
LOS	E	C	D	D	B	E	B	E	C
Approach Delay		52.2		28.6			20.1		24.8
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 26.0

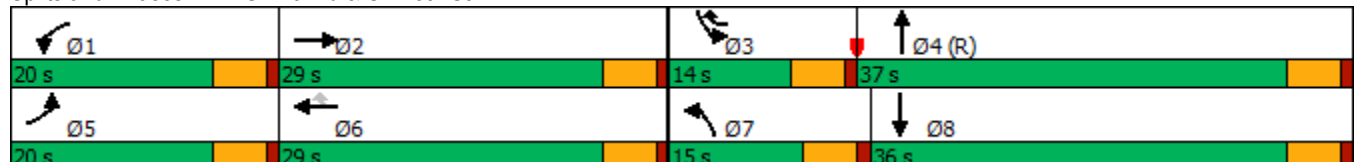
Intersection LOS: C

Intersection Capacity Utilization 58.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	45	34	29	64	158	46	910	16	89	793	87
Future Volume (veh/h)	156	45	34	29	64	158	46	910	16	89	793	87
Initial Q (Qb), 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		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	173	50	6	32	71	97	51	1011	17	99	881	90
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	204	271	32	50	141	239	88	1878	32	122	1715	175
Arrive On Green	0.12	0.16	0.16	0.03	0.08	0.08	0.10	1.00	1.00	0.07	0.56	0.56
Sat Flow, veh/h	1767	1664	200	1697	1841	1585	1767	3518	59	1654	3074	314
Grp Volume(v), veh/h	173	0	56	32	71	97	51	503	525	99	481	490
Grp Sat Flow(s),veh/h/ln	1767	0	1864	1697	1841	1585	1767	1749	1829	1654	1678	1710
Q Serve(g_s), s	9.6	0.0	2.6	1.9	3.7	5.5	2.8	0.0	0.0	5.9	17.8	17.8
Cycle Q Clear(g_c), s	9.6	0.0	2.6	1.9	3.7	5.5	2.8	0.0	0.0	5.9	17.8	17.8
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.03	1.00		0.18
Lane Grp Cap(c), veh/h	204	0	303	50	141	239	88	934	976	122	936	954
V/C Ratio(X)	0.85	0.00	0.18	0.64	0.50	0.41	0.58	0.54	0.54	0.81	0.51	0.51
Avail Cap(c_a), veh/h	265	0	447	254	442	498	177	934	976	149	936	954
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.84	0.84	0.84	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	36.1	48.0	44.3	38.4	44.0	0.0	0.0	45.6	13.7	13.7
Incr Delay (d2), s/veh	14.7	0.0	0.1	5.0	1.0	0.4	1.9	1.9	1.8	19.5	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	2.1	1.5	3.1	3.8	2.1	0.9	0.9	5.4	10.8	10.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.2	53.0	45.3	38.8	45.8	1.9	1.8	65.1	15.7	15.7
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h		229			200			1079			1070	
Approach Delay, s/veh		52.8			43.4			3.9			20.3	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	21.3	12.4	58.4	16.5	12.7	10.0	60.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.9	4.6	7.9	2.0	11.6	7.5	4.8	19.8				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.0	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			18.1									
HCM 6th LOS			B									

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	166	182	106	165	46	689	59	643
Future Volume (vph)	166	182	106	165	46	689	59	643
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	9.4	18.6	7.6	16.8	7.4	48.0	7.9	46.4
Actuated g/C Ratio	0.09	0.19	0.08	0.17	0.07	0.48	0.08	0.46
v/c Ratio	0.55	0.79	0.42	0.74	0.38	0.52	0.44	0.50
Control Delay	49.5	51.4	48.6	50.4	68.6	8.1	51.7	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	51.4	48.6	50.4	68.6	8.1	51.7	26.3
LOS	D	D	D	D	E	A	D	C
Approach Delay		50.6		49.8		11.3		28.2
Approach LOS		D		D		B		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 29.0

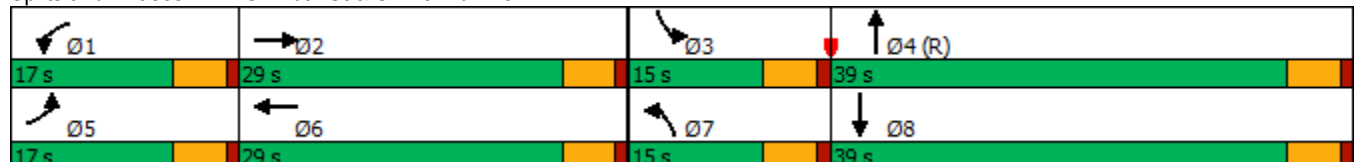
Intersection LOS: C

Intersection Capacity Utilization 62.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	182	78	106	165	57	46	689	132	59	643	103
Future Volume (veh/h)	166	182	78	106	165	57	46	689	132	59	643	103
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	175	192	65	112	174	46	48	725	125	62	677	97
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	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	242	222	75	174	206	54	86	1629	281	80	1620	232
Arrive On Green	0.07	0.16	0.16	0.05	0.14	0.14	0.05	0.54	0.54	0.06	0.71	0.71
Sat Flow, veh/h	3428	1358	460	3483	1437	380	1725	3006	518	1795	3021	432
Grp Volume(v), veh/h	175	0	257	112	0	220	48	425	425	62	385	389
Grp Sat Flow(s),veh/h/ln	1714	0	1817	1742	0	1817	1725	1763	1762	1795	1721	1733
Q Serve(g_s), s	5.0	0.0	13.8	3.2	0.0	11.8	2.7	14.6	14.6	3.4	9.1	9.2
Cycle Q Clear(g_c), s	5.0	0.0	13.8	3.2	0.0	11.8	2.7	14.6	14.6	3.4	9.1	9.2
Prop In Lane	1.00		0.25	1.00		0.21	1.00		0.29	1.00		0.25
Lane Grp Cap(c), veh/h	242	0	298	174	0	260	86	955	954	80	923	929
V/C Ratio(X)	0.72	0.00	0.86	0.64	0.00	0.85	0.56	0.45	0.45	0.78	0.42	0.42
Avail Cap(c_a), veh/h	411	0	436	418	0	436	172	955	954	180	923	929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.83	0.83	0.83
Uniform Delay (d), s/veh	45.5	0.0	40.7	46.6	0.0	41.8	46.4	13.8	13.8	46.5	8.0	8.0
Incr Delay (d2), s/veh	1.5	0.0	8.3	1.5	0.0	3.2	2.1	1.5	1.5	4.9	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	0.0	10.9	2.5	0.0	9.1	2.1	9.6	9.6	2.8	5.3	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	49.0	48.1	0.0	45.0	48.5	15.3	15.3	51.5	9.1	9.1
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	A	A
Approach Vol, veh/h		432			332			898			836	
Approach Delay, s/veh		48.2			46.0			17.1			12.3	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	21.4	9.5	59.2	12.1	19.3	10.0	58.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	5.2	15.8	5.4	16.6	7.0	13.8	4.7	11.2				
Green Ext Time (p_c), s	0.1	0.5	0.0	3.1	0.1	0.5	0.0	2.9				

Intersection Summary

HCM 6th Ctrl Delay 24.7
HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	789	3	7	801
Future Vol, veh/h	7	10	789	3	7	801
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	20	4	67	0	7
Mvmt Flow	7	11	831	3	7	843
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1270	418	0	0	835	0
Stage 1	834	-	-	-	-	-
Stage 2	436	-	-	-	-	-
Critical Hdwy	6.8	7.3	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.5	-	-	2.2	-
Pot Cap-1 Maneuver	163	536	-	-	807	-
Stage 1	392	-	-	-	-	-
Stage 2	625	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	161	535	-	-	806	-
Mov Cap-2 Maneuver	161	-	-	-	-	-
Stage 1	392	-	-	-	-	-
Stage 2	619	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	18.7	0	0.1			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 161 535	806	-		
HCM Lane V/C Ratio	-	- 0.046 0.02	0.009	-		
HCM Control Delay (s)	-	- 28.4 11.9	9.5	-		
HCM Lane LOS	-	- D B	A	-		
HCM 95th %tile Q(veh)	-	- 0.1 0.1	0	-		

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	100	148	207	117	67	100	704	349	108	547
Future Volume (vph)	100	148	207	117	67	100	704	349	108	547
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	25.3	17.2	28.8	19.0	19.0	8.8	43.0	52.8	10.0	44.2
Actuated g/C Ratio	0.25	0.17	0.29	0.19	0.19	0.09	0.43	0.53	0.10	0.44
v/c Ratio	0.33	0.71	0.80	0.36	0.16	0.69	0.54	0.38	0.35	0.53
Control Delay	25.6	46.7	46.5	36.3	0.8	66.1	24.8	2.2	41.1	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	46.7	46.5	36.3	0.8	66.1	24.8	2.2	41.1	21.1
LOS	C	D	D	D	A	E	C	A	D	C
Approach Delay		39.7		35.6			21.6			23.9
Approach LOS		D		D			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 26.5

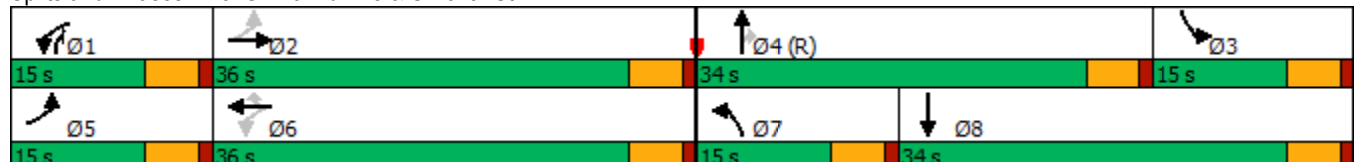
Intersection LOS: C

Intersection Capacity Utilization 67.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	148	55	207	117	67	100	704	349	108	547	116
Future Volume (veh/h)	100	148	55	207	117	67	100	704	349	108	547	116
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1728	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1684
Adj Flow Rate, veh/h	111	164	43	230	130	4	111	782	172	120	608	113
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	8	3	0	5	0	2	0	9	2	1	11	11
Cap, veh/h	338	214	56	308	371	303	141	1037	655	860	1267	235
Arrive On Green	0.07	0.16	0.16	0.10	0.18	0.18	0.07	0.29	0.29	0.25	0.47	0.47
Sat Flow, veh/h	1646	1374	360	1850	2018	1652	1922	3578	1679	3385	2694	500
Grp Volume(v), veh/h	111	0	207	230	130	4	111	782	172	120	361	360
Grp Sat Flow(s),veh/h/ln	1646	0	1734	1850	2018	1652	1922	1789	1679	1693	1600	1593
Q Serve(g_s), s	5.6	0.0	11.4	10.0	5.6	0.1	5.7	19.9	2.4	2.7	15.4	15.5
Cycle Q Clear(g_c), s	5.6	0.0	11.4	10.0	5.6	0.1	5.7	19.9	2.4	2.7	15.4	15.5
Prop In Lane	1.00		0.21	1.00		1.00	1.00		1.00	1.00		0.31
Lane Grp Cap(c), veh/h	338	0	271	308	371	303	141	1037	655	860	753	750
V/C Ratio(X)	0.33	0.00	0.76	0.75	0.35	0.01	0.79	0.75	0.26	0.14	0.48	0.48
Avail Cap(c_a), veh/h	384	0	538	308	626	512	192	1037	655	860	753	750
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	0.0	40.4	33.0	35.6	10.7	45.6	32.3	7.5	28.9	18.1	18.1
Incr Delay (d2), s/veh	0.2	0.0	1.6	8.6	0.2	0.0	9.6	5.1	1.0	0.0	2.2	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	0.0	8.3	9.0	4.9	0.1	5.4	13.8	2.1	2.0	9.7	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.2	0.0	42.0	41.6	35.8	10.7	55.1	37.3	8.5	28.9	20.3	20.3
LnGrp LOS	C	A	D	D	D	B	E	D	A	C	C	C
Approach Vol, veh/h		318			364			1065			841	
Approach Delay, s/veh		38.6			39.2			34.5			21.5	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	20.6	30.4	34.0	12.2	23.4	12.3	52.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	12.0	13.4	4.7	21.9	7.6	7.6	7.7	17.5				
Green Ext Time (p_c), s	0.0	0.3	0.0	1.4	0.0	0.2	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			31.5									
HCM 6th LOS			C									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Baseline 2038 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	36	310	27	255	63	6	11	0	21
Future Volume (vph)	36	310	27	255	63	6	11	0	21
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effect Green (s)	5.5	25.1	5.5	22.9	9.0	9.0		9.0	9.0
Actuated g/C Ratio	0.12	0.56	0.12	0.51	0.20	0.20		0.20	0.20
v/c Ratio	0.20	0.40	0.15	0.41	0.28	0.16		0.05	0.07
Control Delay	26.3	12.8	26.0	13.8	18.0	7.1		15.1	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.3	12.8	26.0	13.8	18.0	7.1		15.1	1.5
LOS	C	B	C	B	B	A		B	A
Approach Delay		14.1		14.8		13.4		6.2	
Approach LOS		B		B		B		A	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 44.6

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 14.0

Intersection LOS: B

Intersection Capacity Utilization 44.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	310	24	27	255	46	63	6	41	11	0	21
Future Volume (veh/h)	36	310	24	27	255	46	63	6	41	11	0	21
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	44	383	26	33	315	48	78	7	0	14	0	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	90	757	51	70	663	101	332	166	0	327	0	142
Arrive On Green	0.05	0.44	0.44	0.04	0.43	0.43	0.09	0.09	0.00	0.09	0.00	0.00
Sat Flow, veh/h	1810	1704	116	1787	1527	233	1388	1876	0	1376	0	1610
Grp Volume(v), veh/h	44	0	409	33	0	363	78	7	0	14	0	0
Grp Sat Flow(s),veh/h/ln	1810	0	1819	1787	0	1760	1388	1876	0	1376	0	1610
Q Serve(g_s), s	0.8	0.0	5.6	0.6	0.0	5.2	1.3	0.1	0.0	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.8	0.0	5.6	0.6	0.0	5.2	1.8	0.1	0.0	0.4	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.13	1.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	90	0	809	70	0	764	332	166	0	327	0	142
V/C Ratio(X)	0.49	0.00	0.51	0.47	0.00	0.48	0.23	0.04	0.00	0.04	0.00	0.00
Avail Cap(c_a), veh/h	258	0	4154	255	0	4017	1399	1607	0	1426	0	1379
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.2	0.0	7.0	16.5	0.0	7.1	15.3	14.6	0.0	14.8	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.2	1.8	0.0	0.2	0.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	2.0	0.4	0.0	1.8	0.9	0.1	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	0.0	7.2	18.3	0.0	7.2	15.5	14.7	0.0	14.8	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	B	A	B	A	A
Approach Vol, veh/h	453				396				85			
Approach Delay, s/veh	8.2				8.2				15.4			
Approach LOS	A				A				B			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	20.6		8.1	6.7	20.2		8.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.6	7.6		2.4	2.8	7.2		3.8				
Green Ext Time (p_c), s	0.0	0.8		0.0	0.0	0.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	8.9											
HCM 6th LOS	A											

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	157	338	11	5	320	14	29	2	17	16	2	70
Future Vol, veh/h	157	338	11	5	320	14	29	2	17	16	2	70
Conflicting Peds, #/hr	3	0	3	3	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	0	0	5	0	0	0	0	0	0	27
Mvmt Flow	185	398	13	6	376	16	34	2	20	19	2	82

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	395	0	0	414	0	0	1216	1185	408	1177	1175	379
Stage 1	-	-	-	-	-	-	778	778	-	391	391	-
Stage 2	-	-	-	-	-	-	438	407	-	786	784	-
Critical Hdwy	4.13	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.47
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.543
Pot Cap-1 Maneuver	1158	-	-	1156	-	-	159	191	648	169	193	616
Stage 1	-	-	-	-	-	-	392	410	-	637	611	-
Stage 2	-	-	-	-	-	-	601	601	-	388	407	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1155	-	-	1153	-	-	119	159	646	141	160	614
Mov Cap-2 Maneuver	-	-	-	-	-	-	119	159	-	141	160	-
Stage 1	-	-	-	-	-	-	328	343	-	533	606	-
Stage 2	-	-	-	-	-	-	516	596	-	314	341	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	2.7			0.1			36.4			16.4		
HCM LOS							E			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	170	1155	-	-	1153	-	-	143	614
HCM Lane V/C Ratio	0.332	0.16	-	-	0.005	-	-	0.148	0.134
HCM Control Delay (s)	36.4	8.7	-	-	8.1	-	-	34.5	11.8
HCM Lane LOS	E	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	1.4	0.6	-	-	0	-	-	0.5	0.5

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	49	436	3	357	14	5	66	3
Future Volume (vph)	49	436	3	357	14	5	66	3
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	31.7	34.1	29.6	30.0	9.2	9.2	9.4	9.4
Actuated g/C Ratio	0.68	0.73	0.63	0.64	0.20	0.20	0.20	0.20
v/c Ratio	0.10	0.38	0.01	0.43	0.06	0.04	0.28	0.14
Control Delay	6.3	9.0	6.7	12.5	18.3	14.7	20.5	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	9.0	6.7	12.5	18.3	14.7	20.5	8.3
LOS	A	A	A	B	B	B	C	A
Approach Delay		8.8		12.5		16.8		15.7
Approach LOS		A		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 46.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 11.2

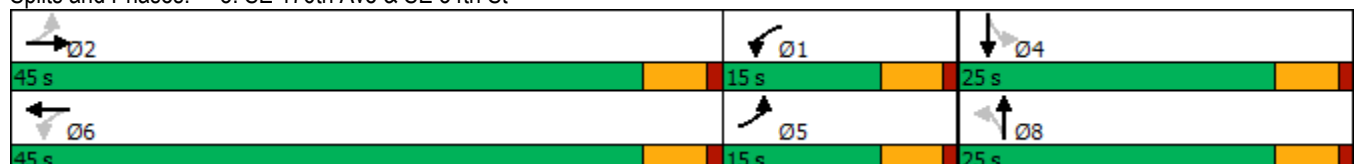
Intersection LOS: B

Intersection Capacity Utilization 50.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	436	2	3	357	59	14	5	4	66	3	39
Future Volume (veh/h)	49	436	2	3	357	59	14	5	4	66	3	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		1.00	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	58	513	2	4	420	62	16	6	0	78	4	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	470	766	3	483	642	95	348	205	0	345	205	0
Arrive On Green	0.06	0.41	0.41	0.06	0.42	0.42	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1682	1847	7	1810	1541	227	1409	1900	0	1384	1900	0
Grp Volume(v), veh/h	58	0	515	4	0	482	16	6	0	78	4	0
Grp Sat Flow(s),veh/h/ln	1682	0	1854	1810	0	1769	1409	1900	0	1384	1900	0
Q Serve(g_s), s	0.0	0.0	8.2	0.0	0.0	7.9	0.4	0.1	0.0	1.9	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	8.2	0.0	0.0	7.9	0.4	0.1	0.0	2.0	0.1	0.0
Prop In Lane	1.00		0.00	1.00		0.13	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	470	0	769	483	0	737	348	205	0	345	205	0
V/C Ratio(X)	0.12	0.00	0.67	0.01	0.00	0.65	0.05	0.03	0.00	0.23	0.02	0.00
Avail Cap(c_a), veh/h	832	0	2047	868	0	1952	974	1049	0	959	1049	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	10.7	0.0	8.6	10.2	0.0	8.5	14.6	14.5	0.0	15.4	14.4	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.4	0.0	0.0	0.4	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	3.4	0.0	0.0	3.1	0.2	0.1	0.0	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.8	0.0	9.0	10.2	0.0	8.8	14.7	14.5	0.0	15.5	14.5	0.0
LnGrp LOS	B	A	A	B	A	A	B	B	A	B	B	A
Approach Vol, veh/h	573			486			22			82		
Approach Delay, s/veh	9.2			8.8			14.6			15.4		
Approach LOS	A			A			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	20.0		8.9	7.2	20.1		8.9				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	10.2		4.0	2.0	9.9		2.4				
Green Ext Time (p_c), s	0.0	2.0		0.1	0.0	1.9		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	9.6											
HCM 6th LOS	A											

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	13	4	124	91	104
Future Vol, veh/h	5	13	4	124	91	104
Conflicting Peds, #/hr	2	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	10	0	2	1	18
Mvmt Flow	6	15	5	146	107	122
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	326	168	229	0	-	0
Stage 1	168	-	-	-	-	-
Stage 2	158	-	-	-	-	-
Critical Hdwy	6.4	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	2.2	-	-	-
Pot Cap-1 Maneuver	672	856	1351	-	-	-
Stage 1	867	-	-	-	-	-
Stage 2	875	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	669	856	1351	-	-	-
Mov Cap-2 Maneuver	669	-	-	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	875	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.7	0.2		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1351	-	794	-	-	
HCM Lane V/C Ratio	0.003	-	0.027	-	-	
HCM Control Delay (s)	7.7	-	9.7	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Intersection	
Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	272	26	75	314	14	29	67	55	0	60	10
Future Vol, veh/h	12	272	26	75	314	14	29	67	55	0	60	10
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	13	299	29	82	345	15	32	74	60	0	66	11
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	15.2	15.1	11.2	11.2
HCM LOS	C	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	55%	0%	91%	0%	96%	86%
Vol Right, %	0%	45%	0%	9%	0%	4%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	29	122	12	298	75	328	70
LT Vol	29	0	12	0	75	0	0
Through Vol	0	67	0	272	0	314	60
RT Vol	0	55	0	26	0	14	10
Lane Flow Rate	32	134	13	327	82	360	77
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.065	0.242	0.024	0.539	0.146	0.578	0.148
Departure Headway (Hd)	7.343	6.496	6.42	5.92	6.357	5.768	6.911
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	487	551	557	609	564	624	517
Service Time	5.107	4.26	4.168	3.667	4.101	3.513	4.985
HCM Lane V/C Ratio	0.066	0.243	0.023	0.537	0.145	0.577	0.149
HCM Control Delay	10.6	11.3	9.3	15.4	10.2	16.2	11.2
HCM Lane LOS	B	B	A	C	B	C	B
HCM 95th-tile Q	0.2	0.9	0.1	3.2	0.5	3.7	0.5

Timings

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center

Baseline 2038 AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations											
Traffic Volume (vph)	42	7	46	141	16	37	23	1081	16	795	
Future Volume (vph)	42	7	46	141	16	37	23	1081	16	795	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	
Protected Phases		2			6		7	4	3	8	
Permitted Phases	2		2	6		6					
Detector Phase	2	2	2	6	6	6	7	4	3	8	
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0	
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	10.0	32.0	
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	17.0	64.0	17.0	64.0	
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	14.2%	53.3%	14.2%	53.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag							Lead	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max	
Act Effct Green (s)	18.7	18.7	18.7	18.7	18.7	18.7	5.7	86.9	5.4	84.6	
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.05	0.72	0.04	0.70	
v/c Ratio	0.21	0.02	0.16	0.69	0.07	0.13	0.28	0.31	0.22	0.24	
Control Delay	42.7	37.1	6.3	62.4	38.9	3.9	37.5	22.3	61.9	8.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	42.7	37.1	6.3	62.4	38.9	3.9	37.5	22.3	61.9	8.2	
LOS	D	D	A	E	D	A	D	C	E	A	
Approach Delay		24.6			49.2			22.6		9.2	
Approach LOS		C			D			C		A	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 85 (71%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 20.0

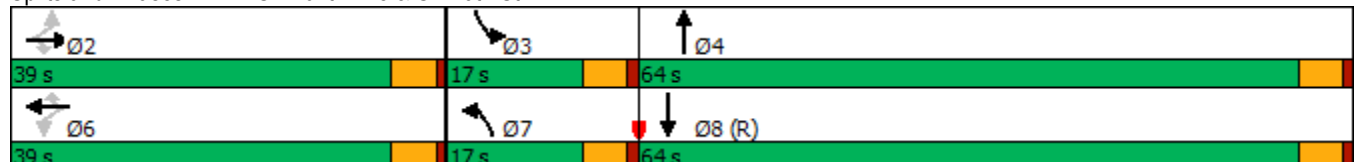
Intersection LOS: B

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	7	46	141	16	37	23	1081	15	16	795	26
Future Volume (veh/h)	42	7	46	141	16	37	23	1081	15	16	795	26
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1856	1900	1856	1856	1648	1900	1900	1870	1796	1796	1856	1826
Adj Flow Rate, veh/h	44	7	5	148	17	4	24	1138	15	17	837	25
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	0	3	3	17	0	0	2	7	7	3	5
Cap, veh/h	221	239	198	230	207	202	42	2579	34	31	2485	74
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.02	0.50	0.50	0.02	0.49	0.49
Sat Flow, veh/h	1380	1900	1572	1391	1648	1610	1810	5194	68	1711	5055	151
Grp Volume(v), veh/h	44	7	5	148	17	4	24	746	407	17	559	303
Grp Sat Flow(s),veh/h/ln	1380	1900	1572	1391	1648	1610	1810	1702	1858	1711	1689	1828
Q Serve(g_s), s	3.5	0.4	0.3	12.5	1.1	0.3	1.6	16.9	17.0	1.2	12.1	12.1
Cycle Q Clear(g_c), s	4.6	0.4	0.3	12.9	1.1	0.3	1.6	16.9	17.0	1.2	12.1	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.08
Lane Grp Cap(c), veh/h	221	239	198	230	207	202	42	1690	923	31	1660	899
V/C Ratio(X)	0.20	0.03	0.03	0.64	0.08	0.02	0.58	0.44	0.44	0.55	0.34	0.34
Avail Cap(c_a), veh/h	438	538	446	450	467	456	181	1690	923	171	1660	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.4	46.0	46.0	51.7	46.4	46.0	58.0	19.5	19.5	58.4	18.6	18.6
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.1	0.1	0.0	3.6	0.7	1.2	5.6	0.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.3	0.2	7.9	0.8	0.2	1.4	10.3	11.2	1.0	8.2	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.5	46.1	46.0	52.8	46.4	46.0	61.7	20.1	20.7	64.0	19.1	19.6
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	B	B
Approach Vol, veh/h	56			169			1177			879		
Approach Delay, s/veh	48.0			52.0			21.2			20.2		
Approach LOS	D			D			C			C		
Timer - Assigned Phs	2			3			4			6		
Phs Duration (G+Y+Rc), s	20.1			7.2			64.6			20.1		
Change Period (Y+Rc), s	5.0			5.0			5.0			5.0		
Max Green Setting (Gmax), s	34.0			12.0			59.0			34.0		
Max Q Clear Time (g_c+I1), s	6.6			3.2			19.0			14.9		
Green Ext Time (p_c), s	0.0			0.0			5.3			0.2		
Intersection Summary												
HCM 6th Ctrl Delay	23.7											
HCM 6th LOS	C											

Timings
12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	60	165	294	121	109	111	931	264	158	742
Future Volume (vph)	28	60	165	294	121	109	111	931	264	158	742
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	6.4	8.2	23.0	20.0	23.8	47.0	11.8	55.6	80.6	18.2	62.0
Actuated g/C Ratio	0.05	0.07	0.19	0.17	0.20	0.39	0.10	0.46	0.67	0.15	0.52
v/c Ratio	0.39	0.56	0.53	1.11	0.36	0.18	0.72	0.64	0.26	0.66	0.34
Control Delay	68.3	70.9	31.3	130.9	45.0	4.6	74.0	28.4	1.8	52.0	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	70.9	31.3	130.9	45.0	4.6	74.0	28.4	1.8	52.0	20.8
LOS	E	E	C	F	D	A	E	C	A	D	C
Approach Delay		44.8			84.9			26.9			26.1
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 38.2

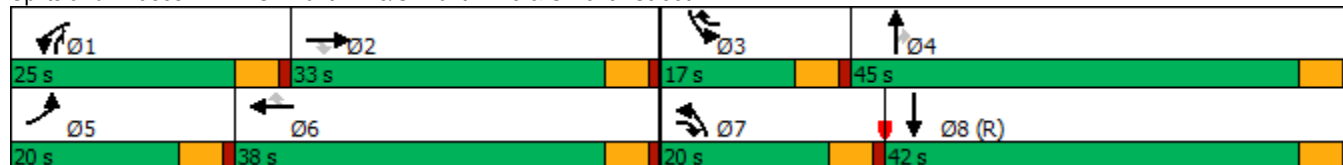
Intersection LOS: D

Intersection Capacity Utilization 70.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	60	165	294	121	109	111	931	264	158	742	37
Future Volume (veh/h)	28	60	165	294	121	109	111	931	264	158	742	37
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	31	67	124	327	134	33	123	1034	169	176	824	38
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	40	159	270	297	434	515	147	1125	740	172	1635	75
Arrive On Green	0.03	0.09	0.09	0.17	0.23	0.23	0.09	0.33	0.33	0.03	0.11	0.11
Sat Flow, veh/h	1491	1758	1528	1781	1885	1560	1706	3375	1480	1720	4711	217
Grp Volume(v), veh/h	31	67	124	327	134	33	123	1034	169	176	560	302
Grp Sat Flow(s),veh/h/ln	1491	1758	1528	1781	1885	1560	1706	1687	1480	1720	1603	1722
Q Serve(g_s), s	2.5	4.3	8.7	20.0	7.1	1.7	8.5	35.3	7.7	12.0	19.7	19.8
Cycle Q Clear(g_c), s	2.5	4.3	8.7	20.0	7.1	1.7	8.5	35.3	7.7	12.0	19.7	19.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	40	159	270	297	434	515	147	1125	740	172	1112	598
V/C Ratio(X)	0.77	0.42	0.46	1.10	0.31	0.06	0.84	0.92	0.23	1.02	0.50	0.51
Avail Cap(c_a), veh/h	186	410	488	297	518	585	213	1125	740	172	1112	598
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	58.0	51.6	44.2	50.0	38.3	27.5	54.0	38.4	16.9	58.0	43.4	43.5
Incr Delay (d2), s/veh	11.1	0.7	0.5	82.2	0.1	0.0	11.8	13.3	0.7	73.5	1.6	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	3.4	5.9	23.0	5.8	1.2	7.3	22.7	4.8	14.0	13.4	14.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	52.2	44.7	132.2	38.4	27.5	65.8	51.8	17.7	131.5	45.0	46.4
LnGrp LOS	E	D	D	F	D	C	E	D	B	F	D	D
Approach Vol, veh/h	222				494				1326			
Approach Delay, s/veh	50.4				99.8				48.7			
Approach LOS	D				F				D			
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	15.9	17.0	45.0	8.2	32.7	15.4	46.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	10.7	14.0	37.3	4.5	9.1	10.5	21.8				
Green Ext Time (p_c), s	0.0	0.1	0.0	1.0	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay	60.8											
HCM 6th LOS	E											

Timings 1: SE 192nd & SE 15th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	116	91	40	82	242	63	1246	115	1424
Future Volume (vph)	116	91	40	82	242	63	1246	115	1424
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	9.0	15.7	6.2	10.9	19.7	7.0	52.3	9.7	57.0
Actuated g/C Ratio	0.09	0.16	0.06	0.11	0.20	0.07	0.52	0.10	0.57
v/c Ratio	0.79	0.58	0.38	0.43	0.68	0.52	0.73	0.69	0.82
Control Delay	78.1	36.7	54.0	45.8	30.8	52.8	23.8	63.7	25.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	36.7	54.0	45.8	30.8	52.8	23.8	63.7	25.9
LOS	E	D	D	D	C	D	C	E	C
Approach Delay		53.4		36.7			25.2		28.5
Approach LOS		D		D			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 30.1

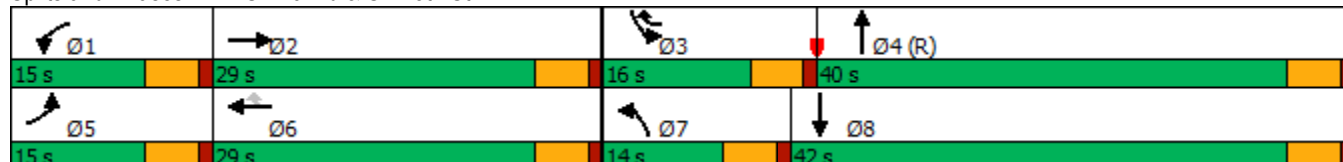
Intersection LOS: C

Intersection Capacity Utilization 78.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	91	80	40	82	242	63	1246	32	115	1424	133
Future Volume (veh/h)	116	91	80	40	82	242	63	1246	32	115	1424	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	122	96	47	42	86	192	66	1312	33	121	1499	135
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, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	150	221	108	62	248	345	100	1762	44	150	1733	155
Arrive On Green	0.09	0.19	0.19	0.03	0.13	0.13	0.11	1.00	1.00	0.08	0.53	0.53
Sat Flow, veh/h	1739	1194	585	1810	1856	1582	1810	3542	89	1810	3298	295
Grp Volume(v), veh/h	122	0	143	42	86	192	66	658	687	121	803	831
Grp Sat Flow(s),veh/h/ln	1739	0	1779	1810	1856	1582	1810	1777	1854	1810	1777	1816
Q Serve(g_s), s	6.9	0.0	7.1	2.3	4.2	10.8	3.5	0.7	0.7	6.6	39.1	40.1
Cycle Q Clear(g_c), s	6.9	0.0	7.1	2.3	4.2	10.8	3.5	0.7	0.7	6.6	39.1	40.1
Prop In Lane	1.00		0.33	1.00		1.00	1.00		0.05	1.00		0.16
Lane Grp Cap(c), veh/h	150	0	329	62	248	345	100	884	923	150	934	954
V/C Ratio(X)	0.82	0.00	0.43	0.67	0.35	0.56	0.66	0.74	0.74	0.81	0.86	0.87
Avail Cap(c_a), veh/h	174	0	427	181	445	513	163	884	923	199	934	954
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.48	0.48	0.48	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	36.1	47.7	39.4	34.9	43.6	0.1	0.1	45.1	20.5	20.8
Incr Delay (d2), s/veh	19.5	0.0	0.3	4.6	0.3	0.5	1.3	2.8	2.7	12.3	10.2	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	5.5	2.0	3.5	7.3	2.7	1.3	1.4	6.1	23.8	24.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	36.4	52.4	39.7	35.5	45.0	2.9	2.8	57.3	30.7	31.5
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	C	C
Approach Vol, veh/h		265			320			1411			1755	
Approach Delay, s/veh		49.3			38.8			4.8			32.9	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	23.5	13.3	54.8	13.6	18.4	10.5	57.5				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.3	9.1	8.6	2.7	8.9	12.8	5.5	42.1				
Green Ext Time (p_c), s	0.0	0.2	0.0	2.9	0.0	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			24.0									
HCM 6th LOS			C									

Timings
2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	233	183	236	265	138	813	151	1024
Future Volume (vph)	233	183	236	265	138	813	151	1024
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	14.0	35.0	18.0	39.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	14.0%	35.0%	18.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	11.3	24.3	11.4	24.4	9.1	32.6	11.7	35.2
Actuated g/C Ratio	0.11	0.24	0.11	0.24	0.09	0.33	0.12	0.35
v/c Ratio	0.62	0.63	0.62	0.88	0.88	0.86	0.75	1.07
Control Delay	49.0	38.5	48.9	56.7	96.7	22.6	63.9	76.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	38.5	48.9	56.7	96.7	22.6	63.9	76.2
LOS	D	D	D	E	F	C	E	E
Approach Delay		43.3		53.7		32.0		74.9
Approach LOS		D		D		C		E

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.07
Intersection Signal Delay: 54.0
Intersection Capacity Utilization 88.0%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service E

Splits and Phases: 2: SE 192nd Ave & SE 20th St

			
Ø1	Ø2	Ø3	Ø4 (R)
20 s	27 s	18 s	35 s
			
Ø5	Ø6	Ø7	Ø8
20 s	27 s	14 s	39 s

HCM 6th Signalized Intersection Summary 2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	183	92	236	265	118	138	813	137	151	1024	237
Future Volume (veh/h)	233	183	92	236	265	118	138	813	137	151	1024	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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		
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	243	191	78	246	276	106	144	847	129	157	1067	227
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	316	281	115	319	286	110	163	1198	182	189	1167	247
Arrive On Green	0.09	0.22	0.22	0.09	0.22	0.22	0.09	0.38	0.38	0.14	0.53	0.53
Sat Flow, veh/h	3510	1281	523	3510	1301	500	1810	3115	474	1795	2917	618
Grp Volume(v), veh/h	243	0	269	246	0	382	144	487	489	157	648	646
Grp Sat Flow(s),veh/h/ln	1755	0	1804	1755	0	1801	1810	1791	1799	1795	1777	1758
Q Serve(g_s), s	6.8	0.0	13.7	6.9	0.0	21.0	7.9	23.0	23.0	8.5	33.2	33.6
Cycle Q Clear(g_c), s	6.8	0.0	13.7	6.9	0.0	21.0	7.9	23.0	23.0	8.5	33.2	33.6
Prop In Lane	1.00		0.29	1.00		0.28	1.00		0.26	1.00		0.35
Lane Grp Cap(c), veh/h	316	0	396	319	0	396	163	689	692	189	711	703
V/C Ratio(X)	0.77	0.00	0.68	0.77	0.00	0.96	0.88	0.71	0.71	0.83	0.91	0.92
Avail Cap(c_a), veh/h	527	0	397	527	0	396	163	689	692	233	711	703
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.48	0.48	0.48
Uniform Delay (d), s/veh	44.5	0.0	35.8	44.5	0.0	38.6	45.0	26.0	26.0	42.1	21.8	21.9
Incr Delay (d2), s/veh	1.5	0.0	3.8	1.5	0.0	35.6	38.3	6.0	6.0	7.9	10.1	10.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	10.3	5.3	0.0	18.7	8.9	15.6	15.7	6.2	16.8	17.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	0.0	39.7	46.0	0.0	74.2	83.3	32.1	32.0	50.1	31.9	32.6
LnGrp LOS	D	A	D	D	A	E	F	C	C	D	C	C
Approach Vol, veh/h	512			628			1120			1451		
Approach Delay, s/veh	42.7			63.2			38.6			34.2		
Approach LOS	D			E			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.1	26.9	15.6	43.4	14.0	27.0	14.0	45.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	9.0	34.0				
Max Q Clear Time (g_c+I1), s	8.9	15.7	10.5	25.0	8.8	23.0	9.9	35.6				
Green Ext Time (p_c), s	0.2	0.5	0.0	1.9	0.2	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	41.6											
HCM 6th LOS	D											

Intersection							
Int Delay, s/veh	0.2						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Vol, veh/h	3	4	1098	3	10	1219	
Future Vol, veh/h	3	4	1098	3	10	1219	
Conflicting Peds, #/hr	0	0	0	2	2	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	125	0	-	-	230	-	
Veh in Median Storage, #	0	-	0	-	-	0	
Grade, %	0	-	0	-	-	0	
Peak Hour Factor	95	95	95	95	95	95	
Heavy Vehicles, %	0	0	1	0	0	1	
Mvmt Flow	3	4	1156	3	11	1283	
Major/Minor	Minor1	Major1		Major2			
Conflicting Flow All	1824	582	0	0	1161	0	
Stage 1	1160	-	-	-	-	-	
Stage 2	664	-	-	-	-	-	
Critical Hdwy	6.8	6.9	-	-	4.1	-	
Critical Hdwy Stg 1	5.8	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.5	3.3	-	-	2.2	-	
Pot Cap-1 Maneuver	70	461	-	-	609	-	
Stage 1	265	-	-	-	-	-	
Stage 2	479	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	69	460	-	-	608	-	
Mov Cap-2 Maneuver	69	-	-	-	-	-	
Stage 1	264	-	-	-	-	-	
Stage 2	470	-	-	-	-	-	
Approach	WB	NB		SB			
HCM Control Delay, s	33	0		0.1			
HCM LOS	D						
Minor Lane/Major Mvmt		NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)		-	-	69	460	608	-
HCM Lane V/C Ratio		-	-	0.046	0.009	0.017	-
HCM Control Delay (s)		-	-	59.7	12.9	11	-
HCM Lane LOS		-	-	F	B	B	-
HCM 95th %tile Q(veh)		-	-	0.1	0	0.1	-

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	126	204	355	183	120	108	955	204	212	932
Future Volume (vph)	126	204	355	183	120	108	955	204	212	932
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	27.5	19.6	38.6	25.7	25.7	9.1	36.4	50.4	10.0	37.3
Actuated g/C Ratio	0.28	0.20	0.39	0.26	0.26	0.09	0.36	0.50	0.10	0.37
v/c Ratio	0.37	0.83	1.08	0.39	0.23	0.69	0.77	0.24	0.65	0.86
Control Delay	22.9	54.8	98.0	32.3	2.0	65.7	34.3	1.9	40.7	29.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.9	54.8	98.0	32.3	2.0	65.7	34.3	1.9	40.7	29.1
LOS	C	D	F	C	A	E	C	A	D	C
Approach Delay		45.0		62.2			31.8			31.0
Approach LOS		D		E			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 38.6

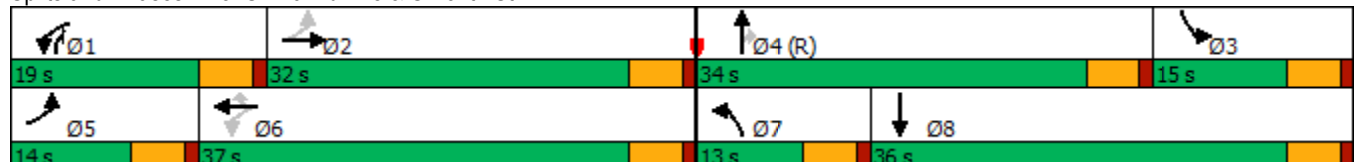
Intersection LOS: D

Intersection Capacity Utilization 88.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	204	83	355	183	120	108	955	204	212	932	118
Future Volume (veh/h)	126	204	83	355	183	120	108	955	204	212	932	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1773	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1743
Adj Flow Rate, veh/h	133	215	70	374	193	25	114	1005	98	223	981	115
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, %	5	0	2	1	1	0	0	2	1	0	1	7
Cap, veh/h	392	250	81	375	496	422	144	1095	726	621	1244	146
Arrive On Green	0.08	0.19	0.19	0.14	0.25	0.25	0.08	0.29	0.29	0.18	0.40	0.40
Sat Flow, veh/h	1688	1328	432	1908	2003	1704	1922	3777	1683	3413	3132	367
Grp Volume(v), veh/h	133	0	285	374	193	25	114	1005	98	223	545	551
Grp Sat Flow(s),veh/h/ln	1688	0	1760	1908	2003	1704	1922	1889	1683	1706	1741	1759
Q Serve(g_s), s	6.3	0.0	15.7	14.0	8.0	0.7	5.8	25.7	1.5	5.7	27.5	27.5
Cycle Q Clear(g_c), s	6.3	0.0	15.7	14.0	8.0	0.7	5.8	25.7	1.5	5.7	27.5	27.5
Prop In Lane	1.00		0.25	1.00		1.00	1.00		1.00	1.00		0.21
Lane Grp Cap(c), veh/h	392	0	331	375	496	422	144	1095	726	621	691	698
V/C Ratio(X)	0.34	0.00	0.86	1.00	0.39	0.06	0.79	0.92	0.14	0.36	0.79	0.79
Avail Cap(c_a), veh/h	408	0	475	375	641	545	154	1095	726	621	691	698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.00	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.1	0.0	39.3	30.0	31.3	11.2	45.5	34.3	5.9	35.8	26.5	26.5
Incr Delay (d2), s/veh	0.2	0.0	7.1	45.4	0.2	0.0	20.3	13.4	0.4	0.1	8.9	8.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.4	0.0	11.3	17.2	6.8	0.8	6.3	19.2	1.2	4.2	18.1	18.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.2	0.0	46.5	75.4	31.5	11.3	65.8	47.8	6.3	35.9	35.4	35.3
LnGrp LOS	C	A	D	E	C	B	E	D	A	D	D	D
Approach Vol, veh/h	418			592			1217			1319		
Approach Delay, s/veh	41.0			58.4			46.1			35.4		
Approach LOS	D			E			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	23.8	23.2	34.0	13.1	29.7	12.5	44.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	17.7	7.7	27.7	8.3	10.0	7.8	29.5				
Green Ext Time (p_c), s	0.0	0.4	0.0	0.5	0.0	0.3	0.0	0.5				

Intersection Summary

HCM 6th Ctrl Delay	43.6
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Baseline 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	12	336	37	387	71	1	44	7	118
Future Volume (vph)	12	336	37	387	71	1	44	7	118
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effect Green (s)	5.6	22.8	5.6	24.8	8.4	8.4		8.4	8.4
Actuated g/C Ratio	0.13	0.54	0.13	0.59	0.20	0.20		0.20	0.20
v/c Ratio	0.05	0.45	0.17	0.41	0.29	0.11		0.20	0.30
Control Delay	24.1	12.7	24.5	10.8	17.6	7.2		16.3	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	24.1	12.7	24.5	10.8	17.6	7.2		16.3	5.8
LOS	C	B	C	B	B	A		B	A
Approach Delay		13.1		11.9		14.3		8.9	
Approach LOS		B		B		B		A	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 41.9

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 12.1

Intersection LOS: B

Intersection Capacity Utilization 50.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
Ø1	Ø2	Ø4
10 s	85 s	35 s
		
Ø5	Ø6	Ø8
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary 6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	336	80	37	387	29	71	1	32	44	7	118
Future Volume (veh/h)	12	336	80	37	387	29	71	1	32	44	7	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1841	1900	1900
Adj Flow Rate, veh/h	13	357	75	39	412	29	76	1	4	47	7	14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	4	0	0
Cap, veh/h	31	632	133	78	767	54	320	40	160	331	37	196
Arrive On Green	0.02	0.42	0.42	0.04	0.45	0.45	0.12	0.12	0.12	0.12	0.12	0.12
Sat Flow, veh/h	1810	1497	314	1745	1704	120	1346	326	1304	1195	303	1603
Grp Volume(v), veh/h	13	0	432	39	0	441	76	0	5	54	0	14
Grp Sat Flow(s),veh/h/ln	1810	0	1811	1745	0	1824	1346	0	1630	1498	0	1603
Q Serve(g_s), s	0.3	0.0	6.6	0.8	0.0	6.4	2.0	0.0	0.1	0.8	0.0	0.3
Cycle Q Clear(g_c), s	0.3	0.0	6.6	0.8	0.0	6.4	3.1	0.0	0.1	1.1	0.0	0.3
Prop In Lane	1.00		0.17	1.00		0.07	1.00		0.80	0.87		1.00
Lane Grp Cap(c), veh/h	31	0	765	78	0	821	320	0	200	368	0	196
V/C Ratio(X)	0.42	0.00	0.57	0.50	0.00	0.54	0.24	0.00	0.03	0.15	0.00	0.07
Avail Cap(c_a), veh/h	248	0	3966	239	0	3995	1261	0	1339	1395	0	1317
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.8	0.0	8.0	17.0	0.0	7.3	16.0	0.0	14.1	14.5	0.0	14.2
Incr Delay (d2), s/veh	3.4	0.0	0.2	1.8	0.0	0.2	0.1	0.0	0.0	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.0	2.7	0.5	0.0	2.4	1.0	0.0	0.1	0.6	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.2	0.0	8.3	18.9	0.0	7.5	16.1	0.0	14.1	14.6	0.0	14.2
LnGrp LOS	C	A	A	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h	445			480			81			68		
Approach Delay, s/veh	8.6			8.4			16.0			14.5		
Approach LOS	A			A			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	20.4		9.5	5.6	21.4		9.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.8	8.6		3.1	2.3	8.4		5.1				
Green Ext Time (p_c), s	0.0	0.4		0.0	0.0	0.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				9.5								
HCM 6th LOS				A								

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	407	32	12	560	4	18	0	7	14	4	181
Future Vol, veh/h	31	407	32	12	560	4	18	0	7	14	4	181
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	0	-	-	-	-	-	0
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, %	0	2	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	34	447	35	13	615	4	20	0	8	15	4	199
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	625	0	0	482	0	0	1278	1184	466	1185	1197	621
Stage 1	-	-	-	-	-	-	533	533	-	647	647	-
Stage 2	-	-	-	-	-	-	745	651	-	538	550	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	966	-	-	1091	-	-	144	191	601	167	187	491
Stage 1	-	-	-	-	-	-	534	528	-	463	470	-
Stage 2	-	-	-	-	-	-	409	468	-	531	519	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	960	-	-	1091	-	-	81	181	600	158	177	488
Mov Cap-2 Maneuver	-	-	-	-	-	-	81	181	-	158	177	-
Stage 1	-	-	-	-	-	-	515	510	-	444	462	-
Stage 2	-	-	-	-	-	-	237	460	-	505	501	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.2			49.9			18.6		
HCM LOS							E			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	107	960	-	-	1091	-	-	162	488			
HCM Lane V/C Ratio	0.257	0.035	-	-	0.012	-	-	0.122	0.408			
HCM Control Delay (s)	49.9	8.9	-	-	8.3	-	-	30.3	17.4			
HCM Lane LOS	E	A	-	-	A	-	-	D	C			
HCM 95th %tile Q(veh)	0.9	0.1	-	-	0	-	-	0.4	2			

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	141	374	11	628	10	6	94	15
Future Volume (vph)	141	374	11	628	10	6	94	15
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	49.2	49.1	41.1	37.3	11.0	11.0	11.0	11.0
Actuated g/C Ratio	0.71	0.71	0.59	0.54	0.16	0.16	0.16	0.16
v/c Ratio	0.42	0.32	0.02	0.82	0.05	0.03	0.46	0.07
Control Delay	17.6	9.9	7.9	25.0	26.2	23.2	34.6	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	9.9	7.9	25.0	26.2	23.2	34.6	22.6
LOS	B	A	A	C	C	C	C	C
Approach Delay		11.9		24.7		24.9		32.5
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 69.3

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 20.6

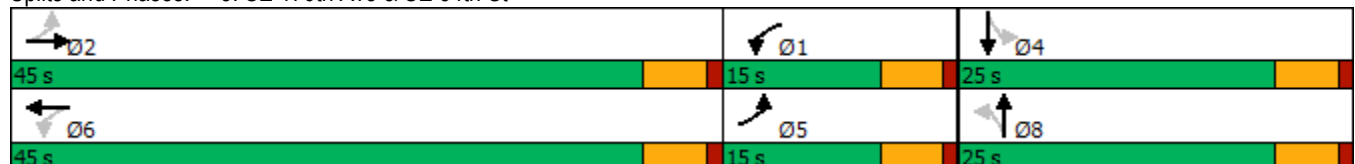
Intersection LOS: C

Intersection Capacity Utilization 72.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	374	13	11	628	120	10	6	2	94	15	5
Future Volume (veh/h)	141	374	13	11	628	120	10	6	2	94	15	5
Initial Q (Qb), 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		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	153	407	13	12	683	122	11	7	0	102	16	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	307	552	18	724	781	139	281	196	0	288	182	11
Arrive On Green	0.09	0.31	0.31	0.28	0.50	0.50	0.10	0.10	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1795	1802	58	1810	1557	278	1412	1900	0	1413	1766	110
Grp Volume(v), veh/h	153	0	420	12	0	805	11	7	0	102	0	17
Grp Sat Flow(s),veh/h/ln	1795	0	1860	1810	0	1835	1412	1900	0	1413	0	1876
Q Serve(g_s), s	0.0	0.0	9.9	0.0	0.0	19.1	0.3	0.2	0.0	3.4	0.0	0.4
Cycle Q Clear(g_c), s	0.0	0.0	9.9	0.0	0.0	19.1	0.7	0.2	0.0	3.6	0.0	0.4
Prop In Lane	1.00		0.03	1.00		0.15	1.00		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	307	0	569	724	0	920	281	196	0	288	0	194
V/C Ratio(X)	0.50	0.00	0.74	0.02	0.00	0.87	0.04	0.04	0.00	0.35	0.00	0.09
Avail Cap(c_a), veh/h	513	0	1519	724	0	1498	712	776	0	719	0	766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	15.2	10.6	0.0	10.9	20.2	19.8	0.0	21.4	0.0	19.9
Incr Delay (d2), s/veh	0.5	0.0	0.7	0.0	0.0	2.0	0.0	0.0	0.0	0.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.6	0.0	6.2	0.1	0.0	9.3	0.2	0.1	0.0	1.9	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	0.0	15.9	10.6	0.0	12.8	20.2	19.8	0.0	21.7	0.0	20.0
LnGrp LOS	C	A	B	B	A	B	C	B	A	C	A	B
Approach Vol, veh/h	573			817			18			119		
Approach Delay, s/veh	17.2			12.8			20.1			21.4		
Approach LOS	B			B			C			C		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.9	20.0		10.1	9.4	29.6		10.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	11.9		5.6	2.0	21.1		2.7				
Green Ext Time (p_c), s	0.0	1.5		0.1	0.1	3.5		0.0				

Intersection Summary

HCM 6th Ctrl Delay 15.2
HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	31	15	259	89	105
Future Vol, veh/h	20	31	15	259	89	105
Conflicting Peds, #/hr	3	0	7	0	0	7
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	7	0	15	0	1	0
Mvmt Flow	22	33	16	278	96	113
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	473	160	216	0	-	0
Stage 1	160	-	-	-	-	-
Stage 2	313	-	-	-	-	-
Critical Hdwy	6.47	6.2	4.25	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.3	2.335	-	-	-
Pot Cap-1 Maneuver	541	890	1280	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	730	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	526	884	1271	-	-	-
Mov Cap-2 Maneuver	526	-	-	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	725	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.6	0.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1271	-	698	-	-	
HCM Lane V/C Ratio	0.013	-	0.079	-	-	
HCM Control Delay (s)	7.9	-	10.6	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

Intersection	
Intersection Delay, s/veh	79.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	466	58	89	503	18	41	120	73	27	84	28
Future Vol, veh/h	48	466	58	89	503	18	41	120	73	27	84	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	52	507	63	97	547	20	45	130	79	29	91	30
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	102.9	95.5	18	18.2
HCM LOS	F	F	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	19%
Vol Thru, %	0%	62%	0%	89%	0%	97%	60%
Vol Right, %	0%	38%	0%	11%	0%	3%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	41	193	48	524	89	521	139
LT Vol	41	0	48	0	89	0	27
Through Vol	0	120	0	466	0	503	84
RT Vol	0	73	0	58	0	18	28
Lane Flow Rate	45	210	52	570	97	566	151
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.11	0.474	0.114	1.139	0.208	1.134	0.373
Departure Headway (Hd)	9.497	8.717	8.213	7.564	8.147	7.588	9.62
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	380	415	439	484	443	481	376
Service Time	7.197	6.417	5.913	5.264	5.847	5.288	7.62
HCM Lane V/C Ratio	0.118	0.506	0.118	1.178	0.219	1.177	0.402
HCM Control Delay	13.4	19	12	111.2	13	109.6	18.2
HCM Lane LOS	B	C	B	F	B	F	C
HCM 95th-tile Q	0.4	2.5	0.4	19	0.8	18.7	1.7

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	30	51	117	22	50	42	1434	47	1306
Future Volume (vph)	89	30	51	117	22	50	42	1434	47	1306
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA
Protected Phases		2			6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	2	2	2	6	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	19.5	32.0
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	15.0	66.0	15.0	66.0
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	12.5%	55.0%	12.5%	55.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	16.9	16.9	16.9	16.9	16.9	16.9	6.3	83.5	6.5	83.7
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.05	0.70	0.05	0.70
v/c Ratio	0.47	0.12	0.19	0.65	0.10	0.19	0.49	0.44	0.51	0.40
Control Delay	53.0	41.8	8.4	63.3	41.2	8.2	51.4	21.4	73.1	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.0	41.8	8.4	63.3	41.2	8.2	51.4	21.4	73.1	9.7
LOS	D	D	A	E	D	A	D	C	E	A
Approach Delay		37.6			46.1			22.2		11.8
Approach LOS		D			D			C		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 20.0

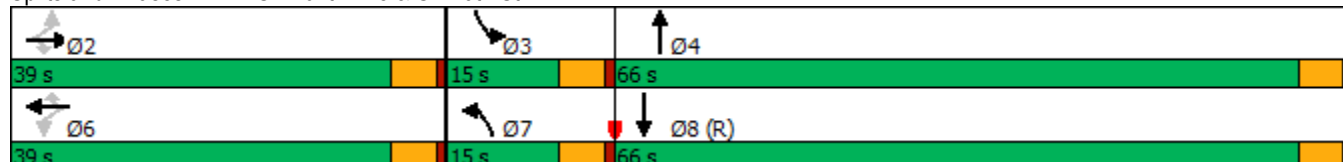
Intersection LOS: B

Intersection Capacity Utilization 59.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	30	51	117	22	50	42	1434	32	47	1306	46
Future Volume (veh/h)	89	30	51	117	22	50	42	1434	32	47	1306	46
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1826	1633	1856	1826	1870	1752	1870	1885	1900
Adj Flow Rate, veh/h	94	32	6	123	23	5	44	1509	33	49	1375	46
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, %	0	0	0	5	18	3	5	2	10	2	1	0
Cap, veh/h	227	250	211	216	215	206	56	2614	57	63	2616	88
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.03	0.51	0.51	0.04	0.51	0.51
Sat Flow, veh/h	1398	1900	1603	1332	1633	1565	1739	5142	112	1781	5114	171
Grp Volume(v), veh/h	94	32	6	123	23	5	44	999	543	49	922	499
Grp Sat Flow(s),veh/h/ln	1398	1900	1603	1332	1633	1565	1739	1702	1850	1781	1716	1854
Q Serve(g_s), s	7.6	1.8	0.4	10.8	1.5	0.3	3.0	24.5	24.5	3.3	21.6	21.6
Cycle Q Clear(g_c), s	9.1	1.8	0.4	12.6	1.5	0.3	3.0	24.5	24.5	3.3	21.6	21.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.09
Lane Grp Cap(c), veh/h	227	250	211	216	215	206	56	1730	940	63	1755	949
V/C Ratio(X)	0.41	0.13	0.03	0.57	0.11	0.02	0.79	0.58	0.58	0.78	0.53	0.53
Avail Cap(c_a), veh/h	439	538	454	418	463	444	145	1730	940	148	1755	949
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.9	46.0	45.4	51.6	45.9	45.4	57.7	20.5	20.5	57.4	19.6	19.6
Incr Delay (d2), s/veh	0.4	0.1	0.0	0.9	0.1	0.0	6.3	1.0	1.8	7.4	1.1	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.9	1.5	0.3	6.6	1.1	0.2	2.5	13.7	15.0	2.8	13.2	14.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.3	46.1	45.4	52.4	46.0	45.4	64.0	21.5	22.4	64.8	20.7	21.7
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	C	C
Approach Vol, veh/h		132			151			1586			1470	
Approach Delay, s/veh		49.1			51.2			23.0			22.5	
Approach LOS		D			D			C			C	
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		20.8	9.2	66.0		20.8	8.9	66.4				
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0				
Max Green Setting (Gmax), s		34.0	10.0	61.0		34.0	10.0	61.0				
Max Q Clear Time (g_c+I1), s		11.1	5.3	26.5		14.6	5.0	23.6				
Green Ext Time (p_c), s		0.0	0.0	1.7		0.0	0.0	1.6				
Intersection Summary												
HCM 6th Ctrl Delay			25.1									
HCM 6th LOS			C									

Timings
12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	49	102	194	295	136	247	192	1216	331	164	1249
Future Volume (vph)	49	102	194	295	136	247	192	1216	331	164	1249
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	7.3	10.7	34.0	12.0	17.5	38.0	18.3	61.8	78.8	15.5	59.0
Actuated g/C Ratio	0.06	0.09	0.28	0.10	0.15	0.32	0.15	0.52	0.66	0.13	0.49
v/c Ratio	0.51	0.66	0.41	1.73	0.54	0.46	0.74	0.70	0.30	0.75	0.54
Control Delay	71.7	71.0	24.2	385.6	56.2	21.9	64.4	26.2	3.6	64.7	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	71.0	24.2	385.6	56.2	21.9	64.4	26.2	3.6	64.7	22.4
LOS	E	E	C	F	E	C	E	C	A	E	C
Approach Delay		44.8			186.9			26.1			27.2
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.73

Intersection Signal Delay: 53.8

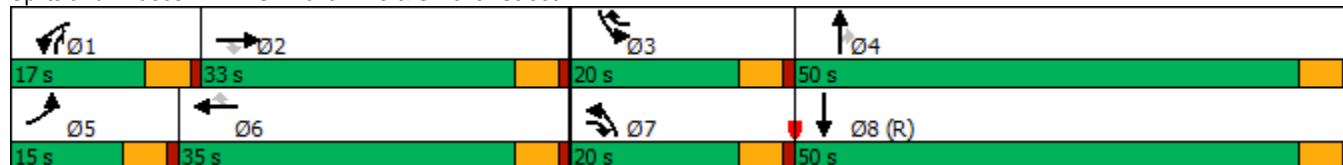
Intersection LOS: D

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th Street



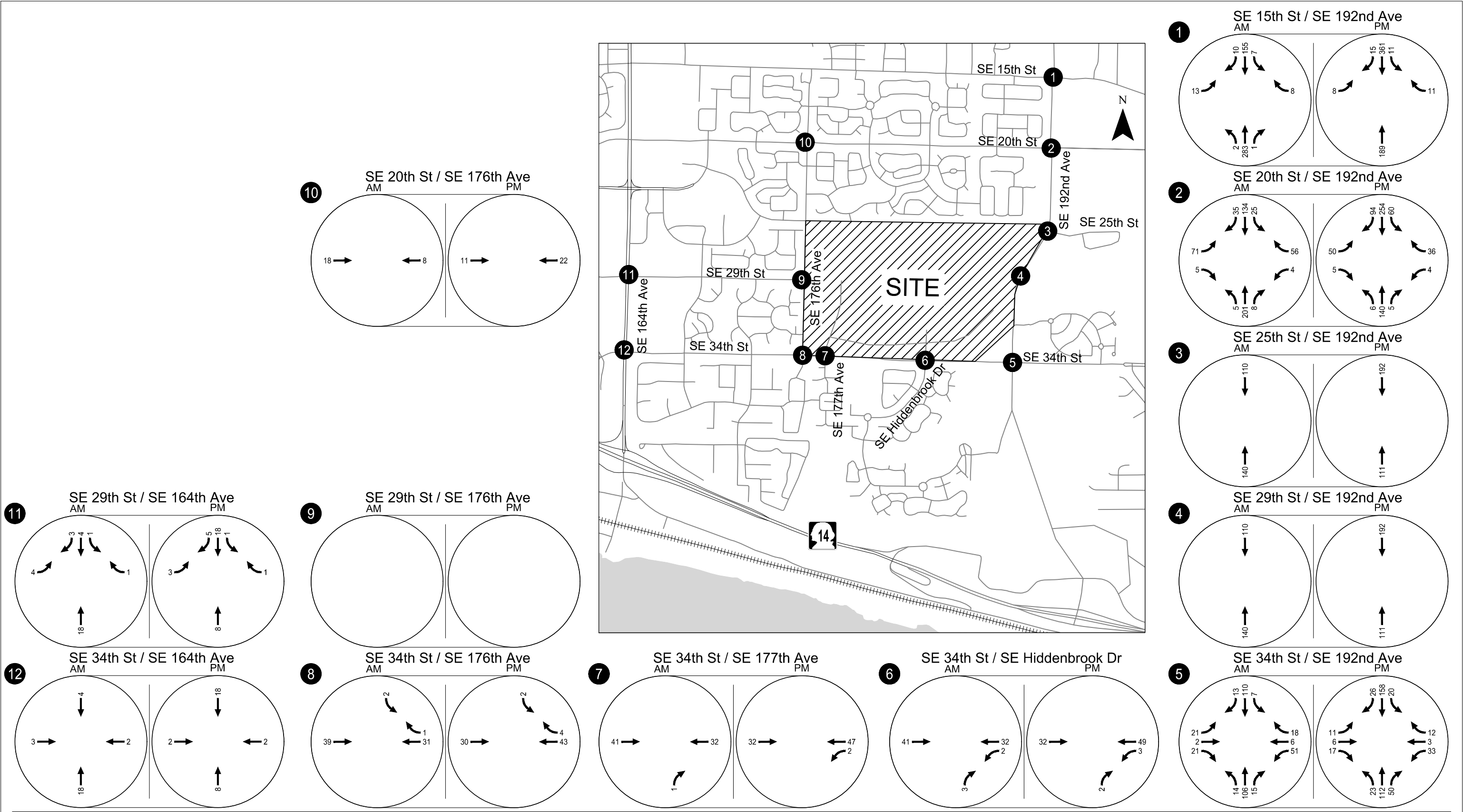
HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	102	194	295	136	247	192	1216	331	164	1249	49
Future Volume (veh/h)	49	102	194	295	136	247	192	1216	331	164	1249	49
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1767	1826	1885	1870	1841	1856	1885	1870	1885	1870	1870	1841
Adj Flow Rate, veh/h	51	106	152	307	142	182	200	1267	237	171	1301	48
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	64	183	359	178	298	430	224	1379	780	199	1895	70
Arrive On Green	0.04	0.10	0.10	0.10	0.16	0.16	0.13	0.39	0.39	0.04	0.12	0.12
Sat Flow, veh/h	1682	1826	1598	1781	1841	1572	1795	3554	1598	1781	5054	186
Grp Volume(v), veh/h	51	106	152	307	142	182	200	1267	237	171	876	473
Grp Sat Flow(s),veh/h/ln	1682	1826	1598	1781	1841	1572	1795	1777	1598	1781	1702	1837
Q Serve(g_s), s	3.6	6.7	9.8	12.0	8.4	11.4	13.2	40.7	10.7	11.5	29.6	29.6
Cycle Q Clear(g_c), s	3.6	6.7	9.8	12.0	8.4	11.4	13.2	40.7	10.7	11.5	29.6	29.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	64	183	359	178	298	430	224	1379	780	199	1277	689
V/C Ratio(X)	0.79	0.58	0.42	1.72	0.48	0.42	0.89	0.92	0.30	0.86	0.69	0.69
Avail Cap(c_a), veh/h	140	426	572	178	460	569	224	1379	780	223	1277	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	57.2	51.6	39.8	54.0	45.7	35.8	51.7	34.9	18.5	56.8	45.8	45.8
Incr Delay (d2), s/veh	7.9	1.1	0.3	348.1	0.4	0.2	31.8	11.3	1.0	21.5	2.8	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	5.5	6.9	35.7	6.9	7.7	12.4	26.1	7.3	10.7	19.8	21.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	52.7	40.1	402.1	46.1	36.0	83.5	46.2	19.5	78.4	48.6	50.9
LnGrp LOS	E	D	D	F	D	D	F	D	B	E	D	D
Approach Vol, veh/h		309			631			1704			1520	
Approach Delay, s/veh		48.6			216.4			46.8			52.7	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	17.0	18.4	51.6	9.6	24.4	20.0	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	11.8	13.5	42.7	5.6	13.4	15.2	31.6				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.1	0.0	0.3	0.0	2.9				
Intersection Summary												
HCM 6th Ctrl Delay				74.8								
HCM 6th LOS				E								

H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\report\figs\27715-Figures_Fig E-1_in-process Trips Apr 05, 2023 - 2:00pm - ckleynhans Layout Tab: Fig E-1_in-process Trips



In-Process Trip Assignment
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
E-1

Appendix F 2038 With-Project Phase 1
Buildout Operations
Worksheets

Timings 1: SE 192nd & SE 15th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	45	29	64	158	49	925	89	814
Future Volume (vph)	156	45	29	64	158	49	925	89	814
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	12.4	18.7	5.9	10.2	22.0	6.8	50.6	8.8	54.5
Actuated g/C Ratio	0.12	0.19	0.06	0.10	0.22	0.07	0.51	0.09	0.54
v/c Ratio	0.80	0.26	0.32	0.38	0.42	0.45	0.60	0.69	0.56
Control Delay	67.8	21.0	53.4	45.3	17.3	60.3	18.0	69.1	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	21.0	53.4	45.3	17.3	60.3	18.0	69.1	20.8
LOS	E	C	D	D	B	E	B	E	C
Approach Delay		51.7		28.6			20.1		25.1
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 26.0

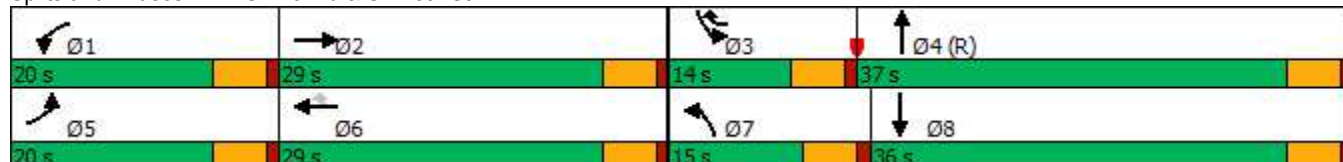
Intersection LOS: C

Intersection Capacity Utilization 58.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	45	37	29	64	158	49	925	16	89	814	87
Future Volume (veh/h)	156	45	37	29	64	158	49	925	16	89	814	87
Initial Q (Qb), 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		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	173	50	5	32	71	97	54	1028	17	99	904	90
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	204	276	28	50	141	239	88	1879	31	122	1720	171
Arrive On Green	0.12	0.16	0.16	0.03	0.08	0.08	0.10	1.00	1.00	0.07	0.56	0.56
Sat Flow, veh/h	1767	1699	170	1697	1841	1585	1767	3519	58	1654	3082	307
Grp Volume(v), veh/h	173	0	55	32	71	97	54	511	534	99	492	502
Grp Sat Flow(s),veh/h/ln	1767	0	1869	1697	1841	1585	1767	1749	1829	1654	1678	1711
Q Serve(g_s), s	9.6	0.0	2.5	1.9	3.7	5.5	2.9	0.0	0.0	5.9	18.3	18.3
Cycle Q Clear(g_c), s	9.6	0.0	2.5	1.9	3.7	5.5	2.9	0.0	0.0	5.9	18.3	18.3
Prop In Lane	1.00		0.09	1.00		1.00	1.00		0.03	1.00		0.18
Lane Grp Cap(c), veh/h	204	0	304	50	141	239	88	934	976	122	936	955
V/C Ratio(X)	0.85	0.00	0.18	0.64	0.50	0.41	0.61	0.55	0.55	0.81	0.53	0.53
Avail Cap(c_a), veh/h	265	0	449	254	442	498	177	934	976	149	936	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.82	0.82	0.82	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	36.1	48.0	44.3	38.4	44.1	0.0	0.0	45.6	13.8	13.8
Incr Delay (d2), s/veh	14.7	0.0	0.1	5.0	1.0	0.4	2.1	1.9	1.8	19.5	2.1	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	2.0	1.5	3.1	3.8	2.3	0.9	0.9	5.4	11.1	11.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.2	53.0	45.3	38.8	46.1	1.9	1.8	65.1	15.9	15.9
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h		228			200			1099			1093	
Approach Delay, s/veh		52.8			43.4			4.0			20.4	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	21.3	12.4	58.4	16.5	12.7	10.0	60.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.9	4.5	7.9	2.0	11.6	7.5	4.9	20.3				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.1	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			18.1									
HCM 6th LOS			B									

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	166	182	119	165	46	707	59	667
Future Volume (vph)	166	182	119	165	46	707	59	667
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	9.4	18.7	8.0	17.2	7.3	47.6	7.7	46.0
Actuated g/C Ratio	0.09	0.19	0.08	0.17	0.07	0.48	0.08	0.46
v/c Ratio	0.55	0.79	0.45	0.72	0.39	0.54	0.45	0.52
Control Delay	49.5	51.2	48.7	48.4	67.5	8.7	52.3	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	51.2	48.7	48.4	67.5	8.7	52.3	27.1
LOS	D	D	D	D	E	A	D	C
Approach Delay		50.5		48.5		11.7		28.9
Approach LOS		D		D		B		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 29.2

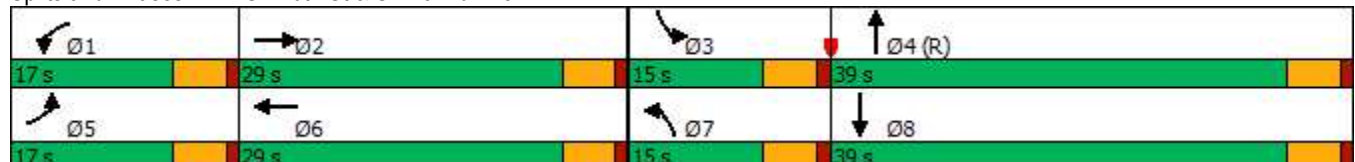
Intersection LOS: C

Intersection Capacity Utilization 63.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	182	80	119	165	57	46	707	138	59	667	103
Future Volume (veh/h)	166	182	80	119	165	57	46	707	138	59	667	103
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	175	192	66	125	174	46	48	744	131	62	702	97
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	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	242	222	76	189	212	56	86	1609	283	80	1615	223
Arrive On Green	0.07	0.16	0.16	0.05	0.15	0.15	0.05	0.54	0.54	0.04	0.53	0.53
Sat Flow, veh/h	3428	1352	465	3483	1437	380	1725	2996	527	1795	3036	419
Grp Volume(v), veh/h	175	0	258	125	0	220	48	438	437	62	398	401
Grp Sat Flow(s),veh/h/ln	1714	0	1816	1742	0	1817	1725	1763	1760	1795	1721	1735
Q Serve(g_s), s	5.0	0.0	13.8	3.5	0.0	11.7	2.7	15.3	15.3	3.4	14.1	14.1
Cycle Q Clear(g_c), s	5.0	0.0	13.8	3.5	0.0	11.7	2.7	15.3	15.3	3.4	14.1	14.1
Prop In Lane	1.00		0.26	1.00		0.21	1.00		0.30	1.00		0.24
Lane Grp Cap(c), veh/h	242	0	298	189	0	268	86	947	945	80	915	923
V/C Ratio(X)	0.72	0.00	0.87	0.66	0.00	0.82	0.56	0.46	0.46	0.77	0.43	0.44
Avail Cap(c_a), veh/h	411	0	436	418	0	436	172	947	945	180	915	923
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.81	0.81	0.81
Uniform Delay (d), s/veh	45.5	0.0	40.7	46.4	0.0	41.3	46.4	14.3	14.3	47.3	14.3	14.3
Incr Delay (d2), s/veh	1.5	0.0	8.6	1.5	0.0	2.6	2.1	1.6	1.6	4.8	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	0.0	10.9	2.7	0.0	9.1	2.1	10.0	10.0	2.9	8.7	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	49.3	47.8	0.0	44.0	48.5	15.9	15.9	52.0	15.5	15.5
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	B	B
Approach Vol, veh/h	433			345			923			861		
Approach Delay, s/veh	48.4			45.4			17.6			18.1		
Approach LOS	D			D			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.4	21.4	9.5	58.7	12.1	19.8	10.0	58.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	5.5	15.8	5.4	17.3	7.0	13.7	4.7	16.1				
Green Ext Time (p_c), s	0.1	0.5	0.0	3.1	0.1	0.5	0.0	2.9				

Intersection Summary

HCM 6th Ctrl Delay 26.7
HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	813	3	7	840
Future Vol, veh/h	7	10	813	3	7	840
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	20	4	67	0	7
Mvmt Flow	7	11	856	3	7	884
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1315	431	0	0	860	0
Stage 1	859	-	-	-	-	-
Stage 2	456	-	-	-	-	-
Critical Hdwy	6.8	7.3	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.5	-	-	2.2	-
Pot Cap-1 Maneuver	152	525	-	-	790	-
Stage 1	380	-	-	-	-	-
Stage 2	611	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	150	525	-	-	789	-
Mov Cap-2 Maneuver	150	-	-	-	-	-
Stage 1	380	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	19.5	0	0.1			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 150 525	789	-		
HCM Lane V/C Ratio	-	- 0.049 0.02	0.009	-		
HCM Control Delay (s)	-	- 30.2 12	9.6	-		
HCM Lane LOS	-	- D B	A	-		
HCM 95th %tile Q(veh)	-	- 0.2 0.1	0	-		

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	124	152	207	127	67	118	704	349	108	547
Future Volume (vph)	124	152	207	127	67	118	704	349	108	547
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	27.0	18.3	29.2	19.4	19.4	9.9	41.9	51.7	10.0	42.1
Actuated g/C Ratio	0.27	0.18	0.29	0.19	0.19	0.10	0.42	0.52	0.10	0.42
v/c Ratio	0.40	0.74	0.82	0.38	0.16	0.73	0.55	0.38	0.35	0.59
Control Delay	26.3	47.2	48.4	36.4	0.8	66.8	25.7	2.3	42.0	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	47.2	48.4	36.4	0.8	66.8	25.7	2.3	42.0	23.6
LOS	C	D	D	D	A	E	C	A	D	C
Approach Delay		39.8		36.7			22.8			26.1
Approach LOS		D		D			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 28.0

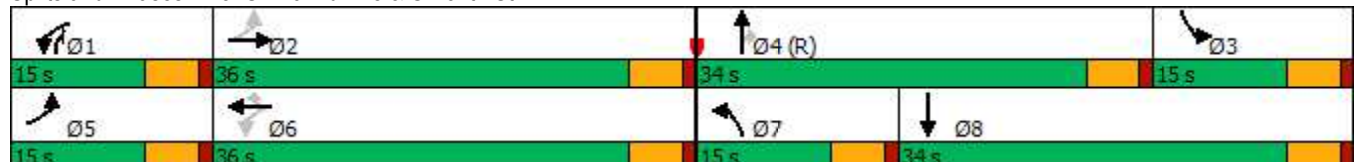
Intersection LOS: C

Intersection Capacity Utilization 69.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	124	152	74	207	127	67	118	704	349	108	547	155
Future Volume (veh/h)	124	152	74	207	127	67	118	704	349	108	547	155
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1728	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1684
Adj Flow Rate, veh/h	138	169	60	230	141	7	131	782	179	120	608	149
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	8	3	0	5	0	2	0	9	2	1	11	11
Cap, veh/h	352	214	76	305	368	301	163	1037	655	818	1138	278
Arrive On Green	0.09	0.17	0.17	0.10	0.18	0.18	0.08	0.29	0.29	0.24	0.45	0.45
Sat Flow, veh/h	1646	1268	450	1850	2018	1652	1922	3578	1679	3385	2548	623
Grp Volume(v), veh/h	138	0	229	230	141	7	131	782	179	120	381	376
Grp Sat Flow(s),veh/h/ln	1646	0	1718	1850	2018	1652	1922	1789	1679	1693	1600	1571
Q Serve(g_s), s	6.8	0.0	12.8	10.0	6.1	0.2	6.7	19.9	2.6	2.8	17.3	17.4
Cycle Q Clear(g_c), s	6.8	0.0	12.8	10.0	6.1	0.2	6.7	19.9	2.6	2.8	17.3	17.4
Prop In Lane	1.00		0.26	1.00		1.00	1.00		1.00	1.00		0.40
Lane Grp Cap(c), veh/h	352	0	289	305	368	301	163	1037	655	818	715	702
V/C Ratio(X)	0.39	0.00	0.79	0.75	0.38	0.02	0.80	0.75	0.27	0.15	0.53	0.54
Avail Cap(c_a), veh/h	374	0	532	305	626	512	192	1037	655	818	715	702
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.92	0.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.4	0.0	39.9	32.0	36.0	11.4	44.9	32.3	7.4	29.8	20.1	20.1
Incr Delay (d2), s/veh	0.2	0.0	1.7	9.1	0.2	0.0	15.9	5.1	1.0	0.0	2.8	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	0.0	9.0	9.0	5.3	0.2	6.9	13.8	2.2	2.0	10.8	10.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.7	0.0	41.6	41.1	36.2	11.4	60.9	37.3	8.5	29.9	22.9	23.0
LnGrp LOS	C	A	D	D	D	B	E	D	A	C	C	C
Approach Vol, veh/h		367			378			1092			877	
Approach Delay, s/veh		37.5			38.7			35.4			23.9	
Approach LOS		D			D			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	21.8	29.2	34.0	13.6	23.2	13.5	49.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	12.0	14.8	4.8	21.9	8.8	8.1	8.7	19.4				
Green Ext Time (p_c), s	0.0	0.4	0.0	1.4	0.0	0.2	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			32.4									
HCM 6th LOS			C									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Baseline 2036 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	36	310	27	255	63	11	58	1	21
Future Volume (vph)	36	310	27	255	63	11	58	1	21
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effect Green (s)	5.6	26.3	5.6	24.1	9.2	9.2		9.2	9.2
Actuated g/C Ratio	0.12	0.57	0.12	0.53	0.20	0.20		0.20	0.20
v/c Ratio	0.20	0.40	0.15	0.50	0.30	0.17		0.28	0.07
Control Delay	27.7	12.3	27.4	14.3	19.5	8.4		19.2	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	27.7	12.3	27.4	14.3	19.5	8.4		19.2	1.5
LOS	C	B	C	B	B	A		B	A
Approach Delay		13.8		15.2		14.4		14.5	
Approach LOS		B		B		B		B	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 45.9

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 14.5

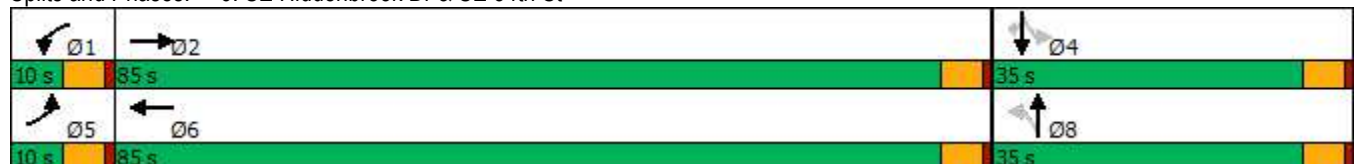
Intersection LOS: B

Intersection Capacity Utilization 47.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St



HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	310	24	27	255	113	63	11	41	58	1	21
Future Volume (veh/h)	36	310	24	27	255	113	63	11	41	58	1	21
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	44	383	26	33	315	119	78	14	0	72	1	0
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	89	737	50	70	526	199	375	210	0	347	3	181
Arrive On Green	0.05	0.43	0.43	0.04	0.42	0.42	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1810	1704	116	1787	1245	470	1387	1876	0	1324	24	1610
Grp Volume(v), veh/h	44	0	409	33	0	434	78	14	0	73	0	0
Grp Sat Flow(s),veh/h/ln	1810	0	1819	1787	0	1716	1387	1876	0	1348	0	1610
Q Serve(g_s), s	0.9	0.0	5.9	0.7	0.0	7.1	0.0	0.2	0.0	1.7	0.0	0.0
Cycle Q Clear(g_c), s	0.9	0.0	5.9	0.7	0.0	7.1	1.5	0.2	0.0	2.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.27	1.00		0.00	0.99		1.00
Lane Grp Cap(c), veh/h	89	0	787	70	0	724	375	210	0	350	0	181
V/C Ratio(X)	0.49	0.00	0.52	0.47	0.00	0.60	0.21	0.07	0.00	0.21	0.00	0.00
Avail Cap(c_a), veh/h	251	0	4039	248	0	3809	1374	1562	0	1377	0	1341
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	16.7	0.0	7.5	17.0	0.0	8.1	14.9	14.3	0.0	15.2	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.2	1.8	0.0	0.3	0.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	0.0	2.3	0.4	0.0	2.7	0.9	0.2	0.0	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.2	0.0	7.7	18.8	0.0	8.4	15.0	14.4	0.0	15.3	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	B	A	B	A	A
Approach Vol, veh/h	453				467				92			
Approach Delay, s/veh	8.7				9.1				14.9			
Approach LOS	A				A				B			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	20.6		9.0	6.8	20.2		9.0				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.7	7.9		4.0	2.9	9.1		3.5				
Green Ext Time (p_c), s	0.0	0.8		0.1	0.0	0.9		0.1				
Intersection Summary												
HCM 6th Ctrl Delay	9.8											
HCM 6th LOS	A											

Intersection												
Int Delay, s/veh	7.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	234	338	11	5	320	14	29	2	17	16	2	125
Future Vol, veh/h	234	338	11	5	320	14	29	2	17	16	2	125
Conflicting Peds, #/hr	3	0	3	3	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	0	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	3	3	0	0	5	0	0	0	0	0	0	27
Mvmt Flow	275	398	13	6	376	16	34	2	20	19	2	147

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	395	0	0	414	0	0	1429	1365	408	1357	1355	379
Stage 1	-	-	-	-	-	-	958	958	-	391	391	-
Stage 2	-	-	-	-	-	-	471	407	-	966	964	-
Critical Hdwy	4.13	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.47
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.227	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.543
Pot Cap-1 Maneuver	1158	-	-	1156	-	-	114	149	648	127	151	616
Stage 1	-	-	-	-	-	-	312	338	-	637	611	-
Stage 2	-	-	-	-	-	-	577	601	-	309	336	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1155	-	-	1153	-	-	69	112	646	98	114	614
Mov Cap-2 Maneuver	-	-	-	-	-	-	69	112	-	98	114	-
Stage 1	-	-	-	-	-	-	237	257	-	484	606	-
Stage 2	-	-	-	-	-	-	435	596	-	226	255	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	3.6			0.1			76			17.4		
HCM LOS							F			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	103	1155	-	-	1153	-	-	100	614
HCM Lane V/C Ratio	0.548	0.238	-	-	0.005	-	-	0.212	0.24
HCM Control Delay (s)	76	9.1	-	-	8.1	-	-	50.4	12.7
HCM Lane LOS	F	A	-	-	A	-	-	F	B
HCM 95th %tile Q(veh)	2.5	0.9	-	-	0	-	-	0.7	0.9

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	49	508	3	404	14	5	70	3
Future Volume (vph)	49	508	3	404	14	5	70	3
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	32.7	32.0	30.7	27.9	9.6	9.6	9.6	9.6
Actuated g/C Ratio	0.66	0.64	0.62	0.56	0.19	0.19	0.19	0.19
v/c Ratio	0.11	0.51	0.01	0.56	0.06	0.04	0.31	0.14
Control Delay	6.4	10.8	6.7	14.4	20.1	15.6	22.8	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	10.8	6.7	14.4	20.1	15.6	22.8	9.0
LOS	A	B	A	B	C	B	C	A
Approach Delay		10.4		14.4		18.2		17.6
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 49.8

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 12.9

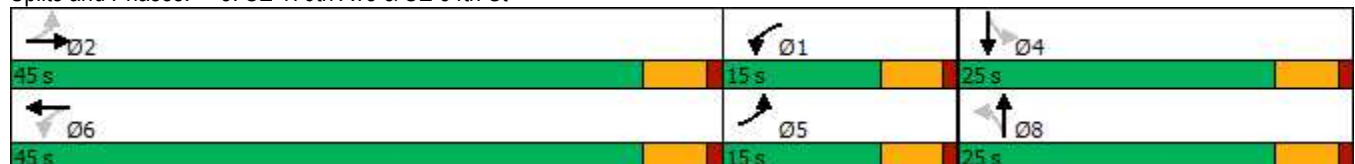
Intersection LOS: B

Intersection Capacity Utilization 54.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	508	2	3	404	67	14	5	5	70	3	39
Future Volume (veh/h)	49	508	2	3	404	67	14	5	5	70	3	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		1.00	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	58	598	2	4	475	71	16	6	0	82	4	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	425	765	3	423	640	96	351	209	0	347	209	0
Arrive On Green	0.06	0.41	0.41	0.06	0.42	0.42	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1682	1848	6	1810	1538	230	1409	1900	0	1385	1900	0
Grp Volume(v), veh/h	58	0	600	4	0	546	16	6	0	82	4	0
Grp Sat Flow(s),veh/h/ln	1682	0	1854	1810	0	1768	1409	1900	0	1385	1900	0
Q Serve(g_s), s	0.0	0.0	10.2	0.0	0.0	9.5	0.4	0.1	0.0	2.0	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	10.2	0.0	0.0	9.5	0.4	0.1	0.0	2.1	0.1	0.0
Prop In Lane	1.00		0.00	1.00		0.13	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	425	0	767	423	0	735	351	209	0	347	209	0
V/C Ratio(X)	0.14	0.00	0.78	0.01	0.00	0.74	0.05	0.03	0.00	0.24	0.02	0.00
Avail Cap(c_a), veh/h	786	0	2043	808	0	1948	972	1047	0	957	1047	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.1	0.0	9.2	11.8	0.0	9.0	14.6	14.4	0.0	15.4	14.4	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.7	0.0	0.0	0.6	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.5	0.0	4.3	0.0	0.0	3.8	0.2	0.1	0.0	0.9	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.1	0.0	9.9	11.8	0.0	9.5	14.6	14.4	0.0	15.5	14.4	0.0
LnGrp LOS	B	A	A	B	A	A	B	B	A	B	B	A
Approach Vol, veh/h	658			550			22			86		
Approach Delay, s/veh	10.1			9.5			14.6			15.5		
Approach LOS	B			A			B			B		
Timer - Assigned Phs	1	2	4		5	6	8					
Phs Duration (G+Y+Rc), s	7.3	20.0	9.0		7.2	20.1	9.0					
Change Period (Y+Rc), s	5.0	5.0	5.0		5.0	5.0	5.0					
Max Green Setting (Gmax), s	10.0	40.0	20.0		10.0	40.0	20.0					
Max Q Clear Time (g_c+I1), s	2.0	12.2	4.1		2.0	11.5	2.4					
Green Ext Time (p_c), s	0.0	2.4	0.1		0.0	2.2	0.0					

Intersection Summary

HCM 6th Ctrl Delay 10.3
HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	13	4	132	95	104
Future Vol, veh/h	5	13	4	132	95	104
Conflicting Peds, #/hr	2	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	10	0	2	1	18
Mvmt Flow	6	15	5	155	112	122
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	340	173	234	0	-	0
Stage 1	173	-	-	-	-	-
Stage 2	167	-	-	-	-	-
Critical Hdwy	6.4	6.3	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.39	2.2	-	-	-
Pot Cap-1 Maneuver	660	850	1345	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	657	850	1345	-	-	-
Mov Cap-2 Maneuver	657	-	-	-	-	-
Stage 1	859	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	9.7	0.2		0		
HCM LOS	A					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1345	-	786	-	-	
HCM Lane V/C Ratio	0.003	-	0.027	-	-	
HCM Control Delay (s)	7.7	-	9.7	-	-	
HCM Lane LOS	A	-	A	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Intersection	
Intersection Delay, s/veh	14.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	272	28	75	314	14	33	71	55	0	62	10
Future Vol, veh/h	12	272	28	75	314	14	33	71	55	0	62	10
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	13	299	31	82	345	15	36	78	60	0	68	11
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	15.5	15.3	11.3	11.3
HCM LOS	C	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	56%	0%	91%	0%	96%	86%
Vol Right, %	0%	44%	0%	9%	0%	4%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	33	126	12	300	75	328	72
LT Vol	33	0	12	0	75	0	0
Through Vol	0	71	0	272	0	314	62
RT Vol	0	55	0	28	0	14	10
Lane Flow Rate	36	138	13	330	82	360	79
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.074	0.251	0.024	0.546	0.147	0.583	0.153
Departure Headway (Hd)	7.371	6.533	6.47	5.965	6.408	5.819	6.959
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	485	548	552	603	559	620	513
Service Time	5.134	4.297	4.22	3.715	4.154	3.565	5.035
HCM Lane V/C Ratio	0.074	0.252	0.024	0.547	0.147	0.581	0.154
HCM Control Delay	10.7	11.5	9.4	15.7	10.3	16.4	11.3
HCM Lane LOS	B	B	A	C	B	C	B
HCM 95th-tile Q	0.2	1	0.1	3.3	0.5	3.8	0.5

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	42	7	47	141	16	37	27	1106	16	823
Future Volume (vph)	42	7	47	141	16	37	27	1106	16	823
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA
Protected Phases		2			6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	2	2	2	6	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	10.0	32.0
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	17.0	64.0	17.0	64.0
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	14.2%	53.3%	14.2%	53.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag							Lead	Lag	Lead	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	18.7	18.7	18.7	18.7	18.7	18.7	5.9	86.9	5.4	84.4
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.05	0.72	0.04	0.70
v/c Ratio	0.21	0.02	0.16	0.69	0.07	0.13	0.32	0.32	0.22	0.25
Control Delay	42.7	37.1	6.5	62.4	38.9	3.9	36.9	23.3	61.9	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	37.1	6.5	62.4	38.9	3.9	36.9	23.3	61.9	8.3
LOS	D	D	A	E	D	A	D	C	E	A
Approach Delay		24.6			49.2			23.6		9.3
Approach LOS		C			D			C		A

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 85 (71%), Referenced to phase 8: SBT, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 20.4

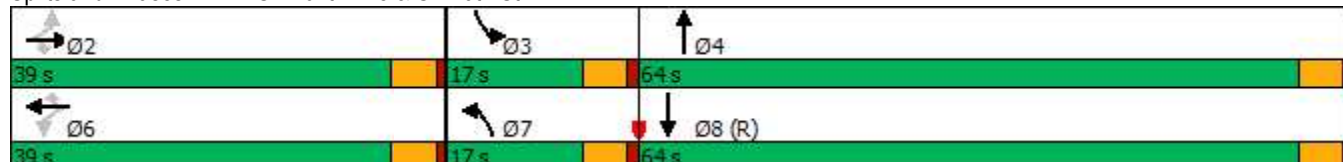
Intersection LOS: C

Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	7	47	141	16	37	27	1106	15	16	823	26
Future Volume (veh/h)	42	7	47	141	16	37	27	1106	15	16	823	26
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1856	1900	1856	1856	1648	1900	1900	1870	1796	1796	1856	1826
Adj Flow Rate, veh/h	44	7	6	148	17	4	28	1164	15	17	866	25
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	0	3	3	17	0	0	2	7	7	3	5
Cap, veh/h	221	239	198	230	207	202	46	2592	33	31	2488	72
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	0.03	0.50	0.50	0.02	0.49	0.49
Sat Flow, veh/h	1380	1900	1572	1390	1648	1610	1810	5195	67	1711	5060	146
Grp Volume(v), veh/h	44	7	6	148	17	4	28	763	416	17	578	313
Grp Sat Flow(s),veh/h/ln	1380	1900	1572	1390	1648	1610	1810	1702	1858	1711	1689	1829
Q Serve(g_s), s	3.5	0.4	0.4	12.5	1.1	0.3	1.8	17.4	17.4	1.2	12.6	12.6
Cycle Q Clear(g_c), s	4.6	0.4	0.4	12.9	1.1	0.3	1.8	17.4	17.4	1.2	12.6	12.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.08
Lane Grp Cap(c), veh/h	221	239	198	230	207	202	46	1698	927	31	1660	899
V/C Ratio(X)	0.20	0.03	0.03	0.64	0.08	0.02	0.61	0.45	0.45	0.55	0.35	0.35
Avail Cap(c_a), veh/h	438	538	446	449	467	456	181	1698	927	171	1660	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.73	0.73	0.73	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.4	46.0	46.0	51.7	46.3	46.0	57.9	19.4	19.4	58.4	18.7	18.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.1	0.1	0.0	3.6	0.6	1.2	5.6	0.6	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.3	0.3	7.9	0.8	0.2	1.6	10.3	11.3	1.0	8.5	9.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.5	46.1	46.1	52.8	46.4	46.0	61.5	20.0	20.6	64.0	19.3	19.8
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	B	B
Approach Vol, veh/h	57				169				1207			
Approach Delay, s/veh	48.0				52.0				21.2			
Approach LOS	D				D				C			
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	20.1		7.2	64.9		20.1		8.0	64.0			
Change Period (Y+Rc), s	5.0		5.0	5.0		5.0		5.0	5.0			
Max Green Setting (Gmax), s	34.0		12.0	59.0		34.0		12.0	59.0			
Max Q Clear Time (g_c+I1), s	6.6		3.2	19.4		14.9		3.8	14.6			
Green Ext Time (p_c), s	0.0		0.0	5.5		0.2		0.0	3.8			
Intersection Summary												
HCM 6th Ctrl Delay	23.7											
HCM 6th LOS	C											

Timings 12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	60	165	312	121	138	111	931	307	187	742
Future Volume (vph)	28	60	165	312	121	138	111	931	307	187	742
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	6.4	8.2	23.0	20.0	23.8	52.1	11.8	50.5	75.5	23.3	62.0
Actuated g/C Ratio	0.05	0.07	0.19	0.17	0.20	0.43	0.10	0.42	0.63	0.19	0.52
v/c Ratio	0.39	0.56	0.53	1.18	0.36	0.20	0.72	0.71	0.32	0.61	0.34
Control Delay	68.3	70.9	31.3	152.9	45.0	4.0	74.0	32.9	2.1	45.5	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	70.9	31.3	152.9	45.0	4.0	74.0	32.9	2.1	45.5	20.5
LOS	E	E	C	F	D	A	E	C	A	D	C
Approach Delay		44.8			94.1			29.3			25.4
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 41.1

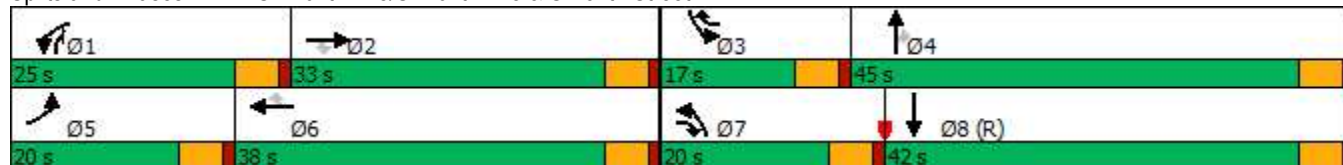
Intersection LOS: D

Intersection Capacity Utilization 72.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Baseline 2036 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	60	165	312	121	138	111	931	307	187	742	37
Future Volume (veh/h)	28	60	165	312	121	138	111	931	307	187	742	37
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	31	67	124	347	134	50	123	1034	181	208	824	38
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	40	159	270	297	434	515	147	1125	740	172	1635	75
Arrive On Green	0.03	0.09	0.09	0.17	0.23	0.23	0.09	0.33	0.33	0.03	0.11	0.11
Sat Flow, veh/h	1491	1758	1528	1781	1885	1560	1706	3375	1480	1720	4711	217
Grp Volume(v), veh/h	31	67	124	347	134	50	123	1034	181	208	560	302
Grp Sat Flow(s),veh/h/ln	1491	1758	1528	1781	1885	1560	1706	1687	1480	1720	1603	1722
Q Serve(g_s), s	2.5	4.3	8.7	20.0	7.1	2.7	8.5	35.3	8.4	12.0	19.7	19.8
Cycle Q Clear(g_c), s	2.5	4.3	8.7	20.0	7.1	2.7	8.5	35.3	8.4	12.0	19.7	19.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.13
Lane Grp Cap(c), veh/h	40	159	270	297	434	515	147	1125	740	172	1112	598
V/C Ratio(X)	0.77	0.42	0.46	1.17	0.31	0.10	0.84	0.92	0.24	1.21	0.50	0.51
Avail Cap(c_a), veh/h	186	410	488	297	518	585	213	1125	740	172	1112	598
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96
Uniform Delay (d), s/veh	58.0	51.6	44.2	50.0	38.3	27.8	54.0	38.4	17.1	58.0	43.4	43.5
Incr Delay (d2), s/veh	11.1	0.7	0.5	106.0	0.1	0.0	11.8	13.3	0.8	134.8	1.6	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	3.4	5.9	26.2	5.8	1.8	7.3	22.7	5.2	18.8	13.4	14.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	52.2	44.7	156.0	38.4	27.8	65.8	51.8	17.9	192.8	45.0	46.4
LnGrp LOS	E	D	D	F	D	C	E	D	B	F	D	D
Approach Vol, veh/h		222			531			1338			1070	
Approach Delay, s/veh		50.4			114.3			48.5			74.1	
Approach LOS		D			F			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	15.9	17.0	45.0	8.2	32.7	15.4	46.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	10.7	14.0	37.3	4.5	9.1	10.5	21.8				
Green Ext Time (p_c), s	0.0	0.1	0.0	1.0	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			68.3									
HCM 6th LOS			E									

Timings
1: SE 192nd & SE 15th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	116	91	40	82	242	66	1268	115	1436
Future Volume (vph)	116	91	40	82	242	66	1268	115	1436
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effect Green (s)	9.0	15.7	6.2	10.9	19.7	7.1	52.3	9.7	56.9
Actuated g/C Ratio	0.09	0.16	0.06	0.11	0.20	0.07	0.52	0.10	0.57
v/c Ratio	0.79	0.59	0.38	0.43	0.68	0.54	0.74	0.69	0.83
Control Delay	78.1	36.7	54.0	45.7	30.8	52.8	24.3	63.7	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	36.7	54.0	45.7	30.8	52.8	24.3	63.7	26.4
LOS	E	D	D	D	C	D	C	E	C
Approach Delay		53.3		36.7			25.7		28.9
Approach LOS		D		D			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 30.4

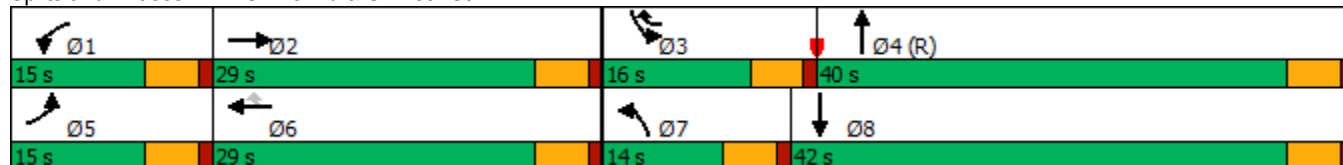
Intersection LOS: C

Intersection Capacity Utilization 79.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	91	82	40	82	242	66	1268	32	115	1436	133
Future Volume (veh/h)	116	91	82	40	82	242	66	1268	32	115	1436	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	122	96	49	42	86	192	69	1335	33	121	1512	135
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, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	150	218	111	62	248	345	103	1763	44	150	1729	153
Arrive On Green	0.09	0.19	0.19	0.03	0.13	0.13	0.11	1.00	1.00	0.08	0.52	0.52
Sat Flow, veh/h	1739	1176	600	1810	1856	1582	1810	3544	88	1810	3301	293
Grp Volume(v), veh/h	122	0	145	42	86	192	69	669	699	121	809	838
Grp Sat Flow(s),veh/h/ln	1739	0	1776	1810	1856	1582	1810	1777	1854	1810	1777	1816
Q Serve(g_s), s	6.9	0.0	7.2	2.3	4.2	10.8	3.7	0.7	0.7	6.6	39.8	40.8
Cycle Q Clear(g_c), s	6.9	0.0	7.2	2.3	4.2	10.8	3.7	0.7	0.7	6.6	39.8	40.8
Prop In Lane	1.00		0.34	1.00		1.00	1.00		0.05	1.00		0.16
Lane Grp Cap(c), veh/h	150	0	329	62	248	345	103	884	923	150	931	951
V/C Ratio(X)	0.82	0.00	0.44	0.67	0.35	0.56	0.67	0.76	0.76	0.81	0.87	0.88
Avail Cap(c_a), veh/h	174	0	426	181	445	513	163	884	923	199	931	951
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.43	0.43	0.43	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	36.2	47.7	39.4	34.9	43.4	0.1	0.1	45.1	20.8	21.1
Incr Delay (d2), s/veh	19.5	0.0	0.3	4.6	0.3	0.5	1.2	2.7	2.6	12.3	10.8	11.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	5.5	2.0	3.5	7.3	2.8	1.3	1.3	6.1	24.3	25.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	36.5	52.4	39.7	35.5	44.7	2.8	2.7	57.3	31.6	32.6
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	C	C
Approach Vol, veh/h		267			320			1437			1768	
Approach Delay, s/veh		49.2			38.8			4.7			33.8	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	23.5	13.3	54.8	13.6	18.4	10.7	57.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.3	9.2	8.6	2.7	8.9	12.8	5.7	42.8				
Green Ext Time (p_c), s	0.0	0.2	0.0	3.0	0.0	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			24.3									
HCM 6th LOS			C									

Timings
2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 		 			 		 
Traffic Volume (vph)	233	183	242	265	140	838	151	1038
Future Volume (vph)	233	183	242	265	140	838	151	1038
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	15.0	35.0	18.0	38.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	15.0%	35.0%	18.0%	38.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	11.3	24.2	11.5	24.4	9.7	32.6	11.7	34.6
Actuated g/C Ratio	0.11	0.24	0.12	0.24	0.10	0.33	0.12	0.35
v/c Ratio	0.62	0.64	0.63	0.88	0.83	0.89	0.75	1.10
Control Delay	49.0	38.8	49.0	56.7	86.6	25.9	63.5	88.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	38.8	49.0	56.7	86.6	25.9	63.5	88.4
LOS	D	D	D	E	F	C	E	F
Approach Delay		43.4		53.7		33.5		85.7
Approach LOS		D		D		C		F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 58.5

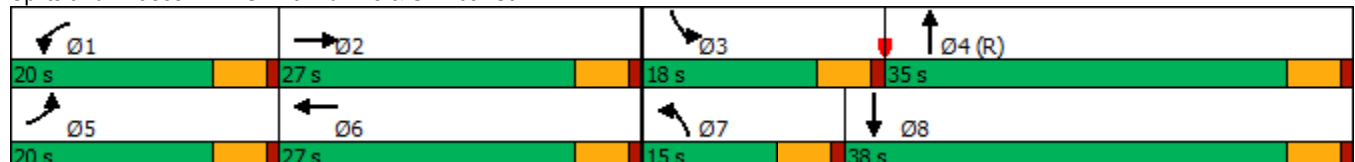
Intersection LOS: E

Intersection Capacity Utilization 88.5%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary

2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	183	92	242	265	118	140	838	150	151	1038	237
Future Volume (veh/h)	233	183	92	242	265	118	140	838	150	151	1038	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	243	191	78	252	276	106	146	873	141	157	1081	227
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	316	279	114	325	286	110	179	1185	191	191	1143	239
Arrive On Green	0.09	0.22	0.22	0.09	0.22	0.22	0.10	0.38	0.38	0.11	0.39	0.39
Sat Flow, veh/h	3510	1281	523	3510	1301	500	1810	3087	499	1795	2925	612
Grp Volume(v), veh/h	243	0	269	252	0	382	146	506	508	157	655	653
Grp Sat Flow(s),veh/h/ln	1755	0	1804	1755	0	1801	1810	1791	1795	1795	1777	1759
Q Serve(g_s), s	6.8	0.0	13.7	7.0	0.0	21.0	7.9	24.3	24.3	8.6	35.6	36.0
Cycle Q Clear(g_c), s	6.8	0.0	13.7	7.0	0.0	21.0	7.9	24.3	24.3	8.6	35.6	36.0
Prop In Lane	1.00		0.29	1.00		0.28	1.00		0.28	1.00		0.35
Lane Grp Cap(c), veh/h	316	0	392	325	0	396	179	688	689	191	695	688
V/C Ratio(X)	0.77	0.00	0.69	0.78	0.00	0.96	0.81	0.74	0.74	0.82	0.94	0.95
Avail Cap(c_a), veh/h	527	0	397	527	0	396	181	688	689	233	695	688
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.47	0.47	0.47
Uniform Delay (d), s/veh	44.5	0.0	36.0	44.4	0.0	38.6	44.1	26.5	26.5	43.8	29.4	29.5
Incr Delay (d2), s/veh	1.5	0.0	4.0	1.5	0.0	35.6	22.4	6.9	6.9	7.6	13.3	14.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	10.3	5.5	0.0	18.7	8.1	16.5	16.5	6.4	21.2	21.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	0.0	39.9	45.9	0.0	74.2	66.5	33.4	33.4	51.3	42.6	43.7
LnGrp LOS	D	A	D	D	A	E	E	C	C	D	D	D
Approach Vol, veh/h		512			634			1160			1465	
Approach Delay, s/veh		42.8			63.0			37.5			44.1	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.2	26.8	15.6	43.4	14.0	27.0	14.9	44.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	10.0	33.0				
Max Q Clear Time (g_c+I1), s	9.0	15.7	10.6	26.3	8.8	23.0	9.9	38.0				
Green Ext Time (p_c), s	0.2	0.5	0.0	1.6	0.2	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			45.1									
HCM 6th LOS			D									

Intersection							
Int Delay, s/veh	0.2						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Vol, veh/h	3	4	1138	3	10	1239	
Future Vol, veh/h	3	4	1138	3	10	1239	
Conflicting Peds, #/hr	0	0	0	2	2	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	125	0	-	-	230	-	
Veh in Median Storage, #	0	-	0	-	-	0	
Grade, %	0	-	0	-	-	0	
Peak Hour Factor	95	95	95	95	95	95	
Heavy Vehicles, %	0	0	1	0	0	1	
Mvmt Flow	3	4	1198	3	11	1304	
Major/Minor	Minor1	Major1		Major2			
Conflicting Flow All	1876	603	0	0	1203	0	
Stage 1	1202	-	-	-	-	-	
Stage 2	674	-	-	-	-	-	
Critical Hdwy	6.8	6.9	-	-	4.1	-	
Critical Hdwy Stg 1	5.8	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.5	3.3	-	-	2.2	-	
Pot Cap-1 Maneuver	65	447	-	-	587	-	
Stage 1	251	-	-	-	-	-	
Stage 2	473	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	64	446	-	-	586	-	
Mov Cap-2 Maneuver	64	-	-	-	-	-	
Stage 1	250	-	-	-	-	-	
Stage 2	464	-	-	-	-	-	
Approach	WB	NB		SB			
HCM Control Delay, s	35	0		0.1			
HCM LOS	E						
Minor Lane/Major Mvmt		NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)		-	-	64	446	586	-
HCM Lane V/C Ratio		-	-	0.049	0.009	0.018	-
HCM Control Delay (s)		-	-	64.2	13.1	11.3	-
HCM Lane LOS		-	-	F	B	B	-
HCM 95th %tile Q(veh)		-	-	0.2	0	0.1	-

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	166	213	355	187	120	124	955	204	212	932
Future Volume (vph)	166	213	355	187	120	124	955	204	212	932
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	29.3	20.8	39.8	26.3	26.3	9.9	35.2	49.2	10.0	35.3
Actuated g/C Ratio	0.29	0.21	0.40	0.26	0.26	0.10	0.35	0.49	0.10	0.35
v/c Ratio	0.46	0.86	1.11	0.39	0.22	0.73	0.80	0.24	0.65	0.92
Control Delay	24.3	56.6	106.9	31.8	1.9	67.9	36.2	2.0	40.5	32.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	56.6	106.9	31.8	1.9	67.9	36.2	2.0	40.5	32.9
LOS	C	E	F	C	A	E	D	A	D	C
Approach Delay		45.4		66.7			33.8			34.1
Approach LOS		D		E			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 41.3

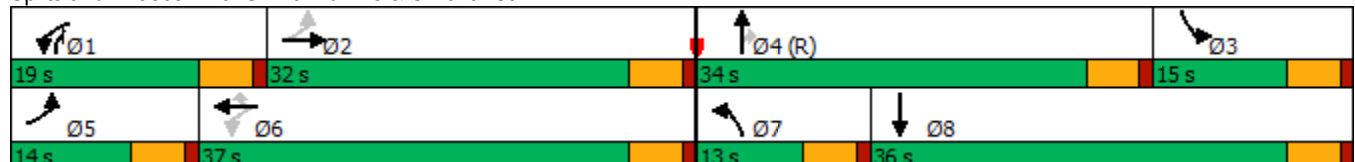
Intersection LOS: D

Intersection Capacity Utilization 91.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	213	103	355	187	120	124	955	204	212	932	138
Future Volume (veh/h)	166	213	103	355	187	120	124	955	204	212	932	138
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1773	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1743
Adj Flow Rate, veh/h	175	224	88	374	197	28	131	1005	100	223	981	133
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, %	5	0	2	1	1	0	0	2	1	0	1	7
Cap, veh/h	411	255	100	373	507	431	154	1095	726	570	1159	157
Arrive On Green	0.09	0.20	0.20	0.14	0.25	0.25	0.08	0.29	0.29	0.17	0.38	0.38
Sat Flow, veh/h	1688	1255	493	1908	2003	1704	1922	3777	1683	3413	3073	416
Grp Volume(v), veh/h	175	0	312	374	197	28	131	1005	100	223	555	559
Grp Sat Flow(s),veh/h/ln	1688	0	1748	1908	2003	1704	1922	1889	1683	1706	1741	1749
Q Serve(g_s), s	8.2	0.0	17.3	14.0	8.1	0.8	6.7	25.7	1.6	5.8	29.2	29.2
Cycle Q Clear(g_c), s	8.2	0.0	17.3	14.0	8.1	0.8	6.7	25.7	1.6	5.8	29.2	29.2
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	411	0	355	373	507	431	154	1095	726	570	656	659
V/C Ratio(X)	0.43	0.00	0.88	1.00	0.39	0.06	0.85	0.92	0.14	0.39	0.85	0.85
Avail Cap(c_a), veh/h	411	0	472	373	641	545	154	1095	726	570	656	659
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.00	0.81	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.9	0.0	38.7	28.9	30.9	11.7	45.4	34.3	5.9	37.1	28.5	28.5
Incr Delay (d2), s/veh	0.2	0.0	9.6	47.2	0.2	0.0	32.8	13.4	0.4	0.2	12.8	12.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.8	0.0	12.3	17.2	6.9	0.9	8.0	19.2	1.3	4.3	19.8	19.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	0.0	48.2	76.1	31.1	11.7	78.3	47.8	6.3	37.3	41.3	41.3
LnGrp LOS	C	A	D	F	C	B	E	D	A	D	D	D
Approach Vol, veh/h		487			599			1236			1337	
Approach Delay, s/veh		41.0			58.3			47.6			40.6	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	25.3	21.7	34.0	14.0	30.3	13.0	42.7				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	19.3	7.8	27.7	10.2	10.1	8.7	31.2				
Green Ext Time (p_c), s	0.0	0.4	0.0	0.5	0.0	0.3	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 45.9
HCM 6th LOS D

Notes

User approved pedestrian interval to be less than phase max green.

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 1 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	12	336	37	387	71	2	113	11	118
Future Volume (vph)	12	336	37	387	71	2	113	11	118
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2	1	6		8		4	
Permitted Phases					8		4		4
Detector Phase	5	2	1	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	Min	None	Min	None	None	None	None	None
Act Effect Green (s)	5.7	19.1	5.7	21.0	9.9	9.9		9.9	9.9
Actuated g/C Ratio	0.13	0.44	0.13	0.48	0.23	0.23		0.23	0.23
v/c Ratio	0.06	0.55	0.17	0.55	0.27	0.10		0.44	0.27
Control Delay	26.1	14.6	26.4	13.0	17.8	7.6		20.6	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.1	14.6	26.4	13.0	17.8	7.6		20.6	5.6
LOS	C	B	C	B	B	A		C	A
Approach Delay		14.9		14.0		14.5		13.3	
Approach LOS		B		B		B		B	

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 43.3

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 14.2

Intersection LOS: B

Intersection Capacity Utilization 52.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	336	80	37	387	69	71	2	32	113	11	118
Future Volume (veh/h)	12	336	80	37	387	69	71	2	32	113	11	118
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	1.00		0.99	0.99		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1841	1900	1900
Adj Flow Rate, veh/h	13	357	74	39	412	66	76	2	5	120	12	21
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	4	0	0
Cap, veh/h	30	589	122	77	651	104	320	86	216	410	33	293
Arrive On Green	0.02	0.39	0.39	0.04	0.42	0.42	0.18	0.18	0.18	0.18	0.18	0.18
Sat Flow, veh/h	1810	1501	311	1745	1551	249	1333	473	1183	1287	182	1605
Grp Volume(v), veh/h	13	0	431	39	0	478	76	0	7	132	0	21
Grp Sat Flow(s),veh/h/ln	1810	0	1812	1745	0	1800	1333	0	1656	1469	0	1605
Q Serve(g_s), s	0.3	0.0	7.5	0.9	0.0	8.3	2.1	0.0	0.1	2.9	0.0	0.4
Cycle Q Clear(g_c), s	0.3	0.0	7.5	0.9	0.0	8.3	5.3	0.0	0.1	3.1	0.0	0.4
Prop In Lane	1.00		0.17	1.00		0.14	1.00		0.71	0.91		1.00
Lane Grp Cap(c), veh/h	30	0	711	77	0	755	320	0	302	443	0	293
V/C Ratio(X)	0.43	0.00	0.61	0.51	0.00	0.63	0.24	0.00	0.02	0.30	0.00	0.07
Avail Cap(c_a), veh/h	230	0	3680	222	0	3657	1092	0	1262	1286	0	1223
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.2	0.0	9.5	18.4	0.0	9.0	16.8	0.0	13.2	14.4	0.0	13.3
Incr Delay (d2), s/veh	3.5	0.0	0.3	1.9	0.0	0.3	0.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.0	3.5	0.6	0.0	3.7	1.1	0.0	0.1	1.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	9.8	20.3	0.0	9.4	16.9	0.0	13.2	14.6	0.0	13.4
LnGrp LOS	C	A	A	C	A	A	B	A	B	B	A	B
Approach Vol, veh/h	444			517			83			153		
Approach Delay, s/veh	10.2			10.2			16.6			14.4		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	20.5		12.2	5.7	21.5		12.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.9	9.5		5.1	2.3	10.3		7.3				
Green Ext Time (p_c), s	0.0	0.4		0.1	0.0	0.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				11.2								
HCM 6th LOS				B								

Intersection												
Int Delay, s/veh	6.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	75	407	32	12	560	4	18	0	7	14	4	258
Future Vol, veh/h	75	407	32	12	560	4	18	0	7	14	4	258
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	1	1	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	140	-	-	95	-	0	0	-	-	-	-	0
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, %	0	2	0	0	2	0	0	0	0	0	0	0
Mvmt Flow	82	447	35	13	615	4	20	0	8	15	4	284

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	625	0	0	482	0	0	1416	1280	466	1281	1293	621
Stage 1	-	-	-	-	-	-	629	629	-	647	647	-
Stage 2	-	-	-	-	-	-	787	651	-	634	646	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	966	-	-	1091	-	-	116	167	601	144	164	491
Stage 1	-	-	-	-	-	-	474	478	-	463	470	-
Stage 2	-	-	-	-	-	-	388	468	-	471	470	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	960	-	-	1091	-	-	44	150	600	131	147	488
Mov Cap-2 Maneuver	-	-	-	-	-	-	44	150	-	131	147	-
Stage 1	-	-	-	-	-	-	434	437	-	421	462	-
Stage 2	-	-	-	-	-	-	159	460	-	425	430	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.3			0.2			84.9			23		
HCM LOS							F			C		

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	44	88	960	-	-	1091	-	-	134	488
HCM Lane V/C Ratio	0.3	0.162	0.086	-	-	0.012	-	-	0.148	0.581
HCM Control Delay (s)	118.6	53.7	9.1	-	-	8.3	-	-	36.5	22.1
HCM Lane LOS	F	F	A	-	-	A	-	-	E	C
HCM 95th %tile Q(veh)	1	0.5	0.3	-	-	0	-	-	0.5	3.6

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	141	413	12	700	10	6	99	15
Future Volume (vph)	141	413	12	700	10	6	99	15
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	55.4	54.8	45.4	43.4		11.5	11.6	11.6
Actuated g/C Ratio	0.73	0.72	0.60	0.57		0.15	0.15	0.15
v/c Ratio	0.48	0.35	0.02	0.85		0.08	0.51	0.07
Control Delay	21.9	9.4	8.0	27.2		24.9	37.5	22.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	21.9	9.4	8.0	27.2		24.9	37.5	22.4
LOS	C	A	A	C		C	D	C
Approach Delay		12.5		26.9		24.9		35.0
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 76

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 22.2

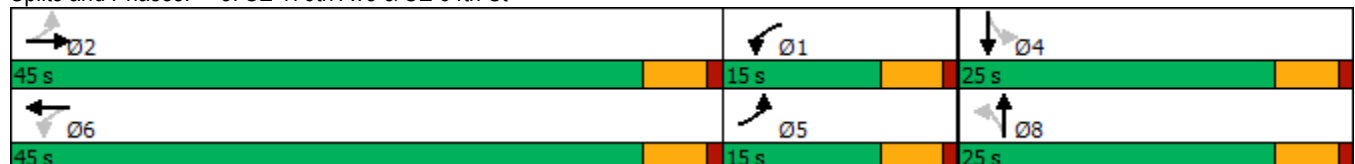
Intersection LOS: C

Intersection Capacity Utilization 73.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	413	13	12	700	124	10	6	2	99	15	5
Future Volume (veh/h)	141	413	13	12	700	124	10	6	2	99	15	5
Initial Q (Qb), 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		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	153	449	13	13	761	127	11	7	0	108	16	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	282	542	16	743	846	141	185	91	0	281	181	11
Arrive On Green	0.08	0.30	0.30	0.32	0.54	0.54	0.10	0.10	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1795	1809	52	1810	1575	263	755	884	0	1413	1766	110
Grp Volume(v), veh/h	153	0	462	13	0	888	18	0	0	108	0	17
Grp Sat Flow(s),veh/h/ln	1795	0	1861	1810	0	1838	1639	0	0	1413	0	1876
Q Serve(g_s), s	0.2	0.0	12.5	0.0	0.0	23.4	0.0	0.0	0.0	3.4	0.0	0.4
Cycle Q Clear(g_c), s	0.2	0.0	12.5	0.0	0.0	23.4	0.5	0.0	0.0	3.9	0.0	0.4
Prop In Lane	1.00		0.03	1.00		0.14	0.61		0.00	1.00		0.06
Lane Grp Cap(c), veh/h	282	0	557	743	0	988	275	0	0	281	0	192
V/C Ratio(X)	0.54	0.00	0.83	0.02	0.00	0.90	0.07	0.00	0.00	0.38	0.00	0.09
Avail Cap(c_a), veh/h	464	0	1374	743	0	1357	693	0	0	658	0	693
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.8	0.0	17.7	11.5	0.0	11.2	22.0	0.0	0.0	23.5	0.0	22.0
Incr Delay (d2), s/veh	0.6	0.0	1.2	0.0	0.0	5.3	0.0	0.0	0.0	0.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	0.0	8.1	0.2	0.0	12.2	0.4	0.0	0.0	2.3	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	18.9	11.5	0.0	16.5	22.1	0.0	0.0	23.8	0.0	22.1
LnGrp LOS	C	A	B	B	A	B	C	A	A	C	A	C
Approach Vol, veh/h		615			901			18			125	
Approach Delay, s/veh		20.0			16.4			22.1			23.6	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	22.4	21.2		10.6	9.5	34.1		10.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	14.5		5.9	2.2	25.4		2.5				
Green Ext Time (p_c), s	0.0	1.7		0.1	0.1	3.7		0.0				

Intersection Summary

HCM 6th Ctrl Delay 18.4

HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	31	15	263	94	105
Future Vol, veh/h	20	31	15	263	94	105
Conflicting Peds, #/hr	3	0	7	0	0	7
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	80	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	7	0	15	0	1	0
Mvmt Flow	22	33	16	283	101	113
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	483	165	221	0	-	0
Stage 1	165	-	-	-	-	-
Stage 2	318	-	-	-	-	-
Critical Hdwy	6.47	6.2	4.25	-	-	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.3	2.335	-	-	-
Pot Cap-1 Maneuver	534	885	1275	-	-	-
Stage 1	852	-	-	-	-	-
Stage 2	726	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	520	879	1267	-	-	-
Mov Cap-2 Maneuver	520	-	-	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	721	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	10.7	0.4		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1267	-	692	-	-	
HCM Lane V/C Ratio	0.013	-	0.079	-	-	
HCM Control Delay (s)	7.9	-	10.7	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

Intersection	
Intersection Delay, s/veh	81.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	466	62	89	503	18	43	122	73	27	85	28
Future Vol, veh/h	48	466	62	89	503	18	43	122	73	27	85	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	52	507	67	97	547	20	47	133	79	29	92	30
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	107.3	97.1	18.3	18.4
HCM LOS	F	F	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	19%
Vol Thru, %	0%	63%	0%	88%	0%	97%	61%
Vol Right, %	0%	37%	0%	12%	0%	3%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	43	195	48	528	89	521	140
LT Vol	43	0	48	0	89	0	27
Through Vol	0	122	0	466	0	503	85
RT Vol	0	73	0	62	0	18	28
Lane Flow Rate	47	212	52	574	97	566	152
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.116	0.48	0.114	1.152	0.209	1.139	0.377
Departure Headway (Hd)	9.531	8.753	8.25	7.596	8.194	7.635	9.678
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	379	415	437	482	441	481	374
Service Time	7.231	6.453	5.95	5.296	5.894	5.335	7.678
HCM Lane V/C Ratio	0.124	0.511	0.119	1.191	0.22	1.177	0.406
HCM Control Delay	13.5	19.3	12	116	13	111.5	18.4
HCM Lane LOS	B	C	B	F	B	F	C
HCM 95th-tile Q	0.4	2.5	0.4	19.5	0.8	18.9	1.7

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations											
Traffic Volume (vph)	89	30	55	152	22	50	44	1463	47	1326	
Future Volume (vph)	89	30	55	152	22	50	44	1463	47	1326	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Prot	NA	
Protected Phases		2			6		7	4	3	8	
Permitted Phases	2		2	6		6					
Detector Phase	2	2	2	6	6	6	7	4	3	8	
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	15.0	5.0	15.0	
Minimum Split (s)	39.0	39.0	39.0	38.0	38.0	38.0	10.0	32.0	19.5	32.0	
Total Split (s)	39.0	39.0	39.0	39.0	39.0	39.0	15.0	66.0	15.0	66.0	
Total Split (%)	32.5%	32.5%	32.5%	32.5%	32.5%	32.5%	12.5%	55.0%	12.5%	55.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag							Lead	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max	
Act Effct Green (s)	19.0	19.0	19.0	19.0	19.0	19.0	6.5	81.5	6.5	81.5	
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.05	0.68	0.05	0.68	
v/c Ratio	0.42	0.11	0.19	0.76	0.09	0.18	0.50	0.46	0.51	0.42	
Control Delay	48.9	39.8	8.9	68.9	39.3	7.7	50.5	23.7	73.1	10.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	48.9	39.8	8.9	68.9	39.3	7.7	50.5	23.7	73.1	10.8	
LOS	D	D	A	E	D	A	D	C	E	B	
Approach Delay		34.7			52.3			24.5		12.9	
Approach LOS		C			D			C		B	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 21.9

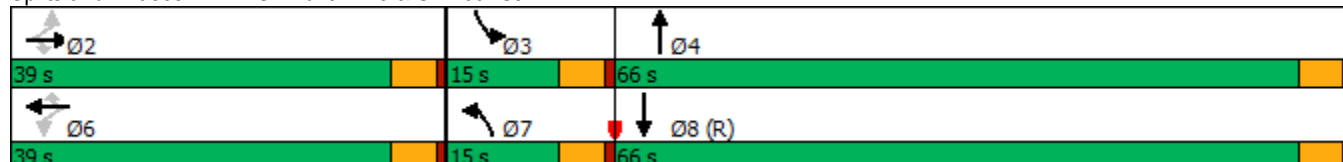
Intersection LOS: C

Intersection Capacity Utilization 61.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	30	55	152	22	50	44	1463	32	47	1326	46
Future Volume (veh/h)	89	30	55	152	22	50	44	1463	32	47	1326	46
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1826	1633	1856	1826	1870	1752	1870	1885	1900
Adj Flow Rate, veh/h	94	32	5	160	23	5	46	1540	33	49	1396	46
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, %	0	0	0	5	18	3	5	2	10	2	1	0
Cap, veh/h	262	298	251	250	256	245	59	2615	56	63	2610	86
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	0.03	0.51	0.51	0.04	0.51	0.51
Sat Flow, veh/h	1399	1900	1604	1334	1633	1566	1739	5144	110	1781	5117	169
Grp Volume(v), veh/h	94	32	5	160	23	5	46	1019	554	49	936	506
Grp Sat Flow(s),veh/h/ln	1399	1900	1604	1334	1633	1566	1739	1702	1850	1781	1716	1855
Q Serve(g_s), s	7.4	1.7	0.3	14.0	1.4	0.3	3.2	25.2	25.2	3.3	22.1	22.1
Cycle Q Clear(g_c), s	8.8	1.7	0.3	15.8	1.4	0.3	3.2	25.2	25.2	3.3	22.1	22.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.09
Lane Grp Cap(c), veh/h	262	298	251	250	256	245	59	1730	941	63	1750	946
V/C Ratio(X)	0.36	0.11	0.02	0.64	0.09	0.02	0.79	0.59	0.59	0.78	0.53	0.53
Avail Cap(c_a), veh/h	440	538	454	419	463	444	145	1730	941	148	1750	946
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.68	0.68	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	43.4	42.8	50.2	43.3	42.8	57.5	20.7	20.7	57.4	19.8	19.8
Incr Delay (d2), s/veh	0.3	0.1	0.0	1.0	0.1	0.0	5.8	1.0	1.8	7.4	1.2	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	1.5	0.2	8.4	1.1	0.2	2.6	13.9	15.2	2.8	13.5	14.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.4	43.5	42.8	51.2	43.3	42.8	63.3	21.7	22.5	64.8	21.0	22.0
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	C	C
Approach Vol, veh/h	131			188			1619			1491		
Approach Delay, s/veh	46.2			50.0			23.2			22.8		
Approach LOS	D			D			C			C		
Timer - Assigned Phs	2		3	4		6		7	8			
Phs Duration (G+Y+Rc), s	23.8		9.2	66.0		23.8		9.0	66.2			
Change Period (Y+Rc), s	5.0		5.0	5.0		5.0		5.0	5.0			
Max Green Setting (Gmax), s	34.0		10.0	61.0		34.0		10.0	61.0			
Max Q Clear Time (g_c+l1), s	10.8		5.3	27.2		17.8		5.2	24.1			
Green Ext Time (p_c), s	0.0		0.0	1.8		0.0		0.0	1.6			
Intersection Summary												
HCM 6th Ctrl Delay	25.3											
HCM 6th LOS	C											

Timings
12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	49	102	194	301	136	278	192	1216	346	188	1284
Future Volume (vph)	49	102	194	301	136	278	192	1216	346	188	1284
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	7.3	10.7	34.0	12.0	17.5	40.5	18.3	59.2	76.2	18.0	59.0
Actuated g/C Ratio	0.06	0.09	0.28	0.10	0.15	0.34	0.15	0.49	0.64	0.15	0.49
v/c Ratio	0.51	0.66	0.41	1.77	0.54	0.49	0.74	0.73	0.32	0.74	0.56
Control Delay	71.7	71.0	24.2	402.1	56.2	22.8	64.4	28.5	3.9	58.4	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	71.0	24.2	402.1	56.2	22.8	64.4	28.5	3.9	58.4	22.9
LOS	E	E	C	F	E	C	E	C	A	E	C
Approach Delay		44.8			188.8			27.6			27.3
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.77

Intersection Signal Delay: 55.5

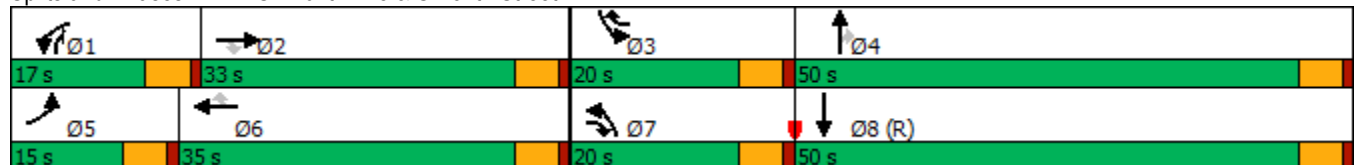
Intersection LOS: E

Intersection Capacity Utilization 82.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 1 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	102	194	301	136	278	192	1216	346	188	1284	49
Future Volume (veh/h)	49	102	194	301	136	278	192	1216	346	188	1284	49
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1767	1826	1885	1870	1841	1856	1885	1870	1885	1870	1870	1841
Adj Flow Rate, veh/h	51	106	152	314	142	217	200	1267	241	196	1338	48
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	64	183	359	178	298	451	224	1333	759	223	1898	68
Arrive On Green	0.04	0.10	0.10	0.10	0.16	0.16	0.13	0.38	0.38	0.04	0.12	0.12
Sat Flow, veh/h	1682	1826	1598	1781	1841	1572	1795	3554	1598	1781	5060	182
Grp Volume(v), veh/h	51	106	152	314	142	217	200	1267	241	196	900	486
Grp Sat Flow(s),veh/h/ln	1682	1826	1598	1781	1841	1572	1795	1777	1598	1781	1702	1838
Q Serve(g_s), s	3.6	6.7	9.8	12.0	8.4	13.7	13.2	41.6	11.2	13.1	30.5	30.5
Cycle Q Clear(g_c), s	3.6	6.7	9.8	12.0	8.4	13.7	13.2	41.6	11.2	13.1	30.5	30.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	64	183	359	178	298	451	224	1333	759	223	1277	689
V/C Ratio(X)	0.79	0.58	0.42	1.76	0.48	0.48	0.89	0.95	0.32	0.88	0.71	0.71
Avail Cap(c_a), veh/h	140	426	572	178	460	590	224	1333	759	223	1277	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90
Uniform Delay (d), s/veh	57.2	51.6	39.8	54.0	45.7	35.4	51.7	36.4	19.5	56.6	46.2	46.2
Incr Delay (d2), s/veh	7.9	1.1	0.3	365.2	0.4	0.3	31.8	15.4	1.1	27.6	3.0	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	5.5	6.9	37.0	6.9	8.9	12.4	27.4	7.6	12.4	20.3	22.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	52.7	40.1	419.2	46.1	35.7	83.5	51.8	20.6	84.2	49.2	51.6
LnGrp LOS	E	D	D	F	D	D	F	D	C	F	D	D
Approach Vol, veh/h		309			673			1708			1582	
Approach Delay, s/veh		48.6			216.8			51.1			54.3	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	17.0	20.0	50.0	9.6	24.4	20.0	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	11.8	15.1	43.6	5.6	15.7	15.2	32.5				
Green Ext Time (p_c), s	0.0	0.2	0.0	0.7	0.0	0.3	0.0	2.9				
Intersection Summary												
HCM 6th Ctrl Delay				78.2								
HCM 6th LOS				E								

Appendix G 2038 With-Project Phase 2
Buildout Operations
Worksheets & Re-routed trips

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 2 2038 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	45	29	64	158	58	973	89	848
Future Volume (vph)	156	45	29	64	158	58	973	89	848
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	12.4	18.7	5.9	10.2	22.0	7.3	50.6	8.8	54.1
Actuated g/C Ratio	0.12	0.19	0.06	0.10	0.22	0.07	0.51	0.09	0.54
v/c Ratio	0.80	0.28	0.32	0.38	0.42	0.50	0.63	0.69	0.58
Control Delay	67.8	20.2	53.4	45.3	17.7	61.3	18.5	69.1	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	20.2	53.4	45.3	17.7	61.3	18.5	69.1	21.6
LOS	E	C	D	D	B	E	B	E	C
Approach Delay		50.5		28.8			20.8		25.7
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 26.4

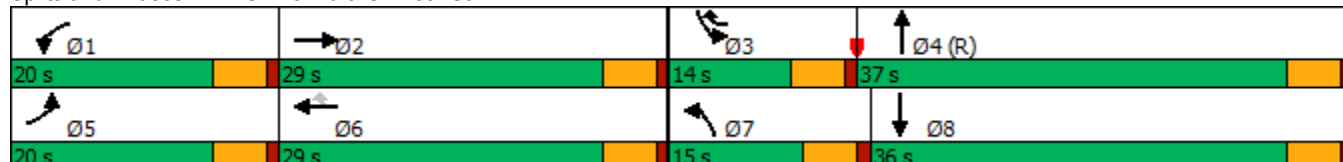
Intersection LOS: C

Intersection Capacity Utilization 60.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	45	44	29	64	158	58	973	16	89	848	87
Future Volume (veh/h)	156	45	44	29	64	158	58	973	16	89	848	87
Initial Q (Qb), 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		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	173	50	8	32	71	103	64	1081	17	99	942	91
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	204	266	42	50	148	244	97	1869	29	122	1699	164
Arrive On Green	0.12	0.17	0.17	0.03	0.08	0.08	0.11	1.00	1.00	0.07	0.55	0.55
Sat Flow, veh/h	1767	1598	256	1697	1841	1585	1767	3523	55	1654	3092	299
Grp Volume(v), veh/h	173	0	58	32	71	103	64	537	561	99	511	522
Grp Sat Flow(s),veh/h/ln	1767	0	1854	1697	1841	1585	1767	1749	1829	1654	1678	1713
Q Serve(g_s), s	9.6	0.0	2.7	1.9	3.7	5.9	3.5	0.0	0.0	5.9	19.7	19.7
Cycle Q Clear(g_c), s	9.6	0.0	2.7	1.9	3.7	5.9	3.5	0.0	0.0	5.9	19.7	19.7
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.03	1.00		0.17
Lane Grp Cap(c), veh/h	204	0	308	50	148	244	97	928	970	122	922	941
V/C Ratio(X)	0.85	0.00	0.19	0.64	0.48	0.42	0.66	0.58	0.58	0.81	0.55	0.55
Avail Cap(c_a), veh/h	265	0	445	254	442	498	177	928	970	149	922	941
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	35.9	48.0	44.0	38.3	43.6	0.0	0.0	45.6	14.6	14.6
Incr Delay (d2), s/veh	14.7	0.0	0.1	5.0	0.9	0.4	2.2	2.1	2.0	19.5	2.4	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	2.2	1.5	3.1	4.0	2.7	1.0	1.0	5.4	11.8	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.0	53.0	44.9	38.7	45.8	2.1	2.0	65.1	17.0	16.9
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h		231			206			1162			1132	
Approach Delay, s/veh		52.6			43.0			4.4			21.2	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	21.6	12.4	58.0	16.5	13.0	10.5	60.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.9	4.7	7.9	2.0	11.6	7.9	5.5	21.7				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.2	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			18.4									
HCM 6th LOS			B									

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 		 			 		 
Traffic Volume (vph)	166	182	140	165	46	764	59	708
Future Volume (vph)	166	182	140	165	46	764	59	708
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	9.4	18.6	8.6	17.8	7.3	47.0	7.7	45.4
Actuated g/C Ratio	0.09	0.19	0.09	0.18	0.07	0.47	0.08	0.45
v/c Ratio	0.55	0.80	0.49	0.70	0.39	0.60	0.45	0.56
Control Delay	49.5	52.2	49.0	46.5	63.3	10.5	52.2	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	52.2	49.0	46.5	63.3	10.5	52.2	28.3
LOS	D	D	D	D	E	B	D	C
Approach Delay		51.2		47.4		13.0		30.0
Approach LOS		D		D		B		C

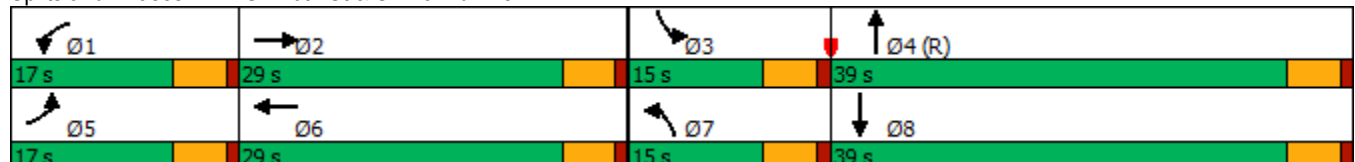
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 29.6
 Intersection Capacity Utilization 65.8%
 Analysis Period (min) 15

Intersection LOS: C

ICU Level of Service C

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	182	84	140	165	57	46	764	156	59	708	103
Future Volume (veh/h)	166	182	84	140	165	57	46	764	156	59	708	103
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	175	192	70	147	174	23	48	804	147	62	745	97
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	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	242	221	81	214	256	34	86	1570	287	80	1599	208
Arrive On Green	0.07	0.17	0.17	0.06	0.16	0.16	0.05	0.53	0.53	0.06	0.69	0.69
Sat Flow, veh/h	3428	1328	484	3483	1631	216	1725	2976	544	1795	3061	398
Grp Volume(v), veh/h	175	0	262	147	0	197	48	476	475	62	419	423
Grp Sat Flow(s),veh/h/ln	1714	0	1813	1742	0	1846	1725	1763	1757	1795	1721	1739
Q Serve(g_s), s	5.0	0.0	14.1	4.1	0.0	10.1	2.7	17.5	17.5	3.4	11.0	11.0
Cycle Q Clear(g_c), s	5.0	0.0	14.1	4.1	0.0	10.1	2.7	17.5	17.5	3.4	11.0	11.0
Prop In Lane	1.00		0.27	1.00		0.12	1.00		0.31	1.00		0.23
Lane Grp Cap(c), veh/h	242	0	301	214	0	290	86	930	927	80	899	908
V/C Ratio(X)	0.72	0.00	0.87	0.69	0.00	0.68	0.56	0.51	0.51	0.78	0.47	0.47
Avail Cap(c_a), veh/h	411	0	435	418	0	443	172	930	927	180	899	908
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.79	0.79	0.79
Uniform Delay (d), s/veh	45.5	0.0	40.6	46.0	0.0	39.8	46.4	15.3	15.3	46.5	9.0	9.0
Incr Delay (d2), s/veh	1.5	0.0	9.2	1.5	0.0	1.0	2.1	2.0	2.0	4.7	1.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	0.0	11.1	3.2	0.0	8.0	2.1	11.2	11.2	2.8	6.2	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	49.8	47.5	0.0	40.8	48.5	17.3	17.3	51.2	10.3	10.3
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	B	B
Approach Vol, veh/h		437			344			999			904	
Approach Delay, s/veh		48.7			43.7			18.8			13.1	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.1	21.6	9.5	57.8	12.1	20.7	10.0	57.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	6.1	16.1	5.4	19.5	7.0	12.1	4.7	13.0				
Green Ext Time (p_c), s	0.1	0.5	0.0	3.3	0.1	0.5	0.0	3.2				
Intersection Summary												
HCM 6th Ctrl Delay			24.9									
HCM 6th LOS			C									
Notes												
User approved pedestrian interval to be less than phase max green.												

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	888	3	7	906
Future Vol, veh/h	7	10	888	3	7	906
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	20	4	67	0	7
Mvmt Flow	7	11	935	3	7	954
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1429	470	0	0	939	0
Stage 1	938	-	-	-	-	-
Stage 2	491	-	-	-	-	-
Critical Hdwy	6.8	7.3	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.5	-	-	2.2	-
Pot Cap-1 Maneuver	128	494	-	-	738	-
Stage 1	346	-	-	-	-	-
Stage 2	586	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	127	494	-	-	737	-
Mov Cap-2 Maneuver	127	-	-	-	-	-
Stage 1	346	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	21.7	0		0.1		
HCM LOS	C					
Minor Lane/Major Mvmt		NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)		-	-	127 494	737	-
HCM Lane V/C Ratio		-	-	0.058 0.021	0.01	-
HCM Control Delay (s)		-	-	35.1 12.4	9.9	-
HCM Lane LOS		-	-	E B	A	-
HCM 95th %tile Q(veh)		-	-	0.2 0.1	0	-

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	199	170	207	145	67	153	704	349	108	547
Future Volume (vph)	199	170	207	145	67	153	704	349	108	547
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	31.5	21.8	31.6	21.8	21.8	12.8	38.5	48.2	10.0	35.7
Actuated g/C Ratio	0.32	0.22	0.32	0.22	0.22	0.13	0.38	0.48	0.10	0.36
v/c Ratio	0.59	0.84	0.89	0.38	0.15	0.73	0.60	0.40	0.35	0.75
Control Delay	29.3	50.7	59.3	34.4	0.7	61.4	28.7	2.4	43.1	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	50.7	59.3	34.4	0.7	61.4	28.7	2.4	43.1	30.9
LOS	C	D	E	C	A	E	C	A	D	C
Approach Delay		42.3		41.4			25.3			32.4
Approach LOS		D		D			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 32.4

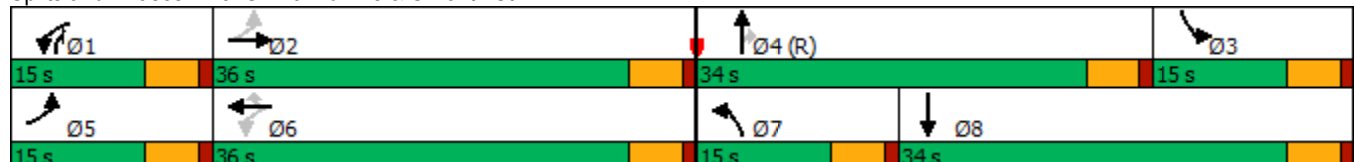
Intersection LOS: C

Intersection Capacity Utilization 77.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

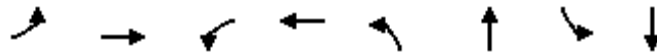
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	199	170	136	207	145	67	153	704	349	108	547	221
Future Volume (veh/h)	199	170	136	207	145	67	153	704	349	108	547	221
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1728	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1684
Adj Flow Rate, veh/h	221	189	114	230	161	7	170	782	154	120	608	202
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	8	3	0	5	0	2	0	9	2	1	11	11
Cap, veh/h	395	221	133	298	424	347	192	1037	655	677	920	305
Arrive On Green	0.10	0.21	0.21	0.10	0.21	0.21	0.10	0.29	0.29	0.20	0.39	0.39
Sat Flow, veh/h	1646	1051	634	1850	2018	1653	1922	3578	1679	3385	2359	782
Grp Volume(v), veh/h	221	0	303	230	161	7	170	782	154	120	412	398
Grp Sat Flow(s),veh/h/ln	1646	0	1684	1850	2018	1653	1922	1789	1679	1693	1600	1542
Q Serve(g_s), s	10.0	0.0	17.3	9.8	6.8	0.2	8.7	19.9	2.6	2.9	21.2	21.2
Cycle Q Clear(g_c), s	10.0	0.0	17.3	9.8	6.8	0.2	8.7	19.9	2.6	2.9	21.2	21.2
Prop In Lane	1.00		0.38	1.00		1.00	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	395	0	354	298	424	347	192	1037	655	677	624	601
V/C Ratio(X)	0.56	0.00	0.86	0.77	0.38	0.02	0.88	0.75	0.23	0.18	0.66	0.66
Avail Cap(c_a), veh/h	395	0	522	298	626	513	192	1037	655	677	624	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.81	0.00	0.81	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.2	0.0	38.1	29.1	33.9	12.1	44.4	32.3	7.2	33.2	25.1	25.1
Incr Delay (d2), s/veh	0.9	0.0	5.2	10.7	0.2	0.0	34.1	5.1	0.8	0.0	5.4	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.1	0.0	11.4	8.7	5.9	0.2	9.8	13.8	2.2	2.1	13.3	12.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	0.0	43.2	39.8	34.1	12.1	78.5	37.3	8.0	33.2	30.5	30.7
LnGrp LOS	C	A	D	D	C	B	E	D	A	C	C	C
Approach Vol, veh/h		524			398			1106			930	
Approach Delay, s/veh		37.3			37.0			39.6			30.9	
Approach LOS		D			D			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	26.0	25.0	34.0	15.0	26.0	15.0	44.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	11.8	19.3	4.9	21.9	12.0	8.8	10.7	23.2				
Green Ext Time (p_c), s	0.0	0.5	0.0	1.4	0.0	0.2	0.0	1.1				
Intersection Summary												
HCM 6th Ctrl Delay			36.1									
HCM 6th LOS			D									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 2 2038 AM Peak Hour Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	115	290	27	238	63	19	231	4
Future Volume (vph)	115	290	27	238	63	19	231	4
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effect Green (s)	5.2	34.2	5.2	29.1	21.7	21.7	21.7	21.7
Actuated g/C Ratio	0.07	0.48	0.07	0.41	0.30	0.30	0.30	0.30
v/c Ratio	1.08	0.45	0.25	0.83	0.20	0.14	0.70	0.11
Control Delay	144.1	16.3	42.8	28.0	22.1	10.2	34.1	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	144.1	16.3	42.8	28.0	22.1	10.2	34.1	7.8
LOS	F	B	D	C	C	B	C	A
Approach Delay		50.5		28.8		16.3		29.4
Approach LOS		D		C		B		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 71.7

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 34.7

Intersection LOS: C

Intersection Capacity Utilization 66.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

10 s	85 s	35 s
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	290	24	27	238	249	63	19	41	231	4	45
Future Volume (veh/h)	115	290	24	27	238	249	63	19	41	231	4	45
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	142	358	26	33	294	254	78	23	7	285	5	8
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	172	730	53	65	332	286	469	342	104	466	163	261
Arrive On Green	0.09	0.43	0.43	0.04	0.37	0.37	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1810	1695	123	1787	891	769	1372	1381	420	1401	658	1053
Grp Volume(v), veh/h	142	0	384	33	0	548	78	0	30	285	0	13
Grp Sat Flow(s),veh/h/ln	1810	0	1818	1787	0	1660	1372	0	1801	1401	0	1711
Q Serve(g_s), s	4.1	0.0	8.0	1.0	0.0	16.3	2.4	0.0	0.7	10.3	0.0	0.3
Cycle Q Clear(g_c), s	4.1	0.0	8.0	1.0	0.0	16.3	2.7	0.0	0.7	11.0	0.0	0.3
Prop In Lane	1.00		0.07	1.00		0.46	1.00		0.23	1.00		0.62
Lane Grp Cap(c), veh/h	172	0	783	65	0	618	469	0	446	466	0	424
V/C Ratio(X)	0.83	0.00	0.49	0.51	0.00	0.89	0.17	0.00	0.07	0.61	0.00	0.03
Avail Cap(c_a), veh/h	172	0	2762	170	0	2522	911	0	1026	917	0	975
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	10.8	24.9	0.0	15.5	16.0	0.0	15.1	19.3	0.0	15.0
Incr Delay (d2), s/veh	25.6	0.0	0.2	2.3	0.0	1.8	0.1	0.0	0.0	0.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.9	0.0	4.4	0.7	0.0	8.8	1.3	0.0	0.5	5.6	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	0.0	11.0	27.2	0.0	17.2	16.1	0.0	15.2	19.8	0.0	15.0
LnGrp LOS	D	A	B	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h	526			581			108			298		
Approach Delay, s/veh	21.2			17.8			15.8			19.6		
Approach LOS	C			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	27.7		18.1	10.0	24.6		18.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	3.0	10.0		13.0	6.1	18.3		4.7				
Green Ext Time (p_c), s	0.0	0.7		0.1	0.0	1.2		0.1				
Intersection Summary												
HCM 6th Ctrl Delay	19.2											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	413	11	7	339	29	17
Future Vol, veh/h	413	11	7	339	29	17
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	3	0	0	5	0	0
Mvmt Flow	486	13	8	399	34	20
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	502	0	911	496
Stage 1	-	-	-	-	496	-
Stage 2	-	-	-	-	415	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1073	-	307	578
Stage 1	-	-	-	-	616	-
Stage 2	-	-	-	-	671	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1070	-	304	576
Mov Cap-2 Maneuver	-	-	-	-	304	-
Stage 1	-	-	-	-	614	-
Stage 2	-	-	-	-	666	-
Approach	EB	WB		NB		
HCM Control Delay, s	0	0.2		16.5		
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	368	-	-	1070	-	
HCM Lane V/C Ratio	0.147	-	-	0.008	-	
HCM Control Delay (s)	16.5	-	-	8.4	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	236	352	4	305	14	7	66	4
Future Volume (vph)	236	352	4	305	14	7	66	4
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	31.5	31.9	25.7	19.3	9.3	9.3	9.3	9.3
Actuated g/C Ratio	0.64	0.65	0.52	0.39	0.19	0.19	0.19	0.19
v/c Ratio	0.48	0.35	0.01	0.62	0.07	0.05	0.30	0.31
Control Delay	12.9	10.5	7.0	18.7	19.3	15.0	22.3	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	10.5	7.0	18.7	19.3	15.0	22.3	7.4
LOS	B	B	A	B	B	B	C	A
Approach Delay		11.5		18.6		17.2		13.2
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 49.4

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 14.1

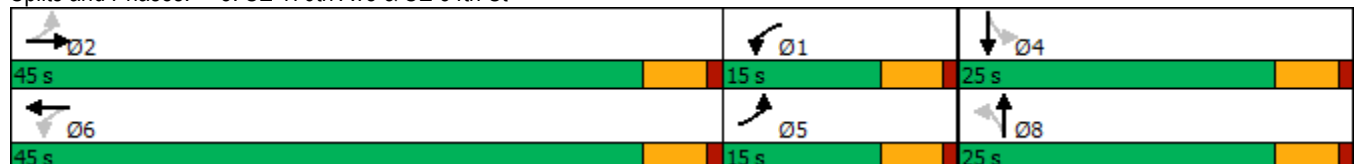
Intersection LOS: B

Intersection Capacity Utilization 55.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	236	352	2	4	305	59	14	7	6	66	4	100
Future Volume (veh/h)	236	352	2	4	305	59	14	7	6	66	4	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		1.00	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	278	414	2	5	359	57	16	8	0	78	5	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	569	711	3	613	590	94	331	202	0	326	202	0
Arrive On Green	0.12	0.39	0.39	0.12	0.39	0.39	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1682	1845	9	1810	1524	242	1407	1900	0	1382	1900	0
Grp Volume(v), veh/h	278	0	416	5	0	416	16	8	0	78	5	0
Grp Sat Flow(s),veh/h/ln	1682	0	1854	1810	0	1766	1407	1900	0	1382	1900	0
Q Serve(g_s), s	0.0	0.0	6.9	0.0	0.0	7.4	0.4	0.1	0.0	2.1	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	6.9	0.0	0.0	7.4	0.5	0.1	0.0	2.2	0.1	0.0
Prop In Lane	1.00		0.00	1.00		0.14	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	569	0	714	613	0	684	331	202	0	326	202	0
V/C Ratio(X)	0.49	0.00	0.58	0.01	0.00	0.61	0.05	0.04	0.00	0.24	0.02	0.00
Avail Cap(c_a), veh/h	795	0	1901	852	0	1810	903	974	0	888	974	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.6	0.0	9.5	8.8	0.0	9.6	15.8	15.6	0.0	16.6	15.6	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.3	0.0	0.0	0.3	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	0.0	3.3	0.0	0.0	3.3	0.2	0.1	0.0	1.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.8	0.0	9.8	8.8	0.0	9.9	15.9	15.7	0.0	16.8	15.6	0.0
LnGrp LOS	B	A	A	A	A	A	B	B	A	B	B	A
Approach Vol, veh/h	694				421				24			
Approach Delay, s/veh	11.0				9.9				15.8			
Approach LOS	B				A				B			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	20.0		9.1	9.8	20.1		9.1				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	8.9		4.2	2.0	9.4		2.5				
Green Ext Time (p_c), s	0.0	1.5		0.1	0.3	1.6		0.0				

Intersection Summary

HCM 6th Ctrl Delay 11.1
HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

MOVEMENT SUMMARY

 **Site: 101 [SE 176 Avenue/ SE 29th Street Phase 2 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 2
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: SE 176th Avenue															
3	L2	All MCs	5	0.0	5	0.0	0.315	5.9	LOS A	1.8	44.4	0.37	0.18	0.37	32.8
8	T1	All MCs	144	2.0	144	2.0	0.315	6.0	LOS A	1.8	44.4	0.37	0.18	0.37	33.5
18	R2	All MCs	225	0.0	225	0.0	0.315	5.9	LOS A	1.8	44.4	0.37	0.18	0.37	33.2
Approach			373	0.8	373	0.8	0.315	5.9	LOS A	1.8	44.4	0.37	0.18	0.37	33.3
East: SE 29th Street															
1	L2	All MCs	74	0.0	74	0.0	0.286	5.6	LOS A	1.5	38.6	0.37	0.20	0.37	32.5
6	T1	All MCs	215	0.0	215	0.0	0.286	5.6	LOS A	1.5	38.6	0.37	0.20	0.37	33.1
16	R2	All MCs	46	0.0	46	0.0	0.286	5.6	LOS A	1.5	38.6	0.37	0.20	0.37	32.9
Approach			335	0.0	335	0.0	0.286	5.6	LOS A	1.5	38.6	0.37	0.20	0.37	33.0
North: SE 176th Avenue															
7	L2	All MCs	20	88.0	20	88.0	0.291	16.9	LOS C	1.2	35.0	0.50	0.33	0.50	29.7
4	T1	All MCs	105	1.0	105	1.0	0.291	5.9	LOS A	1.2	35.0	0.50	0.33	0.50	32.8
14	R2	All MCs	122	18.0	122	18.0	0.291	7.5	LOS A	1.2	35.0	0.50	0.33	0.50	32.2
Approach			247	16.5	247	16.5	0.291	7.4	LOS A	1.2	35.0	0.50	0.33	0.50	32.2
West: SE 29th Street															
5	L2	All MCs	6	0.0	6	0.0	0.109	4.1	LOS A	0.5	12.1	0.37	0.22	0.37	33.6
2	T1	All MCs	98	0.0	98	0.0	0.109	4.1	LOS A	0.5	12.1	0.37	0.22	0.37	34.3
12	R2	All MCs	15	10.0	15	10.0	0.109	5.0	LOS A	0.5	12.1	0.37	0.22	0.37	33.8
Approach			119	1.3	119	1.3	0.109	4.2	LOS A	0.5	12.1	0.37	0.22	0.37	34.2
All Vehicles			1074	4.2	1074	4.2	0.315	6.0	LOS A	1.8	44.4	0.40	0.23	0.40	33.0

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

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 AM.sip9

Intersection												
Intersection Delay, s/veh	15.1											
Intersection LOS	C											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	272	33	76	314	14	47	85	56	0	66	10
Future Vol, veh/h	12	272	33	76	314	14	47	85	56	0	66	10
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	13	299	36	84	345	15	52	93	62	0	73	11
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	16.5	16.1	11.9	11.6
HCM LOS	C	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	60%	0%	89%	0%	96%	87%
Vol Right, %	0%	40%	0%	11%	0%	4%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	47	141	12	305	76	328	76
LT Vol	47	0	12	0	76	0	0
Through Vol	0	85	0	272	0	314	66
RT Vol	0	56	0	33	0	14	10
Lane Flow Rate	52	155	13	335	84	360	84
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.107	0.286	0.024	0.57	0.152	0.599	0.165
Departure Headway (Hd)	7.446	6.637	6.633	6.117	6.573	5.984	7.119
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	479	539	538	587	544	602	500
Service Time	5.22	4.409	4.399	3.883	4.336	3.746	5.211
HCM Lane V/C Ratio	0.109	0.288	0.024	0.571	0.154	0.598	0.168
HCM Control Delay	11.1	12.1	9.6	16.8	10.5	17.4	11.6
HCM Lane LOS	B	B	A	C	B	C	B
HCM 95th-tile Q	0.4	1.2	0.1	3.6	0.5	4	0.6

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	42	14	46	202	35	140	23	1081	92	795
Future Volume (vph)	42	14	46	202	35	140	23	1081	92	795
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	10.0	32.0
Total Split (s)	10.0	25.0	25.0	14.0	29.0	29.0	17.0	44.0	37.0	64.0
Total Split (%)	8.3%	20.8%	20.8%	11.7%	24.2%	24.2%	14.2%	36.7%	30.8%	53.3%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	15.9	12.0	12.0	23.3	15.2	15.2	5.7	71.8	10.0	80.1
Actuated g/C Ratio	0.13	0.10	0.10	0.19	0.13	0.13	0.05	0.60	0.08	0.67
v/c Ratio	0.22	0.08	0.16	0.85	0.16	0.44	0.28	0.38	0.66	0.26
Control Delay	39.2	47.7	1.2	71.7	46.1	10.8	64.1	7.1	72.8	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	47.7	1.2	71.7	46.1	10.8	64.1	7.1	72.8	9.8
LOS	D	D	A	E	D	B	E	A	E	A
Approach Delay		23.3			46.8			8.3		16.2
Approach LOS		C			D			A		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 4 (3%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 17.6

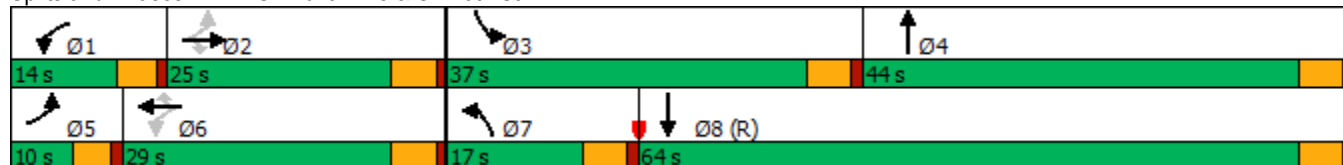
Intersection LOS: B

Intersection Capacity Utilization 58.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	14	46	202	35	140	23	1081	15	92	795	26
Future Volume (veh/h)	42	14	46	202	35	140	23	1081	15	92	795	26
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1856	1900	1856	1870	1870	1900	1900	1870	1796	1885	1856	1826
Adj Flow Rate, veh/h	44	15	7	213	37	22	24	1138	15	97	837	25
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	0	3	2	2	0	0	2	7	1	3	5
Cap, veh/h	226	156	129	305	242	208	42	2323	31	121	2485	74
Arrive On Green	0.03	0.08	0.08	0.08	0.13	0.13	0.02	0.45	0.45	0.07	0.49	0.49
Sat Flow, veh/h	1767	1900	1572	1781	1870	1610	1810	5194	68	1795	5055	151
Grp Volume(v), veh/h	44	15	7	213	37	22	24	746	407	97	559	303
Grp Sat Flow(s), veh/h/ln	1767	1900	1572	1781	1870	1610	1810	1702	1858	1795	1689	1828
Q Serve(g_s), s	2.7	0.9	0.5	9.5	2.1	1.4	1.6	18.6	18.6	6.4	12.1	12.1
Cycle Q Clear(g_c), s	2.7	0.9	0.5	9.5	2.1	1.4	1.6	18.6	18.6	6.4	12.1	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.04	1.00		0.08
Lane Grp Cap(c), veh/h	226	156	129	305	242	208	42	1522	831	121	1660	899
V/C Ratio(X)	0.19	0.10	0.05	0.70	0.15	0.11	0.58	0.49	0.49	0.80	0.34	0.34
Avail Cap(c_a), veh/h	250	317	262	305	374	322	181	1522	831	479	1660	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	51.0	50.8	47.1	46.4	46.1	58.0	23.5	23.5	55.2	18.6	18.6
Incr Delay (d2), s/veh	0.4	0.1	0.1	6.9	0.1	0.1	3.6	0.9	1.6	4.6	0.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.8	0.3	3.8	1.8	1.0	1.4	11.3	12.4	5.4	8.2	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.7	51.1	50.8	53.9	46.5	46.2	61.7	24.4	25.1	59.7	19.1	19.6
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	B	B
Approach Vol, veh/h		66			272			1177			959	
Approach Delay, s/veh		49.5			52.3			25.4			23.4	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	14.8	13.1	58.7	8.3	20.5	7.8	64.0				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	9.5	20.0	32.0	39.0	5.5	24.0	12.0	59.0				
Max Q Clear Time (g_c+I1), s	11.5	2.9	8.4	20.6	4.7	4.1	3.6	14.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	4.7	0.0	0.1	0.0	3.7				

Intersection Summary

HCM 6th Ctrl Delay	28.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Timings
12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	60	165	302	121	109	111	931	366	158	803
Future Volume (vph)	28	60	165	302	121	109	111	931	366	158	803
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	6.4	8.2	23.0	20.0	23.8	47.0	11.8	55.6	80.6	18.2	62.0
Actuated g/C Ratio	0.05	0.07	0.19	0.17	0.20	0.39	0.10	0.46	0.67	0.15	0.52
v/c Ratio	0.39	0.56	0.53	1.14	0.36	0.18	0.72	0.64	0.35	0.66	0.37
Control Delay	68.3	70.9	31.3	140.5	45.0	4.6	74.0	28.4	1.9	65.2	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	70.9	31.3	140.5	45.0	4.6	74.0	28.4	1.9	65.2	14.5
LOS	E	E	C	F	D	A	E	C	A	E	B
Approach Delay		44.8			91.0			25.1			22.6
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 36.9

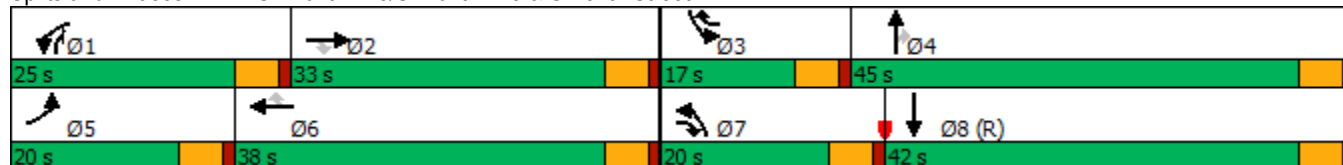
Intersection LOS: D

Intersection Capacity Utilization 70.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 2 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	60	165	302	121	109	111	931	366	158	803	37
Future Volume (veh/h)	28	60	165	302	121	109	111	931	366	158	803	37
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	31	67	124	336	134	33	123	1034	235	176	892	38
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	40	159	270	297	434	515	147	1125	740	172	1641	70
Arrive On Green	0.03	0.09	0.09	0.17	0.23	0.23	0.09	0.33	0.33	0.20	0.69	0.69
Sat Flow, veh/h	1491	1758	1528	1781	1885	1560	1706	3375	1480	1720	4730	201
Grp Volume(v), veh/h	31	67	124	336	134	33	123	1034	235	176	604	326
Grp Sat Flow(s),veh/h/ln	1491	1758	1528	1781	1885	1560	1706	1687	1480	1720	1603	1725
Q Serve(g_s), s	2.5	4.3	8.7	20.0	7.1	1.7	8.5	35.3	11.3	12.0	11.1	11.2
Cycle Q Clear(g_c), s	2.5	4.3	8.7	20.0	7.1	1.7	8.5	35.3	11.3	12.0	11.1	11.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	40	159	270	297	434	515	147	1125	740	172	1112	599
V/C Ratio(X)	0.77	0.42	0.46	1.13	0.31	0.06	0.84	0.92	0.32	1.02	0.54	0.54
Avail Cap(c_a), veh/h	186	410	488	297	518	585	213	1125	740	172	1112	599
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94
Uniform Delay (d), s/veh	58.0	51.6	44.2	50.0	38.3	27.5	54.0	38.4	17.8	48.0	13.7	13.7
Incr Delay (d2), s/veh	11.1	0.7	0.5	92.6	0.1	0.0	11.8	13.3	1.1	72.8	1.8	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	3.4	5.9	24.4	5.8	1.2	7.3	22.7	7.1	12.5	5.6	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	52.2	44.7	142.6	38.4	27.5	65.8	51.8	19.0	120.8	15.5	17.0
LnGrp LOS	E	D	D	F	D	C	E	D	B	F	B	B
Approach Vol, veh/h	222			503			1392			1106		
Approach Delay, s/veh	50.4			107.3			47.5			32.7		
Approach LOS	D			F			D			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	15.9	17.0	45.0	8.2	32.7	15.4	46.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	10.7	14.0	37.3	4.5	9.1	10.5	13.2				
Green Ext Time (p_c), s	0.0	0.1	0.0	1.0	0.0	0.2	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay	51.9											
HCM 6th LOS	D											

Timings

Mitigation

1: SE 192nd & SE 15th St

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	116	91	40	82	242	78	1310	115	1475
Future Volume (vph)	116	91	40	82	242	78	1310	115	1475
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effect Green (s)	9.0	15.8	6.2	11.1	19.8	7.6	52.2	9.7	56.3
Actuated g/C Ratio	0.09	0.16	0.06	0.11	0.20	0.08	0.52	0.10	0.56
v/c Ratio	0.79	0.62	0.38	0.42	0.67	0.60	0.77	0.69	0.86
Control Delay	78.1	36.9	54.0	45.4	30.5	54.0	25.1	63.7	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	36.9	54.0	45.4	30.5	54.0	25.1	63.7	28.3
LOS	E	D	D	D	C	D	C	E	C
Approach Delay		52.7		36.4			26.7		30.6
Approach LOS		D		D			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 31.5

Intersection LOS: C

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St

			
Ø1	Ø2	Ø3	Ø4 (R)
15 s	29 s	16 s	40 s
			
Ø5	Ø6	Ø7	Ø8
15 s	29 s	14 s	42 s

HCM 6th Signalized Intersection Summary

Mitigation

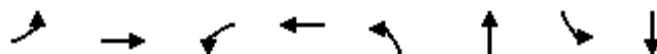
1: SE 192nd & SE 15th St

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	91	94	40	82	242	78	1310	32	115	1475	133
Future Volume (veh/h)	116	91	94	40	82	242	78	1310	32	115	1475	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	122	96	56	42	86	192	82	1379	32	121	1553	135
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, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	150	207	121	62	248	344	116	1768	41	149	1708	147
Arrive On Green	0.09	0.19	0.19	0.03	0.13	0.13	0.09	0.66	0.66	0.11	0.69	0.69
Sat Flow, veh/h	1739	1116	651	1810	1856	1582	1810	3550	82	1810	3309	285
Grp Volume(v), veh/h	122	0	152	42	86	192	82	690	721	121	828	860
Grp Sat Flow(s),veh/h/ln	1739	0	1767	1810	1856	1582	1810	1777	1855	1810	1777	1818
Q Serve(g_s), s	6.9	0.0	7.7	2.3	4.2	10.8	4.4	27.1	27.2	6.5	38.4	40.0
Cycle Q Clear(g_c), s	6.9	0.0	7.7	2.3	4.2	10.8	4.4	27.1	27.2	6.5	38.4	40.0
Prop In Lane	1.00		0.37	1.00		1.00	1.00		0.04	1.00		0.16
Lane Grp Cap(c), veh/h	150	0	327	62	248	344	116	885	924	149	917	938
V/C Ratio(X)	0.82	0.00	0.46	0.67	0.35	0.56	0.71	0.78	0.78	0.81	0.90	0.92
Avail Cap(c_a), veh/h	174	0	424	181	445	512	163	885	924	199	917	938
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.30	0.30	0.30	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	36.3	47.7	39.4	35.0	44.8	13.1	13.1	43.8	13.6	13.8
Incr Delay (d2), s/veh	19.5	0.0	0.4	4.6	0.3	0.5	1.0	2.1	2.0	12.5	13.8	15.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	5.8	2.0	3.5	7.3	3.2	10.0	10.4	5.9	18.7	19.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	36.7	52.4	39.7	35.5	45.8	15.2	15.1	56.3	27.4	28.9
LnGrp LOS	E	A	D	D	D	D	D	B	B	E	C	C
Approach Vol, veh/h		274			320			1493			1809	
Approach Delay, s/veh		49.0			38.8			16.8			30.0	
Approach LOS		D			D			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	23.5	13.2	54.8	13.6	18.4	11.4	56.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.3	9.7	8.5	29.2	8.9	12.8	6.4	42.0				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.9	0.0	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay				27.0								
HCM 6th LOS				C								

Timings

Mitigation

2: SE 192nd Ave & SE 20th St



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↰↱	↱	↰↱	↱	↰	↱↱	↰	↱↱
Traffic Volume (vph)	233	183	266	265	144	892	151	1089
Future Volume (vph)	233	183	266	265	144	892	151	1089
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	14.0	35.0	18.0	39.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	14.0%	35.0%	18.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	11.3	23.6	12.1	24.4	9.3	32.6	11.7	35.0
Actuated g/C Ratio	0.11	0.24	0.12	0.24	0.09	0.33	0.12	0.35
v/c Ratio	0.62	0.66	0.66	0.88	0.90	0.97	0.75	1.13
Control Delay	49.0	39.8	49.4	56.7	89.3	35.9	62.2	99.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	39.8	49.4	56.7	89.3	35.9	62.2	99.4
LOS	D	D	D	E	F	D	E	F
Approach Delay		44.0		53.7		42.2		95.6
Approach LOS		D		D		D		F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 64.8

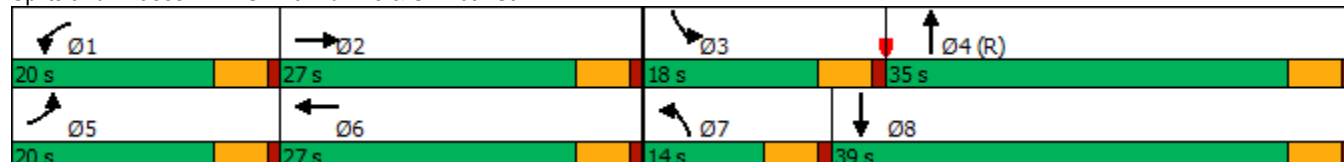
Intersection LOS: E

Intersection Capacity Utilization 90.1%

ICU Level of Service E

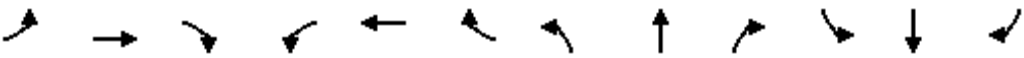
Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary 2: SE 192nd Ave & SE 20th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	🔴🔴	🔴		🔴🔴	🔴		🔴	🔴🔴		🔴	🔴🔴	
Traffic Volume (veh/h)	233	183	94	266	265	118	144	892	179	151	1089	237
Future Volume (veh/h)	233	183	94	266	265	118	144	892	179	151	1089	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	243	191	79	277	276	106	150	929	168	157	1134	227
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	316	268	111	350	286	110	163	1165	211	189	1181	235
Arrive On Green	0.09	0.21	0.21	0.10	0.22	0.22	0.09	0.38	0.38	0.14	0.53	0.53
Sat Flow, veh/h	3510	1276	528	3510	1301	500	1810	3029	548	1795	2953	588
Grp Volume(v), veh/h	243	0	270	277	0	382	150	549	548	157	680	681
Grp Sat Flow(s),veh/h/ln	1755	0	1803	1755	0	1801	1810	1791	1786	1795	1777	1764
Q Serve(g_s), s	6.8	0.0	13.9	7.7	0.0	21.0	8.2	27.2	27.2	8.5	36.5	37.2
Cycle Q Clear(g_c), s	6.8	0.0	13.9	7.7	0.0	21.0	8.2	27.2	27.2	8.5	36.5	37.2
Prop In Lane	1.00		0.29	1.00		0.28	1.00		0.31	1.00		0.33
Lane Grp Cap(c), veh/h	316	0	379	350	0	396	163	689	687	189	711	705
V/C Ratio(X)	0.77	0.00	0.71	0.79	0.00	0.96	0.92	0.80	0.80	0.83	0.96	0.97
Avail Cap(c_a), veh/h	527	0	397	527	0	396	163	689	687	233	711	705
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.42	0.42	0.42
Uniform Delay (d), s/veh	44.5	0.0	36.7	44.0	0.0	38.6	45.1	27.3	27.3	42.1	22.6	22.7
Incr Delay (d2), s/veh	1.5	0.0	4.7	2.5	0.0	35.6	47.3	9.3	9.4	7.0	13.8	15.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	10.5	6.1	0.0	18.7	9.6	18.5	18.5	6.0	18.6	19.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	0.0	41.3	46.5	0.0	74.2	92.4	36.7	36.7	49.1	36.3	37.9
LnGrp LOS	D	A	D	D	A	E	F	D	D	D	D	D
Approach Vol, veh/h		513			659			1247			1518	
Approach Delay, s/veh		43.5			62.6			43.4			38.4	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	26.0	15.6	43.4	14.0	27.0	14.0	45.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	9.0	34.0				
Max Q Clear Time (g_c+I1), s	9.7	15.9	10.5	29.2	8.8	23.0	10.2	39.2				
Green Ext Time (p_c), s	0.2	0.5	0.0	0.4	0.2	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			44.7									
HCM 6th LOS			D									

Intersection							
Int Delay, s/veh	0.2						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Vol, veh/h	3	4	1225	3	10	1316	
Future Vol, veh/h	3	4	1225	3	10	1316	
Conflicting Peds, #/hr	0	0	0	2	2	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	125	0	-	-	230	-	
Veh in Median Storage, #	0	-	0	-	-	0	
Grade, %	0	-	0	-	-	0	
Peak Hour Factor	95	95	95	95	95	95	
Heavy Vehicles, %	0	0	1	0	0	1	
Mvmt Flow	3	4	1289	3	11	1385	
Major/Minor	Minor1	Major1		Major2			
Conflicting Flow All	2008	648	0	0	1294	0	
Stage 1	1293	-	-	-	-	-	
Stage 2	715	-	-	-	-	-	
Critical Hdwy	6.8	6.9	-	-	4.1	-	
Critical Hdwy Stg 1	5.8	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.5	3.3	-	-	2.2	-	
Pot Cap-1 Maneuver	53	418	-	-	542	-	
Stage 1	225	-	-	-	-	-	
Stage 2	451	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	52	417	-	-	541	-	
Mov Cap-2 Maneuver	52	-	-	-	-	-	
Stage 1	225	-	-	-	-	-	
Stage 2	442	-	-	-	-	-	
Approach	WB	NB		SB			
HCM Control Delay, s	41.6	0		0.1			
HCM LOS	E						
Minor Lane/Major Mvmt		NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)		-	-	52	417	541	-
HCM Lane V/C Ratio		-	-	0.061	0.01	0.019	-
HCM Control Delay (s)		-	-	78.7	13.7	11.8	-
HCM Lane LOS		-	-	F	B	B	-
HCM 95th %tile Q(veh)		-	-	0.2	0	0.1	-

Timings 5: SE 192nd Ave & SE 34th St

Mitigation

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	253	245	355	216	120	177	955	204	212	932
Future Volume (vph)	253	245	355	216	120	177	955	204	212	932
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	33.6	24.6	43.6	29.6	29.6	10.4	31.4	45.4	10.0	31.0
Actuated g/C Ratio	0.34	0.25	0.44	0.30	0.30	0.10	0.31	0.45	0.10	0.31
v/c Ratio	0.63	0.92	1.13	0.40	0.21	0.98	0.89	0.25	0.65	1.13
Control Delay	28.3	61.7	117.2	29.9	1.8	109.6	45.1	2.1	40.0	91.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	61.7	117.2	29.9	1.8	109.6	45.1	2.1	40.0	91.7
LOS	C	E	F	C	A	F	D	A	D	F
Approach Delay		48.7		69.9			47.0			83.6
Approach LOS		D		E			D			F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 63.5

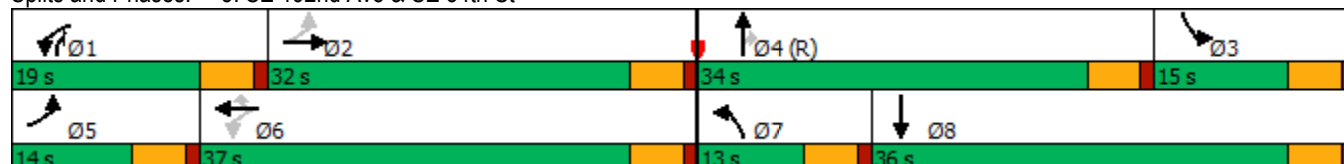
Intersection LOS: E

Intersection Capacity Utilization 101.5%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	253	245	152	355	216	120	177	955	204	212	932	215
Future Volume (veh/h)	253	245	152	355	216	120	177	955	204	212	932	215
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1773	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1743
Adj Flow Rate, veh/h	266	258	136	374	227	30	186	1005	87	223	981	205
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, %	5	0	2	1	1	0	0	2	1	0	1	7
Cap, veh/h	444	280	147	365	595	507	154	1095	726	419	951	198
Arrive On Green	0.09	0.25	0.25	0.14	0.30	0.30	0.08	0.29	0.29	0.12	0.33	0.33
Sat Flow, veh/h	1688	1131	596	1908	2003	1705	1922	3777	1683	3413	2857	596
Grp Volume(v), veh/h	266	0	394	374	227	30	186	1005	87	223	597	589
Grp Sat Flow(s),veh/h/ln	1688	0	1728	1908	2003	1705	1922	1889	1683	1706	1741	1713
Q Serve(g_s), s	9.0	0.0	22.2	14.0	9.0	0.9	8.0	25.7	1.6	6.1	33.3	33.3
Cycle Q Clear(g_c), s	9.0	0.0	22.2	14.0	9.0	0.9	8.0	25.7	1.6	6.1	33.3	33.3
Prop In Lane	1.00		0.35	1.00		1.00	1.00		1.00	1.00		0.35
Lane Grp Cap(c), veh/h	444	0	427	365	595	507	154	1095	726	419	579	570
V/C Ratio(X)	0.60	0.00	0.92	1.02	0.38	0.06	1.21	0.92	0.12	0.53	1.03	1.03
Avail Cap(c_a), veh/h	444	0	467	365	641	546	154	1095	726	419	579	570
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.78	0.00	0.78	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.4	0.0	36.7	25.3	27.9	11.7	46.0	34.3	6.2	41.2	33.4	33.4
Incr Delay (d2), s/veh	1.2	0.0	18.4	53.4	0.1	0.0	139.9	13.4	0.3	0.7	45.3	46.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.1	0.0	16.0	17.0	7.5	0.9	15.8	19.2	1.4	4.6	28.5	28.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.6	0.0	55.1	78.6	28.0	11.7	185.9	47.8	6.6	41.8	78.7	79.9
LnGrp LOS	C	A	E	F	C	B	F	D	A	D	F	F
Approach Vol, veh/h		660			631			1278			1409	
Approach Delay, s/veh		44.4			57.2			65.1			73.3	
Approach LOS		D			E			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	29.7	17.3	34.0	14.0	34.7	13.0	38.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	24.2	8.1	27.7	11.0	11.0	10.0	35.3				
Green Ext Time (p_c), s	0.0	0.3	0.0	0.5	0.0	0.4	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			63.3									
HCM 6th LOS			E									
Notes												
User approved pedestrian interval to be less than phase max green.												

Timings

Mitigation

6: SE Hiddenbrook Dr & SE 34th St

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	69	308	37	366	71	15	309	27
Future Volume (vph)	69	308	37	366	71	15	309	27
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effect Green (s)	5.1	37.4	5.1	32.9	30.4	30.4	30.4	30.4
Actuated g/C Ratio	0.06	0.45	0.06	0.39	0.36	0.36	0.36	0.36
v/c Ratio	0.67	0.51	0.37	0.93	0.21	0.08	0.69	0.31
Control Delay	72.0	18.7	51.8	42.0	23.7	11.4	34.3	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.0	18.7	51.8	42.0	23.7	11.4	34.3	6.5
LOS	E	B	D	D	C	B	C	A
Approach Delay		26.7		42.6		18.8		23.0
Approach LOS		C		D		B		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 83.5

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 31.0

Intersection LOS: C

Intersection Capacity Utilization 78.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	308	80	37	366	249	71	15	32	309	27	184
Future Volume (veh/h)	69	308	80	37	366	249	71	15	32	309	27	184
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1841	1900	1900
Adj Flow Rate, veh/h	73	328	73	39	389	234	76	16	11	329	29	62
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	4	0	0
Cap, veh/h	109	607	135	70	420	253	437	297	204	500	154	330
Arrive On Green	0.06	0.41	0.41	0.04	0.39	0.39	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	1810	1479	329	1745	1077	648	1265	1034	711	1357	538	1150
Grp Volume(v), veh/h	73	0	401	39	0	623	76	0	27	329	0	91
Grp Sat Flow(s),veh/h/ln	1810	0	1808	1745	0	1724	1265	0	1746	1357	0	1688
Q Serve(g_s), s	2.3	0.0	9.6	1.3	0.0	19.7	2.8	0.0	0.6	13.2	0.0	2.3
Cycle Q Clear(g_c), s	2.3	0.0	9.6	1.3	0.0	19.7	5.1	0.0	0.6	13.9	0.0	2.3
Prop In Lane	1.00		0.18	1.00		0.38	1.00		0.41	1.00		0.68
Lane Grp Cap(c), veh/h	109	0	742	70	0	673	437	0	501	500	0	484
V/C Ratio(X)	0.67	0.00	0.54	0.55	0.00	0.93	0.17	0.00	0.05	0.66	0.00	0.19
Avail Cap(c_a), veh/h	158	0	2533	153	0	2415	739	0	917	824	0	887
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	12.8	26.9	0.0	16.6	17.3	0.0	14.8	19.8	0.0	15.4
Incr Delay (d2), s/veh	2.7	0.0	0.2	2.5	0.0	2.5	0.1	0.0	0.0	0.6	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.7	0.0	5.6	0.9	0.0	10.9	1.4	0.0	0.4	7.0	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.0	0.0	13.0	29.4	0.0	19.1	17.3	0.0	14.8	20.3	0.0	15.4
LnGrp LOS	C	A	B	C	A	B	B	A	B	C	A	B
Approach Vol, veh/h	474			662			103			420		
Approach Delay, s/veh	15.5			19.7			16.7			19.3		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	28.4		21.4	8.4	27.3		21.4				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	3.3	11.6		15.9	4.3	21.7		7.1				
Green Ext Time (p_c), s	0.0	0.3		0.1	0.0	0.6		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	18.2											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	450	32	16	606	18	7
Future Vol, veh/h	450	32	16	606	18	7
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	495	35	18	666	20	8
Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	530	0	1215	514
Stage 1	-	-	-	-	513	-
Stage 2	-	-	-	-	702	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1048	-	202	564
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	495	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1048	-	199	563
Mov Cap-2 Maneuver	-	-	-	-	199	-
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	487	-
Approach	EB	WB	NB			
HCM Control Delay, s	0	0.2	21.7			
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	243	-	-	1048	-	
HCM Lane V/C Ratio	0.113	-	-	0.017	-	
HCM Control Delay (s)	21.7	-	-	8.5	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-	

Timings 8: SE 176th Ave & SE 34th St

Mitigation

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	197	383	16	488	10	9	94	19
Future Volume (vph)	197	383	16	488	10	9	94	19
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	37.2	35.8	30.0	24.9	10.5	10.5	10.5	10.5
Actuated g/C Ratio	0.62	0.60	0.50	0.42	0.18	0.18	0.18	0.18
v/c Ratio	0.53	0.39	0.03	0.86	0.05	0.05	0.41	0.41
Control Delay	20.5	10.9	8.6	28.7	23.9	19.7	29.4	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	10.9	8.6	28.7	23.9	19.7	29.4	10.0
LOS	C	B	A	C	C	B	C	B
Approach Delay		14.1		28.2		21.5		17.4
Approach LOS		B		C		C		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 59.7

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 20.6

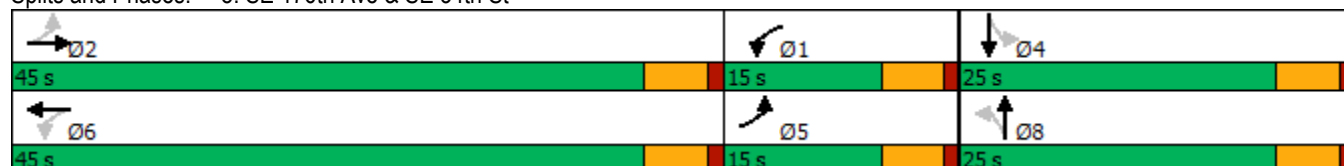
Intersection LOS: C

Intersection Capacity Utilization 68.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary 8: SE 176th Ave & SE 34th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	197	383	13	16	488	120	10	9	5	94	19	135
Future Volume (veh/h)	197	383	13	16	488	120	10	9	5	94	19	135
Initial Q (Qb), 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		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	214	416	13	17	530	117	11	10	1	102	21	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	396	639	20	652	637	141	301	189	19	320	121	75
Arrive On Green	0.11	0.35	0.35	0.18	0.43	0.43	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1795	1804	56	1810	1496	330	1391	1699	170	1409	1085	672
Grp Volume(v), veh/h	214	0	429	17	0	647	11	0	11	102	0	34
Grp Sat Flow(s),veh/h/ln	1795	0	1860	1810	0	1826	1391	0	1869	1409	0	1757
Q Serve(g_s), s	0.0	0.0	8.2	0.0	0.0	13.3	0.3	0.0	0.2	3.0	0.0	0.7
Cycle Q Clear(g_c), s	0.0	0.0	8.2	0.0	0.0	13.3	1.0	0.0	0.2	3.2	0.0	0.7
Prop In Lane	1.00		0.03	1.00		0.18	1.00		0.09	1.00		0.38
Lane Grp Cap(c), veh/h	396	0	659	652	0	777	301	0	208	320	0	196
V/C Ratio(X)	0.54	0.00	0.65	0.03	0.00	0.83	0.04	0.00	0.05	0.32	0.00	0.17
Avail Cap(c_a), veh/h	625	0	1757	753	0	1724	802	0	882	828	0	830
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.7	0.0	11.5	9.4	0.0	10.8	17.5	0.0	16.8	18.2	0.0	17.0
Incr Delay (d2), s/veh	0.4	0.0	0.4	0.0	0.0	0.9	0.0	0.0	0.0	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.8	0.0	4.4	0.1	0.0	6.5	0.2	0.0	0.2	1.6	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.1	0.0	11.9	9.4	0.0	11.7	17.5	0.0	16.9	18.4	0.0	17.2
LnGrp LOS	B	A	B	A	A	B	B	A	B	B	A	B
Approach Vol, veh/h	643			664			22			136		
Approach Delay, s/veh	13.6			11.7			17.2			18.1		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.6	20.0		9.7	9.6	23.0		9.7				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	10.2		5.2	2.0	15.3		3.0				
Green Ext Time (p_c), s	0.0	1.6		0.2	0.2	2.7		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	13.2											
HCM 6th LOS	B											

MOVEMENT SUMMARY

 Site: 101 [SE 176 Avenue/ SE 29th Street Phase 2 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 2
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]	ft			mph
South: SE 176th Avenue															
3	L2	All MCs	16	15.0	16	15.0	0.314	7.4	LOS A	1.7	43.3	0.41	0.22	0.41	32.3
8	T1	All MCs	268	0.0	268	0.0	0.314	6.0	LOS A	1.7	43.3	0.41	0.22	0.41	33.4
18	R2	All MCs	74	0.0	74	0.0	0.314	6.0	LOS A	1.7	43.3	0.41	0.22	0.41	33.1
Approach			358	0.7	358	0.7	0.314	6.1	LOS A	1.7	43.3	0.41	0.22	0.41	33.3
East: SE 29th Street															
1	L2	All MCs	152	0.0	152	0.0	0.438	8.4	LOS A	2.6	64.2	0.59	0.40	0.59	31.0
6	T1	All MCs	247	0.0	247	0.0	0.438	8.4	LOS A	2.6	64.2	0.59	0.40	0.59	31.6
16	R2	All MCs	41	0.0	41	0.0	0.438	8.4	LOS A	2.6	64.2	0.59	0.40	0.59	31.3
Approach			440	0.0	440	0.0	0.438	8.4	LOS A	2.6	64.2	0.59	0.40	0.59	31.3
North: SE 176th Avenue															
7	L2	All MCs	44	0.0	44	0.0	0.249	6.5	LOS A	1.2	29.2	0.55	0.41	0.55	32.1
4	T1	All MCs	67	1.0	67	1.0	0.249	6.6	LOS A	1.2	29.2	0.55	0.41	0.55	32.7
14	R2	All MCs	113	0.0	113	0.0	0.249	6.5	LOS A	1.2	29.2	0.55	0.41	0.55	32.4
Approach			224	0.3	224	0.3	0.249	6.6	LOS A	1.2	29.2	0.55	0.41	0.55	32.4
West: SE 29th Street															
5	L2	All MCs	22	7.0	22	7.0	0.159	5.4	LOS A	0.7	18.1	0.42	0.27	0.42	32.9
2	T1	All MCs	111	0.0	111	0.0	0.159	4.8	LOS A	0.7	18.1	0.42	0.27	0.42	33.8
12	R2	All MCs	33	0.0	33	0.0	0.159	4.8	LOS A	0.7	18.1	0.42	0.27	0.42	33.5
Approach			166	0.9	166	0.9	0.159	4.9	LOS A	0.7	18.1	0.42	0.27	0.42	33.6
All Vehicles			1187	0.4	1187	0.4	0.438	6.9	LOS A	2.6	64.2	0.50	0.33	0.50	32.4

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

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 PM.sip9

Intersection	
Intersection Delay, s/veh	90.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	466	71	93	503	18	49	132	76	27	95	28
Future Vol, veh/h	48	466	71	93	503	18	49	132	76	27	95	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	52	507	77	101	547	20	53	143	83	29	103	30
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	124.1	106.1	19.5	19.6
HCM LOS	F	F	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	18%
Vol Thru, %	0%	63%	0%	87%	0%	97%	63%
Vol Right, %	0%	37%	0%	13%	0%	3%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	49	208	48	537	93	521	150
LT Vol	49	0	48	0	93	0	27
Through Vol	0	132	0	466	0	503	95
RT Vol	0	76	0	71	0	18	28
Lane Flow Rate	53	226	52	584	101	566	163
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.133	0.517	0.117	1.199	0.223	1.167	0.409
Departure Headway (Hd)	9.705	8.932	8.467	7.801	8.438	7.877	9.937
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	372	407	426	473	429	464	365
Service Time	7.405	6.632	6.167	5.501	6.138	5.577	7.937
HCM Lane V/C Ratio	0.142	0.555	0.122	1.235	0.235	1.22	0.447
HCM Control Delay	13.9	20.8	12.3	134.1	13.5	122.6	19.6
HCM Lane LOS	B	C	B	F	B	F	C
HCM 95th-tile Q	0.5	2.9	0.4	21.2	0.8	19.7	1.9

Timings

Mitigation

11: SE 164th Ave & SE 29th St

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	49	51	240	36	143	42	1434	131	1306
Future Volume (vph)	89	49	51	240	36	143	42	1434	131	1306
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	19.5	32.0
Total Split (s)	15.0	20.0	20.0	19.0	24.0	24.0	15.0	59.0	22.0	66.0
Total Split (%)	12.5%	16.7%	16.7%	15.8%	20.0%	20.0%	12.5%	49.2%	18.3%	55.0%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effect Green (s)	18.9	11.0	11.0	28.7	14.5	14.5	6.3	64.6	11.8	72.1
Actuated g/C Ratio	0.16	0.09	0.09	0.24	0.12	0.12	0.05	0.54	0.10	0.60
v/c Ratio	0.37	0.30	0.19	0.76	0.17	0.47	0.49	0.57	0.78	0.46
Control Delay	40.7	55.0	1.5	55.9	47.9	12.2	51.3	34.3	80.8	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	55.0	1.5	55.9	47.9	12.2	51.3	34.3	80.8	14.9
LOS	D	D	A	E	D	B	D	C	F	B
Approach Delay		33.8			40.3			34.8		20.8
Approach LOS		C			D			C		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 29.6

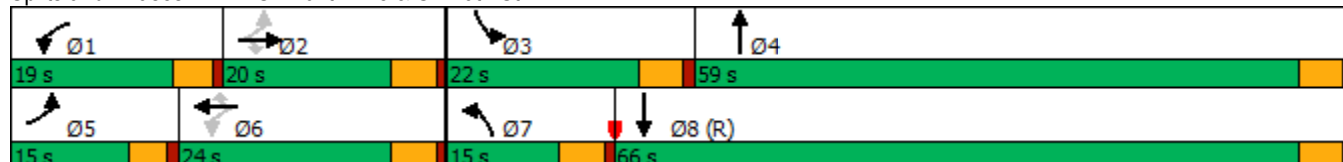
Intersection LOS: C

Intersection Capacity Utilization 68.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	49	51	240	36	143	42	1434	32	131	1306	46
Future Volume (veh/h)	89	49	51	240	36	143	42	1434	32	131	1306	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	1826	1870	1752	1885	1885	1900
Adj Flow Rate, veh/h	94	52	10	253	38	26	44	1509	32	138	1375	46
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, %	0	0	0	2	2	2	5	2	10	1	1	0
Cap, veh/h	287	163	138	356	273	230	56	2315	49	164	2605	87
Arrive On Green	0.06	0.09	0.09	0.12	0.15	0.15	0.03	0.45	0.45	0.09	0.51	0.51
Sat Flow, veh/h	1810	1900	1599	1781	1870	1579	1739	5146	109	1795	5114	171
Grp Volume(v), veh/h	94	52	10	253	38	26	44	998	543	138	922	499
Grp Sat Flow(s),veh/h/ln	1810	1900	1599	1781	1870	1579	1739	1702	1851	1795	1716	1854
Q Serve(g_s), s	5.6	3.1	0.7	14.5	2.1	1.7	3.0	27.4	27.4	9.1	21.7	21.7
Cycle Q Clear(g_c), s	5.6	3.1	0.7	14.5	2.1	1.7	3.0	27.4	27.4	9.1	21.7	21.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.06	1.00		0.09
Lane Grp Cap(c), veh/h	287	163	138	356	273	230	56	1532	833	164	1748	944
V/C Ratio(X)	0.33	0.32	0.07	0.71	0.14	0.11	0.79	0.65	0.65	0.84	0.53	0.53
Avail Cap(c_a), veh/h	334	238	200	356	296	250	145	1532	833	254	1748	944
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.0	51.5	50.4	42.6	44.7	44.5	57.7	25.7	25.7	53.6	19.8	19.8
Incr Delay (d2), s/veh	0.7	0.4	0.1	6.5	0.1	0.1	6.3	1.5	2.8	8.2	1.1	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	2.7	0.5	12.0	1.8	1.2	2.5	15.5	17.0	7.8	13.3	14.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.7	51.9	50.5	49.1	44.8	44.6	64.0	27.2	28.5	61.8	20.9	21.9
LnGrp LOS	D	D	D	D	D	D	E	C	C	E	C	C
Approach Vol, veh/h	156			317			1585			1559		
Approach Delay, s/veh	48.7			48.2			28.7			24.8		
Approach LOS	D			D			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	15.3	16.0	59.0	11.8	22.5	8.9	66.1				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.5	15.0	17.0	54.0	10.5	19.0	10.0	61.0				
Max Q Clear Time (g_c+I1), s	16.5	5.1	11.1	29.4	7.6	4.1	5.0	23.7				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.6				
Intersection Summary												
HCM 6th Ctrl Delay	29.6											
HCM 6th LOS	C											

Timings

Mitigation

12: SE 164th Ave & SE 34th St

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	49	102	194	279	136	247	192	1216	390	164	1372
Future Volume (vph)	49	102	194	279	136	247	192	1216	390	164	1372
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	7.3	10.7	34.0	12.0	17.5	38.0	18.3	61.8	78.8	15.5	59.0
Actuated g/C Ratio	0.06	0.09	0.28	0.10	0.15	0.32	0.15	0.52	0.66	0.13	0.49
v/c Ratio	0.51	0.66	0.41	1.64	0.54	0.46	0.74	0.70	0.35	0.75	0.59
Control Delay	71.7	71.0	24.2	348.1	56.2	21.9	64.4	26.2	3.7	67.2	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	71.0	24.2	348.1	56.2	21.9	64.4	26.2	3.7	67.2	22.3
LOS	E	E	C	F	E	C	E	C	A	E	C
Approach Delay		44.8			166.5			25.4			26.9
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.64

Intersection Signal Delay: 48.8

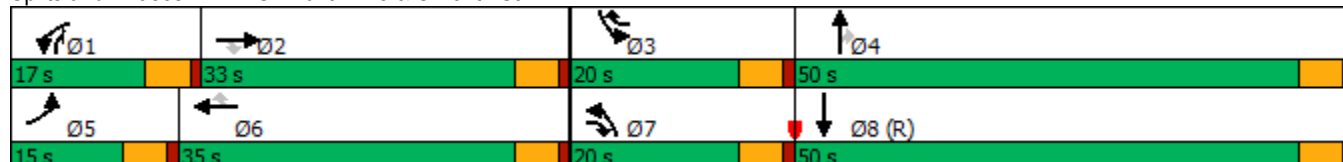
Intersection LOS: D

Intersection Capacity Utilization 80.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th St



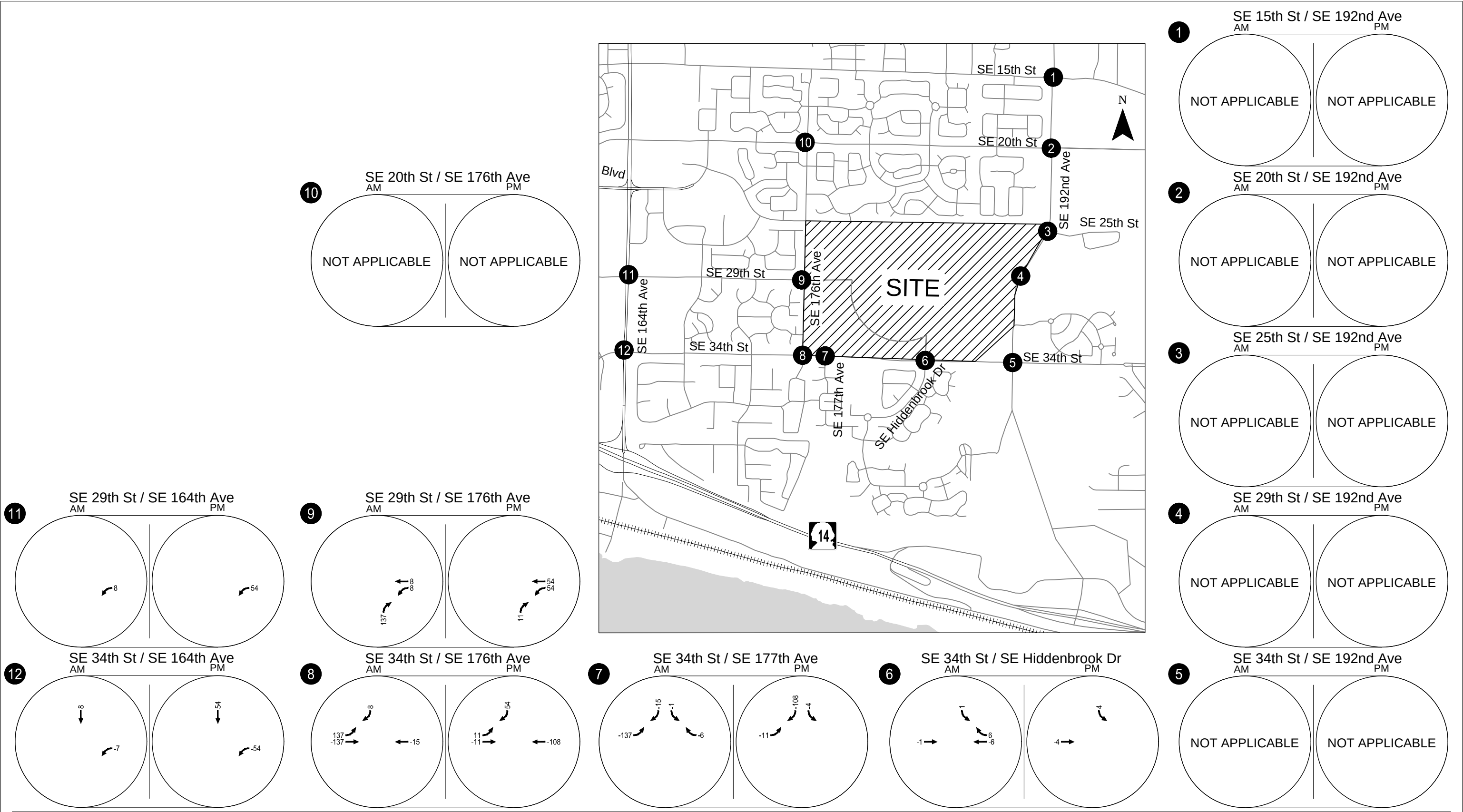
HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th St

Mitigation

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	102	194	279	136	247	192	1216	390	164	1372	49
Future Volume (veh/h)	49	102	194	279	136	247	192	1216	390	164	1372	49
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1767	1826	1885	1870	1841	1856	1885	1870	1885	1870	1870	1841
Adj Flow Rate, veh/h	51	106	152	291	142	182	200	1267	279	171	1429	48
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	64	183	359	178	298	430	224	1379	780	199	1902	64
Arrive On Green	0.04	0.10	0.10	0.10	0.16	0.16	0.13	0.39	0.39	0.04	0.12	0.12
Sat Flow, veh/h	1682	1826	1598	1781	1841	1572	1795	3554	1598	1781	5073	170
Grp Volume(v), veh/h	51	106	152	291	142	182	200	1267	279	171	959	518
Grp Sat Flow(s),veh/h/ln	1682	1826	1598	1781	1841	1572	1795	1777	1598	1781	1702	1840
Q Serve(g_s), s	3.6	6.7	9.8	12.0	8.4	11.4	13.2	40.7	13.0	11.5	32.7	32.7
Cycle Q Clear(g_c), s	3.6	6.7	9.8	12.0	8.4	11.4	13.2	40.7	13.0	11.5	32.7	32.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	64	183	359	178	298	430	224	1379	780	199	1277	690
V/C Ratio(X)	0.79	0.58	0.42	1.63	0.48	0.42	0.89	0.92	0.36	0.86	0.75	0.75
Avail Cap(c_a), veh/h	140	426	572	178	460	569	224	1379	780	223	1277	690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Uniform Delay (d), s/veh	57.2	51.6	39.8	54.0	45.7	35.8	51.7	34.9	19.0	56.8	47.2	47.2
Incr Delay (d2), s/veh	7.9	1.1	0.3	309.2	0.4	0.2	31.8	11.3	1.3	20.4	3.5	6.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	5.5	6.9	32.7	6.9	7.7	12.4	26.1	8.5	10.5	21.4	23.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	52.7	40.1	363.2	46.1	36.0	83.5	46.2	20.3	77.2	50.7	53.6
LnGrp LOS	E	D	D	F	D	D	F	D	C	E	D	D
Approach Vol, veh/h	309			615			1746			1648		
Approach Delay, s/veh	48.6			193.2			46.3			54.4		
Approach LOS	D			F			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	17.0	18.4	51.6	9.6	24.4	20.0	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	11.8	13.5	42.7	5.6	13.4	15.2	34.7				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.1	0.0	0.3	0.0	2.9				
Intersection Summary												
HCM 6th Ctrl Delay	70.5											
HCM 6th LOS	E											

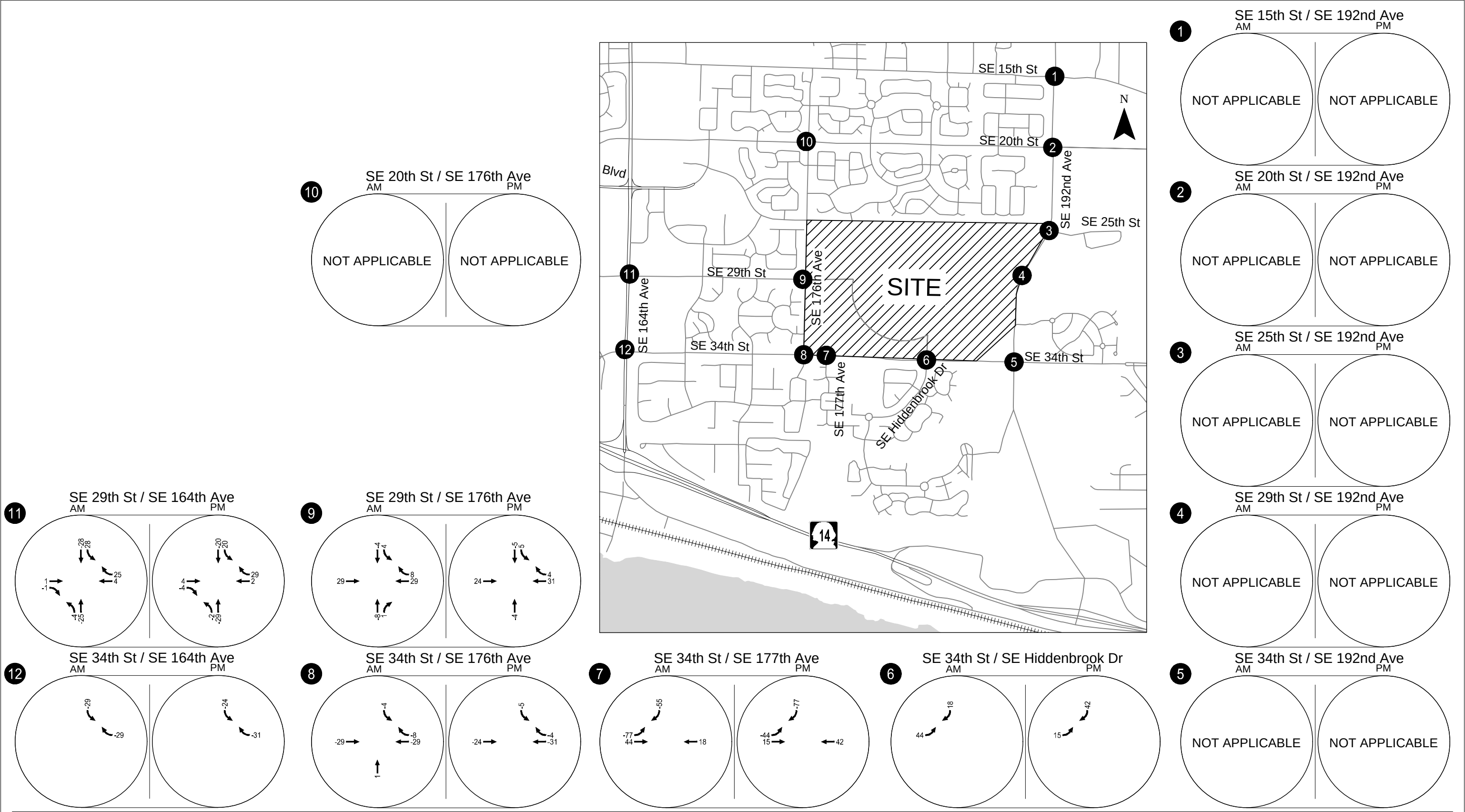
H:\2715 - VIC Implementation\005 - Master Plan Update\TIA\report\figs\2715-Figures_Fig G-1-Redistributed 29th (west) Apr 05, 2023 - 3:31pm - ckleyhans Layout Tab: Fig G-1_Redistributed 29th (west)



Redistributed Baseline Traffic Volumes - SE 29th St Western Connection
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
G-1

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Redistributed Phase 1 Trips - SE 29th St Western Connection
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
G-2

Appendix H 2038 With-Project Phase 3
Buildout Operations
Worksheets & Re-routed trips

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 3 2038 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	45	29	64	158	61	986	89	888
Future Volume (vph)	156	45	29	64	158	61	986	89	888
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	12.4	18.7	5.9	10.2	22.0	7.4	50.6	8.8	54.0
Actuated g/C Ratio	0.12	0.19	0.06	0.10	0.22	0.07	0.51	0.09	0.54
v/c Ratio	0.80	0.30	0.32	0.38	0.43	0.53	0.64	0.69	0.61
Control Delay	67.8	19.2	53.4	45.3	17.8	58.9	23.7	69.1	22.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	19.2	53.4	45.3	17.8	58.9	23.7	69.1	22.2
LOS	E	B	D	D	B	E	C	E	C
Approach Delay		49.3		28.9			25.7		26.1
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 28.4

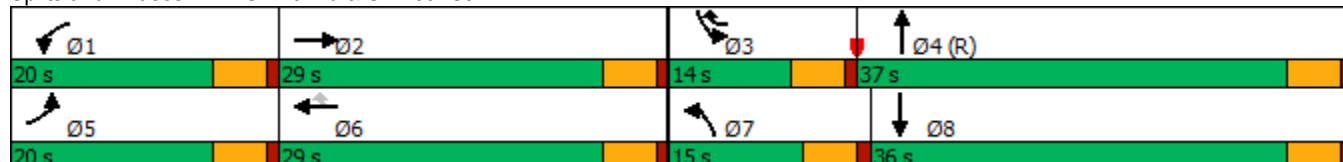
Intersection LOS: C

Intersection Capacity Utilization 60.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	45	50	29	64	158	61	986	16	89	888	87
Future Volume (veh/h)	156	45	50	29	64	158	61	986	16	89	888	87
Initial Q (Qb), 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		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	173	50	8	32	71	99	68	1096	17	99	987	91
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	204	262	42	50	144	241	101	1877	29	122	1708	157
Arrive On Green	0.12	0.16	0.16	0.03	0.08	0.08	0.11	1.00	1.00	0.07	0.55	0.55
Sat Flow, veh/h	1767	1598	256	1697	1841	1585	1767	3523	55	1654	3107	286
Grp Volume(v), veh/h	173	0	58	32	71	99	68	544	569	99	533	545
Grp Sat Flow(s),veh/h/ln	1767	0	1854	1697	1841	1585	1767	1749	1829	1654	1678	1715
Q Serve(g_s), s	9.6	0.0	2.7	1.9	3.7	5.6	3.7	0.0	0.0	5.9	21.0	21.0
Cycle Q Clear(g_c), s	9.6	0.0	2.7	1.9	3.7	5.6	3.7	0.0	0.0	5.9	21.0	21.0
Prop In Lane	1.00		0.14	1.00		1.00	1.00		0.03	1.00		0.17
Lane Grp Cap(c), veh/h	204	0	304	50	144	241	101	932	975	122	923	943
V/C Ratio(X)	0.85	0.00	0.19	0.64	0.49	0.41	0.68	0.58	0.58	0.81	0.58	0.58
Avail Cap(c_a), veh/h	265	0	445	254	442	498	177	932	975	149	923	943
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.76	0.76	0.76	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	36.1	48.0	44.2	38.4	43.4	0.0	0.0	45.6	14.9	14.9
Incr Delay (d2), s/veh	14.7	0.0	0.1	5.0	1.0	0.4	2.2	2.0	1.9	19.5	2.6	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	2.2	1.5	3.1	3.9	2.8	0.9	0.9	5.4	12.4	12.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.2	53.0	45.2	38.8	45.6	2.0	1.9	65.1	17.5	17.4
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h	231			202			1181			1177		
Approach Delay, s/veh	52.6			43.3			4.5			21.5		
Approach LOS	D			D			A			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	21.4	12.4	58.3	16.5	12.8	10.7	60.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.9	4.7	7.9	2.0	11.6	7.6	5.7	23.0				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.2	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay	18.4											
HCM 6th LOS	B											

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	 		 			 		 
Traffic Volume (vph)	166	182	166	165	47	780	59	754
Future Volume (vph)	166	182	166	165	47	780	59	754
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	9.4	18.7	9.3	18.7	7.4	46.2	7.7	44.6
Actuated g/C Ratio	0.09	0.19	0.09	0.19	0.07	0.46	0.08	0.45
v/c Ratio	0.55	0.81	0.54	0.67	0.39	0.62	0.45	0.60
Control Delay	49.5	53.3	49.3	44.1	64.6	14.2	52.2	29.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	53.3	49.3	44.1	64.6	14.2	52.2	29.7
LOS	D	D	D	D	E	B	D	C
Approach Delay		51.9		46.3		16.6		31.2
Approach LOS		D		D		B		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 31.4

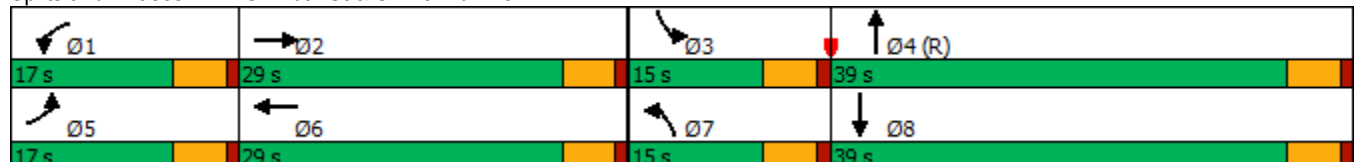
Intersection LOS: C

Intersection Capacity Utilization 67.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	182	89	166	165	57	47	780	161	59	754	103
Future Volume (veh/h)	166	182	89	166	165	57	47	780	161	59	754	103
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	175	192	74	175	174	46	49	821	154	62	794	99
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	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	242	220	85	244	241	64	86	1531	287	80	1574	196
Arrive On Green	0.07	0.17	0.17	0.07	0.17	0.17	0.05	0.52	0.52	0.06	0.68	0.68
Sat Flow, veh/h	3428	1306	503	3483	1437	380	1725	2962	556	1795	3078	384
Grp Volume(v), veh/h	175	0	266	175	0	220	49	489	486	62	444	449
Grp Sat Flow(s),veh/h/ln	1714	0	1809	1742	0	1817	1725	1763	1755	1795	1721	1742
Q Serve(g_s), s	5.0	0.0	14.3	4.9	0.0	11.5	2.8	18.5	18.5	3.4	12.6	12.6
Cycle Q Clear(g_c), s	5.0	0.0	14.3	4.9	0.0	11.5	2.8	18.5	18.5	3.4	12.6	12.6
Prop In Lane	1.00		0.28	1.00		0.21	1.00		0.32	1.00		0.22
Lane Grp Cap(c), veh/h	242	0	305	244	0	305	86	911	907	80	880	891
V/C Ratio(X)	0.72	0.00	0.87	0.72	0.00	0.72	0.57	0.54	0.54	0.78	0.50	0.50
Avail Cap(c_a), veh/h	411	0	434	418	0	436	172	911	907	180	880	891
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.77	0.77	0.77
Uniform Delay (d), s/veh	45.5	0.0	40.5	45.5	0.0	39.4	46.4	16.2	16.2	46.5	9.8	9.8
Incr Delay (d2), s/veh	1.5	0.0	9.8	1.5	0.0	1.3	2.2	2.3	2.3	4.6	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	0.0	11.3	3.8	0.0	8.8	2.2	11.8	11.8	2.8	6.8	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	50.3	47.0	0.0	40.7	48.6	18.4	18.4	51.1	11.4	11.4
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	B	B
Approach Vol, veh/h		441			395			1024			955	
Approach Delay, s/veh		49.0			43.5			19.9			14.0	
Approach LOS		D			D			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.0	21.9	9.5	56.7	12.1	21.8	10.0	56.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	6.9	16.3	5.4	20.5	7.0	13.5	4.8	14.6				
Green Ext Time (p_c), s	0.1	0.5	0.0	3.3	0.1	0.5	0.0	3.3				

Intersection Summary

HCM 6th Ctrl Delay 25.8
HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	910	3	7	983
Future Vol, veh/h	7	10	910	3	7	983
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	20	4	67	0	7
Mvmt Flow	7	11	958	3	7	1035
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1493	482	0	0	962	0
Stage 1	961	-	-	-	-	-
Stage 2	532	-	-	-	-	-
Critical Hdwy	6.8	7.3	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.5	-	-	2.2	-
Pot Cap-1 Maneuver	116	485	-	-	724	-
Stage 1	337	-	-	-	-	-
Stage 2	559	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	115	485	-	-	723	-
Mov Cap-2 Maneuver	115	-	-	-	-	-
Stage 1	337	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	23.2	0	0.1			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 115 485	723	-		
HCM Lane V/C Ratio	-	- 0.064 0.022	0.01	-		
HCM Control Delay (s)	-	- 38.4 12.6	10	-		
HCM Lane LOS	-	- E B	B	-		
HCM 95th %tile Q(veh)	-	- 0.2 0.1	0	-		

Timings

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center

Phase 3 2038 AM Peak Hour Conditions

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	147	70	91	766	781
Future Volume (vph)	147	70	91	766	781
Turn Type	Prot	pt+ov	Prot	NA	NA
Protected Phases	2	2 7	7	4	8
Permitted Phases					
Detector Phase	2	2 7	7	4	8
Switch Phase					
Minimum Initial (s)	5.0		5.0	5.0	5.0
Minimum Split (s)	27.0		10.0	26.0	26.0
Total Split (s)	35.0		15.0	65.0	50.0
Total Split (%)	35.0%		15.0%	65.0%	50.0%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None		None	C-Max	Max
Act Effct Green (s)	14.8	30.7	10.8	75.2	59.3
Actuated g/C Ratio	0.15	0.31	0.11	0.75	0.59
v/c Ratio	0.62	0.14	0.52	0.31	0.53
Control Delay	49.6	5.3	28.6	11.4	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	49.6	5.3	28.6	11.4	23.0
LOS	D	A	C	B	C
Approach Delay	35.3			13.2	23.0
Approach LOS	D			B	C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 20.3

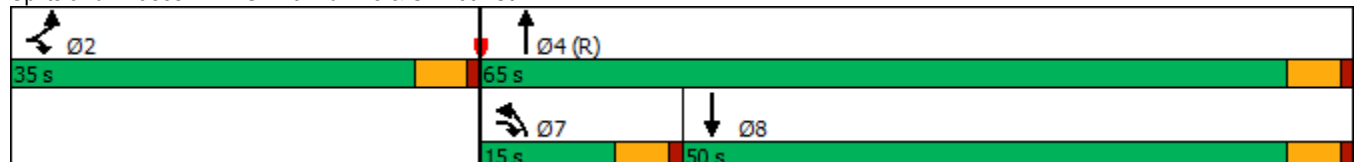
Intersection LOS: C

Intersection Capacity Utilization 53.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: SE 192nd Ave & SE 29th St



HCM 6th Signalized Intersection Summary

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	147	70	91	766	781	209
Future Volume (veh/h)	147	70	91	766	781	209
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1811	1826	1826	1826	1811	1767
Adj Flow Rate, veh/h	155	20	96	806	822	201
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	6	5	5	5	6	9
Cap, veh/h	192	279	120	2736	1836	449
Arrive On Green	0.11	0.11	0.14	1.00	0.67	0.67
Sat Flow, veh/h	1725	1547	1739	3561	2831	670
Grp Volume(v), veh/h	155	20	96	806	516	507
Grp Sat Flow(s),veh/h/ln	1725	1547	1739	1735	1721	1690
Q Serve(g_s), s	8.8	1.1	5.4	0.0	14.1	14.1
Cycle Q Clear(g_c), s	8.8	1.1	5.4	0.0	14.1	14.1
Prop In Lane	1.00	1.00	1.00			0.40
Lane Grp Cap(c), veh/h	192	279	120	2736	1153	1132
V/C Ratio(X)	0.81	0.07	0.80	0.29	0.45	0.45
Avail Cap(c_a), veh/h	517	571	174	2736	1153	1132
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.81	0.81	1.00	1.00
Uniform Delay (d), s/veh	43.4	34.0	42.5	0.0	7.8	7.8
Incr Delay (d2), s/veh	7.8	0.1	12.9	0.2	1.3	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	7.4	1.8	4.6	0.2	8.3	8.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	51.2	34.2	55.3	0.2	9.0	9.1
LnGrp LOS	D	C	E	A	A	A
Approach Vol, veh/h	175			902	1023	
Approach Delay, s/veh	49.2			6.1	9.1	
Approach LOS	D			A	A	
Timer - Assigned Phs	2		4		7	8
Phs Duration (G+Y+Rc), s	16.1		83.9		11.9	72.0
Change Period (Y+Rc), s	5.0		5.0		5.0	5.0
Max Green Setting (Gmax), s	30.0		60.0		10.0	45.0
Max Q Clear Time (g_c+I1), s	10.8		2.0		7.4	16.1
Green Ext Time (p_c), s	0.4		6.3		0.0	7.3
Intersection Summary						
HCM 6th Ctrl Delay			11.1			
HCM 6th LOS			B			

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	74	164	207	146	87	111	775	349	121	604
Future Volume (vph)	74	164	207	146	87	111	775	349	121	604
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	26.5	19.8	32.8	24.8	24.8	9.4	40.5	50.2	10.0	41.0
Actuated g/C Ratio	0.26	0.20	0.33	0.25	0.25	0.09	0.40	0.50	0.10	0.41
v/c Ratio	0.23	0.79	0.84	0.34	0.18	0.72	0.63	0.39	0.39	0.59
Control Delay	22.1	48.8	50.4	32.4	0.7	66.6	28.3	2.3	44.6	25.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	48.8	50.4	32.4	0.7	66.6	28.3	2.3	44.6	25.5
LOS	C	D	D	C	A	E	C	A	D	C
Approach Delay		42.9		34.6			24.4			28.3
Approach LOS		D		C			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 29.3

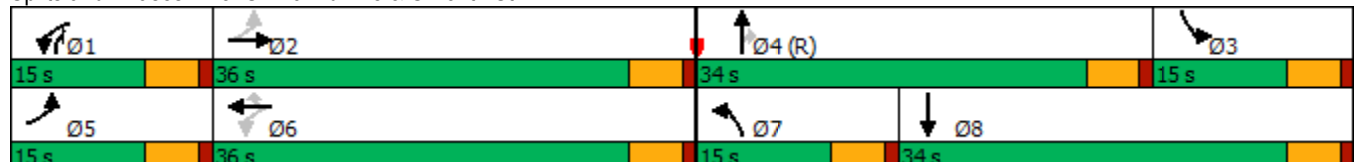
Intersection LOS: C

Intersection Capacity Utilization 70.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	164	96	207	146	87	111	775	349	121	604	89
Future Volume (veh/h)	74	164	96	207	146	87	111	775	349	121	604	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1817	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1817
Adj Flow Rate, veh/h	82	182	79	230	162	16	123	861	169	134	671	88
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	3	0	5	0	2	0	9	2	1	11	2
Cap, veh/h	357	221	96	302	472	387	154	1037	655	758	1233	162
Arrive On Green	0.05	0.19	0.19	0.10	0.23	0.23	0.08	0.29	0.29	0.22	0.43	0.43
Sat Flow, veh/h	1731	1189	516	1850	2018	1654	1922	3578	1679	3385	2844	373
Grp Volume(v), veh/h	82	0	261	230	162	16	123	861	169	134	377	382
Grp Sat Flow(s),veh/h/ln	1731	0	1706	1850	2018	1654	1922	1789	1679	1693	1600	1616
Q Serve(g_s), s	3.8	0.0	14.7	9.9	6.7	0.4	6.3	22.5	2.6	3.2	17.5	17.5
Cycle Q Clear(g_c), s	3.8	0.0	14.7	9.9	6.7	0.4	6.3	22.5	2.6	3.2	17.5	17.5
Prop In Lane	1.00		0.30	1.00		1.00	1.00		1.00	1.00		0.23
Lane Grp Cap(c), veh/h	357	0	317	302	472	387	154	1037	655	758	694	701
V/C Ratio(X)	0.23	0.00	0.82	0.76	0.34	0.04	0.80	0.83	0.26	0.18	0.54	0.54
Avail Cap(c_a), veh/h	440	0	529	302	626	513	192	1037	655	758	694	701
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.85
Uniform Delay (d), s/veh	30.5	0.0	39.1	29.4	31.9	9.9	45.2	33.2	7.3	31.4	21.0	21.0
Incr Delay (d2), s/veh	0.1	0.0	2.0	9.7	0.2	0.0	13.5	7.7	1.0	0.0	2.6	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.8	0.0	10.1	8.7	5.7	0.5	6.3	15.7	2.2	2.3	10.5	10.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.6	0.0	41.1	39.1	32.1	9.9	58.7	40.9	8.2	31.4	23.6	23.6
LnGrp LOS	C	A	D	D	C	A	E	D	A	C	C	C
Approach Vol, veh/h		343			408			1153			893	
Approach Delay, s/veh		38.6			35.2			38.0			24.7	
Approach LOS		D			D			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	23.6	27.4	34.0	10.2	28.4	13.0	48.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	11.9	16.7	5.2	24.5	5.8	8.7	8.3	19.5				
Green Ext Time (p_c), s	0.0	0.4	0.0	1.2	0.0	0.2	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			33.4									
HCM 6th LOS			C									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 3 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	153	289	27	212	63	29	61	4
Future Volume (vph)	153	289	27	212	63	29	61	4
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	5.4	28.1	5.4	17.1	8.9	8.9	8.9	8.9
Actuated g/C Ratio	0.12	0.63	0.12	0.38	0.20	0.20	0.20	0.20
v/c Ratio	0.78	0.30	0.14	0.52	0.27	0.21	0.26	0.14
Control Delay	52.7	10.2	25.1	15.6	17.6	9.3	17.4	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	10.2	25.1	15.6	17.6	9.3	17.4	6.6
LOS	D	B	C	B	B	A	B	A
Approach Delay		24.2		16.3		13.2		12.8
Approach LOS		C		B		B		B

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 44.6

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 19.1

Intersection LOS: B

Intersection Capacity Utilization 48.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary 6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	153	289	24	27	212	102	63	29	41	61	4	42
Future Volume (veh/h)	153	289	24	27	212	102	63	29	41	61	4	42
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	170	321	24	30	236	92	70	32	3	68	4	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	217	799	60	64	479	187	330	185	17	312	110	83
Arrive On Green	0.12	0.47	0.47	0.04	0.39	0.39	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	1810	1691	126	1787	1233	481	1380	1690	158	1395	1008	756
Grp Volume(v), veh/h	170	0	345	30	0	328	70	0	35	68	0	7
Grp Sat Flow(s),veh/h/ln	1810	0	1817	1787	0	1714	1380	0	1848	1395	0	1764
Q Serve(g_s), s	3.6	0.0	4.8	0.6	0.0	5.7	1.9	0.0	0.7	1.8	0.0	0.1
Cycle Q Clear(g_c), s	3.6	0.0	4.8	0.6	0.0	5.7	2.0	0.0	0.7	2.5	0.0	0.1
Prop In Lane	1.00		0.07	1.00		0.28	1.00		0.09	1.00		0.43
Lane Grp Cap(c), veh/h	217	0	859	64	0	665	330	0	202	312	0	193
V/C Ratio(X)	0.78	0.00	0.40	0.47	0.00	0.49	0.21	0.00	0.17	0.22	0.00	0.04
Avail Cap(c_a), veh/h	231	0	3706	228	0	3494	1234	0	1413	1226	0	1349
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.8	0.0	6.7	18.6	0.0	9.1	16.5	0.0	15.9	17.0	0.0	15.6
Incr Delay (d2), s/veh	13.6	0.0	0.1	2.0	0.0	0.2	0.1	0.0	0.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.6	0.0	1.9	0.5	0.0	2.5	1.0	0.0	0.5	1.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.4	0.0	6.8	20.6	0.0	9.3	16.6	0.0	16.0	17.1	0.0	15.6
LnGrp LOS	C	A	A	C	A	A	B	A	B	B	A	B
Approach Vol, veh/h	515			358			105			75		
Approach Delay, s/veh	14.6			10.2			16.4			17.0		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	23.5		9.3	9.7	20.2		9.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.6	6.8		4.5	5.6	7.7		4.0				
Green Ext Time (p_c), s	0.0	0.6		0.0	0.0	0.6		0.1				
Intersection Summary												
HCM 6th Ctrl Delay	13.5											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	450	11	7	310	29	17
Future Vol, veh/h	450	11	7	310	29	17
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	3	0	0	5	0	0
Mvmt Flow	529	13	8	365	34	20
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	545	0	920	539
Stage 1	-	-	-	-	539	-
Stage 2	-	-	-	-	381	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1034	-	303	546
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	695	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1031	-	300	544
Mov Cap-2 Maneuver	-	-	-	-	300	-
Stage 1	-	-	-	-	587	-
Stage 2	-	-	-	-	689	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		16.8	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	360	-	-	1031	-	
HCM Lane V/C Ratio	0.15	-	-	0.008	-	
HCM Control Delay (s)	16.8	-	-	8.5	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	280	388	4	276	14	9	65	4
Future Volume (vph)	280	388	4	276	14	9	65	4
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	31.4	31.8	24.6	18.7	9.3	9.3	9.3	9.3
Actuated g/C Ratio	0.64	0.65	0.50	0.38	0.19	0.19	0.19	0.19
v/c Ratio	0.54	0.38	0.01	0.58	0.07	0.07	0.29	0.32
Control Delay	13.6	10.2	7.5	18.3	18.7	14.5	21.7	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	10.2	7.5	18.3	18.7	14.5	21.7	7.2
LOS	B	B	A	B	B	B	C	A
Approach Delay		11.7		18.2		16.4		12.4
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 48.9

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 13.7

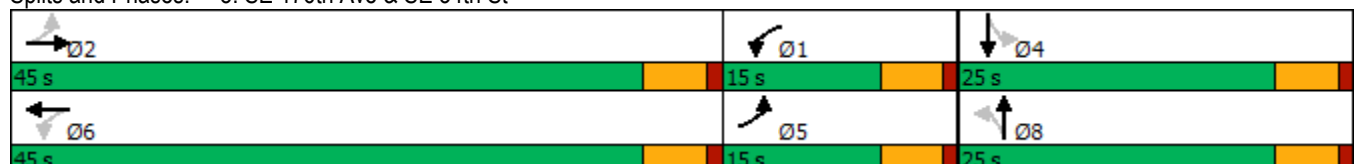
Intersection LOS: B

Intersection Capacity Utilization 56.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	388	2	4	276	59	14	9	8	65	4	109
Future Volume (veh/h)	280	388	2	4	276	59	14	9	8	65	4	109
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		1.00	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	329	456	2	5	325	56	16	11	0	76	5	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	595	709	3	584	580	100	331	203	0	324	203	0
Arrive On Green	0.12	0.38	0.38	0.13	0.39	0.39	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1682	1846	8	1810	1503	259	1407	1900	0	1378	1900	0
Grp Volume(v), veh/h	329	0	458	5	0	381	16	11	0	76	5	0
Grp Sat Flow(s),veh/h/ln	1682	0	1854	1810	0	1762	1407	1900	0	1378	1900	0
Q Serve(g_s), s	0.0	0.0	7.9	0.0	0.0	6.6	0.4	0.2	0.0	2.1	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	7.9	0.0	0.0	6.6	0.5	0.2	0.0	2.3	0.1	0.0
Prop In Lane	1.00		0.00	1.00		0.15	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	595	0	712	584	0	680	331	203	0	324	203	0
V/C Ratio(X)	0.55	0.00	0.64	0.01	0.00	0.56	0.05	0.05	0.00	0.23	0.02	0.00
Avail Cap(c_a), veh/h	816	0	1895	818	0	1801	900	971	0	881	971	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.4	0.0	9.9	9.4	0.0	9.4	15.9	15.7	0.0	16.7	15.7	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.4	0.0	0.0	0.3	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.6	0.0	3.8	0.0	0.0	3.0	0.2	0.1	0.0	1.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.7	0.0	10.2	9.4	0.0	9.7	15.9	15.8	0.0	16.9	15.7	0.0
LnGrp LOS	B	A	B	A	A	A	B	B	A	B	B	A
Approach Vol, veh/h	787				386				27			
Approach Delay, s/veh	11.3				9.7				15.8			
Approach LOS	B				A				B			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.9	20.0		9.2	9.9	20.1		9.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	9.9		4.3	2.0	8.6		2.5				
Green Ext Time (p_c), s	0.0	1.7		0.1	0.3	1.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay	11.2
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

MOVEMENT SUMMARY

 **Site: 101 [SE 176 Avenue/ SE 29th Street Phase 3 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 3

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	ft				mph
South: SE 176th Avenue															
3	L2	All MCs	5	0.0	5	0.0	0.392	7.2	LOS A	2.3	57.6	0.49	0.29	0.49	32.2
8	T1	All MCs	144	2.0	144	2.0	0.392	7.4	LOS A	2.3	57.6	0.49	0.29	0.49	32.8
18	R2	All MCs	279	0.0	279	0.0	0.392	7.2	LOS A	2.3	57.6	0.49	0.29	0.49	32.6
Approach			427	0.7	427	0.7	0.392	7.3	LOS A	2.3	57.6	0.49	0.29	0.49	32.6
East: SE 29th Street															
1	L2	All MCs	85	0.0	85	0.0	0.338	6.2	LOS A	1.9	48.5	0.40	0.21	0.40	32.2
6	T1	All MCs	259	0.0	259	0.0	0.338	6.2	LOS A	1.9	48.5	0.40	0.21	0.40	32.9
16	R2	All MCs	53	0.0	53	0.0	0.338	6.2	LOS A	1.9	48.5	0.40	0.21	0.40	32.6
Approach			396	0.0	396	0.0	0.338	6.2	LOS A	1.9	48.5	0.40	0.21	0.40	32.7
North: SE 176th Avenue															
7	L2	All MCs	26	88.0	26	88.0	0.322	18.6	LOS C	1.3	38.3	0.55	0.39	0.55	29.3
4	T1	All MCs	104	1.0	104	1.0	0.322	6.5	LOS A	1.3	38.3	0.55	0.39	0.55	32.3
14	R2	All MCs	122	18.0	122	18.0	0.322	8.3	LOS A	1.3	38.3	0.55	0.39	0.55	31.7
Approach			252	18.2	252	18.2	0.322	8.3	LOS A	1.3	38.3	0.55	0.39	0.55	31.7
West: SE 29th Street															
5	L2	All MCs	6	0.0	6	0.0	0.176	4.9	LOS A	0.8	20.5	0.41	0.25	0.41	33.3
2	T1	All MCs	167	0.0	167	0.0	0.176	4.9	LOS A	0.8	20.5	0.41	0.25	0.41	34.0
12	R2	All MCs	15	10.0	15	10.0	0.176	5.8	LOS A	0.8	20.5	0.41	0.25	0.41	33.5
Approach			188	0.8	188	0.8	0.176	4.9	LOS A	0.8	20.5	0.41	0.25	0.41	34.0
All Vehicles			1264	4.0	1264	4.0	0.392	6.9	LOS A	2.3	57.6	0.46	0.28	0.46	32.7

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

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglach M1 implied by US HCM 6 Roundabout Capacity Model.

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 AM.sip9

Intersection	
Intersection Delay, s/veh	15.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	272	34	76	314	14	50	88	56	0	69	10
Future Vol, veh/h	12	272	34	76	314	14	50	88	56	0	69	10
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	13	299	37	84	345	15	55	97	62	0	76	11
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	16.7	16.4	11.9	11.8
HCM LOS	C	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	61%	0%	89%	0%	96%	87%
Vol Right, %	0%	39%	0%	11%	0%	4%	13%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	144	12	306	76	328	79
LT Vol	50	0	12	0	76	0	0
Through Vol	0	88	0	272	0	314	69
RT Vol	0	56	0	34	0	14	10
Lane Flow Rate	55	158	13	336	84	360	87
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.114	0.293	0.024	0.575	0.154	0.604	0.173
Departure Headway (Hd)	7.47	6.666	6.679	6.161	6.62	6.03	7.157
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	477	536	534	582	540	595	497
Service Time	5.249	4.445	4.45	3.931	4.386	3.795	5.253
HCM Lane V/C Ratio	0.115	0.295	0.024	0.577	0.156	0.605	0.175
HCM Control Delay	11.2	12.2	9.6	17	10.6	17.7	11.8
HCM Lane LOS	B	B	A	C	B	C	B
HCM 95th-tile Q	0.4	1.2	0.1	3.6	0.5	4	0.6

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	42	15	46	214	38	162	23	1081	145	792
Future Volume (vph)	42	15	46	214	38	162	23	1081	145	792
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	10.0	32.0
Total Split (s)	10.0	25.0	25.0	14.0	29.0	29.0	17.0	44.0	37.0	64.0
Total Split (%)	8.3%	20.8%	20.8%	11.7%	24.2%	24.2%	14.2%	36.7%	30.8%	53.3%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	15.9	12.0	12.0	23.3	15.2	15.2	5.7	68.0	13.8	80.1
Actuated g/C Ratio	0.13	0.10	0.10	0.19	0.13	0.13	0.05	0.57	0.12	0.67
v/c Ratio	0.22	0.08	0.16	0.90	0.17	0.48	0.28	0.40	0.75	0.26
Control Delay	39.2	47.9	1.2	79.3	46.3	11.2	64.3	7.8	72.3	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	47.9	1.2	79.3	46.3	11.2	64.3	7.8	72.3	9.8
LOS	D	D	A	E	D	B	E	A	E	A
Approach Delay		23.6			49.6			8.9		19.2
Approach LOS		C			D			A		B

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 4 (3%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 19.8

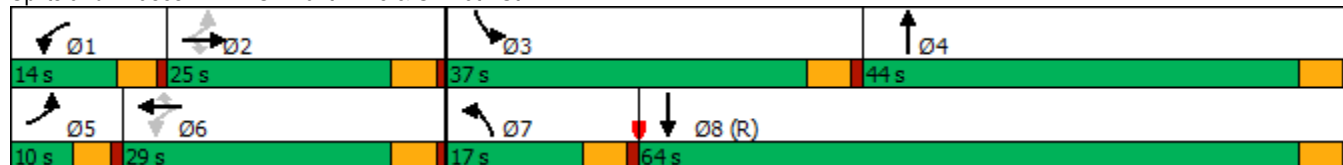
Intersection LOS: B

Intersection Capacity Utilization 61.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	15	46	214	38	162	23	1081	20	145	792	26
Future Volume (veh/h)	42	15	46	214	38	162	23	1081	20	145	792	26
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1856	1900	1856	1870	1870	1900	1900	1870	1796	1885	1856	1826
Adj Flow Rate, veh/h	44	16	2	225	40	14	24	1138	20	153	834	25
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	0	3	2	2	0	0	2	7	1	3	5
Cap, veh/h	226	155	128	304	241	207	42	2141	38	180	2485	74
Arrive On Green	0.03	0.08	0.08	0.08	0.13	0.13	0.02	0.41	0.41	0.10	0.49	0.49
Sat Flow, veh/h	1767	1900	1572	1781	1870	1610	1810	5167	91	1795	5054	151
Grp Volume(v), veh/h	44	16	2	225	40	14	24	750	408	153	557	302
Grp Sat Flow(s),veh/h/ln	1767	1900	1572	1781	1870	1610	1810	1702	1854	1795	1689	1828
Q Serve(g_s), s	2.7	0.9	0.1	9.5	2.3	0.9	1.6	19.8	19.9	10.1	12.0	12.1
Cycle Q Clear(g_c), s	2.7	0.9	0.1	9.5	2.3	0.9	1.6	19.8	19.9	10.1	12.0	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.05	1.00		0.08
Lane Grp Cap(c), veh/h	226	155	128	304	241	207	42	1410	768	180	1660	899
V/C Ratio(X)	0.19	0.10	0.02	0.74	0.17	0.07	0.58	0.53	0.53	0.85	0.34	0.34
Avail Cap(c_a), veh/h	250	317	262	304	374	322	181	1410	768	479	1660	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.78	0.78	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	51.0	50.7	47.7	46.5	45.9	58.0	26.4	26.4	53.1	18.6	18.6
Incr Delay (d2), s/veh	0.4	0.1	0.0	9.3	0.1	0.1	3.6	1.1	2.1	4.3	0.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	0.8	0.1	4.9	2.0	0.7	1.4	12.1	13.2	8.2	8.2	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	51.1	50.7	57.0	46.7	46.0	61.7	27.5	28.5	57.3	19.1	19.6
LnGrp LOS	D	D	D	E	D	D	E	C	C	E	B	B
Approach Vol, veh/h	62			279			1182			1012		
Approach Delay, s/veh	49.4			54.9			28.5			25.0		
Approach LOS	D			D			C			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	14.8	17.0	54.7	8.3	20.4	7.8	64.0				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	9.5	20.0	32.0	39.0	5.5	24.0	12.0	59.0				
Max Q Clear Time (g_c+I1), s	11.5	2.9	12.1	21.9	4.7	4.3	3.6	14.1				
Green Ext Time (p_c), s	0.0	0.0	0.1	4.6	0.0	0.1	0.0	3.7				
Intersection Summary												
HCM 6th Ctrl Delay	30.6											
HCM 6th LOS	C											

Timings
12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	60	165	293	121	99	111	936	449	155	813
Future Volume (vph)	28	60	165	293	121	99	111	936	449	155	813
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	6.4	8.2	23.0	20.0	23.8	46.4	11.8	56.2	81.2	17.6	62.0
Actuated g/C Ratio	0.05	0.07	0.19	0.17	0.20	0.39	0.10	0.47	0.68	0.15	0.52
v/c Ratio	0.39	0.56	0.53	1.11	0.36	0.16	0.72	0.64	0.42	0.66	0.53
Control Delay	68.3	70.9	31.3	129.9	45.0	4.8	74.0	28.0	2.1	66.0	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	70.9	31.3	129.9	45.0	4.8	74.0	28.0	2.1	66.0	16.8
LOS	E	E	C	F	D	A	E	C	A	E	B
Approach Delay		44.8			85.8			23.7			24.4
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 35.3

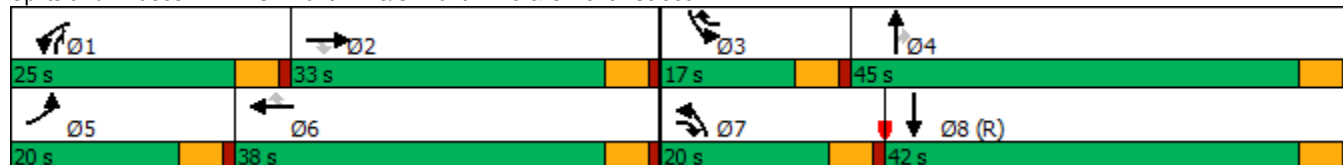
Intersection LOS: D

Intersection Capacity Utilization 70.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 3 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	60	165	293	121	99	111	936	449	155	813	37
Future Volume (veh/h)	28	60	165	293	121	99	111	936	449	155	813	37
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	31	67	124	326	134	30	123	1040	291	172	903	39
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	40	159	270	297	434	515	147	1125	740	172	1326	57
Arrive On Green	0.03	0.09	0.09	0.17	0.23	0.23	0.09	0.33	0.33	0.10	0.35	0.35
Sat Flow, veh/h	1491	1758	1528	1781	1885	1560	1706	3375	1480	1720	3821	165
Grp Volume(v), veh/h	31	67	124	326	134	30	123	1040	291	172	532	410
Grp Sat Flow(s),veh/h/ln	1491	1758	1528	1781	1885	1560	1706	1687	1480	1720	1127	1732
Q Serve(g_s), s	2.5	4.3	8.7	20.0	7.1	1.6	8.5	35.6	14.7	12.0	24.2	24.3
Cycle Q Clear(g_c), s	2.5	4.3	8.7	20.0	7.1	1.6	8.5	35.6	14.7	12.0	24.2	24.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	40	159	270	297	434	515	147	1125	740	172	782	601
V/C Ratio(X)	0.77	0.42	0.46	1.10	0.31	0.06	0.84	0.92	0.39	1.00	0.68	0.68
Avail Cap(c_a), veh/h	186	410	488	297	518	585	213	1125	740	172	782	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.93	0.93	0.93
Uniform Delay (d), s/veh	58.0	51.6	44.2	50.0	38.3	27.4	54.0	38.5	18.7	54.0	33.5	33.5
Incr Delay (d2), s/veh	11.1	0.7	0.5	81.1	0.1	0.0	11.8	13.9	1.6	66.2	4.4	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	3.4	5.9	22.8	5.8	1.0	7.3	23.0	8.9	12.8	11.1	16.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	52.2	44.7	131.1	38.4	27.4	65.8	52.5	20.2	120.2	37.9	39.3
LnGrp LOS	E	D	D	F	D	C	E	D	C	F	D	D
Approach Vol, veh/h		222			490			1454			1114	
Approach Delay, s/veh		50.4			99.4			47.1			51.1	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	15.9	17.0	45.0	8.2	32.7	15.4	46.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	10.7	14.0	37.6	4.5	9.1	10.5	26.3				
Green Ext Time (p_c), s	0.0	0.1	0.0	0.9	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			56.5									
HCM 6th LOS			E									

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 3 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	116	91	40	82	242	84	1345	115	1486
Future Volume (vph)	116	91	40	82	242	84	1345	115	1486
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	9.0	15.9	6.2	11.1	19.8	7.8	52.2	9.7	56.1
Actuated g/C Ratio	0.09	0.16	0.06	0.11	0.20	0.08	0.52	0.10	0.56
v/c Ratio	0.79	0.62	0.38	0.42	0.67	0.63	0.79	0.69	0.87
Control Delay	78.1	37.0	54.0	45.3	30.4	53.9	25.4	63.7	28.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	37.0	54.0	45.3	30.4	53.9	25.4	63.7	28.9
LOS	E	D	D	D	C	D	C	E	C
Approach Delay		52.7		36.4			27.0		31.2
Approach LOS		D		D			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 31.8

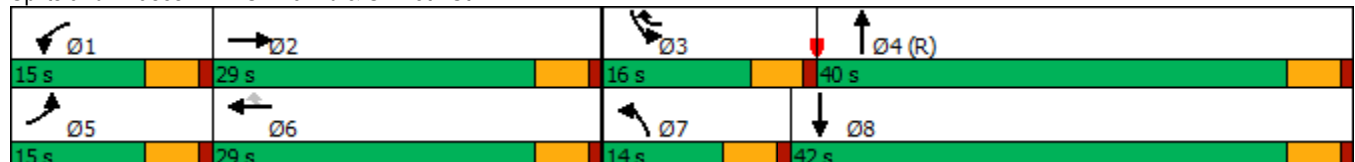
Intersection LOS: C

Intersection Capacity Utilization 81.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	91	97	40	82	242	84	1345	32	115	1486	133
Future Volume (veh/h)	116	91	97	40	82	242	84	1345	32	115	1486	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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		
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	122	96	58	42	86	192	88	1416	32	121	1564	135
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, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	150	204	123	62	248	344	122	1769	40	149	1699	145
Arrive On Green	0.09	0.19	0.19	0.03	0.13	0.13	0.09	0.66	0.66	0.11	0.68	0.68
Sat Flow, veh/h	1739	1100	664	1810	1856	1582	1810	3552	80	1810	3311	283
Grp Volume(v), veh/h	122	0	154	42	86	192	88	708	740	121	833	866
Grp Sat Flow(s),veh/h/ln	1739	0	1764	1810	1856	1582	1810	1777	1856	1810	1777	1818
Q Serve(g_s), s	6.9	0.0	7.8	2.3	4.2	10.8	4.7	28.6	28.7	6.5	39.6	41.3
Cycle Q Clear(g_c), s	6.9	0.0	7.8	2.3	4.2	10.8	4.7	28.6	28.7	6.5	39.6	41.3
Prop In Lane	1.00		0.38	1.00		1.00	1.00		0.04	1.00		0.16
Lane Grp Cap(c), veh/h	150	0	327	62	248	344	122	885	924	149	912	933
V/C Ratio(X)	0.82	0.00	0.47	0.67	0.35	0.56	0.72	0.80	0.80	0.81	0.91	0.93
Avail Cap(c_a), veh/h	174	0	423	181	445	512	163	885	924	199	912	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.19	0.19	0.19	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	36.4	47.7	39.4	35.0	44.6	13.3	13.3	43.8	14.0	14.3
Incr Delay (d2), s/veh	19.5	0.0	0.4	4.6	0.3	0.5	1.1	1.5	1.5	12.5	15.1	16.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	5.9	2.0	3.5	7.3	3.1	9.8	10.2	5.9	19.5	20.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	36.8	52.4	39.7	35.5	45.7	14.8	14.8	56.3	29.1	30.8
LnGrp LOS	E	A	D	D	D	D	D	B	B	E	C	C
Approach Vol, veh/h	276			320			1536			1820		
Approach Delay, s/veh	49.0			38.8			16.6			31.7		
Approach LOS	D			D			B			C		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	23.5	13.2	54.8	13.6	18.4	11.7	56.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.3	9.8	8.5	30.7	8.9	12.8	6.7	43.3				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.6	0.0	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay	27.6											
HCM 6th LOS	C											

Timings
2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	233	183	272	265	148	933	151	1103
Future Volume (vph)	233	183	272	265	148	933	151	1103
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	14.0	35.0	18.0	39.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	14.0%	35.0%	18.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effct Green (s)	11.3	23.5	12.2	24.4	9.5	32.6	11.7	34.8
Actuated g/C Ratio	0.11	0.24	0.12	0.24	0.10	0.33	0.12	0.35
v/c Ratio	0.62	0.66	0.66	0.88	0.91	1.03	0.75	1.15
Control Delay	49.0	40.2	49.5	56.7	105.2	54.2	61.7	106.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	40.2	49.5	56.7	105.2	54.2	61.7	106.8
LOS	D	D	D	E	F	D	E	F
Approach Delay		44.2		53.7		60.1		102.3
Approach LOS		D		D		E		F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 72.9

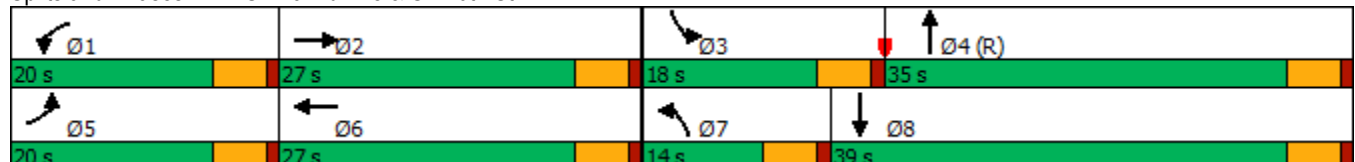
Intersection LOS: E

Intersection Capacity Utilization 90.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary

2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	183	95	272	265	118	148	933	203	151	1103	237
Future Volume (veh/h)	233	183	95	272	265	118	148	933	203	151	1103	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	243	191	80	283	276	106	154	972	192	157	1149	228
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	316	265	111	355	286	110	163	1146	226	189	1183	233
Arrive On Green	0.09	0.21	0.21	0.10	0.22	0.22	0.09	0.38	0.38	0.14	0.53	0.53
Sat Flow, veh/h	3510	1270	532	3510	1301	500	1810	2981	588	1795	2958	583
Grp Volume(v), veh/h	243	0	271	283	0	382	154	583	581	157	688	689
Grp Sat Flow(s),veh/h/ln	1755	0	1802	1755	0	1801	1810	1791	1778	1795	1777	1764
Q Serve(g_s), s	6.8	0.0	14.0	7.9	0.0	21.0	8.5	29.7	29.8	8.5	37.3	38.1
Cycle Q Clear(g_c), s	6.8	0.0	14.0	7.9	0.0	21.0	8.5	29.7	29.8	8.5	37.3	38.1
Prop In Lane	1.00		0.30	1.00		0.28	1.00		0.33	1.00		0.33
Lane Grp Cap(c), veh/h	316	0	376	355	0	396	163	689	684	189	711	706
V/C Ratio(X)	0.77	0.00	0.72	0.80	0.00	0.96	0.95	0.85	0.85	0.83	0.97	0.98
Avail Cap(c_a), veh/h	527	0	397	527	0	396	163	689	684	233	711	706
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.40	0.40	0.40
Uniform Delay (d), s/veh	44.5	0.0	36.8	43.9	0.0	38.6	45.3	28.1	28.1	42.1	22.8	22.9
Incr Delay (d2), s/veh	1.5	0.0	5.0	2.9	0.0	35.6	54.0	12.3	12.5	6.7	14.9	16.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	10.6	6.2	0.0	18.7	10.2	20.5	20.4	5.9	19.1	19.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	0.0	41.8	46.8	0.0	74.2	99.2	40.4	40.6	48.8	37.7	39.6
LnGrp LOS	D	A	D	D	A	E	F	D	D	D	D	D
Approach Vol, veh/h		514			665			1318			1534	
Approach Delay, s/veh		43.8			62.6			47.4			39.7	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.1	25.9	15.6	43.4	14.0	27.0	14.0	45.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	9.0	34.0				
Max Q Clear Time (g_c+I1), s	9.9	16.0	10.5	31.8	8.8	23.0	10.5	40.1				
Green Ext Time (p_c), s	0.3	0.5	0.0	0.0	0.2	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			46.5									
HCM 6th LOS			D									

Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	4	1294	3	10	1337
Future Vol, veh/h	3	4	1294	3	10	1337
Conflicting Peds, #/hr	0	0	0	2	2	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	0	1	0	0	1
Mvmt Flow	3	4	1362	3	11	1407
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	2092	685	0	0	1367	0
Stage 1	1366	-	-	-	-	-
Stage 2	726	-	-	-	-	-
Critical Hdwy	6.8	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	46	395	-	-	509	-
Stage 1	206	-	-	-	-	-
Stage 2	445	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	45	394	-	-	508	-
Mov Cap-2 Maneuver	45	-	-	-	-	-
Stage 1	206	-	-	-	-	-
Stage 2	435	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	47.1	0		0.1		
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	45	394	508	-
HCM Lane V/C Ratio	-	-	0.07	0.011	0.021	-
HCM Control Delay (s)	-	-	91	14.2	12.2	-
HCM Lane LOS	-	-	F	B	B	-
HCM 95th %tile Q(veh)	-	-	0.2	0	0.1	-

Timings

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center

Phase 3 2038 PM Peak Hour Conditions

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	131	45	55	1166	1239
Future Volume (vph)	131	45	55	1166	1239
Turn Type	Prot	pm+ov	Prot	NA	NA
Protected Phases	2	7	7	4	8
Permitted Phases	2				
Detector Phase	2	7	7	4	8
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	27.0	10.0	10.0	26.0	26.0
Total Split (s)	30.0	16.0	16.0	68.0	54.0
Total Split (%)	30.0%	16.0%	16.0%	68.0%	54.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead		Lead		Lag
Lead-Lag Optimize?	Yes		Yes		Yes
Recall Mode	Max	None	None	C-Max	None
Act Effct Green (s)	25.0	38.5	8.5	65.0	53.6
Actuated g/C Ratio	0.25	0.38	0.08	0.65	0.54
v/c Ratio	0.32	0.08	0.40	0.53	0.75
Control Delay	33.0	9.9	68.8	4.6	23.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	9.9	68.8	4.6	23.2
LOS	C	A	E	A	C
Approach Delay	27.1				7.5
Approach LOS	C				C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 45 (45%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 16.4

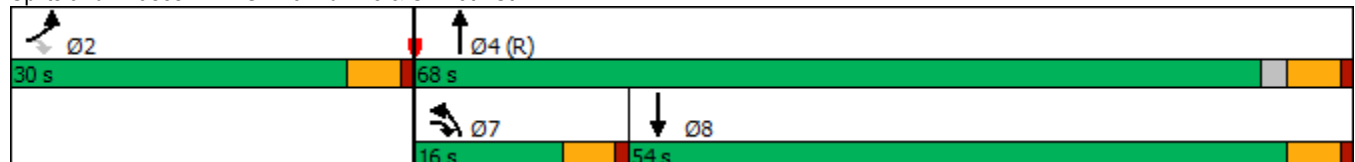
Intersection LOS: B

Intersection Capacity Utilization 61.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: SE 192nd Ave & SE 29th St



HCM 6th Signalized Intersection Summary

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	131	45	55	1166	1239	101
Future Volume (veh/h)	131	45	55	1166	1239	101
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1856	1826	1826	1885	1885	1826
Adj Flow Rate, veh/h	138	47	58	1227	1304	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	5	5	1	1	5
Cap, veh/h	442	453	74	2328	1880	144
Arrive On Green	0.25	0.25	0.08	1.00	0.56	0.56
Sat Flow, veh/h	1767	1547	1739	3676	3466	258
Grp Volume(v), veh/h	138	47	58	1227	691	713
Grp Sat Flow(s),veh/h/ln	1767	1547	1739	1791	1791	1839
Q Serve(g_s), s	6.4	2.2	3.3	0.0	27.8	28.0
Cycle Q Clear(g_c), s	6.4	2.2	3.3	0.0	27.8	28.0
Prop In Lane	1.00	1.00	1.00			0.14
Lane Grp Cap(c), veh/h	442	453	74	2328	998	1025
V/C Ratio(X)	0.31	0.10	0.78	0.53	0.69	0.70
Avail Cap(c_a), veh/h	442	453	191	2328	998	1025
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.49	0.49	1.00	1.00
Uniform Delay (d), s/veh	30.5	25.8	45.3	0.0	15.9	16.0
Incr Delay (d2), s/veh	1.8	0.5	8.6	0.4	2.1	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.2	4.1	2.7	0.2	16.0	16.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.3	26.3	53.9	0.4	18.0	18.1
LnGrp LOS	C	C	D	A	B	B
Approach Vol, veh/h	185			1285	1404	
Approach Delay, s/veh	30.8			2.8	18.0	
Approach LOS	C			A	B	
Timer - Assigned Phs	2		4		7	8
Phs Duration (G+Y+Rc), s	30.0		70.0		9.2	60.8
Change Period (Y+Rc), s	5.0		5.0		5.0	5.0
Max Green Setting (Gmax), s	25.0		63.0		11.0	49.0
Max Q Clear Time (g_c+I1), s	8.4		2.0		5.3	30.0
Green Ext Time (p_c), s	0.5		11.8		0.0	9.2
Intersection Summary						
HCM 6th Ctrl Delay			12.1			
HCM 6th LOS			B			

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	191	254	355	220	124	139	1006	204	221	968
Future Volume (vph)	191	254	355	220	124	139	1006	204	221	968
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	33.3	24.8	43.8	30.2	30.2	9.3	31.2	45.2	10.0	32.0
Actuated g/C Ratio	0.33	0.25	0.44	0.30	0.30	0.09	0.31	0.45	0.10	0.32
v/c Ratio	0.47	0.93	1.14	0.40	0.21	0.86	0.94	0.26	0.68	1.05
Control Delay	22.4	62.2	118.0	29.7	2.0	88.2	51.5	2.1	73.0	87.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	62.2	118.0	29.7	2.0	88.2	51.5	2.1	73.0	87.9
LOS	C	E	F	C	A	F	D	A	E	F
Approach Delay		49.4		69.6			47.8			85.4
Approach LOS		D		E			D			F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.14

Intersection Signal Delay: 64.4

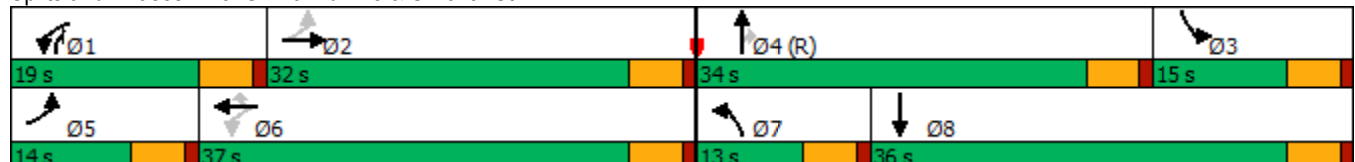
Intersection LOS: E

Intersection Capacity Utilization 97.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	254	145	355	220	124	139	1006	204	221	968	135
Future Volume (veh/h)	191	254	145	355	220	124	139	1006	204	221	968	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1817	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1817
Adj Flow Rate, veh/h	201	267	131	374	232	32	146	1059	90	233	1019	130
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, %	2	0	2	1	1	0	0	2	1	0	1	2
Cap, veh/h	451	289	142	365	598	509	154	1095	726	415	1027	131
Arrive On Green	0.09	0.25	0.25	0.14	0.30	0.30	0.08	0.29	0.29	0.12	0.33	0.33
Sat Flow, veh/h	1731	1163	570	1908	2003	1705	1922	3777	1683	3413	3099	395
Grp Volume(v), veh/h	201	0	398	374	232	32	146	1059	90	233	572	577
Grp Sat Flow(s),veh/h/ln	1731	0	1733	1908	2003	1705	1922	1889	1683	1706	1741	1753
Q Serve(g_s), s	8.7	0.0	22.4	14.0	9.2	0.9	7.6	27.7	1.7	6.4	32.7	32.8
Cycle Q Clear(g_c), s	8.7	0.0	22.4	14.0	9.2	0.9	7.6	27.7	1.7	6.4	32.7	32.8
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00	1.00		0.23
Lane Grp Cap(c), veh/h	451	0	431	365	598	509	154	1095	726	415	577	581
V/C Ratio(X)	0.45	0.00	0.92	1.02	0.39	0.06	0.95	0.97	0.12	0.56	0.99	0.99
Avail Cap(c_a), veh/h	451	0	468	365	641	546	154	1095	726	415	577	581
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.00	0.79	1.00	1.00	1.00	1.00	1.00	1.00	0.62	0.62	0.62
Uniform Delay (d), s/veh	24.9	0.0	36.7	25.2	27.8	11.7	45.8	35.0	6.3	41.4	33.3	33.3
Incr Delay (d2), s/veh	0.2	0.0	18.8	53.7	0.2	0.0	57.0	20.3	0.4	0.7	27.5	27.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.1	0.0	16.2	17.1	7.7	0.9	9.9	21.5	1.4	4.8	22.8	23.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.1	0.0	55.5	78.8	28.0	11.8	102.8	55.3	6.6	42.1	60.8	61.0
LnGrp LOS	C	A	E	F	C	B	F	E	A	D	E	E
Approach Vol, veh/h	599			638			1295			1382		
Approach Delay, s/veh	45.3			57.0			57.3			57.7		
Approach LOS	D			E			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	29.8	17.2	34.0	14.0	34.8	13.0	38.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	24.4	8.4	29.7	10.7	11.2	9.6	34.8				
Green Ext Time (p_c), s	0.0	0.3	0.0	0.0	0.0	0.4	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 55.6

HCM 6th LOS E

Notes

User approved pedestrian interval to be less than phase max green.

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 3 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	74	307	37	334	71	17	250	37
Future Volume (vph)	74	307	37	334	71	17	250	37
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	5.2	29.0	5.2	24.0	17.8	17.8	17.8	17.8
Actuated g/C Ratio	0.08	0.46	0.08	0.38	0.28	0.28	0.28	0.28
v/c Ratio	0.53	0.49	0.27	0.77	0.26	0.11	0.71	0.38
Control Delay	47.8	15.9	37.5	24.9	21.5	10.3	32.9	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.8	15.9	37.5	24.9	21.5	10.3	32.9	8.1
LOS	D	B	D	C	C	B	C	A
Approach Delay		21.0		25.7		16.9		21.6
Approach LOS		C		C		B		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 62.6

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 22.5

Intersection LOS: C

Intersection Capacity Utilization 68.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	307	80	37	334	167	71	17	32	250	37	173
Future Volume (veh/h)	74	307	80	37	334	167	71	17	32	250	37	173
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1841	1900	1900
Adj Flow Rate, veh/h	79	327	74	39	355	156	76	18	7	266	39	53
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	4	0	0
Cap, veh/h	126	548	124	75	419	184	424	323	126	487	183	249
Arrive On Green	0.07	0.37	0.37	0.04	0.35	0.35	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1810	1474	333	1745	1213	533	1263	1285	500	1359	728	989
Grp Volume(v), veh/h	79	0	401	39	0	511	76	0	25	266	0	92
Grp Sat Flow(s),veh/h/ln	1810	0	1807	1745	0	1745	1263	0	1784	1359	0	1717
Q Serve(g_s), s	1.9	0.0	8.0	1.0	0.0	12.2	2.3	0.0	0.5	8.3	0.0	1.9
Cycle Q Clear(g_c), s	1.9	0.0	8.0	1.0	0.0	12.2	4.2	0.0	0.5	8.8	0.0	1.9
Prop In Lane	1.00		0.18	1.00		0.31	1.00		0.28	1.00		0.58
Lane Grp Cap(c), veh/h	126	0	672	75	0	603	424	0	448	487	0	432
V/C Ratio(X)	0.63	0.00	0.60	0.52	0.00	0.85	0.18	0.00	0.06	0.55	0.00	0.21
Avail Cap(c_a), veh/h	201	0	3217	194	0	3107	950	0	1191	1053	0	1146
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	0.0	11.4	21.1	0.0	13.6	15.0	0.0	12.8	16.1	0.0	13.3
Incr Delay (d2), s/veh	1.9	0.0	0.3	2.1	0.0	1.3	0.1	0.0	0.0	0.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.3	0.0	4.3	0.7	0.0	6.7	1.1	0.0	0.3	4.1	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	0.0	11.7	23.1	0.0	14.9	15.0	0.0	12.8	16.5	0.0	13.4
LnGrp LOS	C	A	B	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h	480			550			101			358		
Approach Delay, s/veh	13.4			15.5			14.5			15.7		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	21.7		16.3	8.1	20.5		16.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	3.0	10.0		10.8	3.9	14.2		6.2				
Green Ext Time (p_c), s	0.0	0.3		0.1	0.0	0.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	14.8											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	454	32	16	563	18	7
Future Vol, veh/h	454	32	16	563	18	7
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	499	35	18	619	20	8
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	534	0	1172	518
Stage 1	-	-	-	-	517	-
Stage 2	-	-	-	-	655	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1044	-	215	562
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	521	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1044	-	211	561
Mov Cap-2 Maneuver	-	-	-	-	211	-
Stage 1	-	-	-	-	603	-
Stage 2	-	-	-	-	512	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		20.7	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	256	-	-	1044	-	
HCM Lane V/C Ratio	0.107	-	-	0.017	-	
HCM Control Delay (s)	20.7	-	-	8.5	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-	

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	207	387	18	443	10	10	93	21
Future Volume (vph)	207	387	18	443	10	10	93	21
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	35.3	34.1	29.8	23.4	10.2	10.2	10.2	10.2
Actuated g/C Ratio	0.61	0.59	0.52	0.41	0.18	0.18	0.18	0.18
v/c Ratio	0.52	0.40	0.04	0.81	0.06	0.06	0.41	0.48
Control Delay	18.1	11.0	7.5	25.4	23.4	18.4	28.2	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	11.0	7.5	25.4	23.4	18.4	28.2	9.7
LOS	B	B	A	C	C	B	C	A
Approach Delay		13.4		24.9		20.3		15.7
Approach LOS		B		C		C		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 57.6

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 18.4

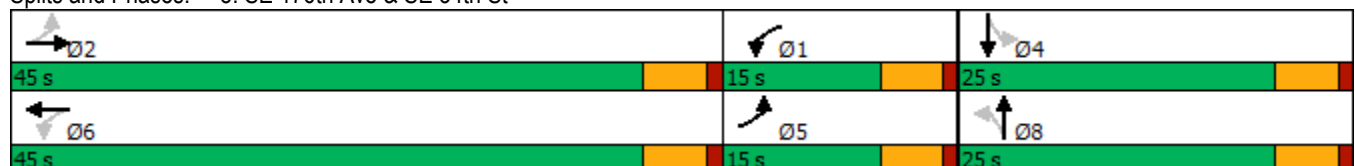
Intersection LOS: B

Intersection Capacity Utilization 66.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	387	13	18	443	120	10	10	6	93	21	174
Future Volume (veh/h)	207	387	13	18	443	120	10	10	6	93	21	174
Initial Q (Qb), 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		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	225	421	13	20	482	115	11	11	0	101	23	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	449	671	21	614	591	141	305	215	0	330	110	86
Arrive On Green	0.11	0.37	0.37	0.14	0.40	0.40	0.11	0.11	0.00	0.11	0.11	0.11
Sat Flow, veh/h	1795	1805	56	1810	1471	351	1382	1900	0	1409	975	763
Grp Volume(v), veh/h	225	0	434	20	0	597	11	11	0	101	0	41
Grp Sat Flow(s),veh/h/ln	1795	0	1860	1810	0	1822	1382	1900	0	1409	0	1738
Q Serve(g_s), s	0.0	0.0	7.7	0.0	0.0	11.8	0.3	0.2	0.0	2.8	0.0	0.9
Cycle Q Clear(g_c), s	0.0	0.0	7.7	0.0	0.0	11.8	1.2	0.2	0.0	3.0	0.0	0.9
Prop In Lane	1.00		0.03	1.00		0.19	1.00		0.00	1.00		0.44
Lane Grp Cap(c), veh/h	449	0	691	614	0	732	305	215	0	330	0	196
V/C Ratio(X)	0.50	0.00	0.63	0.03	0.00	0.82	0.04	0.05	0.00	0.31	0.00	0.21
Avail Cap(c_a), veh/h	689	0	1843	802	0	1806	834	941	0	869	0	861
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	10.4	9.4	0.0	10.8	16.8	16.0	0.0	17.3	0.0	16.3
Incr Delay (d2), s/veh	0.3	0.0	0.4	0.0	0.0	0.9	0.0	0.0	0.0	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.7	0.0	3.9	0.2	0.0	5.7	0.2	0.1	0.0	1.5	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	0.0	10.7	9.4	0.0	11.6	16.8	16.0	0.0	17.5	0.0	16.5
LnGrp LOS	B	A	B	A	A	B	B	B	A	B	A	B
Approach Vol, veh/h	659			617			22			142		
Approach Delay, s/veh	12.4			11.5			16.4			17.2		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.8	20.0		9.6	9.6	21.2		9.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	9.7		5.0	2.0	13.8		3.2				
Green Ext Time (p_c), s	0.0	1.6		0.2	0.2	2.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay 12.6
HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

MOVEMENT SUMMARY

 **Site: 101 [SE 176 Avenue/ SE 29th Street Phase 3 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 3
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: SE 176th Avenue															
3	L2	All MCs	16	15.0	16	15.0	0.336	7.9	LOS A	1.9	46.6	0.45	0.27	0.45	32.1
8	T1	All MCs	267	0.0	267	0.0	0.336	6.5	LOS A	1.9	46.6	0.45	0.27	0.45	33.2
18	R2	All MCs	87	0.0	87	0.0	0.336	6.5	LOS A	1.9	46.6	0.45	0.27	0.45	32.9
Approach			370	0.7	370	0.7	0.336	6.5	LOS A	1.9	46.6	0.45	0.27	0.45	33.1
East: SE 29th Street															
1	L2	All MCs	197	0.0	197	0.0	0.594	11.4	LOS B	6.0	151.1	0.71	0.58	0.94	29.8
6	T1	All MCs	354	0.0	354	0.0	0.594	11.4	LOS B	6.0	151.1	0.71	0.58	0.94	30.3
16	R2	All MCs	47	0.0	47	0.0	0.594	11.4	LOS B	6.0	151.1	0.71	0.58	0.94	30.1
Approach			598	0.0	598	0.0	0.594	11.4	LOS B	6.0	151.1	0.71	0.58	0.94	30.1
North: SE 176th Avenue															
7	L2	All MCs	51	0.0	51	0.0	0.325	8.5	LOS A	1.5	38.0	0.65	0.54	0.65	31.2
4	T1	All MCs	86	1.0	86	1.0	0.325	8.6	LOS A	1.5	38.0	0.65	0.54	0.65	31.8
14	R2	All MCs	113	0.0	113	0.0	0.325	8.5	LOS A	1.5	38.0	0.65	0.54	0.65	31.6
Approach			249	0.3	249	0.3	0.325	8.5	LOS A	1.5	38.0	0.65	0.54	0.65	31.6
West: SE 29th Street															
5	L2	All MCs	22	7.0	22	7.0	0.199	6.3	LOS A	0.9	23.1	0.48	0.34	0.48	32.6
2	T1	All MCs	139	0.0	139	0.0	0.199	5.5	LOS A	0.9	23.1	0.48	0.34	0.48	33.5
12	R2	All MCs	33	0.0	33	0.0	0.199	5.5	LOS A	0.9	23.1	0.48	0.34	0.48	33.2
Approach			194	0.8	194	0.8	0.199	5.6	LOS A	0.9	23.1	0.48	0.34	0.48	33.3
All Vehicles			1411	0.3	1411	0.3	0.594	8.8	LOS A	6.0	151.1	0.60	0.46	0.70	31.5

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

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglach M1 implied by US HCM 6 Roundabout Capacity Model.

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 PM.sip9

Intersection	
Intersection Delay, s/veh	92.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	466	73	93	503	18	50	135	76	27	96	28
Future Vol, veh/h	48	466	73	93	503	18	50	135	76	27	96	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	52	507	79	101	547	20	54	147	83	29	104	30
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	127.4	107.5	19.7	19.8
HCM LOS	F	F	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	18%
Vol Thru, %	0%	64%	0%	86%	0%	97%	64%
Vol Right, %	0%	36%	0%	14%	0%	3%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	211	48	539	93	521	151
LT Vol	50	0	48	0	93	0	27
Through Vol	0	135	0	466	0	503	96
RT Vol	0	76	0	73	0	18	28
Lane Flow Rate	54	229	52	586	101	566	164
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.136	0.525	0.117	1.208	0.224	1.171	0.413
Departure Headway (Hd)	9.732	8.962	8.503	7.834	8.481	7.92	9.988
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	371	406	424	469	426	464	363
Service Time	7.432	6.662	6.203	5.534	6.181	5.62	7.988
HCM Lane V/C Ratio	0.146	0.564	0.123	1.249	0.237	1.22	0.452
HCM Control Delay	14	21.1	12.3	137.6	13.6	124.3	19.8
HCM Lane LOS	B	C	B	F	B	F	C
HCM 95th-tile Q	0.5	3	0.4	21.6	0.8	19.8	2

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	51	51	287	38	193	42	1419	151	1304
Future Volume (vph)	89	51	51	287	38	193	42	1419	151	1304
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	19.5	32.0
Total Split (s)	15.0	20.0	20.0	19.0	24.0	24.0	15.0	59.0	22.0	66.0
Total Split (%)	12.5%	16.7%	16.7%	15.8%	20.0%	20.0%	12.5%	49.2%	18.3%	55.0%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	18.9	11.0	11.0	28.7	14.5	14.5	6.3	63.6	12.9	72.1
Actuated g/C Ratio	0.16	0.09	0.09	0.24	0.12	0.12	0.05	0.53	0.11	0.60
v/c Ratio	0.37	0.31	0.19	0.91	0.18	0.55	0.49	0.57	0.83	0.94
Control Delay	40.8	55.3	1.5	74.3	48.1	12.4	51.0	35.3	84.5	36.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	55.3	1.5	74.3	48.1	12.4	51.0	35.3	84.5	36.2
LOS	D	E	A	E	D	B	D	D	F	D
Approach Delay		34.1			49.3			35.7		41.1
Approach LOS		C			D			D		D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 39.7

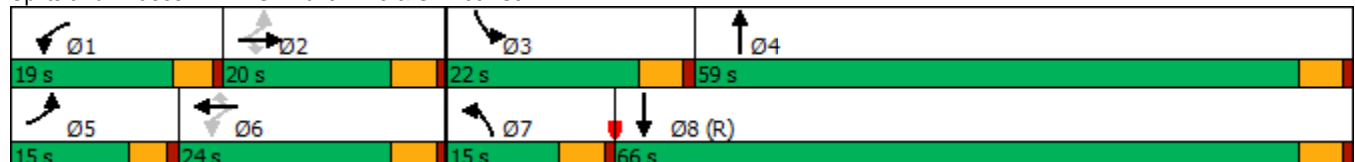
Intersection LOS: D

Intersection Capacity Utilization 72.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	51	51	287	38	193	42	1419	36	151	1304	46
Future Volume (veh/h)	89	51	51	287	38	193	42	1419	36	151	1304	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	1826	1870	1752	1885	1885	1900
Adj Flow Rate, veh/h	94	54	1	302	40	17	44	1494	36	159	1373	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, %	0	0	0	2	2	2	5	2	10	1	1	0
Cap, veh/h	287	163	137	355	273	230	56	2308	56	186	1794	61
Arrive On Green	0.06	0.09	0.09	0.12	0.15	0.15	0.03	0.45	0.45	0.10	0.52	0.52
Sat Flow, veh/h	1810	1900	1599	1781	1870	1579	1739	5128	124	1795	3443	118
Grp Volume(v), veh/h	94	54	1	302	40	17	44	992	538	159	677	743
Grp Sat Flow(s), veh/h/ln	1810	1900	1599	1781	1870	1579	1739	1702	1848	1795	848	1864
Q Serve(g_s), s	5.6	3.2	0.1	14.5	2.2	1.1	3.0	27.1	27.1	10.5	38.1	38.1
Cycle Q Clear(g_c), s	5.6	3.2	0.1	14.5	2.2	1.1	3.0	27.1	27.1	10.5	38.1	38.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		0.06
Lane Grp Cap(c), veh/h	287	163	137	355	273	230	56	1532	832	186	884	972
V/C Ratio(X)	0.33	0.33	0.01	0.85	0.15	0.07	0.79	0.65	0.65	0.86	0.77	0.77
Avail Cap(c_a), veh/h	335	238	200	355	296	250	145	1532	832	254	884	972
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.0	51.6	50.2	45.1	44.7	44.3	57.7	25.6	25.6	52.9	22.9	22.9
Incr Delay (d2), s/veh	0.7	0.4	0.0	17.6	0.1	0.0	6.3	1.5	2.8	14.6	6.3	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	2.8	0.0	6.6	1.9	0.8	2.5	15.3	16.8	9.2	12.5	23.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.7	52.0	50.2	62.7	44.8	44.3	64.0	27.1	28.4	67.5	29.1	28.6
LnGrp LOS	D	D	D	E	D	D	E	C	C	E	C	C
Approach Vol, veh/h		149			359			1574			1579	
Approach Delay, s/veh		48.7			59.9			28.6			32.8	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	15.3	17.4	59.0	11.8	22.5	8.9	67.5				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.5	15.0	17.0	54.0	10.5	19.0	10.0	61.0				
Max Q Clear Time (g_c+I1), s	16.5	5.2	12.5	29.1	7.6	4.2	5.0	40.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.5				

Intersection Summary

HCM 6th Ctrl Delay	34.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Timings
12: SE 164th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	49	102	194	287	136	232	192	1220	405	162	1419
Future Volume (vph)	49	102	194	287	136	232	192	1220	405	162	1419
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	7.3	10.7	34.0	12.0	17.5	37.8	18.3	62.0	79.0	15.3	59.0
Actuated g/C Ratio	0.06	0.09	0.28	0.10	0.15	0.32	0.15	0.52	0.66	0.13	0.49
v/c Ratio	0.51	0.66	0.41	1.69	0.54	0.43	0.74	0.70	0.36	0.75	0.86
Control Delay	71.7	71.0	24.2	366.8	56.2	20.7	64.4	26.0	3.7	67.8	25.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	71.0	24.2	366.8	56.2	20.7	64.4	26.0	3.7	67.8	25.4
LOS	E	E	C	F	E	C	E	C	A	E	C
Approach Delay		44.8			179.6			25.1			29.6
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.69

Intersection Signal Delay: 51.1

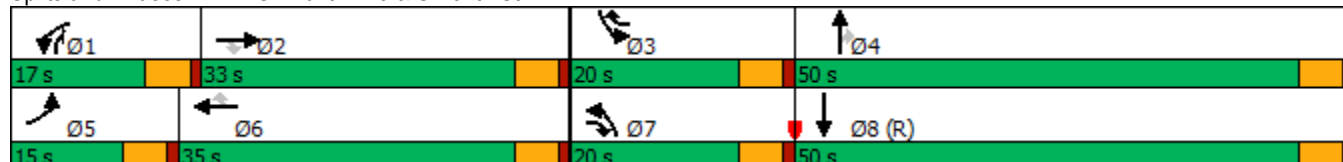
Intersection LOS: D

Intersection Capacity Utilization 80.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th St



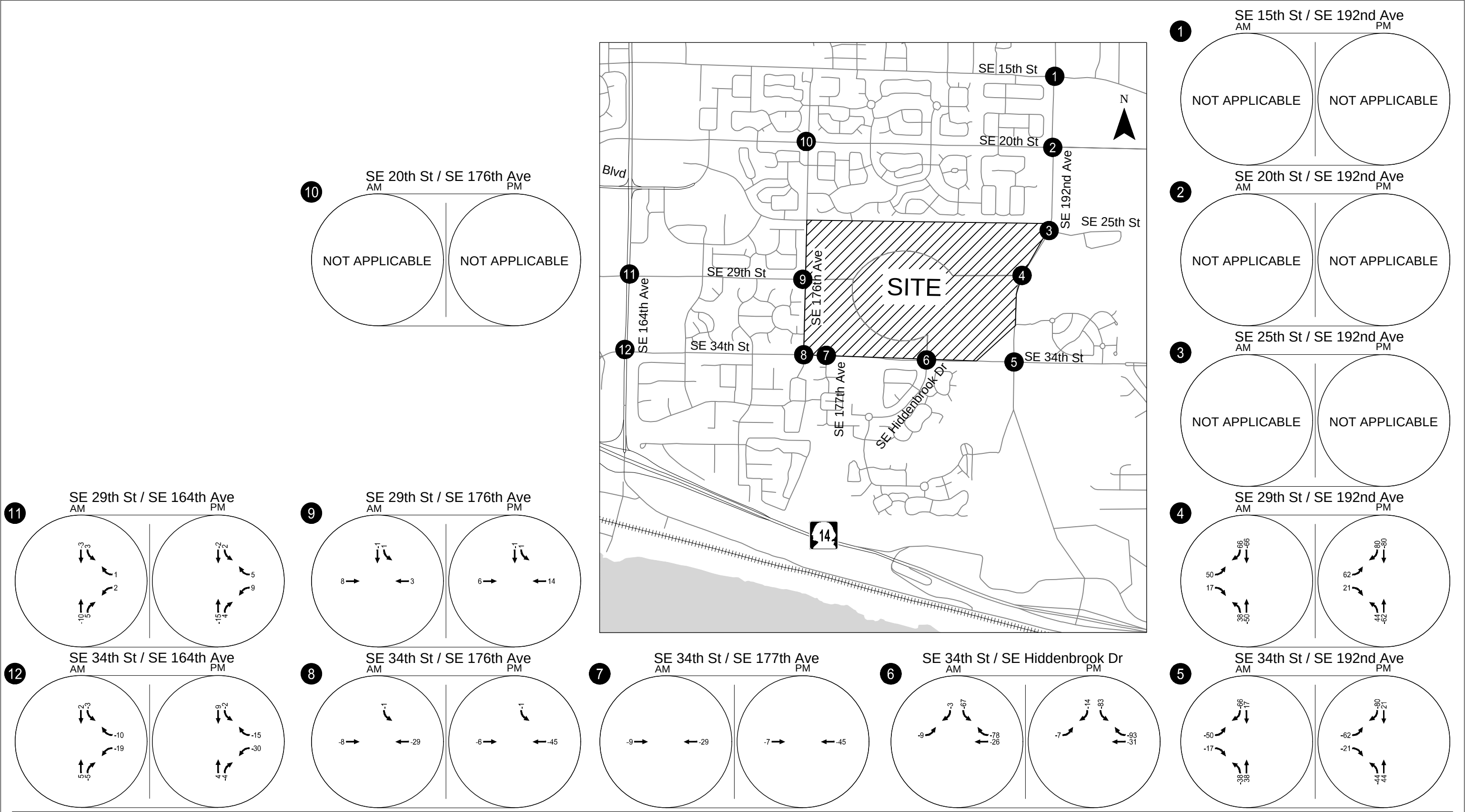
HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th St

Vancouver Innovation Center
Phase 3 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	102	194	287	136	232	192	1220	405	162	1419	49
Future Volume (veh/h)	49	102	194	287	136	232	192	1220	405	162	1419	49
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1767	1826	1885	1870	1841	1856	1885	1870	1885	1870	1870	1841
Adj Flow Rate, veh/h	51	106	152	299	142	167	200	1271	291	169	1478	49
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	64	183	359	178	298	427	224	1387	783	195	1552	51
Arrive On Green	0.04	0.10	0.10	0.10	0.16	0.16	0.13	0.39	0.39	0.11	0.38	0.38
Sat Flow, veh/h	1682	1826	1598	1781	1841	1572	1795	3554	1598	1781	4140	137
Grp Volume(v), veh/h	51	106	152	299	142	167	200	1271	291	169	868	659
Grp Sat Flow(s),veh/h/ln	1682	1826	1598	1781	1841	1572	1795	1777	1598	1781	1216	1846
Q Serve(g_s), s	3.6	6.7	9.8	12.0	8.4	10.4	13.2	40.7	13.6	11.2	41.6	41.6
Cycle Q Clear(g_c), s	3.6	6.7	9.8	12.0	8.4	10.4	13.2	40.7	13.6	11.2	41.6	41.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	64	183	359	178	298	427	224	1387	783	195	912	692
V/C Ratio(X)	0.79	0.58	0.42	1.68	0.48	0.39	0.89	0.92	0.37	0.86	0.95	0.95
Avail Cap(c_a), veh/h	140	426	572	178	460	566	224	1387	783	223	912	692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.30	0.30	0.30
Uniform Delay (d), s/veh	57.2	51.6	39.8	54.0	45.7	35.6	51.7	34.7	19.1	52.5	36.5	36.5
Incr Delay (d2), s/veh	7.9	1.1	0.3	328.6	0.4	0.2	31.8	11.0	1.4	8.6	8.4	10.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	5.5	6.9	34.2	6.9	7.1	12.4	26.0	8.9	7.5	16.1	23.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	52.7	40.1	382.6	46.1	35.8	83.5	45.7	20.4	61.2	44.9	46.9
LnGrp LOS	E	D	D	F	D	D	F	D	C	E	D	D
Approach Vol, veh/h	309			608			1762			1696		
Approach Delay, s/veh	48.6			208.8			45.8			47.3		
Approach LOS	D			F			D			D		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	17.0	18.2	51.8	9.6	24.4	20.0	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	11.8	13.2	42.7	5.6	12.4	15.2	43.6				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.1	0.0	0.3	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay	69.2											
HCM 6th LOS	E											

H:\2715 - VIC Implementation\005 - Master Plan Update\TIA\report\figs\2715-Figures_For_TIA.dwg Apr 05, 2023 - 3:43pm - ckleyhans Layout Tab: Fig H1_Redistributed 29h



Redistributed Baseline Traffic Volumes - SE 29th St Eastern Connection
Weekday AM & PM Peak Hour
Vancouver, WA

Figure
H-1

Appendix I 2038 With-Project Phase 4
Buildout Operations
Worksheets

Timings

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 4 2038 AM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	156	45	29	64	158	69	1025	89	920
Future Volume (vph)	156	45	29	64	158	69	1025	89	920
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	20.0	29.0	20.0	29.0	14.0	15.0	37.0	14.0	36.0
Total Split (%)	20.0%	29.0%	20.0%	29.0%	14.0%	15.0%	37.0%	14.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	12.4	18.7	5.9	10.2	22.0	7.7	50.6	8.8	53.7
Actuated g/C Ratio	0.12	0.19	0.06	0.10	0.22	0.08	0.51	0.09	0.54
v/c Ratio	0.80	0.31	0.32	0.38	0.43	0.57	0.66	0.69	0.63
Control Delay	67.8	18.5	53.4	45.3	18.0	60.6	24.5	69.1	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	18.5	53.4	45.3	18.0	60.6	24.5	69.1	22.9
LOS	E	B	D	D	B	E	C	E	C
Approach Delay		48.3		29.0			26.8		26.7
Approach LOS		D		C			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 29.0

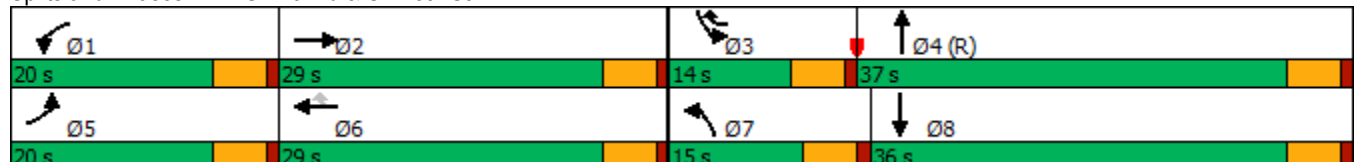
Intersection LOS: C

Intersection Capacity Utilization 61.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	156	45	57	29	64	158	69	1025	16	89	920	87
Future Volume (veh/h)	156	45	57	29	64	158	69	1025	16	89	920	87
Initial Q (Qb), 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		0.98	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1900	1796	1781	1841	1870	1856	1841	1900	1737	1767	1856
Adj Flow Rate, veh/h	173	50	9	32	71	100	77	1139	17	99	1022	91
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	3	0	7	8	4	2	3	4	0	11	9	3
Cap, veh/h	204	258	46	50	145	242	109	1877	28	122	1697	151
Arrive On Green	0.12	0.16	0.16	0.03	0.08	0.08	0.12	1.00	1.00	0.07	0.54	0.54
Sat Flow, veh/h	1767	1567	282	1697	1841	1585	1767	3526	53	1654	3117	277
Grp Volume(v), veh/h	173	0	59	32	71	100	77	565	591	99	550	563
Grp Sat Flow(s),veh/h/ln	1767	0	1849	1697	1841	1585	1767	1749	1830	1654	1678	1716
Q Serve(g_s), s	9.6	0.0	2.8	1.9	3.7	5.7	4.2	0.0	0.0	5.9	22.2	22.2
Cycle Q Clear(g_c), s	9.6	0.0	2.8	1.9	3.7	5.7	4.2	0.0	0.0	5.9	22.2	22.2
Prop In Lane	1.00		0.15	1.00		1.00	1.00		0.03	1.00		0.16
Lane Grp Cap(c), veh/h	204	0	304	50	145	242	109	931	974	122	913	934
V/C Ratio(X)	0.85	0.00	0.19	0.64	0.49	0.41	0.70	0.61	0.61	0.81	0.60	0.60
Avail Cap(c_a), veh/h	265	0	444	254	442	498	177	931	974	149	913	934
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	36.1	48.0	44.2	38.3	42.9	0.0	0.0	45.6	15.4	15.5
Incr Delay (d2), s/veh	14.7	0.0	0.1	5.0	1.0	0.4	2.2	2.1	2.0	19.5	2.9	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	8.5	0.0	2.2	1.5	3.1	3.9	3.2	1.0	1.0	5.4	13.1	13.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.1	0.0	36.2	53.0	45.1	38.8	45.1	2.1	2.0	65.1	18.4	18.3
LnGrp LOS	E	A	D	D	D	D	D	A	A	E	B	B
Approach Vol, veh/h		232			203			1233			1212	
Approach Delay, s/veh		52.5			43.2			4.7			22.2	
Approach LOS		D			D			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.9	21.4	12.4	58.2	16.5	12.9	11.2	59.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	24.0	9.0	32.0	15.0	24.0	10.0	31.0				
Max Q Clear Time (g_c+I1), s	3.9	4.8	7.9	2.0	11.6	7.7	6.2	24.2				
Green Ext Time (p_c), s	0.0	0.1	0.0	2.3	0.0	0.2	0.0	1.6				
Intersection Summary												
HCM 6th Ctrl Delay			18.6									
HCM 6th LOS			B									

Timings
2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	166	182	182	165	50	827	59	793
Future Volume (vph)	166	182	182	165	50	827	59	793
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	17.0	29.0	17.0	29.0	15.0	39.0	15.0	39.0
Total Split (%)	17.0%	29.0%	17.0%	29.0%	15.0%	39.0%	15.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	9.4	18.8	9.7	19.1	7.5	45.8	7.7	44.0
Actuated g/C Ratio	0.09	0.19	0.10	0.19	0.08	0.46	0.08	0.44
v/c Ratio	0.55	0.82	0.57	0.65	0.42	0.67	0.45	0.64
Control Delay	49.5	53.5	49.7	43.0	64.3	19.0	51.9	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	53.5	49.7	43.0	64.3	19.0	51.9	31.1
LOS	D	D	D	D	E	B	D	C
Approach Delay		52.0		46.0		21.2		32.4
Approach LOS		D		D		C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 33.2

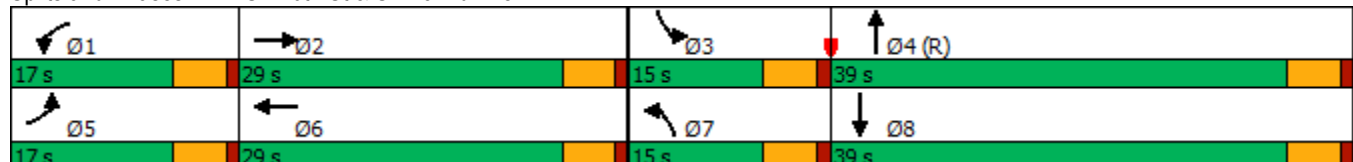
Intersection LOS: C

Intersection Capacity Utilization 69.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: SE 20th St & SE 192nd Ave



HCM 6th Signalized Intersection Summary

2: SE 20th St & SE 192nd Ave

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	166	182	92	182	165	57	50	827	179	59	793	103
Future Volume (veh/h)	166	182	92	182	165	57	50	827	179	59	793	103
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1856	1900	1841	1885	1885	1885	1811	1856	1841	1885	1811	1826
Adj Flow Rate, veh/h	175	192	77	192	174	46	53	871	172	62	835	100
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	0	4	1	1	1	6	3	4	1	6	5
Cap, veh/h	242	220	88	261	251	66	87	1496	295	80	1560	187
Arrive On Green	0.07	0.17	0.17	0.07	0.17	0.17	0.05	0.51	0.51	0.06	0.67	0.67
Sat Flow, veh/h	3428	1290	517	3483	1437	380	1725	2934	579	1795	3094	371
Grp Volume(v), veh/h	175	0	269	192	0	220	53	523	520	62	464	471
Grp Sat Flow(s),veh/h/ln	1714	0	1807	1742	0	1817	1725	1763	1751	1795	1721	1744
Q Serve(g_s), s	5.0	0.0	14.5	5.4	0.0	11.4	3.0	20.7	20.7	3.4	13.9	13.9
Cycle Q Clear(g_c), s	5.0	0.0	14.5	5.4	0.0	11.4	3.0	20.7	20.7	3.4	13.9	13.9
Prop In Lane	1.00		0.29	1.00		0.21	1.00		0.33	1.00		0.21
Lane Grp Cap(c), veh/h	242	0	308	261	0	318	87	899	893	80	868	879
V/C Ratio(X)	0.72	0.00	0.87	0.74	0.00	0.69	0.61	0.58	0.58	0.78	0.54	0.54
Avail Cap(c_a), veh/h	411	0	434	418	0	436	172	899	893	180	868	879
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.74	0.74	0.74
Uniform Delay (d), s/veh	45.5	0.0	40.4	45.3	0.0	38.7	46.5	17.1	17.1	46.5	10.4	10.4
Incr Delay (d2), s/veh	1.5	0.0	10.3	1.5	0.0	1.1	2.6	2.7	2.8	4.4	1.8	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.8	0.0	11.5	4.2	0.0	8.7	2.4	13.1	13.0	2.8	7.3	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.0	0.0	50.7	46.8	0.0	39.9	49.1	19.8	19.8	51.0	12.2	12.2
LnGrp LOS	D	A	D	D	A	D	D	B	B	D	B	B
Approach Vol, veh/h	444			412			1096			997		
Approach Delay, s/veh	49.2			43.1			21.3			14.6		
Approach LOS	D			D			C			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.5	22.1	9.5	56.0	12.1	22.5	10.0	55.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	24.0	10.0	34.0	12.0	24.0	10.0	34.0				
Max Q Clear Time (g_c+I1), s	7.4	16.5	5.4	22.7	7.0	13.4	5.0	15.9				
Green Ext Time (p_c), s	0.1	0.5	0.0	3.4	0.1	0.5	0.0	3.5				

Intersection Summary

HCM 6th Ctrl Delay 26.3
HCM 6th LOS C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	10	978	3	7	1041
Future Vol, veh/h	7	10	978	3	7	1041
Conflicting Peds, #/hr	0	0	0	1	1	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	125	0	-	-	230	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	0	20	4	67	0	7
Mvmt Flow	7	11	1029	3	7	1096
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1594	517	0	0	1033	0
Stage 1	1032	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Critical Hdwy	6.8	7.3	-	-	4.1	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.5	-	-	2.2	-
Pot Cap-1 Maneuver	100	459	-	-	681	-
Stage 1	309	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	99	459	-	-	680	-
Mov Cap-2 Maneuver	99	-	-	-	-	-
Stage 1	309	-	-	-	-	-
Stage 2	535	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	25.9	0	0.1			
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 99 459	680	-		
HCM Lane V/C Ratio	-	- 0.074 0.023	0.011	-		
HCM Control Delay (s)	-	- 44.3 13	10.4	-		
HCM Lane LOS	-	- E B	B	-		
HCM 95th %tile Q(veh)	-	- 0.2 0.1	0	-		

Timings
4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

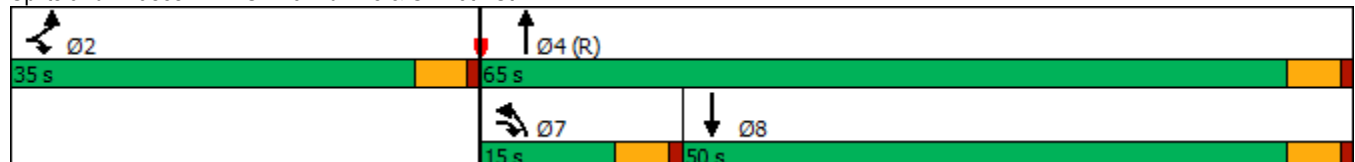
					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	215	100	109	766	781
Future Volume (vph)	215	100	109	766	781
Turn Type	Prot	pt+ov	Prot	NA	NA
Protected Phases	2	2 7	7	4	8
Permitted Phases					
Detector Phase	2	2 7	7	4	8
Switch Phase					
Minimum Initial (s)	5.0		5.0	5.0	5.0
Minimum Split (s)	27.0		10.0	26.0	26.0
Total Split (s)	35.0		15.0	65.0	50.0
Total Split (%)	35.0%		15.0%	65.0%	50.0%
Yellow Time (s)	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.0
Lead/Lag			Lead	Lag	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None		None	C-Max	Max
Act Effct Green (s)	18.6	35.4	11.9	71.4	54.6
Actuated g/C Ratio	0.19	0.35	0.12	0.71	0.55
v/c Ratio	0.72	0.17	0.57	0.33	0.61
Control Delay	50.5	5.0	28.9	14.1	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	50.5	5.0	28.9	14.1	27.0
LOS	D	A	C	B	C
Approach Delay	36.1			15.9	27.0
Approach LOS	D			B	C

Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 85 (85%), Referenced to phase 4:NBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 23.9
 Intersection Capacity Utilization 60.6%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 4: SE 192nd Ave & SE 29th St



HCM 6th Signalized Intersection Summary 4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	215	100	109	766	781	267
Future Volume (veh/h)	215	100	109	766	781	267
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1811	1826	1826	1826	1811	1767
Adj Flow Rate, veh/h	226	39	115	806	822	252
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	6	5	5	5	6	9
Cap, veh/h	266	364	141	2587	1595	489
Arrive On Green	0.15	0.15	0.16	1.00	0.61	0.61
Sat Flow, veh/h	1725	1547	1739	3561	2684	795
Grp Volume(v), veh/h	226	39	115	806	545	529
Grp Sat Flow(s),veh/h/ln	1725	1547	1739	1735	1721	1668
Q Serve(g_s), s	12.8	2.0	6.4	0.0	17.9	17.9
Cycle Q Clear(g_c), s	12.8	2.0	6.4	0.0	17.9	17.9
Prop In Lane	1.00	1.00	1.00			0.48
Lane Grp Cap(c), veh/h	266	364	141	2587	1058	1026
V/C Ratio(X)	0.85	0.11	0.82	0.31	0.52	0.52
Avail Cap(c_a), veh/h	517	589	174	2587	1058	1026
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.79	0.79	1.00	1.00
Uniform Delay (d), s/veh	41.2	30.0	41.2	0.0	10.8	10.9
Incr Delay (d2), s/veh	7.4	0.1	17.6	0.2	1.8	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.9	3.5	5.7	0.2	10.6	10.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	48.6	30.1	58.8	0.2	12.6	12.7
LnGrp LOS	D	C	E	A	B	B
Approach Vol, veh/h	265			921	1074	
Approach Delay, s/veh	45.9			7.6	12.7	
Approach LOS	D			A	B	
Timer - Assigned Phs	2		4		7	8
Phs Duration (G+Y+Rc), s	20.4		79.6		13.1	66.5
Change Period (Y+Rc), s	5.0		5.0		5.0	5.0
Max Green Setting (Gmax), s	30.0		60.0		10.0	45.0
Max Q Clear Time (g_c+I1), s	14.8		2.0		8.4	19.9
Green Ext Time (p_c), s	0.7		6.3		0.0	7.5
Intersection Summary						
HCM 6th Ctrl Delay			14.5			
HCM 6th LOS			B			

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	74	173	207	154	95	121	785	349	131	624
Future Volume (vph)	74	173	207	154	95	121	785	349	131	624
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	15.0	36.0	15.0	36.0	36.0	15.0	34.0	15.0	15.0	34.0
Total Split (%)	15.0%	36.0%	15.0%	36.0%	36.0%	15.0%	34.0%	15.0%	15.0%	34.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	27.6	20.9	34.0	26.0	26.0	10.0	39.3	49.1	10.0	39.3
Actuated g/C Ratio	0.28	0.21	0.34	0.26	0.26	0.10	0.39	0.49	0.10	0.39
v/c Ratio	0.22	0.82	0.85	0.34	0.19	0.73	0.66	0.40	0.43	0.63
Control Delay	21.3	49.9	52.2	31.6	0.8	66.8	29.6	2.4	41.6	24.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	49.9	52.2	31.6	0.8	66.8	29.6	2.4	41.6	24.3
LOS	C	D	D	C	A	E	C	A	D	C
Approach Delay		44.0		34.5			25.6			27.0
Approach LOS		D		C			C			C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 29.7

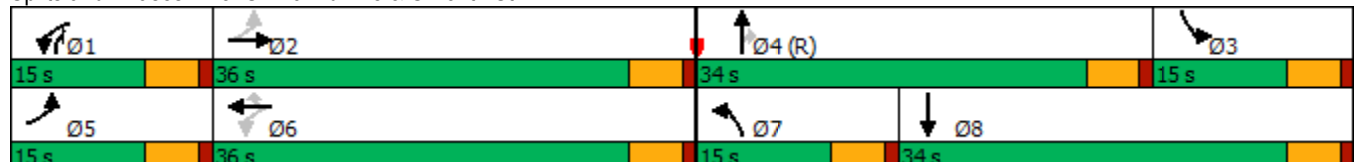
Intersection LOS: C

Intersection Capacity Utilization 72.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	173	112	207	154	95	121	785	349	131	624	89
Future Volume (veh/h)	74	173	112	207	154	95	121	785	349	131	624	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1817	1803	1847	1943	2018	1988	2018	1883	1988	1832	1684	1817
Adj Flow Rate, veh/h	82	192	94	230	171	19	134	872	165	146	693	88
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	3	0	5	0	2	0	9	2	1	11	2
Cap, veh/h	367	228	111	300	501	411	166	1037	655	712	1182	150
Arrive On Green	0.05	0.20	0.20	0.10	0.25	0.25	0.09	0.29	0.29	0.21	0.41	0.41
Sat Flow, veh/h	1731	1140	558	1850	2018	1655	1922	3578	1679	3385	2856	362
Grp Volume(v), veh/h	82	0	286	230	171	19	134	872	165	146	388	393
Grp Sat Flow(s),veh/h/ln	1731	0	1698	1850	2018	1655	1922	1789	1679	1693	1600	1618
Q Serve(g_s), s	3.7	0.0	16.2	9.7	7.0	0.5	6.8	22.9	2.7	3.6	18.8	18.8
Cycle Q Clear(g_c), s	3.7	0.0	16.2	9.7	7.0	0.5	6.8	22.9	2.7	3.6	18.8	18.8
Prop In Lane	1.00		0.33	1.00		1.00	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	367	0	339	300	501	411	166	1037	655	712	662	670
V/C Ratio(X)	0.22	0.00	0.84	0.77	0.34	0.05	0.81	0.84	0.25	0.21	0.59	0.59
Avail Cap(c_a), veh/h	451	0	526	300	626	513	192	1037	655	712	662	670
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.79	0.79
Uniform Delay (d), s/veh	29.5	0.0	38.5	28.6	30.9	9.9	44.9	33.3	7.2	32.6	22.7	22.7
Incr Delay (d2), s/veh	0.1	0.0	4.1	10.3	0.1	0.0	16.8	8.2	0.9	0.0	3.0	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.7	0.0	11.1	8.6	5.9	0.6	7.1	16.0	2.3	2.6	11.1	11.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.6	0.0	42.6	38.9	31.0	9.9	61.7	41.5	8.1	32.6	25.7	25.7
LnGrp LOS	C	A	D	D	C	A	E	D	A	C	C	C
Approach Vol, veh/h		368			420			1171			927	
Approach Delay, s/veh		39.7			34.4			39.1			26.8	
Approach LOS		D			C			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.0	25.0	26.0	34.0	10.1	29.8	13.6	46.4				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	31.0	10.0	29.0	10.0	31.0	10.0	29.0				
Max Q Clear Time (g_c+I1), s	11.7	18.2	5.6	24.9	5.7	9.0	8.8	20.8				
Green Ext Time (p_c), s	0.0	0.4	0.0	1.1	0.0	0.3	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			34.5									
HCM 6th LOS			C									

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 4 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	169	288	27	212	63	57	86	29
Future Volume (vph)	169	288	27	212	63	57	86	29
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	27.0	10.0	27.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	5.4	28.3	5.4	17.3	9.6	9.6	9.6	9.6
Actuated g/C Ratio	0.12	0.62	0.12	0.38	0.21	0.21	0.21	0.21
v/c Ratio	0.88	0.31	0.14	0.55	0.26	0.28	0.35	0.20
Control Delay	67.2	10.4	25.7	16.2	17.4	13.8	19.0	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.2	10.4	25.7	16.2	17.4	13.8	19.0	9.0
LOS	E	B	C	B	B	B	B	A
Approach Delay		30.4		16.9		15.2		14.5
Approach LOS		C		B		B		B

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 45.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 21.9

Intersection LOS: C

Intersection Capacity Utilization 51.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
10 s	85 s	35 s
		
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	169	288	24	27	212	120	63	57	41	86	29	42
Future Volume (veh/h)	169	288	24	27	212	120	63	57	41	86	29	42
Initial Q (Qb), 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		
Adj Sat Flow, veh/h/ln	1900	1841	1900	1876	1802	1876	1832	1876	1876	1900	1900	1900
Adj Flow Rate, veh/h	188	320	24	30	236	107	70	63	22	96	32	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	4	0	0	5	0	3	0	0	0	0	0
Cap, veh/h	217	761	57	63	428	194	359	207	72	324	257	32
Arrive On Green	0.12	0.45	0.45	0.04	0.37	0.37	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	1810	1691	127	1787	1172	532	1344	1329	464	1333	1656	207
Grp Volume(v), veh/h	188	0	344	30	0	343	70	0	85	96	0	36
Grp Sat Flow(s),veh/h/ln	1810	0	1817	1787	0	1704	1344	0	1793	1333	0	1863
Q Serve(g_s), s	4.3	0.0	5.4	0.7	0.0	6.7	2.0	0.0	1.8	2.9	0.0	0.7
Cycle Q Clear(g_c), s	4.3	0.0	5.4	0.7	0.0	6.7	2.7	0.0	1.8	4.6	0.0	0.7
Prop In Lane	1.00		0.07	1.00		0.31	1.00		0.26	1.00		0.11
Lane Grp Cap(c), veh/h	217	0	818	63	0	623	359	0	279	324	0	289
V/C Ratio(X)	0.87	0.00	0.42	0.48	0.00	0.55	0.19	0.00	0.31	0.30	0.00	0.12
Avail Cap(c_a), veh/h	217	0	3484	214	0	3267	1116	0	1289	1075	0	1339
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	7.8	19.8	0.0	10.5	16.3	0.0	15.6	17.7	0.0	15.2
Incr Delay (d2), s/veh	27.9	0.0	0.1	2.1	0.0	0.3	0.1	0.0	0.2	0.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.6	0.0	2.4	0.5	0.0	3.2	1.0	0.0	1.2	1.4	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.9	0.0	7.9	21.8	0.0	10.8	16.4	0.0	15.9	17.9	0.0	15.2
LnGrp LOS	D	A	A	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h	532			373			155			132		
Approach Delay, s/veh	21.4			11.7			16.1			17.1		
Approach LOS	C			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	23.8		11.5	10.0	20.2		11.5				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	2.7	7.4		6.6	6.3	8.7		4.7				
Green Ext Time (p_c), s	0.0	0.6		0.1	0.0	0.7		0.2				
Intersection Summary												
HCM 6th Ctrl Delay	17.2											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	465	11	7	310	29	17
Future Vol, veh/h	465	11	7	310	29	17
Conflicting Peds, #/hr	0	3	3	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	3	0	0	5	0	0
Mvmt Flow	547	13	8	365	34	20
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	563	0	938	557
Stage 1	-	-	-	-	557	-
Stage 2	-	-	-	-	381	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1019	-	296	534
Stage 1	-	-	-	-	578	-
Stage 2	-	-	-	-	695	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1016	-	293	532
Mov Cap-2 Maneuver	-	-	-	-	293	-
Stage 1	-	-	-	-	576	-
Stage 2	-	-	-	-	689	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		17.1	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	351	-	-	1016	-	
HCM Lane V/C Ratio	0.154	-	-	0.008	-	
HCM Control Delay (s)	17.1	-	-	8.6	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	295	403	4	276	14	9	65	4
Future Volume (vph)	295	403	4	276	14	9	65	4
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	31.7	32.1	24.5	18.7	9.3	9.3	9.3	9.3
Actuated g/C Ratio	0.65	0.65	0.50	0.38	0.19	0.19	0.19	0.19
v/c Ratio	0.56	0.40	0.01	0.59	0.07	0.07	0.29	0.39
Control Delay	14.5	10.2	7.5	18.4	18.9	14.5	21.7	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	10.2	7.5	18.4	18.9	14.5	21.7	7.1
LOS	B	B	A	B	B	B	C	A
Approach Delay		12.0		18.3		16.4		11.6
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 49.1

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 13.7

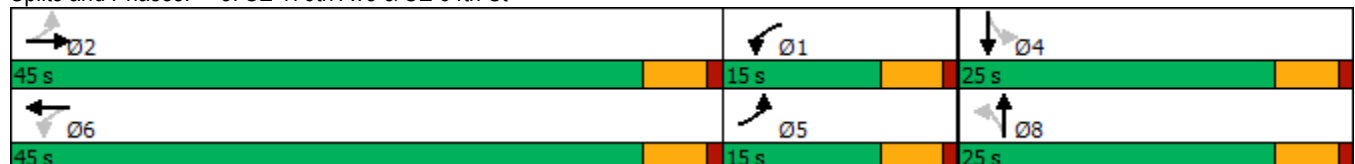
Intersection LOS: B

Intersection Capacity Utilization 59.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	403	2	4	276	59	14	9	8	65	4	141
Future Volume (veh/h)	295	403	2	4	276	59	14	9	8	65	4	141
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	0.98		1.00	0.98		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1767	1856	1900	1900	1811	1826	1900	1900	1530	1870	1900	1885
Adj Flow Rate, veh/h	347	474	2	5	325	56	16	11	0	76	5	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	9	3	0	0	6	5	0	0	25	2	0	1
Cap, veh/h	596	708	3	572	580	100	330	202	0	324	202	0
Arrive On Green	0.12	0.38	0.38	0.13	0.39	0.39	0.11	0.11	0.00	0.11	0.11	0.00
Sat Flow, veh/h	1682	1846	8	1810	1503	259	1407	1900	0	1378	1900	0
Grp Volume(v), veh/h	347	0	476	5	0	381	16	11	0	76	5	0
Grp Sat Flow(s),veh/h/ln	1682	0	1854	1810	0	1762	1407	1900	0	1378	1900	0
Q Serve(g_s), s	0.0	0.0	8.3	0.0	0.0	6.6	0.4	0.2	0.0	2.1	0.1	0.0
Cycle Q Clear(g_c), s	0.0	0.0	8.3	0.0	0.0	6.6	0.5	0.2	0.0	2.3	0.1	0.0
Prop In Lane	1.00		0.00	1.00		0.15	1.00		0.00	1.00		0.00
Lane Grp Cap(c), veh/h	596	0	711	572	0	680	330	202	0	324	202	0
V/C Ratio(X)	0.58	0.00	0.67	0.01	0.00	0.56	0.05	0.05	0.00	0.23	0.02	0.00
Avail Cap(c_a), veh/h	816	0	1893	805	0	1800	899	970	0	880	970	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.6	0.0	10.0	9.7	0.0	9.4	15.9	15.7	0.0	16.7	15.7	0.0
Incr Delay (d2), s/veh	0.3	0.0	0.4	0.0	0.0	0.3	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	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.9	0.0	4.0	0.0	0.0	3.0	0.2	0.1	0.0	1.0	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.9	0.0	10.4	9.7	0.0	9.7	15.9	15.8	0.0	16.9	15.7	0.0
LnGrp LOS	B	A	B	A	A	A	B	B	A	B	B	A
Approach Vol, veh/h	823				386				27			
Approach Delay, s/veh	11.5				9.7				15.9			
Approach LOS	B				A				B			
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.0	20.0		9.2	9.9	20.1		9.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	10.3		4.3	2.0	8.6		2.5				
Green Ext Time (p_c), s	0.0	1.8		0.1	0.4	1.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay	11.4
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

MOVEMENT SUMMARY

 **Site: 101 [SE 176 Avenue/ SE 29th Street Phase 4 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 4

Site Category: (None)

Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh. veh	Dist]				mph
			veh/h	%	veh/h	%	v/c	sec			ft				
South: SE 176th Avenue															
3	L2	All MCs	5	0.0	5	0.0	0.515	10.9	LOS B	3.9	97.6	0.71	0.64	0.94	30.6
8	T1	All MCs	144	2.0	144	2.0	0.515	11.2	LOS B	3.9	97.6	0.71	0.64	0.94	31.1
18	R2	All MCs	296	0.0	296	0.0	0.515	10.9	LOS B	3.9	97.6	0.71	0.64	0.94	30.9
Approach			445	0.6	445	0.6	0.515	11.0	LOS B	3.9	97.6	0.71	0.64	0.94	31.0
East: SE 29th Street															
1	L2	All MCs	122	0.0	122	0.0	0.527	8.9	LOS A	3.9	97.9	0.51	0.27	0.51	31.1
6	T1	All MCs	418	0.0	418	0.0	0.527	8.9	LOS A	3.9	97.9	0.51	0.27	0.51	31.7
16	R2	All MCs	79	0.0	79	0.0	0.527	8.9	LOS A	3.9	97.9	0.51	0.27	0.51	31.5
Approach			619	0.0	619	0.0	0.527	8.9	LOS A	3.9	97.9	0.51	0.27	0.51	31.6
North: SE 176th Avenue															
7	L2	All MCs	69	88.0	69	88.0	0.536	28.9	LOS D	2.9	90.3	0.75	0.78	1.15	26.5
4	T1	All MCs	104	1.0	104	1.0	0.536	12.3	LOS B	2.9	90.3	0.75	0.78	1.15	28.9
14	R2	All MCs	122	18.0	122	18.0	0.536	14.7	LOS B	2.9	90.3	0.75	0.78	1.15	28.4
Approach			295	28.5	295	28.5	0.536	16.4	LOS C	2.9	90.3	0.75	0.78	1.15	28.1
West: SE 29th Street															
5	L2	All MCs	6	0.0	6	0.0	0.351	7.5	LOS A	1.8	46.0	0.57	0.40	0.57	32.2
2	T1	All MCs	313	0.0	313	0.0	0.351	7.5	LOS A	1.8	46.0	0.57	0.40	0.57	32.8
12	R2	All MCs	15	10.0	15	10.0	0.351	8.7	LOS A	1.8	46.0	0.57	0.40	0.57	32.3
Approach			334	0.5	334	0.5	0.351	7.5	LOS A	1.8	46.0	0.57	0.40	0.57	32.8
All Vehicles			1693	5.2	1693	5.2	0.536	10.6	LOS B	3.9	97.9	0.62	0.48	0.75	31.0

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

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 AM.sip9

Intersection	
Intersection Delay, s/veh	16.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	272	36	87	314	14	55	94	66	0	93	10
Future Vol, veh/h	12	272	36	87	314	14	55	94	66	0	93	10
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles, %	0	4	10	4	1	9	4	3	0	0	0	0
Mvmt Flow	13	299	40	96	345	15	60	103	73	0	102	11
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	18.8	17.9	12.8	12.8
HCM LOS	C	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	59%	0%	88%	0%	96%	90%
Vol Right, %	0%	41%	0%	12%	0%	4%	10%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	55	160	12	308	87	328	103
LT Vol	55	0	12	0	87	0	0
Through Vol	0	94	0	272	0	314	93
RT Vol	0	66	0	36	0	14	10
Lane Flow Rate	60	176	13	338	96	360	113
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.13	0.338	0.026	0.614	0.185	0.638	0.235
Departure Headway (Hd)	7.746	6.923	7.051	6.526	6.969	6.377	7.466
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	463	519	510	555	517	569	481
Service Time	5.489	4.665	4.763	4.238	4.681	4.089	5.517
HCM Lane V/C Ratio	0.13	0.339	0.025	0.609	0.186	0.633	0.235
HCM Control Delay	11.6	13.2	10	19.1	11.3	19.7	12.8
HCM Lane LOS	B	B	A	C	B	C	B
HCM 95th-tile Q	0.4	1.5	0.1	4.1	0.7	4.5	0.9

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	42	30	46	234	56	259	23	1081	237	792
Future Volume (vph)	42	30	46	234	56	259	23	1081	237	792
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	10.0	32.0
Total Split (s)	10.0	25.0	25.0	14.0	29.0	29.0	17.0	44.0	37.0	64.0
Total Split (%)	8.3%	20.8%	20.8%	11.7%	24.2%	24.2%	14.2%	36.7%	30.8%	53.3%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	15.9	12.0	12.0	23.3	15.2	15.2	5.7	61.5	20.3	80.1
Actuated g/C Ratio	0.13	0.10	0.10	0.19	0.13	0.13	0.05	0.51	0.17	0.67
v/c Ratio	0.23	0.17	0.16	0.98	0.25	0.62	0.28	0.45	0.82	0.26
Control Delay	39.2	49.8	1.2	98.6	48.1	11.6	64.3	9.3	69.2	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	49.8	1.2	98.6	48.1	11.6	64.3	9.3	69.2	9.8
LOS	D	D	A	F	D	B	E	A	E	A
Approach Delay		27.3			52.4			10.4		23.1
Approach LOS		C			D			B		C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 4 (3%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 23.8

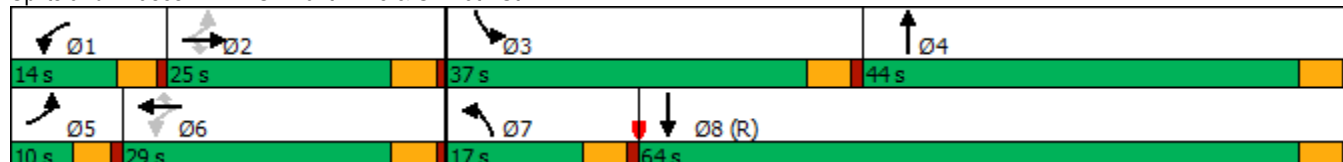
Intersection LOS: C

Intersection Capacity Utilization 67.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	30	46	234	56	259	23	1081	37	237	792	26
Future Volume (veh/h)	42	30	46	234	56	259	23	1081	37	237	792	26
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1856	1900	1856	1870	1870	1900	1900	1870	1796	1885	1856	1826
Adj Flow Rate, veh/h	44	32	2	246	59	22	24	1138	37	249	834	25
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	0	3	2	2	0	0	2	7	1	3	5
Cap, veh/h	225	158	130	293	243	209	42	1834	60	276	2485	74
Arrive On Green	0.03	0.08	0.08	0.08	0.13	0.13	0.02	0.36	0.36	0.15	0.49	0.49
Sat Flow, veh/h	1767	1900	1572	1781	1870	1610	1810	5079	165	1795	5054	151
Grp Volume(v), veh/h	44	32	2	246	59	22	24	763	412	249	557	302
Grp Sat Flow(s),veh/h/ln	1767	1900	1572	1781	1870	1610	1810	1702	1840	1795	1689	1828
Q Serve(g_s), s	2.7	1.9	0.1	9.5	3.4	1.4	1.6	22.1	22.2	16.4	12.0	12.1
Cycle Q Clear(g_c), s	2.7	1.9	0.1	9.5	3.4	1.4	1.6	22.1	22.2	16.4	12.0	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.09	1.00		0.08
Lane Grp Cap(c), veh/h	225	158	130	293	243	209	42	1229	664	276	1660	899
V/C Ratio(X)	0.20	0.20	0.02	0.84	0.24	0.11	0.58	0.62	0.62	0.90	0.34	0.34
Avail Cap(c_a), veh/h	249	317	262	293	374	322	181	1229	664	479	1660	899
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.77	0.77	0.77	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.2	51.3	50.5	48.9	46.9	46.0	58.0	31.6	31.6	49.9	18.6	18.6
Incr Delay (d2), s/veh	0.4	0.2	0.0	18.9	0.2	0.1	3.6	1.8	3.4	6.2	0.5	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.2	1.7	0.1	7.7	2.9	1.0	1.4	13.5	14.8	12.2	8.2	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.6	51.6	50.5	67.8	47.1	46.1	61.6	33.4	34.9	56.1	19.1	19.6
LnGrp LOS	D	D	D	E	D	D	E	C	C	E	B	B
Approach Vol, veh/h		78			327			1199			1108	
Approach Delay, s/veh		49.9			62.6			34.5			27.6	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.0	15.0	23.4	48.3	8.3	20.6	7.8	64.0				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	9.5	20.0	32.0	39.0	5.5	24.0	12.0	59.0				
Max Q Clear Time (g_c+I1), s	11.5	3.9	18.4	24.2	4.7	5.4	3.6	14.1				
Green Ext Time (p_c), s	0.0	0.0	0.1	4.4	0.0	0.1	0.0	3.7				

Intersection Summary

HCM 6th Ctrl Delay	35.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Timings
12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	28	60	165	312	121	99	111	953	465	155	833
Future Volume (vph)	28	60	165	312	121	99	111	953	465	155	833
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	20.0	33.0	20.0	25.0	38.0	17.0	20.0	45.0	25.0	17.0	42.0
Total Split (%)	16.7%	27.5%	16.7%	20.8%	31.7%	14.2%	16.7%	37.5%	20.8%	14.2%	35.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes		Yes		Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	6.4	8.2	23.0	20.0	23.8	46.4	11.8	56.2	81.2	17.6	62.0
Actuated g/C Ratio	0.05	0.07	0.19	0.17	0.20	0.39	0.10	0.47	0.68	0.15	0.52
v/c Ratio	0.39	0.56	0.53	1.18	0.36	0.16	0.72	0.65	0.43	0.66	0.54
Control Delay	68.3	70.9	31.3	152.9	45.0	4.8	74.0	28.4	2.3	65.1	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.3	70.9	31.3	152.9	45.0	4.8	74.0	28.4	2.3	65.1	17.1
LOS	E	E	C	F	D	A	E	C	A	E	B
Approach Delay		44.8			100.8			23.7			24.4
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 15 (13%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 37.8

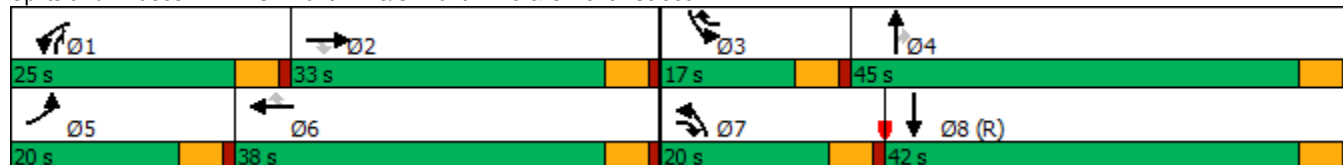
Intersection LOS: D

Intersection Capacity Utilization 71.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave/SE164th Ave & SE 34th Street



HCM 6th Signalized Intersection Summary

12: SE 164th Ave/SE164th Ave & SE 34th Street

Vancouver Innovation Center
Phase 4 2038 AM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	60	165	312	121	99	111	953	465	155	833	37
Future Volume (veh/h)	28	60	165	312	121	99	111	953	465	155	833	37
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1565	1758	1803	1870	1885	1841	1791	1776	1746	1806	1761	1761
Adj Flow Rate, veh/h	31	67	124	347	134	30	123	1059	306	172	926	39
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	19	6	3	2	1	4	1	2	4	0	3	3
Cap, veh/h	40	159	270	297	434	515	147	1125	740	172	1327	56
Arrive On Green	0.03	0.09	0.09	0.17	0.23	0.23	0.09	0.33	0.33	0.10	0.35	0.35
Sat Flow, veh/h	1491	1758	1528	1781	1885	1560	1706	3375	1480	1720	3826	161
Grp Volume(v), veh/h	31	67	124	347	134	30	123	1059	306	172	545	420
Grp Sat Flow(s),veh/h/ln	1491	1758	1528	1781	1885	1560	1706	1687	1480	1720	1127	1732
Q Serve(g_s), s	2.5	4.3	8.7	20.0	7.1	1.6	8.5	36.6	15.6	12.0	25.0	25.1
Cycle Q Clear(g_c), s	2.5	4.3	8.7	20.0	7.1	1.6	8.5	36.6	15.6	12.0	25.0	25.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	40	159	270	297	434	515	147	1125	740	172	782	601
V/C Ratio(X)	0.77	0.42	0.46	1.17	0.31	0.06	0.84	0.94	0.41	1.00	0.70	0.70
Avail Cap(c_a), veh/h	186	410	488	297	518	585	213	1125	740	172	782	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	58.0	51.6	44.2	50.0	38.3	27.4	54.0	38.9	18.9	54.0	33.7	33.8
Incr Delay (d2), s/veh	11.1	0.7	0.5	106.0	0.1	0.0	11.8	16.0	1.7	65.9	4.7	6.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.9	3.4	5.9	26.2	5.8	1.0	7.3	23.8	9.3	12.7	11.3	16.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	69.2	52.2	44.7	156.0	38.4	27.4	65.8	54.9	20.6	119.9	38.5	39.9
LnGrp LOS	E	D	D	F	D	C	E	D	C	F	D	D
Approach Vol, veh/h		222			511			1488			1137	
Approach Delay, s/veh		50.4			117.6			48.7			51.3	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	25.0	15.9	17.0	45.0	8.2	32.7	15.4	46.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	28.0	12.0	40.0	15.0	33.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	22.0	10.7	14.0	38.6	4.5	9.1	10.5	27.1				
Green Ext Time (p_c), s	0.0	0.1	0.0	0.6	0.0	0.2	0.0	1.7				
Intersection Summary												
HCM 6th Ctrl Delay			60.2									
HCM 6th LOS			E									

Timings
1: SE 192nd & SE 15th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	116	91	40	82	242	87	1360	115	1505
Future Volume (vph)	116	91	40	82	242	87	1360	115	1505
Turn Type	Prot	NA	Prot	NA	pm+ov	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	3	7	4	3	8
Permitted Phases					6				
Detector Phase	5	2	1	6	3	7	4	3	8
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	15.0	5.0	15.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	10.0	20.0
Total Split (s)	15.0	29.0	15.0	29.0	16.0	14.0	40.0	16.0	42.0
Total Split (%)	15.0%	29.0%	15.0%	29.0%	16.0%	14.0%	40.0%	16.0%	42.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	Max
Act Effct Green (s)	9.0	15.9	6.2	11.1	19.9	7.9	52.1	9.7	55.9
Actuated g/C Ratio	0.09	0.16	0.06	0.11	0.20	0.08	0.52	0.10	0.56
v/c Ratio	0.79	0.63	0.38	0.42	0.67	0.64	0.80	0.69	0.88
Control Delay	78.1	37.1	54.0	45.1	30.3	53.9	25.6	63.7	30.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	37.1	54.0	45.1	30.3	53.9	25.6	63.7	30.0
LOS	E	D	D	D	C	D	C	E	C
Approach Delay		52.5		36.2			27.2		32.3
Approach LOS		D		D			C		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 32.3

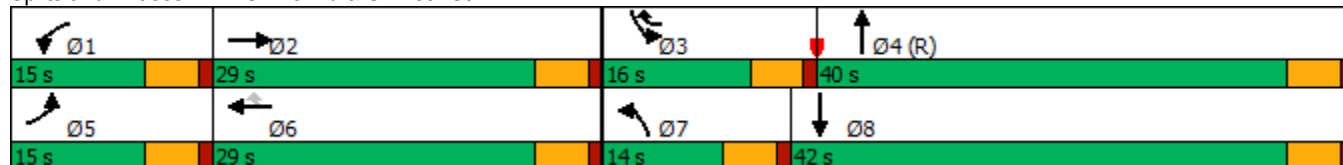
Intersection LOS: C

Intersection Capacity Utilization 82.8%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: SE 192nd & SE 15th St



HCM 6th Signalized Intersection Summary

1: SE 192nd & SE 15th St

Vancouver Innovation Center

Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	116	91	101	40	82	242	87	1360	32	115	1505	133
Future Volume (veh/h)	116	91	101	40	82	242	87	1360	32	115	1505	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1826	1885	1900	1900	1856	1900	1900	1870	1900	1900	1870	1870
Adj Flow Rate, veh/h	122	96	60	42	86	192	92	1432	33	121	1584	135
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, %	5	1	0	0	3	0	0	2	0	0	2	2
Cap, veh/h	150	201	125	62	248	344	126	1768	41	149	1694	143
Arrive On Green	0.09	0.19	0.19	0.03	0.13	0.13	0.09	0.66	0.66	0.11	0.68	0.68
Sat Flow, veh/h	1739	1084	678	1810	1856	1582	1810	3550	82	1810	3315	280
Grp Volume(v), veh/h	122	0	156	42	86	192	92	716	749	121	842	877
Grp Sat Flow(s),veh/h/ln	1739	0	1762	1810	1856	1582	1810	1777	1855	1810	1777	1819
Q Serve(g_s), s	6.9	0.0	7.9	2.3	4.2	10.8	4.9	29.3	29.5	6.5	41.1	43.0
Cycle Q Clear(g_c), s	6.9	0.0	7.9	2.3	4.2	10.8	4.9	29.3	29.5	6.5	41.1	43.0
Prop In Lane	1.00		0.38	1.00		1.00	1.00		0.04	1.00		0.15
Lane Grp Cap(c), veh/h	150	0	326	62	248	344	126	885	924	149	908	929
V/C Ratio(X)	0.82	0.00	0.48	0.67	0.35	0.56	0.73	0.81	0.81	0.81	0.93	0.94
Avail Cap(c_a), veh/h	174	0	423	181	445	512	163	885	924	199	908	929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.14	0.14	0.14	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.9	0.0	36.4	47.7	39.4	35.0	44.5	13.4	13.5	43.8	14.4	14.7
Incr Delay (d2), s/veh	19.5	0.0	0.4	4.6	0.3	0.5	1.1	1.2	1.2	12.5	16.8	18.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.7	0.0	6.0	2.0	3.5	7.3	3.1	9.7	10.1	5.9	20.7	22.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.4	0.0	36.8	52.4	39.7	35.5	45.5	14.6	14.6	56.3	31.3	33.4
LnGrp LOS	E	A	D	D	D	D	D	B	B	E	C	C
Approach Vol, veh/h		278			320			1557			1840	
Approach Delay, s/veh		48.9			38.8			16.4			33.9	
Approach LOS		D			D			B			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	23.5	13.2	54.8	13.6	18.4	12.0	56.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	10.0	24.0	11.0	35.0	10.0	24.0	9.0	37.0				
Max Q Clear Time (g_c+I1), s	4.3	9.9	8.5	31.5	8.9	12.8	6.9	45.0				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.5	0.0	0.2	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			28.5									
HCM 6th LOS			C									

Timings
2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	233	183	280	265	149	951	151	1126
Future Volume (vph)	233	183	280	265	149	951	151	1126
Turn Type	Prot	NA	Prot	NA	Prot	NA	Prot	NA
Protected Phases	5	2	1	6	7	4	3	8
Permitted Phases								
Detector Phase	5	2	1	6	7	4	3	8
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	20.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	25.0	10.0	25.0
Total Split (s)	20.0	27.0	20.0	27.0	14.0	35.0	18.0	39.0
Total Split (%)	20.0%	27.0%	20.0%	27.0%	14.0%	35.0%	18.0%	39.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	C-Max	None	Max
Act Effect Green (s)	11.3	23.3	12.4	24.4	9.5	32.6	11.7	34.8
Actuated g/C Ratio	0.11	0.23	0.12	0.24	0.10	0.33	0.12	0.35
v/c Ratio	0.62	0.67	0.67	0.88	0.91	1.05	0.75	1.17
Control Delay	49.0	40.5	49.7	56.7	104.0	62.1	61.1	115.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	40.5	49.7	56.7	104.0	62.1	61.1	115.4
LOS	D	D	D	E	F	E	E	F
Approach Delay		44.4		53.7		66.8		110.0
Approach LOS		D		D		E		F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 93 (93%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.17

Intersection Signal Delay: 78.1

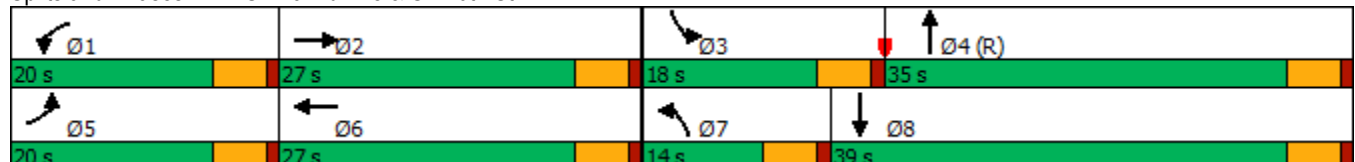
Intersection LOS: E

Intersection Capacity Utilization 91.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: SE 192nd Ave & SE 20th St



HCM 6th Signalized Intersection Summary

2: SE 192nd Ave & SE 20th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	233	183	95	280	265	118	149	951	210	151	1126	237
Future Volume (veh/h)	233	183	95	280	265	118	149	951	210	151	1126	237
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	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	
Adj Sat Flow, veh/h/ln	1900	1900	1885	1900	1900	1870	1900	1885	1900	1885	1870	1885
Adj Flow Rate, veh/h	243	191	80	292	276	106	155	991	200	157	1173	228
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	1	0	0	2	0	1	0	1	2	1
Cap, veh/h	316	262	110	364	286	110	163	1142	230	189	1188	229
Arrive On Green	0.09	0.21	0.21	0.10	0.22	0.22	0.09	0.38	0.38	0.14	0.53	0.53
Sat Flow, veh/h	3510	1270	532	3510	1301	500	1810	2969	598	1795	2970	573
Grp Volume(v), veh/h	243	0	271	292	0	382	155	597	594	157	699	702
Grp Sat Flow(s),veh/h/ln	1755	0	1802	1755	0	1801	1810	1791	1777	1795	1777	1766
Q Serve(g_s), s	6.8	0.0	14.0	8.1	0.0	21.0	8.5	30.8	30.9	8.5	38.6	39.5
Cycle Q Clear(g_c), s	6.8	0.0	14.0	8.1	0.0	21.0	8.5	30.8	30.9	8.5	38.6	39.5
Prop In Lane	1.00		0.30	1.00		0.28	1.00		0.34	1.00		0.32
Lane Grp Cap(c), veh/h	316	0	372	364	0	396	163	689	683	189	711	707
V/C Ratio(X)	0.77	0.00	0.73	0.80	0.00	0.96	0.95	0.87	0.87	0.83	0.98	0.99
Avail Cap(c_a), veh/h	527	0	397	527	0	396	163	689	683	233	711	707
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.37	0.37	0.37
Uniform Delay (d), s/veh	44.5	0.0	37.1	43.8	0.0	38.6	45.3	28.4	28.5	42.1	23.1	23.3
Incr Delay (d2), s/veh	1.5	0.0	5.2	3.5	0.0	35.6	55.7	13.8	14.2	6.3	16.9	19.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	5.3	0.0	10.7	6.5	0.0	18.7	10.3	21.3	21.3	5.8	19.8	20.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.0	0.0	42.3	47.3	0.0	74.2	101.0	42.3	42.6	48.4	40.0	42.5
LnGrp LOS	D	A	D	D	A	E	F	D	D	D	D	D
Approach Vol, veh/h		514			674			1346			1558	
Approach Delay, s/veh		44.0			62.6			49.2			42.0	
Approach LOS		D			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	15.4	25.6	15.6	43.4	14.0	27.0	14.0	45.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	15.0	22.0	13.0	30.0	15.0	22.0	9.0	34.0				
Max Q Clear Time (g_c+I1), s	10.1	16.0	10.5	32.9	8.8	23.0	10.5	41.5				
Green Ext Time (p_c), s	0.3	0.5	0.0	0.0	0.2	0.0	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			48.0									
HCM 6th LOS			D									

Intersection							
Int Delay, s/veh	0.2						
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Vol, veh/h	3	4	1320	3	10	1368	
Future Vol, veh/h	3	4	1320	3	10	1368	
Conflicting Peds, #/hr	0	0	0	2	2	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	125	0	-	-	230	-	
Veh in Median Storage, #	0	-	0	-	-	0	
Grade, %	0	-	0	-	-	0	
Peak Hour Factor	95	95	95	95	95	95	
Heavy Vehicles, %	0	0	1	0	0	1	
Mvmt Flow	3	4	1389	3	11	1440	
Major/Minor	Minor1	Major1		Major2			
Conflicting Flow All	2135	698	0	0	1394	0	
Stage 1	1393	-	-	-	-	-	
Stage 2	742	-	-	-	-	-	
Critical Hdwy	6.8	6.9	-	-	4.1	-	
Critical Hdwy Stg 1	5.8	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.5	3.3	-	-	2.2	-	
Pot Cap-1 Maneuver	43	388	-	-	497	-	
Stage 1	199	-	-	-	-	-	
Stage 2	437	-	-	-	-	-	
Platoon blocked, %			-	-		-	
Mov Cap-1 Maneuver	42	387	-	-	496	-	
Mov Cap-2 Maneuver	42	-	-	-	-	-	
Stage 1	199	-	-	-	-	-	
Stage 2	427	-	-	-	-	-	
Approach	WB	NB		SB			
HCM Control Delay, s	50.1	0		0.1			
HCM LOS	F						
Minor Lane/Major Mvmt		NBT	NBRWBLn1	WBLn2	SBL	SBT	
Capacity (veh/h)		-	-	42	387	496	-
HCM Lane V/C Ratio		-	-	0.075	0.011	0.021	-
HCM Control Delay (s)		-	-	97.6	14.4	12.4	-
HCM Lane LOS		-	-	F	B	B	-
HCM 95th %tile Q(veh)		-	-	0.2	0	0.1	-

Timings
4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	157	57	70	1166	1239
Future Volume (vph)	157	57	70	1166	1239
Turn Type	Prot	pm+ov	Prot	NA	NA
Protected Phases	2	7	7	4	8
Permitted Phases	2				
Detector Phase	2	7	7	4	8
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	27.0	10.0	10.0	26.0	26.0
Total Split (s)	30.0	16.0	16.0	68.0	54.0
Total Split (%)	30.0%	16.0%	16.0%	68.0%	54.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0
Lead/Lag		Lead	Lead		Lag
Lead-Lag Optimize?		Yes	Yes		Yes
Recall Mode	Max	None	None	C-Max	None
Act Effct Green (s)	25.0	34.1	9.1	65.0	53.1
Actuated g/C Ratio	0.25	0.34	0.09	0.65	0.53
v/c Ratio	0.38	0.11	0.47	0.53	0.77
Control Delay	34.1	11.5	70.0	4.6	24.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	11.5	70.0	4.6	24.0
LOS	C	B	E	A	C
Approach Delay	28.1			8.3	24.0
Approach LOS	C			A	C

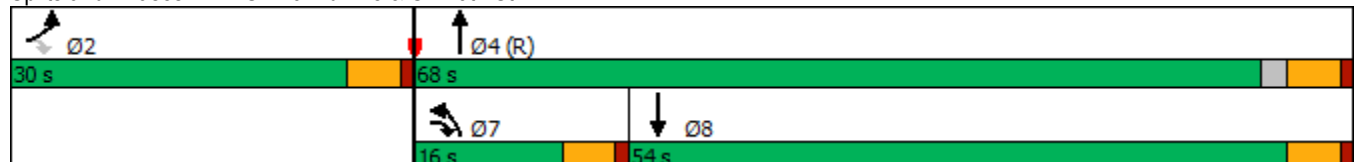
Intersection Summary

Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 45 (45%), Referenced to phase 4:NBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 17.5
 Intersection Capacity Utilization 73.5%
 Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service D

Splits and Phases: 4: SE 192nd Ave & SE 29th St



HCM 6th Signalized Intersection Summary

4: SE 192nd Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	157	57	70	1166	1239	132
Future Volume (veh/h)	157	57	70	1166	1239	132
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1856	1826	1826	1885	1885	1826
Adj Flow Rate, veh/h	165	39	74	1227	1304	131
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	5	5	1	1	5
Cap, veh/h	442	470	94	2328	1795	180
Arrive On Green	0.25	0.25	0.11	1.00	0.55	0.55
Sat Flow, veh/h	1767	1547	1739	3676	3382	329
Grp Volume(v), veh/h	165	39	74	1227	708	727
Grp Sat Flow(s),veh/h/ln	1767	1547	1739	1791	1791	1826
Q Serve(g_s), s	7.7	1.8	4.1	0.0	29.7	30.0
Cycle Q Clear(g_c), s	7.7	1.8	4.1	0.0	29.7	30.0
Prop In Lane	1.00	1.00	1.00			0.18
Lane Grp Cap(c), veh/h	442	470	94	2328	978	997
V/C Ratio(X)	0.37	0.08	0.79	0.53	0.72	0.73
Avail Cap(c_a), veh/h	442	470	191	2328	978	997
HCM Platoon Ratio	1.00	1.00	2.00	2.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.46	0.46	1.00	1.00
Uniform Delay (d), s/veh	31.0	24.8	44.0	0.0	17.0	17.1
Incr Delay (d2), s/veh	2.4	0.3	6.6	0.4	2.7	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.4	3.4	3.3	0.2	17.2	17.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.4	25.2	50.6	0.4	19.7	19.9
LnGrp LOS	C	C	D	A	B	B
Approach Vol, veh/h	204			1301	1435	
Approach Delay, s/veh	31.9			3.3	19.8	
Approach LOS	C			A	B	
Timer - Assigned Phs	2		4		7	8
Phs Duration (G+Y+Rc), s	30.0		70.0		10.4	59.6
Change Period (Y+Rc), s	5.0		5.0		5.0	5.0
Max Green Setting (Gmax), s	25.0		63.0		11.0	49.0
Max Q Clear Time (g_c+I1), s	9.7		2.0		6.1	32.0
Green Ext Time (p_c), s	0.5		11.8		0.0	8.9
Intersection Summary						
HCM 6th Ctrl Delay			13.3			
HCM 6th LOS			B			

Timings
5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	191	258	355	224	129	148	1016	204	225	976
Future Volume (vph)	191	258	355	224	129	148	1016	204	225	976
Turn Type	pm+pt	NA	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	1	6		7	4	1	3	8
Permitted Phases	2		6		6			4		
Detector Phase	5	2	1	6	6	7	4	1	3	8
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	25.0	10.0	10.0	25.0
Total Split (s)	14.0	32.0	19.0	37.0	37.0	13.0	34.0	19.0	15.0	36.0
Total Split (%)	14.0%	32.0%	19.0%	37.0%	37.0%	13.0%	34.0%	19.0%	15.0%	36.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	C-Max	None	None	Max
Act Effct Green (s)	33.8	25.2	44.2	30.7	30.7	9.6	30.8	44.8	10.0	31.2
Actuated g/C Ratio	0.34	0.25	0.44	0.31	0.31	0.10	0.31	0.45	0.10	0.31
v/c Ratio	0.47	0.94	1.13	0.40	0.22	0.89	0.97	0.26	0.69	1.08
Control Delay	22.2	64.1	117.8	29.5	2.2	92.2	55.9	2.1	72.0	97.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	64.1	117.8	29.5	2.2	92.2	55.9	2.1	72.0	97.2
LOS	C	E	F	C	A	F	E	A	E	F
Approach Delay		50.8		68.8			51.8			92.9
Approach LOS		D		E			D			F

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 36 (36%), Referenced to phase 4:NBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 68.3

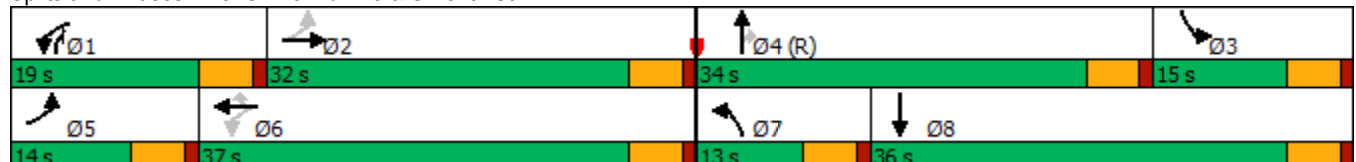
Intersection LOS: E

Intersection Capacity Utilization 99.2%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 5: SE 192nd Ave & SE 34th St



HCM 6th Signalized Intersection Summary

5: SE 192nd Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	258	153	355	224	129	148	1016	204	225	976	135
Future Volume (veh/h)	191	258	153	355	224	129	148	1016	204	225	976	135
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1817	1847	1817	2003	2003	2018	2018	1988	2003	1847	1832	1817
Adj Flow Rate, veh/h	201	272	138	374	236	35	156	1069	91	237	1027	130
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, %	2	0	2	1	1	0	0	2	1	0	1	2
Cap, veh/h	455	292	148	363	610	520	154	1095	726	393	1009	128
Arrive On Green	0.09	0.25	0.25	0.14	0.30	0.30	0.08	0.29	0.29	0.12	0.33	0.33
Sat Flow, veh/h	1731	1148	583	1908	2003	1705	1922	3777	1683	3413	3102	392
Grp Volume(v), veh/h	201	0	410	374	236	35	156	1069	91	237	576	581
Grp Sat Flow(s),veh/h/ln	1731	0	1731	1908	2003	1705	1922	1889	1683	1706	1741	1753
Q Serve(g_s), s	8.6	0.0	23.1	14.0	9.3	1.0	8.0	28.0	1.7	6.6	32.5	32.5
Cycle Q Clear(g_c), s	8.6	0.0	23.1	14.0	9.3	1.0	8.0	28.0	1.7	6.6	32.5	32.5
Prop In Lane	1.00		0.34	1.00		1.00	1.00		1.00	1.00		0.22
Lane Grp Cap(c), veh/h	455	0	441	363	610	520	154	1095	726	393	566	570
V/C Ratio(X)	0.44	0.00	0.93	1.03	0.39	0.07	1.01	0.98	0.13	0.60	1.02	1.02
Avail Cap(c_a), veh/h	455	0	467	363	641	546	154	1095	726	393	566	570
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.79	0.00	0.79	1.00	1.00	1.00	1.00	1.00	1.00	0.59	0.59	0.59
Uniform Delay (d), s/veh	24.4	0.0	36.4	25.5	27.4	11.8	46.0	35.2	6.4	42.1	33.7	33.7
Incr Delay (d2), s/veh	0.2	0.0	20.2	54.8	0.1	0.0	76.5	22.0	0.4	1.1	33.4	33.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	6.1	0.0	16.8	17.2	7.7	1.0	11.4	22.0	1.5	4.9	23.8	24.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.6	0.0	56.6	80.4	27.5	11.8	122.5	57.1	6.7	43.2	67.2	67.5
LnGrp LOS	C	A	E	F	C	B	F	E	A	D	F	F
Approach Vol, veh/h	611			645			1316			1394		
Approach Delay, s/veh	46.1			57.3			61.4			63.2		
Approach LOS	D			E			E			E		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	30.5	16.5	34.0	14.0	35.5	13.0	37.5				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.0	27.0	10.0	29.0	9.0	32.0	8.0	31.0				
Max Q Clear Time (g_c+I1), s	16.0	25.1	8.6	30.0	10.6	11.3	10.0	34.5				
Green Ext Time (p_c), s	0.0	0.2	0.0	0.0	0.0	0.4	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay 59.0

HCM 6th LOS E

Notes

User approved pedestrian interval to be less than phase max green.

Timings

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center

Phase 4 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	86	306	37	333	71	26	263	46
Future Volume (vph)	86	306	37	333	71	26	263	46
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases					8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	30.0	10.0	30.0	32.0	32.0	34.0	34.0
Total Split (s)	10.0	85.0	10.0	85.0	35.0	35.0	35.0	35.0
Total Split (%)	7.7%	65.4%	7.7%	65.4%	26.9%	26.9%	26.9%	26.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	5.2	29.9	5.2	24.9	19.0	19.0	19.0	19.0
Actuated g/C Ratio	0.08	0.46	0.08	0.38	0.29	0.29	0.29	0.29
v/c Ratio	0.63	0.49	0.28	0.79	0.26	0.12	0.71	0.40
Control Delay	55.8	16.1	38.9	26.1	21.8	11.3	32.7	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.8	16.1	38.9	26.1	21.8	11.3	32.7	11.1
LOS	E	B	D	C	C	B	C	B
Approach Delay		23.3		27.0		17.1		22.8
Approach LOS		C		C		B		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 64.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 23.9

Intersection LOS: C

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: SE Hiddenbrook Dr & SE 34th St

		
Ø1	Ø2	Ø4
10 s	85 s	35 s
		
Ø5	Ø6	Ø8
10 s	85 s	35 s

HCM 6th Signalized Intersection Summary

6: SE Hiddenbrook Dr & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	306	80	37	333	181	71	26	32	263	46	174
Future Volume (veh/h)	86	306	80	37	333	181	71	26	32	263	46	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.99	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		
Adj Sat Flow, veh/h/ln	1900	1870	1841	1832	1847	1876	1817	1876	1832	1885	1900	1900
Adj Flow Rate, veh/h	91	326	74	39	354	167	76	28	8	280	49	82
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	2	4	3	2	0	4	0	3	1	0	0
Cap, veh/h	134	553	125	74	407	192	398	367	105	494	167	279
Arrive On Green	0.07	0.38	0.38	0.04	0.34	0.34	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1810	1473	334	1745	1183	558	1220	1402	401	1378	637	1066
Grp Volume(v), veh/h	91	0	400	39	0	521	76	0	36	280	0	131
Grp Sat Flow(s),veh/h/ln	1810	0	1807	1745	0	1741	1220	0	1803	1378	0	1703
Q Serve(g_s), s	2.3	0.0	8.3	1.0	0.0	13.1	2.5	0.0	0.7	9.0	0.0	2.9
Cycle Q Clear(g_c), s	2.3	0.0	8.3	1.0	0.0	13.1	5.4	0.0	0.7	9.7	0.0	2.9
Prop In Lane	1.00		0.19	1.00		0.32	1.00		0.22	1.00		0.63
Lane Grp Cap(c), veh/h	134	0	678	74	0	598	398	0	472	494	0	446
V/C Ratio(X)	0.68	0.00	0.59	0.53	0.00	0.87	0.19	0.00	0.08	0.57	0.00	0.29
Avail Cap(c_a), veh/h	193	0	3088	186	0	2975	860	0	1155	1016	0	1092
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.1	0.0	11.7	21.9	0.0	14.4	16.0	0.0	13.0	16.7	0.0	13.8
Incr Delay (d2), s/veh	2.2	0.0	0.3	2.1	0.0	1.6	0.1	0.0	0.0	0.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	1.6	0.0	4.5	0.7	0.0	7.4	1.1	0.0	0.5	4.6	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	0.0	12.0	24.1	0.0	16.0	16.1	0.0	13.0	17.1	0.0	14.0
LnGrp LOS	C	A	B	C	A	B	B	A	B	B	A	B
Approach Vol, veh/h	491			560			112			411		
Approach Delay, s/veh	14.1			16.5			15.1			16.1		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.0	22.6		17.2	8.5	21.1		17.2				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	5.0	80.0		30.0	5.0	80.0		30.0				
Max Q Clear Time (g_c+I1), s	3.0	10.3		11.7	4.3	15.1		7.4				
Green Ext Time (p_c), s	0.0	0.3		0.1	0.0	0.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay	15.6											
HCM 6th LOS	B											

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	465	32	16	563	18	7
Future Vol, veh/h	465	32	16	563	18	7
Conflicting Peds, #/hr	0	0	0	0	0	1
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	95	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	0	0	2	0	0
Mvmt Flow	511	35	18	619	20	8
Major/Minor	Major1	Major2		Minor1		
Conflicting Flow All	0	0	546	0	1184	530
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	655	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1033	-	211	553
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	521	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1033	-	207	552
Mov Cap-2 Maneuver	-	-	-	-	207	-
Stage 1	-	-	-	-	595	-
Stage 2	-	-	-	-	512	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.2		21.1	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	251	-	-	1033	-	
HCM Lane V/C Ratio	0.109	-	-	0.017	-	
HCM Control Delay (s)	21.1	-	-	8.5	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-	

Timings 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	219	398	18	443	10	10	93	21
Future Volume (vph)	219	398	18	443	10	10	93	21
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	15.0	5.0	15.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.0	24.0	10.0	28.0	33.0	33.0	32.0	32.0
Total Split (s)	15.0	45.0	15.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	17.6%	52.9%	17.6%	52.9%	29.4%	29.4%	29.4%	29.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	Min	None	Min	None	None	None	None
Act Effct Green (s)	35.9	34.6	29.8	23.5	10.3	10.3	10.3	10.3
Actuated g/C Ratio	0.62	0.60	0.51	0.40	0.18	0.18	0.18	0.18
v/c Ratio	0.55	0.40	0.04	0.82	0.07	0.06	0.41	0.50
Control Delay	19.1	10.9	7.6	25.7	23.8	18.5	28.5	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	10.9	7.6	25.7	23.8	18.5	28.5	9.7
LOS	B	B	A	C	C	B	C	A
Approach Delay		13.7		25.2		20.5		15.5
Approach LOS		B		C		C		B

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 58.1

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 18.5

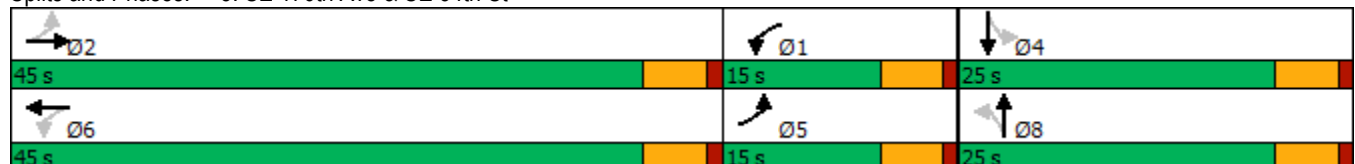
Intersection LOS: B

Intersection Capacity Utilization 68.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 8: SE 176th Ave & SE 34th St



HCM 6th Signalized Intersection Summary 8: SE 176th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	219	398	13	18	443	120	10	10	6	93	21	186
Future Volume (veh/h)	219	398	13	18	443	120	10	10	6	93	21	186
Initial Q (Qb), 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		0.97
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1900	1885	1885	1900	1900	1900	1885	1900	1900
Adj Flow Rate, veh/h	238	433	13	20	482	115	11	11	0	101	23	18
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	1	2	0	0	1	1	0	0	0	1	0	0
Cap, veh/h	450	670	20	607	590	141	304	215	0	330	110	86
Arrive On Green	0.12	0.37	0.37	0.15	0.40	0.40	0.11	0.11	0.00	0.11	0.11	0.11
Sat Flow, veh/h	1795	1806	54	1810	1471	351	1382	1900	0	1409	975	763
Grp Volume(v), veh/h	238	0	446	20	0	597	11	11	0	101	0	41
Grp Sat Flow(s),veh/h/ln	1795	0	1861	1810	0	1822	1382	1900	0	1409	0	1738
Q Serve(g_s), s	0.0	0.0	8.0	0.0	0.0	11.8	0.3	0.2	0.0	2.8	0.0	0.9
Cycle Q Clear(g_c), s	0.0	0.0	8.0	0.0	0.0	11.8	1.2	0.2	0.0	3.0	0.0	0.9
Prop In Lane	1.00		0.03	1.00		0.19	1.00		0.00	1.00		0.44
Lane Grp Cap(c), veh/h	450	0	690	607	0	731	304	215	0	330	0	196
V/C Ratio(X)	0.53	0.00	0.65	0.03	0.00	0.82	0.04	0.05	0.00	0.31	0.00	0.21
Avail Cap(c_a), veh/h	687	0	1839	790	0	1801	832	939	0	867	0	859
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	0.0	10.5	9.6	0.0	10.8	16.8	16.0	0.0	17.4	0.0	16.3
Incr Delay (d2), s/veh	0.4	0.0	0.4	0.0	0.0	0.9	0.0	0.0	0.0	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	2.9	0.0	4.1	0.2	0.0	5.7	0.2	0.1	0.0	1.5	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.8	0.0	10.9	9.6	0.0	11.7	16.9	16.1	0.0	17.5	0.0	16.5
LnGrp LOS	B	A	B	A	A	B	B	B	A	B	A	B
Approach Vol, veh/h	684			617			22			142		
Approach Delay, s/veh	12.6			11.6			16.5			17.2		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.9	20.0		9.6	9.7	21.2		9.6				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	10.0	40.0		20.0	10.0	40.0		20.0				
Max Q Clear Time (g_c+I1), s	2.0	10.0		5.0	2.0	13.8		3.2				
Green Ext Time (p_c), s	0.0	1.6		0.2	0.2	2.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay 12.7
HCM 6th LOS B

Notes

User approved pedestrian interval to be less than phase max green.

MOVEMENT SUMMARY

 **Site: 101 [SE 176 Avenue/ SE 29th Street Phase 4 (Site Folder: General)]**

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Phase 4
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Queue	Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh. veh	Dist]				mph
			veh/h	%	veh/h	%	v/c	sec			ft				
South: SE 176th Avenue															
3	L2	All MCs	16	15.0	16	15.0	0.373	9.0	LOS A	2.1	51.9	0.53	0.35	0.53	31.7
8	T1	All MCs	267	0.0	267	0.0	0.373	7.3	LOS A	2.1	51.9	0.53	0.35	0.53	32.8
18	R2	All MCs	100	0.0	100	0.0	0.373	7.3	LOS A	2.1	51.9	0.53	0.35	0.53	32.5
Approach			383	0.6	383	0.6	0.373	7.4	LOS A	2.1	51.9	0.53	0.35	0.53	32.7
East: SE 29th Street															
1	L2	All MCs	210	0.0	210	0.0	0.673	13.7	LOS B	9.1	227.6	0.79	0.71	1.20	29.0
6	T1	All MCs	408	0.0	408	0.0	0.673	13.7	LOS B	9.1	227.6	0.79	0.71	1.20	29.5
16	R2	All MCs	60	0.0	60	0.0	0.673	13.7	LOS B	9.1	227.6	0.79	0.71	1.20	29.3
Approach			677	0.0	677	0.0	0.673	13.7	LOS B	9.1	227.6	0.79	0.71	1.20	29.3
North: SE 176th Avenue															
7	L2	All MCs	66	0.0	66	0.0	0.369	9.7	LOS A	1.8	46.4	0.68	0.62	0.76	30.6
4	T1	All MCs	86	1.0	86	1.0	0.369	9.9	LOS A	1.8	46.4	0.68	0.62	0.76	31.2
14	R2	All MCs	113	0.0	113	0.0	0.369	9.7	LOS A	1.8	46.4	0.68	0.62	0.76	30.9
Approach			265	0.3	265	0.3	0.369	9.7	LOS A	1.8	46.4	0.68	0.62	0.76	30.9
West: SE 29th Street															
5	L2	All MCs	22	7.0	22	7.0	0.263	7.2	LOS A	1.3	31.7	0.53	0.38	0.53	32.3
2	T1	All MCs	194	0.0	194	0.0	0.263	6.4	LOS A	1.3	31.7	0.53	0.38	0.53	33.1
12	R2	All MCs	33	0.0	33	0.0	0.263	6.4	LOS A	1.3	31.7	0.53	0.38	0.53	32.9
Approach			248	0.6	248	0.6	0.263	6.4	LOS A	1.3	31.7	0.53	0.38	0.53	33.0
All Vehicles			1573	0.3	1573	0.3	0.673	10.3	LOS B	9.1	227.6	0.67	0.56	0.86	30.9

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

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: H:\27\27715 - VIC Implementation\005 - Master Plan Update TIA\Analysis\176th_29th With Project 2038 PM.sip9

Intersection	
Intersection Delay, s/veh	97.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	48	466	76	96	503	18	52	142	79	27	104	28
Future Vol, veh/h	48	466	76	96	503	18	52	142	79	27	104	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	0	0	1	0	7	0	1	0	4	1	8
Mvmt Flow	52	507	83	104	547	20	57	154	86	29	113	30
Number of Lanes	1	1	0	1	1	0	1	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	1	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	1	2	2
HCM Control Delay	137.5	114	20.9	20.8
HCM LOS	F	F	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1
Vol Left, %	100%	0%	100%	0%	100%	0%	17%
Vol Thru, %	0%	64%	0%	86%	0%	97%	65%
Vol Right, %	0%	36%	0%	14%	0%	3%	18%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	52	221	48	542	96	521	159
LT Vol	52	0	48	0	96	0	27
Through Vol	0	142	0	466	0	503	104
RT Vol	0	79	0	76	0	18	28
Lane Flow Rate	57	240	52	589	104	566	173
Geometry Grp	7	7	7	7	7	7	6
Degree of Util (X)	0.142	0.554	0.119	1.235	0.235	1.191	0.438
Departure Headway (Hd)	9.852	9.084	8.658	7.985	8.65	8.088	10.159
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	366	399	416	460	417	453	358
Service Time	7.552	6.784	6.358	5.685	6.35	5.788	8.159
HCM Lane V/C Ratio	0.156	0.602	0.125	1.28	0.249	1.249	0.483
HCM Control Delay	14.2	22.5	12.5	148.6	14	132.4	20.8
HCM Lane LOS	B	C	B	F	B	F	C
HCM 95th-tile Q	0.5	3.2	0.4	22.5	0.9	20.4	2.2

Timings
11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	59	51	295	44	229	42	1419	194	1304
Future Volume (vph)	89	59	51	295	44	229	42	1419	194	1304
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Prot	NA
Protected Phases	5	2		1	6		7	4	3	8
Permitted Phases	2		2	6		6				
Detector Phase	5	2	2	1	6	6	7	4	3	8
Switch Phase										
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0	10.0	5.0	15.0	5.0	15.0
Minimum Split (s)	9.5	39.0	39.0	9.5	38.0	38.0	10.0	32.0	19.5	32.0
Total Split (s)	15.0	20.0	20.0	19.0	24.0	24.0	15.0	59.0	22.0	66.0
Total Split (%)	12.5%	16.7%	16.7%	15.8%	20.0%	20.0%	12.5%	49.2%	18.3%	55.0%
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	C-Max
Act Effct Green (s)	18.9	11.0	11.0	28.7	14.5	14.5	6.3	60.6	15.9	72.1
Actuated g/C Ratio	0.16	0.09	0.09	0.24	0.12	0.12	0.05	0.50	0.13	0.60
v/c Ratio	0.38	0.36	0.19	0.94	0.20	0.60	0.49	0.60	0.86	0.94
Control Delay	40.8	56.6	1.5	79.8	48.6	12.5	51.0	37.6	82.8	36.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	56.6	1.5	79.8	48.6	12.5	51.0	37.6	82.8	36.2
LOS	D	E	A	E	D	B	D	D	F	D
Approach Delay		35.3			50.3			38.0		42.1
Approach LOS		D			D			D		D

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 112 (93%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 41.3

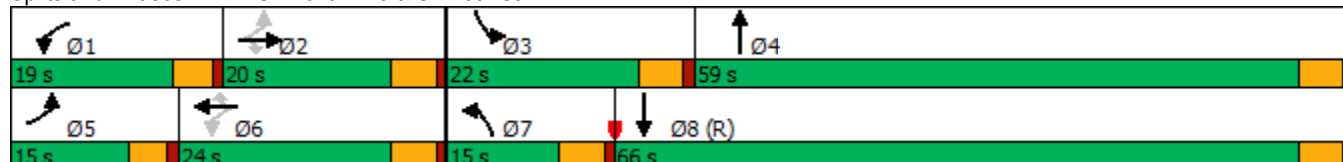
Intersection LOS: D

Intersection Capacity Utilization 74.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 11: SE 164th Ave & SE 29th St



HCM 6th Signalized Intersection Summary

11: SE 164th Ave & SE 29th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	59	51	295	44	229	42	1419	36	194	1304	46
Future Volume (veh/h)	89	59	51	295	44	229	42	1419	36	194	1304	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	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	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	1826	1870	1752	1885	1885	1900
Adj Flow Rate, veh/h	94	62	12	311	46	107	44	1494	36	204	1373	45
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, %	0	0	0	2	2	2	5	2	10	1	1	0
Cap, veh/h	278	164	138	348	273	230	56	2308	56	230	1883	62
Arrive On Green	0.06	0.09	0.09	0.12	0.15	0.15	0.03	0.45	0.45	0.13	0.55	0.55
Sat Flow, veh/h	1810	1900	1599	1781	1870	1579	1739	5128	124	1795	3448	113
Grp Volume(v), veh/h	94	62	12	311	46	107	44	992	538	204	676	742
Grp Sat Flow(s), veh/h/ln	1810	1900	1599	1781	1870	1579	1739	1702	1848	1795	848	1865
Q Serve(g_s), s	5.6	3.7	0.8	14.5	2.6	7.5	3.0	27.1	27.1	13.4	36.0	36.0
Cycle Q Clear(g_c), s	5.6	3.7	0.8	14.5	2.6	7.5	3.0	27.1	27.1	13.4	36.0	36.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.07	1.00		0.06
Lane Grp Cap(c), veh/h	278	164	138	348	273	230	56	1532	832	230	927	1018
V/C Ratio(X)	0.34	0.38	0.09	0.89	0.17	0.46	0.79	0.65	0.65	0.89	0.73	0.73
Avail Cap(c_a), veh/h	326	238	200	348	296	250	145	1532	832	254	927	1018
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.71	0.71	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.0	51.8	50.5	45.7	44.9	47.0	57.7	25.6	25.6	51.4	20.5	20.5
Incr Delay (d2), s/veh	0.7	0.5	0.1	24.0	0.1	0.5	6.3	1.5	2.8	25.6	5.0	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	4.7	3.2	0.6	8.2	2.2	5.3	2.5	15.3	16.8	12.1	11.7	22.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.8	52.3	50.6	69.7	45.0	47.5	64.0	27.1	28.4	77.0	25.6	25.1
LnGrp LOS	D	D	D	E	D	D	E	C	C	E	C	C
Approach Vol, veh/h		168			464			1574			1622	
Approach Delay, s/veh		49.1			62.1			28.6			31.8	
Approach LOS		D			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	15.3	20.4	59.0	11.8	22.5	8.9	70.5				
Change Period (Y+Rc), s	4.5	5.0	5.0	5.0	4.5	5.0	5.0	5.0				
Max Green Setting (Gmax), s	14.5	15.0	17.0	54.0	10.5	19.0	10.0	61.0				
Max Q Clear Time (g_c+I1), s	16.5	5.7	15.4	29.1	7.6	9.5	5.0	38.0				
Green Ext Time (p_c), s	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.5				

Intersection Summary

HCM 6th Ctrl Delay	34.9
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Timings
12: SE 164th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	49	102	194	295	136	232	192	1220	426	162	1427
Future Volume (vph)	49	102	194	295	136	232	192	1220	426	162	1427
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	5	2	7	1	6	3	7	4	1	3	8
Permitted Phases			2			6			4		
Detector Phase	5	2	7	1	6	3	7	4	1	3	8
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	20.0	5.0	5.0	20.0
Minimum Split (s)	10.0	33.0	10.0	10.0	32.0	10.0	10.0	31.0	10.0	10.0	28.0
Total Split (s)	15.0	33.0	20.0	17.0	35.0	20.0	20.0	50.0	17.0	20.0	50.0
Total Split (%)	12.5%	27.5%	16.7%	14.2%	29.2%	16.7%	16.7%	41.7%	14.2%	16.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	C-Max
Act Effct Green (s)	7.3	10.7	34.0	12.0	17.5	37.8	18.3	62.0	79.0	15.3	59.0
Actuated g/C Ratio	0.06	0.09	0.28	0.10	0.15	0.32	0.15	0.52	0.66	0.13	0.49
v/c Ratio	0.51	0.66	0.41	1.73	0.54	0.43	0.74	0.70	0.38	0.75	0.86
Control Delay	71.7	71.0	24.2	385.6	56.2	20.7	64.4	26.0	3.8	67.6	25.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.7	71.0	24.2	385.6	56.2	20.7	64.4	26.0	3.8	67.6	25.7
LOS	E	E	C	F	E	C	E	C	A	E	C
Approach Delay		44.8			190.1			24.9			29.9
Approach LOS		D			F			C			C

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 40 (33%), Referenced to phase 8:SBT, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.73

Intersection Signal Delay: 52.7

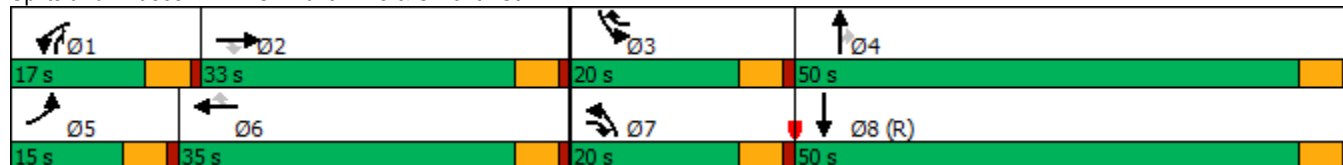
Intersection LOS: D

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 12: SE 164th Ave & SE 34th St



HCM 6th Signalized Intersection Summary

12: SE 164th Ave & SE 34th St

Vancouver Innovation Center
Phase 4 2038 PM Peak Hour Conditions

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	102	194	295	136	232	192	1220	426	162	1427	49
Future Volume (veh/h)	49	102	194	295	136	232	192	1220	426	162	1427	49
Initial Q (Qb), 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	
Adj Sat Flow, veh/h/ln	1767	1826	1885	1870	1841	1856	1885	1870	1885	1870	1870	1841
Adj Flow Rate, veh/h	51	106	152	307	142	167	200	1271	305	169	1486	48
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	9	5	1	2	4	3	1	2	1	2	2	4
Cap, veh/h	64	183	359	178	298	427	224	1387	783	195	1554	50
Arrive On Green	0.04	0.10	0.10	0.10	0.16	0.16	0.13	0.39	0.39	0.11	0.38	0.38
Sat Flow, veh/h	1682	1826	1598	1781	1841	1572	1795	3554	1598	1781	4144	134
Grp Volume(v), veh/h	51	106	152	307	142	167	200	1271	305	169	872	662
Grp Sat Flow(s), veh/h/ln	1682	1826	1598	1781	1841	1572	1795	1777	1598	1781	1216	1846
Q Serve(g_s), s	3.6	6.7	9.8	12.0	8.4	10.4	13.2	40.7	14.4	11.2	41.9	41.9
Cycle Q Clear(g_c), s	3.6	6.7	9.8	12.0	8.4	10.4	13.2	40.7	14.4	11.2	41.9	41.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.07
Lane Grp Cap(c), veh/h	64	183	359	178	298	427	224	1387	783	195	912	692
V/C Ratio(X)	0.79	0.58	0.42	1.72	0.48	0.39	0.89	0.92	0.39	0.86	0.96	0.96
Avail Cap(c_a), veh/h	140	426	572	178	460	566	224	1387	783	223	912	692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.28	0.28	0.28
Uniform Delay (d), s/veh	57.2	51.6	39.8	54.0	45.7	35.6	51.7	34.7	19.3	52.5	36.5	36.5
Incr Delay (d2), s/veh	7.9	1.1	0.3	348.1	0.4	0.2	31.8	11.0	1.5	8.1	8.5	10.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.0	5.5	6.9	35.7	6.9	7.1	12.4	26.0	9.3	7.4	16.1	23.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	52.7	40.1	402.1	46.1	35.8	83.5	45.7	20.7	60.6	45.0	47.0
LnGrp LOS	E	D	D	F	D	D	F	D	C	E	D	D
Approach Vol, veh/h		309			616			1776			1703	
Approach Delay, s/veh		48.6			220.7			45.7			47.3	
Approach LOS		D			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.0	17.0	18.2	51.8	9.6	24.4	20.0	50.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	12.0	28.0	15.0	45.0	10.0	30.0	15.0	45.0				
Max Q Clear Time (g_c+I1), s	14.0	11.8	13.2	42.7	5.6	12.4	15.2	43.9				
Green Ext Time (p_c), s	0.0	0.2	0.0	1.1	0.0	0.3	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay				71.0								
HCM 6th LOS				E								

APPENDIX I

SUSTAINABILITY GOALS FOR CITY OF VANCOUVER CAF ALIGNMENT

Memo

Date: March 27, 2023
Project: VIC Sustainability Master Planning
Project Number: 22-1362
To: Pedro Polanco, Jennifer Rabina, Marc Esrig
From: Forest Tanier-Gesner, Ned Greene
Subject: Sustainability Goals for City of Vancouver CAF Alignment

The Vancouver Innovation Center (VIC) development is determining sustainability goals for site infrastructure and future phase developments and is working to align to the Vancouver Climate Action Framework (CAF) that has recently been released by the City of Vancouver.

GOALS OF THE CLIMATE ACTION FRAMEWORK

One of the primary goals of the City of Vancouver's Climate Action Framework is aggressive reductions in the Greenhouse Gas (GHG) emissions associated with the City and Community operations:

- By 2025 – Achieve 80% Reduction in GHG emissions associated with municipal operations.
- By 2030 – Achieve 80% Reduction in GHG emissions associated with community operations.
- By 2040 – Achieve 100% Reduction in GHG emissions (Carbon Neutrality) associated with municipal and community operations.

PAE understands that the VIC development team is in favor of these performance-based standards over arbitrary certification programs that do not guarantee the City's desired outcome for emission reduction as set forth in the CAF.

To that end, PAE has developed life-cycle emissions and life-cycle cost assessments of several heating, cooling, and domestic hot water (DHW) system options and cooking appliance options for the VIC campus. PAE's recommended baseline design option was then benchmarked against the City of Vancouver's CAF. Based on this analysis it is estimated that the non-industrial process loads¹ on the VIC campus could be within 2% of the CAF reduction targets by 2030 and within 1% of the total CAF target by 2040.

PAE identified additional potential measures to address the minor gap in the emissions reductions estimates versus the CAF targets. These measures serve as a menu of options and can be implemented incrementally and discretely during the course of the VIC development. The quantifiable impacts of these options are also summarized in the following table.

¹ It is understood that the campus currently houses industrial processes that rely on natural gas fuel. These operations are currently outside of the scope of the systems options analysis and emissions reduction estimates. Alternate fuel sources should be considered by the Development Team as these become more readily available for the types of industrial processes.



	Reference Year	2024	2030	2040
BENCHMARK:				
Existing Building Stock and Forecasting Future buildings per today's Standards				
	MT CO2e/year	20,743	20,743	20,743
BASELINE DESIGN for new buildings:				
All Electric heating, cooling, and domestic hot water for all asset types.				
All Electric appliance requirements for all residential buildings (all-electric cooking and laundry)				
Efficient heat pump selections for space heating and domestic hot water (DHW) in all new buildings				
	MT CO2e/year	7,075	4,530	289
	(% reduction from benchmark)	66%	78%	99%
UPGRADES BY 2030 - OPTIONS TO CONSIDER				
Increase campus Photovoltaic (Solar) installations as needed to reach emission reduction goal. Consider exceeding code minimum if needed.			A	
Material selections and construction practices could further reduce the emissions associated with the campus development, through reductions in the embodied emissions for the buildings and site infrastructure. Design teams could help address marginal reductions needed to achieve goal by 2030			B	
Consider committing to provide more EV charging for residential parking and/or more residential spaces provisioned as EV ready if market demand supports that investment			C	
A+B+C = 390 MT CO2e/year	MT CO2e/year	7,075	4,140	289
	(% reduction from benchmark)	66%	80.0%	99%
UPGRADES BY 2040				
Phase out use of non-industrial gas use from the VIC Campus - enforce all electric cooking in commercial buildings, upgrade existing buildings, phase out other gas uses by 2040 if required by code.				-289
	MT CO2e/year	7,075	4,140	0
	(% reduction from benchmark)	66%	80%	100%

Table 1: Emissions Reduction Estimates for VIC Campus



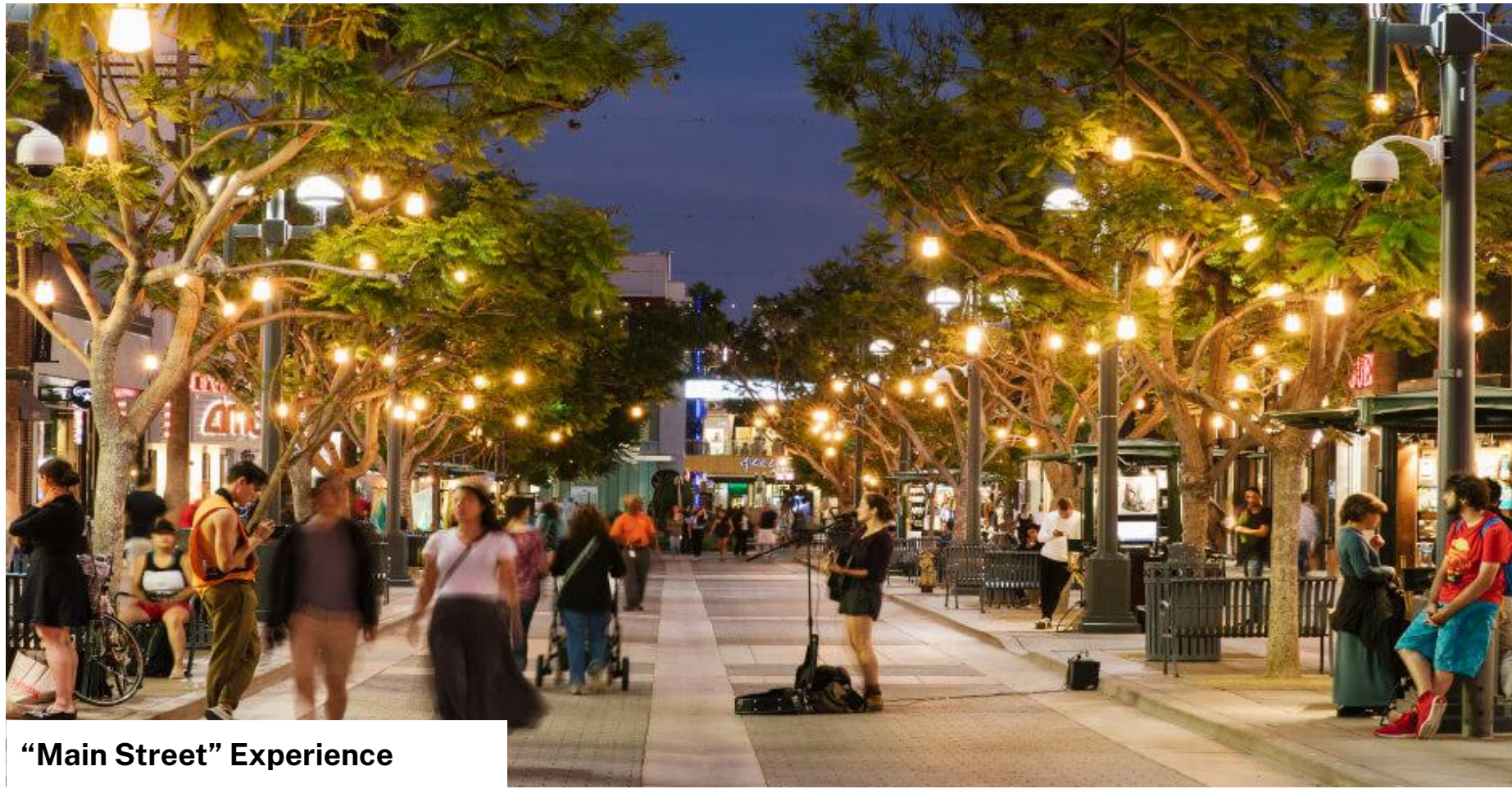
VIC SUSTAINABILITY GOALS

As shown in Table 1, site emissions estimates for the recommended baseline design approach closely aligns with the City's CAF emissions reductions targets. Below is a summary of PAE's recommended baseline design for the campus:

- BOD - "Building by Building Heating and Cooling – All Electric" systems approach for all new construction.
 - Efficient heat pump selections for space heating and domestic hot water (DHW) in all new buildings
 - Electrification phase in plan for all existing buildings heating and DHW heating systems by 2040, if required under City CAF.
 - Central heating update requires consideration of low temp heating coils for end-of-life upgrades with current heat pump technology.
 - All Electric appliance requirements for all residential buildings (all-electric cooking and laundry)

To close the minor gap between the baseline design approach and the CAF targets, PAE recommends the following possible options to be evaluated at the time of each new development project:

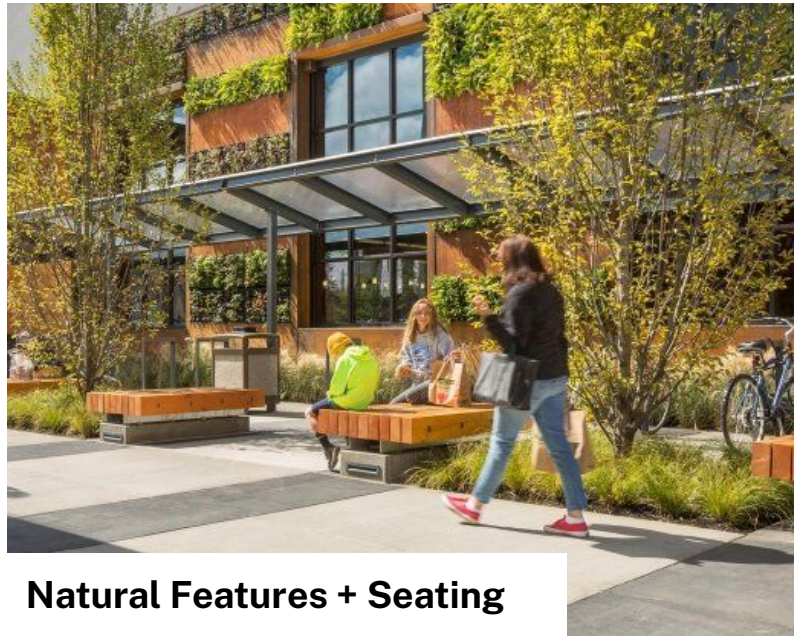
- Recommend to future commercial tenants to strive for All Electric appliance requirements for all commercial buildings (i.e. all-electric commercial cooking by 2040 if required by code). It is understood that restaurants and some industrial tenants who have commercial grade kitchens within their premises, may not be willing to comply with this requirement today given current industry standards.
- Increase onsite Photovoltaic (solar) installations as needed to reach emission reduction goal. This may require exceeding code minimum to achieve the desired target.
- Material selections and construction practices could further reduce the emissions associated with the campus development, through reductions in the embodied emissions for the buildings and site infrastructure. Design teams could help address marginal reductions needed to achieve goal by 2030.
- Evaluate demand for Increasing percentage of Electrical Vehicle charging stations for residential neighborhoods. Exceeding existing code if demand warranted that could help meet the CAF targets.



“Main Street” Experience



Destination Retail and F&B



Natural Features + Seating



Community Amenities



VIC - The Loop



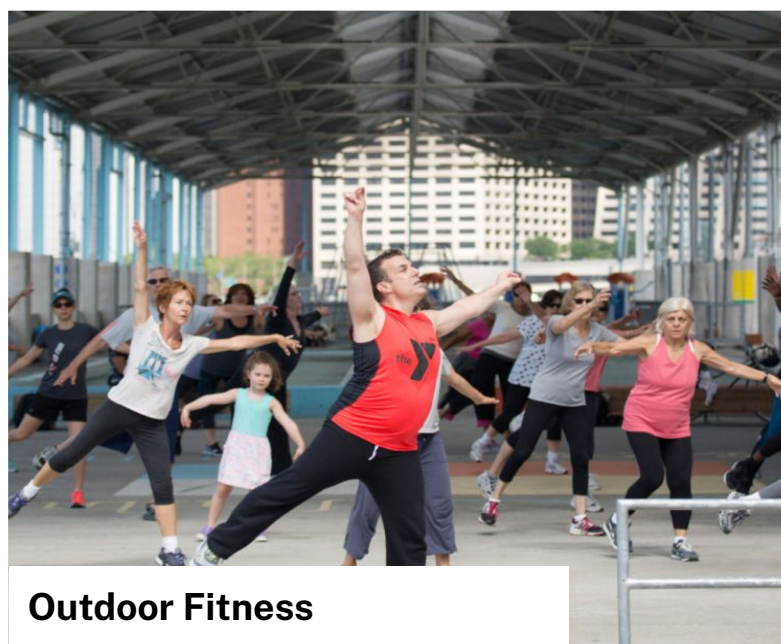
Town Plaza and
VIC Commons



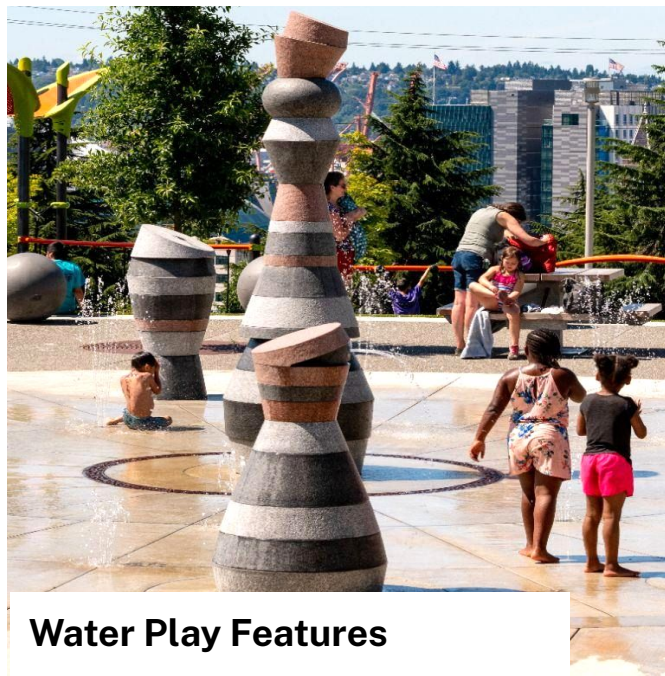
Placemaking // Town Plaza and VIC Commons



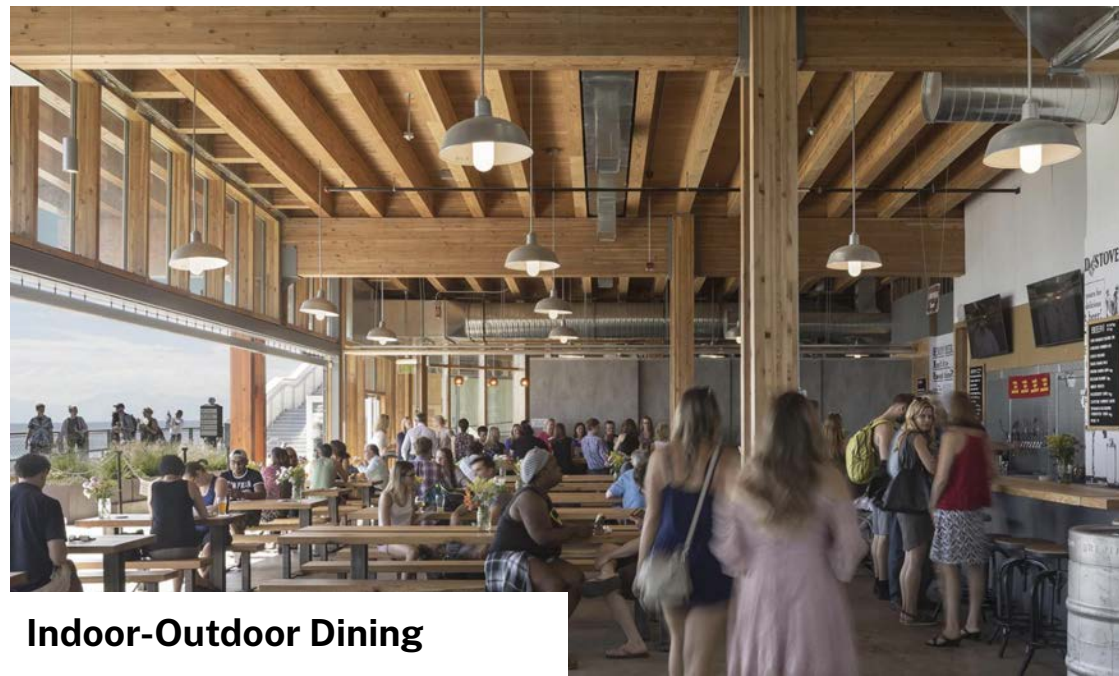
Community Events



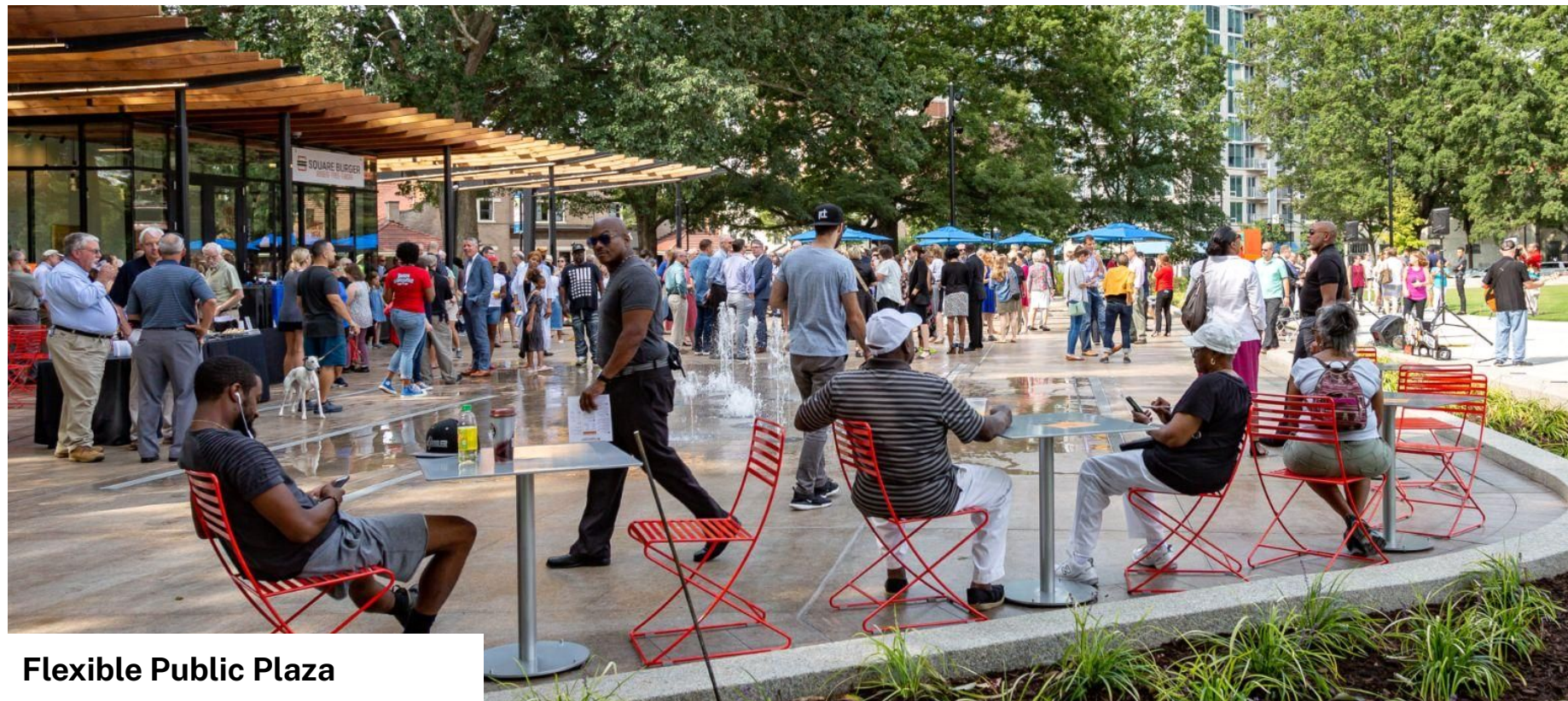
Outdoor Fitness



Water Play Features



Indoor-Outdoor Dining



Flexible Public Plaza



VIC - Town Plaza

APPENDIX A

APPLICATION

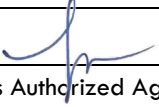


Planning Permit Application

LAND USE PRELIMINARY APPLICATION (LUP)

415 W 6th ST ~ Vancouver, WA 98660, P.O. Box 1995 ~ Vancouver, WA 98668, Phone (360) 487-7800

Email completed application to plans@cityofvancouver.us

REVIEW TYPE (Check one review and one process type)					
Review Type: ☐ Type I ☐ Type II ☐ Type III ☒ Type IV ☐ Tree Removal Only (nuisance or hazard)					
Process Type: ☒ Standard ☐ Streamline (Type I & II applications only. Pre-submittal Meeting required. By selecting streamline process, applicant waives all land use review timelines in VMC Title 20)					
USE					
☐ Single-Family	☐ Commercial	☐ Multi-family	☒ Mixed Use (commercial with multi-family)	☐ Industrial	☐ Residential
☐ Duplex		☐ Wireless Communications Facility (new) see VMC 20.890			
PROJECT INFORMATION					
Site Acres: Approx. 179 acres	Disturbed Acres: Approx. 179 acres	Zoning: Mixed-Use	Sewer: ☐ Septic ☒ Public	Water: ☐ Well ☒ Public	
Proposed # of Lots: N/A		Proposed Dwelling Units: 1,800			
Non-Residential Bldg. Square Footage: N/A		Ground Floor: N/A	Total of All Upper Floors: N/A		
Hard Surface Area Square Feet - New: N/A		Replacement: N/A	Total: N/A		
PROJECT NAME AND LOCATION					
Proposed project name: Vancouver Innovation Center Master Plan Revision					
Project site address: 18110 SE 34th Street			Parcel #(s): 986056-494; 126455-000; 986060-362; 126816-000 Parcel numbers per GIS 4/21/23. VIC Building North Parcel not yet displayed.		
PROJECT DESCRIPTION					
(Briefly describe the proposed project. Provide more detail in project narrative)					
The applicant is requesting major revisions to the original Vancouver Innovation Center (VIC) Mixed Use Master Plan.					
PRIMARY APPLICANT			CONTACT		
Business Name: The VIC Building Owner LLC			Business Name: DOWL		
Contact Name: Jennifer Rabina			Contact Name: Jessica Herceg		
Address: 505 Fifth Avenue, 27th Floor			Address: 7200 NE 41st Street, Suite 204		
City/State/Zip: New York, NY 10017			City/State/Zip: Vancouver, WA 98662		
Phone: (212) 680-4500			Phone: (971) 280-8653		
Email: jrabina@rabina.com			Email: jherceg@dowl.com		
ELECTRONIC PLANS SUBMITTER (required) (responsible for ePlans uploading and correspondence)			OWNER (attached additional sheets for multiple owners)		
Name: Jessica Herceg, DOWL			Name: The VIC Building Owner LLC Attn: Josh Rabina		
Address: 7200 NE 41st Street, Suite 204			Address: 505 Fifth Avenue, 27th Floor		
City/State/Zip: Vancouver, WA 98662			City/State/Zip: New York, NY 10017		
Email (required): jherceg@dowl.com			Email: josh@rabina.com		
Phone: (971) 280-8653			Phone: (212) 398-2030		
ONLINE PAYMENT					
Existing ePermits User Name: Rabina505			Request an ePermits Account		
REQUIRED SIGNATURES					
As evidenced by my signature below, I/we agree that City of Vancouver staff has my/our full permission to enter upon the subject property at any reasonable time to consider the merits of the application, to take photographs and to post public notices.					
Applicant Signature: 			Date: 04/21/2023		
Property Owner or Owner's Authorized Agent Signature: 			Date: 04/21/2023		

LUP APPLICATION SUB TYPES

Please check all applicable applications and information where necessary

☐ Airport Height Overlay District
☐ Archaeological Pre-determination
☐ Binding Site Plan ☐ Conceptual (without Site Plan Review) ☐ Detailed (with Site Plan Review)
☐ Boundary Line Adjustment # of lots to be adjusted:
☐ Comprehensive Plan Amendment (Including Zone Map Amendment with Comp Plan)
☐ Conditional Use Permit ☐ Initial (Type III) (Comm. Centers, Group Meal Service, Shelters) ☐ Major Modification (Type III) ☐ Minor Modification (Type I) Engineering Review Required ☐ Yes ☐ No
☐ Covenant Release
☐ Critical Areas (not used when in Shoreline) Check one → ☐ Duplex/Single Family ☐ All Other Uses Check one → ☐ Permit ☐ Statement of Exemption (No Fee) Check the applicable critical area(s) ☐ Fish & Wildlife ☐ Frequently Flooded ☐ Geological Hazards ☐ Wetlands ☐ Minor Exception (not common) ☐ Reasonable Use (not common)
☐ Design Review ☐ Exterior Modification Only ☐ All Others
☐ Development Agreement ☐ Initial ☐ Modification ☐ Extension
☐ Historic Preservation ☐ Modification ☐ Registry ☐ Historic Preservation – Special Valuation
☐ Legal Lot Determination # of lots to be reviewed:
☒ Master Plan (Mixed Use) ☐ Public Facilities MP ☒ Conceptual (without Site Plan Review) ☐ Detailed (with Site Plan Review) ☐ Hybrid (Some areas with Site Plan Review)
☐ Planned Development ☐ Commercial ☐ Residential ☐ Mixed Use* *Ground Floor SF: Upper Floor SF:
☐ Plat Alteration
☐ Post Decision Review/Modification (Includes Planned Development/Master Plan Modifications) ☐ Type I ☐ Type II ☐ Type III Engineering Review Required ☐ Yes ☐ No

☐ Road Modification ☐ Minor ☐ Technical ☐ Major Submitted: ☐ Before ☐ After Decision (submitted after decision is not common)
☐ Shoreline Permits ☐ Substantial Development Permit ☐ Shoreline Permit - Statement of Exemption (no fee) ☐ Shoreline Conditional Use ☐ Shoreline Variance
☐ Site Plan Review ☐ Type I ☐ Type II <u>Check Use Type below</u> ☐ Residential ☐ Non-Residential ☐ Qualified Planned Action ☐ Unoccupied Commercial/Utility Structure ☐ Commercial Pad ☐ Land Extensive Stormwater ☐ Yes ☐ No Transportation ☐ Yes ☐ No
☒ State Environmental Policy Act (SEPA) ☐ Check if for Single-Family Residential house (only) ☐ Residential Site Plan Review (SPR) ☐ Grading Only ☐ Subdivision or Planned Development ☐ Non-Project Actions (not common) ☒ All Other (Includes Comm/Indust SPR) (When more than one applies check All Other)
☐ Subdivision/Short Subdivision ☐ Short Subdivision (2-9 lots) ☐ Subdivision (10+ Lots)
☐ Temporary Use ☐ Commercial/Industrial ☐ Unforeseen Emergency ☐ Seasonal Event ☐ Model Home ☐ Sales Office
☐ Tree Plan Enter Tree Plan Level (1 to 7): (Tree Removal for nuisance or hazard tree(s) is Level 3)
☐ Variance ☐ Check if for Single Family Residential house ☐ Type I - # requested: ☐ Type II - # requested: Stormwater ☐ Yes ☐ No Transportation ☐ Yes ☐ No
☐ Zoning Map Amendment (Not involving Comprehensive Plan Amendment)

APPENDIX C

SEPA CHECKLIST

**SUBMIT TO:**

City of Vancouver
Community & Economic Development
415 W. 6th ST
Vancouver, WA 98660
www.cityofvancouver.us

SEPA ENVIRONMENTAL CHECKLIST**WAC 197-11-960**

Property Owner: The VIC Building Owner LLC; Attn: Jennifer Rabina Telephone: (212) 680-4500
(Print or Type Name)

Mailing Address: 505 Fifth Avenue, 27th Floor, New York, NY 10017
(No., City, State, ZIP)

Applicant: Same Telephone: Same
(Print or Type Name)

Mailing Address: _____
(No., City, State, ZIP)

Relationship to Owner: _____

Tax Assessor Serial Number(s): 126455000, 126816000, 986056-494, and 986060-362
(Parcel numbers per Clark County GIS 4/24/23. VIC Building North parcel number not yet assigned.)

Legal description: Lot(s) See response to Block(s) _____ Plat name N/A
Question A.12 below

(If a Metes and Bounds description, check here **X**, and attach narrative to this application.)

Site Address (if any): 18110 SE 34th Street, Vancouver WA 98683

② Include 8½" x 11" copies of ☐ Quarter Section Map, ☐ Topographic Map, ☐ Scaled Site Plan. Delineate site on maps.
Notice to Applicants: You must use the current revision of this form or your application will not be accepted. If you use our disk version of this form (MS Word 6.0) you may not alter the format. Make sure you have the current version before submittal.

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for applicants: [\[help\]](#)

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of checklist for nonproject proposals: [\[help\]](#)

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of sections A and B plus the [SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS \(part D\)](#). Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected

geographic area," respectively. The lead agency may exclude (for non-projects) questions in Part B - Environmental Elements –that do not contribute meaningfully to the analysis of the proposal.

A. BACKGROUND [\[help\]](#)

1. Name of proposed project, if applicable: [\[help\]](#)
Vancouver Innovation Center Master Plan Revision
2. Name of applicant: [\[help\]](#)
The VIC Building Owner LLC
3. Address and phone number of applicant and contact person: [\[help\]](#)
Applicant/Owner
The VIC Building Owner LLC
505 5th Avenue, 27th Floor
New York, NY 10017
Attn: Jennifer Rabina
Phone: 212-680-4500
Email: jrabina@rabina.com

Applicant Representative (Contact):
DOWL
7200 NW 41st Street, Suite 204
Vancouver, WA 98662
Attn: Jessica Herceg
Phone: 971-280-8653
Email: Jherceg@dowl.com
4. Date checklist prepared: [\[help\]](#)
May 5, 2023
5. Agency requesting checklist: [\[help\]](#)
City of Vancouver
6. Proposed timing or schedule (including phasing, if applicable): [\[help\]](#)
Revised Master Plan Review – Spring/Summer of 2023
Amended and Restated Development Agreement Review – Spring/Summer of 2023
7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. [\[help\]](#)
The proposed Vancouver Innovation Center Mixed Use Master Plan revision outlines a multi-phase development plan that will be built out over multiple years. Full build-out of the master plan could take 7-15 years, depending on market conditions.
8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. [\[help\]](#)
Past Studies related to the Vancouver Innovation Center Master Plan include:
 - **Critical Areas Memo for the Vancouver Innovation Center Phase 1 – VIC Building North, prepared by Pacific Habitat Services, Inc., dated September 12, 2022.**
 - **Archaeological Pre-Determination Report, prepared by Archaeological Investigations Northwest, Inc., dated August 18, 2022.**
 - **Preliminary Geotechnical Engineering Report, prepared by NV5, dated August 25, 2021.**

- **Phase 1 Environmental Site Assessment Vancouver Tech Center – 18110 SE 34th Street Vancouver, Washington, prepared by WSP, dated January 2021**
- **Traffic Impact Study, prepared by Kittelson and Associates Inc., dated April 28, 2023**

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

[\[help\]](#)

The applicant has recently received Type 2 Site Plan Review approval for a 200,981 square foot light industrial building to be located immediately north of the existing building on the site. Site construction and building permit approvals are in the final issuance stage for that project.

10. List any government approvals or permits that will be needed for your proposal, if known. [\[help\]](#)

The proposed master plan revision request and development agreement will require review and approval from the City of Vancouver through a Type IV Master Plan review process, subject to final approval from the Vancouver City Council.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.) [\[help\]](#)

The applicant is requesting City of Vancouver (City) approval for master plan revisions to amend elements of the current VIC Master Plan. The revised master plan design consolidates industrial areas to optimize opportunities for employment-generating development without reducing the number of jobs provided for in the current master plan, provides a higher level of integration of uses to allow for greater density, thus creating an opportunity to provide more open space, and introduces a new roadway loop geometry at the center of the VIC that establishes a mixed-use center at the core of the site. The revised master plan is included as Sheet 003 of the Master Plan Design Set (Appendix E) and reflects the proposed land use area configuration.

The land use areas (LUAs) on the site include a school (approximately 20 acres), residential area (approximately 38 acres), light industrial/employment area (approximately 74 acres), mixed use area (approximately 33 acres) and a 13.7-acre forested tract. Potential open space areas are reflected across the Residential LUA (RLUA), Mixed-Use LUA (MX LUA), and Light Industrial LUA (IL LUA), and School LUA (S LUA), but acreage and boundaries for these future open space areas are conceptual and will be refined at site development.

Noteworthy changes to the master plan include:

- **A central right-of-way loop or “ring road” is proposed for main site circulation. The northern arc of the loop will serve as the SE 29th Street collector.**
- **Reconfiguration and relocation of land use areas to achieve the desired product type mix and scale in each LUA and provide greater integration of uses throughout the site. The consolidation allows for the development of large-footprint light industrial buildings in the IL LUA to optimize opportunities for employment-generating**

development and is critical to achieve both the Project's and the City's employment generation goals.

- The plan improves the integration of the mixed-use elements of the project by changing from the "Town Center District" within the MX LUA to a mixed-use corridor along the proposed ring road which serves as the gravitational center of the revised master plan and contemplates a substantial public plaza opposite the existing VIC Commons. The revised master plan will incorporate all necessary changes for the VIC and will not propose a separate/future master plan revision for a Town Center district within the master plan area.
- Single Family Residential (SFR) and Multi-Family Residential (MFR) land use areas (LUAs) are now consolidated and listed as "Residential Land Use Area (R LUA)" and the applicant has removed detached single family residential use from the plan.
- The master plan anticipates an overall increase in open space and will provide approximately 24 acres of open space across the master plan area including an approximately 13.7-acre forested tract. Open space projections in the revised plan represent a 26% increase over the 19 acres proposed in the current master plan. To allow greater design discretion in the precise limits of open space with future site development, the applicant is proposing to represent open space within the plan as an overlay rather than a discrete Open Space LUA, a common approach with master plan entitlements.
- The forested tract and the school parcel are identified independent of other LUA's to reflect the separate ownership of the school parcel by the Evergreen School District and the applicant's establishment of a tract for forest preservation. While the forested tract boundary has been altered in the revised master plan—a project arborist has made recommendations to better preserve key tree stands—the acreage of the tract has been retained.
- As opposed to the current master plan, which segregated rights of way for SE 29th Street and SE 184th Avenue from LUA acreages, the proposed revision plan has assumed that all rights of way will be internal to land use areas, similar to how rights of way would be treated in a zoning context.
- The revised main plan proposes a more fluid approach to phasing, whereby the size, location, and order of development within the property be determined by the applicant so that they may respond in real time to market conditions and demand.

New Employment Square Footage

The master plan revision proposes construction of a minimum of 600,000 square feet of gross floor area for employment uses.

Open Space

The applicant anticipates providing approximately 24 acres of open space, including the approximately 13.7-acre Forested Tract. Sheet 004 of the Master Plan Design Set (Appendix E) illustrates potential open spaces, including a two-mile multi-use trail around the entire perimeter of the property. Distinct cross sections are provided as Sheet 007 (Appendix E) to illustrate the open space design at key locations in the site, including the northern site edge. Other open space features include a neighborhood park within the Residential LUA in the southwest corner of the site and a town plaza in the southeast corner.

Residential Units and Density

The revised master plan will consolidate the Single-Family Residential LUA and Multi-Family Residential LUA into a single, non-contiguous Residential LUA. The revised master plan proposes a maximum of 1,800 dwelling units which can be constructed within either the R LUA, the MX LUA, or the IL LUA, with a maximum of 100 dwelling units allowable within the IL LUA. The proposed increase in residential density is in response to the City's continuing concern about housing availability, as well as to market demands for housing co-located with the future businesses on the site. In addition, rather than specify quantities of distinct housing types (apartments, townhomes, etc.) within each LUA, the revised master plan proposes to build housing types in response to market demand, limited to the residential housing types permitted within the VMC. Single-family detached homes, however, will be removed from the master plan.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. [\[help\]](#)
- The Vancouver Innovation Center (VIC) Mixed Use Master Plan encompasses an approximately 179-acre site located generally at 18110 SE 34th Street. According to the most recent maps produced by Clark County GIS, the site is composed of four (4) parcels (Parcel IDs 986060362, 986056494, 126455000, and 126816000), however it should be noted that the applicant filed an exempt land division to establish a discrete parcel for a new building, VIC Building North. The documents were recorded December 6, 2022, under Auditor's File Number 6094243 however a parcel number has not yet been assigned. The site is bound on the north by the Clearmeadows and Fisher's Grove Subdivisions, on the south by SE 34th Street, on the east by SE 192nd Avenue and on the west by SE 176th Avenue.**

The abbreviated legal description for each parcel listed in GIS is as follows:

- Parcel 986060362 is Lot #17 Sec 6 T1N R3EWM 20.00A.
- Parcel 986056494 is Lots #5&7 6-1-3E #10 Martin DLC, #22N, 41, 36, 13 Simmons DLC 105.32A.
- Parcel 126455000 is Lots #5&7 6-1-3E #10 Martin DLC, #22N, 41, 36, 13 Simmons DLC 52.65A.
- Parcel 126816000 is #172 WM Simmons DLC 1.24A.

Parcels are located in NE, NW, SE and SW Quarters of Section 6 of Township 1 North, Range 3 East of the Willamette Meridian.

B. ENVIRONMENTAL ELEMENTS [\[help\]](#)

1. Earth

- a. General description of the site [\[help\]](#)
(circle one): Flat, rolling, hilly, steep slopes, mountainous,
other _____

According to Clark County MapsOnline, the site is generally flat with the exception of some rolling berms on the north and northwest portions of the property, which were created from excavation of the site for buildings and from overburden of road building for 176th Avenue.

- b. What is the steepest slope on the site (approximate percent slope)? [\[help\]](#)
The steepest slope on the site is just under an 8 percent grade.
- c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. [\[help\]](#)
The site contains Hillsboro loam, 0 to 3 percent slopes (HIA), Hillsboro loam, 3 to 8 percent slopes (HIB), and Lauren gravelly loam, 0 to 8 percent slope (LgB). The land is not designated nor identified as agricultural land of long-term commercial significance. The proposal to revise the current VIC Master Plan will not result in any removal of these soils.
- d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. [\[help\]](#)
There are no indications or history of unstable soils in the immediate vicinity of the project site. The Report of Geotechnical Engineering Services, prepared by NV5 on August 17, 2022, concludes that "based on the mapped groundwater conditions, a non-liquefiable crust at least 30 feet thick is present over the entire site and liquefaction is not a design consideration for the project."
- e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. [\[help\]](#)
All anticipated areas of improvement throughout the site will require some degree of cut or fill to construct. The total area and quantities of fill/grade or excavation to be completed with the project are not known at this conceptual Master Plan stage. As each phase of development occurs cut and fill quantities will be defined and addressed with future SEPA reviews.
- f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe. [\[help\]](#)
Erosion could occur as a result of clearing and construction of future projects within the master plan, but this potential will be minimized and/or avoided with the implementation of Best Management Practices (BMPs) for erosion control. Specific erosion control methods will be identified and addressed with each individual site development.
- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? [\[help\]](#)
The applicant anticipates approximately 2,433,155 square feet (56 acres) of new and replaced hard surfaces including roadways, pedestrian ways, bikeways, parking lot areas, and building to cover approximately 31.03% (+/-) of the master plan site area.
- h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: [\[help\]](#)
As each phase of development occurs, the developer(s) will employ BMPs to minimize the potential for erosion as a result of clearing and construction. The exact placement of BMPs will be outlined in the Stormwater Pollution Prevention Plans that will be prepared with each site development proposal.

2. Air

- a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. [\[help\]](#)

Site construction may result in dust emissions. During construction of buildings and site improvements, emissions from some heavy equipment such as concrete trucks, pumper trucks, and material delivery trucks is expected. These emissions will be temporary in nature.

In addition, emissions will occur from vehicular trips generated by the site as the VIC develops. However, it is anticipated that the integrated mixed-use orientation of the site and provision of multi-modal options for residents and employees within the master plan will have a reduce vehicle miles traveled (VMT) resulting from site development, compared to a non-mixed use development scenario on the site. Additionally, the use, operation, and maintenance of buildings throughout the site will result in greenhouse gas emissions. However, consistent with a memorandum dated March 27, 2023, prepared by PAE Engineers (Appendix I), the project intends to implement baseline design guidelines for new buildings that will help achieve the city-wide goals for the reduction of greenhouse gas emissions consistent with the City's 2022 Climate Action Framework.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. [\[help\]](#)

There are no off-site sources of emissions or odor that affect the proposal.

- c. Proposed measures to reduce or control emissions or other impacts to air, if any: [\[help\]](#)

The applicant will employ air emission BMPs in conjunction with site development activities. Additionally, the applicant will implement baseline design guidelines for GHG reduction that emphasizes electric use for domestic energy needs, efficient heating and cooling systems and other means to help achieve the City's GHG reduction goals of the Climate Action Framework.

3. Water

- a. Surface Water: [\[help\]](#)

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. [\[help\]](#)

Fisher's Creek meanders south/southwest of the site and flows into the Columbia River approximately one (1) mile south of State Route 14 (SR-14). A potential wetland associated with Fisher Creek was identified outside of the applicant's property. The existing VIC Stormwater Facility located west of the resource area is designed to overflow to Fisher Creek during severe storm events. No changes are proposed to the existing stormwater system.

A Critical Areas Memorandum prepared by Pacific Habitat Services (PHS) was submitted to the City as part of the VIC Building North site plan application. The intent of the memorandum was to demonstrate that the project would have no effect on the unclassified resource area by applying a maximum 300-foot buffer measured laterally from the estimated outer boundary of the resource.

The revised master plan contemplates activity within 300-feet of this off-site resource therefore further field investigation will be required with future site development land use applications to classify the resource and establish resource boundaries and associated regulatory buffers. With subsequent site plan approval, stormwater generated from new site development associated with the master plan will be treated and detained on site consistent with local and state regulations.

- 2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. [\[help\]](#)
The revised master plan contemplates activity within 200-feet of the off-site resource therefore further field investigation will be required with future site development proposals to classify the resource, establish resource boundaries and regulatory buffers and quantify impacts, if any.
- 3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. [\[help\]](#)
No development, including fill or dredge material(s), will be placed in, or removed from surface water or wetlands.
- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known. [\[help\]](#)
Neither the master plan nor subsequent site development will require surface water withdrawals or diversions.
- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. [\[help\]](#)
No portion of the proposal lies within a 100-year floodplain.
- 6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. [\[help\]](#)
The proposed master plan and future developments within it would not discharge waste materials to surface waters.

b. Ground Water:

- 1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. [\[help\]](#)
There is an existing well on the site that has been historically used to support the agricultural use of the property. Its use was converted for irrigation purposes and may continue to be used for irrigation of landscaping throughout the buildout of the master plan. No waters will be discharged to groundwater. All stormwater runoff from impervious surfaces on the site will be treated and infiltrated on-site as noted above. Stormwater runoff will be addressed in detail with future development plans and Stormwater Technical Information Report(s) with site plan review requests.
- 2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals. . . ; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if

applicable), or the number of animals or humans the system(s) are expected to serve. [\[help\]](#)

Future buildout of the master plan site will not result in the discharge of wastewater from sewer systems into the groundwater. There will be no septic systems as part of this master plan and subsequent development proposals.

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow?

Will this water flow into other waters? If so, describe. [\[help\]](#)

An existing stormwater facility located in the southeast portion of the site treats surface runoff from the existing building and parking areas. The stormwater pond is designed to overflow to Fisher Creek during severe storm events. The existing facility will be maintained, matching the existing condition.

Upon future buildout of the VIC Master Plan, stormwater runoff from impervious services (e.g., parking lots, building/rooftops, streets, bikeways, and sidewalks) will be treated and infiltrated on-site. Stormwater runoff will be addressed in detail with future development plans and Stormwater Technical Information Report(s) with site plan review requests.

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

[\[help\]](#)

As noted above, the existing stormwater facility serving the building and parking lots is designed to overflow into Fisher Creek during severe storm events.

New development within the revised master plan site is expected to fully infiltrate runoff from pollution generating impervious surfaces following treatment to City of Vancouver standards. No waste material discharge is to occur within any ground waters. Future stormwater systems are not anticipated to discharge to surface waters off-site.

- 3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

The master plan site will not alter or otherwise affect drainage patterns in the vicinity of the site. Stormwater from the current development flows to the existing stormwater pond and subsequently to Fisher Creek. Existing flows will be maintained.

- 4) Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:

Current stormwater flows to the existing stormwater pond and subsequently to Fisher Creek will be maintained. The master plan site is designed to fully infiltrate stormwater on-site given the high permeability factor of on-site soils. Upon future site buildout, construction and site improvements will occur in compliance with local and state stormwater management requirements. Implementation of erosion control Best Management Practices (BMPs) will ensure that the project will not have any significant effects on surface or ground waters.

4. Plants [\[help\]](#)

- a. Check the types of vegetation found on the site: [\[help\]](#)
☒ deciduous tree: **alder**, maple, aspen, other
☒ evergreen tree: **fir**, cedar, pine, other
☒ shrubs
☒ grass
☒ pasture
☐ crop or grain
☐ Orchards, vineyards or other permanent crops.
☐ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
☐ water plants: water lily, eelgrass, milfoil, other
☐ other types of vegetation
- b. What kind and amount of vegetation will be removed or altered? [\[help\]](#)
Of the approximately 179-acre master plan site, approximately 24 acres is devoted to open space area including an approximately 13.7-acre forested tract in the northeast portion of the site. Upon future buildout, any required vegetation to be impacted will be reflected on the development plans and limited to the extent feasible.
- c. List threatened and endangered species known to be on or near the site. [\[help\]](#)
As noted in the Critical Areas Memorandum prepared on September 12, 2022, by PHS, no critical habitat for threatened or endangered species has been mapped within the VIC master plan site.
- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: [\[help\]](#)
Approximately 24 acres of the VIC Master Plan site is devoted to open space area including an approximately 13.7-acre forested tract in the northeast portion of the site. Future site development will incorporate landscaping consisting of groundcover, shrubs, and trees in compliance with Vancouver Municipal Code (VMC) requirements to provide plant diversity including native plans and tree canopy.
- e. List all noxious weeds and invasive species known to be on or near the site.
There are no noxious weeds or invasive species known to be on or near the site.

5. Animals

- a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include: [\[help\]](#)
 birds: **hawk**, heron, eagle, **songbirds**, other: **osprey**
 mammals: deer, bear, elk, beaver, other: **cows**
 fish: bass, salmon, trout, herring, shellfish, other:
- b. List any threatened and endangered species known to be on or near the site. [\[help\]](#)
As noted in the September 12, 2022, Critical Areas Memorandum prepared by PHS, no critical habitat for threatened or endangered species has been mapped within the Master Plan site.

- c. Is the site part of a migration route? If so, explain. [\[help\]](#)
The Master Plan site is located within the Pacific Flyway but is not known to be used as a critical stopover.
- d. Proposed measures to preserve or enhance wildlife, if any: [\[help\]](#)
As noted in the September 12, 2022, Critical Areas Memorandum prepared by PHS, there are no anticipated impacts to wildlife or wildlife habitat as a result the future buildout of the Master Plan.
- e. List any invasive animal species known to be on or near the site.
There are no invasive animal species known to be on or near the Master Plan site.

6. Energy and natural resources

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. [\[help\]](#)
Energy for future proposed development will include electricity to be used for heating, cooling, and lighting of light industrial buildings, offices, commercial/retail buildings, and residential dwelling units. Use of natural gas within the campus will be limited to commercial and industrial uses.

The applicant has provided Sustainability Goals for City of Vancouver Climate Action Framework (CAF) Alignment, prepared by PAE on March 27, 2023 (Appendix I) for site infrastructure and future phase developments to align to the Vancouver Climate Action Framework (CAF) targeted goals. The memorandum addresses recommended Green House Gas (GHG) reducing measures to be evaluated at the time of each new development project.

- b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe. [\[help\]](#)
Due to planned setbacks from adjacent properties, the Master Plan site is not anticipated to affect the potential use of solar energy by adjacent properties.
- c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any: [\[help\]](#)
Future proposed buildings will conserve energy through compliance with the Washington State Energy Code, and through the implementation of energy efficiency measures and sustainability goals that closely align with the targeted goals of the recently adopted CAF. As described in the Sustainability Goals for City of Vancouver Climate Action Framework (CAF) Alignment, prepared by PAE on March 27, 2023, included as Appendix I with the Master Plan application, build-out of the master plan is intended to include all-electric systems approach for new domestic use, apart from natural gas implemented for proposed light industrial uses as necessary. PAE has recommended other GHG reducing options that will be evaluated at the time of each subsequent site plan request including measures to increase electric use with proposed commercial/retail uses, increase onsite solar installations, material selections and construction practices to reduce emissions for the buildings and site infrastructure, and increasing electrical vehicle charging stations as necessary with change in demand.

The Mixed-Use Master Plan site has the potential to reduce energy impacts, predominantly through the "20 Minute Neighborhood" concept that encourages active (walking, cycling) transport and public transport in order to reduce

dependency on vehicles and gasoline consumption. As demonstrated on the Mobility Plan Sheet 005 of the Master Plan Design Drawings (Appendix E), non-vehicular routes to the site including bicycle and pedestrian pathways are proposed throughout the site.

7. Environmental health

- a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste that could occur as a result of this proposal? If so, describe. [\[help\]](#)

The proposed master plan allows an array of land uses within the various designated land use areas. As the specific uses and their operational needs are unknown at this time, the proposed master plan will not result in any environmental health hazards. Further evaluation of the potential for any site-specific development to pose environmental health hazards will be addressed with site-specific SEPA evaluations.

- 1) Describe any known or possible contamination at the site from present or past uses.

Per the Phase 1 Environmental Site Assessment Vancouver Tech Center – 18110 SE 34th Street Vancouver, Washington, prepared by WSP, dated January 2021, underground waste solvent lines were previously located south of the South Service Building; however, the former location of the lines is currently within a new corridor, and an acoustic chamber has been built in the vicinity. Therefore, it is likely that the piping was removed during construction and activities and any contamination encountered at that time would have been reported and addressed. No investigation is recommended by WSP because the area has been developed.

- 2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

There are no existing on-site hazardous chemicals or conditions within the master plan site that would affect future site development and design.

- 3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Existing tenants within the VIC may store small quantities of hazardous chemicals used in light manufacturing processes. Existing and future tenants are required to comply with applicable regulations related to the use, storage or production of toxic or hazardous waste. A review of toxic or hazardous chemical storage, use or production will be evaluated and addressed at the time of individual site development for each phase within the Master Plan site.

- 4) Describe special emergency services that might be required.

Fire, emergency medical, and police services will be required with future development of the site.

- 5) Proposed measures to reduce or control environmental health hazards, if any:

There are no environmental health hazards anticipated with this site; therefore, no measures are proposed to reduce or control environmental health hazards.

b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? [\[help\]](#)

Existing noise around the site includes loading activities at the existing VIC buildings, movement of vehicles throughout the VIC site, and vehicular traffic on the streets that bound the master plan site – SE 34th Street to the south, SE 192nd Avenue to the east, and SE 176th Avenue to the west. These noise sources are typical ambient urban conditions and will not affect the project.

- 2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. [\[help\]](#)

Heavy equipment used for site improvements and construction will generate noise on the site and will be of short-term duration. The hours of use for heavy equipment will be governed by the City's noise ordinance. In the long-term, noise from vehicular traffic on new roadways within the site will generate noise similar to traffic on the other adjacent streets.

- 3) Proposed measures to reduce or control noise impacts, if any: [\[help\]](#)

Compliance with the City's noise ordinance will reduce and control any temporary and long-term noise impacts.

8. Land and shoreline use

- a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. [\[help\]](#)

The current VIC Mixed Use Master Plan Site consists of an existing approximately 715,000 square foot (SF) multi-tenant light industrial building.

The Master Plan Site abuts the Clear Meadows and Fisher's Grove master planned single family residential communities to the north, SE 34th Street (a four-lane arterial road with a center landscaped median) which separates the site from other master planned single-family residential neighborhoods (Hiddenbrook, The Village, and The Glen). The site is bounded on the east by Fishers Creek and SE 192nd Avenue, with adjacent commercial development. The site is bounded on the west by SE 176th Avenue and adjacent master planned residential subdivisions (The Firs, 4-5 Town Center, and Heritage Park). All the adjacent master planned communities are within City of Vancouver Neighborhood Associations.

The revised Mixed-Use Master Plan has been designed for compatibility with adjacent properties with the inclusion of trails/open space area, and convenient and accessible bike/pedestrian-oriented pathways to navigate to and from the site.

- b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? [\[help\]](#)

Historically, northern portions of the site have had limited agriculture and cattle grazing activity. Outside of this limited use, there is no other known agricultural history on the site or forest land of long-term commercial significance on the property.

- 1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:
There is no working farmland or forestland in the vicinity of the master plan site. Upon future site development, remaining limited cattle grazing activity will be curtailed and/or eliminated from the site.
- c. Describe any structures on the site. [\[help\]](#)
There are six (6) main structures consisting of approximately 715,000 square feet on the property that are connected either through covered, enclosed walkways or interior corridors.
- d. Will any structures be demolished? If so, what? [\[help\]](#)
The vast majority of existing buildings and structures located within the site will remain. Small ancillary structures including the fire pump house and recycling facility are likely to be demolished and replaced during future build out of the master plan.
- e. What is the current zoning classification of the site? [\[help\]](#)
The VIC Master Plan site is zoned Mixed Use (MX).
- f. What is the current comprehensive plan designation of the site? [\[help\]](#)
The VIC Master Plan site's current comprehensive plan designation is Commercial.
- g. If applicable, what is the current shoreline master program designation of the site? [\[help\]](#)
There are no shoreline master program designations for the site.
- h. Has any part of the site been classified as a critical area by the city or county? If so, specify. [\[help\]](#)
As confirmed in the September 12, 2022, Critical Areas Memorandum, Fisher Creek and associated wetlands have been identified off-site to the east. Buffers associated with the creek and wetlands may extend into the Master Plan site. Additional field investigation will be required with future site development land use applications to classify the resource and establish resource boundaries and associated regulatory buffers.
- i. Approximately how many people would reside or work in the completed project? [\[help\]](#)
The revised master plan will consolidate the Single-Family Residential LUA and Multi-Family Residential LUA into a single, non-contiguous Residential LUA. The revised master plan proposes a maximum of 1,800 dwelling units which can be constructed within either the R LUA, the MX LUA or IL LUA. The United States Census Bureau reports that the City of Vancouver had an average of 2.46 persons per household between 2017-2021. Applying this average household size to the project, the development could have an estimated 4,428 residents.

The applicant proposes approximately 1,703,065 square feet of non-residential building square footage for employment uses within the IL and MX LUAs, which includes 715,000 square feet within the existing VIC building. Overall, the new employment square footage contemplated is consistent with the current master plan and is expected to yield approximately 5,000 jobs, including 3,500 net new jobs across the entire campus at project buildout.

- j. Approximately how many people would the completed project displace? [\[help\]](#)
The proposed buildout of the VIC Master Plan will not result in displacement.
- k. Proposed measures to avoid or reduce displacement impacts, if any: [\[help\]](#)
The proposed buildout of the VIC Master Plan will not result in displacement.
- l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: [\[help\]](#)
The VIC Mixed Use Master Plan site has a comprehensive plan designation of Commercial and is zoned Mixed Use (MX). The proposed land use areas are compatible with the current City comprehensive plan and applicable zoning code standards for the site as amended by the Third Amended and Restated Development Agreement (Restated DA). Therefore, no mitigation measures are necessary to ensure compatibility with existing and projected land uses and plans.
- m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:
There are no nearby agricultural or forest lands of long-term commercial significance, so no mitigation measures are needed.

9. Housing

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing. [\[help\]](#)
The VIC Mixed Use Master Plan proposes approximately 1,800 residential dwelling units. The Master Plan proposes a mix of building types including low-rise residential units, studio apartments, multi-family units, and townhomes.
- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing. [\[help\]](#)
There are no dwelling units to be eliminated with this master plan site.
- c. Proposed measures to reduce or control housing impacts, if any: [\[help\]](#)
There are no dwelling units to be eliminated with this master plan site.

10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? [\[help\]](#)
Upon future buildout, the applicant anticipates the tallest structure to be approximately six (6) stories, with a maximum height of approximately 75 feet. As noted in the Design Guidelines (Appendix F), a variety of building materials is encouraged throughout the site including weathered wood, rusted steel, singed woods, and other materials that reflect the industrial character of the IL LUA, such as concrete, steel, aluminum, and heavy timber. Additionally, single family attached developments are encouraged to incorporate a variety of natural materials including wood and stone in a range of natural color tones,
- b. What views in the immediate vicinity would be altered or obstructed? [\[help\]](#)
There are no views in the immediate vicinity that would be significantly altered or obstructed. The Master Plan proposes land use areas (LUAs) that are compatible with adjacent property uses. Per the Revised Master Plan Sheet 003 (Appendix E), the southwest corner will be multi-family residential LUA near the adjacent residential neighborhoods to the west. The northern part of the site, which abuts a residential neighborhood, will have a school LUA,

residential LUA, and open space area. The denser, light industrial and mixed-use land use areas will be in the core, to the south, and to the east of the property, to effectively transition to commercial areas along SE 192nd Avenue.

- c. Proposed measures to reduce or control aesthetic impacts, if any: [\[help\]](#)
The orientation of the proposed land uses within the master plan has been designed to mitigate and control potential aesthetic impacts of the project. Light industrial, employment and mixed-use buildings are focused at the center of the property around the existing buildings on the site and residential uses, a school, an open space corridor and forested tract are proposed to the west and northeast closest to the nearest residential subdivisions to ensure the most compatible land uses are adjacent to existing uses.

11. Light and glare

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur? [\[help\]](#)
The future development of the Mixed-Use Master Plan site will produce light or glare associated with residential, light industrial, office, commercial/retail, and school uses. Lighting produced on the site will consist of outdoor lighting for building safety, vehicle circulation and maneuvering areas limited to early morning and evening hours. Streetlights will be proposed in accordance with City Standards with the roads that do not presently have street lighting (e.g., 176th Avenue). Streetlights would result in lighting in early morning and evening hours to enhance safety on-site and to the adjacent properties. Future proposed development under the Master Plan will be designed to avoid producing glare to the extent feasible.
- b. Could light or glare from the finished project be a safety hazard or interfere with views? [\[help\]](#)
Future development of the Master Plan site is not anticipated to produce light or glare that will result in a safety hazard or interfere with views.
- c. What existing off-site sources of light or glare may affect your proposal? [\[help\]](#)
There are no known off-site sources of light or glare that would affect this master plan proposal.
- d. Proposed measures to reduce or control light and glare impacts, if any: [\[help\]](#)
Future development of the VIC Master Plan site will propose on-site lighting elements in compliance with applicable VMC requirements, which will include fixtures designed to minimize any significant light trespassing onto off-site properties.

12. Recreation

- a. What designated and informal recreational opportunities are in the immediate vicinity? [\[help\]](#)
The subdivisions to the west and north have 'pocket parks'. Fisher's Landing Elementary School is located to the south of the site across 34th Street and contains a playfield adjacent to 34th Street. Two neighborhood, public parks, Clear Meadows Park and Heritage Park are in the immediate vicinity of the Master Plan site. Approximately one mile away along 192nd Avenue is Fisher Basin community park, which draws from a wider geographic base to include this site. The VIC Master Plan proposes approximately 24-acres of open space LUA which includes designating an approximately 13.7-acre forested tract for

public recreation at the northeast corner of the Master Plan area. Other open space and recreational features include a perimeter multi-use loop trail, pedestrian/bicycle-oriented pathways, a neighborhood park and town plaza area.

- b. Would the proposed project displace any existing recreational uses? If so, describe. [\[help\]](#)
There are no recreational uses to be displaced as a result of future development of the VIC Master Plan.
- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: [\[help\]](#)
The VIC Master Plan proposes approximately 24-acres of open space LUA which includes designating an approximately 13.7-acre forested tract for public recreation at the northeast corner of the Master Plan area. Other open space and recreational features include a two-mile multi-use loop trail around the perimeter of the site, pedestrian/bicycle-oriented pathways, a neighborhood park, and town plaza area. Other open space features include a neighborhood park block within the Residential LUA in the southwest corner of the site and a town plaza in the southeast.

13. Historic and cultural preservation

- a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. [\[help\]](#)
There are no buildings or structures located on-site that are over 45 years old and that are listed or are eligible for listing in national, state, or local preservation registers.
- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. [\[help\]](#)
Archaeological Investigations Northwest (AINW) conducted a cultural resources survey for the revised Vancouver Innovation Center Master Plan site in August of 2022. The report found no known evidence of archaeological or historic resources on the VIC property.
- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. [\[help\]](#)
AINW conducted a review of records available on the Department of Archaeological and Historic Preservation (DAHP) Washington Information System for Architectural and Archaeological Records Data (WISAARD) online database. Historical maps, photographs, and documents were reviewed to assess the potential for pre-contact (Native American) and historic-period archaeological resources. AINW conducted shovel tests distributed across the site. There are no known landmarks or evidence of cultural or historic resources on or near the site.
- d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

There are no known archaeological materials identified during AINW's investigation therefore, no measures to avoid, minimize or compensate for loss, changes to, and disturbance to resources are proposed. With future construction activity, the developer will comply with City and State regulations if any archaeological, cultural, and historic resources are discovered.

14. Transportation

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

[\[help\]](#)

The VIC Master Plan site is served on the south by SE 34th Street (a four lane principal arterial with a center median and sidewalk on both sides, with a meandering sidewalk fronting the subject site), on the west by SE 176th Avenue (a two-lane collector with a center turn lane and sidewalks on both sides), and on the east by SE 192nd Avenue (a four lane principal arterial with a center median, meandering sidewalk on both sides and a bike lane on the south leg). Access to the VIC site is provided via SE 34th Street. A private vehicle circulation route extends north into the site from the signalized intersection of SE Hiddenbrook Drive and SE 34th Street along the site frontage. The private road loops around the building and connects with SE 34th Street at a stop-controlled intersection near the southwest corner of the site.

- b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? [\[help\]](#)

C-TRAN bus line Number 37 serves the site along SE 34th Street and SE 192nd Avenue. Bus stops are located at the southeastern corner of the project site at SE 34th Street and Hiddenbrook, and at the intersection of SE 34th Street and 177th Avenue.

- c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate? [\[help\]](#)

Several existing parking facilities within the site will be incrementally demolished as development occurs. New parking lots, stalls, and/or facilities will be constructed with each phase of new development. The applicant is anticipating the use of shared or joint parking across the site. The variety of uses proposed within the site do not have coinciding peak parking demands and therefore, provide a unique opportunity to allow shared parking.

Parking capacity requirements are based upon unit type, size and use therefore an estimate of parking capacity is not known at this time. Parking standards will be evaluated at the time of individual site development and will be consistent with applicable regulations.

- d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private). [\[help\]](#)

Per the Traffic Impact Analysis (TIA), prepared by Kittelson and Associates Inc., dated April 28, 2023, master plan development is generally anticipated in four phases with phases 2-4 providing new on-site public roadways:

- Phase 1 includes the VIC Building North and up to 300 homes using existing campus access.
- Phase 2 will construct the southwest portion of a new on-site loop road between SE Hiddenbrook Drive and SE 29th Street, SE 29th Street

between the new west loop road roundabout and a new roundabout at SE 176th Avenue and will close the existing VIC campus roadway connection to SE 34th Street aligned with SE 177th Avenue.

- Phase 3 will extend SE 29th Street from the Phase 2 west roundabout terminus east across the VIC campus to a new signalized intersection at SE 192nd Avenue.
- Phase 4 will complete the loop road between a new east roundabout on the loop road and SE Hiddenbrook Drive to the south.

- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe. [\[help\]](#)
There are no water, rail, or air transportation facilities located on or in the immediate vicinity of the Master plan site area.
- f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates? [\[help\]](#)
The revised master plan does not anticipate significant impact or demand to transportation, water, sewer or stormwater management systems and infrastructure as further described below.

The VIC Development Agreement (VIC DA) with the City of Vancouver vested trips for the currently approved Master Plan. Per the DA, vested net new trips include a total of 26,982 average daily trips (ADTs), 2,088 AM peak hour trips, and 1,991 PM peak hour trips. On- and off-site transportation capacity mitigation is predicated on the number of AM and PM peak hour trips while transportation concurrency mitigation is determined based on PM peak hour trips.

The April 28, 2023, Traffic Impact Analysis (TIA) prepared by Kittelson and Associates, Inc. (Appendix D) demonstrates that the proposed uses within the revised master plan will result in a modest increase in weekday AM peak hour trip generation (141 net new trips added) and will not change the total net new PM peak hour trip generation compared to the current master plan. As indicated on Table 4 of the TIA, the revised master plan is estimated to generate 2,229 net new weekday AM peak hour trips and 1,991 net new PM peak hour trips. The TIA updated on- and off-site impacts of the project based upon the revised peak hour trip generation and recalibrated identified mitigation as appropriate. No new off-site traffic mitigation improvements were identified.

- g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.
Future buildout of the site is not expected to interfere with, affect or be affected by the movement of agricultural and/or forest products on roads or streets in the area.
- h. Proposed measures to reduce or control transportation impacts, if any: [\[help\]](#)
The proposed master plan revision will result in reduced overall traffic impacts when compared to the current master plan, therefore, no new mitigation measures are proposed. However, it is anticipated that the following mitigation measures will be implemented with buildout of the proposed revised master plan as noted in Table 1 on the following page.

Table 1. Preliminary Transportation Mitigation – VIC Master Plan

Facility	Segment/ Study Intersection ID	Mitigation Recommendation	Needed Pre- VIC Master Plan?	Triggered by VIC Master Plan Trips?	VIC Master Plan Trigger Phase?
On-Site Roadways & Intersections					
SE 29 th Street	<i>Extend collector arterial roadway across the VIC Master Plan site in three segments</i>				
	West Segment	From SE 176 th Avenue to West Loop Road	N/A	Yes	2
	North Segment	From West Loop Road to East Loop Road	N/A	Yes	3
	East Segment	From East Loop Road to SE 192 nd Avenue	N/A	Yes	3
SE 184 th Avenue	N/A	Renovate collector arterial roadway within The VIC Master Plan site from SE 34 th Street to Loop Road	N/A	Yes	2
West Loop Road	N/A	From SE 184 th Avenue to SE 29 th Street	N/A	Yes	2
East Loop Road	N/A	From SE 184 th Avenue to SE 29 th Street	N/A	Yes	4
West Loop Road/ SE 29 th Street	N/A	Construct single lane roundabout	N/A	Yes	2
East Loop Road/ SE 29 th Street	N/A	Construct single lane roundabout	N/A	Yes	3
Site-Access Changes					
West Site Access/ SE 34 th Street	7	Close and vacate motor vehicle site-access (intersection north approach)	No	No	2
SE 29 th Street/ SE 176 th Avenue	9	Reconstruct as a single lane roundabout	No	Yes	2
SE 29 th Street/ SE 192 nd Avenue		Install traffic signal with interconnect Construct and stripe separate eastbound left and right turn lanes with 250 feet of storage each Stripe northbound left-turn lane with 200 feet of storage		Yes	3
Off-site Intersection Mitigations with Master Plan Development					
SE 29 th Street/ SE 164 th Avenue	11	Modify traffic signal to provide east-west protected/permissive left-turn phasing	No	Yes	2
		Extend westbound left-turn lane striping to provide 225 feet of storage (striping only)	No	Yes	2
		Extend southbound left-turn storage to provide 300 feet of storage (reconstruct center median area)	No	Yes	2
SE 192 nd Avenue/ SR- 14 Westbound Ramp Terminal	N/A	Pay proportionate share contribution toward future capacity improvements with each site development application. Estimated total fee of \$430,000 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added
SE 20 th Street/ SE 176 th Avenue	10	Pay proportionate share contribution toward future capacity improvements with each site development application. Estimated total fee of \$33,600 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added
SE 34 th Street/ SE 192 nd Avenue	5	Pay proportional share contribution towards re-constructing streets with a more durable pavement treatment to reduce maintenance needs. Estimated total fee of \$83,400 based on assumed Master Plan land use plan.	Yes	No	Each phase based on trips added

15. Public Services

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. [\[help\]](#)

With the VIC Mixed Use Master Plan buildout, residents, employees, and businesses would require fire protection, police protection, public transit, health care, schools, and amenities like parks, open space, and recreational activities.

- b. Proposed measures to reduce or control direct impacts on public services, if any. [\[help\]](#)

No measures are proposed to reduce or control direct impacts on public services as it is anticipated that tax revenues and utility fees generated from the build out of the master plan will address the additional demands created by the project.

16. Utilities

- a. Circle utilities currently available at the site: [\[help\]](#)
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

Electricity, natural gas, water, refuse services, telephone, and sanitary sewer. Cable and data services are also available to the site.

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed. [\[help\]](#)

The VIC Mixed Use Master Plan site will require the following utilities:

Electricity	Clark Public Utilities
Natural Gas	NW Natural Gas
Sewer	City of Vancouver
Water	City of Vancouver
Refuse	Waste Management
Communications	Multiple providers available

C. SIGNATURE [\[HELP\]](#)

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:  _____

Name of signee: Jessica Herceg

Position and Agency/Organization: Senior Planner, DOWL

Date Submitted: May 5, 2023

APPENDIX F

REVISED DESIGN GUIDELINES



EXHIBIT E DESIGN GUIDELINES

Vancouver Innovation Center Master Plan

Updated April 2023

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Appendix A

Single Family Residential Design Reference Guide

Appendix B

Placemaking Goals

PURPOSE

These design guidelines are intended to ensure that development within the Vancouver Innovation Center is cohesive in both form and function and is consistent with the brand pillars of the VIC. These brand pillars form the foundation of the design principles that will guide project implementation. These brand pillars and the associated VIC design principles are described further below:



Natural

Connected to nature in all that we do

Design Principle

Provide a network of both passive and active open space areas that utilize existing trees and natural resources for recreation and relaxation.



Balanced

physical, mental, and spiritual

Design Principle

Provide a balance of community gathering spaces and areas for personal escape.



Authentic

Urban style and refinement, built with taste, personalization and ease in mind

Design Principle

Create a compact urban form composed of well-articulated buildings and ample pedestrian areas to encourage multi-modal travel throughout the site between the various on-site uses and open space areas.



Blended

Contemporary convenience, modern collaboration

Design Principle

Design buildings to encourage pedestrian access, ground floor visibility and community spaces for socialization and collaboration.



Community

Inclusivity and shared knowledge, energy and passion

Design Principle

Design with an eye towards the future. Incorporate sustainability and energy efficiency measures including things such as vehicle charging stations, solar panels, and low impact development (LID) stormwater management approaches. Continuously evaluate project performance related to parking and space efficiency, vehicular trips and sustainability with the goal of design refinements and improvements throughout project buildout, with the goal of the project becoming a “living laboratory.” Provide a network of well defined and accessible pedestrian corridors to encourage access through the site for all individuals.

APPLICABILITY

These guidelines will apply to new development and remodels of existing development within the Residential, Light Industrial, Mixed-Use, and Open Space LUAs within the VIC masterplan. Demonstration of project adherence to these guidelines will be required with land use permit submittals for new development on the site.



DESIGN GUIDELINES



Mobility

All new developments will demonstrate:

- a. Support for a 20-Minute Neighborhood by providing means to reduce need for vehicle trips;
- b. Functional connections to the site-wide bicycle and walking path network outlined in the Masterplan;
- c. Compliance with Washington State electric vehicle charging standards in effect at the time of land use application;
- d. Curbside ride share drop off or pull-out areas shall be incorporated at major entry points to all new buildings in the IL LUA; and
- e. Shared parking strategies.
- f. Compliance with the City of Vancouver Complete Street Policy, including infrastructure designed to be safe for all users, ages and abilities regardless of their mode of travel.



Energy

Developer is installing HVAC and lighting upgrades for the Existing Building. All new developments will demonstrate:

- a. Compliance with the 2018 Washington State Energy Code, at a minimum;
- b. Compliance with environmental standards in effect at the time of building permit application (i.e. environmental development standards do not vest on the Restated DA Effective Date;
- c. That every new building is designed to accommodate ready access for installation of solar panels that would occupy at least 10% of the building footprint. This includes the necessary structural and electrical infrastructure to accommodate the solar panels; and
- d. Infrastructure for electric vehicle charging stations.
- e. Advancement of "District Energy Conditions" as identified in Appendix A – Vancouver Innovation Center Master Plan Sustainability Framework.

Water

The VIC will prioritize use reductions, efficiency strategies, and surface water quality in its design. All new development applications will include:

- a. Water-saving plumbing fixtures in all new buildings;
- b. Native and adaptive plant selections that do not require excessive irrigation; and
- c. A surface stormwater strategy synopsis describing anticipated collection, treatment, and discharge strategies including any Low Impact Development (LID) BMPs planned for the project.
- d. An evaluation of means to reduce potable water use consistent with Appendix A – Vancouver Innovation Center Master Plan Sustainability Framework.





Building Design

a. Blank Walls

- i. At least 75% of the width of any new first-story building wall facing a street shall be devoted to interest-creating features, pedestrian entrances, transparent show or display windows, or windows affording views into retail, office or lobby space.
- ii. In all areas other than the IL LUA, building surfaces over 2,000 sf shall be broken up with window openings and/or changes in material.
- iii. Blank walls longer than 20 feet without windows or an unbroken series of garage doors are not permitted on any street frontage.
- iv. Any face of a building that is over 50' wide shall have varied horizontal plane and/or vertical façade shifts to break up the building's mass.

b. Corner Buildings

- i. New IL LUA buildings on a corner will have an entrance within 75 feet of the corner.

c. Ground Floor

- i. Buildings should engage with the “sidewalk zone” to bring visual interest, variation, and intimacy to the streetscape, while maintaining the pedestrian through-routes that link the land use areas on the site.
- ii. Pedestrian access to primary building entrances should be close to and visible from circulation facilities that include a pedestrian component such as a sidewalk, trail, or pedestrian plaza. Primary building entrances may not be from non-pedestrian oriented areas. Each primary building entrance should be attractive and have weather protection and highlight the presence of the entrance to pedestrians through the use of architectural treatments such as changes in the street-facing wall and lighting. Entrances from primary pedestrian corridors should be visually more prominent than
- iii. The design of buildings, above and below should be pedestrian scaled, intimate, and inviting.

d. Roofs

- i. Roof materials shall screen roof top mechanical equipment from ground-level views
- ii. Buildings shall have primarily flat roofs - architectural detailing and rooftop decks shall be allowed.



Exterior Building Finishes

To create a unique identity for the VIC, material selection and application is required to adhere to exterior finish standards.

- a. Major color themes are to predominantly be earth tones of grey, brown, and tan.
- b. Materials exhibiting patina are encouraged – including weathered wood, rusted steel, singed wood.
- c. Material changes shall be offset by a minimum 3 ½" horizontal or vertical relief.
- d. Materials that expose their natural state are encouraged such as exposed wood and concrete.
- e. First floor window framing shall be either wood or aluminum (does not apply to Residential LUAs)
- f. Opportunity for more industrial and technological materials, such as steel, aluminum, and heavy timber.

Maximum Building Heights

See Development Standards applicable to each LUA under Exhibit D of the Restated DA.

Single Family Residential

Single family residential attached designs should incorporate the material and pedestrian orientation provisions of these guidelines. See Appendix B – Single Family Residential Design Reference Guide.

Signage

- a. Monument signs will have a uniform color and typeface throughout the property.





Tree canopy

Every development application must demonstrate how it complies with the Tree Canopy Plan (Section 6.10 of the Restated DA) and provide an tree canopy assessment for its site and a 5-, 10-, 15-, and 20-year forecast for the tree canopy on the entire Property.

Open Space

All site plans will demonstrate adherence to the Masterplan and Appendix C - Placemaking Goals.

- a. Open spaces shall be directly accessible from all buildings in the development (building occupants should not have to walk around the building to get outside)
- b. Avoid inconvenient or circuitous ped access to amenities.
- c. Both greenscaping and useable accessible hardscaping elements shall count as open space
- d. Hardscape open spaces shall be designed for four season use and durable for urban intensity.
- e. Neighborhood open spaces
 - i. Refer to Circulation and Open Public Space Plan for targeted locations.
 - ii. Neighborhood open spaces shall be a minimum of 2,000 sf.
 - iii. Neighborhood open spaces shall incorporate interactive amenities such as pavilions, picnic facilities, and play structures.

Street Cross Sections

See DA for street section implementation options for the Vancouver Innovation Center.

APPENDIX A

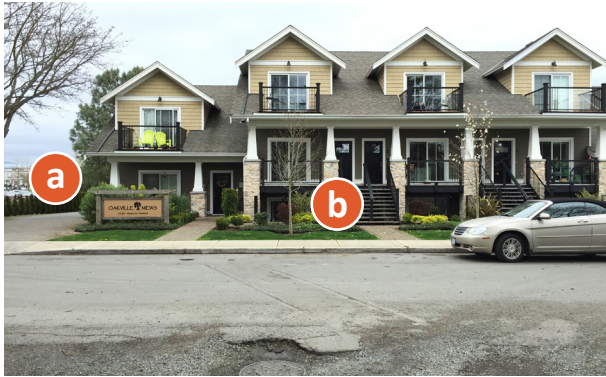
Single Family Residential Design Reference Guide

Vancouver Innovation Center Master Plan

Updated April 2023



SINGLE FAMILY ATTACHED

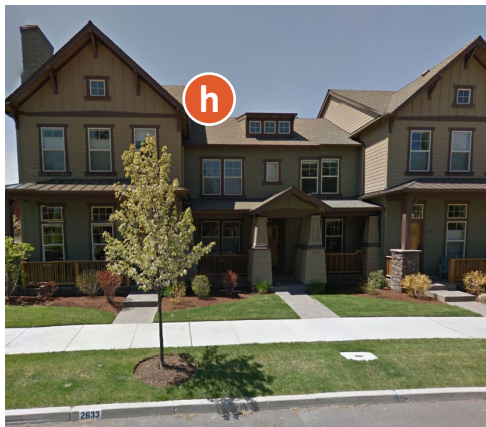


- a. Find opportunities to alley-load attached single family residential units to minimize driveway and garage exposure.
- b. Orient residential buildings to the “sidewalk zone” through the use of front porch features.
- c. Incorporate a range of natural color tones, architectural styles and horizontal and vertical relief.
- d. Seek opportunities to orient units to courtyards and open spaces.
- e. Create visual interest through horizontal and vertical relief and variation of architectural styles of adjoining attached units.
- f. Encourage reduced setbacks for residential units to engage entrances with the sidewalk.



SINGLE FAMILY ATTACHED – CONTINUED

- g.** Allow front-loaded attached units when accessed from a local street and when the garage exposure is minimized by site and building design features.
- h.** Allow for a mix of scale and size of attached product including larger duplexes.
- i.** Natural material elements including wood and stone should be prioritized for use.
- j.** Provide substantial window and trim relief on units to break up the potential for monolithic appearances on taller units.
- k.** For continuous banks of attached units, provide vertical, horizontal and roof relief variation to minimize the scale of the structures.



APPENDIX B

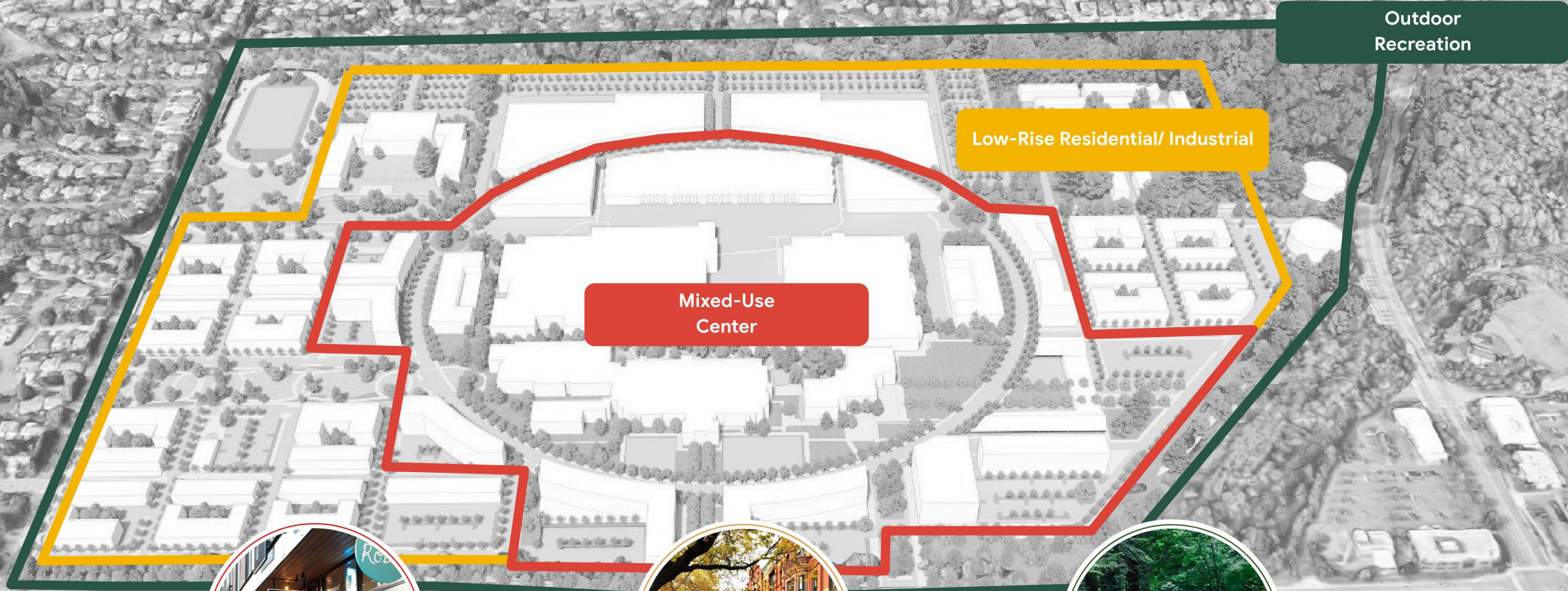
Placemaking Goals

Vancouver Innovation Center Master Plan

Updated April 2023



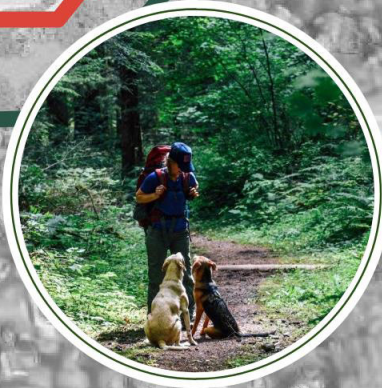
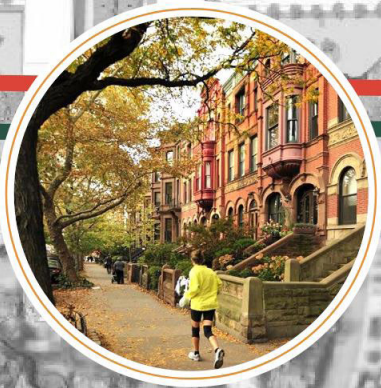


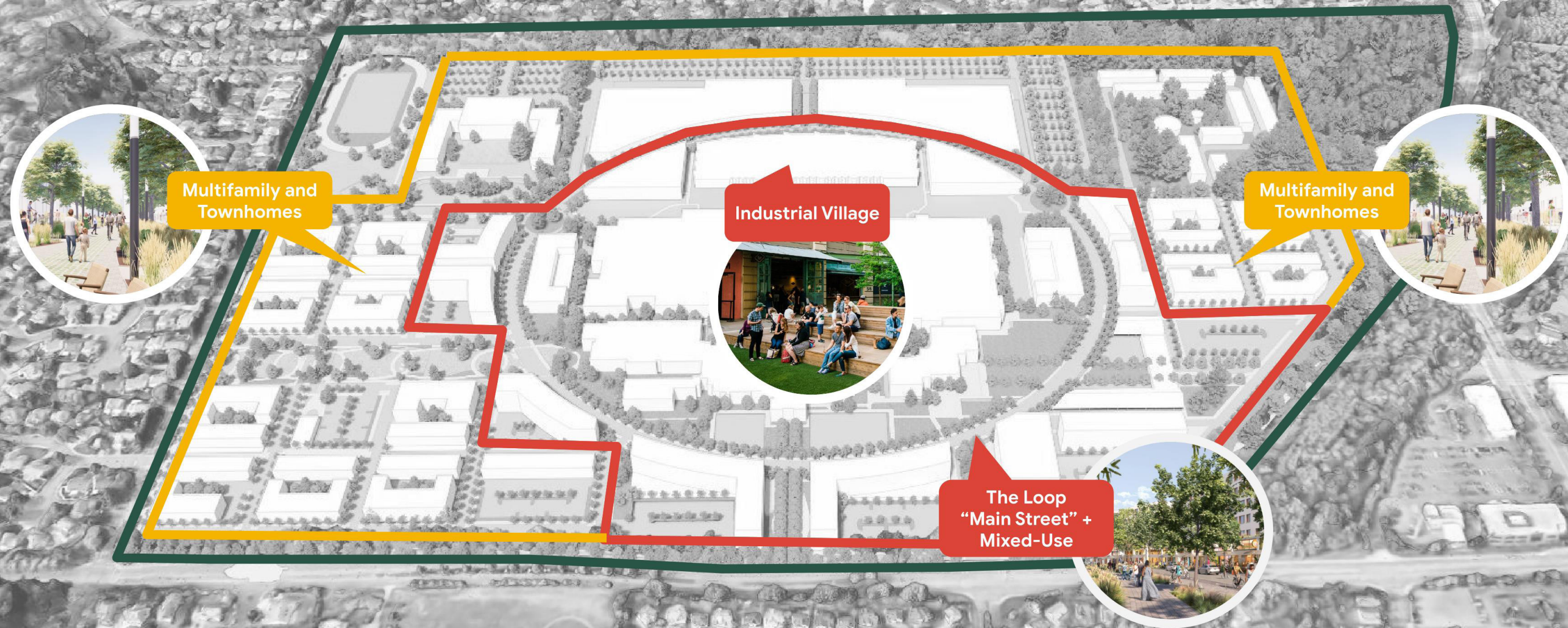


Outdoor
Recreation

Low-Rise Residential/ Industrial

Mixed-Use
Center



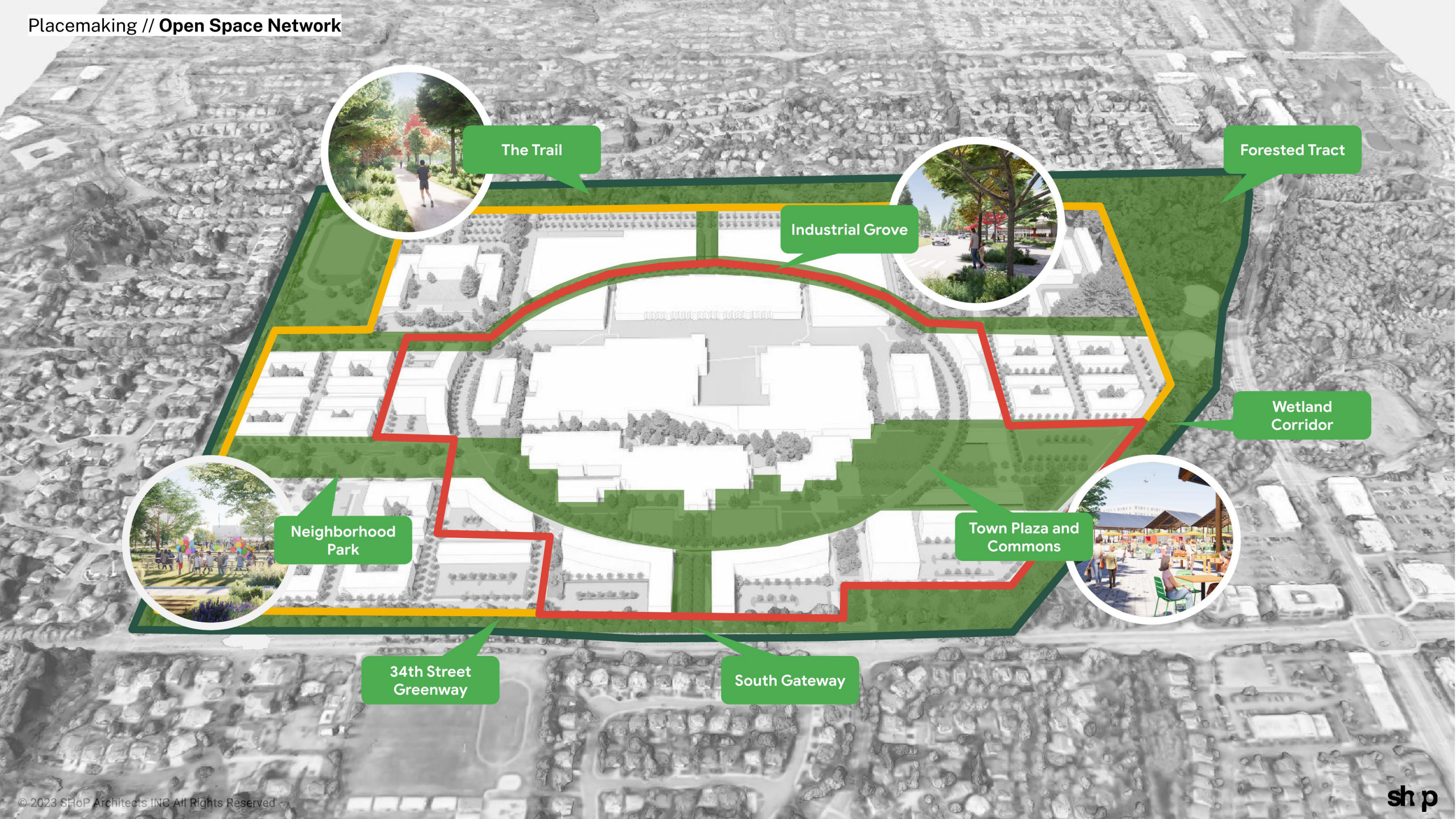


Multifamily and
Townhomes

Industrial Village

The Loop
"Main Street" +
Mixed-Use

Multifamily and
Townhomes



The Trail

Forested Tract

Industrial Grove

Wetland
Corridor

Neighborhood
Park

Town Plaza and
Commons

34th Street
Greenway

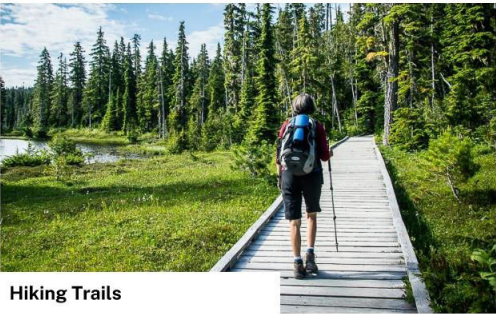
South Gateway



Multi-Use Public Trail



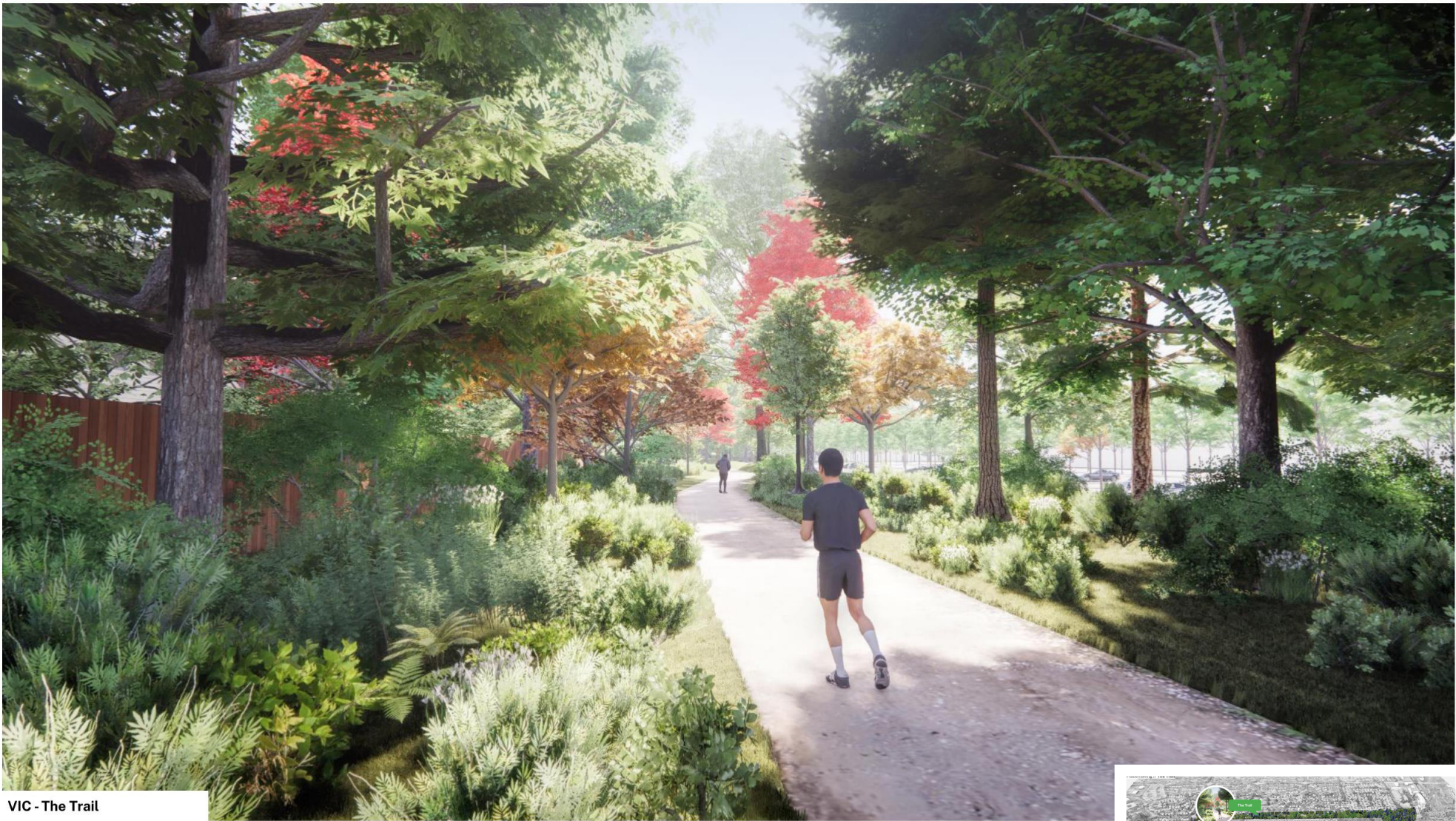
Existing Landscape



Hiking Trails

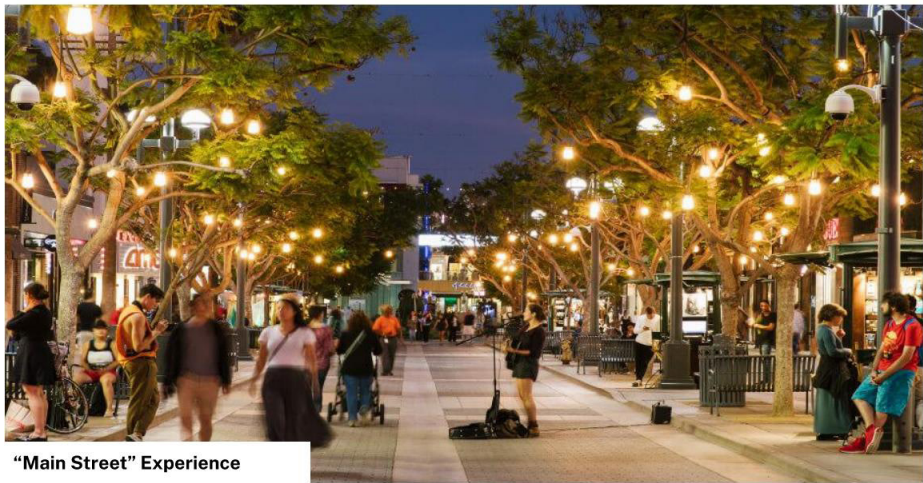


Connection to Forest Park



VIC - The Trail

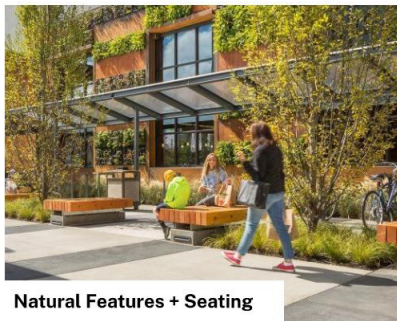




“Main Street” Experience



Destination Retail and F&B



Natural Features + Seating



Community Amenities



VIC - The Loop



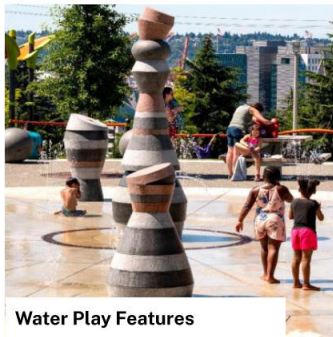
Placemaking // Town Plaza and VIC Commons



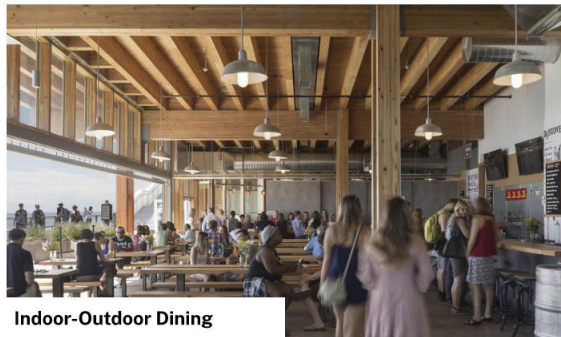
Community Events



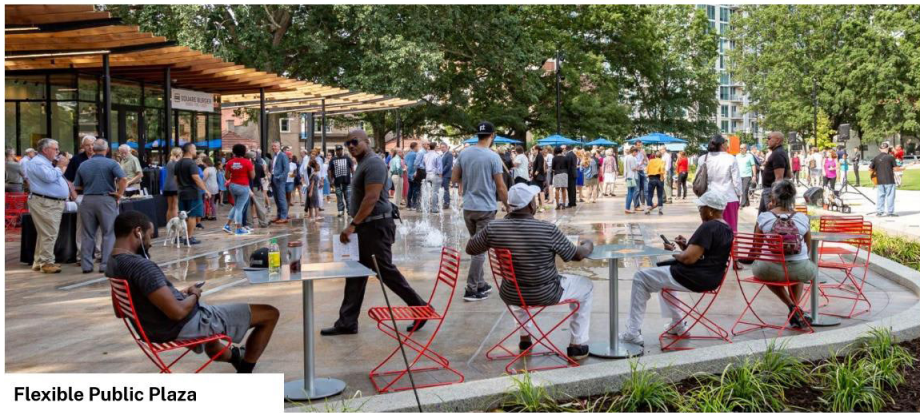
Outdoor Fitness



Water Play Features



Indoor-Outdoor Dining



Flexible Public Plaza



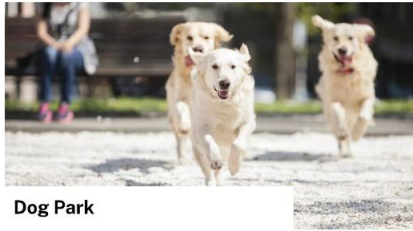
VIC - Town Plaza



Placemaking // Multi-family and Townhomes - Neighborhood Park



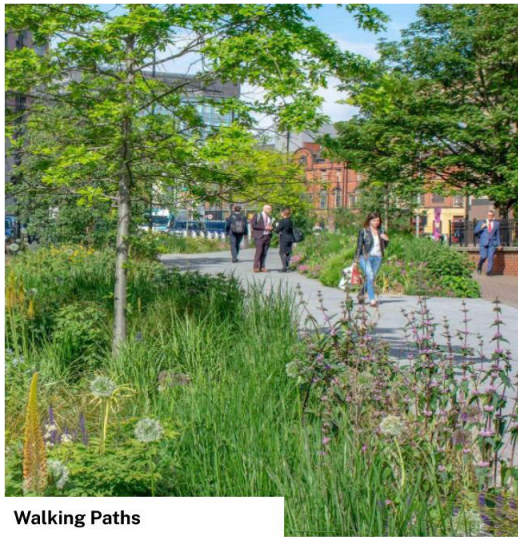
Seating + Picnic Areas



Dog Park



Playscapes



Walking Paths



Community Garden



VIC - Neighborhood Park



Placemaking // Multi-family and Townhomes - Pedestrian Laneways



Variety of Residential Types



Bioretention Landscape



Porches + Stoops



Pedestrian + Bike Laneway



VIC - Pedestrian Laneway



Placemaking // Industrial Grove



Light Industrial + Manufacturing



29th St. Parkway



Pedestrian Pathways



Parking Area



Innovation + Makerspace



VIC - Industrial Grove



APPENDIX G

PARKING STRATEGY

SEE PROJECT NARRATIVE, APPENDIX B

APPENDIX H

PHASING STRATEGY

SEE PROJECT NARRATIVE, APPENDIX B

APPENDIX J

PRE-APPLICATION CONFERENCE REPORT

2
3 **December 1, 2022 Pre-Application Conference Summary**
4 **Vancouver Innovation Center – Revised Mixed Use Master**
5 **Plan and Development Agreement**
6

7 **Project Description:** Proposed revision of Mixed Use Master Plan and Development
8 Agreement approved on 176-acre site in 2021. Future
9 development proposals will require site plan and/or land
10 division review.

11
12 **Site Location:** 8110 SE 34th , Tax Lot #s 126455000, 126816000
13

14 **Applicant:** The VIC Building Owner c/o Jennifer Rabina, represented by
15 DOWL c/o Jessica Herceg, jherceg@dowl.com
16

17 **Property Owner:** The VIC Building Owner
18 505 Fifth Avenue
19 New York, NY 10017
20

21 **Case Manager:** Chad Eiken, Director, City of Vancouver Community
22 Development Department, (360) [487-7882](tel:487-7882),
23 Chad.Eiken@cityofvancouver.us; and Bryan Snodgrass, Principal
24 Planner, (360) 487-7946, bryan.snodgrass@cityofvancouver.us
25
26

27 **Neighborhood Association(s):** Fisher's Landing East and Fisher's Creek

PROCEDURAL NOTE

The comments provided are preliminary and intended only to assist the applicant in identifying pertinent issues regarding general City of Vancouver requirements as of the date of the pre-application conference. These comments are based on a preliminary review of the information presented and/or available at the time of the pre-application conference. Any changes to the proposal after the meeting date may void comments made in this report. These comments are in no way implied or intended to be final in their nature or inclusive of all City regulations and requirements that may apply.

GENERAL SITE INFORMATION:

Size of Site:	Approximately 176 acres
Existing Vegetation:	trees and grasslands
Existing Structures:	Six connected buildings in the middle of site encompassing approximately 700,000 square feet constructed by original owners Hewlett Packard for research and construction of consumer electronics.
Adjacent Land Uses:	Primarily single family residential neighborhoods. North of the site are the Clearmeadows and Fisher's Grove subdivisions zoned R-9; to the west across 176 th Avenue, a two lane road, are the Firs and Heritage Reserve subdivisions, also zoned R-9. To south across 34 th Street, a four land road with a median, are the Village Vista and Hiddenbrook subdivisions, also zoned R-9, as well as Fisher's Landing Elementary School. The property is bounded on the east by Fishers Creek and above that by SE 192nd Avenue. Across Fishers Creek is the Riverstone commercial development including a Les Schwab tire dealership, a drive-through bank branch, and a two-story office building, zoned CC. Across 192 nd Avenue is undeveloped City-owned property used for stormwater purposes.
Topography:	Flat
Fill:	None known.
Geologic Hazards:	No mapping indicators.
Archaeology:	Level B low probability, entire parcel
Priority Habits or Species:	No mapping indicators.
Drainage Basin:	Columbia Slope
Soils:	LgB, HIA, HIB
Access Roads:	SE 34 th Street, 176 th and 192 nd Avenues
Traffic Impact Fee Area:	Cascade
Park Impact Fee District:	District C
Schools:	Fisher's Landing Elementary, Shalala Middle and Mt. View High Schools in the Evergreen School District
Sewer:	City of Vancouver
Water District:	City of Vancouver
Fire Service:	City of Vancouver

75
76
77
78 **INITIAL STAFF REVIEW OF COMPLIANCE ISSUES:**
79

80 The December 1 pre-application meeting was held via Microsoft Teams teleconference and
81 attended by Chad Eiken, Rebecca Kennedy, Patrick Quinton, Dave Perlick, Julie Hannon,
82 Monica Tuberville, Terry Snyder, Charles Ray, Kate Drennan, Emily Benoit. Greg Turner,
83 Mark Person, Ryan Lopossa, Becky Coutinho, and Bryan Snodgrass. The applicant team was
84 represented by Marc Esrig, Jennifer Rabina, Ian Klein, Pedro Polanco, Steve Horenstein, Maren
85 Calvert, Steven Garcia, Riley MacPhee, Dana Wu, Chris Brehmer, Matthew Dolan, Read
86 Stapleton, and Jessica Herceg. Fisher's Land East and Fisher's Creek Neighborhood Association
87 representatives were notified of the meeting but did not attend.

88
89 Chad Eiken and Bryan Snodgrass gave opening remarks on overall City hopes and expectations
90 for the proposal, and general schedule and review process, emphasizing likely support for the
91 proposed amendment and it's potential to improve on the existing plans, as well as the need
92 procedurally to have the various issues involved clarified and resolved prior to City workshops
93 and hearings.

94
95 Jennifer Rabina summarized the proposal, noting that changes to the approved Master Plan and
96 Development Agreement were sought to address new market opportunities, with more open
97 space and higher residential densities overall. Steven Garcia described the open space network in
98 more detail.

99
100 The applicant team asked whether changes to include public road rights-of-way as part of the
101 acreage total within the Land Use Areas in which they appear was acceptable, and whether the
102 tree canopy plan could rely on a site wide tree count as opposed to being graphically depicted on
103 individual sites. City staff indicated that both were acceptable.

104
105 City staff discussed various substantive issues that should be addressed in the application. The
106 application should demonstrate compliance with the City Council's Interim Green Building
107 Policy, and the additional 600 additional housing units proposed relative to the existing Master
108 Plan should all be affordable, half at the 60% and half at the 80% AMI level. The application
109 should also include updated renderings showing how the increased residential density will appear
110 near the site perimeter, particularly the north and west edges. The application should provide
111 details about what is envisioned in and around the proposed plaza in the southeast portion of the
112 site, and how the forested tract park in the northeast will be integrated into the Master Plan.

113
114 The group acknowledged that there was ongoing communication on parks issues. City staff
115 indicated their appreciation for the applicant's willingness to extend the letter of intent, and
116 highlighted the importance of integrating the park into the full site. City Staff indicated that all
117 major Park issues will need to be appropriately resolved prior to scheduling workshops or
118 hearings with the Planning Commission or City Council.

Ryan Lopossa discussed transportation issues, including the SE 34th Street Safety & Mobility Project, and recent discussion with Chris Bremmer about the traffic study needed for the revised VIC Master Plan and D.A., including trip generation and distribution, and impacts to the existing transportation system. The study should examine all of the transportation mitigations identified in the previous approval to ensure they are still applicable. The study should provide information in terms of the timing of both the onsite transportation improvements and the off-site mitigation. The study should also be closely coordinated with the analysis and work contemplated by the City's SE 34th Street Safety & Mobility project. Lopossa noted that the proposed VIC internal network was acceptable, but the application should indicate how it will be implemented. Read Stapleton noted that there had been some changes with the street sections, which City staff indicated they would review and respond to.

The applicant team and City staff discussed public outreach. Steve Horenstein noted that the applicants envisioned a mid-January meeting which City staff should attend as well.



URBAN DESIGN / MASTERPLAN

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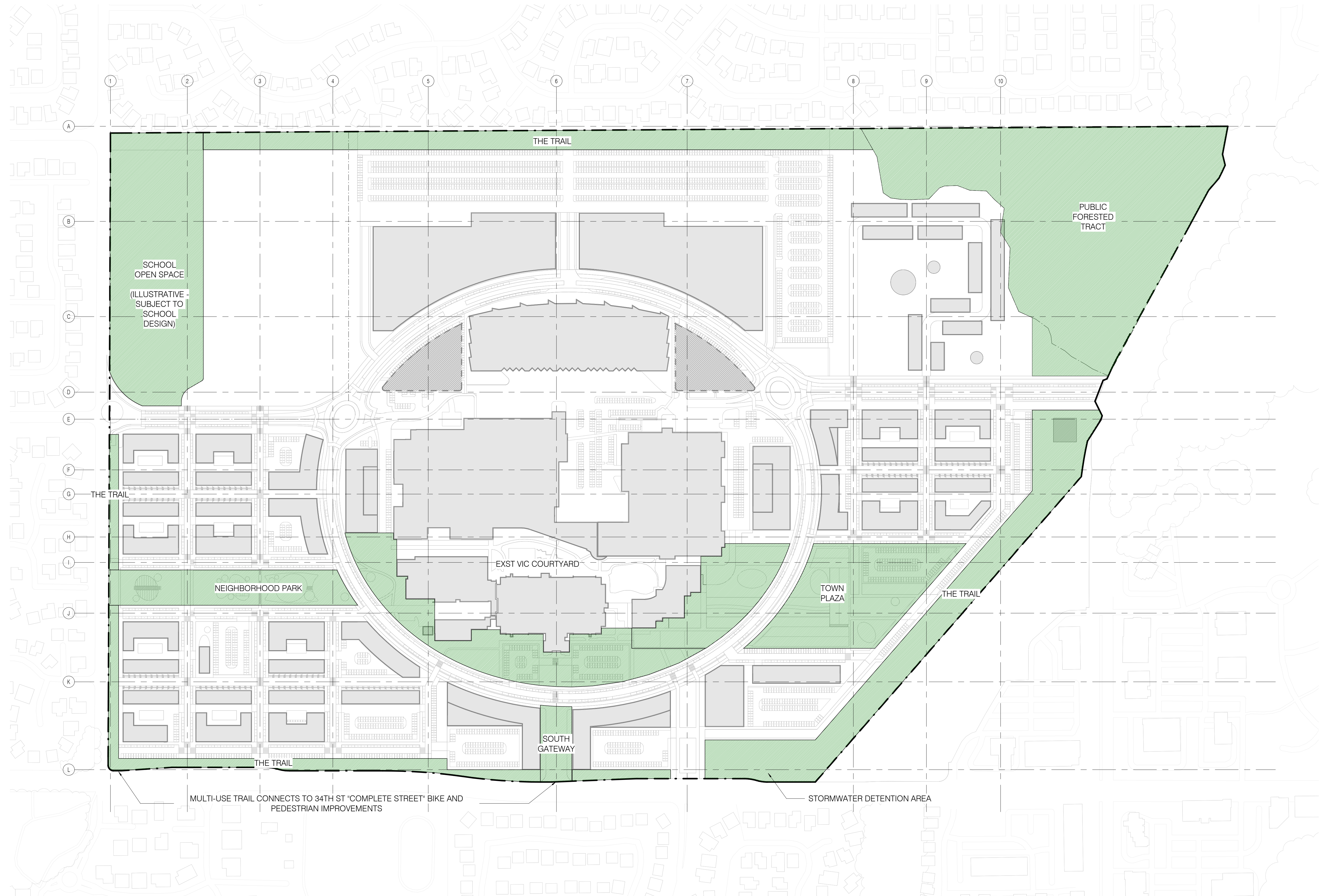
SEAL & SIGNATURE _____ DATE _____

DRAWING NUMBER

STREET SECTION LEGEND

- | | |
|---|---|
|  | TRAVEL LANE |
|  | ON-STREET PARKING / FLEX LANE
MAY CONTAIN BULB-OUTS AT INTERSECTIONS |
|  | SIDEWALK |
|  | SHARED VEHICULAR/BICYCLE/PEDESTRIAN ACCESS |
|  | MEDIAN/TURN POCKET |
|  | LANDSCAPE ZONE |
|  | CYCLE TRACK |
|  | OUT OF STREET SCOPE, SEE PLAN |

1. BUILDING FOOTPRINTS ARE ILLUSTRATIVE AND SUBJECT TO CHANGE.
2. OPEN SPACE BOUNDARIES ARE CONCEPTUAL. THE LOCATIONS AND SIZE OF EACH OPEN SPACE AREA WILL BE REFINED AT THE SITE DEVELOPMENT STAGE.



– STORMWATER DETENTION AREA

1	004
---	-----

004

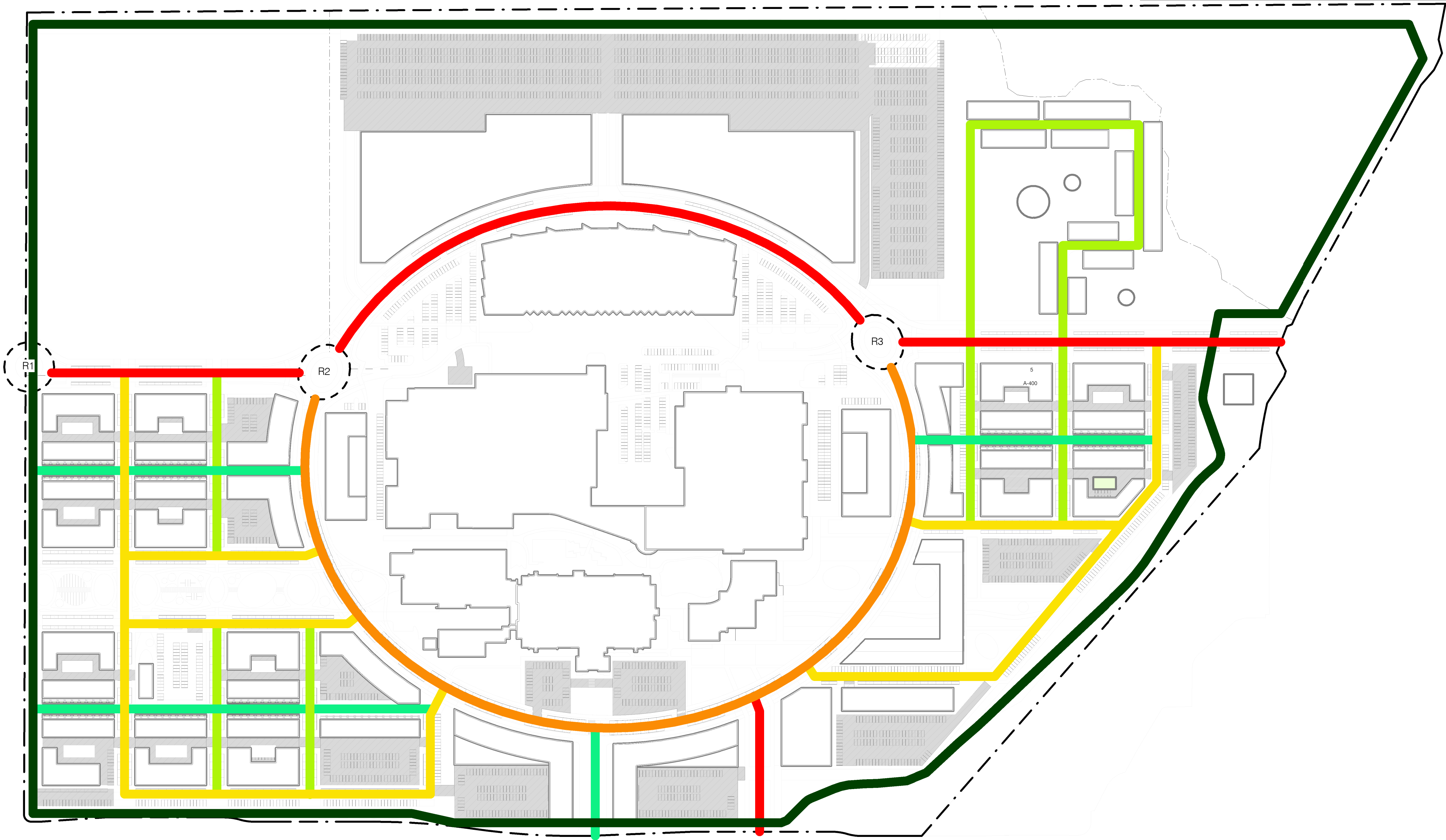
004

GENERAL NOTES:

1.
- LOCATION OF STREET TYPES 04 LOCAL ACCESS CONNECTIONS AND 05 PEDESTRIAN LANEWAYS ARE ILLUSTRATIVE AND SUBJECT TO CHANGE.
2.
- BUILDING FOOTPRINTS ARE ILLUSTRATIVE AND SUBJECT TO CHANGE.
3.
- LOCATION OF TRAIL IS ILLUSTRATIVE AND SUBJECT TO CHANGE. TRAIL LOCATION IN SCHOOL PARCEL AND FORESTED TRACT ARE SUBJECT TO COORDINATION WITH EVERGREEN SCHOOL DISTRICT AND CITY OF VANCOUVER.
4.
- REFER TO SHEET 007 FOR CORRESPONDING STREET SECTIONS.

MOBILITY LEGEND

- STREET TYPE 01 - MAIN STREET ALONG LOOP
- STREET TYPE 02 - SLOW STREET ALONG LOOP
- STREET TYPE 03 - LOCAL STREET/NEIGHBORHOOD LOOP
- STREET TYPE 04 - LOCAL ACCESS CONNECTIONS
- STREET TYPE 05 - PEDESTRIAN LANEWAYS
- ROUNDBABOUT
- SURFACE PARKING LOT
- TRAIL - REFER TO SHEET 008

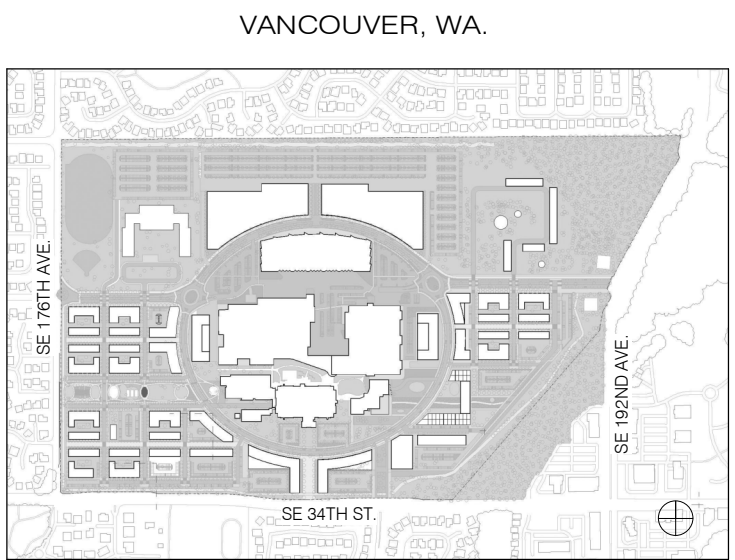


sh p

CLIENT	CLIENT
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URBAN DESIGN + MASTERPLAN ARCHITECT SHOP ARCHITECTS 233 BROADWAY 11TH FLOOR NEW YORK, NY 10279 tel 212.889.9005	MASTERPLAN LOCAL ARCHITECT EL DORADO ARCHITECTS 1623 NW MARSHAL STREET PORTLAND, OR 97209 tel 971.266.8665
LANDSCAPE ARCHITECT SITEWORKSHOP 3800 WOODLAND PARK AVE. N, SUITE 200 SEATTLE, WA 98103 tel 206.285.3026	CIVIL ENGINEER KPF 111 SW 5TH AVENUE #2600 PORTLAND, OR 97204 tel 503.227.3251
TRAFFIC ENGINEER KITTELSON & ASSOCIATES 651 SW 6TH AVE., SUITE 600 PORTLAND, OR 97204 tel 800.878.5250	LAND USE CONSULTANT DOWL 720 SW WASHINGTON ST., SUITE 750 PORTLAND, OR 97205 tel 971.280.8641
ENERGY & WATER USE DISTRICT PLANNING PAE ENGINEERS 151 SW 1ST AVENUE PORTLAND, OR 97204 tel 503.226.2921	SUSTAINABILITY PAE ENGINEERS 151 SW 1ST AVENUE PORTLAND, OR 97204 tel 503.226.2921

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SHEET INFORMATION: ARCH D 24"x36"

DRAWING TITLE
SITE PLAN - MOBILITY PLAN

SEAL & SIGNATURE	DATE
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DRAWN BY	Author
CHECKED BY	Checker

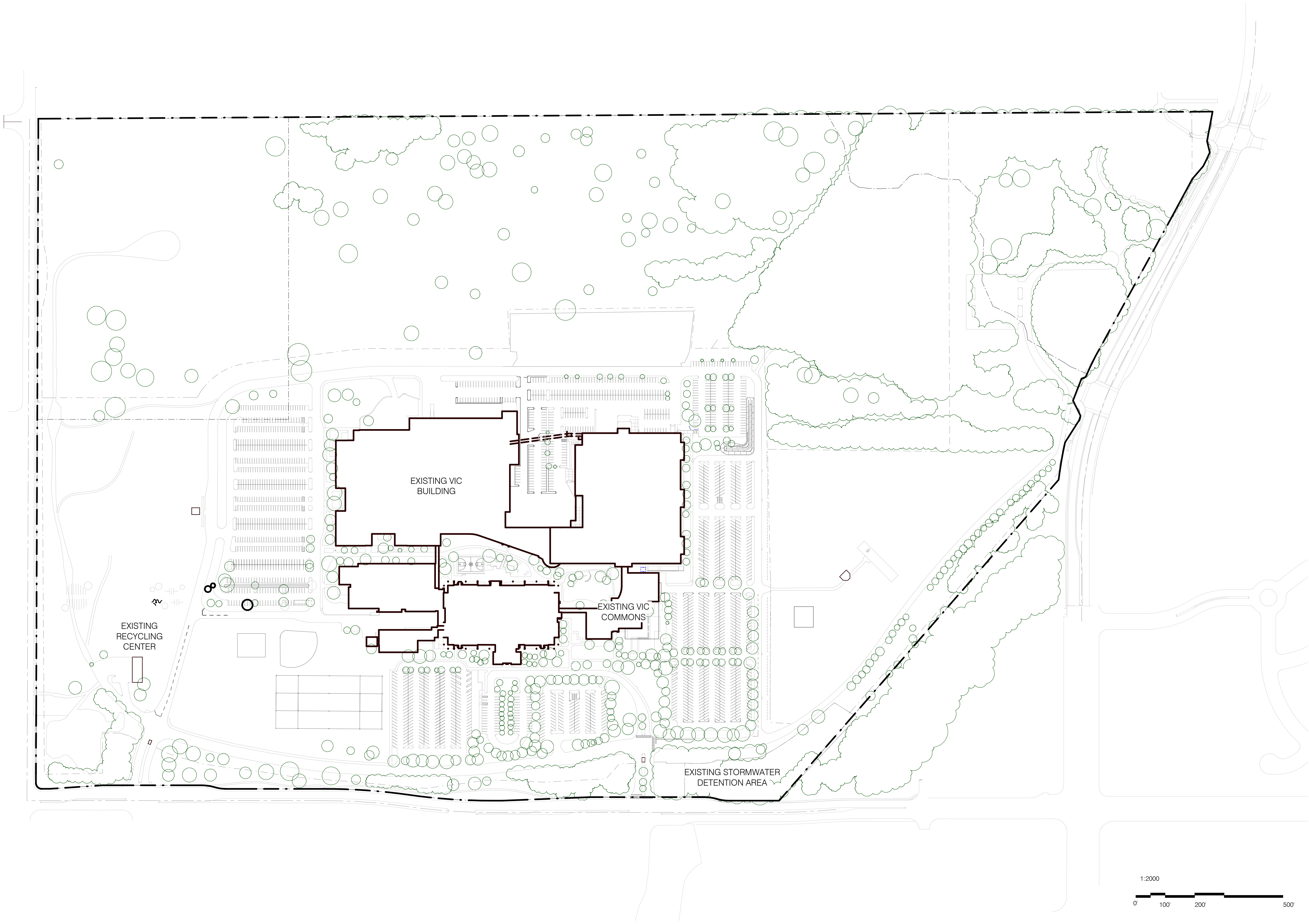
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MOBILITY PLAN

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1
005

005



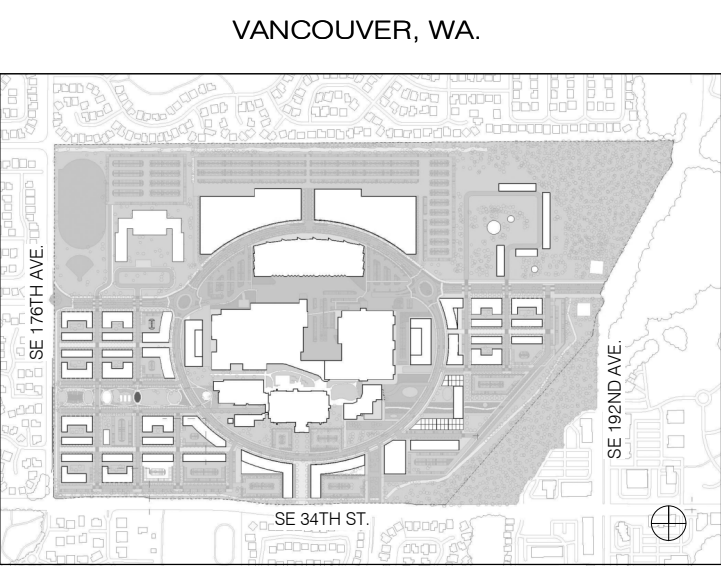
BOUNDARY LEGEND	
	EXISTING PARCEL BOUNDARY



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LANDSCAPE ARCHITECT	
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VANCOUVER INNOVATION CENTER

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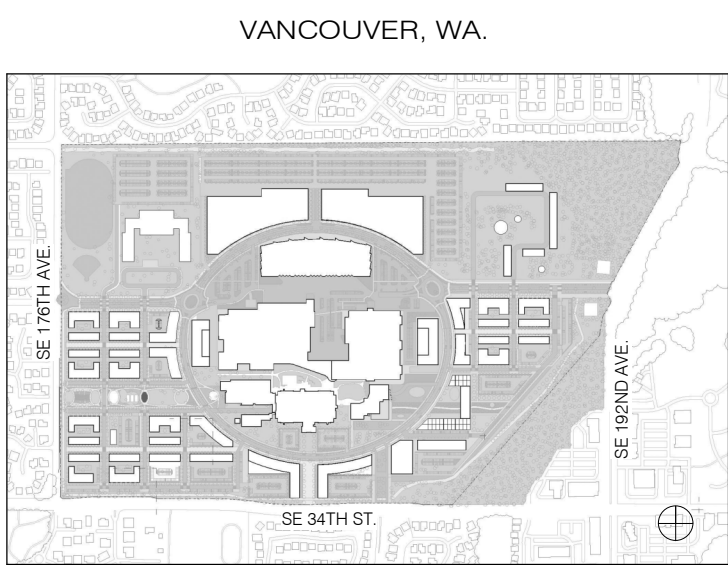


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SITE PLAN - EXISTING		
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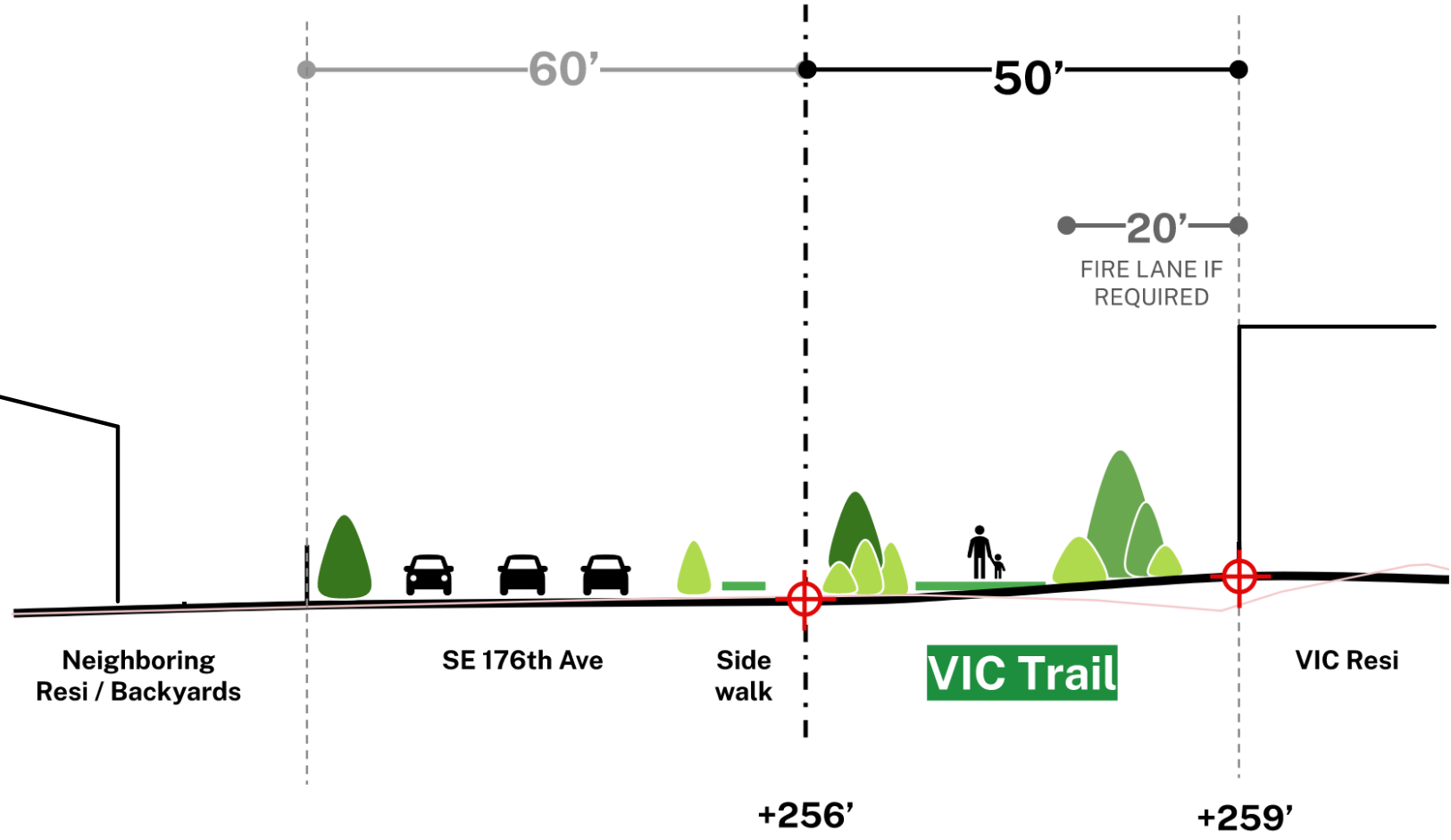
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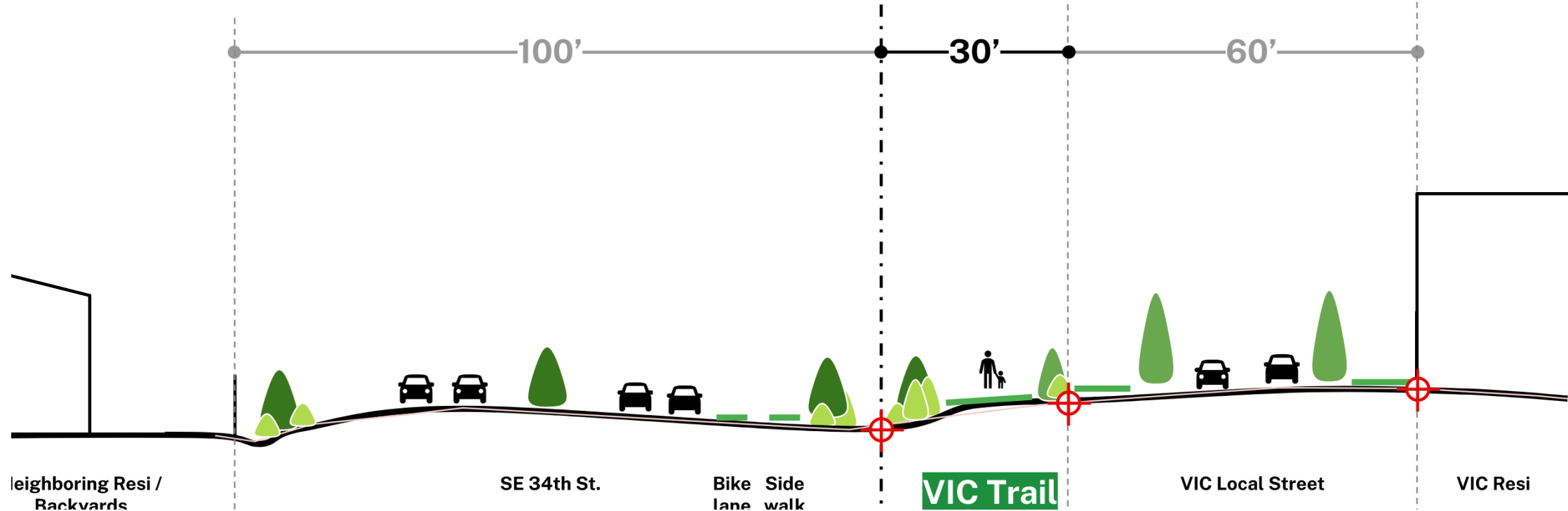
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SECTION 1 ALONG SE 176TH AVE

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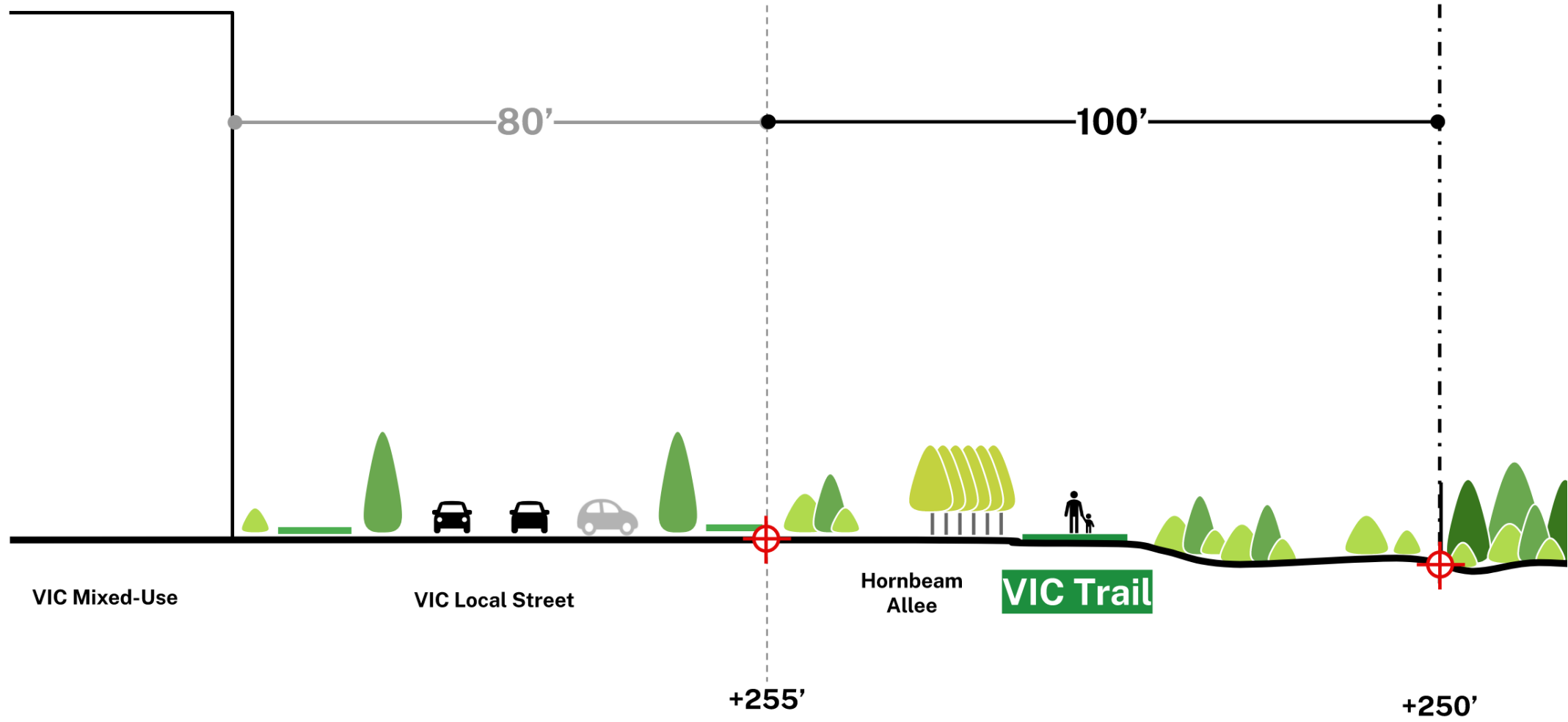
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SECTION 2 ALONG SE 34TH ST

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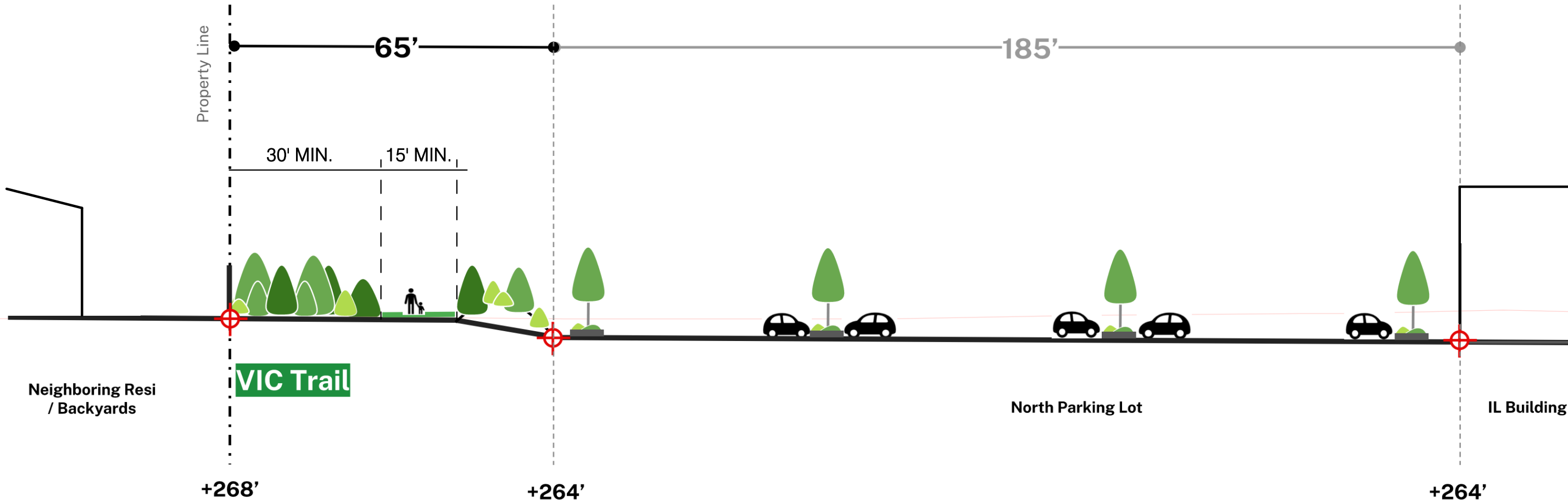
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SECTION 3 ALONG SE HORNBEAM ALLEE

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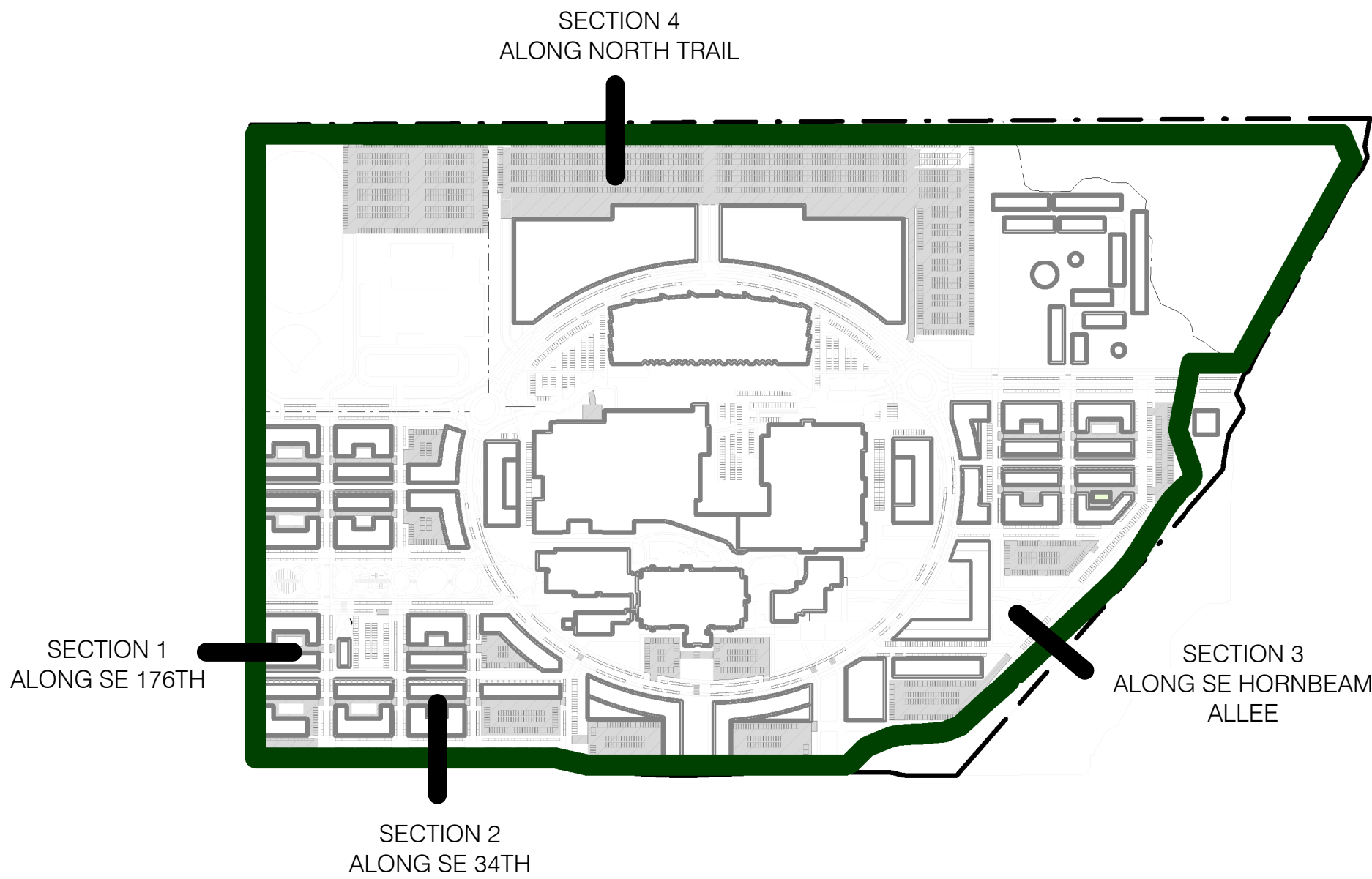
3
007



SECTION 4 ALONG NORTH TRAIL

1 : 250

1
007



TRAIL SECTION KEY PLAN

1 : 6000

5
007

From: ssilvey643@aol.com
To: [Planning Commission](#)
Subject: Sept 12 meeting comments
Date: Tuesday, September 12, 2023 5:59:21 AM
Attachments: [Evergreen and Grand Commercial Corridors Strategy.pdf](#)

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Sirs,

Attached are my comments on your meeting and some of the material presented via e-mail.

In general as one condenses a population, and changes demographics, it is best to comprehend all, meaning both sides of the coin in layman's terms, if one never shows what is to be done, by physically experimenting than the costs and inconvenience and unintended consequences add up.

As a commission you walk away never facing the real issues, while those whom buy, work, live in an area, do live with the consequences and its effects.

The real quality of life, not limited by telling folks what they cannot have, what they have to put up with, that they are not important and some ideal is the way you want yet you yourself are not there.

TA
Steven Silvey
Vancouver, WA

Evergreen and Grand Commercial Corridors Strategy

These PowerPoint points are vague, and seem to be based on some ideals with no common sense.

- 1- 1/2 a parking spot per unit
- 2- 1 bike spot per unit
- 3- 60 foot height 5 stories,
- 1- are those residents in signing a lease, buying a unit signing a paper to the city, planners and so forth that they will not own a car? Are they signing a paper stating they shall never need medical or public assistance help, from police, fire, medical, hospice, and meals on wheels? This is brought up as these services use vehicles. Further they shall not have visitors or guest? Further since this is to be a walking community ideal, how much more costs do these folks pay since the shops and so forth, are not large stores, and must have frequent deliveries, and have higher prices. What size parking spot is being created, tiny, medium, large, or is it stated that one can only have a vehicle that is 10 feet long, and 5 feet width? Where are the electrical plugs for chargers, and is there enough power for it? How about going to the area now and limiting parking and see what happens as a test for your theory dream, as it is a lot less costly to run a test than tear it down and build to find out it doesn't work.
- 2- Only 1 bicycle spot, per unit, how are they to get around? No kids, no spousal riding.... but it is understood with current social issues of thieves and lack of safety.
- 3- When are the story poles going up or containers to 60 feet to give real life visual so people can really see what are proposed. Where are the sun/shadow data, over the year showing how it is cast from these buildings onto existing and proposed buildings during the day and all. Simple programs such as AutoCAD, solid works have these data capabilities to show realistic data....

Other general comments

Further with this walk idea, where are the jobs? Are they in Vancouver? Or does one need to take a bus for 2 hours to reach them, or maybe a car, further it mentions families, where do they work, how do they get around? Does only one work or do both? What schools and sports activities are within walking distance, how many parks, green space are there. If a bus only comes every half hour is that calculated in "Quality of life" for residents, are connections such that off of one on another within a few minutes, or is it sitting at point B for 15 to 25 minutes while waiting to connect to C ? Is there a major job area that buses go to? Or is it that as you approve the new warehouse space in the east how does public transit serve? Seems someone is talking BS, as in one breath you want everyone to stay in only their area, than you approve build a warehouse district out in middle of space where transport to it is not there.

When looking at plans, and ideas, one need only look at areas of 4th Plain, near Andresen, with wide sidewalks but power poles and other obstruction in the middle of the walking path, so both bikes and walkers share same space, brought up too long ago, and mention that using different colors for bikes and walkers, and told all were aware of system but doesn't matter. The other issue is, are their folks

whom know how to measure and that standards are met? I bring this up from prior experience also in that it appears folks do not know how and do not seem to care within planning.

Another example is permits required to do things, which are applied, given, and signed off on yet years later it is found that they did not meet code, did not meet what was set, yet all approved and bought off, now the owners pay again for lack of someone doing their job, in the first place.

It is simple to test out ideas, block off lanes, place objects in the way and see if they really work, yet it appears that all like to do that on paper, and use their ideas/dreams to say it might work, yet no one is out after work looking at what is going on, what folks really do, so do the planners live in these areas' walk to work, have to be at work at set time and not flex time or work from home.

Steven Silvey

Vancouver, WA

From: [Heidi Cody](#)
To: [Eiken, Chad](#); pc@cityofvancouver.us; [Nischik, Julie](#); [Kennedy, Rebecca](#)
Cc: [Cathryn Chudy](#)
Subject: Questions re: proposed code changes to Warehouse Moratorium 9/12/23
Date: Tuesday, September 12, 2023 11:50:38 AM
Attachments: [Questions re proposed Warehouse Moratorium Code Changes \(2\).pdf](#)

CAUTION: This email originated from outside of the City of Vancouver. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hello Chad, the Planning Commission and others,

Cathryn Chudy and I have some questions and concerns about the proposed code changes to the Warehouse Moratorium. Please see below, and our letter is attached as a pdf:

September 12, 2023

Dear Chad Eiken and team and Planning Commission,

Thank you for giving us a chance to look over proposed changes to the City's Warehouse Moratorium. We appreciate that the larger than 250,000 square foot warehouses will now be allowed only in the IH District, and that there are special use and development standards being proposed for those warehouses, including measures to address visual impact, traffic, and climate action priorities.

We have questions and are concerned about a couple issues:

- There seems to be a loophole that would allow builders of new warehouses, or partly completed warehouses, to circumvent the 250,000 square foot threshold. What would prevent a warehouse builder to build a 200,000 sq. ft. warehouse and another smaller warehouse or building at 49,000 sq. ft.--and thereby avoid the "energy transition ready" stipulations that affect permitted use?
- These proposed changes also seem like a missed opportunity for the City to require more energy efficient/renewable energy ready stipulations of smaller warehouses. In addition, the change from permitted to limited use for these smaller warehouses limits the amount of public participation and engagement.
- On p.2, Amendment 1 under Proposed Change, the text says smaller warehouses facilities will continue as a permitted use. Is that correct, or will smaller warehouse facilities be limited use?
-

Is it correct to assume that because the Council changed the size threshold to 250,000 sq. ft, that the Warehouse Moratorium code changes can only be made for that size and larger?

- We recommend requiring or at least incentivizing more energy efficiency and climate friendly stipulations consistent with our Climate Action Framework, as well as more public engagement process, for all new warehouses. These new proposed code changes seem to limit the City's leverage and oversight of the planning process.

Thank you for allowing us to comment, and thank you for your work on this important issue.

Sincerely,

Heidi Cody and Cathryn Chudy

September 12, 2023

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We have questions and are concerned about a couple issues:

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- On p.2, Amendment 1 under Proposed Change, the text says smaller warehouses facilities will continue as a permitted use. Is that correct, or will smaller warehouse facilities be limited use?
- Is it correct to assume that because the Council changed the size threshold to 250,000 sq. ft, that the Warehouse Moratorium code changes can only be made for that size and larger?
- We recommend requiring or at least incentivizing more energy efficiency and climate friendly stipulations consistent with our Climate Action Framework, as well as more public engagement process, for all new warehouses. These new proposed code changes seem to limit the City's leverage and oversight of the planning process.

Thank you for allowing us to comment, and thank you for your work on this important issue.

Sincerely,
Heidi Cody and Cathryn Chudy

From: [Eiken, Chad](#)
To: [Peter L. Fels](#); [Nischik, Julie](#); [Kennedy, Rebecca](#)
Subject: RE: Warehouse Moratorium
Date: Tuesday, September 12, 2023 10:19:40 AM
Attachments: [image001.png](#)
[image002.png](#)

Hi Peter,

Thanks for your note. I'll try and respond to your questions at today's workshop. Regarding the partially-completed properties, I'm attaching an aerial photo of one IL-zoned property near the Port that appears to have a remaining pad available – shown in blue (likely for a warehouse) but because warehouses already exist in excess of 250K total square footage around it, it could not be developed even for a small warehouse. This is just one example but I'm sure that other examples exist. Anyway, I hope this answers that question. Thanks, Chad



From: Peter L. Fels <plfels@gmail.com>

Sent: Monday, September 11, 2023 9:21 PM

To: Eiken, Chad <Chad.Eiken@cityofvancouver.us>; Nischik, Julie
<Julie.Nischik@cityofvancouver.us>; Kennedy, Rebecca <Rebecca.Kennedy@cityofvancouver.us>

Subject: Warehouse Moratorium

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Hello Chad and Planning Commission,

I've reviewed the new proposed measures regarding large warehouses, and I have the following questions, which I hope you will address in the workshop on September 12:

What "partially completed" properties in IL districts would be affected by "unintended consequences" if these changes were not implemented and the original plans were? What would those consequences be?

How do neighbors of existing warehouses less than 100,000 square feet feel about their impacts? If there are negative impacts, shouldn't they be addressed?

What are the expected impacts of currently vested projects not yet built? How can those be avoided?

"Solar ready" roofs should include consideration of how to maximize available space for PV panels, e.g., by clustering HVAC and other rooftop equipment and spacing any skylights as well as addressing the carrying/load capacity and electrical outlets/junction boxes.

For larger parking lots throughout the city - i.e., not just at warehouses - , can we incentivize using solar covers (which also serve as rain shelters)?

Why did these changes eliminate solar roofs in favor of solar-ready roofs?

Under these new proposals, will it be possible for a developer to evade requirements for large (over 250,000 square feet) warehouses by placing more than one building on the same IL parcel, where the total of the multiple buildings exceeds 250,000 square feet?

Thank you for your consideration.

Peter Fels
Vancouver

From: [Peter L. Fels](#)
To: [Planning Commission](#)
Subject: VIC Revised Master Plan
Date: Monday, September 11, 2023 9:26:19 PM

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Dear Commissioners,

I have looked through the appendices to try to find details about bicycle transportation within the revised VIC Master Plan. It appears the plan calls for a 20 foot wide perimeter trail and some interior trails that reach the interior loop ("pedestrian lanes" shown in green on the Site Plan Mobility Plan). Also the plan appears to call for some shared roads.

Pedestrian and bike separations are not specified. There also are no specific provisions for other types of transportation, e.g., e-bikes, motorized scooters, motorized skateboards, etc., which are now proliferating and not well regulated. In my experience, current combined use trails, such as the Renaissance Trail and Burnt Bridge Creek trail, are hazardous for both cyclists and pedestrians because there are no designated lanes. Pedestrians often are unaware of approaching cyclists and sometimes do not hear warnings because they are using audio devices. Pedestrians with dogs create additional hazards for cyclists and the dogs.

The safest bike routes are separated from both motorized vehicles and pedestrians.

I encourage the developers to consult bike use groups such as Vancouver Bike Club and Cascade Bicycle Club for input on how to manage combined pedestrian, motorized vehicle and bicycle traffic. The traffic study noted two reported bicycle/car collisions in the area which appear to be the result of mixed bike and car traffic.

In addition, it is not clear how cyclists or pedestrians will reach the buildings inside the interior loop, as no paths are shown. It would be helpful if the developers were to provide interior bike routes as well as indoor bike parking or at least bike racks at the entrance to every building. This would encourage more bike use by employees and visitors and help meet our CAF goals.

Otherwise, I appreciate the VIC Owners for acknowledging the Vancouver CAF and proposing some excellent sustainability features.

Thank you for your consideration.

Peter Fels
Vancouver